B-75: Mulching for water conservation in agro-well farming

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Use of limited shallow ground water by pumping through open dug wells for field crops cultivation has become popular among dry zone farmers during the recent past. It has been observed that cost of water extraction is considerable in lift irrigation farming. Due to shortage of well water especially during the latter part of the cropping period, farmers fail to get a successful harvest if not a complete crop failure. A study was carried out in a farmer's field to determine the effectiveness of mulch types (*Gliricidia* and rice straw) in increasing the water use efficiency of the chilli crop.

The study was carried out at Paindikulama during 1994 Yala season. Plots of 2.4 x 2.4 m cultivated with chilli at spacing of 60 x 45 cm were used for the study. Two types of mulch namely *Gliricidia* leaves and rice straw at the rate of 8 t/ha on dry weight basis were used along with unmulched plots for comparison in a RCD design with 3 replicates. All plots received recommended rates of N, P and K inorganic fertilizers. Flat beds were prepared with adequate drainage facilities, and manual weeding was adopted. Plots were given irrigation only when the crop showed 50% wilting at 1100 h. A calculated amount of water to reach the field capacity level was given to plots showing wilting on each day, and their records were maintained.

Crop yield was measured. The farmer was allowed to follow his own management in pest control.

The chilli yields obtained were low due to thrips damage. Results indicated that use of *Gliricidia* leaves and rice straw as surface mulch at the rate of 8 t/ha (dry weight) could reduce the total irrigation requirement by 30 and 40% respectively, compared to unmulched plots. This brings a 30-40% saving of pumping cost and a reduction of labour requirement for irrigation. Application of mulch does not involve a significant cost for both materials and use.

Plots where mulch was applied produced a chilli yield of 0.80 t/ha despite severe incidence of past. The yield has come down to 0.25 t/ha where the mulch was absent. This indicates a 3 fold increase of the farmer income in chilli cultivation when mulch is used. This may not only be due to water but a resultant effect of weed suppression, tolerance to pest and also the reduced temperature in surface soil because of mulch application. Water use efficiencies of chilli in unmulched, *Gliricidia* and rice straw mulched plots were 0.64, 2.92 and 3.36 kg ha^{-1} mm^{-1} respectively.

Gliricidia leaves and rice straw mulch could increase water use efficiency of chilli by 355 and 425% respectively under agro-well farming in the Yala season. *Gliricidia* and rice straw mulch could save 30 and 40% respectively of irrigation water extracted from the shallow ground water reserve while recording a three fold yield increase in chilli.

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