STI — Sustainable Turmeric Initiative: An Innovative Method for Cultivation of Turmeric (*Curcuma longa*)

WHY ARE FARMERS SWITCHING TO STI?

- Turmeric cultivation is simplified in accordance with basic principles of SRI
- Production of healthier seedlings
- Maintenance and enhancement of the long-term fertility of the soil, and savings of water and electricity
- Reduction in the seed material needed from turmeric rhizomes
- Improvement in the social and economical status of the farming community

CULTIVATION PRACTICES INVOLVED

Land preparation:

While preparing the nursery for turmeric production, at the same time we cultivate a green manure crop (*Daincha*) in the main field. While preparing the land, the usual tillage operation may be adopted. Farmyard manure (FYM), neem cake, basal fertilizers, and micronutrients are applied to the soil as recommended. Beds should be prepared – 15 cm in height and 120 cm in width, and a convenient length – with at least 30cm spacing between the beds. In the case of irrigated crops, ridges and furrows are prepared, and the seedlings are planted on the top of the bed. Spacing generally adopted is 40 cm between rows and 30 cm between plants, compared with 30 cm by 30 cm with standard methods.

Planting materials:

With this new methodology, we use sections of seed rhizomes weighing 20 to 35 grams each. For an acre, 180 kg of seed rhizomes are needed (usually there are 30 to 50 rhizomes per kg, with single rhizomes having a length of 7 to 9 cm, and a perimeter of 7 to 8 cm). Single rhizomes are cut into 3 to 4 pieces, each having 2 rings with a bulged portion. In a single rhizome, 8 to 10 rings are seen. We need about 22,000 pieces per acre (55,000 per ha).

Seed Treatment:

Fungicide (any type) - 2 gms / one liter of water
Insecticide (any type) - 2 mls / one liter of water
Urea - 5 gms / one liter of water
The fungicide used is organic, so no inorganic fungicides are used.

The above materials are soaked in water for half an hour, after which they are kept for warming in air-tight gunny bags for eight days in a protected area. This should initiate the germination, which starts earlier in the bulged portions that protrude outward.

Pro-Tray Filling:

Farmers fill the trays in which seedlings are to be raised with coco-peat, vermi-compost, some Effective Microorganisms (EM) solution, *Trichoderma viridae*, *Pseudomonas*, and a mixer. Then the trays are filled with partially-germinated seed, and the remaining space in the pits is filled with the above mixer of coco peat. Then the trays are kept under a shade net for 40 to 45 days. The usual daily maintenance activities are taken to ensure proper growth.

Transplantation:

After 40 days, we plant the seedlings in the main field with the support of drip irrigation and fertigation. Spacing between rows for STI is 40 cm between rows, and 30 cm between plants, while conventional spacing is 30 cm by 30 cm, as noted above. We have to protect the crop properly and carefully from pests and diseases through organic and inorganic methods. The materials used are listed in the comparative cost accounting below.

YIELD:

From a well-maintained crop, we get nearly 25 quintals (dried weight) per acre. This is **12.5 tons per acre**, which is 25% more than what is achieved with conventional production methods, 10.0 tons per acre.

WHAT ARE THE CONNECTIONS WITH SRI?

These practices were inspired by the experiences that Thambal farmers have had with using the System of Rice Intensification (SRI). Turmeric is a very different plant from rice, but some of the basic ideas for SRI turn out to be relevant for turmeric even though it is a rhizome-based crop, and not a grain.

1. With STI, the planting material is reduced drastically, as with SRI -- by more than 80%.

2. Spacing between the plants is also reduced, although not as much as with SRI; the plant-to-plant distance for STI is one-third greater than in conventional turmeric cultivation.

3. Fertilization is not much different; but organic fertilization is increased with green manure (*dhaincha*) applied to the crop, and the materials used for crop protection are all organic.

4. With STI, irrigation applications are reduced by two-thirds, which is effective because of the plants' greater root growth and the better structure of the soil given its more organic management.

5. STI requires more careful management as with SRI, but costs are reduced and the results are very worthwhile.

COST COMPARISON OF CONVENTIONAL vs. STI

The main factor driving or limiting farmers' turmeric cultivation is their cost of cultivation. The crop generally requires more cost and more care than others. In the previous two years, farmers got more income because of higher price; but this year they face heavy losses because of lower prices. Still, STI reduces the loss for farmers as yield is more with 20% less cost. The significant improvement in farmers' net income from turmeric production with STI methods is seen below.

COMPARATIVE COSTING: Cost of cultivation of turmeric (one acre model)				
Cost/acre	STI		Conventional	
Item of expenditure	Quantity/unit	Cost (Rs.)	Quantity/unit	Cost (Rs.)
OPERATIONS (labour)				
Clearing of field	2	600	2	600
Ploughing	16	6,400	16	6,400
Trench/bedmaking	2	600	2	600
Carrying & application of manure	8	1,500	8	1,500
Rhizome treatment & planting	15	3,750	15	3,750
Irrigation costs	13 (drip irrigation)	3,900	40	12,000
Intercultural operations (hoeing, weeding)	36	5,400	48	7,200
Harvesting (labour)	50	12,500	50	12,500
Transport from field to stockyard	5	1,500	4	1,200
Boiling of fingers (Rs. 60/quintal)	125	7,500	100	6,000
Drying of fingers	12	2,100	10	1,800
Polishing/packaging (Rs. 50/quintal)	25	1,250	20	1,000
Total		**47,000**		**54,550**
MATERIALS				
Planting material (Rs. 12/kg)	180	2,160	1,000	12,000
Farmyard manure (Rs. 1,000/ton)	8	8,000	8	8,000
Basal fertilizer	5 kg micro-nutrients	300	5 kg micro-nutrients	300
	2 liters Biocure F2	550	2 liters Biocure F2	550
	2 liters Biocure B2	550	2 liters Biocure B2	550
	1.5 liters Bionematon	525	1.5 liters Bionematon	525
	5 kg Vam plus	430	5 kg Vam plus	430
	NPK	2,700	NPK	2,700

Top dressing	5 kg micro-nutrients	300	5 kg micro-nutrients	300
	Bionematon	525	Bionematon	525
	NPK	3,800	NPK	3,800
Neem cakes (anandham + aboorvam)	320 kg	4,000	320 kg	4,000
Mulching material (green manures, etc.)	20 kg	1,000		
Plant protection	Cumasin (anti-fungal, anti-bacterial) 5x Florigene (growth promoter) 2x EM (Effective Microorganisms) + Trichoderma viridae 6x Trenching with Trichoderma viridae (Symbion-K, Symbion-S) 2x	6,250	Chemical sprays 5x: Quinalphos, Monocropto-phos, Dithane M-45 Corbentzin, Fytolon Acephate 4x Trenching with borate + blue copper 2x	12,230
Fuel wood for boiling		3,000		2,500
TOTAL		34,090		48,500
OPERATIONAL + MATERIAL COSTS		**81,090**		**103,050**
Saving with STI methods	***Rs. 21,960***			

ECONOMIC EVALUATION

	STI	Conventional
Revenue @ Rs.17/hg	Rs. 212,500 (12.5 tons/acre)	Rs. 170,000 (10 tons/acre)
Costs of cultivation/acre	Rs. 81,090	Rs. 103,050
Net income/acre	Rs. 131,410	Rs. 66,950
Added income from STI	***Rs. 64,460***	

This increased income of Rs. 60,000+ is because of our inspiration from SRI experience!

MONITORING OF THE STI CROP:

Scientists from the KVK (Farmer Science Centre), Dr. Manickam from Tamil Nadu Agricultural University, staff from the Horticulture Department, and officials from the T. Stanes & Company Ltd. have all been visiting and monitoring the crop from the beginning of the season up to the harvesting. They have monitored the various stages:

1. Seed selection
2. Nursery preparation
3. Transplantation
4. Control of pests and diseases
5. Harvest

Dr. Manickam, TNAU, and P. Baskaran, Thambal SRI Farmers Association

Conclusion:

This year I have plans to cultivate STI on 0.5 acre and to cultivate turmeric conventionally on another 0.5 acre, so that I can analyze both results easily and record any missing data. Confidently I can say that in the future, turmeric cultivation may develop along SRI lines and improve the economic status of the farmers.

Like with SRI and SSI, in STI there is productivity from 100% of the plant population along with **seed saving, labour saving, water saving, and power saving,** etc. So this initiative can give farmers the right way to get more profit from their efforts. With any support that I may get, the crop results from the experiments this year and previous years would be disseminated to the farmers in the District through a district-level conference.

Information provided by P. Baskaran, Thumbal, Salem District, Tamil Nadu
(baskarantbl@gmail.com)