

Production of biomass in soil degraded

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The author describe a system to combat effectively the soil degradation through a correct management of the still available resources, reconstituting the functions of the Water/Soil/Biomass complex and, at the same time, promoting a decisively behavioral change in the Man/Nature relationship. The description of two equipment able to mechanically create micro basins for water harvesting are reported.

Introduction

The scanty attention and care dedicated by Man to preservation of the natural environment has been the cause of degradation and desertification in many regions of the world, in particular in the Mediterranean basin. In this area the process has undergone a strong acceleration during the last decades in both the Southern regions (Northern Africa and Middle East) and in the southern parts of the Northern regions (Spain, Italy, Greece and Anatolia). The sub-saharian region of Sahel has experienced similar desertification during the course of this century and in particular as of the 1950s.

By progressively reducing the efficiency and functionality of the Water/Soil/Biomass (ASB) complex, the main seat of fertility, desertification leads first to depression and then to the rupture of the water cycle. The only way we can contrast desertification is to combat effectively degradation through a correct management of the still available resources, reconstituting the functions of the ASB complex and, at the same time, promoting a decisively behavioral change in the Man/Nature relationship.

This is an extremely difficult and delicate task, of a socio-cultural and technical-environmental nature, which tends in general to follow in the opposite direction the stages of environmental degradation. In this process nature comes to our aid. It tends constantly to re-create situations of equilibrium, even if at levels less satisfactory than originally, now compromised by anthropic pressure. To fulfill this task we can count on a certain amount of already acquired knowledge and technologies, as well as on those we know we can acquire by following the right direction.

The mechanized technique of micro-basins

A considerably significant aid in this context is represented by the mechanized technique of micro-basins for collection of surface runoff (water harvesting) known as the "Vallerani System".

The Vallerani system, developed in 1988 in the framework of the Integrated Project for Rehabilitation of Damergou (FAI-Niger), has offered the possibility of mechanizing said technique and thus represents its most advanced and modern version. Two special ploughs were developed both able to excavate micro-basins in order to harvest and concentrate the scarce available resources constitute of rain and runoff water, fine superficial soils and organic matter.

The Model. "Delfino" (50 MI/CM) is an hydraulic single furrow plough for discontinuous ploughing with a particular shaped working body, mounted type, fitted with sub-soiler and programmable lifting device for micro-pits creation. The implement is equipped with a front knife that supports the stability during operation. The machine is able to create from 15 to 28 micro-pits per minute, 0,5m X 0,5 m size plus 0,2 m sub-soiling. The Model "Treno" (POR 130 - 119 MZ/RCM) is a mounted reversible single-furrow plough fitted with a sub-soiler and with a mechanism for gathering the superficial and fertile layer of soil which is the deposited at regular and programmable intervals in the furrow in order to create ridges where seeds are located.

Conclusion

On the basis of the experiences conducted with the Vallerani System it is possible to state that the fight against desertification through biomass production and the search for a sustainable development in rural environments require in the developing countries the application and optimisation of the basic conditions and of the following factors:

At the technical and economic level:

- a consistent increase of the use of mechanisation at reduced costs and in any case at a cost much lower than manual work, to permit to effectively fight water and wind erosion on a large scale, through soil and water preservation actions and rehabilitation of the ecosystems, with particular regard for the cropped areas (hydraulic/agrarian works);
- concentration and supply to the plants of the residual fertility resources (water, fertile land and organic matter) necessary to reactivate and reconstitute the functions of the Water/Soil/Biomass complex, thereby inverting the environmental degradation processes;
- gradual application of balanced and increasingly productive agro-forest-pastoral systems, with a short/medium/long-term action strategy in the agricultural, stockraising and reforestation sector.

At the socio-anthropological/environmental level:

- a fiduciary, open and interactive relationship between the technical management of the requalification programme and the communities concerned, necessarily founded on:
- a technical-economic approach which: is, as much as possible, simple, educational and efficient; has no counter-effects and is of sure reliability in the short/medium/ long-term; is capable of gaining the confidence of the population and to rapidly promote, through environmental education, its active and responsible participation in the environmental and productive requalification issues and actions.