

# **LDC Workshop on National Adaptation Programmes of Action**

## **Fact Sheet**

### **Key adaptation options in the agriculture and rural development sectors**

#### ***Overview***

Given the high vulnerability of rural communities in most countries, appropriate adaptation strategies in the agriculture and related rural development sectors are of utmost importance.

Food security in developing countries relies to a large extent on rain-fed and subsistence agriculture. Food production and farming systems will have to cope with changing climate patterns, such as increased droughts, floods, and serious changes in precipitation cycles, affecting planting calendars and crop choices. In addition to water scarcity and increased climate variability, natural resources such as soil and plants will need to be more carefully managed, taking climate risks into account.

A wide range of options are available to adapt the rural development sector including agriculture to climate change and the resulting challenges:

#### ***Water conservation and harvesting***

"Water conservation" is an essential component to ensure long-term water resources in a given region or ecosystem. Water conservation has to apply to all sectors but will be essential in agriculture. Conservation applies to the types of irrigation systems used, the recycling of water for agricultural use, and, often, the varieties of crops, plants and trees planted that are, for example, drought tolerant or requiring shorter growing seasons and are thereby more resilient.

"Water harvesting" describes a wide range of techniques and methods. Water harvesting can be applied at the farm and field level as part of (often traditional) planting and soil preparation methods ('bund', 'zai', etc.) or at the community level where rain water catchment systems can be applied.

- Water conservation techniques include: drip irrigation systems, use of 'grey' water (recycled or treated wastewater); switching to drought tolerant varieties and/or crops; introduction of agroforestry systems.
- Water harvesting techniques include: small scale water/dew capture through terracing; use of stone bund systems; run-off capture; large scale harvesting through rain water capture in basins and different kinds of catchments.

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### *Adapted and enhanced crops and adapted agricultural tools*

About sixty percent of food crops grown today come from rain-fed agricultural systems and rain-fed agriculture covers 80% of the world's cultivated land.<sup>1</sup> With decreasing water resources in many agricultural regions and less predictability of weather patterns, there is a need for adapting food production systems to these new and changing conditions.

Adapting and enhancing crops has been a fundamental feature in traditional farming systems where crop varieties were matched as much as possible to the conditions of the given ecosystem. In field (in-situ) crop enhancement through seed selection allowed for gradual adaptation to drought conditions and/or changing growing seasons. However, while many farmers in developing countries have been relying on these techniques, they are no longer sufficient to achieve a better ratio for crop yield to hectare that is needed to satisfy the increasing demand for food. New, higher-yielding crop varieties for the major food crops such as rice, wheat, maize are constantly being developed and tested in gene banks and research stations (ex-situ). Many of these newer, high-yielding varieties, however, require more and predictable water resources and often will not produce adequately in conditions of extreme weather conditions and/or high weather variability.

For regions with serious water stress, either permanent or seasonal, efforts are focusing on drought tolerant crop varieties or those with shorter growing cycles that at the same time produce good yields.

Agricultural tools and techniques also require adapting to the new conditions. In addition to the introduction of adapted and enhanced crops, improved soil preparation and water management will be of great importance. Tools and techniques focusing on soil preparation and enhancement include:

- Methods to improve the nutrient content of the soil (e.g. mulching, composting)
- Diversifying and intercropping appropriate crops,
- Introduction of agro-forestry where suitable to enhance soil quality and moisture retention,
- Use of low or no-tillage for improved moisture retention, terracing to limit erosion.

Other important agricultural tools involve the development of better guidance and extension systems to support rural communities, including:

- drought and flood early warning systems
- dynamic agricultural calendars

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<sup>1</sup> WWDR3, ch.7,p.105pp.

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- local agricultural research (improved varieties)

### *Integrated farming systems, rangeland management, income diversification*

Traditional farming systems, focusing on subsistence for families and communities, were based in diversity depending on the respective ecosystem. Agricultural production would rely in different crops and their varieties, often forest products, fish ponds, animal husbandry, etc. These integrated farming system have protected farming communities in times of weather variabilities and emergencies, such as droughts and floods. In many regions farming communities and pastoralists and rangeland managers shared water resources and the two systems were mutually beneficial. With demographic shifts and technological modernization farming systems have also changed in many countries with trends towards commercial farming systems, where cash crop production has outstripped local food production, or specialization and mono-cropping of preferred crops to the detriment of variety and stability in the face of weather variabilities. Integrated farming systems and negotiated land use agreements between farmers and pastoralists have gained in importance as communities and countries need to adapt to climate change.

- Diversification of agricultural production
- Establishing natural resource and water sharing between pastoralists and farmers in dryland regions
- Researching or identifying income diversification such as food processing, farmers' markets and trade arrangements, cereal and seed banks, etc.
- Increased use of tree planting as part of integrated farming systems

### *Index-based insurances*

Small-scale farmers and poor rural communities are most at risk in the face of climate change impacts. To reduce the risks for small farmers requires tools that can adjust to climate variability and underpin other adaptation strategies. Approaches are being explored for insurance schemes for farmers that can provide them with some security for their livelihood in extreme weather conditions. One such insurance scheme is establish a rainfall index and to link any payout to a shortfall below the agreed level. Crop levels are also agreed and incentives are built into the system. When rainfall is below the level needed and will cause crops to fail, insurers will pay out to farmers within days or weeks. Thus farmers do not need to sell assets to survive, which can make them dependent on aid long after the drought has ended. By using index insurance to protect against massive losses during major droughts, farmers are able to put resources into being productive in good years instead of being limited by the low productivity of rare bad years.