

Project Overview Brief

Turning tragedy into opportunity: Water management solutions for flood-recession and dry-season agriculture in Nigeria



Inundated maize crop, Lokoja, Kogi state, Nigeria, 2012

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One of the key objectives of the Federal Government of Nigeria, as stated in the 2013 Budget Speech of the Nigerian President to the National Assembly, is to improve and enhance dry-season agriculture. This calls for the implementation of integrated agricultural water management (AWM) solutions, including floodwater capture and management for smallholder irrigation, and relevant institutional arrangements to improve farmers' access to complementary inputs and markets. The flood incident of September 2012, while unfortunate, provides an opportunity to explore options for flood-recession agriculture to complement dry-season farming, minimize the likely negative impacts of future flood events and build the resilience of Nigerian agriculture to climate change.

The ***Turning tragedy into opportunity: Water management solutions for flood-recession and dry-season agriculture in Nigeria*** project has emerged from discussions held between the Federal Ministry of Agriculture and Rural Development of Nigeria and the International Water Management Institute (IWMI). Both of these parties are keen to explore opportunities in Nigeria to simultaneously:

- reduce the risks posed by flooding through accurate forecasting systems and mitigation plans, including putting flood water into productive agricultural use;
- improve and enhance dry-season farming through integrated AWM solutions, helping to increase the country's agricultural output and food security.

Goal

The goal of this project is to assist the Government of Nigeria to increase agricultural production and achieve food security through sustainable water management, which allows smallholder farmers to profitably engage in flood-recession and dry-season agriculture.

Objectives

The three-year project will establish fact-based evidence on historical and current flooding patterns and risks as a guide to decision making on flood response. It will also identify flood capture and storage solutions for flood-recession agriculture and dry-season farming. The project will be implemented in the Nigerian states of Anambra, Benue and Kogi.



Anambra, Benue and Kogi states of Nigeria (IWM)

What are agricultural water management (AWM) solutions?

AWM solutions aim to enhance food security and alleviate poverty. An AWM solution is any measure, including technologies, products and practices, that increases or improves AWM knowledge, policies and financing, and contributes to smallholder livelihoods; benefits women and men; is cost-effective; is suitable for out-scaling; and addresses resource sustainability.

Outputs

- Water and land management maps at river basin and state levels:
 - River basin scale: flood vulnerability zones and flood inundation and recession patterns over time
 - State level: estimates of surface water resources, including their location, extent and dynamics
- Tools to support flood forecasting and estimate potential impacts along the Niger and Benue rivers
- Agricultural water and land management solutions (e.g., rainwater harvesting, surface ponds and tanks, pump irrigation, etc.)
- Maps of areas suitable for AWM solutions, livelihood patterns and number of beneficiaries (hectares and people)
- Proven business models for implementation of AWM solutions
- Field-tested methodologies: Participatory Rapid Opportunities and Constraints Analysis (PROCA), and monitoring and evaluation (M&E) methodologies

Impacts

- **Improved food security** through greater knowledge of Nigeria's water resources and their management to improve crop planning and increase cropping intensity
- **Enhanced rural incomes** through expanded dry-season and flood-recession farming together with new opportunities for rural employment (particularly for youth) through the introduction of irrigation service providers and other AWM business models
- **Smallholder farmers profitably participating in food value chains**
- Improved **adaptation to climate change** and more **resilient** farming communities

AWM business models

On the basis of the flood risk assessment and identification of promising AWM solutions, the project will determine suitable business models related to water access, storage and use to support both flood-recession and dry-season agriculture. The project team will build on and refine existing AWM business models, such as:

- small reservoirs and water storage for smallholder farming;
- decentralized rainwater harvesting for supplementary and dry-season farming; and
- pump rental markets supported by irrigation service providers and small-scale entrepreneurs (potentially youth) who offer both irrigation services and information to smallholder farmers.

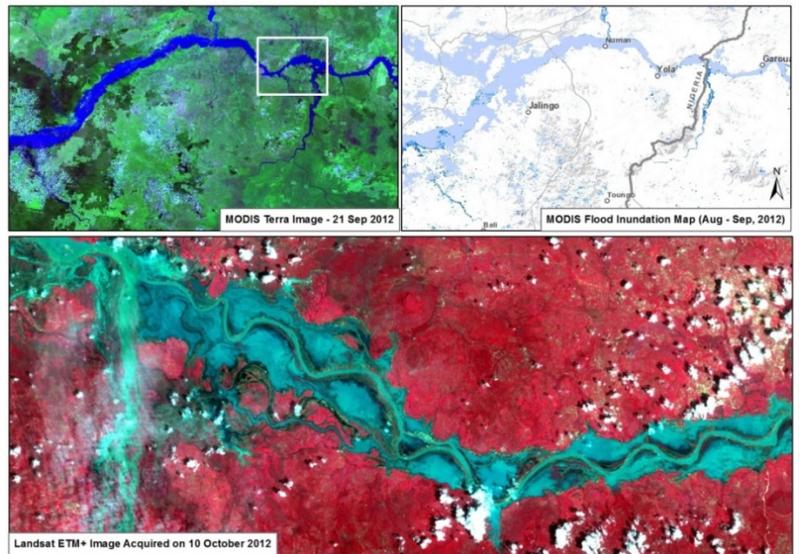
Preparation of the business models will involve mapping specific solutions to priority value chains, and assessing geographic suitability and demand for these solutions to estimate beneficiaries, application area and investment costs. Further refinement of the business models will take place through piloting to regularly monitor and evaluate the impacts of these interventions on agricultural productivity, livelihoods, gender and the environment.

Risk analysis and assessment of AWM interventions

As part of this project, researchers will develop flood maps based on satellite data to assess and analyze flood inundation patterns over time, identify the locations and economic activities at particular risk from future flood events, and develop flood forecasting tools and systems. These will be applicable at the national, basin and state levels. Together, these tools and information will support the government's efforts to improve flood planning and response, and reduce the negative social, economic and environmental impacts of future flood events.

Researchers will also analyze the technological, biophysical, social and institutional landscape in which AWM interventions operate in Nigeria to understand the opportunities, constraints and impacts of their use and promising solutions. This will involve:

- a situational analysis of the AWM policy, institutional and technological landscape, and key players;
- mapping and assessing areas where AWM interventions will have the greatest impact on rural livelihoods; and
- field analysis of opportunities, constraints and prospects for long-term sustainability of the adoption of AWM technologies.



Flood inundation mapping along the Benue River (Nigeria) using MODIS and Landsat Satellite images (IWMI)

Capacity building, uptake and policy support

The project team will work closely with local and national partners throughout the research process to strengthen the capacity of these institutions in resource and livelihood mapping, identification of AWM solutions, and development and implementation of business models. The project will also include additional participatory stakeholder engagement and consultation to review and validate project findings, to ensure the project outputs are relevant, and to support their uptake. In order to actively support the scaling-up of the results of this project, the knowledge, tools and resources developed will be transferred to national partners and programs thereby enabling them to be used in other locations.

How can flood management improve dry-season farming, and safeguard lives and property?

Flood-recession agriculture

Inundation and recession of floodwaters can provide a variety of opportunities for productive agriculture. High levels of post-flood residual soil moisture and shallow groundwater tables in the floodplains enable effective dry-season agriculture without, or with only limited, need for irrigation. Floods bring sediments from the upper catchment. When these floodwaters are effectively managed, the organic matter in these sediments are deposited, which enhances soil fertility. Fine-grained sediment deposits also have higher water retention capacities. This, in turn, can be useful in supplementing the water requirements of crops grown in these deposits. Flood-resistant crops, such as certain types of rice and sorghum, can be grown at different points during the flood cycle to maximize a farm's annual productivity. At least two crop cycles may be possible by effectively managing floods and carefully timing the planting of crops to make use of fertile floodplain land that is only accessible during the dry season, but may still retain significant soil moisture.

Mitigating the impacts of flood events

Safeguarding lives and property from the impacts of floods involves reducing the intensity of peak floods through a variety of water and land management practices. Capturing floodwater in both natural and constructed storage systems, such as marshlands, aquifers or reservoirs, for example, can reduce downstream flooding as well as provide opportunities for agriculture. Effective soil and land management techniques can be used to increase soil infiltration rates and storage capacities, thereby reducing runoff, and slowing the flow and accumulation of floodwaters in downstream areas. Such techniques can also reduce soil erosion and sedimentation losses, especially during flood events which can have destructive impacts both upstream and downstream.



Project stakeholders

The project will be implemented to complement on-going initiatives and in collaboration with many national and international organizations, including:



Project partners



About IWMI

The International Water Management Institute (IWMI) is a non-profit, scientific research organization focusing on the sustainable use of water and land resources in developing countries. It is headquartered in Colombo, Sri Lanka, with regional offices across Asia and Africa. IWMI is a member of CGIAR, a global research partnership for a food secure future.

Our role

IWMI works in partnership with governments, civil society and the private sector to develop scalable agricultural water management solutions that have a real impact on poverty reduction, food security and ecosystem health. IWMI is a:

- think tank driving innovative research and ideas for solutions;
- provider of science-based products and tools; and
- facilitator of learning, strengthening capacity and achieving uptake of research findings.

We work directly with a broad spectrum of people and organizations, from rural farmers to national and Pan-African policymakers. This is because we recognize that, in order to really make a difference, our efforts are most effective when we partner with others. Careful consideration of how the outputs of IWMI's research activities can be easily communicated, understood, taken up and acted on forms a core component of our work. Our approach to impact puts people – research users and the ultimate beneficiaries – at the heart of research-for-development efforts.

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