

The Africa Integrated Climate Risk Management Programme:

Building the resilience of smallholder farmers to climate change impacts in 7 Sahelian Countries of the Great Green Wall (GGW)

Burkina Faso, Chad, Mali, Mauritania, Niger, Senegal and The Gambia

Environmental and Social Management Framework (ESMF)

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Africa Integrated Climate Risk Management Programme -Environmental & Social Management Framework (ESMF)

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EXECUTIVE SUMMARY

In the Sahel Region, agricultural production and productivity are constrained by frequent natural disasters, including floods, droughts, diseases, intense rain, wildfires and locust outbreaks, among others. Projections of temperatures in the Sahel region and across the Great Green Wall (GGW) from both the CMIP3 GCMs (SRES A2 and A1B emission scenarios) and CMIP5 GCMs (RCP4.5 and RCP8.5 scenarios) will increase by 2100, with average temperatures rising between 3 to 6°C above the late 20th century baseline (+3°C in the coastal areas in Mauritania, Senegal and The Gambia and +4°C in Continental Sahel in Mali, Chad, Burkina Faso and Niger) (Climate Change Profile West African Sahel, USAID, 2018). While eleven GGW countries have collectively restored approximately 3.6 million ha of land within the GGW intervention zones (GGW secretariat, 2020), nearly 20 million ha still need to be restored and sustainably managed using innovative and blended financial instruments such as insurance with adaptation and mitigation measures to reach the countries' (Intended) Nationally Determined Contributions ((I)NDCs) targets by 2030. Agricultural productivity is also hindered by the unsustainable extraction and management of natural resources from ecosystems (forest and land) by rural households, which reduces agricultural production as climate change profile West African Sahel, USAID, 2013) (Climate Change Profile West Africa between 1975 and 2013 (Climate Change Profile West African Sahel, USAID, 2018).

The Sahelian ecosystems are already being affected by climate change, and future impacts are expected to be substantial particularly in the agricultural and forestry sector and on land use. The region is facing its fourth major drought-related emergency in less than ten years. Burkina Faso faced four severe droughts between 2000 and 2017, while between 1983 and 2017, Chad, Mali and Niger faced ten, fourteen, and seven severe droughts, respectively (Country risk profiles, ARC, 2020). These droughts led to a decrease in crop productivity by 10% to 25% over the last several decades in the respective countries (Aghrymet, 2018). An increase in temperature is also likely to encourage the competition over water resources, detrimental to crops in the region. For instance, Lake Chad, the largest lake in the Sahel, has shrunk by 95% since the 1960s, with estimates attributing 50% of the decrease to increased water use (e.g., from population growth and unsustainable irrigation projects) and 50% to changing rainfall and increasing temperatures (Climate Change Profile West African Sahel, USAID, 2018).

The seven countries' vulnerability against climate shocks also increases their vulnerability to poverty, food insecurity, gender inequality, conflict and political instability. Of the West Africa Sahel countries, three (Burkina Faso, Chad and Niger) rank in the bottom five countries of the global Human Development Index (HDI), one more (Mali) in the bottom 10% and one more (Mauritania) in the bottom 20%. Within Africa, four of the West Sahelian countries (Chad, Mali, Mauritania and Niger) are in bottom 10 (of 52) African countries in the Africa Gender Equality Index (AGEI), with only Burkina Faso and Nigeria ranking in the top 50%. The nutrition situation is critical, with nearly 15.5 million people estimated to be severely food insecure during the 2020 lean season (June–August 2020) according to the latest "Cadre Harmonisé" analysis in the Sahel and West Africa (November 2019). Smallholder farmers and poor households are particularly vulnerable given their dependence on natural resources for their livelihood. Within this, women and youth are disproportionally affected, which is a large-scale problem, given that the region is also one of the most youthful of the world, with 64,5% of young people aged 25 and under (UNFP, 2018).

To address these challenges, risks and vulnerability posed by climate change in smallholder farming in a more comprehensive and integrated way, IFAD, in partnership with the African Development Bank and the World Food Programme, proposes the "Africa Climate Risk Financing Programme: Building the resilience of smallholder farmers to climate change impacts in Africa". The objective of the Programme is to build and scale up the resilience and adaptive capacity to climate change for 817,922 direct smallholder farmers and rural communities in seven Sahelian Least Developed Countries (LDCs), namely: Burkina Faso, Chad, Mali, Mauritania, Niger, Senegal and The Gambia. To achieve this goal, the programme seeks to implement climate risk management activities and related infrastructures in specific locations within selected local government areas and communities that still have to be identified. Consequently, in accordance with the GCF guideline, this programme requires the development of an Environment and Social Management Framework (ESMF), which describes how the programme through the accredited and executing entities and main stakeholders will manage the environmental and social risks and impacts when full information is not available. The Stakeholder



Engagement process as part of the programme has been summarised in Section 5 of this ESMF. The Stakeholder Engagement is built on the existing work done by the local authorities and partners and builds on established links with representatives of stakeholder groups including women, facilitated data collection and identified concerns and opportunities.

The programme will lead to the implementation of specific subprojects as described under Output 1. and Output 2. such as:

- the installation of automatic weather stations and rain gauges,
- upgrading/ rehabilitation of existing hydrological stations across the seven countries;
- construction of rainwater harvesting infrastructure across seven transhumance corridors;
- installation of Agro-Pastoral/Farmer Field Schools (AP/FFS) and nurseries for the selection climateadapted varieties (e.g. heat-tolerant, submergence, drought and salinity tolerant, pest resistant);
- construction and rehabilitation of water points (reservoirs, ponds, wells, boreholes) for farming and to cover transhumance pathways; and
- installation of mini-grids with photovoltaic solar power plants to power agricultural livestock value chains and improve households' access to energy.

The programme will integrate insurance as part of the inputs for smallholder farming, especially in areas prone to climate risks, through capacity-building targeting government authorities, regulatory and supervisory bodies; the insurance industry, primarily the national commercial providers such as CNAAS but also international insurance companies such as Allianz, AXA, SUNU, NSIA. The outcome will:

- improve the capacity of government stakeholders to support communities and smallholder farmers in preparing for climate change adaptation effectively (Component 1: Climate risk preparedness);
- assist smallholder farmers and communities in adapting to climate change by adopting climate resilient activities and value chains (Component 2: Climate risk reduction measures and options (adaptation and mitigation); and
- promote the creation of integrated risk transfer schemes where micro, meso and macro insurance policies are interlinked (Component 3: Climate risk transfer (micro and sovereign risk transfer mechanism).

Potential negative impacts of such interventions include land and soil degradation due to poor land preparation, which would reduce the soil and nutrient support services of the environment. Unsustainable use of agrochemicals during the production processes is also expected to contribute to the contamination of water and soil resources, desertification and soil erosion as well as dunes movements. Poor pest management in rice, maize, poultry and other animal farming as well as aquaculture may create nuisances in the environment. Construction/rehabilitation, small-scale irrigation and drainage activities as well as aquaculture (especially on state farms) in wetland and swamp areas, can lead to forest and wetland removals. Moderate impacts are expected from increased rainfall, poor land management, and the regular flood regimes, which may lead to degradation of agricultural lands and washing away of fishponds and affect every segment of agricultural value chains including marketing. In addition, bush fires due to unsustainable land preparation ('slash and burn') still present a risk with significant impacts.

The programme will incorporate environmental, climate and social concerns as an intrinsic part of the regional programme cycle management to prevent and mitigate any harm to the environment and to people in compliance with IFAD policies and principles, IFAD's Social, Environment and Climate Assessment Procedures (SECAP), as well as standards and procedures laid out in this ESMF report. This ESMF will specify how the yet un-identified subprojects will be systematically screened for environmental and social impacts, what the criteria for site selection will be, and what appropriate mitigation measures should be implemented. Experts from environmental agencies from each of the seven participating countries will provide technical advice and guide implementation of sub-projects to address potential adverse impacts on the environment, if any, and local communities.

Potential technical risks related to insurance industry development will be mitigated thorough due diligence process led by the AfDB, IFAD, WFP and ARC technical and financial experts, and by ensuring robust engineering, procurement and governance systems. Programme operation risks will be mitigated by a thorough due diligence process led by IFAD technical and financial experts and by ensuring a robust M&E



system is in place. With regard to TA agreements and procurements procedures established at each EE level, they will help in supporting high delivery quality. Additionally, the agreements between the recipient governments and their respective Meteorological Agencies and other relevant sector ministries are to ensure that they are able to manage the infrastructures well during and beyond the project lifecycle. The IFAD grievance mechanism will be used for the reporting of complaints or allegations of wrongdoing within the projects or activities (whistle blower programme). The description of IFAD grievance mechanism is presented in the ESMF. The programme will establish a stakeholder engagement process (See Annex 7) and provide access to information on a regular basis. This ESMF will also include the IFAD Complaints Procedure to ensure that appropriate mechanisms are in place to allow individuals and communities to contact IFAD directly and file a complaint if they believe they are or might be adversely affected by an IFAD-funded project/programme

Safeguards preparation will be fully disclosed to the public in the IFAD's Policy on the Disclosure of Documents (2010), which includes information notes on projects being developed for Board presentation, agreements for approved loans and grants, and project/programme design documents. This ESMF will therefore be translated into French, which is spoken in all Programme countries expect The Gambia, and disclosed on IFAD's official website (http://www.ifad.org). In addition, the ESMF will be disclosed on ministries' official websiteso that all stakeholders are able to access the document. The project also complies with GCF's Information Disclosure Policy as well as the requirements of the GCF Environmental and Social Policy on disclosure of sub-projects. Under the GCF's "Comprehensive Information Disclosure Policy of the Fund," this Framework would be categorised according to the anticipated risk profile of the individual subprojects to require site-specific assessments consistent with the approach of IFAD. Thus, Category A projects will be excluded from receiving GCF financing so that this framework will overall be considered for Category B projects only.

This GCF Programme will be complementary to the overall IFAD, AfDB, ARC baseline investments in the selected countries. Current contributions from IFAD in form of grants amount to US\$30,315 million, from AfDB (US\$23 million), ARC (US\$7.239 million). The total financing of the Programme is US\$143, 4 million, including a GCF funding request of US\$82.85 million. The Programme will be developed under the supervision and coordination of IFAD through the Regional Coordination Unit (RCU), in charge of this Programme management. As an Executing Entity (EE), the Agriculture Finance and Rural Finance Department of AfDB through the ADRIFI Programme will be responsible of the overall coordination and technical assistance for the component on climate risk transfer in all seven countries in coordination with the Africa Risk Capacity (Output 3.2. of Component 3). It will also coordinate with countries on the implementation of activities under Output 1.1.7 and activities under Output 1.1 (Component 1) and all activities under Output 3.2 (Component 3) and WFP, also EE, will be responsible for the implementation of Output 3.1 (Component 3). In their roles as EE, the selected seven countries will be the recipients of the grant proceeds, channel them to the relevant national entities and make decisions on the use of the GCF grant to implement activities (1.1.1 and 1.1.2) under Output 1.1. (Component 1).



1 INTRODUCTION

1.1 Background

The objective of this Programme is to build and scale up the resilience and adaptive capacity of smallholder farmers and rural communities of seven Sahelian Least Developed Countries (LDCs) to climate change using the Integrated Climate Risk Management Approach. To achieve this goal, this Programme seeks to upgrade, strengthen, scale up and replicate existing and fragmented climate risk management practices by introducing a combination of climate risk preparedness, with climate risk reduction (adaptation and mitigation) and climate risk transfer through micro and macro insurance. The main targeted crops are key staple crops (millet, maize, sorghum, groundnuts) and livestock (cash-asset). The Programme will build on current and past IFAD investments.

The Programme's integrated approach combines three strategies that are usually pursued independently:

- improve the capacity of government stakeholders to support communities and smallholder farmers in preparing for climate change adaptation effectively (risk analysis and preparedness);
- assist smallholder farmers and communities in adapting to climate change by adopting climate-resilient activities and value chains (risk reduction); and
- promote the creation of integrated risk transfer schemes where micro, meso and macro insurance policies are interlinked.

The combination of the three levels of insurance is important for risk sharing and can significantly reduce the premiums charged for each insurance type, but also promote better access to credit by smallholder farmers.

This programme proposes implementing integrated climate change management measures all along the agricultural value chains to reduce the climate risks on poor smallholder farmers at the centre of the agricultural production, and to strengthen their resilience and that of the entire agricultural sector. Risk transfer schemes have the potential to reduce the impacts of climate disasters and economic losses and contribute to sustainable development when combined with risk assessment and preparedness tools and the right adaptation options aside other alternatives rural finance options which the IFAD baseline investments propose. Risk transfer mechanisms alone, without appropriate climate preparedness and reach. Economic models have shown that interest rates on credit and other financial services are lower when risks are low, and insurance policies have been incorporated.

Many activities and related climate infrastructure projects supported under this regional programme will be implemented in specific locations (within selected Local Government Areas and communities) that are not yet known. As a result, and in accordance to the GCF guideline, this programme requires the development of an environment and social management framework (ESMF), which unlike in the case of an environment and social management plan (ESMP), is developed when full information is not available. This also means that this report can only provide a general overview of likely environmental and social impacts for the Sahel region. Nevertheless, where existing data was available or identified through stakeholder consultations, the report does provide a more detailed analysis of key characteristics and likely environmental and social impacts for the sahel region. Nevertheless per state. A climate eligibility criteria list for the selection of sub- projects/ activities to be supported under the programme implementation for unknown locations is prepared and included in this ESMF. For each country, a specific ESMF will be prepared and shared with the GCF six months after the start up. It will include the capacity building of the Country Programme Management Units (PMUs) and staff in charge of implementing country specific ESMF.

The Africa Climate Risk Management Programme: Building the resilience of smallholder farmers to climate change impacts in Africa will be executed at country level by the respective Ministries of Agriculture and meteorological agencies with the support of the executing entities WFP, ARC and AfDB. This programme will be implemented through collaboration between all stakeholders, including the ministries of environment, government agencies, state ministries, the private sector, international and local NGOs, as well as local communities and farmers through cooperatives/ farmers organizations and groups.



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A key principle is to prevent and mitigate any harm to the environment and to people by incorporating environmental, climate and social concerns as an intrinsic part of the regional programme cycle management. Environmental and social issues will be tracked during all stages of the planned programme, each country project and sub-project cycle to ensure that supported activities comply with the policies and guidelines laid out in this ESMF report. Experts from environmental agencies from each of the seven participating countries and PMUs will provide technical advice and guide implementation of sub-projects to address potential adverse impacts on the environment and vulnerable people in the seven targeted countries. The sub-activities supported by this regional programme in each of the country are likely to have few, if any, adverse impacts on the environment and local communities. Nevertheless, in accordance with IFAD policies and principles as well as IFAD's Social, Environment and Climate Assessment Procedures (SECAP), this ESMF report includes standards and procedures, specifying how the yet un-identified subprojects will be systematically screened for environmental and social impacts, what the criteria for site selection will be, and what appropriate mitigation measures should be implemented.

1.2 Project Description

1.2.1 Project Objectives

The overall project aim is to build and scale up the resilience and adaptive capacity of smallholder farmers and rural communities of seven Sahelian LDCs to climate change using Integrated Climate Risk Management Approach. The objectives aligned to this overall project aim are:

- **Climate risk preparedness** by improving the capacity of government stakeholders to support communities and smallholder farmers in preparing for climate change adaptation effectively;
- **Climate risk adaptation and mitigation** by assisting smallholder farmers and communities in adapting to climate change by adopting climate resilient activities and value chains; and
- **Climate risk transfer** by promoting the creation of integrated risk transfer schemes where micro, meso and macro insurance policies are interlinked.

Each of these project objectives are linked to specific project outcomes which include the planned activities to achieve the objectives as defined in the following Section.

1.2.2 Project Objective Outcomes

Objective 1: Climate Risk Preparedness

Output 1.1. Increased Access to Agro-Climatic Information Services

Activities include:

- A preliminary study, mapping of the exact and most appropriate locations for the small hydraulic infrastructure across the 7 countries with detailed designs and ESS studies;
- Installation of 560 automatic weather stations and 700 rain gauges; Upgrading/ rehabilitation of existing 210 hydrological stations across the 7 countries;
- Trainings of 350 meteorological/experts in country on impact-based forecasting methodologies, data collection and interpretation;
- Co-design and develop a nationally tailored version of the system, using in-situ data and local knowledge/priorities;
- Development of communication systems and dissemination methods to translate early warning information into guidance and warnings for government agencies, emergency services, aid agencies, agricultural NGOs, extension services, farmer organisations, and insurance companies and financial institutions;
- Coordination and knowledge sharing with ACMAD and other regional institutions (e.g. AGRHYMET, Climate Outlook Forum) on best practice, complementarities and consistencies with regional products and warnings; and
- Review and assess the ARC agricultural, rangeland, drought model,

Output 1.2. Awareness Raising and Capacity Building on Integrated Climate Risk Management



Activities include:

- Training of 50,000 smallholder farmers on the timely dissemination of early warning products (including agro-climatic information);
- Awareness raising among 1,500,000 smallholder farmers/ pastoralists on the best climate adaptation/mitigation practices/technologies;
- Awareness raising activities for weather index insurance gender and youth climate nexus;
- Training of 700 extension agents on integrated climate risk (climate information, adaptation / mitigation options and practices; insurance products, selection of improved crop varieties, better livestock control, improved water management, and the control of weeds, pests or plant diseases);
- Conduct gender and youth impact analyses and training of 100,000 women and 100,000 youth;
- Trainings on financial literacy and integrated climate risk management for 2000 cooperatives, SMEs or farmers organisations;
- Support the integration of integrated climate risks into 35 local development plans across the 7 countries; and
- Support of 3 digital financial services per country to deliver key information's on production, weather, finance and markets, community disease and food safety surveillance; payments of premiums via mobile money.

Objective 2: Climate Risk Reduction

Output 2.1 Promotion and Implementation of Adaptation/mitigation Activities

Activities include:

- Establishment of 500 Agro-Pastoral/Farmer Field Schools (AP/FFS) and 1000 nurseries for the selection climate-adapted varieties (e.g. heat-tolerant, submergence, drought and salinity tolerant, pest resistant) with short growing cycles from seeds to yields;
- Promotion of Climate Smart Agriculture (CSA) on 200,000 ha, with a minimum integrated service package- (certified, seeds, fertilisers, training) bundled with agricultural insurance on at least 100,000 ha across the 7 countries;
- Support sustainable forest management SFM (40,000 ha of forests);
- Promotion of the integration of agro-forestry into farming systems on 26,000ha of selected watersheds;
- Support the Integration of Assisted Natural Regeneration of trees (ANR) into 70,000 ha of rain fed production systems, crop rotation and association, per ecosystems;
- Zai half-moon techniques on 60000 ha;
- Construction and rehabilitation of 175 water points (reservoirs, ponds, wells, boreholes) for farming and 100,000 of transhumance pathways;
- Installation of 392 mini-grids to power agro forestry–livestock value chains and improve access to energy to households;
- Trainings of 50,000 farmers on sustainable agriculture, community maintenance of infrastructures and watershed management by user associations. Additional topics for the trainings of farmers include:
 - protected areas to reduce degradation of habitats (10,000 ha);
 - landscapes restoration techniques, which will comprise establishment of green infrastructure to fight against erosion, build-up mechanical works for the recovery of degraded land, creation of nurseries to assist biological rehabilitation, terracing and bundling of slopes and construction of check dam and gabions in degraded washed gullies; and
 - building and management of infrastructure to fight against sand, salt-water intrusion, including dikes and water harvesting.

Output 2.2. Climate-resilient Production and Post-harvest Systems and Livelihood Diversification in Targeted Areas

Activities include:

• Establishment of 200 modern communal poultry farms for youth and women;



- Construction of 200 earth dams for fish farming activities (of less that 15m height);
- Establishment of 100 community model of integrated vegetable garden of at least 4-5 ha (solar pumps, compost systems, day care facility for women, agroforestry and rotation of crops; transport systems);
- Support to 2500 off farms activities (mechanical workshops for equipment maintenance; solar system maintenance; stores, bakeries); -;
- Climate-proofing 700 feeder roads and farm tracks (no longer than 10km) to ensure the year-round and all-weather usability (culverts, sand stabilization, side-drains to reduce erosion....) and connexion to markets;
- Development of and delivering modules on financial literacy, marketing and business management for 2500 farmers organisations, 1500, MSMEs, 2000, cooperatives;
- Construction/rehabilitation of 200 warehouses and processing facilities that withstand to climate changes;
- Construction and rehabilitation and 100 veterinary points; and
- Support to districts for development of Feeder Roads Maintenance Plans and to Farmer-based Organisations (Road gangs' formation, distribution of maintenance tools, and development of Farm Tracks Maintenance Plans).

Objective 3: Climate Risk Transfer

Output 3.1. Increased access to micro insurance

Activities include:

- Conduct an inception assessment in each country to obtain a clear understanding of the context and demand at the moment of project start (types of risks, existing products and delivery channels, key value chains and crops, etc.), confirm that the selected regions and crops are conducive for implementation and scale of index insurance, identify capacity-building needs and select partners on the basis of WFP's procurement rules (public agencies and ministries, insurance companies, delivery channels). This subactivity will mainly be conducted through interviews and review of documentation. Field assessments to meet with communities and stakeholders will also be essential;
- Collect data, design index, set pricing and finalise product based on the type of index selected (for the mix of products). WFP will work with service providers, insurance and reinsurance companies to develop the best product possible;
- Design distribution and consumer education strategy, which will be based on an approach to ensure integration with other activities and programmes. WFP, with the service provider, will design this strategy and the consumer education tools;
- Develop and consolidate product distribution channels during the first sales season in collaboration with microfinance institutions, saving groups, local banks and digital solutions such as mobile money platforms. Similarly, WFP will work with the service provider and insurance company on this sub-activity;
- Design the graduation strategy and business model. WFP will work mainly with the insurance company, but also other stakeholders to develop this strategy;
- Offer capacity-building on product design to private sector and the government from the beginning, but also on handing over to insurance sector over the course of the project. WFP, in particular, will be in charge of this sub-activity, with potential support from the service provider;
- Provide support to governments and supervisors on the development of regulation and policy, including potential technical support on developing an institutional approach on index insurance by supporting the creation of a dedicated insurance company, or a domestic public insurance scheme whose role is to provide index insurance product to farmers, or even a coinsurance pool to increase local retention, without investing except in capacity-building. WFP will be in charge of this sub-activity with potential support from the service provider;
- Establish an M&E system, including key performance indicators to help countries and insurance companies monitor portfolio growth, loss ratio, promptness in claims settlement, index design efficiency ratio, consumer education investment ratio, satisfaction and performance of the scheme and provide recommendations to improve the process. Every year, an outcome audit will also be conducted to have a clear picture of performance for this outcome. WFP will leverage the existing R4 M&E framework to implement this activity.



Output 3.2. Sovereign risk transfer mechanism (macro-insurance)

Activities include:

- Formulate seven national disaster risk financing (DRF) strategies and 14 local contingency plans for the seven countries;
- Review and assess the ARC agricultural, rangeland and drought models; Offer training to 420 government officials and other sector ministries on the use of ARC view;
- Organise capacity-building for 1,000 farmers organisations and cooperatives on threshold triggering;
- Assess the best existing social protection programmes and possibility for scaling up;
- Develop tools and financing instruments to identify and quantify existing disaster risks to estimate financing needs according to the severity and frequency of the risks;
- Develop seven country integrated climate risk frameworks;
- Develop a comprehensive layering approach to climate risk financing based on climate risk profiling on sites that combine risks preparedness, risks reduction and micro insurance;
- Provide technical support to authorities of seven countries in sustaining premiums payments to ARC from their own national budget through eco-tax reallocation, climate budget tagging (CBT) or from national climate/contingency funds;
- Support the development of climate fiscal frameworks for the seven countries; Enhance institutional and coordination mechanisms to ensure effective use of pay-outs and that they reach end users via citizen engagement (shadow reports from civil society);
- Foster alignment and linkages with micro insurance and coordination;
- Strengthen countries' responsiveness capacity to climate hazards (through contingency funding for high frequency/low severity events for which risk transfer may not be suitable);
- Develop tools and instruments to support policymakers on integrated climate risks management;
- Organise events and workshops and institutionalise a platform discussion with players from the micro and macro insurance industry and key financial institutions and government officials, primarily the ministries of economy and finance, to discuss and plan agricultural insurance industry development;
- Support ARC in developing a scaling up approach in the Sahel region and the entire continent;
- Support research for the development of new tools and instruments; and
- Organise four high level events on this integrated approach with the Africa Union, the Africa CEO forum, the G5 Sahel summit and the General Assembly of FANAF.

See Table 24 and Annex 10 for an overview of possible activities per Programme country, and Table 1 for the targeted regions and the numbers of direct and indirect beneficiaries.

GCF resources will be used for capacity-building on the institutional, regulatory and legal framework for effective integrated climate risks management and institutionalization of country premiums payments into national budget. Through ADRIFI, AfDB will support the first year's country premiums payments to ARC. ARC will provide technical assistance (in kind contribution) to countries to effectively implement this output.

Programme management and coordination. This programme will set up under IFAD a Regional coordination unit (RCU) dedicated to efficient management, monitoring and evaluation of the programme and dissemination of implementation results as well as the implementation of the ESMF in each of tithe countries. It includes the supervision of activities, the monitoring and evaluation, as well as the annual audits. The programme design embraces the "subsidiarity principle," whereby most interventions will be implemented at the national level. Implementation/institutional arrangements are detailed in Section C.4. The RCU will also ensure that good practices of ESMF are shared within the participating countries and beyond through SSTC. Executing entities like WFP, ARC and AFDB will also implement the activities they are in charge in line with the ESMF

The programme's approaches, actions, modes of organisation and implementation will apply a general principle of subsidiarity in decision-making processes, which should be as close as possible to the action at different levels:

• geographical, the programme targets primarily the most "local" geographical scale as possible (village, commune, province) and their link to the regional and national scales;



- institutional;
- project management (delegate project implementation to direct users when possible); and
- knowledge management, by strengthening local capacities and knowledge sharing, and cross-sectoral transfers.

The Project Management Unit: In each country, the proposed programme will be managed by the Ministry of Agriculture through the national PMU of the IFAD baseline investment and the National Met Agency. The PMU will be responsible and accountable to the Government and IFAD for the efficient use of project resources in compliance with the funding The Ministry of Agriculture will work closely with the Ministry of Environment and the Ministry of Finance of each country. Concertation and consultations mechanisms at the national level will be carried out by each sub-project Steering Committee.

Given the geographical and thematic scope of each project, there will be direct complementarity with the Ministry of Forests, Gender and other relevant ministries involved in the IFAD main baseline investments. The Ministry of Environment will contribute to the overall oversight of the programme and ensure that the ESMF and safeguards are implemented and monitored according to the GCF standards while the Ministry of Forests will support the PMUs on the implementation of the best adaptation and mitigation practices.

With regard to Gender, the ministry of gender or social protection will be involved to oversee the implementation of the Gender action. Other relevant government departments in the national steering committees will provide their technical guidance, coordination and oversight of the programme in each country. A joint inter-ministerial decision will establish the Steering Committee and specify its composition, mandate and functioning. The nomination of Steering Committee will be done in compliance with the GCF Gender Policy. IFAD PMUs are or will be facilitated by the presence of the IFAD Country Office, which will be able to provide or call upon expertise in institutional development, if necessary.

Geographic scope and field interventions:

The Programme targets 7 Sahelian countries. The Sahel an area of ecological transition that separates the Sahara in the north from the savannah in the south. It forms a belt that stretches from the Atlantic Ocean to the Red Sea. It has always been an area of movement and traffic, of trade, commerce, rebellion and struggles for influence between different social groups. Individuals and communities face uncertainty and risk. The seven countries of the Sahel where this regional programme will shortly be implemented are, to varying degrees but without exception, facing serious difficulties. The Sahel region faces a number of complex, multifaceted and interconnected challenges and deteriorating conditions, which are developmental in nature. The countries of the Sahel do not have sufficient strategic and operational capacities to ensure respect for the law, territorial control and the security of people and goods, and to respond effectively to growing threats in the region.



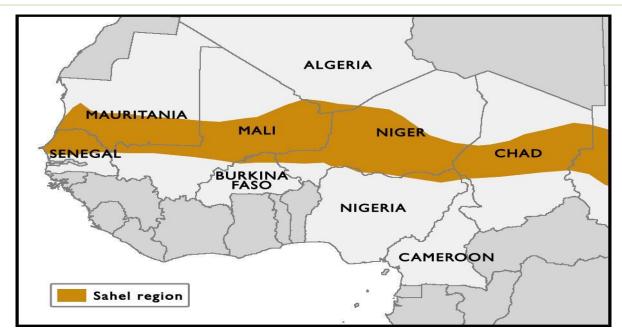


Figure 1 Map of Project Area: Sahel Region

The desert in West and Central Africa is expanding at a rate of 200 to 250 km per century. This desertification is accompanied by a gradual deterioration of the natural environment and has been forcing the population to move southward. The Sahelian belt also suffers from irregularities in rainfall, with successive droughts and floods leading to food insecurity, shorter lifespans, depletion of livestock, and increased poverty. This trend is compounded by climate change. Although demographic patterns are stabilising throughout West Africa, particularly in urban areas, this is not the case in the 7countries of the Sahelian belt. Seventy-seven million people lived in the Sahel in 2011. With a growth rate of approximately 3% per year (3.9% in Niger), the population in these seven countries is expected to reach 135.3 million in 2030. The population is young (60% are under 20 years), female and rural, and experiences persistent mass unemployment. About 24 million people live in areas affected by droughts, with 12 million directly at risk. The participating countries are extremely vulnerable to food crises, which partly result from irregular rainfall and droughts. Imports of cereals and other food products are expensive and difficult to access for poor populations. Even when harvests are good, 230,000 people across the region die from malnutrition each year. For several years, the overall rate of acute malnutrition has exceeded the 15% emergency threshold, although improvements have been seen in some countries in the past five years. Like in other countries in Sub-Saharan Africa, women make up more than 50% of the population. More than 70% of them depend on agriculture but take on a greater share of the work than men, despite having less access to education, information and agricultural knowledge, as well as credit and other financial services for purchasing inputs.

Mass poverty affects nearly 51% of the population in the Sahel, particularly young people and women. Outside Burkina Faso and Niger, which experienced a slight reduction in the level of poverty over the past ten years (8% reduction), the other countries have failed to reverse that trend. Because of the lack of a stable cash income, populations are having difficulties accessing food on the market. In addition, the degradation of productive capital for farmers and livestock breeders, together with the negative effects of climate change, have made populations more vulnerable and more dependent on humanitarian aid. Countries facing conflicts among the programme-selected countries are Mali, Niger and Burkina. However, the sites selected for the programme are secured sites in the countries concerned. In addition, each country will propose a plan of action for the safety of the intervention sites that will be taken into account at the start of the programme.

1.2.3 Beneficiaries

The GCF programme target areas in the seven selected countries were identified and defined during IFAD baseline investments design. The main criteria for the selection are:

- the level poverty and remoteness,
- food insecurity and nutrition,



- climate vulnerability and unsustainable management of natural resources,
- rural gender disparities and youth unemployment,
- absence or lack of rural infrastructure including energy access,
- opportunities for job creation both for youth and women, and
- possibility to create synergies with other donor-supported programmes (IFAD main baseline investments, ARC contingency plans target areas, WFP and AfDB target areas).

These targeted regions have a range of ecosystems and agricultural zones, such as the savannah, and the semi-arid Sahel regions. Agriculture accounts for over 51% of employment and is the main source of livelihood. Various tradable commodities are produced in the targeted regions such as maize, soybean, dairy, livestock, rice, tree crops (cashew), and horticulture, with fish farming in other regions, including in the Lake Chad and Niger basins. The programme's target intervention regions are summarised in Table 1and will build synergies with the new IFAD G5 Sahel + Senegal regional programme. Maps are compiled in the Annex Map.

Target groups are:

- small producers engaged in staple crops (millet, maize, sorghum, groundnuts) and livestock (dairy and beef, sheep and goats, chicken) and Non-Timber Forest Products (forestry) value chains being characterised by subsistence production and reduced size of agricultural land and livestock capital,
- rural smallholder farmers that are extremely vulnerable people to climate change and climate variability,
- rural marginalised communities including disabled, the elderly, widows and widowers, displaced people, and
- young people educated or not, women heads of households all characterised by a pronounced weakness or lack of production capital (agricultural and livestock) and a lack of economic opportunities and jobs.

The programme will promote inclusiveness and non-discrimination of disadvantaged and vulnerable groups (includes persons with disabilities). The programme will focus particularly on youth and women. The stakeholder engagement plan and social management plan sections describe further how the programme will help address challenges face by the most disadvantaged people (see Section 6).



Country	IFAD Baseline Investment	Intervention Areas Regions		Direct beneficiaries		Indirect Beneficiaries (direct x 6 per household)	
	(see Feasibility Annex)	IFAD baseline investment	Regional Program G5+1 Sahel	IFAD baseline investment	Regional Program G5+1 Sahel	IFAD baseline investment	Regional Program G5+1 Sahel
Burkina	PAFA-4R (2020-2026)	 Boucle du Mohoun Haut Bassin Cascades 	Central Nord Region: • Touri • Bouromand Yalgo Sahel Region: • Dor • Seytenga • Bani. Nord Region: • Oula • Leba • Basi • Goursi	70,000	15,000	42,0000	90,000
The Gambia	ROOTS (2020-2026)	 Central River Region (CRR) North Bank Region (NBR) Lower River Region (LRR) West Coast Region (WCR) Upper River Region (URR) 		40,000	0	240,000	0
Chad	Re-Per (2019-2025)	 Guera Baguirmo Mongo Ati Adjer Lamis. 	Kamen: Kanem Nord Lake: Mamdi Wayi Hadjer Lamis: Haraz-Al-Bia	146,000	18,500	876,000	110,000

Table 1: Targeted intervention regions and beneficiaries (direct and indirect) for each country



0t	IFAD Baseline Investment	Intervention Areas Regions		Direct beneficiaries		Indirect Beneficiaries (direct x 6 per household)			
Country	(see Feasibility Annex)	IFAD baseline investment	Regional Program G5+1 Sahel	IFAD baseline investment	Regional Program G5+1 Sahel	IFAD baseline investment	Regional Program G5+1 Sahel		
Mauritania	PROGRES (2020-2026)	 Brakna, Kaedi Klffa Hod El Gharbi 	 Wilaya Hodh Echargui Wilaya Hodh El Gharbi Diffa Region: N'Guigmi 	30,000	17,500	185,000	108,500		
Mali	MERIT-(2021-2027)	 Kayes Segou Koulikoro Sikasso 	 Kayes Mopti Tombouctou Gao Menaka 	42,000	40,000	420,000	260,000		
Niger	PRECIS (2020-2026)	 Dosso Tahoua Maradi et Zinder 		209,722	20,000	1,468,054	140,000		
Senegal	Agri-Jeunes (2020-2026)	 Louga. Thiès Diourbel Fatick Kaolack Kaffrine Sédhiou Ziguinchor 	Matam Region: • Matam • Kanel • Ranerou Tambacounda Region: • Bakel, • Goudiri. Saint Louis Region: • Podor	150,000	19,200	900,000	115,200		
Sub Total				687,722	130,200	4,509,054	823,700		
Total (direct	& indirect beneficiaries)			817	,922	5,332	2,754		
Total benefic	iaries				6,15	0,676	6,150,676		



1.3 ESMF Approach, Scope and Methodology

1.3.1 Overview

This ESMF report builds on the findings of the Social, Environmental and Climate Assessment Procedure (SECAP) review prepared during the IFAD baseline investments, and part of the GCF initial programme design phase. These findings were complemented by a desk review of relevant documents on the environmental and social context of the Sahel, stakeholder engagement sessions (Annex 8) and an assessment and determination of impacts, which encompassed impact identification, prediction, evaluation and interpretation, based on field studies during the design of each of the project between end of 2017 and 2018- and reviewed 2019, experience with other similar projects and technical expertise. Furthermore, as part of the ESMF, a general ESMP was developed (Section 6) for potential general project impacts, including mitigation measures, capacity and awareness building requirements to mitigate those measures, and monitoring.

In view of the large geographic project area (comprising all 7 countries in the Sahel, focused on priority areas highlighted in the SECAP review of each the project and only collected high-level (general) baseline data in a limited number of potential project locations. In terms of the technical scope, the ESMF reviewed environmental, climate and social impacts, focusing on areas that have been impacted unsustainable agricultural practices and climate change. More specifically, the ESMF reviewed earlier reports and studies on ground and water contamination, CO2 emissions, aquatic pollution, potential impacts of oil pollutants on public health, soil degradation, impact of illegal refining operations, as well as the institutional and legal structures in the targeted areas.

This ESMF report was developed in accordance with IFAD's Social Environment and Climate Assessment Procedures (SECAP) as well as IFAD's Environment and Natural Resources Management Policy, the Gender Equality and Women's Empowerment, and Targeting policies and the GCF. The report also considered relevant environmental and social laws, policies and guidelines of the 7 countries.

1.3.2 ESMF Rationale

During the design phase of each of the baseline investment, which this additional climate finance is attached, it was established that the Environment and Social Risk Category of the project is 'B' (i.e. 'some adverse impacts can be readily remedied by appropriate preventive actions and/or mitigation measures') according to IFAD SECAP, while the Climate Risk Category is high.

As a result, the programme requires the development of an environment and social management framework (ESMF), which unlike in the case of an environment and social management plan (ESMP), is developed when full information is not available. This also means that this report can only provide a somewhat general overview of likely environmental and social impacts for the Sahel region. Nevertheless, where existing data was available or identified through stakeholder consultations, the report does provide a more detailed analysis of key characteristics and likely environmental and social impacts and mitigation measures per country / region.

The main objectives of the ESMF as per the terms of reference of this study are to:

- Identify potential impacts of the regional programme project and to prepare an Environmental and Social Management Plan for the direct and indirect impacts, as well as incremental impacts as they relate to installation of installation of automatic weather stations; rain gauges; upgrading/ rehabilitation of existing hydrological stations, land use changes, soil erosion, dust emissions, noise pollution, loss of trees, biodiversity due to road constructions, liquid and solid wastes from the activities, installation of mini-grids, construction of infrastructure, benefits sharing and settling of grievances among others;
- To formulate an ESMF including any standards and procedures, specifying how unidentified subprojects whose location are unknown will systematically address environmental and social issues in the screening for environmental and social impacts and categorization, site selection criteria, mitigation measures, design, implementation and operational phases as well as maintenance of the subproject lifecycle;
- For "B" infrastructure related projects, to formulate Environmental and Social guidelines for construction firms to be recruited as contractors. These guidelines shall be recommended for incorporation in contractor's bids and contract documents.



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1.3.3 Disclosure of ESMF

IFAD's Policy on the Disclosure of Documents (2010) requires full disclosure to the public, and includes information notes on projects being developed for Board presentation, agreements for approved loans and grants, and project/programme design documents. This ESMF will therefore be translated into the language (French) spoken in the six countries expect the Gambia, and disclosed on IFAD's official website (http://www.ifad.org).

In addition, the ESMF will be disclosed on ministries official website, IFAD website, so that all stakeholders are able to access the document.

The Programme will also comply with GCF's Information Disclosure Policy as well as the requirements of the GCF Environmental and Social Policy on disclosure of subprojects [which indicates that: in the case of Category B subprojects, the ESIA and an ESMP will be disclosed at least 30 days in advance of the approving authority's decision. The safeguard reports will be available in both English and the local language (if not English). The reports will be submitted to GCF and made available to GCF via electronic links in both the AE and the GCF's website as well as in locations convenient to affected peoples in consonance with requirements of GCF Information Disclosure Policy and Section 7.1 of (Information Disclosure) of GCF Environmental and Social Policy].

1.3.4 Executing Entities

The executing entities include IFAD, governmental entities, AfDB, ARC, WFP. The following table sets out the institutional arrangements in the execution of the project, including key roles and responsibilities.



Table 2 Roles and Responsibilities of Different Executive Entities

Executing Entities	Description, Agreement and Procurement Modalities
IFAD is in charge of the regional activities defined under programme management and coordination	As the Accredited Entity (AE), IFAD will administrate the transfer of GCF resources to the seven participating countries (Burkina Faso, Chad, Mali, Mauritania, Niger, Senegal and The Gambia), provide oversight and implementation support and ensure quality through an established Regional Coordination Unit (RCU) hosted at the G5 Sahel Secretariat in Nouakchott. The RCU will be staffed with international experts who will perform the regional coordination activities on behalf of IFAD (EE). GCF grant proceeds will be passed by IFAD to the selected countries under a single agreement. For this purpose, IFAD has robust fiduciary and technical oversight and quality assurance systems, which will be closely supporting the recipient governments' ministries of agriculture in programme implementation. IFAD will provide bi-annually financial reports and report annually to the GCF on the overall implementation of the programme, based on quarterly reports from all countries sent by their PMUs and channelled to IFAD through the RCU. Every year, an annual work plan and budget (AWBP) will be developed and shall include AfDB and IFAD co-financing and IFAD baseline investment. This AWPB will be validated by the Steering Committee chaired at regional level by representatives of the countries' ministry of finance; IFAD will participate in the RSC as an observer. To channel GCF resources, IFAD and the selected countries (executing entities) will manage the grant. At country level, the Ministry of Agriculture through the PMUs of the baseline investment will represent the governments (EEs) and will be in charge of implementation of the programme and the environmental and social safeguards. Countries (EE) will sign contracts for services and goods with private and other services providers. The selected countries (EEs) will also sign agreements with the national meteorological agencies: [Met Mauritanie, Office National de Météorologie in Burkina Faso; The Gambia Met Office; the Direction de la Météorologie NALCIM) in Senegal; Mali Météo; l
Governments of Burkina	country and regional level through it country offices and the RCU including the implementation of the environmental and social safeguards. The Republic of Niger, Burkina Faso, Chad, Mali, Mauritania, Senegal and The Gambia, represented by their respective Ministry of Economy and
Faso, Chad, Mali,	Finance, are Executing Entities (EE) and will be the recipient of the GCF financing.
Mauritania, Niger, Senegal and The Gambia	The respective governments (EEs) will enter in agreement with their respective national meteorological agencies: Met Mauritanie, Office National de Météorologie in Mauritania; l'Agence Nationale de l'Aviation Civile et de la Météorologie (ANACIM) in Senegal; Mali Météo; l'Agence Nationale de la Météorologie in Burkina Faso; The Gambia Met Office; the Direction de la Météorologie Nationale du Niger in Niger, and l'Agence Nationale de la Météorologie in Chad]. Under such agreement, the respective Met agencies will act according to the instruction of the EEs to implement activities (1.1.1. and 1.1.2) under output 1.1, which are to procure, install and maintain the climate information infrastructures. A designated account bank account will be created in each country to receive these resources. IFAD will provide technical support to the recipient countries for the implementation of each of the activities.
	At the country level, the Ministries of Agriculture and PMUs of baseline investments will represent the government (EEs) and be in charge of implementation of the programme at the country level. Countries (EE) will sign contracts for services and goods with private and other services providers as well as the implementation of the environmental and social safeguards.

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Executing Entities	Description, Agreement and Procurement Modalities
AfDB	AfDB will act as an EE and be responsible of the overall coordination and technical assistance for the component on climate risk transfer in all seven countries in coordination with the Africa Risk Capacity (Output 3.2. of Component 3). It will also coordinate with countries on the implementation of activities under Output 1.1. of Component 1 on risk preparedness. IFAD will sign a subsidiary agreement with AfDB and will transfer funds directly to AfDB. Under such an agreement, AfDB will procure goods and
	services to support the implementation of activities at the country level.
ARC	ARC will act as an EE and be responsible for the implementation of activities of Output 1.1.7 - Coordination and knowledge sharing with ACMAD and other regional institutions (e.g., AGRHYMET, Climate Outlook Forum) on best practices, complementarities and consistencies with regional products and warnings; activities under Output 1.1 (of Component 1) and all activities under Output 3.2 of Component 3 in coordination with AfDB.
	IFAD will sign a subsidiary agreement with ARC and will transfer funds directly to ARC. The set of activities were clearly defined and based on the comparative advantage of each EE in coordination with IFAD and the ministry of economy and finance of the recipient country. ARC will procure goods and services to support the implementation of the selected activities under Output 3.2. at the country level.
WFP	WFP will be responsible for the implementation of Output 3.1 (Component 3) and act as EE by providing support to countries on micro insurance using the R4 integrated climate risk management approach and adapting it to each context.
	IFAD will sign a subsidiary agreement with WFP and will transfer funds directly to WFP under that agreement. Under the subsidiary agreement signed with IFAD, WFP will procure goods and services to support the implementation of the selected activities under Output 3.1. at the country level.
	The main criteria that will be assessed to select the insurer will be: i. experience and willingness to distribute microinsurance activities, and in particular climate and agricultural or pastoral risk insurance, ii. capacity and willingness to develop a long-term sustainable insurance strategy, iii. capacity to distribute and scale up the insurance scheme, iv. capacity to use digital or mobile solutions, v. costs of the services. To ensure financial viability, a light business case with financial projections will be developed with the selected insurer.
	WFP is already working with multiple types of insurers (national, multinational, or coinsurance pool), as well as reinsurers (Hannover re, Axa Re, Swiss Re, Scor, Acr Ltd) or reinsurance brokers (Willis Towers Watson). But also, with distribution channels / aggregators (MFIs such as Vision Fund, or OTIV Tana, NGOs such as World Vision, cooperatives and VSLAs in Senegal and even a mobile operator such as MTN in Zambia

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1.4 **Project Alternatives**

The following alternatives will be considered before the commencement of any activity:

- **Site:** the location of a proposed agro-enterprise will be evaluated to ensure it is not sited on a walking path or in a flood-prone area, and maintains the necessary distance from highways;
- Route: the enterprise will not be sited near power lines, flow stations, and/or oil and gas pipelines or right
 of way;
- **Commodity**: only those crop types and varieties, which are drought tolerant, pest resistant and of high yield will be selected. Refer to Table 3 Commodity Analysis of Alternatives);
- **Input** (e.g. power source, agrochemicals), scale (e.g. small-scale growers, large commercial farms); and design (e.g. building height, screens, colour) of each enterprise will be analysed before any activity is carried out.

The table below provides a more detailed analysis of potential alternatives for the different commodity types:

Commodity	Predominant Cultural Practices	Climate Smart Agriculture Practices
Cassava and equivalent	 Use of spent stems Wrong application of soil amendments Use of low-yield varieties Fertiliser spreading Tillage operations Use of inorganic crop protection chemicals 	 Encourage outgrower schemes Encourage soil sample analysis Encourage the adoption of improved varieties Encourage ring application at 6cm-10cm depth Encourage minimum or zero tillage Encourage the use of organic crop protection solutions like neem oil Encourage carbon sequestration activities
Plantain	 Use of F3 generation suckers Wrong application of soil amendments Use of low-yield varieties Fertiliser spreading Tillage operations Use of inorganic crop protection chemicals 	 Adopt micro propagation multiplication for suckers Encourage soil sample analysis Encourage the adoption of improved varieties Encourage ring application at 6cm-10cm depth Encourage minimum or zero tillage Encourage the use of organic crop protection solutions like Neem oil Encourage carbon sequestration activities
Fish	 Waste water and effluence are discharged into the environment Use of chemicals like Gamaling 20 to capture fish 	 Efficient management of waste water and effluence Encourage the use of fishing gear Encourage the use of plastic ponds in impacted land areas
Poultry	 Use of saw dust Droppings are disposed in open space as manure 	 Encourage use of wood shavings Droppings should be incorporated into the soil
Rice	 Recycling of paddy wrong application of soil amendments Use of low yield varieties Fertiliser spreading Tillage operations Use of inorganic crop protection chemicals 	 Encourage paddy transplanting Encourage soil sample analysis Encourage the adoption of improved varieties Encourage deep application of urea at 6cm- 10cm depth Encourage minimum or zero tillage Encourage the use of organic crop protection solutions like Neem oil Encourage carbon sequestration activities
Other staple crops (millet groundnut, maize etc.)	 Use of low yield varieties wrong application of soil amendments Use of low yield varieties Fertiliser spreading 	 Use of post nursery seedling Encourage soil sample analysis Encourage the adoption of improved varieties

Table 3 Commodity Analysis of Alternatives



Commodity	Predominant Cultural Practices	Climate Smart Agriculture Practices
	 Tillage operations Use of inorganic crop protection chemicals 	 Encourage ring application at 6cm-10cm depth Encourage minimum or zero tillage Encourage the use of organic crop protection solutions like Neem oil Encourage carbon sequestration activities
Tree crops	 Recycling of seedlings wrong application of soil amendments Use of low yield varieties Fertiliser spreading Tillage operations Use of inorganic crop protection chemicals 	 Adopt outgrower schemes Encourage soil sample analysis Encourage the adoption of improved varieties Encourage minimum or zero tillage Encourage the use of organic crop protection solutions like Neem oil Encourage carbon sequestration activities

2 REGULATORY FRAMEWORK AND APPLICABLE STANDARDS

2.1 Overview

This section provides an overview of the applicable standards, legislation and guidelines that will be applied to the programme. A detailed gap analysis will be conducted during the screening assessment (refer to Annex 2 ENVIRONMENTAL AND SOCIAL SCREENING FORMS FOR THE SUBPROJECTS) to ensure that all projects and sub-project components are addressed in the gap analysis whereupon a detailed management plan can be developed.

2.2 GCF Environmental and Social Safeguards (ESS) Requirements

The GCF ESS aims at identifying, analysing, avoiding, minimising and mitigating any potential adverse environmental and social impacts of its activities, to maximize environmental and social benefits and to improve the environmental and social performance of GCF and its activities consistency over time.

GCF Policy is to:

- Avoid, and where avoidance is impossible, mitigate adverse impacts to people and the environment;
- Enhance equitable access to development benefits; and
- Give due consideration to vulnerable and marginalised populations, groups, and individuals, local communities, indigenous peoples, and other marginalised groups of people and individuals that are affected or potentially affected by GCF-financed activities.
- To achieve the policy objectives GCF recommend the implementation of the following principles into all GCF financed activities:
 - Integration of environmental and social sustainability;
 - Transboundary risk and impact approach;
 - Scaled risk-based approach;
 - Fit-for-purpose approach;
 - Equality and non-discrimination;
 - Application of mitigation hierarchy;
 - Coherence and links with relevant policies and practices of GCF;
 - Continuous improvement and best practices;
 - Stakeholder engagement and disclosure;
 - Gender-sensitive approach;
 - Knowledge-sharing;
 - Harmonised application of environmental and social requirements;
 - Compliance with applicable laws;
 - Consistency with the United Nations Framework Convention on Climate Change UNFCCC) REDD-



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plus safeguards;

- Fair and decent labour and working conditions;
- Avoid adverse impact on indigenous peoples;
- Uphold human rights; and
- Protect and conserve biodiversity.

2.3 IFAD Environmental and Social Framework

2.3.1 IFAD Safeguard Policy

The IFAD'S ten Environmental and Social Values and Principles are relevant to the regional programme as well as the GCF ESS. These social values and principles are:

- Address the vulnerability and adaptation needs for the rural poor;
- Promote the sustainable use of natural resources and protection of key ecosystems;
- Focus on partnership-oriented initiatives for improved social and environmental quality;
- Address environmental and social impact assessments of agricultural and non-agricultural activities in an integrated manner;
- Incorporate externalities and minimise social costs;
- Implement participatory approaches, with special emphasis on the role of women;
- Promote the development of Indigenous Peoples and other marginalised groups (pastoralists, hunters and gatherers);
- Promote environmentally sound agricultural and manufacturing processes;
- Ensure systematic environmental and social monitoring; and
- Undertake Strategic Environmental Assessments.

2.3.2 IFAD Safeguard Requirements

While the IFAD ES standards align fully with the GCF ES standards, the GCF ES standards will be applicable to this programme given the activities that will be implemented include:

- 1. **Resource efficiency and pollution prevention:** The project will invest in activities that promote the use of land and water resources. To ensure that these and other resources are efficiently utilised, the project will build beneficiary capacity on Integrated Pest Management, Good agronomic practices, Water use management and other aspects.
- 2. Assessment and management of environmental and social risks and impacts: The project will promote climate insurance and other aspects of risk management to ensure sustainability of the gains recorded by the project and improve the livelihood of beneficiaries. The impacts of the project activities will be assessed through:
 - a. A knowledge management strategy;
 - b. Solution-oriented platforms containing KM information;
 - c. An online platform for sharing adaptation and mitigation knowledge;
 - d. Organise high-level and technical events;
 - e. Publications and one brief per country per year during the programme's lifecycle, as well as videos, radio programmes and catalogues for dissemination of best practices and lessons learnt;
 - f. A SSTC plan;
 - g. At least six south-south and triangular cooperation exchange visits;
 - h. Support of 28 postgraduate students on their research on integrated climate risk management
- 3. **Community health, safety and security:** The project will invest in rural communities working with clusters, and farmer organisations. The GALs methodology will also be employed to increase the active participation of youth and women in decision-making. This project will undertake a conflict analysis or risk assessment at the start of project implementation to provide mitigation strategies against identified potential conflicts. To ensure that the programme safeguards its personnel and property and avoid risks to conflict prone communities, the programme will not implement in those areas. Each country will propose a plan of action for the safety of the intervention sites that will be taken into account during the evaluation mission. For Mali, the restriction and ban were lifted and a transition is underway. In addition, the conflict



analysis report will also inform this decision. It is expected that the creation of decent paid jobs by the project, in combination with the social impact mitigation measures outlined in the later part of this document, will help to reduce youth restiveness in the Sahel region.

- 4. **Biodiversity conservation and sustainable management of living natural resources:** The project will not invest in areas where biodiversity will be greatly depleted. However, audits will be carried out prior to the construction of new roads and land development to ensure that identified species are propagated and endangered species relocated. The programme will not invest in GMO crops and varieties.
- 5. Indigenous People: While the project will invest in rural communities, it does not anticipate that the nature of investments will impact negatively on the rights of indigenous people. However, to ensure that issues affecting their rights, access to land, resources and livelihoods do not arise, the project will adopt the Free, Prior and Informed consent (FPIC) principle through its policy on IFAD's Engagement with Indigenous Peoples (2009). The project will also be designed in a participatory manner, taking into account the concerns of all stakeholders. IFAD requires that projects are carried out in compliance with its policies, standards and safeguards.
- 6. **Cultural Heritage:** The project will not invest in areas identified as cultural heritage sites. These include; shrines, village squares, etc. The project specific ESMP will ensure that the scoping and screening exercises caption these kinds of issues.
- 7. **Labour:** The project will not exploit child labour and will not engage ineligible migrant workers, defined as workers who are not legally permitted to work in the country and/or sector as per national law, and where this does not conflict with other applicable IFAD / GCF standards. All jobs will be guided by signed contracts in accordance with national and international labour conventions.
- 8. Land Acquisition: The programme will develop a clear and simple Stakeholder Engagement Plan (SEP), including grievance and redress mechanism, to manage communication involving the beneficiaries and other stakeholders in a timely manner, and that these groups are provided sufficient opportunity to voice their opinions and concerns that may influence Programme decisions. The Programme will actively involve women and youth in all components and levels of decision-making.
- 9. **Involuntary Resettlement:** Resettlement is not expected as there is no plan to displace any individuals and hence activities supported under this programme are not expected including physical and economic displacement. All these measures will contribute to de-risking the programme in each country during the implementation and will contribute to countries INDCs

2.3.3 IFAD Integrated Management System

Through its, new SECAP, IFAD will support an integrated management system (IMS) in line with relevant standards (i.e. ISO) and will identify, analyse, avoid, minimise and mitigate adverse environmental and social (E&S) impacts and maximise E&S benefits. There will also be processes and procedures to continuously improve E&S performance. IFAD will used its supervision mission guideline to monitor the performance

The IFAD IMS will be audited and accredited by GCF accreditation panel for:

- Capacity
- Track record
- Ability to identify, asses and minimise adverse effects
- Reinforce positive opportunities

IFAD IMS Risk Management Process will assess and manage:

- Labour working conditions
- Resource efficiency
- Pollution prevention
- Community health, safety and security
- Land acquisition and involuntary resettlement
- Biodiversity conservation and sustainable management of living natural resources
- Respect of indigenous peoples
- Protection and preservation of cultural heritage

IMS Gender Safeguard Process will demonstrate implementation of GCF Gender Policy through:



- Competencies
- Internal policies
- Processes and procedures

All projects will include Gender Assessment and Project Gender Action Plans with Key Performance Indicators and targets disaggregated by gender.

2.3.4 IFAD FPIC Policy & Principles

IFAD applies a Free, Prior & Informed Consent (FPIC) process which provides for:

- Free implies no coercion, intimidation or manipulation.
- Prior implies that consent has been sought sufficiently in advance of any decision point or commencement of activities and respect is shown to time requirements of indigenous consultation/consensus processes.
- Informed implies that information provided covers (at least) the following aspects:
 - The nature, size, pace, duration, reversibility and scope of the proposed project/activity;
 - The rationale or purpose of the project/activity;
 - The geographical areas that will be affected;
 - A preliminary assessment of the likely economic, social, cultural and environmental impact, including potential risks and fair and equitable benefit-sharing;
 - Personnel likely to be involved in the execution of the proposed project/activity;
- Procedures that the project or activity may entail.
- Consent is the expected outcome of the consultation, participation and collective decision-making process by the local communities. It is the mutual agreement reached, documented and recognised by all parties. Consultation and participation are crucial components of a consent process and require time and an effective system for communicating among interest holders. Consultation should be undertaken in good faith, and local communities must be able to participate through their own freely chosen representatives and customary or other institutions.

Note the FPIC has become an IFAD operational principle through its policies on Improving Access to Land and Tenure Security (2008) and Engagement with Indigenous Peoples (2009). The principle is also mentioned in the IFAD Policy on Environment and Natural Resource Management (2011) and in IFAD's Social, Environmental and Climate Assessment Procedures (2014). IFAD is the first international financial institution to adopt FPIC as an operational principle in its policy documents.



Table 4 IFAD FPIC Guideline

Seeking FPIC at Implementation Stage

ConductIdentify decision- making institutionsConduct consultation le to FPICsociocultural and land tenure assessmentand representativesto FPIC		consultation leading	Formalize consent agreement
From Concept Note through first design mission	During first design mission	From first design mission through appraisal	Before QA (to be annexed to the PDR) WHEN? ?
 Identify: Customary laws, informal rules and organizing practices on land ownership Institutions and governance systems Types of livelihoods Mutual support and solidarity mechanisms Community stakeholders, land users and assess who has the right to give or withhold the consent Assess: Consequences from the proposed project that may result in the change of the status of the lands, territories and resources 	 Conduct preliminary consultations with the community and explain the nature of the proposed project Allow time for communities to discuss and decide on their representatives for the consultation process leading to FPIC Clarify responsibilities of representatives Agree on the process leading to FPIC Identify signatory parties for the consent agreement 	 Share objective and scope of the project with the representatives identified by the communities and identify project component(s) requiring FPIC Inform them on the actors financing and implementing the project and their respective responsibilities Provide clear and transparent information on the benefits and risks of the project Share the findings of the sociocultural, land tenure and environmental assessment Formalize consent agreement 	 Include: Respective expectations Proposed project duration, expected results and activities Participatory monitoring and verification plan and procedures Identification of grievances procedures and mechanisms Terms of withdrawal of consent Record of process through means and languages accessible to all stakeholders and parties involved

2.4 Legislation, Policies and Regulations

The table below summarises for each of the 7 countries the policy framework, legislative and regulatory instruments and institutional contexts in relation to climate risk management and building the resilience of vulnerable smallholder farmers.



COUNTRY	POLICY FRAMEWORK	LEGISLATIVE AND REGULATORY INSTRUMENTS	CORRESPONDING GCF ES STANDARDS	IFAD ES STANDARDS	INSTITUTIONAL CONTEXT
Burkina Faso	 SCADD - Accelerated Growth and Sustainable Development Strategy PNDES - National Social and Economic Development Programme NAPA - National Adaptation Programme of Action CSLP - Strategic Framework for the Fight against Poverty SDR - Rural Development Strategy PAN/LCD - National Action Plan for Desertification Control PAGIRE - Action Plan for Integrated Water Resource Management PNSR - National Rural Sector Programme NAP - National Climate Change Adaptation Plan National Disaster Risk Management Strategy 	 RAF- bill on agrarian and land reforms Environmental Code National Law on Water Management Law Orienting Use and Access to Pastures Orientation Law on Pastoralism Water Management law Decree to establish CONASUR National Civil Protection Policy National Water Resources Strategy Law no. 012-2014/AN Framework for the prevention and management of risks, humanitarian crises and disasters 	 Assessment and management of environmental and social risks and impacts Labour and working conditions Resource efficiency and pollution prevention Community health, safety and security Land acquisition and involuntary resettlement Biodiversity conservation and sustainable management of living natural resources Indigenous peoples Cultural heritage 	 Assessment and Management of Environmental and Social Risks and Impacts Labour and Working Conditions Resource Efficiency and Pollution Prevention and Management Community Health and Safety Land Acquisition, Restrictions on Land Use and Involuntary Resettlement Biodiversity Conservation and Sustainable Management of Living Natural Resources Indigenous Peoples/Sub- Saharan African Historically Underserved Traditional Local Communities Cultural Heritage Stakeholder Engagement and Information Disclosure 	 DGM - Directorate General of Meteorology DGRE - Directorate General of Water Resources DGPC - Directorate General of Civil Protection CONASUR - National Council for Emergency Relief and Rehabilitation ANAM – National Meteorology Agency

Table 5 Country Policy Framework, Legislative and Regulatory Instruments Gap Assessment with IFAD Standards

Africa Integrated Climate Risk Management Programme - Environmental &	Rev. Date:	2021/01/29
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COUNTRY	POLICY FRAMEWORK	LEGISLATIVE AND REGULATORY INSTRUMENTS	CORRESPONDING GCF ES STANDARDS	IFAD ES STANDARDS	INSTITUTIONAL CONTEXT
Chad	 PANA - National Climate Change Adaptation Programme PND - National Development Plan PAN/LCD - National Action Plan for Desertification Control PNAE - National Plan Actions for the environment PNG - National Politics Gender of Chad PNATUH - National Politics of Development of the territory, of Urbanism and Habitat National policy Water, hygiene and sanitation National Water Policy on the horizon National Policy of Employment and Vocational Training National Strategy of Fight against Violence Based on genre 	 Environmental Code Hygiene code Order 11-014 2011-02-28 PR The Water Code Law n ° 016 / PR / 99 of August 18, 1999 Laws relating to Communities local Organic law n ° 002 / PR / 2000 of February 16, 2000, the law organic n ° 007 / PR / 2002 of 5 June 2002 and Ordinance no. 01 / PR / 2003 Labour Code Law n ° 038 / PR / 96 of December 11 1996 Law n ° 07 of March 11, 1966 on the Provident Code social Law n ° 14-60 of November 2, 1960 protecting heritage Cultural ORDER N ° 043 / PR /2018 bearing Agro Sylvo orientation pastoral and fishery 	 Assessment and management of environmental and social risks and impacts Labour and working conditions Resource efficiency and pollution prevention Community health, safety and security Land acquisition and involuntary resettlement Biodiversity conservation and sustainable management of living natural resources Indigenous peoples Cultural heritage 	 Assessment and Management of Environmental and Social Risks and Impacts Labour and Working Conditions Resource Efficiency and Pollution Prevention and Management Community Health and Safety Land Acquisition, Restrictions on Land Use and Involuntary Resettlement Biodiversity Conservation and Sustainable Management of Living Natural Resources Indigenous Peoples/Sub- Saharan African Historically Underserved Traditional Local Communities Cultural Heritage Stakeholder Engagement and Information Disclosure 	 DREM - Water Resources and Meteorology Directorate CNSC – National Framework for Climate Services CASAGC – Action Committee for Food Security and Crisis Management



COUNTRY	POLICY FRAMEWORK	LEGISLATIVE AND REGULATORY INSTRUMENTS	CORRESPONDING GCF ES STANDARDS	IFAD ES STANDARDS	INSTITUTIONAL CONTEXT
Gambia (The)	 PRSP - Poverty Reduction Strategy Paper GEAP - Gambian Environmental Action Plan GNAIP - Gambian National Agricultural Investment Programme National Disaster Management Policy Disaster Management Plan NAPA - National Adaptation Plan of Action Agriculture and Natural Resources Policy National Water Policy PAGE - Programme for Accelerated Growth and Employment 	 NEMA - National Environment Management Act National Disaster Management Act 	 Assessment and management of environmental and social risks and impacts Labour and working conditions Resource efficiency and pollution prevention Community health, safety and security Land acquisition and involuntary resettlement Biodiversity conservation and sustainable management of living natural resources Indigenous peoples Cultural heritage 	 Assessment and Management of Environmental and Social Risks and Impacts Labour and Working Conditions Resource Efficiency and Pollution Prevention and Management Community Health and Safety Land Acquisition, Restrictions on Land Use and Involuntary Resettlement Biodiversity Conservation and Sustainable Management of Living Natural Resources Indigenous Peoples/Sub- Saharan African Historically Underserved Traditional Local Communities Cultural Heritage Stakeholder Engagement and Information Disclosure 	 NEA - National Environment Agency NDMA - National Disaster Management Agency



COUNTRY	POLICY FRAMEWORK	LEGISLATIVE AND REGULATORY INSTRUMENTS	CORRESPONDING GCF ES STANDARDS	IFAD ES STANDARDS	INSTITUTIONAL CONTEXT
Mali	 CSCRP – Strategic Framework on Growth and Poverty Reduction PNCC- National Climate Change Policy NAPA - National Adaptation Programme of Action National Strategy for Disaster Risk Reduction 	 Agricultural orientation law Decree on the creation, powers, organisation and functioning of the National Platform for the Prevention of Disasters and Disaster Risk Management National Civil Defence Policy 	 Assessment and management of environmental and social risks and impacts Labour and working conditions Resource efficiency and pollution prevention Community health, safety and security Land acquisition and involuntary resettlement Biodiversity conservation and sustainable management of living natural resources Indigenous peoples Cultural heritage 	 Assessment and Management of Environmental and Social Risks and Impacts Labour and Working Conditions Resource Efficiency and Pollution Prevention and Management Community Health and Safety Land Acquisition, Restrictions on Land Use and Involuntary Resettlement Biodiversity Conservation and Sustainable Management of Living Natural Resources Indigenous Peoples/Sub- Saharan African Historically Underserved Traditional Local Communities Cultural Heritage Stakeholder Engagement and Information Disclosure 	 DGPC – Directorate General of Civil Defence National Meteorology Agency AEDD – Environment and Sustainable Development Agency National Climate Change Committee National Environment Council

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COUNTRY	POLICY FRAMEWORK	LEGISLATIVE AND REGULATORY INSTRUMENTS	CORRESPONDING GCF ES STANDARDS	IFAD ES STANDARDS	INSTITUTIONAL CONTEXT
Mauritania	 SCAPP - Accelerated Growth and Shared Prosperity Strategy SNDD – National Sustainable Development Strategy PANE – National Environment Action Plan PAN/LCD - National Action Plan for Desertification Control NAPA - National Adaptation Programme of Action PANGRC – National Action Plan on Disaster Risk Management 	 Law n°2000-045 from 26/07/2000: Environmental Act ° Agropastoral Orientation Act 	 Assessment and management of environmental and social risks and impacts Labour and working conditions Resource efficiency and pollution prevention Community health, safety and security Land acquisition and involuntary resettlement Biodiversity conservation and sustainable management of living natural resources Indigenous peoples Cultural heritage 	 Assessment and Management of Environmental and Social Risks and Impacts Labour and Working Conditions Resource Efficiency and Pollution Prevention and Management Community Health and Safety Land Acquisition, Restrictions on Land Use and Involuntary Resettlement Biodiversity Conservation and Sustainable Management of Living Natural Resources Indigenous Peoples/Sub- Saharan African Historically Underserved Traditional Local Communities Cultural Heritage Stakeholder Engagement and Information Disclosure 	 ONM – National Meteorology Office

٢	Africa Integrated Climate Risk Management Programme - Environmental &		2021/01/29
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COUNTRY	POLICY FRAMEWORK	LEGISLATIVE AND REGULATORY INSTRUMENTS	CORRESPONDING GCF ES STANDARDS	IFAD ES STANDARDS	INSTITUTIONAL CONTEXT
• Niger	 PANA - National Climate Change Adaptation Programme of Action PSRC – Strategic Plan on Climate Resilience PNEDD- National Plan on the Environment and Sustainable Development SNPA/CVC- National Strategy on Climate Change and Variability SDDCI – Sustainable Development and Inclusive Growth Strategy PNCC – National Policy on Climate Change PANGIRE - National Action Plan for Integrated Water Resource Management PAN/LCD-GRN - National Action Plan for Desertification Control – Natural Resource Management PDES – Economic and Social Development Programme 	 Decree n°2011_057/PCSRD/PM from 27/01/2011 on the incorporation of climate change in national planning Decree n°2011_057/PCSRD/PM from 27/01/2011 gives CNEDD the mandate to ensure the integration of climate change and adaptation in development policies, strategies and programmes 	 Assessment and management of environmental and social risks and impacts Labour and working conditions Resource efficiency and pollution prevention Community health, safety and security Land acquisition and involuntary resettlement Biodiversity conservation and sustainable management of living natural resources Indigenous peoples Cultural heritage 	 Assessment and Management of Environmental and Social Risks and Impacts Labour and Working Conditions Resource Efficiency and Pollution Prevention and Management Community Health and Safety Land Acquisition, Restrictions on Land Use and Involuntary Resettlement Biodiversity Conservation and Sustainable Management of Living Natural Resources Indigenous Peoples/Sub- Saharan African Historically Underserved Traditional Local Communities Cultural Heritage Stakeholder Engagement and Information Disclosure 	 CNEDD – National Council on the Environment and Sustainable Development DMN – National Meteorology Agency DNPGCCA – National Mechanism for the Prevention and Management of Disasters and Food Crises

	frica Integrated Climate Risk Management Programme - Environmental 8	Rev. Date:	2021/01/29
J LIFAD	Social Management Framework (ESMF)		Approved
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COUNTRY	POLICY FRAMEWORK	LEGISLATIVE AND REGULATORY INSTRUMENTS	CORRESPONDING GCF ES STANDARDS	IFAD ES STANDARDS	INSTITUTIONAL CONTEXT
Senegal	 PSE – Emerging Senegal Plan PRACAS - Programme for Accelerated Agricultural Development in Senegal PANA – National Climate Change Adaptation Action Programme PAN - National Adaptation Plan PNDD – National Sustainable Development Policy PNAE – National Action Plan for the Environment Senegal's National Climate Change Strategy National Programme for the Prevention and Reduction of Major Risks and the Natural Disaster Management 	 Law n° 2001-01 from 15 January 2001 on the Environment Code Law n° 2004-16 from 4 June 2004 on the agro-sylvo- pastural orientation act Law n° 96-06 from 22 March 1996 on the Local Community Code Law n° 96-07 from 22 March 1996 on the transfer of environmental powers to local communities and Decree n° 96-1134 from 27 December 1996 	 Assessment and management of environmental and social risks and impacts Labour and working conditions Resource efficiency and pollution prevention Community health, safety and security Land acquisition and involuntary resettlement Biodiversity conservation and sustainable management of living natural resources Indigenous peoples Cultural heritage 	 Assessment and Management of Environmental and Social Risks and Impacts Labour and Working Conditions Resource Efficiency and Pollution Prevention and Management Community Health and Safety Land Acquisition, Restrictions on Land Use and Involuntary Resettlement Biodiversity Conservation and Sustainable Management of Living Natural Resources Indigenous Peoples/Sub- Saharan African Historically Underserved Traditional Local Communities Cultural Heritage Stakeholder Engagement and Information Disclosure 	 CNAAS - National Agricultural Insurance Company of Senegal DPC - Directorate of Civil Protection ANACIM - National Agency of Civil Aviation and Metéo ISRA - Senegalese Agricultural Research Institute CSE - Ecological Monitoring Centre DEEC - Directorate of the Environment and Classified Establishment CRCA - Regional Commission for Insurance Supervision DA - Direction of Agriculture COMNACC - National Committee on Climate Change COMRECC - Regional Committees on Climate Change DGPRE - Directorate of Water Resource Management and Planning National Committee to Combat Floods

	Africa Integra	ated Climate Risk Management Programme - Environmental &	Rev. Date:	2021/01/29	
Ĵ, IFAD		Social Management Framework (ESMF)	Status:	Approved	
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2.5 Nationally Determined Contributions (NDC)s

The Nationally Determined Contributions (INDC) are (intended) reductions in greenhouse gas emissions under the UNFCCC. These contributions encompass the nationally appropriate mitigation actions to these developing countries within the SAHEL and are summarised in Table 6.

COUNTRY	INTENDED NATIONALLY DETERMINED CONTRIBUTION	
Burkina Faso	Burkina Faso – 28/9/15 An unconditional pledge to reduce emissions by 6.6% below business-as-usual levels by 2030, with a further 11.6% reduction conditional upon international support. Includes interim pledges for 2020 and 2025. In the section on adaptation, actions proposed would reduce emissions by a further 36.95%, taking the total reductions up to a potential 55.15% below business-as-usual levels. Burkina Faso's INDC.	
Chad	Chad – 28/9/15 Unconditional pledge to reduce emissions by 18.2% by 2030, compared to a business-as-usual scenario, or a 71% reduction by 2030, which is conditional upon international support. Includes section on adaptation, including areas of priority in the country.	
The Gambia	Gambia – 28/9/15 A 44% emissions cut by 2025, compared to business-as-usual projections, and a 45% cut by 2030. The targets exclude land use and forestry. Two of 12 sectoral mitigation schemes, with associated emissions reduction targets, are unconditional. The rest are conditional upon international financial support and technology transfer. Includes section on adaptation.	
Mali	Mali – 29/9/15 Commits to reducing emissions by 29% for agriculture, 31% for energy and 21% for forests and land use, each by 2030 and in comparison, to a business-as-usual scenario. This is an average reduction of 27%. This is conditional upon international support, although around 40% of this can be met unconditionally. Includes a section on adaptation, though only for the period 2015-2020.	
Mauritania	Mauritania – 23/9/2015 A 22.3% reduction in emissions below business-as-usual levels by 2030. 88% of this pledge is conditional upon international support, and 12% is unconditional. This will avoid 33.56 million tonnes of carbon dioxide. Contains information on adaptation.	
Niger	Niger – 29/9/2015 An unconditional 3.5% reduction in emissions by 2030, compared to a business-as-usual scenario, or a 34.6% reduction by 2030 on the condition of receiving international support. Contains section on adaptation.	
Senegal	Senegal – 26/9/2015 An unconditional reduction in emissions of 5% by 2030, compared to business-as-usual levels, with interim targets of 3% by 2020 and 5% by 2025. Accompanied by a conditional target, subject to international financial support, of 7% by 2020, 15% by 2025 and 21% by 2030, compared to business-as-usual levels. Contains section on adaptation, as well as information on potential obstacles.	

2.6 International Agreements

The following additional international agreements may apply, but are not limited to:

- African Convention on the Conservation of Nature and Natural Resources (Revised version). Date of text: 11 July 2003; and
- Convention reaffirming the creation of the Inter-State Standing Committee to Combat Drought in the Sahel (CILSS). Date of text: 22 April 1994

3 DESCRIPTION OF EXISTING ENVIRONMENT

3.1 Introduction

This section aims to provide an overview of the Sahel region as a whole. The description of existing environment for each individual country can be found in Annex 10.



3.2 Topography, Geology and Soils

The Sahel is a semi-arid grassland and shrubland transition zone stretching across the African continent between the Sahara Desert to the north and the tropical savannas to the south. The Sahel covers parts of Senegal, Mauritania, Mali, Burkina Faso, Algeria, Niger, Chad, South Sudan, North Sudan and Eritrea, however as previously mentioned the focus of this project will be on Burkina Faso, Chad, The Gambia, Mali, Mauritania, Niger and Senegal (Doso, 2018)¹.

The topography is mainly flat with a variation between 200 m to 400 m in elevation. Geologically, the region overlies a number of post-Jurassic sedimentary basins, with the higher elevations found between the Central African Republic and Sudan is made up of Precambrian basement materials. There are also recent deposits from huge lakes, which were present during the pluvial periods of a few thousand years ago, centered on present day Lake Chad and the Inner Niger Delta (Anon, 2021)².

The Sahelian soils are mainly sandy with poor structural stability, low nutrient holding and water retention capacity. The dominant soil types are Entisols and Alfisols (Doso, 2018).

3.3 Climate

3.3.1 Climate Zones

The West Africa Sahel region is a semi-arid area that runs from the Atlantic Ocean eastward to Chad, separating the Sahara Desert to the north and the Sudanian Savana to the south. The Sahel has a hot, semiarid climate characterised by very high temperatures year-round; a long, intense dry season from October– May; and a brief, irregular rainy season linked to the West African monsoon. Mean temperatures range 21.9°– 36.4°C, with substantially cooler temperatures in the mountainous regions of northern Chad, Niger, and Mali, and the coastal zone of Mauritania. Mean annual rainfall varies from year to year and decade to decade, but generally is lower in the north (100–200 mm) than in the south (500–600 mm) and is limited to the summer months of June–September. The length of the rainy season ranges from one to two months in the north and four to five months in the south. In the winter (November–March), the dry, dust-laden Harmattan trade winds blow from the northeast to the southwest; these induce desert-like weather conditions (i.e., low humidity, very little cloud cover, no rainfall) and can produce severe dust/sandstorms (Climate Change Profile West African Sahel , 2018).

The climate gradient and the vegetation distribution in West Africa was used to define some parts of the Sahel region's bioclimatic zones. West Africa can be divided into four broad bioclimatic zones from north to south known as the Saharan, Sahelian, Sudanian, Guinean, and Guineo-Congolian Regions (Climate Change Profile West African, 2018):

- The Saharan Region stretches across the whole northern extent of West Africa, formed by the Sahara Desert. It consists of a variety of arid landscapes varying from sandy sheets and dune fields to gravel plains, low plateaus, and rugged mountains. Vegetation cover is sparse to absent, except in depressions, wadis, and oases, where water is present at or just below the surface. The average annual rainfall ranges from 0 to 150 mm per year;
- The Sahelian Region is a broad semi-arid belt, extending from the Atlantic Ocean to Sudan (and to the Red Sea), averaging about 350 km wide. Climatically, it is characterised by average annual rainfall between 150 and 600 mm, with great variability in amount and timing in a given year. It has an ecologically dry season of 8 to 9 months. Vegetation in the Sahel is generally characterised by open herbaceous types (steppe and short grass savanna) often mixed with woody plants. It is known for its thorny trees, particularly from the genus Acacia, and mostly annual grasses from the genera Aristida and Cenchrus.

² Sahelian Acacia savanna | Ecoregions | WWF (worldwildlife.org)



¹

https://www.researchgate.net/publication/284364313_Land_degradation_and_agriculture_in_the_Sahel_of_ Africa_causes_impacts_and_recommendations

The present physiognomy of Sahelian vegetation results from long-term human and animal presence. Annual grass fires often sweep across its landscapes where there is ample grass cover. The Sahel is also home to countless small wetlands, like in eastern Mauritania, as well as some major ones including the Senegal Delta, the Inland Niger Delta, and the Lake Chad area;fF

- The Sudanian Region consists of a very large belt immediately south of the Sahel, with average annual rainfall between 600 and 1,200 mm and an ecologically dry season of 5 to 7 months. It is the domain of the savanna ranging from open tree savannas to wooded savannas to open woodlands. As in the Sahel, rainfall is spread over the months when the sun is high (typically May to October). The short, annual grasses of the Sahel are replaced in the Sudan Region by tall, perennial grasses, mainly of the genus Andropogon. In the northern part of the Sudanian Region, tree savannas tend to dominate, whereas the southern reaches of this region typically transition into denser wooded savannas and open woodlands. Both natural and human-induced bush fires sweep through the savanna areas, burning up to 80% of their area each year. Gallery forests, with tall tree species more common in the Guinean Region to the south, follow watercourses, penetrating deep into the Sudanian Region. They are generally not affected by bushfires and often act as natural fire breaks;
- The Guinean Region lies immediately south of the Sudanian Region, generally defined by average annual rainfall between 1,200 and 2,200 mm. This is the domain of the seasonally wet-and-dry deciduous or semi- deciduous forest. Despite the relatively high rainfall, this region has a distinct dry season of 7 to 8 months, which distinguishes it from the Guineo-Congolian Region. The forest canopy is generally dense and closed, forming over a heterogeneous woody understory and it is generally not affected by bushfires. Present day landscapes of the Guinean Region are mostly altered by human activity, particularly slash-and- burn agriculture, so that the actual extent of Guinean forest is rather limited. Humans have modified most of what remains. The tree and wooded savannas are also extensive. Gallery forests of varying width follow watercourses; and
- The Guineo-Congolian Region is the wettest in West Africa, with average annual rainfall between 2,200 and 5,000 mm. The rainfall can be distributed across most of the year, or in two rainy seasons with short drier periods between the rains. This region is split geographically into western and eastern blocks, separated by the Dahomey Gap where savanna reaches the coast. This region is thought to have been mostly forested in the past, but today only a fraction of the land is forested. Nevertheless, the forest flora is the richest in West Africa. The forests are dense, with trees reaching over 60 m. The upper tier usually has a discontinuous canopy, towering over a lower, dense canopy. In the undergrowth, woody climbers and epiphytes are characteristic. Herbaceous ground cover may be found but can also be absent.



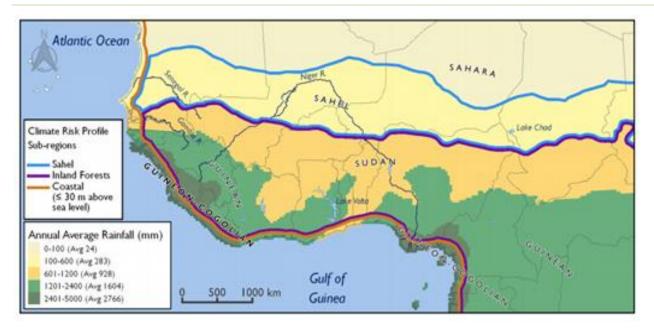


Figure 2 Bioclimatic regions of West Africa (Adapted from CILSS, 2016)

3.3.2 Climate Change Status

The recurrence of increasingly extreme climate conditions in the Sahel is exacerbating the depletion of the natural resource base and rising the vulnerability to food insecurity of smallholder farmers and rural communities. The whole region also faces low and declining soil fertility as a key environmental constraint. The considerably adverse effects of climate change further land degradation and undermine the potential Africa has to become a dominant player in agriculture production.

Fragile areas run heightened risks especially from drought and flood, but also from a deregulation of rainwater that will bring seasonal alterations and the increase in heavy rainfall. In the 7 selected countries, dry areas will become drier, and wet areas wetter. Longer and more frequent dry periods are expected as well as an increased risk of flooding. An increase in temperature is also likely, which will encourage the proliferation of pests detrimental to staple crops.

Countries' limited resilience against climate shocks is resulting in lower growth as well as GDP losses. The cost of response is significant, especially in the case of severe droughts, which occur every 4-5 years in most of the countries.

IPCC AR5 projected climate change impacts in the Sahel include:

- compounded stress on water resources,
- reduced crop productivity and livelihood and food security, and
- vector- and waterborne diseases.

Compounded stress on water resources is projected to have a medium risk level in the near term with the potential through appropriate adaptation to reduce the risk to very low. In the long term (2080 - 2100), it is predicted that compounded water stress will have a very high-risk level with potential for additional adaptation to reduce risk level to high. Reduced crop productivity, livelihood, and food security threat is predicted to have a high-risk level in the near term (2030 - 2040) and very high risk in the long term with a 2°C warming. This impact is projected to reduce to medium only with potential additional adaptation to reduce risk. Lastly, vector and waterborne diseases are predicted to be high-risk in Africa and only efficient and effective adaptation strategies can reduce them to low in the near term.



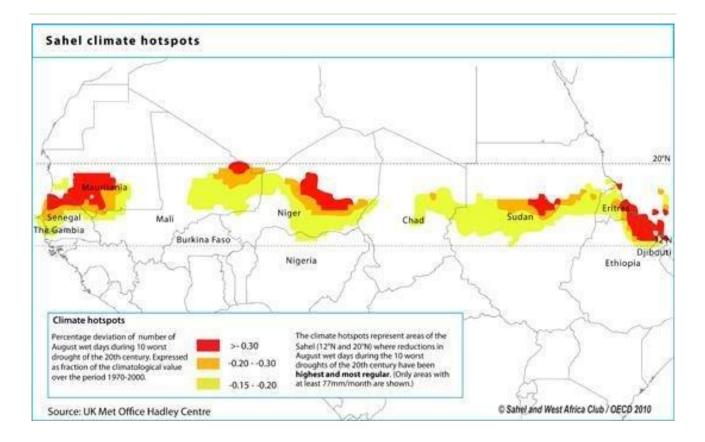


Figure 3 Climate Hotspots in the Sahel (Heinrigs, 2010)

3.3.3 Climate Change, Conflict and Migration in the Region

According to the recent Climate Change Profile West African Sahel report, 2018, the relationship between climate change, conflict and migration is complex. Steady urbanization and long-established international, intra-regional and circular migration between rural and urban areas are important and on-going demographic trends. In the past and present, West Sahel livelihood strategies have included migration. Pastoralists, seasonally move their herds. Predating colonialism, in response to the extremely seasonal and unimodal distribution of rainfall, 'circular migration' is a common practice in which people travel long distances, especially to towns and to work by the roadsides, to seek work or alternative sources of income during the agricultural off-season when they are unable to grow food. For agricultural households particularly vulnerable to rainfall variability, this seasonal migration also establishes social and economic networks and provides a hedge against the frequent droughts that occur in the region. Climate change is expected to intensify the conditions, which result in migration, in particular in the poorest and most climate-vulnerable areas. Climate variability, particularly multi-seasonal drought in dryland areas, is anticipated to increase the pace of internal migration and the refugee flows in the region (Climate Change Profile West African Sahel, 2018).



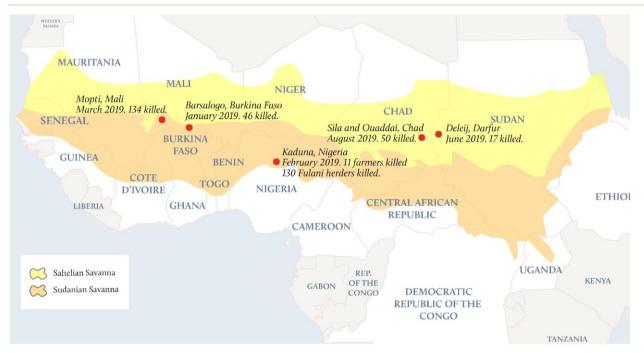


Figure 4 Herder-Farmer Violence in the Sahel (Relief web, 2019)

3.3.4 Hydrology

The water resources in West Africa are composed of 28 major transboundary river basins that range in size from 2,113,350 km² (Lake Chad Basin) to 16,000 km² (Tanoé River Basin), which form an important water network covering all countries in the Sahel region (El Vilaly and Mohamed El Vilaly, 2013). The most important are the Niger River Basin (shared between 10 countries), the Senegal River Basin (4 countries), the Volta River Basin (6 countries), the Lake Chad Basin (8 countries), and the Komoé River Basin (4 countries) (see Figure 4 and Table 7).

Table 7 Transboundary river basins in west Africa, including length, watershed size, and riparian countries (El Vilaly and Mohamed El Vilaly, 2013)

River Basin	River Length (Km)	Watershed size (km²)	Riparian Country/Countries
Niger	4,200	2,113,350	Ten: Algeria Benin Burkina Faso Cameroon Chad Guinea Mali Niger Nigeria Sierra Leone
Senegal	1,800	289,000	Four: • Guinea • Mali • Mauritania • Senegal



River Basin	River Length (Km)	Watershed size (km²)	Riparian Country/Countries
Volta	1,610	441,000	Six: Burkina Faso Benin Ivory Coast Ghana Mali Togo
Lake Chad	1,400	2,388,700	Nine Algeria Chad Cameroon Central African Republic Libya Niger Nigeria Soudan
Komoé River	1,160	78,000	Four: Burkina Faso Ivory Coast Ghana Mali
Gambia	1,130	77,000	Four: • Gambia • Guinea • Guinea Bissau • Senegal
Sassandra	720	75,000	Two: Côte d'Ivoire Guinea



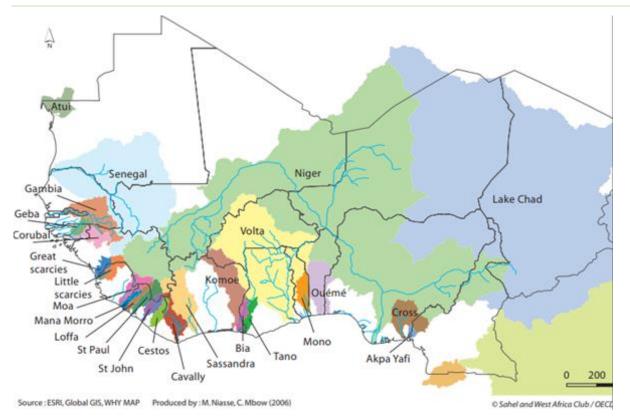


Figure 5 Transboundary Watercourses in West Africa (ECOWAS-SWAC/OECD 2006)

The Lake Chad Basin is the largest inland drainage area in Africa and covers an area of 2,434,000 km², equal to 8% of the total area of the African continent. The basin extends through seven countries: Algeria, Cameroon, Niger, Nigeria, Central Africa Republic, Chad, and Sudan109. The water level is largely the result of the inflow from the Chari River from the south and, seasonally the Komodugu-Yobe river from the northwest. Rainfall also reaches the lake from smaller tributaries and groundwater discharge110. Inflow fluctuates with the shifting patterns of rainfall associated with the West African Monsoon, making it very sensitive to drought with years of little rain having a direct relationship with the water supply (Climate Change Profile: West African Sahel, 2018).

The shrinking of Lake Chad and its far-reaching consequences is an often-cited example of how a combination of weak institutions, poor resource management, population growth and pressure, climate change and violent extremism can result in a disastrous social, economic and political situation (see Maps 8 and 9). Lake Chad Basin is currently one of the most unstable areas in the world. There are 2.3 million displaced people and around 4.5 million people across the conflict-hit region are food insecure, still needing food assistance as armed attacks and insecurity continue (Climate Change Profile: West African Sahel, 2018).



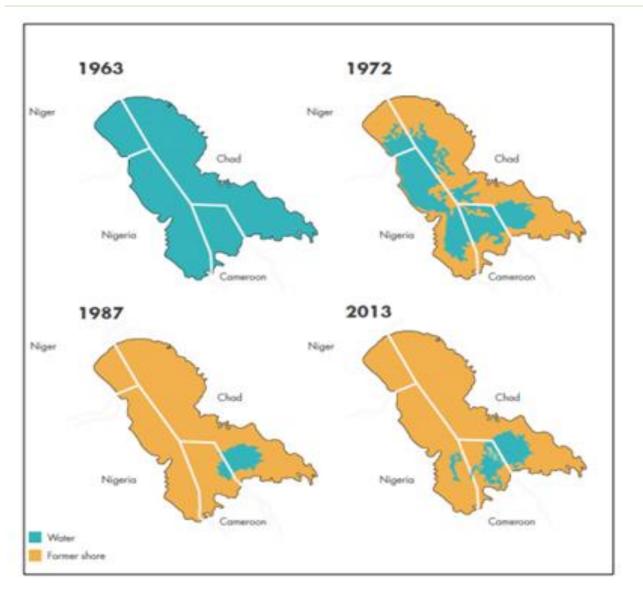


Figure 6 The shrinking of Lake Chad (Climate Change Profile: West African Sahel, 2018)

Water is a limiting factor for development in the Sahel. The region's water supply is unevenly distributed, is poorly accessible due to undeveloped hydraulic supply systems, and crosses national boundaries, creating significant management challenges (Climate Change Profile West African Sahel, 2018). For example, more than 40% of water supply in Mali and Chad and 90% in Mauritania and Niger come from outside each country's boundaries. Surface water is limited and often seasonal, making groundwater a primary source of water for many people in the region.

Studies suggest that Chad and Mauritania hold significant groundwater reserves in desert areas, but these are far from urban centres. Declines in rainfall, increases in temperature, and more frequent droughts contribute to a decline in surface and groundwater availability and accessibility. However, total renewable water resources per capita range from 745,600 m³³ /year in Burkina Faso to 6,818,000 m³ /year in Mali. Thus, the problem is thought to be one not of absolute water scarcity, but rather a lack of infrastructure to provide access to supplies for use in dry seasons and dry years. Nevertheless, areas including Burkina Faso, Mauritania, and Niger that have low, but sufficient, water resources per capita are expected to experience physical water scarcity (defined as when the water supply falls below the 1,000 m³ per person per year) by 2025.

Increasing demand from a growing population and planned irrigation schemes along the Niger and Senegal Rivers have led to 25–60% reductions in flows over the last 30 years, causing increasingly severe low water levels with frequent pauses in water flows, depleted reservoirs, and reduced water supplies for cities.



Lake Chad, the largest lake in the Sahel, has shrunk by 95% since the 1960s, with estimates attributing 50% of the decrease to increased water use (e.g., from population growth and unsustainable irrigation projects) and 50% to changing rainfall and increasing temperatures. As a result, disputes over access to water, fish catches, and ownership of land exposed by receding waters have increased dramatically in the area. Concerns persist that Lake Chad and other surface water bodies are in danger of running dry or being reduced to seasonal waterbodies. For example, Mali's Lake Faguibine has been dry or nearly dry since the 1970s, forcing more than 200,000 farmers and fishermen to abandon their livelihoods. (Climate Change Profile West African Sahel, 2018).

To ensure that water resources do not continue to be depleted, a number of approaches which include, water harvesting techniques, water use associations to improve resource efficiency, water leakage fixing from major water sources among others will be actions implemented by the project to ensure that this resource is efficiently managed. Furthermore, efforts will be made to partner with international organisations like IFSA and FAO which already have policy and implementation strategies to assuage this crisis in the Sahel region.

3.4 Water Resources & Groundwater

In the Sahel, several studies found a decrease in surface and groundwater flows in the 1970s, resulting from the decreases in rainfall, and an increase in flow in the 1990s. The impact of climate change on surface water resources in the **Gambia Basin** has shown a break in 1994 and an upward trend in the flow in the basin, unlike in the 1970s and 1980s, where discharges in the basin declined significantly3. In addition, prolonged conditions of rainfall and hydrometric deficits since the 1970s have been highlighted over the whole of The Gambia watershed. A long trend increase in temperature will considerably affect the hydrological cycle, thus changing rainfall pattern and the magnitude and timing of runoff⁴. Loss of vegetation cover is leading to widespread soil erosion and sediment transfer in the Gambia River.

Regarding the **Senegal River** basin, findings from 36 rain gauge stations and three hydrometric stations reveal two main shifts on annual rainfall in 1969 and 19945. The first shift (1969) marks the starting point of the drought. After the second shift (1994), there is an increase of annual rainfall, compared to the previous period (1969–1994), which indicated a partial rainfall recovery. It was, however, not significant at a basin level. Overall, these findings demonstrate that annual rainfall has recovered to a certain extent in the Senegal River basin, which is leading to the improvement of surface water availability.

A study on the impact of climate change on the climate and the hydrology of the Senegal River Basin has shown that climate change is likely to impact considerably the basin's climate (with substantial changes of precipitation and temperature) and also the availability of water resources (with a greater decrease in soil moisture, actual evapotranspiration and runoff) in the future6. This research is based on one regional climate simulation in the present-day climate and two scenarios (RCP4.5 and RCP8.5) simulations in the future.

By the end of the 21st century (2071-2100) under RCP4.5 and 8.5, river discharge, runoff, actual evapotranspiration and soil moisture is projected to decrease, even though there are some localized increases in some parts of the basin (particularly in Guinean highlands) with the uncorrected simulations. This decrease is mainly related to the decline of precipitation. The most extremes changes of soil moisture and runoff are likely to occur in the northern basin, which is the driest and hottest part. Additionally, the available water



³ Faye, C. 2019. Positive effects of climate change on water resources enhancement in Africa: Case of Gambia River Basin (Senegal). Hydrology - The Science of Water, Muhammad Salik Javaid, IntechOpen

⁴ Azari, M.; Moradi, H.R.; Saghafian, B.; Faramarzi, M. 2016. Climate change impacts on streamflow and sediment yield in the North of Iran. Hydrol. Sci. J., 61, 123–133.

resources exhibit substantial decrease (from -100 percent to -25 percent) in the majority of the basin for all data, except the Guinean highlands where an increase (50 percent) is found under RCP4.5 in the uncorrected data. Additionally, runoff is highly variable when compared to rainfall, soil moisture and evapotranspiration, particularly in the drier northern basin. The small runoff coefficients of the basin have shown that a lower portion of the rainfall becomes runoff and also the sensitiveness to precipitation fluctuations.

The region's water supply is unevenly distributed, poorly accessible due to undeveloped supply systems and crosses national boundaries, creating significant management challenges. For example, more than 40 percent of water supply in Mali and Chad and 90 percent in Mauritania and Niger come from outside each country's boundaries. Surface water is limited and often seasonal, making groundwater a primary source of water for many people in the region. Decreases in rainfall, increases in temperature and the frequency of droughts which could be exacerbated in certain parts of the region due to climate change, as seen earlier - reduce surface and groundwater availability and accessibility. Rising temperatures raises the risk of increased evaporation of surface waters and reduced water levels. Areas including Burkina Faso, Mauritania, and Niger that have low, but sufficient, water resources per capita are expected to experience physical water scarcity by 2025. Increasing demand from a growing population and planned irrigation schemes along the Niger and Senegal Rivers have led to 25-60 percent reductions in flows over the last 30 years, causing increasingly severe low water levels with frequent pauses in water flows, depleted reservoirs, and reduced water supplies for cities. Lake Chad has shrunk by 95 percent since the 1960s, with estimates attributing 50 percent of the decrease to increased water use (e.g., from population growth and unsustainable irrigation projects) and 50 percent to changing rainfall and increasing temperatures⁷. Groundwater levels in The Gambia have been declining over the last decade, causing shallow wells that farmers used to irrigate crops to dry up8.

Where water is available, sustainable irrigation can make a critical difference. It reduces dependence on the weather, makes multiple harvests possible during the year and may reduce under-employment and land pressure. The demand for access to modern energy is significant, especially in rural areas, and solar pumps for irrigation could increase agricultural productivity of key food crops and livestock. Solar water pumping (SWP) is poised to grow tremendously over the next decade due to declining costs, high reliability and increased commercial availability in rural areas of less developed countries. Shifting from diesel to solar water pumping will help the selected countries save 31 percent on investment annually. SWP systems are reliable and have become much more affordable due to decreases in costs of PV modules⁹: system costs have dropped by 80 percent since 2009 and many systems installed 20 or more years ago are still operational.

In the **Niger River** basin, water remains the most critical constraint on agricultural production. Irrigated land is more productive and profitable than rain-fed land, particularly in Dosso, Tahoua Maradi and Zinder (targeted areas). Nevertheless, only 0.2 percent of agricultural land is under some form of water management. Of Niger's 270,000 hectares of irrigable land, 140,000 ha are concentrated in the Niger River valley. The rest of the country's irrigation potential comes primarily from the Komadougou River (part of the Lake Chad basin), several small seasonal rivers, dry riverbeds with easily accessible groundwater (dallols), the small oasis basins of Manga and Aïr and in some areas, groundwater that is accessible with a pump. It therefore appears that Niger's irrigation potential is under-exploited: less than 100,000 ha, or about 37 percent of estimated potential, are under irrigation. In addition to water harvesting, several types of irrigation techniques are being implemented and constitute ways to better adapt to climate change and climate variability. Nearly all hydroagricultural developments (aménagements hydro-agricoles in French or AHA) and medium-to-large irrigation systems are located in the Niger River Valley where rice is the main crop. However, in some areas, high value vegetable crops are grown in the dry season, as land use has evolved over the past years.

Climate impacts on water resources in the Niger River basin are varied. There has been a drop in groundwater levels and an increase in the coefficient of runoff for small ponds; quantitative and qualitative reductions in water resources; increasingly low water levels in rivers (early drying up of water points such as ponds, wells,

⁹ Future of solar photovoltaic, IRENA, 2019



⁷ USAID, 2017, West Africa Sahel.

⁸ The Gambia, UNEP, 2016, FP011: Large-scale Ecosystem-based Adaptation in the Gambia River Basin: developing a climate resilient, natural resource-based economy. Available from https://bit.ly/3q2hCwC

etc.); pockets of drought (water deficit) during the rainy season, decreases in the length of the season (the number of days of rain) of agricultural production and rural exodus. The reduction in the number of rainy days together with the increase in rainfall intensity results in floods in most cases (RdM, 2011). Despite these hydrologic relationships, there currently appears to be little risk of water stress for users along the Niger River until the major diversion structure at Markala. Irrigation along the river does not consume a great deal of water (the two largest schemes are 1,350 ha just below Selingue Dam and 3,500 at Banguineda, just downstream from Bamako), and extractions for domestic and industrial use are small compared to overall river flows

3.5 Terrestrial Flora and Fauna

Due to its geographic scope and its bio-climatological diversity, the area contains a considerably rich ecosystem (forests, savannas, tiger bush, steppes, deserts, etc.), next to its wetlands and marine ecosystem. The various ecosystems, ranging from dry savanna to tropical forest, provide habitats to more than 2,000 amphibian, bird and mammal species (IUCN, 2015). The region's tropical forest, in the Upper Guinean countries, is the main locus for biodiversity. These lowland forests of West Africa are home to 320 mammal species (which represents more than a quarter of Africa's mammals), 9,000 vascular plant species, and 785 bird species (Conservation International, 2008). The Upper Guinean forest is renowned for its primate diversity, with nearly 30 distinct species, and has been identified as some of Africa's most critical primate conservation area (CILSS, 2016).

The Sahel's ecosystems are nevertheless already degraded due to prolonged drought, agricultural expansion, deforestation, erosion, the proliferation of invasive species, and biodiversity loss from poaching (Climate Change Profile West African Sahel, 2018). Between 1975 and 2013, forest cover was reduced by 37% in West Africa. Endangered mammals such as the cheetah, giraffe, and lion, once common in the region, are now largely absent outside of protected areas (e.g., Air and Ténéré National Nature Reserve in Niger and Sahel Partial Faunal Reserve in Burkina Faso) due to overhunting for food and sport. Climate change threatens to further degrade land, vegetation and water resources through increased incidence of drought, desertification and floods and projected shortening of the rainy season. Roughly 50% of Chad, 65% of Mauritania and Mali, 80% of Niger, and the northernmost point of Burkina Faso are within the Sahara Desert boundaries, which is expanding southward into the Sahel at a rate of 1–10 km per year. As a result of long-term declines in rainfall from the 1970s to 1990s, the Sahel ecological zone has shifted 25–35 km southward, resulting in biodiversity loss and conversion of arable land to sand dunes. This migration of sand dunes buried a large expanse of viable agricultural lands, prompting the southward migration of people and consequent intensification of resource requirements as more people settle on the remaining arable land. Increased drought events threaten to dry out land and water resources that are vital to the region's flora and fauna, including migratory bird species that use the southern Sahel as a stopover point before crossing the Sahara Desert (Climate Change Profile West African Sahel, 2018).

3.6 Land Use

3.6.1 Agriculture and Pastoralism

Agriculture and pastoralism are the most common activities in the Sahel region. This is reflected in land use where pastoral farming predominantly in terms of covered territory, even if agriculture, particularly in favourable areas (recession areas, inland delta, banks of rivers, wetlands, perimetres arranged for irrigation, etc.) is also practiced by a large section of the population. These activities can be grouped into three sets of production (Ly et al., 2010):

- Pastoral systems based on transhumant pastoral livestock farming;
- Mixed agro-pastoral production systems combining livestock farming pastoral and rainfed and/or flood recession agriculture; and
- Mixed production systems combining irrigation-based agriculture and sedentary livestock breeding.

Millet and sorghum are the predominant crops in the Sahelian zone, transitioning to maize, groundnuts, and cowpeas farther south in the Sudanian zone (CILSS, 2016). These food crops are among the top five harvested crops in the Sahelian countries — Mauritania, Senegal, Mali, Burkina Faso, Niger, and Chad. Root crops such



as cassava and yams are found mostly across the Guinean zone, especially in Sierra Leone, Ghana, Nigeria, and Côte d'Ivoire. Finally, tree crops such as cocoa, palm trees, or cashew trees are found in the Guineo-Congolian zone. In this humid climate, rice is also one of the most harvested crops in terms of area; it ranks first in Guinea, Liberia, and Sierra Leone. Rice is the most rapidly growing staple food in West Africa and constitutes a major part of the population's diet (FAOSTAT, 2015).

Agriculture in the Sahel is extensive, poorly mechanised and almost entirely reliant on the limited three to four months of variable summer rainfall (June–September), making it highly vulnerable to climate variability and change (Climate Change Profile West African Sahel, 2018). In dry years, the region faces serious challenges related to food security and must rely on grain purchases and food aid to meet food requirements.

Agriculture contributes 40% of the combined regional GDP and employs more than 70% of the labour force in Niger, Burkina, Mali, and Chad, and 52% in Mauritania. Farming is practiced down to the 350 mm rain belt, while pastoralism provides the principal livelihood below this threshold.

Landlocked countries (Burkina Faso, Chad, Mali, and Niger) are major cereal producers that export to neighbouring countries. Staple dryland crops include millet, sorghum and cowpea, while cotton and groundnut constitute major cash crops. Temperature increases higher than 2°C are projected to decrease millet and sorghum yields by 15–25% by 2080. Studies cited by UNEP also suggest that because of changing rainfall patterns and degraded land, Chad and Niger could potentially lose their entire rainfed agriculture by 2100, while in Mali cereal harvests might decline by 30% (Climate Change Profile West African Sahel , 2018).

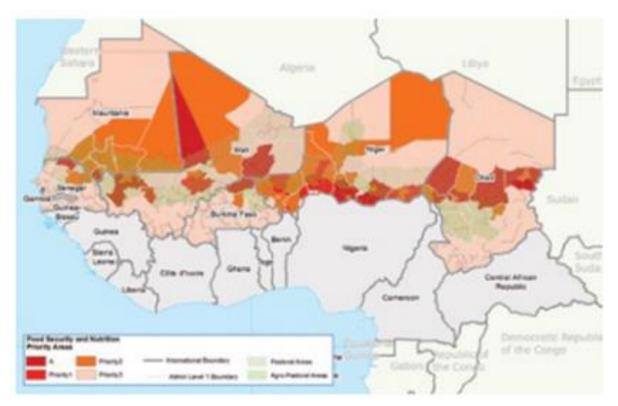


Figure 7 Food insecurity in the Sahel (Climate Change Profile: West African Sahel, 2018)

3.6.2 Deforestation and Degradation of Forest Resources

According to the FAO (2015, 2016), the forest resources of countries in the region will have gone from almost 103 million ha in 1990 to 77 million ha in 2015, an average reduction of 1% per year over the period. Only Ghana has seen an increase in its resources with an average annual rate of 0.3%. The downward trend in dependency is projected to continue at least through the next quarter found more or less accentuated by subregions; this decrease would be 1,17% per year for the West and Central Africa subregion corresponding to a reduction of over 30 000 ha per year.



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This deforestation and degradation of forest resources are fuelled by high population growth and a growing demand for food, agricultural expansion accounts for most land cover change across West Africa. In 1975, cropland was widely scattered among the natural landscapes, covering 10.7% of the mapped area (see CILSS land cover maps). In the next several decades, cropland has expanded rapidly and now pervades the whole region. By 2013, the area covered by cultivated areas doubled, reaching a total of 1,100,000 sq km, or 22.4% of the land surface. In every country in West Africa, agriculture has been exerting pressure on the natural landscapes, replacing and fragmenting savannas, woodlands, wetlands, and forests (CILSS, 2016).

Across the Sahel, agriculture expanded into most of the suitable soils that were occupied by the natural Sahelian savanna, and cut into the traditional pastoral areas of northern Mali, Niger, and Chad. Niger's vast south-central agricultural zone, already heavily cultivated in 1975, became fully saturated with cropland and expanded eastward into the pastoral zone. In Senegal, cropland spread into the central and southern wooded savannas and woodlands, creating a new patchwork of farmland and settlements. Meanwhile, Senegal's Peanut Basin is also notable by the extent of cropland loss, with large areas being put into long-term fallow, mapped as savanna. This is one of the manifestations of the agriculture crisis as cultivation is abandoned, young men and women leaving the land to seek opportunities in urban areas (CILSS, 2016).



Figure 8 Annual rate of agriculture expansion in West African countries (1975-2013 average) (CILSS, 2016)

Mauritania and Togo stand out with high annual rates of agriculture expansion, 7 and 6.4% per year on average, respectively. Indeed, in 1975 agriculture represented only 0.2% of southern Mauritania, but cultivated areas expanded by more than 3 times in the past four decades. The core of agriculture expansion, however, occurred within the Sudanian zone where climate is more suited for a large variety of crops. From southwestern Senegal to southern Chad, cropland has expanded — replacing biodiverse savannas, woodlands, and gallery forests. The most dramatic change occurred in Burkina Faso where cropland became the dominant land cover, reaching 39% of the national area in 2013.

West Africa's Sudanian zone is rapidly transforming into human-crafted landscapes leaving scattered islands of semi-natural vegetation cover. In southern Chad, notably in the Logone Basin, cultivated areas are establishing a foothold in the savannas and woodlands.

3.7 Population and Gender

3.7.1 Demography

The West African Sahel is a region of rapidly growing populations, poverty, food insecurity, gender inequality, illiteracy, conflict, and political instability. Of the West Africa Sahel countries, three (Burkina Faso, Chad, and Niger) rank in the bottom five countries of the global Human Development Index (HDI), one (Mali) in the bottom



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10% and two (Mauritania and Nigeria) in the bottom 20%55. Also. the West Sahelian countries all rank in the bottom 25% of the Gender Inequality Index of the HDI. Within Africa four of the West Sahelian countries (Chad, Mali, Mauritania, and Niger) are in bottom 10 (of 52) African countries in the Africa Gender Equality Index (AGEI) with only Burkina Faso and Nigeria ranking in the top 50%. The OECD Social institutions and Gender Index (SIGI) for West Africa had similar results (see Map 6) citing very high level of discrimination for women in Chad, Mali, Mauritania, Niger and Nigeria and a high level of discrimination in Burkina Faso in customary practices, social norms, in addition to discriminatory legal frameworks and poor implementation measures (Climate Change Profile: West African Sahel, 2018).

The instability of the West Sahel is reflected in the fragile state index ranking of its countries. Globally, Chad is ranked as one of the ten most fragile states with Niger and Nigeria ranked as being among the twenty most fragile states. None of the three remaining countries (Burkina Faso, Mauritania and Mali) have a ranking below 44, placing all three within the 25% most fragile countries in the world. Due to its population growth rates, the West Sahel population (excluding Nigeria) of 81,063,984 is projected to more than double to 198,282,000 by 2050, placing an increasing number of people, already struggling with food insecurity, at risk to the consequences of climate change (Climate Change Profile: West African Sahel, 2018).

This situation is a reflection of

- the limited progress of activities relating to the development and valorisation of natural resources (land, water, vegetation, mineral resources, renewable energies, etc.) and
- limited and/or unequal development of basic infrastructure.

However, it would eventually evolve along national patterns / regional planning and development programmes, especially with regard to a better balance between regions.

	Burkina Faso	Chad	Mali	Mauritania	Niger	Nigeria
GDP (PPP)	1,771	1,990	2,125.7	3,825.5	986	5,861.1
Population (2018 est)	19,751,651	15,353,184	19,107,706	4,540,068	22,311,375	195,875,237
Population growth rate	2.9	3.1	3.0	2.8	3.8	2.6
Population 2050	43,207,000	33,636,000	44,020,000	8,965,000	68,454,000	410,638,000
Population Density	68	11	15	4	16	204
Human Development Index (HDI) (2016) (188 countries)	185	186	175	157	187	152
Corruption Perception Index (CPI) (2017) (180 countries)	72	159	116	143	101	148
Gender Inequality Index (GII) (2016) (188 countries)	146	157	156	147	157	n/a
Africa Gender Equality Index (2015) (52 countries)	22	44	50	46	45	23
Fragile State Index (2017) (178 countries)	44	8	31	28	20	13
Adult Literacy (%)	36.6 (2014)	22.3 (2016)	33.07 (2015)	45.7 (2007)	15.4 (2012)	51.08 (2008)

Table 8 Socio-Economic Situation in the Sahel (Climate Change Profile: West African Sahel, 2018)



3.7.2 Economy

West Africa's 15 economies are diverse across many dimensions of development, and the region is home to some of the continent's least developed countries (AfDB, 2019). In 2018, income per capita ranged from \$452 in Niger to \$3,678 in Cabo Verde, one of the region's few lower-middle-income countries (figure 7). Nigeria's income per capita was an estimated \$2,089, and its GDP was an estimated \$409 billion, or about two-thirds of West Africa's total. The country accounts for half the region's population, and its size dominates the region's economic performance. Lower GDP per capita is symptomatic of fragile growth in a region with a growing population. From 2010 to 2017, volatility in output averaged 1.5%, resulting in part from weak economic diversification. Growth rates differ considerably over time and across West African countries. Some countries have experienced high growth, even exceeding 7% in 2017 and 2018. Nine countries saw growth of at least 5% in 2017 and 2018, and four of them (Côte d'Ivoire, Guinea, Mali, and Senegal) have been growing at that rate since 2014–16 (figure 7). Performance in these five fast-growing countries has been driven by agriculture. But other sectors have emerged to complement agriculture.

Despite security challenges, growth in Mali has gained pace, bolstered by favourable performance of the primary sector, mainly agriculture. Niger's growth is also explained by good performance in agriculture, but oil has also emerged as an important driver. Rising investment, as well as robust exports of zircon, peanuts, and phosphate, drove growth in Senegal in 2018. Zircon exports increased by about \$4 million between August 2017 and August 2018 (AfDB, 2019).

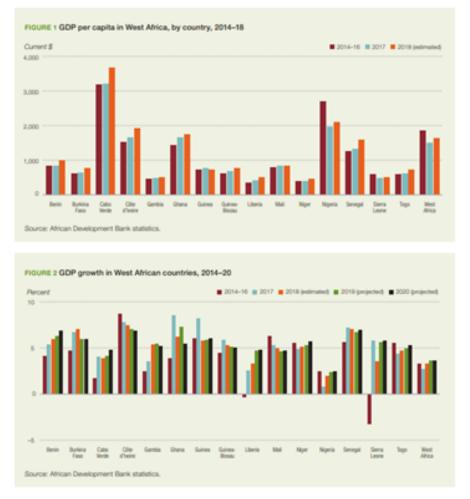


Figure 9 GDP per capita in West Africa by country 2014-2018 (top); GDP growth in West African countries, 2014-2018 (bottom) (AfDB data, 2019)

The fight against corruption is of major concern to the West Africa subregion and has had mixed outcomes. According to Transparency International, Cabo Verde occupies a major place in West Africa, ranking 42nd, with a score of 57 against an average of 34.73 for West Africa, out of 175 countries in 2014. Ghana and

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Senegal, which ranked 61st and 69th respectively out of 175 in 2014, improved their scores by 3 and 7 points respectively from 2012 to 2014 (Trade Law Centre, 2016).

3.7.3 Human Development

West Africa has an average development index of 0.46. Most of the countries of the zone are in the category of countries with "low human development" except for Cabo Verde and Ghana, which are in the category of countries with "average human development". Of the West Africa Sahel countries three (Burkina Faso, Chad, and Niger) rank in the bottom five countries of the global Human Development Index (HDI), one (Mali) in the bottom 10% and two (Mauritania) in the bottom 20%. Within Africa four of the West Sahelian countries (Chad, Mali, Mauritania, and Niger) are in bottom 10 (of 52) African countries in the Africa Gender Equality Index (AGEI) with only Burkina Faso and Nigeria ranking in the top 50%.

3.7.4 Gender and Youth

Women and young people are also a vulnerable group and strongly affected by poverty in the Sahel region (. As women and youth represent the vast majority of the population in most countries in the Sahel, the impacts on this group have consequences for the whole region. According to a study made by McOmber and Lecturer (2020), women are heavily involved in pastoralist and agricultural activities, making up about two-thirds of the world's poor livestock keepers. In West Africa, approximately 70% of women's labour is in the food economy, with the majority of that work being off-farm sectors (Pepper, 2019). These off-farm sectors are particularly gendered: women make up 88% of food-away-from-home (e.g., restaurant service), 83% of food processing, and 72% of food marketing labour (Allen et al., 2018).

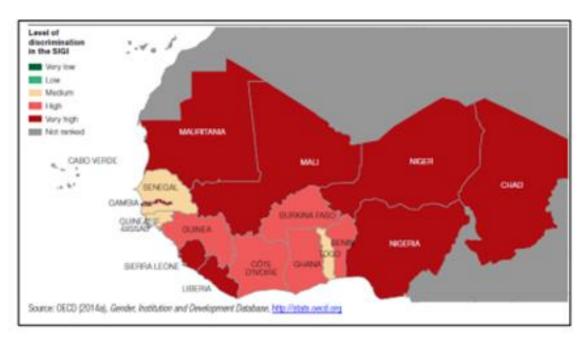


Figure 10 Gender discrimination in the Sahel (Climate Change Profile: West African Sahel, 2018)

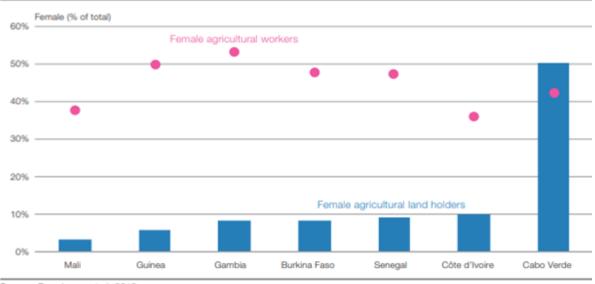
Conditions of social vulnerability among women and young people in particular, including inequitable access to financial assets and markets as well as lack of representation and political voice, become especially relevant as climate conditions continue to present challenges to pastoral livelihoods. Pastoralist livelihoods in West Africa tend to be highly gendered in terms of roles and responsibilities. While men are often responsible for managing herds and migration, women tend to be responsible for milking and dairy processing tasks.

In some cases, women are involved in the selling of dairy products and they can be involved in decisionmaking around how that income is spent. Such is the case in Burkina Faso and Niger, where women are often responsible for the processing and marketing of dairy products such as curdled milk, butter, and cheeses (McOmber and Lecturer, 2020). This income from dairy products are therefore a critical resource that allows women to negotiate as contributors to household income.



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This situation forces women and young people to migrate to cities or abroad, where the options are no better. For young girls, the situation is even more limiting, since their access to land and employment opportunities are even lower. Women and young people, too, are not among the decision makers at the local level and are frequently frustrated that their initiatives and ideas are not taken into account (International Peace Institute, 2019)



Source: Bouchama et al. 2018.



3.7.5 Human Health

The Sahel has some of the lowest human health indicators in the world and is currently suffering from the effects of four consecutive food crises, all of which occurred in the last 10 years (Climate Change Profile West African Sahel, 2018). Climate change is likely to aggravate acute malnutrition and disease outbreaks. Burkina Faso, Mali, Mauritania, Niger, and Chad have some of the highest under-five mortality rates in the world, with the majority of deaths resulting from pneumonia, diarrhoea and malaria.

Malnutrition and poor access to health care exacerbate the impacts of these illnesses and increase vulnerability to climate change impacts. Increased temperatures and variable rainfall will likely exacerbate food and water insecurity, especially in the dry season.

Reduced water availability concentrates water users around limited water sources, enhancing conditions for contamination and transmission of endemic water-related diseases such as cholera, diarrhoea and typhoid. West Africa has the highest rates of malaria infection and deaths in the world and this burden will continue in many parts of the region. Nevertheless, the outlook for malaria is more favourable in the long term, with climate change projected to render a large part of the western Sahel unsuitable for malaria transmission by 2050 if temperature increases exceed the limits of mosquito survival.

Changing rainfall patterns have increased the frequency and intensity of flood events in virtually all of Burkina Faso, most of southern Niger and southern Chad, and large parts of Mali. The region experienced the worst floods in over 30 years in 2007, 2008 and 2009, with losses estimated at several billion dollars and hundreds of thousands of people displaced. Displacement from flood, drought and violent conflict across the region has led to a decline in public health indicators as displaced people live in precarious conditions with poor sanitation and no access to clean water. Currently, Africa's fastest growing displacement crisis is unfolding across the oil-rich Lake Chad Basin (Nigeria, Chad, Niger, and Cameroon), where violence from Boko Haram and drought threaten the lives and livelihoods of 20 million people (Climate Change Profile West African Sahel, 2018).

The nutrition situation is very critical, with about 3.4 million children under the age of five expected to be affected by acute malnutrition. Poor households are particularly vulnerable given their dependence on natural resources for their livelihood (food security, nutrition and income). The resilience of the poor has been significantly compromised by both the food crisis and by conflict, including the effects on those communities

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that are hosting refugees (IOM, 2018). Within this, women and youth are disproportionally affected, which is a large scale problem, given the region is also one of the most youthful of the world, with 64,5% of young people aged less than 25 years (UNFP,2018)

Table 9 Climate Risks and Potential Impacts. *similar data for number of people affected by drought is not available (OCHA, 2016)

Country	Number of food insecure people	Number by flood affected by flood in 2016
Burkina Faso	2.5 million	30,000
Chad	3.8 million	206,000
Mali	3.0 million	11,000
Mauritania	1.2 million	n/a
Niger	2.5 million	105,000

3.7.6 Coronavirus Threat to Development

The COVID-19 pandemic exacerbates the unprecedented health and economic crisis in the Sahel region. By exacting a heavy human toll, upending livelihoods, and damaging business and government balance sheets, the crisis threatens to slow the region's growth prospects in the years to come (IMF, 2020). Consequently, the 2020 IMF projects the sub-Saharan region's economy to contract by -1.6% this year—the worst reading on record. This reflects the multiple shocks that will weigh on economic activity heavily:

- The strong containment and mitigation measures that countries have had to adopt to limit the spread of the coronavirus disease (COVID-19) outbreak will greatly disrupt production and reduce demand sharply;
- Plummeting global economic growth and tighter global financial conditions are having large spill overs to the region; and
- The sharp decline in commodity prices, especially oil, is set to compound these effects, exacerbating challenges in some of the region's largest resource-intensive economies, notably Chad, Angola and Nigeria. These large adverse shocks will interact with existing vulnerabilities to exacerbate social and economic conditions.

The measures that countries have had to adopt to enforce social distancing and keep people from circulating are certain to imperil the livelihoods of innumerable vulnerable people. Given the limited social protections in place to offset the income losses, people will suffer. For the public sector in many countries in the region, the crisis could not have come at a worse time. The pandemic is reaching the shores of the continent when budgetary space to absorb the effects of the shocks is limited in most countries, thus complicating the appropriate policy response.

3.8 Indigenous Peoples and Ethnic Minorities

In West Africa, several groups identify as indigenous peoples due to their historic occupation of the Sahara and the Sahel, their continuous adherence to economic and cultural systems of pastoralistism and their ongoing marginalisation from the political economy. These peoples include the Mbororo (Bororo / Wodaabe), the Tuareg, and the Tubu (Teda and Daza). The Mbororo are part of the wider language group, the Fulani-Peulh in West Africa. These groups adhere to their traditional nomadic culture, territories and identities. Other groups, such as the Bassaris hunters of Senegal, and the Nemadi hunters of Mauritania, are also in vulnerable situations. These peoples face severe degradation of their environment and biodiversity, mainly caused by oil exploration and industrial exploitation of other natural resources such as uranium, and resultant violations of their human rights.



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4 ENVIRONMENTAL AND SOCIAL RISK ASSESSMENT

4.1 Assumptions

Based on IFAD Social, Environmental and Climate Assessment Procedures (SECAP), the overall Environment and Social risk category for is 'B' and high for climate risks. This categorization is a result of a screening and scoping exercise where the screening form in the annex was administered and results deduced from the data collected.

As per IFAD SECAP guidelines and B categorization, all dams and irrigation facilities technologies proposed for the project will be below 15m high and feeder roads will not exceed 10km per location. This is also seen in the screening form administered and hence some criteria for the B categorization.

Each sub-project will develop site-specific ESMPs when the exact locations of the projects are not known particularly for the installation automatic weather stations; rain gauges; rain harvesting water, water points and mini-grids (see Annex 5). Additionally, a climate eligibility criteria list for the selection of projects/ activities was developed to help address the potential on the activities listed above.

Given the above, a full disclosure of the environmental and social risks and remediation actions through placed based and context-specific environmental and impact assessment (ESIA) are not possible at this time. Consequently, environmental and social screening will be conducted for each sub-project / enterprise cluster location and, where required, a full ESMP will be required to guide project implementation. The environmental impacts will be substantially place-based and commodity-specific across enterprise clusters and communities around the project and most of them can be readily remedied by appropriate preventive actions and/or mitigation measures proposed in the ESMP in Section 6.

4.2 Project Risk Assessment Process

All Risk Assessments will follow the Risk Management Process as defined in IFAD's Integrated Management System (IMS) to ISO standard (Section 2.3.3).

The Risk Assessment involves a standardised risk assessment matrix of consequence versus likelihood for all aspects that are to be evaluated. The following are the different impacts that will be evaluated. A simplified Risk Matrix is shown below, Table 10. The result of Project Risk Assessments is captured in Risk Register which keeps an up-to-date status of all identified risks.

The risk management scoring methodology assesses the significance of possible risks occurring during the life of project implementation. This assessment is conducted according to the following criteria: a. the likelihood (probability) of the event arising; and b. the impact (consequences) of the event on the project's objectives if it occurs.

Description of impacts: Environmental impacts arise as a result of the programme activities in each country either interacting with environmental or social receptors directly, or causing changes to the existing environment such that an indirect effect occurs. Environmental and social impacts from a planned event are those resulting from the routine and intended construction or operations / activities planned under the selected components even though they are considered with no major negative impacts

Nature of impact: Threat or Opportunity - the nature of an impact is defined as the type of change from baseline conditions. The nature of an impact is described as being either positive (Opportunity) or negative (Threat).

Type of impact: Impact type indicates the relationship of the impact to the programme activity in terms of cause and effect, as either:

- Direct impact resulting from the direct interaction between a project activity and the receiving environment; or
- Indirect impact which include secondary or induced impacts caused by a change in the programme environment (e.g. employment opportunities created by the supply chain requirements); or



• Cumulative impact; where a programme t impact acts together with other impacts (including those from concurrent or planned future third-party activities) to affect the same resources and/or receptors as the Project.

Scale of impact: Impact extent relates to the geographic reach of the impact and is described as:

- Local impact would affect local resources or receptors and would be restricted to a single community (i.e. impacts in the footprint of Project activities and the immediate adjacent area);
- Regional impact would affect regional resources or receptors and would be experienced at a regional scale;
- Trans-boundary impact would be those that are experienced in one country as a result of activities in another

Duration of the impact: Impact duration refers to the time period over which a resource or receptor will be affected, and includes:

- Temporary impacts would be of a very short duration, are reversible and intermittent or occasional in nature. The resource or receptor would return to the previous state when the effect ceases or after a short period of recovery;
- Short-term impacts would last for a short duration (2 to 5 years) and are usually limited to the construction period. The impact would cease when the effect ceases following a short period of recovery;
- Medium-term impacts would last for over five years but less than fifteen years (5 to 15 years). The impact would cease following rehabilitation and a period of recovery;
- Long-term impacts would continue for an extended period of time (e.g. beyond 15 years), or cause a more permanent change in the affected receptor or resource that endures substantially beyond the Project lifetime.

Probability: The probability of an event occurring and creating an impact on a given receptor is designated using a qualitative scale from 1 to 4, the higher values being more probable that an impact will occur, is presented in the table below:



Table 10 Simplified Risk Matrix of Consequence versus Likelihood

Consequence					
Likelihood	No Impact / No change	Negligible	Intermediate / Moderate	Severe	
Unlikely					
Possible / less than annually					
Occasional / at least annually					
Frequent / at least monthly					
Continuous, inevitable, daily irreversible					

Legend:

Low significance

Medium significance

High significance

4.3 Climate Risk Assessment

4.1.1 Climate risks

Based the IFAD guidelines on the Social, Environmental and Climate Assessment (SECAP), the climate risk category for the project is 'high'.

Potential Negative Climate Project Risk: The major climate risks for the project are rainfall, drought, temperature and the possibility of some crops and activities contributing to GHG emissions. Heat waves, floods are frequent. Future climate scenarios for the programme area foresee an increase in both temperature and draught rainfall, which will increase flooding and rainfall and change in agro ecological zones. However, this is not likely to adversely affect the programme project's impact, sustainability and cost over the six-year lifetime if the integrated climate risk management is in place.

Potential Positive Climate Risk Impacts: Strengthen climate-resilient development capabilities: The project target group (youth and women) are almost entirely dependent on natural resources, such as seasonal crops from rain-fed agricultural plots. Aside from flooding, extreme weather and weather-related losses and damage has been very moderate in the past. However, climate variability is projected to affect agricultural productivity (especially crops) and the associated incidence of pests and diseases. Weather-related risks, including dry spells and floods, may adversely impact upon key stages of identified value chains in the project (from production to markets). Investment in institutional development and capacity building for rural institutions such as farmer groups, cooperatives will be a key focus for this project. This should help to strengthen climate-resilient development, indigenous climate risk management capabilities, and the adoption of green technologies, such as creation of value chains in integrated climate risk management, climate risks transfer both at macro, meso and micro level



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Combined Potential Positive and Negative (to Project development) Climate Risk Impacts: Rainfall increase/decrease: Rainfall is expected in some parts of the Sahel, while others are likely to experience declining rainfall. This will have differential positive and negative impacts. Positive impacts including enhanced growth of major staple and tree crops in the south of each country. However, increased rainfall will also mean increased flooding in some areas. Declining rainfall will negatively impact cropping in the most vulnerable regions. Unless timely climate information is provided to guide planting activities, dry spell will also spell doom for some crops and in some areas such as maize, cassava and vegetable

Temperature Rise: The overall rise in temperature will impact production across the region. All countries have been experiencing rising temperatures, which is consistent with the rise in global temperature and this is projected to continue into the future. Impacts may be crop-specific and to some extent, place-specific. Rice production is particularly affected by higher temperatures. Excessive heat may also exacerbate dry spells and reduce water availability for crops. Higher temperature may also positively impact some heat-tolerant crop varieties. It will also aid the processing of cassava and some other staple crops. However, the timing of farm operations will be crucial.

GHG Emissions: The expected GHG impacts of programme are expected mainly from increased rice paddies, forest and wetland removals and the use of machineries during the construction of market infrastructures, processing platforms and transportation of agricultural products, land management. Rice cultivation, monoculture of millet, maize, sorghum, groundnuts pose serious agricultural production method in some countries, with their extensive wetlands could be highly impacted due to land clearing for production. On the positive side, an increase in the cultivation of tree crops enhance canopy ecosystems, which will contribute to GHG removal and sequestration. Tree crops will also significantly reduce the temperature of the surrounding environment and depending on the area size, can even positively influence the rainfall pattern in certain areas.

4.1.2 CARD Analysis for the 7 Countries

The Climate Adaptation in Rural Development – Assessment Tool (CARD) is a platform to explore the effects of climate change on the yield of major crops. It is intended to support the quantitative integration of climate-related risks in agricultural and rural development investments and strategies, including economic and financial analyses (EFA). This tool provides data for 17 major crops in nearly all African countries.

For the selected countries, Annex 2 on Projects locations Hazards Analysis and Impact on Yield Productivity supported by CARD tool was developed and attached.

4.4 Direct Impacts

4.1.3 Overview

This Section identifies the main significant (i.e. most likely and consequential) potential negative impacts regarding the environment, climate and social context. At the time of writing, the exact project locations in terms of LGAs and communities have not yet been decided. The environmental and climate impacts identified below therefore include those relevant to the overall programme and pertinent to each country. Recommended mitigation measures to address each potential impact are specified in the ESMP in Section 6. The more specific environmental and social impacts and related mitigation measures for each of the component of the regional programme.

Key potential direct impacts are as follows:

- Activities may include minimal rehabilitation of infrastructure and will not entail the total area being cleared of above 100 ha.
- The programme will discourage opening up of wetlands, forest and virgin lands through ecosystemcompatible enterprise selection.
- There is very low risk of impacting physical and cultural resources and the regulation against opening lands in protected areas will be enforced.
- The project has minimal risk of causing land degradation through unsustainable land preparation and management practices, which will be mitigated through awareness, and training on sustainable land management practices.



- Moderate risk impact of surface water resources from use of agrochemical and pesticides is also expected which will be mitigated by encouraging use of biodegradable farm manure and training of youth to create sustainable value chain in pesticides and agrochemicals management to provide service to the farmers.
- No economic displacement of marginal or indigenous population is envisaged.

Local communities are the second-level beneficiaries of the project after the apprentices and incubators. In addition to government land, access to land will also depend on the community's free-consent release of land for the project to the youth and women (who are members of the community). No impact on the use rights of land by the community is envisaged. No unsustainable natural resources management such as fisheries, forestry and significant increase in use of agrochemicals that exceed the carrying capacity of the ecosystem is envisaged. Fish farming and aquaculture business will be on hand-stocked plastic and/or earthen pond. To minimise the effect of flooding on aquaculture, river courses and very low-lying areas will be avoided and buffer created around the ponds. Aquaculture, poultry and other animal entrepreneurs will also receive training on improved hygiene and sustainable management of waste. Generally, the project will involve land use changes (agricultural intensification and/or expansion of the cropping area) and resources that may have adverse impacts on habitats, ecosystems, and/or livelihoods in non-sensitive areas. Small dams and water impoundment in non-sensitive and wetland area may be constructed to complement rainfall to ensure all-year round cropping for some crops.

Pastoralism functions best within the prevalent context of wide rainfall variability and unpredictability. With the right policies, investment and support, pastoralism presents a logical adaptation route in areas of increased climatic variability, and has an important role to play where other livelihoods are likely to fail. However, pastoralists are increasingly vulnerable to drought and other shocks as a result of policies at odds with the unique needs of the drylands, and years of poor and inadequate investment in the development of these areas. Pastoralists' resilience to drought and their adaptive capacity must be built upon and supported. Evidence suggests that, alongside improved drought preparedness planning, disaster management structures and risk reduction efforts, it would be more effective to enable and strengthen the inherent adaptive capacity of pastoralists, finding ways to encourage their autonomous adaptation, rather than providing adaptation strategies for them.

Pastoralism is a rational use of the drylands as seen in the Sahel. Pastoralists respond to and use, even choose and profit from, variability. This allows for a vibrant and productive livelihood system in some of the harshest landscapes in the world. Pastoralists use mobility to respond quickly to fluctuations in resource availability, dictated by the drylands' scarce and unpredictable rainfall. They also employ a number of highly specialised risk-spreading strategies to safeguard their herds against drought, floods, disease and social unrest. These strategies – including building up herd sizes as insurance against times of hardship, splitting herds across different locations to spread risk, keeping different species and breeds and loaning surplus animals to family and friends – ensure the rational use of the natural resource base and also develop and strengthen social relations as a form of social capital. Pastoralism's contribution to the health of dryland ecosystems Dryland ecosystems are healthier where mobile pastoralism continues to be practiced effectively. Grazing opens up pastures, stimulates vegetation growth, fertilises the soil and enhances its water infiltration capacity as hoof action breaks up the soil crust, aids in seed dispersal to maintain pasture diversity, prevents bush encroachment and enhances the cycling of nutrients through the ecosystem.

As climate change exacerbates stresses on the system, the rate of destitution among pastoralists is likely to increase unless policies are implemented which enable adaptation and a choice of livelihoods which allows people to maintain or improve their conditions independently of livestock-keeping. Developing climate foresight to enable adaptation. The anticipated climatic changes in the drylands will require people in the region to adapt, while the drastic nature of these changes means that people may have to adapt to conditions beyond their ken. Adaptation usually occurs with regard to perceived changes in the conditions of local environments, but climate change means that people have to adapt to what they do not necessarily perceive as probable changes. The state and development agencies have an important role to play, therefore, in facilitating what can be called 'climate foresight'. This means the ability to utilise climate projections – estimates of most likely climate changes – in the planning of activities and investments related to and affected by climate. In addition, local communities need to inform planning in the drylands, and therefore need to be equipped with information



on climate change and its implications on a localised scale, as different communities will face different climatic effects in different places, and there is a need to understand what the ranges of likely climate change effects are going to be in different locations.

Actions for enabling climate adaptation include:

- The programme will increase the adaptive capacity of pastoralism and of different pastoralist groups to climate needs to be better understood and recognised in the project area. The external factors that hinder the expression of adaptive capacity will be identified through stakeholder engagements and policy dialogues.
- The returns in terms of enhanced adaptive capacity on investments in pastoralism for income generation (through better market access), human and animal health, education and information provision, and empowerment of local adaptive decision-making, will form part of the ESIA studies.
- The investment on water management will help reduce risks from flooding and capture rainfall for agricultural, livestock and ecosystem use, ensuring that resilience is sustained.

The following table examines the programme activities/sub-project's potential negative and positive environmental and social impacts, affecting agricultural production, marketing, processing, transport and financial services facing farmers and other agricultural practitioners, policy makers, institutions and stakeholders. It also provides measures needed to prevent, minimise or mitigate adverse impacts and improve environmental and social performance. A more thorough analysis will be undertaken through discussions with local communities and other stakeholders, if needed.



Activities under Output 1.1 and 1.2	Key issue affecting the Environment	Potential impact (negative and positive)		Standard mitigation measures	Monitoring & indicators	
	Environment	Environmental	Social & Institutional	Economic		
Installation of automatic weather stations and rain gauges as well as upgrading/ rehabilitation existing hydrological stations	 Poor choice of the location causing visual pollution and health issues Poor maintenance of automatic weather stations installation causing pollution Failures of hydrological stations to respond effectively to slow-onset extreme climate events, which decreases the resilience of crops, livestock and the communities 	 Reduce the adverse impacts of Sustainable intensification of agriculture Adoption of climate- smart agricultural production practices Improved hydrological and climate risk modelling and information systems to inform Introduction of community-based water resource and ecological monitoring systems 	 Communal acquisition or individual land to install the equipment's Potential disagreement on the exact site location Improved communication and decision-making processes to maximize the benefit of early warning Strengthened national and communal capacities for integrated climate risks management 	 Effectiveness in production all year- round Improvement of farmers' technical capacities to support integrated climate risks management thus improving productivity 	 A preliminary study, mapping of locations of the small hydraulic infrastructure across ESS studies Apply the Environmental, social and climate screening investment criteria Establish a Community engagement and awareness-raising around climate change and adaptation opportunities, as well as knowledge- sharing within and outside the intervention areas Making appropriate early warning information available to decision makers at a more local level Incorporate systematic feedback from users, and change 	 Level of application of mitigation measures in the preliminary study and mapping of locations of the small hydraulic infrastructures as well as the ESS studies carried out Number of weather stations, rain gauges installed and rehabilitation of existing hydrological stations across the 7 countries Number of persons trained, including decision makers in integrated climate risks management, health and safety Number of persons having access to reliable climate information services Number of radios, newspaper and other

Table 11 Environmental and Social Management Framework (ESMF) by outputs and for Agricultural Value Chain Stages



Activities under Output 1.1 and 1.2	Key issue affecting the Environment	ng the			Standard mitigation measures	Monitoring & indicators
	Environment	Environmental	Social & Institutional	Economic		
					 with the needs of stakeholders and new technology Invest in the quality, accessibility and integration of data Develop and implement an infrastructure management manual related to agro-climatic information services and early warning infrastructure Set up an infrastructure management committee as well as committee trainings on integrated climate risks management 	 communication tools sharing hydrological and climate risk modelling and information systems to inform Number of hectares of land brought under climate- resilient management Number of infrastructure management committees established in relation to Ecosystem-based Adaptation (EbA) interventions Existence of the maintenance manual for infrastructures / works
Establish Agro- Pastoral/Farmer Field Schools (AP/FFS).	Poor participation from the beneficiaries, which decreases the number of farmers that received training	Improve farmers' knowledge in pest identification, best farming practices and improve their ecosystems understanding	At institutional level, effectiveness in best farming techniques/practice s, financial education and knowledge diffusion	 Effectiveness in production Improvement of farmers' technical and entrepreneurial capacities 	 Develop a Stakeholder Engagement Plan Train beneficiaries throughout the value chain in the proper use of phytosanitary products in 	 Level of application of the Stakeholder Engagement Plan Number of FFS established Number of persons trained by FFS



Activities under Output 1.1 and 1.2	Key issue affecting the Environment	Potential impact (negative and positive)			Standard mitigation measures	Monitoring & indicators
	Environment	Environmental	Social & Institutional	Economic		
	on sustainable land preparation				 accordance with the FAO code of good practice Train beneficiaries throughout the value chain on the principles of production and integrated pest management pests and parasites Prioritize local labour 	 Number of persons reporting improved knowledge and practices on pesticides, parasites and sustainable land use management Percentage of cultivated agricultural area that is not treated with pesticides
Installation of nurseries for the selection climate-adapted varieties (e.g., heat- tolerant, submergence, drought and salinity tolerant, pest resistant)	Use of plastic in the nursery system will be discouraged to reduce non degradable waste and improve the environmental performance of the system	 Securing agricultural input Easy access to Agricultural inputs (pesticides, fertilizers and seeds) Improving the quality of local seed Promotion of approved phytosanitary products 	 Improve access of farmers to approved quality fertilizers Improve storage of seed crops and inputs Strengthened national and communal capacities for climate-adapted varieties use 	 Reduction of crop losses, which improves production Job creation Increase women and young beneficiaries' income 	 Sign an agreement with service providers related to products' quality control in each of the 7 countries for quality control and seed certification Enforce procedures for the use, storage and selection of climate-adapted crop varieties Evaluate the performance of local vegetable varieties tolerant to salt and short-cycle varieties to manage climate risks Train beneficiaries throughout the value chain in the 	 Existence of an agreement on products' quality control Level of application of procedures for the use, storage and selection of climate-adapted crop varieties Environmental monitoring on the performance of local vegetable varieties tolerant to salt and short-cycle varieties Number of nurseries installed Number of people having access to the adapted seed/crop variety



Activities under Output 1.1 and 1.2	Key issue affecting the	Potential impact (negative and positive)			Standard mitigation measures	Monitoring & indicators
	Environment	Environmental	Social & Institutional	Economic		
					 proper use of adapted seed/crop varieties Train beneficiaries throughout the value chain on the principles of production and integrated pest management pests and parasites 	Number of people reporting improved knowledge and practices on adapted seed/crop varieties
Undertake mechanical/biological management of pasture restoration (ravines)	Pastures store energy primarily in structural carbohydrates (cellulose etc.), which people cannot digest	 Improve soil fertility Perennial plant growth with Carbon sequestration in pasture Sediment filter from pastures improves nutrient level from overland water flows Reduce loss of nitrogen in the atmosphere 	 Increase value of pastoral landscapes Strengthened national and communal capacities for pasture restoration management 	Improve forage productivity	 Implement actions for the restoration and sustainable management of land as well as the promotion of agroforestry Establish measures to combat soil erosion (reforestation, re- seeding with grass, land preparation and earthworks) Use or promote the High Labor Intensity (HIMO) approach 	 Percentage of activities whose expected impacts are achieved Level of application of measures to combat soil erosion Amount of energy captured in the pasture Yield quantity in the pasture Amount of water infiltration in the pasture Quantity of runoff from precipitation Amount of weedy species in the pasture Number of hectares of land recovered under sustainable management of land



Activities under Output 1.1 and 1.2	Key issue affecting the	Potentia	l impact (negative and	positive)	Standard mitigation measures	Monitoring & indicators
	Environment	Environmental	Social & Institutional	Economic		
Construction and rehabilitation of water points (reservoirs, ponds, wells, boreholes) for farming and to cover 100,000 ha of transhumance pathways)	 Poor groundwater and surface water levels monitoring Poor choice of the location degrading water quality, quantity and causing health issues Poor maintenance of irrigation equipment causing pollution 	 Increased possibility of farming Reducing the risk of flooding and securing production Resilience of beneficiaries to the effects of climate change 	 Reduction in the suffering population of women and young people in terms of access to irrigation for crops Improvement of nutritional and health quality Land tenure issues of the water points site 	 Creation of employment and reduction of unemployment Securing production 	 Establish agreements with local institutions in the 7 countries to monitor land tenure security Sign an agreement in each beneficiary communes with technicians specializing in the maintenance of irrigation equipment Sign an agreement in each beneficiary communes with technicians specializing in the maintenance of irrigation equipment Monitor groundwater levels and water quality in the project reception area Establish a work and maintenance monitoring committee for each cultivated land perimeter Evaluate the performance of local vegetable varieties tolerant to salt and short-cycle 	 Existence of an agreement with local institutions for monitoring land tenure security and with technicians for irrigation equipment maintenance Existence of the performance of local vegetable varieties tolerant to salt and short-cycle varieties Number of people having access to the water points Number of hectares of land irrigated Percentage of irrigation water applying technologies that use water more efficiently Quantity of water that can be retained in the short term in agricultural soil, as well as on agricultural land, and by agricultural irrigation or drainage facilities.



Activities under Output 1.1 and 1.2	Key issue affecting the Environment	Potenti	Potential impact (negative and positive)			Monitoring & indicators
	Environment	Environmental	Social & Institutional	Economic		
Installation of mini-grids to power agricultural – livestock value chains and improve access to energy to households	 Poor maintenance of mini-grids, which disrupts agricultural- livestock value chain Poor choice of the location degrading soil quality 	Provision of renewable energy services, which decreases carbon and reduce greenhouse gas emissions	 Increase Understanding and awareness in the 7 countries about the value added by mini-grids in terms of service reliability and socio-economic stimulation Increase trainings, especially for women and youth Strengthened national and communal capacities for specific policies for mini-grids in their national electrification plans, which improves programme planning and implementation Information gap between users, investors and policymakers 	 Job creation, including for women and youth Creation of other income generation and entrepreneurial opportunities, which further expanded the beneficiaries' development impact Improved financial sustainability Strengthened access to finance for small power producers 	 varieties to manage climate risks Use or promote the HIMO approach Carry out studies to improve the competitiveness of local production Integrate smart metering and demand-side management technologies to reduce costs Develop a community engagement plan that seeks to increase demand and expand productive use of energy Highlight useful areas for public interventions and providing market information to organizations funding R&D and innovation Broaden the number of rural users, with a long- term goal of representing all private sector 	 Level of application of studies to improve the competitiveness of local production Existence of an Infrastructure management manual for mini- grids, community engagement plan and an agreement with local municipalities for monitoring access to energy to households Number of households with improved access to off grid clean energy Number of persons benefiting from agricultural production due to better access to energy to households Potential cumulative tons of CO₂ emission

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Activities under Key issue Output 1.1 and 1.2 affecting the Environment		Potenti	al impact (negative and j	positive)	Standard mitigation measures	Monitoring & indicators
	Environment	Environmental	Social & Institutional	Economic		
			 Lack of regulatory policy for small power producers Lack of support from local governments and rural electrification agencies for small power producers 		 developers across the 7 countries Establish agreements with local municipalities to monitor access to energy to households Develop and implement an infrastructure management manual Establish an infrastructure management committee Train the infrastructure management committees on health and safety Sign agreements with local institutions of energy and infrastructures for the annual maintenance of constructed mini- grids Use the HIMO approach when constructing the mini-grids Prioritize the local workforce 	reductions achieved over a specific timeline of the installed mini-grid technology Number of hectares of land brought under climate- resilient management Number of persons in the management committees related to the mini-grids Number of persons trained in the management of mini-grids, on health and safety Existence of the maintenance and maintenance manual for infrastructures / works



Activities under Output 1.1 and 1.2	Key issue affecting the	Potentia	Potential impact (negative and positive)			Monitoring & indicators
	Environment	Environmental	Social & Institutional	Economic		
Establishment of modern communal poultry farms for youth and women.	 Conflicts between beneficiaries, which decreases the number of farmers receiving training on sustainable poultry farms management Waste disposal issues 	Improve farmers' knowledge in poultry ecosystems	 High variability in flock sizes and management practices in rural chicken production systems At institutional level, effectiveness in best poultry farming techniques/practice s, financial education and knowledge diffusion Poultry disease issues 	 Increase growth and egg production Improvement of farmers' technical and entrepreneurial capacities 	 Develop a Stakeholder Engagement Plan Develop a strategy to prevent disease epidemiology on poultry Train women and youth throughout the value chain on the principles of modern communal poultry farms production Provide operational and financial trainings on women and youth to maintain to deliver the pullets as planned Maintain higher management level of improved stock in the intervention areas Provide extension support to women and youth Provide institutional and organizational support Prioritize local labour 	 Existence of a Stakeholder Engagement Plan Level of application of measures preventing diseases on poultry Number of modern communal poultry farms established Percentage of poultry farms that are not using modern communal poultry farming Number of women and youth trained about modern communal poultry farms Number of women and youth benefiting from modern communal poultry farms

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Activities under Output 1.1 and 1.2	Key issue affecting the	Potentia	ll impact (negative and p	ositive)	Standard mitigation measures	Monitoring & indicators
	Environment	Environmental	Social & Institutional	Economic		
Construction of earth dams for fish farming activities	 Removal of organic soil and vegetation from the area that will covered by the dam base Poor choice of location of dams and pond type disrupting the environment Poor environmental control and monitoring Poor water control and transport Waste disposal issues 	 Prevention of loss of endangered and/or commercially important fish biodiversity Maintenance of fish stock abundance Sustainability of catch Protecting spawning grounds in affluent inflow areas 	national and communal capacities on water resources, environmental assessment, fisheries management, biodiversity	 Cost increase by excavating sediments and replacing with compacted fill Sustainable income Maintenance of fish stock abundance, to increase fish production Production of exportable fish products. 	 Develop a simplified environmental impact assessment (EIA) and an environmental and social management plan (ESMP) Establishment of community-based or user group fisheries management systems Management of the water level to prevent erratic behaviour deleterious to fish stocks Train beneficiaries throughout the value chain on the principles of production and integrated pest management Provide workers with personal protective equipment Produce environmental monitoring reports Use the HIMO approach when constructing the earth dams 	 Level of application of the simplified EIA and ESMP Existence of a community- based/user groups for fisheries management systems Number of earth dams established for fish farming Number of persons benefiting from the construction of earth dams for fish farming activities Development of a monitoring system for preventive measures and protection of the environment, fish biodiversity and migrations, as well as sediment loads. Number of community-based or user group fisheries management systems established Existence of the maintenance and maintenance



Activities under Output 1.1 and 1.2	Key issue affecting the	Potential impact (negative and positive)			Standard mitigation measures	Monitoring & indicators
	Environment	Environmental	Social & Institutional	Economic		
						manual for infrastructures / works
Climate-proofing feeder roads and farm tracks to ensure the year-round and all- weather usability (culverts, sand stabilization, side- drains to reduce erosion) and connexion to markets.	 Transport sector is the major contributor of Carbon emissions Removal of organic soil and vegetation from the area that will covered by the roads Poor environmental control and monitoring Poor water control and transport Waste disposal issues 	 Resilient periodic development plans Improved early impacts of climate change that have caused unprecedented heavy rain and massive floods followed by long spells of drought 	 Prepare people to adapt to the adverse impacts of climate change Improve access of population movements Improve access of rural areas Improve access to basic social services (health centre, maternity ward, schools, markets, etc.) Development of agricultural and economic activities 	 Job creation Improve flow of agricultural products and goods High cost of building and maintaining road infrastructure 	 Identify locations for extreme climate conditions Develop a simplified environmental impact assessment (EIA) and an environmental and social management plan (ESMP) Produce environmental monitoring reports Develop and implement an infrastructure management manual Provide workers with personal protective equipment Establish an infrastructure management committee Train the infrastructure management committees on health and safety Use the HIMO approach when 	 Number of EIAs carried out Level of application of mitigation measures on the ESMP Existence of Environmental monitoring and environmental monitoring Existence of maintenance and maintenance and maintenance of the structures Number of climate-proofing feeder roads established Number of persons benefiting from the construction of the climate-proofing feeder roads and farm tracks



Activities under Output 1.1 and 1.2	Key issue affecting the Environment	Potential impact (negative and positive)			Standard mitigation measures	Monitoring & indicators
		Environmental	Social & Institutional	Economic		
					constructing the climate-proofing feeder roads and farm tracks Prioritise the local workforce Manufacturing	
Construction/ rehabilitation of veterinary points	 Removal of organic soil and vegetation from the area that will covered by the roads Poor environmental control and monitoring Poor waste disposal issues Water conservation and health issues 	 Improve Environmental sustainability 	 Contribute to the improvement of the community and the betterment of public health Strengthened beneficiaries, communities on conservation, education, and research on animal health 	 Animal pain relief, which improves animal growth and production 	 Develop a simplified environmental impact assessment (EIA) and an environmental and social management plan (ESMP) Produce environmental monitoring reports Develop and implement an infrastructure management manual Provide workers with personal protective equipment Establish an infrastructure management committee Train the infrastructure management committees on health and safety 	 Number of EIAs carried out Level of application of mitigation measures on the ESMP Existence of Environmental monitoring and environmental monitoring Existence of maintenance and maintenance and maintenance and maintenance for infrastructure / structures Number of veterinary points established Number of animals having access to the veterinary points Number of animals benefiting from the veterinary services



Activities under Output 1.1 and 1.2	Key issue affecting the Environment	Potential impact (negative and positive)			Standard mitigation measures	Monitoring & indicators
		Environmental	Social & Institutional	Economic		
					 Use the HIMO approach when constructing the climate-proofing feeder roads and farm tracks Prioritize the local workforce Manufacturing 	
		Linked to all o	other activities under O	utput 2.1 and 2.2.		
Production through CSA, Zai techniques, Assisted Natural Regeneration of trees (ANR), agro-forestry, SFM, integrated vegetable garden	 Land preparation – land clearing, cultivation and other issues Use of earth- moving machines, e.g. tractors for clearing Use of agro- chemicals Use of pesticides 	 Forest and wetland removal Land & soil degradation Water and soil pollution Flooding Erosion Bush and pipeline fire Biodiversity loss Waste management GHG emission 	 Increased youth employment with possible decrease in youth restiveness Increased youth interaction and cooperation and ability to solve problems and resolve conflicts Increased sense of pride and responsibility by participating youth Inter- and intra- community conflict on land ownership Possible agitation from youth not presently included in the programme Social exclusion, especially lack of 	 Increased sales and household income Increased youth employment and social well-being Improved nutrition and food security Increased ability of youth to manage their enterprises in productive and profitable manner, thereby increasing GDP and manpower development Increased import substitution But increasing associated environmental and social costs 	 As much as possible, discourage the opening of virgin forest and wetlands Train farmers in sustainable land management practices to reduce environmental impacts Deliver training and agricultural inputs to farmers on-time to enable them to adjust and adapt their planting and harvesting methods and timing Adopt and enforce health, safety and environment rules at production sites to ensure clean, sustainable and 	 Changes in forest and wetland Number of days in a year that the soil is covered with vegetation. Number of farmers that received training on sustainable land preparation Existence of periodic soil analysis Difference between the nitrogen available to an agricultural system (inputs, mainly from livestock manure and chemical fertilisers) and the uptake of nitrogen by agriculture



Activities under Output 1.1 and 1.2	Key issue affecting the Environment	Potentia	al impact (negative and	positive)	Standard mitigation measures	Monitoring & indicators
	Environment	Environmental	Social & Institutional	Economic		
			access to land by women and youth		 environmentally friendly as well as climate-smart production processes Encourage full exploration of the value chain, e.g. convert poultry and other livestock waste into farm manure Develop a clear and simple Stakeholder Engagement Plan (SEP), incl. grievance mechanism, to manage expectations Actively involve women and youth in all components and levels of decision- making within the project 	 (outputs, largely crops and forage). Percentage of cultivated agricultural area that is not treated with pesticides and the percentage of cultivated agricultural area under integrated pest management. Percentage of irrigation water applied by different irrigation technologies, from the least efficient methods (e.g. flooding) to technologies (e.g. drip emitters) that use water more efficiently Quantity of water that can be retained in the short term in agricultural soil, as well as on agricultural land, and by agricultural irrigation or drainage facilities. Existence of Heath, safety and environment manual



Activities underKey issuePotential impact (negative and positive)Output 1.1 and 1.2affecting the Environment		Standard mitigation measures	Monitoring & indicators			
	Environment	Environmental	Social & Institutional	Economic		
						 Develop a strategy for the recovery of domestic organic residues Develop a strategy for the sustainable management and enhancement of harvest and / or processing residues from the three target sectors (rice straw, rice husk, cassava peelings, etc.). Number of value chain enterprises around waste management and valorization, pesticide and agrochemical management Map of soil parameters to assist beneficiaries and key stakeholders to continuously monitor disposal areas or areas where agricultural wastes are used for fertilization/irrigation Level of application of the Stakeholder Engagement Plan



Activities under Output 1.1 and 1.2	Key issue affecting the Environment	Potentia	Potential impact (negative and positive)			Monitoring & indicators
	Environment	Environmental	Social & Institutional	Economic		
						 Number of women and young people engaging in decision making and agricultural production Number of women and young people benefiting from agricultural production Number of women and young people reporting improved knowledge and practices on sustainable land use management and nutrition Establishment of conflict resolution committee meetings Lists of approved projects and their beneficiaries Community agreement on land access for women and youth
Processing	Use of processing machines	 Waste generation Air, water and land pollution GHG emission from machines 	 Unsafe and non- healthy working conditions 	 Increased sales and household income Increased youth employment and social well-being Improved processing 	Encourage the use of renewable and low-carbon energy sources during processing operations	 Number of operators adopting renewable low carbon technologies Number of enterprises established



Activities under Output 1.1 and 1.2	Key issue affecting the Environment	Potentia	l impact (negative and	positive)	Standard mitigation measures	Monitoring & indicators
	Environment	Environmental	Social & Institutional	Economic		
				 capacity, value additions and value chain development Improved nutrition and food security Increased ability of youth to manage their enterprises in productive and profitable manner, thereby increasing GDP and manpower development Increased import substitution But increasing associated environmental and social costs 	 Adopt health, safety and environment rules at processing sites Train farmers in sustainable agro- processing practices to reduce environmental impacts Step up knowledge management and information dissemination to showcase the achievement of the project 	focusing on waste conversion and valorisation Number of entrepreneurs adopting sustainable processing operations Knowledge management /communication plans, stakeholder meeting reports, communication project flyers/leaflets
Marketing	Construction of market infrastructure	 Dust, smoke, noise, ground movement / vibration Deforestation Water pollution Flooding and erosion from poorly Constructed culverts, roads, etc. 	 Better access to market Better access to production and processing sites by supervisory agencies Improved access to rural communities Conflict over land and demand for compensation where infrastructure is to be constructed 	 Improved market penetration Access to market information and market linkage and support services Strengthened market value chain, with more profitable enterprise Improved storage and reduced waste 	 Use construction equipment with moderate decibel during construction Develop/adopt and enforce health, safety and environment rules at construction sites Lawful and willing consent of community/or individuals on land site for market infrastructure 	 Observation of construction equipment for dust, noise, smoke, vibration, etc. Work inspection report on the environmental quality of market infrastructure Health, safety and environment plans Copy of consent of community /individuals on market



Activities under Output 1.1 and 1.2	Key issue affecting the	Potential impact (negative and positive)			Standard mitigation measures	Monitoring & indicators
	Environment	Environmental	Social & Institutional	Economic		
						infrastructure land site
Transport (and supply) ¹⁰	Use of motorized and heavy transportation machines disrupting the soil and causing pollution	GHG emission from transportation	 Influx of rural migrants to agro- enterprise sites and processing areas Increased number of service providers, which boost the economy 	 Increased ownership of motorized and other transport system Increased number of service providers Increased GDP But increasing associated environmental and social costs 	 Organize transport entrepreneurs into an association for easy management Develop a code of conduct, and health, safety and environment regulation for transport operators 	 Code of conduct for transport operators Minutes of meetings of transport operators' association
Financial services	 Poor or lack of adapted agricultural insurance causing un- sustainable production and loss of assets and production Lack of adapted green lending products 	 Sustainable production and loss of assets and production Increased adoption of environmentally sustainable and climate resilient technologies and practices 	Destocking and migration	 Increased financial products Set up the agricultural insurance industry 	 Support private and public actor to develop a mature insurance sector Adopt agricultural insurance Green lending products 	 Number of Public and private partnership established Number of tons of greenhouse gas emissions (CO2) avoided and/or sequestered Number of beneficiaries reporting adoption of environmentally sustainable and



¹⁰ There are certain activities, such as the supply of materials that are not associated directly with production, processing, marketing or transport, which could have different environmental and socio-economic impacts.

Activities under Output 1.1 and 1.2	Key issue affecting the Environment	affecting the			Standard mitigation measures	Monitoring & indicators
		Environmental	Social & Institutional	Economic		
						 climate resilient technologies and practices Number of beneficiaries reporting a significant reduction in the time spent for collecting water or fuel

As part of the ESMF, the programme will give a specific attention to risk, challenges and opportunities facing youth in the region (Table 12).

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Social Group		Women			Men			
Social Group	Risks	Challenges	Opportunities	Risks	Challenges	Opportunities		
Individual	VictimizationMigrationLow level crime	 Unemployment Social Exclusion Land access Limited skills 	 Apprenticeship Access to land and finance Service jobs 	MigrationCriminalityMilitancy	 Unemployment Land access Limited skills 	 Apprenticeship Access to land and finance Service jobs 		
Household Leader	Victimization	 Underemployment Limited skills Limited free time 	Service jobsAccess to finance	MigrationCriminalityMilitancy	UnderemploymentLimited skills	Service jobsAccess to finance		
Graduate	MigrationLow level crime	 Unemployment Underemployment Access to resources 	 Roles as incubators Access to growth markets Land and finance 	MigrationCriminalityMilitancy	 Unemployment Underemployment Access to resources 	 Roles as incubators Access to growth markets Land and finance 		
Non-Graduate	VictimizationMigrationLow level crime	 Unemployment Social Exclusion Limited skills Access to resources 	 Apprenticeship Access to land and finance Service jobs 	MigrationCriminalityMilitancy	 Unemployment Limited skills Access to resources 	 Apprenticeship Access to land and finance Service jobs 		

Table 12 Level of Risk, Challenges and Opportunities facing youth in the Sahel Region

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4.5 Cumulative Impacts

Cumulative impacts and effects are those that arise as a result of an impact and effect from the Project interacting with those from another activity to create an additional impact and effect. These are termed cumulative impacts and effects.

The IMS for each sub-project will consider the cumulative effects that could arise from a combination of programme project effects with those of other existing or planned developments in the surrounding area to be selected. Typical examples arise from impacts of nearby pre-existing or proposed new developments on local communities who may also be exposed to further impacts from the proposed programme.

In addition, the cumulative impact assessments will need to include other developments which might take place as a consequence of the programme in each country, e.g. to provide access to markets, power or water supplies, waste disposal, or to house or provide jobs for people attracted to the area by the programme in each country.

Regenerative Agriculture and Holistically Managed Livestock have demonstrated in semi-arid lands to cumulatively sequester carbon in soils through plant exudates producing increased soil biology¹¹; this will:

- Year-on-year increase soil fertility
- Increase available nutrients to plants through increased levels of bacteria, mycorrhizal fungi and micropredators (Error! Reference source not found.)
- Reduced water run-off through increase in soil permeability
- Increase soil water retention through higher humic organic content
- Increased biodiversity of Regenerative Agriculture, increases natural biodiversity
- Reduced dependency on pesticides through combination of Regenerative Agriculture techniques, increased soil secondary chemical products (SCPs) and available macro- and micro-nutrients and fauna predator biodiversity
- Gradual long term increase in plant transpiration contributing to seasonal rainfall¹² as a result of increased ground plant cover
- The combined effect is a gradual consistent increase in potential for agricultural produce in semi-arid lands
- Contribute to long term reduction in atmospheric CO₂ and increase of regional rainfall

4.6 **Potential Benefits**

4.1.4 Reduced Climate-Related Disaster Risks

Improved access and utilization of hydro-meteorological information and EWS through and improved CIEWS will reduce the climate-related disaster risks through an increase community preparedness for response and recovery, consistent with Sustainable Development Goal (SDG) target 13.1 and SGD target 13.3 on strengthening institutional capacity on climate change mitigation and adaptation.

The following Programme activities will generate benefits for food security, adaptation to climate change (microclimate), and water management:

- Restoration and reforestation (40,000 ha of forests)
- Promotion of agro-forestry into farming systems on 26,000 ha of selected watersheds
- Support for the Integration of Assisted Natural Regeneration of trees (ANR) into 70,000 ha of rain fed production systems
- Crop rotation and association per ecosystems Zai half-moon techniques on 60000 ha.

¹² <u>https://www.learningfromnature.com.au/drought-proof-increasing-rainfall/</u>



¹¹ <u>https://www.nrcs.usda.gov/Soil_Food_Web</u>

It will further provide safety nets for rural people in times of economic distress, helping them offset losses in income caused by weather shocks. This is consistent with SDG 13 on climate change, SDG 15 on sustainable forests, and INDC priorities on agriculture and forestry.

In various agricultural production and processing interventions, fossil fuels are the main source of electricity. Promoting access to renewable energy to power agricultural value chains and produce beyond the 3 months rainy season will contribute to climate resilient and low emission agriculture. This is consistent with the SDG 7.

4.1.5 Water Supply

Managing surface and groundwater watershed offers water supply and quality benefits essential to maintaining a basic living standard. Interventions on water river basin with well-informed information will contribute to managing surface and groundwater watershed including fisheries, cropping, and gardening.

Protection and wise use of river basin resources will also offer water supply and quality benefits that are often essential to maintaining a basic standard of living in both urban and rural areas. This is consistent with SDG 15 on protection, restoration and promotion of sustainable use of terrestrial ecosystems and halting and reverse land degradation and halt biodiversity loss as well as the SDG 6 on water.

Through these activities, the project will contribute to reducing 26,084,691 MtCO2e (10% of the GGWI emission reduction target) and will contribute to each country Nationally Determined Contributions (NDCs. Throughout the lifespan of the project and contributing to the SDG 13.

The development of local contingency plans will provide sustainable funding for conservation actions by prioritising proposals for funding that involve local people in negotiated resource use and co-management of resources.

4.1.6 Economic Co-Benefits

The project economic analysis is based on a 20 year impact given the 6 years implementation period. CIEWS and weather information systems and other water, land, energy infrastructures will last 30 to 40 year lifespan and operations and maintenance (O&M) costs are assumed to be between 1% of programme investments and to be after under the government and Met agencies budget.

The cost-benefit analysis shows that with a 10% discount rate, the discounted net present value of the project is valued at about 90 million USD. The economic internal rate of return is 24%, which exceeds the discount rate of 10%. Though the internal rate of return is 24% for the base case, there are other benefits not captured in this analysis highlighted previously. The implication of not capturing the increase in the differences with or without the project in the face of climate change is that benefits estimated in this analysis provide a lower bound on the value of the project.

Three sensitivity test cases were examined:

- total cost increased by 20%;
- total benefits decreased by 20%; and
- total cost increased by 20% and total benefits simultaneously decreased by 20%.

In all cases, the project remains economically feasible and EIRR remains above the minimum threshold. The programme is considered are viable is implies that the programme would be viable even with higher discount rates. It will generate jobs and opportunities 50% women and 45% of youth from the 817,922 direct beneficiaries and 5,332,754 beneficiaries.

With increased resilience, access to climate information and services for forecast based financing and programmes, access to insurance schemes, productivity will increase for food security and surpluses to be marketed to generate income. Integrated landscape management will promote the multi-functionality of landscapes and provide a mechanism that enables local stakeholders to reduce conflicts among different types of specialised resource users who differ in their dependencies on a range of ecosystem services (e.g., herders, farmers, or fishers).

This work will address conflict over natural resources and climate induced. Other water infrastructure will also help to de-escalate tensions, promote stability, and provide resilience to hydrological shocks that might



otherwise act as a trigger for conflict. Targeted areas will include transhumance corridors and rangelands. This is consistent with SDG 17 on partnership.

4.1.7 Reduced Air Quality Impacts from Non-Renewable Energy Sources

The programme will contribute to reduced smoke from use of fuelwood, educational and health and other offfarm activities beyond daylight hours, management of pest and diseases can be achieved with the use of renewable energy and adoption of sustainable best adaptation and mitigation practices and technologies. The programme will address both health risks posed by the use of biomass to their immediate users including burns and direct inhalation of toxic PM2.5 particles including slash and burn practices replaced by CSA. It will generate positive impact through a decentralised electrification, improved income and better livelihood for smallholder farmers and rural communities. With regard to climate smart agriculture, agro forestry, the programme will contribute to improving ecosystem services (recreational, cultural services, natural, spiritual, medicinal, etc.). This contributes to the SDG 3 on heath.

4.1.8 Gender Considerations

The project has set targets for with 45% of women and 55% will be dedicated to Youth consistently with SGD 5 (gender equality). Specific actions will be developed to strengthen the technical and managerial capacities of women aimed at providing them with appropriate tools for identifying and managing climate risks along the entire value chains. Specific training will be developed on asset access, financial education, and agricultural production and processing and CIEWS. As stated in the gender action plan, gender-disaggregated data will be assessed against the appropriate indicator to measure enhanced access for women to assets, inputs, and financial products including insurance. The project intends to close the gender gap, as women represent 60 to 70% of the work force and do not have access to productive assets, finance and knowledge. Women will be included into the National Steering committee to influence the main strategic decisions. Sharing information to strengthen Integrated Climate Risk Management and Forecast based Financing along production basin and the transhumance routes will strengthen resilience.

4.1.9 Promotion of Climate Resilience

If the proposed mitigation measures and monitoring plan are implemented, the programme can have an overall positive impact on the environment. The promotion of climate resilient is expected to significantly improve the agro-ecosystems with positive impacts on the climate and environmental systems. More climate and environmental provisioning services (including food and freshwater), regulating services (including carbon sequestration, flood and erosion prevention, land degradation prevention and restoration, water purification, soil remediation, and pollination), supporting services (including soil formation and nutrient cycling), and cultural services (including recreation and aesthetics), if done well, can bring environmental benefits. Such services will also enrich the biodiversity by creating new habitats and corridors for bird and animal populations. The mitigation monitoring strategy will ensure the preservation of virgin forests and wetlands with the possibility of ecotourism projects in the future. Adopting agroforestry (retaining trees in farmlands) and mixed cropping (with cover crops and anchor crops) will increase soil fertility, prevent erosion and reduce the usage of pesticides and agrochemicals, resulting in an overall cleaner and safer environment, agricultural insurance.

In the Sahel, pastoralism capitalised on an extreme environment. Although it is accused of producing excessive amounts of greenhouse gases per kilogram of milk or meat produced, a research study conducted in Senegal shows that pastoral landscapes can actually have a neutral carbon balance: emissions from animals are offset by carbon sequestration in soils and plants. These findings were obtained using an original evaluation method, known as ecosystem assessment, which integrates the use of the pastoral landscape as a whole, according to the seasons and the areas grazed by herds. The C balance varied considerably with the seasons, with a positive monthly balance in the wet season, from July to October, and a negative monthly balance in the cold dry season from November to February and the hot dry season from March to June. These findings indicate that current standards for calculating feeding behaviour and methane emissions from ruminant digestion need to be revised downwards. Other implications are possible, such as improving the carbon balance through specific local practices and promoting these areas on the carbon market. Preserving this livestock system is also one way of fostering development and ensuring greater security in these regions. However, it will be useful to develop further research in other Sahelian countries to consolidate these findings.



4.1.10 Support Other Programmes Promoting Negative Impact Reduction from Pastoral Livestock Farming

Currently, CIRAD is interested in working to modify the vision of the negative impact of (agro) pastoral livestock farming systems on the environment. It is about enabling (agro) pastoral farmers to continue to live from their practices, by producing and having the ability to adapt and participate in the mitigation of climate change effects. Undeniably, Sahelian (agro) pastoral livestock systems are threatened, in particular, because they are declared as significant emitters of GHGs, due to insufficient data, repositories, and reliable scientific and technical skills. Therefore, that would be interesting to see how to support (agro) pastoralists to produce and have the capacity to adapt and participate in mitigation, policy-makers and regional bodies to understand, build and update the repositories on the environmental impact of livestock systems and to sustain their environmental, economic, and social contributions. At design, the proposed project activities will be assessed for sustainability at different scales (household, territorial, national, and regional)

4.1.11 Capture Updated Information on Pastoral and Agro-Pastoral Practices within the Scope of Agro-Ecology

Furthermore, from pastoralists to small-scale crop-livestock farmers, many livestock keepers already practice what has a similitude of agro-ecological. The project will also explore ways to capture and fully document the pastoral and agropastoral practices that really fall within the scope of agro-ecology, to measure their extent and to assess their economic and social viability.

4.1.12 Social Benefits

There are several social benefits to be derived from the programme. On a national scale, the project directly addresses countries' challenging economic situation by focusing on rural poverty alleviation through public-private-producer partnerships (PPPP) in agri-business, generating youth employment, contributing to women and youth empowerment, developing agriculture and countering costly importation of food through increased domestic food production, improving the agricultural sector with insurance and support better access to credit.

This project will indirectly generate jobs for youth and women, boost agricultural production, increase access to markets and finance, and improve nutrition as well as social inclusion of youth and women while building the resilience to climate change.

The small-scale infrastructure that will be constructed during this project could include land improvements, climate feeder roads, culverts, small bridges as well as production and processing facilities that will also benefit economic activities as well as farmers, fishermen and other community members in surrounding areas.

4.7 Potential Negative Impacts

4.1.12.1 Land and Soil Degradation

Due to poor land preparation and potential opening of forest and wetland, soil erosion and flooding might increase, which would reduce the climate and soil and nutrient support services of the environment. Unsustainable use of agrochemicals is also expected to contribute to the contamination of water and soil resources, desertification and soil erosion, dunes movements. Pervasive soil erosion and gullying due to the nature of soil, high rainfall, agricultural land use pressure and unsustainable land practices.

4.1.12.2 Groundwater Depletion

Agricultural intensification and increased extraction of groundwater for irrigation purposes leads to increased evapotranspiration, which in turn has the potential to lower the groundwater level in the long term and decreases the availability of groundwater for ecosystems and societies. This is especially relevant in the case of non-directed irrigation practices, such as field flooding and surface irrigation.

4.1.12.3 Water Pollution

Water pollution is likely because of poor waste management and increased use of agrochemicals during the production processes, which may impact water sources and cause eutrophication (i.e. an excess of nutrients).



4.1.12.4 Degradation/loss of Forest and Wetland Removal / Protected Areas

Agricultural intensification and provision of market and production infrastructure, including road construction/rehabilitation, small-scale irrigation and drainage projects as well as aquaculture (especially on state farms) in wetland and swamp areas, can lead to forest and wetland removals.

4.1.12.5 Flooding

High levels of rainfall produce large areas of back beach that are perpetually wet and waterlogged during the peak of the rainy season (July-October). A moderate impact is expected from increased rainfall, poor land management, and the regular flood regimes, which may lead to inundation and devastation of agricultural lands and washing away of fishponds and affect every segment of the value chain including marketing. This is expected to come with significant losses to the agro-entrepreneurs. Possible mitigation measures include avoiding production in low-lying areas, using climate and weather information to improve the timing of agricultural production activity, adopting early-maturity cultivars and signing on to flood agricultural insurance.

4.1.12.6 Erosion and Gully Creation

Erosion and gully will incur a moderate impact level that may result from increased rainfall intensity and high storms as well as unsustainable land practices especially in densely populated areas around poorly consolidated sandstone and shale soils. Adapting cultivation to suit the topography and soil conditions will assist in mitigating the impacts.

4.1.12.7 Bush Fire

Bush fires due to unsustainable land preparation ('slash and burn') still presents a risk with significant impacts. Both bush and pipeline fires destroy crops, processing facilities, forests, and biodiversity. Fires kill animals and scares birds and bee. Even human beings are at very high risk. Some of the mitigation options include making sure that production and processing facilities are clear of the pipeline right of way, and to entrench sustainable land management principles.

4.1.12.8 Loss of Biodiversity

Overall, the programme presents a low risk to biodiversity loss, mainly through cereal cultivation and fish farming, which attract birds and can lead to depletion of bird populations.

4.1.12.9 Lack of Waste Management

Poor waste management in rice, cassava, maize, poultry and other animal farming as well as aquaculture can result in increased pests that may create nuisances in the environment.

4.1.12.10 Use of Agrochemicals Resulting in Environmental Degradation

Pesticides, herbicides and insecticides can potentially cause environmental pollution as it can contribute to water pollution resulting in eutrophication, which in turn affects aquatic life and ecosystem function. Excessive use of fertilisers and agrochemicals can potentially pollute water sources, and may render the produced crop unfit for human consumption (a collateral damage with severe health and nutrition impacts). Considering the land mass required for the large-scale cultivation, breeding and processing of the value chains, there is undoubtedly the likelihood of infestation by pests, currently within the proposed area or migratory pests. An Integrated Pest Management Plan (IPMP) is the main safeguard instrument for tackling pest management issues (see Integrated Pest Management Framework (IPMF) in Annex 12).

4.1.13 Social

4.1.13.1 Limitations on Access to Land and Loss of Land

Security of tenure is a serious challenge for all models of land tenure in the Sahel region. Most of the land 'owned' or used by either individuals, families or communities in rural areas has no statutory or customary right of occupancy. Some of the private and communal land access arrangements do not guarantee social inclusion of the direct beneficiaries of the project -youth and women. In many rural communities in each of the participating country, women cannot own (or access) land independent of their male partners, while in primogeniture societies with patrilineal inheritance systems, many youth and women often do not have access



to family lands. Without secure ownership or at least guaranteed access to land for women and youth, the development of sustainable climate resilient value chains will be extremely difficult, if not impossible. As such, the current land arrangement in each country can have a highly negative impact on the regional programme. Vice versa, if land arrangements for women and youth made in the context of the project are not appropriately secured or authorised by the relevant community and government institutions, there is a high risk that they will be pushed off the land, losing whatever investments made including the risk transfer with the micro and macro-insurance.

The project will facilitate land negotiation for beneficiaries within their communities under the auspices of the community leadership and the existing land tenure laws. In essence, IFAD uses various tools and approaches to strengthen poor rural people's access and tenure, and their ability to better manage land and natural resources, individually and collectively. These include:

- Recognising and documenting group rights to rangelands and grazing lands, forests and artisanal fishing waters;
- Recognising and documenting smallholder farmers' land and water rights in irrigation schemes;
- Strengthening women's secure access to land;
- Using geographic information systems to map land and natural resource rights, use and management; and
- Identifying best practices in securing these rights through business partnerships between smallholder farmers and investors.

4.1.13.2 Social Exclusion

In the rural parts of the Sahel, the traditional ruler, usually in consultation with a council of elders (chiefs), mostly takes community-level decisions. Women and youth can provide input through their respective groups or associations or during larger community ('town hall') meetings. In practice, however, there are still many communities where women and youth are not sufficiently represented during community meetings and have limited say, let alone influence, in decision-making processes. As a result, women and youth not only risk being marginalised in land access, but also when opportunities or slots are allocated for economic activities in the community. Unless specific measures are taken to address the different forms of social exclusion that are prevalent in many communities, there is a significant risk that women and youth will not be adequately represented in decision making processes that concern them.

4.1.13.3 Unsafe and Non-Healthy Working Conditions

Working conditions across sectors are generally poor because of general poverty, poor production methods, climatic conditions, limited awareness of, and non-compliance with health & safety standards. In the agricultural sector, most farmers do backbreaking work and are regularly exposed to agro-chemical toxins from the overuse of fertiliser and pesticides as well as water and air pollution due to sandstorm. In addition, due to the high level of poverty, children often help in the production and/or processing of agricultural commodities...

4.1.13.4 Youth Restiveness

Youth restiveness in the Sahel has resulted from years of deep poverty and developmental neglect amidst vast oil wealth, centralization of oil revenues, environmental damage affecting traditional livelihoods, and conservative elite politics. Youth restiveness manifests itself in different types of aggressive behaviour, particularly among young males within and around local communities, and in extreme cases lead to militancy (creation of armed groups involved in kidnapping and attacking oil installations) and 'cultism' (existence of school campus-based confraternities that engage in moneymaking criminal activities).

Youth restiveness has increased since 2015, in the form of social conflict, kidnapping for ransom, rape, armed robbery and other social vices. It is widely accepted that this increase is due to lack of jobs and decent means of livelihood for youth, caused mainly by exclusion and poor governance, but exacerbated by low productivity and environmental degradation from the oil exploitation activities. It can have a negative impact on the project, and vice versa, the project can exacerbate restiveness when youth are not adequately consulted or selected into the project and attempt to disturb others from participating fully.



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4.1.13.5 Elite Capture

Weak and non-transparent governance structures as well as exclusionary and divisive politics in each country y have allowed the emergence of political, economic and community elites at all levels. This presents a risk to the project when, for example, politicians attempt to influence and 'hijack' the community selection process, when service providers misuse infrastructure funds, or when community leaders direct the beneficiary selection process to their family members or friends. Elite capture can undermine the project's ability to reach youth and women entrepreneurs, and vice versa, the project's scale and scope may attract attention from dishonest elites by providing opportunities for diversion of funds. Specific mitigation measures are presented and including imposing quotas for women (40%), inclusion of youth and targeting of the most vulnerable communities through IFAD targeting mechanisms

4.1.13.6 Resource Use Conflicts

The recent escalation of conflicts over land between farmers and pastoralists, precipitated by climate change and the Boko Haram crisis around lac chad, conflict in Mali and Libya, has also weakened the region. Due to its focus on agriculture, the project may lead to larger areas of land under cultivation and no longer freely accessible, and thereby exacerbate tensions between farmers and pastoralists. The targeted areas are not affected by the conflicts and the programme as well as IFAD baseline investments promote dialogue and conflict resolution through this programme

4.1.13.7 Physical and Economic Displacement

Physical displacement refers to relocation, loss of residential land, or loss of shelter, while economic displacement implies the "substantial" or major loss of livelihood source such as loss of land, assets, access to assets and income sources. As Agri-enterprise projects supported under this programme are expected to be nil, no physical and economic displacement is foreseen. The list of screening investment Criteria's will be applied to the identified activities to achieve the results expected.

5 STAKEHOLDER ENGAGEMENT AND PUBLIC PARTICIPATION

5.1 Public Consultation

For this programme, the consultation processes were held between 2017/2018 a follow up for few countries in 2019 during the finalization of IFAD baseline investments in Burkina Faso for the PAPFA project that started in 2017-2018; in Chad for the Re-PER project in 2018 and Mali, Mauritania, Niger, the Gambia and Senegal, all started the MERIT, PROGRES, PRECIS, ROOTS and Agri-Jeunes projects, respectively in 2018-2019.

In 2020, consultation processes were held to develop a Joint RBA regional project to address the COVID-19, Conflicts and Climate Change challenges in Burkina Faso, Chad, Mali, Mauritania, Niger and Senegal. In each country, consultations were held with the Ministry of Agriculture, the National Environmental Standards and Regulations Enforcement Agency, Ministry of Environment and agencies, Ministry of Women and social affairs and other sector ministries, Insurance companies (Public and private), Met agencies.

At the local level, a wide range of consultations were held with local communities and beneficiaries, CBOs, NGOs, private actors and religious chiefs.

Annex 8 on stakeholder engagement and 0 summarises consultations for the baseline of individual participating countries, including the list of participants, issues raised and how the specific baseline project will address them during implementation. The plan for ongoing stakeholder engagement and the framework for the future ESMS specific plans is also provided in Annex 7.

5.2 FPIC

Given the diversity of situations and contexts when seeking FPIC, there is no simple or universal way to carry it out. Rather, the various instruments that are enshrined in FPIC and implementation experiences provide general guidelines and qualitative requirements that guide the processes to obtain FPIC. Soliciting FPIC of local communities cannot be reduced to a checklist that is "ticked" as it is carried out. Therefore, one of the



first steps for seeking FPIC is to agree with the concerned community on the FPIC process itself. As local communities vary greatly in their sociocultural aspects, history, institutions and approaches to development, the processes that they will agree to undertake will differ.

The following risks (and proposed minimising of risks) are relevant to FPIC implementation and should form part of the content /agendas of community consultations.

- **Economic risks:** Productive specialization (vs traditional diversification strategy): vulnerability to market shocks; increased seasonality effects on income and labour cycles; Competition for labour from other sectors;
 - Minimise risks by: including / incentivising the values of traditional farming within HESAD project and promoting small-scale, community owned / family owned other farming enterprises
- **Climate change risks:** Productive transformation without access to technology and information for water and soil management; Shift to less diversified farming systems
 - Minimise by risks minimising strategy above as well as ensuring investment in appropriate (organic) technology and communications/ training in same.
- **Social risks:** Weakening of social capital and organisation capacity; Exclusion of vulnerable groups including women and youth;
 - Minimise risks by: (i) ensuring guarantees for inclusion of women and youth through women & youth quotas and quora for FPIC & related decision-making to go forward; (ii) a gender and inclusion policy to guide; including short course or module on gender & development as part of capacity-building; incorporating national youth policy into FPIC implementation.
- Risks for nutrition and food security: Increased complexity of nutritional problems (e.g., transition to unhealthy diets); Decrease in food security; Loss of traditional knowledge, food culture and agrobiodiversity
 - Minimise risks by encouraging traditional rotational /diversified household farming and consumption
 of healthy home-grown foods; incentivising local shops / markets for stocking whole wheat flour and
 brown rice; natural juices and other healthy foods; educating communities about dangers of
 consuming imported processed foods and sugary/soda drinks etc.
- **Institutional risks:** Weak inter-institutional coordination for actions at the regional level; Weak managerial and organisational capacity to implement investment at the local level (communities and producers' organisations)
 - Minimise risks by linking to local / regional initiatives for cohesive policy and strategic long-term planning

5.3 Social Inclusion

The project will directly contribute to social inclusion by actively focusing on unemployed youth and women. Most disadvantaged people including disabled will be also considered. It will use a combination of geographical and direct targeting, as well as self-targeting approaches. The Stakeholder Engagement Plan (see Annex 7) will be used to better target the most vulnerable groups (youth, women). In relation to overall national implementation, the project will target: (i) areas where poor, vulnerable social groups are highly concentrated; (ii) areas that are highly vulnerable to climate change, and (iii) zones in which production for the target value chains is located.

1.4 Stakeholder Engagement, Community Sensitisation and Expectation Management

Experience with previous IFAD and other economic and social investment projects in the region indicate that stakeholder engagement and sensitisation are of critical importance to project success. In the absence of clear communication with relevant stakeholders and appropriate sensitization of local communities, rumours, misinformation and speculation thrive, and accusations and tensions easily boil over into (violent) conflict within and between communities. Therefore, for many of the potential environmental and social impacts, the above-



mentioned management plan recommends the development of a Stakeholder Engagement Plan (SEP) with a clear communication strategy and the organisation of community sensitization activities on a regular basis. The plan will also take cognisance of the Gender Action and Learning System (GALS) methodology used to ensure the inclusion of women and youth in addition to the gender action plan in the project.

The GALS is a community-led household methodology that aims to give women and men more control over their personal, household, community and organisational development. It comprises role playing and visual tools to help farmers plan their lives and sustainable livelihoods. GALS is most often used to support farmers in more collaborative intra-household decision-making, and generally for development purposes. The GALS framework and strategy will be developed and included in the SEP.

A SEP will be developed for each of the category B and C sub-projects, and will include at least the following components (Framework SEP provided in Annex 7):

- Principles, objectives and scope of engagement
- Regulations and (institutional) requirements
- Summary of previous stakeholder engagement activities
- Stakeholder mapping and analysis
- Strategies of engagement (including GALS)
- Key messages and communication channels
- Grievance mechanism
- Resources and responsibilities
- Monitoring and evaluation.

Considering the large project scale and considerable social risks, the development of a detailed SEP is desirable. If, for whatever reason, this is not feasible then the development of a detailed communication ('outreach') strategy during the first six months of project implementation would be the minimum required.

Community sensitization (i.e. awareness-raising and training) activities need to be clear, timely and culturally appropriate; this means that key messages need to be communicated in a format and language that is easy to understand, preferably by someone who speaks the local language and is familiar with local customs and sensitivities, and during a time that is convenient and sufficient for all key community groups, particularly women and youth.

To ensure appropriate community entry and reach target groups most effectively and efficiently, it is advisable to not only rely on project staff or commercial service providers, but also include those civil society organisations that are already active in and trusted by the selected communities.

To ensure such expectations do not reach unrealistic levels and as a result cause disappointment or exacerbate existing tensions, it is important that expectations are continuously and appropriately managed, which is a responsibility of all project stakeholders.

The mechanism by which stakeholder and public engagement is achieved is described in the ESMP under Section 6.

6 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP)

6.1 Overview

A high-level overview is provided of the environmental and social management measures to apply an impact management strategy that would enhance positive impacts and mitigate negative impacts.

The ESMP presented below are relevant to the entire programme, including the agro-enterprise and related infrastructure sub-projects whose locations are not yet known and insurance products. It also covers climate measures, including adaptation and GHG reduction. It combines the mitigations measures proposed for each country and include a section on financial instruments.

It should be noted that a number of activities have to be carried out during the various phases of each of the sub-projects in each Programme country, to ensure adequate environmental and social impact management.



These include, but are not limited to a negotiation phase, start-up/inception phase and an implementation phase as defined in the project delivery found in Section 6.3 of this document.

6.2 Environmental and Social Management Plan

The tables below present the environmental, climate and social management plans. For each of the potential overall impacts described in Section 4, the plans indicate a significance rating and (geographical) extent/ prevalence of each impact, recommend mitigation measures, identify who is responsible for implementation of the mitigation measures, how implementation can be verified, and how frequently. The plans have been developed with inputs from a broad range of stakeholders consulted during the ESMF field mission. The recommended mitigation measures mostly apply to all countries; where more information was available, they also recommend context-specific measures for relevant states or areas within states. Nonetheless, a specific ESMP will be developed per sub-project to build upon the contents of the present programme (see Annex 5). A copy of the ESMPs should be made available to all programme staff, participating institutions and other key stakeholder representatives as well as used in community sensitization (i.e. awareness-raising and training) activities.



Impact	Significance Rating (likelihood x consequence)	Extent / Prevalence	Recommended Mitigation Measures	Responsibility for implemention	Means of verification	Timing / frequency of verification
			ENVIRONMENTAL MITIGATION PL	.AN		
Land and soil degradation (incl. agrochemicals)	Medium	All countries	 Train farmers and service providers on sustainable land development and preparation methods, including zero or minimum tillage Encourage agricultural intensification (incl. multi-cropping and re-use) and discourage opening of virgin forest for cropping Encourage mixed cropping with cover crops and anchor crops with the main crop Avoiding soil compaction or flooding to reduce methane emissions as experienced in paddy rice systems 	 PMU Service providers 	 Number of farmers that received training on sustainable land preparation Percent decline in forest and wetland Soil analysis 	 Annual Baseline, mid- term, end-term Baseline, mid- term, end-term
Depletion of groundwater resources	Medium	All countries	 Train farmers and service providers to reduce the water needs for their crops, for instance by using more drought-resistant varieties, improved farming calendars or crop associations. Train farmers and service providers on improved irrigation techniques, including: Drip irrigation Irrigating early in the morning or late in the evening Usage of an irrigation schedule taking into account crop development stages, soil, field and meteorological conditions, Mulching with organic materials Train farmers and service providers on groundwater recharge techniques, including: 	 PMU Service providers 	 Number of farmers that received training on improved irrigation or groundwater recharge techniques Number of farmers implementing such techniques Development of groundwater levels over time 	 Annual Baseline, mid- term, end-term

Table 11 Environmental (including Climate Change) Management Plan

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Impact	Significance Rating (likelihood x consequence)	Extent / Prevalence	Recommended Mitigation Measures	Responsibility for implemention	Means of verification	Timing / frequency of verification
			 Arrangement of physical obstacles on slopes, including plants with strong root systems and/or stone or compacted earth structures, Increasing topsoil permeability by selective tilling, planting crops which contribute to soil decompaction, stimulating soil microorganisms and/or installation of percolation trenches Train farmers and service providers to avoid soil compaction by avoidance of heavy machinery, livestock passage and other means. 			
Water pollution	Medium	All countries	 Minimize use of non-organic fertilizers and encourage use of organic (biodegradable) manure Encourage the development of an environmentally-smart, agricultural value chain by training youth on how to run an enterprise focused on the sustainable application of agrochemicals and pesticides Guidance contained in Annex 12 Invest in boreholes with water treatment facility to reduce iron content of fish pond water Encourage the use of simple, effective technologies and better hygiene to prevent pollution including poultry odour and discharge from fish farms 	PMU Service providers	 Number of farmers that use organic manure instead of non-organic fertilizer Number of youth engaged in integrated agrochemicals and pesticides application Number of boreholes with water treatment facility Number of entrepreneurs trained in simple pollution abatement technologies 	Annual
Forest and wetland removal	Medium	All countries	 Discourage opening of forest lands and draining of wetlands for farming Encourage the production of tree crops such as cocoa and oil palm in the forest belt to improve canopy ecosystems 	 PMU Service providers 	 Percent decline in forest and wetland Number of tree crop enterprises established 	 Reference/baseli ne, Mid-term, End-Term Mid-term, End- Term



Impact	Significance Rating (likelihood x consequence)	Extent / Prevalence	Recommended Mitigation Measures	Responsibility for implemention	Means of verification	Timing / frequency of verification
Erosion and gully	Medium	All countries	 Encourage agronomic practices such as contour ploughing, terraces, and bunds in erosion-prone areas Encourage the planting of cover crops, inter-cropping and cultivation of crops like cashew and raffia bamboo, whose root systems improve the binding of the soil Encourage buffers along riverbank to prevent erosion 	 PMU Service providers 	Number of farmers in erosion-prone areas adopting sustainable agronomic practices	Mid-termEnd-Term
Bush and pipeline fire	High	All countries	 Train farmers and service providers on sustainable land development and preparation methods including no slashing and burning Introduction of hay enterprise equipment for making livestock forage from grasses Discourage enterprise development around pipelines and maintain the pipeline right of way Encourage enforcement of environmental regulations to prevent bush burning Provide agriculture insurance. 	 PMU, Service providers 	Number of farmers reporting impact due to bush and pipeline fires	Annual
Loss of biodiversity	Low	All countries	 Innovate on traditional bird restraining techniques such as use of scare-crow in farms, use of nets on fish ponds, etc. Training on sustainable use of pesticides and introduction to organic pesticides like Neem oil 	PMU Service providers	 Use of bird restraining techniques Number of entrepreneurs trained on pest management 	Annual
Waste proliferation	Low	All countries	Train enterprise owners on sustainable waste management by simple and effective technologies and better hygiene to liquidate waste, including poultry odour	 PMU Service providers 	Number of entrepreneurs that received training on waste management	Annual



Impact	Significance Rating (likelihood x consequence)	Extent / Prevalence	Recommended Mitigation Measures	Responsibility for implemention	Means of verification	Timing / frequency of verification
			 Create a value chain for waste valorisation by converting waste to products, for example rice, maize and cassava waste can be converted into animal feed, while poultry waste can be converted into fish feed and farm manure Introduce aquaponics to reduce water loss and increase nitrogen intake to crops 		Number of enterprises established focusing on waste conversion and valorisation	
Pollution of water and crops due to use of agrochemicals	Moderate	All countries	 Collaborate with seed centres such as IITA, Africa Rice, etc. to encourage development and use of improved and resilient local crop varieties to reduce pest resistance and use of agro- chemicals Encourage the development of an environmentally-smart, agricultural value chain by training youth on how to run an enterprise focused on the sustainable application of agrochemicals and pesticides Encourage use of organic manure 	PMU Service providers	 Number of collaboration with specialized centres Number of youth trained in integrated pesticide and agrochemicals management Number of enterprises using organic manure 	Annual
Flooding	Moderate	All countries	 Integrate use of local flood forecasting knowledge with climate information Encourage regular and timely dissemination of hydro-meteorological information to agri-entrepreneurs Link agri-entrepreneurs to 'once and for all' agriculture insurance from the National Agriculture Insurance Corporation. This should perhaps be a pre-condition in certain enterprises and (e.g. flood-prone) areas Timely delivery of training and agricultural inputs to assist farmers to 	PMU Service providers	 Number of farmers receiving and using climate information Number of entrepreneurs that signed on to agricultural insurance Number of fish farmers using collapsible tanks and concrete ponds Number of farmers impacted due to flooding No of ADP substations created 	 Monthly Quarterly Annual



Impact	Significance Rating (likelihood x consequence)	Extent / Prevalence	Recommended Mitigation Measures	Responsibility for implemention	Means of verification	Timing / frequency of verification
			 adjust and adapt their planting and harvesting methods and timing Work with farmers to use the right crop varieties / cultivars at the right time – early maturing variety to take advantage of the flood receding season in flood prone area is key Discourage siting of ponds near rivers or sea and promote use of collapsible plastic tank or concrete ponds a bit further inland Encourage the ADP to establish at least one sub-station per local government area 			
GHG emissions	Moderate	All countries	 Discourage excessive opening of new virgin forests and wetlands Train farmers to draining rice paddies in mid-season to reduce CH4 emission and improvement of nutrient management including the retention of rice residues Encourage full exploration of the value chain, for example convert poultry and other livestock waste into farm manure Encourage carbon sequestration by planting perennial crops and grass species Encourage use of clean, renewable energy sources such as solar and wind power for processing activities 	PMU Service providers	 Percent decline in forest and wetland Number of farmers trained in sustainable rice paddies management Number of enterprise established around waste conversion and valorisation Use of perennial crops and grass species Number of processing units using sustainable energy 	 Reference/baseli ne, Mid-term, End-Term Annual

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6.3 Forward Works Programme

6.3.1 Project Delivery Phases

Negotiation Phase (September 2021 – end 2022):

- Agree on final (objective) criteria and community selection;
- Develop a non-technical project information document (max 2 3 pages) with relevant contact information for each country; and
- Agree on the proposed screening criteria and forms for the proposed sub-projects.

Start-up / Inception Phase (early 2022 – mid-2022):

- Develop a stakeholder engagement plan (or at least a detailed communication/outreach strategy);
- Sensitization of key stakeholders, particularly at community level, about project objectives, scope, target groups, beneficiary selection and grievance mechanism;
- Establish grievance mechanism and train relevant committee members and programme staff;
- Conduct detailed studies (on environment, socio-economic/livelihood conditions) for each of the selected communities to establish a baseline for all key indicators;
- Conduct a small-scale land access survey among a sample of farmers to find out if men will be willing to release land to women and who are the value chain actors; and
- Develop template contracts that incorporate the environmental and social guidelines for contractors presented in Annex 3.

Implementation Phase (mid-2022 - 2026):

• Regular sensitization of key stakeholders, particularly at community level of the potential environmental and social impacts of the project and how to implement the recommended mitigation measures.

6.4 Roles and Responsibilities

6.4.1 Programme Governance and Programme Steering Committee

Governance is the framework within which authority is exercised in organisations. This framework includes but is not limited to:

- Rules,
- Policies,
- Procedures,
- Norms,
- Relationships,
- Systems, and
- Processes.

This framework influences how:

- Objectives of the organisation are set and achieved,
- Risk is monitored and assessed, and
- Performance is optimised.

Factors to consider in defining an organisational structure include but are not limited to:

- Degree of alignment with organisational objectives,
- Specialization capabilities,
- Span of control, efficiency, and effectiveness,
- Clear path for escalation of decisions,
- Clear line and scope of authority,
- Delegation capabilities,



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- Accountability assignment,
- Responsibility assignment,
- Adaptability of design,
- Simplicity of design,
- Efficiency of performance,
- Cost considerations,
- Physical locations (e.g., collocated, regional, and virtual), and
- Clear communication (e.g., policies, status of work, and organisation's vision).

6.4.2 Core Principles of Project Governance

- Ensure a Single Point of Accountability (SPA) for each project
 - A single leadership point of accountability ensures clarity of leadership and timeliness of decision making
- Assign a competent Project Manager (PM) to lead each project or group of projects
 - It is not enough to nominate someone to be accountable, the right person, an effective project leader, must be selected to be accountable
 - Appropriate project management skills
 - Given sufficient authority
- Make project management independent of asset ownership
 - Project Manager is specialised in delivery of projects, not necessarily expert in operation of projects (s different skill set)
- Establish an enabling governance oversight structure (Steering Committee)
 - The Steering Committee has overall responsibility for the Governance of the Programme and its Projects
 - The authority of the Steering Committee and how it relates to the Programme must be laid out in policy and procedural documentation; in this way, the Steering Committee's governance will not duplicate or impede the role of Programme and project management
 - The Steering Committee defines the roles, responsibilities and performance criteria for project management
 - The role of the Steering Committee is that of an independent review body that oversees and monitors programme and project management, and then relays Programme information and advice to facilitate decision making of the corporate executive (e.g. Board of the Programme)
- Split stakeholder management and project decision making
 - Projects have to deal with multiple Stakeholders. Project decision making and stakeholder management are essential for project success, but they are two separate activities and need to be treated as such. Separation prevents decision making forums from clogging with tangential Stakeholder agendas.
- Separate Project Governance from company governance
- Will reduce the number of decision making layers and associated delays and inefficiencies
- Provide timely reporting and disclosure
 - The Programme will have valid requirements in terms of reporting and Stakeholder involvement;
 dedicated reporting mechanism established by the Programme can address the former and the Programme Governance framework must address the latter.

Key governance issues that have caused project problems elsewhere include:

- Failure to give project manager sufficient authority to execute necessary decisions
- A bulky governance oversight body that is an impediment to project decision making
- Shortcutting approval steps and pushing projects "no matter what"
- Absence of clear link between the project and corporate priorities
 - No agreed-upon measures of project success
 - Inconsistent application of business and project objectives
- No senior management project ownership or leadership within the corporation



- Inadequate resources and skills to deliver the project, i.e. lack of pragmatism about owner capabilities
- Lack of effective engagement with stakeholders

Where good governance is applied, projects will:

- Ensure that the required approvals are obtained at each appropriate stage of the project
- Enable the project team to deliver the required outcomes
- Ensure appropriate review of issues encountered within the project
- Describe the proper flow of information about the project to all stakeholders (i.e. documented IMS Communication Process)
- Provide a framework for project disclosures (IMS Communication Process)
- Outline relationships between internal and external group involved in the project (IMS Communication Process)
- Foster a culture of frank internal disclosure of project information, and
- Provide access to best practices and independent advice



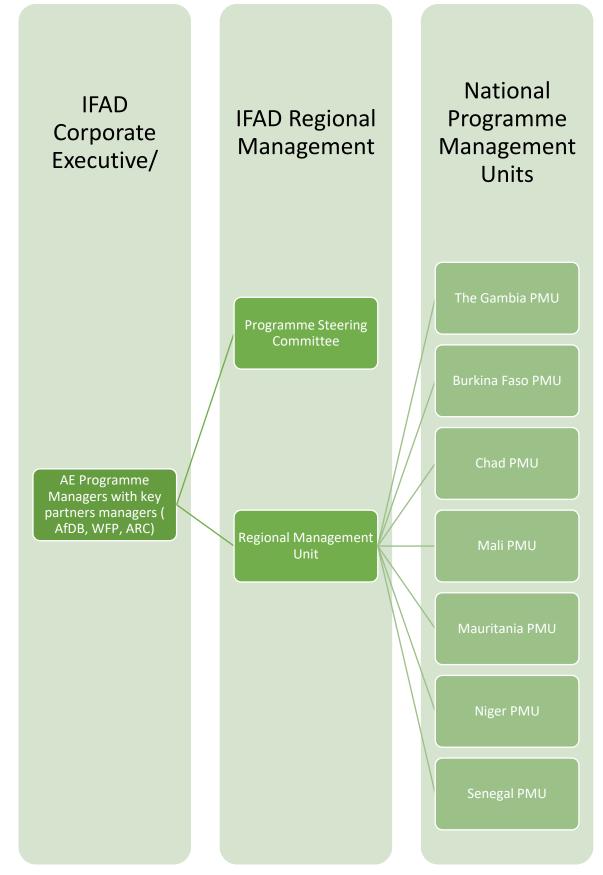


Figure 12 Governance of Programme



6.4.4 Key Roles

Board of the Programme: The members of the Board of the Programme have the executive decision making authority over the Programme.

Programme Steering Committee: The members of the Programme Steering Committee is appointed by the Board of the Programme to provide overall direction of the Programme. The Programme Steering Committee is accountable for the success of the Programme through the Regional Programme Manager of the Regional Coordination Unit (RCU). It has certain responsibilities and authority for the Programme, set by the Board of the Programme, but it has no Programme decision-making power by itself. The Programme Steering Committee provides leadership on culture and values, owns the business case, keeps the Programme aligned with the organisation's strategy and portfolio direction, governs Programme risk, works with other sponsors, focuses on the realisation of benefits, ensures continuity, and provides assurance and feedback. The Programme Steering Committee's duty is to ensure that a coherent and supportive relationship exists between GCF/IFAD business strategy and the Programme's goals. The go/no-go decisions on Projects will be made based on the recommendations of the Programme Steering Committee. For the Regional Programme Manager, the Programme Steering Committee provides timely guidance, enables trade-offs, clarifies the decision-making framework, sets business priorities and strategies, communicates business issues, provides resources when requested, engenders trust, manages relationships, supports the Regional Programme Manager's role, and promotes ethical working. The Programme Steering Committee is a support resource for the Regional Programme Manager in engaging with stakeholders and, when needed, can be the final arbitrator between conflicting stakeholders.

Regional Programme Manager: The Regional Programme Manager has the authority to run the Programme on a day-to-day basis on behalf of the Board of the Programme and is accountable for delivering successful Programme outcomes. The Regional Programme Manager's prime responsibility is to ensure that the Programme produces the required outcomes, to the required standard of quality, and within the specified constraints of time and cost, thus delivering the benefits defined in the business case. The Regional Programme Manager **reports to one member of Board of the Programme**, for example VP Projects or CEO. The Regional Programme Manager does not report to the governance Programme Steering Committee, as this would add a layer into the organisational structure and thus would be a violation of good governance.

The following table summarises the high-level roles and responsibilities of the entities:



Table 13 Roles and Responsibilities of Entities

Entity	Responsible Unit	Role(s) in Programme	Responsibilities
GCF	GCF Secretariat	Provision of funds and coordination with the AE Together with national key stakeholders, provides members of the Program's Steering Committee	Coordination with the AE on the programme implementation
IFAD	ACD: Regional Coordination Unit (RCU) (Lead by Regional Programme Manager)	Disbursal of funds to Project countries Development and implementation of the Integrated Management System (IMS) and ESMF. Provide technical support to Nation Field Coordinator.	Coordination of the programme in connexion with countries PMU and IFAD country teams and reporting to the GCF through the RCU
Country project	Each Country Project Management Unit (PMU) (Lead by Country Project Managers)	Coordination and support the implementation of sub- projects- Adapt core IMS to local constraints (normally at Work Instruction level).	Supervise the development of the sub-project specific Integrated Management and ESMF at project and sub project level, Monitoring of the ESMF Ensuring contractors / sub- contractors respect ESMF
			Reporting to higher entities
Sub-Project / country	Communities or Contractors	Implementation of one or more sub-projects as presented below	Implementation of ESMF requirements; Development et of Sub-Project-specific Integrated Management System (IMS) and ESMP (see Annex 5). Monitoring as per ESMF
			Ensuring contractors / sub- contractors respect ESMF Reporting to higher entities
Contractors and sub-contractors	Safeguard specialist of the contractors-sub contractors	Implementation of one or more sub projects and report to the country project PMU	Integrate the ESMF recommendations into the work and Follow ESMF requirements Reporting to PMU
Relevant national ministries (Agriculture, environment, economic development, interior etc.)	Respective focal points from the planning and implementation units	Ensure compliance with the respective government policy and guidelines, particularly environmental and social safeguarding	Participate in programme planning and coordination meetings Provide technical and governance input to other entities



Table 14 Roles and Responsibilities of Accredited Entity (AE)

Role and Responsibilities	Accredited Entity				
Output 1.1: Increased access to agro-climatic information services and early warning infrastructure to supp integrated climate risks management					
 1.1.2. Install 560 automatic weather stations and 700 rain gauges; upgrade/rehabilitate 210 existing hydrological stations in the seven countries 1.1.5. Construct rainwater harvesting infrastructure along seven transhumance corridors 	Met agencies will ensure that activities are screened against the eligibility criteria and ensure that they activities follow all stages: i) the assessment of the baseline scenario in targeted areas; ii) the application of additionally criteria; iii) a barrier analysis; iv) an investment analysis, v) mitigation impacts; vi) co-benefits analysis; vii) preliminary climate risk assessment, and viii) verification of activities using the exclusion list				
Output 2.1: Best available adaptation/mitigation techno and implemented with agricultural insurance schemes	logies (forest and land use; renewable energy) adopted				
 2.1.1. Establish 500 Agro-Pastoral/Farmer Field Schools (AP/FFS) 2.1.2. Set up 1,000 nurseries to grow select climate-adapted varieties (e.g. heat, submergence, drought and salinity-tolerant, pest resistant) 	IFAD will ensure that activities are screened against the eligibility criteria and ensure that they activities follow all stages: i) the assessment of the baseline scenario in targeted areas; ii) the application of additionally criteria; iii) a barrier analysis; iv) an investment analysis, v) mitigation impacts; vi) co-benefits analysis; vii) preliminary climate risk assessment, and viii) verification of activities using the exclusion list				
2.1.3. Promote CSA, dune stabilization techniques; restoration of degraded land and sustainable forest management on 200,000 ha	IFAD will ensure that activities are screened against the eligibility criteria and ensure that they activities follow all stages:				
 2.1.4. Undertake mechanical/biological management to restore 100,000 ha of pastureland across the 7 countries 2.1.5. Promote sustainable forest management techniques for 40,000 ha of forests 2.1.6. Promote the integration of agroforestry into farming systems on 26,000 ha of selected watersheds. 2.1.7. Support the integration of Assisted Natural Regeneration of trees (ANR) into 70,000 ha of rain-fed production systems 2.1.8. Promote Zaï and half-moon techniques on 60,000 ha 	 The assessment of the baseline scenario in targeted areas; The application of additionally criteria; A barrier analysis; An investment analysis, Mitigation impacts; Co-benefits analysis; Preliminary climate risk assessment, and Verification of activities using the exclusion list 				
2.1.9. Construction and rehabilitation of 175 water points (reservoirs, ponds, wells, boreholes) for farming and along 100,000 km of transhumance pathways					
2.1.10 Install 392 mini-grids to power agricultural and livestock value chains and improve households' access to energy					



Role and Responsibilities	Accredited Entity
Output 2.2. Diversified livelihood through the promotion renewable energy (executing entities)	n of income generating activities powered with
 2.2.1. Establishment of 200 modern communal poultry farms for youth and women 2.2.2. Construction of 200 earth dams for fish farming activities 2.2.3. Establishment of 100 integrated vegetable gardens based on community models on at least 4-5 ha (solar pumps, compost systems, day-care facility for women, agroforestry and rotation of crops; transport systems) 2.2.5. Climate-proof 700 feeder roads and farm tracks to ensure year-round and all-weather usability (culverts, sand stabilization, side-drains to reduce erosion, etc.) and connection to markets 2.2.7. Construct/rehabilitate 200 warehouses and processing facilities that are resilient to climate change 2.2.8. Construct or rehabilitate 100 vet points 2.2.9. Support the deployment of 100 micro grid to power agricultural value chains 	 IFAD will ensure that activities are screened against the eligibility criteria and ensure that they activities follow all stages: The assessment of the baseline scenario in targeted areas; The application of additionally criteria; A barrier analysis; An investment analysis, Mitigation impacts; Co-benefits analysis; Preliminary climate risk assessment, and Verification of activities using the exclusion list
3.1.9. Support the implementation of the digressive premiums payments for smallholder farmers	 WFP will ensure that activities are screened against the eligibility criteria and ensure that they activities follow all stages: The assessment of the baseline scenario in targeted areas; The application of additionally criteria; A barrier analysis; An investment analysis, Mitigation impacts; Co-benefits analysis; Preliminary climate risk assessment, and Verification of activities using the exclusion list

6.4.5 Regional Coordination Unit (RCU)

The Regional Coordination Unit (RCU) acts as the project management office (PMO) of a corporation and does not yet exist and will be established once the Programme has been commenced. All high-level support to the field Project Managers will be coordinated from RCU.

The Regional Programme Manager will be based at RCU and will have access to:

- Programme Steering Committee
- Their supervisor, (member of the Board of the Programme)
- All Project Managers, both in RCU, and PMUs via videoconferencing
- Access to best practice and independent advice
- Services normally found in a corporate Project Management Office, i.e. cost engineer, scheduler, etc. (Figure 13 Organisation of Regional Coordination Unit (RCU))



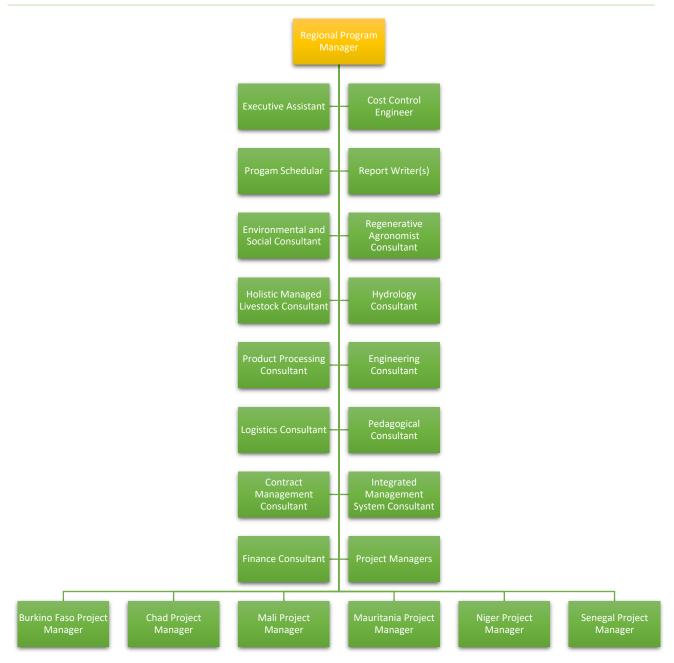


Figure 13 Organisation of Regional Coordination Unit (RCU)

Note: Consultants are not necessarily full-time employees, and may be third-party consultants. Supporting staff are not shown.

Regional Programme Manager: The Regional Programme Manager will have deep experience in managing complex diverse programs while ensuring that key stakeholders are fully engaged. The manager will be intimately familiar with ISO 21500 Guidance on project management.

Project Manager/Engineers: will plan and lead projects, often several projects simultaneously. They will be experts in project management and should be accredited PMP, or equivalent. The number of Project manager/Engineers will depend on the volume of projects.

Cost Control Engineer: will manage of project cost and schedule, involving such activities as estimating, cost control, cost forecasting, investment appraisal and risk analysis. Cost Engineers will budget, plan and monitor projects. They seek the optimum balance between cost, quality and time requirements.



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Programme Schedular: will be experienced in develop and managing schedules for projects. They will assist Regional Programme Manager with schedule planning, coordinate tasks, and monitor the timelines of scheduled assignments.

Report Writer(s): due to the volume of documentation required to satisfy all key stakeholders and public engagement, there may need to be more than one Report Writer to coordinate inputs from various sources and deliver Programme Reports to the Regional Programme Manager for review and approval for issue.

Executive Assistant: will manage all aspects of the office, including Programme human resources, legal and accounts on behalf of the Regional Programme Manager.

Environmental, Social and Safety Consultant: will plan, deliver and monitor all E&S programs. The consultant will also ensure the IMS, that all appropriate safety standards are respected on the projects.

Regenerative Agronomist: will be an expert in the regenerative agriculture techniques to sequester atmospheric CO_2 into the soil, increase soil fertility and water retention for longer growing season. They will be responsible to plan and monitor all agricultural projects with respect to long term soil fertility.

Holistic Managed Livestock Consultant: will be an expert in holistically managed livestock for the sequestration of CO₂, increased long term fertility of the soil and minimisation of net CH₄ generation.

Hydrology Consultant: will be a field expert in hydrology and hydrogeology, the movement, distribution, and management of water on and in the soil, including the water cycle, water resources, and environmental watershed sustainability. They will be responsible to plan and monitor all modifications that increase water retention in and on the earth to maximise the productivity of agricultural projects.

Product Processing Consultant: will advise, plan and monitor all product processing plant projects for the agricultural projects, such as canning, freezing, dairy and abattoirs.

Engineering Consultant: will advise, plan and monitor engineering projects for the processing of agricultural produce and for infrastructure projects.

Logistics Consultant: will advise, plan and monitor all logistics projects to support the agricultural and product processing projects.

Pedagogical Consultant: will advise, plan and monitor all significant, repetitive training activities, to efficacy in student retention of training, delivery time and cost. The consultant will manage the syllabus, training module development and delivery, train the trainers, training support resources.

Contract Management Consultant: given the potential volume of contracts, they will ensure that all contact management systems are in place and meet international standards. They will supervise all contract administrators.

Integrated Management System (IMS) Consultant: will ensure all the management systems meet appropriate ISO standards for the delivery IFAD agricultural projects.

Finance Consultant: will ensure all projects are well costed to meet international standards, and manage the sourcing of third-party finance for the projects.

6.4.6 Country Project Management Units (PMUs):

The Country Project Management Units are the offices in each country where most of the project managers will be based to deliver the Programme's projects.

6.4.7 Management Responsibilities

As the Accredited Entity (AE), IFAD will be responsible for the overall oversight of this framework implementation and will report to GCF under the Accreditation Master Agreement (AMA) and the Funded Activity Agreement (FAA). IFAD will be consistent with its role as an international financial institution through the use of IFAD's resources approved by its management, Governing Council, Executive Board and any other decision-making body. For managing the GCF resources, a special Trust Fund will be established within IFAD



as a stand-alone facility and IFAD will administrate the transfer of GCF resources to the seven participating countries (Burkina Faso, Chad, Mali, Mauritania, Niger, Senegal and The Gambia). In line with GCF Standards, IFAD will sign a subsidiary agreement with the Executive Entities (AfDB, ARC and WFP) and will transfer funds directly to these respective entities. Under such an agreement, AfDB, ARC and WFP will procure goods and services to support the implementation of activities at the country level.

The proposed Programme will be managed by the Ministry of Agriculture in each country through the financially and administratively autonomous national Programme Management Unit of IFAD's baseline investment in each country. National steering committees in the seven countries will be established and will include the ministries of strategic interest, within which focal points will be designated, as well as producer organisations, insurance committees and banks, among others. For the implementation of the ESMF, In which will include overall responsibility for safeguards due diligence and compliance monitoring.

A Regional Coordination Unit (RCU) hosted at the G5 Sahel Secretariat in Nouakchott will be established to provide general guidance for implementation. The RCU will be in charge of the development of learning materials and knowledge products, the organisation of exchange visits between the seven countries for farmers and ministerial technical teams to share experiences (South-South and Triangular Cooperation) and support the establishment of a knowledge platform specific to each country, as well as a regional platform for the scaling up of this initiative in the entire region and in other countries of the GGW.

A PMU will be established, which will be composed of an environmental and social safeguards specialist at country level and a country-level policy engagement in IFAD who will be responsible for all issues related to stakeholders' engagement. Specifically, in terms of environmental and social (E&S) risk management across the Programme components, the PMU for the Programme will be responsible for:

- Overall oversight of the E&S risk assessment, management, and monitoring processes in line with this ESMF, for each component of the Programme ;
- Establishing and implementing a reporting system from both public and private local institutions to IFAD on implementation of E&S requirements;
- Engaging an independent E&S auditor to ensure that both public and private local institutions are implementing E&S requirements set out in the ESMF consistently;
- Assuming responsibility for stakeholders' engagement, maintaining adequate stakeholder engagement and grievance redress mechanism and ensuring that both public and private local institutions maintain the same at their level. The PMU will establish a communication line between IFAD Country Offices and ensure the Programme success on this aspect. The PMU will establish a quarterly coordination meeting of implementing partners to monitor progress of activities and share lessons learnt from one region to another. Local Advisory Committees (LACs) will be established to provide opportunities for affected communities to communicate amongst themselves and with local governments, and be responsible for assisting the implementation and M&E of the interventions. LACs will work with local authorities and communities in developing, regularly monitoring and evaluating the site-specific, on the ground watershed activities, particularly on irrigation and the implementation of the ESMP.
- Designing, organising and implementing capacity building programmes for the Programme's activities and other key stakeholders;
- Defining, jointly with the respective seven local governments, the Programme priorities based on technical and policy development priorities and;
- Monitoring the implementation of the Programme in consultation with the seven local governments.

IFAD plays an essential role in setting the overall E&S standards and ensuring the requirements are met under each component through the process. Its responsibilities include:

- Setting applicable E&S requirements (E&S requirement setting);
- Screening for E&S risk and impacts (E&S screening);
- E&S due diligence and risk management (E&S due diligence);
- E&S monitoring;
- E&S reporting; and



• Independent E&S audit.

As an Executive Entity (EE), AfDB will be consistent with its role as an international financial institution through the use of AfDB's resources approved by its management and Board of Directors and any other decision-making body. AfDB will be responsible of the overall coordination and technical assistance for the component 3 on climate risk transfer in all seven countries in coordination with the Africa Risk Capacity (Output 3.2. of Component 3). It will also coordinate with countries on the implementation of activities under Output 1.1. of Component 1 on risk preparedness.

As an EE, ARC will be consistent with its role as an international robust disaster risk management agency through the use of ARC's resources approved by its management and Board of Directors and any other decision-making body. ARC will be responsible for the implementation of activities of Output 1.1.7 - Coordination and knowledge sharing with ACMAD and other regional institutions (e.g. AGRHYMET, Climate Outlook Forum) on best practices, complementarities and consistencies with regional products and warnings; activities under Output 1.1 (of Component 1) and all activities under Output 3.2 of Component 3 in coordination with AfDB.

As an EE, WFP will be consistent with its role as an international financial institution through the use of WFP's resources approved by its management and Executive Board and any other decision-making body. WFP will be responsible for the implementation of Output 3.1 (Component 3) by providing support to countries on micro insurance using the R4 integrated climate risk management approach and adapting it to each context.

6.5 **Project Delivery and Administration**

6.5.1 Project Delivery

A number of activities have to be carried out during the various phases of each of the projects, for each country independently, to ensure adequate environmental and social impact management. These include, but are not limited, to the following:

Negotiation Phase (September 2021 – end 2022):

- Agree on final (objective) criteria and community selection;
- Develop a non-technical project information document (max 2 3 pages) with relevant contact information for each regions; and
- Agree on the proposed screening criteria and forms for the proposed sub-projects.

Start-up / Inception Phase (early 2022 – mid-2022):

- Develop a stakeholder engagement plan (or at least a detailed communication/outreach strategy);
- Sensitization of key stakeholders, particularly at community level, about project objectives, scope, target groups, beneficiary selection and grievance mechanism;
- Establish grievance mechanism and train relevant committee members and Programme staff;
- Conduct detailed studies (on environment, socio-economic/livelihood conditions) for each of the selected communities to establish a baseline for all key indicators;
- Conduct a small-scale land access survey among a sample of farmers to find out if men will be willing to release land to women and who are the value chain actors; and
- Develop template contracts that incorporate the environmental and social guidelines for contractors presented in Annex 3.

Implementation Phase (mid-2022 - 2026):

• Regular sensitization of key stakeholders, particularly at community level of the potential environmental and social impacts of the project and how to implement the recommended mitigation measures.



6.6 Screening of Sub-Projects

6.6.1 Overview

For activities which may have potential risks, a list of climate eligibility criteria for the selection of projects / activities to be supported under the Programme implementation is presented in Annex 2

Eligibility Criteria

The climate eligibility criteria were developed to:

- Guide the process of assessing the eligibility of country subprojects from a climate perspective;
- Identify the baseline data needed for the seven selected countries (Burkina Faso, Chad, Mali, Mauritania, Niger, Senegal, The Gambia) to conduct assessments and detailed due diligence;
- Identify any potential issues at an early stage of the Programme in each country and targeted region; and
- Guide and inform the on-site due diligence process carried out during the implementation phase for all
 pre-defined subprojects. The criteria to be used in the assessment include climate eligibility criteria,
 criteria for targeted areas and beneficiaries, investment guidelines and environmental and social
 management safeguards.

Potential subprojects will be analysed to ensure they do not contain elements on the exclusion list. Sub-projects could for example be the installation of a Mini Grid or Farmers Field Schools.

This criteria will be applied to each of the activities under the Programme. These investments criteria's will also be further defined in a Programme Implementation Manual (PIM) for each activity.

To address potential negative impacts a preliminary study, mapping of locations of the small hydraulic infrastructure across and ESS studies, will be conducted and final selection of sites summarised in an inception report 3 months after.

The Risk Management Process of IFAD's Integrated Management System (Section 2.3.3, 0) will identify all known Risks and will establish which risk threats can be eliminated, avoided, accepted, mitigated or transferred, and risk opportunities that can be exploited, shared, enhanced or accepted. The Risk Process will update the Risk Register on a regular basis to ensure that all risks are identified and adequately controlled, and reviewed on a regular basis. The option to transfer risk will often be in the form of insurance. The Risk Management Process of IFAD IMS will have an Insurance Procedure in which insurance eligibility criteria will be used ensure that a project is not over insured.

6.6.2 Environmental and Social Screening

The environmental and social screening of sub-projects is the screening of project's activities that may have potential environmental, social and climate constraints related to the implementation of the project and which will be faced by those responsible for its implementation. Sub projects are all activities identified under the various outputs under the Programme. This screening is therefore meant to check for potential environmental and social safeguard issues by assessing potential impacts and, through a new project-specific ESMP, identifying appropriate design mitigation measures. The outcome of the screening process is a review of the final sub-project proposal that will include:

- Compliance with the above-described ESMP and ESMF as well as IFAD's SECAP guidance statements;
- Potential for the project to cause adverse environmental impacts;
- Potential for the project to cause adverse climate impacts;
- Potential for the project to cause adverse social impacts;
- Adequacy and feasibility of the proposed safeguard mitigation measures and monitoring plans, including any local community's plan or process framework for restrictions of inclusion.

In the event of sub-projects with medium (and therefore manageable) environmental and social impacts, an environmental and/or social review should be undertaken, based on the IFAD SECAP and the ESMP and ESMF outlined in chapters 6 and 7. Such a review will examine the sub-project's potential negative and positive



environmental and social impacts as well as define any measures needed to prevent, minimise or mitigate adverse impacts and improve environmental and social performance. In most cases, this will be a simple review by reference to existing reports and studies (if available), and through discussions with local communities and other stakeholders, if needed.

6.6.3 Screening Criteria

Baseline scenario and additional criteria: In line with IFAD-SECAP, an assessment of all subprojects identified in this Programme proposal will be carried out in the following stages: i) the assessment of the baseline scenario in targeted areas; ii) the application of additionally criteria; iii) a barrier analysis; iv) an investment analysis, v) mitigation impacts; vi) co-benefits analysis; vii) preliminary climate risk assessment, and viii) verification of activities using the exclusion list. The steps of the process are:

- Step 1: Each country PMU will conduct the baseline assessments and then based on this information, evaluate the subprojects identified under the relevant outputs in this proposal according to additionally criteria, barriers analysis, investment analysis, co-benefits analysis and exclusion list.
- Step 2: If the subproject does not meet the criteria analysed in each stage, it will not be approved for financing under this proposal.
- Step 3: If criteria are met, then the subproject will be approved for implementation.

Baseline scenario: The main assumption is that without the Programme, country projects and GCF funds, the following activities described under the selected outputs will not be carried out in the selected areas. The table below identifies the relevant activities and the assessments that will need to be carried out for each one to establish the baseline scenario prior to Programme implementation.

Baseline scenario - without the GCF regional programme	Criteria/evidence
Output 1.1: Increased access to agro-climatic info support integrated climate risks management	ormation services and early warning infrastructure to
 Install 560 automatic weather stations and 700 rain gauges; upgrade/rehabilitate 210 existing hydrological stations in the seven countries. Construct rainwater harvesting infrastructure along seven transhumance corridors. 	 Assessment of current CIEWS infrastructure and potential for future investments in the same areas in each country and targeted region. Assessment of current transhumance corridors and status of rainwater harvesting infrastructure at the start-up phase and identification of locations in each country and target regions.
	gies (forest and land use; renewable energy) adopted and gricultural insurance schemes
 Establish 500 Agro-Pastoral/Farmer Field Schools (AP/FFS). Set up 1,000 nurseries to grow select climate- adapted varieties (e.g., heat, submergence, drought and salinity-tolerant, pest resistant). 	Assessment and confirmation of the baseline situation (current and historical) regarding the Agro-Pastoral/Farmer Field Schools (AP/FFS) and nurseries in the future locations and any potential future investments planned at the start-up phase; identification of the specific locations in each country and targeted regions.
 Promote CSA, dune stabilization techniques; restoration of degraded land and sustainable forest management on 200,000 ha. Undertake mechanical/biological management to restore 100,000 ha of pastureland across the 7 countries. Promote sustainable forest management techniques for 40,000 ha of forests. Promote the integration of agroforestry into farming systems on 26,000 ha of selected watersheds. 	Assessment of current and historical production techniques (CSA, Zaï, mechanical/biological management, sustainable forest management techniques, agroforestry, ANR) used in the specific locations in each country.

Table 15 Baseline Scenario Screening Criteria



Baseline scenario - without the GCF regional programme	Criteria/evidence
 Support the integration of Assisted Natural Regeneration of trees (ANR) into 70,000 ha of rain-fed production systems. Promote Zaï and half-moon techniques on 60,000 ha. 	
 Construction and rehabilitation of 175 water points (reservoirs, ponds, wells, boreholes) for farming and along 100,000 km of transhumance pathways Install 392 mini-grids to power agricultural and livestock value chains and improve households' access to energy 	Assess and confirm the baseline situation (historical and current) of water points and mini-grids and potential investment planned at the start-up phase and identification of the specific locations in each country and target regions.
	ncome generating activities powered with renewable energy cuting entities)
 Establishment of 200 modern communal poultry farms for youth and women Construction of 200 earth dams for fish farming activities Establishment of 100 integrated vegetable gardens based on community models on at least 4-5 ha (solar pumps, compost systems, daycare facility for women, agroforestry and rotation of crops; transport systems) Climate-proof 700 feeder roads and farm tracks to ensure year-round and all-weather usability (culverts, sand stabilization, side-drains to reduce erosion, etc.) and connection to markets Construct/rehabilitate 200 warehouses and processing facilities that are resilient to climate change Construct or rehabilitate 100 vet points Support the deployment of 100 micro grid to power agricultural value chains 	Assessment of the baseline situation and confirm the activities selection under the Programme at start-up and identification of the specific locations in each country and target regions
Support the implementation of the digressive premiums payments for smallholder farmers	 The micro insurance schemes should target: Companies with experience and willingness to distribute micro-insurance activities, and in particular climate and agricultural or pastoral risk insurance Capacity and willingness to develop a long-term sustainable insurance strategy, Capacity to distribute and scale up the insurance scheme, Capacity to use digital or mobile solutions Costs of the services. Note: to ensure financial viability, a light business case with financial projections will be developed with the selected insurer.



Additional criteria: Main assumption, subprojects in each of the selected countries that fall under one or several of the aspects described in the table below need the funds provided by the proposed regional Programme in order to be executed and thus, can be considered additional.

Table 16 Additional Project Selection Criteria

Aspect of subprojects	Criteria/evidence
Output 1.1: Increased access to agro-climatic information services and early warning infrastructure to support integrated climate risks management 1.1.2. Installation of 560 automatic weather stations and 700 rain gauges; upgrade/rehabilitate existing 210 hydrological stations across the 7 countries	 The CIEWS equipment shall meet at least the following criteria: WMO standards Equipment shall provide seasonal and near-term forecasts in formats accessible to farmers and strengthen early warning systems. Equipment will be able to scale down climate impact modelling and scenario planning to the regional and local levels
1.1.5. Construction of rainwater harvesting infrastructure along 7 transhumance corridors	 The rainwater harvesting infrastructure shall meet at least the following criteria: Capacity to collect of the adequate rainwater Built with concrete and sustainable materials
Output 2.1: Best available adaptation/ mitigation technologies (forest and land use; renewable energy) adopted and implemented with agricultural insurance schemes 2.1.1. Establish 500 Agro-Pastoral/Farmer Field Schools (AP/FFS).	 The AP/FFS uses at least one the following: Solar panels for irrigation Sustainable agriculture techniques Measures to counter soil erosion (e.g. terracing, contour bunds, drainage, agroforestry, perennial crops) Practices that increase carbon and organic matter in soil Water conservation and efficiency measures such as water harvesting, efficient irrigation infrastructure, check dams, flood management and drainage
2.1.2. Set up 1,000 nurseries to grow select climate-adapted varieties (e.g., heat, submergence, drought and salinity tolerant, pest resistant)	 The nurseries should use at least the following: Solar panels for irrigation Sustainable agriculture techniques Measures to counter soil erosion (e.g. terracing, contour bunds, drainage, agroforestry, perennial crops). Increase soil carbon and improve the management of organic matter in the soil. Efficient water conservation and use measures such as water harvesting, efficient irrigation infrastructure, check dams, flood management and drainage

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Aspect of subprojects	Criteria/evidence
2.1.3. Promote CSA, dune stabilization techniques, restoration of degraded land and sustainable forest management on 200,000 ha	 Subproject implemented in an area where at least one of the following applies: Agroforestry, forest-pastoral or ecosystem-based adaptation systems and supply chains are established or enhanced Area/ha of habitat or kilometers rehabilitated to reduce external shocks such as land degradation through replanting and protection Evidence of human-assisted natural regeneration is provided Where applicable, evidence of avoided deforestation is provided Switching from conventional logging to reduced-impact logging, and extending the rotation cycle or cutting age Afforestation (plantations) and reforestation on previously deforested land Note: Activities that drain native ecosystems or degrade hydrological systems shall not be eligible.
2.1.4. Undertake mechanical/biological management to restore 100,000 ha of pastureland across the 7 countries	 Mechanical/biological management systems shall use/integrate at least one: Locally proven restoration techniques Proven erosion control measures, reduced tillage intensity, use of cover crops, crop rotation, higher inputs of organic matter in soil, processing and application of manure, perennial cropping systems, deep rooting species Cultivation of organic soils, inhibitor management, drainage management, improved crop breeds and biotechnology that reduce emissions, and water management (e.g. in paddy rice) Leakage assessment, including displaced land use activities outside the project area, should be considered.
2.1.5. Promote sustainable forest management techniques for 40,000 ha of forests	Subprojects shall demonstrate: • Human-assisted natural regeneration techniques increase adaptive capacity of the
2.1.6. Promote the integration of agroforestry into farming systems on 26,000 ha of selected watersheds	 communities (evidence should be provided) Leakage assessment, including displaced land-use activities outside the project area, have been considered
2.1.7. Support the integration of Assisted Natural Regeneration of trees (ANR) into 70,000 ha of rain-fed production systems	 Afforestation (plantations) and reforestation on previously deforested land restoration of degraded natural land-based habitats A substantial reduction in net GHG emissions or carbon intensity (tCO2e/unit of outcome) through efficient nitrogen fertilizer use (by improving the rate, type, timing, placement or
2.1.8. Promote Zaï and half-moon techniques on 60,000 ha	 precision of application), cultivation of organic soils, inhibitor management, manure management including anaerobic digestion Note: Activities that drain native ecosystems or degrade hydrological systems shall not be eligible.



Aspect of subprojects	Criteria/evidence
2.1.9. Construction and rehabilitation of 175 water points (reservoirs, ponds, wells, boreholes) for farming and along 100,000 km of transhumance pathways	 The water points to be built shall meet at least the following criteria: Infrastructures use adequate materials to reduce water leakages and management The design integrates techniques to enhance resilience to climate impacts (location, conservation, equipment)
Output 2.2. Diversified livelihood through the promotion of income generating activities powered with renewable energy (executing entities: 2.2.1. Establishment of 200 modern communal poultry farms for youth and women.	 The modern communal poultry farms shall: Integrate minimum environmental standards (ventilation, recycling and re-use of waste, system, space) Promote local breeds Minimum 40% of beneficiaries are youth/women Use renewable energy sources for lighting Use efficient watering equipment
2.2.2. Construction of 200 earth dams for fish farming activities.	 The earth dams include at least one of the following criteria: Use of solar systems to power freezers or refrigerators for conservation Protect biodiversity (water sources, lake, sea)
2.2.3. Establishment of 100 integrated vegetable gardens based on community models on at least 4-5 ha of land (solar pumps, compost systems, day-care facilities for women, agroforestry systems and crop rotation; transport systems)	 Integrated vegetable gardens shall meet at least one the following criteria: Use of solar panels for irrigation Use of sustainable agriculture techniques Use of measures to counter soil erosion (e.g. terracing, contour bunds, drainage, agroforestry, perennial crops) Adoption of techniques to increase carbon and organic matter in the soil Adoption of water conservation and efficiency measures, such as water harvesting, efficient irrigation infrastructure, check dams, flood management and drainage
2.2.5. Climate-proof 700 feeder roads and farm tracks to ensure year-round and all-weather usability (culverts, sand stabilization, side drains to reduce erosion, etc.) and connection to markets	 The feeder roads shall involve at least: An Environmental Impact Assessment (GIS, remote sensing, mapping) Construction of culverts and side drains to reduce erosion Include environmentally-friendly asphalt (hot mix asphalt, HMA)
2.2.7 Construct/rehabilitate 200 warehouses and processing facilities that are resilient to climate change	 The warehouse and processing facilities integrate at least the following: Minimum environmental standards (Lightning, ventilation) Use of appropriate local material for their construction Integrate pest management techniques



Aspect of subprojects	Criteria/evidence
2.2.8. Construct or rehabilitate 100 vet points	The vet points shall meet minimum environmental standards (orientation, ventilation, materials used)
2.2.9 Support the deployment of 100 mini grid to power agricultural value chains	 The mini-grids shall meet: Cost and affordability Provision of energy consumption data: if possible, on an hourly basis Power quality (AC/DC): voltage stability, ripples and switching noise, transients, faults/ day Power reliability Maintenance

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6.6.4 Targeted Areas and Beneficiaries

The target areas of the GCF Programme in the seven selected countries were identified and defined during the IFAD baseline investments design process. The main selection criteria were:

- the level poverty and remoteness;
- food insecurity and nutrition;
- climate vulnerability and unsustainable management of natural resources;
- rural gender disparities and youth unemployment;
- absence or lack of rural infrastructure including energy access;
- opportunities for job creation both for youth and women, and
- possibility to create synergies with other donor-supported Programmes (IFAD main baseline investments, ARC contingency plans target areas, WFP and AfDB target areas).

These targeted regions have a range of ecosystems and agricultural zones, such as savannahs and semi-arid regions. Agriculture accounts for over 51% of employment and is the main source of livelihood. Various tradable commodities are produced in the targeted regions such as maize, soybean, dairy, livestock, rice, tree crops (cashew) and horticulture, with fish farming in certain regions, including the Lake Chad and Niger River basins. The Programme's target intervention regions are summarised in Table 6 and will build synergies with the new IFAD G5 Sahel + Senegal regional Programme. Maps are compiled in the Appendix Map.

Target groups are:

- Small producers engaged in staple crops (millet, maize, sorghum and groundnuts), livestock (dairy and beef, sheep and goats, chicken) and non-timber forest products (forestry) value chains characterised by subsistence production and the reduced size of agricultural land and livestock capital;
- Rural smallholder farmers that are extremely vulnerable people to climate change and climate variability;
- Rural marginalised communities including persons living with disabilities, the elderly, widows and widowers and displaced people, and
- Young people (educated or not), women heads of households, which are all characterised by a pronounced weakness or lack of production capital (agricultural and livestock) and a lack of economic opportunities and jobs.

Barrier analysis main assumption: There are barriers that the subproject would not be able to address without the funds provided by this regional Programme in each of the participating countries. These barriers are compiled into the table below.



Table 17 Barrier Analysis to Project Implementation

Aspect	Criteria / evidence
Limited access to agro-climatic information services and early warning infrastructure to support integrated climate risk management, particularly activities 1.1.2 and 1.1.5	Inadequate climate risk information services and limited knowledge and understanding of climate change impacts hinder capacity to better plan and develop integrated adaptive approach and solutions and assessment of existing climate risk information services
Limited adoption of best available adaptation/mitigation technologies (forest and land use; renewable energy), particularly activities 2.1.1; 2.1.2; 2.1.3; 2.1.4; 2.1.4; 2.1.5; 2.1.6; 2.1.7; 2.1.8 and 2.1.9	Very limited adoption of best adaptation/mitigation technologies (forest and land use; renewable energy) and when they are used, they are fragmented and not often linked to climate risk transfer mechanisms
Limited range of livelihood options and access to renewable energy sources, particularly activities 2.2.1; 2.2.2; 2.2.5; 2.2.7; 2.2.8 and 2.2.9	Very limited adoption of integrated climate resilient agriculture practices that enable farmers to diversify their sources of income, and limited access to renewable energy sources; assessment of current and past livelihood options in the selected sites and communities is required
Limited funds available particularly for the targeted regions and communities for the selected activities above	Access to financing, particularly climate finance, is very limited; an assessment of sources of funding channelled to the selected sites and selected activities is required
Weak policy, institutional coordination mechanisms and capacity on integrated climate risk management	Assessment of similar policies, institutional coordination mechanisms and capacity on integrated climate risk management existing in other countries and regions is required
Limited technical capacities	Assessment of beneficiaries' capacities to implement integrated climate risk management is required
Limited access to agricultural insurance, as private insurers are reluctant to develop this market; farmers and countries are reluctant to pay premiums; and financial institutions charge high interest rates, which limit investments	Assessment of current and past insurance products and services in the selected countries compared to other countries and regions

Investment analysis main assumption: Different land uses are more financially or economically attractive than the ones offered by the Programme (but not as climate resilient or sustainable), and thus would be more likely to be adopted without the funds provided this regional Programme.



Table 18 Investment Analysis

Aspect	Criteria / evidence
Performance and capacity of agro- climatic information services and early warning infrastructure to support integrated climate risk management	Comparison of expected performance of CIEWS based on a suitable indicator in a scenario where Programme has been implemented and one without it shows that performance and capacity enhanced when subproject is implemented
Level of adoption of best available adaptation/ mitigation technologies (forest and land use; renewable energy) combined with agricultural insurance schemes <i>versus</i> other alternatives	Comparison of expected performance, based on a suitable indicator, in scenario <i>without</i> Programme-supported adoption of best practices combined with agricultural insurance schemes and a scenario <i>with</i> this Programme's support shows that the uptake of the said best practices is greater with support, thus contributing to greater resilience and adaptive capacity
Range of livelihood options, available to farmers, especially ones powered with renewable energy sources	Comparison of expected performance based on a suitable indicator in scenarios with and without Programme's support shows that the promotion of income generating activities powered with renewable energy significantly helps farmers diversify their livelihood options (activities 2.2.1; 2.2.2; 2.2.5; 2.2.7; 2.2.8; 2.2.9)
Comparison of risk transfer mechanism with micro-insurance	Comparison of expected performance based on a suitable indicator against the without project supported access to micro insurance through activity 3.1.9 and others
Benchmark analysis	Comparison of expected performance based on a suitable indicator against applicable benchmarks in the market

Mitigation impacts main assumption: The net climate change mitigation impact of the project is positive.

Table 19 Mitigation Impacts of CO₂ Sequestration

Aspect	Scenario/Evidence
Estimate of the net sequestration in the project in tCO2	 Use the EXCAT and fund carbon methodology attached in Annex 22 Sequestration in the project refers to the biomass resulting from project implementation. It includes aboveground and belowground biomass of trees. Baseline correspond to the biomass in the scenario that would occur in the absence of the project according to the most plausible scenario. Most often, the most plausible scenario is the continuation of activities initiated prior to the start of the project. Leakage refers to emissions that occur due to a shift of activities (mainly agriculture and livestock) from inside to outside of a project area as a result of project implementation. Other project emissions refer to emissions resulting from burning of biomass during land preparation or fires.

Co-benefits main assumption: The project will create positive co-benefits related to: the establishment of climate information systems that inform farmers, governments and other stakeholders on the best mitigation and adaptation activities to implement; the restoration of degraded land; conservation and avoided deforestation through activities identified under output 1.2. output 2.1. and output 2.2.

Table 20 Co-Benefits

Aspect	Criteria / evidence
Climate change mitigation benefit	Demonstrate that subproject activities in each of the 7 countries and targeted regions will have positive mitigation impacts, namely reduced emissions from unsustainable land use, deforestation and forest degradation thanks to the adoption of sustainable forest management and conservation practices and techniques to increase forests' carbon stocks, and improved access to renewable energy sources (mini grids), which will result in the avoidance of 21 393 593 MtCO2e
	Assessment using appropriate methodologies is attached in appendix 22 which assess direct and indirect impacts on forest and land use, renewable and non-renewable energy



Aspect	Criteria / evidence
Climate change adaptation benefit	Demonstrate that subproject, country project and the regional Programme will have positive impacts on the well-being of communities by comparing their current situation to their anticipated conditions with the Programme's support for enhanced CIEWS networks, climate resilient adaptation measures, diversification of livelihood and risk transfer measures. Assessment of country and regional climate change and climate variability scenarios and impacts in the absence of the Programme based on available studies
Positive impacts on smallholder farmers and rural communities	Demonstrate that subprojects in the 7 countries increase resilience and enhance the livelihood and food and water security of smallholder farmers and rural communities through integrated climate risk management of natural resources (water, soil, ecosystems). Assessment based on appropriate methodologies that assess direct and indirect impacts on each of the community groups, including potential impacts on ecosystem services identified as important for the communities (including water and soil resources)

6.6.5 Environmental Procedures, Site and Activity-Specific Work Plan / Instructions

Tables below present the environmental, climate and social management plans. For each of the potential overall impacts, the plans indicate a significance rating and (geographical) extent/prevalence of each impact, recommend mitigation measures, identify who is responsible for implementation of the mitigation measures, how implementation can be verified, and how frequently.

The plans have been developed with inputs from a broad range of stakeholders consulted during the ESMF field mission). The recommended mitigation measures mostly apply to all countries; where more information was available, they also recommend context-specific measures for relevant states or areas within states.

A copy of the plans should be made available to all Programme staff, participating institutions and other key stakeholder representatives as well as used in community sensitization (i.e. awareness-raising and training) activities. This plan is complemented by the ESMPs in the SECAP notes.Training

6.6.6 Strengthening Capacity and Improving Resilience

A successful implementation of the Programme requires the strengthening of institutional capacities, in particular on insurance, cooperatives and other relevant farmer organisations. Moreover, there is a strong need for context-specific, in-situ training sessions for farmers, other beneficiaries, for example on climate-smart agriculture and climate change adaptation, to improve their resilience to deal more effectively with climate-related weather events such as flooding, drought and heat waves.

The training of trainers of the regional environmental/climate specialists will be delivered by seasoned consultants in collaboration with staff from the Environment and Climate Division of IFAD in the region to ensure that training is in consonant with IFAD and GCF policies. These regional specialists will be trained to provide implementation support to the different PMUs and monitor the implementation of the ESMF.

6.6.7 Existing Capacity

Stakeholder consultations in all countries revealed that one of the key challenges was the limited technical expertise, practical experience and lack of clear responsibilities of the state environmental officers. As a result, their capacity to practically implement or monitor environmental, social and climate related management was limited. To ensure that environmental, social and climate safeguards are upheld and wholly integrated into the Programme, the country teams and environmental agencies will be included as part of the trainees on a broad range of topics and at different levels.

6.6.8 Training Topics

Proposed training topics include, at the very least:

- Community sensitisation;
- Requirements of IFAD's SECAP and ERNM as well as the Climate, Land and Disclosure policies;
- ESMF processes, procedures and institutional arrangements to develop and implement required management plans;



- Data gathering and use of tools for data analysis;
- Screening and rating as prescribed in the ESMF;
- Environmental, social and climate impact assessment, and requirements;
- Preparation, implementation and monitoring of ESMPs and ESIAs;
- Reporting and monitoring implementation of ESMPs;
- Commodity-specific training on climate smart agriculture, environmental and social best practices, such as effective use of organic and chemical fertilisers, pest and disease management, water-saving agronomic practices, soil fertility management, low-impact farming methods as well as labour-saving techniques;
- Conflict resolution and grievance management mechanisms;
- Environmental (EMS 14001) and social audit, and report writing
- Plus project specific topics

6.6.9 Target Audience

The target groups for training should include, at least:

- Project Steering and Technical Committees;
- Regional and state environment/climate officers
- IFAD project staff
- Service providers
- Beneficiaries (i.e. incubators and apprentices)
- Agricultural insurance companies

6.6.10 Training Approach

The above-mentioned training topics will be delivered based on the needs of each training target group. Training will in the first instance be provided to the project staff as well as Steering and Technical Committees. The regional environment/climate specialists will then be trained to deliver a training of trainers (ToT) to the state environment/climate specialists and other stakeholders at the local government and community level.

This ToT will particularly focus on ESMF process, screening requirements and approvals, including preparation of impact management plans and their implementation. Country project staff will be trained to support the private service providers with on-the-ground implementation of climate smart agriculture, improvement of resilience, implementation of mitigation and management measures, with special attention on water management and agrochemical application, handling, storage and disposal. Independent consultants will be contracted to carry out specific technical trainings. In most trainings, other resource persons from IFAD, academia, civil society and other development agencies will be invited to participate.

The training of the PMUS to implement the ESS will be provided by IFAD through its safeguards teams similar to IFAD standard practices with current IFAD investment at country level. Once trained, the environmental / safeguards specialist of the project will train of partners involved in the project.

The following table sets out a proposed approach and budget for capacity building.



Table 21 Capacity Building Costs (Estimate)

Activity		Year				Budget (USD)	Remarks		
	1	2	3	4	5	6	75		
Capacity Assessment of capacity assessment of national partners	x							70,000	Capacity building Report
Stakeholder and community sensitization workshops (7 countries) including IPP	x							70,000	One day workshop per country, estimated at 10,000 USD per workshop
Community sensitization workshops (7 countries) including IPP		х	х	х				210,000	A total of 21 2-day workshops, estimated at 10.000 USD per workshop
(7 countries) ToT training for regional and regions environment/climate specialists, project staff and other relevant stakeholders on	х			х				280,000	14 5-day workshops, estimated at 20,000 USD per
 Requirements of IFAD's SECAP and ERNM, Climate, Land and Disclosure Policies ESMF processes, procedures and institutional arrangements to develop and implement required management plans Screening and rating as prescribed in the ESMF Environmental, social and climate impact assessment and mitigation Preparation, implementation, monitoring and reporting of ESMPs and ESIAs. Requirement for IPPs where ever relevant 									workshop
Soil testing, and soil analysis for value chains	x	x	х	х	x			100,000	Estimated at 20,000 USD per year for sample taking and laboratory costs
Data gathering and use of tools for data analysis including integration of IPPs	х							50,000	Estimated total costs
ESMF monitoring, commodity-specific trainings on climate-smart agriculture, environmental and social best practices, including effective use of organic and chemical fertilizer, pest and disease management, water-saving agronomic practices, soil fertility management, low-impact farming methods and labour- saving techniques in the 7 countries.	x	X	x	x	х			245,000	35 trainings in total, estimated at 7,000 USD per training
Conflict resolution and grievance management including for the IPPs	х							60,000	
Environmental (EMS 14001) and social audit and report writing taking into account IPPs wherever relevant	x							70,000	Estimated at 10,000 USD per country
Grand Total								2,550,000 USD	



6.7 Grievance Redress Mechanism (GRM)

The Programme will establish a community engagement process and provide access to information on a regular basis. In order to reduce conflicts, the project will use the grievance mechanism established by IFAD which includes a "Complaints Procedure" to receive and facilitate resolution of concerns and complaints with respect to alleged non-compliance with GCF or IFAD's environmental and social policies as well as the mandatory aspects of the Social, Environmental and Climate Assessment Procedures in the context of IFAD-supported projects. The procedure allows affected complainants to have their concerns resolved in a fair and timely manner through an independent process.

Although IFAD normally addresses potential risks primarily through its enhanced QE/QA process and by means of project implementation support, it remains committed to:

- working proactively with the affected parties to resolve complaints;
- ensuring that the complaints procedure is responsive and operates effectively; and
- maintaining records of all complaints and their resolutions.

Moreover, IFAD's Strategic Framework calls for ensuring that projects and programmes promote the sustainable use of natural resources build resilience to climate change and are based upon ownership by rural women and men themselves in order to achieve sustainability.

IFAD-supported projects and programmes including supplementary funds like this GCF programme are designed in a participatory manner, taking into account the concerns of all stakeholders. IFAD requires that projects are carried out in compliance with its policies, standards and safeguards. It will be the responsibility of the PMU of the project at country level, under the control of IFAD, to ensure that all relevant stakeholders are adequately informed of the grievance mechanism. This mechanism will be made available at the Governorate of the region and Administrators of the provinces (sectors). Copies of the manual of grievance mechanism will be made available at the villages' level. It will also posted on the project website and the implementing entity (IFAD) website. The procedures on how to submit the complaint are available on the IFAD.

The objective of the IFAD Complaints Procedure is to ensure that appropriate mechanisms are in place to allow individuals and communities to contact IFAD directly and file a complaint if they believe they are or might be adversely affected by an IFAD-funded project/programme not complying with IFAD's Social and Environmental Policies and mandatory aspects of SECAP. Complaints must concern environmental, social and climate issues only and should not be accusations of fraudulent or corrupt activities in relation to project implementation – these are dealt with by IFAD's Office of Audit and Oversight.

Issues arising from farmer-herder clashes continue to be a point of reference in grievance mechanism. To ensure that these conflicts are resolved or managed through appropriate channels, the Programme will ensure that they are included in the policy dialogue meetings and stakeholder engagements to capture their participation in economic, development and adaptive capacity building activities. The regular contact meetings with the extension officers and other clusters will greatly reduce the likelihood of tensions and conflicts.

Eligibility criteria according to IFAD's grievance mechanism

- To file a complaint for alleged non-compliance with IFAD's social and environmental policies and mandatory aspects of its SECAP, IFAD will consider only complaints meeting the following criteria:
- The complainants claim that IFAD has failed to apply its social and environmental policies and/or the mandatory provisions set out in SECAP and Safeguards of the GCF.
- The complainants claim that they have been or will be adversely affected by IFAD's failure to apply these policies.
- Complaints must be put forward by at least two people who are both nationals of the country concerned and/or living in the project area. Complaints from foreign locations or anonymous complaints will not be taken into account.
- Complaints must concern projects/Programmes currently under design or implementation. Complaints concerning closed projects, or those that are more than 95 per cent disbursed, will not be considered.



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The process according to IFAD's grievance mechanism. The complainants should first bring the matter to the attention of the government or non-governmental organisation responsible for planning or executing the project or Programme (Ministry of Agriculture implementing agency and the Ministry of Economy and finance and The Environmental Protection Agency that have with the responsibility for overseeing the work on the field. If the Implementing Agency does not adequately respond, then the matter may be brought to the attention of IFAD. The issue may be brought straight to IFAD if the complainants feel they might be subject to retaliation if they went to the Lead Agency directly

The Regional Division of IFAD will examine the complaint submitted through the Regional Coordination Unit of the Programme (RCU) and, if necessary, will contact the Ministry of agriculture and Ministry of Economy and Finance, The Environmental Protection Agency under the ministry of environment to decide if the complaints are justified. If the complainants request that their identities be protected, IFAD will not disclose this information to the Ministry of Agriculture or anyone else in government. If the complaint is not justified, the Regional Division will inform the complainants in writing. If the Regional Division finds the complaint is justified and there is proof of actual or likely harm through IFAD's failure to follow its policies and procedures, IFAD will take action. This may consist of making changes to the project/Programme, or requiring that the government observes its obligations under the Financing Agreement. IFAD's response will focus bringing the project/Programme into compliance and no monetary damages will be available or paid in response to such complaints. The complainants will be informed of the outcome of the issue by the Regional Division.

In all cases, if the complainants disagree with IFAD's response, they may submit a request to <u>SECAPcomplaints@ifad.org</u> and request that an impartial review be carried out by the Office of the Vice-President. The Office of the Vice-President will decide on the steps to be taken to examine such complaints, including, if necessary, contracting external experts to review the matter. The complainants will be informed of the results of the review. IFAD will include in its Annual Report a list of received complaints and a summary of actions taken to address them.

The GCF Independent Redress Mechanism (IRM) can also be employed by complainants, and stakeholders will be informed of this parallel grievance mechanism. In this instance, all complaints that pass through the GCF IRM system relating to the project will be regularly communicated by GCF to IFAD regarding the current status and any decisions made. Similarly, the GCF Secretariat's Indigenous Peoples Focal point will be indicated in communications with stakeholders regarding the grievance mechanism.

How to submit a complaint:

A complaint relating to non-compliance with IFAD's Social and Environmental Policies and mandatory aspects of its SECAP can be submitted in any of the following ways:

- Download the complaints form (Word) through IFAD website: <u>https://www.ifad.org/en/accountability-and-</u> complaints-procedures
- Send an email to <u>SECAPcomplaints@ifad.org</u>

In addition, This GCF Programme will as much as possible utilise every available grievances redress mechanisms including: associations (including farmers' associations/organisations) traditional council (Paramount Chiefs and elders), village square engagement (consisting of representatives of men, women and social groups), village general assembly, the project NCPU, etc.

Whenever a project causes negative environmental or social impacts there will be grievances (complaints) from people who are affected. "Having a good overall community engagement process in place and providing access to information on a regular basis can substantially help to prevent grievances from arising in the first place, or from escalating to a level that can potentially undermine project performance. Grievance mechanisms should [therefore] not be thought of as a substitute for the [above-mentioned] community engagement process or vice versa. The two are complementary and should be mutually reinforcing. Criteria to be used for a robust grievance / complaints mechanism are:

• Legitimate: enabling trust from the stakeholder groups for whose use they are intended, and being



accountable for the fair conduct of grievance processes;

- Accessible: being known to all stakeholder groups for whose use they are intended, and providing adequate assistance for those who may face particular barriers to access;
- **Predictable:** providing a clear and known procedure with an indicative time frame for each stage, and clarity on the types of process and outcome available and means of monitoring implementation;
- Equitable: seeking to ensure that aggrieved parties have reasonable access to sources of information, advice and expertise necessary to engage in a grievance process on fair, informed and respectful terms;
- **Transparent:** keeping parties to a grievance informed about its progress, and providing sufficient information about the mechanism's performance to build confidence in its effectiveness and meet any public interest at stake;
- **Rights-compatible:** ensuring that outcomes and remedies accord with internationally recognised human rights;
- A source of continuous learning: drawing on relevant measures to identify lessons for improving the mechanism and preventing future grievances and harms;
- **Based on engagement and dialogue:** consulting the stakeholder groups for whose use they are intended on their design and performance, and focusing on dialogue as the means to address and resolve grievances.

In general (not limited to this proposed GCF Sahel project), IFAD has established a complaints procedure to receive and facilitate resolution of concerns and complaints with respect to alleged non-compliance of its environmental and social policies and the mandatory aspects of its Social, Environmental and Climate Assessment Procedures in the context of IFAD-supported projects. The procedure allows affected complainants to have their concerns resolved in a fair and timely manner through an independent process. IFAD has established a complaints procedure to receive and facilitate resolution of concerns and complaints with respect to alleged non-compliance of its environmental and social policies and the mandatory aspects of its Social, Environmental and Climate Assessment.

Any community member in the project intervention areas concerned by the country project may submit a complaint regarding the project. Depending on the type and severity, the complaint should be submitted to either a community-level complaints committee (in case of community-level matters, e.g. related to land access) or the Project Management Unit or the project steering committee with copy to the Project Coordinator (in case the community-level committee is implicated itself, cannot solve the issue, or is not functioning). In case the complaint is directly related to Programme design, it may be submitted to the RCU in copy IFAD team in project countries. Any complaint can be submitted via email, letter or by verbal submission to the relevant.

At each level, the respective complaints will be received and systematically recorded in a complaint register by a designated officer, and subsequently assessed on severity, assigned to a committee member ('complaint owner') to investigate the complaint within 15 days, and communicate the findings back (respond) to the complainant within 30 days. If the complainant does not accept the proposed resolution, he/she can appeal to an appeals committee at the Project Coordination for the project, which should review the case and recommend a course of action within 30 days. Once the solution has been implemented (or when the appeals committee authorises the case for closure), the case will be closed. Complaints or grievances are not only an indicator of something gone wrong, but also provide a valuable source of feedback and information that can help to improve Programme delivery. All GCF funded project stakeholders should therefore be actively encouraged to use the grievance mechanism. Similar to complaints, all general requests for information should also be systematically recorded and answered. It is recommended the PMU and IFAD team keep a log of such requests and periodically upload the provided response under the 'frequently asked questions' section of the proposed national Programme website.

Practically, the following order and structure is proposed for handling different type of complaints related to the regional project:



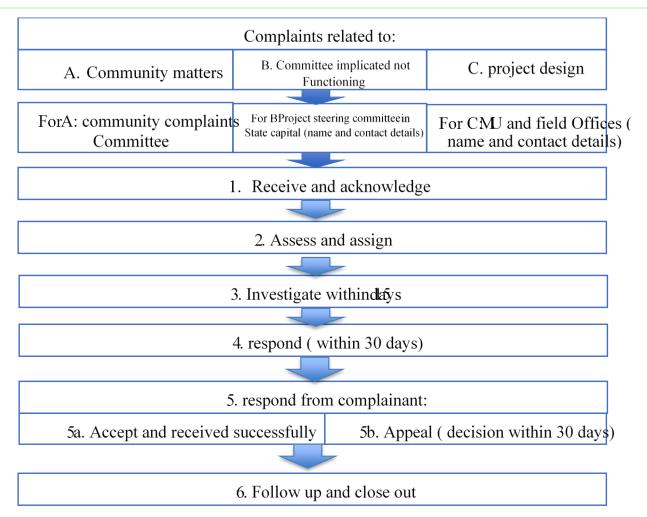


Figure 14 Complaints mechanism flow chart

Grievance Management Mechanism (GMM) Guide: This will be produced and disseminated in community in a basic format (one legal size page folded to create four pages). The draft GMM and the draft Communications Guide will be presented at the project inception meeting for review, input, change and approval

- Log Book: A log-book of any grievances, conflicts and disputes arising out of the HESAD project implementation at village / community level should be documented, likewise any mutually agreed solutions must be signed, recorded and logged.
- **Time Frame:** A turn-around time of 3 days to a maximum of 2 weeks is the recommended time-frame for handling complaints brought forward to the GMM.
- Preference for Resolving Conflict/Grievance at community Level: The preferred option, as stated unanimously by community residents and leaders consulted, is at the community level, using community systems and mechanisms. It is therefore recommended that every effort and option, mechanism and human resource must be called upon and exhausted at the community level, before any conflict or grievance is taken outside of the community for resolution.

Grievance Management Mechanism (GMM) - Conflict Resolution Process:

Prerequisites of Good faith & Acceptance of Final Decision

- In all cases / options good faith and willingness to resolve the conflict, grievance, complaint or dispute is an essential pre-requisite to the process.
- A Mediator may be mutually agreed to assist with resolving the conflict and/or grievance
- The decision/resolution arrived through mutual agreement will be final.
- Such decision will be signed by both parties and witnessed and communicated as the final and binding



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decision – at whichever level a decision or resolution of conflict or grievance is agreed.

6.7.1 Community Based Project Level Resolutions Process

- Complaints/ Grievances/ Conflicts at the community level should first be brought to the local communitybased project management team and an attempt made to mutually and satisfactorily resolve the issue.
- The issue must be documented and the decision recorded with both or multiple parties involved signing onto the decision and/or resolution of the issue at stake.

If there is no resolution possible at the community-based project management level – then the matter will be brought before the Village Council (VC) or CDC.

Village Council/ Community Council Level:

At the Village Council /CDC level – a Grievance / Conflict Management Committee comprising of a minimum of 3 persons and maximum of 5 persons will:

- Review the complaint / grievance;
- Interview the two or multiple parties;
- Deliberate and decide / recommend a solution.
- A neutral Mediator may be co-opted or assigned to assist the process and must be agreed to by both conflicted parties or by the aggrieved party

This solution will be presented at a special VC/CDC meeting to which all parties concerned will be invited.

If there is no resolution possible at the VC/CDC level – then the matter will be brought before the relevant, geographical District or Regional Council that has partnership/stakeholder status

District Level / Regional Level:

In each region A three to five member GMM team will also be set up or drawn upon from these District/Regional institutions for hearings of the Programme – FPIC conflicts etc. and for resolving same

If there is no mutually satisfactory resolution reached at the district or regional level – then the matter will be brought forward to a national level GMM.

National Level:

Ministry of Social development in charge of issues related to Indigenous Peoples Affairs (MoIPA) in relevant countries

- At the national level, a 3 to 5-member committee comprising MoIPA representing government; National representing IP leadership and an independent legal advisor who is deemed acceptable to both/all parties involved in the conflict.
- It is also recommended that if appropriate and useful, given the particular issue at stake, representatives from IP NGOs or Entities

If no resolution is possible at any or all of the above levels – then either party has the right and the option to move to the Legal Court system of the concerned countries

IFAD System (SECAP) & Indigenous Peoples' Forum at IFAD (IPFI):

If there are conflicts of which IFAD needs to be informed, or that may involve an IFAD staff or consultant etc. then this needs to be processed through the IFAD Country Programme Manager, the IFAD Regional Director and IFAD Senior Management.

- The new Social, Environmental and Climate Assessment Procedures (SECAP), approved by IFAD's Executive Board in December 2014 outlines how IFAD will address the social, environmental and climate impacts associated with its projects and programmes by:
 - "ensuring effective stakeholder engagement, including a procedure to respond to alleged complaints from project-affected individuals /communities..."
- IFAD Policy on the Disclosure of Documents and IFAD Complaints Procedures underpins SECAP. The



purpose of the latter is to receive and respond to alleged complaints of non-compliance with IFAD's environmental and social policies and mandatory elements of SECAP.

Indigenous Peoples' Forum (IPFI):

- Also, IFAD has a platform of dialogue between staff/management and indigenous peoples, which is the Indigenous Peoples' Forum at IFAD (IPFI).
- The Indigenous Peoples Forum at IFAD serves as a platform of dialogue.

6.8 GCF Independent Redress Mechanism (IRM)

The IRM's mission is to address complaints from affected people and provide recourse in a way that is fair, effective and transparent, and enhance the performance of GCF's climate funding. The IRM also accepts requests from Developing Countries seeking reconsideration of funding proposals that were denied by the GCF Board.

The IRM has a mandate to provide advice to the Board on GCF's operational policies and procedures, based on lessons learned from our cases. Recognizing that GCF Direct Access Entities may need assistance to develop their grievance mechanisms and procedures, the IRM has also been mandated to implement programmes for such capacity development. For more information about the IRM | Independent Redress Mechanism (greenclimate.fund) : https://irm.greenclimate.fund/

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6.9 Stakeholder Engagement and Public Participation

As part of the IMS Communication Process, IFAD will engage with Stakeholders and the Public with:

- Regular quarterly or semi-annual scheduled meeting with key stakeholders
- Schedule annual or semi-annual public meetings in each country with varied locations
- Publish quarterly public reports for Key Stakeholders, including:
 - Involved governmental entities
 - Interested financiers
 - Interested community leaders
 - Major national newspapers and TV stations
- Publish summary internal monthly progress reports for internal stakeholders with:
 - Current status
 - Progress in previous month
 - Plan for following month
 - Key positive achievements
 - Key issues of concern
 - Updated key risk and opportunity register
 - Actual versus plan costs and schedule for each project
 - Actual and forecast Key Performance Indicators for each project
 - Report non-conformances from Integrated Management System



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- Report current list of Opportunities for Improvement

The methodology for engagement with Stakeholders and the Public will be described in Communication Process if IFAD's Integrated Management System (IMS). Engagement with Stakeholders in the Project Management Process will likely be more frequent than stipulated in the Communication Process.

As part of IMS Communication Process and Project Management Process, Stakeholder identification will include connection with key individuals and groups of women and youths in the local community. A stakeholder management plan was developed (see Annex 8).



Parameter	Activity	Monitoring Indicator	Responsibility for monitoring	Monitoring means	Recommended frequency of monitoring	Total Estimated Monitoring Costs (USD)
	'	ENVIRONI	MENTAL MONITORING			1
Preparation of an ESMP	ESMP Design	Baseline on the sub projects	 Countries (EEs) PMUs, Environmental Agencies, constructors and services providers Environmental Agencies 	ESMPs for Sub projects		
Site specific impacts	Environmental screening and baseline study	 Baseline on status of the environmental conditions in selected communities and areas 	 Countries (EEs) PMUs, Environmental Agencies, constructors and services providers IFAD (RCU) and IFAD country teams 	 ESMP/ESMF/ESIA reports Adherence to laid legal and policy requirements 	 Once, at beginning of project 	393, 050
Environmental baseline	Conduct a baseline assessment to obtain baseline values of key environmental parameters in selected communities including IPPs wherever relevant	 See environmental indicators mentioned from next row 	 Countries (EEs) PMUs with support from specialists in soil, water, air quality, biodiversity and climate change 	• Field survey		
All Subprojects listed under the ESMP with potential impacts	Close monitoring and consultations with all stakeholders and the Environmental Agency in each country	 Data collected for the areas and communities included in the Programme Control; Areas and communities not included in the Programme 	 Countries (EEs) PMUs, Environmental Agencies, constructors and services providers IFAD (RCU) and IFAD country teams 			

	— · · · · ·		
Table 22 Environmental, Climate and Social	Design and Mo	onitoring Plan of ESN	DPs per country



Parameter	Activity	Monitoring Indicator	Responsibility for monitoring	Monitoring means	Recommended frequency of monitoring	Total Estimated Monitoring Costs (USD)
Land and soil degradation	Monitor quality of soil and other biological conditions	 Soil micro-organism count Soil organic matter count 	 Countries (EEs) PMUs, Environmental Agencies, constructors and services providers, Environmental specialist and M&E officer IFAD (RCU) and IFAD country teams 	 Field measurement, incl. Soil sample analysis 	 Annual (or after cropping cycle) 	4,800,000
Surface and subsurface water quality	Monitor quality of surface and subsurface water at sample sites	• Water quality	 Countries (EEs) PMUs, Environmental Agencies, constructors and services providers, Environmental specialist and M&E officer IFAD (RCU) and IFAD country teams 	 Field measurement and Laboratory test 	 Annual (or after cropping cycle) 	500,000
Degradation of Forest and wetland	Monitor quality of forest and wetlands	 Changes in forest and wetland area 	 Countries (EEs) PMUs, Environmental Agencies, constructors and services providers, Environmental specialist and M&E officer IFAD (RCU) and IFAD country teams 	 Remote sensing and field assessment 	 Baseline Mid-Term, End- Term 	633,000
Erosion and gully	Monitor quality of land	Changes in area of bare surfaces	 Countries (EEs) PMUs, Environmental Agencies, constructors and services providers, Environmental specialist and M&E officer IFAD (RCU) and IFAD country teams 	 Remote sensing and field assessment 	 Baseline Mid-Term, End- Term 	150,000



Parameter	Activity	Monitoring Indicator	Responsibility for monitoring	Monitoring means	Recommended frequency of monitoring	Total Estimated Monitoring Costs (USD)
Bush and pipeline fire	Monitor quality of vegetation	Changes in vegetal cover	 Countries (EEs) PMUs, Environmental Agencies, constructors and services providers, Environmental specialist and M&E officer IFAD (RCU) and IFAD country teams 	 Remote sensing and field assessment 	• Annual	340,000
Loss of biodiversity	Monitor quality of biodiversity	 Changes in abundance of biodiversity 	 Countries (EEs) PMUs, Environmental Agencies, constructors and services providers, Environmental specialist and M&E officer IFAD (RCU) and IFAD country teams 	• Field survey	• Annual	177,049
Waste proliferation	Monitor quality of land, water and air	 Changes in soil, air and water quality 	 Countries (EEs) PMUs, Environmental Agencies, constructors and services providers, Environmental specialist and M&E officer IFAD (RCU) and IFAD country teams 	 Field measurement and laboratory test 	• Annual	265,574
Use of agrochemicals	Monitor quality of plant, soil and water	 Changes in quality of plant, soil and water 	 Countries (EEs) PMUs, Environmental Agencies, constructors and services providers, Environmental specialist and M&E officer IFAD (RCU) and IFAD country teams 	Laboratory test	• Annual	265,574

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Parameter	Activity	Monitoring Indicator	Responsibility for monitoring	Monitoring means	Recommended frequency of monitoring	Total Estimated Monitoring Costs (USD)
Flooding	Monitor quality of land	• Extent of land inundation	 Countries (EEs) PMUs, Environmental Agencies, constructors and services providers, Environmental specialist and M&E officer IFAD (RCU) and IFAD country teams 	 Field survey and remote sensing 	Quarterly	413,115
GHG emissions	Monitor quality of air	• Preponderance of GHG in the air	 Countries (EEs) PMUs, Environmental Agencies, constructors and services providers, Environmental specialist and M&E officer IFAD (RCU) and IFAD country teams 	 Field measurement (using FAO EX-ACT tool) 	• Annually	212,459
		SOC	CIAL MONITORING			
Socio-economic conditions	Conduct a combined sustainable livelihood analysis (SLA) / resilience assessment, providing baseline status of key socio- economic conditions in selected communities including the most disadvantaged people and IPPs	 Food security, assets, employment, income, production methods and volumes, access to markets and finance, social inclusion, disaster preparedness 	 Countries (EEs), support from specialists in food security/nutrition, agriculture, social inclusion and/or disaster risk reduction IFAD (RCU and country offices, communities 	 Field survey Field measurement (update) 	 Baseline: once, at beginning of project Annual 	413,115
Community conflict (internal)	Monitor conflict situation	 Occurrence of violent conflicts within selected communities 	 Countries (EEs) PMUs, communities , Environmental specialist and M&E officer IFAD (RCU) and IFAD country teams 	Community visit	Quarterly	• 950,000
Youth violence (militancy and cultism)	Monitor youth violence situation	 Occurrence of youth violence within selected communities 	 Countries (EEs) PMUs, communities , Environmental specialist and M&E officer IFAD (RCU) and IFAD country teams 	Community visit	Quarterly	• 950,000



Parameter	Activity	Monitoring Indicator	Responsibility for monitoring	Monitoring means	Recommended frequency of monitoring	Total Estimated Monitoring Costs (USD)
Resource-based conflict (farmers – pastoralists) and IPPs	Monitor conflict situation	 Occurrence of violent conflicts between selected communities and external parties 	 Countries (EEs) PMUs, communities , Environmental specialist and M&E officer IFAD(RCU) and IFAD country teams 	Community visit	Quarterly	
Loss of (access to) agricultural land	Monitor land access and ownership	 Change in land access and ownership for women and youth 	 Countries (EEs) PMUs, communities, Environmental specialist and M&E officer IFAD(RCU) and IFAD country teams 	Community visit	Annually	
Social exclusion	Monitor inclusion of women and youth, IPPs in decision-making	 Percentage of women and youth represented in community-level decision-making committees, associations and meetings 	M&E Officer	Community visit	Annually	
Elite capture	Monitor (political) interference, conflicts of interest, corruption and exclusion of IPPs	• Number of cases reported and suspected of (political) interference, conflicts of interest, corruption	M&E Officer	Community visit	Annually	
Unsafe and non- healthy working conditions	Monitor health impacts	 Number of cases reported and suspected of health impact due to use of agro-chemicals, accidents due to use of production and processing machinery and related faulty wiring 	• M&E Officer	Community visit	Annually	



6.10 Monitoring Budget

Table 23 gives a summary of the estimated costs for the different monitoring activities mentioned above, for year one, and then for years two to six of the Programme. This will take into account IPPs wherever it is relevant.

Monitoring parameter	Unit Cost (per country) (in USD)	Total over 7 countries	Y1 over 7 countries	Y2-Y6 over 7 countries
Site ESIA	83,607	585,249	83,607	418,035
Environmental baseline study	78,689	550,823	78,689	393,445
Environmental monitoring	241,639	1,691,473	241,639	1,208,195
Social/ livelihood baseline study	45,902	321,314	45,902	229,510
Livelihood monitoring	29,509	206,563	29,509	1,475,545
Other social monitoring	45,902	321,314	45,902	229,510
Total monitoring costs	525 246	3,676,722	525,246	2,626,230

Table 23 Monitoring Costs (Estimate) included in baseline investments for the 7 countries

6.11 Population and Gender

6.11.1 Performance Criteria

The overall objective of this Programme is to build and scale up the resilience and adaptive capacity of smallholder farmers and rural communities of seven Sahelian Least Developed Countries (LDCs) to climate change using Integrated Climate Risk Management Approach. To achieve this goal, this Programme seeks to upgrade, strengthen, scale up and replicate current existing and fragmented climate risk management practices by introducing a combination of climate risk preparedness, with climate risk reduction (adaptation and mitigation) and climate risk transfer through micro insurance and macro insurance. The main targeted crops are key staple crops (millet, maize, sorghum, groundnuts) and livestock (cash-asset) strengthen smallholder farmers' resilience to climate change by promoting a climate risk management continuum that links adaptation measures and risks preparedness, risks reduction with risk transfer schemes.

The Programme will build on current and past IFAD investments and is an additional climate finance to build the resilience of the IFAD investment to climate impact. The Programme's integrated approach combines three strategies that are usually pursued independently:

- (1) improve the capacity of government stakeholders to support communities and smallholder farmers in preparing for climate change adaptation effectively (risk analysis and preparedness);
- (2) assist smallholder farmers and communities in adapting to climate change by adopting climate resilient activities and value chains (risk reduction); and
- (3) promote the creation of integrated risk transfer schemes where micro and macro insurance policies are interlinked.



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The combination of the two levels of insurance is important for risk sharing and can significantly reduce the premiums charged for each insurance type but also promote better access to credit by smallholder farmers.

The project development objectives include;

- Increased resilience and enhanced livelihoods of the most vulnerable people, communities and regions;
- Reduced emissions through increased low-emission energy access and power generation;
- Increased resilience of infrastructure and the built environment to climate change;
- Improved resilience of ecosystems and ecosystem services; and
- Strengthened institutional and regulatory systems for climate-responsive planning and development

The following indicators, among others, will measure the achievement of the project objectives at the end of the project life:

- LDC Sahelian countries, 817,922 direct and 5,332,754 indirect beneficiaries receive integrated climate risk management measures to build their resilience to climate shocks;
- At least 21 466 499 MtCO2e will be avoided by the Programme contributing to reducing a significant part
 of countries NDCs targets as expressed in their Nationally Determined Contributions (NDCs) with a target
 of the following targets unconditional reduction in emissions by 2030: Burkina 7,808.3 GgCO2e; Chad
 23,449.07 GgCO2e; Mali 33,628,772 KT-eq. CO2; Mauritania GgCO2e; Niger 3.5% and Senegal 5%
 below business as usual levels; The Gambia 1750,4 GgCO2e conditional reduction in emissions;
- At least 3 Agricultural value chains are powered with renewable energy and power generation estimated to 4 % of the Programme total investment with the installation mini-grids;
- Better management of Forestry and land use with 18% of the total Programme investment allocated to restoring about 340,000 hectares of land and forest;
- Improve the adoption and implementation of the best adaptation and mitigation techniques for most of the vulnerable people, communities and regions in the targeted regions; and
- At least 5 to 10 plans, coordination's mechanisms, national systems and public and private partnerships established and at least micro-insurance industry is unlocked.

6.11.2 Reporting

Gender assessment and action plan : For effective women inclusion, this Programme gender assessment and action plan will promote access of women to all outcomes of the Programme particularly better access to climate information's systems for decision making; concretes adaptation and mitigation measures such as women favourable enterprises such as vegetable, and poultry, livestock production, access to renewable energy (mini-grids) for processing and marketing for income that also support household food security and nutrition as described in IFAD baseline investments. There will also be provision to expand the commodities supported in each state to include opportunity commodity/enterprises, which fall within the range of women friendly enterprises. Strategies to realise this will include:

- events appropriate to women's time and venue constraints;
- self-targeting of women's only groups;
- provision of 40 per cent slot for women in benefiting from all activities of the Programme including the provision of agricultural insurance;
- ensuring that women hold at least 40% of leadership positions in commodity associations;
- engagement of a minimum of 40% of women in the project management team, among others. The Programme will also adopt and promote the use of Gender Action Learning System (GALS) that has been successfully used by other IFAD funded Programmes. Finally, nutrition activities on homestead vegetable production or related commodity will target women groups.



ANNEXES

Annex 1 ELIGIBILITY SCREENING FORM FOR ENTERPRISES OR FARMS

Letter of Interest (Eligibility Screening Form)

Please complete all the required spaces in this form

1. Name: Surname	Other Names:Maiden
2. Sex: (a) Male { }	
3. Date of birth:	
 4. Highest Education Level: (a) No formal education { } (d) Vocational school (e) Tertiary Education { 	<pre>} (b) Primary School { } (c) Secondary School {</pre>
5. Which community do you belong to:	
6. How long have you lived in this community:	
7. How do you belong to this community: (a) by birth {	} (b) by marriage { } (c) other (specify):
8. Local Government Area (LGA):	
9. What enterprise are you interested in (see list of sel	ected enterprises for the LGA):
10. Do you have any experience in this enterprise: (a)	Yes { } (b) No { }. If yes, how many years:
11. Do you belong to any youth or women organisation	n: (a) Yes { } (b) No { }. If yes, what is the name:
12. Do you belong to any cooperative society: (a) Yes	{ } (b) No { }. If yes, what is the name:
13. Do you have access to any land for the enterprise:	(a) Yes { } (b) No { }.
14. If yes to question 13, where is the land located area size of the land?	; and what is the
15. What kind of title to you have to the land: (a) Gov	ernment paper { } (b) Inheritance from parent { } (c)

15. What kind of title to you have to the land: (a) Government paper { } (b) Inheritance from parent { } (c) husband or wife's consent { } (d) family allocation { } (e) community's allocation { } (f) Others (specify):-

Endorsements:

Applicant: I certify that the information provided here is correct

Name: -----Signature: ------

Date: -----



Community/traditional leader:

Name:	
Sign:	
Date:	

Verifications:

Comments by the Local Government Liaison Office:
Name of Officer:
Designation:
Sign and date:

Comments by the State Project Coordination Office:			
Name of Officer:			
Designation:			
Sign and date:			

Screening:

Comments by Service Providers:	
comments (a) Applicant Eligible { } (b) Applicant Ineligible { }	



Annex 2 ENVIRONMENTAL AND SOCIAL SCREENING FORMS FOR THE SUBPROJECTS

A: Screening Form for Agri-Enterprise Projects
A. Screening Form for Agri-Linterprise Frojects
1
1

General Information		
Project·Name:¤	α	c
Name of incubator / applicant:	n	c
Name of Cooperative:¶	n	c
Contact person's details: ∞		
Name of Apex Group:	α	C
Contact person's details:¤		
Project-Location:¤	α	r
Project sector (e.g. rice farming, cassava	n	C
processing, etc.)¤		
Estimated Cost:¤	n	Z
Proposed Date of Commencement: a	n	Z
Expected Project duration:x	n	c
Site (estimated area in ha):¤	n	c
Any equity/contribution brought into the project:x	α	7
Any plan for new construction:	α	
α	α	7

Screening for Environmental and Social Issues §

Question¤	Yes¤	No¤	Additional explanation of 'Yes' response ⊭	¤
1.→Will the sub-project develop any wetlands?¤	α	α	α	a
 → Would the sub-project result in economic displacement[®] (loss of assets or access to resources) or physical resettlement a 	α	α	x	¤
 → Would the sub-project result in conversion and/or loss of physical cultural resources?^a 	α	α	Ω	¤
4. → Will the sub-project have significant social adverse impacts (affecting access to and/use rights to land, access to potable water and water for other uses) on local communities or other project-affected parties? ^a	n	α	α	¤
5. → Will the project trigger unsustainable natural resource management practices (fisheries, forestry, livestock, and significant increase in use of agrochemicals) that exceed the carrying capacity? [∞]	¤	α	x	a
6. → Does the sub-project include conversion of significant areas (above 50 ha) of natural forests/other wild lands? [∞]	¤	α	Ω	a
7. → Would the project potentially cause significant adverse impacts to habitats and/or ecosystems and their services (e.g. habitat loss, erosion/ other form of land degradation, fragmentation, hydrological changes)?¤	x	α	X	¤
8. → Does the proposed project target area include ecologically sensitive areas ¹⁰ , areas of global significance for biodiversity conservation and/or biodiversity-rich area; habitats depended on by endangered species? [∞]	α	α	Ω.	¤

ſ

Economic displacement implies the loss of land, assets, access to assets, income sources or means of livelihoods (see SECAP Procedure Guidance Statement 13)¶

ſ

C: Sensitive areas' include: protected areas (national parks, wildlife/nature reserves, biosphere reserves); areas of globalsignificance for biodiversity conservation; habitats depended on by endangered species; natural forests; wetlands; coastalecosystems, including coral reefs and mangrove swamps; small island ecosystems; areas most vulnerable to climate change and variability; lands highly susceptible to landslides, erosion and other forms of land degradation and areas that include physicalcultural resources (of historical, religious, archaeological or other cultural significance) and areas with high social vulnerability due to poverty, disease, ethnicity and race.¶



	volve-fisheries-development ion-exists on-sustainable yi		α	α	α	3
	ose·a·risk·of·introducing·inva		α	α	×	3
11. → Does the project inv genetically modified	volve-the-transfer, handling- l·organisms/living-modified- se-effect-on-threatened-bioc	organisms∙that∙	α	¤	α	3
12. → Is the project site cl	ose to any oil and gas insta minal, oil or gas pipeline rig	llation such as	α	x	α	3
13. → Has·oil·spill/·or·pipe site?¤	line fire ever been recorded	l∙around∙project∙	α	α	α	3
intensification and/o	volve-land-use-changes-(agi or expansion of the cropping have adverse impacts on h ·livelihoods?¤	g·area)·and·	121	n	Σ.	3
may affect the natu	llt in increased use of agroc ral environment/human hea	lth?¤	α	α	α	3
projects, and water (except in wetlands		all∙dams∙	¤	α	×	100
	volve agricultural intensifica ng area in non-sensitive are		α	α	α	3
development?¤	ities include rangeland and		α	¤	α	
information on susta			α	n	а	
mariculture?¤	ities include aquaculture an		α	¤	12	
rehabilitation?¤	ities include watershed mar	_	α	α	¤	1
conservation measu			α	¤	¤	
development sub-p			α	α	¤	
service providers, ir agrochemicals, live	volve-credit-operations-throu ncluding-credit-for-pesticide/ stock-purchasing,-irrigation,	other ∙etc.?¤	α	n	α	
chain development?			α	α	α	
on physical cultural		-	α	α	¤	
resettlement or eco	ave·low·probability·to·have· nomic·displacement?¤		α	¤	¤	
facilities? ¤	clude development of agro-	-	α	α	¤	
construction?¤	iire a migrant workforce dur	_	α	α	α	
harvest produce?¤	iire·seasonal·workers·to·pla		α	¤	¤	
31. → Will the construction increase in traffic or	n·or·operation·of·the·project n·rural·roads?¤	∙cause∙an∙	α	α	α	
uidance for sub-project						_,
"Yes" response to any of questions 1-13¤	Sub-project· Environmental·and· social·category·is·A¤	ESIA·is·required	l·for·sub	project∙¤		¢
"Yes" response to	Sub-project	Sub-project to a	dopt the	e∙ESMP∙ir	n·the·general·ESMF¤	3



questions 14-31x

Environmental and social category is Bx

6.11.3 A: Screening Form for Agro-Enterprise Projects

Genera Information					
Project Name:					
Name of incubator / applicant:					
Name of Cooperative:					
Contact person's details:					
Name of Apex Group:					
Contact person's details:					
Project Location:					
Project sector (e.g rice farming, cassava					
processing, etc.)					
Estimated Cost:					
Proposed Date of Commencement:					
Expected Project duration:					
Site (estimated area in ha):					
Any equity/contribution brought into the project:					
Any plan for new construction:					

	Screening for Environmental and Social Issues						
	Question	Yes	No	Additional explanation of 'Yes' response			
1.	Will the sub-project develop any wetlands?						
2.	Would the sub-project result in economic displacement13 (loss of assets or access to resources) or physical resettlement						
3.	Would the sub-project result in conversion and/or loss of physical cultural resources?						
4.	Will the sub-project have significant social adverse impacts (affecting access to and/use rights to land, access to potable water and water for other uses) on local communities or other project-affected parties?						
5.	Will the project trigger unsustainable natural resource management practices (fisheries, forestry, livestock, and significant increase in use of agrochemicals) that exceed the carrying capacity?						
6.	Does the sub-project include conversion of significant areas (above 50 ha) of natural forests/other wild lands?						
7.	Would the project potentially cause significant adverse impacts to habitats and/or ecosystems and their services (e.g. habitat loss, erosion/ other form of land degradation, fragmentation, hydrological changes)?						
8.	Does the proposed project target area include ecologically sensitive areas14; areas of global significance for biodiversity conservation and/or						

¹³ Economic displacement implies the loss of land, assets, access to assets, income sources or means of livelihoods (see SECAP Procedure Guidance Statement 13)

¹⁴ 'Sensitive areas' include: protected areas (national parks, wildlife/nature reserves, biosphere reserves); areas of global significance for biodiversity conservation; habitats depended on by endangered species; natural forests; wetlands; coastal ecosystems, including coral reefs and mangrove swamps; small island ecosystems; areas most vulnerable to climate change and variability; lands highly susceptible to landslides, erosion and other forms of land degradation and areas that include physical cultural resources (of historical, religious, archaeological or other cultural significance) and areas with high social vulnerability due to poverty, disease, ethnicity and race.



	Screening for Environmental and Social Issues					
	Question	Yes	No	Additional explanation of 'Yes' response		
	biodiversity-rich area; habitats depended on by endangered species?					
9.	Does the project involve fisheries development in situations where little information exists on sustainable yield?					
10.	Could the project pose a risk of introducing invasive alien species?					
11.	Does the project involve the transfer, handling or use of genetically modified organisms/living modified organisms that may have an adverse effect on threatened biodiversity?					
12.	Is the project site close to any oil and gas installation such as flow stations, oil terminal, oil or gas pipeline right of way?					
13.	Has oil spill/ or pipeline fire ever been recorded around project site?					
14.	Does the project involve land use changes (agricultural intensification and/or expansion of the cropping area) and resources that may have adverse impacts on habitats, ecosystems, and/or livelihoods?					
15.	Will the project result in increased use of agrochemicals, which may affect the natural environment/human health?					
16.	Does the project include small-scale irrigation and drainage projects, and water impoundment including small dams (except in wetlands)?					
17.	Does the project involve agricultural intensification and/or expansion of cropping area in non-sensitive areas?					
18.	Do the project activities include rangeland and livestock development?					
19.	Does the project involve artisanal fisheries where there is information on sustainable yield?					
20.	Do the project activities include aquaculture and/or mariculture?					
21.	Do the project activities include watershed management or rehabilitation?					
22.	Does the project include large-scale soil and water conservation measures?					
23.	Does the project include small and micro enterprise development sub- projects?					
24.	Does the project involve credit operations through financial service providers, including credit for pesticide/other agrochemicals, livestock purchasing, irrigation, etc.?					
25.	Do the project activities include natural resources-based value chain development?					
26.	Would any of the project activities have minor adverse impacts on physical cultural resources?					
27.	Would the project have low probability to have physical resettlement or economic displacement?					
28.	Does the project include development of agro-processing facilities?					
29.	Will the project require a migrant workforce during construction?					
30.	Will the project require seasonal workers to plant and/or harvest produce?					
31.	Will the construction or operation of the project cause an increase in traffic on rural roads?					



Guidance for sub-project categorisation					
"Yes" response to any of questions 1-13	Sub-project Environmental and social category is A	ESIA is required for subproject			
"Yes" response to questions 14-31	Sub-project Environmental and social category is B	Sub-project to adopt the ESMP in the general ESMF			
"No" response to almost all questions	Subproject Environmental and social category is C	No further analysis is required			



6.11.4 B: Screening Form for (Market) Infrastructure Sub-Projects

Screening Form for (Market) Infrastructure Sub-Projects					
Name of market infrastructure:					
Infrastructure type:					
Location:					
Proposed Date of Commencement:					
Expected Project duration:					
Estimated cost:					
Estimate number of communities to be served:					
Estimated number of entrepreneur to be served:					

Screening for (Market) Infrastructure Sub-projects Υ Ν Question es ο Will the project activities include construction/rehabilitation of rural roads or other rural infrastructure in 1 protected/sensitive areas¹⁵? Does the project include construction of roads or other infrastructure that entail the total area being cleared of 2. 50 ha or above? Does the project include construction of dam (s)/reservoir (between 5-15 m high with a reservoir exceeding 2 3. million m³)? 4 Does the project involve large-scale irrigation schemes rehabilitation/ development (above 100 ha)? 5. Does the project involve significant extraction of ground water (significantly above recharge capacity)? 6. Does the project include water-based (ground or surface) development where it is believed that significant depletion due to climate change or overutilization has occurred? 7. Does the project involve significant extraction, diversion or containment of surface water? 8. Does the project include drainage or correction of natural water bodies (e.g. river draining)? 9. Will the project include construction/rehabilitation of rural roads that pass through oil infrastructure locations such as flow stations, tank farms or oil and gas pipelines? 10. Would any of the project activities have minor adverse impacts on physical cultural resources? 11. Does the project include development of agro-processing facilities? 12. Will the project require a migrant workforce during construction? 13. Will the construction or operation of the project cause an increase in traffic on rural roads? 14. Has the government or community guaranteed the lease of the land for the (market) infrastructure? 15. Is there any plan in place for sustainability of the infrastructure during the project life time? 16. Does the project include specific measures to protect against dust (such as dust masks and water spraying)? 17. Has arrangement been made to pay adequate compensation for private property that may be affected by the construction of the project?

¹⁵ 'Sensitive areas' include: protected areas (national parks, wildlife/nature reserves, biosphere reserves); areas of global significance for biodiversity conservation; habitats depended on by endangered species; natural forests; wetlands; coastal ecosystems, including coral reefs and mangrove swamps; small island ecosystems; areas most vulnerable to climate change and variability; lands highly susceptible to landslides, erosion and other forms of land degradation and areas that include physical cultural resources (of historical, religious, archaeological or other cultural significance) and areas with high social vulnerability due to poverty, disease, ethnicity and race.



Screening for (Market) Infrastructure Sub-projects

Question								
18.	Will construction equipment with moderate decibels be used and the timing of use be so that people will experience less discomfort?							
19.	Will tree and vegetation replanting be carried out to stabilize slopes and re-green road sides?							

Guidance for categorisation:						
"Yes" response to any of questions 1-9	Environmental and social category is A	ESIA is required				
"Yes" response to questions 10-13	Environmental and social category is B	Sub-project to adopt the general ESMP in the ESMF				
"No" response to almost all questions 1-13 and 'Yes' to questions 14-19	Environmental and social category is C	No further analysis is required				



6.11.5 C: Climate Screening Form for Sub-Projects

	Screening for Climate Issues						
Question		Yes	No	Additional response*	Explanation	of	'Yes'
1.	Is the project area subject to extreme climatic events such as flooding, drought, tropical storms, or heat waves?						
2.	Do climate scenarios for the project area foresee changes in temperature, rainfall or extreme weather that will adversely affect the project impact, sustainability or cost over its lifetime?						
3.	Will the project make investments in low-lying coastal areas/ zones exposed to river flooding and coastal storm surge?						
4.	Will the project promote agricultural activity in marginal and/or highly degraded areas that have increased sensitivity to climatic events (such as on hillsides, deforested slopes or floodplains)?						
5.	Is the project located in areas where rural development projects have experienced significant weather-related losses and damages in the past?						
6.	Will the project develop/ install infrastructure in areas with a track record of extreme weather events?						
7.	Is the project target group entirely dependent on natural resources (such as seasonal crops, rain-fed agricultural plots, migratory fish stocks) that have been affected by in the last decade by climate trends or specific climatic events?						
8.	Will climate variability likely affect agricultural productivity (crops/ livestock/fisheries) or the associated incidence of pests and diseases for the project target groups?						
9.	Would weather-related risks or climatic extremes likely adversely impact upon key stages of identified value chains in the project (from production to markets)?						
10.	Is the project investing in climate-sensitive livelihoods that are diversified?						
11.	Is the project investing in infrastructure that is exposed to infrequent extreme weather events?						
12.	Is the project investing in institutional development and capacity building for rural institutions (such as farmer groups, cooperatives) in climatically heterogeneous areas?						
13.	Does the project have the potential to become more resilient through the adoption green technologies at a reasonable cost?						
14.	Does the project intervention have opportunities to strengthen indigenous climate risk management capabilities?						



	Screening for Climate Issues							
Question		Yes	No	Additional response*	Explanation	of	'Yes'	
15.	Does the project have opportunities to integrate climate resilience aspects through policy dialogue to improve agricultural sector strategies/policies?							
16.	Does the project have potential to integrate climate resilience measures without extensive additional costs (e.g. improved crop variety, capacity building; or including climate risk issues in policy processes)							
17.	Based on the information available would the project benefit from a more thorough climate risk and vulnerability analysis to identify additional complementary investment actions to manage climate risks?							

Guidance for categorization:						
"Yes" response to any of questions 1-9	Sub-project Climate risk is High	Climate risk Analysis is required for sub-project				
"No" response to almost all questions	Sub-project climate risk is moderate	Sub-project to adopt the ESMP in the general ESMF				

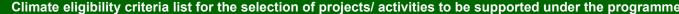


	Climate eligibility criteria list for the selection of projects/ activities to be supported under the programme				
Results	Category	Eligible activities	Screening investment Criteria's		
Results Paradigm Shift potential for low- emission development pathway	 Agriculture: energy efficiency improvement; renewable energy technologies ; carbon sequestration GHG emission reduction Forestry: GHG-emission reduction 	 Reduction in energy consumption in agro-pastoral value chains Use of renewable energy and energy efficiency technologies in operations Agricultural projects that contribute to increasing the carbon stock in the soil or avoiding soil carbon loss through erosion control measures Avoidance/Reduction of non-CO2 GHG emissions from agricultural practices or technologies 	 Projects shall demonstrate a substantial reduction in net GHG emissions or carbon intensity (tCO2e/unit of outcome) including energy efficiency of crop production and increasing use of energy efficiency technologies for agricultural processing and storage (Examples of operations are traction, solar irrigation, pumping, energy efficiency for crop cooling, storage and transportation.) Renewable energy shall meet the same criteria for low lifecycle GHG emissions such as increased use of bioenergy through conversion of agricultural waste to energy, use of solar-powered irrigation pumps, and energy efficiency for cooling and storage Projects shall demonstrate a substantial reduction in net GHG emissions or carbon intensity (tCO2e/unit of outcome such as efficient nitrogen fertilizer use (by improving the rate, type, timing, placement, or precision of application), cultivation of organic soils, inhibitor management, improved crop breeds and biotechnology that reduce emissions, and water management (such as in paddy rice). Degraded land rehabilitation, erosion control measures, reduced tillage intensity and cover crops, crop rotation, higher inputs of organic matter to soil, processing and application of manure, perennial cropping systems, deep rooting species, biochar, fire management, peatland restoration and avoided conversion of peatlands. Projects shall demonstrate a substantial reduction in net GHG emissions or carbon intensity (tCO2e/unit of outcome) with more efficient nitrogen fertilizer use (by improving the rate, type, timing, placement, or precision of application, projects shall demonstrate a substantial reduction in net GHG emissions or carbon intensity (tCO2e/unit of outcome) with more efficient nitrogen fertilizer use (by improving the rate, type, timing, placement, or precision of application), cultivation of organic soils, inhibitor management, or precision of application), cultivation of organic soils, inhibitor management, or precision of applicat		
	Forestry: GHG-emission reduction	 Forestry or agroforestry projects that sequester carbon through afforestation and reforestation 	 Projects shall demonstrate a substantial increase in the above- or below-ground carbon stock. Non-GHG impacts should also be considered to ensure suitability of planting species to local conditions. Evidence of human-assisted natural regeneration that increase adaptive capacity of the communities should be provided. Activities that drain native ecosystems or degrade hydrological systems should not be eligible. Leakage assessment, including displaced land-use activities outside the project area, should be considered. Potentially eligible activities include afforestation (plantations) and reforestation on previously deforested land. 		

6.11.6 D: Climate Eligibility Criteria List for the Selection of Projects/ Activities to be Supported under the Programme

	Africa Integrated Climate Risk Management Programme - Environmenta			
J IFAD		Social Management Framework (ESMF)	Status:	Approved
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Results	Category	Eligible activities	Screening investment Criteria's
	Forestry or agroforestry projects that reduce GHG emissions from deforestation or land degradation		 Projects shall demonstrate a substantial reduction in net GHG emissions or carbon intensity (tCO2e/unit of outcome). Non-GHG impacts should also be considered to ensure suitability of planting species to local conditions Evidence of human-assisted natural regeneration should be provided. Where applicable, evidence of avoided deforestation should be provided. Activities that drain native ecosystems or degrade hydrological systems should not be eligible. Leakage assessment, including displaced land-use activities outside the project are should be considered. Potentially eligible activities include agroforestry supply chains, restoration of degraded natural land based habitats, biosphere conservation, payments for ecosystem services, forest-based industries substituting materials derived from for fuels with renewable wood, policy interventions that explicitly protect carbon stoce (e.g., through land use zoning, enforcement of sanctions for deforestation, or sustainable intensification of land use), switching from conventional logging to reduced-impact logging, and extending the rotation cycle or cutting age
	Livestock: GHG-emission reduction	Projects that reduce methane or other GHG emissions from livestock	 Projects shall demonstrate a substantial reduction in net GHG emissions or carbon intensity (tCO2e/unit of outcome) through Introduced species shall not contribute native ecosystem degeneration. Possible detrimental non-GHG effects arising from excessive production intensification (e.g., on animal health or productivity) should be considered. Potentially eligible activities include manure management with biodigesters, improved feeding practices or improved feeds/forage to increase feed conversion efficiency and reduce methane emissions, and efficiency improvement measures t reduce the herd size
	Livestock: carbon sequestration	 Livestock projects that improve carbon sequestration through rangeland management 	 Projects shall demonstrate a substantial reduction in net GHG emissions or carbor intensity (tCO2e/unit of outcome) including improved pasture management to increase soil carbon stocks and reduce erosion; improved grazing management; promotion of silvopastoralism and nitrogen-inhibiting species in pastures; paymer for ecosystem services.





Results	Category	Eligible activities	Screening investment Criteria's
	 Renewable energy in water supply 	 Use of renewable energy in water supply projects 	 Renewable energy used in supplying water shall meet the criteria for wastewater, faecal sludge or septage management projects that feature cogeneration of biogas from anaerobic digestion a substantial reduction in net GHG emissions. Potentially eligible activities include installation of solar pumps, , and cogeneration using biogas from anaerobic digestion.
Increased climate- resilient sustainable development	Input supplies	• Seeds	 Project shall provide access to specific climate-adapted varieties where available (e.g heat-tolerant, submergence- tolerant).] Maintain diversity through seed banks, including wild relatives.
		• Fertilisers	 Project shall integrate fertilizer advice and supply with wider soil management and manure use. Project shall Precision farming and CSA Project shall conduct periodic water quality analysis. Project shall I support onsite technical support to monitor use and disposal.
		Pest management	 Project shall promote integrated pest management (e.g. push-pull methods) develop monitoring, knowledge and applied research systems for pests and diseases of crops livestock and fisheries. Project shall Precision farming and CSA Project shall support onsite technical support to monitor use and disposal.
		Information Services	 Project shall enable provision of seasonal and near-term forecasts in formats usable and accessible by farmers strengthen early warning systems. Invest in country-level capacity in scaled down climate impact modelling and scenario planning.
		Financial services	 Investigate financial channels to reduce risks associated with innovation (e.g. microfinance, small grants programmes, index-based weather insurance. Financing should encourage the use of water harvesting, solar power and other GHC reduction technologies.



	Climate eligibility criteria list for the selection of projects/ activities to be supported under the programme				
Results	Category	Eligible activities	Screening investment Criteria's		
		Tools and equipment	 Substitute low-cost high-efficiency systems wherever possible (e.g. rainwater harvesting plus surface water irrigation). Provide access to early warning systems. Introduce protective features to the siting and storage of seeds, tools, vehicles, fuels and energy infrastructure. 		
	Agricultural Production	Soil Management	 Introduce measures to counter soil erosion (e.g. terracing, contour bunds, drainage, agroforestry, perennial crops). Increase soil carbon and improve the management of soil organic matter 		
		Water Management	 Adopt water conservation and efficiency measures such as water harvesting, efficient irrigation infrastructure, check dams, flood management and drainage Support riparian habitat restoration. Introduce water allocation systems. 		
		Diversification	• Investigate potential for sustainable intensification and diversified cropping systems through crop rotations (e.g. staple/horticulture), intercropping, agroforestry, mixed crop/livestock systems		
		 Landscape-level management Skills base of farmers and local institutions 	 Undertake participatory mapping and land-use planning Remote sensing-based landscape monitoring Exploit all available incentives (financial, regulatory, etc.) for sustainable environmental management in the project Invest in local capacity for planning, monitoring, decision-making and financial management. Transfer control to local institutions; provide training on climate issues and support to farmer-based research and knowledge systems. Include smallholders in policy dialogue and scenario-building exercises 		
	Post – Production	Post-production: storage, processing, transport& retail	 Incentivise waste reduction measures and value addition for by-products. Provide renewable energy sources to cover changing requirements for cooling, drying, milling and threshing 		



Results	Category	Eligible activities	Screening investment Criteria's		
		Siting of processing facilities	 Use hazard exposure and crop suitability maps to inform siting of processing facilities. Retrofit processing facilities with protective features. Insure processing facilities against extreme climate events. 		
		Energy processing	 Provide renewable energy sources (such as solar photovoltaic panels for cooling / drying / milling / heating, wind, biogas). Equip processing facilities with energy- saving appliances (e.g. solar lighting, solar charging, and efficient cook stoves). Adopt pollution control measures 		
		Water in processing	 Re-site facilities. Increase water storage and distribution capacity (water harvesting, communal ponda groundwater recharge). Introduce demand-side water efficiency measures. Support conflict resolution for different water users (e.g. water user groups). 		
		Packaging materials and methods	Design suitable packaging materials in parallel with waste and storage management strategies		
		Transport hubs and routes	 Re-site hubs. Co-design value addition, storage and transport components to avoid high-risk transport routes and seasons. 		
	Infrastructure	Feeder roads	 Carry out an Environmental Impact Assessment (GIS, remote sensing, mapping). Culverts and side-drains to reduce erosion. Environmentally friendly asphalt (hot mix asphalt -HMA). 		
		Refrigeration and cold chains	 Conduct cost-benefit analyses of dependency on refrigerated cold chains. Introduce renewable energy sources for cooling and ventilation. Develop contingency plans for climate shocks and extreme events; create contingency storage opportunities. 		
		"Just-in-time" logistics	Link into regional markets to avoid over- dependence on high-value export markets		



Results	Category	Eligible activities	Screening investment Criteria's
Gender -Sensitive Response		 Involvement of women by## % in the activities 	 The project will be inclusive women empowering women to improve their agricultural productivity and implement climate resilience agricultural activities with climate co-benefits The Project will consider the number of women benefiting from capacity building for climate resilient agricultural practices. The project will consider ## % reduction of women affected by climate-related disasters,
	 Increased resilience and enhanced livelihoods of the most vulnerable people, communities, and regions 	 Adaptive capacities of the communities toward managing climate change and related disaster risk issues. 	 The project will consider Percentage reduction in the number of affected communities by climate-related disaster risk The project will consider increase number of households adopting a wider variety of livelihood strategies/coping mechanisms to climate related risks.
 Strengthened institutional and regulatory systems for climate-responsive planning and development 	Climate change mainstreaming in policies and effective climate change institutional planning of development activities	 Projects will consider with climate mainstreaming measures in development planning and institutional regulatory systems that improve incentives for climate resilience and are accompanied by evidence of their effective implementation. The project will consider institutional coordination and information sharing mechanism on climate change planning among multi-stake holders in the countries. The project will consider tailored specific capacity building activities for different stakeholders including the most vulnerable communities and government institutions and private sector entities involve in the Programme. 	
	Increased resilience of ecosystems and ecosystem services	Protection of the ecosystems-based adaptation and strengthening responses to climate change variability	 The project will consider area of agroforestry projects, forest-pastoral systems, or ecosystems –based adaptation systems established or enhanced. Area/ ha of habitat or kilometres rehabilitated to reduce external shocks such as landegradation through replanting and protection.

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Annex 3 ENVIRONMENTAL AND SOCIAL GUIDELINES FOR CONTRACTORS¹⁶

(for reference in contractor agreements/contracts)

Sound environmental and social management of construction projects can be achieved only with adequate site selection and project design. As such, the ESMP for projects involving any new construction, or any rehabilitation or reconstruction for existing projects, should provide information as to screening criteria for site selection and design including the following sections.

Site Selection

Site selection is the responsibility of the sub-project owners/proponents or local communities or organisations, under the supervision of the PMUs, field teams of WPF, ARC etc. and the Local Advisory Councils. Sites should be chosen based on community needs for additional projects, with specific lots chosen based on geographic and topographic characteristics. The site selection process involves site visits and studies to analyse:

- The site's, sub-urban, or rural characteristics;
- National, regional, or municipal regulations affecting the proposed sites;
- Accessibility and distance from inhabited areas;
- Land ownership, including verification of absence of squatters and/or other potential legal problems with land acquisition;
- Determination of site vulnerability to natural hazards, (i.e. intensity and frequency of floods, landslides, etc.);
- Suitability of soils and sub-soils for construction;
- Site contamination;
- Flora and fauna characteristics;
- Presence or absence of natural habitats and/or ecologically important habitats on site or in vicinity (e.g. forests, wetlands, rare or endangered species); and
- Historic and community characteristics.

The rules (including specific prohibitions and construction management measures) should be incorporated into all relevant bidding documents, contracts, and work orders.

Prohibitions

The following activities are prohibited on or near the project site:

- Cutting of trees for any reason outside the approved construction area;
- Hunting, fishing, wildlife capture, or plant collection;
- Use of unapproved toxic materials, including lead-based paints, asbestos, etc.
- Disturbance to anything with architectural or historical value;
- Building of fires;
- Use of firearms (except by authorised security guards);
- Use of alcohol by workers.

Construction Management Measures

6.11.7 Legal Compliance:

• Contractors will comply with in country legislation as well as the ILO Convention and international best practice guidelines including but not limited to the GCF ESS and IFC Performance Standards,

¹⁶ Adapted from Ministry of Agriculture, Irrigation and Water Development, Republic of Malawi (2015) Environmental and Social Management Framework for Programme for Rural Irrigation Development in Malawi, pp.76-80.



6.11.8 Human resources management:

- The contractor will develop human resources policies and procedures that addresses human rights issues, core labour requirements, compensation and workers grievance mechanism.
- The contractor will also put in place a human rights policy and plan to address key human rights issues in line with the relevant country legislation as well as international best practice standards that govern the project.
- The policies and plans will include detailed information on key issues such as workforce induction, information on rights, forced labour, equal opportunity, migrant workers, promotion of local employment opportunities, labour union, workforce grievance mechanism, retrenchment plans and security personal where applicable.
- The contractor shall ensure that these core labour requirements are cascaded down across their procurement and supply chain.

6.11.9 Construction Site:

The contractor must be properly controlled, through the implementation of the following measures:

- Waste Management:
 - Minimise the production of waste that must be treated or eliminated;
 - Identify and classify the type of waste generated. If hazardous wastes (including health care wastes) are generated, proper procedures must be taken regarding their storage, collection, transportation and disposal;
 - Identify and demarcate disposal areas clearly indicating the specific materials that can be deposited in each;
 - Control placement of all construction waste (including earth cuts) to approved disposal sites (>300 m from rivers, streams, lakes, or wetlands). All garbage, metals, used oils, and excess material generated during construction should only be dispose in authorised areas, incorporating recycling systems and the separation of materials.
- Maintenance:
 - Identify and demarcate equipment maintenance areas (>15m from rivers, streams, lakes or wetlands);
 - Ensure that all equipment maintenance activities, including oil changes, are conducted within demarcated maintenance areas; never dispose spent oils on the ground, in water courses, drainage canals or in sewer systems;
 - Identify, demarcate and enforce the use of within-site access routes to limit impact on site vegetation;
 - Install and maintain an adequate drainage system to prevent erosion on the site during and after construction.
- Erosion Control
 - Erect erosion control barriers around perimeter of cuts, disposal pits, and roadways;
 - Spray water on dirt roads, cuts, fill material and stockpiled soil to reduce wind-induced erosion, as needed;
 - Maintain vehicle speeds at or below 10mph within the work area, 15mph or below within 200m of the site, and abide by the relevant speed limits at all times to / from the work area.
- Stockpiles and Borrow Pits
 - Identify and demarcate locations for stockpiles and borrow pits, ensuring that they are 15 metres away from critical areas such as steep slopes, erosion-prone soils, and areas that drain directly into sensitive water bodies;
 - Limit extraction of material to approved and demarcated borrow pits.
- Site Clean-up
 - Establish and enforce daily site clean-up procedures, including maintenance of adequate disposal facilities for construction debris.



6.11.10 Safety During Construction

The Contractor's responsibilities include the protection of every person and nearby property from construction accidents. The Contractor shall be responsible for complying with all national and local safety requirements and any other measures necessary to avoid accidents, including the following:

- Carefully and clearly mark pedestrian-safe access routes;
- If school children are in the vicinity, include traffic safety personnel to direct traffic;
- Maintain supply of supplies for traffic signs (including paint, easel, sign material, etc.), road marking, and guard rails to maintain pedestrian safety during construction;
- Conduct safety training for construction workers prior to beginning work;
- Provide personal protective equipment (PPE) and clothing (such as goggles, gloves, respirators, dust masks, hard hats, steel-toed and –shanked boots, etc.,) for construction workers and enforce their use;
- Post Material Safety Data Sheets for each chemical present on the worksite;
- Require that all workers read, or have read, all Material Safety Data Sheets. Clearly explain the risks to them and their partners, especially when pregnant or planning to start a family. Encourage workers to share the information with their physicians, when relevant;
- Ensure that the removal of asbestos-containing materials or other toxic substances be performed and disposed of by specially trained workers;
- During heavy rains or emergencies of any kind, apply construction safeguards guidelines;
- Brace electrical and mechanical equipment to withstand unexpected events during construction.

6.11.11 Nuisance and Dust Control

To control nuisance and dust the Contractor should:

- Maintain all construction-related traffic at or below 15 mph on streets within 200 m of the site;
- Maintain all on-site vehicle speeds at or below 10 mph;
- To the extent possible, maintain noise levels associated with all machinery and equipment at or below 90db;
- In sensitive areas (including residential neighbourhoods, health centres, schools, etc.) more strict measures may need to be implemented to prevent undesirable noise levels;
- Minimise production of dust and particulate materials at all times, to avoid impacts on surrounding families and businesses, and especially to vulnerable people (children, elderly);
- Phase removal of vegetation to prevent large areas from becoming exposed to wind;
- Place dust screens around construction areas, paying particular attention to areas close to housing, commercial areas, and recreational areas;
- Spray water as needed on dirt roads, cut areas and soil stockpiles or fill material;
- Apply proper measures to minimise disruptions from vibration or noise coming from construction activities.

6.11.12 Community Relations

To maintain cordial community relations the Contractor should:

- Following the country and ESMP requirements, inform the population about construction and work schedules, interruption of services, traffic detour routes, as appropriate;
- Limit construction activities at night. When necessary ensure that night work is carefully scheduled and the community is properly informed so they can take necessary measures;
- At least five days in advance of any service interruption (including water, electricity) the community must be advised through clearly visible posters at the project site and at central community locations;
- Where possible, particularly for tasks that can also be performed through low-skilled manual labour (such as digging of shallow trenches, etc), make use of labour from the local community.

6.11.13 Chance Find Procedures for Culturally Significant Artifacts

In case culturally valuable materials (incl. shrines, graves, etc.) are uncovered during excavation:

• Stop work immediately following the discovery of any materials with possible archeological, historical,



paleontological, or other cultural value, announce findings to project manager and notify relevant authorities;

- Protect artifacts as well as possible using plastic covers, and implement measures to stabilise the area, if necessary, to properly protect artifacts;
- Prevent and penalise any unauthorised access to the artifacts;
- Restart construction works only upon the authorization of the relevant authorities.

6.11.14 Environmental Supervision during Construction

The bidding documents should indicate how compliance with environmental rules and design specifications would be supervised, along with the penalties for non-compliance by contractors or workers. Construction supervision requires oversight of compliance with the manual and environmental specifications by the contractor or his designated environmental supervisor. Contractors are also required to comply with national and state regulations governing the environment, public health and safety.



Annex 4 OUTLINE OF FPIC IMPLEMENTATION PLAN

Free, prior and informed consent (FPIC) is an operational principle empowering local communities including Ethnic Minorities and self declared indigenous people groups to give or withhold their consent to proposed investment and development programmes that may affect their rights, access to lands, territories and resources, and livelihoods. FPIC is solicited through consultations with pastoralists in the Sahel communities in good faith with the representative institutions endorsed by communities. It ensures that they participate in decision-making processes concerning a given development project. Their inclusion in the stakeholder engagement process will not only reduce or manage conflicts but will also increase the adaptive capacities of the farmer and the herders.

IFAD has established a complaints procedure to receive and facilitate resolution of concerns and complaints with respect to alleged non-compliance with policies and the mandatory aspects of SECAP in IFAD- supported projects, including FPIC. The procedure allows complainants to have their concerns resolved in a fair and timely manner through an independent process. Although IFAD normally addresses potential risks primarily through its enhanced QE/QA processes and by means of project implementation support, it remains committed to:

- Working proactively with the affected parties to resolve complaints;
- Ensuring that the complaints procedure is responsive and operates effectively; and
- Maintaining records of all complaints and their resolutions.

FPIC of local communities on public development initiatives that may affect their rights, access to land, resources and livelihoods has become an IFAD operational principle through its policies on Improving Access to Land and Tenure Security (2008) and Engagement with Indigenous Peoples (2009). The principle is also mentioned in the IFAD Policy on Environment and Natural Resource Management (2011) and in IFAD's Social, Environmental and Climate Assessment Procedures (2014). IFAD is the first international financial institution to adopt FPIC as an operational principle in its policy documents.

Consent should be sought in a way that is "free, prior and informed":

- Free implies no coercion, intimidation or manipulation.
- Prior implies that consent has been sought sufficiently in advance of any decision point or commencement of activities and respect is shown to time requirements of indigenous consultation/consensus processes.
- Informed implies that information provided covers (at least) the following aspects:
 - The nature, size, pace, duration, reversibility and scope of the proposed project/activity;
 - The rationale or purpose of the project/activity;
 - The geographical areas that will be affected;
 - A preliminary assessment of the likely economic, social, cultural and environmental impact, including potential risks and fair and equitable benefit-sharing;
 - Personnel likely to be involved in the execution of the proposed project/activity;
 - Procedures that the project or activity may entail.
- Consent is the expected outcome of the consultation, participation and collective decision-making process by the local communities. It is the mutual agreement reached, documented and recognised by all parties. Consultation and participation are crucial components of a consent process and require time and an effective system for communicating among interest holders. Consultation should be undertaken in good faith, and local communities must be able to participate through their own freely chosen representatives and customary or other institutions. In general, communities would first consent to discuss the idea of the project that will affect their land, territories and resources. They would further participate in the consultation process leading to consent by contributing to the design of the project, including its implementation and monitoring mechanisms. Depending on the nature of the project, consent may be required for:
 - The overall project (e.g. the construction of an irrigation system);
 - A component and specific activity of a project (e.g. if a project has one component on irrigation and



one on microfinance, consent would be needed for the component that affects the land and use rights of the communities).

Possible forms of remedy will include, but are not limited to:

- Return or restitution of lands, territories and resources, and other property and intangible resources, taken or affected without the consent of communities;
- Restoration of damaged ecosystems and/or resources;
- Payment for the relinquishment of rights;
- Improved benefits for smallholders and workers;
- Increased participation in project design, benefits and profits;
- Payment in cash or kind for ceded lands or use of lands, preferably land-based compensation;
- Compensation for damages and infringements of rights;
- Compensation for losses of livelihood and income;
- Compensation for losses of intangible heritage;
- Payment of the costs of securing reparations, engaging in negotiations and seeking advice;
- Agreement either to permanently suspend operations in the disputed area and/or proceed with a newly negotiated agreement involving all the requirements of an FPIC process;
- Formal recognition/preservation of indigenous peoples identity, culture and history;
- Formal guarantees of non-repetition; and (n) Formal procedures and sanctions in the case of repetition.

If adequate details on the project are not available at the Concept Note stage, the first design mission should identify the requirement for FPIC, and project components and activities that require FPIC by the rural communities. The mission should then develop the FPIC implementation plan indicating the process and time schedule for soliciting FPIC from concerned communities before the project design is completed.

An outline for the FPIC plan would include the following steps in the process and include timeline:

Conduct a sociocultural and land tenure assessment

Provide information on the socio-cultural assessment, what has been done during design and what needs to be done during implementation. Provide information on when the sociocultural assessment will be ready

Identify decision-making institutions and representatives

Describe consultations held during the project design (including name of communities, organisations contacts) phase and its outcomes. Describe how decision making institutions will be identified, representations formalised in order to agree upon the consultation process leading to FPIC of concerned communities. Indicate by when this process will be conducted.

Conduct consultation leading to FPIC on the proposed project/specific component/activities

Describe consultations held during the project design (including name of communities, organisations contacts) phase and its outcomes. Describe the process of consultations to be conducted during implementation phase that will lead to the FPIC by the concerned communities. Indicate aspects of the proposed project that require FPIC. Indicate who will conduct the consultations. Indicate by when this process will be conducted. As part of the consultation process, specify whether participatory mapping will be used as an instrument for the consultation process leading to FPIC.

• Formalise the consent agreement Specify that the consent agreement will be formalised in a written form or in other forms as agreed upon by the communities. Indicate by when the consent agreement will be formalised.

- Assess FPIC implementation
 Describe how FPIC implementation will be assessed during joint supervision missions

 Loan Agreement
- Indicate appropriate actions the borrower commits to undertake
- Disclosure of documentation related to the FPIC process Indicate when documentation will be disclosed.
- Document FPIC process



Describe how the FPIC process will be documented

IFAD Policy on Engagement with Indigenous Peoples

FPIC has evolved as a right of indigenous peoples, based on the right to self-determination within the United Nations Universal Declaration on Human Rights, which is applicable to all peoples, and not just to indigenous peoples. Although requirements in international, regional and national standards for FPIC emerge as a right of indigenous peoples, there is a growing recognition that all communities should have an important role in making decisions about projects that affect them in a significant way. This also includes the ability to withhold consent and refuse to host projects that either negatively affect them, or do not provide adequate benefits to realise their development goals and priorities. It is within the international environmental law that FPIC is being extended to include the category of local communities and reflected in recent policies and guidelines, such as the Voluntary Guidelines on the Responsible Governance of Tenure of Land of the Food and Agriculture Organisation of the United Nations (FAO).

Nine principles of engagement underscore IFAD's policy:

- 1. **Cultural heritage and identity:** IFAD will assist communities in taking full advantage of their traditional knowledge, culture, governance systems and natural resources, all of which form part of their tangible and intangible heritage.
- 2. **Free, prior and informed consent:** In working with Member States on projects targeting or affecting indigenous peoples, IFAD shall support the participation of indigenous peoples' communities in determining priorities and strategies for their own development. IFAD shall consider this consultation and consent as a criterion for project approval.
- 3. Community-driven development: IFAD will follow and enhance community-driven development approaches that are well suited to the holistic perspectives of indigenous peoples. 4. Land and resources. IFAD will promote equitable access to land and territories by indigenous peoples and enhance their tenure security, by strengthening their capacity to manage their territories and resources in a sustainable way.
- 4. **Indigenous peoples' knowledge:** IFAD will value indigenous peoples' knowledge and practices in investment projects. We will also build on these assets by supporting research that blends traditional knowledge and practices with modern scientific approaches.
- 5. **Environmental issues and climate change:** IFAD will support indigenous peoples in enhancing the resilience of the ecosystems in which they live and in developing innovative adaptation measures.
- 6. Access to markets: Indigenous peoples' societies have begun to join the market economy, which brings both opportunities and challenges. IFAD will explore these opportunities and enable indigenous peoples' communities to engage in markets on more profitable terms.
- 7. **Empowerment:** Empowerment is essential for poor and marginalised populations to improve their livelihoods in a sustainable way. IFAD will support the empowerment of indigenous peoples by providing resources for capacity-building so they can secure and manage their resources and lead their own development processes.
- 8. **Gender equality:** Indigenous women often experience triple discrimination as women, as members of indigenous peoples' communities and as women within those communities. In continuing to incorporate a gender focus in our programmes, IFAD will make a special commitment to improve the well-being of indigenous women.

An outline for an Engagement with Indigenous Peoples would include the following steps in the project:

- Reflect indigenous peoples' issues in the project;
- Include representatives of indigenous communities in all stages of design and implementation of the project;
- Continue funding research and knowledge creation on indigenous peoples' issues, including through grants;
- Strengthen the Indigenous Peoples' Assistance Facility, which provides small grants for grass-roots projects that are designed and implements by indigenous peoples' communities;
- Advocate with national governments and other partners, aiming to bring indigenous peoples'



representatives and other relevant partners into consultative processes;

• Promote systematic dialogue with indigenous peoples and promote their participations in outreach and learning events. Beginning in February 2013, an indigenous people's forum takes place each year at IFAD in conjunction with IFAD's Governing Council meeting.

Seeking FPIC at Implementation Stage

Conduct sociocultural and land tenure assessment	Identify decision- making institutions and representatives	Conduct consultation leading to FPIC	Formalize consel _{WHAT?} ? agreement
From Concept Note through first design mission	During first design mission	From first design mission through appraisal	Before QA (to be annexed to the PDR) WHEN? ?
 Identify: Customary laws, informal rules and organizing practices on land ownership Institutions and governance systems Types of livelihoods Mutual support and solidarity mechanisms Community stakeholders, land users and assess who has the right to give or withhold the consent Assess: Consequences from the proposed project that may result in the change of the status of the lands, territories and resources 	 Conduct preliminary consultations with the community and explain the nature of the proposed project Allow time for communities to discuss and decide on their representatives for the consultation process leading to FPIC Clarify responsibilities of representatives Agree on the process leading to FPIC Identify signatory parties for the consent agreement 	 Share objective and scope of the project with the representatives identified by the communities and identify project component(s) requiring FPIC Inform them on the actors financing and implementing the project and their respective responsibilities Provide clear and transparent information on the benefits and risks of the project Share the findings of the sociocultural, land tenure and environmental assessment Formalize consent agreement 	 Include: Respective expectations Proposed project duration, expected results and activities Participatory monitoring and verification plan and procedures Identification of grievances procedures and mechanisms Terms of withdrawal of consent Record of process through means and languages accessible to all stakeholders and parties involved





Annex 5 OUTLINE OF SUB-PROJECT LEVEL ENVIRONMENTAL AND SOCIAL MANAGEMENT PLANS (ESMPs) CONTENT

The Environmental and Social Management Plans (ESMPs) prepared at the sub-project level will contain at least the following sections:

Executive Summary

- 1 Introduction
- 2 Project Description
- 3 Methodology, Assumptions and Limitations
- 4 Applicable Standards and Regulatory Framework
- 5 Summary of Environmental and Social Impact Assessment
 - a. Environmental and Social Baseline Overview
 - b. Identified Environmental and Social Impacts
- 6 Consultations (if relevant)
- 7 Management and Mitigation Measures
 - a. Mitigation Measures
 - b. Roles and Responsibilities
 - c. Institutional Arrangements
 - d. Budget
 - e. Schedule
- 8 Monitoring and Reporting



Annex 6 EXCLUSION LIST

- 1. The programme will not build dams above 15 m high
- 2. The programme will not construct feeder roads which exceed 10 km per location
- 3. The programme will not develop above 25 ha per location
- 4. The programme will not lead to any physical and economic displacement
- 5. The programme will not develop alternative land uses on Cultural heritage sites
- 6. The programme will not develop alternative land uses on in Protected areas, wetlands, virgin lands and forests that have been identified through ecosystem-compatible enterprise selection
- 7. The programme will not engage in Child labour in a way that is in contravention with country specific legislation as well as the stipulations of the ILO convention.
- 8. The programme will not engage in Category A activities
- 9. The programme will operate in secured sites only and conflict prone areas will be avoided



Annex 7 FRAMEWORK STAKEHOLDER ENGAGEMENT PLAN

1 INTRODUCTION

The Africa Integrated Climate Risk Management Programme's main overall objective is to increase resilience and enhance the livelihoods and food and water security of smallholder farmers and rural communities through integrated climate risk management of natural resources (water, soil, ecosystems) in seven countries of the Great Green Wall (GGW). It also seeks to enable these countries to adopt low emission, climate resilient pathways for agricultural development by promoting, upgrading and scaling up risk management measures in agriculture while delivering various adaptation and mitigation co-benefits, including the avoidance of 21 466 499 tCO2q emissions. To achieve the expected outcome, the programme is divided into three mutually reinforcing and interlinked components that contribute to the following three outcomes:

- Outcome 1: Strengthened climate weather information services to support decision-making and planning in relation to agroforestry, livestock raising, agricultural insurance products and services and capacity development for farmers, government and the private sector
- Outcome 2: Strengthened climate resilient agroforestry and pastoral value chains, powered by reliable and affordable renewable energy sources
- Outcome 3: Reduced obstacles (financial market products and services/high premiums) to access to agricultural insurance for governments and smallholder farmers to enhance resilience

This Stakeholder Engagement Plan (SEP) for the Programme has been prepared to establish a functioning platform for effective interaction and meaningful consultations with potentially affected parties and persons, who have interests in the implementation, and outcomes of the programme. The Programme is committed to engaging with local rural communities (direct and indirect beneficiaries) in programme-related activities in each of the selected countries, importantly, with youth and women, and to soliciting their feedback on project design and implementation while simultaneously managing expectations of beneficiaries and interested parties about programmes outcomes. In order to ensure appropriate stakeholder engagement for each activity, each sub-project will elaborate a separate Sub-project Stakeholder Engagement Plan (see last section of this annex).

The 7 participating countries are parties to the United Nations Framework Convention on Climate Change (UNFCCC) and have signed and ratified the Kyoto Protocol. By ratifying the UNFCCC, these countries have committed to implementing measures to adapt to climate change and reporting on their NDCs. This programme will contribute to the implementation of objectives of the three Rio conventions ratified by all countries, including the UNFCCC, as well as the Paris Climate Agreement, the SDGs and the Sendai Framework for Disaster Risk Reduction.

This programme is fully aligned with the countries' national development plans and their national commitments on climate mitigation and adaptation included in their NAPAs, National Climate Change Policies and Strategies, NDCs, National Communications (NCs), SDGs and National Strategies for Disaster Risk Reduction.

The programme is also consistent with the Intended Nationally Determined Contributions (INDC) of each country, which are reference documents for actions in the field of climate resilience17. NDCs describe each country's adaptation and investment priorities, analyse knowledge on best practices for climate-smart agriculture and/or co-benefits adaptation and mitigation measures. The implementation of climate-resilient measures in the 7 proposed countries in the programme addresses the NDCs (see table below).

STP:

https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Sao%20Tome%20and%20Principe%20First/STP_INDC% 20_Ingles_30.09.pdf



Countries	INDC	Adaptation Measures	Mitigation Measures
Burkina Faso	Burkina Faso – 28/9/15 An unconditional pledge to reduce emissions by 6.6% below business- as-usual levels by 2030, with a further 11.6% reduction conditional upon international support. Includes interim pledges for 2020 and 2025. In the section on adaptation, actions proposed would reduce emissions by a further 36.95%, taking the total reductions up to a potential 55.15% below business-as-usual levels. Burkina Faso's INDC.	 Increase ecosystem Productivity and resilience Improve biodiversity Conservation Improve ecological Research and monitoring Mitigate greenhouse gas emissions Capacity building Climate insurance Collection and conservation of water on the plot Irrigation techniques Reinforce the utilization of organic and mineral fertilizers Popularization of improved varieties of maize Creation of a favourable policy and institutional framework Development and management of water resources Monitoring and evaluation of water resources Capacity building 	 Renewable Energy – Biomass (Briquetting machines) Promote Urea Deep Placement Applicators Promote Solar powered driers Promote Solar powered irrigation pumps Promotion of portable Biogas production units Promotion of simple Planters, Transplanters and Reapers

Table 24 Overview of the 7 Countries INDC with recommended Climate Actions

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Countries	INDC	Adaptation Measures	Mitigation Measures
Chad	Chad – 28/9/15 Unconditional pledge to reduce emissions by 18.2% by 2030, compared to a business-as-usual scenario, or a 71% reduction by 2030, which is conditional upon international support. Includes section on adaptation, including areas of priority in the country.	 Improved use of surface water for agriculture and livestock Quality of and access to health care Increase preparedness, Capacity building Irrigation systems Diversification and intensification Improving and disseminating climate-sensitive planting schedules Soil rehabilitation for the development of agricultural activities Improving inter-community pasture zones, Livestock Food Bank The use of processed organic matter (Compost, Manure) Improve forecasting capacity National Center for Climate Change Observation Reduce climate change vulnerability 	 Renewable Energy – Biomass (Briquetting machines) Promote Urea Deep Placement Applicators Promote Solar powered driers Promote Solar powered irrigation pumps Promotion of portable Biogas production units Promotion of simple Planters, Transplanters and Reapers
The Gambia	Gambia – 28/9/15 A 44% emissions cut by 2025, compared to business-as-usual projections, and a 45% cut by 2030. The targets exclude land use and forestry. Two of 12 sectoral mitigation schemes, with associated emissions reduction targets, are unconditional. The rest are conditional upon international financial support and technology transfer. Includes section on adaptation.	 Nutritional support to vulnerable groups Public health infrastructure Vaccination programme Technical adaptation measures Regulatory adaptation measures Livestock 	 Renewable Energy – Biomass (Briquetting machines) Promote Urea Deep Placement Applicators Promote Solar powered driers Promote Solar powered irrigation pumps Promotion of portable Biogas production units Promotion of simple Planters, Transplanters and Reapers

	Africa Integrated Climate Risk Management Programme - Environmental &				
J LIFAD	Social Management Framework (ESMF)		Approved		
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Countries	INDC	Adaptation Measures	Mitigation Measures
Mali	Mali – 29/9/15 Commits to reducing emissions by 29% for agriculture, 31% for energy and 21% for forests and land use, each by 2030 and in comparison to a business-as-usual scenario. This is an average reduction of 27%. This is conditional upon international support, although around 40% of this can be met unconditionally. Includes a section on adaptation, though only for the period 2015-2020.	 National Programme to Combat Desertification Home Energy Strategy (SED) Water supply Drilling Watering courses and public places Disaster prevention Awareness raising Vaccination and immunization Dissemination of information Travel restrictions Increasing resilience Capacity building Reconciliation and improved inputs Provision of security Use of adapted crop varieties Agrometeorological assistance 	 Renewable Energy –Biomass (Briquetting machines) Promote Urea Deep Placement Applicators Promote Solar powered driers Promote Solar powered irrigation pumps Promotion of portable Biogas production units Promotion of simple Planters, Transplanters and Reapers
Mauritania	Mauritania – 23/9/2015 A 22.3% reduction in emissions below business-as-usual levels by 2030. 88% of this pledge is conditional upon international support, and 12% is unconditional. This will avoid 33.56 million tonnes of carbon dioxide. Contains information on adaptation.	 Substitution of ligneous fuel Reinforce nature conservation Improvement of knowledge of the resource and its sustainable management Demand management Monitoring Water management Water control Cleaner schools Incinerators of medical waste Capacity building, Land management Promotion of water-saving irrigation methods in oasis zones Improvement of cultivation methods in pluvial zones 	 Renewable Energy – Biomass (Briquetting machines) Promote Urea Deep Placement Applicators Promote Solar powered driers Promote Solar powered irrigation pumps Promotion of portable Biogas production units Promotion of simple Planters, Transplanters and Reapers

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Countries	INDC	Adaptation Measures	Mitigation Measures
Niger	Niger – 29/9/2015 An unconditional 3.5% reduction in emissions by 2030, compared to a business-as-usual scenario, or a 34.6% reduction by 2030 on the condition of receiving international support. Contains section on adaptation.	 Land management Reforestation Capacity building Supply management Ecosystem restoration Demand management Early warning system Capacity building Monitoring Increase resilience of the agriculture sector Irrigation management Pest management Disaster management Meteorological services, Capacity building 	 Renewable Energy – Biomass (Briquetting machines) Promote Urea Deep Placement Applicators Promote Solar powered driers Promote Solar powered irrigation pumps Promotion of portable Biogas production units Promotion of simple Planters, Transplanters and Reapers
Senegal	Senegal – 26/9/2015 An unconditional reduction in emissions of 5% by 2030, compared to business-as-usual levels, with interim targets of 3% by 2020 and 5% by 2025. Accompanied by a conditional target, subject to international financial support, of 7% by 2020, 15% by 2025 and 21% by 2030, compared to business-as-usual levels. Contains section on adaptation, as well as information on potential obstacles.	 Increasing water resources Water management Improving the efficiency of irrigation systems Demand management policy Vector control Epidemiological surveillance Information, education and communication for behavioural change Increasing resilience Land management Investments Increase productivity Needs assessment and policy design Erosion control and flood management Capacity building 	 Renewable Energy – Biomass (Briquetting machines) Promote Urea Deep Placement Applicators Promote Solar powered driers Promote Solar powered irrigation pumps Promotion of portable Biogas production units Promotion of simple Planters, Transplanters and Reapers

Source: http://www4.unfccc.int/INDCs as communicated by Parties.

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Addressing adequately the climate change risks in the 7 selected countries requires action both at local and national levels. This is why during the design process, all stakeholders including civil societies organizations have been consulted during field missions which were carried out during the IFAD new design phase in 2019 and gaps in IFAD investments have been identified and aligned with National Action Plans. Following the consultations held with all GCF National Focal Points, government authorities between in 2019 during the designs of IFAD new investments, supervisions, this regional programme was endorsed by all GCF focal from participating countries. Recent evaluations show growing capacities for countries to implement this integrated climate risk

A summary of the key organizational set up of the programme and responsible persons for the implementation of the stakeholder engagement plan has been described to help identify roles and responsibilities. The document has also provided effective procedures and mechanisms to ensure effective and meaningful consultations with the stakeholders, and timely disclosure of information related to the programme. In addition, it also provides the redress mechanism (GRM) for the IFAD and GCF programme with clear provisions for receiving grievances, processing and resolution, and reporting to complainant. The GRM has also incorporated a systematic escalation procedure of a grievance if the complainant remains unsatisfied with the resolution and seeks to appeal.

Resources required for implementing SEP activities for the whole programme lifecycle has been included. The SEP also clearly lays out a monitoring mechanism to ensure effective implementation of the activities and to enable the project to take corrective measures if required. This SEP represents a "living document" and could be updated in case of new circumstances. Further, this SEP should be read in context of the current COVID-19 environment, and the restrictions under COVID-19, which may impact on the ability to carry out stakeholder engagement activities as currently envisaged in this SEP. Some considerations for undertaking stakeholder engagements during the context of COVID-19 has been provided. Where circumstances related to COVID-19 change such that this stakeholder plan cannot be carried out as planned, this SEP will be updated as required.

2 CONTEXT OF THE DOCUMENT

This document constitutes the Stakeholder Engagement Plan (SEP) to be implemented throughout the life of the Africa Integrated Climate Risk Management Programme: Building the resilience of smallholder farmers to climate change impacts in 7 Sahelian Countries of the Great Green Wall (GGW). The SEP identifies project stakeholders and describes how these stakeholders will be engaged through meaningful consultations throughout the programme lifecycle. The SEP, being a "living document" will be updated and refined as the project progresses. This will include a revision prior to the commencement of project phases so that the SEP continues to be fit for purpose.

3 OBJECTIVES OF THE SEP

The Africa Integrated Climate Risk Management Programme is being prepared under the IFAD SECAP. As per the SECAP, Stakeholders Engagement and Information Disclosure, Targeting mechanism, the implementing agencies should provide stakeholders with timely, relevant, understandable and accessible information, and consult with them in a culturally appropriate way. IFAD SECAP provides a systematic approach to stakeholder engagement that will help the inclusion and effective management of all beneficiaries with project-affected parties and other interested parties throughout the Programme life cycle on issues that could potentially affect them, provide project-affected parties with accessible and inclusive means to raise



4 KEY STANDARD AND LEGISLATION

Country	Policies and regulatory frameworks related to stakeholder engagement
Burkina Faso	National Legislation: The constitution is not very explicit in stakeholder engagement in projects but guarantee the inclusion every citizen has the right to demand and receive information on any matter of their interest and inclusion Sectoral Policy on Environment 2018-2027 in its vision and implementation mechanisms encourages full participation of all stakeholders in projects National Forest Policy since 1997 and revised describes agreements for SEP in all Forest projects
The Gambia	National Legislation: The constitution is not very explicit in stakeholder engagement in projects but guarantee the inclusion every citizen has the right to demand and receive information on any matter of their interest and inclusion - National Environment Management Act, 1994 (Act No. 13 of 1994), Environment and Climate Laws and Regulations, 2020 supports stakeholders engagement in programmes/ projects The forestry Sub sector Policy 2010-2019: engage local communities and their forest committees on bush fire prevention and mitigation programmes as well as national awareness on conservation and rational utilisation of forest resources especially in urban areas
Chad	National Legislation: The constitution is not very explicit in stakeholder engagement in projects but guarantee the inclusion every citizen has the right to demand and receive information on any matter of their interest and inclusion Chad National Policy and environment protection supports the Stakeholders engagement in projects and programmes development as well as the Forest Policy
Mauritania	National Legislation: The constitution is not very explicit in stakeholder engagement in projects but guarantee the inclusion every citizen has the right to demand and receive information on any matter of their interest and inclusion The National Action Plan on Environment version 1 and Version 2 Policy has sections on stakeholder engagement in all projects for better management of natural resources Forestry Code 1997 encourages stakeholders participation in all projects/Programs
Mali	National Legislation: The constitution is not very explicit in stakeholder engagement in projects but guarantee the inclusion every citizen has the right to demand and receive information on any matter of their interest and inclusion National Policy for environmental policy, and the National Policy for Agricultural Development both supports full participation of stakeholders engagement
Niger	National Legislation: The constitution is not very explicit in stakeholder engagement in projects but guarantee the inclusion every citizen has the right to demand and receive information on any matter of their interest and inclusion Niger National Environmental Plan and Sustainable Development and the Forestry Policy encourage stakeholder engagement in projects and programme development.
Senegal	National Legislation: The constitution is not very explicit in stakeholder engagement in projects but guarantee the inclusion every citizen has the right to demand and receive information on any matter of their interest and inclusion The Environment Act 2001; The Plan Senegal Emergent 2021-2023; The national Forest Policy 2005-2005 all clearly mention stakeholder engagement and ownership



5 IFAD SECAP

The objectives of the Environment and Social Impact Assessment Study in the IFAD's SECAP procedure are to:

- Identify key linkages between rural poverty and environmental management and assess the potential environmental and social impacts of the proposed project on the natural resource base and livelihoods of communities in the target areas;
- Explore and identify key options for advancing environmental and social sustainability; and
- Recommend key opportunities to influence IFAD support towards environmental sustainability and climate smart development.

The SECAP recognizes the importance of open and transparent engagement between the proponent and project stakeholders as an essential element of good international practices. Effective stakeholder engagement can improve the environmental and social sustainability of projects, enhance project acceptance, and make a significant contribution to successful project design and implementation. The programme provide project-affected parties with accessible and inclusive means to raise issues and grievances and allow Borrowers to respond and manage such grievance

6 PROGRAMME STAKEHOLDERS

6.1 Stakeholder Identification and Analysis

For the purposes of this SEP, project stakeholders are defined as individuals, groups or other entities who are impacted or likely to be impacted directly or indirectly, positively or adversely, by the Programme, each country project and sub projects (also known as 'affected parties'); and may have an interest in the Programme ('interested parties'). They include individuals or groups whose interests the Programme may affect and who have the potential to influence the Programme outcomes in any way. Cooperation and negotiation with the stakeholders throughout the Programme development often also require the identification of persons within the groups who act as legitimate representatives of their respective stakeholder group, i.e. the individuals who have been entrusted by their fellow group members with advocating the groups' interests in the process of engagement with the Project.

Rural Community representatives may provide helpful insight into the local settings and act as main conduits for dissemination of the Project-related information and as a primary communication/liaison link between the Programme and targeted communities and their established networks. Verification of stakeholder representatives (i.e. the process of confirming that they are legitimate and genuine advocates of the community they represent) remains an important task in establishing contact with the community stakeholders. Legitimacy of the community representatives can be verified by talking informally to a random sample of community members and heeding their views on who can be representing their interests in the most effective way.

With community gatherings limited or forbidden under COVID-19, it may mean that the stakeholder identification will be on a much more individual basis, requiring different media to reach affected individuals. In addition, efforts will also be made to check their affiliation with the particular interest groups that they are claiming to be associated as a representative.

6.2 Methodology

In order to meet best practice approaches, the Programme will apply the following principles for stakeholder engagement:

- public consultations for the project(s) will be arranged during the whole lifecycle, carried out in an open manner, free of external manipulation, interference, coercion or intimidation;
- information will be provided to and widely distributed among all stakeholders in an appropriate format;



opportunities are provided for communicating stakeholders' feedback, for analyzing and addressing comments and concerns;

- stakeholder identification is undertaken to support better communications and build effective relationships. The participation process for the projects is inclusive. All stakeholders at all times are encouraged to be involved in the consultation process. Equal access to information is provided to all stakeholders. Sensitivity to stakeholders' needs is the key principle underlying the selection of engagement methods. Special attention is given to vulnerable groups, in particular women, youth, elderly and the cultural sensitivities of diverse ethnic groups.
- if social distancing inhibits traditional forms of engagement, the methodology should adapt to other forms of engagement, including various forms of internet communication.

Stakeholder identification for the regional programme was initiated during the scoping meetings, IFAD and regional Programme design missions. The list of stakeholders identified in the 7 countries are: Smallholder farmers, individuals, groups and other which are located within the Project Direct Area directly influenced (actually or potentially). The affected parties include direct and indirect beneficiaries: These may include, but not limited to:

- smallholder farmers (particularly rural women/youth), herders , cooperatives, MSMEs; other entrepreneurs who can benefit from the programme
- Agricultural institutions e.g. extensions services
- Government officials, including mayors of municipalities located in the project areas, environmental protection authorities, health authorities dealing with COVID-19
- Individuals and households that will be directly affected
- Public and private organizations and businesses whose normal operations are affected due project and sub-project related activities.
- Farmers and producers from communities surrounding the project areas who can benefit from selling produce in project-supported regional market centers
- Central government ministries including Ministry of Finance, Ministries of agriculture, Ministries of Environment, Ministry of energy
- Provincial and local government agencies
- Public and private organizations, civil society organizations (CSOs), non-government organizations (NGOs) included agricultural NGOs,

Vulnerable groups as defined in the funding proposal - (i) small producers engaged in staple crops (millet, maize, sorghum and groundnuts), livestock (dairy and beef, sheep and goats, chicken) and non-timber forest products (forestry) value chains characterized by subsistence production and the reduced size of agricultural land and livestock capital; (ii) rural smallholder farmers that are extremely vulnerable people to climate change and climate variability; iii) rural marginalized communities including persons living with disabilities, the elderly, widows and widowers and displaced people, and iv) young people (educated or not), women heads of households, which are all characterized by a pronounced weakness or lack of production capital (agricultural and livestock) and a lack of economic opportunities and jobs

This SEP (as well as the ESMF prepared for this project) has also been prepared in a manner consistent with the ESS7 on Indigenous Communities to enable targeted meaningful consultation, including identification and involvement of IP communities and their representative bodies and organizations; culturally appropriate engagement processes; providing sufficient time for IPs decision making processes; and allowing their effective participation in the design of project activities or mitigation measures that could affect them either positively or negatively. The GRM established is culturally appropriate and accessible for IPs, taking into account their customary dispute settlement mechanism.

6.3 Stakeholder Engagement Strategy

High interest and high influence group: Stakeholders with high influence and high interest will be managed closely and with serious efforts to fully engage them particularly for all subproject identified. The E&S focal



person, under each PMU will maintain close contact with these stakeholders. In addition, the E&S focal person will also organize quarterly consultations with the stakeholders where project or subproject officials will update the project status, including past activities in relation to the E&S risks management, the activities planned in coming months and the possible E&S risks and impacts, and record concerns, issues and suggestions raised by the stakeholders.

- Major engagement strategy:
- Maintain contact details of the individuals/institutions categorized in the group and update it regularly
- Maintain regular and close contacts
- Organize pre-informed quarterly consultation meeting
- Provide updates about the project including the past and upcoming ones
- Organize quick and short exposure visits, if required.

High influence and low interest group: For the stakeholders falling under the high influence and low interest stakeholder group, the project and subproject will put effective efforts to keep them informed. The E&S focal person will maintain regular contacts and organize targeted consultations with the group in every six months. The project or subproject officials will update the project status, including past activities in relation to the E&S risks management, the activities planned in coming months and the possible E&S risks. The E&S focal person will prepare a minute with signatures of the participants and the minutes will include the issues discussed and the decisions or actions agreed in the consultative meeting. At the end of every meeting E&S focal person will readout the minutes and a copy of the minute will be made available to the local ward office of concerned municipalities.

- Major engagement strategy:
- Maintain regular contact with individuals/institutions categorized in this group
- Organize pre-informed half-yearly consultation meetings
- Provide updates about the project including the past and upcoming ones

High interest and low influence group: For the stakeholders falling under the high interest and low influence stakeholder group, the project and subproject will put efforts to keep them informed. The E&S focal person will maintain regular contact and organize targeted consultations with the group once in a year. The programme or subproject officials will update the project status, including past activities in relation to the E&S risks management, the activities planned in coming months and the possible E&S risks. The E&S focal person will prepare a minute with signatures of the participants and the minutes will include the issues discussed and the decisions or actions agreed in the consultative meeting. At the end of every meeting E&S focal person will readout the minutes and a copy of the minute will be made available to the local ward office of the concerned municipalities.

Major Engagement strategy:

- Maintain contact with individuals/institutions categorized in the group
- Organize pre-informed yearly consultation meeting
- Provide updates about the project including the past and upcoming ones

Low interest and low influence group: For the stakeholders that have low interest and low influence stakeholder group, the programme and subprojects will monitor their activities. For this, the E&S focal person will remain vigilant about the activities of this group and will share project related information when demanded.

Major engagement strategy:

- Monitor activities of the categorized in the group
- Share each country project-related information



6.4 Stakeholder Engagement Plan

Following the identification and analysis of the project stakeholders, the programme design and implement a comprehensive plan for stakeholder engagement, as outlined in the table below. The table presented below describes the three stages of engagement and the relevant activities and targeted stakeholders. This table was prepared prior to the escalation of COVID-19, and consequently should be read together with suggested considerations for adapting engagement activities to the COVID-19 context.

6.5 COVID-19 implications and considerations for stakeholder engagements

The 7 selected countries have set various measures to mitigate the spread of COVID-19 including restrictions on non-essential movement, requirements for social distancing, and prohibitions on social gathering. Other measures have also been recommended by health organizations to limit the spread within countries. These measures impact the ability to undertake stakeholder engagement activities in the manner originally envisaged under the programme. This SEP represents a "living document" such that it can be revised to reflect changing circumstances and remain relevant and responsive to stakeholder concerns and project needs. Consequently, in the situation where COVID-19 restrictions impose too many constraints in carrying out the engagement plan as envisaged to adequately meet the needs of the stakeholders and the requirements of the project, the SEP will be revised accordingly and will be resubmitted to IFAD.



6.6 Engagement Summary

Project Objective	Primary Engagement Activities and Topics	Target Stakeholders	Method(s) of Engagement	Frequency and Location	Stakeholder Feedback Opportunity	Responsibilities
Project Phase: Planr	hing					
 Disclose relevant project information to stakeholders and solicit their inputs/feedback into ESMF, /// 	Dissemination of Project details, including possible impacts and mitigation measures, SECAP policy and principles Disclosure and grievance Redressal Mechanism, Benefit Sharing Plan, information in FPIC process, Cumulative Impact Assessment, Separate consultations with IPs.	• Stakeholder of all levels, including Project targeted Parties, concerned government agencies at local, provincial and central levels, and local municipalities	 Dissemination of project information sheets such as FAQs and fact sheets, community radio programs, use of social media, group meeting, Focus group discussions, particularly with women and vulnerable groups, Household survey and visits, one-to-one meetings if necessary. 	 Quarterly consultations, radio programs, visits to affected communities once in a month, regular communication through mass & social media, E&S focal person maintaining regular contacts with the affected population 	 Project officers will hear feedbacks & suggestions from the PAPs during the regular consultative meetings. In addition, E&S focal person will be in the project site and will be receptive toward all sorts of feedback coming from PAPs and other stakeholders. The subprojects will also run radio programs. There will also be GRM 	PMU with Environmental and Social Team
	 Project scope, rationale and E&S principles Grievance mechanism process 	 Representatives of local communities, government entities & local municipalities, Chief District Officer, PMUs representatives 	• Separate consultative meetings with identified stakeholders, PAPs and also joint public/community meetings, Meeting with the representatives of concerned government agencies and local municipalities	 At least quarterly when can organized as when required. (The frequency of such meetings will be high during land acquisition) 	 Regular consultations and stakeholders through project office and E&S focal person. Functioning GRM. 	 Project team, E&S team of the project and E&S focal person



Project Objective	Primary Engagement Activities and Topics	Target Stakeholders	Method(s) of Engagement	Frequency and Location	Stakeholder Feedback Opportunity	Responsibilities
•	 Project alternatives, scope of the potential impacts and mitigation measures and benefit sharing Coordination activities for development and implementation of management plans 	All the stakeholders, local communities, district, provincial and national stakeholders.	Consultative meetings with identified stakeholders, of all levels,	At least once in every six months or as and when required	Regular consultations and stakeholders through programme office and E&S focal person and through functioning GRM.	 Project team, E&S team of the project and E&S focal person
	 Project information - scope and rationale and E&S principles • 	All interested stakeholders of all level form local to national	 Face-to-face meetings, Trainings/workshops Invitations to public/community meetings 	At achievement and as and when needed	 Meetings, trainings and workshops 	 Project team and E&S team of the project
	Consultations and coordination to ensure implementation and management of cumulative impacts	All interested stakeholders of all level form local to national and other development projects	 Meetings, Trainings/workshops Invitations to public/community meetings 	At achievement and when needed	Meetings, trainings and workshops	Concerned ministry, project team and E&S team of the project

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Project Objective	Primary Engagement Activities and Topics	Target Stakeholders	Method(s) of Engagement	Frequency and Location	Stakeholder Feedback Opportunity	Responsibilities
•	Consultation and coordination with various stakeholders for feedbacks and effective implementation of Biodiversity Management Plan (BMP)	Interested stakeholders of all levels - District, Provincial and central governments, research institutions and NGOs.	 Meetings, Trainings/workshops Invitations to public/community meetings 	At achievement and when needed	Meetings, trainings and workshops	 Project team and E&S team of the project
	Present the final ESMF, Environmental and Social Management Plans (ESMP), draft environmental and social commitment plan	 Interested stakeholders of all levels - District, Provincial and central governments, research institutions and NGOs. 	 Local consultative meetings particularly with women and marginalized communities, Group meeting, Project Information factsheets and documents, FAQs, community radio, Mass/Social Media, website 	Once in each sub project site E&S Team during the finalization of the plans	 Meetings and group discussions by inviting all interested stakeholders, Collection of comments and feedback through GRM, 	 Project team and E&S team of the project
Presenting Programme and sub projects information to solicit interest from Programme beneficiaries,	Present details to potential project beneficiaries to inform and solicit interest from e.g. rural farmer groups etc., and to inform other interested stakeholders	All affected parties and interested groups included farmer groups, farmer associations agri start ups	 Face-to-face meetings, Trainings/workshops Invitations to public/community meetings Specific focus group discussions will be held with women, in particular rural female and youth and with indigenous groups, to ensure their participation in the relevant countries 	At least quarterly when can organized as when required.	Meetings, trainings and workshops	Project team per country



Project Objective	Primary Engagement Activities and Topics	Target Stakeholders	Method(s) of Engagement	Frequency and Location	Stakeholder Feedback Opportunity	Responsibilities
Project Phase: Pre-i	implementation			·		
 Consolidate engagement activities to prepare stakeholders 	Increase the frequency and intensity of ongoing consultation related sub projects	Sub Project Affected Parties	 Local consultative meetings with women and marginalized communities, Group meeting, Project Information factsheets and documents, FAQs, community radio, Mass/Social Media, project website 	Once a month or as when required	 Collection of comments and feedback through GRM, focal person. Project telephone line and email address, radio interview Meetings and household visits 	 Concerned ministry and government agencies, project team and E&S team of the project
 Presenting project information to provide updates to beneficiaries and other affected parties and interested stakeholders 	 Present update on project progress to project beneficiaries and including those affected groups and interested groups etc. 	All affected parties and interested groups included farmer groups, farmer associations	 Face-to-face meetings, Trainings/workshops Invitations to public/community meetings Specific focus group discussions will be held with female farmers, as well as with youths, and with indigenous groups, to ensure their participation. 	Once a month or as when required	Meetings, trainings and workshops	Project team

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Project Objective	Primary Engagement Activities and Topics	Target Stakeholders	Method(s) of Engagement	Frequency and Location	Stakeholder Feedback Opportunity	Responsibilities
 Provide regular updates on sub project activities activities and other stakeholders, Implement and monitor the implementation Handling of complaints in a prompt and effective manner 	 Regularly update on activities, including key milestones, key changes in the Sub Project design, and monitoring results Health and safety impacts Ensure effective functioning of the GRM 	• All stakeholders, including local municipalities, concerned government agencies	 Project Information Sheets, such as brochures, factsheets, notices and social media such as feedbacks from stakeholders Community meetings Monitoring and Community Perception Surveys Project and website Radio and newspaper GRM 	Once on every three months or as when required	• Meeting and meetings minutes, Feedbacks received through the LCO, Project telephone line and email address, interactive radio programs and GRM	 Project team, E&S team of the project and LCOs
	 Disclose and consult on Construction Contractor activities, hiring preferences, job and business opportunities and skill training opportunities, among others. Undertake community Health and safety awareness program 	All stakeholders, including local communities, local municipalities, concerned government agencies	 Community meetings, Project Information Sheets, such as brochures, factsheets, notices and social media, feedbacks from stakeholders and website Radio and newspaper 	 Once on every two months or as when required Timely information to locals on job opportunities through PIC, social media, community radio and community meetings 	 Feedback Form Project and interactive radio programme Community meetings Project telephone line, and email and GRM 	 Project team, E&S team of the project and LCOs
	Meetings and discussions with key government departments for construction permits and licenses and provide construction progress update	District level government agencies, Local Provincial and central governments agencies	Official meeting with concerned government officials, Group meeting, briefings and presentations	 Once on every two months or as when required 	Meeting minutes and meeting feedback forms and GRM	Concerned ministry and government agencies, project team and E&S team of the project



Project Objective	Primary Engagement Activities and Topics	Target Stakeholders	Method(s) of Engagement	Frequency and Location	Stakeholder Feedback Opportunity	Responsibilities
	Interaction with IIPs on IPPF governance	IPPs within identified shareholders	FGDs or group meeting with IPs	 Once on every two months or as when required 	Meeting minutes and meeting feedback forms, GRM	 Project team and E&S team of the project,
 Presenting project information to provide updates to beneficiaries and other affected parties and interested stakeholders 	Present update on project progress to project beneficiaries and including those affected groups and interested groups etc.	All affected parties and interested groups included farmer groups, farmer associations	 Face-to-face meetings, Trainings/workshops Invitations to public/community meetings Specific focus group discussions will be held with female farmers, as well as with youths, and with indigenous groups, to ensure their participation. 	Once a month or as when required	Meetings, trainings and workshops	Project team
•	Interaction in line with IPPF	IPPs within the PAPs and identified shareholders	FGDs or group meeting with IPs	Once on every six months or as when required	Meeting minutes and meeting feedback forms, GRM	 Project team and E&S team of the project, LCOs



6.7 Strategies for Information disclosure

Timely and effective disclosure of relevant project-related information is crucial in helping stakeholders, including the affected persons and communities understand the risks, impacts and opportunities of the project. The Programme will ensure that the disclosure of the relevant information will inform the stakeholders about;

- The purpose, nature, and scale of the project,
- The duration of proposed project and associated activities during preparation, construction and operation phases,
- Risks and potential impacts of each sub activities and other stakeholders,
- The mitigation plan, which will list out the measures that the project will undertake along with timeline for each activity, required financial resources and responsible units or persons within the project,
- GRM put in place by the project and their functioning, and
- Stakeholder engagement process including grievance redress mechanism

The Project aims to use the various mediums as explained in section 4.1.1 to disclose project-related information to all identified stakeholders throughout the project lifecycle.

The project officials and E&S focal person will make sure the disclosure programs are organized in culturally appropriate manners and ensure participation of women and vulnerable groups. Given the complex terrain and road connectivity that greatly limit the availability of public transportation, timely information of the disclosure events is crucial in ensure that the majority of the stakeholders are able to participant in such events. So, in each country, the project and sub-projects will make sure that appropriate and reliable means of communication are adopted to inform stakeholders about the date, time and place of such event. In each country, the programme and sub-projects plan to use the following means and methods for such purpose:

- Display of public notice in various local places where general public gather
- E&S focal person and E&S team of the project areas
- Local municipalities, ward offices and their notice boards
- High school students and local schoolteachers and school boards
- Health centres and their notice boards
- Notice about the event in the local community radio and newspapers
- Social media,
- Local NGO network
- District level Journalists Association
- Communication Materials

Key disclosure and consultation materials include:

- Project Information Document (PID), Project Factsheet: A short (two-pager) factsheet in official language with map, graphics and pictures, Grievance Redress Mechanism (GRM)
- Programme Management Unit

Each project office will also act as the Project Information Centre (PIC) through its PMU. The project coordinator, who will trained to handle the flow of information and grievances related to sub-project, will maintain the PICs. Project website and telephone, social media will be included.

6.8 Strategies for Consultation

The project and sub-project will apply a number of strategies for communication to achieve a broader objective of the Stakeholder Engagement Plan. The project and the sub-projects will implement various consultation methods to ensure inclusive and effective engagement with all stakeholders.



6.9 Targeted Stakeholders and Consultation Strategy

Consultation Methods	Targeted Stakeholders		
Community meetings and proceedings appropriate to the culture and norms of the Indigenous Peoples	Every community in the Directly and Indirectly Affected Population.		
Public Information Centre (PIC)	Each PMU will also act as the PIC and it will be made accessible to all interested stakeholders in getting project-related information		
Focus group discussion (FGD)	Women groups, Youth Groups , marginalized community IPs		
Household visits	households in extreme poverty, female headed households, people with disabilities,		
Face-to-face meeting/ workshop	Government offices – all levels, elected officials, schools and health clinics, interest groups, NGOs,		
Community Radio	Regional stakeholders and other interested parties who can call in to ask questions and raise issues/ concerns.		
Project email address	All stakeholders can email to request information, and raise issues/concerns		

7 MONITORING AND EVALUATION

7.1 Monitoring of Stakeholder Engagement Activities

The stakeholder engagement process will be monitored through two methods:

- Review of engagement activities in the field particularly all sub projects as related in the eligibility criteria's annex; and
- Each PMU will prepare a half-yearly SEP Implementation Report and submit it to the regional coordination Unit. Once approved, the report will be disseminated to the stakeholders through periodic consultations and project website.

Overall performance will be reviewed on an ongoing basis to determine the effectiveness of the SEP, including the methods of engagement being used, their outcomes and the accuracy of the mapping results. The performance indicators are presented below

7.2 Performance Indicators

Objectives	Performance Indicators		
All stakeholders are provided information about the sub- project in a timely and culturally appropriate manner	 Means of informing all stakeholders about the meeting Were the participations given advance notice about the meeting Were the participations aware in advance about meeting agenda, Number of consultation meetings within a specific time period, Means of dissemination and number of materials disseminated, Comments received on disclosure materials, positive or negative Locations of information disclosure and nature of participation 		



Objectives	Performance Indicators
Stakeholders have an opportunity to share their views and concerns about the Project's development	 Type of engagement opportunities given to participants in the meeting Nature of participation in terms of gender and indigenous people Quality of recording of comments made by the participants Attendance rates Numbers of grievances related to the sub-project activities
Informed participation by Vulnerable Groups	 Number and type of engagement opportunities provided to Vulnerable Groups Types of feedback/comments from vulnerable groups Attendance rates Representation of all sub-groups Number and type of grievances from vulnerable groups
Positive working relationships are built and maintained over time	 Number and type of grievances lodged by stakeholders Number of satisfactorily closed out grievances Percentage of stakeholders taking part in engagement efforts Community attitudes and perceptions
Engagement continues to be transparent, inclusive and appropriate throughout the Programme lifecycle	 Adherence to the schedule of stakeholder engagement activities Representation of Vulnerable Groups in engagement activities Number and type of grievances lodged by community members Number of satisfactorily closed out grievances

7.3 Reporting

Effective implementation of community engagement is vital for building trust and respect with stakeholders. Reporting is crucial in convincing the stakeholders that the project is serious about the complaints lodged by local community and the GRM system, put in place by the project, indeed works. In addition, double checking information, testing the stakeholder's reaction to the proposed mitigation measures, and obtaining further feedback to refine the measures before implementation, getting buy-in from key stakeholders for implementation plans are other major advantages of reporting back system.

The process of reporting to the stakeholders will be conducted in the following ways:

Frequently updated FAQs to address new concerns that have come to light through stakeholder feedback during planning, pre-construction, construction and operations with the PMU or the RCU. The updated FAQs is one of the key disclosure materials for the Project throughout the Project lifecycle.

Updated Issues and Response Report to be disclosed with the final ESMF incorporating any feedback received during the Draft ESMF consultation phase and how the feedback has been considered in the Project designs and decisions.

Sub projects Issues and Response Report to be disclosed which incorporate any new issues that have come to light and concerns and queries raised by the Project stakeholders.



7.4 Roles, Responsibilities and Resources

	Role and responsibility of IFAD (AE)	Role and responsibilities of AfDB	Role and responsibilities of ARC	Role and responsibilities of WFP	Role and responsibilities of the private sector	Role and responsibilities of the government/ government entities	Role and responsibilities of the farmers
Component 1: C	limate Risk Pre	eparedness					
Output 1.1. Increased access to agro climatic information services and early warning infrastructures to support integrated climate risks management	will ensure that the PMU and	AfDB with the PMUs are in charge of the coordination and implementation and reporting to IFAD AfDB will perform the following activities: 1.1.3. Provide training for 350 meteorological experts in the country on impact- based forecasting methodologies, data collection and interpretation 1.1.4. Design and develop a nationally tailored version of the system, using in-situ data and local knowledge/priorities	ARC will be in charge of supporting countries on activities under: 1.1.8. Coordination and knowledge sharing with ACMAD and other regional institutions (e.g. AGRHYMET, Climate Outlook Forum) on best practices, complementarities and consistencies with regional products and warnings. ARC will sign contract agreements for services at activity level	None	Private actors will be hired by PMUs to provide services and goods for proper implementation of the programme	The government (EE), represented by the Met agencies, will implement activities under: 1.1.1. A preliminary study, mapping of locations of the small hydraulic infrastructure in the seven countries and detailed designs and ESS studies 1.1.2. Installation of 560 automatic weather stations and 700 rain gauges; upgrading/ rehabilitation of existing 210 hydrological stations in the seven countries Met agencies will sign contract agreements for good work and services at activity level	Work closely with EEs PMUs



	Role and responsibility of IFAD (AE)	Role and responsibilities of AfDB	Role and responsibilities of ARC	Role and responsibilities of WFP	Role and responsibilities of the private sector	Role and responsibilities of the government/ government entities	Role and responsibilities of the farmers
		1.1.6. Develop communication systems and dissemination methods to translate early warning information into guidance and warnings for government agencies, emergency services, aid agencies, agricultural NGOs, extension services.					
Output 1.2. Improved awareness and capacity both at farmers and institutional level on integrated climate risk management	As AE and EE through the RCU, IFAD is in charge of the overall coordination of this output and will ensure that the PMU and AfDB are implementing and reporting the activities as planned to GCF	AfDB will be in charge of the implementation of all activities under Output 1.2.	None except coordination and coherence	None except coordination and coherence	Private actors will be hired by PMUs to provide services and goods for proper implementation of the programme	EEs (countries) will ensure cross-sectoral coordination, timely delivery of all activities implemented by AfDB under are output 1.2., and that capacity is built and local plans updated and implemented	Sustain the capacity gained and use of climate information generated



	Role and responsibility of IFAD (AE)	Role and responsibilities of AfDB	Role and responsibilities of ARC	Role and responsibilities of WFP	Role and responsibilities of the private sector	Role and responsibilities of the government/ government entities	Role and responsibilities of the farmers
Component 2: C	limate Reducti	on Measures (adap	otation/ mitigation)				
Output 2.1. Best Available technologies adaptation/ mitigation (forest and land use; renewable energy) adopted and implemented with agricultural insurance schemes	charge of the overall coordination of this output and ensuring that the PMU and IFAD country team and AfDB are implementing and reporting the activities as planned under component 2 to GCF. IFAD through its country offices and support PMUs will provide	AfDB will implement activities co- financed though ADRIFI and report to IFAD	None except coordination and coherence	WFP will coordinate with IFAD to ensure that the proposed minimum service package of best adaptation activities is bundled with agricultural insurance and support the implementation through the R4	Private actors could be hired by PMUs to provide services and goods for proper implementation of the programme	EEs (countries), represented by their ministry of agriculture and PMUs, are in charge of the implementation of all activities under Output 2.1. and report to IFAD and the regional coordination unit. PMU in each country will sign contract agreements with all services providers extension services for good work and services at activity level	Farmers will support the implementation as recipients of the services and goods
Output 2.2. Diversified livelihood through the promotion of	technical support for the implementation of activities financed though	None except coordination and coherence	None except coordination and coherence	None	Private actors could be hired by PMUs to provide services and goods for proper	PMUs representing the EE (countries) are in charge of the implementation and	Farmers will support the implementation as recipient of the services and goods



	Role and responsibility of IFAD (AE)	Role and responsibilities of AfDB	Role and responsibilities of ARC	Role and responsibilities of WFP	Role and responsibilities of the private sector	Role and responsibilities of the government/ government entities	Role and responsibilities of the farmers
income generating activities powered with renewable energy	IFAD baseline investment earmarked in FP and other adaptation and mitigation activities				implementation of the PROGRAMME	report to IFAD and the regional coordination unit PMU in each country will sign contract agreements with services providers extension services for good work and services at activity level	
Component 3 : (Climate Risk Tr	ansfer					
Output 3.1. Access to micro insurance expanded to enhance integrated climate risks management	As AE, IFAD is in charge of the overall coordination of this output and will ensure that the PMU and WFP are implementing and reporting the activities as planned to GCF	None except coordination and coherence	None except coordination and coherence	Implementation and reporting on all activities under output 3.1. to the PMUs and PMUs to IFAD using its R4 under the agreement signed with each country. WFP will manage the REPLICA, where possible	Private actors could be hired by PMUs to provide services and goods for proper implementation of the programme WFP will use its long- term agreements for the region with several providers (Inclusive Guarantee, Pula Advisors, IRI,	PMUs receive TA from WFP on R4 and report to IFAD on the implementation as per the agreement signed with each country Full involvement of ministries of finance Contract agreement will be signed between the	Farmers are recipients and sign contracts with insurance companies and participate in the R4 approach.



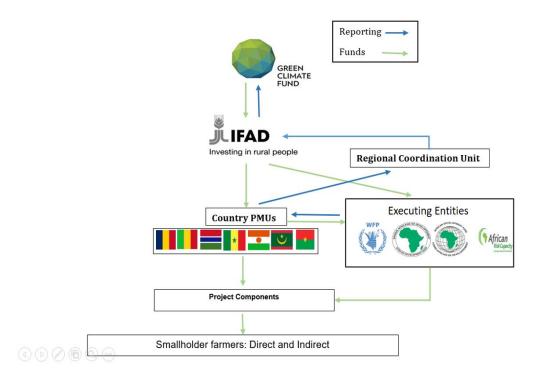
	Role and responsibility of IFAD (AE)	Role and responsibilities of AfDB	Role and responsibilities of ARC	Role and responsibilities of WFP	Role and responsibilities of the private sector	Role and responsibilities of the government/ government entities	Role and responsibilities of the farmers
					Blue Marble) to procure goods and services	PMU and WFP and WFP will use its long-term agreements for the region with several providers to provide goods and services	
Output 3.2. Sovereign risk transfer supported and promoted to strengthen integrated climate risks management	in charge of the overall coordination of	AfDB will coordinate with ARC and ensure coherence with ADRIFI on the implementation and complementary between micro and macro insurance	ARC will be in charge of supporting the EEs on the implementation of Output 3.2., in coordination with AfDB, including a technical working group on ARV, capacity-building and adjustment ARC will sign contact agreements for good work and services at activity level	None except coordination and synergies to ensure linkages between the micro and macro insurance	Private actors could be hired by PMUs to provide services and goods for proper implementation of the programme ARC will sign contact agreements for good work and services at activity level	PMUs are supported by ARC and report to IFAD on the implementation as per the agreement signed with each country	Farmers receive the payouts and implement according to the contingency plans.

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	Role and responsibility of IFAD (AE)	Role and responsibilities of AfDB	Role and responsibilities of ARC	Role and responsibilities of WFP	Role and responsibilities of the private sector	Role and responsibilities of the government/ government entities	Role and responsibilities of the farmers
Programme ma	nagement and c	coordination					
Coordination	of the programme,	AfDB with the PMUs are in charge of the coordination and implementation and reporting to IFAD on activities under Outputs 1.1, 1.2, 2.1 and 3.2 with ARC	ARC will be in charge of reporting to the RCU, which reports to IFAD on the implementation results and dissemination. IFAD will report to GCF	ARC will be in charge of reporting to the RCU, which reports to IFAD on the implementation results and dissemination. IFAD will report to GCF	Private actors hired by PMUs will report to the PMUs, which report the RCU. RCU then reports to IFAD, and IFAD to GCF	PMU in each country will report to the RCU, which reports to IFAD	During supervision mission, farmer's reports to PMUs/ IFAD country teams on the implementation status, results achieved and needs. The PMUs will report to the RCU and IFAD. IFAD will report to GCF

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The organizational structure provide the flow of funds. At the country level and sub project level,



At the country level and sub project level, roles and responsibilities are:

Future Phases Stakeholder Engagement Team Member	Responsibilities
GCF National Coordinator	Responsible for approving the SEP, including the annual budget required for implementation inc consultation with the IFAD PMU baseline investment coordinator Responsible for the overall implementation of the SEP and to ensure that grievances are resolved in a timely manner
M&E Officer	Support the Senior Safeguard Specialist in the implementation of the SEP Coordinating the E&S focal person s activities on the ground, including regular training and briefings Hold weekly meetings with E&S focal person to examine the stakeholder engagement/feedback and grievance register records undertaken by the E&S focal person Provide a weekly summary of feedback and grievances to the Communications and Stakeholder Engagement Lead and Social Team Lead
E&S focal person (Subproject based)	Receive training once a month on general Project information, engagement skills and techniques, various specialist topics centred on Project key risks and how the Project team plans to manage them Hold small group meetings in local IPs language to explain printed disclosure materials for people who are not literate or problem in reading/understanding Receive stakeholder feedback and grievances, and each will maintain a log of meetings held by them Communicate urgent issues and grievances to the team coordinator in a timely manner



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7.5 Roles and Responsibility of Key Stakeholders

The Roles and Responsibility of Key Stakeholders are shown in the table below.

Key Agencies	Responsibilities
GCF Coordinator / National coordinator	Planning Budgeting and Implementation of the SEP throughout project lifecycle Guiding stakeholder engagement activities for the success of project; Management of grievances and its resolution as mention in ESMF Coordination and monitored to the consultants and contractors on SEP activities; Documentation of the environmental and social performance SEP implementation Monitoring and Evaluation of the feedback of SEP
Construction Supervision Consultation CSC	Facilitate the SEP activities for the implementation Supervision and monitoring of Contractor's activities during construction phase.; Coordination and Management of engagement meetings of stakeholders during the construction phase Facilitate to lodge overall project level grievances.
Contractors	Implementation of given activities as per stakeholder engagement plan inform and share the project any issues related to their engagement with stakeholders; Updates the activities of SEP in every monthly Meeting

7.6 Estimated Budget

A tentative budget for implementing activities related to Stakeholder Engagement Plan (SEP) over the period of six years (2021 - 2026) that covers the planning and preparation and project implementation phases is provided in the table given below. The budget is included under specific activities related to training, sensitization and awareness under Output 1.1. It will be reviewed every six months.



Stakeholder Engagement Plan Budget (2021 - 2026)

ltem	Quantity	Unit Cost (US\$)	Months	Total Cost (US\$)	Remarks
Periodic stakeholder consultations	21	400	-	8,400	On average once a quarter for 5 years
Travel expense	60	1,500		90,000	On average once a month for 5 years
Logistic expense	-	-	-	10,000	Lump-sum (calculated on the basis of 2,000 US\$ per year on average for five years)
Exposure visits	5	3,000	-	15,000	Once a year for 5 years
Training and orientations for staff - Communications	6	3,000	-	18,000	Once a year for 6 years
Training and orientations for staff GRM and Grievance committee members	6	5,000	-	30,000	Once a year for 6 years
Project Information and GRM Centres (Establishment and operations)	4	1,250	-	5,000	One for each of the four sub- projects
Communication and GRM Materials (FAQs)	-	-	-	12,000	Lump-sum (calculated on the basis of 2,000 US\$ on average per year for six years)
Project website (Development and operations)	-	-	-	10,000	Lump-sum (calculated on the basis of 2,000 US\$ on average per year for five years)
Monitoring and Evaluation, including half-yearly SEP implementation report	10	1,000		10,000	Twice yearly for five years
Total				208,400	

7.7 Sub-project Stakeholder Engagement Plans (SSEP)

Each sub-project will elaborate a separate SSEP. While being fully compliant with the SEP outlined in this annex, it will further define and adapt the present SEP to the specifications and requirements of the specific local conditions. The SSEP will contain at least the following sections:

- Introduction and Scope
- Sub-project Overview
 - o Activities
 - Stakeholders
 - o Potential positive and negative impacts
- Engagement Principles
 - o Information Disclosure



- \circ Consultation
- o Reporting and Transparency
- Roles and Responsibilities
- Budget
- Performance Indicators



Annex 8 BASELINE STAKEHOLDER CONSULTATIONS

1 Burkina Faso

Among the IFAD design team, the mission was composed of : Mr. Abdoul Barry, IFAD Portfolio Officer for Côte d'Ivoire and Burkina Faso, Head of Mission; Mr. Samir Bejaoui, Programme Officer, IFAD / WCA; Mr. Ludovic Conditamdé, Programme Support Officer, IFAD / WCA; Ms. Karine Nikiema Téwendé Karine, Programme / Gender Support Assistant; Mr. Frans Goossens, Chief of Technical Mission, FAO / TCIA; Ms. Sonia Andrianarivelo, Targeting, Gender and Monitoring & Evaluation Specialist, FAO / TCIA; Mr. Mathieu Faujas, Expert in value chains, FAO / TCIA consultant; Ms. Garance Kafondo, Agronomist, specialist in environmental and social assessment, FAO / TCIA consultant; Mr. Jean-Charles Heyd, Agronomist, FAO / TCIA consultant; Ms. Cécile Bangui, Expert in agricultural institutions and professional organisations, FAO / TCIA; Mr. Jean-Pascal Kabore, Institutional Specialist, FIDA / WCA; Mr. Maladho Barry, Rural Infrastructure Expert, FAO / TCIA Consultant; Ms. Rachida Ouro Gbele, COSTAB Economist, Financial and Economic Analysis, FAO / TCIA Consultant; Ms. Anne-Christelle Ott, FIDA / WCA Financial and Economic Analysis Economist; Ms. Christa Ketting, Public-Private Partnerships Specialist, IFAD / PTA; Ms. Mylene Kherallah, Lead advisor, FIDA / PTA.

The Government was represented by Mr. Touré Adama, Director of Policy Formulation at the General Directorate of Sector Studies and Statistics (DGESS) of the MAAH, assisted by his close collaborators; and Ms. Dao Compaoré Agnès, Programme Officer at the General Directorate of Cooperation (DGCOOP), Ministry of the Economy, Finance and Development.

The consultations raised the issues that the incidence of poverty in Burkina Faso is high. Indeed, in 2014, the proportion of the poor in the population at the national level, was estimated at 40.1% with a depth of poverty of 9.7% and a severity of poverty of 3.3.%. There are also huge social disparities where 92% of the poor live in rural areas with an incidence of poverty of 47.5% against 13.7% in urban areas. On the other hand, the disparities between the thirteen regions are considerable (Boucle du Mouhoun is one of the regions with the most poor with a poverty incidence of 59.7%; the Hauts-Bassins and the Cascades are moderately poor with incidences of poverty of 34% and 22% respectively). These regions are also exposed to climatic hazards, drought, rainfall deficit, bush fires) and agricultural risks (damage caused by animals or birds, livestock mortality, plant diseases). Local communities including community leaders in the targeted regions were met around focus groups and meetings

In this context, the Government of Burkina Faso and IFAD, drawing lessons from the performance of previous projects, favour the design of a new operation, the Support Project for the Promotion of Agricultural Sectors (PAPFA: 2017-2024). PAPFA aims to consolidate and implement " scale the achievements of the Agricultural Sectors Support Project (PROFIL) and the Rural Private Sector Support Project (PASPRU), financed by IFAD and closed in June 2017. Through the development of four agricultural sectors, rice, market gardening, sesame and cowpea, PAPFA will respond to the major challenges of the rural context in Burkina Faso.. The PAPFA is also aligned with the National Food and Nutrition Security Policy (PNSAN) by aiming to increase the availability, nutritional value and the health and nutritional quality of products, as well as the promotion of good nutrition.

2 Mali

The IFAD design team in the mission was composed of : Jean Pascal Kaboré, Representative of IFAD, Head of the IFAD Mali Portfolio and Head of Mission; Antonio Rota - Senior Technical Advisor IFAD; Karim Sissoko - Head of IFAD Country Office in Mali; Alban Bellinguez - Expert in breeding and institutional aspects; Valeria Casavola - Targeting and Gender Officer; Amadou Coulibaly - National renewable energy expert; Abdelkader Djenepo - Monitoring and evaluation specialist; Hassane Issa - Expert in social engineering and integrated land management; Olivier Lasbouygues - Environment and climate expert- Amath Pathe SENE, lead Environment and Climate provided a remote technical backup; Anne-Christelle Ott, Economist; Johan Pasquet



- Expert in agroecology; Karan Sehgal - IFAD Renewable Energy Expert and Mariama Walet, Financial Management Specialist. The entire formulation process was coordinated by Maëlle Peltier, Consultant at IFAD.

The government national party was composed of representatives of the National Direction for Agriculture (DNA); the National Direction for Animal Productions and Industries (DNPIA) of the Livestock Ministry; agencies related to the Ministry of Energy (AMADER, ANADEB, AER); the Environment and Sustainable Development Agency (AEDD), etc. and representatives of the Ministry of Finance, representing the Borrower. The mission met local communities including community leaders in the targeted regions around focus groups and meetings to discuss needs.

The consultations raised the issues that access to agricultural supplies remains limited in Mali, and the promotion of climate-resilient farming practices is still on an ad hoc basis, resulting in a decrease in agricultural productivity. Smallholder family farms are more vulnerable given that they face difficulties such as the increase in relative costs of fertiliser inputs with regards to the prices of agricultural commodities, as well as a limited access to land, in a context of declining soil fertility. The virtual lack of access to energy impedes the transformation of agriculture and the modernization of Malian family farms: only 15% of Mali's rural population has access to electricity. Rural women are the first to be affected by this situation. The consultation also raised the issue of the presence of armed groups in the circle of Banamba which was reported in early November 2018. Development of the security situation will be closely monitored and the decision to retain this region in the project may be reassessed.

In order to address these issues and based on the outcomes of ASAP/PAPAM, the Malian government has introduced biodigesters within national policies and strategies, thus catching up with other initiatives in the region. The implementation of the Multi-Energy for Resilience and Integrated Territory management (MERIT: 2019-2024) project will be the opportunity to develop, together with INCLUSIF financial products (credit schemes) specifically aimed at financing biodigesters. Project implementation will rely on a "faire faire" approach, based on partnerships with qualified partners in Mali, and in particular the international NGOs Agronomes et Vétérinaires Sans Frontières (AVSF) and SNV, which have proven their technical capacity and comparative advantage during the implementation of ASAP/PAPAM. Project implementation will also rely on a close collaboration with all the institutional actors, within the relevant sectors of concern:

3 Chad

Among the IFAD team, the mission was composed of : Composition of the mission: Valantine Achancho, Portfolio Officer, Head of Mission, IFAD; Mr. Pascal Sanginga, Technical Coordinator of the mission, TCIA / FAO; Mr. Jean-Philippe Audinet, Principal Technical Advisor, IFAD; Ms. Edi Bruni, Agronomist, specialist in Sahelian agro-pastoral systems, gender and TCIA / FAO targeting; Mr. Philippe Ankers, Livestock Specialist, TCIA / FAO; Mr. Youssef Brahimi, specialist in natural resources management, environment and climate, IFAD consultant; Mr. Ibro Manomi, Economist, TCIA / FAO; Mr. Alain Traoré, specialist in agribusiness, value chain and farmers' organisations, TCIA / FAO; Ms. Giorgia Nicolo, specialist in nutrition and transversal aspects of support, FAO; Mr. Jacques Boka Etien, Irrigation and Rural Infrastructure Specialist, Consultant, IFAD; Mr. Arcadius Denis Domingo, microfinance specialist, IFAD consultant; Mr. Alou Albdoulkarim, Financial Management Specialist, IFAD Consultant; Mr. Mamadou Dioulde Sow, Procurement Specialist, IFAD Consultant; Mr. Marcelin Norvilus, IFAD Programme Officer, specialist in monitoring and evaluation.

The multidisciplinary national team was composed of Mr. Koko Wakdet from the MPIEA, Mr. Kampété Abdoulaye from the MPIEA, Mr. Rakidjim Nanatengar from the MPIEA, Ms. Gongnet Gnifienet from the MEPD, Ms. Reinta Natebaye from the MEP, Mr. Abakar Ramadan from the MEA, Mr. Ahmed Mohamed Nadif from MEPA, Mr. Soumaine Albachar from CNCPRT and Ms. Mariam Titimbaye from CELIAF

The consultations raised the issues that Chad is a fragile country marked by great economic and financial vulnerability following the prolonged fall in oil prices. In addition, the country is faced on the one hand with environmental and climatic risks following recurrent droughts, combined with inefficient traditional agricultural practices and less resilient to climate change and, on the other hand, security risks linked to conflicts. armed



Africa Integrated Climate Risk Management Programme - Environmental	& Rev. Date:	2021/01/29
Social Management Framework (ESMF)	Status:	Approved
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forces at its borders and repeated attacks by the terrorist group Boko Haram. The number of people suffering from undernourishment increased from 3.9 million between 2004-2006 to 4.6 million between 2014-2016. This deterioration in the food situation could be attributed to conflicts and unfavourable climatic conditions, with Chad being one of the ten countries in the world most vulnerable to climate change.

In this context, the Government of Chad has requested funding from IFAD for the Strengthen the Productivity of Family Agro-pastoral Farms and Resilience (RePER: 2018-2025) to extend, reproduce, adapt and support, in space and time, the results and achievements of previous successful projects, in order to reach a greater number of poor rural people and deploy innovations in approaches, tools and methods to further improve the productivity and strengthen the resilience of family agro-pastoral farms in the area Central Sahelian in Chad.

4 Mauritania

Among the IFAD team, the mission was composed of: Haoua Sienta, IFAD Portfolio Officer for Mauritania, Head of Mission; Lazare Hoton, Head of Technical Mission, Fao-Tcia; Patrick Habamenshi, Institutional Specialist, IFAD; Issaka Oumarou, Specialist in social engineering and integrated land management, Consultant; Monique Trudel, Territorial approach and decentralization specialist, Tcia Consultant; Sonia Andrianarivélo, Targeting, Gender, and monitoring and evaluation, Consultant Tcia; Gabriel Boc, Economist, Fao-Tcia; Olivier Lasbouygues, Expert in Environment, Management of natural resources and climate change, Consultant; Amath Pathe SENE, lead Environment and Climate provided a remote technical backup, Mariama Walet Mohamed Aly, Specialist in financial management and procurement, Consultant.

The Mauritanian national party was represented by Sylli Gandega, IFAD focal point in Mauritania; Coquein Mejdoub, Deputy Director of Resource Mobilisation and Coordination of External Aid / Ministry of Economy and Finance (DA / DMBRCR / DGIPCE / MEF); Mohamed Saleck Ould Hmeida, Deputy Director of strategies, cooperation and monitoring-evaluation / Ministry of Agriculture (DA / DSCSE / MA); Isselmou Ould Abdatt, Deputy Director of Planning, Cooperation and Monitoring-Evaluation / Ministry of Livestock (DA / DPCSE / ME); the PASK II and PRODEFI Coordination Units represented by Ahmed Ould Amar, PASK II Coordinator; and Abdelkader Mohamed Saleck, Coordinator of PRODEFI as well as their respective teams.

The consultations raised the issues that Mauritania is a vulnerable country highly exposed to the adverse effects of climate change, which weaken the structural foundations of its economic development. Indeed, about 75% of the poor live in rural areas where the prevalence of poverty is mainly due to a poor performance of the agricultural sector, which accounts for 14% of Gdp. Up to 40% of the population of the southern wilayas – where IFAD concentrates its interventions – live below the poverty line. Poverty is coupled with food insecurity (28%) and malnutrition (23%), which particularly affects rural households, most of which are headed by small agro-pastoralists. Survival strategies developed by the latter, amplify the state of degradation of natural resources, weaken agro pastoral ecosystems, thus causing a continuous loss of their means of livelihoods. The mission met local communities including community leaders in the targeted regions around focus groups and meetings to discuss needs.

In order to address these issues, the Project for the Sustainable Management of Natural Resources, Local Equipment and the Structuring of Rural Producers (PROGRES 2019-2026) envisions a deep rural transformation based on citizen engagement and on sustainable management of natural resources, and places poor rural communities at the heart of the sector's development. It proposes to regenerate degraded ecosystems through the restoration of abandoned farming areas and pastoral areas, and to promote climate resilient agriculture. The PROGRES will be implemented according to the IFAD's COSOP (2018-2024) approach for Mauritania.

5 Niger

Among the IFAD team, the mission was composed of : For the IFAD team: Mr. Achancho Valantine, Country Director, IFAD Head of Mission; Mr. Lawan Cherif, Programme Officer, IFAD; Radu Damianov, Principal Finance Officer, IFAD; Ms. Claudia Savarese, Associate Programme Officer, IFAD; Mr. Patrick Habamenshi,



Rural Development Specialist, Principal Consultant; Mr. Abdoulaye Dicko, rural infrastructure specialist, Consultant; Mr. Ahmed oumarou, specialist in environment and climate change, consultant; Mr. Guy Raoul SANON, specialist in economic and financial analysis, consultant; Mr. Alain TRAORE, specialist in youth entrepreneurship, Consultant; Mr. El Hadj Issa YAHAYA, specialist in financial management, consultant.

The government part was composed of: Mr. Abdou Chaibou, Director of Studies and Programmeming, MAG / EL, Head of Government Mission; Mr. Assadeck Mohamed, Senior National Technical Assistant in political dialogue, CENAT / ProDAF; Mr. Chaibou Magagi, Senior National Technical Assistant in Financial Consolidation, CENAT / ProDAF,, Mr. Yacouba Seybou Director, Sustainable Land Management Department, Mr. Amadou Bachir Head of Division / HC3N, Mr. Moussa Mai Moussa Head of Division DP / DGPD / MP, Mr. Issa Mano DGA / DPPV / MAG / EL, Mr. Alyou Abdou Ali Head of Division DSI / MP, Mr. Salifou Maman Bassirou DEP / MESUD, Mr. Boukari Chouidi DGPIA, Ms. Ali Rahila DGGR / MAG / EL, M. Oumarou Ibrahim Monitoring and evaluation / RECA. The mission met local communities including community leaders in the targeted regions around focus groups and meetings to discuss needs.

The consultations raised the issues that Niger's population is dependent upon small-scale farming and livestock that are highly dependent on the weather. However, climate change is having negative effects on agriculture due to degradation of natural resources. The country has therefore untapped resources that could significantly boost agriculture production and productivity, The result is a poor performance in terms of production and productivity, and a situation of almost permanent food insecurity. The mission also raised the political climate of the country that is relatively stable; however, the country is challenged on the security front by repeated attacks by terrorist groups operating in the Diffa region (Lake Chad Zone), Tillabery and northern parts of Tahoua, which keeps those areas in a near constant state of emergency.

To address these issues, the Government of Niger developed in 2018 the "Project to strengthen resilience of rural communities to food and nutrition insecurity in Niger (PRECIS: 2019-2022)" whose overall objective is to sustainably improve the food and nutritional security of rural households and strengthen their resilience to climate and natural resource degradation. Its development objective is to increase the incomes of rural households, improve their livelihoods, and ensure the socio-economic integration of young people (men and women) in promising rural professions.

6 Senegal

The mission was composed of: Benoit Thierry, Director and Portfolio Manager Senegal; Semou Diouf, CPO - IFAD Senegal; Jean-Philippe Audinet, PMI-PTL, FIDA; Lazare Hoton, Team Leader, DPIA, FAO, Annick Huyghe Mauro, Training Specialist - Integration, Consultant DPIA-FAO, Edi Bruni, Agronomist, Consultant, IFAD; Sonia Andrianarivelo, Agroeconomist, DPIA-FAO; Gabriel Boc, Economist, DPIA-FAO; Samba-Diom BA, Financial Management Specialist, Consultant, IFAD . Amath Pathe SENE, lead Environment and Climate provided a remote technical backup.

The national project preparation team consisted of the following members: Cheikh Ndiaye Anpej; Tanor Meissa Dieng, MAER and Saliou Fall, MAER Agriculture Branch; Mouhamadou Sene, Ministry of Youth, Employment and Citizen Construction; Métaké Sagna, National Planning Directorate / DGPPE; Boubacar Diallo, Budget Programmeming Branch; Abdoulaye Diouf & Seyni Dio , Directorate for Cooperation and External Financing; Babacar Ndiaye, ANIDA, Khady Drama, DAPSA; Alioune Babacar Dion gue , Youth Council / CNCR; Dr. Abba Leye, Livestock Directorate. The mission met local communities including community leaders in the targeted regions around focus groups and meetings to discuss needs

The consultations raised the issues that the Senegal records:

- A high prevalence of poverty particularly in rural areas (57 per cent) that affects the resilience of family farms and low income cohorts;
- A very low youth employment rate (38 per cent) with an annual level of new entrants of roughly 160,000;
- Particularly high underemployment in rural areas (31 per cent), which has led to significant international migration from the rural areas to the cities and abroad.



In this context, the AGRI-JEUNES TEKKI NDAWÑI project (2020 - 2025) is positioned as a rural transformation initiative targeting rural youth, who are largely excluded from the process of wealth creation and who currently lack productive and innovative jobs in the agro sylvo-pastoral and fisheries sector. AGRI-JEUNES TEKKI NDAWÑI will promote modern productive rural jobs for decent income in villages through the process of agroentrepreneurs where each young agriculture becomes an entrepreneur on his/her farm. In line with the Plan Senegal Emergent, the national strategic guidelines for agricultural development, the project is part of the COSOP 2019-2024.

7 The Gambia

Among the IFAD team, the project design mission included : Ms. Haoua Sienta, Mission Leader, Country Director, IFAD WCA; M. Amath Pathe Sene, Lead Regional Climate and Environment Specialist, Project Technical Leader (PTL), IFAD WCA; M. Julien Vallet, Technical Mission Leader and Economist, FAO-DPI; M. Brent Simpson, Senior Natural Resources Management Officer, FAO-DPI; M. Yesuf Abdella, Irrigation Engineer, FAO-DPI; M. Gabriel Boc, Economist, FAO-DPI; M. Claude Side, Economist, FAO-DPI; M. Frédéric Ponsot, Remittances and Financial Inclusion Specialist, Consultant, IFAD; Ms. Claire Bilksi, Gender, youth inclusion and targeting Specialist, Consultant, IFAD; Ms. Mame Awa Mbaye, Finance Officer, IFAD-FMD; Ms. Itziar Garcia Villlanueva, Legal Officer, IFAD-LEG; M. Tétié Abdoulaye Bakayoko, Financial Management Specialist, Consultant, IFAD. M. Benoit Thierry, Director of West Africa Hub, IFAD WCA, joined the mission from February 5-8. M. Jonathan Agwe, Lead Regional Technical Specialist for Rural Finance, Markets, Enterprises and Value Chains, IFAD WCA, joined the mission from 27 January- February.

A national project preparation team comprised M. Momodou L. Gassama, Coordinator of NEMA, M. Abdoulie Touray, M&E Officer, CPCU, M. Bakary Jammeh, Knowledge Management Officer, NEMA; M. Kebba Manka, Water Management Specialist, NEMA; M. Saikou Sanyang, Director General, DoA. The mission met local communities including community leaders in the targeted regions around focus groups and meetings to discuss needs.

The consultations raised the issues that the country is one of the most vulnerable countries to climate change because of its geographical location, characterised by high dependence on rain-fed agriculture and severe salt-water intrusion in the lowlands floodplain. The effects of climate change relative to rising sea level and reduced rainfall have increased saltwater intrusion to 150-200 km inland, thereby affecting crop yields. In addition, the country experienced severe droughts in 2011 and 2014, leading to a drop of crop output of 50 per cent. In 2016, the short rainy season led to a drop of crop production, boosting food price inflation.

The Government is addressing the main drivers of the country's agricultural fragility and environmental degradation through the Resilience of Organisations for Transformative Smallholder Agriculture Project (ROOTS: 2019-2022). In addition, the Government has stressed the need to capitalise on the gains of the ongoing IFAD-funded National Agricultural Land and Water Management Development (NEMA) programme. The approach will be based on:

- Consolidation of NEMA's investments;
- Sustained investments and support to women organisation, youth producers and farmers' organisations;
- Supporting value chain interaction platforms to enable Public-Private Producers' Partnerships (4Ps);
- Better access to financing;
- Mainstreaming environmental and climate, gender and nutrition in the interventions; and
- Project management and delivery mechanisms to improve performance and enhance sustainability of benefits.



Annex 9 STAKEHOLDER ENGAGEMENT REGISTER

Stakeholder Engagement Register					
COUNTRY	NAME	DESIGNATION	INSTITUTION		
Burkino Faso	Mr. Touré Adama	Director of Policy Formulation	General Directorate of Sector Studies and Statistics (DGESS) of the MAAH		
Burkino Faso	Ms. Dao Compaoré Agnès,	Programme Officer	General Directorate of Cooperation (DGCOOP), Ministry of the Economy, Finance and Development		
Burkino Faso	Local communities including community leaders in the targeted regions were met around focus groups and meetings	Community leader	///Community Name		
Mali	Mr Cisse	National Direction for Agriculture (DNA)			
Mali	Mr Camara		National Direction for Animal Productions and Industries (DNPIA) of the Livestock Ministry		
Mali	Mr Famory		Ministry of Energy (AMADER, ANADEB, AER)		
Mali			Environment and Sustainable Development Agency (AEDD)		
Mali			Ministry of Finance		
Mali	local communities including community leaders	Community leader	///Community Name		
Chad	Mr. Koko Wakdet		MPIEA		
Chad	Mr. Kampété Abdoulaye		MPIEA		
Chad	Mr. Rakidjim Nanatengar		MPIEA		
Chad	Ms. Gongnet Gnifienet		MEPD		
Chad	Ms. Reinta Natebaye		MEP		
Chad	Mr. Abakar Ramadan		MEA		
Chad	Mr. Ahmed Mohamed Nadif		MEPA		
Chad	Mr. Soumaine Albachar		CNCPRT		
Chad	Ms. Mariam Titimbaye		CELIAF		
Mauritania	Sylli Gandega	IFAD focal point in Mauritania	IFAD		
Mauritania	Coquein Mejdoub,	Deputy Director of Resource Mobilization and Coordination of External Aid	Ministry of Economy and Finance (DA / DMBRCR / DGIPCE / MEF);		



Stakeholder Engagement Register					
COUNTRY	NAME	DESIGNATION	INSTITUTION		
Mauritania	Mohamed Saleck Ould Hmeida	Deputy Director of strategies, cooperation and monitoring-evaluation	Ministry of Agriculture (DA / DSCSE / MA);		
Mauritania	Isselmou Ould Abdatt	Deputy Director of Planning Cooperation and Monitoring-Evaluation,	Ministry of Livestock (DA / DPCSE / ME);		
Mauritania	Ahmed Ould Amar,	Coordinator	PASK II and PRODEFI		
Mauritania	Abdelkader Mohamed Saleck,	Coordinator	PRODEFI		
Niger	Mr. Abdou Chaibou	Director of Studies and Programmeming	, MAG / EL, Head of Government Mission		
Niger	Mr. Assadeck Mohamed	Senior National Technical Assistant in political dialogue	CENAT / ProDAF		
Niger	Mr. Chaibou Magagi	Senior National Technical Assistant in Financial Consolidation	CENAT / ProDAF		
Niger	Mr. Yacouba Seybou	Director	Sustainable Land Management Department		
Niger	Mr. Amadou Bachir	Head of Division	HC3N		
Niger	Mr. Moussa Mai Moussa	Head of Division	DP / DGPD		
Niger	Mr. Issa Mano		DGA / DPPV / MAG / EL		
Niger	Mr. Alyou Abdou Ali	Head of Division	DSI / MP		
Niger	Mr. Salifou Maman Bassirou		DEP / MESUD,		
Niger	Mr. Boukari Chouidi		DGPIA		
Niger	Ms. Ali Rahila,		DGGR / MAG / EL		
Niger	M. Oumarou Ibrahim	Monitoring and evaluation	RECA.		
Niger	The mission met local communities including community leaders in the targeted regions around focus groups and meetings to discuss needs	Community leader	///Community Name		
Senegal	Cheikh Ndiaye Anpej		MAER		
Senegal	Saliou Fall	Agriculture Branch	MAER		
Senegal	Mouhamadou Sene,		Ministry of Youth, Employment and Citizen Construction		
Senegal	Métaké Sagna,	National Planning Directorate	DGPPE		
Senegal	Boubacar Diallo		Budget Programming Branch		



Stakeholder Engagement Register					
COUNTRY	NAME	DESIGNATION	INSTITUTION		
Senegal	Abdoulaye Diouf		Directorate for Cooperation and External Financing;		
Senegal	Seyni Dio		Directorate for Cooperation and External Financing;		
Senegal	Tanor Meissa Dieng,				
Senegal	Babacar Ndiaye		ANIDA		
Senegal	Khady Drama		DAPSA		
Senegal	Alioune Babacar Dion gue.	Youth Council	CNCR		
Senegal	Dr. Abba Leye,		Livestock Directorate		
Senegal	The mission met local communities including community leaders in the targeted regions around focus groups and meetings to discuss needs				
The Gambia	M. Momodou L. Gassama	Coordinator	NEMA		
The Gambia	M. Abdoulie Touray	M&E Officer	CPCU		
The Gambia	M. Bakary Jammeh	Knowledge Management Officer	NEMA		
The Gambia	M. Kebba Manka,	Water Management Specialist	NEMA		
The Gambia	M. Saikou Sanyang	Director General	DoA		
The Gambia	The mission met local communities including community leaders in the targeted regions around focus groups and meetings to discuss needs.				



Annex 10 COUNTRY PROFILES

1 THE GAMBIA

1.1 Country Background

The Gambia is the smallest country on mainland Africa with an area of 10,689 km² and a population of 2.1 million that will double in 20 years, due to a growth rate of three per cent (World Bank, 2017). The population is very young - 40 per cent is below 15 years and 25 per cent between 15 and 25 years old. Youth rural-urban migration and overseas emigration are key facets of the population dynamics; 40 per cent of Gambians live in rural settings and about 3.1 per cent of them migrate annually (2019-2024 COSOP).

Ethnic groups in the country mainly include Mandinka/Mandé that are agriculturalists (44 per cent), Fulani/Fula/Peulh that are pastoralist (18 per cent), Wolof (16 per cent and, Jola/Karoninka (10 per cent) that are cultivators (CIA World Factbook). The Constitution does not explicitly note the existence of Indigenous Peoples in Gambia. However, the country signed the African Commission on Human and Peoples' Rights (ACHPR) with a mandate to protect and promote human and peoples' rights in Africa. In 2000, the African Commission on Human and Peoples' Rights established the Working Group on Indigenous Populations/Communities (WGIP).

Large-scale emigration over the past decade has drained the country of its most educated and productive workers, especially in rural areas. As a result, there is shortage of agricultural labour due to the exodus of young people from rural areas. The number of households as counted in the 2013 population census increased from 157,494 in 2003 to 229,500, an increase of 45.7 per cent. The 2013 census figures indicate an average household size of 8.2 in 2013. The large households in the Gambia reflects the fact that many people continue to live in traditional household settings in which members of different generations live under the same roof. This requires better targeting to ensure the best return on investment (IFAD, 2019).

The Gambia experiences rapid depletion of the natural resource base as a result of increasing population pressure, extended periods of shifting cultivation, deforestation, recurrent droughts and increasing climate variability. Reduced water infiltration, high water run-off rates and the drying of inland valleys and river tributaries, which have been observed, hinder agricultural productivity. Erosion and siltation of the Gambia River have reduced water flow and resulted in increased saltwater intrusion into the marginal lands. Siltation and sedimentation continue to threaten the viability and sustainability of lowland agriculture. These effects combined with periodic floods and epidemics place the country at risk to disasters. (IFAD, 2015b)

The Gambia is a nascent and fragile democracy, transitioning from 22 years of dictatorship and recovering progressively from misrule and diplomatic isolation. Since 2017, the country has been politically stable and the Government enjoys approval among the electorate (EIU, 2018).[1] Pledges to respect human rights and promote good governance, as well as restored relations with Senegal and ECOWAS contributed to rebuilding confidence of foreign donors and private investors. The Gambia's fragile policy and governance context is still marked by a low rank in the 2018 Corruption Perception Index (93rd out of 180) and the World Bank's 2019 Doing Business Index (149th out of 190). Foreign Direct Investment (FDI) remains low in spite of progress from US\$37 million in 2010 to US\$87 million in 2017, while personal inflows of remittances are almost three times the level of FDI (IFAD, 2019).

1.2 Income and Poverty

The country's Gross Domestic Product (GDP) growth has increased from minus 0.9 per cent in 2014, to a positive 4 per cent in 2016 and 6.6 per cent in 2018, driven by private consumption, public investments, remittances, exports and reexports of goods and services. The services sector, mainly tourism and government, contributes 60 per cent to GDP, agriculture 18 per cent and the industrial sector (construction and agro-processing) 12 per cent (EIU, 2018). At end2017 the public debt amounted to more than 129 per



cent of GDP, which has created a significant risk of debt distress and threatens public and private investments (EIU, 2018). Given structural twin deficits of both the fiscal account (7.5 per cent of GDP in 2017) and current account (19 per cent of GDP in 2017), the country requires donor support to pursue public investments towards achieving the Sustainable Development Goals (SDGs). Global indices reflect the country's challenges. For example, its scored on the Fragile States Index (FSI) worsened steadily from 80.6 in 2010 to 89.4 in 2017 before improving to 83.9 in 2019; it is now ranked the 47th most fragile of 178 countries (IFAD 2019).

Notwithstanding a poverty reduction of 10 per cent over the last ten years, The Gambia remains one of the poorest and most unequal countries in the world. Sixty-two per cent of the Gambians live on less than US\$10 per day and 48 per cent live below the national poverty line of US\$1.25 per day. The UNDP classifies The Gambia as a Least Developed Country (LDC) with a Gross National Income (GNI) per capita of US\$450 in 2017 and a Gini-coefficient of 0.451 (UNDP, 2018). A Human Development Index (HDI) of 0.460 in 2018 puts The Gambia in the low human development basket (174th position). This HDI reflects the multi-dimensional aspect of poverty, with low literacy and education levels, poor health indicators, and weak public infrastructure and services. Poverty is more a rural phenomenon as 74 per cent of Gambians below the national poverty line live in rural areas (World Bank, 2017).[3] Rural poverty and food insecurity are related to low productivity of rain-fed farming systems, particularly in the Lower River Region (IFAD , 2019).

1.3 Nutrition

The Gambia's deep poverty and inadequate social services are manifested in the poor nutritional status of the population, tenuous food security and malnutrition. The country is on the verge of a nutrition emergency. The 2018 Global Hunger Index (GHI) ranks The Gambia 75th out of 119 countries (scoring 22.3) with a "serious" level of hunger. National stunting and wasting rates are a "critical high" 25 and 11 per cent (GHI, 2018). Twenty per cent of infants are born with low birth weights and 28 per cent of children under five years are stunted, increasing the risk of impaired cognitive development (World Bank, 2018). More than one third of child deaths are due to undernutrition. Anaemia affects more than 75 per cent of pregnant women and preschool-aged children and Vitamin A deficiency is wide spread. There are clear regional dimensions to maternal and child malnutrition, with areas such as Basse, Kantur, Kerewan and Janjanbureh (North Bank, Central and upper regions) showing higher prevalence. The long term impact of such forms of malnutrition can be detrimental to the population and economy (IFAD, 2019).

1.4 Gender

The Gambia is a patriarchal society with cultural values and roles constraining female participation in society and leadership. The 2015 Gender Inequality Index (GII) ranks The Gambia 148th out of 159 countries. Women represent 70 per cent of the agricultural labor force. They have, however,

minimal control over their own land, income and access to credit, and are vulnerable to climate change. The labor hours of women farmers are disproportionately high in comparison with men. Gender parity exists at the preschool, primary, and secondary levels, but inequality remains in tertiary and vocational training. The literacy rate for women is only 40 per cent compared with 64 per cent for men. However, female-headed households are less food insecure than male-headed households, and poverty is more prevalent in male-headed households (50.9 per cent) than in female-headed households (38.3 per cent) (IFAD, 2019).

1.5 Temperature, Rainfall, Seasons and Agro-Climate Zones

The Gambia has a Sudano-Sahelian climate, characterised by a long dry season (November to May) and a short wet season (June to October). Average temperatures range from 18° to 30°C during the dry season and 23° to 33°C during the wet season. Mean annual temperature has increased noticeably since the 1940s. Mean annual rainfall varies from 900 mm in the south-west to about 500 mm in the northeast. Average relative humidity is about 68% in coastal areas and 41% in inland areas during the dry season and generally above



77% throughout the country during the wet season, (Agricultural National Appropriate Mitigation Actions). (IFAD, 2015b)

In The Gambia the topography is largely unvaried consisting of riverine flats and mangrove swamps intersected by tidal creeks and savannah woodland with shrub and grass. Twenty per cent of the country is classified as wetlands (ARC, 2017). In the uplands the soil is largely cultivated under the responsibility of men. In this area the major crops are groundnuts (about 45% of the cultivated area), early millet, maize, sorghum, late millet, cotton and upland rice in decreasing order of importance; horticultural crops are also grown. The lowlands are largely the responsibility of women. The main crop is rice that is grown in the wet season using hand cultivation on approximately 20 000 ha, primarily along the middle and lower reaches of the River Gambia. In the dry season, vegetables are cultivated in the lowlands. In The Gambia the preferred staple food is rice which is usually cultivated as a subsistence crop (ARC, 2017).

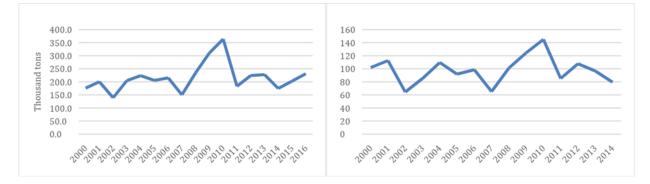
1.6 Agriculture and Rural Livelihoods

Agriculture is the principal source of livelihood for the rural population and for the majority of households below the poverty line. The agriculture sector is characterised by: small-scale subsistence rainfed crop production mostly undertaken during a single rainy season from June to October; traditional livestock rearing; semicommercial groundnut and horticultural production; small-scale cotton and a large artisanal fisheries subsector. Only about 6% of the irrigation potential has been utilised. (IFAD, 2015b)

Agriculture employs 70 per cent of the labour force in the country, contributes two thirds of youth (18-35 years) employment and provides 75 per cent of household income. Farming is mainly rain-fed, with three per cent of arable land under irrigation, although irrigation is expanding in the floodplains along The Gambia River, mainly for cultivation of rice and vegetables. Small-scale and mixed cropping systems (rice, millet, maize, sorghum and cassava), traditional livestock rearing, semi-commercial production (groundnut, cotton, and sesame), horticulture and a vibrant fisheries sub-sector characterise the sector. Despite its agricultural potential, The Gambia relies on imports for nearly half of its cereal consumption, so that international food prices strongly influence domestic prices. Rice consumption, per annum, amounts to 117 kg per capita, about 106 per cent above the world average of 56.9 kg, of which 83 per cent is imported. The current rice consumption need of the country is about 215,000 MT of which only 36,000 MT is produced locally with the remaining 179,000 MT met through imports. Local rice still remains competitive vis-à vis imported rice. Vegetables are in high demand to complement diets. With growing local demand, including a flourishing tourism sector, aggregate food production is far below aggregate demand. Many rice-growing floodplains in The Gambia have been affected by increasing saline-water intrusion over the past years, thereby reducing available cultivable land. Rice fields located mainly in the western part of the country (West Coast, Lower River and North Bank Regions) have also been impacted by the effects of climate change (IFAD, 2019).



Figure 15 Cereal Production and Crop Production Index The Gambia (World Bank, 2018a)



1.7 Climate Change: Temperature

Average temperatures in Gambia range from 18°C to 30°C during the dry season and 23°C to 33°C during the wet season. In La Niña years, temperatures tend to be cooler than average throughout the year. The long-term mean annual rainfall of 860 mm is largely determined by July, August and September rainfall, where mean monthly rainfall varies between 150 mm (in the northern extremes) and 300 mm (in the southern extremes).

Projections on temperature: In The Gambia, mean annual temperatures have increased by 1.0°C since 1960, an average rate of 0.21°C per decade. The rate of increase has been most rapid in the months of October, November and December, at 0.32°C per decade. The mean annual temperature in The Gambia is projected to increase by between 1.1°C to 3.1°C by the 2060's and by between 1.8°C to 5.0°C by the 2090's. The projected rate of warming is faster in the interior regions of The Gambia than in those areas closer to the coast. All projections indicate substantial increases in the frequency of days and nights that are considered 'hot' in current climate.

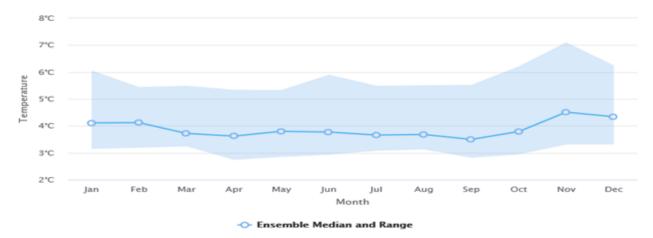


Figure 16 Projected Change in Monthly Temperature for Gambia for 2080-2099 (WB, 2020)

1.8 Climate Change: Precipitation

Linear trends indicate that wet season (July, August and September) rainfall in The Gambia has decreased significantly between 1960 and 2006, at an average rate of 8.8 mm per month per decade. The length of the rainy season has also been decreasing with increasing variability in inter-annual rainfall. Projections of mean annual rainfall averaged over the country from different models in the ensemble project a wide range of increases and decreases in precipitation for the Gambia, but tend towards decreases, particularly in the wet season (July, August and September).



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Projections on precipitation: Projections of mean annual rainfall averaged over the country from different models in the ensemble project a wide range of increases and decreases in precipitation for The Gambia, but tend towards decreases, particularly in the wet season, JAS. Projected annual change ranges from -23 to +18% by the 2090s, with ensemble means between 0 and -3%. Projected JAS changes ranges from -53 to +74% by the 2090s, with ensemble means between -7 and -20%. Despite the projected decreases in total rainfall, the proportion of total annual rainfall that falls in heavy4 events tends towards increases in the ensemble projections. Seasonally, this varies between tendencies to decrease in JFM and AMJ, and to increase in JAS and OND. The range of projections from different models in the ensemble, however, includes both increases and decreases in all seasons. 1- and 5-day rainfall maxima in projections all tend towards increases and decreases in projections from the model ensemble covers both increases and decreases in projections from the model ensemble covers both increases and decreases and d

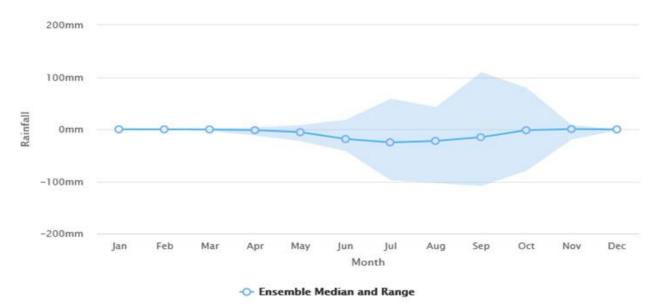


Figure 17 Projected Change in Monthly Precipitation for Gambia for 2080-2099 (WB, 2020)

1.9 Climate Change Impacts: Climatic Hazards and Extreme Events

According to Gambia's 2nd Communication to the UNFCCC, temperature measurements since the 1940s reveal a rising trend in the order of 0.50°C/decade. The models agree that temperature increases will be significant with extremes in temperature becoming the norm and substantial increases in the number of hot days and nights by the 2090s, occurring more rapidly in the east of the country. The trend is consistent with the Intergovernmental Panel on Climate Change Assessment Report 5 (IPCC-AR5), which states that near surface temperatures over West Africa and the Sahel have increased over the last 50 years by 0.40° to 0.67°C per decade. In the AR5, temperatures in Africa are projected to rise faster than the global average increase during the 21st Century. (IFAD, 2015b)

Gambia's rural communities are dependent upon the natural resource base and rainfall and therefore significantly vulnerable to climate change and worsening environmental conditions. Trend data shows that the Western end of the country is getting wetter, but with return periods for poor rainfall of between 6-10 years. The central and Eastern parts of the country are becoming drier, with return periods for poor rainfall of between 4-8 years (depending on the location) and a delayed start to the rains, but with extremely good rains every 8-10 years. (IFAD, 2015b)

The larger overall drying trend of the last 40 years had a profound impact on water resources: dried up springs and streams and falling water tables, contraction of seasonally flooded swamps and enhanced saline intrusion. Since the 1960s, salt plains or salt-water marshes because of reduced fresh water inflow from storm run-off,



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preventing rice production in North Bank Region and Western parts of Central River Region, have replaced large areas of freshwater swamps in Western Gambia. Discussions with communities during the concept design mission revealed that 50% or more of productive lowlands have been lost in some areas due to changes in environmental conditions, displacing agricultural activity to the uplands, which are already under pressure. (IFAD, 2015b)

Projections on climate change impacts: According to the National Adaptation Programme of Action developed in 2007, the main climate hazards in The Gambia are torrential rainfall, storms, drought, cold spells, intra-seasonal drought, heat waves and unseasonal rains. The last three are perceived as distinct evidence of the onset of a changing climate, which is characterised notably by increasing atmospheric CO2 concentrations and sea level rise. Related hazards include a limited ability to predict the incidence of some hazards and the concomitance of multiple and mutually reinforcing hazards. (IFAD, 2015b)

Regional model studies included in the AR5 suggest an increase in the number of extreme rainfall days over West Africa and the Sahel during May and July with low to medium confidence. Dry periods of more than five days are expected to increase and breaks in rainfall of more than one week become frequent, as will droughts. Annual average total soil moisture is expected to continue to decrease due to increased evapotranspiration and reduced rainfall desiccate soil. Annual run-off will continue to increase, linked to storms and intense rain events. The wave regime is also expected to increase though the availability of wind predictions remains limited for West Africa.

1.10 Climate Change Impacts: Lives and Livelihoods

The Gambia ranks as one of the countries highly vulnerable to climate change based on the GAIN index, ranking 163rd out of 180 countries, (or 16th most vulnerable). The food security vulnerability to climate change, which is measured in terms of food production, food demand, nutrition and rural population, is 177th out of 186 ranked countries. The indicators for the score include projected change of cereal yields, projected population growth, food import dependency, rural population, agriculture capacity and child malnutrition. (IFAD, 2015b)

Temperatures in The Gambia (hot days and nights) are increasing with implications for crop productivity and the incidence of pests and diseases. The incidence of red spider mites, which attack vegetables and for which there is no known appropriate pest management remedy, is temperature related and a more frequently occurring problem, as are snails. Pest occurrences such as armyworms and termites attack rice and are associated with dry spells. (IFAD, 2015b)

The most vulnerable areas from a climate change perspective will be the lower-central part of the country where saline water meets freshwater, the balance of which is determined by rainfall conditions and, increasingly, sea level rise. However, other regions are also vulnerable. In the Western part of the country, which is more densely populated, lowland rice and horticulture are vulnerable to saline ground water resources and short return periods for low rains and heavy rains that will worsen land degradation in the uplands. In the Eastern part of the country, rainfall variability threatens both droughts and floods, and here too temperature increases will be felt more keenly. (IFAD, 2015b)

1.11 Climate Change Impacts: Agriculture

Abovementioned climate-related stresses will magnify the effects on agriculture with impacts on the recharge of aquifers, soil erosion and sedimentation processes, changes in the amount of ground and surface water stored, and other disturbances to the hydrological cycle effects resulting in saline intrusion. Elevated atmospheric CO2 concentrations are expected to increase crop yields, but higher temperatures and water shortages may act to counterbalance this beneficial effect. Recent experiments have shown that crop response to elevated CO2 is relatively greater when water is a limiting factor. Well-fertilised crops respond more positively to CO2 than less fertilised ones and thus the contrary is true for nitrogen. (IFAD, 2015b)



1.12 Climate Change Impacts: Natural Capital

The changes in temperature and rainfall will adversely affect natural resources such as forests and grasslands. Results obtained from the Holdridge Life Zone Classification model suggest that The Gambia's forest cover will fit more into a dry forest and tropical very dry forest categories. As the temperature becomes warmer, rainfall decreases and potential evapotranspiration increases, forest cover will be approximately subdivided into tropical very dry forest (35%-40%) and tropical dry forest (45%-60%), the warmer BMRC climate scenario having the highest%age of tropical very dry forest. (IFAD, 2015b)

1.13 Climate Change Impacts: Health

The effects of weather and climate inclusive of extremes (droughts, floods, storms) on human health are difficult to quantify because of poor reporting and paucity of research into secondary and delayed impacts. However, no one disputes that natural disasters caused by extreme weather adversely affect human health in many ways. Climate-related hazards faced by children, elderly people and other vulnerable socio-economic groups living in specific localities within The Gambia include droughts, flooding and sea level rise. (UNEP, 2012). Malaria, for instance, is an endemic disease peaking in the rainy season (July-October). Around 1,000 children die every year from the direct effects of malaria, which also accounts for 20% of medical consultations at outpatient departments of government health facilities. Diarrheal diseases also exhibit seasonal patterns. Whereas 84% of the population have access to safe, drinking water and 86% live in households with excreta disposal facilities, the incidence of diarrhea remains high due to inadequate water handling practices and environmental sanitation exacerbated by uncontrolled runoff and flooding. Acute respiratory infections (including pneumonia) are second to malaria as the leading cause of morbidity and mortality especially among infants and young children. The British Medical Research Council (MRC) studies on infant mortality found out that 14% of under-five deaths in the central part of the country were attributable to acute respiratory tract infections. (UNEP, 2012)

1.14 Climate Change Impact: Vulnerability Mapping

A recent community vulnerability assessment has mapped the hot spots with high risk to both natural (bushfires, causal erosion, drought, floods, lightning storms, mangrove depletion, salt intrusion, soil erosion and wind storms) and agricultural hazards in the country (see Figure 2 below). These threats have a profound impact on the livelihood situation of the rural communities who depend entirely on their natural resource base. (IFAD, 2015b).



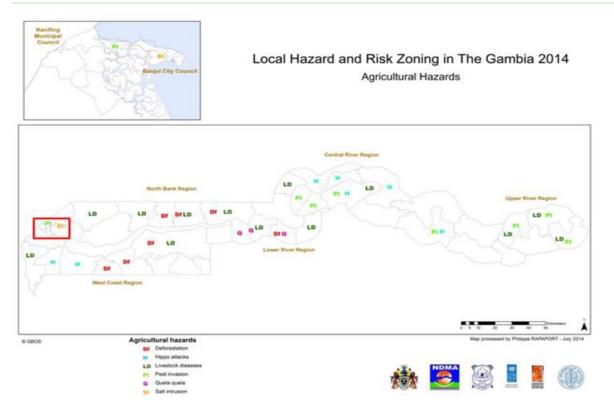


Figure 18 Climate hazard mapping for The Gambia (NAPA)

1.15 Suggested Geographies and Sectors for Intervention for Climate Change Adaptation

Table 25 Adaption Options by Sector for The Gambia (UNEP, 2012)

Sector	Adaptation mechanism	Description
Forestry	 Establishment and expansion of community natural forests Plantations National parks and forest parks 	As an adaptation measure with mitigation co-benefits, the proposed action should enhance the resilience of forest ecosystems including provisioning functions in support of sustainable livelihood of direct beneficiaries. The activity will empower communities with the legal security, skills and knowledge necessary to rationally utilise their natural resources and conserve the remaining biodiversity.
	Expansion and intensification of agro-forestry and re-forestation activities	This adaptation measure which targets specific areas across the country will enhance the contributions of restored forest ecosystems to forest-based poverty alleviation, and, more broadly, to other national economic goals. The measure is expected to achieve the following:
	Mainstreaming climate change in forest policies and plans	In order to be fully responsive to the challenges of climate change, forestry sector policies and programmes need to incorporate the realities of climate change.



Sector	Adaptation	Description
	mechanism	
Rangelands	Development and implementation of effective policies on integrated natural resources management	The negative impacts of climate change on rangelands can be attenuated through formulation and implementation of effective policies that seek to improve production and take into consideration the needs of other natural resources-based sectors of the economy.
	Restoration of rangeland landscape	This adaptation option includes the manipulation and monitoring of animal stocking rates, institutionalization of strict grazing controls and management of the vegetation and soils.
	New management strategies	New strategies consist of a combination of measures including active selection of plant species, and stimulation of livestock economy to encourage owners to supply livestock and meat products on local/regional markets.
Health	Vector control programme	Health impacts from malaria will need investment in social mobilisation and education, prevention techniques such as mosquito repellents, insecticide treated nets, (ITN) low-cost anti-malarial drugs. Use of ITNs in particular has been shown to reduce malarial morbidity and mortality in The Gambia.
	Continuous public health education and awareness creation programme	Health education and awareness raising are conducted at community level to help audiences in their decision-making on thematic issues. Health education and promotion programmes should therefore incorporate elements of climate
	Integrated disease surveillance and response	Disease surveillance is a fundamental building block of infectious disease control programme. In this regard, there is a clear need to create or improve on the design of health databases, and strengthening of the integrated disease surveillance programme of MOHSW.
	Nutritional support to vulnerable groups	The National AIDS Secretariat with support from the global fund assists the ministry by providing nutritional support to vulnerable groups and their family members
	Public health infrastructure	Proper waste disposal should be promoted to prevent pathogenic and toxic contamination during floods. Numerous tools and technologies can be used to reduce the impacts of climate variability on the health of vulnerable human populations. In Kanifing Municipal Council (KMC), these include promotion of healthy housing environment and enforcement of building regulations. In areas where people depend on untreated water, reliable and safe drinking water as well as the use of simple measures such as proper storage of drinking water in narrow-mouthed vessels, filtering drinking water and use of use of chlorine tablets.
	Vaccination programme	Under its Expanded Programme of Immunization, The Gambia has one of the highest coverages of immunization in the West Africa sub region. Vaccination campaigns for all possible diseases need to be supported. Yellow fever vaccine is administered at the age of 9 months in all RCH clinics throughout the country. Meningitis vaccine is given only to Muslim pilgrims prior to the annual hajj and when an outbreak of the disease threatens.
Agriculture	Technical adaptation measures	Selection of drought-, pest- disease-, and salinity-resistant, high-yield crop varieties under local conditions. For this purpose, the genetic potential of local crop species must be investigated and specimens stored in seed banks;
		Change in planting dates and replacement of long-duration upland and lowland rice varieties with short-duration varieties
		Demonstration, promotion and diffusion of improved post-harvest technologies. This will have the long-term effect of reducing extensive cultivation of marginal lands
		Discouraging cultivation on marginal areas



Sector	Adaptation mechanism	Description
	Regulatory	Cooked food waste reduction
	adaptation measures	Diversification of eating habit (change from rice to other cereals)
	Livestock	Increase fodder production from intensive feed gardens
		Promote crop/livestock integration;
		Improve feed conservation techniques and access to supplements
		Engage with other institutions, for example, the International Trypanotolerance Centre (ITC), to explore the potential of intensive livestock production systems in different areas in The Gambia
		Further explore opportunities for selective/cross-breeding of Ndama cows with higher milk-producing breeds



2 Burkina Faso

2.1 Country Background

Located at the heart of West Africa, Burkina Faso is a landlocked country covering an area of 274,000 km² Bordering on six countries – Benin, Côte d'Ivoire, Ghana, Mali, Niger and Togo – Burkina is a crossroads for trade in the sub region and a country of transit between the Sahelian countries of Mali and Niger and countries along the coast. The closest point to the Atlantic Ocean is 500km away. In terms of administrative subdivisions, Burkina Faso has 13 regions, 45 provinces, 351 departments, 302 rural communes, 49 urban communes and 8,435 villages. (IFAD, 2016).

Burkina Faso comprises 66 different ethnic groups. The M'bororo Fulani and the Tuareg are two of the peoples considered Indigenous. They live spread throughout the country but are particularly concentrated in the north, Seno, Soum, Yagha and Oudalan regions; they are often geographically isolated, living in dry areas, economically marginalised and the victims of human rights violations. However, Burkina Faso's Constitution does not recognise the existence of Indigenous Peoples, but it does guarantee education and health care for all. A lack of resources and appropriate infrastructure, however, means that, in practice, nomadic peoples enjoy only limited access to these rights. Burkina Faso voted for the UN Declaration on the Rights of Indigenous Peoples on 12 May 2018 (The Indigenous World, 2020).

The country's demographic dynamic presents strong internal and external migration flows. The North, Sahel and Centre provinces are affected in particular, with migrants – mainly men – leaving these areas for regions located further south where conditions are more favourable. This situation engenders an increasing imbalance between the North – with its labour scarcity, uncertain rainfall and chronic cereal deficit – and the South – with its strong land pressures, steeply increasing land occupation rates and anarchic natural resource use. There are some 60 ethnic groups speaking virtually the same number of languages. The population is characterised by its youth – 58.2% under 20 – and predominance by women, at 51.83%. (IFAD, 2016)

The Government is faced with multiple social demands, which relate to the cost of living and particularly that of fuel. In addition, Burkina Faso has suffered regularly since 2015, terrorist attacks attributed to jihadist groups. Apart from the attacks perpetrated in Ouagadougou, the violence is mainly concentrated on the Malian and Nigerian borders, the east of the country having become particularly exposed. Because of its financial and political implications, the security issue weighs heavily on the socio-economic prospects of the country and of sub-regional economic integration. However, multiple efforts are underway by the Government to restore security in these areas (IFAD, 2019).

2.2 Income and Poverty

With a strong demographic growth of 2.8% per annum over the period 2010-2015, Burkina Faso had 17.5 million people in 2015, 45% of whom were under 15 and 71% lived in rural areas. The findings of the household survey on living conditions 2009/2010 shows that 43.9% of the population lived below the poverty line in 2009, and that the regions of the North, at 68%, and the East, at 62%, were the most affected.

Burkina Faso is ranked 183rd out of 188 in the 2018 Human Development Index (HDI). Its predominantly rural population (79%) was estimated in 2016 at 19.03 million inhabitants with a growth rate of 3, 1% per year. From 2003 to 2014, the poverty rate fell from 53% to 40%, thanks to an average economic growth of 6% [8] per year. However, in 2016, eight in ten Burkinabés lived on less than USD 3 per day. Poverty is most prevalent in rural areas, where nine out of ten poor people live and households headed by women are more likely to be poor. Nevertheless, it is necessary to underline the creativity and individual and collective resilience shown by rural communities through their aptitudes to make the most of the resources available to them in order to derive their livelihood from them (IFAD, 2019).

Burkina Faso ranked 89th out of 119 countries according to the 2018 Global Hunger Index (GHI). The country has a structural food deficit and imports about 18% of the food consumed. Around 3.5 million people, or 18.4%



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of the population, periodically find themselves in a situation of food insecurity, often seasonal. The causes of food insecurity are structural rural poverty, the structural deficit in agricultural production, the strong seasonality of rains and climatic shocks as well as the absence of social protection system (IFAD, 2019).

2.3 Nutrition

In 2017, the prevalence of acute malnutrition was 8.6%, that of severe acute malnutrition 2%, and that of chronic malnutrition (stunted growth in children under 5) 21.2% [3]. More than one million children under 5 are stunted and an estimated 26,000 children die each year from the consequences of malnutrition. Malnutrition is estimated to be an underlying cause of 34% of deaths in children under 5. The economic cost of malnutrition is estimated at 7.7% of GDP. Faced with this situation, the Government in December 2016 developed the National Food and Nutrition Security Policy (PNSAN 2018-2027), which serves as a unique framework to guide actions to promote food and nutritional security. By seeking to integrate the nutrition dimension into the targeted sectors, the PAFA-4R aligns with the PNSAN by aiming to increase the availability, nutritional value and health quality of products, as well as the adoption of good practices. nutritional. On the demand side, the focus will be on the consumption by rural households of part of the vegetable, fish and NTFP production rich in nutrients (IFAD, 2019).

2.4 Gender

Despite the progress made in achieving gender equality, the country ranks 146th out of 149 on the Gender Inequality Index (GII). The incidence and severity of poverty are higher for women than for men (52% versus 48%) and women's access to productive resources, particularly land, credit and agricultural extension services remains low. The causes are the low level of education - the illiteracy rate among adult women is 79% - and the socio-cultural constraints regarding the place of women in society. The country's total fertility rate is among the highest in the world (5.6 children per woman) (IFAD, 2019).

2.5 Temperature, Rainfall, Seasons and Agro-Climate Zones

Burkina Faso experiences high temperatures and variable rainfall. Three climate zones split the country from north to south: the Sahelian zone in the north with rainfall less than 600 millimetres per year (mm/year), the Sudano-Sahelian region on a savanna plateau (Mossi Plateau) with rainfall from 600-900 mm/year and slightly cooler temperatures, and the southern more humid Sudanian zone with rainfall averages between 900-1200 mm/year. Each of these zones experiences a pronounced wet and dry season, with the wet season extending over a two-month period in the north and a six-month period in the south (WB, 2020).Due to its geographical position, Burkina Faso is characterised by a dry tropical climate, which alternates between a short rainy season and a long dry season. Burkina Faso's climate is prone to strong seasonal and annual variation due to its location in the hinterland and within the confines of the Sahara. The country has three climatic zones: the Sahelian zone in the north receiving less than 600mm average annual rainfall; the north-Sudanian zone in the centre receiving an average annual rainfall between 600 and 900mm; and the south-Sudanian zone in the south with an average annual rainfall in excess of 900mm. (UNDP, 2018a)

The rainy season starts slowly in late March to early April in the southwest, extending gradually toward the centre of the country in May and June, and reaching the northern extents in June or early July. The length of the growing season varies from less than 60 days in the north to 160 days in the south, with large inter-annual variations. The dry season is influenced by the harmattans, or dry, easterly winds that bring hot air to Burkina Faso from March to May. Extremes in temperatures are occurring with monthly high temperature averages now regularly exceeding the previous maximums of 35°C, particularly in the north (WB, 2020).



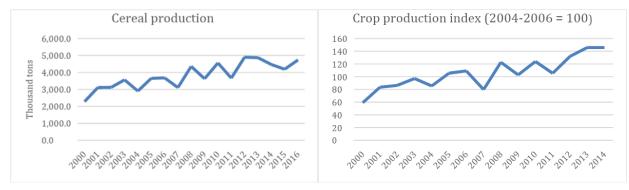
2.6 Agriculture and Rural Livelihoods

Burkina Faso's economy largely depends on the agricultural sector which employs 86% of the working population, contributes around 35% to the GDP, and provides 61.5% of the cash income of rural households. Agricultural production relies primarily on rain-fed crops and is faced with episodes of cyclical droughts that intensify with climate change. Cereals (sorghum, millet, maize, rice and fonio) are the main products along with cowpeas. Animal husbandry and market gardening are also very important (IFAD, 2019).

The development potential of agriculture remains significant because the country has a great potential of 9 million ha of cultivable land, which is exploited up to 46%, including 233,500 ha of irrigable land (12 to 14% only are currently exploited) and 500,000 ha of easily developable lowlands. The potential for the development of irrigation is great. Indeed, the country has nearly 1,200 bodies of water (dams, lakes, ponds). The country can mobilise up to 5 billion m2 of surface water per year. Mobilising water requires considerable investment, as well as advanced irrigation technologies.(IFAD, 2019)

The Government and the farmers are committed to a diversification of production in order to exploit to the maximum the agro-climatic potential of the country and to respond autonomously to the needs of the national market and to the opportunities, even niche, of the international market. This has resulted in the simultaneous development of numerous sectors, including processing activities and the establishment of short marketing circuits. The dynamic is driven by local market demand for national products pre-processed and packaged for urban consumers. Other products are more intended for export but always with the desire to maximise local added value; especially for non-timber forest products (NTFPs) and the niche of certified organic products. Particular emphasis is placed on young people, with modalities promoting access to technological packages and the emergence of rural microenterprises. Finally and always in order to mitigate agricultural risks, the Government, with its partners, is investing in adaptation technologies (seeds, management practices), and water mobilisation and management infrastructure (IFAD, 2019).





2.7 Climate Change: Temperature

The maximum temperature varied in average between 32,8 °C in Bobo-Dioulasso and 36,6 °C in Dori for the baseline period 1961-1990 and between 33,0°C (Bobo-Dioulasso) and 36,6 °C (Dori) over the period 1971-2000. Dori and Ouahigaya (in the Sahel area) have been hot areas while Bobo-Dioulasso, Gaoua and Niangoloko (Sudanese area) recorded the lowest average maximum temperatures. Concerning the average minimum temperature, it varied between 20°C and 22°C usually over the two periods (1961-1990 and 1971-2000). The average annual temperature increased by at least 0,5°C over the period 1961-2008 on all the synoptic stations in the country. The national average temperature of 27,5°C in 1961 increased to 28,5°C in 2008. The annual average temperature in 2000 varied between 23,8°C and 30,8°C concerning the minimum temperature is between 26,1°C and 35,7°C for the maximum temperature. Compared to the average temperatures in 1961-1990, the minimum monthly temperature increased throughout 2000 except in February. These high temperatures vary between 0,4°C and 3,6°C. (MoESD, 2014)



Projections on temperature: As the global climate changes, temperatures across West Africa, including within Burkina Faso, are projected to continue to increase. Based on its most recent analysis using global circulation models, and under a high-emissions scenario, the Intergovernmental Panel on Climate Change (IPCC) projects that western Africa will experience mean annual temperature increases of a median value of 0.9°C (ranging from 0.7°C to 1.5°C) by 2035, by 2.1°C (range of 1.6°C to 3.3°C) by 2065, and by 4.0°C (range of 2.6°C to 5.9°C) by 2100 (Crawford et al., 2016). Warming is projected to be greater in the December to February period, and lower between June and August. It is expected that there will be an increase in the frequency of hot days and a decrease in the occurrence of cold temperature extremes (Crawford et al., 2016).

According to the World Bank Group data (2020), temperatures across Burkina Faso are projected to increase 3-4°C by 2080-2099. This represents substantially higher temperature increases than the global average. Projected temperatures will increase in the north at a relatively higher rate than in the south and more in the wet season than in the dry season.

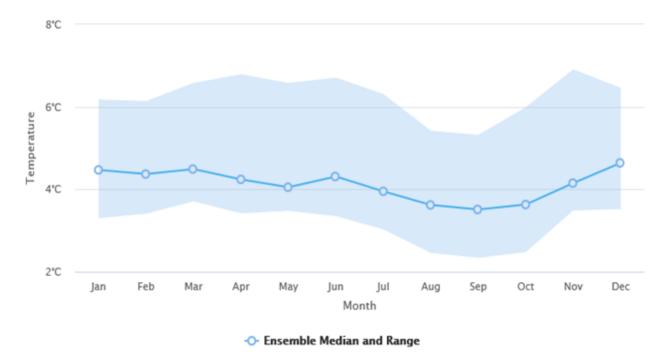


Figure 20 Projected Change in Monthly Temperature for Burkina Faso for 2080-2099 (WB, 2020)

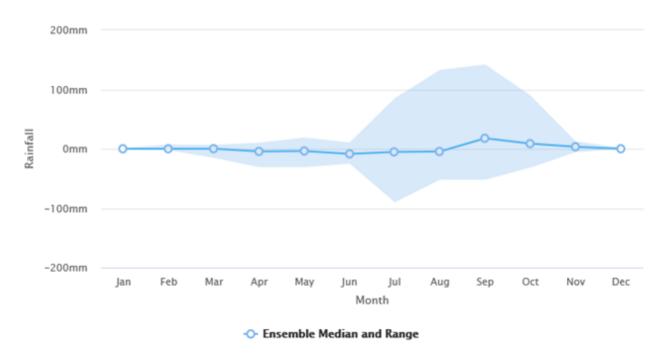
2.8 Climate Change: Precipitation

The analysis of the historical data of rainfall indicates an overall situation of movements of isohyets toward the south. During the period 1931-1960, Burkina Faso could record an annual rainfall superior than 1.200 mm in its South-West region. The post 1960 period has been characterised by a significant decrease of the rainfall. The absence of isohyets 1.200 mm over the periods 1961-1990 and 1971-2000 was noticed. The lack of rainfall noticed is much more important between the periods 1931-1960 and 1961-1990. It thus confirms the impact of two droughts recorded in Burkina Faso over the period 1972- 1990. Concerning the period 1971-2000, the annual accumulation of the rainfall varies between 290mm in the North and 1170 mm in the South. The number of rainy days of the period 1961-1990 varies between 31 and 91 with an average of 58 days and a standard gap of 13 days. In average, there is n significant change in the number of rainy days over the period 1961- 1990. (MoESD, 2014)

Projections on precipitation: According to the potential trends provided in the GIEC elaborated in 2007, the rainfall could record a decrease of -6,4% in 2025 and -11% by 2050 in the event of maximum tress, or an increase in the same proportions for the favorable situation. Between the two extreme situations, we have



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integrated an transitional situation which would be a moderate type of - 3,2% in 2025, and -6,5% in 2050. (MoESD, 2014)

Figure 21 Projected Change in Monthly Precipitation for Burkina Faso for 2080-2099 (WB, 2020)

2.9 Climate Change Impacts: Climatic Hazards and Extreme Events

As a Sahelian country, Burkina Faso is hit hard by climate change. Over the next 20 years, the water balance (the difference between rainfall and evaporation) of the crop year will decrease by around 200mm in the four target regions. The water balance of the Hauts-Bassins and South-West regions could become in deficit around 2025 (median). This decrease in the water balance is mainly linked to the rapid increase in temperatures accompanied by heat waves during the campaign. The frequency of heat waves could increase between 50 and 75% by the end of the funding period compared to the period 1986-2005. Projections of precipitation extremes suffer from greater uncertainty (IFAD, 2019). The government is helping villagers dig wells and build small water reservoirs to better utilise the country's scarce water resources. (UNDP, 2018a).

Projections on climate impacts: Climate change may affect the Sahelian region of Africa through severe variations in rainfall, water shortage and low agricultural yield. This should amplify drought risks and evaporation, and reduce agricultural productivity (a 10% drop in rainfall is expected by 2050; GIEC, 1997). In addition, climate change will probably result in higher temperatures (a 1.4-1.6°C rise is expected by 2050; GIEC, 1997), potentially increasing the risk for forest fires or bushfires. (UNDP, 2018a)

2.10 Climate Change Impacts: Lives and Livelihoods

Multi-model projections using Coupled Model Intercomparison Model 5 (CMIP5) call for a rise in cumulative precipitation for the period 2020-2040. The wet season will be more marked, with rains coming later in September and October, and rising accumulation on the order of +20%, but periods of drought will be longer. Severe precipitation events will be more frequent. In parallel, temperatures will rise on the order of 1°C. These changes will exacerbate the dynamics of erosion and increase the risk of flooding and damage to infrastructure. Later and heavier rainfall could threaten standing harvests. Rising temperatures coupled with higher humidity and longer periods of drought will increase crop health risks, particularly for market garden crops, as well as water requirements, especially during the off-season. (IFAD, 2016)



2.11 Climate Change Impacts: Agriculture

The combined crop and livestock farming system is widespread and based on cereals, which account for 97% of rainfed crops. In 2011, cereal production in the region, consisting primarily of millet and sorghum, provided 7% of national production (more than 320,000 tons). In the same year, livestock resources in the region consisted mainly of small ruminants (9.4% of the national herd), with close to two million head (compared to nearly 400,000 head of cattle). In the course of the past decade, the degradation trend has been reversed to some extent with a number of interventions in land reclamation and sustainable natural resource management, consisting of semi-circular micro-catchments (demi-lunes), planting pits (zaï), stone barriers, contour bunds, and other improvements. (IFAD, 2016)

2.12 Climate Change Impacts: Natural Capital

Projections predict important changes in the structure and function of ecosystems, ecological interactions between species and distribution areas of species, with mainly negative impacts on biodiversity and the goods and services of ecosystems. The size of the problem is such that a specific study is needed in order to understand the domino effect of the impacts. The significant variation in rainfall from one year to the next and the increase in potential evapotranspiration (PET) represent certain risks to the uninterrupted growth cycle of plants (loss of biomass). There is therefore a risk that the regeneration capacity of forest formations will be unable to compensate for timber cut for energy.

More frequent and serious flooding is to be feared, with destructive effects on biodiversity in the bottomlands and an increase in water-borne diseases among wild fauna. Furthermore, the increase in potential evapotranspiration combined with anthropogenic activities will result in faster degradation of ground vegetation and thus a reduction in infiltration to replenish the water table. Surface water will also evaporate faster and permanent watercourses will tend to disappear with gallery forests. (UNDP, 2015b)

2.13 Climate Change Impacts: Health

The impact of the vulnerability of water resources on the health sector takes the form of damage caused by excessive rainfall, especially floods, which may pose a risk to public health due to the precarious condition of water works and a gradual deterioration in the quality of water, causing outbreaks of water-borne diseases such as cholera, dysentery and salmonella. This risk of flooding might pose a risk to food security if harvests are destroyed, thereby also resulting in increased malnutrition, especially among children. The health sector will also be more vulnerable to the direct effects of flooding, such as infection and diarrhoeal diseases. (UNDP, 2015b)

2.14 Climate Change Impact: Vulnerability Mapping

Big data analytics were leveraged to identify structurally vulnerable zones. These zones of development need were calculated by averaging together all relevant and available sub-national development indicators across a broad spectrum. In all, 36 datasets, many of which were historical, were aggregated into composites, which were then aggregated into higher-level composites. Geographic areas where most development indicators were negative are redder and areas where indicators were relatively better are bluer. (USAID , 2015)



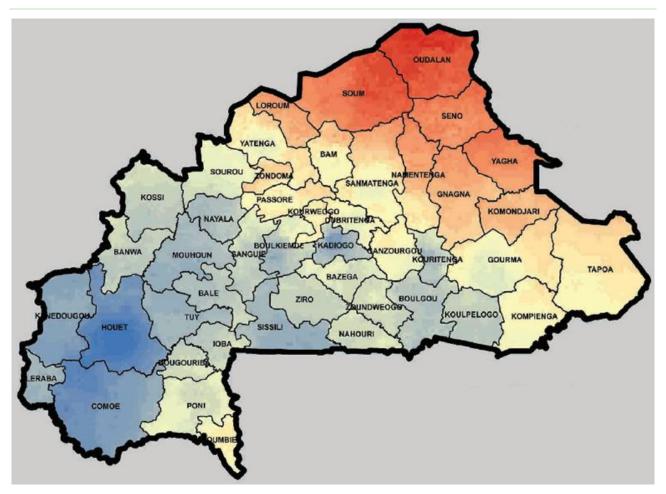


Figure 22 Vulnerability Map Burkina Faso (USAID , 2015)

2.15 Suggested Geographies and Sectors for Intervention for Climate Change Adaptation

Table 26 Adaptation O	ptions by Sector for	[·] Burkina Faso (MoESI	0. 2014: UNDP. 2015b)
Table 20 Adaptation 0	phone by occur for		2, 2014, 0101, 20130

Sector	Adaptation mechanism	Description	
Natural capital	Increase ecosystem productivity and resilience	Increasing forest biomass production and promotion of new fuel wood technologies in combination with more sustainable land use management practices. This can be supplemented with the introduction of best practices have been introduced in the field of fisheries and aquaculture.	
	Improve biodiversity conservation	Increase the protection of biodiversity (forests, wildlife etc.) and improve protection from climate change-related risks.	
	Improve ecological research and monitoring	Establish a permanent R&D facility devoted to climate change adaptations. Climate change impacts on ecosystems are monitored on a permanent basis.	
	Mitigate greenhouse gas emissions	Establishment of urban pollution mitigation measures and a national observatory for the environmental and natural hazards.	
Agriculture	Capacity building	Provide staff and means to support the Regional Organisms of Development (ORD) initiative to boost the development of agriculture production. This would enable the regional offices to become active in conducting agriculture research and training for farmers.	



Sector	Adaptation mechanism	Description
	Climate insurance	Encourage farmers and the other stakeholders involved (mainly insurance companies) to promote climate insurance based on a predefined climate index which includes factors such as rainfall, temperature, sunshine or result from a combination of several climate parameters. The State should create a suitable framework for the emergence of that new type of insurance.
	Collection and conservation of water on the plot	As part of the adaptation strategy developed, we need to point out the techniques of collection and conservation of water such as the Zai or the Django and the half-moon. To reduce the run off and the erosion of the soil, several techniques such as stone bunds and grass strips have been developed.
	Irrigation techniques	Irrigation (supplement in the wet season, or total in the dry season) seems essential in the future for agriculture in dry or semi-dry areas, where temperatures are high and the evaporation is important.
	Reinforce the utilization of organic and mineral fertilisers	A few years ago, the government had launched a campaign to popularise the production of organic fertilisers through the promotion of compost pits. This initiative should continue but at the same time, the State should review its policy concerning the availability of mineral fertilisers for farmers.
	Popularization of improved varieties of maize	The efforts of agricultural research, which has set up several varieties of improved maize adapted to the current context in the sector, are strategies of adaptation for the farmers. Increased uptake would improve the productivity of the agriculture sector and make total output more resilient towards climate impacts.
Water	Creation of a favourable policy and institutional framework	Actions and strategies implemented by political powers to reduce the vulnerability of Burkina Faso to face climate variability and climate change. This entails review and adjustment of existing policies and programmes to account for climate change impacts.
	Development and management of water resources	The development of water resources in response to declining rainfall in the context of climate change, affecting the availability of water. It is essential to develop strategies to reduce losses of bodies of water through evaporation in response to the increase in temperature, and therefore in evaporation. At this level, recent technological innovations such as the technique of subsurface dam (for example the one of Narre built in 1997) and artificial recharge, especially in fractured basement area, are highly considered.
	Monitoring and evaluation of water resources	Improve understanding of water resources, to promote scientific research, to develop a system of early warning of floods and an Information System on Water (SNIEau).
	Capacity building	This strategy requires awareness, information and communication, training and development of basic skills, equipment and technical tools, legal and administrative framework, mobilising financing, and finally, cooperation and exchange of information



3 Chad

3.1 Country Background

The Republic of Chad is a large, landlocked Central African country of a total land area of 1,259,200 Km² (486,180 sq. miles) that straddles the subtropical, semi-arid belt known as the Sahel. The 2020 Worldometer elaboration of the latest United Nations data estimates that the Chadian population at 15 million, with an average lifespan at birth of 51.4 years and a high demographic rate of 3.5% per year. The average population density is 13 per km² (34 people per mile 2) and 23.3% of the population is urban (3,830,260 people in 2020). The population of Chad is essentially young, with an average age around 19 years living mainly in rural areas (78 per cent) and is characterised by her extreme youth (51% of the population under 15 years of age) (PND 2017-2021).

Two peoples are considered indigenous to Chad: the Mbororo sub-group of the Fulani people and the Toubou. However, The Mbororo people are not officially recognised by the Chadian government in law. Despite the lack of official recognition, the UNDRIP ensures recognition through self-identification: a people must recognise itself as indigenous and meet all the criteria as specified in the Report of the African Commission's Working Group of Experts on Indigenous Populations/Communities. The Mbororo Fulani live primarily from pastoralism and subsistence farming. According to the 1993 census, they number some 250,000 clustered in the dry centre and tropical south where there is pasture for their livestock. It is estimated that they make up some 10% of the Chadian population. The Fulani are often poor, the majority of them are illiterate and they have no political representation at the national level. The Toubous are considered one of the oldest groups currently living in the Sahara. Their origin remains a mystery and they have always been an enigma in the eyes of others. Warriors and pastoralists like many other Saharan peoples, these nomads are feared by their neighbours, and owe their reputation to their legendary capacity for adaptation and survival in the particularly arid environment of the Tibesti mountains. They rear camels and cattle and live largely in northern Chad, with the exception of small communities settled in Niger, Libya and Egypt. Chad was absent on the day of the vote on the UN Declaration on the Rights of Indigenous Peoples (UNDRIP) in the UN General Assembly.

Chad grapples with security challenges associated with conflicts in bordering countries as well as the impacts of climate change, which is exacerbating desertification, declining fish stocks, disappearance of certain animal and plant species, and soil degradation (WB, 2020) Apart from structural and climatic factors, these security challenges lead to a large influx of refugees in the country. Over the past 25 years, Chad has in fact received every year more than 450,000 refugees from Sudan, the Central African Republic, and Nigeria, and therefore ranks 12th - in absolute numbers - among all host countries in the world and sixth in Africa alone (WB, 2020). Refugees make up almost three% of the population, making Chad the fifth most important host country in the world (in relative terms). The terrorist threat in the Lake region is contained, making it possible to create the conditions for the care of affected populations through a response plan in favour of returnees and refugees that the Government has formulated.(WB, 2020).

6.11.15 Income and Poverty

The economy is heavily dependent on oil, accounting for 36% of gross domestic product, agriculture and livestock constituting 21%, trade 13%, and all other sectors accounting for 29%. Critical development challenges for Chad include reducing their dependence on oil revenues, diversifying the economy, and growing other sectors, especially the private sector. As a result of their reliance on oil, the economy is quite vulnerable to oil price shocks. 45% of Chadians are living in poverty and face severe deprivation of a range of basic needs. For example, 93% of the population lives in households that lack adequate sanitation and food insecurity affects 44.2% of the population (WB, 2020).

Over the past 5 years, the Human Development Index (HDI) has improved to 0.401 in 2019, an increase of 2.3% compared to 2013. Nonetheless, 45% of Chadians are living in poverty and face severe deprivation of a range of basic needs. For example, 93% of the population lives in households that lack adequate sanitation and food insecurity affects 44.2% of the population (<u>WB, 2020</u>). Chad has one of the highest levels of hunger



in the world - 66.2% of its population of 15.5 million live in severe poverty. It is ranked 187th out of 189 countries in the 2019 Human Development Index (WFP, 2020). Life expectancy at birth increased from 49.6 to 54.0 years between 2010 and 2019 (HDR 2019), with an infant mortality rate for Chad in 2020 of 71.557 deaths per 1000 live births, a 2.01% decline from 2019 based on a 2020 macrotrend data. Despite an improvement in the net enrolment rate and the completion rate of primary education, the level of education of the population remains one of the lowest in Africa (WB,2020).

The HAI (Human Assets Index) social vulnerability index, developed by the UNDP on the basis of social services (education, health, etc.) shows a fairly low rate in Chad (24.4 in 2015) and ranks it 185th. rank out of 188 countries. This index could deteriorate further due to the effects of climate change. One of the challenges to be overcome in the medium and long term will be improving resilience to shocks and climatic extremes in a context of population growth (WB,2020).

Chad is the world's second most food-insecure country (118th of 119 countries on the Global Hunger Index). An integrated context analysis indicates that the regions most affected by food insecurity are those that exhibit the greatest vulnerability. These regions are overwhelmingly concentrated in the Sahelian belt, which is the region hit worst during the yearly lean season (from June to September). From 2016 to 2017, national food insecurity levels rose from 18.5 to 23.7%, reaching 50.2% among female-headed households. In 2017, food insecurity prevalence was particularly high among refugees (60%), IDPs (35%) and people adversely affected by the lean season (40%). Over 3 million people are food-insecure or at risk of food insecurity, and over 500,000 children are at risk of becoming malnourished during the lean season every year (CSP/WFP 2019-2023).

In the Lake region, the Boko Haram insurgency has disrupted agricultural activities, livelihoods and market access for 180,000 internally displaced people and Nigerian refugees. Households of western Chad, the Sahel, the south and the south-east, whose livelihoods depend on trade, pastoralism and agro-pastoralism, face heavy income and purchasing power losses from the disruption of cross-border trade and restrictions on movement between Chad and Nigeria, Libya, the Central African Republic and the Sudan. Refugees, returnees and internally displaced people have limited access to land, water and livelihood and employment opportunities. Among these already vulnerable groups, access for women is especially restricted due to discriminatory land inheritance practices and restricted mobility, education and representation in decision-making bodies (CSP/WFP 2019-2023).

3.2 Nutrition

A 2016 Cost of Hunger in Africa study for Chad indicates that malnutrition and hunger could cost Chad 9.5% of its GDP per year, with 43% of child mortality linked to malnutrition and 20% of children under 5 underweight. In 2017, the global acute malnutrition rate stood at 13.9% overall and exceeded the World Health Organisation (WHO) emergency threshold of 15% in 12 of Chad's 23 regions, mainly in the Sahel. Chronic malnutrition prevalence is 32.4% overall and above the 40% threshold in five regions. Data for 2017 from the Office of the United Nations High Commissioner for Refugees (UNHCR) indicate that more than 15% of children living in refugee camps in the east suffer from chronic malnutrition. In some areas of the Sahel, the anaemia prevalence of children under 5 exceeds 50%. Anaemia prevalence among women of reproductive age for the country as a whole is 47% (CSP/WFP 2019-2023).

According to a multiple indicator demographic and health survey for 2014–2015, the prevalence of human immunodeficiency virus (HIV) in Chad is 1.6%. The prevalence is age-dependent, at 0.8% in the 15–19 age group, 2.9% in the 35–39 age group and 1.4% in the 45–59 age group. There are 140 women living with HIV for every 100 men living with HIV. The Lake region is of special concern, with an HIV prevalence of 2.1%. In this region, 67% of people living with HIV are malnourished. All children under 14 living with HIV assessed in 2017 were found to be acutely malnourished. Malnutrition is more prevalent among women and girls (72.6%) than among men and boys (59%) living with HIV (CSP/WFP 2019-2023).



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3.3 Gender

The%age of the female labour force working in agriculture is 92.4 versus 82.9% for working men.15 Women have restricted access to productive assets, credit, land ownership and the opportunity to rent land. Land inheritance customs often discriminate against women, and men decide on the use of harvested crops and income. Only 22.3% of women take part in decision-making about income-generating activities, 22.6% have access to credit and 26% have a bank account,16 while 12.8% of national parliamentarians are women.17 On average, girls are less educated than boys and more likely to leave school early, often being forced into early marriage. Chad has the third highest rate of child marriage in the world—68% of girls are married as children. Gender-based violence and sexual violence are pervasive and are aggravated by conflict and displacement.(CSP/WFP 2019-2023).

It should also be noted that the custom in some Chadian communities "excludes" women from access to land ownership, although they occupy a special place in the economy in rural areas. By way of illustration, the agricultural sector employs more than 2/3 of the country's active population, more than half of which is made up of women (FAO, 2015).

3.4 Temperature, Rainfall, Seasons and Agro-Climate Zones

The Chadian territory is subject to a system of two winds including the Harmattan of the North-East sector and the monsoon of the South-West sector whose behavior of their meeting, the Inter Tropical Front (FIT) depends on the evolution (strengthening / weakening) anticyclones from Saint Helena, the Azores and others (Libya, Arabia depending on the period). Precipitation is marked by a strong irregularity in its distribution, both spatial and temporal. This irregularity is explained by the importance of the flow distribution of the Guinean monsoon, the main source of moisture. The thermal regime is marked by a relatively cold period from December to February (11 ° - 22°C) and a hot period from March to June (39 - 45°C) (WB,2020).

The distribution of rainfall and plant cover makes it possible to subdivide the territory into three large zones (WB,2020).:

- Saharan zone: This zone which occupies more than half of the national territory is characterised by a very low rainfall limited to South by the 200 mm / year isohyet. Vegetation is present in the wadis, plains and outcrop areas of the water table, while the soils are mostly undeveloped soils. The fauna is dominated by the family of antelopes such as: dammah gazelle, dorcas gazelle, leptocerous gazelle, addax and oryx, etc. ;
- Sahelian zone: It is between the 200 and 800 mm isohyets with sandy tropical ferruginous soils, poor in organic matter. The vegetation is characterised by: the shrub savannah occupying the southern part and where, depending on the type of soil, Acacias and Balanites dominate, with a herbaceous carpet composed of Andropogonea, and the steppe (or pseudo-steppe), located in the northern part and characterised by very open woody formations, the grassy carpet dominated by Aristidae. The fauna is abundant and varied;
- Sudanian zone: It ranges from the 800 mm isohyet to 1200 mm and more for vegetation made up of two types of formations (open forest and wooded savannah). The soils are tropical ferruginous, rich in organic matter and the fauna is abundant and varied.

3.5 Agriculture and Rural Livelihoods

Over 4.5 million people—80% of the 5.6 million Chadian labour force—work in the agriculture sector (including livestock, forestry and fisheries), which accounts for 59% of GDP. The combined crop and livestock farming system is widespread and based on cereals, which account for 97% of rainfed crops. In 2011, cereal production in the region, consisting primarily of millet and sorghum, provided 7% of national production (more than 320,000 tons). In the same year, livestock resources in the region consisted mainly of small ruminants (9.4% of the national herd), with close to two million head (compared to nearly 400,000 head of cattle). In the course



of the past decade, the degradation trend has been reversed to some extent with a number of interventions in land reclamation and sustainable natural resource management, consisting of semi-circular micro-catchments (demi-lunes), planting pits (zaï), stone barriers, contour bunds, and other improvements. (IFAD, 2016)

Security threats, natural disasters, limited connectivity to local and transborder markets, high transaction costs, weak credit systems, poor management of water resources and low adoption of modern farming techniques and tool use curtail smallholder productivity and incomes. Fluctuating seasonal rainfalls and conflicts in the Lake region have negatively affected the livelihoods of pastoralists who depend on cross-border trade (22.6% of cross-border traders are women) and of fishers because of displacement and security constraints. The agriculture sector remains largely under-exploited in Chad (CSP/WFP 2019-2023).

Of a total of 39 million hectares (ha) of arable land or 30% of only 3 million ha (7.7%) are planted annually. The cereals constitute the basis of the diet, but the levels of production are low and strongly dependent on variable climatic conditions, particularly in the Saharan Sahel. Yields for dry cereals do not exceed 1 tonne per hectare. The yields of other food crops, groundnuts, sesame, beans, cassava are also low. The production system is extensive, unproductive and based on subsistence agriculture practiced on small traditional family farms with an area of 2 to 5 ha. (FIDA, 2014)

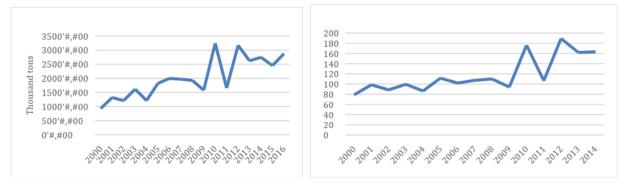


Figure 23 Total cereal production and crop production index Chad (World Bank, 2018a)

3.6 Climate Change: Temperature

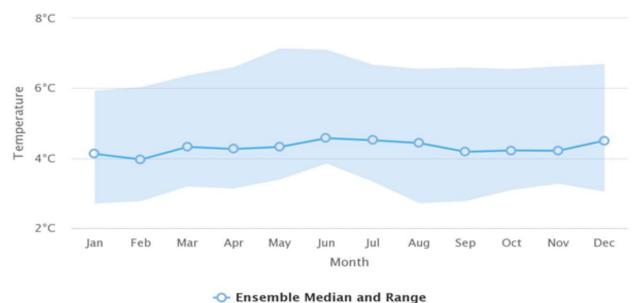
Annually, mean temperatures in Chad are similar across most of the country at 25-30°C, and only differ substantially in the cooler mountainous regions of the north at 15-25°C. However, seasonal variations are large, and differ in their patterns for different parts of the country. In the north and central regions, summer and winter temperatures are distinct at 27-35°C in summer and 20-27°C in winter (these temperatures are 5-10°C lower, year-round, in the northernmost mountainous regions). In the south, less seasonal variation is evident, but the summer months (JAS) are the coolest (22-25°C) due to the cooling effects of rain at this time of year. Based on a 2016 WB data, the mean annual temperatures in Chad have increased by 0.7°C since 1960. The greatest rate of increase occurred in the wet season during the months of July-September at a rate of 0.36°C per decade. Seasonal temperatures vary considerably with temperatures ranging from 20-27°C in the winter and between 27-35°C in the summer. Northern Chad extends into the Sahara Desert and receives very little annual rainfall with seasonal temperature variations similar to that of the central region. The dry season lasts between November-March and very little to no precipitation falls during this season (WB, 2020).

Projections on temperature: The mean annual temperature is projected to increase by 1.0 to 3.4°C by the 2060s, and 1.6 to 5.4°C by the 2090s. The range of projections by the 2090s under any one emissions scenario is 1.5- 2°C. The projected rate of warming is similar in all seasons and regions of Chad. All projections indicate substantial increases in the frequency of days and nights that are considered 'hot' in current climate. Annually, projections indicate that 'hot' days will occur on 17-36% of days by the 2060s, and 21-54% of days by the 2090s. Days considered 'hot' by current climate standards for their season are projected to increase most rapidly in JAS, occurring on 35-84% of days of the season by the 2090s. Nights that are considered 'hot' for the annual climate of 1970-99 are projected to occur on 26-49% of nights by the 2060s and 31-63% of nights



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by the 2090s. Nights that are considered hot for each season by 1970-99 standards are projected to increase most rapidly in JAS, occurring on 48-95% of nights in every season by the 2090s. Projected increases in hot days and nights are more rapid in the south of the country than the north. All projections indicate decreases in the frequency of days and nights that are considered 'cold' in current climate, and in much of the country, do not occur at all by the 2090s. (UNDP, 2015b)



Clisenble Median and Range

Figure 24 Projected Change in Monthly Temperature for Chad for 2080-2099 (WB, 2020)

3.7 Climate Change: Precipitation

Mean annual rainfall over Chad has not changed with any discernible trend since 1960. Some unusually high rainfalls have occurred in the dry season in the very recent years (2000-2006), but this has not been a consistent trend. There is not sufficient daily precipitation data available to determine trends in the daily variability of rainfall. (UNDP, 2015b)

Projections on precipitation: Projections of mean annual rainfall averaged over the country from different models in the ensemble project a wide range of changes in precipitation for Chad. Projected change ranges from -15 to +9mm per month (-28 to +29%) by the 2090s, with ensemble means close to zero. Whilst the range of projections across the model ensemble is large, the regional changes in rainfall more consistently indicate increases in wet-season (JAS) rainfall in the south of the country. The relative (%) changes in rainfall in the dry regions and seasons are exaggerated because of the very small rainfall totals that changes are presented as a proportion thereof (i.e. a 400% increase in JFM rainfall is equivalent to only an additional 5mm). The proportion of total rainfall that falls in heavy2 events is projected to increase in the south of the country, but to decrease in the north. Projections indicate that maximum 1- and 5-day rainfalls may increase in magnitude in the south of the country. (UNDP, 2015b)



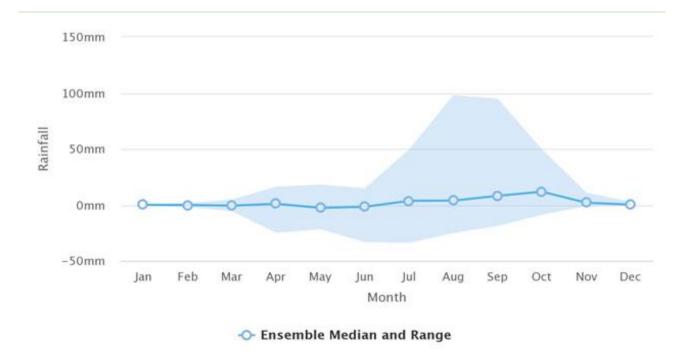


Figure 25 Projected Change in Monthly Precipitation for Chad for 2080-2099 (WB, 2020)

3.8 Climate Change Impacts: Climatic Hazards and Extreme Events

The geographical location of Chad makes it one of the most vulnerable countries to the adverse impacts of climate change. Chad's Second National Communication (June 2012) projects an average temperature increase of 1.2° by 2030, 2.2°C by 2050 and 4.1°C by 2100 in the Saharan zone of the country. These impacts are affecting all areas of social and economic activity. Rural communities are particularly affected. In recent years, Chad suffered from a resurgence of extreme weather events, including floods, droughts, bush fires and land degradation (UNDP, 2020).

Indeed, Chad has experienced persistent drought for several decades. Deserts are advancing at a rate of 3 km per year in the northern part of the country (GFDRR, 2017). Precipitation varies from one year to another and from one decade to another. Meteorological observations in the Sudanian zone indicate a decrease in precipitation patterns during the rainy season (May-October) over the period from 1951 to 2000. In the Sahelian zone, rainfall has increased since the 1990s, with precipitation above the average over several years. Minimum average temperatures in Chad have increased by 0.5 to 1.7°C, depending on the observation stations, since 1950, while maximum annual temperatures have increased by 1.34°C over the same period (NAPA/UNDP).

According to the Global Climate Risk Index 2018, natural hazards cost Chad on average USD 49 million in damages per year between 1997 and 2006. Given the fragility of its ecosystems, Chad will continue to face challenges in developing and maintaining sustainable food systems. Rural populations are particularly vulnerable to natural disasters and climate change. The competing interests of farmers and herders are becoming more difficult to balance; a pastoralism code approved by the National Assembly in 2014 has yet to be applied (CSP/WFP 2019-2023).

Projections on climate impacts: Based on the previous projections on temperature and precipitation, there will be an increase in precipitation and temperature over Chad throughout the 21st Century. This will exacerbate climatic hazards (drought and flood), which will result in difficult or late start to the wet and dry seasons, dry episodes after sowing or at the flowering stage, early end of rains, flooding of fields in lowland areas before tillering, flooding in the mature phase – harvests, and out of season rains. In addition, the Intergovernmental Panel on Climate Change Fifth Assessment Report (IPCC AR5) indicates that under the RCP 8.5 scenario, model projections indicate that in southern Chad there will be an increase in the wet season



rainfall from July to September. They also project an increase in heavy precipitation events in Southern Chad with a decrease in the Northern part of the country (Climate Change Knowledge Portal, 2018). According to the projection of all models, the number of hot days and nights will increase yearly and the projected fastest increase will be from July to September. The South of Chad will see the quickest increase in these events (Climate Change Knowledge Portal, 2018). Recent climate projections (Climate Change Knowledge Portal, 2018). Recent climate projections (Climate Change Knowledge Portal, 2018). Becent climate projections (Climate Change Knowledge Portal, 2018) using 14 Global Circulation Models from the IPCC AR5 indicate that by the 2060s, mean annual temperature is projected to increase from 1.0 to 3.4°C and by the 2090s to between 1.6 to 5.4°C (UNDP, 2020).

3.9 Climate Change Impacts: Lives and Livelihoods

According to the 2016 Climate Change Vulnerability Index Chad was the most vulnerable country to climate change. The country faces recurring extreme weather conditions such as droughts and floods, while lacking sufficient institutional and community capacities to adapt and mitigate consequences. In 2019, severe flooding has affected multiple provinces in Chad, with a major impact in the North and East. The size of Lake Chad, on which 30 million people depend to survive, has decreased from 25,000 km² in 1963 to a tenth of its size, due to severely depleted rainfall or rain failure linked to climate change, as well as through human water use and activities. (UNOCHA, 2019) Besides, the unfavourable geographical situation due to its geographical position as a sub-Saharan country, with a territory to more than half (63%) desert, is subject to a dry tropical climate sensitive to the slightest modification of the climate.

After discovering oil in 2003, the country experienced an average annual growth rate exceeding 7 per cent between 2004 and 2014. However, this has not translated into a reduction of inequalities, as the Gini index, which measures income inequality, increased from 0.49 to 0.51. From 2016, Chad faced a severe economic crisis related to the global fall in oil prices and poor investments (UNOCHA, 2019).. Combined, the country bases its national economy on agriculture and livestock, both sectors highly dependent on the climatic conditions that have become increasingly unstable. Indeed, for the Sudanian zone, the first five sectors considered to be the most vulnerable are water resources, agriculture, livestock farming, fishing and the forest. In the Sahelian zone, the same sectors come back and in almost the same order except that the craft comes fourth before fishing. On the other hand, in the Saharan zone, the pattern is quite different. It is rather the breeding which takes the head, followed of agriculture and commerce. From the above, it can be inferred that the people the most vulnerable people are to climate change are mainly farmers, ranchers and fishermen. (RdC, 2012).

Austerity measures adopted by the Government since late 2016 to address the situation led to rising social tensions, with civil servants' strikes disrupting the functioning of basic social services, including school closures, and growing impoverishment of Chadian society. As a result, social indicators continued to deteriorate, with a negative impact on health, education, food security and nutrition. The chronic vulnerability of the population, further exacerbated by this situation, results in significant humanitarian need. (UNOCHA, 2019)

3.10 Climate Change Impacts: Agriculture

Agriculture, which employs the majority of the population, especially young people, has been hit particularly hard, which inevitably led to a reduction of people's purchasing power. Over 95% of Chad's agriculture relies on rainfall for irrigation, which explains the vulnerability of Chadians to climate change. In addition, very high poverty rates in rural areas prevents access to adaptation measures. As a result, the need for local populations to access financial markets and financial services is becoming critical. With dwindling income sources, people find the purchase of seeds and agricultural inputs increasingly challenging. Coupled with weak climate risk management, small farmers are severely constrained when seeking loans for agricultural inputs (improved seeds, fertilisers, small-scale equipment) for their agriculture production. The vulnerability of agriculture is likely to worsen due to the steady decline in precipitation in Chad. Change of rainfall patterns to the south and the intra-seasonal rainfall variations cause impacts such as long dry spells and the degradation of natural



resources (water, soil, forests) and agricultural infrastructure. The limited capacity of local populations to adapt to climate risks is also a well-known barrier (UNDP, 2020).

Due to the very wide variability of the climate, fish production has decreased significantly in recent years, due to drought resulting in a reduction of water bodies. The increase in the number of fishermen, the widespread use of small mesh nets has also contributed to the scarcity of certain species and the increase in the catch of juveniles.

3.11 Climate Change Impacts: Natural Capital

The stress created by the overexploitation of the natural resources of Lake Chad are undermining the ability of the plant and animal populations to maintain their normal regenerative rate. Impacts include the loss of plant and animal species, as well as damages to ecosystem health. This is rooted in population growth, absence of sustainable development in political programmes, and low environmental awareness. This reduces ecosystem productivity and thus resources availability, resulting in deepening poverty. It also contributes to the decreasing viability of biological resources. (UNDP, 2018b)

Forest resources have also declined over the past several decades. According to FAO's forest area has been estimated at 21.7 million in 2005 down from 23.1 million ha in 1990. Climate variability is however not the only cause, the other reason being the abusive and anachronistic exploitation of forest resources. In the Saharan zone, the plant formations found in the lowlands, the spreading plains and the outcrop areas are often made more vulnerable to climate change due to anthropogenic pressures due to demography.

Climate change, due to its impact on natural resources, has also forced many populations to migrate. This was the case, for example, in 1984, a period of great drought, when the populations of Guéra and Batha had to move to other regions with milder climates. Currently, the whole country is affected by the migratory phenomenon linked to climate change, with the consequences of pressures on the natural resources of the host regions, leading to numerous conflicts between breeders and farmers

3.12 Climate Change Impacts: Water

The evolution of the climate has effects on all of the country's natural resources. The climate impacts are significant on the major hydrographic systems that are the basins of Lake Chad and Niger, the natural, agro-sylvo- pastoral, fishery and human systems. In recent decades, the Saharan and Sahelian climatic zones of Chad have progressed south by 150 km. In relation to water resources, climate change has impacted the volume of surface water which has seriously reduced, like Lake Chad whose volume increased from 44 billion m³ in 1963 to 18 billion in 1992. Its area has been reduced from 25,000 km² to about 2,000 km² (NASA).

Sedimentation in rivers and water bodies has led to changes in channel flow patterns, a reduction in the inflows to the lake through channel diversion, and the colonization of the silted sites by invasive species. It is driven mainly by unsustainable farming practices on marginal lands and is rooted in low environmental awareness, population pressure, and absence of sustainable development on the political agenda of the member states. (UNDP, 2018b).

3.13 Climate Change Impacts: Health

Taking into account IPCC statements on the increase of frequencies and intensities of extreme weather events (floods, drought, heat wave, sandstorm) reported above and considering the alternation of flood episodes and drought during the last decades, we can expect the recrudescence of certain pathologies such as; cholera, malaria and other water-borne diseases if the level of hygiene of populations is not improved in Chad. The projection of temperature variations at 2030, 2050 and 2100 lead to cardiovascular diseases especially in the most vulnerable people (old men, young children and pregnant women). Increased temperatures and expected rainfall decrease in the Sahelian zone increase the risk of an epidemic of cerebrospinal meningitis and will



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lead to the modification of the spatial distribution of certain infectious disease vectors. There will be an increase number of deaths, illnesses and accidents due to heat waves, floods, storms, bush fires and droughts. This situation may be aggravated by disruption of sanitation, rainwater drainage and wastewater in urban centres that will be increasingly populated. Heat waves are going to make a lot of victims as was the case in 1998. (RdC, 2012)

Health services in Chad are under additional pressure when they have to respond to increased demand due to climate-related natural disasters, such as flooding. The last floods in Mayo Kebbi and Moyen Chari in 2008; by for example, destroyed homes that led to the exposure of poor people (women, children and the elderly) to bad weather conditions of accommodation of fortune. The residential areas (schools, churches, mosques, etc.) where promiscuity prevailed the dignity of people who no longer had their personal belongings. The number of patients increased significantly, health centres could not provide the services victims needed. This can cause patients to be satisfied with self-treatment, which is not safe for health. (RdC, 2012)

3.14 Climate Change Impact: Vulnerability Mapping

According to the NAPA and consultations carried out during the workshop launching the INDC preparation process, climate change exposes certain sectors and social groups to a medium to high level of vulnerability (1 = very high, 6 = lower), depending on the geographic zone:

- Saharan Zone Sectors:
 - Livestock
 - Agriculture
 - Trade
 - Natural Resources
 - Water
- Saharan Zone Groups:
 - The Sick
 - Isolated Elderly People
 - Women And Children
 - Disabled Heads Of Family
 - Displaced Persons
- Sahelian Zone Sectors:
 - Water Resources
 - Agriculture
 - Livestock
 - Fishing
 - Gathering
 - Handicrafts
 - Forestry
- Sahelian Zone Groups:
 - Women And Children
 - Isolated Elderly People
 - The Sick
 - Displaced Persons And Refugees
 - Returning Persons
- Sudanian Zone Sectors:
 - Water Resources
 - Agriculture
 - Livestock
 - Fishing
 - Fishery Resources
 - Forestry



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- Sudanian Zone Groups:
 - Women And Children
 - Isolated Elderly People
 - Displaced Persons
 - Refugees
 - Rural Populations
 - Returning Persons

Whilst the INDC actions are applicable to all of Chad, it appears that the priority target zones (Kanem, Barh El Ghazal, Batha, Guéra, Hadjer Lamis, Wadi Fira; Ouaddai, Dar Sila, Lac, Moyen-Chari, Borkou, Tibesti, Ennedi Est, Ennedi Ouest) are especially vulnerable to the effects of climate change and, in part, to the arrival of displaced populations. There are approx. 700,000 displaced people in Chad, including refugees and Chadians returning from Sudan, the Central African Republic, Nigeria and Libya (OCHA, 2015).

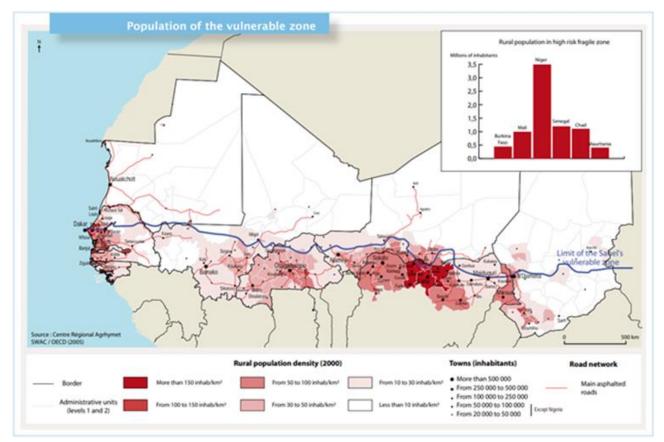


Figure 26 Population in the vulnerable zone of the Sahel area (OECD, 2006)

3.15 Suggested Geographies and Sectors for Intervention for Climate Change Adaptation

Table 27 Adaptation Options by Sector for Chad (Crawford, Hove, & Parry, 2011; RdC, 2012)

Sector	Adaptation mechanism	Description
Water	Improved use of surface water for agriculture and livestock	To better use surface water resources to reduce climate vulnerabilities and improve food security among rural populations. This will be done through the development of irrigation infrastructure, reforestation programmes and more



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Sector	Adaptation mechanism	Description
	Quality of and access to health care	Equipping the health centres and making them accessible geographically and financially to the entire population is a necessity.
Health	Increase preparedness	Early warning of epidemics associated with variability and climatic changes
	Capacity building	Promote endogenous knowledge and know-how in health matters human
	Irrigation systems	The irrigation system and off-season crops (berbere and vegetables) are one of the possible responses to climate variability and change. The recent increase in irrigated area deserves to be encouraged. Berber culture and other off-season crops need to be developed by increasing yield through the use of inputs. This approach will reduce the vulnerability of populations subject to the effects of droughts or floods one year out of three. For the mastery and the rational management of water, the drip irrigation system should be used especially in horticulture and sugar cane. In addition to this, other options below need to be advocated.
	Diversification and intensification	To reduce the negative effects of climate change and climate variability on the agricultural sector through the intensification and diversification of crops.
Agriculture	Improving and disseminating climate-sensitive planting schedules	Contribute to better agricultural decision-making and improved yields through the dissemination of climate-sensitised planting calendars and support for better planning capacity among farmers.
	Soil rehabilitation for the development of agricultural activities	To improve soil fertility and agricultural yields and to prevent further soil degradation linked with the anthropogenic and climatic factors.
	Improving inter- community pasture zones	To improve the availability of pasture and fodder for livestock in order to reduce migratory pressures among pastoralists, promote new livelihoods and to improve their capacity to adapt to climate change.
	Livestock Food Bank	To establish and stock eleven national food banks for livestock to ensure animal health and improve livestock productivity.
	The use of processed organic matter (Compost, Manure)	The integration of agriculture and livestock farming, the merits of which are known and vaunted, requires recovery of crop residues and manure from manure and compost. Compost and manure are advanced organic materials that, when used correctly give very appreciable returns. A high rate of widespread adoption of these technologies could significantly increase agricultural productions.
Climate	Improve forecasting capacity	To improve seasonal rainfall forecasting and models, and improve knowledge for vulnerability reduction strategies.
Climate information	National Centre for Climate Change Observation	To establish a national centre for climate change observation



Secto	r Adaptation mechanism	Description
	Reduce climate change vulnerability	To contribute to the national strategy for climate risk management, through climate observation and modelling, analysis, policy integration and awareness raising.



4 Mali

4.1 Country Background

Mali is a landlocked country in the heart of West Africa. It has about 13.5 million inhabitants most of whom live in rural areas, with a growth rate of around 3% per year. The country shares more than 7,000 km borders with seven neighbouring countries, namely Senegal and Guinea-Conakry in the west, the Mauritania in the North-West, Algeria in the North, Niger and Burkina Faso in the East, and Côte-d'Ivoire in the South.

The Tuareg (Tamazight speakers), the Moors (Arabic speakers) and, in riverine areas, the Songhay and Peuls (Fulani) are the main communities that inhabit the vast northern space that accounts for two-thirds of Mali. Their political alliances and their conflicts have shaped the history of a region in which there has been an interdependence between nomadic and settled populations, who have participated in vast economic, cultural and social exchange networks across the Sahara. The Tuareg live in the five administrative regions of northern Mali (Kidal, Timbuktu, Gao, Taoudenit and Menaka), known as Azawad by the autonomy movements. They also have a presence in the border areas of other states (Niger, Algeria, Libya, Burkina Faso). In 1960, when Mali was created, official figures put the Tuareg at more than 10% of the country's population. Today, despite no reliable data, official discourse around the conflicts that have pitted the Tuareg against the Malian state puts them at a mere 3% of the global population, a figure that is scarcely credible. The National Agreement, a peace accord signed with the armed Tuareg fronts in 1992, recognised the specific nature of the regions inhabited by the Tuareg although these provisions were never concretely implemented. Mali voted in favour of the UN Declaration on the Rights of Indigenous Peoples (UNDRIP) in 2007. The Malian state does not, however, recognise the existence of "Indigenous Peoples", as defined by the UNDRIP and ILO Convention 169 on Indigenous and Tribal Peoples in Independent Countries, on its territory (The Indigenous Peoples, 2020).

The state of emergency that has been in place since 2015 was extended in 2019. The country's security situation has reached a critical point, following much the same trajectory as in 2018 despite the massive presence of international forces. Jihadist groups intensified their attacks throughout 2019, killing 150 civilians,13 terrorising rural populations and causing them to be displaced (The Indigenous Peoples, 2020). Attacks on the army increased, with more than 100 Malian soldiers killed in October and November 2019 alone. (The Indigenous Peoples, 2020).

Despite deteriorating security within the country, economic performance is strong, with robust growth. Robust performance in the agriculture and services sectors led to a projected growth rate of 5.8% in 2016 (down from 6.0% in 2015) despite volatile security conditions. Primary sector growth fell from 7.6% to 4.8% between 2016 and 2017, due to decreased rainfall, while tertiary sector growth has been robust (around 6% since 2014) following renewed dynamism in the ICT sector. On the demand side, investment has grown sharply by 8%, partly as a result of the increase in private investments for the first time since 2012, and partly as a result of the Government's efforts to reduce infrastructure gaps. (World Bank, 2018c)

4.2 Income and Poverty

Mali has a population of nearly 16.5 million (2015). Although 57% of the population lives in rural areas, the urbanization rate is 4.8%, demonstrating a significant rural exodus, resulting from a lack of work, education and access to land. Poverty is a more rural phenomenon in Mali: 53% of the rural population is poor against 28.5% of the urban population. Farmers and agro-pastoralists constitute the poorest socio-professional category, with a poverty rate of 57%. The poor living in rural areas are concentrated at 90% in the south of the country, where the population density is the highest (more than 25 inhabitants / km² against 1 inhabitant / km² in the north) (IFAD, 2019).

With immense security and developmental challenges, Mali is one of the poorest countries in the world. Gross Domestic Product (GDP) of roughly \$12 billion (2014) and GDP per-capita of \$1,700 (2014). With just over



50% of the population living in extreme poverty on less than \$1.25/day and a life expectancy of 55 years, Mali ranks 176 out of 187 according to the 2014 United Nation's (UN) Human Development Index. Historically, Malians have faced numerous obstacles such as lack of education and economic opportunities, chronic malnutrition and food insecurity, an inadequate health care system, endemic corruption and weak institutions, and recurring insecurity due to conflict. In the post-coup era, Mali has formed a new government and has received increased focus and support from the international community. This presents an opportunity for Malians to confront these challenges and to forge a new future. (USAID, 2014b)

The economy of Mali is dominated by family-type agriculture. After the military and political crisis that began in 2012, Mali experienced a good economic recovery, with growth of 6.8% in 2014, and 7.6% in 2015 (IFAD, 2019). The medium-term outlook remains favourable even though the country is exposed to volatile gold and cotton prices, and the risk of the climate of insecurity spreading from the north and centre to the south of the country. The economy of Mali remains vulnerable: with one of the Gross Domestic Products (GDP) per capita (2,200 USD) among the lowest in the world (204th position).

Mali is one of the sub-Saharan countries to have achieved MDG 1 "No poverty", but the 2012 crisis eroded household living conditions. The country ranks only 182nd out of 189 countries in 2018 according to the Human Development Index. Mali risks not achieving the Sustainable Development Goals (SDGs), and in particular SDGs 1, 2 and 13 ("No poverty", "Zero hunger" and "Measures relating to the fight against climate change"), as well as SDGs 5 ("Gender Equality") and 7 ("Clean and affordable energy") (<u>IFAD, 2019</u>).

4.3 Nutrition

Food security and nutrition have improved significantly in Mali in recent years. However, food insecurity and chronic malnutrition remain endemic problems resulting from poverty. In addition, according to the 2017 National Food and Nutrition Security Survey, 25.6% of Malian households are food insecure (mainly in its moderate form 22% and 3.6% for the severe form). In rural areas, access to health services and drinking water are limited, with 14% and 56% respectively access to these services (IFAD, 2019)..

The rapid growth of the population, in a context of climate change and degradation of natural resources, are very serious challenges in the medium and long term to ensure food security in Mali. Thanks to the development of the agricultural sector resulting from sectoral policies, cereal and rice production in particular have increased considerably. Animal husbandry is also an important component of the agricultural sector, but the consumption of animal protein, particularly milk, remains limited (38 L / year / person)(IFAD, 2019).

In poor rural areas, 57% of households still suffer from periods of famine (4.4 months on average) (IFAD, 2019). In addition, the variable availability of cooking energy in poor families sometimes limits the amount of hot and well-cooked meals in the household. Micronutrient deficiency is a common phenomenon in Mali. While the universal salt iodization strategy has greatly improved the iodine deficiency problems of the population, vitamin A deficiency is still considered a public health problem among women. Anemia, on the other hand, remains a public health problem in young children and women. Thus, even if the availability of food has increased in recent years, the poor diversification of the foods consumed and the persistence of periods of scarcity among the most vulnerable populations are still challenges to be overcome to ensure food security and put an end to food consumption. malnutrition in Mali.

4.4 Gender

Women represent 50.3% of the Malian population, with a higher unemployment rate than men (24.5% of the inactive population) (IFAD, 2019). In the agricultural sector, 63.7% of working women are part of the sector and are responsible for at least 70% of food production. In this sector, the social division of labour is an important limiting factor. Indeed, women who are destined to work in food crops (family subsistence) are at a disadvantage compared to men who are more active in cash crops. Illiteracy is higher among women than among men, and literacy rates are around 38.8% among young women compared to 56% for young men.



Access to land still shows persistent inequalities, as does access to agricultural equipment which remains very limited for them (less than 20%) (IFAD, 2019).

4.5 Temperature, Rainfall, Seasons and Agro-Climate Zones

Mali has two seasons: a dry season that lasts 9 months in the north (October to June) at 6 months in the south (from November to April) and a wet season that lasts 3 months in the north and 6 months in the south. (RdM, 2011). The topography of Mali ranges from desert sand plains in the north to the great alluvial plain of Inner Niger Delta. In the north, the topography is characterised by the predominance of plateaus and sandy plains. The northeast is characterised by an extension of sandstone massifs of the Sahara central. The valleys of the massif open to the Tamesna Plain to the east, to the Telemsi Trough to the west, to the western basin of the Azaouak valley to the south, and Tanezrouft to the north. The center of the country is dominated by a vast alluvial plain, namely, the inner delta of the Niger River. In the Goundam area, the dunes and small rocky hills meet the plains of the delta where the lakes have formed. A second category includes plains stretching across the eastern delta between the northern loop of Niger and the Dogon plateau, in the south, it is known as Gourma. At this level, we can observe fixed and isolated dune chains emerging from rocky plains or sandy. Incomes and poverty. (RdM, 2011)

4.6 Agriculture and Rural Livelihoods

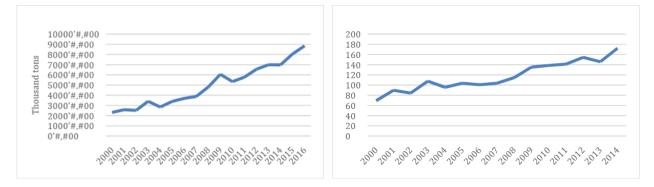
Dominated by family-type agriculture, the agricultural sector in Mali represents 39.4% of the GDP with 60% of the sector represented by crop production, 36% by livestock and 6% by fishing (<u>IFAD</u>, 2019).. The cultivated areas represent 4.8 million hectares, or 4% of the territory. Most of the farms are small (58% of farms are less than 5 ha) and are based on mixed cereal crops and livestock. The main crop productions are: millet, sorghum, maize, rice, peanuts and cotton. Cereal production is mainly intended for own consumption, with a proportion of 20% which is marketed. Livestock farming is very widespread: 87% of farms have at least one animal, the presence of livestock being more important in the north of the country than in the south. There are two main farming systems, the sedentary and the transhumant. The largest livestock numbers are found in the regions of Kidal (20.47 Tropical Livestock Units - UBT), Kayes (12.21 UBT), Sikasso (11.25 UBT), Gao (9.74 UBT) and Mopti (7.19 UBT). Low productivity, gradual decline in soil fertility, crop and post-harvest losses, water availability issues, underdeveloped markets, and vulnerability to climate change are some of the main challenges affecting the sector.

The main constraints in the agriculture sector are the lack of innovative technologies, irrigation, and private storage and infrastructure, combined with food price volatility (FAO, 2017a). In Mali, 26% of the population has access to electricity, leaving 11 million people off the grid, mostly in rural areas. Rural electrification rates increased from 1% in 2000 to around 9% in 2017. Energy use at farm level is still heavily dependent on human labour (IFAD, 2019). Besides, the country's adverse climatic conditions, along with its political and institutional instability, threaten key sectors of agriculture and health. Mali consists of two main regions (North and South), each with different conditions for agricultural production. The North is the region most challenged by drought, desertification and population migration. Mali's population sustains itself on small-scale, rainfed subsistence agriculture and pastoralism. (FAO, 2017a).

The use of mineral fertilisers is widespread in cotton growing areas. As their cost continues to increase, producers tend to turn more to organic fertilization. In general, the majority of farms use insufficiently decomposed organic manure, resulting in insufficient fertilization and low crop yields. In addition, there is the small volume of compost or manure pits, which often contain too much non-recyclable waste. Finally, there is a lack of knowledge on the different types of composts (from digestate or other materials), the quantities to be applied depending on the crops and soils. Land pressure is growing in southern Mali and there is therefore an increased interest from farmers in maintaining the fertility of their fields. In addition, women need to produce their own compost for market gardening, which is widely practiced in the targeted project area (IFAD, 2019).



Table 28 Total cereal production and crop production index Mali (World Bank, 2018a)



4.7 Climate Change: Temperature

Mean annual temperature has increased by 0.7°C since 1960, an average rate of 0.15°C per decade. The rate of increase is most rapid in the hot, dry season, AMJ, at 0.25°C per decade, but there is no evidence of a warming trend in the driest season, JFM. Despite the observed increases in mean temperature, the frequency of days that are classed as 'hot' has not increased significantly in most seasons. The frequency of nights that are classed as 'hot' has increased significantly in all seasons except winter, DJF. The average number of 'hot' nights per year increased by 55 (an additional 14.9% of nights) between 1960 and 2003. The rate of increase is seen most strongly in JJA when the average number of hot JJA nights has increased by 5.7 nights per month (an additional 18.7% of JJA nights) over this period. The frequency of 'cold' days has decreased significantly only in summer (JJA). The frequency of cold nights has decreased by 31 (8.6% of days). This rate of decrease is most rapid in MAM when the average number of cold MAM nights has decreased by 3.0 nights per month (9.7% of MAM nights) over this period. (UNDP, 2015e)

Projections on temperature: The mean annual temperature is projected to increase by 1.2 to 3.6°C by the 2060s, and 1.8 to 5.9°C by the 2090s. The range of projections by the 2090s under any one emissions scenario is 1.5- 2.5°C. The projected rate of warming is similar in all seasons and regions of Mali. All projections indicate substantial increases in the frequency of days and nights that are considered 'hot' in current climate. Annually, projections indicate that 'hot' days will occur on 18-38% of days by the 2060s, and 22-54% of days by the 2090s. Days considered 'hot' by current climate standards for their season are may increase most rapidly in JAS, but the range between model projections is large, occurring on 30-91% of days of the season by the 2090s. Nights that are considered 'hot' for the annual climate of 1970-99 are projected to occur on 23-40% of nights by the 2060s and 27-54% of nights by the 2090s. Nights that are considered to increase most rapidly in JAS, occurring on 47-95% of nights in every season by the 2090s. Projected increases in hot days and nights are more rapid in the south of the country than the north. All projections indicate decreases in the frequency of days by the 2090s, and cold nights less than 3% of nights. Cold days and nights do not occur at all by the 2090s time in some projections. (UNDP, 2015e)



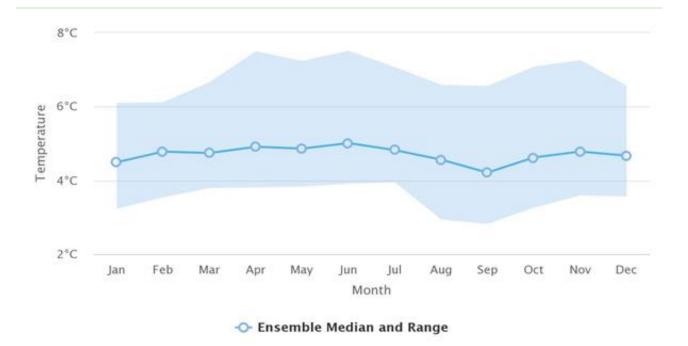


Figure 27 Projected Changes in Monthly Temperature for Mali for 2080-2099 (WB, 2020)

4.8 Climate Change: Precipitation

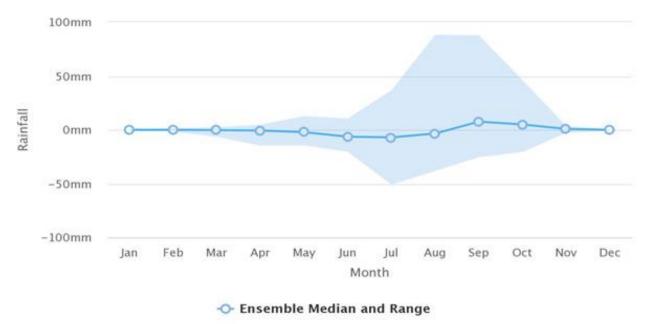
Sahelian rainfall is characterised by high variability on inter-annual and inter-decadal timescales, which can make long-term trends difficult to identify. A period of particularly high rainfall occurred in the early 1960s, whilst the early 80s were very dry, causing widespread dry in Mali and other Sahelian countries. Rainfall in Mali has recovered to some extent since the 80s, and the late 90s and early 00s have been relatively wet. Daily rainfall observations indicate statistically significant decreasing trends in 5-day rainfall maxima since 1960. Annual 5-day rainfall maxima have decreased by 4.0mm per decade since 1960. The largest decreases are seen in the wet season (JJA) of 4.9mm per decade. (UNDP, 2015e)

According to the 2020 WB data, the mean annual temperature has increased by 0.7°C since 1960, an average rate of 0.15°C per decade. The rate of increase is most rapid in the hot, dry season, April through June. Droughts have become more frequent, especially in the northern areas, which have seen increased migration.

In general, the average rainfall for 1951 - 1970 varied between 95 mm in the North and 1380 mm in the South-West and from 1971-2000 it fluctuated between 70 mm in the North and 1112 mm in the South: a decrease of 24.6 mm in the North and 179.2 mm in the South in half a century. Climatic trends show: i) a regular decrease in the amount of rain, and a large spatio-temporal variation, ii) a random distribution of rainfall at the start and end of the rainy season; iii) the persistence of droughts from the 1970s leading to fairly significant rainfall deficits and a displacement of isohyets of around 200km towards the south, which means that migration has increasingly become a strategy in the face of these new climatic conditions and precarious environmental issues (IFAD, 2019).

Projections on precipitation: Projections of mean annual rainfall averaged over the country from different models in the ensemble project a wide range of changes in precipitation for Mali but tend towards decreases. Projected change ranges from -22 to +25% by the 2090s, with ensemble means between 0 and -11%. Proportionally, decreases are largest in the north of Mali. The largest decreases in total rainfall, however, affect the southwest corner of Mali in the wet season, JAS. The changes proportion of total rainfall that falls in heavy3 events range widely between increases and decreases. However, annually, these values tend to increase in the south of the country, but to decrease in the north. Decreases are largest in AMJ and increases are largest in OND. 1- and 5-day rainfall maxima in projections also tend towards slight increases in JAS and OND, and





decreases in AMJ. The range of changes in projections from the model ensemble, is however, covers both increases and decreases in all seasons. (UNDP, 2015e)

Figure 28 Projected Change in Monthly Precipitation for Mali for 2080-2099 (WB, 2020)

4.9 Climate Change Impacts: Climatic Hazards and Extreme Events

Like the other Sahelian countries, Mali is facing the effects of climate change which materialise in a deterioration of climatic conditions: i) gradual decrease in rainfall (22% decrease in rainfall by 2100), ii) temperature increase (+ 3°C by 2100) leading to an increase in potential evapotranspiration; iii) reinforcement of extreme events, droughts and floods. These effects as well as the climatic vulnerability of the communities will have a negative impact on its economic development: i) potential drop in yields between 5% and 17% respectively for maize and wheat; ii) increase in late bush fires representing 63% of burnt areas and impacting the availability of pasture resources; iii) loss of productive capital linked to flooding, currently 12,000 ha flooded and 26,000 head of cattle in 2017. These increasingly unfavorable climatic conditions weaken ecosystems and the development of productive activities by amplifying the phenomena of erosion and desertification, making family farming even more vulnerable. Indeed, the effects of climate change alter the livelihoods of populations in the long term by acting on the productive potential (fertility, soil, water). According to the National Climate Change Strategy (SNCC), climate change threatens key sectors of the economy, namely: agriculture, livestock, fishing, forests, energy, health and infrastructure. Agriculture, which represents 45% of the Gross National Product (GNP) and employs 80% of the population, is the most sensitive sector and the most affected by climate change (IFAD, 2019).

Projections on climate impacts: While the projections of changes in precipitation are unclear, certain impacts can be expected. Increasing temperatures will cause greater evapotranspiration, which will lead to drier soil conditions in many areas and coupled with an increase in demand means water availability is likely to decrease regardless of whether there is an increase or decrease in precipitation. The decrease in water availability may make conflict between agriculturalists and pastoralists more likely. Strengthening the synergies between agricultural and pastoral practices, for example through the traditional practice of allowing grazing for fodder on cultivated land, will help to avoid conflict. (weADAPT, 2016)

Climate change is also expected to increase variability and the incidence of extreme weather events, such as droughts, floods and intense rainfall events, and without improved planning and management, the incidence of disasters can be expected to increase. This may increase the frequency of floods in the country, which



would destroy crops and property, increase erosion of already fragile soils, and require dams to cope with greater flows of water. Health is likely to be affected by increased maximum temperatures, an increase in diarrheal disease if floods become more frequent and possibly longer-term conditions related to mal-nutrition depending on the effect that climate change has on food security. (weADAPT, 2016)

4.10 Climate Change Impacts: Lives and Livelihoods

Mali is highly dependent on the primary sector, which employs 83% of the population, and comprises 50% of the GDP (footnote 6), and as such is particularly vulnerable to the impacts of climate change. Without adaptation measures there are likely to be adverse effects on agriculture associated with these changes in climate, although the extent of the effects varies greatly depending on different projections for precipitation. The costs of climate change have not been calculated for Mali, and it would be difficult to do so given the uncertainties in climate projections. The Stern Review, however, indicates that for developing countries the costs could be in excess of 10% of GDP with a warming of 5-6°C. It is also difficult to estimate the effects of climate change on the informal economy, which plays an important role in the livelihoods of many Malians, and there is a lack of information on the impacts on urban areas. What is clear, however, is that already vulnerable, poor rural groups will be particularly affected by the impacts of climate change and that climate change will need to be integrated in development planning in Mali if the ambitious growth plans set out by the government are to be met, in particular as the majority of this growth is based on natural resource exploitation. (weADAPT, 2016)

4.11 Climate Change Impacts: Agriculture

Livestock, an indicator of wealth and food security in many households, is likely to suffer heat stress and reduced production from rising temperatures (Climate Risk Profile Mali, 2018). Desertification and drought, along with expansion of armed groups in the north, have altered pastoralists' range and pasture access, contributing to increased herder–farmer conflict. Higher temperatures and lower rainfall may lead to decreased vegetation, affecting grazing potential and fodder production. Climate change will also impact the range and incidence of pests and diseases afflicting livestock. A hotter, wetter climate may expand the range of Rift Valley fever in some areas (with particularly adverse effects on sheep) and increase transmission risk for African swine fever. A hotter and drier climate, however, may lead to increased poultry losses as a result of more frequent outbreaks of Newcastle disease and increased risk of avian flu, as well as higher exposure to anthrax as reduced water availability drives larger numbers of livestock to graze in dry flood zones or contaminated watering ponds (Climate Risk Profile Mali, 2018).

4.12 Climate Change Impacts: Natural Capital

Climate change may lead to a range of potential ecological implications, such as increases in dry season river flows and flooding that facilitate expansion of invasive species, or beneficial expansion of the floodplain fish nurseries (Climate Risk Profile Mali, 2018). Climate changes and population growth affecting the spatiotemporal inundation patterns of the IND in turn have an impact on food production and food security. For economically important inland fish species like characin and perch, rising temperatures alter water quality and dissolved oxygen content in lakes, harming fish reproduction, survivability, and virility. Rainfall variability and drought can lower water levels of tributaries and prevent seasonal fish migrations to rich flood plains for feeding and breeding. Beyond potential impacts to the IND, higher temperatures and lower rainfall may lead to decreased density of tree and shrub species. This vegetation is not only important for soil and water conservation, but also a significant source of construction material and fuelwood. This impact is further exacerbated by the southward shift of vegetation zones (Climate Risk Profile Mali, 2018).



4.13 Climate Change Impacts: Water

Climate impacts on water resources are varied. A drop in groundwater levels as well as an increase in the coefficient of runoff for small ponds. Quantitative and qualitative reduction of water resources. Increasingly low water levels in rivers (early drying up of water points such as ponds, wells, etc.). Start and difficult end of the rainy season, pockets of drought (water deficit) during the rainy season, decreasing the length of the season (the number of days rainy) of agricultural production, rural exodus. Decrease in the number of rainy days and increase in rainfall intensity translating into floods in most cases. (RdM, 2011). Prolonged droughts and lack of rainfall have imposed limitations on water availability to communities throughout Mali. Estimates from a case study by N'Djim and Doumbia predict a 52% decline in per capita freshwater supplies by 2020 primarily due to projected decreases in precipitation and future population growth. Even as overall rainfall decreases, climate variability and the likelihood of extreme events are anticipated to increase with climate change. This may result in greater frequency and intensity of heavy rainfall events and storms such as those seen in the country in the 1960s, 1990s, and 2000s, which caused floods, contaminated surface and groundwater, and caused siltation of surface water sources. In areas like the Niger River flood plain, heavy rainfall events during the rainy season can lead to overflows of the Niger River and intense flooding, causing a loss of lives and livestock, destruction of settlements and infrastructure, and land erosion. Non-climate stressors such as pollution, inadequate management of irrigation systems, sedimentation, and siltation also threaten water resources in Mali. (USAID, 2012)

4.14 Climate Change Impacts: Health

Rising temperatures and more frequent heat waves also increase exposure to heat stress, which can have both direct impacts on human health (e.g., heat rash, heat stroke) and indirect impacts (e.g., heightened food insecurity and malnutrition resulting from crop failure and decreased livestock productivity) (Climate Risk Profile Mali, 2018). Mali has high rates of diarrheal disease because only 25% of the population uses improved sanitation facilities and only 77% uses piped water or other improved drinking water sources. Although the incidence of diarrheal disease declined 32% from 2005 to 2016, higher temperatures and increased flood risk may increase transmission of pathogens. Southern Mali lies in the "meningitis belt," characterised by seasonal epidemics during the dry season. Although the exact linkages to climate have not been isolated, risk factors include dust and low humidity— both of which may increase in a drier, hotter climate. Twenty-five% of Malian families are considered moderately to severely food insecure, and one in three children under the age of five is affected by stunting. Malnutrition also increases susceptibility to other diseases. Decreased agricultural production as a result of climate stressors may lead to increased household food insecurity (Climate Risk Profile Mali, 2018).

4.15 Climate Change Impact: Vulnerability Mapping

Generally, vulnerability proceeds in a south-north gradient, with lowest vulnerability in the extreme south and around Bamako, and gradually increasing vulnerability northward with the exception of some areas of moderately low vulnerability in the Niger Delta and along the Niger River. In this map, we have also included inset maps (Figure 8, bottom) that provide information on uncertainty levels in the DHS and climate data that provided the basis for seven out of 18 indicators. Although uncertainty levels cannot be assessed for all data sets, what these insets show is that error levels for the DHS and climate data are higher in regions to the west of Bamako and in the North owing to spatial gaps in measurements for both data sources (i.e., DHS sample clusters and meteorological stations). Results are more robust in areas that are white or lightly shaded in both inset maps; conversely, users should be more cautious about results in areas that are dark in both maps. Note that these maps reflect spatial gaps in measurement rather than measurement error per se (e.g., problems of survey design or instrumentation). (USAID, 2014a)



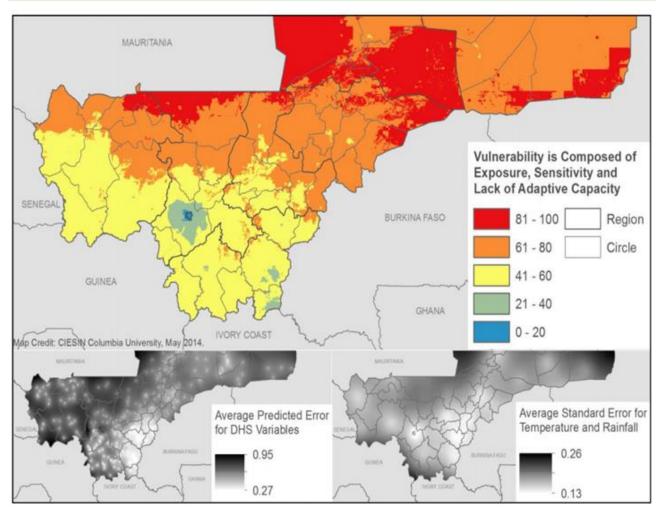


Figure 29 Climate vulnerability Index for Mali (USAID, 2014a)

Approximately 40% of Mali's population resides in areas classified as medium vulnerability, and 32% reside in medium-high vulnerability. Only 6% reside in areas of highest vulnerability, and the population density in these mostly northern regions is only 7 persons per sq. km, compared with a density of more than 3,600 persons per sq. km for the low vulnerability category. The area of the lowest category is only 600 km², and is confined to Bamako and its environs. The medium-high category comprises the largest area at almost 310,000 km², or roughly one quarter of Mali's total land area. Two of the adaptive capacity indicators, the health infrastructure index and market accessibility, are highly correlated with population density, and hence it should be noted that the vulnerability index is not completely independent of population distribution. (USAID, 2014a)

4.16 Suggested Geographies and Sectors for Intervention for Climate Change Adaptation

Table 29 Adaptation Options by Sector for Mali (RdM, 2007)

Sector	Adaptation mechanism	Description
Forestry	National Programme to Combat Desertification	



Sector	Adaptation mechanism	Description
	Home Energy Strategy (SED)	The main objective was to contribute to the protection of the environment and the fight against desertification by limiting the removal of woodfuel to the actual regeneration capacity of the forest formation. It should be noted, however, that the results of the SED have been the subject of much controversy.
	Water supply	Focus on the control of surface water such as small dams the development of ponds and small watercourses at the village level, the creation of artificial ponds.
Water	Drilling	Development operations for the recharge of the water table, the operations of deepening wells. The costs of implementing these facilities and equipment are generally beyond means of the populations, which required a strong involvement of the state and partners in development in their implementation.
	Watering courses and public places	
	Disaster prevention	Assessing the actual impacts of climate change and variability on the health and well-being of the Malian population and the development of warning plans for extreme weather conditions in order to prevent their effects on the population.
	Awareness raising	Training, awareness, information and communication on the effects adverse effects of climate change on the health and well-being of the population.
Health	Vaccination and immunization	Vaccination campaigns for the whole population and immunization campaigns against the main epidemic pathologies such as malaria, meningitis, and measles. Further, temporary closure of schools during periods of epidemic.
	Dissemination of information	The transmission of information from mouth to mouth, by letter, through the traveller's channel, etc.
	Travel restrictions	Travel restrictions and visits to patients in the same neighborhoods during periods of epidemics.
	Increasing resilience	Diversification of animal and crop production, including the use of improved species that are adapted to climate change and the creation of cereal banks.
	Capacity building	Farmer training in the use of information and advice agrometeorological, the development of provisional timetables for the implementation of main cultural interventions and the establishment of a database in rural areas. This also entailed the reinforcement of innovation capacities and education and training on the importance of hygiene and sanitation.
	Reconciliation and communication	Reconciliation and improved communication help people who compete for the same resources to use these resources effectively and peacefully.
Agriculture	Intensification and improved inputs	The use of improved seeds and other inputs, as well as agricultural intensification, will help farmers to cope with climate change effects.
	Provision of security	Provision of security stocks free of charge or at a reasonable price to provide access to those in need when it is most needed.
	Use of adapted crop varieties	To cope with the deficit and the poor distribution of rainfall, many farmers use varieties whose short cycle corresponds to the water availability and water requirements are lower.
	Agrometeorological assistance	Rainfall problems led the National Meteorological Directorate to put implement a programme of assistance to the rural world. This assistance concerns the awareness raising.



5 MAURITANIA

5.1 Country Background

Mauritania is a vast Sahel-Saharan country of 1,030,700 km², of which more than 2/3 are desert. Its multicultural population, primarily nomadic in origin, has become highly sedentary; it was estimated in 2020 at 4.4 million inhabitants with an urbanization rate of over 60% (WB data, 2018). Women constitute 52% of the population. With a sustained total fertility rate of about 4 children per woman and almost 60% of the population under the age of 25, Mauritania's population is likely to continue growing for the foreseeable future. Mauritania's large youth cohort is vital to its development prospects, but available schooling does not adequately prepare students for the workplace. Girls continue to be underrepresented in the classroom, educational quality remains poor, and the dropout rate is high. The literacy rate is only about 50%, even though access to primary education has improved since the mid-2000s. Women's restricted access to education and discriminatory laws maintain gender inequality - worsened by early and forced marriages and female genital cutting (The world factbook/CIA, 2020).

The population is made up of three principal groups: people speaking Hassaniya Arabic and of mixed Berber-Arab ancestry (collectively known as Beydanes or White Moors); those of dark skin colour who also speak Arabic (a group known as Haratines, descended from former slaves to the Berber-Arabs, many still in servile roles); and dark-skinned people who belong to sub-Saharan African ethnic groups (mainly the Fulani – known as Peul in French – Wolof, Soninké and Bambara, herders and cultivators who mostly live in the south of the country, along the Senegal river valley). However, there are no groups recognised as indigenous peoples in the country.

Although Mauritania abolished slavery in 1981 (the last country in the world to do so) and made it a criminal offense in 2007, the millenniums-old practice persists largely because anti-slavery laws are rarely enforced and the custom is so ingrained. According to a 2018 nongovernmental organisation's report, a little more than 2% of Mauritania's population is enslaved, which includes individuals subjected to forced labour and forced marriage, although many thousands of individuals who are legally free contend with discrimination, poor education, and a lack of identity papers and, therefore, live in de facto slavery. The denial of education to Haratine (black Moors) also helps to perpetuate slavery and is a violation of Article 19 of the African Charter according to the 2009 ILO and African Commission on Human and People' Rights. The UN and international press outlets have claimed that up to 20% of Mauritania's population is enslaved, which would be the highest rate worldwide (The world factbook/CIA, 2020)..

Drought, poverty, and unemployment have driven out migration from Mauritania since the 1970s. Early flows were directed toward other West African countries, including Senegal, Mali, Cote d'Ivoire, and Gambia. The 1989 Mauritania-Senegal conflict forced thousands of black Mauritanians to take refuge in Senegal and pushed labour migrants toward the Gulf, Libya, and Europe in the late 1980s and early 1990s. Mauritania has accepted migrants from neighbouring countries to fill labour shortages since its independence in 1960 and more recently has received refugees escaping civil wars, including tens of thousands of Tuaregs who fled Mali in 2012 (The world factbook/CIA, 2020).

5.2 Income and Poverty

Mauritania remains one of the Least Developed Countries in the world, with 46.3% of the population living on less than one US dollar a day. In 2017, the country has a Gross Domestic Product (GDP) of \$2.16 billion; it has a population of 4.4 million people with a population growth rate at of 2.7%. The country has experienced highly volatile, yet positive growth rates since 2010. The country's GDP is led by agriculture, fishing and forestry, which accounts for 22.9% of GDP and the industry sector (including mining, construction, electricity, water and gas), which contributes 28.7% of GDP (WB, 2020).



Mauritania's Human Development Index (HDI) increased from 0.487 to 0.527 between 2014 and 2019, but still remains below the average for sub-Saharan Africa at 0.541. With a population growth rate of around 2.8%, the growth of the economy is proving insufficient to promote social safety nets on a large scale likely to achieve the objective of sustainable development aimed at eliminating extreme poverty (IFAD, 2019). During the period of strong growth induced by the mining boom in particular between 2008 and 2014, poverty fell considerably from 42% to 31%, then stagnated thereafter with the crisis. This reduction was stronger in rural areas with an average annual rate of 2.5% against only 0.7% in urban areas. The current situation in rural areas is characterised by fairly marked levels of poverty and malnutrition (25.1% and 23%). While poverty reduction almost froze in 2017, the absolute number of poor people continues to increase.

With a debt ratio of over 97% of its GDP, Mauritania is included in the category of countries at high risk of debt distress according to the criteria of As part of the Accelerated Growth Strategy and of shared prosperity (Scapp 2016–2030). Thanks to the ongoing reforms, the prospects for development and improving the living conditions of the populations are promising; Mauritania ranks 159th in the UNDP's human development index in 2018, and gained 26 places in four years in the Doing business ranking, positioning itself 150th out of 190 economies studied in 2017. This recovery remains fragile, however, as liquidity constraints on the domestic market continue to dampen the growth momentum. This is estimated at 3% in 2018, mainly due to the delayed effect of the drought episode on agriculture. Growth prospects are based on a series of structural measures that the Government has committed to undertake as part of its reform programme. GDP growth is expected to gradually rebound and reach 5.2% by 2020. This recovery is projected on the basis of an anticipated rebound in commodity prices, the increase in foreign direct investment (FDI) in the extractive sectors. , and continued reforms in the fisheries and agriculture sectors, including livestock.(IFAD, 2019)

A recent government study, funded by IFAD (2016), shows that literacy levels in rural areas remain low among adults (29 per cent for women and 35 per cent for men) and youth 15 at age 24 (40% for girls and 47% for boys). (FIDA, 2017). Men mostly head Mauritanian households: more than two thirds (68%) of heads of households are men against 32% of women. The analysis of poverty by sex of head of household shows an advantage in favour of female-headed households83. Indeed, 23.2% of households headed by men are poor (72.7% of poor households and 16.2% of all households), compared to 20.2% of households headed by women. (i.e. 27.3% of poor households and 6.1% of all households). (FIDA, 2017)

5.3 Nutrition

The household food security monitoring survey (FSMS) in 2017 estimated that 28% of Mauritanians were in a situation of food insecurity, including 5.7% in severe food insecurity. The majority of food insecure households reside in the agro-pastoral zone, the rain-fed crop zone and in the Senegal River valley. The poor rainfall in 2014 and its consequences on agricultural production, animal husbandry and agricultural labour are the main causes of the increase in food insecurity in all areas of the country. Poor rural households faced a longer and more difficult lean period in 2018 than in the average year, since January (instead of March / April), due to large deficits in agricultural production and pasture, as well as difficulties of access to water and income. Global acute malnutrition (Mag) rates jumped for the year 2018, particularly in Guidimakha and Hodh Chargui with respective rates of 17% and 13% (IFAD, 2019).

5.4 Gender

Women's poverty in Mauritania manifests itself in different forms, including difficulties in accessing work and factors of production (land, livestock). The condition of women is even more constraining in rural areas given the inadequacy of basic socio-economic infrastructure. In addition, the Mauritanian economy offers few job opportunities. Although the drop in the unemployment rate has been notable since the start of the mining boom in 2006, this drop masks a continuing decline in the labor force, especially among women and young people, which can have a negative effect on earnings in terms of employment. poverty reduction. This situation highlights the need to invest in human capital and reform social safety nets not only to protect the poorest



populations and the most vulnerable to shocks and reforms, particularly in times of stagnation, but also to provide them economic opportunities (IFAD, 2019).

5.5 Temperature, Rainfall, Seasons and Agro-Climate Zones

The country is located in the Sahelian climatic zones (annual rainfall between 200 and 400 mm), the main agro-pastoral zone of the country and Sudano-Sahelian (annual rainfall between 400 and 600 mm) of the south eastern end of the country (Guidimakha). The rainfall pattern is monomodal with an 8-month dry season (November to June). The air masses that sweep the country are made up of three main currents that blow throughout the year: the sea trade, the continental trade and the summer monsoon. The air masses carrying precipitation are the maritime trade winds and the monsoons. These air masses are responsible for the erosion phenomena (IFAD, 2019).

Mauritania has a dry, hot and windy climate, and is severely exposed to the effects of desertification. The majority of Mauritania receives very little rainfall throughout the year. The country's southern edge, which reaches the Sahel, has a wet season controlled by the movement of the Inter-Tropical Convergence Zone (ITCZ) which oscillates between the northern and southern tropics over the course of a year. The country's mean monthly temperature stay above 25°C year round with the hot season occurring from May to October, with peak mean monthly temperatures reaching 33°C in June and July (WB, 2020).

5.6 Agriculture and Rural Livelihoods

Mauritania is strongly influencing agricultural production systems. The latter can be divided into 5 categories:

- The system of extensive rainfed culture in sandy zone or "diéri"
- The culture system behind dams and lowlands
- Natural or controlled flood systems walo
- The oasis system and
- Irrigated agriculture in total water control. (FIDA, 2017)

The contribution of the rural sector to the formation of GDP averaged 25% during the period 2005-2010, of which 11% for the crop production sub-sector, 9% for the livestock sub-sector and 5% for the fishing subsector (World Bank, 2016) 60. The average annual GDP growth of the primary sector over this period was 4.1% per year, with significant year-to-year differences due to erratic rainfall. (FIDA, 2017). More than half of Mauritania's 3.89 million people earn a living from agriculture and livestock. However, domestic cereal production in this arid country only meets about one-third of the national food needs, forcing a reliance on imports, especially for sorghum, millet and wheat. Food prices soared in 2008 and continue to be volatile. This, combined with poor rains in 2011, which slashed agricultural output by two-thirds, pushed more farmers and pastoralists into poverty and hunger. Although cereal production has rebounded in recent years, with bumper crops registered in 2012 and 2013, food security remains shaky in parts of the country, particularly in areas where unpredictable rains in 2013 affected crops and grazing land. The presence of tens of thousands of Malian refugees, who fled violence in their own country, has further strained Mauritania's limited resources. (FAO, 2018)

The fish industry is also an important economic sector, representing 10% of the country's GDP and between 35-50% of its exports. It is estimated that artisanal fishing provides employment for 31% of the population. Although industrial fishing is responsible for 90% of catches, it creates jobs for only 12% of the population and adds little value to the Mauritanian economy. The country's EEZ hosts a rich variety of demersal fish (over 400 species have been counted, of which 100 are commercially valuable); pelagic fish (including deep sea fish, such as tuna and swordfish); molluscs (including cephalopods, such as octopus, cuttlefish, squid) and crustaceans (shrimp, lobster, crab) (CDB, 2011-2020).

Formerly classified as the second largest producer of gum Arabic (Acacia Senegal) in the world, Mauritania now produces 500 tons annually, down markedly from 5,700 tons produced annually in the late 1960s/early



1970s. The production of dates has become a highly valued economic activity for the country (in oasis areas, agriculture is essentially based on the date palm with over 200 palm cultivars counted) (CDB, 2011-2020).

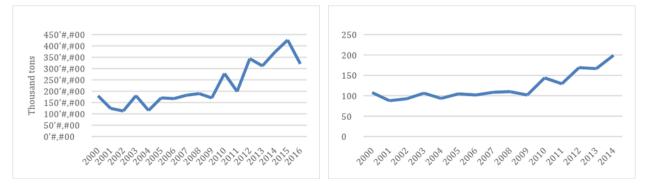


Figure 30 Total cereal production and crop production index Mauritania (World Bank, 2018a)

5.7 Climate Change: Temperature

Mean annual temperature has increased by 0.9°C since 1960, an average rate of 0.19°C per decade. The rate of increase is most rapid in the hot, dry season, AMJ, at 0.34°C per decade. Despite the observed increases in mean temperature, there is no evidence of observed increases in the frequency of days that are classed as 'hot'. The frequency of nights that are classed as 'hot', however, has increased significantly in all seasons except winter, DJF. The average number of 'hot' nights per year increased by 46 (an additional 12.5% of nights2) between 1960 and 2003. The rate of increase is seen most strongly in JJA when the average number of hot JJA nights has increased by 6.5 days per month (an additional 20.9% of JJA nights) over this period. The frequency of 'cold'3 days has decreased significantly only in summer (JJA). The frequency of cold nights has decreased significantly in all seasons except winter (DJF). The average number of 'cold' nights per year has decreased by 24 (6.5% of days). This rate of decrease is most rapid in JJA when the average number of cold JJA nights has decreased by 2.2 nights per month (7.1% of JJA nights) over this period. (UNDP, 2015f)

Projections on temperature: The mean annual temperature is projected to increase by 1.3 to 3.8°C by the 2060s, and 1.8 to 6.0°C by the 2090s. The range of projections by the 2090s under any one emissions scenario is 1.5- 2.5°C. The projected rate of warming is faster in the interior regions of Mauritania than in those areas closer to the coast. All projections indicate substantial increases in the frequency of days and nights that are considered 'hot' in current climate. Annually, projections indicate that 'hot' days will occur on 16-32% of days by the 2090s. Days considered 'hot' by current climate standards for their season are may increase most rapidly in JAS, but the range between model projections is large, occurring on 29-84% of days of the season by the 2090s. Nights that are considered 'hot' for the annual climate of 1970-99 are projected to occur on 19-34% of nights by the 2060s and 24-46% of nights by the 2090s. Nights that are considered hot for each season by 1970-99 standards are projected to increase most rapidly in JAS, occurring on 44-92% of nights in every season by the 2090s. Projected increases in hot days and nights are more rapid in the south and east of the country than the north and west. All projections indicate decreases in the frequency of days and nights less than 3% of nights. Cold nights do not occur at all by the 2090s in any projections under the highest emissions scenario (A2). (UNDP, 2015f)



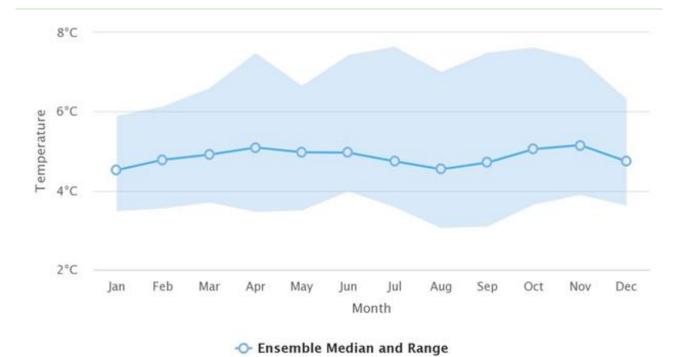


Figure 31 Projected Changed in Monthly Temperature for Mauritania for 2080-2099 (WB, 2020)

5.8 Climate Change: Precipitation

Mean annual rainfall over Mauritania has not changed with any consistent trend since 1960. Some unusually high rainfalls have occurred in very recent years (2000-2006), but this has not been part of a consistent trend. There are insufficient daily rainfall observations available from which to determine changes in extremes indices of daily rainfall. (UNDP, 2015f)

Projections on precipitation: Projections of mean annual rainfall averaged over the country from different models in the ensemble project a wide range of changes in precipitation for Mauritania but tend towards decreases. Projected change ranges from -65 to +28% by the 2090s, with ensemble means between -7 and -25%. The changes proportion of total rainfall that falls in heavy events range widely between increases and decreases but tends towards increases in the south in the wet season, JAS, and decreases in the other seasons. There is no consistent change in 1- and 5-day rainfall maxima in projections. The range of changes in projections from the model ensemble covers both increases and decreases in most seasons. (UNDP, 2015f)



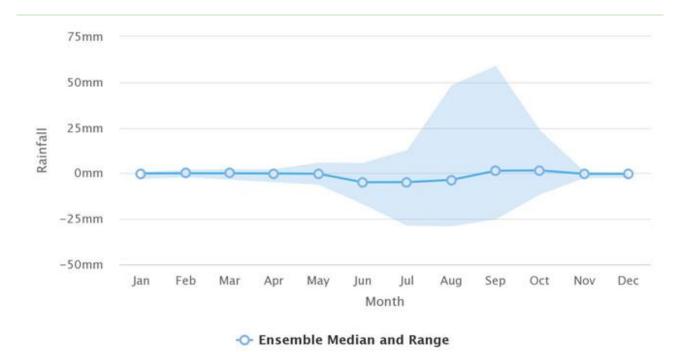


Figure 32 Projected Changed in Monthly Precipitation for Mauritania for 2080-2099 (WB, 2020)

5.9 Climate Change Impacts: Climatic Hazards and Extreme Events

Like all the other countries in the Sahel region, Mauritania experienced severe drought during the 1970s and the 1980s. The decrease in rainfall resulted in several adverse ecological, economic, social, and even cultural consequences. In fact, the drastic reduction of the vegetation increased desertification, and led to a heavy reduction of the livestock and agricultural production and triggered a process of pauperization in rural communities. These formerly nomadic communities settled either in the areas they considered most favourable (wetlands) or took part in a massive rural exodus to the main urban centres. The non-mobile and urban environment has also experienced some problems related to various forms of pollution. The quality of drinking water and sanitation has become a matter for concern regarding public health. The quality of the air in the main urban centres (Nouakchott and Nouadhibou) is being degraded by increasing quantities of vehicle exhaust fumes, all the more polluting as most of these vehicles are very old and they run on poor quality fuel. (IFAD, 2019)

Projections on climate impacts: The climate will evolve, within twenty years, towards greater aridity, an increase in the frequency of extreme weather events and a decrease in precipitation. Climate scenarios predict global warming of around $+ 2.1^{\circ}$ C by 2050 and more than $+ 4.5^{\circ}$ C by 2100; rainfall should experience a regression of between 17 to 20% compared to the reference normal for the 2050 horizon. This increase in temperature and decrease in precipitation would be accompanied by an increase in the frequency and intensity of extreme events of drought and flooding and disturbances in the seasonal distribution of precipitation (IFAD, 2019).

5.10 Climate Change Impacts: Lives and Livelihoods

Three-quarters of the Mauritanian territory is covered by Saharan desert, and the remaining one quarter is a Sahelian zone. Mauritania is therefore one of the countries most vulnerable to the effects of desertification. This is the consequence of the winds activity that sweep the country. These air masses are made up of 3 main currents blowing throughout the year: marine trade wind, continental trade wind, and the summer monsoon. The precipitation bearing air masses are the marine trade wind and the monsoon. (UNDP, 2018c)



As recently as the 1980s, 70% of Mauritanians were nomads and subsistence farmers. In the past thirty years, recurrent droughts have forced many of these people to move to the cities. But cities are finding it difficult to cope with the influx. There is high unemployment and a severe lack of social services. Almost half of Mauritania's population, and 75% of the country's poor, still depend on agriculture and livestock. And these activities generate about a third of the country's GNP. For these reasons the Government has made it a priority to make rural livelihoods more resilient to the impacts of climate change. Mauritania's Programme d'Action National d'Adaptation identifies desertification and its impact on land and water resources - and their impact, in turn, on livelihoods and food security - as a key issue, highlighting that pastoralism and agriculture are the most vulnerable sectors in the country (AF, 2014-2018).

The overall effect on rural incomes and rural food security can be devastating. According to FAO domestic food production has declined over the past forty years. The production index13 has fallen from 161 in 1969-71 to 97 in 2005-2007. This reduced agricultural output leads to reduced income for rural populations, thereby exacerbating poverty and decreasing their purchasing power to buy food. Poor rural households allocate up to 80% of their income to food; many have had to cut back on other expenses such as health and education, sell their assets and reduce their consumption of meat and dairy products. Acute malnutrition in children aged 6–59 months is 12.5% nationwide – well above the World Health Organisation threshold – with peaks above 18%.14 Choric malnutrition affects as much as a third of the population in the center of the country, and in the south east which is the target of the proposed project (AF, 2014-2018).

5.11 Climate Change Impacts: Agriculture

Agriculture in Mauritania, as in much of the Sahel, is poorly mechanised and almost entirely reliant on the limited and variable summer rainfall, making it highly vulnerable to climate variability and change. In dry years, the region faces serious challenges related to food security and must rely on grain purchases and food aid to meet food requirements. Delayed rains and rain deficits have been particularly pronounced for the country's agricultural zones in recent years. Mauritanian soils are generally nutrient-limited and at risk of further degradation from deforestation, overgrazing and continuous cropping. Reduced precipitation and higher temperatures is expected to increase desertification and sand intrusion. Land cover changes, primarily deforestation for firewood, also affect the moisture content of the soil and increased water stress is expected to compound reduced crop productivity (WB, 2020).

Agricultural and herding practices have always been tenuous in the country's hot, dry climate. Rain-fed and "derrière barrage" cultivation are the main cropping systems and have long been exposed to variability in rainfall. Agricultural production systems are not advanced and there is still little or no use of fertiliser. Over thousands of years, pastoralists and farmers have developed adaptation strategies to cope with variations in the weather. These principally focused on moving to areas which were less hot and dry and not overpopulated, and developing and protecting water resources. In recent years, agricultural diversification and temporary emigration and employment have been added as coping strategies. None of these strategies are as robust as they used to be as a result of climate change (AF, 2014-2018).

Degradation continues to be exacerbated by recurrent droughts, thus contributing to the expansion of the desert and reduction of cultivable area. As a result, more people are farming and herding on smaller pieces of land, there is increased competition between cropping and livestock, and farmers are increasingly using marginal soils that are sensitive to erosion. Wide scale sedentarisation is reflected in the proliferation of villages along the transhumance axes and paved roads. And among and within villages there is a widening disparity of wealth favouring those with the means to acquire land and livestock and further impoverishing crop and livestock farmers who sell to them during shocks. In short, traditional pastoralists are abandoning their nomadic lifestyle, selling their livestock and becoming destitute (AF, 2014-2018).

5.12 Climate Change Impacts: Natural Capital

The expected impacts will be mainly linked:



- To water resources: by the disruption of the wadi regime and the disruption of water flows favouring erosion, reduction of groundwater recharge, increased water evaporation surface and the disruption of the distribution of rains leading to pockets of drought and a modification of the cropping calendar;
- Pastoral resources: by the reduction in latitude of pastoral rangelands and in particular the decrease in access to pasture in the North and a shift towards the South exacerbating conflicts with agriculture, the reduction in the water table and watering, overgrazing and degradation of herbaceous resources;
- To the agricultural sector by reducing the useful agricultural area through overexploitation and the phenomena of wind and water erosion, the disruption of plant cycles, the drop in crop yields or even the loss of crops, the increase in food insecurity accentuated by the population growth rate of 2.4%; and
- Forest resources, where agricultural and pastoral pressures but also the increase in bushfires, the expiry
 of fuelwood will reinforce the degradation of the forest resource and increase the erosion of biodiversity
 (IFAD, 2019).

In the last 25 years, the country has experienced three long periods of drought (<u>CDB, 2011-2020</u>). Climate change has further exposed unprotected soil, raised temperatures and dried out wells, and compromised land management practices that were at least marginally sustainable. Since 1968, the plant growth period has decreased by 20 to 30 days.10 It is estimated that since 1970 some 150,000 km² of Mauritania has turned to desert, with populations constantly retreating from areas becoming uninhabitable. As a result, there has been a reduction of livestock and a sedentarisation of herds around large agglomerations. Animal diseases are on the rise and animal deaths are more common (<u>AF, 2014-2018</u>).

According to the FAO, forest cover has decreased at an average annual rate of around 2.7% over the last 10 years (<u>CDB, 2011-2020</u>). In the Senegal River Valley, many classified forests have gradually disappeared or seen their areas reduced due to drought and agricultural pressures. More and more of these areas are being given up to the development of hydro-agricultural schemes. A strategy for restoring protected forests has been developed however its action plan has not been implemented.

5.13 Climate Change Impacts: Water

The impacts of climate change will be significant and will result in a general decrease in water resources of around 10 to 15%, with the following consequences:

- A decrease in runoff of around 10% between 2000 and 2020
- An increase in evapotranspiration and degradation of water quality
- A decrease in piezometric levels and salinity of waters in coastal zones
- A disruption of the wadis regime and a reduction in the capacity of the rivers. dams due to concentrated precipitation and accelerated siltation by erosion
- Warmer, less aerated surface waters with lower flow rates and thus less ability to dilute and biodegrade certain pollutions, etc. (IRM, 2014).

5.14 Climate Change Impacts: Health

In Mauritania, life expectancy is less than 60 years. Twenty years of drought have caused a profound demographic transformation in this country, which is 90% desert. The nomadic population has rapidly declined, with people settling in rural areas and in shantytowns in cities where access to clean water and sanitation is scarce. The Mauritanian people faces serious health risks and many children suffer from diarrhoea and other diseases related to deteriorating environmental conditions. Around 2150 Mauritanians, including 1700 children under the age of 5 die each year from diarrhoea disease. WHO estimates that nearly 90% of these deaths are directly attributed to the poor quality of water, sanitation and lack of hygiene. (WHO, 2013).



5.15 Climate Change Impact: Vulnerability Mapping

The people of Mauritania are striving to withstand the consequences of prolonged vulnerabilities each year, punctured with crippling peak years that trigger critical humanitarian needs. Fuelled by a challenging natural environment, drought is a recurrent threat that drives chronic food insecurity, malnutrition and livelihood fragility. Rainfall has steadily declined since the 1950s, and water is retreating deeper underground. As the 23rd most vulnerable country in the world to climate change, natural hazards in Mauritania are long-term challenges that generate long-term needs. Mauritania still struggles to recover from one of the world's biggest food crises that wreaked havoc on the Sahel in 2011 and 2012. In 2017 the country was hit by a severe drought and confronted by an unusually long lean season, exhausting vulnerable communities' coping mechanisms. Over 550,000 people were driven into a food crisis and 124,000 affected by malnutrition in 2018 (Reliefweb, 2019).

Mauritania is affected by challenges stirring in the Sahel, particularly the persisting conflict in neighbouring Mali. The 57,000 Malians who fled to Mauritania require humanitarian assistance to survive. From January to July 2018 alone almost 7,000 migrants arrived in Nouadhibou, as per governmental sources. In recognition of these and other complicating factors, Mauritania is included in the UN Support Plan for the Sahel as part of the United Nations Integrated Strategy for the Sahel (UNISS) framework. Compounding these issues, the population is expected to double by 2039, and there is a growing youth demographic bulge with limited livelihood options. With thousands of children outside the formal education system,3 young people searching for opportunity are at risk of radicalization (Reliefweb, 2019).

Further pressure on food security and nutrition is expected in 2019. Successive years of biomass deficits, low and poorly distributed rainfall, have strained resources and resilience and depleted assets, and the alert has been raised that Mauritania may face an early pastoral lean season5 for the second year in a row. Although some regions have received average rainfall with better distribution in comparison with last year, the situation remains difficult for certain areas in the southwest that experience extended periods without rain. Significant biomass deficits are observed in the northern areas of Trarza, Brakna, Assaba, Tagant and the northeast of Gorgol (Reliefweb, 2019).



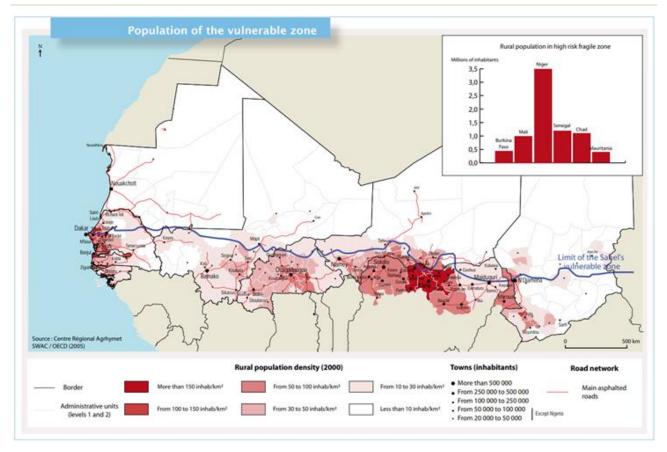


Figure 33 Population in the vulnerable zone of the Sahel area (OECD, 2006)

5.16 Suggested Geographies and Sectors for Intervention for Climate Change Adaptation

Table 30 Adaptation Options by Sector for Mauritania (IRM, 2004)

Sector	Adaptation mechanism	Description
	Substitution of ligneous fuel	Raise public awareness of the necessity of using butane gas instead of wood and charcoal. Provide affordable butane gas and help the people (particularly those in rural areas and the outlying suburbs of the big urban centers). Develop income-generating activities to redeploy people who had been engaged in the business of selling wood and charcoal.
Forestry	Reinforce nature conservation	The general objective is to develop the capacities of the institution responsible for the protection of the environment so as to help it to fulfil its mission. The specific objective is that the institution responsible for the protection of the environment is able to fulfil its mission.
	Improvement of knowledge of the resource and its sustainable management	To carry out a review (plant formation, large wetlands, use of these formations, evolutive trends of these formations) and socioeconomic studies. Initiation developments for Mauritanian forests to promote sustainable use and improvement of the current state of plant formation.
Water	Demand management	Contribution to a better knowledge of the surface water regime and support for the dissemination of new irrigation technologies. Establishment of networks of operational measures and publication of monthly news bulletins during the rainy season.
	Monitoring	Improvement of monitoring of the piezometric networks of water tables and monitoring of quality of the water.



Sector	Adaptation mechanism	Description
	Water management	Improvement of management of the resource and the experimental use and extension of the new adapted technologies. Carry out community awareness and activity campaigns on the use of water. Establish protection zones around water supply points. Make people participate in paying for the cost of water cost through the local communities. Organise the beneficiary communities into water point committees with manual pumps. Sign maintenance contracts with the National Agency for Drinking Water and Sanitation (NADWS) responsible for the thermal and solar DEP and SPM networks.
Health	Water control	A mobile water control laboratory supplied by WHO to Mauritania, two years ago, is an important resource to monitor water quality in the most remote rural areas. (WHO, 2013)
	Cleaner schools	In the El Baraka School in the capital city of Nouakchott, for example, water basins have been installed and advice provided on handwashing and hygiene in classrooms and toilets. The entire school community – students, teachers and administrative staff – are active players in creating a more hygienic school. (WHO, 2013)
	Incinerators of medical waste	Health centres located in these regions are also creating a healthier environment with the installation of 6 biomedical waste incinerators. Medical waste is a reservoir of infectious microorganisms that pose a health risk – not only to patients, visitors and health workers – but can also contaminate the soil, water and air with hazardous substances. (WHO, 2013)
Agriculture	Capacity building	Capacity building by means of offering training and information to the producers, their Socio- Professional Organisations (SPOs) and Community Educators (CEs). Training and capacity building of producers, their SPOs and CEs in the field of organisation (Cooperative Using Agricultural Equipment), establishment of seed-bearing trees etc), of farm management and the role of the agricultural adviser, etc. Information, by all channels on communication, on technological progress recorded, particularly advances within their reach and immediately applicable to improve productivity, types of successful farming methods. Improvement of the producers' and CEs' expertise, particularly concerning the use of agricultural methods respectful of the environment. Improvement of the agro-systems productivity and consequently of the standard of living environment of this fringe community.
	Land management	The improvements of farming techniques in pluvial zones and introduction of new varieties of high-yield drought-resistant cereal.
	Promotion of water- saving irrigation methods in oasis zones	The promotion of economical irrigation techniques in oasis zones (pilot scheme using the drip technique). Implementation of activities to create awareness and to identify the sites which will be covered by the project through missions, diagnostic research, etc. acquisition and the installation of pumping equipment and of the irrigation network and monitoring and the maintenance of networks
	Improvement of cultivation methods in pluvial zones	Acquisition of agricultural equipment for ploughing, mowing and weeding. Training of producers in efficient and effective use of the equipment through training programmes, seminars, sessions, etc. Identification, then the experimental use, of high-yield, fast-growing varieties, suitable for various zones.



6 NIGER

6.1 Country Background

Niger is a landlocked Sahelian country with an area of 1,267,000 km² bordered by Algeria and Libya to the north, Chad to the east, Nigeria and Benin to the south, while Burkina Faso and Mali are its western neighbours (IFAD, 2019). The population in Niger was estimated at around 22.44 million inhabitants in 2018 by the WB, at least 84% of whom live in rural areas with a relatively high density in the south central part of the country. Of the population, 8.5%, or 1,248,914, were Fulani, 8.3%, or 1,219,528, were Tuareg, and 1.5%, or 220,397, were Toubou. These three ethnic groups are considered Niger's Indigenous Peoples groups and all of them transhumant pastoralists (The Indigenous Peoples, 2020).

The Fulani can be further subdivided into the Tolèbé, Gorgabé, Djelgobé and Bororo. They are mostly cattle and sheep herders although some of them have converted to agriculture since losing their livestock during the droughts. The Tuareg raise camels and goats and live in the north (Agadez and Tahoua) and west (Tillabéry) of the country. The Toubou are camel herders who live in the east of the country around Tesker (Zinder), N'guigmi (Diffa) and along the border with Libya (Bilma). The June 2010 Constitution does not explicitly note the existence of Indigenous Peoples in Niger. The Tuareg, Fulani and Toubou are not considered a minority or marginalised communities but, in contrast, are treated like any other community in the country despite the problems associated with their nomadic way of life (The Indigenous Peoples, 2020). Pastoralists' rights are set out in the Pastoral Code, adopted in 2010. Most importantly, this code includes an explicit recognition of mobility as a fundamental right, along with a ban on the privatisation of pastureland, which poses a threat to this mobility. A further important element in the Pastoral Code is the recognition of priority use rights in their pastoral homelands (terroirs d'attache). Niger has not signed ILO Convention 169 but did vote in favour of the United Nations Declaration on the Rights of Indigenous Peoples.

The political climate is relatively stable. However, in terms of security, the country is weakened by the repeated attacks by terrorist groups that are rife in the regions of Diffa (Lake Chad area), Tillabéry and in the north of the Tahoua region where the state of emergency remains in effect. As a result, Niger hosts more than 371,000 refugees and displaced persons, 32% of whom are refugees from the regional "Boko Haram" crisis and 15.75% from the Malian crisis. This situation leads to a notable increase in defence spending, coupled with chronic food insecurity and the recurrent natural crises that the country is experiencing (droughts, floods and locust invasions) (IFAD, 2019).

6.2 Income and Poverty

The population of Niger lives mainly on small-scale agriculture and family breeding, which employ more than 85% of the working population. Real GDP growth estimated at 5.2% in 2018, up from 2017 (4.9%), is mainly due to the increase in the production of extractive activities, a satisfactory agricultural season on the whole and construction sites linked to the organisation of the African Union (AU) Summit in 2019. The structure of GDP remains relatively stable, with a predominance of the agricultural sector (43.4% of GDP in 2018), followed by services (35%) and the industrial sector (14.9%). The informal nature of the economy does not favor its development. Real GDP could stand at 5.5% and 5.6% respectively in 2019 and 2020 (IFAD, 2019).

In addition, the country's macroeconomic performance is affected by the drop in the prices of raw materials on which the country depends and the increase in expenditure on hosting refugees, which further weakens them. Indeed, Niger's external public debt rose from 27% to 35% of GDP between 2014 and 2016 and reached 37% in 2018. Thus, the country's natural and socio-economic environment is not conducive to inclusive and sustainable rural development (IFAD, 2019).

In terms of employment, the unemployment rate 0.48 % in 2019. This rate is 23.7% for young people in the 15-29 age group. Underemployment affects on average 68.4% of the working population (IFAD, 2019).



6.3 Nutrition

In November 2016, the national SMART survey estimated that more than 40% of children under five in Niger suffered from stunting. In particular, the national prevalence of chronic malnutrition is 42.2%, exceeding the critical threshold of 40%, but significantly lower compared to the two previous years (46.4% in 2014 and 45.5% in 2015). This prevalence is 45% in rural areas against 33.8% in urban areas. In rural areas, the prevalence of chronic malnutrition varies between 34% in rural Tillabéry and 55.5% in rural Maradi. The severe form of chronic malnutrition is particularly high in the Maradi region where more than 25% of children are stunted. The overall acute malnutrition rate is 10.3%. This rate is below the emergency threshold (15%), but exceeds the critical threshold of 10% according to WHO. This national prevalence is 10.5% in rural areas against 8.5% in urban areas. The national prevalence of severe acute malnutrition is 1.9% (1.1% in rural areas and 2.1% in urban areas). In rural areas, the prevalence of global acute malnutrition varies from one stratum to another with extremes of 13.3% in rural Maradi and 7.4% in rural Dosso. In general, the nutritional situation has not changed significantly for six years. In terms of food availability, the rate of increase in agricultural production estimated at 2.5% is much lower than the rate of population growth (3.9%). This generates recurrent food and nutritional insecurity with one in three years in deficit. Each year, 15 to 20% of the population (2 to 3 million people) are food insecure. Low dietary diversity, linked to unbalanced dietary habits and the reservation of products with high nutritional value for sale, accentuate the poor nutritional conditions of the rural population. Niger's ambition to end hunger (SDG2) is to reduce acute malnutrition to 1% and chronic malnutrition to 11% by 2035 (IFAD, 2019).

6.4 Gender

Niger ranked 154th out of 154 on the 2019 gender inequality index (0.647). Niger is a country where the challenges of gender equality, the empowerment and involvement of women in the development process arise with acuity. According to INS statistics, Niger had 50.3% of women in 2012 and this rate has risen to 52.4% to date. The average fertility rate is 7.6 children per woman and it can reach 9 children per woman in the regions of Maradi and Zinder. Despite the legislative and regulatory efforts made in recent years, gender inequalities persist and result in gaps in access to basic social services, productive resources including land, education, financial services and markets and at the political level through limited access by women to decision-making bodies. Certain socio-cultural norms restrict opportunities for women's empowerment and hinder girls' access to education. This is the case with early marriages and pregnancies of young girls, which have a negative impact on their children (mortality rate, malnutrition and stunting). According to the United Nations Children's Fund (UNICEF), 30% of girls are married before the age of 15 and 75% before 18. Early marriages are one of the causes of low education for girls and young women as they are forced to interrupt their studies to look after their families. In addition, women are subjected to daily workloads of 16 to 18 hours, including chores of collecting water for the household, which does not give them enough time to take care of their children and to carry on economic activities for their own development (IFAD, 2019).

6.5 Temperature, Rainfall, Seasons and Agro-Climate Zones

From the north to the south of the country, it is possible to distinguish four agro-ecological zones based on rainfall, vegetation and soils. These are; The Sahara zone (with a desert climate) occurs in the north of the country and covers 65% of the national territory. Rainfall is scarce and remains always below 100 mm/year. The dry season is very long when average temperatures are typically over 35°C. Agricultural production is limited to nomadic herding and scattered oasis agriculture. What little vegetation there is forms a discontinuous steppe and is mostly to be found growing in the depressions where moisture conditions are slightly better. The Sahelo-Saharan zone (a sub-desertic climate) covers 12.2% of the national territory and occurs immediately to the south of the Sahara Zone. It experiences low rainfall between 100-300 mm/year. Rivers are temporary, only flowing after significant rainfall events. Semi-nomadic herding dominates but some rainfed subsistence



cropping is possible where soil and moisture conditions permit. This area is characterised by vegetation dominated by small scattered shrubs.

The Sahelo-Sudanian zone covering 21.9% of the national territory lies to the south of the Sahelo-Saharan zone and typically receives between 300-600 mm of rainfall per year. The northern part of this zone is the drier Sahelian sub-zone devoted mainly to nomadic livestock raising, while rainfed cropping dominates in the wetter southern Sudanian sub-zone. This zone is characterised by a discontinuous herbaceous savannah vegetation with a low-density shrub stratum, becoming more wooded in low-lying areas with better soil moisture conditions; and The Sudanian zone occurs in the most southerly part of the country, covering only 0.9% of the national territory. This zone receives more than 600 mm of rainfall per year. The higher rainfall permits intensive cropping, and this zone is where most of the irrigated agriculture is carried out. Because of the higher rainfall, the zone is also more wooded than the other zones. The savannah vegetation is characterised by a more or less continuous herbaceous stratum, in which there are areas of closed shrubs and woodlands. The woody vegetation is dominated by species of Combretaceae and includes some valuable tree species like the Shea tree (vitelaria paradoxum) and the Néré (parkia biglobosa). (GEF, 2009)

6.6 Agriculture and Rural Livelihoods

In terms of agriculture, Niger has significant resources that are little exploited:

- A cultivable land potential of 15 million ha
- A known irrigable potential of around 10.9 million ha (including groundwater)
- 62 million hectares of pastoral areas
- A herd estimated at 42.8 million head in 2015
- Fishery resources covering an area of approximately 410,000 ha (PDES 2017-2021)
- Forest resources (16 million ha and 1,600 plant species)
- Easily mobilised water resources (400,000 ha of water bodies).

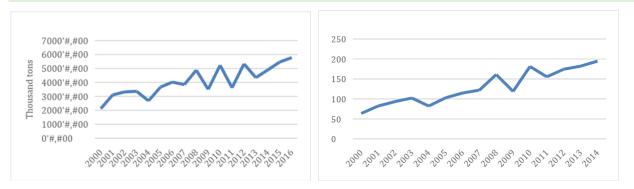
The basins of the Niger River in the west and Lake Chad in the east in the Diffa region annually drain between 24 to 30 billion m³ of water, of which only 1% is exploited. This low level of exploitation of available resources means that the rural sector remains dependent on climatic hazards. This results in poor performance in terms of production and productivity, and a situation of almost permanent food insecurity (IFAD, 2019).

Agricultural production systems based on cereals (millet, sorghum and maize) are extensive, with very low use of inputs (chemical fertilisers and pesticides) and exposed to climatic hazards. Figure 11 illustrates total cereal production in thousand tons and the crop production index for Niger. Production techniques are inefficient, in particular the level of training and information of producers is low. The development of the agriculture subsector is limited not only by low rainfall, but also by poor dune soils and pest pressure. Climatic analyses indicate an increase in temperature of + 2°C between the period 1980 - 1999 and the period 2020-2039, and variations in rainfall with an early dry season and a shorter rainy season (July-September). Average annual precipitation is expected to increase by 8% by the years 2020-2039 compared to the period 1980-1999, but with a large irregularity cancelling out the positive effects of this increase (IFAD, 2019).

The development of irrigated crops is affected by the low financial capacity of farmers, the lack of adequate credit, an efficient system for supplying inputs and marketing agricultural products (IFAD, 2019).

Infrastructure, especially rural ones, are generally deficient and in poor condition in Niger. In 2018, the country ranked 52nd out of 53 African states in terms of the infrastructure development index with a rate of total infrastructure contribution to per capita growth of approximately 5%. (IFAD, 2019).







6.7 Climate Change: Temperature

The country's climate is of the arid and semi-arid tropical type. Niger is indeed in one of the hottest areas of the globe. There are four types of seasons. A cold season (December to February) characterised by cool nights with temperatures as low as 0°C. A hot, dry season (March to May) with warm winds and temperatures that sometimes peak above 45°C. During this season, the harmattan (hot and dry wind) of moderate speed (5 to 10 m / s) blowing from the Northeast or East remains dominant throughout the country. A rainy season (June to September) characterised by often stormy rains, high humidity and average temperature between 28.1 and 31.7°C. The monsoon (humid wind) blowing from South-West to North-East remains dominant over most of the country. Wind speed is generally low to moderate (2 to 8 m/s) during this period, but maximum instantaneous winds (gusts) can be observed with velocities greater than 40 m / s when passing grain lines moving from east to west. And lastly, a warm season without rain (October to December), with a maximum relative humidity of between 28 and 59%; while the minimum value varies between 9 and 24% and an average temperature of 35°C. Records of recorded temperatures are -2.4°C (observed on January 13, 1995 in Bilma) for minimum temperatures and 49.5°C (observed on September 07, 1978 in Diffa) for maximum temperatures. (RdN, 2016)

Projections on temperature: There is a strong consensus that increases in Sahelian temperatures will continue. Downscaled climate model projections for Niamey covering the period 2040-2060 compared to 1980-2000 anticipate an increase of between 1°C and 3°C. These projections indicate that Niger is likely to face difficult climate challenges ahead, with perhaps more total rainfall than in some previous decades but punctuated by unpredictability, soaring temperatures, dry spells, and intense storms. (GlobalSecurity, 2017).



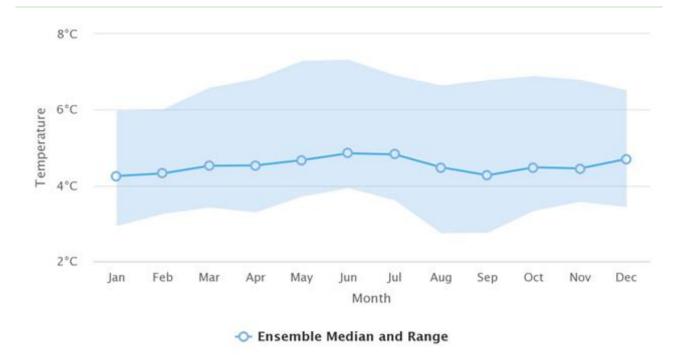


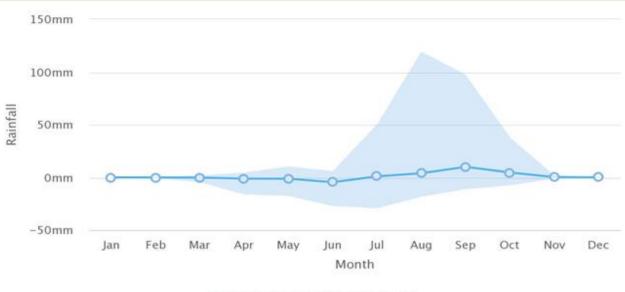
Figure 35 Projected Change in Monthly Temperature for Niger 2080-2099 (WB, 2020)

6.8 Climate Change: Precipitation

Precipitation has experienced in recent decades, chronic disturbances of great magnitude. The analysis of their evolution over the period 1961-2010 shows a significant decrease in rainfall since 1970 and which has continued until beginning of the 1990s, with a long deficit period between 1980 and 1990. The corresponding rainfall deficit is on average around 20%, but may exceed 30% in the west and centre; a clear tendency for isohyets to slide south up to 150 km. In addition, there is a slight wet trend that began in 1990 in the Saharan and while the Sahel-Sudan zone shows a general tendency to stabilization over the same period. Furthermore, observations indicate a decreasing rainfall variability towards the South and an upward trend in temperatures at all stations, with a moderate increase on the Niamey and Tahoua stations. (RdN, 2016)

Projections on precipitation: At sub regional, national or local scale, the high variability of rainfall and the very sparse observation network makes predictions of future climate changes difficult and uncertain. The projections given by the SDSM model for the 2050 horizon indicate, compared to the reference period 1961-1990 (CNEDD, 2007) significant increases in cumulative rainfall by 2050 for Tahoua, Konni, Zinder, Mainé, Agadez and especially Tillabéri. Slight decreases in accumulations on the other hand are projected at the Gaya, Niamey and Maradi. However, the relatively high rate of these declines is to be taken with precaution because it involves only low rainfall amounts (some millimetres). A later start of the rainy season on all the areas considered and a small variation in the duration of dry weather throughout the rainy season. Overall, a net increase in evapotranspiration in Niamey, Zinder, Tahoua and Tillabéri and an increase in the number and frequency of extreme events (temperatures and rains) at all stations. Tillaberi has by far the higher increases, especially in terms of extreme rainfall. Increasing extreme temperatures can reach 3.3 ° C. (RdN, 2016)





-O- Ensemble Median and Range

Figure 36 Projected Change in Monthly Precipitation for Niger 2080-2099 (WB, 2020)

6.9 Climate Change Impacts: Climatic Hazards and Extreme Events

Available evidence shows that the isohyets that delimit the agro-climatic zones shifted southward by 100–200 kilometres from 1950–90, following a decline in rainfall, with a prolonged period of below average rainfall from 1970–90. Recent analysis of long-term rainfall trends showed that this trend had reversed, with average rainfall increasing again since the 1990s. This suggests that the rainfall isohyets of 350–400 millimetres, which delimit the zones where crop production is viable, are shifting north again. As a result, the area suitable for crop production may have increased since the 1990s. (GlobalSecurity, 2017)

While the country has received an increase in total rainfall since the 1990s, the 21st century has seen the return of a series of droughts and severe food insecurity in 2005, 2010, and 2012. Researchers also have noted what they characterise as changes in seasonal patterns (late arrival and early cessation of rains) and intense rain events. There is not a strong consensus about future rainfall in the Sahel, but scientists have recently suggested the likelihood of a somewhat wetter Sahel, with more variable precipitation on all time scales, from intra-seasonal to multi-decadal, and projected increases in daily rainfall intensity rather than frequency. (GlobalSecurity, 2017)

Projections on climate impacts: Floods are a recurrent natural hazard in Niger and are projected to increase in frequency in the future, especially in the southern part of the country. They have negative impacts on agriculture, food security, GDP, endemic diseases (malaria), and contribute to rural poverty. Sandstorms are a frequent extreme event that hits Niger and adversely affects agriculture, livestock, water resources public health, and human life. Droughts are projected to increase in frequency in the coming century. Development of an early warning system, better water management, and dissemination of meteorological data will help decrease the population's vulnerability to this extreme event. (World Bank, 2018d).

6.10 Climate Change Impacts: Lives and Livelihoods

Niger, owing to its climatic, institutional, livelihood, economic, and environmental context, is one of the most vulnerable countries of the world. Poverty is pervasive in Niger and it ranks low on almost all the human development indicators. Agriculture is the most important sector of Niger's economy and accounts for over 40% of national gross domestic product (GDP) and is the principal source of livelihoods for over 80% of the country's population. (GlobalSecurity, 2017)



With 80% of its territory made up of the Sahara and the Sahel, the desert's progression of 200,000 ha per year, Niger repeatedly suffers the effects of climate change which result in:

- A decrease in the hydrological balance
- Variability and decrease in rainfall, and
- Increase in temperatures.

These consequences thus have the most visible impacts:

- The increase in the phenomenon of desertification and land erosion
- The increase in extreme weather events (drought and flooding) and
- The degradation of biodiversity.

All of these factors strongly alter livelihoods (productive potential, water, soil) and require the implementation of adapted and targeted measures to increase the resilience of agricultural systems (IFAD, 2019). According to the climate change vulnerability index (ND-GAIN Index 2018), Niger is the 2nd most vulnerable country (ranked 173rd) and the 52nd least prepared to fight against the effects of climate change.

6.11 Climate Change Impacts: Agriculture

Excess agricultural production until the beginning of the 1970s, covered at the end of the 1980s only 86% of the food needs to become structurally deficit these days mainly because of the droughts. This deficit is related to the decrease in precipitation confirmed by the DMN since the last three decades. The study on the vulnerability of the agricultural sector has shown that the evolution of the yields of millet crops are subject to a high interannual variability linked to many factors, including variations in the rainfall regime. Droughts and floods also have a negative impact on agriculture. There are various climate related impacts on the agriculture sector. Changes in climate are facilitating the upsurge of pests such as Desert Locusts, Grasshoppers, Leaf Miner caterpillars, etc. In addition, high interannual variability causes yield reductions and loss of crop production and hence increased food insecurity and malnutrition. The insecurity of food supply necessitates increased imports and food aid, which increases Niger's dependency on its neighbours and the international community. Furthermore, the increasing frequency of extreme events facilitates the erosion of productive lands and silting of rivers and causes damages to agricultural infrastructure. (RdN, 2016)

In the dry scenario, from 2011 to 2050, the years with annual rainfall deficit compared to the normal annual rainfall over the period 1961-1990, will be predominant. The potential impacts of climate change related to this situation include a reduction in the length of the agricultural season combined with an increasing frequency of dry days during the agricultural season. The appearance of crop pests such as leaf caterpillars when several consecutive dry days occur at the time of heading of millet. Inadequate water conditions to meet the water needs of crops during their development cycle, leading to the decrease and / or total loss of agricultural production and hence reinforces food insecurity with its various socio-economic consequences. In the wet scenario from 2011 to 2050, the years with excess annual rainfall compared to the normal annual rainfall over the period 1961-1990, will prevail. The potential impacts of climate change related to this situation include the abundance of rainfall with many positive potential effects that can contribute to the improvement of agricultural production and an increased frequency of flooding of crop areas. Asphyxiation and decrease in plant development due to excess water, which will increase the occurrence of diseases and some pests of crops related to excess water conditions. Floods cause damages to homes and infrastructure and lead the reduction and / or total loss of agricultural production, livestock and sometimes even human lives in the areas affected by the floods. The recrudescence of pests and climate-sensitive diseases of crops, which will increase food insecurity with its various socio-economic consequences in areas affected by floods. (RdN, 2016)

6.12 Climate Change Impacts: Natural Capital

In Niger, recurring droughts have had irreversible consequences on the state of forest potential, affecting both the adaptability of forest species and their productivity. These extreme events, which have exacerbated aridity



with the warming trend of the last forty (40) years, have probably contributed to profound disturbances in the dynamics of forest ecosystem functioning. Indeed, the degradation of forest resources in Niger has accelerated with the main consequences, the reduction and fragmentation of forest areas, the low natural regeneration and the reduction of biological diversity as well as the low productivity of forested forests, often in uncultivated land. The factors of this degradation are mainly anthropic and climatic. More generally, climate change will increase the effects of all factors of desertification, which may become irreversible, especially as the environment becomes drier and soils are degraded by erosion and settlement. (RdN, 2016)

6.13 Climate Change Impacts: Water

The most likely impacts are a further decline in the flows of the Niger River in Niamey, in relation with the decline in inflows from the Guinean flood. An increase in the volume and peak flow of the local flood, which will become more and more widespread, as observed in recent years. An increase in flows in small endoreic basins and tributaries of the right bank of the river, in relation to the anthropogenic pressure on the vegetation cover that modifies the surface states. An increase in the solid load of the flows, especially those coming from small watersheds, in connection with the aggravation of erosion due to deforestation; a decrease in the filling of lakes and dams. On the other hand, in small endoreic basins, the increase in flows and the solid load will induce a surplus of solid inputs at the level of water bodies, with significant risks of siltation. A rise in water temperature that would lead to a decline in the quality of surface water. In secondary streams, this effect could be partially offset by increased flows. On the other hand, in the river, the decrease of the flows could accentuate that of the water quality, which would increase the concentrations of chemical elements rejected by the industries in the city of Niamey. A shift in the hydrological regime of the river and its main tributaries on the right bank (i.e. the Sirba) which would continue, with peak flows from the Guinean flood in Niamey which will be shifted from February / March to December / January, or even November / December in the case of the most unfavourable scenarios. An increase in the magnitude and frequency of floods, particularly in the southern part of the country. This increase will result from the expected increase in the frequency of heavy rainfall events. Increased evaporation in line with rising temperatures, which could reduce low flow (i.e. river). (RdN, 2016)

Concerning groundwater resources, Niger is likely to experience very significant reduction in aquifer recharge in large sedimentary basins. Their vulnerability will be accentuated by anthropogenic pressure on land and abstraction for irrigation. The increase in groundwater recharge and the increase of their piezometric levels in endorheic basins where flows could increase. A decrease or increase in the input of groundwater to the watercourse depending on the increase or decrease in recharge. The increase or reduction of groundwater resources in relation to the evolution of recharge. Lastly, the deterioration of water quality in relation to the rise or fall in groundwater recharge. The increase in flows in deforested areas favours soil leaching and the concentration of pollutants towards areas of depressions favourable to recharge. Pollution is transferred to the aquifer through the unsaturated zone. In urban areas, the poorly controlled development of housing areas and inadequate sanitation will increase pressure on water resources. (RdN, 2016)

6.14 Climate Change Impacts: Health

For the 2030-2050 decade (Table 80), the dry scenario projects an increase in malaria of 13.88‰ over the 2001-2012 reference period (Figure 18). The range of likelihood is between 13.81 and 14.02‰. The wet scenario projects an increase in meningitis and measles respectively of the order of 2.19‰ and 1.76‰ for the same period. By 2050, if nothing is done, the number of cases of malaria would increase by about 50% and that of meningitis and measles by 76.79% and 9.74% respectively. Therefore, forecasts of future morbidity trends by 2050 compared to the period 2001-2012 (CNEDD, 2013d) predict an increase in the order of 50% of morbidities due to malaria in the case of Dry Scenario. An approximate 77% increase in morbidity due to meningitis in the Wet scenario and an almost 10% increase in measles morbidities for Wet Scenario. (RdN, 2016)



6.15 Climate Change Impact: Vulnerability Mapping

The situation of chronic food insecurity that affects the country has profoundly undermined the means 80% of Niger's population is composed of farmers and pastoralists. Every year, between 15 to 20% of the population (2 to 3 million people) are food insecure - even in the year surplus production. According to the results of the regional technical meetings validated during the national meeting of synthesis of evaluation of the food, nutritional and pastoral situation of the year 2012 held in Maradi from 23 to 24 November 2012, One hundred and eighty-five areas grouping together 3243 villages with an estimated population of 2,483,051 will be vulnerable to food insecurity 2013. (RdN, 2013).In addition to food, nutrition and armed conflict issues in the sub region, Niger has was also a victim in 2012 of unprecedented floods, which affected more than half a million people. These floods have seriously damaged housing, public infrastructure, crops and caused about a hundred casualties. The unpredictability of rainfall seasonal, the continued degradation of the environment, the precariousness of living conditions combined the effects of climate change suggest large-scale floods in recent years to come up. Efforts to prevent preventable epidemics such as measles and poliomyelitis will continue with a limited success. Cholera and malaria will increase in prevalence from year to year due to poor hygiene conditions and limited access to health services, inadequate access to safe drinking water, high promiscuity and inadequate prevention measures. (RdN, 2013).Locust threat and other crop pests, as well as bush fires, conflicts between farmers- and pastoralists are regular in Niger. These plagues can affect the same families during the same year, and several years right now. Their livelihoods are continually degrading and then disappearing for some the population and their resilience diminished or lost. For these households or communities, it is necessary set up multiannual recovery programmes to enable them to again the path of sustainable development. (RdN, 2013)

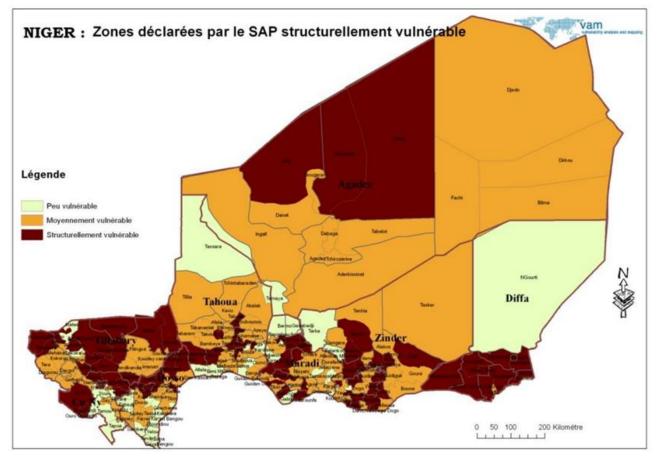


Figure 37 Structurally vulnerable zones in Niger (RdN, 2013)

(SAP = Système d'Alerte Précoce et Prévention)



6.16 Suggested Geographies and Sectors for Intervention for Climate Change Adaptation

Table 31 Adaptation Options by Sector for Niger (RdN, 2016)

Sector	Adaptation mechanism	Description
Forestry	Land management	Development and implementation of natural forest management and management plans. Intensification and diversification of agricultural production systems integrating climate change considerations through the dissemination of appropriate techniques for improving soil fertility, diversification of production and land security.
	Reforestation	Development and implementation of extensive reforestation, siltation, degraded land reclamation, assisted regeneration of agroforestry parks and enhancement of natural forest formations.
	Capacity building	The training of forest managers in the techniques of inventories, mapping and monitoring of resources (GIS, GPS) with a view to better knowledge and control of forest areas. The establishment of a functional monitoring and evaluation system for forest resources. Sensitization, training and mobilisation of populations for the development of agroforestry and for a rational and participative management of their forest areas integrated into local development programmes.
Water	Supply management	Mobilisation of surface water for the increase of agricultural production and for the recharge of groundwater and the rehabilitation and strengthening of the national surface water monitoring system. The rehabilitation and reinforcement of the national system for the qualitative and quantitative monitoring of groundwater, especially alluvial aquifers and large aquifers (Illumenden, Lake Chad) in relation to the countries concerned
	Ecosystem restoration	Bank protection and the rehabilitation of silted ponds and regeneration of degraded natural environment of watersheds through the introduction of plant species better adapted to new conditions.
	Demand management	Establishing a balance between the availability of water resources and the water requirements for irrigation and the consumption of populations and livestock. Improving the knowledge of large fossil aquifers (Continental Intercalaire, Continental Hamadien, Air Palaeozoic aquifers) with a view to their balanced exploitation, and in order to locate other aquifers that can be put into exploitation in the zones. urgent needs (basement areas, areas with large access depths, etc.).
Health	Early warning system	The establishment of a weather watch and warning system.
	Capacity building	Examining the factors that influence current coping capacity, including physiological, psychological (knowledge, beliefs, attitudes) and socio-economic factors, as well as the characteristics of the health system.
	Monitoring	The progressive implementation of biological and health monitoring measures as means of adaptation to climate change.
Agriculture	Increase resilience of the agriculture sector	Includes the use of improved varieties of medium or short cycle crops adapted to climatic conditions and the supply of agricultural inputs and the technical supervision of agricultural producers in order to carry out the cultivation work in good conditions.
	Irrigation management	The use of irrigated cultivation as a result of the supply of food to needy populations throughout the irrigated season, combined with the promotion of small irrigation with water saving (example: drip). Additionally, the mobilisation of runoff water and its recovery for irrigated crops, especially market gardening and the realization of Hydro-Agricultural Improvements (AHA) where possible.
	Pest management	Fight against climate-sensitive enemies and diseases of crops.



Sector	Adaptation mechanism	Description
	Disaster management	Construction of appropriate structures to protect crop areas against floods and the establishment of a farmers insurance system against risks.
	Meteorological services	Meteorological services to agricultural producers through the provision of products and information for decision support in the conduct of agricultural activities for rainfed and irrigated crops.
	Capacity building	Capacity building of specialised agents for technology transfer in agricultural production and food technology.



7 SENEGAL

7.1 Country Background

According to the 2018 WB data, the population of Senegal reached 15.85 million with a growth rate of 2.6% per year. The demographic profile illustrates the numerical importance of women (52%) and a relatively young structure with 50% of the population under 16 years of age. It is predominantly rural but with rapid urbanization and a rural exodus of young people. The proportion of the poor population has decreased from 67.9% in 1994 to 46.7% in 2011 (ESPS II, 2011) but is declining more slowly in rural than in urban areas. A dual challenge for the rural world is to:

- Feed a population that is growing rapidly in a context where environmental issues and climate change are increasingly penalising agricultural production, as well as ensuring food security and capture opportunities in the domestic and regional markets
- Create new agricultural and non-agricultural employment opportunities for young people. (IFAD, 2018)

In Senegal, half of the population is under 18 (19 for women versus 17 for men) and the average age of the total population is 22.7 years (23.2 for women versus 22.3 years for men). According to the latest RGPHAE census, the population is younger in rural than urban areas, with a median age of 16 and 21, respectively. Those under 15 represent 42.1% of the population, with a lower share for girls (40.5%) than boys (43.6%). People in the 15-64 age group are 54.4%, with a higher proportion for women (55.9%) than men (53%). In all regions of the project intervention area, more than 6 out of 10 young people are in the 20-34 age group. In three-quarters of the project intervention regions, at least one in three inhabitants is in the 15-34 age group (IFAD, 2019).

According to the Minority rights group international, , 38.7 per cent of the population were estimated to be Wolof; 26.5 per cent Pular/Peuhl; 15 per cent Serer; 4.2 per cent Mandinka; 4 per cent Diola/Jola; 2.3 per cent Soninke; and 9.3 per cent other (including Europeans and people of Lebanese descent) as of 2010-2011. The UN Committee for the Elimination of All Forms of Racial Discrimination, in its Concluding Observations following its review of Senegal's report in 2012, expressed regret at the lack of statistical data reflecting the ethnic makeup of the population. The Constitution does not recognise any ethnic groups as indigenous people.

Senegal is one of the most politically stable countries in Africa and has maintained steady economic growth over the last decade (Climate Risk Profile Senegal, 2017).

7.2 Income and Poverty

Senegal aspires to become an emerging country by 2035. The country's economic growth started to increase in 2014 and 2015, with strong growth of 6.5%, its best performance since 2003. At the end of 2015, the Senegalese Government announced 6.5% growth driven by agriculture and the secondary sector; in addition, the budget deficit has been reduced from 6.7 to 4.7% as a result of investment efforts. According to the World's Bank (2020), Senegal's economic growth has been among the highest in Africa between 2014 and 2018, remaining above 6% annually. GDP growth was 5.3% in 2019, down from 6.3% in 2017. The main drivers of growth is strong demand from the private sector, stimulated by low energy and transport prices, as well as the ambitious public investment programme put in place by the Government in 2015. At the sectoral level, services remain the main driver of growth contributing to more than a third of this economic expansion. The industry accounted for 23%, thanks to the chemical and real estate industries. The agricultural sector contributed 34% of Gross Domestic Product (GDP) in 2015 thanks to good rainfall and programmes for rice and horticultural production. (IFAD, 2018) However, the announced growth rate has failed to reduce the endemic poverty rate estimated at About 46% placing the country among the 25 poorest countries in the world, and that despite all the average growth rate of 7.1% set by the PES Priority Action Plan for the period 2014-2018 has not been achieved. (FIDA, 2018). Besides, since early 2020, the COVID-19 pandemic has significantly changed Senegal's economic outlook (WB, 2020). Growth has slowed significantly to an estimated 1.3%% in 2020, with



services (such as tourism and transport) and exports particularly hard hit. Overall, the Senegalese economy has fallen back into a weak growth equilibrium, with low job creation and little progress in reducing poverty, especially in rural areas where the reduction in cultivated land, the lack of use of certified seeds and the lack of access to certified seeds. Irregular rainfall was the main cause of deficits in agricultural production. This has helped to accentuate the vulnerabilities in rural areas, which account for 94% of the vulnerable compared to only 4% in the other cities and 2% in Dakar. (IFAD, 2018)

More than half of the population (56%) lives in rural areas where poverty is more accentuated with an incidence estimated in 2011 at 57.1% against 47% nationally. The good growth performance made it possible, from 2016 to reduce this figure from 4 to 7%; projections are for an even faster decline in the poverty rate to 31% by 2020 due to agricultural growth (IFAD, 2019). The concentration of poverty in rural areas is also confirmed by the subjective poverty rates and by the levels of the Multidimensional Poverty Index (MPI). Regarding subjective poverty measured by households' perception of their living conditions, 56.5% of Senegalese households consider themselves poor and of which 45.7% consider themselves very poor. Subjective poverty is more pronounced in rural areas where more than two thirds of households declare themselves poor (69%), compared to Dakar (38.2%) or other urban centres (57.7%). The same is true for multidimensional poverty, the incidence of which is 92.4% in rural areas, against 34.7% in Dakar and 67.7% in other urban centres (IFAD, 2019). Although it affects rural areas disproportionately, poverty is more pronounced in the central and southern regions of the country . Indeed, the 2017 EDS Continue data shows that Kaffrine and Sédhiou (in addition to Kolda) have the highest levels of poverty, with more than 80% of the population classified in the first two quintiles (ANSD and ICF, 2018). The proportion of the population considered multidimensionally poor is estimated at 78.1% in the Centre and 74.1% in the South, compared to the North (65.1%) and the West (31.4%) (IFAD, 2019)

In terms of food security, Senegal ranks 66th out of 119 countries according to the World Hunger Index (GHI, 2018). It has progressed by ten points in less than two decades, with a score going from 37.7% in 2000 to 17.2% in 2018, thus showing the best food situation in West Africa. The share of food insecure households is more than twice as high in rural areas (21%) than in urban areas (9%). It is especially the regions located in the South and South-East (including Ziguinchor and Sédhiou being part of the project intervention zone), and somewhat those of the Centre (including Fatick and part of Diourbel and Louga) which are the most affected by food insecurity.

7.3 Nutrition

The evolution of nutrition indicators between 2012 and 2016 in Senegal shows that prevalence rates are generally higher in the southern zone, particularly for chronic malnutrition and underweight. The country is making encouraging progress in the fight against chronic malnutrition and has the lowest rate in sub-Saharan Africa, at 17.1%. . The incidence of undernutrition fell from 29% in 2000 to 10% in 2015 (IFAD, 2019). The key determinants of chronic malnutrition are socioeconomic status household, mother's level of education, place of residence and child's age. Efforts have been noted in the area of child health, in particular for chronic malnutrition, reflected in a decline in the prevalence in recent years. The rate of chronic malnutrition at the national level is 17%, the lowest rate in mainland sub-Saharan Africa. This rate shows a downward trend, from 29% to 20.55% between 2000 and 2015, before reaching 17% in 2017. (IFAD, 2019) The rates of acute malnutrition and underweight testify to a precarious nutritional situation among children under 5, despite the decline observed over the period 2000-2015. These rates decreased from 10% to 7.85% for acute malnutrition and from 20.3% to 15.5% for the prevalence of underweight 106. In addition to the northern and eastern regions such as Podor (18.2%), Matam (16.5%) and Tambacounda (12.5%), the prevalence rate of global acute malnutrition exceeded the emergency threshold in Louga (16%) in 2017. Deficiencies in micronutrients like iron are a serious problem hampering the nutritional status of children. Nationally, almost seven in ten children (aged 6 to 59 months) are anaemic (IFAD, 2019).



7.4 Gender

Senegal's HDI value for 2018 was 0.514, which put the country in the low human development category, positioning it at 166 out of 189 countries and territories. Between 1990 and 2018, Senegal's HDI value increased from 0.377 to 0.514, an increase of 36.5%. Between 1990 and 2018, Senegal's life expectancy at birth increased by 10.5 years, mean years of schooling increased by 0.9 years and expected years of schooling increased by 4.5 years. Senegal's Gender Inequality Index per capita increased by about 43.9% between 1990 and 2018. Over the past two decades, Senegal has taken steps to address gender inequalities. It is thus ranked in 1st place according to the Gender Inequalities Index, compared to other WAEMU countries. Senegal occupies a good position with regard to the Social Institutions and Gender Equality Index (ISE), with a score of 0.20 compared to the regional average of 0.28. The government's efforts in favor of gender have resulted in better representation of women in high decision-making bodies, integration of gender into the budget process and sector programmes, the development of a first Equity and Development Strategy. " Gender Equality 2005-2015 (SNEEG1) updated in 2016 for a period of ten years (SNEEG2), and the definition of quotas for women at the level of facilities (IFAD, 2019).

The constraints that limit the integration of women into the productive system relate to unequal access to factors of production, low representativeness of young women in particular in decision-making bodies, low qualification and limited mastery of routes and management tools for agricultural and / or related activities. Results from three ANSD surveys show that women have lower activity and employment rates than men (IFAD, 2019). Women represent only 22.8% of workers in the formal sector, with a larger presence in small businesses (30.1%). Financial inclusion is 13.4% for women against 21.9% for men, a difference that remains statistically significant even when including income, education and other individual characteristics. These results are partly explained by the fact that women participate less in financial and budgetary decisions of the household. Thus, women are generally less well paid than men. On average, a male "senior manager" earns 933,333 FCFA / month against 697,286 FCFA / month for a woman in Senegal; the same is true for the "junior and senior manager" category where the monthly remuneration is 684,493 FCFA for men against 569,559 FCFA for women. The rate of food insecurity is higher in households headed by women (40.4%) than those headed by men (29.4%) (IFAD, 2019).

7.5 Temperature, Rainfall, Seasons and Agro-Climate Zones

Senegal's climate is generally characterised as tropical, with one rainy season from May–November and a dry season dominated by dry, hot harmattan winds between December and April. Temperatures and rainfall vary across regions, with rainfall generally increasing from north to south and temperatures increasing from coast to interior. Along the coast, temperatures are cool, ranging from 17–27°C. In the northern Sahelian zone, the climate is characterised by cool nights (minimum of 14°C) and hot days (maximum of 40°C). The north has a longer dry season from November–May, and receives about 360 mm of rainfall the rest of the year. Moving south, rainfall increases and reaches up to 1,500mm per year in the extreme south. Hot and humid, the southern region averages temperatures of 30°C throughout the year (Climate Risk Profile Senegal, 2017).

Rainfall is relatively high and dependable in the south, but in the north the climatic shift it has experienced during the past 25 years has resulted in crop and livestock production becoming even more difficult, as desertification extends further into the country from the Sahara. Like its neighbouring countries, Senegal was hit by serious drought in the late 1960s, which has affected the country's ecology and environment. Average annual rainfall and agricultural production have decreased, livestock mortality has increased, and the country's forest resources are disappearing. (UNDP, 2018d)

On the eco-geographic level, criteria that take into account a set of biophysical and socio-economic factors have made it possible to group more or less homogeneous spaces from an integrated development perspective. Thus, Senegal is subdivided from north to south, into 7 agroecological zones, namely: River (Fleuve in French), Niayes, North Bassin Arachidier, South Bassin Arachidier, sylvo-pastoral zone, Oriental Senegal and Haute Casamance and Basse and Moyenne Casamance. (GoS, 2006) In the north of the country,



the Sahelian zone, north of Saint-Louis' region, is covered with sparse vegetation dominated by thorny trees or shrub steppe; The wooded savannah, rich in fauna, characterises the Sudanian zones, in the regions of Fatick and Kaolack, north and centre of Tambacounda region; The thick forest and the most humid zone is located in the Guinean zone, including the North of Ziguinchor and Kolda region; The Sahel-Sudanian zone, in the regions of Dakar, Thiès, Diourbel, Louga, Matam, consist of trees and dry steppe; and finally the Sudano-Guinean zone, in the North of Ziguinchor and Kolda and the South of Tambacounda, is made up of forests and very thick savannas.

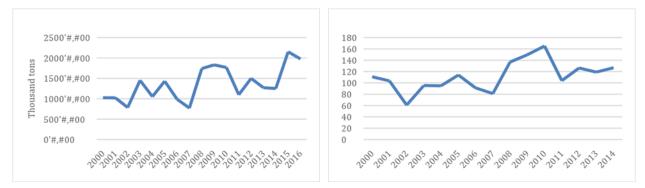
7.6 Agriculture and Rural Livelihoods

Senegalese agriculture is mainly rain-fed and seasonal. It is based on both cash crops (peanuts, cotton, sesame) and subsistence food crops (millet, sorghum, maize). Rice, a traditional crop in Casamance, is growing strongly in the Senegal River valley, in the south of the country and in the centre thanks to rainfed rice varieties. The peanut sector, long the engine of the Senegalese economy is in a phase of recovery after a major crisis. On the other hand, production increases in cereals (millet, rice, and maize), fruits and vegetables, and cassava, responding to growing local demand. (FIDA, 2018)

With the development of irrigation, especially in the Senegal River Valley, the performance of the rice sector has improved. Production of millet, a traditional rainfed crop that had declined sharply, is also on the rise in terms of self-consumption and marketing. Micro and small enterprises play a central role in boosting domestic production for urban consumer markets. The vast majority of agricultural producers are small farmers who cultivate land on traditional land tenure and practice traditional crop rotation. Most of them combine cash crops and subsistence food crops, while possessing a few animals, extensive and, in rare cases, intensive farming. Horticulture is developing in the Niayes zone (along the coast) and in the irrigated lands along the Senegal River where rice cultivation has also developed strongly. (FIDA, 2018)

Livestock is an important sector of the Senegalese economy because of its contribution to the household food and nutritional security and the creation of wealth. It is practiced according to three main systems:

- The predominantly pastoral system practiced over large areas and based on herd mobility to limit the effects of climatic constraints
- The agro-pastoral system which concerns 67% of cattle and 62% of small ruminants in areas such as the Groundnut Basin, Senegal River Valley, Eastern Senegal and Casamance, and
- The intensive system of private and state structures supported by large investments. (FIDA, 2018)





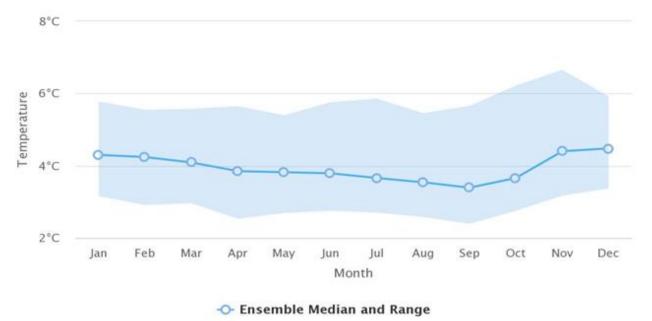
7.7 Climate Change: Temperature

The evolution of temperatures is marked by an upward trend in annual averages between 1950 and 2014, compared to the 1961-1990 normal. An increase of 1.6°C was noted for the mean annual temperature, with a greater rise (3°C) at Linguère, located in the sylvo-pastoral zone, and a smaller rise (0.7°C) at Kédougou 128. Analysis of the increase between 1950-2014 shows lower-than-normal temperatures during the first period



(1959-1968), temperatures globally close to normal (1969-2014), and temperature differences that can exceed 1°C during the period 1995-2014. The increase in temperatures during the cool period has a range of -1.8°C to 1.7°C, but is lower during the warm period (-1.7°C to 1°C) (IFAD, 2019).

Projections on temperature: The mean annual temperature is projected to increase by 1.1 to 3.1°C by the 2060s, and 1.7 to 4.9°C by the 2090s. The range of projections by the 2090s under any one emissions scenario is 1.0- 2.5°C. The projected rate of warming is faster in the interior regions of Senegal than in those areas closer to the coast. All projections indicate substantial increases in the frequency of days and nights that are considered 'hot' in current climate. Annually, projections indicate that 'hot' days will occur on 22-46% of days by the 2060s, and 29-67% of days by the 2090s. Days considered 'hot' by current climate standards for their season are may increase most rapidly in JAS, but the range between model projections is large, occurring on 33-96% of days of the season by the 2090s. Nights that are considered 'hot' for the annual climate of 1970-99 are projected to occur on 27-51% of nights by the 2060s and 37-70% of nights by the 2090s. Nights that are considered hot for each season by 1970-99 standards are projected to increase most rapidly in JAS, occurring on 65-99% of nights in every season by the 2090s. Projected increases in hot days and nights are more rapid in the south and east of the country than the north and west. All projections indicate decreases in the frequency of days and nights that are considered 'cold' in current climate. 'Cold' days occur on less than 3% of days by the 2090s, and 'cold' nights less than 2% of nights. 'Cold' nights do not occur at all by the 2090s in any projections under the highest emissions scenario (A2). (UNDP, 2015h)





7.8 Climate Change: Precipitation

Sahelian rainfall is characterised by high variability on inter-annual and inter-decadal timescales, which can make long-term trends difficult to identify. A period of particularly high rainfall occurred in the early 1960s, whilst the early 80s were particularly dry. Statistically significant decreases of around 10 to 15mm per decade have, however, been observed in the southern regions of Senegal in the wet season (JAS) between 1960 and 2006. Some unusually high rainfalls have occurred in the dry season (JFM) in very recent years (2000-2006), but this has not been part of a consistent trend. There are insufficient daily rainfall observations available from which to determine changes in extremes indices of daily rainfall. (UNDP, 2015h)

Projections on precipitation: Projections of mean annual rainfall averaged over the country from different models in the ensemble project a wide range of changes in precipitation for Senegal, but tend towards

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decreases, particularly in the wet season, JAS. Projected annual change ranges from -38 to +21% by the 2090s, with ensemble means between +7 and -18%. Projected JAS changes ranges from -41 to +48% by the 2090s, with ensemble means between -3 and -18%. Despite the projected decreases in total rainfall, the proportion of total annual rainfall that falls in heavy events tends towards increases in the ensemble projections. Seasonally, this varies between tendencies to decrease in JFM and AMJ, and to increase in JAS and OND. The range of projections from different models in the ensemble, however, includes both increases and decreases in all seasons. 1- and 5-day rainfall maxima in projections all tend towards increases and decreases in most seasons. (UNDP, 2015h)

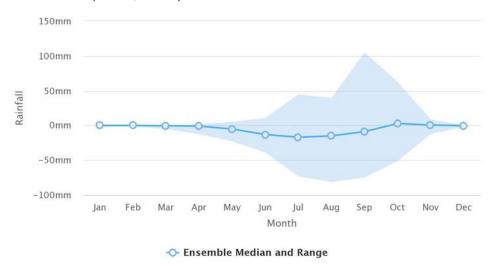


Figure 40 Projected Change in Monthly Precipitation for Senegal for 2080-2099 (WB, 2020)

7.9 Climate Change Impacts: Climatic Hazards and Extreme Events

Senegal is vulnerable to several natural hazards, particularly coastal erosion, droughts, floods, and locust invasions. Flooding annually affects about 200,000 people and has an \$89 million impact, with large-scale flooding in 2009 largely in the Dakar region causing about \$104 million in damages and losses. Flood risk is exacerbated by rapid urbanization, insufficient drainage, and poor sewage infrastructure, which has resulted in the settling of low-lying areas and a reduction in soil infiltration potential. Droughts generally impact the arid and semi-arid Sahelian regions (northern Senegal) every three to four years. Since 1980, droughts have affected more than 3 million people. (GFDRR, 2017)

Climate change is exacerbating hazard risk in Senegal. Rising sea levels and increasingly intense storms are the primary causes of coastal erosion and flood risks. About 74% of the coastal-area housing stock is vulnerable to erosion. Sea levels are projected to rise up to one meter by 2100, potentially putting more than 100,000 people in low-lying areas at greater risk for flooding. (GFDRR, 2017)

Projections on climate impacts: According to the 2017 Climate Risk Profile of Senegal, projected changes by the 2060s include:

- Rising average annual temperatures by 1.1–3.1°C; projected rates of warming are faster in the north and interior, and during the dry season.
- Substantial increases in the frequency of 'hot' days and nights, with more rapid increases in the south and east.
- Uncertainties exist about whether rainfall will increase or decrease, but overall increases in heavy rainfall events are expected.
- Rising sea level of up to 1 meter (by 2100).



7.10 Climate Change Impacts: Lives and Livelihoods

Senegal remains vulnerable to environmental shocks that threaten its stability, including recurring natural disasters (particularly floods and droughts) that will increase in magnitude and extent due to increased climate variability. Between 1970 and 2000, the country suffered prolonged droughts that contributed to a rural exodus. Today, roughly 67% of Senegal's population resides in the urban coastal zone, also the location of 90% of Senegalese industrial production. This coastal area is characterised by low-lying, rapidly expanding, high population suburbs, high water tables and poorly planned drainage systems. Even small amounts of rain can flood entire neighbourhoods. In addition to extreme events, rising sea levels place much of the coastal population, infrastructure and ecosystems at risk from flooding and erosion. Climate change will also impact climate sensitive sectors such as agriculture (70% of production is rainfed), livestock and fisheries, which account for 20% of GDP and employ a majority of the workforce. Food security is already stressed due to low yields and high population growth. Estimates suggest that over 15% of rural households and over 8% of urban households are food insecure, and the country imports approximately 60% of its cereal requirements, mostly rice (a main staple crop) (Climate Risk Profile Senegal, 2017)

7.11 Climate Change Impacts: Agriculture

The current vulnerability of Senegalese agriculture is mainly linked to its heavy dependence on rainfall, the inter-annual variability of which is difficult to predict. Extended rainfall breaks during the cycle can compromise harvests and affect crop yields. For instance, groundnuts are sensitive to both rainfall variability and higher temperatures, and crop models project a 5–25% decrease in yields. Rainfall has been inadequate and decreasing in some areas, affecting important growing regions near Thies and Dioubel. While clear evidence does not yet exist, climate factors may also increase the frequency of Desert Locust infestations, which cause significant crop losses throughout West Africa (Climate Risk Profile Senegal, 2017).

The effects of climate change also affect livestock. Around 30% of households rely on livestock (mainly cattle and small ruminants) to support their livelihoods. Climate change impacts livestock directly (via heat stress and reduced productivity) as well as indirectly through reduced water and forage resources (Climate Risk Profile Senegal, 2017).

Senegal's fisheries employ 17% of the workforce, contribute 2.5% to GDP and are one of the main sources of animal protein in the Senegalese diet. Already stressed from overfishing, fisheries are expected to be negatively impacted by climate change as rising surface water temperatures and ocean acidification alter species reproduction and migration. This in turn affects biodiversity and the livelihoods, incomes and nutrition that depend on fisheries (Climate Risk Profile Senegal, 2017).

Traditional rice cultivation, already heavily penalised by soil and water salinity, which has considerably reduced the area under cultivation in the Fatick, Kaolack, Ziguinchor and Kolda regions, will also be affected. Market gardening in the Niayes cuvettes is also exposed to the risk of saltwater intrusion. The negative effects of climate change on Senegalese agriculture will be felt more by the decline in farmers' incomes, which will be negatively impacted by both an increase in temperature and a decrease in rainfall. (RdS, 2015)

7.12 Climate Change Impacts: Natural Capital

Senegal's rapidly urbanising coastal zone is home to the majority of the country's population, infrastructure and industry, as well as diverse ecosystems providing vital services upon which local economies are highly dependent. Coastal infrastructure, including 74% of housing, is at risk from sea level rise-induced coastal erosion and inundation. Rapid and pervasive erosion (due to both climate and human activity) affects almost every major coastal city, leading to losses of physical and financial assets. The 2009 floods caused over \$100 million in damages (\$67 million in Dakar alone), affecting housing, transportation and health systems. Most of the country's tourism infrastructure lies along the Petite Côte, which already faces the impact of erosion, losing 1–2 metres of sandy beachfront a year. Rising sea levels threaten shallow coastal groundwater sources



through increased salinization. Climate change will impact mangroves, a vital coastal resource as they protect the coastline by moderating storm and wave impacts. Mangroves also stabilise sand and soils, cycle nutrients, absorb and break down waste products, provide wildlife habitat and maintain biodiversity. Mangroves are extremely dependent on sea level variations, rainfall and salinity and could therefore migrate or decrease significantly. (Climate Risk Profile Senegal, 2017)

7.13 Climate Change Impacts: Water

More than 93% of urban and 67% of rural populations have adequate access to water. The vulnerability of water resources is a function of several parameters among which can be mentioned: rainfall variability, anthropogenic pressure, evapotranspiration, salinization, pollution, proliferation of aquatic invasive plants, etc. Forage resources are already experiencing quantitative and qualitative degradation due to the water deficit, which limits the primary productivity of pastures. In addition to reduced surface flows, future rainfall deficits and increased variability are likely to reduce aquifer recharge rates. Along the coast and in major cities like Dakar, saltwater intrusion into coastal aquifers and arable land is already a problem, and sea level rise and decreased rainfall will exacerbate salinity issues. Future demand for irrigation will be a concern as rains become more erratic; agriculture consumes more than 90% of water resources, but only 4% of land is currently irrigated (Climate Risk Profile Senegal, 2017).

7.14 Climate Change Impacts: Health

Climate change is likely to exacerbate the risks and impacts associated with water- and vector-borne diseases, which are already prevalent in Senegal. Across the country, higher temperatures will alter water availability and quality, increasing the incidence of waterborne diseases such as cholera and diarrheal disease, especially during the dry season as lower water levels from evaporation concentrate bacteria. With regard to malaria, the morbidity rates recorded in Senegal's health facilities have significantly decreased. This significant reduction in morbidity could be attributed in part to the application of the various innovative strategies put in place by the NMCP and its partners. (RdS, 2015).

Urban areas such as Dakar, already prone to flooding, will likely see more cholera outbreaks due to an increase in intense rainfall events that damage water and sanitation facilities. In the south, malaria (the number one cause of death in children under 5) will remain a significant risk as temperatures rise and may spread to the north (Climate Risk Profile Senegal, 2017).

7.15 Climate Change Impact: Vulnerability Mapping

Senegal is vulnerable to drought, locust invasion, flooding and related health epidemics, sea-level rise, coastal erosion and its corollaries, and bush fire. Priority areas for research and adaptation measures include water infrastructure, coastal zones, and the agriculture sectors, with particular attention to reducing vulnerability to flooding and improving water management in the Senegal River basin. (World Bank, 2011b) If not addressed, climate change effects across the country will continue to threaten the food security, health and nutritional status of the population, particularly the vast majority who depend on agriculture and farming for their livelihoods. The previous temperature projections show that the number of malnourished people might increase in Senegal as climate change might lead to a decrease of food production.



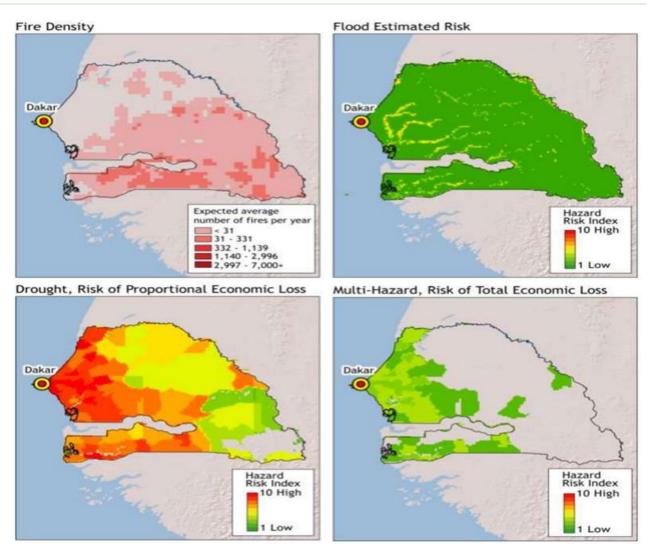


Figure 41 Exposure to climate-related hazards across Senegal (World Bank, 2011b)

7.16 Suggested Geographies and Sectors for Intervention for Climate Change Adaptation

Table 32 Adaptation Options by Sector for Senegal (RdS, 2015)

Sector	Adaptation mechanism	Description
Water	Increasing water resources	Among the identified actions for increasing water supply are the revitalization of the river system of lowlands, temporary pools and artificial lakes, storage of runoff water (Implementation of a storm water management strategy), reuse of wastewater, and the desalination of marine or brackish waters.
	Water management	The reduction of losses in urban and rural networks contributes to more economic water uses and increases water supply.
	Improving the efficiency of irrigation systems	Agriculture uses about 95% of all global freshwater withdrawals to meet current food demand. It is the sector that consumes the most water in Senegal. Improving the efficiency of irrigation systems should be a major objective in the search for climate change adaptation solutions to better fight against water wastage.



Sector	Adaptation mechanism	Description
	Demand management policy	Despite the increase in drinking water production capacity, the Senegalese authorities foresee an imbalance between supply and demand by 2015. In order to cope with this, they have sought to improve demand management by implementing in place of a tariff policy. Senegal has hence chosen to adopt a progressive pricing of drinking water that depends on the volume of water consumed.
Health	Vector control	Among the prevention strategies defined by the WHO to fight effectively against malaria, Anti-Vector Control is the major component. The control plan developed in 2006 focused mainly on the use of impregnated mosquito nets and the introduction of Inner Spreading (AID) as a pilot project.
	Epidemiological surveillance	Early diagnosis and prompt treatment are the two essential components of any comprehensive strategy to reduce morbidity and mortality from malaria. The response to malaria epidemics and emergencies was considered a priority intervention in the two previous strategic plans but did not receive adequate implementation.
	Information, education and communication for behavioural change	In parallel with better environmental information for the health professions, health and environmental education remains a priority. Community mobilisation in an appropriate way to guarantee the adoption of positive behaviours in the fight against these pathologies is one of the determining factors of adaptation strategies. Advocacy and multisector collaboration will mobilise sufficient resources for the implementation of activities. At the local level, community assessments of vulnerability and adaptation to the health impacts of climatic variations are crucial.
	Increasing resilience	Reducing the impact of climatic, environmental, health and economic risks by controlling water, diversifying production, and training rural people, in order to improve the food security of the population and ultimately achieve sovereignty food from Senegal. Introduce new species that are more tolerant to harsh climatic conditions and produce short-cycle cereal varieties adapted to local conditions from selected seeds. Promote sustainable and environmentally friendly farming practices such as: deep plowing techniques, crop rotation.
	Land management	Protection of the environment and sustainable management of natural resources, particularly through knowledge and improvement of soil fertility.
Agriculture	Investments	Stimulating private investments in the agriculture sector to improve productivity and the livelihoods of farmers. Improving the environment and the quality of production so that agriculture is a driver of industrial and artisanal development to better meet the needs of the internal and external markets
	Increase productivity	Strengthening of equitable access to quality seeds and other inputs at remunerative prices
	Needs assessment and policy design	Improve the steering system of the agricultural sub-sector (by strengthening the dialogue between the State and farmers' organisations), adopt a new consensual land reform taking into account rural land, develop and implement a master plan agricultural statistic and the strengthening of the intervention capacities of management structures
	Erosion control and flood management	Various practices of erosion control (e.g., development of stone bunds). The setting of the dunes to protect the vegetable pans of the Niayes and the desalination of mangrove rice fields and restoration of salty soils. Setting up flood defences and plant recession crops near watercourses.



Sector	Adaptation mechanism	Description
	Capacity building	Provide agricultural research structures with appropriate resources (breeding and genetic improvement laboratory, plant and animal biotechnology laboratory, research station, etc.). Support climate data producing institutions to improve the weather warning system and crop forecasting. Revise the agricultural development policy with a view to better taking into account the impacts of climate change. Train, educate farmers about climate change.



Annex 11 BRIEF GUIDELINES FOR IMPROVING ACCESS TO LAND AND TENURE SECURITY

IFAD has addressed land issues mainly through its projects and programmes, and principally through its investments in irrigation, water and soil conservation, forestry and agroforestry, and natural resources management. In addition, the Fund was one of the founding members of the International Land Coalition (ILC) established in 1996, and has been housing its secretariat ever since.

In order to learn from its operational experiences and increase its capacity to work more efficiently around land issues, in 2005, IFAD undertook a stocktaking exercise of the 300 projects approved and supported by the Fund between 1993 and 2004. The exercise identified 85 projects that addressed access to land in one or more of their components, 35 of which were then analysed in depth. This Annex provides a brief guidance on how to improve land tenure and governance to inform and strengthen the design and implementation of future land tenure and governance interventions to best support lasting tenure security and achieve related impacts on poverty, food security, gender equality, environmental sustainability, peace and stability. The lessons learned over the years can be placed within two broad categories: land policy formulation and implementation processes; and the design and implementation of rural poverty reduction programmes and projects.

6.11.16 Securing the right land rights for the right people

It is necessary to specify what kinds of rights (full private ownership or use rights) and whose rights (individual, family, village, ethnic group, state, etc.) need to be secured. Promoting private ownership by setting up cadastres and distributing formal individual legal titles is not always the best solution, as it is expensive and may benefit elite groups that can influence formalization processes. Securing land-use rights through improved tenancy arrangements may better meet the interests of small and landless farmers, and poor rural producers. Formal titles remain an option when no harm is done to existing land access and tenure security mechanisms. Policy frameworks need to accommodate and build upon customary norms and practices, recognise the multiplicity of rights and the coexistence of statutory and customary tenure systems, allow for regional variations, and promote the coherent development of pluralistic systems.

6.11.17 Working with existing systems to provide context-specific solutions

Solutions to the land issues must be sought in situ and informed by the highly diversified and complex realities confronting poor rural women and men. While there is no blueprint solution, the point of departure should be the local land governance system and its economic, political, socio-cultural and ecological contexts. It is often better to build on and foster the progressive evolution of traditional land administration systems (subject to minimum requirements regarding inclusiveness and security of rights) instead of establishing new formal systems at the outset. This is particularly relevant for communal and common property lands, which are very important for the livelihoods of poor rural people and their cultural values. Sustainable and effective solutions always need to be embedded in a national policy and development planning context. Moreover, transnational migrations and movements of people may require multi-country and regional solutions.

6.11.18 Promoting long-term support, partnerships and knowledge-sharing

Pro-poor land reform requires sustained and adequate investments, long-term political commitment and broad and sustained public consultation and civic education to build and sustain trust and agreement among all social groups. Governments, development partners and civil society should join together under the leadership of the countries themselves to support land reforms in favour of the poor. Securing lessons from the field that can feed into pro-poor policy development is crucial, and IFAD can play an important role in this regard by drawing upon its own programmes and the experience of its partners, including that of civil society and farmers' organisations.

6.11.19 Building government capacity at all levels and fostering decentralisation

Home-grown leadership at all levels is a prerequisite for meeting the complex challenges of land-related reform processes In the Maghama District of Mauritania, IFAD supported a negotiation process to provide landless



families with long-term use rights to newly developed flood recession land. This process involved three phases. First, village committees were created to elaborate an entente foncière (land pact between landowners and land users), which was discussed and endorsed by all community members. Second, land tenure assessment was undertaken to identify the most vulnerable groups. The third phase consolidated the land tenure arrangements through a participatory process of negotiation and certification. Negotiations over the entente foncière took two years, but eventually led to signing by landowners and poor farmers. By 2004, 28 villages had signed the agreement and a study of its social implications was undertaken. This greatly contributed to strengthening social capital in the area, as demonstrated by landowners agreeing to facilitate land access for people with no formal titles to it, and also to building mechanisms to negotiate shared resource use to prevent and contain conflict. During the second phase, the IFAD-supported Maghama flood recession works also provided about 9,500 hectares of farmland under controlled flooding conditions. EB 2008/94/R.2/Rev.1 8 for poverty reduction. State institutions need to strengthen their human resources capacity for land policy reforms and actions, especially in handling land administration, land registration, land adjudication, and dispute resolution mechanisms. Inter-ministerial and sectoral collaboration is also essential. Institutional strengthening also applies to local government. Decentralisation represents a huge opportunity for integrating statutory and customary tenure systems, providing more refined and contextual responses to local land tenure issues, and for embedding these in a more sustainable institutional framework. However, in certain settings and contexts, decentralised approaches can be highly vulnerable to elite capture. The challenge is to strike a balance between key positive aspects of centralised reform initiatives and decentralised approaches.

6.11.20 Empowering civil society organisations

While the formulation and implementation of pro-poor public policies are led by government, enforcement and success depend on the active participation of citizens and on a strong and vibrant civil society that can express the will of the people and also represent the interests of the poorest and marginalised groups. The advocacy role of civil society needs to be strengthened, as does its capacity to partner with government. Mechanisms for state-civil society interactions must emerge, expand and be consolidated in order to form a broad pro-poor land reform coalition. Development agencies and solidarity organisations can support the development of a vibrant civil society whose roles may include: research, public consultation and information dissemination; direct support to policy implementation (mainly piloting, monitoring and evaluation [M&E]); advocacy in defending the rights of poor and marginalised groups; and social mobilisation to enable poor rural people to play a full role in the policy processes that affect them.

6.11.21 Valuing land as more than an economic asset

In all considerations of pro-poor land tenure security, land should not be viewed only as an economic asset, but as an integral part of the cultural and social fabric. However, given asymmetries in power, institutions governing access to land often adopt policies based on the interests of dominant groups and/or only on the principles of economic efficiency.

6.11.22 Mitigating and resolving social conflict

In order to mitigate conflict, broad stakeholder participation, particularly of rural people and their organisations, is critical for all land-related policy and institutional reform processes. Given that formal conflict resolution mechanisms, such as the courts, are generally costly and less readily accessible, existing community-based conflict resolution mechanisms (such as the gacaca/abunzi [courts/mediators] system in Rwanda) should be drawn upon as a first recourse for solving conflicts, with statutory mechanisms as a final recourse. In this regard, participatory land-use planning and multi-stakeholder user agreements (e.g. among farmers and pastoralists) are very effective approaches.



Annex 12 INTEGRATED PEST MANAGEMENT FRAMEWORK

1 OVERVIEW

Integrated Pest Management (IPM) is an ecosystem-based strategy that focuses on long-term prevention of pests and diseases (hereafter referred to as "pests" for brevity) and their damage to agricultural production through a combination of techniques such as biological control, habitat manipulation, modification of cultural practices, and use of resistant varieties, with chemical pesticides and other controls used as a last resort. IPM is the practical manipulation of pest populations using sound ecological principles to keep pest populations below a level causing economic injury.

IPM describes and recommends the most appropriate pest management strategies that apply to a given problem created by the activities of pests, and ensures that issues relating to incorrect pesticide application and pollution from agrochemical are avoided and/or managed correctly.

This Integrated Pest Management Framework (IPMF) is the main safeguard instrument for tackling pest management issues for the project.

2 RATIONALE

Excessive use of fertilisers and agrochemicals can potentially pollute water sources, and may render the produced crop unfit for human consumption (a collateral damage with severe health and nutrition impacts).

In IPM, monitoring and correct pest identification are essential in determining the pest and disease management approach to adopt. Monitoring involves the physical examination of the farm to identify type of pest, number per square metre, and impact on vegetation. The most effective, long-term way to manage pests is by using a combination of methods that work better together than separately. Approaches for managing pests are often grouped in the following categories.

- Biological control is the use of natural enemies—predators, parasites, pathogens, and competitors—to control pests and their damage. Invertebrates, plant pathogens, nematodes, weeds, and vertebrates have many natural enemies.
- Cultural controls are practices that reduce pest establishment, reproduction, dispersal, and survival. For example, changing irrigation practices can reduce pest problems, since too much water can increase root disease and weeds.
- Mechanical and physical controls kill a pest directly, block pests out, or make the environment unsuitable for it. Traps for rodents are examples of mechanical control. Physical controls include mulches for weed management, steam sterilization of the soil for disease management, or barriers such as screens to keep birds or insects out.
- Chemical control is the use of pesticides. In IPM, pesticides are used only when needed and in combination with other approaches for more effective, long-term control. Pesticides are selected and applied in a way that minimises their possible harm to people, non-target organisms, and the environment.

Pesticides are used only after monitoring indicates they are needed according to established guidelines, and treatments are made with the goal of removing only the target organism. Pest control materials are selected and applied in a manner that minimises risks to human health, beneficial and non-target organisms, and the environment.

Six major components are common to all IPM programmes and comprise:

- Pest identification (including monitoring and assessing pest numbers and damage)
- Selection of management approach
- Guidelines for when management action is needed



- Preventing pest problems
- Using a combination of biological, cultural, physical/mechanical and chemical management tools
- Evaluation of pest management strategy adopted.

Consequently, proper management and agrochemical usage is needed via an Integrated Pest Management Plan (IPMP). With training, some youths could earn a living as service providers in agrochemical and pesticides application. Considering the land mass required for the large-scale cultivation, breeding and processing of the value chains, there is undoubtedly the likelihood of infestation by pests, currently within the proposed area or migratory pests.

3 OBJECTIVES

The purpose of this IPMF is to provide a strategic framework for the integration of environmental and pest management considerations in the planning and implementation of the activities within the project. Each Sub-Project will develop a project-specific IPMP (see IPMP outline presented at end of this annex). This IPMF has been prepared as a guide for initial screening of the sub-projects for any negative impacts which would require attention and mitigation prior to their implementation.

The objectives of the IPMF are to ensure the following criteria are met in line with GCF, IFAD and other applicable standards and best practices:

- Set out the roles and responsibilities of each entity
- Establish clear procedures and methodologies for IPM planning, design and implementation of microprojects to be financed under the Project
- Set out the expected monitoring and evaluation systems for the various pest management practices for subprojects under the Project
- Assess the potential economic, environmental and social impacts of the pest management activities within the sub-projects
- Mitigate against negative impacts of crop protection measures
- Identify capacity needs and technical assistance for successful implementation of the IPMF
- To identify IPM research areas in the Project
- To propose a budget required to implement the IPMF.

It will also contribute to improving beneficiaries' attention towards smart and regenerative agriculture, IPM practices and technologies, and climate change mitigation measures.

4 Roles and Responsibilities

5 Implementation Framework

5.1 Planning

Planning is at the core of an IPM program and needs to be tailored for every crop that is to be considered. Early planning, prior to a growing season, is crucial for the Programme as it will help to minimize reliance on pesticides.

To effectively plan, design and implement an IPM program, there is need to understand the agro-ecological zones where the project will be based. This is important since IPM relies on the ecosystem approach in its implementation. The sub projects will be implemented in different agro-ecological zones; hence the IPM elements will also depend on the location of the projects.

In addition to the agro-ecologies and enterprises, IPM planning involves consideration of the inputs required in the production processes of the target enterprise. For example:

• What support does the project provide to the target farmers in terms of acquiring key farm inputs?



- Are the inputs used by farmers complementary and do they empower the farmer economically?
- Are there simple and cheap methods that farmers can adopt in their production systems?

Some of the key inputs applied include seeds, fertilizers and pesticides.

5.2 Pest Identification

Effective pest identification requires the following approach:

- Know the crop's growth characteristics to recognize abnormal or damaged plants.
- Identify the cause of the problem to know what kind of pest to be dealt with. If something cannot be identified, consult an expert.
- Determine the stage of growth of the pest and the crop. This is essential for proper timing of control methods.
- Decide whether the infestation is increasing or decreasing.
- Assess the condition of the crop.
- Map out problem areas. It may be possible to limit the area that needs treatment.

5.3 Selection of Management Approach

Once the problem is identified, an appropriate management approach should be determined. The goal in selecting control tactics is to use methods that are effective, practical, economical, and environmentally sound.

To select the best control tactics, it is important to:

- Understand the life cycle and habits of the pest. Some control methods will work only if they are used at the right time.
- Decide whether the infestation is serious in terms of economic loss.
- Compare the costs and benefits of various control methods.
- Make plans for the future. Not every part of an IPM Programme can be put into effect immediately. Some tactics, such as planting resistant varieties or rotating crops, require long-range planning.

Once the underlying cause(s) for pest issues is identified, long-term solutions can be developed.

Non-chemical methods of pest control include:

- Biological controls:
 - The use of natural enemies of crop pests, often called beneficials, which include parasites, predators and insect pathogens such as nematodes (Steinernema species), ladybird beetles, bacteria (Bacillus species) and fungus (Beauvariabassiana).
 - Environmental-friendly chemical interventions sometimes are included in the biological controls, such as the use of semi-chemicals, including pheromones and feeding attractants, and bio-pesticides, for example, specific and beneficial friendly insecticides.
- Cultural and crop or livestock management controls:
 - Tissue culture,
 - disease-free seed,
 - trap crops,
 - cross protection, cultivation,
 - refuge management,
 - mulching,
 - field sanitation,
 - crop rotations,
 - grazing rotations,
 - steam cleaning,
 - trapping,



- freezing,
- intercropping.
- Strategic controls:
 - planting location,
 - timing of planting,
 - Use tillage practices that aerate and loosen the soils, allowing crops to thrive in place of weeds.
 - Add fertilizers, lime and gypsum, based on soil tests, to provide critical nutrients and adjust pH for proper plant growth.
 - Irrigate a field very early in the morning or after 16:00 to prevent extended leaf wetness, which
 increases the potential for disease. Deep and infrequent irrigation is best. For flowers and
 vegetables, water plants at the base and avoid wetting leaves.
 - harvesting.
- Genetically based controls:
 - Insect and disease resistant varieties/breeds and rootstock. Selection of the latest varieties of crops tested and released by national agencies and suitable for the agro-ecological zone will minimize the need for pesticides.

Despite efforts to avoid using chemicals, there are times when only pesticides can control the damage. Even so, it may not pay to use them. Pesticides should be used in an IPM Programme only when the benefits (yield, quality, aesthetic value) exceed the costs of control.

It is not simple to figure out when it pays to use pesticides. There are many variables: the pest population, variety, and crop growth stage, value of the crop, weather, and cost of the control.

The following economic concepts are helpful in determining the point at which it pays to use pesticides:

- Economic Damage (ED) occurs when the cost of preventable crop damage exceeds the cost of control. For example, if maize is worth 1,500 CFA a bag and an insecticide costs 10,500 CFA a hectare, then economic damage occurs when insect damage causes a yield loss of seven or more bags a hectare.
- **Economic Injury Level (EIL)** is the lowest pest population that will cause economic damage. For many pests it is important to use control measures before this level is reached.
- Economic Threshold (ET) is the pest population level at which a control tactic should be started to keep the pest population from reaching the EIL (the ET is also called the action threshold.) Economic thresholds have been established for a number of crop / pest systems, in particular those involving insects.

Pesticides vary greatly in their level of toxicity, so during training in IMP an ecological approach to pest control, it is important to use a product that is effective but as nontoxic as possible to non-target organisms. A reduction in pesticide use can only be achieved with a greater understanding of plant selection, placement and care.

Farmers can do a great deal to reduce and, in many cases, eliminate their use of pesticides. There may be a cultural, mechanical, physical, biological and/or chemical approach that effectively controls the problem with minimal impact on humans and the environment, and IPM considers all those approaches. Whatever the situation, it is always important to first identify the problem, monitor the severity and spread, and know at what time or stage control is necessary

5.4 Evaluation

Evaluation means deciding how effective a Programme is and whether any changes are needed. To evaluate an IPM program, the following steps are to be followed:

- Monitor fields and keep records. Each time fields are visited, note crop and pest conditions, record crop yields and quality and record any counts on pest populations.
- Record control measures. Records should include dates, weather conditions, pest levels, application rates and timing, and costs. Good records are a guide if the same problem occurs and a legal safeguard if required.



• Compare effectiveness. Whatever management approach is chosen, use a different method on some strips. This permits comparison in order to determine which works better, taking into account costs and environmental impacts.

5.5 Monitoring and Evaluation

The focus of monitoring and evaluation (M&E) will be to assess the build-up of IPM capacity and the extent to which IPM techniques are being adopted in agricultural production, and the economic benefits that farmers derive by adopting IPM. It is also crucial to evaluate the prevailing trends in the benefits of reducing pesticide distribution, application and misuse.

Indicators that require regular monitoring and evaluation during the programme implementation include the following:

- (a) The IPM capacity building in membership of Farmer Groups: Number of farmers who have successfully received IPM training in IPM methods; evaluation the training content, methodology and trainee response to training through feedback Numbers of Farmer Organizations that nominated members for IPM training; emphasize the number of women trained; assess Farmer Groups understanding of the importance of IPM for sustainable crop production
- (b) Numbers of farmers who have adopted IPM practices as crop protection strategy in their crop production efforts; evaluate the rate of IPM adoption
- (c) In how many crop production systems is applied IPM? Are the numbers increased and at what rate?
- (d) How has the adoption of IPM improved the production derive by adopting IPM Economic benefits: increased in crop productivity due to adoption of IPM practices; increase in farm revenue resulting from adoption of IPM practices, compared with farmer conventional practices;
- (e) Social benefits: improvement in the health status of farmers
- (f) Numbers of IPM networks operational and types of activities undertaken
- (g) Extent to which pesticides are used for crop production
- (h) Efficiency of pesticide use and handling and reduction in pesticide poisoning and environmental contamination
- (i) Levels of reduction of pesticide use and handling and reduction in pesticide poisoning and environmental contamination
- (j) Number of IPM participatory research project completed
- (k) Influence of the results of IPM participatory research on implementation of IPM and crop production
- (I) Overall assessment of: activities that are going according to plans; activities that need improvements; and remedial actions required

The following indicators will be incorporated into a participatory monitoring and evaluation plan:

- (a) Types and number of participatory learning methods (PLM) delivered; category and number of
 extension agents and farmers trained and reached with each PLM; practical skills/techniques most
 frequently demanded by counties and farmers, and food, cash and horticultural crops and livestock
 management practices preferred by farmers.
- (b) Category and number of farmers who correctly apply the skills they had learnt; new management
 practices adopted by most farmers; types of farmer innovations implemented; level of pest damage and
 losses; rate of adoption of IPM practices; impact of the adoption of IPM on production performance of
 farmers
- (c) Increase in food, cash and horticultural production systems/livestock production; increase in farm revenue; social benefits: e.g. improvement in the health status of farmers, reduction in pesticide package and use; and number of community families using preventive mechanisms against diseases.

The participatory M&E system for IPM should also be enterprise-based so as to deal with a group of diseases and pests affecting any single crop. The approaches being proposed here therefore does not handle single



pest to otherwise the issue of different agronomic practices for different crops would have to be taken into consideration.

Similarly, the animal, forestry and aquaculture pests are treated in a similar way. This approach seems to be the most cost effective in terms of mobilizing stakeholders with common interest (e.g. sugar cane farmers, banana farmers, aquaculture farmers, livestock farmers, etc.) as well as area of coverage and intensity of the pest problems.

The steps involved in participatory M&E will include:

- (a) Stakeholder Analysis and identification of M&E team
- (b) Setting up objectives and expectations for monitoring
- (c) Selection of Impacts to be monitored (Variables/Indicators)
- (d) Develop Indicator sheets
- (e) Develop and test the tools to be used in data collection (usually Participatory Rural Appraisal tools are used)
- (f) Collect the data from as many sources of stakeholders as possible
- (g) Assessment of the data and discussion on regular basis

Participatory Impact Monitoring (PIM) should be employed for continuous observation, systematic documentation and critical reflection of impacts of IPM, followed by corrective action (plan adjustments, strategy changes). It should be done by project staff and target groups, using self-generated survey results. The stakeholder analysis and selection of participatory M&E team is therefore very important in implementing an effective impact monitoring.

Once an agreement on the objectives of PIM is reached among the stakeholders (development partners, implementing agency, target groups etc), their expectations and fears regarding project impact are identified, e.g. in brainstorming sessions. The more participatory the activities have been planned the more these views will overlap each other.

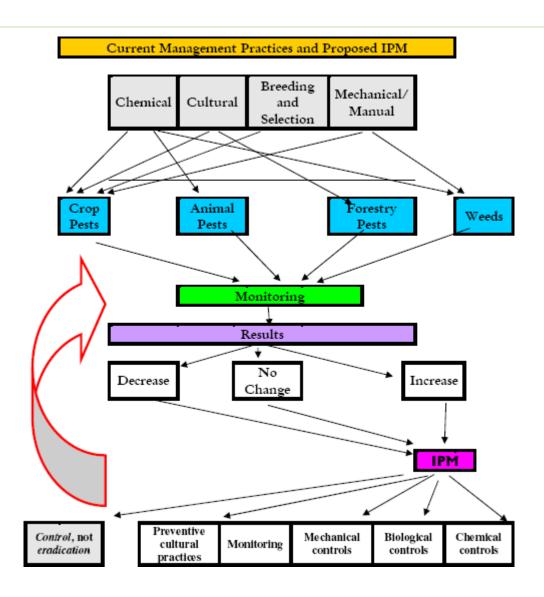
Having examined existing M&E data regarding the selected impacts, the task is to develop indicator sheets which contain all important information for impact measurement: definitions of terms, indicators and their rationale, survey units and respondents, instructions for data collection, statements on limitations of the methods used.

Joint reflection workshops with project staff, target group representatives and other stakeholders are conducted in order to:

- (a) consolidate impact monitoring results by combining the views of various actors and
- (b) ensure that necessary plan adjustments and strategy changes are in line with the target groups' demands and capacities.

The Participatory M&E Framework for IPM should follow a feedback principle in which results or impact of any interventions can be traced to the activities/inputs. Either by using conventional pest management method or IPM, the feedback should allow for evaluation of the methods used and adjustment or incorporation of additional control methods (see figure below). The results of the activities form the basis of the factsheets to be used in monitoring.





6 CAPACITY NEEDS AND TECHNICAL ASSISTANCE

IPM is a knowledge intensive and interactive methodology. The need to accurately identify and diagnose pests and pest problems and understand ecosystem interactions could enable farmers with biological and ecological control opportunities and in making pragmatic pest control decisions.

Consequently, the success of IPM depends largely on developing and sustaining institutional and human capacity to facilitate experiential learning for making informed decisions in integrating scientific and indigenous knowledge to solve county, ward and village specific problems.

Poor communication between farmers, extension agents and researchers from research institutes and universities has often led to poorly-targeted research or to poor adoption of promising options generated by research. The full benefits of investment in agricultural research thereby remain untapped under these circumstances.

Closer farmer-research investigator interaction and adaptive research and participatory learning approaches in capacity building efforts can help to bridge this gap and make research results more applicable by farmers. The farmers will learn biological and ecological processes underpinning IPM options, and use the newly acquired knowledge to choose compatible methods to reduce production and post-harvest losses through frequent field visits, meetings, demonstrations, adaptive research trails, etc



Capacity building will be achieved through farmer-based collaborative management mechanisms where all key stakeholders shall be regarded as equal partners. Beneficiary farmers shall be the principal actors facilitated by other actor such as from research institutes, academic institutions, sector ministries, NGOs, etc. as partners whose role will be to facilitate the process and provide technical direction and any other support necessary for the implementation of PMP. The pilot PMP should be designed to build on, and to some extent strengthen existing national capacities for the promotion and implementation of IPM.

7 IMPLEMENTATION

The PMU for each country will be responsible in the implementation of this IPMF and estimated costs for the various activities under these projects will be built in the budget.

Core activities will include:

- (a) Coordination
- (b) Development of IPM packages for the pilot NARIGP counties
- (c) IPM orientation workshops
- (d) Training of trainers and Farmer groups training
- (e) Public awareness and promoting the adoption of IPM practices
- (f) Field guides/training materials for production, purchase and distribution
- (g) Farmers field days
- (h) Field visits and study tours
- (i) Annual workshops on progress and lesson learnt
- (j) Monitoring and evaluation.

Each 6 months, all parties interested in IPM activities will meet to discuss the progress report and activities plan for the following 12 months.

Each Sub-Project will give periodic reports to the PMU detailing planned activities for the following quarter, and should reflect the approved work program. This should include:

- (a) Name of crop and area under demonstration,
- (b) Activities performed during this period (1 to 3 months),
- (c) Number of farmers involved,
- (d) Dates of various activities,
- (e) Inputs used
- (f) Pest and diseases observed and control methods
- (g) Person hours or days spent on each activity
- (h) Field days and number of people attended
- (i) Farmer to farmer visits done and number of participants
- (j) Leaders invited and attended any of IPM events
- (k) Lessons learnt and problems during the month104
- (I) Other activities done by the group
- (m) Future plans
- (n) Observation and suggestions.

8 BUDGET

A budget will be developed by each PMU based on the sub-projects to be identified. However, for budgeting purposes at the Programme level, an overall budget of USD is envisaged, based on a cost per plan of USD 10,000 for sub-projects, covering the following activities:

- Plan development
- Stakeholder consultation (1 x event after plan conception)
- Training (1 x training event per year for 5 years)



• Monitoring and Evaluation (1 visit per year for 5 years).

9 IPMP OUTLINE

The IPMPs developed by the sub-projects will need to contain at least the following sections:

- Introduction and Scope
- Site information
- Identification of actual and potential pest threats
- Prevention and containment measures
 - o Activities
 - o Budget
- Evaluation indicators and potential adjustments

