FARMING-SYSTEM SPECIFIC EXTENSION CONTENT FOR ENHANCING CLIMATE CHANGE ADAPTATION AND RESILIENT FOOD SYSTEMS IN SORGHUM-BASED DRYLAND FARMING SYSTEMS OF TANZANIA AND BURKINA FASO

WATERSHED EX-SITU WATER HARVESTING

WATERSHED EX-SITU WATER HARVESTING

CLIMATE CHANGE ADAPTATION AND RESILIENT FOOD SYSTEMS ISSUE

How to overcome water loss through evaporation and runoff, encourage infiltration at the cropped area and mitigate the effects of insufficient and erratic rainfall and improve and stabilise productivity.

ESSENTIAL TECHNICAL INFORMATION

Rainfall in the drier environments, in this case sorghum based systems, is generally insufficient to meet basic needs for crop production. As it is poorly distributed over the growing season and often comes in intense bursts, and thus usually unable to support economically viable farming. Even this water is mostly lost in evaporation and runoff, leaving frequent dry periods during the growing season.

Water harvesting is based on the principle of depriving part of the land of its share of rain, which is usually small and non-productive, and adding it to the share of another part which is used for agricultural activities, bringing the amount of water available to the latter area closer to crop water requirements and thereby permitting economic agricultural production.

The main components of water harvesting systems are:

Catchment area: the part of the land that contributes some or all its share of rainwater to a target area outside its boundaries. The catchment area can be as small as a few square meters or as large as several square kilometres. It can be agricultural, rocky or marginal land, or even a rooftop or a paved road.

Storage facility: the place where runoff water is held from the time it is collected until it is used. Storage can be in surface reservoirs, subsurface reservoirs such as cisterns, in the soil profile as soil moisture, and in groundwater aquifers.

Target area: where the harvested water is used. In agricultural production, the target is the plant or the animal, while in domestic use, it is the human being or the enterprise and its needs.

Micro-catchment Systems

Runoff is collected from a small catchment area with mainly sheet flow over a short distance. Runoff water is usually applied to an adjacent agricultural area, where it is either stored in the root zone and used directly by plants, or stored in a small reservoir for later use. The target area may be planted with trees, bushes, or with annual crops. The size of the catchment

ranges from a few square meters to around 1000 m2. Land catchment surfaces may be natural, with their vegetation intact, or cleared and treated in some way to induce runoff, especially when soils are light. Non-land catchment surfaces include the rooftops of buildings, courtyards and similar impermeable structures.

On-Farm Systems

The most important land-based micro-catchment or on-farm water-harvesting systems in the dry areas are: Contour ridges, Semi-circular and trapezoidal bunds and Runoff strips

HOW TO IMPLEMENT EX-SITU WATER HARVESTING

The most important land-based on-farm water-harvesting systems are described below:

Contour ridges

Make bunds or ridges along the contour line, usually spaced between 5 and 20 m apart. The first 1–2 m above the ridge is for cultivation, whereas the rest is the catchment for harvesting water. The height of each ridge varies according to the slope's gradient and the expected depth of the runoff water retained behind it. Reinforce the bunds by stones if necessary. Ridging is a simple technique carried out by farmers. Ridges can be formed manually, with an animal-driven implement, or by tractors with suitable implements. They may be constructed on a wide range of slopes, from 1% to 50%.

On ridges, plant grass e.g Chloris guyana which strengthens the mound.