

WATER MANAGEMENT IN AGROECOLOGY

Fewer drops, more foods, better nutrition

1/ INTRODUCTION

Water – as a component of an agroecosystem - is essential for agriculture as it represents one of the limiting production factors in many parts of the world. Water fills a number of important roles:

1

It represents 25% of soil composition and commands life in the soil by keeping soil biota alive

2

It transports soil and plant nutrients and gives drinks to human and animals

3

It provides ecosystem services through temperature regulation (cooling plants by evaporating from the leaf surface)

4

Water for irrigation and livestock is one the ways food security can be achieved (as without water, neither crop, nor animal production is feasible)

However, food production remains one of the most water-consuming human activities as agriculture accounts for 70% of total water use.

As water is the “lifeblood” of agriculture, improved soil water management is critical for sustainable food production. Sustainable agricultural water management is one of the principles on which agroecology bases its foundations. Water management in agroecology refers to sustainable use of on-farm water resources by managing the soil-water system through the optimized use of water sources: rainfall water and irrigation as well as through the reduction of water losses (for example through runoff and evapotranspiration).



THE GREAT CHALLENGE FOR AGRICULTURE IN THE FUTURE WILL BE INCREASING FOOD PRODUCTION WITH LESS WATER

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2/ SOIL WATER RETENTION CAPACITY AND AGROECOLOGICAL PRACTICES FOR WATER MANAGEMENT

The capacity of soil to store water and to make it easily available to crops is called *soil water storage or water retention capacity*. Soil moisture and water retention capacity depends on soil type, soil organic matter and rooting deep. Any practices inhibiting a soil's capacity to accept, store, release and transmit water reduces its productivity.

All the agroecological practices of water management aim at enhancing soil water retention capacity and improving water harvesting both at farm level and from other unproductive areas such as roads and homestead compounds. Agricultural practices linked with active water harvesting, water retention, and conservation is important practices. In drier areas, water harvesting coupled with in situ water management as well as improved soil, nutrient and crop management have great potential. In humid areas, in situ water management technologies such as conservation agriculture are recommended (Camacho and Kramer, 2016).

In agroecology, four major principles should be taken into account to achieve better and sustainable water management:

1. MOBILIZING WATER RESOURCES

Examples of practices include rain water harvesting techniques, drainage and water mobilizing facilities (small-scale irrigation networks and pumping equipment).

An example of water harvesting techniques in dry areas is planting pits, which are circular holes that collect water and store it for use by the crop. Planting pits is the simplest form of water harvesting. Once made, the pits can be used again, season after season. Planting pits take a lot of work to dig when the soil is dry. But they produce good yields in areas where otherwise crops might die because of a lack of water.

Another water harvesting technique close to pits are Semi-circular bunds (half-moons) used to catch water flowing down a slope. Crops can be planted in the lower portion of the half-moons (Anschütz, J., Kome, A., Nederlof, M., de Neef, R., Ton van de Ven, T., 2003).

2. OPTIMIZED USE OF WATER RESOURCES AT FARMS TO BETTER PRESERVE THEM

Farming practices associated with this principle include farming on ridges, small scale irrigation systems, farming following contour lines, etc.

3. SOIL, WATER AND MOISTURE CONSERVATION AT FARM LEVEL

Examples of practices include application of organic fertilizers, mulching, cover crops, tillage (minimum, zero tillage), and other practices aiming at reducing evapotranspiration such as windbreaks, hedging, agroforestry, crop association, fallow, etc.

4. PROTECTING WATER FROM POLLUTION COMING FROM AGRICULTURAL AND OTHER INDUSTRIAL ACTIVITIES

Examples of practices include use of organic fertilizers, use of natural phytosanitary treatments, as well as sustainable livestock water management practices.

Sustainable agricultural and land management practices that improve soil moisture retention are summarized in the following picture (FAO, 2015).



3/ CONCLUSIONS

- 1 Meeting food security and nutrition requires sustainable agricultural practices and policies that allow improved soil quality and water retention capacity.
- 2 Agroecology provide such sustainable practices to food security and nutrition as it allows producing more foods with few water while achieving better nutrition
- 3 Agroecology provides many ways in which one can better manage water in agriculture and these practices are not exclusive one of the other.

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