

## Sustainable Agricultural and Soil Water Management Practices in Relation to Climate Change and Disaster: A Himalayan Country Experience

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**Abstract :** A "Climate change adaptation and disaster risk management for sustainable agriculture" project was implemented in Nepal, a Himalayan country during 2008 to 2013 sponsored jointly by Food and Agriculture Organization (FAO) and United Nations Development Programme (UNDP), Nepal. The paper is based on the results and findings of this joint pilot project. The climate change events such as increased intensity of erratic rains in short spells, trend of prolonged drought, gradual rise in temperature in the higher elevations and occurrence of cold and hot waves in Terai (lower plains) has led to flash floods, massive erosion in the hills particularly in Churia range and drying of water sources. These recurring natural and climate-induced disasters are causing heavy damages through sedimentation and inundation of agricultural lands, crops, livestock, infrastructures and rural settlements in the downstream plains and thus reducing agriculture productivity and food security in the country. About 65% of the cultivated land in Nepal is rainfed with drought-prone characteristics and stabilization of agricultural production and productivity in these tracts will be possible through adoption of rainfed and drought-tolerant technologies as well as efficient soil-water management by the local communities. The adaptation and mitigation technologies and options identified by the project for soil erosion, flash floods and landslide control are on-farm watershed management, sloping land agriculture technologies (SALT), agro-forestry practices, agri-silvi-pastoral management, hedge-row contour planting, bio-engineering along slopes and river banks, plantation of multi-purpose trees and management of degraded waste land including sandy river-bed flood plains. The stress tolerant technologies with respect to drought, floods and temperature stress for efficient utilization of nutrient, soil, water and other resources for increased productivity are adoption of stress tolerant crop varieties and breeds of animals, indigenous proven technologies, mixed and inter-cropping systems, system of rice/wheat intensification (SRI), direct rice seeding, double transplanting of rice, off-season vegetable production and regular management of nurseries, orchards and animal sheds. The alternate energy use options and resource conservation practices for use by local communities are installation of bio-gas plants and clean stoves (Chulla range) for mitigation of green house gas (GHG) emissions, use of organic manures and bio-pesticides, jatropha cultivation, green manuring in rice fields and minimum/zero tillage practices for marshy lands. The efficient water management practices for increasing productivity of crops and livestock are use of micro-irrigation practices, construction of water conservation and water harvesting ponds, use of overhead water tanks and Thai jars for rain water harvesting and rehabilitation of on-farm irrigation systems. Initiation of some works on community-based early warning system, strengthening of met stations and disaster database management has made genuine efforts in providing disaster-tailored early warning, meteorological and insurance services to the local communities. Contingent planning is recommended to develop coping strategies and capacities of local communities to adopt necessary changes in the cropping patterns and practices in relation to adverse climatic and disaster risk conditions. At the end, adoption of awareness raising and capacity development activities (technical and institutional) and networking on climate-induced disaster and risks through training, visits and knowledge sharing workshops, dissemination of technical know-how and technologies, conduct of farmers' field schools, development of extension materials and their displays are being promoted. However, there is still need of strong coordination and linkage between agriculture, environment, forestry, meteorology, irrigation, climate-induced pro-active disaster preparedness and research at the ministry, department and district level for up-scaling, implementation and institutionalization of climate change and disaster risk management activities and adaptation mitigation options in agriculture for sustainable livelihoods of the communities.

**Keywords :** climate change adaptation, disaster risk management, soil-water management practices, sustainable agriculture

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