

# Improving Crop and Seed Production Systems under Water/Irrigation Management in Sub-Saharan Africa



Project activities were carried out in collaboration with the National Agricultural Research Systems of seven Sub-Saharan countries: Burkina Faso, Gambia, Mali, Mauritania, Niger, Nigeria, Senegal.



Crops are being tested for demonstration of productivity

**Thematic Area:** Crop Productivity and Diversification

**Purpose:** Assist farmers with adopting sustainable crop and seed production systems to increase farm productivity and year-round agricultural production in Sub-Saharan Africa.

**Geographic Scope:** Sub-Saharan Africa

**Timeline:** 2012 - 2015

**Funding Agency:** Islamic Development Bank (IDB)

**Partners:**

- Institut de l'Environnement et de Recherches Agricoles (INERA), Burkina Faso
- National Agricultural Research Institute (NARI), Gambia
- CNRADA, Mauritania
- Institut national de la recherche agronomique du Niger (INRAN), Niger
- National Agricultural Extension and Research Liaison Services (NAERLS), Nigeria
- Institut Senegalais de Recherches Agricoles (ISRA), Senegal.
- Institut d'Economie Rurale (IER), Mali

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Sub-Saharan Africa (SSA) is a region plagued by poverty, malnutrition and poor living conditions. Nearly 80% of the population in SSA lives in rural areas and 70% of this population is dependent on food production through farming or livestock keeping. The irrigated areas rely on groundwater or run-off-river pumping systems, but declining precipitation levels have impacted quantity and quality of available water for irrigation, straining local food markets and increasing the rate of malnutrition in poverty stricken areas. Choosing appropriate small scale irrigation technologies and selecting drought-and-salt tolerant crops are two important ways to minimize risks and improve agricultural productivity and farm income.

The International Center for Biosaline Agriculture (ICBA) in collaboration with National Agricultural Research Systems (NARS) in seven SSA countries launched in 2012, the "Improving Crop and Seed Production Systems Under Water/Irrigation Management in Sub-Saharan Africa project." The project aims to:

- Develop a water resources database for West Africa.
- Identify appropriate technologies suitable for SSA communities based on water availability, water quality, land and crop suitability, improved crop and seed production, and socio-economic conditions.
- Identify packages of diversified crops under different water quality conditions and promote multiple use of water.
- Strengthen research capabilities, agricultural extension services, and skills for rural farmers in water and crop management.

## Activities and Outcomes

An inter-disciplinary approach was employed to improve the performance of irrigated farming systems in the seven participating countries (Burkina Faso, Gambia, Mali, Mauritania, Niger, Nigeria and Senegal). This will help achieve food and nutritional security; provide dependable supply of basic agricultural products; and aid in value chain job creation and development.

During the first year of the project, data regarding water resources, irrigation, crops, and socio-economic conditions of the farming communities for each collaborating country were



*Farmer field days were an effective tool employed by the project to build the capacity of local farming communities in integrated on-farm water management practices.*

collected and stored in a database. Data were analyzed to identify and select appropriate crops and irrigation technologies for field demonstrations. Field trials of irrigation technologies and crops were established in all countries. Irrigation technologies introduced under this project include water lifting devices (i.e. bucket, diesel and solar pumps), water distribution (Californian system), and irrigation methods (i.e. furrow, basin, drip and sprinkler).

Main crops grown in the trial fields include tomato and onion. Initial results show a considerable saving in irrigation water application to onion and tomato crops using Californian and drip irrigation systems as compared to traditional bucket and gravity-pump systems of irrigation. Drip irrigation system was found to be most efficient in water saving without compromising crop yields whereas the Californian system was preferred by farmers due to its ease of operation and lower cost.

During the second and third year of the project, socio-economic surveys were conducted in all countries. The results indicate that in addition to **low fertility of soils** and **low and erratic rainfall conditions**, non-availability of **agricultural equipment** and other farm inputs, **low genetic yields** of local crop varieties, poor economic condition of farmers and **lack of knowledge** about production and irrigation technologies are the main constraints for the development of small scale irrigation in SSA.

Farmer field days and training sessions were conducted on regular basis to build the capacity of farmers, extension workers and project staff. The trainings focused on irrigation technologies, soil and nutrient management, crop production technologies and the crop agronomy. These trainings were targeted for farmers who were not directly involved in the project activities as a means for large scale dissemination of project findings.

During the last year of the project, field surveys are being carried out to evaluate the impact of the project and to formulate strategies to scale up tested and proven technologies to other countries of the region.

## Future Directions

ICBA will continue working with local and international partners to get funding for scaling up successful irrigation technologies and crop management practices in these and other SSA countries. Expanding irrigated areas will help to increase the value of agricultural output by increasing crop yields and crop intensities. Household income is also expected to increase as a result of improved irrigation and crop management. The project will determine the best combination of technology and/or crop diversification that will help to improve the overall livelihood of the rural populations.

Results of field studies will be used to evaluate the impact of different irrigation and crop management activities on socio-economic conditions of poor local farmers in marginal environments. In this context, possible scenarios of agricultural and livestock production systems will be assessed. The scenarios will include public/private/community based irrigation development and management; investment in irrigation technologies and water harvesting; and better integration of crops and feed for livestock production systems. Institutional aspects for sustainable management of land and water resources will also be a top priority.



*Considerable water savings have been shown using Californian and drip irrigation systems compared to traditional bucket and gravity-pump systems.*