



TECA - Technologies and Practices for Small Agricultural Producers

Date: 8/18/2022 - Path: <https://www.fao.org/teca/en/technologies/10108>

Title: Saguna Regenerative Technique (SRT), a no-till, conservation agriculture method of rice-based farming

Id number:	10108
Source:	Saguna Rural Foundation
Language:	English
Date of Publication:	April 2021
Date of Revision:	April 2021
Keywords:	No tillage, Regenerative agriculture, Conservation agriculture, Small scale farming, Climate change, Climate smart agriculture, Zero emission, Good drainage, Water infiltration, Biodiversity conservation
Categories:	Climate Change Adaptation and Disaster Risk Reduction
Country:	India
Region:	Southern Asia

Related SDGs:



Summary

Conservation Agriculture (CA), No-till method of farming which is climate smart, increases organic carbon of the soil, essentially are generative agricultural practice, considerably increases productivity of the land and adds to the amazing happiness & confidence of the farmer." The Saguna Regenerative Technique (SRT) cultivation method was evolved in 2011 at Saguna Baug, Neral, Dist. Raigad, Maharashtra, India.

The permanent raised beds used in this method facilitates ample of oxygen supply to the root zone area while maintaining optimum moisture condition there. SRT is being used for 25 to 30 different crops such as cereals, vegetables, pulses, oilseeds, millets, cotton, maize, etc. Absence of puddling and transplanting of rice makes it possible for "Not dependent on high amount of water, availability of tractor or plough and skilled labour during specific period of transplanting".

Description

Saguna Regenerative Technique (SRT) quickly rejuvenates the soil by enhancing percent organic carbon, by enhanced earthworm and microbial activity, by improved drainage, water infiltration and aerobic condition at rhizosphere, all of it together considerably increases yield at lower cost of production.

Figure 1. Healthy soil for healthy food and healthy environment



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1. Protocol of SRT

- Bed making: the permanent raised beds are used unchanged for the next 20 years or more. The dimensions: centre to centre 136 cm, top width of the bed 100 cm, the furrow channel between beds 36 cm. Height of the bed 20 cm.
- Direction: along the slope.

- Seed Sowing: date of sowing for different crops including rice are to be sown as per the local agroclimatic traditions. Until an automatic seed dibbling machine is developed / located, the operation is to be performed manually with the help of SRT Frame. The iron frame is designed to make holes at 25 x 25 cm but can be changed to multiples of 25 cm as per the crop requirement. E.g. Sweet corn to be planted at 25 x 50 cm.
- Pre emergence selective weedicid application: this is important to prevent weed growth in the first month of plantation. The selective pre emergence weedicid is to be applied within 24 hours after seed planting on a moist land walking backwards.
- Post emergence selective weedicid application: if for some reason the aggressive weed is noticed after crop emergence these set of selective weedicids can be sprayed.
- Gap filling and fertilizer application: this is to be performed between 15 and 25 days after emergence of the crop.
- Pest management: due to SRT the organic carbon of the soil starts rising which helps the crop to keep the insects at a distance. But we strongly recommend use of IPM practices which involves different types of insect pest traps.
- Nutrition booster spray: this spray enhances crop immunity and yield considerably. This can be applied between 50 and 60 days after germination. This consists of mainly the micronutrients and can also have major nutrients in a small quantity.
- Harvesting: as of today harvesting is done either manually or by reaper. But a modified combined harvester can solve the problem of stubble burning and can motivate the large farmers.
- Roots for the land: roots of the previous crop are to be kept undisturbed in-situ. Our philosophy is, “the fruit and the grain is for human being, the leaves and straw for the animals and the roots with stubble for the land”.
- Once the roots of the harvested crop start sprouting again after five to seven days it is to be sprayed by systemic general purpose weedicid which stops the competition for the next crop and the stubbles are converted into organic carbon, the precious source for next crop.
- Crop rotation: the easy possibility of relay crops is one of the important advantages of SRT. If irrigation is available three crops can be taken very easily. Crop rotation is a must in SRT.

1.1 Preparation of permanent raised beds

In this method we make the permanent raised beds. They are used over and again to grow various rotation crops without tillage or land preparation for the next crop.

Figure 2. The permanent raised beds made by the farmer will be used for growing crops for 20 year or more without any tillage



©Saguna Rural Foundation/Farmer Mr Hitendra Bagmare

1.2 Vigorous uniformity

The aerobic condition at the rhizosphere triggers positive chain reaction for healthy root and plant growth and reduced risk and drudgery to the farmer.

Figure 3. Excellent germination and vigorous root and uniform plant growth of the seedling



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2. Impact on soil structure and water infiltration

With increase in organic carbon, in-situ decomposing of organic matter, capillary formation by drying roots and earthworms, enhanced aerobic condition in the deeper layer of soil, quickly builds a healthy soil. Improved water drainage makes the crop climate smart and climate resilient.

2.1 Presence of earthworms in the paddy field in many types of soils.

With the traditional method where ploughing and puddling is performed the survival and performance of earthworms was impossible. But with No Till SRT method all the 3 000 farmers in all six agroclimatic zones are dancing with happiness after noticing naturally presence of earthworms.

Figure 4. Different types of soils showing earthworms



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2.2 Improved soil structure and well drained condition leads to climate smart farming

Increased organic carbon enhanced earthworm activity and higher microflora improve soil aggregation and water drainage which helped all 100 percent SRT farmers during floods in past two years. The same resilience was also noticed in drought conditions.

Figure 5. Side-by-side SRT and traditional rice plots affected by flood



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3. Crop rotation

Crop rotation ensures biodiversity of microflora and in turn the soil health. This also ensures the crop resilience and higher income to the farmers. As the small farmers depend for their home food consumption on their own land, the rotation comes in very handy, ensuring the food security.

3.1 Crop rotation and subsistence farming

A one hectare tribal farmer is able to provide 25 different food items to his family on their food plate due to SRT while he was able to provide only four items by traditional method.

Figure 6. The happy and content tribal farmer with 25 different food items from his one hectare SRT farm



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3.2 Problem of residue burning on farm lands

Organic residue burning on farms is practised either to get rid of the bulk of residue and quickly making it convenient for next crop sowing or to sterilize the land for seed sowing. Both problems are taken care in SRT method by avoiding burning of crop residue.

Figure 7. Wheat after rice without burning of crop residue by SRT



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4. Happiness and dignity to a smallholder farmer is possible

Small farmers are giving up and their next generation is rapidly losing interest in farming. SRT brought an unparalleled change and made every farmer happy and confident for the first time in their life, soon after their adoption to the SRT. Now their next generation after experiencing dignity to the farming even they are joining and taking over the farming profession.

4.1 Farmer happiness index

The survey of 160 farmers was conducted by visiting them and asking a set of 20 questions, collecting replies in smiles and was analysed by statistical tool.

Figure 8. The SRT farmer happiness index



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4.2 The no till science became a movement

The technique was developed to solve my own problems of farming. Our success story was taken to other farmers at our individual level from 2012. The successful farmers are now spreading the technique to other needy farmers in their respective area. Now the ball is about to get rolling which requires intervention by large organizations.

Figure 9. SRT Happy and confident farmers



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5. Validation of the practice

- The technique initially was tested in two districts of Maharashtra, India with 30 rice farmers in 2013. It has gradually grown to 3 000 farmers with 25 different crops in 26 districts of Maharashtra having six agroclimatic zones.
- Initially the technique was used only for rice based farming system under rainfed condition with rainfall +/- 1 500 mm to 3 000 mm. It is now been accepted by POCRA, Project on Climate Resilient Agriculture, World Bank for drought prone 16 districts of Maharashtra for resolving soil and water issues of the region for crops such as cotton, soybean, pigeon pea, maize, sorghum, pearl millet, green gram, chickpea, etc.
- It is accepted for "The Vision of Antyodaya" documentation of the best practices of sustainable development by ISRN, Indian Social Responsibility Network, Ministry of Culture, Govt of India.

6. Minimum requirements for the successful implementation of the practice

The most important basic necessity for successful implementation of SRT is that the farmer should be motivated and ready for change for self upliftment. SRT is working out very well with all types of soil texture, soil PH, water quality, even saline soils in coastal area with respective crops of the area. The technique involves minimum inputs and is "too good to be true" is one of the problem we have noticed for even trying out the technique on a small area by a new farmer.

7. Agro-ecological zones

- Tropics, warm.
- Tropics, cool/cold/very cold.
- Subtropics, warm/mod cool.

8. Related/associated technologies

- [Zero/minimum tillage in rice-wheat system: ID 7715.](#)
- [Introduction to conservation agriculture: principles and benefits: ID 7413.](#)
- [No-till technology: a no-till system with crop residue management for medium scale wheat and barley farming: ID 7507.](#)

9. Objectives fulfilled by the project

9.1 Labour-saving technology (LST)

SRT saves 50 percent labor especially in rice due to avoiding of transplanting operation (a drudgery to the labor). The transplanting operation in knee deep mud is carried out by both men and women.

9.2 Women-friendly

The traditional rice cultivation which involves many small tasks to be carried out by women such as preparation of food for laborers, uprooting the seedling, weeding, cleaning the bullock barn and so on. All these tasks in case of small holder farmer have become zero with SRT which has brought high comfort level to the women. The technique is so easy, light and manageable that she can easily and effectively take care of the farm with or without help of a man. Thus she has become happy, independent and confident.

9.3 Resource use efficiency

- Land: with availability of small amount of irrigation a SRT farmer is easily able to take three crops making the land efficiency 300 percent.
- Water: the increase water holding capacity has reduced water requirement by 40 to 50 percent. Also in case of rice no puddling for transplanting can save 40 percent water.
- Soil: SRT quickly stops soil erosion; during puddling of traditional method 20% fertile silt is washed away with water which is completely saved in SRT.
- Energy inputs: 100 percent saving of fossil fuel required for tillage operations which is almost 90% requirement of small holder farmer.

9.4 Pro-poor technology

The technology reduces the dependence of the small holder farmers on tractor and implements, excess labors and optimum rain/water and yet get the high productivity. This has improved their livelihood because they can easily spend on the education of their young ones, celebrate social functions luxuriously, have sufficient time at hand for future planning, all of which build their confidence.