Guinea-Bissau Mangrove :
Mangrove, mangrove rice and mangrove people - sustainably improving rice production, ecosystems and livelihood

Objectives of the project

To contribute to poverty and hunger eradication and green growth in an inclusive and ecologically-sustainable way, through the transformation of agricultural and food systems in Guinea-Bissau— particularly those associated with mangrove swamp rice cultivation — and through the strengthening of researchers' and farmers' skills in the development and dissemination of innovations. More broadly the project aim at developing a sustainable Agricultural Knowledge and Innovation System (AKIS) towards resilience to political instability and economic crisis.

Background

The national Country Strategy "Terra Ranka" ensures an important focus on biodiversity while it considers the agricultural sector as the main pillar for development in Guinea-Bissau. The situation of mangrove swamp rice production is mobilising a convergent attention from several government bodies and a number of donors and agencies.

In the last years extremely high tides have been occurring destroying dikes and, consequently, large areas of the most productive fields. This situation, deprives mangrove people from a critical source of food and revenues in the coastal areas of Guinea Bissau and deepens the country's trade deficit. Besides, it also threatens the delicate equilibrium between human activity and mangrove ecosystem services, resulting in loss of bio-cultural diversity and natural-cultural heritage.

This situation makes urgent improving rice farming systems based on research inputs and a better transmission of traditional knowledge to the younger generations, with the introduction of new techniques (and perhaps materials) for rice production, dike construction and water management. In collaboration with several specialised NGOs and FAO and with the financial support of the EU, the National Institute for Agriculture Research (INPA) is carrying out research on rice farming systems and especially improved varieties.

The theory of change to achieve the objectives

This DeSIRA project will draw lessons from past experience with conventional research and development approaches to improving mangrove swamp rice production, farmers' livelihoods and mangroves' ecosystem services through the mobilization and integration of science and local knowledge. It will adopt an action-research and participatory-learning approach and will contribute to creating an Agricultural Knowledge and Innovation System (AKIS) through the co-production of knowledge, a network of farmers' organization, the design of early warning systems for the behaviour of the rains and the tides and the creation of regional seed markets.

To achieve the expected results, the project will make an initial diagnosis of the existing practices (data collection of local knowledge) and needs of people livelihoods. It will then systematize the farming practices across ethnic groups and coastal regions, as well as gather the main knowledge gaps and production risks. Furthermore, it will identify the conflicts between rice production, oysters and

fuelwood collection, and mangroves' conservation through ethno-ecological analysis and geospatial techniques. This diagnosis will provide explanations for production failures and ecosystems management associated to climate change and water management constraints and will help identify relevant actions to be taken.

To improve the rice farming systems, a set of new technologies better adapted to changing agro-ecological, socio-economic and cultural contexts, will be identified and tested and disseminated in order to achieve higher and more stable inter-annual rice yields in the targeted areas. For this purpose new rice varieties will be tested in the fields with farmers and their nutritional and organoleptic characteristics will be analyzed in laboratories. Fertilization practices will be improved by soils characterization and analysis. Models on pest and diseases will be designed and will be used to propose integrated pest management practices. Water management technologies will be characterized and improved. To achieve these results, there is a need to reinforce the research capacities with the installation meteorological and hydrological stations.

Beyond the rice production a set of sustainable practices for the agri-aquaculture-livestock farming systems will be formulated and applied in order to improve the contribution of mangrove ecosystem to the livelihoods in the targeted areas. The project envisages carrying out a study on fish, oysters, crabs, shrimps' and plankton in the rice fields and surrounding mangroves, identification of the risks the farming systems and farmers are facing. The project will systematize the local farmers-fisherwomen and men knowledge, attitudes and practices and will carry out participatory development of sustainable aquatic fauna management and aquaculture practices. The project will also process and make use of both satellite and drones' images

The project will develop suitable programmes, tools and field devices for data collection and long-term monitoring, and will develop a contextualized model and an adapted information system. An early warning systems for the behaviour of the rainy season and of spring tides would allow to better adjust the agricultural calendar.

The project (especially the junior researchers) will work with 30 young farmers-researchers (and their families) and with professionals including dike and dam experts. People from their own and neighbouring villages will also quickly benefit from knowledge produced through exchange and systematization of new knowledge produced through the project activities. Through the use of new technologies (namely, cell phones and internet) and the active engagement of young farmers, at least part of this knowledge will spread quickly among kin and kith informal networks. But the main dissemination mechanisms will be introduced by radio messages (namely, for rain and tides forecast) and the videos produced during the project (namely, in relation to the new technologies and practices).

National actors, with an emphasis on young farmers, technicians and researchers, will be empowered in order to revalue agriculture as a profession, co-develop and diffuse innovative technology and influence policy decisions. Training activities will be set up for the needs of junior researchers and postdoctoral researchers involved in research for innovation. The project will also set up training for technical agents. Finally the project will set up an institutional dialogue, while communicating and doing advocacy on livestock and climate change.

However, the DeSIRA project may face a series of risks which are: (i) poor knowledge of current practices, (ii) no institutional and political support for these changes, (iii) young farmers are poorly trained in participatory support, (iv) light rainy season (v) the lack of resources and political will or the

"routine" implementation of activities, (vi) the institutional dialogue bodies are not dynamic, (vii) the continued institutional instability.

Main activities

The main activities of DeSIRA project are:

- ✓ Tendering and selecting junior researchers and postdoctoral researchers committed with research-for-development.
- ✓ Establish a country-wide network of young and senior innovative farmers through tendering, training and selecting young farmers to conduct interviews and transcribe local knowledge and practices.
- ✓ Installation of meteorological and hydrological stations.
- ✓ Conduct baseline data collection of local knowledge, farming and fishing practices, knowledge transmission mechanisms and knowledge gaps.
- ✓ Data collection and analysis and systematization to identify relevant drivers and complex dynamics of mangroves' ecosystem changes, including conflicts and trade-offs between rice production, oysters and fuelwood collection and conservation.
- ✓ Conduct germplasm collection, breeding activities and characterization of selected rice cultivars,
- ✓ Conduct laboratory soil fertility and toxicity analyses.
- ✓ Model rice pests and diseases evolution and develop integrated pest management techniques,
- ✓ On farm experiments to improve rice farming systems (varieties, fertilization, pest management, water and mangrove management.
- ✓ Organize training courses for young farmers for digital inclusion, GPS use, new farming practices, conduct interviews and transcribe local knowledge and practices, and knowledge diffusion.
- ✓ Knowledge diffusion through a network of farmers-researchers using mobile phone and though conventional methods (radio programs, leaflets, videos about new technologies and practices, cell phone SMS, rural extension.

Organization

The project will be implemented by a consortium of European Universities (ISA, IGOT, IRD, WUR), together with a set of local partner institutions (LVIA, Institute of Meteorology, CIPA, INASA, DGER/MADR, DGPP/MADR, the Department of Environmental Sciences of Lusófona University of Guinea-Bissau and of usual experts.

A steering Committee composed of all WP leaders will meet regularly through virtual or face to face meetings. An advisory board composed of all the PhD supervisors, the coordinator of Ianda Guiné (ex-ProGB), one representative per partner, per local participants and regional research institutions will be responsible for the strategic and political orientation of the project. An advisory board will be composed of all the PhD supervisors, the coordinator of Ianda Guiné (ex-ProGB), one representative per partner, per local participants and regional research institutions. This board will be responsible for the strategic and political orientation of the project.

Implementing organizations

Project coordination and management is under the responsibility of ISA – University of Lisbon as Lead Partner

Project partners

University of Lisbon, the Instituto Superior de Agronomia (School of Agriculture; ISA) and the Instituto de Geografia e Ordenamento do Território (Institute of Geography and Spatial Planning; IGOT), Wageningen University (WUR), the Institut de Recherche pour le Développement (IRD).

Other main stakeholders

The Department of Environmental Sciences of Lusófona University-Guinea-Bissau, the Institute of Meteorology, the Departments of Rural Engineering (DGER) and Plant Protection (DGPP) of the Ministry of Agriculture, the Centre for Applied Fisheries Research (CIPA), the National Institute of Public Health (EASA), LVIA (NGO working on rice varieties and head of the Pro-GB Mangrove Rice project).

Region

Guinea Bissau

Funding and co-funding

EU	€ 3,000,000
Total budget	€ 3,000,000

Duration

five (5) years: January 2020 - December 2024