



Water runon as a major ecosystemic service at the field scale in the sudano-sahelian zone

S. Valet (2), M. Motelica-Heino (1), and H. Ozier-Lafontaine (3)

(1) UMR CNRS/Université 7327, ISTO, ORLEANS, France (mikael.motelica@univ-orleans.fr), (2) PASSERELLES, 9, rue du Bât d'Argent, 69001, Lyon France (valet.serge2@wanadoo.fr), (3) INRA, UR1321, ASTRO Agrosystèmes tropicaux, F-97170, Petit-Bourg (Guadeloupe), France (harry.ozier-lafontaine@antilles.inra.fr)

In the sudano-sahelian zone, agroforestry and the biophysical techniques of struggle against erosion are efficient means to preserve and rehabilitate agroecosystems. At the scale of the watershed, results show that sustaining the run-off allows the generation of the run-on. This run-on redistributes water and dissolved or suspended nutrients downhill. At the scale of the field, little research has been done on run-off processes and on the hydric report that integrates their implications on the hydric and fertility transfer.

Field trials on several morpho-pedological units have demonstrated the occurrence at the field scale on very small distances for very slow slopes and its contribution to the transfer of fertility. This is controlled by adequate agricultural techniques (stone corridors, living hedges, half-moons, zaï etc.). In a year with a strong hydric deficit, the mil yields vary from 125 to 1230 kg ha⁻¹ in the same proportions than those obtained at the level of a watershed. These yields vary as the hydric stocks, the proportion of organic carbon, the CEC, total P and pH. The run-on is dependent of abiotic (position, micromodelling, Db, soil work) and both anthropic and natural biotic factors. The mil AET (mm/cycle) varies from 193mm (CV=2.34%) without a run-on to 252mm (CV=11.5%) with the runon. The implementation of stone corridors and contain the run-off and strongly reduce the erosion, increasing significantly and permanently the yields. The hydric report that makes the benefit part of the run-off can be defined as a natural irrigation, complementary and simultaneous to the rain that has generated it as a function of both natural (topographic, morphological, permeability) and anthropic conditions (soil work, biophysical antierosive structures etc.) Thus the run-on is fully part of the major ecosystemic services that agroforesters are able to develop to promote a sustainable ecodesvelopment.