

RESOURCE CONSERVATION TECHNOLOGY

The conservation of resources (land, water, energy) saves cost for water, energy and protects environment while leading to improved productivity on sustainable basis. Targeting the resource conserving technologies offers newer opportunities of better livelihood for the resource poor small and marginal farmers. The major areas of research under this theme cover water conservation, planting techniques such as raised bed and bed furrow planting; orchard floor management, mitigation of desertification and case studies on resource economics.

Resource conservation research focused on raised bad technology, orchard floor management, nitrogen fixing trees for fertility improvement, drought tolerant tree and grass and zerotill seeder for wheat in combine harvested rice.

Technologies

- Nearly 30% water, seed and fertilizer were saved by adopting raised bed wheat planting technique.
- Water, seed and fertilizer were saved by adopting raised bed wheat planting technique.
- Orchard field (floor) management system in fruit crops improved soil fertility, plant health and increased profit margin.
- Three nitrogen fixing trees (NFTS) namely, *Gliricidia sepium*, *Ipil Ipil* and *Sesbania* species were grown under/around coconut plantation as a source of organic matter, for provision of favorable micro climate and improving soil fertility. All of the plants performed well particularly *Gliricidia sepium* giving yield of approximately 10kg fresh biomass per plant per year.
- Various trees and grass species were tested for drought tolerance and biomass production in desert area. The newly introduced *Acacia holoforceac* proved successful while among grasses *Panicum turgidum*, *Lasiurus indicus* and shrub species *Calligonum polygonoides* and *Acacia jacquemontii* performed best.
- To resolve problem of burning straw of wheat after combine harvesting and to use it for beneficial purpose, FMI developed 3rd prototype of the seeder at the workshop of its collaborating manufacturer. This is first year of the project. The anticipated benefits of seeder are conserve moisture, increasing the efficiency of combine and also increase the fertility of soil
- Cotton yield was higher in bed-furrow planting by 10% compared with conventional planting. Nitrogen use efficiency was 34% with residue recycling and 29% without recycling. Similarly, phosphorus (P) use fertilizer efficiency was 20.6% with residue recycling and 18.4% without recycling.

Resource economics

- Resource economics study showed that small farmers were getting 18.6 percent higher output per acre than large farmers depicting inverse relationship between farm size and productivity. Absolute and relative profitability of maize, sugarcane, rice, wheat, cotton were in decreasing order with increase in farm size.
- The study on zero-tillage technology in Punjab revealed that at regional level, farming community saved Rs.1338 million, 1085 million liters of tractor diesel, and 2.05 million hours of tractor services while 10.25 thousands hectare feet water was over pumped.

However, due to successive use of minimum tillage the wheat yield declined @ 6.23 percent per annum versus growth of 2.40 percent compared to non-adopters' field. Hence, the zero tillage plantations as resource conservation technology is recommended for light soils with good drainage than the heavy ones.

- A study on farm mechanization revealed that the use of paddy thresher saved about Rs. 180 to 300/acre compared with bullock and drum beating. Paddy thresher also saved time and can do job in 2 hours/acre than other methods which require more than 48 hours to accomplish the same work.