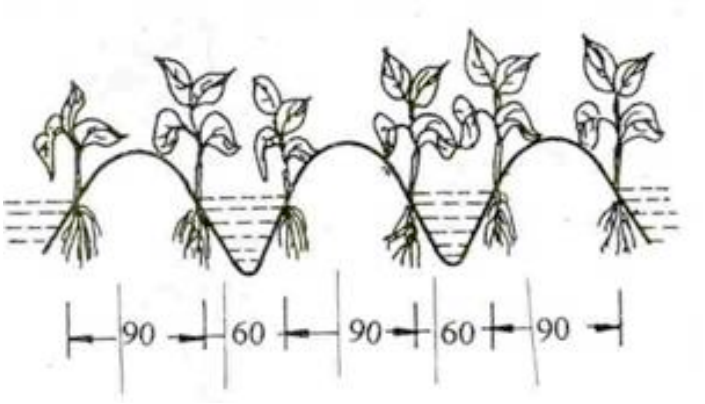
12. Water Management Technology Options for Non-Rice Crops

Special irrigation techniques for non-rice crops:

Paired row technique:

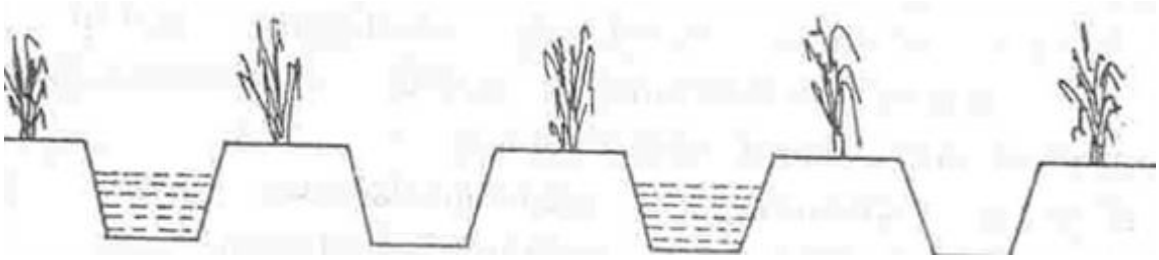
- It is a method in which accommodating crop rows on both sides of furrow by increasing ridge spacing, thereby a common furrow is used fro irrigation of two rows .
- This method of irrigation has been experimented for crops like greengram, blackgram, groundnut and sunflower. The results showed that there was saving of about 20 % irrigation water and 15 % increase in crop yields



- In Coimbatore district, the paired row system of planting for cotton crop saved 29 % of irrigation water with almost the same yield as that of conventional furrow system. The water use efficiency was found to be 31.1 kg/ha-cm.

Alternate furrow system:

In sugarcane alternate furrow saves 34.1 % irrigation water compared to all furrow irrigation



sandy clay loam soils of Coimbatore.

- Growing chillies under alternate furrow irrigation with 10 t/ha of coir pith application saves 30.8 % irrigation water over all furrow irrigation.
- Growing groundnut in ridges and furrows under well irrigated conditions saves 24-27 % of irrigation water compared to check basin
- Alternate furrow irrigation to brinjal saves 24 % of water than normal farmers practice.
- Alternate furrow irrigation for PKM1 tomato crop saves 34 % of irrigation water compared to all furrow irrigation and 55 5 over check basin. There is no significant variation in yields between the two methods

Growing turmeric under improved irrigation practice of using 5 cm depth of water plus application of coir pith 10 tons/ha as mulch saves.

Growing turmeric under improved irrigation practice of using 5 cm depth of water plus application of coir pith 10 tons/ha as mulch saves water upto 44 % over normal farmers practice (ridges and furrows).

Gradual widening technique

Irrigating banana at 1.0 IW/CPE ration (once in 7 days) from 0-7 months and 1.2 IW/CPE ratio (once in 5 days) from 7-14 months recorded higher mean yield of 32.7 t/ha with an increased fruit yield of 2.1 t/ha compared to basin irrigation at 1.0 IW/CPE ratio throughout the crop growth period, besides higher WUE and saving of 140 mm of water. By gradual widening of ring basins from 30x60, 45x90 and 60x120 cm for 0-50, 51-100 and 101-150 days respectively followed. By basin method there was a saving of 25.4 % of water and increased WUE of 25.9 % over check basin

Surge irrigation technique

A relatively new concept in surface irrigation application method viz., surge irrigation has been introduced and evaluated for field use. Extensive experimental trails covering a wide range of long furrow specifications, inflow discharges, cycle ratios and number of surges with different test.

Salient Features

- Easy operation and efficient manipulation of surge flow rates in accordance with the design surge cycle timing parameters and irrigation requirements.
- Deep percolation losses along furrows hardly exceed 5 % compared to more than 25 % in continuous flow systems.
- Nearly 1.5 times increase in the irrigable area per unit time
- Helps achieve high degree of irrigation efficiencies and water use efficiencies (14 kg/ha/mm of water) with maize.
- Saving in water (40 to 60 %), time and labour (30 to 45 man-hours per ha compared to more than 60 man-hours per ha in continuous flow systems

Sorghum- Farmer's practice

- Flat bed system – irrigation based on prevailing weather and eye judgment

Technology options

- Furrow irrigation once in 15-16 days during first 20 days of sowing and six irrigations with an interval of 6 days during the rest of the crop period
- Raton sorghum six irrigation viz., at rationing, 4-5 leaf stage, milking, soft dough and hard dough
- Surge irrigation is feasible in long furrow (>100 m) in level lands

Pearl millet- Farmer's practice

- Beds and channel irrigation

Technology options

- Irrigating with IW / CPE ratio of 0.75 at 4 cm depth was found to be optimum

Finger millet- Farmer's practice

- Flat bed system irrigation based on prevailing weather and eye judgment

Technology options

- Irrigating with IW / CPE ratio of 0.75 at 4 cm depth of water

Maize - Farmer's practice

- Flat bed system- irrigation based on prevailing weather and eye judgment

Technology options

- Irrigating the field at 10 days interval

Pulses- Farmer's practice

- Beds and channels and excess irrigation

Technology options

- Blackgram and greengram irrigation at critical stage i.e. one at sowing, second at flowering and third at pod formation with 4 cm depth.
- Irrigation once in 18 days was optimum
- Soybean, irrigation at 80 mm, CPE once in 11-12 days interval

Groundnut -Farmer's practice

- Beds and channel-irrigation based on prevailing weather and eye judgement

Technology options

- Irrigation at sowing and establishment stages and 25 DAS
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- Irrigation once in 7-9 days found to be optimum

Gingelly - Farmer's practice

- Flat bed system and copious irrigation

Technology options

- Irrigation at Flowering stage and capsule formation

Sunflower- Farmer's practice

- Flat bed system

Technology options

- Irrigation at IW / CPE ratio of 0.75 with 20:30:20 Kg of NPK / ha
- Surge irrigation under long furrow in level lands

Coconut - Farmer's practice

- Check basin and copious irrigation

Technology options

- Irrigation through drip system @ 100 litres of water / tree / day
- For stress management the palm basins to be opened to a radius of 1.8m with receipt of late showers and mulching can be done
- Husk mulching can be done to absorb rain water and making available to palm

Application of green manure and FYM in the basin

- Spreading dried coconut leaves and other organic residues
- Addition of tank silt to the basin increase the water retaining capacity
- Under drought situation lower senescent leaves may be removed
- Pitcher irrigation can be followed where a little water is available

Cotton - Farmer's practice

- Beds and channels

Technology options

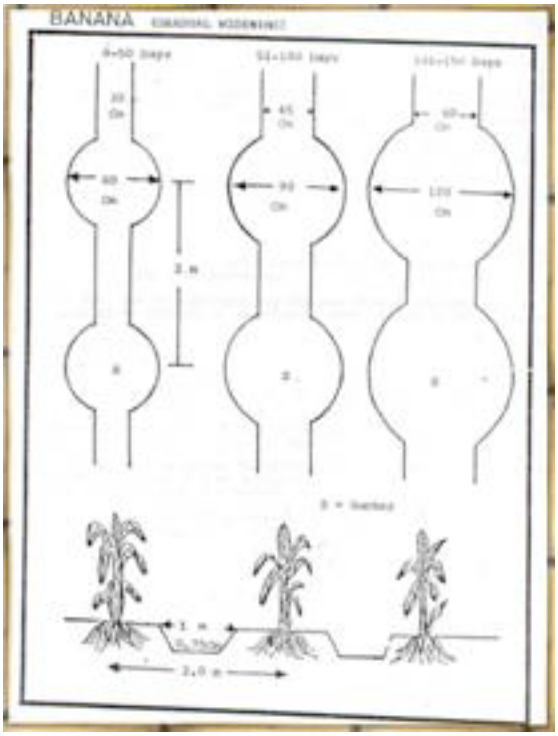
- Sowing of seeds in ridges and furrows
- Irrigation at IW / CPE ratio of 0.75
- Mulching with sugarcane trash @ 5t / ha
- Spraying of Folicot or paraffin wax 10gm or kaolin 50gm in a litre of water
- Sprinkler irrigation is feasible
- Drip irrigation can be adopted

Banana - Farmer's practice

- Trench and mounds method of irrigation

Technology options

- Irrigation at 0.75-0.9 IW /CPE ratio
- Chain basin method could be adopted
- Basins are formed around the suckers and the basins are connected through channels
- Drip irrigation with high density planting, Fertigations are preferred in favourable locations (well irrigated lands)
- Gradual widening of furrows with stage of crops.



Acid lime -Farmer's practice

- Basin irrigation

Technology options

- Irrigation through drippers at 75 per cent of water supplied through basins
- Drip irrigation is preferred

Tomato- Farmer's practice

- Beds and channels

Technology options

- Furrow irrigation may be recommended
- Drip irrigation especially with micro sprinklers may also be recommended for hybrids
- Irrigation at IW / CPE ratio of 1.00 during fruit formation And ripening

- Sprinkler irrigation in tomato with 1760m3 gave significantly higher water use efficiency than any other irrigation method

Sugarcane - Farmer's practice

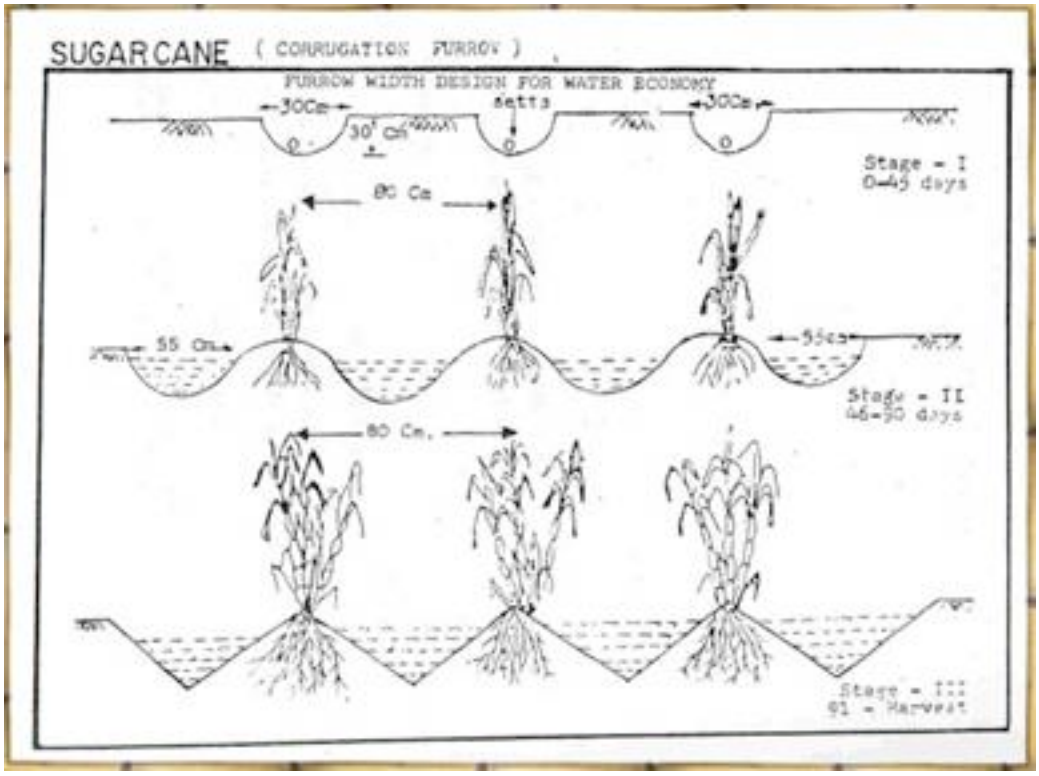
- Excess irrigation through ridges and furrows

Technology options

- Irrigation at IW / PE ratio of 0.9
- Mulching with sugarcane trash in garden land situation reduce evaporation loss
- Foliar application of kaolin @ 12.5 Kg in 750 litres of water per hectare reduce the transpiration loss
- Removal of old dried leaves in 5-7months old crop
- Alternate or skip furrow irrigation can be followed
- Irrigate the field based on sheath moisture percentage
- In deep trench system of planting 30cm deep trenches are opened at 80cm apart, sets are planted in trenches
- Drip irrigation with fertigation is highly suitable
- Surge irrigation may be adopted in long fields in light textured soils

The problems of several non-system tank irrigation system through detailed studies

- Encroachment, siltation, soaking of supply channels resulting in poorer / no-inflow of water, pollution of tank water by tannery and dying factory influence (Coimbatore, Erode, Salem Districts)
- Tank chains almost disappear and their hydrologically interlinking, any improvement could revive the tank will have benefit of exploiting full tank irrigation through appropriate or selective moderanisation benefit
- Owing to vagaries of man only 50-60 % of supply is realized a crop diversification strategy with non-rice crops is suggested
- De-silting for reviving the original capacity, tank fore shore, plantation to arrest the silt flow, feasibility of connecting small different tanks into the



percolation pond for ground water recharge, rehabilitation of tank structure and inward channels are the solutions eminated from the tank system researches

- On-farm development structures has to be strengthened the any tank command areas for equitable water distribution from head to tail end along with farmers participation
- Other technology options for poor quality water
- Conjuctive use of relatively fresh surface water and poor quality ground water with proper proportions are recommended
- Growing of salt tolerant crops in the saline water, irrigation belt along with proper drainage facility
- Community bore wells during the period of erratic water supply in canal command areas enhanced the crop water availability and there by their yields and net returns.