

Key hydraulic structures to achieve climate-smart agriculture in the dry Sahel

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As defined by the FAO (2013)¹ Climate-smart agriculture, is based on three main pillars: (i) sustainably increasing agricultural productivity and income; (ii) adapting and building resilience to climate change; (iii) reducing and/or removing greenhouse gas emissions, where possible. At the southern edge of the Sahara desert, from Saint-Louis (Senegal) to Djibouti, the Sahel is highly vulnerable to climate change due its geographic location and the strong dependence of its population on rain-fed agriculture and livestock.

Within the framework of the Great Green Wall of the Sahara and the Sahel Initiative J. Albergel and Salif Diop (2012)² achieved a synthesis on land and water management techniques (traditional and newly introduced) allowing better resilience to extreme events : droughts or flash floods. Using the concept of increasing green water³ (infiltrated water and water stocked into the soil) which increases crop yields and allows better carbon sequestration as well as reduces the effects of runoff on soil degradation, they reviewed all scientific studies on water and soil management projects from the 80s in the area of the Great Green Wall of the Sahara and the Sahel Initiative.

This presentation summarizes the main results obtained on hydraulic structures ranging from the traditional ones such as flood spreading and flood recession agriculture practiced in Ace Eyla gardens on the Gobaad Wadi banks (Djibouti) to the modern semi-subsurface dam developed and tested in Mali in the 80s. Water structures suitable for sloppy soil and for bottom lands in these arid areas of Africa are discussed in the contexts of the Great Green Wall of the Sahara and the Sahel Initiative, of adaptation to climate change and of poverty alleviation.

¹ FAO (2013), Climate-smart agriculture source book, 555p.

² Albergel Jean, Diop S. (2012) Aménagements hydrauliques innovants pour la gestion conservatoire des eaux et des sols sur le tracé de la Grande Muraille Verte. In : Dia A. (ed.), Duponnois Robin (ed.). La Grande Muraille Verte : capitalisation des recherches et valorisation des savoirs locaux. Marseille : IRD, 2012, p. 321-349.

³ Falkenmark, M., 1995. Land-water linkages-A synopsis in land and water integration"ROME, FAO, Land and Water Bulletin, 1, pp 15-16.