

# INDIA IS WAKING UP TO THE HIDDEN BENEFITS OF NATURAL FARMING

Relevant for: Indian Economy | Topic: Major Crops, Cropping Patterns and various Agricultural Revolutions

**NEW DELHI :** Life is what happens when you're busy making other plans. Or so it happened to KV Homendra. At 23, he went for a degree in an agriculture university aiming to find work as government agriculture officer in Andhra Pradesh. But since those positions weren't open, he instead joined a state owned non-profit, Rythu Sadhikara Samstha, which was set up to promote natural farming. Homendra joined the Samstha as a fellow and was tasked with renting a plot of land and experience firsthand the results of natural farming and demonstrate it to farmers. Those two years changed his life.

"Everything I learnt at the university went for a toss. During the training (in natural farming) I did not believe it could be possible. That one can stop applying all chemical fertilizers and pesticides, replace them with locally prepared stimulants, and still get comparable yields while reducing cost of cultivation by 60-70%," Homendra said.

He rented two and a half acres of land in Kurnool district of Andhra Pradesh and grew a variety of crops—from marigold and tomatoes to cauliflower and paddy. A 1.5-acre plot where he grew horticulture crops gave a handsome return of over 1 lakh. His best tomatoes weighed 250 grams a piece, and the cauliflowers looked like giant white clouds weighing as much as 3 kg a piece. The yields in an acre of paddy came at 35-37 bags of 49 kgs each, or about 4.4 tons per hectare, higher than the district average (4 tons per hectare).

"My experiment with natural farming prompted about 150 local farmers to give it a try," Homendra said over phone. Andhra Pradesh, which launched natural farming as a state policy in 2015, is now home to the largest number of farmers in India who have transitioned from chemical nutrients to applying locally prepared natural inputs. As of March 2021, about 500,000 farmers are practising natural farming in 2,16,000 hectares of land.

For now, two other states, Gujarat and Himachal Pradesh have adopted natural farming as part of the state policy, while elsewhere, the initiative is largely driven by grassroot not-for-profits. But this is set to change. In mid-December, Prime Minister Narendra Modi urged all state governments to introduce natural farming. Small and marginal farmers who spend a lot of money on chemical inputs will benefit the most by taking up natural farming, the Prime Minister said. "We need to unlearn the wrong practices that have crept into our agriculture," he said.

No doubt, if natural farming provides a solution to keep fertilizer subsidies in check, the government will be certain to grab it. India's fertilizer subsidy bill, driven by a spike in natural gas and other raw material prices, is estimated to touch a staggering 1.3 trillion in 2021-22. By severely slashing cultivation costs, natural farming can also ensure higher net income for farmers, as the empirical evidence from Andhra Pradesh shows.

India, however, is choosing a distinctly separate route than its neighbour Sri Lanka which, last year, stopped import of chemical inputs and barred farmers from using them to save on dwindling forex reserves, leading to a collapse in production and food shortages.

The experience in Andhra Pradesh show that a transition can be successful if farmers are convinced and gradually ease into natural farming, a process that can take between three-five years. For instance, Devkanya Bai, a small farmer from Dewas in Madhya Pradesh first tried

natural farming three years back to grow wheat, chick peas, and maize. Now, she has sharply reduced use of chemical fertilizer and discontinued use of crop protection chemicals altogether.

"The soil is softer, my cost of farming has reduced and the roti tastes better," she said. Her pesticide-free produce is now purchased by a local farmer producer company and reaches thousands of urban consumers under the brand name Safe Harvest.

Compared to organic farming, it is this relative flexibility of natural farming which makes it easier for small farmers to transition. "Organic farming is all about certification while natural farming is a gradual process. We, at Safe Harvest, allow rational use of fertilizers and believe that pesticides are more of a problem from the health and ecology perspective," said Rangu Rao, chief executive officer of Safe Harvest, which last year marketed 7,000 tonnes of farm produce grown by over 100,000 farmers in 12 states.

People who are against natural farming are absolutely wrong thinking it to be some (ancient) bullock-cart technology or do-nothing-farming, said Kavitha Kuruganti, convenor of National Coalition for Natural Farming. "This is all about new age soil microbiology... and the impact on the ground in terms of higher net incomes for farmers is incontestable," Kuruganti said.

But first, the practice of natural farming needs to be validated by scientific research, said Ajay Vir Jakhar, chairman of Bharat Krishak Samaj and former head of the Punjab Farmer's Commission. "Besides, the government will have to take hard decisions to discourage use of chemical inputs by slashing subsidies," he added.

The other obvious beneficiary of natural farming will be consumers who are forced to purchase food with chemical residues in it. Certified organic food is more expensive, but the sheer cost savings in natural farming can ensure safe food at affordable prices.

## **Soil science**

T Vijay Kumar, a former civil servant who has been helming the Community Managed Natural Farming project in Andhra Pradesh, explains the scientific basis of natural farming and why soil biology is at the heart of it.

Modern agriculture is based on the principle that the soil has to be replenished by chemical nutrients such as nitrogen and phosphorous depending on the intake by the crop. In organic farming, similarly, the soil is replenished by applying organic manure, say, cow dung. But since cow dung contains very little nitrogen, massive amounts have to be applied, which may be difficult for a farmer to arrange.

Natural farming works on the principle that there is no shortage of nutrients in soil, air and water and a healthy soil biology can unlock these nutrients. How does this work?

Plants, by way of photosynthesis, use CO<sub>2</sub> and water to convert solar energy to biochemical energy or food. About a third of the food manufactured by plants is required by the shoot system over ground, while 30% is used by the roots. Almost 40%, however, is pushed into the soil as root exudates which feed microbes. These microbes—bacteria and fungi—in a symbiotic relationship, make the nutrients available to plants.

In natural farming, a cow dung-based bio-stimulant is prepared locally by fermenting dung with cow urine, jaggery and pulses flour. Compared to organic farming, the requirement of dung is very low, just about 400 kg for an acre of land. The fermented solution when applied to fields increases the microbial count in the soil which supplies the plants with essential nutrients. Using

chemical inputs reduces the microbe population and hinders this natural process.

Natural farming also uses a host of other interventions. Ideally, the field has to have some green cover round the year to aid carbon capture by plants from the air and nurture the soil-carbon-sponge which not only keeps the microbes alive and thriving, but also helps the soil become porous and retain more water. During cultivation of main crops, crop residues are used as mulch to retain soil moisture and prevent growth of weeds. The result is not just cost savings for farmers, but also higher carbon fixation into the soil which can mitigate climate change. Growing multiple crops in the same patch of land also raises soil fertility.

Higher microbial population in soil not only helps improve nutrient delivery to plants but also improves soil structure where 50-60% of the soil is air, or the soil becomes very porous, which increases its water holding capacity, Kumar said.

"(In the battle against climate change) the only thing we can really control is our land management and farming practices through which we can rehydrate and re-green our landscape... and meet fertility (requirements of soil) and the nutritional integrity of food," Australian soil microbiologist and climate scientist Walter Jehne said during a lecture at Niti Aayog in 2019. According to Jehne, regenerative agricultural practices adopted in Andhra Pradesh have fundamentally changed the economic viability of farming and enormously empowered local communities to take charge of their future.

### **Net incomes**

Beyond the science, the empirical evidence from Andhra Pradesh shows why natural farming needs more attention, both from governments and agriculture research systems.

An impact assessment by the Institute for Development Studies at the Andhra University, published in February 2021, surveyed over 3,500 natural and conventional farms to find that farmers were able to save substantial amounts on chemical nutrients and pesticides without any significant loss to production. Net revenues for paddy farmers were higher by 15-65% depending on the crop season, while for commercial crops like chillies, cotton and onion, net revenues were 40-165% more than conventional farming. Average net returns from natural farming were 50% higher.

If the entire gross cropped area in the state was converted into natural farming, the gain will be a staggering 8,038 crore for the state, counting expenditure on chemical inputs, the study said. Farmers, it added, would have realized 15,667 crore more in net revenues.

Further, a panel survey of 260 farm households which were surveyed in 2018-19 and again in 2019-20, found that natural farming reduced the dependence on credit, freeing many from exploitative and interlinked input and credit markets.

The evidence notwithstanding, the scientific establishment remains largely unconvinced of the practices surrounding natural farming.

"There is no scope for an incremental value gained by the farmer or the consumer through zero budget natural farming (ZBNF) that represents one of the many such practices followed in India prior to the 1950s when no more than 50 million tonnes of food grains could be produced, making it a technology that lacks rationale or acceptability," the premier National Academy of Agricultural Sciences wrote in a policy paper in November 2019.

The paper added that it would be premature to recommend its widespread adoption which may

lead to massive damage to the hard-earned knowledge and benefits of agricultural research and development over the last 70 years. "ZBNF cannot provide adequate quantity of nutrients required for higher crop productivity as soil has a limited nutrient supplying capacity," the paper observed, refuting the basic tenet of natural farming that underground microbial ecosystems can tap nutrients from soil, water and air.

How does the 18,000 crore crop protection industry in India view natural farming? "It can improve soil health and reduce incidence of pest infestation but that does not mean farmers can manage without chemicals during outbreaks," said Rajesh Aggarwal, managing director of Insecticides India Ltd. "We advocate farmers to use chemicals judiciously, even though application of pesticides in India is many times lower than in countries like US and Japan. There is no harm in trying out natural farming but it cannot be the only solution."

The agriculture ministry, however, following the Prime Minister's speech, said that natural farming brings down expenditure to a great extent and ends dependence on loans. It also reduces dependence on purchased inputs by encouraging use of locally available natural fertilizers, the ministry added.

The Indian Council of Agricultural Research, the cradle of green revolution which has so far focused on input intensive farming is now designing a curriculum on natural farming for both undergraduate and post-graduate courses. That's a good beginning for sure, said KV Homendra, who learnt all about natural farming hands -on.

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