Technology Fact Sheet for Adaptation
A.3. Technology: Improved Crop Varieties [Imported] [i]
Sector: Agriculture
Subsector: Irrigated and Rain-fed

A.3. 1 Introduction

Agricultural researchers and extension agents can help farmers identify new imported varieties that may be better adapted to changing climatic conditions and facilitate farmers comparing these new varieties with those they already produce. In some cases farmers may participate in selection of imported improved crop varieties that demonstrate the qualities they seek and new varieties with the characteristics they desire. The average productivity of traditional farming systems in Sudan has declined steadily over the past twenty years. The capacity of farmers to produce food in an efficient and sustainable manner is severely limited by technological constraints that are climate variability related and economic limitations rooted. Among the most significant constraints are bad management of plant resources and volatility of rainfall contributing to low productivity, poverty and food insecurity in the traditional rain-fed farming areas. Cyclic poverty deprives farmers of modern inputs such as certified seeds and fertilizer and limits their access to knowledge as well as acquisition of improved production techniques. Shortage of trained manpower reflects the socio-economic development challenges facing Sudan's marginal famer communities. Poor soils, pests and diseases contribute to the marginal farmer communities' predicament, aggravating the degraded natural resource base. Moreover, marketing system access is hindered by various factors, most significant among them infrastructural [such as deficient transport], produce quality and cost.

A.3.2 Technology Characteristics

Imported new improved crop varieties depend on genetic crop diversity and crop gene resources adapted to the targeted areas. The process is composed of the following:

- Selection of the areas for testing the new imported improved crop varieties;
- Testing for tolerance to adverse environmental condition such as drought, flooding and heat;
- Resistance to diseases and pests;
- Agronomic traits affecting yield quality, competences against weeds;
- Meeting the needs of farmers and end users;
- Evaluation started during the research testing on farmers' fields;
- Testing process for environmental adaptation and farmers' acceptance; and
- Seed production for multiplication by seed companies, farmer groups, private and public sectors.

A.3.3 Country Specific Applicability and Potential

This technology can be applied in Sudan depending on the following conditions:

- Institutional arrangements including establishment of farmers' committees in order to synchronize diversification on neighboring farms or plots that share common ecosystems.
- Consultancy in designing the testing programs of improved varieties with national stakeholders and international organizations. Technical training for researchers' as well as states' and federal staff working in the extension areas.
- Improvement of knowledge and skills at all levels including training for farmers, stakeholders, service providers (private sector), seed producers, women and farmer groups.

Sudan's rain-fed sector comprises large areas with considerable rainfall and fertile soil that have the potential for growing a diversity of crops.

A.3.4 Status of Technology in Country

Famers in Sudan rely heavily on farm saved seeds and have little access to commercial improved seed. Improved crop varieties seeds meet only 10% of farmer requirements in Sudan's. Large scale production of improved seed varieties by public or private sectors will strengthen the capacity of research and extension services; and equally strengthen the private sector in the development, dissemination and adoption of improved seed varieties, a prospect that is linked to food security and

sustainable crop production intensity. Hundreds of thousands farmers would be beneficiaries when this win-win situation is attained; but dissemination of information and adoption as well as availability of improved seeds remain prerequisites.

A.3.5. Opportunities and Barriers

Improved crop variety breeding affords the opportunity of increasing production per unit area by 2-3tones/hectare, in addition to alleviating poverty among rural farmers and maintaining food security.

Limited funds and budget for agricultural research impedes research development and consequently research output is inadequate. Specific measures are essential to develop more sustainable research with appropriate integration of technology adaptation which would strengthen farmers, seed companies, researchers, extension agents and policy makers.

A.3.6 Benefits to Economic/Social and Environmental Development

Economic Benefits may include**:**

- Increased crop production and decreased cost of production; and
- Encouraging private sector investment in improved crop seeds production.

Social Benefits

- Improved livelihood of local farmers and the population; and
- Creation of new jobs for research workers, seed production technicians and increase service providers.

Environmental Benefits

- Decreased expansion of agriculture into new areas and maintaining forest green cover in tandem with decreased GHG emission; and
- Minimize demand for water needed for irrigation.

A.3.7 Climate Change Adaptation Benefits

Introducing improved crop varieties will strengthen the resilience of rural farmers to climate change, as well as enhance cultivation of crops in some areas that were not cultivated.

A.3.8 Financial Requirements and Costs

Cost to implement adaptation technology**:** Cost of establishing and rehabilitating 3 research substation units in south Gadarif, south White Nile and Blue Nile to cover rain-fed areas that extend from east to central and west of Sudan.
One unit = 6 million USD
Laboratory equipments = 1.5 million USD
Additional cost to implement adaptation technology, compared to "business as usual"**:** Improved seed varieties that result in increasing the productivity per unit area = 1 million US dollars. The imported improved crop varieties cost 750,000USD

[i] **This fact sheet has been extracted from TNA Report – Technology Needs Assessment for Climate Change Adaptation - Sudan. You can access the complete report from the TNA project website http://tech-action.org/**