Independent Office of Evaluation

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EVALUATION SYNTHESIS ON IFAD'S SUPPORT TO INFRASTRUCTURE

LESSONS AND GOOD PRACTICES FROM FOUR CASE STUDIES

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INTRODUCTION

The four case studies present the institutional challenges in relation to infrastructure sustainability, and how user participation in infrastructure management contributes both to the sustainability of the structures built, and to resilient livelihoods.

The case studies also demonstrate the wide range of infrastructure that IFAD is involved in, from post-Soviet irrigation systems in Georgia to watershed development in Burundi and The Gambia, and nomad wells and pastures in Chad.

They demonstrate the large differences and complexities of local situations. All four cases are long-running IFAD or other donor investments in infrastructure projects, with gradual, but often still incomplete, improvements in their institutional and management arrangements, technical adequacy and sustainability.

IFAD has a comparative advantage in the support of "soft" and community-led infrastructure. However, there are clear limitations set by weak institutional frameworks.

- In Georgia, the slow path of institutional reform in a transition country has acted as a limitation, and user participation has been limited. The absence of water users' organizations (WUOs) has negatively affected the efficiency of water supply and use on farmers' irrigation plots.

- In Burundi, IFAD's comparative advantage on building grass-roots organizations has been clear, but their effectiveness has been limited owing to the weak institutional framework in this fragile context. IFAD has started to work directly with government on improving the enabling ownership and management regulations and laws for associations. The importance of user ownership is also highlighted in the Gambia case, as being key for sustainability.

- In The Gambia, ownership is also related to the limited benefits, and thus motivation, that women attained so far from the improved water infrastructure.

- Finally, the case of Chad shows the strengths of a community-led approach to infrastructure that builds on traditional institutions and ownership principles. As a result, the project has been able to enhance the resilience of pastoral livelihoods and settled farm communities, but it has required a long-term engagement to ensure the sustainability of the institutions built.

IFAD's approach to infrastructure often builds on complementarities with other projects or government initiatives.

- In the case of Georgia, IFAD financed the rehabilitation of irrigation structures to facilitate value chain development, with institutional capacity-building expected to be provided by the World Bank.

- In Chad, IFAD's support to pastoral livelihoods, which included the provision of water for livestock, built on the institutional approach developed by the French Development Agency (AFD). In Burundi, cofinancing of infrastructure with the OPEC Fund for International Development (OFID) and others was common. However, IFAD did not always have a fallback position when complementary activities were delayed or changed.

Soft infrastructure, and the related capacity development of farmers' organizations, government support agencies and other service providers is required in order to ensure the sustainability of benefits from infrastructure.

- Capacities were instrumental to better manage the generated water structures (Chad), while in other cases capacity-building would have been more effective if training had been provided more continuously throughout the project cycle (The Gambia).

- Some capacity-building of government and other service providers should have prepared them better for beneficiary needs and sustaining services, also beyond project completion (Chad and The Gambia).

Delivering infrastructure through a participatory approach helps to ensure ownership and sustainability.

- Farmer participation in one form or another was common in the case studies, but it sometimes had limited impact on actual decisions (Georgia).

- Capacity-building and participation were not always well phased with actual infrastructure construction or rehabilitation (Burundi and The Gambia).

Sustainability would have benefited in all cases from: far more attention, and early on, to sustainable users' and farmers' organizations; the right phasing of soft and hard infrastructure elements; enabling regulatory and market environments; and some form of continued financial and technical support by local and central governments. Exit strategies were not developed sufficiently and early enough. Institutional support for sustainable infrastructure management requires a long-term and location-specific perspective.

GEORGIA

Institutional reforms in a transition country

Project name	Agriculture Modernization, Market Access and Resilience Project (AMMAR)
Implementation period	28/05/2015 – 31/10/2020
Project costs	USD 35 million (approved); IFAD Loan USD 13 million; GEF and DANIDA cofinancing

In Georgia, IFAD's focus has been on value chain development, which has also included rehabilitation of irrigation systems. The initial assumption was that improved irrigation systems with more reliable and measurable water allocation to farmers would increase the effectiveness and efficiency of production systems. Value chain development was expected to incentivize farmers to engage more strongly in irrigated crop production. However, experience shows that the impact of irrigation is limited in the absence of effective farmers' WUOs, sound water and land management practices and skills, secure market access, and profitable value chains.

While IFAD financed the rehabilitation of irrigation structures, it did not support the institutional capacity-building in water and irrigation management, or in operation and maintenance (O&M). This was to avoid overlap with a parallel World Bank project – Financed Irrigation and Land Market Development Project (ILMPD). The World Bank supports all aspects of water management institutional and management capacity-building of the Georgian Amelioration Company (GAC) and WUOs, land registration and related legislation.

Institutional reform of irrigation management

Georgia has a complex history of institutional change in irrigation and drainage. Until 2006, primary irrigation and drainage canals and most secondary canals (off-farm systems) were owned and managed by the Department for Amelioration Scheme Management of the former Ministry of Agriculture. Then, the Government of Georgia replaced it with four regional state-owned limited liability companies.

Attempts to privatize these companies started in 2010. In 2012, the four regional companies were merged into a single state-owned entity called the United Amelioration Service Company for Georgia, which in 2015 was renamed to become GAC. The infrastructure owned and managed by GAC consists of 128 irrigation systems, 22 reservoirs, 31 dams, and other hydraulic infrastructure. The total length of the main canals in the irrigation systems is 3,100 km, first-degree distributaries total 3,600 km, and second- and lower-degree distributaries (internal network canals) 25,000 km.

A legacy of low demand for irrigation services

During the Soviet period, large state and collective farms had operated irrigation facilities, but these were replaced with a succession of different local organizations in the ensuing 20 years. As the owner of the system assets, GAC is responsible for irrigation infrastructure management. Its responsibilities include the O&M of irrigation systems down to the farm-gate level.

GAC is supposed to sign individual service contracts with each customer/landowner for water supply on an annual basis. Yet irrigation contracts and demand for water in some systems cover only a fraction of the total irrigation command area. The World Bank estimates[1] that 28 per cent of all water users have a formal delivery contract with GAC. The share is even lower among women water users, with only 18 per cent of them having formal contracts with GAC.

Confidence in government entities and reliable water and maintenance services is low, and the quality of secondary and tertiary canals is not always adequate, as planned rehabilitation funds have been mainly reallocated for primary canals and systems, and maintenance has been neglected.

Continued inefficiencies in irrigation systems

Current local water delivery involves scheduling based on demand from the farmer, relayed to a ditch-level "regulator" working for GAC, which then is aggregated upward. Farmers judge crop water needs visually, and often try to delay irrigation to avoid having to pay irrigation service fees, counting on rainfall until an extended drought makes irrigation unavoidable. In practice, there are often informal arrangements among farmers – sharing a ditch and irrigation water among themselves and thus saving on service fees.

Fee collection rates are at an acceptable level (reportedly more than 60 per cent) but unified irrigation service fees[2] do not reflect the actual costs for adequate O&M of the system. The tariff

[1] World Bank (2020): Irrigation and Land Market Development Project. ISR.

[2] GEL 75 (USD 22.73) per hectare annually.

is so low that it only covers 10–12 per cent of actual O&M costs. The rest is subsidized by the government.

At the same time, the main system infrastructure limits the options available for system operation to basic on-off control and crude adjustment of flow rates in larger canals. In addition, the virtual absence of water measurement devices and the paucity of cross-regulators in major canals make precise deliveries to individual farmers difficult or impossible. This results in canal operators diverting large volumes of water into canal systems and allowing unused tail water to return to the river. Water in the source rivers is relatively abundant, and most systems do not currently serve their full design command areas.

Generally, little maintenance is carried out on farm-level tertiary canals. In the absence of formal and well-organized local WUOs, most irrigation systems rely on informal local arrangements to distribute water and clean ditches.

Slow progress at local level

The long absence of workable and trusted water management and users' associations has been a well-recognized problem in Georgia. This problem has been addressed in the State Irrigation Strategy (2017-2025) through the promotion of legislative changes for the creation of WUOs. Moreover, a special department has been created within the GAC structure to facilitate the creation of WUOs in all regions.

However, the operationalization of institutional reforms and establishment of WUOs is still pending. The intervention supported by the World Bank, which was intended to complement IFAD's work on value chains, has not yet succeeded in setting up WUOs.[3]

The State Irrigation Strategy requires consultation, and dialogue with farmers is required at three separate stages of rehabilitation: selection, design and construction. The case study found that participation was rather symbolic. Proposals for rehabilitation were discussed at community meetings and requests were made by municipalities, but GAC had the final say in selecting the schemes for rehabilitation.

[3] World Bank (2020): Irrigation and Land Market Development Project. ISR.

Limited benefits from rehabilitation

Benefits for farmers from rehabilitation have been limited. The rehabilitation of irrigation schemes was delayed and came at the tale-end of the value chain projects. Rehabilitation mainly focused on main and secondary canals, with little attention to on-farm canals. The projects did not aim to improve water management practices. The case study did not find farmers adopting higher-value production as a result of improved irrigation.

The absence of WUOs and the low efficiency of irrigation services continue to limit access to and utilization of water. According to beneficiaries and target groups, in July-August, when crop water requirements are at their peak and precipitation is at its lowest monthly level, there is either no water or it runs at very low levels. Thus, farmers may sometimes receive water only two or three times per season.

Institution-building in a country with fragile situations

Project name	Overall costs	Duration	Infrastructure-related components and activities
Rural Recovery and Development Programme (PRDMR)	31.3 million USD	1999 - 2011	Natural resource management ; community development ; social and economic infrastructure.
Transitional Programme of Post-Conflict Reconstruction (PTRPC)	36.7 million USD	2005 - 2014	Rehabilitation and development of swampland, feeder roads and drinking water
Agricultural Intensification and Value-enhancing Support Project (PAIVA-B)	39.8 million USD	2009 - 2020	Agricultural value chain and infrastructure development (milk collection , markets)
Value-chain Development Project I (PRODEFI)	90.5 million USD	2010 - 2019	Agricultural value chain development; irrigated rice production pilot.
National Programme for Food Security and Rural Development in Imbo and Moso (PNSADR-IM)	36.9 million USD	2014 - 2021	Irrigation infrastructure and road access (IFAD implemented; financed by Global Agriculture and Food Support Programme)
Value-chain Development Project II (PRODEFI II)	34.9 million USD	2015 - 2021	Value chain development
Agricultural Production Intensification and Vulnerability Reduction Project (PIPARV-B)	101.01 million USD	2019-2025	Integrated land management ; community development with focus on agricultural productivity and value addition

IFAD's portfolio in Burundi

In Burundi's land-scarce environment, infrastructure plays a fundamental role to enhance agricultural productivity and value addition, mitigate high population pressures and potential conflicts over land, and reduce environmental and climate fragilities. Fragile situations in Burundi are partly caused by the ramifications of the conflicts of the 1990s and continued occasional political

unrest (such as around the 2015 Presidential elections). In part, they are related to serious environmental and climate change pressures caused by growing populations on scarce land and increasingly erratic weather and rainfall patterns.

In Burundi, the IFAD country portfolio of the past two decades has been large, with 10 projects and a total of US$525.28million approved between 1999 and 2019, much of it for infrastructure (project infrastructure shares have ranged from 33 to 78 per cent). More than 40 per cent of IFAD's total investments has been cofinanced, mainly by OFID, African Development Bank, European Union, Belgian Fund for Food Security, World Food Programme, and the Gambia Agricultural Food Security Project, and often focused on infrastructure.

Since 2009, the largest shares of infrastructure investments have gone into: (i) swamp/marsh land reclamation, restoration and development; (ii) natural resources management (NRM) through erosion control, expanded vegetation and reforestation (in the context of broader watershed management); (iii) feeder roads; and (iv) milk collection and pasteurization centres, storage buildings, and rice drying pads and hullers.

Over time, IFAD infrastructure investments have moved from relief, rehabilitation and social sectors to markets, whole value chains and technically more sophisticated water management technologies. Watershed/land management has been important throughout, and climate change adaptation gained greater prominence in 2015 with the first grant from the Adaptation for Smallholder Agriculture Programme.

Increased focus on infrastructure

Infrastructure has gained a prominent role in IFAD's country strategy. The 2008 country strategic opportunities programme (COSOP) mentioned infrastructure more in passing and was more oriented towards community mobilization. The 2016 COSOP had a strong infrastructure focus. Its results management framework contained detailed infrastructure results indicators, including targets and sustainability criteria. It also aimed for a stronger and long-term programmatic approach through thematic and geographical clustering of investments around watersheds and marshlands.

Lessons from past and ongoing infrastructure projects were carefully analysed, particularly for swamp/marsh lands development. The first and most important lesson was that limited institutional and financial arrangements for infrastructure O&M did not allow for sustainability and resilience to climate change. Among other actions, this was supposed to be addressed through policy dialogue to achieve legal recognition of water users' associations (WUAs) and increased land tenure security.

Last, the Government's financing deficit and its limited capacity to fund and operationalize policies and strategies on agriculture, environmental conservation and water management on the ground were seen as a continued major risk factor for sustainability.

There have also been some broader challenges. These have included issues related to market supply and demand, and the underdeveloped private sector. For NRM infrastructure, farmers have not always seen personal incentives for enhanced infrastructure, such as terracing.

Solid performance in infrastructure

Given the country's circumstances, IFAD's support to infrastructure has performed relatively well, including in infrastructure subprojects. All projects have attained high levels of targeted infrastructure outputs, but infrastructure utilization and actual benefits in terms of higher crop production and livestock marketed surplus for target populations are less clear and documented. Sustainability/exit strategies and beneficiary participation have usually received somewhat lower ratings.

However, there have still been a number of shortcomings. Projects have had problems in infrastructure planning and monitoring, including uncertainties around infrastructure tracking and placing. A number of projects have had poor technical specifications and cost estimates. Following a period of political instability in 2015-2016, there were significant delays in completing critical feasibility studies for water and irrigation infrastructure. Delayed cofinancing of critical infrastructure investments made it challenging to integrate complementary activities in capacity-building and input supply.

Community development as the foundation

One of the main accomplishments has been the consistent focus on community development. All projects have formed and trained O&M groups or producers' organizations (POs) for managing infrastructure. However, monitoring and evaluation systems have not monitored the capacities and effectiveness of such groups well enough. Women have been well represented in groups, but have often not benefited equally. Despite the focus on community development, projects have not always taken fully participatory approaches to planning and construction of infrastructure.

It has been easier to establish and train infrastructure users' groups and value chain POs than to operationalize them for O&M. Collecting user and membership fees has often been difficult, and improvements would require national legislation, which the Government and IFAD are working on. Government's financial capacity for sustainable support of public infrastructure beyond project completion has been limited.

Complementarities and phasing of soft and hard infrastructure activities have not been realized, particularly for swampland and irrigation infrastructure. Support for soft activities, such as beneficiary and group participation in planning, stakeholder capacity-building, and O&M arrangements has happened too late, too early or not at all. The latest IFAD-supported project in Burundi has explicitly paid attention to better phasing and coordination of soft and hard infrastructure activities.

Capacity-building for operation and maintenance

Operation and maintenance are, to a large part, carried out through beneficiaries, although other stakeholders from local and state authorities and the private sector are also expected to contribute. Beneficiaries would either organize themselves in local institutions closely linked with specific infrastructure sites, mostly WUAs and road users' associations, or POs and cooperatives, often organized at a slightly higher geographical level and covering several communities or communes. In the case of land and water management, government institutions and regulations would be required to ensure O&M.

In all projects, O&M groups were formed and trained, which has definitely led to improved knowledge and skills on watershed management, ownership of new techniques and PO capacity. For instance, in the Value Chain Development Programme, 30 WUAs had been established and trained in regular swampland production intensification by the time of the mid-term review in 2014. They received practical training on water management, maintenance of structures, administrative and financial management, and collection of user fees.

Sustainability not yet assured

The functioning of these groups is governed by legal conventions and contributions of local users for the financing of maintenance. However, the uncertainty of government support services and roles for the constructed and rehabilitated infrastructure have generated some sustainability issues for O&M group functioning.

Some socio-economic infrastructure seems to be functioning several years after construction. However, management committees for socio-economic infrastructure do not seem to be too "robust" without further institutional support to consolidate such committees.

Similar observations have been made for enhanced NRM environmental conservation infrastructure in uplands. Infrastructure fee collection in swamplands is particularly weak.

Road users' associations are operational and ensure regular road maintenance, but the absence of government regulations to regulate fee collection for road maintenance endangers sustainability after project closure.

The weak capacity of O&M users' groups and the viability of community groups in general have been seen as limiting the sustainability of programme impacts. Supervision missions over the years have recommended strengthening their institutional capacities. They have also pointed to the challenge of changing committee composition, as membership is often motivated by incentives provided during project implementation, putting at risk their functioning after the end of the programme.

Many of these O&M groups continue to receive benefits from further support through other IFAD-supported projects.

Ownership and sustainability

Project name	National Agricultural Land and Water Management Development Project (NEMA)
Implementation period	20/12/2012 – 31/12/2019
Project costs	USD 76.9 (approved); IFAD loan: USD 7.07 million; IFAD grant: USD 27.35 million

IFAD long-term engagement and sustainability

IFAD has been supporting construction and management of rural infrastructure in The Gambia for a long time and with considerable financial resources, with a strong focus on lowland agriculture, swampland irrigation development, and women as target groups. Such infrastructure has improved production and women's lives to some extent, but suffered from overly short lifespans and limited ownership by communities and target groups.

Sustainability has become a major concern over the years. At the community level, two factors stand out for low sustainability: the lack of engagement and the lack of ownership by beneficiaries in the planning, implementation, maintenance and oversight of project activities and infrastructure. This has been partly due to the low technology and quality of the built infrastructure in the earlier projects. Yet, at the same time, infrastructure of higher quality and durability has tended to be beyond the capacity of beneficiaries to manage and maintain.

To date, the Government has not demonstrated the capacity and political will to contribute significantly to long-term financial and technical management capacities. While moving to sturdier and more durable infrastructure in the National Agricultural Land and Water Management Development Project (NEMA), IFAD has not been able to simultaneously fully convince the Government to adopt the infrastructure as a public good and to ensure its sustainability through continued financial and technical contributions.

The Independent Office of Evaluation of IFAD's country programme evaluation (CPE) in The Gambia (2016) specifically focused on sustainability in IFAD's longer-term portfolio, including the two most recent projects for lowland development (the Participatory Integrated Watershed Management Project and NEMA). It also drew attention to the lack of clarity about beneficiary ownership in infrastructure and the role of the state. The CPE made a number of recommendations to achieve better beneficiary ownership and increase the Government's commitment to contribute more towards sustainable financial and technical management beyond project completion.

Infrastructure performance in the 2016 country programme evaluation

The CPE mission visited 28 randomly selected sites with nationwide coverage and presence of IFAD-supported water management projects. It found many water management and irrigation structures to be incomplete, broken or in need of repair. Capacity utilization rates were very low, sometimes due to inappropriate site locations. Dykes were found to poorly maintained or had even almost disappeared; many of them were in dire need of repair. These dykes were no longer sufficient to facilitate the increased production they had been built for. On a positive note, one third of the infrastructure was found to be in good condition, as were gardens, nursery sheds and buildings of savings banks. Poultry houses and bridges were in reasonably good condition.

The CPE found that the type of infrastructure provided by several IFAD-supported projects over time required significant labour inputs by the communities, was of relatively low quality, and provided only short-lived benefits, which discouraged beneficiary ownership. Projects did not incorporate the costs of post-project O&M and sustainability into design, price-setting and financial calculations.

Insufficient ownership and capacities

Beneficiary engagement and ownership have often been insufficient, in part due to the long-standing, in-country practice of free hand-outs and untargeted government subsidies, which has resulted in a lack of incentives for implementing specific mechanisms to sustainability such as financial contributions or digressive and time-bound subsidies. Effective extension, the availability of efficient input and output markets free from governmental interference, and sufficient access to sustainable financial services still need to be fully addressed, as does the targeting of the poorest farmers.

Training has often been provided as a one-time activity and lacked the consistent follow-up required for better and more sustainable infrastructure ownership and maintenance.

Communities have largely been left with the responsibility for maintaining the structures by themselves, which they have often been unable to shoulder.

Infrastructure ownership by farmers' groups as well capacity-building, service provision and market incentives have ultimately proved insufficient to ensure sustainable use of watershed infrastructure in The Gambia, particularly for women farmers.

Management of the tidal irrigation schemes promoted in Gambia was beyond the capacity of farmers' organizations. Proper drainage requires the support of a technician to manage floodgates according to tides and rains. Technicians and social community organizers are available in The Gambia, but their engagement in the dispersed beneficiary communities beyond project completion cannot be assured owing to organizational and financial problems.

Capacity-building

The latest IFAD-supported project in The Gambia (NEMA 2013-2019) addressed the issue of sustainability by using machinery and introducing sophisticated technical requirements to construct dykes, bunds and other infrastructure. While such infrastructure generally has a relatively longer life, it is expected to be difficult for communities to maintain on their own.

NEMA trained farmers' organizations, women, youth groups (*kafos*) and leaders or lead farmers on managerial, governance and technical skills. Training and sensitization were generally undertaken once a year, but, in particular, rural women and youth would require more continuous mobilization and training. All training was done by local service providers, public or private. The limited capacities of service providers were a major cause of implementation delays.

Infrastructure as a public good and capacity needs assessments

The main lesson learned from the Gambia case study is that much of watershed infrastructure should be regarded as a public good, particularly in low-income countries and in view of long-term sustainability. Governments need to ensure their continued support of community-based infrastructure beyond project completion, and to the extent that it requires some financing and external technical support for continued O&M.

Second, a thorough capacity needs assessment would have been needed to underpin a comprehensive training strategy for the organizational management of farmers' organizations and the training and capacity-building needs of other stakeholders, from local authorities to service providers.

Infrastructure for resilient livelihoods

Project name	Projet d'Hydraulique Pastorale en Zone Sahélienne (PROHYPA) [Pastoral Water Project in the Sahel Zone]
Implementation period	26/01/2010 – 31/03/2015
Project costs	USD 20.741 million; IFAD grant: 17.849 million.

IFAD's support to pastoralists in Chad

In Chad, the Water Code enacted in 1999 defines water as a public good. Although pastoralism covers a vast part of the country, the Water Code does not specifically refer to nomadism or transhumant populations.

Water points usually serve on a first-come, first-served basis. However, for wells, there are complex rules in place. Traditionally, the primary right of use of the wells belongs to pastoral groups that invested in their construction. They have the primary (but not exclusive) right to the wells. As a principle of reciprocity, all pastoralists and farmers that need to move their herd have the right to use someone else's well. This practice creates a system of "social debts" between transhumant communities, but also between them and the settled communities. Day-to-day maintenance of the wells involves mostly in-kind work and some buckets, ropes and water-drawing mechanisms (with human or animal force). Heavy maintenance could require hiring paid labour.

The IFAD-supported project in Chad (Pastoral Water and Resource Project in Sahelian Areas) has built on the experiences of earlier interventions to secure access to water for transhumant populations, implemented by the AFD since 1993 over a period 20 years. The type of infrastructure is the same as that used by the AFD. The project covered both pastoral and agropastoral zones.

One of the main project objectives was to strengthen the participation and capacities

of local institutions and populations of both pastoralists and settled communities. Improved decision-making in planning and managing the pastoral land and water resources was expected to sustainably improve water infrastructures and avoid conflicts among different groups, thereby enhancing resilient livelihoods. This included: the marking of transhumant corridors for pastoralists and their livestock; adherence to these corridors; and an enhanced quality of construction and management of wells and ponds.

Institutions for pastoralist hydrostructure

The IFAD-supported project has established three types of management committees for different infrastructure types and tasks.

Committees for well management (CWMs) are in charge of the maintenance and repair of wells, conflict prevention and environmental protection (one specialized commission for each thematic area). Each committee is in charge of one of the wells and detailed operational plans were elaborated for execution. Twelve members form the executive office. They are officially nominated through a decree signed by the president of the CWMs, the heads of cantons, the deputy prefect, the head of the project office, and a project representative.

Committees for pond surveillance are tasked with managing, maintaining and protecting water ponds against pollution. As the ponds are far from the villages and camps, these committees are organized quite differently from the CWMs. Around the 77 ponds, surveillance committees have been put in place. Each committee is composed by members designated by the traditional authority, the head of the village (khalifa). Its main responsibilities include (i) provide access to the ponds for all users, both settled and transhumant; (ii) prevent the water from being used for market gardening; (iii) ensure that the ponds were not dug for bricks; (iv) put in place prevention strategies and conflict management; (v) grow plants around the ponds to prevent sanding; and (vi) ensure periodic maintenance of the ponds.

Mixed committees have been formed to ensure that all users adhere to the three transhumant corridors (190 km) marked out by the project, and to the management of potential conflicts. Each committee is composed of 12 members, with representatives of administrative and traditional authorities, livestock farmers and agricultural farmers, and the Government's decentralized technical services.

Their specific tasks are: (i) awareness-raising of all users about the importance of adhering to the corridors to avoid conflicts; (ii) participation with the project team in putting in place temporary and permanent markings; and (iii) ensuring that the corridors were clear and that everybody adhered well to the corridors.

Management in pastoral and agropastoral zones

For well and pond management in the pastoral zones, the traditional pastoralists' management system has been used, at least in part. People have maintained the wells through their own work or the hiring of local well diggers. The pastoral communities are also expected to dig the ponds before the rainy season to avoid the problem of sanding. Through the project, a CWM has added to the traditional management system to which all parties agreed (traditional chief, administrative authority, and beneficiaries).

In the agropastoral zones, CWMs have been formed, including representatives from both settled and pastoral populations. The transhumant communities have been involved in the management of the wells in these zones, something that had been traditionally carried out by the settled communities. The O&M of these wells is covered through monthly contributions from the settled livestock farmers and voluntary contributions from transhumant populations. The conditions of the contributions are set by the beneficiaries themselves. The voluntary contributions of the transhumant population depend on the length of their stay close to the wells.

As water can be a source of conflict in the region, it is important to respect settled and transhumant customs, and to involve all relevant local and regional institutions and population groups. The creation of organizations has enhanced the governance of pastoral infrastructure. No major conflict around the wells has been recorded. Communities have been made aware of their responsibilities, which has reduced conflicts. The management committees have not interfered with the customary practices of the different social groups.

Impact

The hydrostructures have enhanced the resilience of the transhumant livestock system by improving water and land access. They have also lowered the pressure on the pastures. As the ponds are temporary, this has prevented the fixation of the herds. The marking of the corridors and securing the transhumance have been part of addressing climate change risks, as a strategy to tackle the climatic events and the seasonal changes. However, the project did not manage to put in the permanent corridor markings before completion, as costs had been underestimated (and contractors lacked the relevant experience). The Government has been asked to fund this marking as a contribution to the sustainability of the project, but it remains unclear whether this has happened.

The project has had a positive impact on livestock production, through the secure transhumant corridors, water points and the newly accessible pastures. The construction and rehabilitation of the wells and ponds has reduced the work time for livestock watering by 30 per cent, with 110,000 km^2 of newly accessible pasture lands. Thanks to the extension of their grazing lands, the pastoralists have been able to postpone their descent to the south, where the risks of conflict with settled populations is usually higher. There has been an increase in herd numbers, by 7 per cent a year, with a 75 per cent decrease in herd losses, due to reduced road accidents during migration, better pastures and water points. Animals have gained weight, and daily milk production from increased from 0.5 to 1.0 litres on average. Moreover, the increased water coverage has benefited the consumption needs of households, as pastoral wells can also be used for domestic purposes.

Resilient livelihoods and sustainable infrastructure

The project has had an impact on the reduction of conflict situations and – as a consequence – on the social and economic quality of the pastoralists. The support to local committees for managing the improved hydrostructures in Chad has enhanced local social cohesion, with positive dynamics between pastoralists and settled communities. In the end, these institutions have been well accepted. However, they have remained fragile and their activities have been occasional, mostly dedicated to maintenance and conflict resolution.

Investments into soft infrastructure have enhanced the impact and sustainability of the hard infrastructure provided. The impact of the new agricultural practices, the hydrostructures, and the road and fluvial transportation ways has been sustained by the institutional capacities built. Security of land rights has incentivized investments in land, with farmers able to use their land as collateral for bank loans.

Abbreviations and acronyms

AFD	French Development Agency
CPE	The Independent Office of Evaluation of IFAD's country programme evaluation
CWMs	Committees for well management
GAC	Georgian Amelioration Company
NEMA	National Agricultural Land and Water Management Development Project
NRM	Natural resources management
O&M	Operation and maintenance
POs	Producers' organizations
WUAs	Water users' associations
WUOs	Water users' organizations

Captions & Credits

- Cover photo: The Gambia - Participatory Integrated-Watershed Management Project. Women fill jugs with clean drinking water from a hand pump in Marakisa village. ©IFAD/Nana Kofi Acquah

- Page 4: Bangladesh - Coastal Climate Resilient Infrastructure Project. Connecting road built by IFAD to connect through Nil Dumur hat, Sham nagar, Sathkhira. ©IFAD/G.M.B. Akash

- Page 5: Sri Lanka - Smallholder Plantations Entrepreneurship Development Programme. Farmer working in a rubber nursery in Monaragala district. ©IFAD/G.M.B. Akash

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- Page 10: Georgia - Agricultural Development Project. Man working in his small farm in Lower Phonichala village. ©IFAD/Robert Grossman

- Page 13: Burundi - Agricultural Intensification and Value-enhancing Support Project. Woman using harvested water in Rubuga hill, Gitaramaka village, Karusi Province. ©IFAD/Susan Beccio

- Page 15: Burundi - Agricultural Intensification and Value-enhancing Support Project. Banana farmers in Mwurire hill, Bugendana. ©IFAD/Susan Beccio

- Page 16: The Gambia - Participatory Integrated-Watershed Management Project. Women fill jugs with clean drinking water from a hand pump in Marakisa village. ©IFAD/Nana Kofi Acquah

- Page 20: Chad - Project to Improve the Resilience of Agricultural Systems. Man extracting oil from sesame seeds in the village of Mangalmé. ©IFAD/Barbara Gravelli

- Page 23: Chad - Food Security Project in the Northern Guéra Region Phase II. Livestock market in Mongo. ©IFAD/Sarah Morgan

- Page 25: Chad - Food Security Project in the Northern Guéra Region Phase II. A woman arriving at the well to fill her buckets in Mormo village. ©IFAD/Sarah Morgan

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