

Large Grant Design Document

ENHANCING INSTITUTIONAL BREEDING CAPACITY IN GHANA, SENEGAL AND UGANDA TO DEVELOP CLIMATE RESILIENT CROPS FOR AFRICAN SMALLHOLDER FARMERS

Full Proposal

Proposal submitted to

International Fund for Agricultural Development (IFAD)

By

Africa Rice Center (AfricaRice)

Abidjan, Côte D'Ivoire



AfricaRice

Table of Contents

Table of Contents.....	2
Summary Table.....	3
I. BACKGROUND.....	8
II. RATIONALE: RELEVANCE AND LINKAGES.....	8
A. LINK TO OUTPUTS OF GRANTS POLICY AND CORPORATE PRIORITIES.....	8
B. CONTRIBUTION TO COUNTRY PROGRAMME AND PLANNED OR ONGOING PROJECTS (FOR CS GRANTS).....	9
C. RATIONALE FOR GRANT FINANCING, FOR SELECTED IMPLEMENTING AGENCY AND FOR RECIPIENT SELECTION AND RECIPIENT CAPACITY.....	9
III. THE PROPOSED PROJECT.....	10
A. TARGET GROUP.....	10
B. OVERALL GOAL AND OBJECTIVES.....	10
C. PROJECT OUTCOMES.....	11
D. PROJECT ACTIVITIES.....	11
Key Activity Outputs.....	12
Activity 1 – Delivery chain and knowledge platform: Connecting the dots between breeders, extension workers and farmers.....	13
1.1 Engaging smallholder farmers.....	13
1.2 Linking with the seed business.....	14
1.3 The Knowledge Platform.....	14
Activity 2 – Improved data management and digitalising breeding.....	15
2.1 BMS Deployment and support.....	16
2.2 Data Integration and Sharing.....	16
Activity 3 – Breeding: integrating modern approaches.....	17
3.1 Breeding schemes.....	17
3.2 Modern technologies.....	17
Activity 4 – Capacity enhancement (human and infrastructure).....	17
4.1 Human capacity.....	17
4.2 Improved Infrastructure.....	18
IV. PROJECT IMPLEMENTATION ARRANGEMENTS.....	18
A. IMPLEMENTING ORGANISATION(S).....	18
B. PROJECT MANAGEMENT AND IMPLEMENTATION PERIOD.....	18
C. MONITORING, EVALUATION AND REPORTING.....	18
D. INDICATIVE WORK PLAN (TABLE 2).....	21
V. SUPERVISION, KNOWLEDGE MANAGEMENT AND SCALING UP.....	23
A. SUPERVISION ARRANGEMENTS.....	23
B. KNOWLEDGE MANAGEMENT PLAN.....	24
C. SCALING UP AND SUSTAINABILITY.....	24
VI. PROJECT COSTS AND FINANCING.....	26
A. PROJECT COSTS BY COMPONENT/ACTIVITY (TEXT AND TABLE).....	26
B. PROJECT FINANCING, INCLUDING TABLE SHOWING PROPOSED BY CATEGORY OF EXPENDITURE FOR IFAD AND OTHER FINANCIERS.....	27
VII. FINANCIAL GOVERNANCE.....	31
A. PROCUREMENT PROCEDURES FOR GOODS, SERVICES AND HUMAN RESOURCES.....	33
B. FINANCIAL MANAGEMENT SYSTEM, INCLUDING ACCOUNTING SPECIFICATIONS.....	35
C. AUDIT ARRANGEMENTS.....	36
REFERENCES.....	36
Annex 1: Results-based logical framework.....	38
Annex 2: Supporting documentation for grant design document.....	41
Annex 3: Eligibility and Due Diligence Checklist.....	42
Annex 4: Letters of Support from Upper Management at Partner Institutions.....	43
Annex 5: Confirmation of acknowledgement of design document, budget and Large Grant Agreement template.....	47

Summary Table

1. Name Originator: Ndavi, Malu Muia	2. Division(s): (include all divisions submitting)
3. Title of the proposal: Enhancing institutional breeding capacity in Ghana, Senegal and Uganda to develop climate resilient crops for African smallholder farmers	
4. Value of IFAD grant: USD 2.5 Million	5. Co-financing: (USD 1.83 M) In Kind contribution
6. Implementation period: 36 months	7. GRIPs ID: 20000001621
8. Selected Priority Area: <input type="text"/>	
9. Window: <input type="text"/>	10. Country/Countries: Ghana, Senegal, Uganda
<p>11. Background/relevance: The demand for increased productivity in Africa is growing at a rapid rate. Overall, consumption of food crops is increasing with this demand met, largely, through food imports. However, with better access to inputs and seed distribution channels for smallholder farmers, there is potential and expectation for crop production in well-defined delivery chains to contribute to food and nutrition security and stem rural poverty. African plant breeders are poised to be at the forefront of this effort by developing and testing improved cultivars that will produce more and better crops in response to local and global market demand. To address this challenge the Integrated Breeding Platform (IBP, https://www.integratedbreeding.net/) and AfricaRice propose a project that contributes directly to outputs of IFAD's Grant Financing Policy: a pro-poor grant that will strengthen the breeding capacity within national agricultural plans in three low-income countries of sub-Saharan Africa, where agriculture is key to rural livelihoods. It directly aligns with 3 Strategic Objectives (SO) of IFAD's Strategic Framework 2016-2025:</p> <p>i) SO1: increase rural people's productive capacities: smallholder farmers will have access to improved and resilient cultivars to enhance food security and household incomes. The tools, services, knowledge, resources and peer interactions facilitated by the IBP will enable breeders to integrate new tools and breeding practices that save time and increase effectiveness in developing new cultivars better suited to farmer needs.</p> <p>ii) SO2: increase rural people's benefits from market participation: the varieties developed will be targeted to markets for both staple and cash crops (mainly root and tubers, cereals and legumes).</p> <p>iii) SO3: strengthen the environmental sustainability and climate resilience of rural people's economic activities: resilient crops with broad adaptability to different climatic conditions will be developed.</p> <p>The project's design is anchored on knowledge building, dissemination, and policy engagement; one of IFAD's key pillars for results delivery. Implementation will also be in line with IFAD's five principles of engagement: targeting and benefitting poor rural people; social and economic empowerment; gender equality; innovation, learning and scaling up of successes; and leveraging partnerships.</p>	
<p>12. Direct and indirect target group: The project will benefit 10,000/country smallholder farmers directly (in total 30,000 over the three countries) as IBP will be linked with on-going national agricultural strategies and plans led by National Agricultural Systems (NARS) who are partners in the project implementation. The four partner institutes that will be instrumental in linking the grant to the national agricultural plans are: <i>L'Institut Sénégalais de la Recherche Agricole</i> (ISRA) in Senegal – through four (4) centres: <i>Centre National de Recherche Agronomique de Bambey</i> (CNRA Bambey), the <i>Centre d'Étude Régional pour l'Amélioration de l'Adaptation à la Sécheresse</i> (CERAAS), the <i>Centre de Recherche Agricole St Louis</i> (CRA St Louis) and the <i>Centre de Recherche Agricole Djibélor</i> (CRA Djibélor), Crop Research Institute (CRI) in Ghana, National Semi-Arid Resources Research Institute (NaSARRI) and National Crop Resources Research Institute (NaCRRI) in Uganda. As such, about 10-15 breeding programmes, 20 to 35 breeders in total across the four target Institutes, will benefit from practical and applied learning of modern breeding methods as they go about implementing country agricultural plans. Moreover, the IBP will be working with African universities to support teaching on how to use IBP tools and modern breeding strategies, to proactively develop the skills of young plant breeders. Having access to such technologies also levels the playing field for women researchers at the early stages of their careers by providing equitable access to resources and knowledge (the aim is to include at least 40% women in the project). Another benefit will be the ability for developing country researchers to readily link with advanced research institutes and universities globally. Finally, because buy-in by farmers at early stages of a breeding programme guarantees rapid uptake of new varieties, the IBP will work with partner institutes who have used Participatory Rural Appraisal (PRA) approaches to incorporate local knowledge and opinions (traits of importance) of rural people in planning the development of new cultivars that will best benefit them: http://www.wacci.edu.gh/theses-abstracts1.</p>	

13. Goal, objectives and expected outcomes: The overall **goal** is to contribute to enhanced food security and poverty alleviation by increasing small-holder productivity and income in the 3 target countries in Africa. The main **objective** is to develop and disseminate improved crop cultivars that have characteristics that meet smallholder needs (improved grain, fodder, improved quality of produce grain size, colour, milling etc.) and market demands as well as able to mitigate agro-ecological challenges, climate change, biotic and abiotic stresses. Ultimately, this will lead to the adoption of 'fit-for-purpose' varieties, which is imperative to secure food security over the next 10 years, while aligning with the Science Agenda for Agriculture in Africa (S3A). The major expected outcomes are:

- i. Smallholder farmers with improved resilience to climate change and economic vulnerability by adopting new and better crop varieties that reflect market demand.
- ii. National breeding programmes that better align with and deliver on National Agricultural Plans, thanks to the adoption of best plant breeding practices.
- iii. New crop varieties produced more effectively and efficiently by African plant breeding institutions, following a demand-driven crop variety approach.
- iv. A network of African universities with the capacity to train the next generation of plant breeders and scientists in modern plant breeding.

14. Key activities by component: The context for this proposal is in a value chain approach that spans crop improvement based on smallholder farmer preferences, modern breeding, capacity mobilisation, seed systems, and the engagement of agribusiness and entrepreneurs. The programme will have the following components and outputs:

- (i) **Delivery chain and knowledge platform: Connecting the dots between breeders, extension workers and farmers.** The project will provide expertise, tools and technologies for breeders to manage their ongoing breeding programmes effectively and efficiently, delivering improved varieties with traits based on the needs of the farmers, engage entrepreneurs (especially youth), to establish seed businesses to ensure that farmers have access to the new varieties and other inputs necessary to improve productivity, in response to a demand-driven variety development design.
- (ii) **Improved data management and digitalising breeding.** The IBP, hosted by AfricaRice, aims to be a valuable resource for breeders by providing them with a complete toolbox to conduct their programmes more efficiently. This proposal includes support in the use of the Breeding Management Systems to for routine breeding activities, and to integrate and analyse data. Services provided include support for better data management and assistance for the integration of molecular markers and other modern breeding strategies. The BMS builds a safe, standardised and centralised record of institutional data from one generation to the next. It will assist in developing networks and knowledge, facilitate teamwork and secure institutional memory.
- (iii) **Breeding: integrating modern approaches.** In this activity, individual breeding programmes will be assessed as to how their efficiency could be improved. All phases of the programmes will be addressed, including objective setting, germplasm selection, experimental designs, resources, and the use of modern information and technologies.
- (iv) **Capacity enhancement (human and infrastructure).** The availability of trained breeders who are motivated, together with appropriate infrastructure to implement digital data management and produce reliable phenotypic data is critical for the sustainable adoption of the new methodologies and approaches deployed in this project. The key activities here includes support for human capacity development and improved infrastructure.

15. Recipient: The proposed recipient is AfricaRice. Integrated Breeding Platform (IBP) is not to be intended as a sub-recipient being an hosted entity at AfricaRice.

16. Rationale for recipient selection and recipient capacity: The selection of AfricaRice is directly aligned to the exceptions indicated in the IFAD grant policy (15(iii) of the Grants Policy); because direct selection is allowed for *global and regional grants to institutions that are unique in their normative, policy or representational mandates and therefore have no direct attribution is possible. AfricaRice Centre is a unique institution within the Consultative Group for International Agricultural Research (CGIAR) because unlike all other CGIAR Centres, it is an intergovernmental association of African member countries. This peculiar features will allow the NARS to continue their national crop breeding also after the project closure thanks to this institutional framework. Africarice is is a unique regional apex research organization for NARS of the 27 member countries though part of the CGIAR and has been funded though the Generation challenge programme to develop breeding tools suited for developing countries especuaially sub-saharan Africa. The IBP arose from the Generation Challenge Programme (GCP), a 10-year and USD 170M initiative over the period 2004-15, which demonstrated that harnessing plant genetic diversity, and applying modern breeding to the development of new crop varieties that meet the needs of smallholder farmers, is an effective means of conducting*

translational research ([see success stories online](#)). IBP tools and approaches are already being adopted across Africa, within day-to-day activities to run modern breeding programmes, where upper management at various Crop Research Institutes has entrusted the IBP to support their deployment.

17. Project cost: See budget table below. Building on a grant from the Gates Foundation and some carryover funds from the GCP, the IBP will contribute up to USD 2M over 3 years to support the continuous development of the BMS as well as part/full-time IBP staff engaged in the project. Since the project is linked to on-going national programmes, three year period is adequate to complete the implementation of the proposed activities and to achieve planned outputs. About fifty percent (50%) of the direct costs of the grant will go directly to support activities and infrastructure for NARS:

Budget (USD '000s):

	Y1	Y2	Y3	Total	Co-financing	Grand total
Salaries and Allowances	210	220	230	660	520	1 180
Equipment and Materials¹	175	225	225	625	60	685
Operating Costs	60	70	70	200		200
Goods Services and inputs²	50	75	75	200	900	1 100
Travel	25	25	25	75	40	115
Consultancies	30	40	40	110	50	160
Training	50	70	70	190	40	230
Workshops	70	70	70	210	50	260
Total Direct Cost	670	795	805	2 270	1 660	3 930
Management Fee	50	65	65	180	170	350
CSP (2%)*	14	18	18	50		50
Total Indirect Cost	64	83	83	230	170	400
Grand total	734	878	888	2 500	1 830	4 330

¹ IT and field infrastructure, field trials

² Mainly genotyping services in the grant, BMS development and maintenance under Co-Financing

18. Risks:

BMS product readiness: Negligible risk. The desktop version of the BMS is a mature product- more than 200 users across 10 countries in Africa. A robust server version for multi-user institutes is also now available.

Adoption of technology and methodology by users: The IBP is working with a solid base of early adopters in the target countries, has overall commitment from national programme leaders, and will promote proven approaches. The risk will be mitigated through the provision of support services adapted to specific needs.

Continued and sustainable adoption: Behavioural change requires sustained effort. Ongoing presence and support through the IBP Regional Hubs, together with on-the-ground results, will ensure continued use. This is under-pinned by university training of a new generation of breeders.

Enabling environment for technology adoption and impact: An enabling environment that includes seed systems, involvement of entrepreneurs and farmer participation will be essential for the project to deliver benefits to smallholder farmers. The IBP will use their experience with similar projects (e.g. TL III, funded by the Gates Foundation), in which the value chain approach has proven to be successful in generating positive impacts on livelihoods.

19. Monitoring & Evaluation, KM and Learning: The project will have a solid management framework that will include a risk matrix and verifiable performance indicators. Activities and progress will be reported through a shared content management system and 'ownership' of the project, including KM and lessons learnt, and will be facilitated and enhanced through a 'users input' panel that encourages participatory involvement in deployment, as well as in support and breeding services. MLE will include:

1. Effective project management and reporting
2. MLE framework in place for effective monitoring and implementation
3. Management of implementation of project milestones
4. Empowering partners, NARS and stakeholders as measured by demand for training courses.

20. Supervision modalities: The project will be supervised as per the guidelines described in IFAD's Grant Procedures. Supervision will be the responsibility of the grant sponsor. The grant will be supervised to (a) ensure that the project is moving towards the intended results; (b) support the resolution of known challenges; (c) pursue the project's learning agenda; and (d) review financial reports and costs, and verify them as reasonable.

21. Linkages: The IBP and AfricaRice have close working relations with African Sub-Regional Organisations and IBP has formalised a partnership with CORAF/WECARD to promote and support the deployment of its approaches and tools in West and Central Africa. Similarly, it is building new ties with ASARECA and CCARDESA. The IBP and AfricaRice will be engaged in research for development and technology transfer (TAAT) initiatives supported by the African Development Bank. Linkages will be established with current ongoing IFAD country operations such as the Adaptation for Smallholder Agriculture Programme (ASAP) and the Ghana Agricultural Sector Investment Programme (GASIP) in Ghana; the ACCA programme, the Agricultural Value Chains Support Project and the Support to Agricultural Development and Rural Entrepreneurship Programme in Senegal; and the Agricultural Technology and the Agribusiness Advisory Services Project and the Project for the Restoration of Livelihoods in the Northern Region (PRELNOR) in Uganda. In Uganda the Minister for Science, Technology and Innovation has confirmed that he will facilitate the IBP in Uganda, especially through partnerships with NARO and Makerere University.

22. Scaling up: The project will constitute part of on-going national breeding programme initiatives and since these are part of the national breeding systems, the outputs will be scaled up under the national programmes in the long term, (b) the project will engage policy level actors so that outputs from the training can inform policy with regard to development of country programmes for other crops and (c) facilitation of new breeding methods, the use of different breeding tools and approaches, and the adoption of new technologies, to improve the efficiency and effectiveness of national breeding programmes.

23. Sustainability: The project adopts a 'community-led programme' model, where smallholder farmers will actively participate in project implementation, namely Participatory Varietal Selection (PVS), identifying their needs with guidance from local institutions to ensure ownership and commitment. Linkages with development programmes, national priorities and strategies for youth employment will also facilitate scaling up to ensure sustainability.

24. Other aspects: AfricaRice through their Breeding Task Force and the IBP from its GCP roots is about empowering African partners to embrace new opportunities through technology innovation and a unique spirit of true partnership across plant breeding and plant science communities (<http://www.scidev.net/global/r-d/opinion/build-research-partnerships-benefit-farmers.html>). This project will improve data and results management and provide access to germplasm information, improved seed and corresponding inputs that will be of relevance to smallholder farmers. The project, while submitted as AR4D, will be aligned with 2 Priority Areas of the 2017 Strategic Guidelines namely improved data collection and better results management and innovative ICT for smallholder farmers.

List of Acronyms

AfricaRice:	Africa Rice Center
ASAP	Adaptation for Smallholder Agriculture Programme
ASARECA	Association for Strengthening Agricultural Research in Eastern and Central Africa
AWPB:	Annual Work Plan and Budget
BMS	Breeding Management System
CAADP:	Comprehensive Africa Agriculture Development Programme
CCARDESA	Centre for Coordination of Agricultural Research & Development for Southern Africa
CERAAS	Centre d'Étude Régional pour l'Amélioration de l'Adaptation à la Sécheresse
CGIAR:	CGIAR System Organisation
CNRA:	Centre National de Recherche Agronomique, Senegal
CORAF	West and Central African Council for Agricultural Research and Development
CRP:	CGIAR Research Program
CSIR:	Council for Scientific and Industrial Research, Ghana
CSIR-CRI:	Council for Scientific and Industrial Research - Crop Research Institute
GASIP:	Ghana Agricultural Sector Investment Programme
GCP	Generation Challenge Programme
GIS:	Geographic Information System(s)
GSS:	General Support Staff
HR:	Human Resource(s)
IBP	Integrated Breeding Platform
IFAD:	International Fund for Agricultural Development
ICT:	Information & Communication Technology
ISRA	Institut Sénégalais de Recherches Agricoles, Senegal
KM:	Knowledge Management
M&E:	Monitoring & Evaluation
MSP:	Multi-stakeholder platform
NaCRRRI	National Crop Resources Research Institute, Uganda
NARI:	National Agricultural Research Institution(s)
NARES:	National Agricultural Research and Extension System(s)
NARS:	National Agricultural Research System(s)
NaSARRI	National Semi-Arid Resources Research Institute, Uganda
NGO:	Non-Governmental Organisation
NRM:	Natural Resource Management
OCS:	One Corporate System
PDF:	Post-Doctoral Fellow (Post-doc)
PRA	Participatory Rural Appraisal
PVS	Participatory Varietal Selection
R4D:	Research for development
R&D:	Research and development
RIMS:	Results and Impact Management System
S3A	Science Agenda for Agriculture in Africa
SDG:	Sustainable Development Goals
SLO:	System Level Outcomes
SOs	Strategic Objectives
SSA:	Sub-Saharan Africa
TAAT	Technologies for African Agriculture Transformation
TL III	Tropical Legumes III Project
UN:	United Nations

I. BACKGROUND

Innovation in plant breeding is imperative to meet the growing demand for food and feed due to global challenges such as population growth and climate change.

It is estimated that climate change will be reducing crop productivity by approximately 5% for each degree of warming above historical levels (Challinor et al., 2014).

Moreover, most sub-Saharan countries now contend with a national food production that cannot meet their internal demand. Hence, we need to produce more quantity and higher quality from agricultural production, and this is now possible thanks to improved cultivars adapted to local conditions. With proper channels of seed distribution and access to inputs (water and fertilisers), plant breeders are at the forefront of this food revolution, most particularly in the developing world.

Without the genetic improvement that has taken place in the last couple of decades, the price of foodstuffs would be higher and forests would have been destroyed for more farmland (Evenson et Gollin, 2003 ; Stevenson et al., 2013). For developing countries, breeding for stress tolerance (drought, low fertility, etc.) has particularly helped in increasing yields (Weber et al., 2013; Singh et al., 2011).

Although improved cultivars have been developed over the last decades, smallholders continue to use older, less optimal varieties for lack of better awareness, or lack of relevance for their target environments, and see their production stagnate in the face of ever increasing internal demand. National programmes urgently need to continue modernising their breeding methods and technologies, and adopt best practices to implement a demand-driven crop variety approach more effectively and efficiently.

Many National Programmes in developing countries face limited financial resources, a small pool of specialised workers; inadequate or insufficient infrastructure and equipment; deficient technology for the management and analysis of plant breeding data; and, limited access to information, expertise and networks (Ribaut et al. 2010).

The Integrated Breeding Platform (IBP) provides access to information, tools, services and expertise that breeders need in order to modernise their breeding programmes: as a result they benefit from: improved selection, time and money savings; improved data management by moving into the digital era; facilitated adoption of best practices, and the procurement of quality certifications (Ribaut et al., 2012; Delannay et al., 2012).

The modernisation of commodity (crop) breeding programmes has very significant development impacts, particularly in defining market-driven breeding priorities, engaging stakeholders – including farmers and the seed sector – in knowledge sharing, and enabling access to international networks and sources of expertise.

This proposal embraces a value chain approach that spans crop improvement based on smallholder farmer preferences, modern breeding, capacity mobilisation, seed systems, and the engagement of agribusiness and entrepreneurs, with modernised plant breeding programmes and attendant developments as the primary driver.

II. RATIONALE: RELEVANCE AND LINKAGES

A. Link to outputs of Grants Policy and corporate priorities

The project is aligned with the goal of IFAD grants, and contributes directly to outputs of IFAD's Grant Financing Policy. It is a pro-poor grant that will strengthen the breeding capacity within national agricultural plans in three low-income countries of sub-Saharan Africa, where agriculture is key to rural livelihoods. It directly aligns with the three (3) Strategic Objectives (SOs) of IFAD's Strategic Framework 2016-2025:

- i) SO1 – increase rural people’s productive capacities: smallholder farmers will have access to improved and resilient cultivars to enhance food security and household incomes. The tools, services, knowledge, resources and peer interactions facilitated by the IBP will enable breeders to integrate new tools and breeding practices that save time and increase effectiveness in the development of new cultivars better suited to farmer needs.
- ii) SO2 – increase rural people’s benefits from market participation: the varieties developed will be targeted to markets for both staple and cash crops (mainly rice and groundnut, and to some extent bean, cowpea, maize and sorghum).
- iii) SO3 – strengthen the environmental sustainability and climate resilience of rural people’s economic activities: resilient crops with broad adaptability to different climatic conditions will be developed.

The project’s design is anchored on knowledge building, dissemination, and policy engagement; one of IFAD’s key pillars for results delivery. Implementation will also be in line with IFAD’s five (5) principles of engagement: targeting and benefitting poor rural people; social and economic empowerment; gender equality; innovation, learning and scaling up of successes; and leveraging partnerships.

The proposed project will (a) contribute significantly to both regional and national public good related to IFAD’s mandate; (b) focus on interventions that add value and a comparative advantage over loan investments; and (c) not be used as a substitute for resources from IFAD’s administrative budget.

Lastly, the project will be built on two (2) of the three (3) pillars that are key to sustaining IFAD’s development results. These are: (1) knowledge building, dissemination and policy engagement and (2) institutional functions, services and systems.

B. Contribution to country programme and planned or ongoing projects (for CS grants)

The IBP project will link directly with IFAD supported investments in Ghana and Senegal and has the direct endorsement and support of the Government of Uganda. It will specifically support existing projects by (1) strengthening, facilitating and guiding crop improvement efforts for specified value chains and (2) developing entrepreneurship with these value chains’ actors in the three target countries. In Uganda, it will serve to facilitate and support crop improvement and value chain development by NaCRRRI and NaSARRI and enhance capacity development and training at a major regional University (Makerere), capitalising on an initiative of the African Higher Education Centres of Excellence (ACE II) supported by respective National Governments through a Development Facility of the World Bank, and the more recent initiative PRELNOR (Project for the Restoration of Livelihoods in the Northern Region) supported by IFAD. In Ghana, the project will ensure crop improvement efforts support the IFAD funded Adaptation for Smallholder Agriculture Programme (ASAP), and in Senegal, the project will ensure, through IBP staff located within ISRA, that there is support for groundnut improvement in the IFAD funded Agricultural Value Chains Support Project (Extension).

C. Rationale for grant financing, for selected implementing agency and for recipient selection and recipient capacity

The project will be implemented by the IBP Team, hosted at AfricaRice, in collaboration with partners in Ghana, Senegal and Uganda. The selection of AfricaRice directly aligns to the exceptions indicated in the IFAD grant policy (15(iii) of the Grants Policy); because direct selection is allowed for *global and regional grants to institutions that are unique in their normative, policy or representational mandates and therefore have no direct attribution is possible. AfricaRice Centre is a unique institution within the Consultative Group for International Agricultural Research (CGIAR) because unlike all other CGIAR Centres, it is an intergovernmental association of African member countries. This peculiar features will allow the NARS to continue their national crop breeding also after the project closure thanks to this institutional framework. Africarice is is a unique regional apex research organization for NARS of the 27 member countries though part of the CGIAR and has been funded though the Generation challenge programme to develop breeding tools suited for developing countries especuaially sub-saharan Africa. Indeed through the GCP, Africa Rice developed the expertise in the management of rice breeding programmes, an important crop under the project. Furthermore, since AfricaRice reports to a Council of Ministers (unlike other CGIAR Centres), it will be easier to embed the project within the*

national breeding programmes of the target countries. This funding seeks to scale up these technologies

The IBP arose from the successful Generation Challenge Programme (GCP), a 10-year and USD 170M initiative over the period 2004-15, which demonstrated that harnessing plant genetic diversity, and applying modern breeding to the development of new crop varieties that meet the needs of smallholder farmers, is an effective means of conducting translational research ([see success stories online](#)). IBP tools and approaches are already being adopted across Africa within day-to-day activities to run modern breeding programmes, where upper management at various Crop Research Institutes has entrusted the IBP to support their deployment. Building from the GCP networks, the IBP brings on board expertise from scientists at CGIAR Centres and Advanced Research Institutes, when and where needed.

Implementation mechanisms will ensure that outputs of the project are widely disseminated and made publicly available through various media and on public platforms, and that they will be scaled up through the national breeding programmes.

III. THE PROPOSED PROJECT

A. Target Group

The project will ultimately be of direct benefit to at least 30,000 smallholder farmers across the three target countries consistent with on-going national agricultural plans led by the National Agricultural Research Systems (NARS) in Ghana, Senegal and Uganda who are partners in the project.

There will be attendant beneficiaries in the form of additional stakeholders engaged in various aspects of the commodity (crop) value chains, including small to medium enterprises (SMEs). The four (4) partner institutes that will be instrumental in linking the grant to the national agricultural plans are:

- *L'Institut Sénégalais de la Recherche Agricole* (ISRA) in Senegal – through four (4) centres: *Centre National de Recherche Agronomique de Bambey* (CNRA Bambey), the *Centre d'Étude Régional pour l'Amélioration de l'Adaptation à la Sécheresse* (CERAAS), the *Centre de Recherche Agricole St Louis* (CRA St Louis) and the *Centre de Recherche Agricole Djibélor* (CRA Djibélor);
- the CSIR Crop Research Institute (CRI) in Ghana; and
- the National Semi-Arid Resources Research Institute (NaSARRI) and National Crop Resources Research Institute (NaCRRI) in Uganda.

Moreover, the IBP will be working with African universities to support teaching in how to use IBP tools and modern breeding strategies, to proactively develop the skills of young plant breeders, thereby contributing to the capacity of partner institutes in addressing national crop improvement challenges. It is especially important to note that the project aims to have at least 40% participation by women, especially at the student level.

A key aspect of the project will be to ensure farmer 'buy-in' on the basis of information already available from Participatory Rural Appraisal (PRA) approaches that have incorporated local knowledge and opinions (for crop traits of importance) such that the new cultivars developed by the target breeding programmes will meet the needs of smallholder farmers. Moreover, they will benefit from some guidance in terms of agronomic practices that are adapted to their environmental conditions to make optimal use of the new varieties and thus generate maximum yield and profit from the process. This will be particularly impactful for smallholder farmers and their families, who have very limited resources, especially capital. Better yields of market-preferred varieties will result in higher and more stable incomes which at the household level, is especially important for women.

B. Overall Goal and Objectives

The **goal** is to contribute to enhanced food security and poverty alleviation by increasing small-holder productivity and income in the 3 target countries in Africa.

The main **objective** is to develop and disseminate improved crop cultivars that have characteristics that meet smallholder needs (improved grain, fodder, improved quality of produce grain size, colour, milling etc.) and market demands as well as able to mitigate agro-ecological challenges, climate change, biotic and abiotic stresses. Ultimately, this will lead to the adoption of 'fit-for-purpose'

varieties, which is imperative to secure food security over the next 10 years, while aligning with the Science Agenda for Agriculture in Africa (S3A).

The specific objectives of the project are:

- i. To consolidate existing crop value chains to develop and promote climate resilient, improved crop cultivars for local environments, following a demand-led varietal design.
- ii. To create a network of partners among the different communities of the crop delivery chain that can learn from each other and share a common knowledge platform.
- iii. To strengthen the national plant breeding capacity of 4 institutions across Ghana, Senegal and Uganda, and support the use of modern plant breeding technologies and approaches, including digital data management.
- iv. To support the education of the new generation of crop breeders and integrate their research activities into national breeding programmes.

The project is at the core of CAADP Pillar IV (Agricultural research) and will contribute to Pillars II (Market access) and III (Food supply and hunger). The outcomes of the project will contribute to CGIAR System Level Outcomes (SLOs) 1- Reducing rural poverty; 2- Increasing food security and 3- Improving human nutrition and health. Furthermore, the project will address SDG 1 (No Poverty), SDG 2 (Zero Hunger) and SDG 17 (Partnerships for Goals).

C. Project Outcomes

The major expected outcomes are:

- i. Smallholder farmers with improved resilience to climate change and economic vulnerability by adopting new and better crop varieties that reflect market demand.
 - Linked to RIMS outcome: Effectiveness of NRM and conservation programmes (2.1.5);
 - Linked to RIMS outcome: Effectiveness – Producers benefit from improved market access (2.4.1)
- ii. National breeding programmes that better align with and deliver on National Agricultural Plans, thanks to the adoption of best plant breeding practices.
 - Linked to RIMS outcome: Effectiveness- Improved agricultural and livestock production (2.2.2);
- iii. New crop varieties produced more effectively and efficiently by African plant breeding institutions, following a demand-driven crop variety approach.
 - Linked to RIMS outcome: Effectiveness – Improved performance of service providers (2.2.1);
- iv. A network of African universities with the capacity to train the next generation of plant breeders and scientists in modern plant breeding.

D. Project Activities

The context for this proposal is in a value chain approach that spans crop improvement based on smallholder farmer preferences, modern breeding, capacity mobilisation, seed systems, and the engagement of agribusiness and entrepreneurs. To ensure that breeding ultimately has an impact in smallholder farmers' fields it is essential for plant variety design to be demand driven, and therefore the project activities will involve different actors engaged along the two targeted delivery chains (**Figure 1**).

To ensure impact this project will focus on **commodity value chains (Activity 1)** for groundnut and rice in Senegal and Uganda, and rice in Ghana. Those two crops have been selected considering the strength of the four (4) partner Institutes, the national relevance of the crops, the current genetic and genomic resources to run molecular breeding, existing networks within the value chains, and our partnership with CGIAR Centres and Advanced Research Institutes.

This activity also includes an important **networking component**, which will be critical to empower African partners to embrace new opportunities through technology innovation. It will develop a spirit of true partnership along the targeted delivery chains, as well as across plant breeding and plant science communities. The key element of a true partnership is the exchange of information and knowledge

and, therefore, this proposal will not only improve data collection and management for results in plant breeding, but will also deploy an IBP knowledge base to provide access, building and linking to existing resources, to germplasm information, and improved seed and corresponding inputs, that will benefit smallholder farmers. This knowledge base will be extended to other crops (beans, cowpea, maize, and/or sorghum), should time, resources or opportunities allow it.

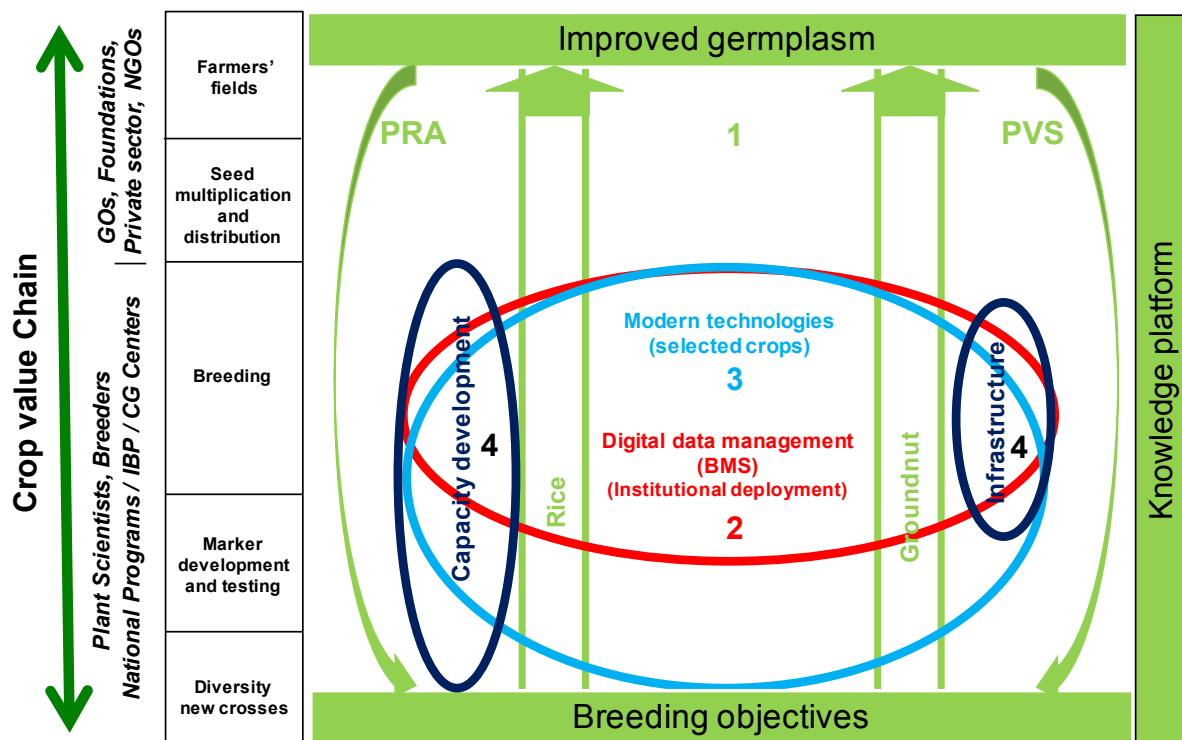
Digitising breeding (Activity 2) and integrating **modern breeding approaches (Activity 3)** will be conducted more broadly across different breeding programmes at the four (4) target Institutes, including groundnut and rice, but also bean, cowpea, maize and/or sorghum programmes.

With the optimisation of breeding practices and data management, breeding programmes in the three (3) target countries will become stronger and more efficient, enabling breeders to develop new varieties responding to the conditions and practices of local farmers, as well as with local and regional market expectations. In this context, **the core research activities** of the project will focus on modernising breeding to increase the effectiveness and efficiency of the selection by:

- i. Providing access to software and databases, which facilitate the logistics, data management, analysis and decision-making for plant breeding, as well as to technical support, such that plant breeders can run their day-to-day activities optimally; and
- ii. Providing strategic and technical support through the IBP breeding service network for the implementation of best practices in breeding, including testing of existing genetic resources for complex traits such as drought and molecular breeding for simple traits such as insect or disease resistance, to reduce costs and increase the overall genetic gain generated from the selection process

The **capacity enhancement component of the project (Activity 4)** will serve to establish optimal conditions, both human and material, through the training of young breeders and the improvement of infrastructure, to ensure that the overall vision can be sustained beyond the scope of this project. PhD students will be engaged by National Programmes to ensure that thesis work will be embedded in the research activities of the project and to secure knowledge transfer through the incorporation of a new generation of young breeders at the target Institutions.

Figure 1: The four key activities of the project represented along the crop value chain



Key Activity Outputs

The overall project is set in a networking framework however the research and capacity building elements will be embedded at different levels in the targeted value chains (rice and groundnut). The four main activities in the project (**Figure 1**, above) will result in the following key outputs:

- i. **Activity 1:** A true partnership amongst the different actors of the groundnut and rice delivery chains in the three target countries and a knowledge platform that contains farmer feedback on improved varieties and seed distribution information;
- ii. **Activity 2:** Four (4) institutions with a centralised data management policy defined and implemented, and 10-15 breeding programmes in total accessing the digital revolution through centralised electronic crop data and information management;
- iii. **Activity 3:** At least 10 breeding programmes using modern technologies, with development of a broad set of improved genetic materials for key staple crops, more adapted to local conditions;
- iv. **Activity 4:** Fifty (50) MSc students trained in the BMS; 5 PhD students working in National Programmes with strong expertise in molecular breeding and at least 3 plant breeding field stations upgraded.

Because the project will promote and support the adoption of new technologies and approaches, it will be critical to the success of the project that the different actors have the right mindset. Behavioural change can only take place if the right commitments and support are in place. Through the GCP, and more recently through the deployment of the BMS in developing countries, the IBP team has built a solid experience in focussing on the interventions needed to bring about this behavioural change. As an example, IBP Regional Hubs and local support staff are in place to provide suitable support for BMS adoption; the IBP team only initiates an institutional deployment plan after securing some engagement from local champions and buy-in from upper management (see support letters relevant to this project in Annex 4).

The following sections describe the different strategies and activities proposed to achieve the objectives of the project, however, some scientific and technical aspects of the work plan will have to be revised and adjusted following initial project workshops that will assemble key personnel.

Activity 1 – Delivery chain and knowledge platform: Connecting the dots between breeders, extension workers and farmers

This project will provide expertise, tools and technologies for breeders to manage their ongoing breeding programmes effectively and efficiently, delivering improved varieties with traits based on the needs of the farmers, engage entrepreneurs (especially youth), to establish seed businesses to ensure that farmers have access to the new varieties and other inputs necessary to improve productivity.

The project builds on the fact that delivery pipelines (new crosses, breeding, improved cultivars, adoption testing, production of foundation seed, seed multiplication and distribution to farmers) are already operational for the value chains of the selected crops in the target countries, with intermediary products available at each level. Therefore, **a key area of focus is to scale up the production of foundation seed** by breeders, to ensure that some improved seed already in the pipeline will be delivered to farmers during the lifetime of the project.

1.1 Engaging smallholder farmers

For the target value chains in each country, there is already some engagement of farmer communities to better understand farmers' needs for new varieties. Rice farmer participatory activities will build on the Breeding Task Force (TF) established in 2010 by AfricaRice to identify lines that are suitable for cultivation under various ecological conditions. Farmers and other stakeholders such as millers and traders are invited to participate in varietal selection, and their opinion on the performance of all entries (i.e. participatory varietal selection, PVS) is collected. The Task Force also accumulates data on performance of new elite lines, thereby facilitating varietal release procedures that occur hand in hand with relevant authorities and organisations in Ghana (e.g., Quality Seed Assurance), Senegal (e.g., FEPRODES) and Uganda (e.g., NASECO).

In Senegal, a participatory rural appraisal (PRA) was recently conducted (2016) by ISRA groundnut breeders in three selected production areas. Farmer preferences were clearly oriented toward pod

and haulm yield, as well as seed size and resistance to leafspot diseases. These traits are the main focus of the ISRA groundnut breeding programme. Moreover, a strong partnership exists between ISRA and farmer organisations such as the *Association Sénégalaise pour la Promotion du Développement par la Base* (ASPRODEB) and COPEOL, representing the oils industry. Finally, most of the stakeholders of the groundnut value chain, including farmer organisations, seed producers and the oils industries, are members of the *Comité National Interprofessionnel de l'Arachide* (CNIA), which along with ISRA, defines variety needs for the groundnut value chain.

In Uganda, where smallholder farmers constitute more than 85% of the production of groundnut, and where groundnut cultivation is estimated at 260,000 ha representing approximately 25% of the total arable land, there is a very significant gap between farm yields (800 kg/ha) and experimental station yields (3,000 kg/ha). NaSARRI routinely engages farmers in PVS work to frame their groundnut breeding agenda, and organise field days and other extension activities through farmer groups, the seed sector (currently there are 23 companies registered and active in the market) and NGOs (ISSD, Lutheran Foundation, World Vision, ZOA, Food for the Hungry, etc.) (Okello et al. 2015). In short, there is a functional value chain approach to smallholder groundnut production in Uganda that is well positioned to capitalise on enhanced breeding of new varieties.

Participatory and decentralised evaluation will enable farmers to connect with a range of new varieties that respond to the diversity of agricultural situations and the different needs of farmers.

This activity will contribute to reach the outcomes of IFAD's ongoing operations. In Senegal, it contributes to the outcome 1 "an increase in production and an improvement in agricultural productivity" of the *Agricultural Value Chains Support Project (Extension)*. The improved cultivars that will be produced through this project will be good input for several value chains of that initiative, in particular cowpea, maize and sorghum. The *Support to Agricultural Development and Rural Entrepreneurship Programme* in its component 1 "enhancing supply of agricultural production" is "strengthening the voice of small-scale producers and their organisations and augment their capacity to participate actively in developing value chains under a market-oriented approach to agriculture". This is similar in Uganda with the component 2 "Enhancing Partnerships between Agricultural Research, Advisory Services, and other Stakeholders" of the *Agricultural Technology and Agribusiness Advisory Services Project* where "NARO and NAADS would promote joint priority setting, planning and implementation of on-farm adaptive research, and, where appropriate, technology multiplication". In that context, linking with the PRELNOR initiative will be important considering the overlap in focus crops (rice, bean, maize and, to a lesser extent, sorghum), adding value to the respective value chains (especially for the production of foundation seeds) and building on possible joint target farmer communities. In addition, the *Agricultural Technology and Agribusiness Advisory Services Project* is "strengthening the capacity of rural poor farming households in Uganda to increase production and productivity of food security and marketable crops".

1.2 Linking with the seed business

Increased demand for seed provides opportunity for engagement of private seed companies in the bulking and marketing of certified seeds. The seed companies acquire pre-basic and basic seeds from research institutions that maintain and produce early generation seeds of the released varieties. Therefore, scaling seed systems, with strong public-private partnerships, is highly dependent on the effectiveness and productivity of African plant breeders in creating more productive varieties that meet customers' needs. For example, in Uganda, the increase in rice production from about 50,000 tonnes to over 290,000 tonnes over the last fifteen years has been accompanied by increased investment of the private sector in rice processing, and the number of mills has increased from 70 to more than 600 (Tokida et al., 2014). An ongoing pipeline of varieties offering advantages for customers is vital for business growth and renewal.

It is therefore critical to invite seed producers to contribute to the project design and be the key driver in the distribution of seeds to smallholder farmers. Under that activity breeders will scale-up the production of foundation seeds to ensure that seed business partners will have enough of the most suitable material to distribute to farmers during the lifetime of the project. African seed producers (<http://afsta.org/memberships/afsta-members/?country>) will be engaged in each of the three target countries. Where not already implemented, the project will aim at nurturing public-private partnerships to catalyse seed scaling. Such partnerships enable plant breeders to access information on markets, customer needs, and production drivers to guide breeding targets and priorities. They also enable access to useful germplasm and provide a route to increased farmer uptake.

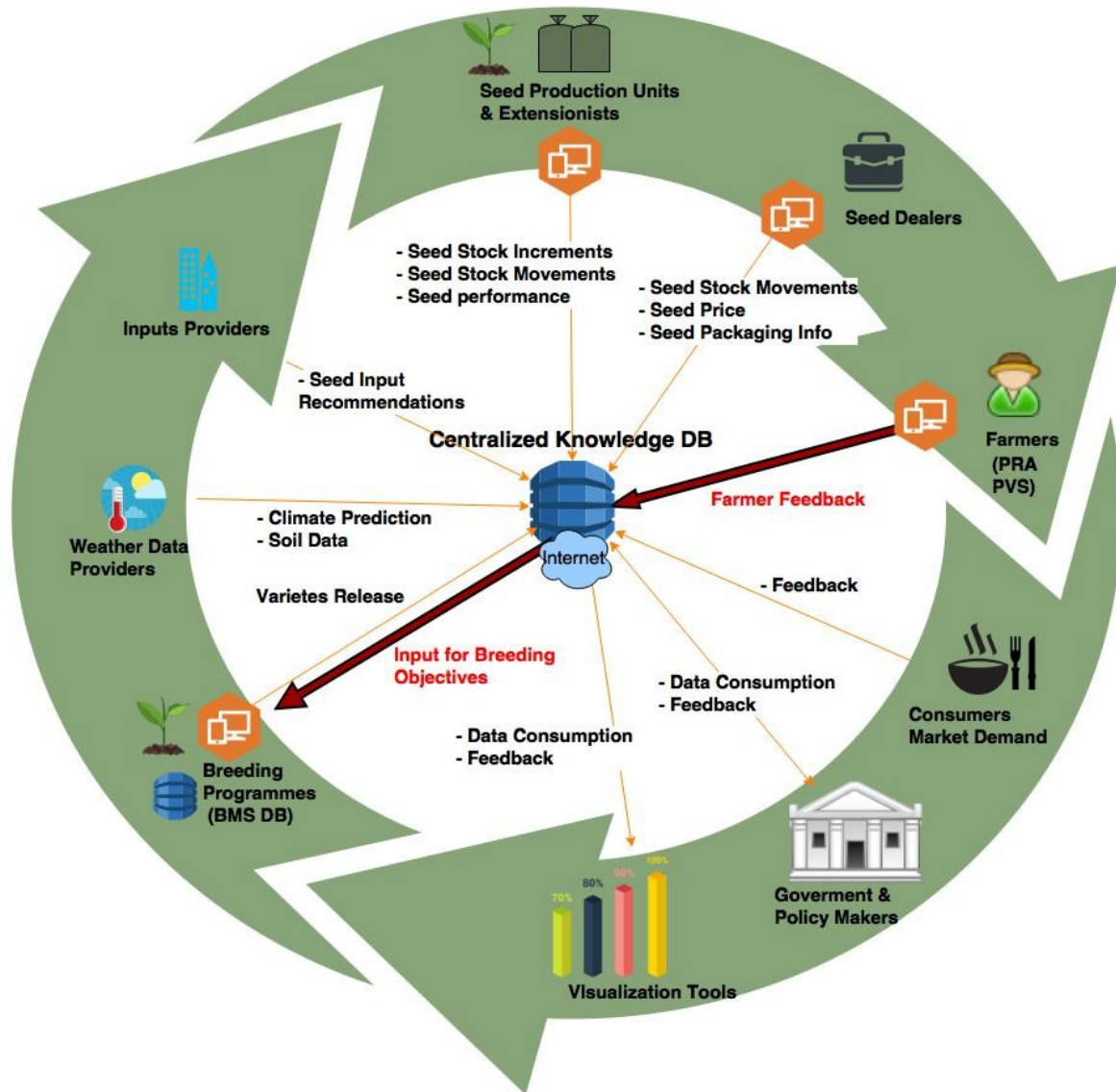
Within the framework of AfricaRice's Breeding Task Force, seed is currently multiplied twice: first by AfricaRice to ensure distribution to NARS to conduct annual evaluation trials, and then further multiplication by NARS for distribution to farmers (2 Kg per variety, per farmer, and for each ecology).

In Ghana, this activity is also in synergy with two programmes: GASIP that targets "smallholder farmers and resource-poor rural people, in particular women, youth (15-24 years) and young adults (25-34 years) and ASAP whose targets are "the vulnerable households to shocks induced by climate change".

1.3 The Knowledge Platform

At the heart of the Integrated Breeding Platform (IBP) is the IBP Portal. Today, it is primarily a resource for plant breeders where they can find tools, services and a broad range of knowledge to support their breeding activities. To extend knowledge across the rice and groundnut value chains, the large amount of data that will be generated by PVS activities, as well as seed catalogues (when available), and contact information of seed dealers will be consolidated and stored in an IBP knowledge base (**Figure 2**, below). Centralisation of the information will facilitate better management, storage, analysis, sharing, and interpretation of farmer feedback leading to the identification of further solutions for farmers at the local level. The use of the IBP Breeding Management System (BMS) to manage breeding information (see Activity 2) and to identify the outcomes of the PVS activities will be key to linking production with market requirements; this is a unique feature of the project.

Figure 2: Flowchart of interactions and knowledge sharing across the different actors



Activity 2 – Improved data management and digitalising breeding

The IBP aims to be a valuable resource for breeders by providing them with a complete toolbox to conduct their programmes more efficiently. This proposal includes support in the use of the BMS to manage routine breeding activities, and to integrate and analyse data. Services provided include support for better data management (capture, quality control, documentation and analysis), as well as assistance for the gradual integration of molecular markers and other modern breeding strategies. The BMS builds a safe, standardised and centralised record of institutional data from one generation to the next. It will assist in developing networks and knowledge, facilitate teamwork and secure institutional memory.

2.1 BMS Deployment and support

Table 1: Proposed operational framework

1. Installation	2. Deployment
<p>Desktop installation on individual computers, or institutional installation (multiuser version of the BMS), either on the institute's local server (LAN), or a cloud space rented to that effect. Over time, upgrade individual users to the institutional version with adequate IT infrastructure.</p> <p>Quality control and migration of a historical dataset, as identified by the breeders themselves.</p> <p>Update and standardise breeding conventions/parameter definitions (e.g. germplasm nomenclature and pedigree management).</p>	<p>Define a data management policy at the institutional level.</p> <p>Series of workshops and visits with users during successive breeding cycles.</p> <p>At the beginning of the season in order to help breeders in using the BMS to prepare their cycle (parent line selection, crosses, populations and trials, experimental designs).</p> <p>Follow-up visits (two per cycle) to assist users with field data capture (at flowering time and/or during harvest) and data analysis.</p>
3. Breeding optimisation	4. Maintenance for sustainable adoption
<p>Breeding experts from the IBP or partner organisations can be assigned to optimise practices and integrate the use of molecular markers when feasible by working with the national programme breeders.</p> <p>It will be possible to: 1) evaluate the genetic diversity of their breeding material, 2) optimise practices to breed new crosses, 3) introduce new favourable genes, from an agronomic perspective, into popular varieties (largely cultivated in the region), or 4) accelerate genetic gain in new crosses.</p> <p>This modernisation is conducted on the basis of available resources and the expressed needs of breeders.</p>	<p>Continuous support and training of IBP focal point at target Institutions.</p> <p>Programme to update users over time on any new BMS functionality or advancements in breeding practices.</p> <p>Training the next generation of breeders through academic networks.</p> <p>Update of the knowledge platform and enhancement of the different operational networks.</p>

There has been some initial adoption of the BMS by single users (desktop edition) in the target institutions, and upper management at each institute has indicated their support for institutional deployment of the BMS (see letters of support in Annex). This effort has been supported locally by IBP Regional Hubs based at AfricaRice (Côte d'Ivoire), CERAAS (Senegal) and resource persons based in Kenya who build on established relationships among local users and institutes to strengthen the dissemination of best practice. Now, the initial efforts need to be scaled up, namely by: implementing an enterprise version of the BMS (LAN based) at the four (4) target institutes; encouraging a collective sharing and management of all breeding data on an LAN or Web server; and ensuring the sustainability of deployments. A focal point at each target institute will be identified, and the IBP will provide more in-depth technical training to these personnel. The IBP Hub in Senegal is deep-rooted, and a resource person will be based in Uganda, with frequent visits to CRI in Ghana, as part of this project.

2.2 Data Integration and Sharing

One of the principal advantages of institutionalising information management is to facilitate the integration and sharing of data and information, both within the institute and across institutes. This integration goes across disciplines – phenotype, genotype, climate, soil, diseases – and for this project, farmer preferences will be an important category. It also goes across breeding teams and projects: it initially sets within institutes, but eventually goes across institutes. With two similar value chains in each of the three countries, this project will represent a very good opportunity to test data and knowledge exchange across countries, and should result ultimately in germplasm exchange either across borders to generate new crosses, or directly for local multi-site testing.

Activity 3 – Breeding: integrating modern approaches

Plant breeding is a key tool for responsible and a sustainable increase in agricultural production. It is a complex tool, impacted by time, monetary resources, and process quality. In this activity, individual breeding programmes will be assessed as to how their efficiency could be improved. All phases of the programmes will be addressed, including objective setting, germplasm, experimental designs, resources, and the use of modern information and technologies.

3.1 Breeding schemes

The effectiveness of selected breeding programmes will be assessed and guidance provided for breeding objectives, germplasm, experimental design, and resource allocation. Well-described breeding processes enable process improvement, and training opportunities. As a result, breeding programmes in the project will operate more efficiently. This will translate into more improved varieties coming out of these programmes, meeting both agronomic demands and user preferences.

3.2 Modern technologies

This project will leverage existing networks and genetic resources (e.g., MAGIC populations, introgression lines, BCNAM and mini-core collections) that have been developed for target crops (groundnut, rice, beans, cowpea, maize and/or sorghum) through different initiatives such as the GCP, and these are now available for local evaluation. Building on the GCP legacy, these materials have genetic information that will allow the identification of important genes for agronomic performance under target environments and, more importantly, will identify promising lines to be tested directly in breeding programmes.

DNA-based genotyping has proven to contribute to increased rates of genetic gain in plant breeding through improved germplasm knowledge and management, simple and complex trait improvement, and quality control (Varshney et al., 2012, 2015). For instance, under this activity genotyping will be employed to improve knowledge of elite or popular local cultivars to make better decisions when selecting parental material for new breeding populations. The use of trait-linked molecular markers will also be assessed for the introduction and deployment of relatively simple traits such as resistance to diseases or insects, tolerance to aluminium or salt, and nutritional or end-user value improvement. Both introgression and deployment will be done in material relevant to each breeding programme – typically local elite material. The output of these activities will include improved local varieties that will be readily acceptable by users.

Beyond assessment of programme efficiency and suggestions for improvement in the areas described above, significant resources will be allocated for breeders to test revised breeding schemes and implement molecular breeding. Existing breeding populations will be used as much as possible to accelerate impact. An inventory of such populations has already begun, in conjunction with an inventory of available trait-linked markers and breeding objectives. In addition to groundnut and rice, the integration of modern approaches for other crops will be considered on a case-by-case basis for each institution.

Activity 4 – Capacity enhancement (human and infrastructure)

The availability of trained breeders who are motivated, together with appropriate infrastructure to implement digital data management and produce reliable phenotypic data is critical for the sustainable adoption of the new methodologies and approaches deployed in this project.

4.1 Human capacity

Today, both academia and the international plant breeding sector are facing the challenge to secure sufficient supply of academically trained plant breeders for the future (Diop et al. 2013). To overcome this constraint, it is critical to bring together the best expertise, human resources and facilities from the public and the private sectors (when suitable), to educate the next generation of plant breeders. The key partner universities identified within each of the three countries (University of Ghana- WACCI, University Cheikh Anta Diop (UCAD) and Thiès University (TU) in Senegal; and Makerere University Regional Centre for Crop Improvement, in Uganda) are leading universities in their field. They work closely with their national research programme institutes, and provide an appropriate venue for educating and training MSc and PhD students.

Each of the selected universities is running an MSc programme in plant breeding and including the BMS in their curriculum.

The BMS is both a functional plant breeding tool and an educational tool; it has an accompanying set of comprehensive tutorials that facilitate teaching and learning. Selected MSc students will also be engaged in the research activities of the project. The project will support a couple of PhD students within each country; ideally in National Programmes and with theses focussing on molecular breeding.

4.2 Improved Infrastructure

Informatics infrastructure: Although it is possible to start the process of institutionalising breeding information management with relatively modest resources, it is essential to have a reasonable level of internet connectivity and capacity to fully implement multi-user shared systems, which facilitate teamwork and secure knowledge at the institutional level. For each institute, an IT development plan will be produced and implemented, targeting adequate capacity in terms of internet connectivity, access to local or cloud servers, laptop or desktop terminals, label printers and bar-code readers, and tablet devices for electronic data capture. The plans will phase targets to ensure that infrastructure remains viable at the end of the project.

Experimental Stations: Since the partner institutes already have a good level of infrastructure, there will not be a major focus on capital works; however, a small fund will be set aside for small developments that may be needed to unblock a constraint at the field station level, including some IT needs. Guidelines on best practice for field trial design and implementation will be provided to the institutions, and follow-up support will be made available to ensure that technical capacity and expertise, together with adequate infrastructure, is available to support modern plant breeding methodologies.

IV. PROJECT IMPLEMENTATION ARRANGEMENTS

A. Implementing Organisation(s)

AfricaRice (lead institution) will be the grant recipient. The project will be implemented by the IBP (hosted at AfricaRice), which will also coordinate overall project implementation in the three target countries of Ghana, Senegal and Uganda. AfricaRice is a pan-African research organisation of 26 member states and a member of the CGIAR System Organisation, and has over 40 years' experience working to contribute to poverty alleviation and food security through research, development and partnership activities aimed at increasing the productivity and profitability of the rice sector in Africa. The IBP is an initiative that originated from the Generation Challenge Programme (GCP) and is the result of an investment of more than USD 30 M over the past eight (8) years. The BP Director, Dr Jean-Marcel Ribaut, will lead the project together with a team of scientists including: a Global Deployment Manager, two BMS Regional Deployment Managers, BMS Support Specialists, IBP Regional Hub Coordinators, and Plant Breeding Specialists.

L'Institut Sénégalais de la Recherche Agricole (ISRA) will be coordinating activities in Senegal. In Ghana, the CSIR-Crop Research Institute (CRI) will be the national coordinator and in Uganda, both the National Semi-Arid Resources Research Institute (NaSARRI) and the National Crop Resources Research Institute (NaCRRRI) will be project coordinators. The IBP has a long history of working with these partners who bring extensive and essential knowledge, networks and expertise to the project.

B. Project Management and Implementation Period

The project will be implemented over 3 years, ideally starting on 1 November 2017 and ending 31 October 2020. AfricaRice, based in Côte d'Ivoire, will host the Project Coordinator at its offices in Abidjan. CSIR-CRI, ISRA, NaCRRRI and NaSARRI, are the national implementing organisations in Ghana, Senegal and Uganda respectively.

C. Monitoring, Evaluation and Reporting

The IBP, through AfricaRice, will be responsible for M&E and reporting to the donor.

Monitoring activities

The project partners will conduct or elaborate (depending on data quality) plant breeding benchmarks and socio-economic baseline surveys for key commodities and plant breeding traits. A more detailed analysis of these targets will be developed and articulated during the course of project start-up workshops in the three target countries. The output of these workshops will inform and refine the baseline value of the indicators for the results-based logical framework (Annex 1).

Monitoring of the following components will then occur simultaneously and systematically as part of an overall monitoring system, so that the project's managers can modify the implementation plan if needed, in a timely fashion and involving key stakeholders whenever possible:

- i.** Process monitoring: the use of inputs and resources, and the efficient progress of activities in time will be tracked through AfricaRice's ERP system which keeps detailed records of all transactions (see section VII- Financial Governance).
- ii.** Compliance monitoring: the Project Coordinator will ensure that the project complies with IFAD grant and contract requirements, via regular communication with the different partners and annual report preparation.
- iii.** Context monitoring: the management of any unexpected considerations that may arise in the larger institutional, funding, and policy context that may affect the project is covered within the Risk Matrix.
- iv.** Beneficiary monitoring: perceptions, satisfaction or complaints with the project and the beneficiaries' overall experience of change will be monitored by the Value Chain Delivery Coordinator through his/her activities along the crop chains, and by IBP experts who will be able to collect feedback during their visits and workshops. Outputs of Participatory Varietal Selection (PVS) will be documented and made available from the knowledge platform on the IBP Portal
- v.** Financial monitoring: an Annual Work Plan and Budget (AWPB) will be developed, and then updated at the beginning of each year, to account for costs by input and activity and ensure that implementation is carried according to the budget and timeframe.
- vi.** Organisational monitoring: AR/IBP staff will visit institutions, local partners and stakeholders to monitor progress in the sustainable implementation of activities. Communication and collaboration in project implementation among all partners will also be tracked through the IBP intranet (Confluence) that has been in use at the IBP for the past 3 years.
- vii.** Results monitoring: to determine if the project is on target towards its intended results (outputs, outcomes, impact), the AfricaRice web-based M&E system will provide a 'dashboard' to continuously monitor project outputs and outcomes.

Evaluation activities

The IBP, through AfricaRice, will communicate with the donor on project progress, outputs and outcomes at the end of each project year and on other occasions as requested by IFAD. The project will be continuously evaluated to learn from experiences and adjust future interventions. Real-time evaluation and feedback collected in the course of project activities will serve to feed annual reports. The project will also be subjected to the usual audits, as per CGIAR policy, and a final report (technical and financial) will be conducted to assess achievements at the end of the project.

Technical reporting

Project communications to IFAD will comprise technical and financial annual and end-of-project reports:

- Project inception**
 - breeding benchmarks
 - socio-economic baseline surveys
 - start-up workshop reports
 - results-based logical framework, revised to take into account institutional frameworks and agreed work plans
- Annually**
 - technical annual report including:
 - activity reports collected across the value chain and participatory activities
 - lessons learnt and future (re) orientations
 - revised risk matrix
- Project closure**
 - Mlax M&E system 'dashboard' report
 - Project completion report (technical) with lessons learned and perspectives.

D. Indicative Work Plan (Table 2)

	Year 1												Year 2												Year 3											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34		
it	1								4								2				5															6
it	1							7									2		8																	
it	1					9						10					2																			
it	1							12				13					2							14										15		
it	1					17											2			18																
it	1						20										2							21												
it	1	23				24											2	25																		
it	1				28												2																			29
it	1		31			32										33		34	2																	

Milestones/Deliverable Outputs (refer Annex 1): The detailed activities will be revisited and discussed with partners during the inception workshop. Also it is at this time responsibilities will be fully apportioned between all implementing partners

1. Inception project workshop for different partners and stakeholders to meet and define together the specific work plan for each National Institution
2. Mid-project meeting, to report, exchange and learn
3. Final project meeting, to report, exchange and prepare the final report
4. First round of PVS conducted for groundnut and rice in Senegal and Uganda, and rice in Ghana
5. Second round of PVS conducted for groundnut and rice in Senegal and Uganda, and rice in Ghana
6. Third round of PVS conducted for groundnut and rice in Senegal and Uganda, and rice in Ghana
7. Validate the different actors in the seed business for the two selected crop value chains, and manage the information in the IBP knowledge database
8. Distribute foundation seed of improved cultivars to seed business partners
9. First prototype of the knowledge platform via the IBP Portal
10. Knowledge platform and database fully operational
11. Final knowledge database filled during the life of the project with the data/information/knowledge generated by partners and stakeholders plus knowledge from external sources (e.g. regional seed catalogues, results from existing PRA and/or PVS studies conducted outside the project (rice breeding Task Force))
12. Data management policy developed and endorsed by upper management at each of the four (4) target Institutes
13. Local focal point identified and trained to provide BMS support to local users at each of the four (4) target Institutes
14. Breeders in selected programmes (10-15) routinely using the BMS at each of the four (4) target Institutes
15. Enterprise version of the BMS installed and used at each of the four (4) target Institutes
16. The four (4) target Institutes operate using digital data management
17. Trait ontology and breeding procedures revised and refined as needed, at each of the four (4) target Institutes
18. Publication of the first meta-analysis using data presented at the mid-project meeting
19. Publication of the final meta-analysis data using data presented at the final project meeting
20. Assessment of the breeding strategy at selected target breeding programmes (10-15, groundnuts, rice, beans, cowpea, maize and/or sorghum)
21. Revised breeding strategies implemented at selected breeding programmes (10-15, groundnuts, rice, beans, cowpea, maize and/or sorghum)
22. Selected breeding programmes (10-15) have adopted good practice to run their breeding activities
23. Genetic material to be tested by the different Institutes in the project (1-2 genetic materials/populations per breeding programme)
24. Segregating material for molecular breeding developed (1-2 crosses per programme) and target trait-based marker identified (1-2 per target crop)
25. Publication of results of the first evaluation of genetic material and first cycle of characterisation/selection with molecular markers
26. Publication of the results of the second evaluation of genetic material and first cycle of characterisation/selection with molecular markers
27. Publication of the selected improved germplasm (5-10 lines/genotypes per breeding programme) at selected target breeding programme (10-15)
28. Thesis work plan of MSc students (5-10) and PhD students (5) defined
29. 50 MSc students have been exposed to and are fluent with the use of the BMS as part of their curriculum.
30. Total 5-10 MSc and 5 PhD who contributed to the research activities of the project are graduated
31. Assessment of the IT needs at each target Institution

32. Assessment of IT and/or field infrastructure needs at selected experimental stations (one per country)
33. IT facilities upgraded at each of the four target Institutes to run effectively the enterprise version of the BMS.
34. Experimental stations upgraded (one per country, IT and/or field infrastructure)

Note 1: Several outputs reported in the Indicative Work Plan are the result of ongoing activities (e.g. output 7 or 14). The timing of the outputs reported on the Work Plan indicates when the activities will be completed and the outputs delivered.

Note 2: The timing reported for some outputs (e.g. 4, 5 and 6) are indicative, and will be revised and refined on a country basis at the establishment of the Institutional Work Plan during the inception workshop.

V. SUPERVISION, KNOWLEDGE MANAGEMENT AND SCALING UP

A. Supervision Arrangements

The project will be supervised as per the guidelines described in IFAD's Grant Procedures. Under the policy for grant financing, supervision will be the responsibility of the grant sponsor. The grant will be supervised to (a) ensure that the project is moving towards the intended results, (b) support the resolution of known challenges, (c) pursue the project's learning agenda, and (d) review financial reports and costs, and verify them as necessary.

Table 3: Schematic overview of role and responsibilities of partners and researchers per Component and Activity

		CGIAR	Senegal (ISRA)		Ghana (CSIR)	Uganda (NARO)		Universities
Component	Activity	AR/IBP	ISRA/CERAAS/ CNRA	ISRA/CRA's St Louis/Djibélor	CRI	NaCRRI	NaSARRI	Makerere, TU, UCAD, WACCI
<i>Component 1:</i>	1.1. Engaging Farmers	Coordination, data collection and publication	PVS for groundnut value chain	PVS for rice value chain	PVS for rice value chains	PVS for rice value chain	PVS for groundnut value chain	Thesis research defined based on farmer's needs
	1.2. Linking with seed business	Coordination and information publication	Link with groundnut seed business	Link with rice seed business	Link with rice seed businesses	Link with rice seed business	Link with groundnut seed business	
	1.3. Knowledge platform	Design and Implementation of the knowledge platform	Groundnut data collection/analysis, knowledge sharing	Rice data collection/analysis, knowledge sharing	Rice data collection/analysis, knowledge sharing	Rice data collection/analysis, knowledge sharing	Groundnut data collection/analysis, knowledge sharing	
<i>Component 2:</i>	2.1. BMS deployment and support	Strategical planning and technical support	Adoption and use	Adoption and use	Adoption and use	Adoption and use	Adoption and use	
	2.2. Data integration and sharing	Mentoring, data integration/publication	Collection, analysis and sharing	Collection, analysis and sharing	Collection, analysis and sharing	Collection, analysis and sharing	Collection, analysis and sharing	Collection, analysis for thesis work
<i>Component 3:</i>	3.1. Breeding schema	Mentoring for evaluation and implementation plans	Target breeding programmes assessment	Target breeding programmes assessment	Target breeding programmes assessment	Target breeding programmes assessment	Target breeding programmes assessment	
	3.2. Modern technologies	Mentoring/ coordination and support	Genetic resource evaluation and molecular breeding activities	Genetic resource evaluation and molecular breeding activities	Genetic resource evaluation and molecular breeding activities	Genetic resource evaluation and molecular breeding activities	Genetic resources evaluation and molecular breeding activities	Modern technologies teaching
<i>Component 4</i>	4.1. Human capacity	Teaching and coordination	Integration of MSc students and one PhD in the breeding activities	Integration of MSc students and one PhD in the breeding activities	Integration of MSc students and one PhD in the breeding activities	Integration of MSc students and one PhD in the breeding activities	Integration of MSc students and one PhD in the breeding activities	BMS teaching
	4.2 Improved Infrastructure	Define strategy, evaluate needs and supervise implementation	Define specific needs and implement	Define specific needs and implement	Define specific needs and implement	Define specific needs and implement	Define specific needs and implement	Define specific needs and implement

B. Knowledge Management plan

The following, systematic approach is proposed to capture and report impact and lessons learnt from the project:

- i. Through training and exchanges there will be mutual learning opportunities between the IBP/ AfricaRice and NARS staff through collaboration in research.
- ii. Through participatory approaches (available PRA information, PVS) and multi-stakeholder platform discussions there will be mutual learning opportunities between plant breeders, researchers and stakeholders as well as among stakeholders.
- iii. Farmer and other stakeholder knowledge and insights will be documented and communicated through appropriate fora.
- iv. Information and knowledge generated through the project will be stored in the Knowledge Database of the IBP. This will be made publically available on the IBP Portal.
- v. Data collection, (cloud) storage and sharing protocols will be implemented for each activity, which includes systematic documentation and records of the verifiable indicators as set out in the log frame, to assess progress towards the realisation of outcomes and objectives of the project. The systematic documentation will be used to assess progress and to enhance project performance and will be available through the IBP Intranet.
- vi. The Project Coordinator will generate annual technical reports with a standard format including 'lessons learnt' for each key activity and these reports will be submitted to IFAD as stipulated in the grant agreement.
- vii. Benchmark, or baseline, data will be made available and will form the basis for measuring impact of the project.
- viii. Peer-reviewed scientific papers, based on specific project activities, will be generated by plant breeders and other research staff, and published under Open Access following the current guidelines and policies of the implementing organisations and IFAD.

C. Scaling up and sustainability

The project is set in a holistic knowledge continuum, where an investment in adapted technologies and participation mechanisms will propel the advent of more impactful plant breeding in Africa. Not only is the vision shared by many stakeholders along strategic value chains, but it also proposes concrete means to reach key Research & Development objectives and to contribute by value-adding agriculture across the region (**Figure 3**, below).

Indeed, regional growth can be achieved with a strong and healthy agricultural sector – namely when more revenue is available to small producers – which then has an impact on other industries, contributing to national wealth and wellbeing. To secure more revenue for farmers, they need access to better seed that will generate more yield and quality; i.e. varieties adapted to their local environments, responsive to climate and resistant to pests and diseases, and appealing to the producers themselves and to potential consumers for profitability.

In addition to the benefits previously mentioned, the participating institutions benefit through knowledge creation and sharing.

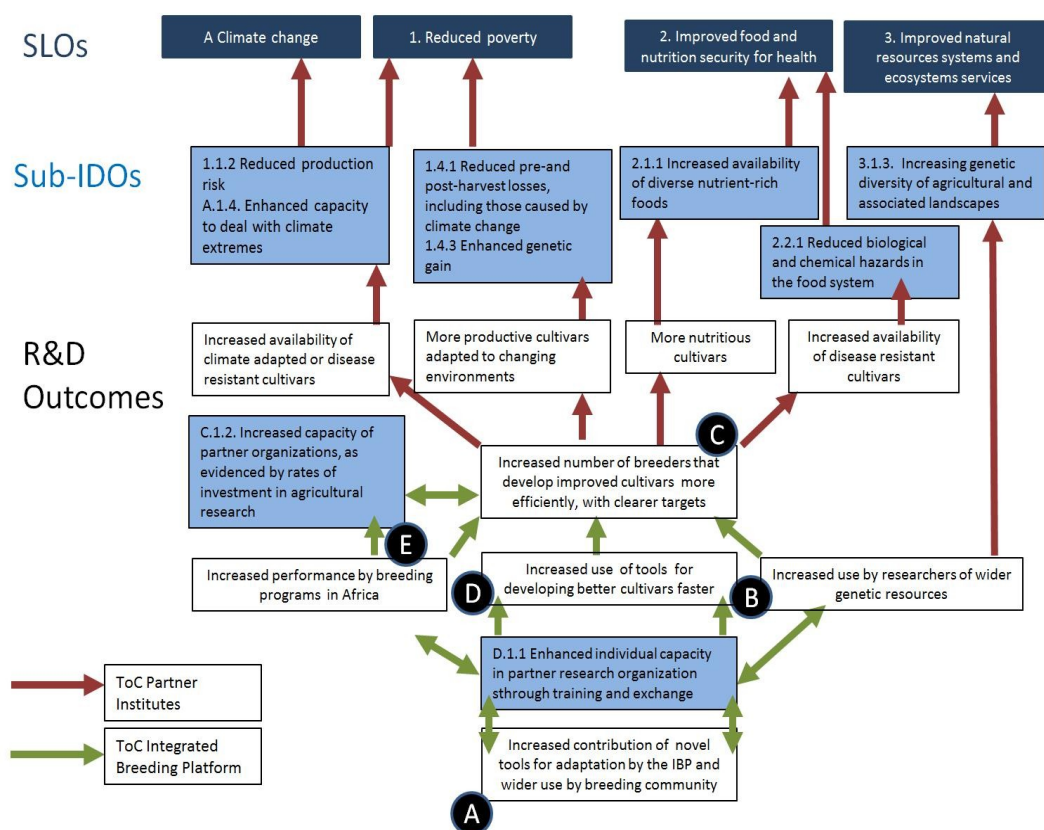
Scaling up: The project will combine three (3) approaches:

- i. horizontal scaling up, i.e., geographical spreading of successful initiatives, linking to on-going breeding programme initiatives;
- ii. vertical scaling up, i.e. engaging higher-level actors for the application of policies emanating from the project at the national level; and
- iii. functional scaling up; i.e. extending the process through the facilitation of new breeding methods, the use of different tools and approaches, and the adoption of new technologies, to improve the efficiency and effectiveness of national breeding programmes.

The project has a clear potential for a training effect across the region. When the case will have been successfully built within the rice and groundnut value chains, it will be easier to integrate more players and improvements into these programmes; to generalise the approach to other crops, networks and countries; and to expand its core principles into institutional policies.

Sustainability: The project will adopt a community-led programme model, where smallholder farmers will actively participate in project planning and implementation. Information available from past Participatory Rural Appraisals (PRA) and the organisation of new Participatory Varietal Selection (PVS) activities will be employed to identify farmer needs with guidance and input from local breeding institutions to ensure ownership and commitment. Linkages with development programmes, national priorities and strategies for youth employment, especially in SMEs will also facilitate scaling up to ensure sustainability. The education of the next generation of breeders (MSc) and young breeders already working in National Programmes (PhD) to modern breeding approaches, and the formation of local technical staff as IBP focal points within each institution, will also be critical for sustainable technology transfer.

Figure 3: Theory of Change diagram



VI. PROJECT COSTS AND FINANCING

A. Project Costs by Component/Activity (text and table)

Table 4: Project costs (operating) per component/activity and project year (USD '000s)

Component/activity	Year 1	Year 2	Year 3	Total (USD)
Component 1				
1.1. Engaging farmers	50	90	90	230
1.1.1 Breeding Task Force and rice value chain	30	54	54	138
1.1.2 Groundnut value chain implementation	20	36	36	92
1.2. Linking with seed businesses	10	25	45	80
1.2.1 Engagement at project workshops	6	6	6	18
1.2.2 Production of foundation seeds	4	19	39	62
1.3. Knowledge platform	20	30	30	80
1.3.1 Portal development / link with existing knowledge sites	15	10	10	35
1.3.2 Data/information collection and publication	5	20	20	45
Component 1 sub-total	80	145	165	390
Component 2				
2.1. BMS deployment and support	140	115	110	365
2.1.1 Development and implementation of Institutional data management policy	50	20	20	90
2.1.2 BMS deployment and support	90	95	90	275
2.2. Data integration and sharing	15	20	30	65
Component 2 sub-total	155	135	140	430
Component 3				
3.1. Breeding schema	90	50	50	190
3.1.1 Assessment of breeding programmes	60	0	0	60
3.1.2 mentoring, monitoring and implementing	30	50	50	130
3.2. Modern technologies	249	388	373	1010
3.2.1 Evaluation of genetic resources	140	120	20	280
3.2.2 Use of molecular markers	80	140	140	360
3.2.3 Cultivar development	29	128	213	370
Component 3 sub-total	339	438	423	1200
Component 4				
4.1 Human capacity	60	100	100	260
4.1.1 BMS support staff at target Institutions	20	20	20	60
4.1.2 PhD	20	55	55	130
4.1.3 MSc	20	25	25	70
4.2 Improved Infrastructure	100	60	60	220
4.2.1 Assessment of IT equipment and implementation	70	30	30	130
4.2.2 Experimental station	30	30	30	90
Component 4 sub-total	160	160	160	480
Total	734	878	888	2500

B. Project Financing by category of expenditure for IFAD and other financiers

Table 5: Project costs per category of expenditure and project year (USD '000s)

Category	Sub-category	Unit description	Quantity	Unit cost (USD)	Total cost (USD)	Implementing entity	IFAD Contribution (USD)				AR/IBP Contribution (USD - in-kind)				Total (USD)
							Y1	Y2	Y3	Total	Y1	Y2	Y3	Total	
Salaries and Allowances	Project Coordinator	Year	3.10	60.00	186.00	AR	60	62	64	186					
	Delivery value chain	Month	0.78	100.00	78.00	AR	25	26	27	78					
	BMS support scientist	Year	3.13	45.00	141.00	AR	45	47	49	141					
	IT/data manager	Month	1.27	100.00	127.00	AR	40	42	45	127					
	<i>Sub-total</i>						170	177	185	532	180	170	## #	520	1 052
Equipment and Materials	CRI-Ghana	Single contract	3.57	35.00	125.00	CRI	35	45	45	125					
	ISRA- Senegal	Single contract	14.29	17.50	250.00	ISRA	70	90	90	250					
	NaCRRRI- Uganda	Single contract	3.57	35.00	125.00	NaCRRRI	35	45	45	125					
	NaSARRI- Uganda	Single contract	3.57	35.00	125.00	NASARRI	35	45	45	125					
	<i>Sub-total</i>						175	225	225	625	20	20	20	60	685
Operating Costs	Vehicle maintenance	Vehicle	5.00	0.60	3.00	AR	1	1	1	3					
	Electricity	m2	5.00	0.60	3.00	AR	1	1	1	3					
	Staff transport services	Staff /Trip	8.33	1.20	10.00	AR	-	5	5	10					
	ITC (telephone & internet, hardware maintenance & repair, photocopies)	Staff	5.71	3.50	20.00	AR	6	7	7	20					
	Procurement office services	Purchase/contract			5.00	AR	2	2	1	5					
	Audit fees	Yearly contract	3.00	7.00	21.00	AR	6	7	8	21					
	Casual assistance	Month	36.00	2.00	72.00	AR	24	24	24	72					
	Administrative support (Accounting Unit, Planning)	Contract	35.45	1.10	39.00	AR	11	14	14	39					

	and Budget Unit, Human Resources Unit)														
	<i>Sub-total</i>						51	61	61	173					173
Goods Services and Inputs	CRI-Ghana	Single contract	4.00	10.00	40.00	CRI	10	15	15	40					
	ISRA- Senegal	Single contract	16.00	5.00	80.00	ISRA	20	30	30	80					
	NaCRRRI-Uganda	Single contract	4.00	10.00	40.00	NaCRRRI	10	15	15	40					
	NaSARRI- Uganda	Single contract	4.00	10.00	40.00	NaSARRI	10	15	15	40					
	<i>Sub-total</i>						50	75	75	200	300	300	## #	900	1 100
Travel	International travel (accommodation and local costs)	Trip	14.00	2.50	35.00	AR/NARS	15	10	10	35					
	Travel services	Trip	7.50	1.20	9.00	AR	3	3	3	9					
	International travel (air tickets)	Trip	25.00	1.60	40.00	AR/NARS	10	15	15	40					
	<i>Sub-total</i>						28	28	28	84	20	10	10	40	124
Consultancies	Consultancies in field station management	Month	26.82	2.20	59.00		19	20	20	59					
	Consultancies in molecular breeding	Month	15.31	3.20	49.00		16	16	17	49					
	Advisory on plant breeding	Month	36.57	3.50	128.00	AR	40	42	46	128					
	Consultancies for market assessments	Month	11.94	1.68	20.00		6	7	7	20					
	<i>Sub-total</i>						81	85	90	256	25	15	10	50	306
Training	University of Ghana- WACCI	Single contract	40.00	1.00	40.00	WACCI	10	15	15	40					
	Thiès University, Senegal	Single contract	40.00	1.00	40.00	TU	10	15	15	40					
	University Cheikh Anta Diop, Senegal	Single contract	40.00	1.00	40.00	UCAD	10	15	15	40					
	Makerere University, Uganda	Single contract	70.00	1.00	70.00	Makerere	20	25	25	70					
	<i>Sub-total</i>						50	70	70	190	20	10	10	40	230
Workshops	Project partner workshops (travel costs, accomodation, venue and communications.)	Event	9.20	16.30	150.00	AR/NARS	50	50	50	150					
	Multi-stakeholder Workshops	Event	8.96	6.70	60.00	AR/NARS	20	20	20	60					

	<i>Sub-total</i>						70	70	70	210	25	-	25	50	260
Total Direct Cost							675	791	804	2 270	590	525	545	1 660	3 930
Management Fee						<i>AR</i>	50	65	65	180	60	55	55	170	350
CSP (2%)*						<i>CGIAR</i>	14	18	18	50					50
Total Indirect Cost							64	83	83	230	60	55	55	170	400
Total Grant							739	874	887	2 500	650	580	600	1 830	4 330

Table 6. Summary budget per category, indicating IFAD's contribution and co-financing per year (USD '000s).

	Y1	Y2	Y3	Total	Co-financing	Grand total
Salaries and Allowances	210	220	230	660	520	1,180
Equipment and Materials	175	225	225	625	60	685
Operating Costs	60	70	70	200		200
Goods Services and Inputs	50	75	75	200	900	1,100
Travel	25	25	25	75	40	115
Consultancies	30	40	40	110	50	160
Training	50	70	70	190	40	230
Workshops	70	70	70	210	50	260
Total Direct Cost	670	795	805	2,270	1,660	3,930
Management Fee	50	65	65	180	170	350
CSP (2%)	14	18	18	50		50
Total Indirect Cost	64	83	83	230	170	400
Grand total	734	878	888	2,500	1,830	4,330

C. Budget narrative

Salary and allowances

Salaries will be paid only for staff solely and directly engaged with the IFAD financed project.

- i. The project will support a full time Project Coordinator (across all activities), to be based at AfricaRice HQ in Abidjan, who will take care of overseeing the implementation of, and reporting on, the different activities proposed in the proposal. This will include, amongst other things: regular communication with the different partners, with at least one site visit every year in each of the three target countries; implementation of the Monitoring and Evaluation plan; responding to challenges as they arise; organisation of the annual project meeting; and annual report preparation. In addition, the Project Coordinator will engage with related IFAD projects/initiatives in the 3 target countries. The Project Coordinator, currently the BMS Regional Deployment Manager for West and Central Africa, is already interacting closely with partners in both Ghana and Senegal, and will contribute to the BMS deployment and support effort across the four (4) target institutions with a focus on CSIR-CRI, Ghana.
- ii. The project will support 25% of the cost for the Value Chain Delivery Coordinator (Activity 1) to organise different activities along the rice value chain, especially building on the work of the Africa Breeding Task Force. The AfricaRice Breeding Task Force for rice is in place and engaged in coordinating smallholder farmer participation in variety development and scaling out seed systems.
- iii. The project will support a full time BMS Support Scientist (Activity 2), based in Uganda, who will primarily assist with deployment and support for the BMS at NaCRRRI and NaSARRI, as well as at Makerere University. The position will also support BMS deployment in Ghana and Senegal as needed. Support for the BMS in Senegal will be provided at CERAAS by the IBP (AfricaRice) as part of its in-kind contribution.
- iv. The project will support 30% of an IT/Data Manager (Activity 2, and partially 1 and 4), to oversee all activities related to IT implementation and data management in the project. This will include, but is not limited to, guiding and advising on the development of institutional data management policy, and defining and overseeing the implementation of the IT infrastructure at each of the target Institutes. Supporting data migration (historical data, migration from desktop to server version) and standardisation of breeding nomenclature at the selected breeding programmes. The IT/Data Manager will also be engaged in the coordination of the big data analysis within and across the four target Institutes, and in the storage and publication of the data and information coming from the participatory varietal selection (PVS) trials. Other IBP support staff engaged in data management (Activity 2.1) as well as the IBP Knowledge and Communication Manager (Activities 1.3 and 4.1) will also be engaged in the project as part of the AfricaRice/IBP in-kind contribution to the project.
- v. The project will support the 50% equivalent of a Plant Breeder (Activity 4) to provide mentorship in the modernisation of the different breeding programmes at the four target Institutes. The breeder(s) bring experience and knowledge from private sector programmes and will be pivotal in assessing breeding programmes and developing new strategies for programmes in each of the four (4) institutes. In particular, there will be an emphasis on the use of molecular markers. The IFAD-funded component will be complemented by the funding of plant breeders through the AfricaRice/IBP in-kind contribution.

Equipment and materials

The budget is allocated to partners as follows: CSIR-CRI, Ghana, rice value chain (20%); ISRA, Senegal, four (4) centres, groundnut and rice value chains (40%); and in Uganda, NaCRRRI, rice value chain (20%) and NaSARRI, groundnut value chain (20%).

Expenditures will be incurred under:

- IT infrastructure: server, internet connectivity, computer, tablet, data capture device, bar-code reader, label printer and others;

- Experimental station infrastructure: fencing, irrigation systems, pumps, met station, seed counter and others; and
- Fieldwork: seed shipments, land preparation, planting, plant sampling, data collection, seed harvest and others.

A more detailed assessment of IT and experimental station needs will be conducted at the project inception meeting.

This category may also include support to universities for thesis work by MSc and PhD students. These requirements will be assessed on a case-by-case basis.

Operating costs

All the operating costs are project direct costs. The line items are defined according to the requirements of AfricaRice for full cost recovery; e.g. ICT connectivity for staff in Abidjan, office space, and other standard charges. In addition, an amount is budgeted for casual assistance that may be required for extra-curricular activities such as meeting and workshop organisation.

Goods, services and inputs

The budget category is allocated to the four (4) institutes mentioned above under Equipment and Materials, in the same proportions; ie, CSIR-CRI 20%; ISRA 40%; NaCRRI/NaSARRI 40%. Inputs will primarily comprise office, laboratory and field supplies.

A component of the budget will be assigned to genotyping services for support in the use of molecular markers (activity 3). A discounted service, provided through Intertek under an initiative supported by the Bill & Melinda Gates Foundation, is being considered at this stage.

Travel

Travel will be partly funded through the IFAD grant (supplemented by AfricaRice/IBP's in-kind contributions) and will include visits by key staff to the project locations in Ghana, Senegal and Uganda. The detailed travel plans will be based on comprehensive work plans to be developed, firstly at the inception workshop and subsequently at the annual project meetings.

Consultancy

Consultants will be engaged, as necessary, to provide specialist input in specific areas where capacity does not exist within the project staff cohort. In particular, we expect this will include consultancies for field station management, molecular breeding, and market assessments.

Training

A number of MSc and PhD students will receive partial support for research costs assessed on a needs basis. Support will be provided to students enrolled at WACCI-Ghana; UCAD, TU- Senegal; and Makerere-Uganda.

Workshops

There will be three (3) country-based workshops, annually (see outputs, indicative work plan, item D under section IV). The budget will cover workshop logistics such as facilities, and travel and local costs of partners. The IFAD budget will also facilitate interaction with farmers and seed company partners, mainly as part of the Farmer Participatory Trials.

D. Project Co-financing

AfricaRice/IBP will contribute an in-kind contribution of 1,830 M US\$ to the project. That contribution will come mainly from two sources: an ongoing project supported by the Bill and Melinda Gates Foundation "Integrated Breeding Platform Phase II", a five-year project of 12M US\$ (September 2014 – August 2019), and some carry over from the GCP. The in-kind contribution will mainly support two IFAD budget categories: 1) salaries and allowances as well as 2) Goods, services and inputs.

Part time of the IBP Director, PI of the project, and of the IBP Knowledge and Communication Manager, who will lead the overall development of the Knowledge Platform component, will be part of the AfricaRice/IBP in-kind contribution. At a technical level, the support of a fulltime BMS Support Scientist based at CERAAS, and part time contribution of IBP data managers and Breeding Specialists of the IBP team, will also come from other sources.

A key pillar of the proposal is to deploy the BMS, a software that is provided at no cost to the different partners involved in the project. Although the BMS is already a mature product, with a first public version released in the summer of 2014 and a commercial version released in December 2016, it is under constant improvement and maintenance like any other analytical pipeline, to better address the needs of users. The 900K in-kind contribution under “Good, Services and Inputs” will comprise support to BMS maintenance and development.

AfricaRice/IBP, via the two external sources of funding reported above, will also be able to complement IFAD support for the following categories: 1) “Equipment and material” (mainly IT equipment), 2) Travel (supporting IBP staff and consultant travel costs), 3) Consultancies (Web Master and capacity building), 4) Training (tutorials and e-learning material development), and 5) Workshops (IBP staff and consultant travel and local costs).

VII. FINANCIAL GOVERNANCE

A. Procurement Procedures for Goods, Services and Human Resources

AfricaRice will carry out the procurement of goods and services, as required for the Project to be financed from the proceeds of the Grant, and in accordance with the approved procurement procedures in force at the Centre. Recruitments will be undertaken in line with AfricaRice policies and procedures and in compliancy with IFAD Procurement Guidelines.

Materials, equipment or goods to be imported will be adequately insured against unforeseen hazards or events subsequent to the acquisition, transportation and delivery thereof to the place of use or installation. AfricaRice will ensure that all necessary administrative arrangements are made to obtain the necessary exemptions from duties and taxes consequent to such importation.

There may be a requirement for computers and servers as part of the BMS installation and IT infrastructure at partner institutes. All purchases will be identified and requested and made according to IFAD protocols and AfricaRice policy (capital items > \$1,000).

Table 7. Procurement plan of (a) Goods; (b) Works and (c) Services

Procurement contract No.	Procured item (description)	No. procured items	Estimated Cost ('000 USD)	Estimated Start and Finish			Procurement Method	Remarks
				Year 1	Year 2	Year 3		
Goods								
1	IT equipment at Institutions	Lump-sum	50 22 22	Q1			Most economically advantageous local cost	Includes: server, internet connectivity, computer, tablet, data capture device, bar-code reader, label printer and others
2	Experimental station equipment	Lump-sum	22 22 22	Q1	Q1	Q1		
						Q1		
	Sub-Total: Goods (USD)		160					
Works								
3	Field activities	Lump-sum	50/50 90/90 90/90	Q1/Q3			Most economically advantageous local cost at each target Institution	Includes: seed shipments, land preparation, planting, plant sampling, data collection, seed harvest and others. laboratory and field supplies
4	Lab and Field inputs	Lump-sum	10 /10 15/15 15/15	Q1/Q3	Q1/Q3	Q1/Q3		
5	Education	Lump-sum	40 75 75	Q1	Q1	Q1		
	Sub-Total: Works (USD)		730					
Services								
6	Genotyping services	Lump-sum	30 45 45	Q1/Q3	Q1/Q3	Q1/Q3	Sole Sourcing: Service contact to 2-3 specialized service providers	Genotyping activities
	Sub-Total: Services (USD)		120					
	Grand Total: Goods, Works and Services ('000 USD)		1,100					

B. Financial Management System, Accounting Specifications, Disbursement and Cash Use Projections

Financial Management System

AfricaRice and any of its collaborating partners will maintain records and documents adequate to report on the operations related to the implementation of the Project.

AfricaRice uses OCS (One Corporate System), a versatile ERP system with the ability to deliver an integrated suite of corporate applications, with modules incorporating end-to-end processes in finance, HR, project planning and management, service units and the supply chain.

The software facilitates the segregation and independent reporting of accounting transactions from a variety of funding sources, with variance analysis tools for the continuous and simultaneous monitoring of expenditure using the budgetary control module with integrated commitment accounting. AfricaRice maintains accounts and accounting records in accordance with the CGIAR Financial Guidelines series (1-6) which are generally consistent with International Accounting Standards.

Accounting Specifications

AfricaRice accounts are prepared under the historical cost convention using the accrual basis of accounting and presented in accordance with the recommendations made in the CGIAR Financial Guidelines Series No. 2: Accounting Policies and Reporting Practices Manual (March 2004 – updated in February 2006), which are in conformity with International Accounting Standards (IAS) for not-for-profit organizations.

AfricaRice will maintain a designated bank account/ledger for the project book keeping in order to allow the traceability of IFAD funds for this specific grant.

AfricaRice accounts are maintained in US dollars. Local currency of various member states and other countries in which AfricaRice operates are recorded in the books of AfricaRice at the rate of exchange prevailing on the dates of the transactions.

Disbursement

Disbursements will be made through the WB acting as Trustee. In this regard, the initial advance should not exceed 75% of the expenditures included in the first year Work Plan and Budget and will be disbursed upon submission of Withdrawal Application signed by an authorised signatory. In subsequent disbursements, AfricaRice will be able to request the balance of the previous year (25%) and 75% of the following year's advance provided that the relevant AWPB has been approved and subject to the provision of a Statement of Expenditures justifying at least 75% of the previous advance and 100% of the preceding instalments.

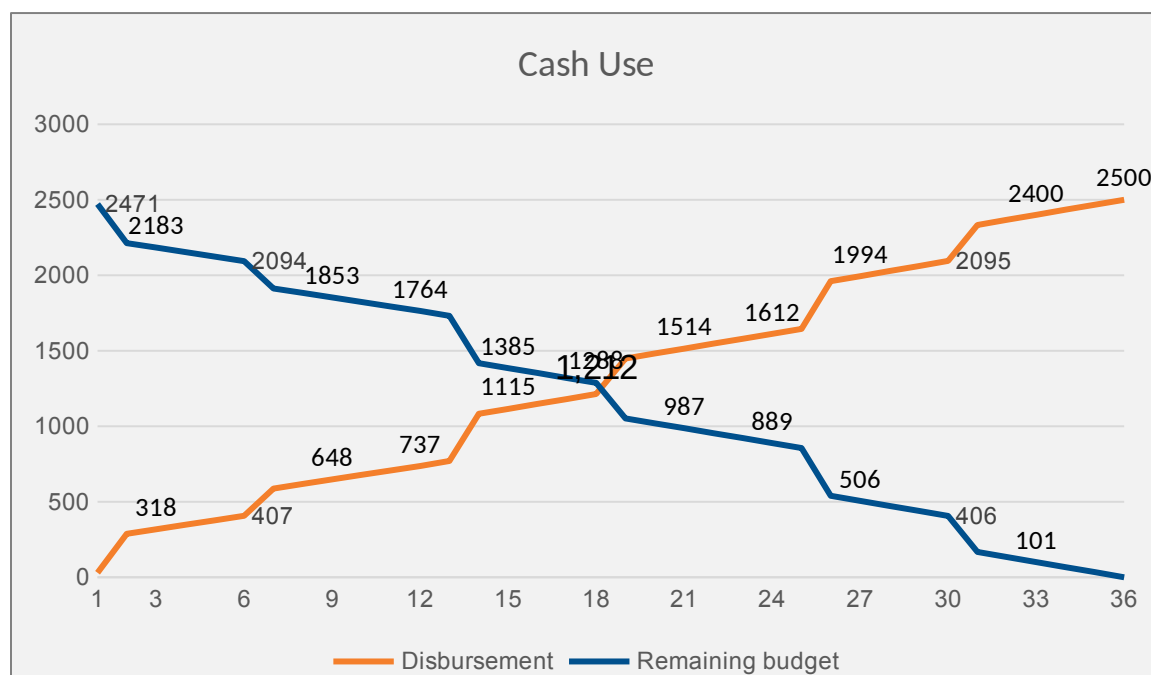
Cash use projection during the project

The line items Salary & Allowances, Operating Costs, Travel, and Consultancies are all projected to have even expenditures across the 36 months of the project. There are no delays anticipated in terms of engaging staff to work on this project and the other categories will comprise activities consistently throughout the project.

The line items Equipment and Materials, Goods, Services and Inputs, and Training are destined for the partners and, as such, there will be two disbursements per year, in February and July.

The line item for Workshops will be expended in February of each year, anticipation a start of the project on January 1st, 2018. This timing will be adjusted as needed.

Fig. 4: Cash use projection (Vertical Axis: USD '000s and horizontal axis: Months)



C. Financial Reporting and Audit Arrangements

AfricaRice will prepare separate records in accordance with internationally accepted accounting standards and will submit consolidated semi-annual unaudited Statements of Expenditure certified by an authorized signatory to IFAD within 45 days of the end of the reporting period. Such Statements of Expenditure shall disclose both IFAD funds and any co-financing funds and consolidate expenditures incurred by sub-grantees and/or implementing partners in cash or in kind together with a detailed expenditures transaction list. AfricaRice will be accountable for the use of sub-grant funds.

AfricaRice will ensure that:

- i. AfricaRice's institutional accounts will be audited annually by reputable, world class, independent auditors in accordance internationally accepted auditing standards in compliancy with IFAD guidelines. A copy of its audited financial statements will be submitted to IFAD within six months after the end of each fiscal year.
- ii. The project- specific financial report and Statement of Expenditure for the year will be under the scope of coverage of the auditor's opinion within the Audited Financial Statements or separately. The auditor's opinion will make specific reference to the IFAD grant number and will clearly disclose the sources and uses of the IFAD funds.
- iii. The annual audit report submitted to IFAD will cover both IFAD funds and any co-financing (excluding co-financing funds in-kind), and consolidate expenditures incurred by sub-grantees, which will be accountable for the use of sub-grant funds and subject to normal audit oversight.
- iv. The final audit report accompanied by a management letter will be submitted to IFAD before the project closing date. Enough time will be reserved to AfricaRice to consolidate the final financial and audit reports and to submit timely the consolidated final audit report to IFAD.

REFERENCES

- Challinor AJ, Watson J, Lobell DB, Howden SM, Smith DR, Chhetri N (2014) A meta-analysis of crop yield under climate change and adaptation. *Nat. Clim. Change* 4: 287-291. doi:10.1038/nclimate2153.
- Davies W.J. and J.-M. Ribaut (2017) Stress resilience in crop plants: Strategic thinking to address local food production problems. *Food and Energy Security*, 6(1):12-18 Security DOI: 10.1002/fes3.105

Delannay X., G. McLaren and J.-M. Ribaut (2012) Fostering molecular breeding in developing countries. *Molecular Breeding*: 29:857-873. DOI 10.1007/s11032-011-9611-9

Diop N.N., F. Okono, and J.-M. Ribaut (2013) Evaluating Human Resource Capacity for Crop Breeding in National Programs in Africa and South and Southeast Asia. *Creative Education*: 4: 72-81. <http://dx.doi.org/10.4236/ce.2013.410A011>

Evenson RE, and Gollin D (2003) Crop variety improvement and its effect on productivity. The impact of international agricultural research. 522 pages. CABI Publishing Oxon Cambridge UK. ISBN 0 - 85199 -549 -7

Okello D, Okori P, Naveen P, Boris Bravo U, Deom CM, Ininda J, Angurua P, Biruma M and Asekenye C (2015) Groundnut seed production manual for Uganda. National agricultural Research Organization publication, pp 1-35.

http://www.caes.uga.edu/content/dam/caes-website/peanut-%26-mycotoxin-innovation-lab/documents/pmil/uga203/Publication_Okello_UGA203_Deom_2015_Groundnut_Seed_Production_Manual_for_Uganda.pdf

Ribaut, J.-M., Delannay, X, McLaren, G, Okono, F (2012). "Molecular Breeding Platforms in World Agriculture". In Robert A. Meyers (ed.) *Encyclopedia of Sustainability Science and Technology*, Springer Verlag. Volume 9, pp. 6692 –6720

Singh RP, Hodson DP, Huerta-Espino J, Jin Y, Bhavani S, Njau P, Herrera-Foessel S, Singh PK, Singh S, Govindan V (2011) The emergence of Ug99 races of the stem rust fungus is a threat to world wheat production. *Annu. Rev. Phytopathol.* 49: 465-481. doi: 10.1146/annurev-phyto-072910-095423.

Stevenson JR, Villoria N, Byerlee D, Kelley T, Maredia M (2013) Green Revolution research saved an estimated 18 to 27 million hectares from being brought into agricultural production. *PNAS* 110: 8363-8368. doi: 10.1073/pnas.1208065110.

Weber VS, Melchinger AE, Magorokosho C, Makumbi D, Bänziger M, Atlin GN (2012) Efficiency of managed-stress screening of elite maize hybrids under drought and low nitrogen for yield under rainfed conditions in southern Africa. 52:1–10

Ribaut J.-M., M.C. de Vicente and X. Delannay (2010) Molecular breeding in developing countries: challenges and perspectives. *Current Opinion in plant Biology*, 13:1–6

Tokida et al (2014) Rice mechanisation: Japan's experience and CARD initiative in Africa, JICA, April 2014

Varshney R.K., J.C. Glaszmann, H. Leung and **J.-M. Ribaut** (2010) More genomic resources for less studied crops. *Trends in biotechnology*, 28:452-460

Varshney R, J-M Ribaut, E. S. Buckler, R. Tuberosa, J. A. Rafalski and P. Langridge (2012) Can genomics boost productivity of orphan crops. *Nature Biotech.* 30: 1172-1176

Varshney R, V.K. Singh, J. Hickey, X. Xun, D.F. Marshall, J. Wang, David Edwards and J.-M. Ribaut (2015) Analytical and decision support tools for genomics-assisted breeding. *Trends in Plant Science*: <http://dx.doi.org/10.1016/j.tplants.2015.10.018>

Groundnut seed production manual for Uganda: http://www.caes.uga.edu/content/dam/caes-website/peanut-%26-mycotoxin-innovation-lab/documents/pmil/uga203/Publication_Okello_UGA203_Deom_2015_Groundnut_Seed_Production_Manual_for_Uganda.pdf

Lists of seed companies: <http://www.usta.ug/wp-content/uploads/2016/06/LIST-of-USTA-MEMBERS-2016.pdf>

Uganda Seed Sector Assessment:

file:///C:/Users/Nate/Downloads/Uganda_Seed_Sector_Assessment,_2012%20(4).pdf

Annex 1: Results-based logical framework

	Objectives-hierarchy	Objectively verifiable indicators	Means of verification	Assumptions
Goal	The overall project goal is to contribute to enhanced food security and poverty alleviation by increasing smallholder productivity and income in three target countries in Africa.	<ul style="list-style-type: none"> - 10% increase in proportion of food secured households in target areas increased - 10% reduction in proportion of poor households in target areas decreased - Reduction in hunger gap by 40% due to stability of agricultural production as a result of growth of new cultivars more resilient to climate changes 	<ul style="list-style-type: none"> - Baseline and end-of-project surveys on agricultural production, markets and household economy 	<ul style="list-style-type: none"> - National agricultural and food policies and regulations do not impact negatively - Major natural disasters or civil unrest will not disturb project continuation and success
Objectives	<p>The main objective is to develop and disseminate improved crop cultivars that have characteristics that meet smallholder needs (improved grain, fodder, improved quality of produce grain size, colour, milling etc.) and market demands as well as able to mitigate agro-ecological challenges, climate change, biotic and abiotic stresses.</p> <p>To consolidate existing crop value chains to develop and promote climate resilient and improved crop cultivars for local environments, following a demand-led varietal design.</p> <p>To create a network of partners among the different communities of the crop delivery chain to learn from each other and share a common knowledge platform.</p> <p>To strengthen the national plant breeding capacity of 4 institutions in Ghana, Senegal and Uganda, and support the use of modern plant breeding technologies and approaches, including digital data management.</p> <p>To support the education of the new generation of crop breeders and integrate their research activities into national breeding programmes</p>	<p><u>RIMS indicators*</u>:</p> <ul style="list-style-type: none"> - At least 20,000 hectares under improved crop varieties (1.1.14) - Enhanced participation of national institutions such as ministries to mainstream the outputs of the project into the national planning processes - Up to 30 plant breeders actively using the BMS to manage their plant breeding operations (1.2.2) - Productivity of target crops increased by at least 15-20% in farmers' fields 5 years after the end of the project (2.2.2) - At least 50 MSc students trained in the use of the BMS (1.2.2) - At least 5 PhD graduates in national programmes using modern plant breeding technologies such as molecular markers (1.2.2) - At least three research facilities upgraded (IT or field infrastructure) (1.4.3) 	<ul style="list-style-type: none"> - Publications and institutional reports - M&E reporting: <ul style="list-style-type: none"> - baseline reports - annual report - revised risk matrix - Modules - Training modules/curricula 	<ul style="list-style-type: none"> - Adequate staffing for the project across the IBP and partners, and associated commitment to execute the project - Local actors and stakeholders are motivated and proactive - Targeted plant breeding institutes remain accessible and safe work places for project staff - Project countries remain politically stable
Outcomes/	Smallholder farmers with improved resilience	- A minimum of 4 institutions with data	- Documented policies and	- Stakeholders are willing and pro-

	Objectives-hierarchy	Objectively verifiable indicators	Means of verification	Assumptions
Outputs	<p>to climate change and economic vulnerability by adopting new and better crop varieties that reflect market demand.</p> <p>National breeding programmes that better align with and deliver on National Agricultural Plans, thanks to the adoption of best plant breeding practices.</p> <p>New crop varieties produced more effectively and efficiently by African plant breeding institutions, following a demand-driven crop variety approach.</p> <p>A network of African universities with the capacity to train the next generation of plant breeders and scientists in modern plant breeding.</p>	<p>management policy and practices in place</p> <ul style="list-style-type: none"> - At least 5 recent PhD students using modern breeding technologies including molecular markers - At least 15 breeding programmes across the 3 target countries with enhanced breeding capacity - At least 30 new genetic materials (e.g. lines, crosses, hybrids, etc.) identified across the 4 Institutes using modern breeding approaches - At least 50 MSc students trained in the use of the BMS - At least 3 plant breeding field stations upgraded (IT or field infrastructure) <p><u>RIMS indicators*:</u></p> <ul style="list-style-type: none"> - At least 10,000 primary beneficiary farmers adopting new cultivars (2.2.2) - At least one functioning value chain, including seed systems, per target country (2.4.3) 	<p>implementation procedures for data management</p> <ul style="list-style-type: none"> - Peer-reviewed scientific publications and training reports - MSc theses - M&E reporting: <ul style="list-style-type: none"> - annual report - Mlax M&E system 'dashboard' report - Base-line report - Institutional annual reports 	<p>active</p> <ul style="list-style-type: none"> - Adequate number of suitable graduate (MSc) students enrolled in plant breeding course across universities in the 3 target countries
Key Activities	<p>Result 1: Delivery chain and knowledge platform: Connecting the dots between breeders, extension workers and farmers</p> <p>SMART Indicator 1</p>	<p>PVS appraisals for 5 value chains (rice in 3 countries and groundnut in Senegal and Uganda) and value chain data available online through the knowledge platform</p>	<p>Survey results, online data and reports</p>	<p>Existing value chains for selected crops in target countries</p>
	<p>Result 2: Improved data management and digitalising breeding.</p> <p>SMART Indicator 2</p>	<p>Up to 30 breeders, representing 10-15 breeding programmes (groundnut, rice, beans, cowpea, maize or sorghum) across 3 countries actively using the BMS</p>	<p>BMS work orders completed, licences granted and breeding data in respective databases</p>	<p>Upper management at the institutional level actively supports adoption and use of the BMS by their plant breeders</p>

	Objectives-hierarchy	Objectively verifiable indicators	Means of verification	Assumptions
		for day to day management of their programmes		
	Result 3: Breeding - Integrating modern approaches	At least 10 breeding programmes across the 3 target countries tested new genetic resources (1-2 populations per programme) and use molecular markers in their breeding programmes	Improved cultivars produced	Genetic and genomics resources available
	Result 4: Capacity enhancement (human) SMART Indicator 3	At least 50 MSc students trained in the BMS and at least 5 PhD students/graduates in national programmes using modern breeding technologies, of whom 40% women.	University completion reports	Availability of suitable MSc and PhD students/ graduates
	Result 5: Capacity enhancement (infrastructure)	Four Institutions with updated IT infrastructure	Target Institutions operate the BMS server version effectively	Local IT service providers available

* RIMS = Results and Impact Management System (proposed by IFAD)

Annex 2: Supporting documentation for grant design document

Legal documentation, including evidence of legal status and capacity, registration and good standing, evidence of the authority of the person who will sign the agreement for the recipient. The recipient must demonstrate that it has been registered and that its registration is current (evidence of good standing no more than 90 days old), that it has the corporate capacity to enter into the Grant Agreement, accept the Grant and carry out the Project, and that the person signing the agreement has the necessary authority. Different jurisdictions have different laws, so the actual documentation required may vary. As a rule, the recipient must be registered in an IFAD Member State. Legal documentation is not required for United Nations agencies or CGIAR institutions.

Yes No Not applicable

Financial documentation, including the name/address of independent auditors, institutional audited financial statements and audit reports. Audit reports must be signed and dated on Auditor's letterhead. For recipients that have not previously received an IFAD grant, two years' audited financial statements and audit reports will be required. Otherwise, one year is sufficient. Financial documentation is not required for UN agencies or CGIAR institutions. For those recipients that have not been required to prepare audit reports, or whose audit reports have been qualified, the financial management questionnaire must be submitted (attachment 8 of the Grant Procedures).

Yes No Not applicable

Recipient's procurement procedures. If the recipient does not have its own procedures, a declaration that it will use IFAD's Procurement Guidelines or other procedures acceptable to the Fund will suffice

Yes No Not applicable

Procurement Plan. The Procurement Plan, defined in paragraph 6.1(xiii) of the IFAD General Provisions, should be prepared where goods and services worth more than US\$ 200,000 are to be procured under the project (attachment 16 of the Grant Procedures). The Grant Sponsor should review the Procurement Plan to ensure, among other things, that the grant is not used to purchase equipment or other durable goods if it would be economically appropriate to lease the equipment instead and that such goods or equipment are suitable and required for the effective implementation of the project.

Yes No Not applicable

Declaration by the recipient (email is acceptable) that it has read and accepted the Project Description and Project Budget. It is mandatory that the recipient has reviewed the Project Description and Project Budget before the Grant Package is submitted for Approval.

Yes No Not applicable

Declaration by the recipient (email is acceptable) that it has read and accepted IFAD's Standard Large/Small Grant Agreement. The model Grant Agreement is available on the IFAD website, in attachment 14 of the Grant Procedures.

Yes No Not applicable

CFS Clearance: _____ Date: _____

LEG Clearance: _____ Dates: _____

Annex 3: Eligibility and Due Diligence Checklist

(LEG and CFS to review)

1. **The recipient is:** (check the appropriate box)

- The government of a developing member state of IFAD
- A non-profit, non-governmental organisation in an IFAD member state
- An intergovernmental organisation with more than one IFAD member state as a member.
- Private sector entity
- Other

(Governments and government agencies of developed Member States and non-Member States are not eligible. Non-profit, non-governmental organisations in non-Member States are eligible only if a specific waiver is granted by the President.)

2.(A) **If the recipient has previously received grant(s) from IFAD, has it provided all necessary progress reports and audited financial reports/statements?**

Yes No n/a

If the answer is no, the recipient is not eligible.

2.(B) **If the recipient has previously received grant(s) managed by your division, was its performance fully satisfactory?**

Yes No n/a

If the answer is no, please explain why the recipient should receive a new grant.

3. **Can the recipient provide audited financial statements for the two previous years?**

Yes No

If the answer is no, describe special circumstances that justify giving the grant to this recipient and provide supporting documentation.

4. **Is IFAD the prime beneficiary of the grant?**

Yes No

5. **Will this grant support activities normally supported by other IFAD resources (i.e. IFARB)?**

Yes No

6. **Will this grant support activities that duplicate efforts being financed by other donors?**

Yes No

If the answer to 4, 5 or 6 is yes, the grant does not comply with the IFAD Grant Policy. No waiver is possible. It is the responsibility of the grant sponsor to confirm the eligibility of the recipient and the conformity of the grant with all aspects of IFAD's policies and procedures. If the grant sponsor requests a waiver of any policy or procedure which is subject to being waived, it must be set forth below.

7. **Deviation from IFAD policies and procedures** List any aspects of the grant that do not comply with IFAD's grant policy or procedures.

Annex 4: Letters of Support from Upper Management at Partner Institutions

AF/as 13/07/2016

REPUBLIQUE DU SENEGAL

Un peuple - Un but - Une foi

**MINISTRE DE L'AGRICULTURE
ET DE L'EQUIPEMENT RURAL**

**INSTITUT SENEGALAIS DE
RECHERCHES AGRICOLES**

Route des Hydrocarbures Bel-Air

Boîte Postale 3120 Dakar

Tél. : 33859-17-19/25

Fax : 33832-24-27

Email : dgisra@isra.sn

Site web : www.isra.sn

4413
N° /DG-ISRA

Dakar, le 14 JUIL. 2016

Le Directeur Général

Doctor Jean Marcel Ribaut
Directeur IBP, Integrated Breeding Platform
c/o CIMMYT
Carretera Mexico-Veracruz Km 45
Texcoco, Edo de Mexico
CP 56237

MEXICO

RE : Commitment for the use of the IBP Breeding Management System at ISRA

Dear Jean Marcel,

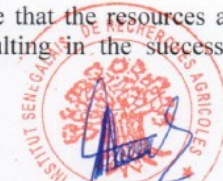
Thank you for the information and demonstrations of the Breeding Management System for the management of the logistics, data, analysis and interpretation of information collected in our breeding programs. At ISRA we recognize that the BMS can improve the efficiency and effectiveness of our breeding programs and we are committed to deploying it as an institutional tool for all our crop improvement programmes.

We have appropriate informatics infrastructure to support the BMS and the IT manager and staff will be available to provide the IT support to ensure smooth running of the system, and assistance to the IBP Regional Hub staff based at CERAAS.

Though it has to be recognised that the introduction of the BMS involves fundamental changes in the way we manage our breeding processes, we note that most of our programmes are already taking it up after only one year of its introduction. Programme leaders will continue to work in close collaboration with the IBP deployment team and Regional Hub staff to establish a plan that is adapted to the needs of ISRA researchers.

ISRA Management will then review this plan and ensure that the resources and personnel are in place to ensure its effective execution, resulting in the successful deployment of the BMS at ISRA.

Yours sincerely,


Le Directeur Général
de l'ISRA
Dr Alioune FAI I



COUNCIL FOR SCIENTIFIC AND INDUSTRIAL RESEARCH
CROPS RESEARCH INSTITUTE

Telefax: +233 (0) 3220 60396
Email: cridirector@yahoo.com
cridirector@cropsresearch.org

P. O. Box 3785
Kumasi-Ashanti
Ghana

Our Ref : CSIR/CRI/RP/11/V:371

21st October, 2016

Your Ref :

Dr Jean Marcel Ribaut
Director Integrated Breeding Platform
c/o CIMMYT
Carretera Mexico-Veracruz Km 45
Texcoco, Edo de Mexico
CP 56237, Mexico

Dear Jean Marcel,

Re: Commitment to the use of the IBP Breeding Management System at CSIR-Crops Research Institute

Thank you for the information and demonstrations of the Breeding Management System for the management of the logistics, data, analysis and interpretation of information collected in our breeding programs. At CSIR-Crops Research Institute, we recognize that the BMS can improve the efficiency and effectiveness of our breeding programs and we are committed to deploying it as an institutional tool for our different crop improvement programs.

We have appropriate infrastructure, such as computers and local network infrastructure, to support the BMS and our IT/data manager(s) and staff will be available to work in collaboration with the IBP Team and regional hubs at (IITA/ AfricaRice / CORAF-ISRA) to provide the support necessary to ensure smooth adoption and running of the system.

The Institute is a National Centre of Specialization for root and tuber crops and is in the process of being upgraded to a Regional Centre of Excellence in root and tuber research, for the sub-region. The creation of a hub for the sub-region is therefore appropriate.

We recognise that the introduction of the BMS will involve fundamental changes in the way in which we manage our breeding programs and to work with you to effect this change we will progress in a stepwise manner starting with the following crops: cowpea, groundnut, soybean, rice, cassava, sweetpotato and yam. Lead breeders, or champions for each crop will be appointed with the authority and the time to work with the IBP deployment team to institutionalise the BMS based on a deployment plan for the next few crop cycles.

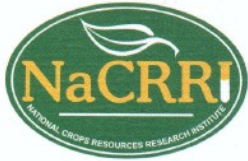
We undertake to have the necessary resources, including personnel, in place to ensure that the BMS will be successfully deployed at our institute and we look forward to working with the IBP.

Yours sincerely,

Dr. Stella A. Ennin
DIRECTOR

TELEPHONE: HEAD OFFICE : FUMESUA, KUMASI
DIRECTOR : +233 (0) 3220 60396
RECEPTION : +233 (0) 3220 60389, 60391, 60425

KWADASO STATION, KUMASI
RECEPTION: +233 (0) 3220 50221, 50222



NATIONAL CROPS RESOURCES RESEARCH INSTITUTE (NaCRRRI)

Namulonge, 9 km Gayaza - Ziobwe Road
P.O. Box 7084 Kampala, Uganda
Tel : +256 414 573 016
Fax : +256 752 726 554
Email : directormacri@naro-ug.org/directormacri@yahoo.com

Our Ref:

Your Ref:

21st March 2016

Dr Jean Marcel Ribaut
Director, Integrated Breeding Platform
c/o CIMMYT
Carretera Mexico-Veracruz Km 45
Texcoco, Edo de Mexico
CP 56237, Mexico

Dear Jean Marcel,

RE Commitment for the use of the IBP Breeding Management System at NaCRRRI

Thank you for the information and trainings on the Breeding Management System for the management of the logistics, data, analysis and interpretation of information collected in our breeding programs. At NaCRRRI we recognize that the BMS can improve the efficiency and effectiveness of our breeding programs and we are committed to deploying it as an institutional tool for all our crop improvement programs.

We have the required informatics infrastructure to support the BMS and the IT manager and other staff will be available to provide the IT support to ensure smooth running of the system.

It is recognised that the introduction of the BMS involved fundamental changes in the way we manage our breeding processes and to effect this change we will progress on a crop by crop basis, starting with maize, beans and rice. We have assigned BMS leads as champions on different crop commodities as: Daniel Kwemoi (maize), Geoffrey Onaga (rice), Eunice Kesiime (beans), Paul Kabayi (soybean) and Idd Ramathan (horticulture) to work with the NaCRRRI Breeders and IBP deployment team to develop a clear BMS roadmap and deployment plan.

We are pleased to confirm that management is committed to oversee successful implementation of BMS that is expected to improve management of breeding programs and database at the institute.

Thank you for valuable support and cooperation.

Yours sincerely,

Dr. Godfrey Asea
Director



National Agricultural Research Organisation



**NATIONAL SEMI ARID RESOURCES RESEARCH
INSTITUTE (NaSARRI) - SERERE**
P.O . Soroti - Uganda
Office: +256-454 463 665/463 663
Email:director@nasarri.go.ug
Website:http://nasarri.go.ug



Our Ref:.....

Your Ref:.....
21st March 2016

Dr Jean Marcel Ribaut
Director Integrated Breeding Platform
c/o CIMMYT
Carretera Mexico-Veracruz Km 45
Texcoco, Edo de Mexico
CP 56237, Mexico

RE: Commitment for the use of the IBP Breeding Management System at NaSARRI

Dear Jean Marcel,

Thank you for the information and demonstrations of the Breeding Management System for the management of the logistics, data, analysis and interpretation of information collected in our breeding programs. At NaSARRI we recognize that the BMS can improve the efficiency and effectiveness of our breeding programs and we are committed to deploying it as an institutional tool for all our crop improvement programs.

We have appropriate informatics infrastructure to support the BMS and the IT manager at the institute and staff will be available to provide the IT support to ensure smooth running of the system.

It is recognised that the introduction of the BMS involved fundamental changes in the way we manage our breeding processes and to effect this change we will progress on a crop by crop basis, starting with groundnuts (peanuts). Lead breeders will be appointed with the authority and the time to work with the IBP deployment team and the NaSARRI breeders to develop a clear deployment plan.

Management will review this plan and ensure that the resources and personnel are in place to ensure its effective execution resulting in successful deployment of the BMS at NaSARRI.

Yours sincerely,


Dr. Michael A. Ugen
DIRECTOR

OBJECTIVE: TO GENERATE, PACKAGE AND DISSEMINATE APPROPRIATE CROP TECHNOLOGIES AND INFORMATION FOR SEMI ARID AGRICULTURAL PRODUCTION SYSTEMS

Annex 5: Confirmation of acknowledgement of design document, budget and Large Grant Agreement template

Abidjan, 6th August 2017

Dear Mr Ndavi

Declaration

The purpose of this letter is to confirm that we, AfricaRice, legally known as The Africa Rice Center, have read and are in agreement with the Large Grant Design Document (LGDD) and the budget. We further wish to state that we have read and are in agreement with the sample grant agreement and general provisions applicable to the large grant agreements.

Yours sincerely,

Harold Roy-Macauley
Director General, AfricaRice

Harold Roy-Macauley | Director General
Tel: +225 22 48 09 10
Fax: +225 22 44 26 29



Africa Rice Center/Cente du Riz pour l'Afrique (AfricaRice)
Headquarters/Siège
Boulevard François Mitterrand
01 BP 4029 Abidjan, Côte d'Ivoire | www.AfricaRice.org

AfricaRice is a pan-African intergovernmental research association of 25 member countries. It is also one of the 15 international Centers that are members of the CGIAR Consortium.
AfricaRice leads the CGIAR Research Program on Rice, the Global Rice Science Partnership (GRISP), in Africa | <http://www.grisp.net/>

Stay connected Stay connected with AfricaRice through various social media channels. The icons include Twitter, Facebook, YouTube, LinkedIn, and others.