Studies on Rainwater Harvesting and its Efficient Utilization in Western Himalayas

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In Himachal Pradesh, about 84 per cent of the net cropped area is rain fed. Due to uneven and erratic rains, the yields of both *rabi* and *kharif* crops are low. Under rainfed conditions only cereal or pulse based cropping sequence are followed which fetch very meager net returns. The cost: benefit ratio can be widened if vegetable or cash crops based cropping systems are adopted. Vegetables are more prone to water stress among all the agricultural crops. So, vegetable production is the major sufferer of erratic and uneven rainfall in rainfed areas. For the cultivation of vegetable crops assured irrigation is very much required. This problem can be mitigated if rain water is stored in polylined water harvesting tanks and its productivity improved through alternative methods of planting and judicious use of stored water. The water resource in hilly areas can be developed by small scale runoff harvesting in dug-out farm ponds suitably lined with poly-sheet, the runoff of which can further be used for bringing diversification through cultivation of profitable cropping sequences especially vegetables based. The Department of Soil Science, CSKHPKV has developed simple and cost effective rain water harvesting technology and about seven polylined water harvesting structures have been constructed in the University research farm. An experiment was conducted with Broccoli as indicator crop in randomized block design with three replications . The treatment included all possible combinations of three irrigation levels and three planting methods. Curd yield of Broccoli during both the growing season were higher under higher irrigation frequency and furrow planting. With the decrease in frequency of irrigation there was a decrease in curd yield. Higher water use efficiency was obtained at lowest irrigation frequency (IW/CPE = 0.8) and furrow planting method. Lower yields in $I_3 P_3$ (IW/CPE = 0.8 and flat method) resulted in lowest water use efficiency.

Moreover, the entire water received through precipitation is not expected to be lost as runoff. A part of it is either retained by the soil for plant growth or percolates down beyond the root zone or evaporates from the soil surface. However, the magnitude of these components of the field water balance following rain depends on various factors such as slope, soil cover etc. The present investigation is being carried out to study the influence of catchments' vegetation on runoff production. Runoff water was linearly regressed for rainfall to evaluate the relationship between soil cover and runoff. The regression analysis indicate that during kharif season, with one unit increase in rainfall, the runoff was expected to increase by 0.3758 units under maize, 0.303 units under soybean and by 0.1364 units under grasses. During rabi 2005-06, with one unit increase in rainfall, the runoff was expected to increase by 0.1242 units under gobhi sarson, 0.0583 units under wheat and by 0.0214 units under grasses.