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Agricultural intensification and fight erosion by Water and soil fertility management" (G.C.E.S.) in Algeria

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The Northem part of Algeria is the most productive, but also, a very fragile area: young mountains, often soft argilites, marl and schist alternating with calcareous sandstone hardrocks. The climate is mediterranean, semi-arid with low energetic but saturating rainfalls during the fresh Winter and with dangerous storms in the hot Summer. The soils are sealing and often stony and have low nitrogen and phosphorus content. After successive colonizations (Romain, Turkish, French) and a recent very high demographic pressure (150 inhabitants per km2), one can observe overstocking (6 sheeps per hectare), vegetation and soil cover degradation in the mountains, sheet, gully and mass erosion, Wadi river embankment migration, roads destruction and very fast silting of reservoirs (in 15 to 50 years). Facing these hard erosion problems, was developed (between 1940-70) a strategy of heavy rural equipment (The D.R.S. = Défense et Restauration des Sols = defens and soil restoration) But as soon as 1980, the failure of this approach was obvious. Despite forty years of Soi1 defence and restoration, soi1 degradation goes on, peasants do not maintain the equipment and solid transports are also worrying. In 1985, two research institutes (INRF and IRD) decided to gather the researches conducted by a dozen researchers in order to test a new collaborative approach aiming at enhancing the soil and the labour, while reducing the erosion hazards in rural areas: the sustainable management of water, biomass and soil fertility (GCES). The question is to intensify, the regional crop systems in order to better protect the soil surface against the rainfall and runoff energy. This paper gives the synthesis of the measurements made concerning runoff, sheet erosion and biomass production in a network of 15 plots (100 m2) distributed over four mountainous mediterranean regions (slopes of 10 to 40 %) ranging from 900 m of altitude and 650 mm of rainfalls. From 1986 to 1995, comparisons were made on the behaviours of bare fallows (maximum hazard), of regional production systems (wheat, broad beans, vineyard, fodder, orchard, rangelands) and of improved systems (fertilization, high-quality stock seed, pesticides and herbicides, cereals/legumes rotation, crops associated with orchard, improvement of rangelands). the improvement in crop systems (and GCES) allowed to increase soil productivity and to reduce erosion hazards, provided that the amount of rainfall should be sufficient to enhance inputs (P > 400 mm.

Keywords: Algeria - Mountain Mediterranean - Semi-arid - Strategy GCES- Improvement in cultivation techniques - Erosion-Runoff -Yields - Net income.