

A novel innovation leading to super productivity of sugarcane through mechanised ring-pit farming in Pakistan

BY:

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Preamble

In the wake of all modern sugarcane technologies available, Pakistan still encircles around meager 56.4 tons/ha yield as compared to India, where productivity at the farm level hovers around 70 tons/ha.

The low productivity and low incomes are serious concerns that sugarcane growers are facing today, thereby, switching towards rice & other crop system. Thus a decline in sugarcane cultivation, coupled with market uncertainty is making the operation of sugar mills exceedingly challenging.

It has been established fact that planting at the density of 150,000 or more buds ha⁻¹ and in 80 cm apart rows produces the highest net returns (Balusamy and Shanmugasundaram, 1999).

The economic analysis of sugarcane planted under various planting methods revealed that cost of production was greater in ring pit system than conventional method of planting and deep trenches, but more net return was given by deep trenches than the other planting methods (Yadav *et al.*, 1991).

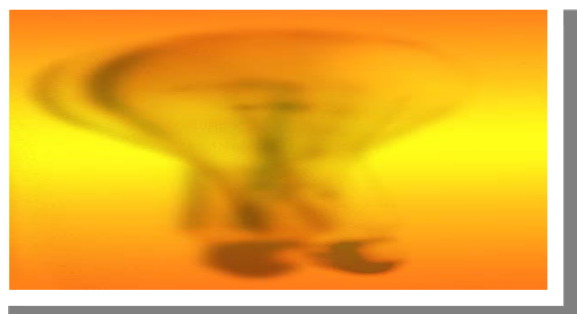
In order to overcome the issue of lower productivity, ring-pit method of sugarcane farming emanated from India in early 1980's (**Singh et al., 1984**). Even in the wake of all out backing of the governmental initiatives, ring-pit farming in India now covers only 0.26% (33,000 acres) of the total cane cultivated area.

The technology could not earn the confidence of farmers, mainly being very labour-intensive and awfully difficult to manage. Nevertheless, in Pakistan ring-pit method was adopted first in Sindh by Syed Hassan Rashi in 2009 yielding 2100 mounds per acre.

Beginning with an Idea

Crises and Response

In the wake of sugarcane low productivity crises, we responded in devising a new technology leading to mega productivity of sugarcane



through introduction of mechanised
ring-pit farming in Pakistan.

Former and Novel Ring-pit Technology Comparison



Labour intensive



Mechanised



Land Preparation to make Furrows & Ridges



Furrows with flat Beds after cultivation

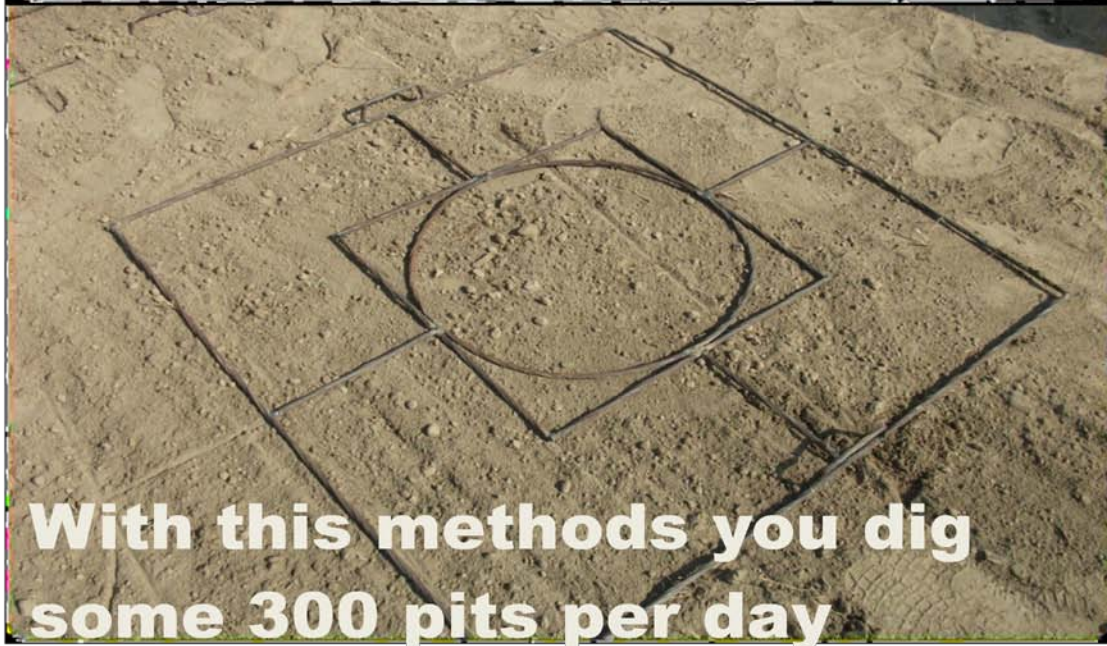


Furrows alignment with rope



Furrows & Beds Shaper

Pits' formation



**With this methods you dig
some 300 pits per day**



Preparation & placing of 2-budded setts

About 2700-3000 circular pits of 70 cm diameter are dug to a depth of 35 cm. The pit to pit distance is around 30-45 cm while row-to-row are gross-spaced @ 150cm apart and net-spaced @80 cm.

A sum of 18-25, two budded setts are placed in a circular pit and covered with soil to a height of c.5 cm. We used cane-seed @ some 130 maund/acre.

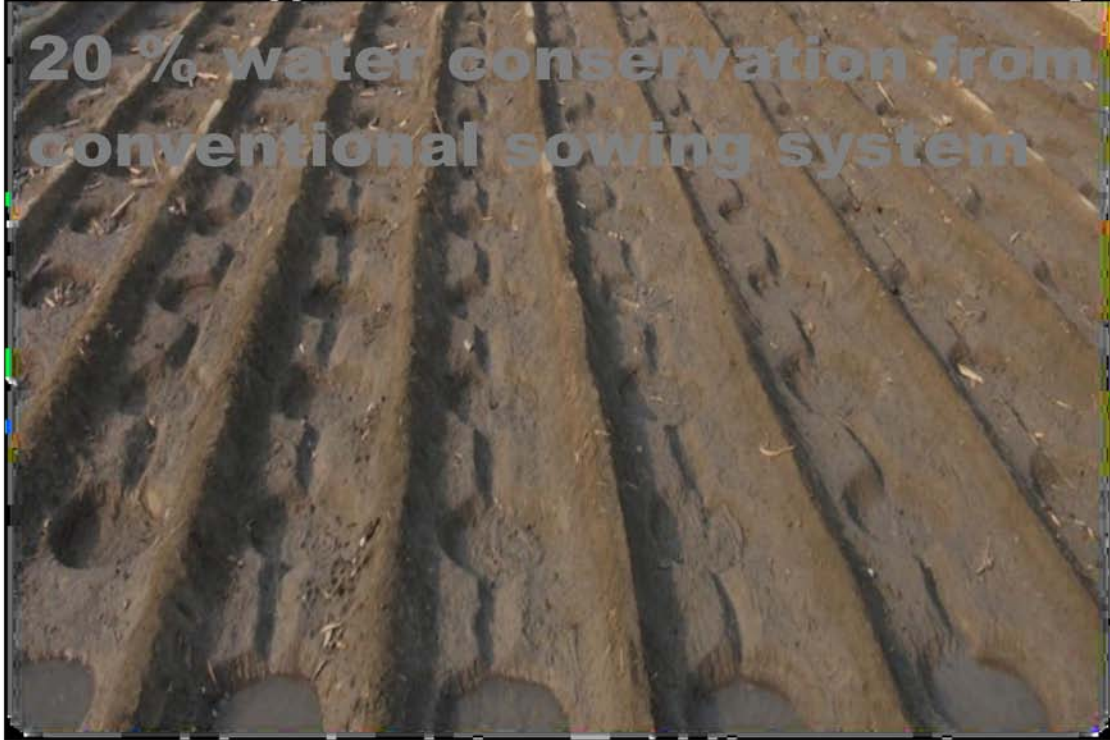
Before planting, we applied 4 gm humate, 16 gram DAP, 16 gm SoP, 350 gm Gypsum in each pit.



Water conservation



**20 % water conservation from
conventional sowing system**





40 percent water conservation
from conventional sowing system

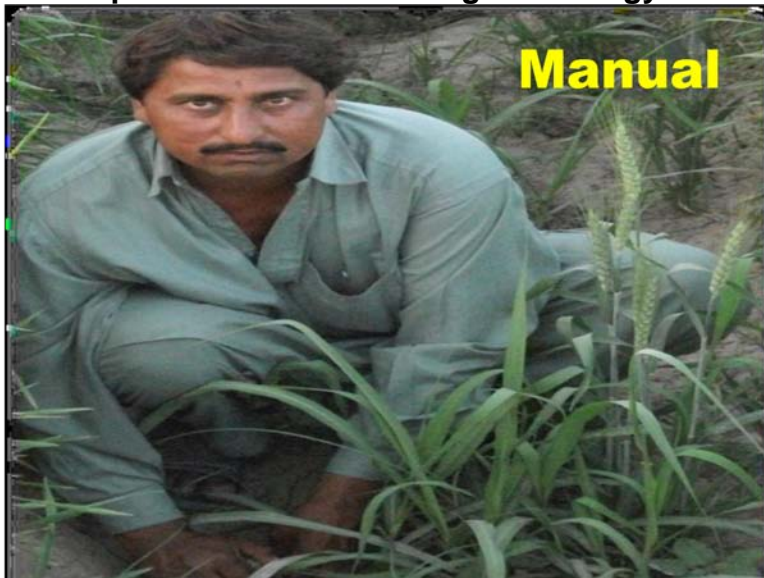


Germination of mother shoots @ 25-30 days post sowing



To oblige more number of mother shoots in the same space, tillers of the sugarcane needs to be suppressed. In order to attain this, more number of setts were placed in circular pits, which resulted in development of 80% mother shoots over tillers. This results in overall increment of sugar recovery up to 0.5 units as compared to higher percentage of tillers emerged in conventional sowing methods (<http://www.iisr.nic.in/download/publications/ringpit-english.pdf>)

The comparison of interculturing technology



Mechanised & Chemical control of weeds and insect pests

Initially, we carpet sprayed solution of Atrazine (500gm/l) along with Mesotrione (50gm/l) *Lajawab* @ one litre/acre and used tractor mounted boom-spray to eradicate all sorts of weeds. Further weeding was controlled with the help of special two-row tined cultivator before and after each irrigation until mid to last week of June, when we applied Thimet 5G @ 10kg/acre to control borers along with 2 bags of NPK (100kg/acre) with the help of two row tine-cultivator cum ridger and finalised the earthing-up process, which also helps in control of lodging.



Microclimatic exploitation

According to (Moore, 1989) at maximum photosynthetic efficiency of leaves and under ideal conditions of growth sugarcane could yield 364 tons/ha of green stalks. The key success in our experimental design demonstrates sustainable high density shoot population due allocation of sufficient space through wider row to row distance (80 cm), which helped in least mortality of tillers by providing uniform light distribution in canopy profile and ensuring optimum moisture during (March to June) tillering phase.



High Density of Stalks

To get maximum possible yields of sugarcane about 180,000 to 200,000 millable canes per ha, each of 2 kg weight are required (Yadav, 1991).

With this mechanised agro-technological approach of planting sugarcane by exploiting micro-climatic regime, we accomplished a high density of some 200,000 stalks/ha, and aim to sustain a super productivity around 250 to 300 tonnes/ha from an area of over 60 acres, which is 5 times higher the current productivity of Pakistan. By application of this method of mechanised ring-pit farming, growers can advantageously get 5-6 ratoons. We forecast a win win situation for farmers, as well as, sugar mill owners in Pakistan through lucrative sustainable produce.



Let's think nationally and work locally

Acknowledgements

Thanks to:

**Hassan Rashdi for sharing data,
Shakarganj Research Institute
and You**