

Technology Fact Sheet for Adaptation

A.2. Technology: Improved Crop Varieties [Breeding] ⁱ

Sector: Agriculture

Subsector: Irrigated and Rain-fed

A.2.1 Introduction

Plant breeding provides new improved crop varieties with unique characteristics that are beneficial, profitable and adapted for many growing environments. The farming sector in Sudan includes a diverse mix of farmers from small holder farmers, to large scale producers in both irrigated and rain-fed areas. The production per unit area is very low due to the lack of agricultural technologies, including improved varieties. Rain fall fluctuation, pests and diseases also drag down productivity.

A.2.2 Technology Characteristics

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

- Selection of the areas and local varieties adapted to the area;
- Breeding process for tolerance to adverse environmental conditions such as drought, flooding and heat;
- Resistance to diseases and pests;
- Agronomic traits affecting yield quality competition against weeds;
- Evaluation starts during the breeding process and continues through variety release;
- Testing process for environmental adaptation and farmer acceptance;
- Breeding seeds production for released improved variety; and
- Foundation seed production for multiplication by seed companies, farmer groups and private and public sectors.

A.2.3 Country Specific Applicability and Potential

To apply this technology in the rain-fed area the following requirements are needed:

- Technical skills and institutional organization;
- Consultancy with national and international organizations in designing the breeding programs of improved varieties;
- Technical training for researchers, as well as state and federal staff who are working with the agriculture extension programme; and
- Establishment and rehabilitation of research units.

The potential covers the main rain-fed areas in south Gadarif, south White Nile and Blue Nile and can be extended from east to central and west of Sudan.

A.2.4 Status of Technology in Country

Training for farmers, stakeholders, service providers (private sector), seed producers, women and farmer groups are all included in the activity of improved crop varieties. Availability of Improved seed crop varieties covers only 10% of farmer needs in Sudan. Large scale production of improved seed varieties by public or private sector concerns would strengthen the capacities of research, extension and private sector operators in the development, dissemination and adoption of improved seed varieties. This would substantially enhance Sudan's quest for sustainable crop production intensity and food security, as well as agriculture commodity export capacity. This technology may reach hundreds of thousands farmers, depending on dissemination of information, adoption and the availability of improved seeds.

A.2.5 Opportunities and Barriers

Opportunities:

- Presence of a large number of plant breeding research institutions, programmes and experts in the country;
- Availability of infrastructures that could be built on; and
- Lack of funds for agricultural research is a big constraint to development. Reform is essential for more sustainable research with appropriate integration of technology adaptation and for strengthening seed research companies, extension agents and policy makers.

A.2.6 Benefits to Economic /Social and Environmental Development

Economic Benefits:

- Increased crop production encourages the private sector to investment in improved crop seed production;
- Multiplication of improved seeds;
- Increased income generation
- New jobs for research workers, seed production technicians and service providers; and
- Increased production per unit area.

Social Benefits:

- Training of different stakeholders who become skillful;
- Guaranteed food security and enhanced resilience of local people;
- Sustainability of livelihoods; and
- Discourage migration from production areas.

Environmental Benefits:

- Cessation of crop failure [as a result of utilization of more adapted crop varieties] will reduce environmental degradation;
- As local communities become technologically adapted they are more likely to contribute to environmental rehabilitation (e.g. become involved in tree planting);
- Decrease the expansion of agriculture into new areas, maintaining forest green covers and decreasing GHG emissions; and
- Minimize the demand for water needed for irrigation.

A.2.7 Climate Change Adaptation Benefits

The technology contributes to the stability of local communities under the ever changing climate through enhancing their coping mechanisms:

- Strengthen the resilience of the rural farmers to climate change; and
- Tolerant crops to withstand adverse climatic condition.

A.2.8 Financial Requirements and Costs

Cost to Implement Adaptation Technology: Cost of establishing and rehabilitating research units

One unit = 6 million USD (A unit composed of 2 offices, meeting room, laboratory, rest house and toilets)

Laboratory equipments cost= 1.5 million USD

Three units are needed in the targeted areas.

- Cost of capacity building and training = 500,000 USD
- Running cost = 750,000 USD
- Unforeseen cost = 540,000 USD

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/>