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Image credits: IndiaSpend/Shreehari Paliath

THE NATURAL FARMING ROUNDTABLE: BUILDING A VIBRANT ECOSYSTEM

HANDBOOK


is.

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Watershed Organization Trust


Gargi Verma

गौठान - भिनगाचल






FOREWORD

Dear Reader,

India's agricultural heritage is a rich tapestry of diverse and harmonious farm practices. Among these, one approach stands out for its emphasis on sustainability, biodiversity and inclusivity with nature: Natural Farming.

As concerns about food security, climate change, and environmental degradation continue to escalate, farmers and researchers are seeking innovative and ecologically sound solutions. Natural Farming aims to build resilient ecosystems that are self sustaining and capable of withstanding uncertainties.

IndiaSpend has reported a series of in-depth stories from the field, which serve as a chronicle of the experiences and insights of farmers, researchers and experts who have dedicated their lives to this transformative approach. We believe that these stories will provide valuable insights to farmers, academia, policymakers and all those interested in sustainable agriculture.

While Natural Farming has gained traction in recent years, it is not without its challenges. Transitioning from conventional agrochemical-led farming practices to Natural Farming requires a shift in mindset, knowledge dissemination, research, and supportive policy frameworks. Through our stories, we aim to address these hurdles and bring to the forefront solutions and interventions necessary to promote Natural Farming on a larger scale.

I hope these narratives allow us to reimagine our agricultural systems and pave the way for a more sustainable and resilient future while improving the discourse on the topic.

I extend my heartfelt gratitude to the farmers, experts, and organisations who generously and wholeheartedly shared their knowledge and experiences. We hope this collection of stories serves as a catalyst for dialogue, collaboration and action, inspiring farmers and enthusiasts to embrace agroecology-based alternatives.

With gratitude,

Shreehari Paliath
Senior Policy Analyst
IndiaSpend

Why The Move To Organic Is Faltering In Sikkim, India's First Fully Organic State.

Farmers say they don't earn enough from farming, there is competition from cheaper non-organic produce from neighbouring states and several problems plague the supply chain for organic produce.

- By Angana Chakrabarti | 24 June, 2023

Image credits: IndiaSpend/Angana Chakrabarti

Nirmala Kami, an organic farmer, in East Sikkim's Samlik-Marchak village, planting ginger.

East Sikkim/Soreng district: On a cold winter's day in January 2016, Prime Minister Narendra Modi declared Sikkim as the first organic farming state in India.

"Sikkim is an example in the sense that when the idea of organic farming was raised here in 2003, it wasn't like there could not have been any opposition…Despite that, I salute those lakhs of farmers of Sikkim who didn't give up their path, didn't give up their desire… And today the whole world would be clapping for Sikkim," Modi said at the landmark Plenary Session of the National Conference on Sustainable Agriculture and Farmers Welfare in Gangtok.

Seven years since then, and two decades since the then chief minister announced government policy to transform Sikkim to a completely organic farming state, the movement is faltering; low earnings and migration to towns mean farmers are leaving the profession, there is competition from cheaper non-organic produce from neighbouring states, several problems plague the supply chain for organic produce, and there are rumours of farmers in districts that border the neighbouring state of West Bengal moving back to chemical farming, and organic produce alone cannot sustain the state's population, our reporting on the ground has found.

In the seventh piece in our series on natural farming, we look at what worked well in Sikkim's transition to organic farming, and the challenges it faces in sustaining the movement. We find that this holds lessons for India, especially as the government--through several initiatives--is pushing natural farming across the country.

Why it was relatively easy for Sikkim to move to organic farming

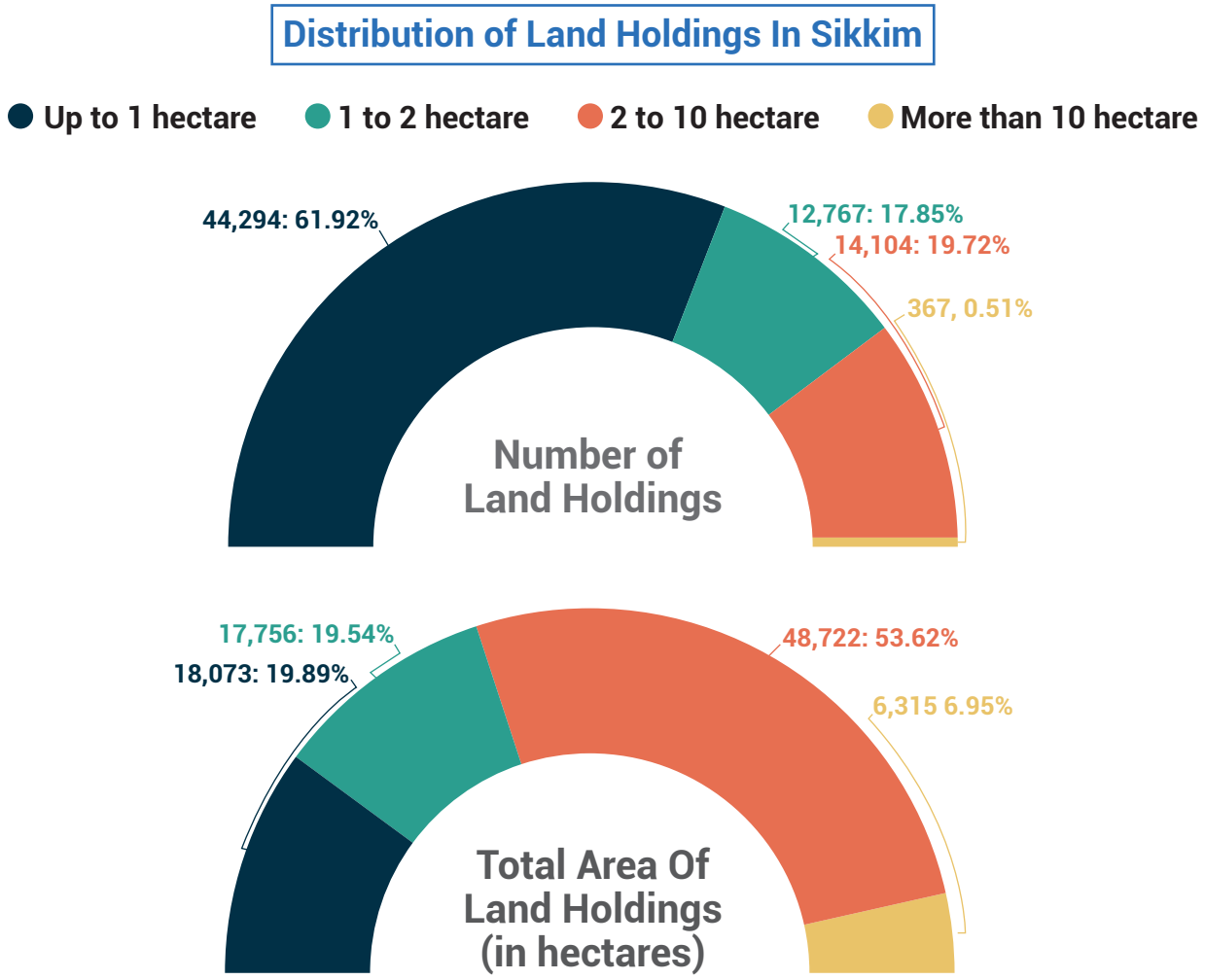
The hilly, thumb-shaped state of Sikkim is wedged between West Bengal in the south, the Tibet Autonomous Region of China (to the north & northeast), Bhutan (in the east), Nepal (in the west).

There were several reasons that came together to aid Sikkim's move to organic farming small land holdings, relatively low fertiliser use and other farming practices that supported organic farming, even before the move to organic.

There are three major ethnic groups in Sikkim: Lepcha, Bhutia and Nepali. Since 1642, Sikkim was ruled by the Chogyal ('Dharma Raja') monarchs of the Namgyal dynasty, who owned all land in the kingdom, and leased it to the Bhutia and Lepcha noblemen. The British, who made Sikkim a protectorate in 1861, encouraged Nepalis to migrate to the state for labour.

"Migration of the Nepalese into Sikkim brought a technological change in agricultural practices in Sikkim, because neither the Bhutias nor the Lepchas had any knowhow of settled cultivation," writes researcher Anjan Chakrabarti in his paper, Migration and Marginalisation in the 'Himalayan Kingdom' of Sikkim. The noblemen would lease land to the Nepali immigrants for cultivation.

Researcher Debashis Das, in the 1994 book Sikkim: Society, Polity, Economy, Environment, writes about the "unequal distribution of land ownership" in the state. According to the 'State Focus Papers 2023-24', published by the National Bank for Agriculture and Rural Development, small and marginal farmers with an average land holding of 0.62 ha (1.532 acres)account for 79% of total land holdings.



Source: https://drive.google.com/file/d/1NKFnOmmiXWltahe3aXsGiKWxnwZogwbW/view

Kunga Samdup, the joint director in Sikkim government's Department of Agriculture, told IndiaSpend that it was easier to convert a “small state with small land holdings" to organic, when compared to a larger state.

In 2002-03, before former Chief Minister Pawan Chamling declared the government's policy to transform the state into “totally organic", the state used 9.9 kg of nitrogenous and phosphatic (NPK) fertilisers per hectare of cropped area. This was the lowest in the country, after Nagaland and Arunachal Pradesh. Compare this to states like Punjab, that used 172 kg of fertiliser per hectare, and Haryana that used 150.4 kg per hectare in 2002-03.

“Traditionally our farmers practised organic farming and hence the possibility of reverting back to this age old practice is not difficult," the former chief minister had said in his announcement in the legislative assembly.

“The farmers of Sikkim make conscious efforts to retain high levels of organic matter in their field through continued use of organic manure as compared to other parts of the country to replenish the nutrient losses through crop removal and erosion," wrote researchers R.K. Avasthe, H. Rahman, Yashoda Pradhan, R. Karuppaiyan and Tasvina Rahman, in their paper, 'Organic Farming in Sikkim – Situation Analysis, Technology Development and Perspective Planning' in January 2007.

The government's organic Sikkim plan

Sikkim's organic mission was implemented between 2003 and 2016 over three phases conceptualisation, preparatory and implementation.

In the conceptualisation phase, the government created an Action Plan and Road Map and the Sikkim State Organic Board. In 2004, as part of the preparatory phase, the government reduced fertiliser subsidies (and later banned it under the Sikkim Agriculture Horticulture and Livestock Feed Regulatory Act 2014), formulated the Sikkim State Policy on Organic Farming, established vermiculture hatcheries and processing units, and started a programme for a new variety of seeds, according to the book, Sikkim: The Organic Leader, published in 2017, on the government of Sikkim's behest. In addition, the Sikkim government adopted 100 bio-villages till 2009 for conducting organic farming demonstrations and trials.

Since most farmers had small land holdings, certification agencies like Gangtok-based Mevedir were engaged by the Sikkim government in 2006 to provide organic certification to groups of farmers rather than to individual farmers, as per the National Programme for Organic Production guidelines.

“The service providers like Mevedir and certification agencies were brought on to help train the farmers and spread awareness. They took all possible details of their land etc," said Samdup, of the department of agriculture.

Later, in 2015, the Sikkim State Organic Certification Agency was set up.

From 2010, in the implementation phase, the state launched the Sikkim Organic Mission to convert Sikkim to a completely organic state by 2015, as per the book cited above. As a part of the mission, the Sikkim government organised training modules on different facets of organic farming, including manure production, and opened a Sikkim Organic Retail outlet in Delhi. In 2018, the Sikkim government inaugurated the Sikkim Organic Market near Gangtok's famous Lall Bazaar, which has outlets put up by farmer cooperatives from across the state.

By 2016, the government and contracted agencies had certified more than 75,000 hectares of land as organic.

After the Sikkim Organic Mission fulfilled its objective, it was renamed the Sikkim Organic Farming Development Agency (SOFDA). "SOFDA now renews the certificate and maintains the organic status of the soil," Samdup said.

Farming doesn't suffice all farming families, farmers do not trust government seeds

Image credits: IndiaSpend/Angana Chakrabarti

Pushplal Sharma on his farm in Sombaria, Sikkim. Sharma uses his own seeds, saying that he does not know whether the government-provided seeds are hybrid or not as they are not labelled, and he does not want to use hybrid seeds on his farm.

Lying in the western part of Sikkim, Soreng district is known for the cultivation of oranges, large cardamom, ginger, turmeric, cherry pepper, babycorn, buckwheat, pulses etc.

Here, 31-year-old Sanchamaya Lepcha's family owns 1 acre (0.40 hectare) of land, which they farm organically with bio-fertiliser made from cow dung. For every 50 kg of potato sowed, Lepcha harvests 200 kg. "I get about Rs 30 per kg for the potatoes…In all, my family is able to earn Rs 2,000-Rs 3,000 a month," she said. Lepcha also works under the Mahatma Gandhi National Rural Employment Guarantee Scheme, the rural jobs programme, and on the fields of another farmer to supplement the family income.

"We use our own seeds, as the seeds from the government cannot be trusted. The seeds they give aren't good, we don't want to take it," she said.

Like Lepcha, 64-year-old Pushpalal Sharma also uses his own seeds, saying that he does not know whether the government-provided seeds are hybrid or not as they are not labelled.

The Sikkim Agricultural, Horticultural Input and Livestock Feed Regulatory Act, 2014, prohibits the use of inorganic agricultural and horticultural inputs. Section 5 of the Act further explains, "organic seed and plant materials shall be used for cultivation but when certified organic seed and plant materials are not available, chemically untreated conventional materials shall be used with the permission of State Government...The use of genetically engineered seeds, pollen, trans-gene plants or plant material is prohibited for cultivation."

The Sikkim government has seed processing units at Majitar and Jorethang.

Samdup said that the government gives hybrid as well as composite seeds (which combine different kinds of varieties), adding that it is not that hybrid varieties cannot sustain in organic environments. "Till date we have not heard that there is increased use of urea. Lot of hybrids have come up, which are highly responsive to the bio-fertiliser," he said, adding that it all depends on the adaptability of the plant.

Sikkim lacks a seed bank which conserves diverse local seeds.

Seed banks are “important for the conservation of the local plants. If we bring all the hybrids from outside, farmers will not end up planting the local plant", said Laxuman Sharma, head of the Department of Horticulture at Sikkim University. “Secondly, it is important because we can use the seeds from the banks to improve the crop through breeding programmes."

For instance, in Odisha, seed banks are trying to revive India's indigenous seed diversity while encouraging farmers to move away from chemical farming.

Unlike Lepcha, Pushpalal Sharma, the farmer, finds farming profitable. The 64-year-old grew up farming on his family-owned land in Sombaria, in Soreng district. After retiring as the deputy director of the education department in Soreng, he took up farming full time on his 2-acre (0.81 hectare) land.

"Last year, we were able to produce 1,200 kg of ginger, which I sold at Rs 500-Rs 800 for a bori (40 kg). I made Rs 10,000 from oranges. After spending money on labour and transportation, it was still profitable." But, he is one of the few educated farmers. "Most people here depend on the government but they are not able to earn much," he said.

Change in policy on transport

Kishor Bhattarai, who owns 2 acres (0.81 hectares) of land, has been employing small farmers since 2013--a few years after he quit his job as a banker and started an NGO, Human Life Reformation & Capacity Building Society.

Bhattarai lauds the previous government for Sikkim's move to organic. “The previous government was serious and was doing all sorts of things--when it started, there was no awareness about organic farming so they prevented the farmers from using inorganic inputs."

In addition to transport subsidies for taking organic goods to the market, in April 2018, the government banned the import of produce from outside.

Bhattarai said that initially there were issues with pricing, since sellers from Siliguri would pass off inorganic produce as organic produce, selling it at cheaper rates. But the government soon intervened. Additionally, to help take produce to markets, and make organic goods more competitive, the government provided transportation, set up rural marketing centres and established organic outlets, he explained. Bhattarai said he would drive the trucks the government provided, go to farmers to collect their produce and take it to the markets.

Now the trucks lie mostly unused. Bhattarai explains why. “The new government is not helping us run the trucks anymore. We don't get the transport subsidies we used to."

We asked S. Anbalagan, chief executive officer of SOFDA, about the government's transport policy for organic crops. “We don't have a policy for transport. Logistics comes as a part of the business," he said, adding that not every aspect can be subsidised.

In the 2019 Assembly elections, the Prem Singh Golay-led Sikkim Krantikari Morcha formed the government, winning against Pawan Chamling's Sikkim Democratic Front. A month after he took office as the Chief Minister, Golay in an interview to the Hindustan Times had said, “The organic farming mission was restricted to only on paper and did not take place at the ground level. We would certainly support the mission but would not force it on the farmers."

We have reached out to Golay's press secretary, Bikash Basnet, for comment on Sikkim's organic mission, and will update the story when we receive a response.

Competition from West Bengal produce

Soreng's farmers transport their produce to markets like the Soreng market, which IndiaSpend visited. Farmers say they are not able to compete with the goods coming from Siliguri in West Bengal.

At the organic stall outside the market, Sunita Rai and Jiwan Rai, who have run the show for five-six years, were sifting through the vegetables. Sunita Rai said that about 50% of the vegetables sold at this Organic Outlet, run by the agriculture department, are locally sourced, while the rest come from Siliguri in West Bengal. “During the season (winter for most vegetables in Sikkim), there are more local vegetables coming in."

Image credits: IndiaSpend/Angana Chakrabarti

A shop for organic goods in Soreng market. Sikkim. Organic crops face competition from cheaper inorganic goods coming in from Siliguri.

"We got cauliflower for Rs 50 and are selling it for Rs 60, the cabbage is for Rs 40 and the farmers get Rs 30, similarly we sell the beans for Rs 70-80, the peas for Rs 80 and the ningro (wild edible fern) for Rs 15-20," she said of the price of organic produce. "Siliguri produce that is not organic is cheaper."

Ashok Kumar Gupta, another shopkeeper at Soreng Market, said that for 10 months in 2018, when the government had restricted the sale of non-organic produce, the market was flooded with organic produce. When asked if the premium rates meant fewer consumers, he said, "People were still buying it. And farmers also profited. Some of the [inorganic] produce coming in goes to waste by the time it gets here," especially in the monsoon as it takes 3.5 hours to get to Soreng from Siliguri.

Like other farmers with small land holdings, Nirmala Das Kami farms on a rented 0.40 ha (1 acre) land. She said she earns Rs 2,000 to Rs 3,000 a week, depending on the season, by selling organic vegetables at the nearby market in Ranipool. Her produce is sold alongside cheaper Siliguri produce and is not packaged or marketed as organic, she said.

It is only in the famous Lall Bazaar in Gangtok that a section of the market has been cordoned off for FPOs to sell only organic produce.

"Despite being the pioneer organic state, the branding and recognition that it got has not helped with the marketing. FPOs have been around in the state since 2017, but we are still like middle-men. We are not given the trader's certificates that would enable us to directly sell the produce," Mahendra Dahal, president of the Sunrise Cooperative Society in Soreng, said.

Anbalagan said that the government cannot restrict competition or stop goods from outside the state. "There is competition but over a period of time, things will normalise. There has to be a premium price for good quality commodities, it will be expensive for being organic."

Laxuman Sharma of Sikkim University concurred that it is not possible to stop crops from outside the state from being sold in Sikkim as Sikkim is not self sufficient. "Production is less because of the nature of land holdings. If you stop vegetables of Siliguri, you cannot feed the people."

Organic certification, rumours of chemical use

In Sikkim, as per the National Programme for Organic Production (NPOP) guidelines, organic certification or scope certificates are issued to groups of farmers called "grower groups". As per the NPOP, producers are required to "undertake organic farming as per the organic standards", change their farm facilities and production methods to comply with standards, produce documentation that includes a detailed farm history, current set-up, operational activities, inputs used etc. and submit an annual production plan and keep farm diaries with day-to-day farming and marketing records.

The 191 grower groups in Sikkim are assessed on the basis of an internal quality management system called the Internal Control System or ICS, as per Sikkim's agricultural department. It is only after the ICS is carried out twice annually by ICS "managers", that the certification body plans an external inspection. The Sikkim State Organic Certification Agency looks after certification in Sikkim, the agriculture department told **IndiaSpend**.

Image credits: IndiaSpend/Angana Chakrabarti

The organic market in Lall Bazaar, Gangtok, Sikkim. The government opened the market in 2018.

The NPOP guidelines say that an internal inspector has to conduct at least two inspections of the grower group (one in growing season of each crop) in the presence of the member of the group or a representative. Earlier, agencies like Mevedir would conduct the internal inspections.

Farmers in Soreng, whom IndiaSpend met, claimed that for the last few years there has been no such inspection. “What is happening now is they are using the data from before to renew the certificates," said Dahal of the Sunrise Cooperative Society. "SIMFED (Sikkim State Cooperative Supply and Marketing Federation) has now been appointed to do this, but they have only done a little soil testing by random sampling."

Dahal added that representatives of Farmer Producer Organisations had also suggested that they be tasked with internal audits since they know more about the area and local farmers, and could cover more ground than SIMFED.

The NPOP guidelines also state that members of grower groups should be provided with the “docket in local languages" that contain details of the process flow (from cultivation to harvest and sales of product including a revision of the standards), farm data sheet, farm diary, prevailing farming system and a schedule on training programmes. But, farmers like Lepcha and Sharma, in Soreng, were unaware that annual internal and external audits were required for organic certification.

“As on this date, farmers are deprived of pesticides, biofertilisers and renewal of certification is not happening (or being communicated to the farmers)... Organic farming was a very innovative idea but that was thought of as Chamling's (the previous government's) mission and it has become aimless now," Bhattarai, the Soreng farmer, said.

Samdup of the department of agriculture denied that certification is not happening as per procedure. “Without the audits, no scope certificates can be issued," he said. Anbalagan of SOFDA added, "We follow process certification, we ensure that farmers follow organic farming principles or practices, and to that extent certificates are issued. Regular soil testing is not a part of certification. It is deemed that if you follow those practices your soil will be healthy."

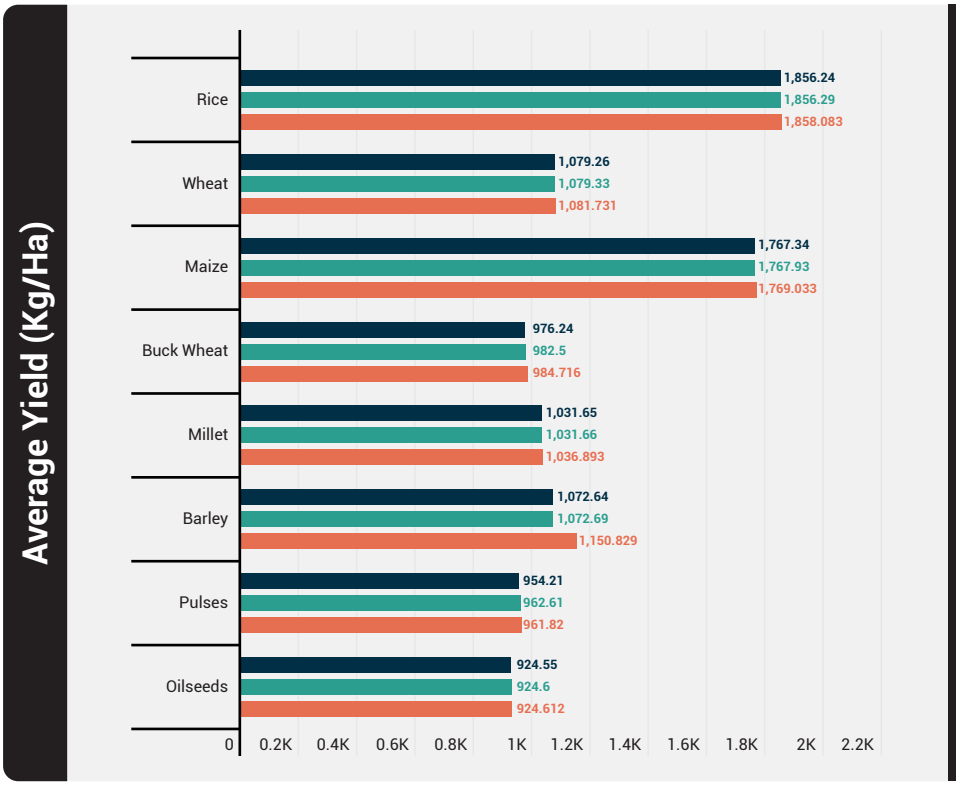
A farmer, who was buying cherry blossoms at the Soreng market, overheard this reporter's conversation with shopkeepers at the market, and interjected, “My neighbour has started using inorganic fertilisers, because there are no sufficient checks and monitoring systems. It has started affecting my farms," he said, asking not to be identified.

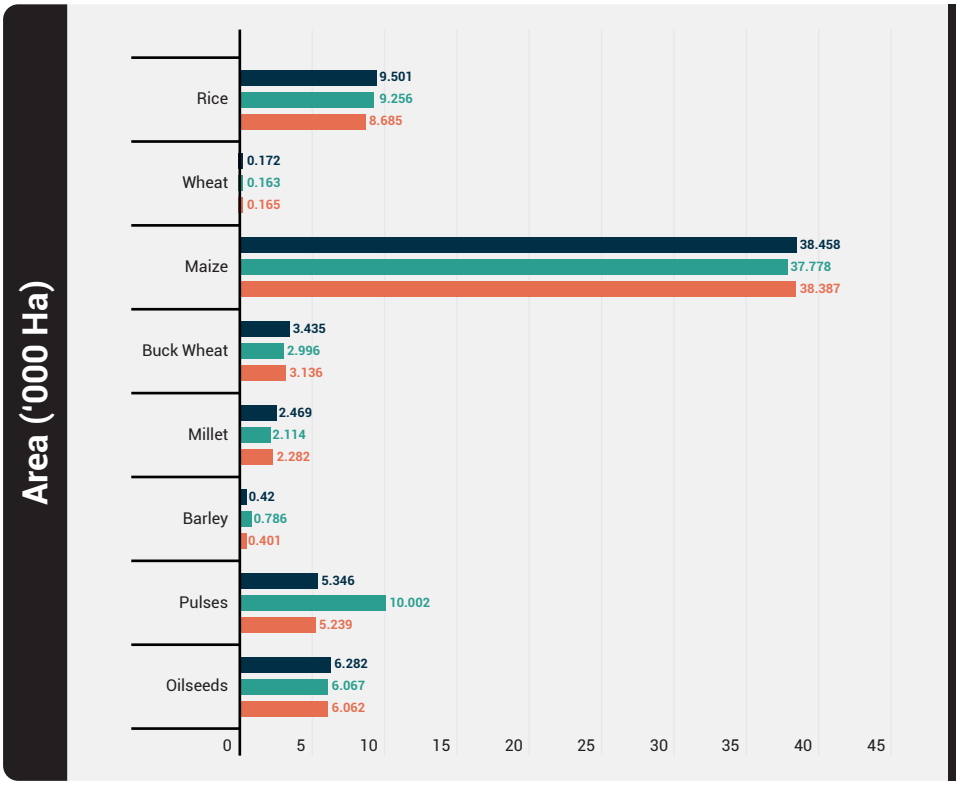
In East Sikkim's Samlik-Marchak village, Kami was planting ginger with two other farmers. She also said they had heard rumours of farmers using inorganic inputs in Radang, a nearby village.

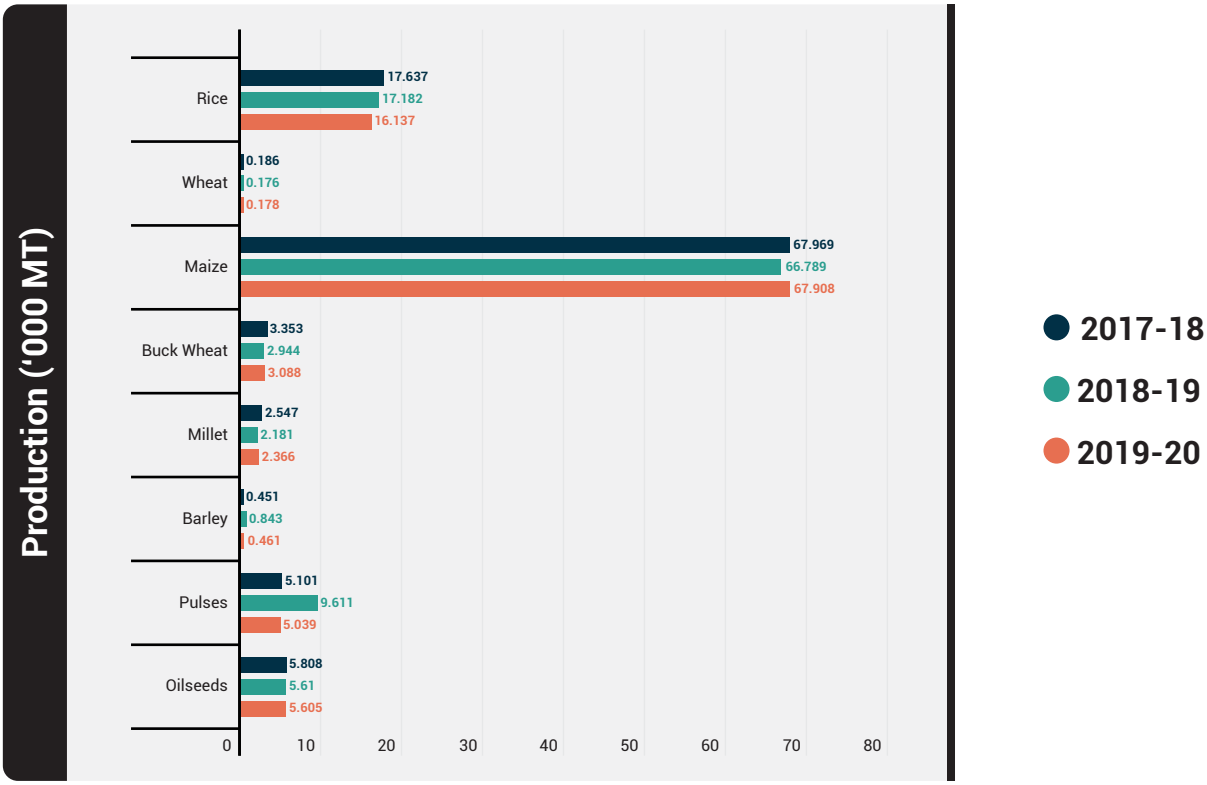
Food security, reducing farmers

According to the Sikkim State Focus Papers 2023-24, except for barley, production fell in the years between 2017 and 2020 for rice, wheat, maize, buck wheat, millet, barley, pulses and oilseeds. This was mainly because of lower land under cultivation, rather than the yield per hectare.

Production of major crops in Sikkim







"We can't sustain without produce coming in from Siliguri. No state can produce each and every commodity. We don't have enough produce," said Samdup.

A second official at the Agricultural Department, who did not want to be named, told IndiaSpend that whatever little produce is exported only goes up to Siliguri in the neighbouring state of West Bengal.

"Sikkim is a small state, we can't compare it (production here) to other states. On top of that the farmers here are too lackadaisical with their approach to farming, they lack motivation," the official added. An example of this, the official added, is the fact that of the total cultivable area in the state, only 50-60% is cultivated. The rest lies fallow.

Samdup said that between 2016 and 2022, the number of farmers reduced from over 66,000 to 65,973, and cultivable land decreased from 76,000 hectares to 75,500 hectares.

Image credits: IndiaSpend/Angana Chakrabarti

Dhanpati Sharma, an organic farmer in Sikkim, points to cucumbers he is growing on his farm. He says that farmers have to be more innovative to profit from organic farming.

"Only 11% of total land here is cultivable, this has also decreased because there has been development, road construction and different infrastructure is coming up," said Laxuman Sharma of the horticulture department at Sikkim University. On the reducing numbers of farmers, he said that many people migrate to towns, and the population's fertility rate is also low, which means a small rural population.

The fertility rate in Sikkim was 1.1 child per woman, according to the National Family Health Survey 2019-2021. According to the 2011 census, Sikkim has a population of over 610,000 of which about 75%, i.e. over 457,000 live in rural areas.

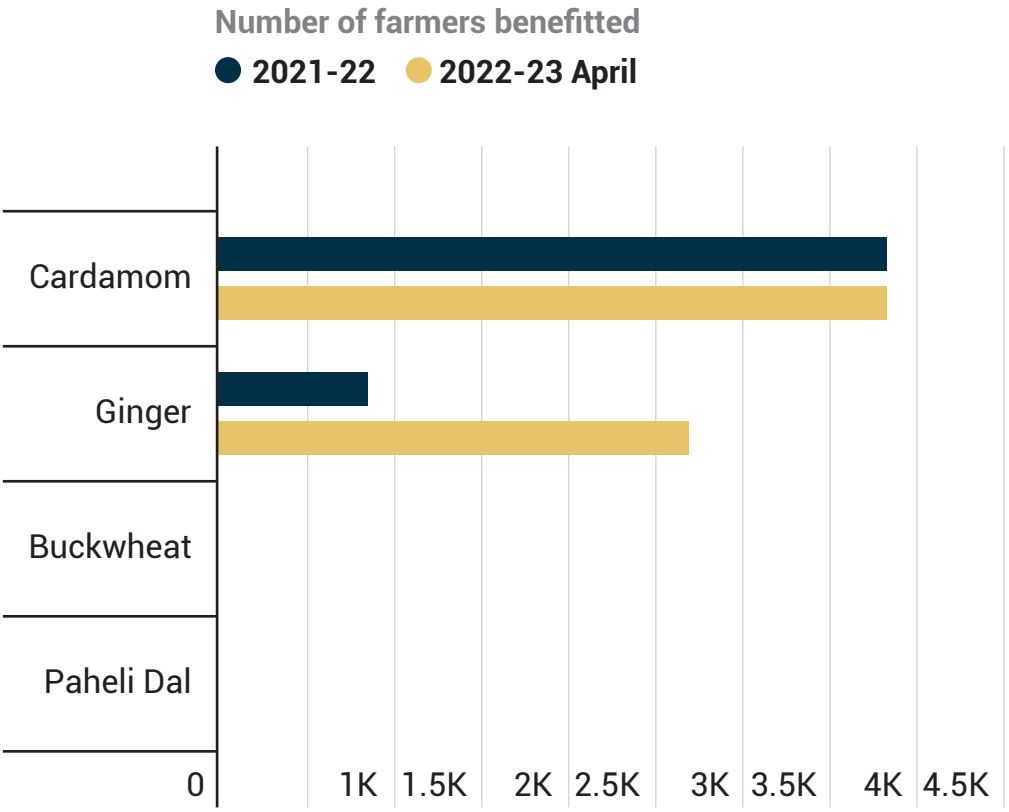
Then there are also challenges of unseasonal weather conditions and wild animals attacking crops, Bhattarai added.

In order to motivate farmers, the government began a production incentive scheme in 2020 for five cash crops--cardamom, ginger, turmeric, orange and buckwheat--to incentivise farmers on production and marketing through the Farmers Producers Organisations. The government later expanded the scheme, which gives an incentive based on the quantity marketed or sold, to other crops.

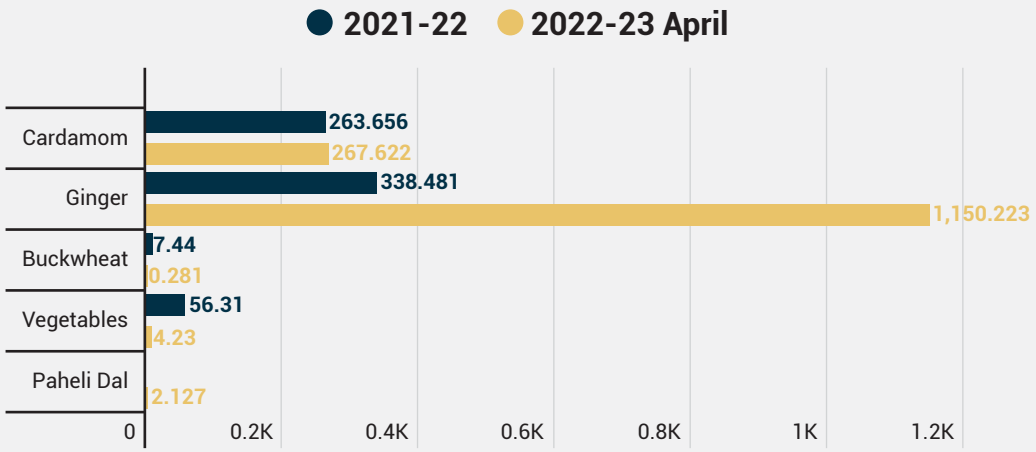
In 2021-22, 4,658 farmers received Rs 17.46 crore as incentive, while in 2022-23, 5,998 farmers received Rs 14.27 crore, as per data provided by SIMFED.

Summary Of Crop Details

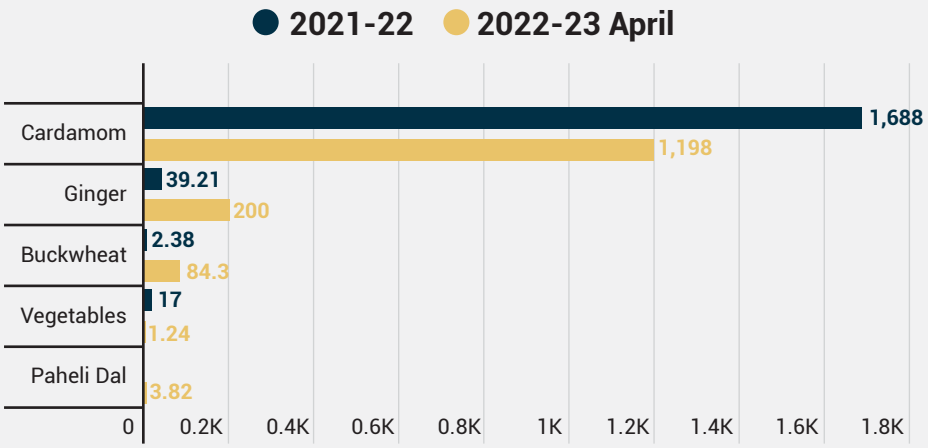
Crops	Incentive (Rs. per Kg)
Cardamom	100
Ginger	20
Buckwheat	10
Vegetables	
Paheli Dal	25



Quantity (MT)



Amount (lakhs)



Sources: Data provided to IndiaSpend by the Sikkim State Cooperative Supply and Marketing Federation

In Assam Lingzey village, about 16 km from Gangtok, farmer Dhanpati Sharma said that the farmers have to do more to profit from organic farming. "The government has done everything but for organic growers we have to do it ourselves. For instance, it is not time for cucumbers; it will come (in the market) after 1.2 months but I have started selling it from now. I got Rs 400 per kg in April at the organic stall, which is much more profitable…The farmers have to use their brains and use such strategies," he said.

The agriculture department official mentioned above, who did not want to be named, conceded that the organic scheme in Sikkim has not significantly helped farmers in terms of their income. "But it has put Sikkim on the global market that is one thing. Tourists come and buy organic, they come here, for most of them it is an organic state. Village tourism has increased a lot."

Organic Farming Empowers Widows In Maharashtra.

Widows of farmers from Vidarbha and Marathwada, who switched to organic farming, experience better income and health. By sowing certain crops, they also challenge superstition.

- By Varsha Torgalkar | 20 Apr, 2023

Image credits: Varsha Torgalkar for IndiaSpend

Kalavati Savandkar, along with 182 other female farmers in Hingoli, Maharashtra, adopted organic farming in 2020-21, and cultivates local varieties of pulses, soybean, cotton and millets, as also vegetables such as spinach, tomato and coriander.

Hingoli: Ever since Kalavati Savandkar, a widow aged 45, adopted organic farming methods on her three acres of farmland, life has changed for the better. For the first time in many years, she earned a profit from her produce. As a bonus, she says, consuming organically grown food has improved her family's health, leading to less frequent hospital visits.

Kalavati also found forest produce growing by itself on her farm. She shows off a recent harvest of about three quintals of turmeric that she has put out to dry on her farm in Tembhurni village, of Vasamat block in Hingoli district, 90 km west of Solapur. She is hopeful that the turmeric will fetch Rs 4,000-6,000 per quintal.

Tulasiram, Kalavati's husband, died by suicide in 2016 as he could not repay a bank loan. He became part of a statistic-Maharashtra registered the highest number of farmer suicides in India in 2019, 2020 and 2021.

Kalavati, along with 182 other female farmers in the area, adopted organic farming in 2020-21, and has been cultivating local varieties of pulses, soybean, cotton and millets, as also vegetables such as spinach, tomato and coriander.

The Mahila Kisan Adhikaar Manch (Makaam) had started this initiative for female farmers, mostly widows of farmers who had died by suicide, sugarcane cutters and marginal farmers from the drought-affected Marathwada and Vidarbha regions of Maharashtra.

“Farmers in both the regions would cultivate cash crops like soybean and cotton,” says Seema Kulkarni, national facilitation team member at Makaam. “Female farmers would not have food to consume at home. The pandemic made women realise this problem, as they had to depend on rations provided by social organisations. Hence, most female farmers agreed to experiment. We did not want them to completely stop cultivating cash crops. They now cultivate 15-25 crops--pulses, millets, vegetables, oilseeds and one main crop (soybean or cotton) for food security."

Many of the women faced initial resistance from their families when they decided to take up organic farming. To surmount this problem, Makaam asked the women to start experimenting on half an acre.

The organisation trained women in methods of producing manure from farm and animal waste, and vermicompost. They also provided training to produce Dashparni Ark (pesticides made using leaves of various trees, cow urine and cow dung).

Once the half-acre experiment began to show signs of success, several women were able to surmount their family's initial objections, and go organic on a larger scale.

Farmers' Suicides in Maharashtra

A study of National Crime Records Bureau (NCRB) data by Makaam found that about 382,000 farmers died by suicide in India between 1995 and 2021. With 87% of these male, more than 320,000 women would have been left to fend for themselves. In Maharashtra, between 1995 and 2021, NCRB data show that 91,998 farmers and agricultural labourers died by suicide.

As many as 5,318 farmers/cultivators and 5,563 agriculture labourers died by suicide in 2021 alone, according to NCRB data. The Marathwada and Vidarbha regions of Maharashtra record the most number of farmer suicides, as per a study on deaths by suicide between 2013 and 2018. Bankruptcy or indebtedness, farming-related issues, family problems, illness and drug abuse were the major reasons for farmer suicides, as per NCRB data from 2013 to 2015.

“Following the death of farmers, their widows often face challenges like lack of land rights, debt, stigma, poor social security, violence and sexual harassment," said Kulkarni. Maharashtra has 2.36 million women-owned land holdings out of a total 15.29 million operational land holdings, as per the latest available Agriculture Census from 2015-16.

Image credits: Varsha Torgalkar for IndiaSpend

Asha Shinde's husband died by suicide seven years ago. Here, she is checking whether her turmeric crop has dried.

Asha Shinde, whose husband died by suicide seven years ago, got half an acre of land in her name. Her two sons were not ready to leave cash crops such as soybean and switch to organic farming. Shinde had a tough time convincing them. “I cultivated pigeon peas as the main crop and green gram and black gram as intercrops. Cowpea, millets, maize and sesame seeds were mixed among other crops to function as pest control. Roselle plant and boru are planted at the borders as a buffer zone," she said.

“Intercropping is the scientific sowing of interdependent crops to increase the quality and productivity of the soil," explains Swati Satpute, member of the state facilitation team at Makaam. “By mixing crops, a population of insects, macro - and micro-organisms is built to strengthen crops, and they also control pests and diseases."

Organic farming in Maharashtra

“To promote organic farming, the Maharashtra government has adopted the Paramparagat Krishi Vikas Yojana (PKKY), a central government-sponsored scheme, in 2016-17," said Sripad Kulkarni, an official of the Agriculture Department of Maharashtra. “60,985 farmers adopted organic farming on 41,012 hectares of land under the scheme. 1,628 groups of farmers are given Rs 10 lakh per group for three years to facilitate the conversion."

The state has also implemented the Dr Panjabrao Deshmukh Organic Farming Mission (PDOFM) to promote the practice since 2018 in six suicide-prone districts of Vidarbha. This programme is separate from PKKY. About 8,337 beneficiaries, under the PDOFM practice organic farming on 13,548 hectares of land across six districts--Akola, Washim, Amravati, Buldhana, Yavatmal and Wardha, said Kulkarni, the agriculture department official.

While the state has started the process of switching to natural farming, Makaam is in early-stage collaborations with agricultural universities to get scientific information about organic farming, research on organic farming and access to seeds, though this is not part of the state scheme as of now.

Image credits: Varsha Torgalkar for IndiaSpend

According to a report by the Centre for Science and Environment (CSE), organic and natural farming are profitable, sustainable and productive. The report underlines the use of organic manure to improve soil structure and enhance soil fertility, and increase microorganisms in the soil. The findings also indicate that the use of organic manure increases the water-holding capacity and porosity of the soil. Besides, nutrients in soil like nitrogen, phosphorus and potassium improve plant and animal biodiversity.

Latabai Narwade, a 50-year-old widow from Kothari village of Hingoli district, says she has observed changes in soil health since she started organic farming two years ago. “Earlier," she says, “the soil would become hard like rock in the summer, and we had to invest a good amount of money for ploughing. Now, the soil remains airy and thin, and we don't have to spend much for ploughing. The soil also absorbs more water, unlike earlier. Even though it rained heavily, the water did not accumulate on my farm this year."

“Organic farming increases organic matter/microorganisms like earthworms in soil and that increases nutrients in soil. For instance, earthworms keep going up and down in soil making it more porous," said Ramanjaneyulu G.V., an agriculture scientist at the Centre for Sustainable Agriculture in Hyderabad. On the other hand, he said, chemicals, such as those in pesticides, kill microorganisms, reducing natural organic matter in the soil.

In the third year since Latabai converted to organic farming on her half-acre land, she harvested 20 kg of yellow gram, 25 kg of black gram, two quintals of cotton and two quintals of turmeric. “Earlier, I would get 3-4 quintal of cotton and 10-12 quintal of turmeric using chemical fertilisers and pesticides. Though my income has been less in these three years, I am in profit because earlier, I had to spend Rs 30,000 per acre for pesticides, fertilisers, seeds and labour. Now I produce my own fertilisers, pesticides and seeds. I have to spend only Rs 10,000 for ploughing and weeding."

Farmers can label their produce as ‘organically grown’ only after completing three years of organic farming, which fetches a premium price in the market. Currently, Latabai sells her extra produce at the market rate for regular produce, and says her produce will fetch a better price from next year.

Enhanced food security

To their surprise, women farmers who had switched to organic farming found wild vegetables growing on their farms. ‘Wild vegetables’ are those that grow automatically without the farmer needing to sow seeds. “Earlier, wild vegetables got killed due to chemical fertilisers and pesticides," says Satpute of Makaam. “Now, with organic manure, they are getting revived. We have observed 19 such vegetables that had earlier become rare, growing in farms in Vidarbha and Marathwada."

Some of these vegetables, she said, are Portulaca Oleracea, known locally as Ghol, and believed to have antibacterial and anti-inflammatory properties, Hibiscus Sabdariffa or Ambadi that is a jute alternative and Celosia Argentea, called Kurdu in the local language, which is high in Vitamin E.

The naturally growing vegetables, together with organically grown food such as pulses and millets, has increased the physical strength and fitness of families, resulting in fewer hospital visits. “As we are now able to eat a variety of vegetables, pulses, millets, my family members have become healthier. No one got affected even with Covid-19 during the pandemic. Earlier my body would ache regularly but now I can work long hours at the farm without body pain," said Kalavati.

Subba Rao, a scientist from the National Institution of Nutrition, India, (NIN), said, “Health benefits of organic food come from lesser or zero exposure to chemicals in fertilisers and pesticides. However, no study has till now established whether the nutritional value of organic food is better than regularly grown food."

The challenges ahead

Image credits: Varsha Torgalkar for IndiaSpend

Women farmers in Hingoli, Maharashtra, are fighting superstition as they grow turmeric which menstruating women are barred from growing. Pictured, organically-grown turmeric drying in the sun on Asha Shinde's farm.

"Problems remain," says Kulkarni of Makaam. "Availability of local varieties of seeds is a major issue. Local varieties of vegetables, pulses and millet had been wiped out. We manage to get seeds and distribute them to farmers. Now farmers have started to produce their own seeds."

"There has also been increased attacks by birds and animals as they get good food in organic farms. Another major problem is that families of some female farmers sold produce without consulting the women, and also sowed another crop with chemical fertilisers. To keep families convinced is still an issue."

Then there is superstition. Young female farmers in the Yavatmal district would not cultivate turmeric, for instance. "We were told that turmeric is auspicious, and that if we touch the plants during our menstruation cycle, the plants will die. But we have started cultivating turmeric for the last three years, and we have been getting good produce," said Vaishali Ghodam.

Organic farming has also increased the credibility of these female farmers. "I have been managing the farm and my home since my husband died," said Shinde, the widow who started organic farming on half an acre of land in Tembhurni village, as she showcased her produce. "Money lenders or relatives would not give loans or help. Now people are ready to invest. As many activists and reporters visit us, locals have started to see our experiment with respect and curiosity. A few farmers have started organic farming after taking our tips."

(Ritika Chadda, an intern with IndiaSpend, contributed to this story.)

Experts Disagree On Chhattisgarh's Cow Dung Scheme As A Push Towards Natural Farming.

The cow dung scheme in the state has been criticised by some for not benefiting those from the scheduled tribes.

- By Gargi Verma | 27 Jan, 2023

Image credits: Gargi Verma

A gothan or cow shelter in Bijapur, set-up in 2020, has only a couple of cows. Herdsmen deposit cow-dung which is then used to create compost, gobar paint and mulch for mushroom production inside the gothan.

Raipur: In Chhattisgarh's Rajankatta village, 68 km from the state capital Raipur, 38-year-old Lakshmi Kanwar starts her day at dawn. Her first task takes her to the family's animal pen, which consists of four bamboo poles holding up a roof thatched with dried palm leaves.

She frees her cows and goats, and collects the dung they leave behind in a straw basket and dumps it in a hole in the ground some distance away from her hut--a noisome task that has to be finished before she has a bath. Such dumping pits are known locally as ghurwa, and it is here that the accumulated dung composts through summer.

"Just before the rains, we burn the weeds growing on our land," Kanwar explains. "We then till the land, and mix in the burnt weeds and the dried compost into the soil. Once the land is prepared, we plant kodo (millets), a little rice, and black lentils. We sell the millet crop, and also some tubers that grow in the bari (kitchen garden)."

Kanwar is one of many farmers belonging to the Kamar tribe, who live in Chhattisgarh's Gariaband district and practice sustenance farming. Those from the scheduled tribes (STs) make up around 30% of the state's population, and live in and around the forests that cover 44% of Chhattisgarh's land area.

"Our ancestors didn't practise farming," says Kanwar's father-in-law Lacchman Kanwar, 60. "We used to be nomadic, settling in any one place only seasonally. Millets are sturdy plants, so back then we would grow millets which, along with forest produce, was our sustenance. It is only over the past few decades that we have adapted to farming completely."

Chief Minister Bhupesh Baghel of the Indian National Congress, who took office in 2018 and identifies himself as the son of a farmer, declared that the focus of his government would be Narwa Garuwa Ghurwa Bari (NGGB), meaning Irrigation channel, cattle, compost and kitchen garden. This also included the construction of gothans or cow shelters. Then in July 2020, the government announced the Godhan Nyay Yojana (which means a scheme that identifies the benefits of a cow) which would ensure that gothans are self-sustaining. The government decided to procure cow dung at Rs 2 per kilogram (kg), which would then be converted to three grades of compost at the gothans by women from self-help groups, and sold at a starting price of Rs 10 per kg.

The scheme was aimed to promote bio-fertilisers and pesticides and encourage natural farming, in a bid to reduce the use of high-cost chemical fertilisers and pesticides and make farming more sustainable.

"Natural farming is an age-old tradition that we had to bring back," said Pradeep Sharma, an aide of Chief Minister Baghel, who is tasked with the planning and execution of the Godhan Nyay Yojana.

Vijendra Ajnabi of the non-governmental organisation Van Adhikar Manch, that works under the international nonprofit Oxfam, points out that those from STs taking to natural farming is an offshoot of their nomadic roots. Cattle is the mainstay of nomadic life, and it has "been an important factor, as the dung and urine can be utilised in many ways, along with herbs, leaves and tree bark found in forests", Ajnabi points out. "From pesticides specific to seasonal flies to a concoction meant to increase soil fertility, tribes have managed without intervention from outside. Granted, this was never farming on a commercial scale--they never felt the need to maximise production."

As part of our ongoing series on natural farming, we visited Chhattisgarh to understand how the Godhan Nyay Yojana, and the shift to natural farming in the state, has fared. You can also read our other stories as part of this series, on why it is difficult for Punjab to move away from artificial chemical-based farming, on women leading the move to natural farming in Andhra Pradesh and seed banks in Odisha.

Farming in Chhattisgarh moved towards high-yielding rice varieties

The Tropic of Cancer runs through Ambikapur district and the state has a tropical climate characterised by hot summers and a monsoon season supportive for agriculture.

A governmental push aimed at making the region self-sustaining saw the yield of rice increase from 4.39 million metric tonnes (MMT) in 2008-09 to 8.05 MMT in 2016-17--the highest recorded in the state. Production fell to 4.93 MMT in 2017-18 but rose to 6.7 MMT in 2019-20 and 7.16 MMT in 2020-21.

The state is colloquially known as the rice bowl of central India for the thousands of rice varieties that, if not preserved, could disappear over time, according to researchers.

Image credits: Gargi Verma

Most women from the family undertake farming activities in natural farming, while men go out for work as daily labourers.

Government estimates indicate that in 2022, paddy was cultivated across 3.3 million hectares in Chhattisgarh. Much of this growth in production is owed to high-yield rice varieties and a significant spike in the use of chemical fertilisers. Pockets of natural farming however exist, particularly in the plateaus of the south and the hilly region to the north and much of this is driven by the ST population, say experts.

"Under the previous BJP [Bharatiya Janata Party] government," said Sharma, "there was a push to maximise production that resulted in chemical fertilisers becoming the go-to for even the smallest farmer. In order to wean people off such cost-intensive methods, we decided to bring back cow dung compost, but in a more accessible and economically feasible way."

A senior BJP leader and an erstwhile member of the state's legislative assembly (MLA) said that the BJP government, when it was formed in 2003, worked to increase the state's low farm productivity and to set up systems for commercialised agriculture where there were none. "Since paddy was a common crop, the BJP ensured that every paddy farmer got their due by working on increasing yield and ensuring accountability in farming through village-level societies. We set up the systems that the Congress government is now using for its schemes."

To push natural farming, and move away from fertilisers that harm the ecology to natural fertilisers like cow dung, the Congress government began the Godhan Nyay Yojana, in 2020, with a budget of Rs 175 crore, for the construction of composting tanks and gothan structures. As many as 2,200 gothans had already been built at this time under the NGGB scheme and 2,800 more were under construction.

According to the budget speech delivered at the assembly by CM Baghel, in 2021, Rs 127 crore was transferred to the bank accounts of dung-sellers and Rs 31.34 crore was paid towards the various SHGs working at the gothans. In a response to a question in the assembly, the state government stated that Rs 928 crore was spent on construction of Gothans under various financial heads by December 2022.

By October 2022, according to government records, they had paid over Rs 340 crore to cow-dung sellers, compost makers and the management committees running the gothans. As of December 2022, the government had approved 11,288 gothans, of which 85% have been constructed and are functioning. The government is procuring dung from 9,631 gothans, said Sharma of the Chhattisgarh government. Of these, 4,372 have become self-sustaining.

Gariaband's Lakshmi Kanwar says the scheme is beneficial for landless farmers, for farmers with no cattle, and for those that are farming after a gap of some years. "If someone can't make their own manure, it is available for purchase," she says. "It is good to ensure that the ease with which farmers used to reach out for chemical fertiliser will now be curbed by this better, more organic product."

Fertiliser shortage and political quarrels

The government's push for bio-fertilisers and natural farming has triggered a political row. The BJP, the principal opposition in the state, has accused the Congress government of a scam. According to former chief minister and BJP leader Raman Singh, the government's numbers are only on paper.

"The only ones benefiting from the scheme are the dairy owners and animal farmers," Singh said. "The cow dung is also watered down and polluted leading to a poor quality compost, which farmers are being forced to buy. Most gothans are either under construction or non-functional. The self-help group women that the government claims to be supporting have also not all been paid."

Government officials deny these allegations. "Very rarely, due to some cases, payments are delayed. This is happening in less than 10% of all the SHGs working at thousands of gothans. To alleviate this issue, we are working on developing the gothans into self-sufficient business models," a senior officer from the Godhan Nyay Yojana department said.

Image credits: Gargi Verma

A wall in a cow shelter. These cow shelters or gothans are imagined to be rural industrial units, and women's self-help groups undertake various activities here, including the conversion of cow dung to waste under the Godhan Nyay Yojana.

Saurabh Singh, BJP MLA from Akaltara constituency, takes these accusations further, and says, "the government created a faux crisis of the chemical fertilisers supplied by the Centre in order to push its cow-dung compost on unsuspecting farmers," and at the same time maligned the central government by blaming them for the fertiliser shortage.

A central government press release dated February 18, 2022 says Chattisgarh had requested 11.75 lakh metric tons (LMT) of chemical fertiliser for the kharif season in 2021, and was allotted 14.44 LMT. For the rabi season in 2021-22, the state had requested 3.61 LMT fertilisers and was allotted 4.11 LMT.

"Despite this, the state government let rakes of fertilisers sit at the railway points for months, not letting the fertilisers be sold at the time when farmers needed them, and instead pushing their compost on them," Singh said. "Those under the farm-debt waiver and registered under societies bore the worst brunt of this. In Chhattisgarh, all farmers mix cow dung in their soil, one way or the other. To make them pay money for what was once free is a scam and is not benefitting anyone."

The ruling Congress party dismisses the allegations as politically motivated, and points out that the Godhan Nyay Yojana has been praised by the RSS [Rashtriya Swayamsevak Sangh] to which the BJP is affiliated. Further, they say that similar schemes have been launched in Jharkhand and Uttar Pradesh after Chhattisgarh's success.

"The BJP can't digest the fact that the Congress government has managed to do what they couldn't do despite being in power for 15 years," Congress party spokesperson Sushil Anand Shukla said. "If they really believed in saving cattle and traditional ways of farming, they would not have messed up the agricultural practices in the state so much. Now that we are doing something productive, they are finding imaginary flaws in it."

But some experts say cow dung sales are a bad idea for natural farming

Politics aside, not everyone is enamoured of the scheme--and the data support some of that disenchantment. When the pandemic hit and cash flows became tight, there was a rush to sell cow dung. However, the purchase of dung appears to have decreased as the number of functioning gothans began to increase. The BBC had reported in October 2022 that between July 2020 and March 2021, the state had bought over 45 lakh quintal of cow-dung. However, between April 2021 and March 2022, the procurement was 21 lakh quintal or less than half of the previous year. The government procured 41.18 lakh quintal of cow dung between December 2021 & December 2022.

Image credits: Gargi Verma

One of the reasons behind the Godhan Nyay Yojana was to reduce stray cattle on the road. But cattle still loiter on roads, including on state and national highways.

Natural farmers in the state find the idea of selling dung risible. According to Om Chauhan (34), a gothan samiti adhyaksh [head of a gothan committee] in Bijapur, the sellers are almost always from the Raut or Yadav communities, and not from the STs. "Even if farmers send their cows to the gothan, there is a communal cattle herder who collects the dung and sells it. The farmer doesn't sell the dung they save at home, because they have multiple uses for it. Right from using it as a plaster layer for the walls and floors of the house, to preparing various solutions to be used as pesticide and in religious rituals, cattle waste is important for the farmer."

"We have never used chemical fertilisers; we have always used cattle waste in various forms," says Kishorilal Thakur (58), a third generation farmer in Dhamtari who grows over 150 varieties of rice and other products like flaxseeds, lentils and vegetables. "We treat our seeds with saptaparni, a solution made by boiling seven types of leaves in cow urine, and we use fresh cow dung while tilling. Compost treated with neem is used as fertiliser."

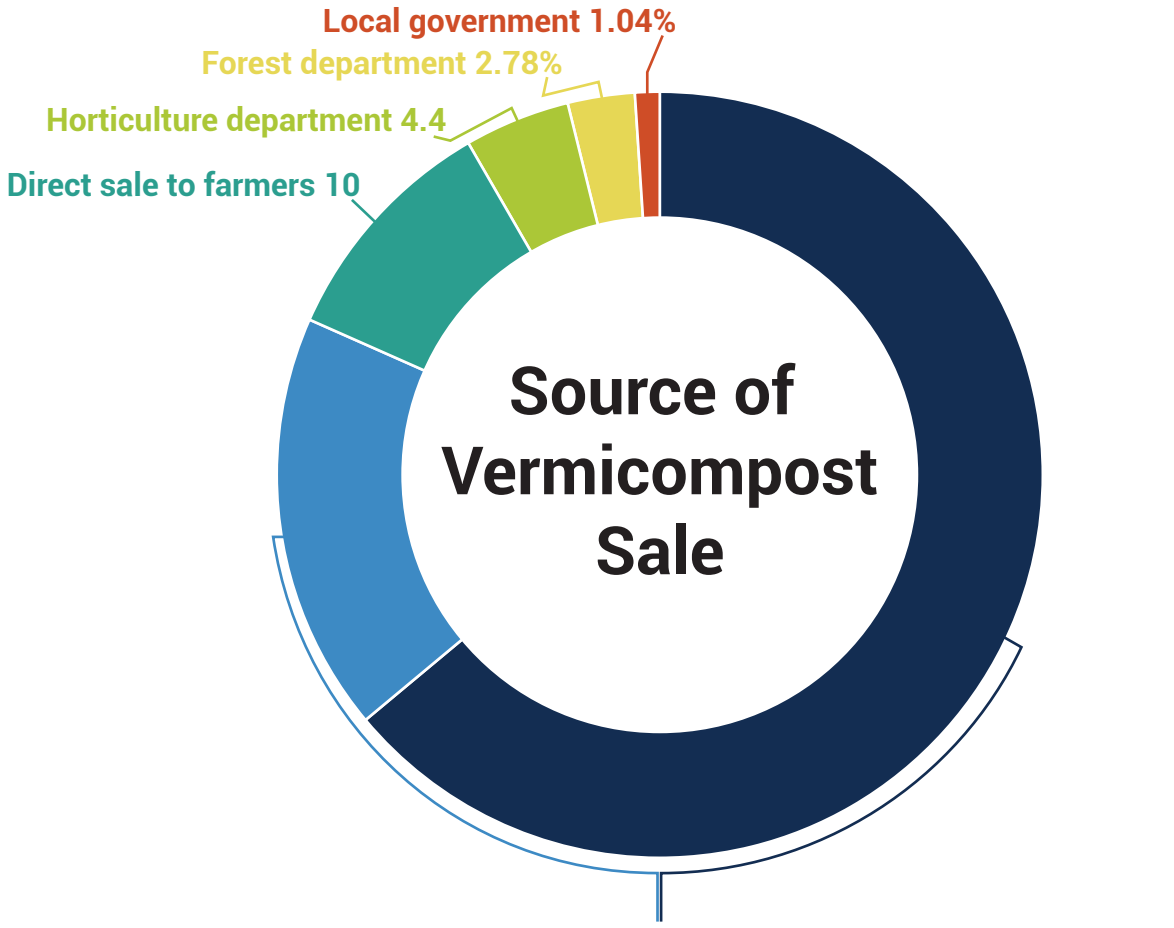
Thakur, who owns over 30 cattle, says he wouldn't dream of selling the waste. "It is the Rauts, the traditional cow herders, that sell cow dung. Any farmer who wants to do non-chemical natural farming will never sell their compost."

Ramgulam Sinha, who heads Prerak, an NGO working on participatory development of marginalised communities, and Siyan Sadan, a farmers' collective that operates an old-age home and encourages natural farming practices, has been working for over three decades in the field of sustainable and natural participatory farming. He believes the scheme is largely ineffective on the ground. "The idea might have been perfect, but the reality on the ground is that not all functional gothans are buying cow-dung, even if villagers want to sell. In fact, it is leading to more socio-economic conflict, as the ones benefiting are mostly from the Yadav or Raut community, as they are traditionally herders, instead of the farmer."

According to government officials, the compost produced at gothans was sold through the established systems for chemical fertilisers. "Just like chemical fertilisers were given to those who had registered with local agro-societies for loan waivers, we started giving them compost," a senior government official explained, requesting anonymity. The major chunk of the sale in December of around 16.4 lakh quintals (64% of the total vermicompost sale), was sold via this medium.

Govt Uses Existing Fertiliser Network To Sell Compost

For the sale of 1,641,731 quintal of vermicompost

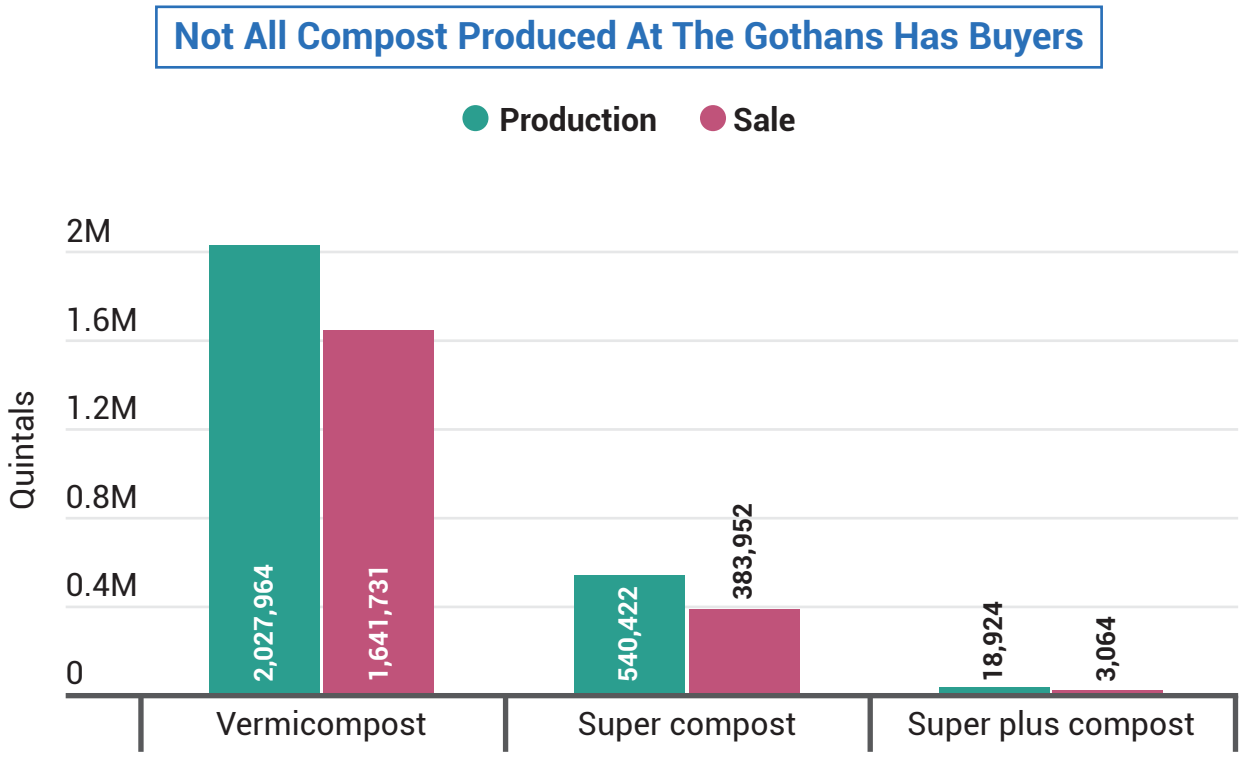


Note: Data until December 15, 2022

Source: https://www.indiaspend.com/h-library/gny-hcm-pptv216122022-1-1.pdf

Many farmers say they don't buy the cow dung compost since they have been making their own for years.

"Our tribal members are not becoming part of the scheme at all and the compost, graded as normal, super and super-plus compost, is not proving to be effective enough for farmers to move away from chemical fertilisers. The government needs to work on saving more traditional practices and crops, like millets. To make gothans successful, more items need to be prepared from the dung and marketed properly," Sinha from Prerak said. Lamps, paint, pots, holi and rangoli colours are also made at the gothans.



Note: Data until December 15, 2022
Source: https://www.indiaspend.com/h-library/gny-hcm-pptv216122022-1-1.pdf

Experts from the farming sector say that while there is debate on the exact nature of natural farming, it is certain that the practice needs zero output from outside the immediate environment of the farm itself. "The top-down method of distributing cow-dung compost is problematic and can't be considered natural as it is the product of an outside intervention," Jacob Nallinethan (60), an agricultural expert working in Chhattisgarh, said.

"Currently, when a tribal gets his land patta, he is registered with a society and gets high-yielding varieties of paddy seeds, encouraging him to go in for commercial farming," said Ajnabi of Van Adhikar Manch. "If the government really wants to save traditional farming and encourage natural farming, the existing schemes need to be tailored to factor in the traditional farming practices."

"This is then further continued by the government only procuring some items under MSP. There is a need to shift the approach and encourage diversity, including a focus on local varieties, if one has to bring a change in ways of farming," adds Ajnabi. "In order to regenerate soil damaged by years of chemical usage, first the locals have to be made aware, and their traditional practices should be respected and brought into the mainstream."

Sharma, aide to the chief minister, is aware that the scheme does not have universal acceptance, and he says the intention was never to reinvent the wheel of natural farming. "There's nothing new in what we are doing, except the scale of it. A need to institutionalise the traditional practice was felt in order to save it, to minimise the nuisance caused by stray cattle, and to ensure that healthy practices take root in the system."

The Kamars of Rajankatta mostly practise subsistence farming; the women spend more time on the farm, while men often work as daily wage workers. "We don't intend to give up the way our ancestors have been farming, even if it means not making more money," says Lakshmi. For them to expand their farming such that it helps them go beyond subsistence while continuing to use natural farming methods, would need an external push, experts say.

While Lakshmi doesn't want her per crop yield to increase, she does want to grow more crops in a year, so that it provides her with financial stability all year round. "What we want from the government is to create a market, so that our produce, which is better in quality, can be sold at a valid price. If the government creates a market for our madia and kutki (kinds of millets), we will go in for a second crop too."

India Must Develop An Ecosystem-Centric Approach For Agriculture.

India's transition to sustainable farming has to be calibrated and orchestrated well, drawing lessons from the successes of India's Green Revolution and the recent crisis in Sri Lanka, says sustainable farming expert P S Vijayshankar.

- Shreehari Paliath | 14 Dec, 2022

Bengaluru: The production-centric intensive agriculture brought about by India's Green Revolution in the 1960s, using high-yielding seeds, fertilisers and high levels of groundwater utilisation, helped India achieve food self-sufficiency by the 1970s, but has created a crisis of depletion of soil health, groundwater, and other natural resources, said P.S. Vijayshankar, an expert on sustainable farming and water resource management. What India needs now is an ecosystem-centric approach to agriculture, which understands that agricultural production draws resources from the ecosystem, and that there are limits to these resources, Vijayshankar told us in an interview about the impacts of industrial agriculture, sustainable agriculture policy and the imperative of sustainable natural resource management.

While the Union government has announced policies and schemes to promote a transition to non-chemical farming, its decision in October 2022 to grant approval for herbicide-tolerant, genetically-modified mustard (GM Mustard) for commercial use reveals confusion in the government's approach to agriculture, said Vijayshankar. As India attempts to bring about a paradigm shift to chemical-free and sustainable agricultural practices, lessons should be drawn from the coherent approach of the Green Revolution, by ensuring adequate research, administrative and financial support for natural farming, said Vijayshankar. India's transition should also be well calibrated, learning from the recent crisis in Sri Lanka, as the abrupt withdrawal of chemical fertilisers can adversely impact yield, and thus farmer's income, he said.

Vijayshankar has lived and worked among Adivasi communities for over 30 years, and is co-founder of Samaj Pragati Sahayog (SPS), a civil society organisation that works on water, sustainable agriculture and livelihoods in Madhya Pradesh and Maharashtra. He was a member of multiple government expert groups, including for the Ministry of Rural Development's Integrated Watershed Management Programme (2009-14) and the Expert Group for the formulation of Madhya Pradesh's State Water Policy (2019). He is also a founding director of Nature Positive Farming and Wholesome Foods Foundation (N+3F), a Bengaluru-based non-profit which promotes sustainable agriculture.

Edited excerpts:

You have written about building farm resilience to manage the climate vulnerability of agriculture, and the need for India to move from the production-centric approach of the Green Revolution, to an ecosystem-centric view of agriculture. Could you elaborate?

A few decades before Independence, the rate of growth of agriculture was low. At the time of Independence, core food producing areas in the west were lost [due to Partition] and food security became a primary concern. In the early 1940s, there was a famine in Bengal. [Due to this], India began a production-centric approach with a focus on food security.

Big dams were constructed and the net sown area increased from 118 million acres [in 1950] to 140 million in 1970, and has stagnated since. Between 1950 and 1960, India's food production increased substantially, by over 30%. But subsequent events in the mid-1960s--two consecutive wars and back-to-back droughts--led to the Green Revolution, which proposed to raise food production and provide food security. It introduced intensive agriculture where more inputs (water, pesticides, high yield seeds) were used to increase yield per unit of land. It apparently became a success within a decade, as India attained self-sufficiency in food [by the 1970s] and food import was stopped. However, this did not provide nutritional security in the country as pervasive undernutrition is prevalent even today.

Production-centric agriculture has created a crisis that impacts soil, groundwater, and natural resources. Soil degradation and depletion of soil health has become a problem. Excessive use of chemical fertilisers and pesticides have also contributed to soil degradation. Now we need to develop an ecosystem-centric approach. The production-centric approach lacks an understanding of the ecosystem. In the ecosystem-centric approach, the production system is seen as a subset of an ecosystem, which draws resources from the ecosystem. It uses the ecosystem as a source of raw material and also dumps waste into it. Any ecosystem has limits and a production-centric view does not recognise this.

The need for a different perspective has been around for nearly half a century, but now there is more recognition of the crisis as stakeholders talk about agroecology.

There have been state-led initiatives in India which attempted to consider agroecology and find alternatives. But institutionally, in terms of access to inputs, markets and other interlinkages in agriculture, much of India's infrastructure is built to carry forward the Green Revolution paradigm and support industrial agriculture. Is it then possible to abandon a production-centric approach in favour of an improved, sustainable form?

The transition will be slow. The Green Revolution was a success on its own terms since it met its objectives of achieving food self-sufficiency and reducing imports. Due to its success, the paradigm is institutionally entrenched and breaking it becomes difficult. All sustainable agriculture initiatives in the last three decades, including organic or natural farming, System of Rice Intensification (SRI), conservation agriculture or Non Pesticide Management (NPM), have received only limited policy support. They have not been scaled up. Their coverage will not be more than 5% of the gross cropped area.

There are institutional constraints because the agricultural research establishment in India is completely oriented towards a production-centric approach. Efforts like natural farming, NPM and other sustainable agriculture methods need research support and support for innovations to be scaled up.

Your organisation SPS has been working on NPM to encourage sustainable agriculture. What has this entailed and how has this progressed?

NPM is a low-cost option for agriculture. Farmers and the government understand the cost aspect of NPM and its reliance on locally available inputs. But agriculture is dynamic and there are new problems that crop up. While being low cost, NPM is also labour-intensive. In a village economy facing labour scarcity, implementing NPM methods has challenges.

There is an acute labour shortage in rural areas. People are not keen to do farm labour. Many people migrate for work, or work on their own small farms. Without support, it is not easy to urge people to move to labour-intensive sustainable agriculture. Innovations like Bio-input Resource Centres, which make organic inputs easily available in the villages, should get popularised. The farmers who work with SPS understand the cost element and are subsistence farmers [who grow food for their own consumption]. But they still need such innovative approaches to stay on their path of sustainable development.

There have been initiatives by various state governments and the Union government to encourage organic and natural farming practices. But an environment ministry committee has recently cleared herbicide-tolerant GM Mustard seeds for commercial introduction, although the Supreme Court is currently hearing petitions against the release of the seeds. Is the GM Mustard decision and the government's support for non-chemical farming divergent?

While pesticides are a problem, herbicides are an even bigger challenge. Labour shortage fosters [its use] because removing weeds is a labour-intensive activity. Herbicides are as harmful as pesticides. The recent controversy about GM Mustard shows that the new variety that has been approved is a herbicide-tolerant variety. The use of such varieties will lead to more intensive use of herbicides, which are already a growing menace.

The government's actions reveal a lot of confusion about its approach to agriculture. They have come out with the National Mission for Natural Farming programme, backed by substantial investments, allocating around Rs 1,500 crore for this natural farming mission. While this is being done, the subsidy on chemical fertilisers continues to grow. It is expected to be around Rs 2.5 lakh crore [$30.3 billion] this year, according to news reports. As I said earlier, intensive use of chemical fertilisers is one of the important reasons for soil degradation and depletion of soil organic carbon. So the goals of these programmes are obviously in conflict.

Based on your experience and experiments with NPM, what inputs does the government seek from you? How does the government think about policy around sustainability?

The government recognises the need to promote low-cost methods. But there is not enough budgetary support for this. The farmers' income support scheme (PM-KISAN; Rs 68,000 crore allocated in 2022-23) that provides Rs 6,000 annually is immensely popular, but it has eroded the agriculture department budget available for other programmes and schemes.

The investment (of Rs 1,500 crore) made for natural farming is a step in the right direction. Some states, for instance Odisha through its Millet Mission promotes alternative [non paddy-wheat] farming, although it may not be about natural farming. State-level initiatives in agriculture are now very significant and there are a number of lessons to be learnt from them.

A paradigm shift is a multi-layered process. Investment is necessary, but there are other factors. Market incentives and public procurement play an important role. Punjab had rainfed cultivation before the colonial British government started growing paddy in an agro-climatically unsuitable region by constructing canals. The high MSP [Minimum Support Price] encourages paddy cultivation. Now, if paddy cultivation is to be relocated to the eastern region of India, a change in support prices and procurement is needed. The system of incentives and subsidies to producers can play a big role in shifting the cropping patterns into ecologically suitable pathways. But today, these are playing a negative role, which needs to be corrected.

Then, we require proper research support and technology for crop management and soil improvement. A systematic body of knowledge does not exist. Market linkages are another challenge. In a mandi [agriculture produce market], there is no differentiation between low cost, non-pesticide produce or produce grown using chemicals. There is no value addition for farmers and they are not convinced by the low cost argument. They will need more tangible incentives.

Organic produce, though niche, has a strong market. In the Green Revolution experience, there are three aspects that worked in its expansion. The effort was consistent; it was targeted for specific areas (it started as Intensive Agriculture Development Programme); it was a multipronged and packaged approach which included seeds, research, marketing, fertilisers etc.

We have to derive from these lessons to focus on areas where the environmental crisis is most severe. This means crop diversification, investing in soil, research and locally appropriate seeds and, most importantly, agricultural extension systems [by which technical advice is provided to farmers about schemes, services, inputs, etc]. It is also very important to note that the progress of the Green Revolution can be attributed to a large extent to a publicly-funded extension system with village level workers (Gram Sewaks). This has become nearly dysfunctional now. We need to revive it.

In an interview this October, ecologist Debal Deb had said that localisation was important for agroecology, and that when a farmer adopts agroecology, it becomes sustainable. What does localisation mean for medium to large farmers who will want to take produce to market? How does it align with the existing production-centric systems of farming?

The localisation that Deb ji talked about is to use locally available or locally appropriate resources that considers the limits of the local ecosystem. He also talks about farmers being in control of the seeds that they grow. There could be a semi-autarchic system where people produce and consume their own food. There is no need for a market, certification or proof of concept. These types of vibrant local food systems are in existence, though we need to see how widespread they are. But they should not be confused with what is called 'default organic' farmers. There are regions where chemical agriculture has not reached. But much of that may not be a matter of choice. The communities may be poor and not have the resources. Localised agriculture may be happening here, but for how long can they be insulated from industrial agriculture is a real question.

We can explore non-market channels through local food systems that directly connect the consumers to producers. In the SPS area, for example, there are farmers who grow wheat for their own consumption and have a small surplus. These farmers are part of our large network of self-help groups (SHGs), which includes groups who are by and large consumers or net buyers of food. Hence, we can have a system of farmer-to-consumer exchange supported by an organisation through the SHG network in a local area. This does not involve a formal market and prices.

In Andhra Pradesh's case, natural farming produce is being sold to Tirumala Tirupati Devasthanam. It is a big and dedicated market. Similarly, there are direct to consumer linkages and fairs outside the mandi system. All this requires effort and dedicated resources to scale up.

These are some ways of visualising localisation with agroecology. I would like to emphasise that there is nothing in an agroecological approach that is intrinsically opposed to markets. In fact, I believe market incentives have a big role in taking agroecology forward.

India's groundwater is a lifeline for agriculture. The country is the largest user of groundwater in the world and groundwater depletion is a major concern. Groundwater extraction in India in 2022, however, was the lowest since 2004, at 60%, according to Central Ground Water Board (CGWB) data. A new assessment methodology was introduced by CGWB in 2017. How do you assess the recent reduction in groundwater extraction?

One of the focuses of the ecosystem-centric approach is to manage water resources. But there are issues with the CGWB assessment of groundwater balance. They follow the process of monitoring wells pre- and post-monsoon, and extraction is assessed separately.

The number of samples of wells monitored by CGWB is small. This may not give a true and representative picture of a country like India, with over 30 million groundwater structures. In a large block, sampling a few wells will not accurately represent regions where groundwater levels are critical or overexploited. So, the 60% groundwater extraction data may be an underestimate.

Secondly, pre- and post-monsoon samples are taken from open wells. The report does not clearly inform if the water from deeper aquifers [water-bearing rock formations] from where borewells source water are sampled. In places like Punjab, where there is high groundwater extraction, open wells do not exist. They are mostly borewells that are medium or deep. This means that if the deeper aquifers are not sampled and only water from shallow ones are checked, the data are bound to be wrong.

Though the CGWB reports mention aquifers, they are often looked at on a regional scale, covering a large area. In places like hard rock areas, the aquifers are local and the scale of mapping will not be commensurate with the scale at which action is to be done. The CGWB's NAQUIM (aquifer mapping project) is a great step in the right direction. However, NAQUIM is not currently informing CGWB's methodology of groundwater balance assessment. Moreover, I feel we must include the perceptions of local communities about the resource in these local assessments of groundwater balance.

The report categorises units as over-exploited, critical, semi-critical, safe and saline. Water quality, in addition to salinity, has problems like presence of fluoride and arsenic which are not considered.

Of the 239 billion cubic metres of groundwater extracted in 2022, as of November 11, 87% is for irrigation. Punjab and Haryana, where farmers have better access to MSP for some crops and have seen the benefits and drawbacks of the Green Revolution, along with Rajasthan, are found to have more than 100% groundwater extraction. Both states may find a change to organic or natural farming difficult. How can the government operationalise a definitive water management policy in agriculture as it plans to support more sustainable methods like organic or natural farming?

Water is a naturally occurring substance in an ecosystem. It is limited in supply. It can undergo qualitative degradation. We must make rational use of water. Punjab was a dry land until the British made public investments in canals and dams. The agroecology does not permit certain types of crops like paddy in that ecosystem.

For decades, there have been discussions about the need to move away from monoculture to diversified cropping systems. Punjab used to grow pulses and cotton. Farmers have been pushed into growing wheat and rice, and supplying to the public procurement system. This has had a negative impact on the groundwater. But the procurement and MSP system is now so entrenched that policy pronouncements have largely remained on paper.

Over the years, the Punjab government has issued notifications and passed laws on postponing paddy transplantation in summer [to ensure that the paddy crop is rain-fed in the monsoon season, and not groundwater-fed]. It has had limited success.

The production-centric view is supported by the procurement process. Paddy and wheat must be given less support in Punjab and other crops must be provided more. But abruptly stopping support can have issues. It must be done in a phased manner so that the eastern belt in India (West Bengal, Chhattisgarh, Jharkhand), where it is more conducive to grow paddy, is encouraged.

The Ukraine-Russia war has led to a global rise in fertiliser prices and the government has approved nearly Rs 52,000 crore as fertiliser subsidy for the winter cropping season. At the same time, the abrupt implementation of the organic farming policy in Sri Lanka, which was undergoing a difficult period economically, resulted in farmer pushback. Against this global backdrop of rising fertiliser prices, Sri Lanka's failed organic farming policy implementation and the repeal of farm laws in India in 2021, how would you look at a pivot away from chemicals-led industrial agriculture to more sustainable agriculture? Can this impact yield and food security?

Non-chemical farming is considered less yielding compared to conventional chemical farming. But there have been reports, like that by the [New Delhi-based research organisation] Centre for Science and Environment, that have contested this claim. Any crop requires a certain amount of nutrients. If chemical fertilisers are suddenly withdrawn, without other ways of adequately supplying nutrients to the plants, then yield will be impacted. Something similar seems to have happened in Sri Lanka, when the move to organic became abrupt.

The transition has to be calibrated and orchestrated well. The option must be given to farmers so that they can provide inputs in an ecologically appropriate way so that yield is not reduced. We need to understand that the soil in many parts of India is depleted in terms of organic matter. Unless we renourish our soil, completely moving away from fertilisers will be difficult. The NPM approach focuses on eliminating chemical pesticides but it also talks about building up soil health and diversifying the cropping system. As we work to improve soil, we will have to judiciously use fertilisers, and stop using pesticides. That's the approach that SPS has followed. The transition will be slow but it is being done by farmers who have stopped chemical inputs.

How Seed Banks In Odisha Are Promoting Organic Farming.

As traditional varieties of seeds are losing ground to hybrid ones, seed banks in Odisha are trying to revive India's indigenous seed diversity while encouraging farmers to move away from chemical farming.

- By Tazeen Qureshy | 23 Nov, 2022

Image credits: Rakesh Roul

Kanchan Behera, a farmer in Raisar, Odisha, displays an indigenous variety of seed stored at the community seed bank.

Nayagarh: For 45-year-old Durjyadhana Jani, a resident of a tiny hamlet, Raisar, about 150 km west of Odisha's capital Bhubaneswar, the last three years have been a déjà vu of sorts. As a child, he had seen his family practise organic farming, but it was replaced by chemical farming when he took up the task over two decades back. For the last three years, he has shunned the use of chemicals and returned to organic farming.

Jani is not alone; the 27 households in the hamlet in Daspalla block in Nayagarh district, dominated by the Kondh tribe, have taken up organic farming. At the centre of this change is a seed bank.

As the name suggests, a 'bank' of seeds-at the village level-stores different varieties of indigenous seeds, and farmers can borrow these seeds promising to return the same amount at the end of the harvest. These seed banks have become instrumental in diversifying the crops grown, as well as in re-introducing chemical-free farming in the area, our reporting found.

Over 70% of Odisha's population is engaged in agriculture and allied sectors, making it primarily an agrarian economy. Organic farming in the state first got a push through the Odisha Organic Policy 2018. Now the aim of the state government's Odisha Agriculture Policy 2020, named Samrudhi (which means progress) is to increase organic farmland in the state from 20,800 hectares in 2020 to 200,000 hectares in 2025. A senior official in the Odisha agricultural department said that they were on track to meet this goal, but did not share data on the current farmland area under organic farming.

In this fifth part of our Natural Farming series, we explore the seed banks of Odisha and the experience of farmers in moving from hybrid to indigenous seed varieties and chemical-free farming.

You can read the rest of the stories in our series https://www.indiaspend.com/natural-farming

A bank for seeds

Image credits: Rakesh Roul

A community seed bank in Raisar village in Odisha's Nayagarh district.

Seeds in earthen pots, and some in plastic boxes, adorn the shelves of a seed bank.

To achieve a diversity of seeds initially, a 'bihan mela' or a seed festival was organised in Gambharikhola village in the same district. Farmers from different areas were invited to come with indigenous seeds and exchange it with others.

The seed bank works like a typical bank, except that seeds replace money.

Every 'transaction' is recorded. "We maintain a register in the seed bank. If we give a farmer 1 kg of seeds, he has to return the same amount after harvest," Behera said. "If he is unable to do so for some reason, he has to return double the quantity as interest the next year."

From 12 varieties in 2019, Raisar villages' seed bank now has 52 types of rice seeds, four types of millets and various vegetables.

Indigenous varieties of rice at the seed bank include Karpurakeli, Kalajeera and Tulasi, several varieties of gram seeds and some local crops such as Janha, Guruchi and Kangu.

Going back to their roots

The concept of using indigenous seeds was not new to most farmers, who had traditional farming knowledge passed down to them for generations. But it was the promise of high yield from chemical farming that made them move away from traditional farming methods.

"Chemical farming promised more yield, and it was obvious that our previous generation farmers opted for it. We were continuing the trend," said Jani. "Who doesn't like more money?"

When a nonprofit, Nirman, which works towards promoting a sustainable ecosystem, introduced the concept of a 'seed bank' in Raisar in 2019, villagers were reluctant to change their farming methods. "When they came to us with the concept of seed bank, we were apprehensive of the yield and rejected the idea," said Jani.

"When asked about the yield, we questioned the villagers whether they had ever calculated the input cost [of chemical farming]," said Kailash Sahoo, who represents Nirman in the area. He said he highlighted the input costs of chemical farming--hybrid seeds, fertilisers, pesticides and sources of irrigation--and asked farmers to compare that to chemical-free farming in which the seeds were local, manure prepared at home and seeds were naturally climate-resistant, meaning they could bear climate vagaries too.

This worked, Sahoo said, and a few farmers agreed to give it a try.

Farmers are now profiting more from traditional farming than chemical-farming, they say. Jani, who would earlier sell his paddy for as low as Rs 1,200 per quintal, is now selling a traditional rice variety for Rs 2,000 a quintal.

"There is a fixed minimum support price for paddy, but most farmers used to sell it to the agents at whatever price they would quote due to a lack of awareness. The mandi system instituted by the administration had a cumbersome process--registration, a token system through which the farmer is given a time-frame of one month to sell his produce in a nearby mandi at the Minimum Support Price--and so the farmers would prefer quick money even if it was less than the minimum price," explained Sahoo. "After switching over to organic farming, for which the demand is high, they sell the crops at a better margin."

Self-consumption has also gone up as villagers are able to grow a variety of vegetables and fruits along with paddy.

"For the hybrid seeds, we were using urea and potash, due to which the soil had lost its porosity. The fertility had also gone down," says Kanchan Behera, a farmer and an active member of the seed bank, who says they now grow local crops as well as gram with the main crop paddy. "Now we are using manure which we prepare ourselves. The soil has become soft and the soil microbes are improving the crop health."

Indigenous seeds coupled with improved soil health also means less maintenance, and traditional varieties need less water than hybrid ones.

"For the last few years, the weather has been fluctuating a lot. Erratic monsoon, unseasonal rain often damages our crops," said Anita Mallick, a farmer. "But the traditional seeds are climate-resilient. If the monsoon is delayed, the crops are not damaged easily. They can survive even with less water."

Women lead

Image credits: Rakesh Roul

Members of the community seed bank in Raisar village at a meeting.

Figures by OXFAM India suggest that around 85% of "economically active" Indian women are engaged in agriculture; yet only 13% own land, making them invisible in the sector. Seed banks in Odisha are trying to bring back women to the fore, and become part of decision-making in farming.

"When we invited them to the meetings while setting up the seed bank in the village, only a few would turn up and sit silently behind the men," said Sahoo. "But in the last three years, the women are first to respond when called for a meeting. They sit in the front while the male members have taken a backseat."

The women agree. "Earlier, the male members would go to the Panchayat office and bring the hybrid seeds for cultivation. Our work was limited to labour-intensive work, such as harvesting and weeding. But now, we tell them what seeds to use and the manure we should put," says Anita of Raisar village.

Gaining popularity

In 2019, the New Indian Express reported that the Directorate of Horticulture, Odisha had drafted a guideline to allocate 250 hectares of land for organic farming in eight districts of the state, including in Nayagarh, with a budgetary allocation of Rs 178 crore in five years.

"In Odisha, seeds are associated with culture," says Dinesh Balam, associate director of WASSAN, a network of civil society organisations, which works with the government, civil societies, researchers and communities to provide ecological security to rainfed areas. For instance, he explained, in the Kalahandi and Rayagada belt, people used to consume little millets, a specific millet variety, during the Nuakhai (agriculture-related festival in Odisha). "Now that the crop is out, people don't use it. So, you are not just conserving a bank, but the culture around it."

Balam says the predominant crop in coastal areas is rice and in the tribal areas, millets, pulses and vegetables, with greater diversity in the rainfed areas. He adds that though there are more seed banks in tribal areas, as various organisations, along with the government, run programmes there, the concept is soon gaining ground. "Several individuals and groups have taken over organic farming in their farmlands."

One of the oldest practitioners of organic farming in the state is a father-daughter duo, who have created a 'food forest' in Odagaon, Nayagarh on a barren land.

The father, late professor Radhammohan, a former information commissioner with the Odisha government, was deeply concerned by the degeneration of the environment and wanted to reverse the trend. In the late 1980s, he began working on the idea of creating a 'food forest' on barren land.

"There was no point he could prove if he tried regenerating a forest on fertile land. So he chose a land which was totally barren--without any grass or trees," says Sabarmatee, his daughter, who now manages the forest. "People said it was an 'asambhav' (impossible) task, but my father wanted to make it 'sambhav' (possible)." He started Sambhav, a nonprofit, which is now a knowledge resource centre for organic farming.

Sabarmatee and her late father 'created' a food forest on barren land in Nayagarh district, Odisha, through organic farming.

The duo brought every seed they could find from the local farmers, including varieties of grass and used to broadcast [scatter] them on land by hand. To meet their water needs, they opted for gully plugging (small check dams to restrict the flow of water) structures and rainwater-harvesting pits. For soil binding, they used vegetative bunds and contour bunding watershed techniques--to stop the overflow of water and improve the soil infiltration. They also store seeds and exchange with farmers and researchers who visit them.

Together, the two of them regenerated almost 90 acres of land, over 11 years, says Sabarmatee, and were conferred with the fourth highest civilian award–the Padma Shri in 2020.

"Now we have around 1,000 species and it is not only inter-species, but also intra-species conservation. So, if I say tomato--you can see tiny tomatoes, chilly tomatoes and black tomatoes. There are 12 to 13 varieties of chilies, lemon varieties which weigh 50 gm and also 2.5 kg. We grow more than 550 varieties of rice, exotic fruits like passion fruit and dragon fruits," says Sabarmatee. "The entire system regenerated ecologically and we never used any chemicals."

Similar instances of organic farming have been reported from across the state from Puri, Kalahandi and Rayagada districts.

Sudam Sahu, a farmer from Bargarh district in Odisha, has conserved over 1,000 varieties of seeds for over two decades. In Balasore district, a couple has set up the largest private seed bank and are conserving over 1,000 varieties of seeds. IndiaSpend had also interviewed ecologist Debal Deb in October 2022, who runs Vrihi, an open folk rice seed bank, and has conserved over 1,400 landraces and shared the seeds with nearly 8,000 farmers for free.

Market challenges

Several challenges remain with chemical-free farming.

Schemes like Paramparagat Krishi Vikas Yojana (PKVY), to 'produce agricultural products free from chemicals and pesticides by adopting eco- friendly, low- cost technologies', and the National Food Security Mission, which subsidises bio-fertilisers for organic farming, and provides funding to Farmer Producer Organisations for organic certification, are not enough, say experts. In PKVY, which promotes cluster-based organic farming, individual farmers get financial assistance of Rs 50,000 per hectare for three years along with training, certification and marketing benefits. But there is a catch.

"Since the green revolution in the 1960s, the government has extended support to chemical inputs, high-yielding and hybrid seeds and machines," says Sabarmatee. "But when you talk about schemes for organic farming, you say it is for three years? For the last 70 years or so, you have been promoting one concept, but now you want a change in three years. How is it possible?"

She adds, "the schemes have been introduced very recently, so the intention is good but the implementation is key because you are asking the people to do the complete opposite."

The administration says the switch might be gradual but is headed in a positive direction.

"In Odisha, we are working with the farmers closely and encouraging them to adopt organic methods," said Arabinda Padhee, Principal Secretary in the Department of Agriculture and Farmers' Empowerment and Department of Handloom, Textiles and Handicrafts, for the Odisha state government.

He said that the government propagates diversification of the cropping system and asks the farmers to incorporate 'Rice Fallow Management' in which farmers are encouraged to grow short-duration pulses or nitrogen-fixing crops after the paddy harvest. He added: "When you switch over from chemical farming, it is expected that there will be loss in yield for at least three years and then become as usual. So, the schemes are designed in such a way."

Sabarmatee also suggests making consumers aware about what is safe for eating to grow the demand for chemical-free food, as well as developing a "proper market" for organic products, from the grassroot to cosmopolitan cities. "Our educational institutions, like agricultural universities should introduce a very good curriculum with good understanding so that we prepare a human resource base which will take it [chemical-free farming] forward."

When I Share A Seed, It Reinstates A Dying Culture.

Until the farmer is totally independent of all external inputs, including machinery, the farm is not sustainable, says ecologist Debal Deb.

- Shreehari Paliath | 26 Oct, 2022

Bengaluru: For nearly three decades, ecologist and farmer-conservator Debal Deb has been conserving, cultivating and sharing native rice varieties and seeds. Many varieties that he has rescued over the years are critically endangered: They are only grown in a small number of farms--often on just one farm.

"I have rescued 35 such critically endangered varieties in Koraput district of Odisha and 15 native varieties in Nagaland," said Deb. Over the years, he has seen the loss of native varieties when the passing of a farmer meant that a native seed variety became extinct.

It is estimated that India had more than 100,000 rice landraces (native rice varieties) until the rise of the Green Revolution in the 1970s, after which the number of varieties declined. Deb's quest to preserve and cultivate rice landraces and native seeds led to the creation of Basudha, a farm roughly the size of a football field located in southern Odisha's Rayagada district. He is now conserving over 1,400 landraces and has shared the seeds with nearly 8000 farmers for free. By the time he had started Basudha in 2001, Vrihi, an open folk rice seed bank that Deb founded, was nearly half a decade old.

"The indigenous crop diversity is a result of human creative intervention and not created by God or by natural selection," said Deb. "It is part of our human heritage." Abdandoning such a system that has existed for generations will have consequences such as indebtedness, distress and suicides, he added.

In an interview, Deb speaks about farmers' autonomy, the importance of native seeds to material and food culture, and the government's approach to sustainable agriculture.

Edited excerpts:

You mention an incident in the late 1990s when a rice landrace went extinct after the farmer who grew it passed away. As a researcher, and someone who conserves native seeds, how routine are such events in your experience?

All over the country, farmers have abandoned native varieties (of rice) over the years. Even if the farmer continues, their children do not want to. This has been the story of farming in India for several decades. The varieties that I had collected decades ago are no longer being cultivated. In West Bengal, I had collected more than 400, but now there may be no more than 150 left. My collection is possibly the last.

Agni sal [a native rice variety] that I had collected from a farmer in Purulia district in the late 1990s went extinct because no one grows it anymore. There are varieties which are now being grown by single farmers. These are critically endangered because they are not only growing in a small number of farms, but grown on just one farm. I have rescued 35 such critically endangered varieties in Koraput district of Odisha and 15 native varieties in Nagaland.

How do you come to know about these endangered varieties?

I am always on the move and meeting farmers in different districts. I collect these field varieties as I travel and meet farmers in the villages and interact with them. I document it through my travels. There is no other option.

There is an increasing focus on climate change and the larger challenges of food security. You have been working on indigenous farming and with the Adivasi communities for decades. What role is the government playing in encouraging agroecology, and how do you see the government's initiatives around organic and natural farming?

The government is not supporting agroecology. So far, there is no support. We should not equate 'organic' and 'natural farming' tags with agroecology. Organic farming is essentially zero chemicals and pesticides. Although agroecology has to include all this, it is much more.

Most of the organic farmers do not use pesticides. But many use urea and DAP (Di-ammonium Phosphate, a fertiliser). Or they combine urea with cow dung and manure. They also employ machinery that consumes fossil fuel. That is not agroecology. It has to be zero synthetic herbicides, pesticides, fertilisers. In addition, it must also have a multi-species, multi-variety [crop] ecosystem. The government is not supporting this. In Sri Lanka too, it was a similar case. It was supporting monocultures on organic manures, not agroecology.

Agroecology also has an important component: localisation. All material inputs has to be from the local community, and the produce to be consumed within the community, the market would be local producers' market. The seeds must be in the farmer's hands, and in a community seeds bank.

There are many agroecological farms in the country, but they are not supported by the government.

The Andhra Pradesh government launched the AP Community Managed Natural Farming (APCNF). It hopes to encourage millions of farmers to transition to natural farming in the state and eliminate use of industrial chemicals in farming. Sikkim is reported to be a 100% organic state. Your comments on such initiatives by states to transition to sustainable farming methods?

I begin with the Sikkim example. Almost all the vegetables grown in Sikkim are procured from external supply of seeds. Almost all of the tomatoes and potatoes are hybrid, grown from corporate seeds, supplied by a few private seed companies. Alongside, I have witnessed a rapid loss of local crop landraces and traditional agricultural knowledge systems. Crops inappropriate to the local soil and climatic conditions are being cultivated, and the traditional agroecosystem management, involving the local flora, is forgotten. Farmers have forgotten the use of native nitrogen fixing plants, which they eliminate as "weeds". This system is against agroecology, and therefore unsustainable.

The same applies to APCNF. When a community has forgotten their traditional knowledge base associated with the traditional crop varieties, one may not expect that a group of individuals coming together will be able to recuperate the farm fertility and sustainability of production. Even when the seeds of different varieties of rice or millets are available, most farmers have forgotten their ancestral knowledge of how and when to sow them, which other crops to grow along with, or after a given crop, and how to employ certain plants and animals to enhance sustainability, with zero external input.

Secondly, in the absence of assured MSP of the farm produce, local farmer markets are the best resort, but that is also usurped by intermediaries, who sweep out all excess produce and profit.

Third, the village communities are being disintegrated, so individual profit maximisation supersedes the community interest. Generally, everyone is earnest to get an immediate, short term gain, here and now, at the cost of long term productivity. In a situation where an individual's motorbike is more desirable than everyone having a bicycle, agriculture is not sustainable in the long run.

What are the issues with the Union government's initiative to support natural farming? How do you create a sustainable alternative through agroecology?

Agroecology itself is sustainable. When a farmer adopts agroecology, it becomes sustainable. The meaning of sustainability in agriculture or any other production system means that there should be zero external inputs. Fertilisers, pesticides, seeds must not come from outside--be it NGO, government or seed companies. The farmer should not depend on bank loans or government aid or microcredits from NGOs for financing farming. Until the farmer is totally independent of all external inputs, including machinery, the farm is not sustainable.

On the one hand, we are asking farmers to do natural farming but the seeds come from corporations or governments, which can be hybrid seeds. There is machinery including a seeder or harvester machine, and pump sets, running on fossil fuel, and each machine part as well as the fuel must rely on external supply. This is not sustainability.

So, farmers must have autonomy over decisions…

The farmers' sovereignty over land, seeds and means of production requires a community of farmers like it existed for thousands of years [before agricultural industrialisation]. Farmers markets will allow them to decide the price of the produce that is not influenced by national or regional market prices. There should be no middleman or agency determining the price. Such a pricing system decided by mutual agreement of producers and consumers is happening in Transition Towns in Europe, and some farmer markets on the West Coast of the US.

There has been scepticism around traditional farming practices, particularly about it being unscientific and the inability to produce enough yield compared to high-yielding variety (HYV) of seeds. Government institutions have pushed for HYV and you have mentioned that native varieties have suffered because of the mindset. How do you respond to concerns about food security due to the transition to organic and natural farming?

Let's not discuss the dead issue of productivity of traditional farming versus industrial farming. A plethora of publications, including FAO's documents, and my own, have amply demonstrated that "yield deficit" of traditional crops and farming systems is a myth. Of course the institutional inertia to accept reality over prejudices is the major issue.

I started my journey alone and continue to do so. I do not get any support from the government, so it does not matter to me if they change their mindset or not. The government's decisions may not impact farmers, who still have some autonomy. Let me give you an example, albeit a negative one. The government had banned Bt Brinjal seeds [in 2010]. But some farmers in Punjab and Maharashtra are smuggling the seeds from Bangladesh. So the ban did not affect their decision to grow Bt Brinjal. It all depends on the farmer.

The Union government has an organic farming policy that is more than a decade old and so have some states. But most of the farmers continue with synthetic chemical-based agriculture. In the case of the farmer who grew Agni sal, the government did not send authorities to stop him. It was the personal decision of farmers and their children to continue or discontinue growing this crop variety or that. Ultimately it is the efficacy of the farming in their farm that determines the state of organic farming or indigenous cropping system. Policy may create a conducive environment, but even in its absence millions of farmers have been doing traditional farming.

In your opinion, are such decisions on farming independently and traditionally more prevalent in indigenous communities, compared to states like Punjab or Haryana, where the agriculture based on the Green Revolution paradigm is stronger?

Generally, I feel that northern India is in the clutches of what I call 'developmentality', where all activities are based on individual benefit maximisation. It is based on a European or US concept of development along the industrial path, at the expense of the ecosystem and of social health. We have accepted that as a normative goal of society and individuals. It is now prevalent in India, particularly in northern India. Most farmers will not go for traditional varieties unless there is a promise of higher price for produce.

Majority of organic farmers are farming in the hope of premium market prices. They will stop if they do not get [good prices] because there is no ideology behind it. It is based on profits and not the kind of agroecology we should seek.

In some belts in the south, including south of Odisha, there are farmers who are not concerned about the market price. They use it for self consumption because they like the aroma and taste of a particular variety of rice or millet. Of course they need money, but they primarily grow the staple for their own consumption. This sort of subsistence does not increase GDP [gross domestic product] so the government is not interested. So if you are doing traditional rice or crop cultivation, it does not entail industrial output, and does not interest the government.

But pre-industrial [food] production systems still persist and it is those farmers who keep traditional varieties alive. Their numbers are shrinking in indigenous communities because their children, exposed to techno-urban modernity, are not interested anymore.

Can you please explain your engagement through Basudha with rural youth in sustaining your initiative of conserving more than 1,400 varieties of rice? What does it take and what interest do you see from the communities you work with?

When you make a personal connection with the communities and show them that you are not there to make profit, they respect you and see the value of your work. My approach is to express gratitude to the traditional farmers on behalf of the nation for conserving native varieties [of crops].

I also share information I access through my research on health benefits of the seeds. Then they see value beyond the market value of a crop. It also helps in reconnecting cultural aspects which go beyond monetary or nutritional value.

A village may have stopped a ceremony because they lost an aromatic variety of rice. Several delicacies have eventually been forgotten in Bengal on both sides of the international border, just because the appropriate rice variety was lost. A special type of idli is no longer available in Tamil Nadu and Kerala because a couple of special rice varieties are extinct from farm fields. Ceremonies associated with those delicacies also die out.

Once we lose a variety, we lose a particular taste or aroma which is specific to a region and community. The material culture, of which food culture is a part, is intricately related to biodiversity and mutually dependent. One affects the other. When I share a seed, it reinstates a dying culture. It is true in other parts of the country too.

The EU's Farm To Fork strategy looks to reduce the use and risk of chemical and hazardous pesticides by 50% by 2030, use of fertilisers by 20%, and bring 25% of total farmland under organic farming by 2030. There have also been reports on the potential increase in greenhouse gas (GHG) emissions (in England and Wales) due to transition to 100% organic farming. Your comments on the global focus on transitioning to agroecological alternatives, and the potential increase in emissions?

I think it is ludicrous to think that there will be an increase in emissions from organic farming, any more than industrial farming. In conventional chemical farming, in growing paddy, there's a lot of water utilisation. Flooding the paddy is the conventional norm. The submerged urea emits GHGs. When modern farmers of northern India burn the rice stubble, they of course cause severe pollution, but that is not the fault of rice farming. Over the history of rice cultivation in the past millennia, no one ever thought of burning the stubble after harvest. The dryland farmers all over the country, until just 70 years ago, never used pump irrigation, used plenty of dry compost, and employed crop rotation technique--emitting no GHG.

The fossil fuels are burned for machinery and transportation in modern production systems. Now, if you compare it to dry compost or mulching, there is almost no emission of methane. Not all farmers use wet compost. This is the science of agroecology.

Most of the people are unaware and focus on the term 'organic farming'. But what type of organic farming and what are its components? No one seems to be discussing it. If there is a transition to agroecology, it will not increase emissions. Agroecology is not new. It has been practised for thousands of years until the advent of the Green Revolution in India in the 1960s which demanded the use of synthetic chemicals and fossil fuels. If you look at the historical perspective, industrial agriculture is the alternative and not agroecology.

Global climate change is a reality. It affects farmers, particularly the unseasonal rains and droughts. In this climate, there is concern about how we will produce our food. Industrial class has mostly created this problem.

We have to grow varieties of crops which are resilient to climate vagaries like frequent floods, long spells of drought, unseasonal rains, soil salinity. Traditional varieties of crops are the only solution and the commonsensical approach.

Farmers are dealing with high indebtedness, farm distress and migration. You talk about independent or individual farmers already following agroecology, but can it scale up?

The root cause of the problem is consumerism. There is a constant demand to accumulate more. There are many people [and communities] in southern Odisha and Jharkhand who do not own gadgets to survive and are happy without it. Hundreds of indigenous farmers in Rayagada district, Koraput district, and Malkangiri district in Odisha, still do not have a cell phone, TV and pump set. But then in some places people have forgotten or lost their indigenous culture due to the pressure of modernisation.

The indigenous crop diversity is a result of human creative intervention and not created by God or by natural selection. It is part of our human heritage. If we abandon it there are consequences like indebtedness, distress and suicides. Every year there is bumper production [of crops] but farm prices are not adequate and farmers remain poor.

Then, there is something I refer to as 'semantic imperialism'. For example, a company may come in and say that your crop is not high yielding but that their certified crop variety is high yielding. So the traditional farmer, who is already growing a high yielding variety, abandons it. By their [corporate] definition, all the traditional ones are low yielding. I have seeds in my accession that yield higher than the HYV, but farmers do not value them because they are not labelled as HYV. Semantically it is accepted that all varieties other than the HYV are low yielding.

Farmers or producers markets are needed to ensure that external factors do not impact them. There are transition towns in Europe which show that people are resisting market forces. But this is not happening here. The middle classes in India do not talk about such markets. We talk about expensive organic produce in supermarkets because it is marketed better than farmers [can market]. The only hope is the indigenous producers themselves. It is happening independent of industrial and governmental support.

What can farmers who are transitioning to traditional farming or other sustainable farming methods do in rural or semi-rural regions which are impacted by industrialisation, market forces and price fluctuations? How can they sustain without intervention by governments, especially if farmers markets and transition towns are not present as is the case in most parts of the country?

It is a simple question, difficult to answer. My direct answer is: an immediate transition to agroecology. This is easier said than done, because agroecology is not successful when just one or two farmers in the entire village make this transition. It requires the community of conscious individuals, who aspire to build a better future, a more sustainable society for their children and grandchildren. The prospect of fetching a higher price for the produce, leading to the ownership of a car or an air conditioned house, can motivate an individual to adopt organic farming. But that does not entail a transition to agroecology and sustainability for the whole rural or peri-urban producer community.

In my experience, the most urgent requirement is a change in the ethos of the people. 'Enoughness, rather than moreness' as Tim Bender put it, is the basis of this worldview, which is alive in the tradition of all indigenous cultures and religious belief systems. In India, this world view is not outlandish. The Upanishads, the teachings of Jain saints, [Guru] Nanak, Kabir and the Bauls, all preach against accumulation and consumerist lust, against the desire to acquire more than what you need. If that craving for "beyond the needs" were in place, a rice or millet farmer would not be driven to buy Bt cotton seeds and herbicides and get trapped in the perpetual debt cycle.

The modern farmer abandons the heirloom seeds, and borrows money to invest in buying hybrid seeds and agrochemicals every year, to grow hybrid tomato or potato, for example. And then, he is unable to sell his bumper produce at even a break-even price. This is exactly what happens frequently in all states. Maharashtra witnessed the bumper yield of brinjals, sold at 20 paise per kg, West Bengal saw potatoes sold at 20 paise per kg within the past decade.

Indebtedness and hunger of the producer's family is commonplace in the modern agriculture system, because modernisation of agriculture entails a bounty for seeds corporations and speculators, with the government bent on "free market" to shrug off the welfare state's responsibilities. Farmers cannot escape from this modernity until they repudiate the modern industrial system of production and consumption. Localisation of the production and distribution system is possible only when the community and the communitarian ethos are reinstated. Wherever the seed commons, the resource commons, and local producer market have been established, the corporate usurpation of land and the exploitation of people have failed. Wherever the community welfare is valued over the individual profit seeking interest, sustainability has been attained. Cuba and La Via Campesina in Mesoamerica are vivid examples.

How Women Farmers Are Helping Transition To Natural Farming In Andhra Pradesh.

The state's natural farming programme must ensure that women are empowered as they move to cleaner, greener farming, and do not just become a means to an end.

- By Shreehari Paliath | 6 Oct, 2022

Image credits: IndiaSpend/Shreehari Paliath

P. Mary, a Dalit farmer on her farm in Andhra Pradesh's Pulivendula in August 2022. She has been farming using natural methods since 2019, which has increased her income.

Pulivendula (Andhra Pradesh) and Bengaluru: In front of her modest one-room house under the shadow of a neem tree, P. Mary cuddles her six-month-old twin grandchildren. As the heat abates and the breeze picks up, Mary, who is in her 40s, along with husband Manohar and youngest daughter Sreelekha, walk over to the adjacent acre of land, past rows of banana saplings they had planted a few weeks earlier.

Alongside serried lines of black drip-irrigation pipes, they begin sowing tomato and chilli seeds in long rows after coating them with beejamrutham, literally nectar for the seeds--a concoction of soil, cow dung, cow urine and lime.

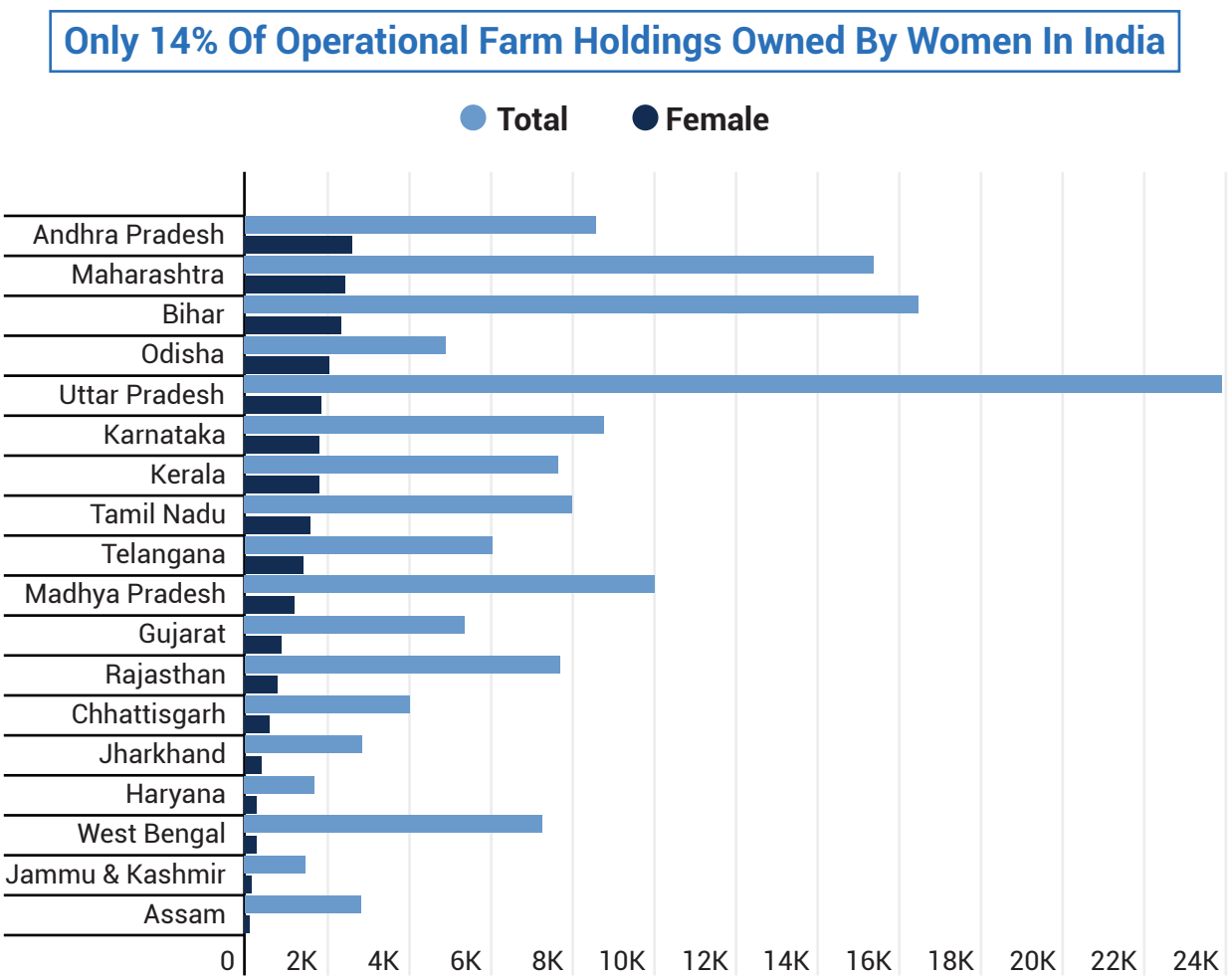
Since 2019 Mary and her family, who live in YSR district's (earlier Kadapa) Vemula mandal (an administrative unit), have transitioned to natural farming. Earlier, they mostly grew cotton and groundnuts with chemical inputs. "The ground has [now] become soft, the produce stays fresh, and it is a healthier option," says Mary, who has been farming for over 25 years.

Mary is one among the 6 million farmers that Andhra Pradesh plans to move to natural farming by 2031. The Andhra Pradesh Community Managed Natural Farming (APCNF) is implemented by the Rythu Sadhikara Samstha (RySS), a not-for-profit farmers' empowerment group.

The intent is to manage farm distress by reducing the high cost of cultivation that leads to indebtedness, while also supporting remunerative prices and improving crop yields, and producing safer, healthier food for consumption. As of August 2022, APCNF had covered more than 3,700 gram panchayats, and plans to reach all 13,371 panchayats in AP in the next three years.

Women do most of the farm work

Across India, it is a truism that men own the land, while the women do the work. Of the 20.4 million operational holdings owned by women in India, AP accounts for the highest proportion at 12.6%, as reported by the 2015-16 Agriculture Census. Twelve states reported 92% of the farm holdings owned by women in India.



Source: https://agcensus.nic.in/document/agcen1516/ac_1516_report_final-220221.pdf

More than three in four women in rural India are engaged in agriculture, as compared to 55% of men.

"There is a high level of women's participation in farming," said Seema Kulkarni, member of the national facilitation team at Mahila Kisan Adhikar Manch (MAKAAM), an informal forum working to secure rights of women farmers in India. "But it is seen as unpaid or unaccounted labour. Paid opportunities in farming seem to be declining, but participation is high."

"Men are mostly supervising, [while] women farmers are completely involved in farming," said T. Pranitha, an Institution Building (IB) coordinator at RySS, who works closely with the farming community and helps identify issues and solutions as they move to natural farming.

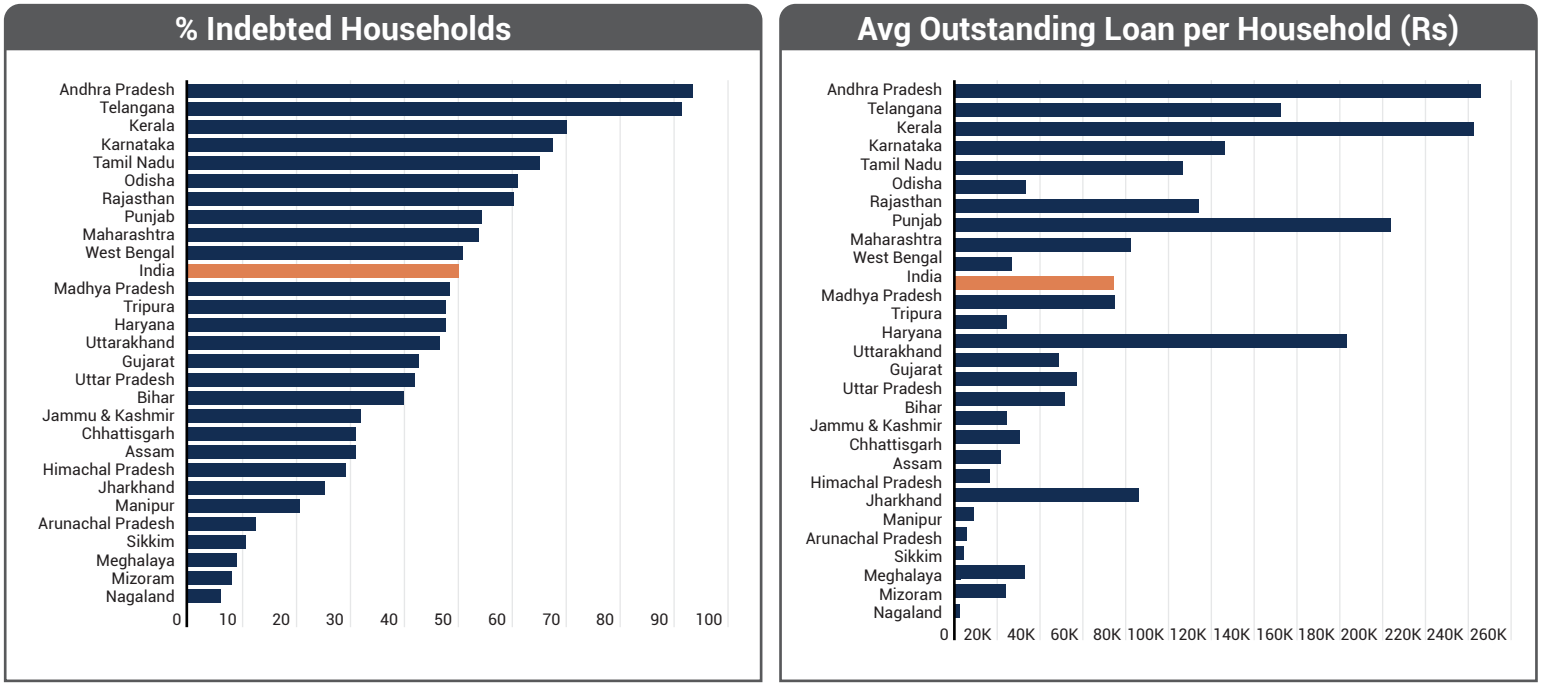
In 2015-16, the state's agriculture department suggested that a transition to natural farming can be supported by working with male farmers, probably because the land was owned by them.

"For nearly a year we went ahead with this approach, but much of the work in the fields is done by women," a senior RySS official who did not wish to be named told **IndiaSpend**. "This meant that we had to work with farmer families in general and women farmers in particular to progress."

AP women go natural

More than three quarters of the agricultural households in AP are small and marginal, averaging two hectares or less. Small holdings, coupled with chemical-dependent agricultural practices, appear to be unviable; AP has the most number of indebted households in all of India, with an average indebtedness of nearly Rs 2.5 lakh per household.

Andhra Pradesh Has The Most Indebted Households in India



Source: https://www.mospi.gov.in/documents/213904/301563//Report_587m1631267040957.pdf

In an effort to find a solution, in 2004, Andhra Pradesh began experimenting with alternative systems of farming through Community-Managed Sustainable Agriculture, with a focus on non-synthetic chemical pest management, soil health improvement and water conservation.

In 2016-17, the government launched the APCNF (then called AP Zero Budget Natural Farming). The programme has a Rs 1,800 crore (nearly $235 million) outlay until 2024. The funds are sourced through Union government programmes, Bharatiya Prakritik Krishi Paddhati (BPKP) and Paramparagat Krishi Vikas Yojana (PKVY), plus a loan from KfW, a German state-owned bank, and a Rs 100 crore grant from Azim Premji Philanthropic Initiatives.

Given that the programme works with groups and not individuals, women self-help groups (SHGs) and their federations, where members discuss credit, thrift and livelihood-related issues regularly, were a readymade platform to work with, the senior RySS official pointed out. APCNF data show there are 140,000 SHGs and more than 5,300 federations in the state.

The women's groups and federations align to the Sapthasutra (seven do's) campaign: Meet and discuss natural farming (NF); eat NF; NF kitchen gardens; NF farms; NF inputs (access); funds for NF and NF records.

Image credits: IndiaSpend/Shreehari Paliath

An SHG meeting, documented in August 2022 in Tallapalle, where women discuss various matters, including information on natural farming practices.

Pranitha, the IB coordinator with RySS, explained that, in 2018-19, when she approached a few male farmers in Vemula, they outright refused to participate in natural farming. It was only after a woman farmer from the village decided to farm using natural methods, and that began showing results, that the men were persuaded. "It was my first experience. Initially the [male] farmer [who had refused] farmed in one acre, now he is doing seven acres [of natural farming] on leased land."

"I was initially reluctant to try out these new methods," said Mary. "But Pranitha and others from the RySS and CSA [Centre for Sustainable Agriculture, a knowledge and implementing organisation for the programme] repeatedly visited and encouraged me to try it out." She convinced her husband, and initially tried a kitchen garden, which did well.

Less than 10 km away in Tallapalle village, T. Gangojamma, a Dalit farmer with a small land holding of 2.5 acres, prepares a fermented microbial culture called jeevamrutham, [literally, the nectar of life] which she sprays on the farm where she grows cotton, pulses and vegetables. The state's vision of transitioning millions of farmers to natural farming depends on women like Gangojamma and her daughter Prabhavathi. Prabhavathi is also the president of the Village Organisation--a federation of 10-15 SHGs--an Internal Community Resource Person (ICRP) and the 'first leader' of her SHG in Tallapalle.

She educates other women about kitchen gardens and natural farming in SHG meetings, and says, "...When we create awareness among the women, and the women communicate to the men, they [men] will listen."

Image credits: Travelling Tripod Films

T.Gangojamma, a Dalit farmer, working in her small farm in Tallapalle where she grows cotton and other crops.

Image credits: IndiaSpend/Shreehari Paliath

"If people have 10 acres, it will be difficult to do natural farming on all of it in the beginning, because they have to get inputs like cow urine, dung, dry leaves etc," said Prabhavathi. "So we tell them to do it in one acre first and see. If you feel it is good, only then you continue to do it and can check the difference between chemical and organic farming."

As the campaign picked up, spouses of SHG members started attending the meetings on natural farming, and women and men now take cropping decisions together, said the RySS official. "As a result, we have started seeing more than 20 crops being grown."

Women making bio-inputs out of cow dung, cow urine and soil in Tallapalle village, to be used in their farms. Photo from August 2022

Economic benefits kick in

For the likes of Mary and Gangojamma, who are small and marginal farmers, the transition to natural farming has improved their incomes, as earlier, input costs including seeds, fertiliser and pesticides were high.

The high cost of farming meant that half (50.2%) of agricultural households were in debt, and the average outstanding loan had gone up by 58%, to around Rs 74,000, over six years to 2018-19, according to the 2019 Situation Assessment of Agricultural Households and Land and Livestock Holdings of Households in Rural India report. "The cost of cultivation was high when we were doing conventional chemical farming and the difference once we switched to natural farming is more than 60%," said Mary, after consulting her husband Manohar. "Our cost used to be Rs 10,000 per acre each season. Now it has fallen to Rs 3,000 per acre [after multicropping]."

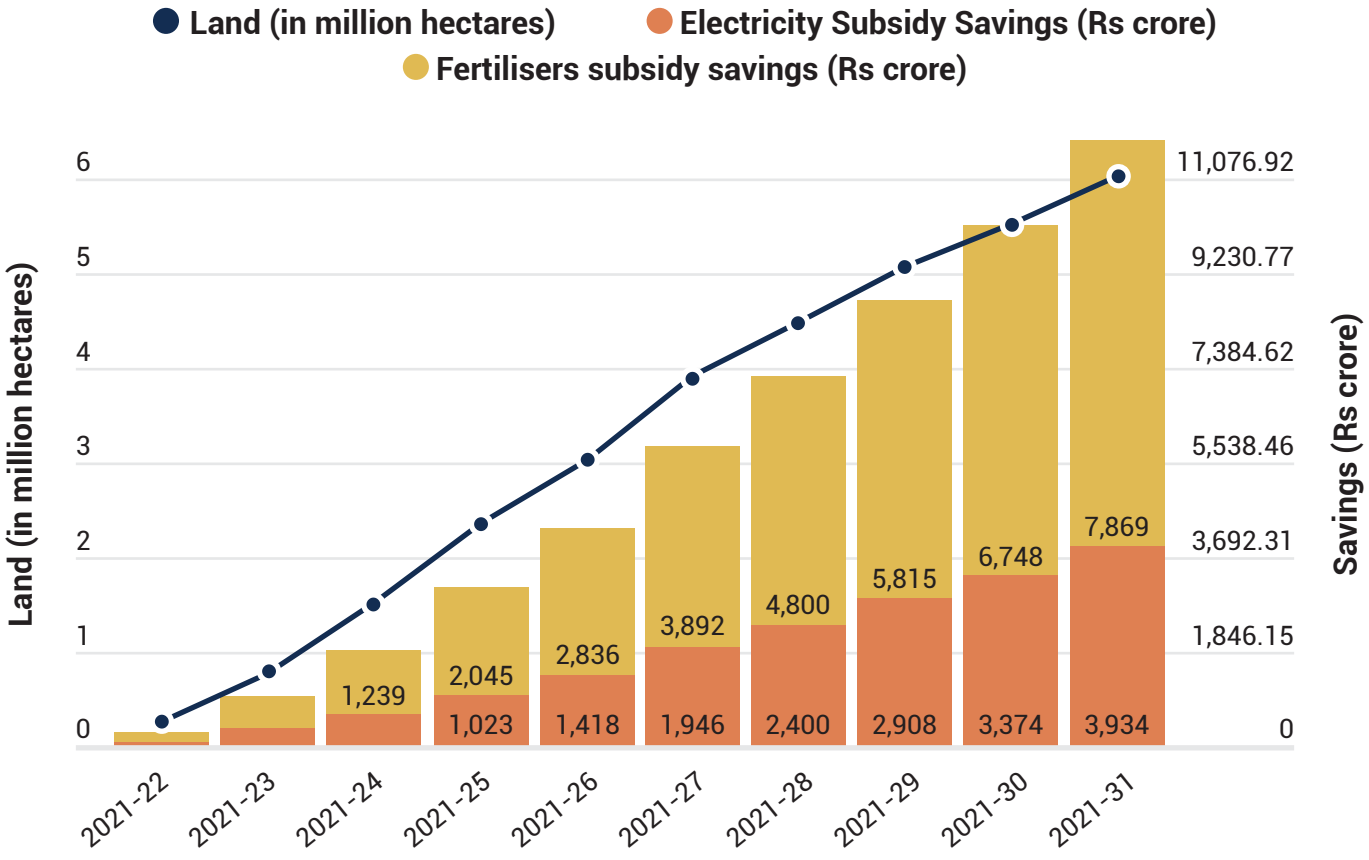
The family spends about Rs 5,000, including hiring labourers to grow bananas on 2 acres of their land. They are able to harvest around 60 tonnes of bananas, and earn between Rs 10,000 and Rs 15,000 a tonnes. In all, the family earns around Rs 3 lakh a year, including through Manohar's job as a driver.

Gangojamma also confirmed that she has saved money by cutting out the input cost on chemicals and pesticides. "Natural farming does not cost more than Rs 2,000 until cultivation, compared to earlier where I spent Rs 8,000 per acre," she said. Gangojamma earns Rs 50,000 per season; intercropping and growing multiple crops also reduces her risks of crop failure.

One of the other benefits of natural farming is good health, both women said, pointing out that even during the pandemic they remained healthy. Besides, the surplus of their vegetable crop is often shared with family and neighbours.

While individual farmers are finding out that there is an economic benefit to switching to natural farming, the state's balance sheet will also reflect the same. It is estimated that savings from fertiliser and electricity subsidies, as farmers move to natural farming on 6 million hectares of land, can be more than Rs 54,000 crore. Electricity subsidy in 2021-22 alone was reported to be Rs 9,000 crore.

Estimate Of Government Savings In Electricity And Fertiliser Subsidies Through Natural Farming Transition



Note: Estimates are based on 2020 prices
Source: https://drive.google.com/file/d/1n_wJ4O-EnJA_Lrah67Meo_3FR259QY1q/view

"Based on our experience so far, we estimate Rs 15,000 per farming family will be needed for the transition over a seven- to 10-year period, and with inflation it may come to around Rs 13,000 crore," said the RySS official. "Although all farmers may not, we are expecting 80% of farmers to transition to natural farming."

Natural farming should not burden women, but empower them

Considering that women already do much of the work in agriculture, does a programme like APCNF burden them even more, while allowing men to avoid responsibility?

"By design, we need to create space for decision making. Women are not only labourers, they have to be seen as managers and resource people, which creates respect for them," said G.V. Ramanjaneyulu, executive director at the Centre for Sustainable Agriculture.

It is also important to see women as landowners, and make it easier for them to get title over land, experts say. For instance, as many as 29% of the wives of indebted farmers who committed suicide were not able to get their husband's land transferred to their names, said a 2018 study by MAKAAM, that IndiaSpend had reported on in September 2019.

Despite the role of women as workers on farms and otherwise, a 2022 report by the international nonprofit Oxfam shows that gender-based discrimination against women in the labour market causes 100% of the employment inequality faced by salaried and self-employed women in rural areas and 98% in urban areas.

It is because of these reasons activists and scholars working with women farmers and workers feel that women must be empowered in the process of achieving non-chemical farming or traditional farming goals.

When thinking about empowering women farmers in natural farming, five aspects should be considered, said Ramanjaneyulu, which include decision making about farms, nutrition from food, reduction of drudgery as they work on farms, their livelihoods, and the role of women-led institutions.

Agroecology [which includes natural farming] provides more space for women farmers, unlike the Green Revolution that did not care about defeminisation of agriculture, caused by reduced mobility and safety of women, lack of power in deciding the choice of seeds, chemical use, finances etc., said, said Kavitha Kuruganti, a social activist with the Alliance for Sustainable & Holistic Agriculture, a volunteer network.

Kuruganti however also cautioned that perspectives around the role of women in natural farming may need to be modified, especially as men must also be responsible for "safe food and nurturing".

"Women must not be a means to meet agroecology as a goal," said Kulkarni of MAKAAM. While women are excited about APCNF, the men seem to have left it up to women to do the work, she said. "While SHGs provide small credit, most women may not be covered by institutional credit. There must be a supporting service (such as bio-resource centres for farm inputs) that provides landless women jobs, maybe through convergence with the MGNREGS [Mahatma Gandhi National Rural Employment Guarantee Scheme, the Indian public jobs programme], to develop inputs for the farm…APCNF cannot only depend on the SHG model to expand. There must be more financial support."

The last mile

The Gayatri Mahila Rythu Sangha (Gayatri Women Farmers Group), a Farmer Producer Organisation, located in Vempalle mandal, and supported by CSA, has more than 200 women members, and collects grains and other produce, processes and markets them. In the eight years since its creation in 2014, it has had a turnover of nearly Rs 55 lakh, with 50 members practising organic and natural farming.

Malleshwaramma, 55, the FPO's president and a farmer, had prior experience as part of another FPO where men dominated and there was a lack of women farmers' perspectives, which prompted her to explore a women's FPO.

The aim of the FPO is to produce without pesticides. "...women are more concerned about health," said Malleshwaramma.

Image credits: IndiaSpend/Shreehari Paliath

Malleshwaramma (second from left), photographed in August 2022, with other members of the exclusively women Farmer Producer Organisation in Vempalle.

"We identify farmers who are following good practices and we pay them an additional 10% on the market price," she said. "We grade the grains, prepare snacks, coriander powder, [packaged] millets, which are organic. We have a label for it for promoting organic."

Natural farming began first for self-consumption, as a result of the health impacts of produce that was grown using harmful chemicals. Gradually, with access to markets and fair prices, natural farming is expanding, said the RySS official. To further aid this expansion, the official added, governments have to take a clear stand in favour of natural farming and remain neutral about chemical farming so that farmers are not confused about its policy.

In addition, it should be linked with Rythu Bharosa Kendras (agriculture service support centres) for input and output marketing, which requires budgetary allocation by the government, said Kulkarni of MAKAAM.

Larger farmers who cannot sell all their produce locally are demanding that markets be created for their organic produce, without which they will have to sell in regular markets, alongside chemical farm produce, said Kuruganti.

One example of successfully creating a market for produce farmed through natural methods is the Tirumala Tirupati Devasthanam, that in 2021, started procuring natural farming produce for its daily requirements, with more than 300 other temples following suit. Around 2,000 hectares of naturally farmed land was linked to the temple, on which 1,500 tonnes was produced and procured. Farmers earned 15% over the cost of chemically-farmed products, said Ramanjanyelu.

In 2022-23, APCNF estimates it will link 25,000 hectares with nearly 15,000 tonnes of 12 crops for procurement, said Ramanjanyelu. The expectation is that the model will slowly grow to include anganwadis and other government-run institutions, as consumers of the produce.

Right now, as Mary waits for her farm's harvest of bananas, she hopes to continue natural farming, and grow multiple crops on her farm. She says she will also encourage other women to take it up, at least in a small way, just as she did.

(A.L. Ramana, a programme officer at the Centre for Sustainable Agriculture, helped with translations during reporting.)

No Country For Organic: Why Punjab Finds It Hard To Quit Chemical Farming.

Punjab has amongst the highest use of fertilisers, pesticides and large machinery, including government support for chemical farming, making it difficult for to transition to organic and natural farming.

- By Manu Moudgil | 3 Sept, 2022

Sher Singh on his farm at Mirpur village in Jalandhar district, August 2, 2022. Singh is an organic farmer but faces several challenges when compared to farming using chemicals.

Chandigarh: When Ashok Kumar, 63, started doing organic farming on three acres of his farm in Sohangarh Rattewala village in Punjab's western Ferozepur district in 2012, the benefits of good health and a cleaner environment were foremost on his mind. Besides growing food for his family, he was also able to sell the surplus to customers who sought organic produce. By 2016, he had decided to grow chemical-free fruit, vegetables, grains and oilseeds on his entire 16 acres, but the scaling up did not yield expected returns.

"I opened a shop in [nearby] Muktsar town in collaboration with six other organic farmers. We also took our produce to a weekend organic market in Jalandhar [three-and-a-half hours away by road], but despite putting in so much effort and money, we continued to make losses," he recalled. There just weren't enough customers, he told IndiaSpend.

"We had to shut down the shop and I eventually reduced the area under organic farming back to three acres, for my own family's consumption. The rest of the land is now given on lease to another farmer, who uses chemical fertilisers and pesticides."

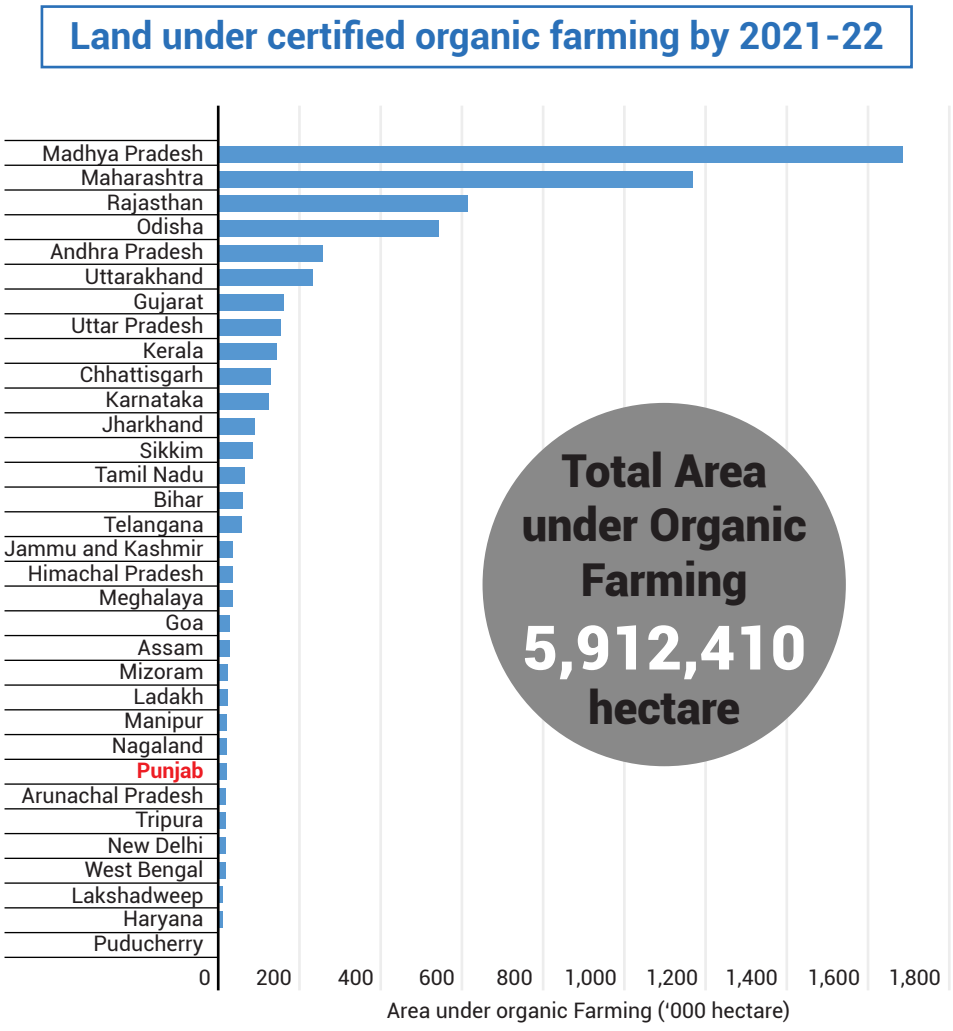
Kumar's story is not reflective of all farmers who are trying to do chemical-free farming in Punjab, but many would relate to his predicament. Their passion for chemical-free, natural farming runs contrary to the longstanding farming culture of the state, our reporting found. The terms 'organic' and 'natural' farming are used interchangeably in India, with farmers using a mix of methods.

In natural farming, if defined strictly, the focus is on the use of bio-inputs prepared from farm and local ecosystems, instead of purchasing these. Organic farming is defined more from a perspective of product certification and marketing (read more in our July 2022 explainer on natural farming). On the ground, these terms are used more fluidly.

This is the second in our series on natural farming, and explores why it is hard for farmers in Punjab, the food bowl of India, to move to chemical-free farming, now being pushed by the Union government and through policy.

"The whole [agricultural] ecosystem in Punjab is built around chemical farming, compared to other parts of India, because we were the frontrunner state during the green revolution. This model is supported both by the state and the market through research, extension services, machines, seeds and assured procurement of wheat and rice. So, it's much easier and remunerative to do chemical farming here," farmer Kamaljeet Hayer, who had partnered with Kumar in setting up the organic produce shop, told IndiaSpend. "Organic farming requires at least 10 times more effort than chemical farming because it's labour-intensive and the returns are modest."

Among states outside of the northeast, the area under organic farming in Punjab is one of the lowest, official data show.



Source: http://164.100.24.220/loksabhaquestions/annex/179/AS134.pdf

Why Punjab needs to move away from chemicals in farming

'Green Revolution' is the name given to the period in the 1960s-70s when India imported new hybrid seed varieties to increase the production of wheat and rice, which could then be supplied at subsidised rates through the public distribution system (PDS).

Punjab was chosen to be the first site to try new varieties because of higher water availability from its rivers and its fertile soil. The new seeds required adequate doses of chemical fertilisers and water to give the promised yields. The Indian government started subsidising the inputs, besides establishing the research and extension services to improve the new seeds and also take the practices to the people. The assured procurement for PDS further enthused farmers to participate.

Today, after around 60 years of intensive agriculture, Punjab has grown economically, but stares at an agro-ecological crisis. There is excessive use of agro-chemicals causing environmental toxicity, high dependence on wheat-rice crop cycle impacting biodiversity and soil health, and costly machinery which made farming easier but also led to high indebtedness.

Though average farm income in Punjab remains one of the highest in the country, per the National Statistical Organisation's Situation Assessment of Agricultural Households and Land and Livestock Holdings of Households in Rural India (SAS) 2019 survey, its growth has slowed at a higher rate than the national average since 2013-14, per government data. There is, however, no disruption yet in the way agriculture is practised, our reporting found.

Punjab accounts for 4% of the country's cropped area but for 8% of all chemical pesticides used. A 2005 study by the Centre for Science and Environment, referenced by a Parliamentary standing committee on agriculture report in 2016, found residues of 6-13 pesticides in blood samples of Punjab villagers. Punjab also has one of the highest chemical fertiliser consumption rates in India at 213 kg per hectare, compared to the national average of 128 kg per hectare.

Further, there is an imbalance in fertiliser use. Against the desirable ratio of 4:2:1 of nitrogen, phosphorus and potassium, Punjab's ratio is as high as 31:8:1, the committee report said. "Inadequate use of micronutrient fertilizers is aggravating trace element deficiencies in soils in many areas. The crops grown on these soils are, generally, deficient in micronutrients. These deficiencies are linked with malnutrition and health disorders in humans and animals," the report added.

Excessive use of nitrogenous fertilisers in Punjab also lead to higher levels of nitrates in the state's groundwater, which has been linked to cancer and blue baby syndrome (when haemoglobin in the blood loses its capacity to carry oxygen, resulting in asphyxia and death), a 2009 Greenpeace study had said. Around 20% of all sampled wells in three districts of Punjab had nitrate levels above the safety limit recommended by the World Health Organization, the study had found. This nitrate pollution was clearly linked with the usage of synthetic nitrogen fertilisers as the study found higher nitrate levels in farms which had higher application of fertilisers.

The 2018 draft Punjab State Farmers' Policy had proposed an annual reduction of 10% in use of agro chemicals.

Image credits: IndiaSpend/Gurdeep Dhaliwal

Kamaljit Hayer on his farm which integrates poultry and a herbal garden with crop cultivation and promotes farm tourism, in Sohangarh Rattewala village, Ferozepur district, Punjab. Pictured on August 3, 2022.

Problems with transitioning to chemical-free farming

The area certified under organic farming in India rose from about 345,000 hectares in 2011-12 to 2.66 million hectares in 2020-21. The practice, however, is not easy. Major problems are a drop in crop yield, infestation of weeds and paucity of farm labour, agriculturalists told us.

"Despite several benefits to health and environment, organic farmers face multiple challenges. A land used to chemical fertilisers for decades would require at least three years to recover its fertility," Umendra Dutt, executive director of Kheti Virasat Mission (KVM), a non-profit organisation based in Jaito, Faridkot district, campaigning for organic farming in Punjab, told IndiaSpend.

"An organic farm would have a greater need for manual labour and the work is also very intensive. From treatment of seeds to preparation of green manure, optimum selection of crop pattern, regular monitoring, de-weeding, mulching, composting and careful harvesting are just some of the basic requirements for chemical-free farming. This [labour-intensive process] makes it difficult to find people who are willing to work in these fields."

Further, big machinery doesn't suit organic farms because these usually grow mixed crops while most machines are designed for mono-cropped wheat and rice fields. There is also a chance of contamination. "I can't hire a combine harvester which has also harvested a crop from a chemical farm because grains from those farms can enter my fields. I have to maintain the purity of my seed," said Rahul Sharma, an IT engineer-turned farmer who grows organic produce on 11 acres in Kapurthala and Patiala districts. "This means I have to hire manual labour because smaller, handheld power-operated machines are either not available or don't enjoy the subsidies the big machines do."

Babban, a farm worker, de-weeding and preparing the soil at an organic farm in Chandigarh, August 13, 2022.

Sher Singh of Mirpur village in Jalandhar district finds it difficult to manage weeds on his six-acre farm, especially during the rainy season. "I use sprinklers for irrigating my vegetables because that helps control the weeds but when it rains, the infestation grows many folds. Someone practising chemical farming would just throw some herbicide and get done with it while I have to hire manual labour. Organic farming is not only a slower process but also costlier," he said. "This labour shortage can be met if the government allows workers under MGNREGA [the rural job guarantee programme] to assist on organic farms. We can pay the government a part of the daily wage of these workers."

Of the total workers in Punjab, only 35% are engaged in agriculture while the national average is 54.6%. One reason for this is heavy use of machines in the state; Punjab is home to nearly 450,000 tractors, one tractor for every 9 hectares of cultivated land, compared with the national average of one per 62 hectares. Between 2000 and 2019, the number of harvester combines in Punjab nearly tripled to 800,000. The investment in big and costly machinery has, however, led to high indebtedness, per a 2014 study by Punjab Agricultural University (PAU), Ludhiana.

Farm households in Punjab are among the most heavily indebted in India, per the SAS 2019 survey. Around 54% of farming households are indebted in the state, with average debt of Rs 2.03 lakh. Loans taken for farm inputs like agrochemicals and machinery formed 52% of the total debt incurred by farmers, the PAU study had found. For small farmers, the share went up to 68%, which reduced their borrowing capacity for other purposes like healthcare and social ceremonies.

Why Punjab needs to move away from mono-cropping

The 'Green Revolution' also oriented Punjab towards wheat-rice crop rotation through assured procurement at minimum support price (MSP). Rice is neither a staple of Punjab's diet nor suited to the agro climatic character of the region. India must shift rice growing east from Punjab and Haryana while encouraging wheat cultivation in the rice-growing regions of Punjab and Haryana, to help prevent an impending water crisis by 2030, **IndiaSpend** reported in June 2019. About 4,118 litres of water is required to grow one kilogram of rice in Punjab, compared to 2,169 litres in West Bengal, a natural habitat for the crop, estimates by the Commission for Agricultural Costs and Prices show.

In 1960-61, 4.8% of the total cropped area in the state was under rice. By 2019-20, the share of rice had increased nearly 10-fold to 40.1%, per Punjab Directorate of Agriculture and Farmers' Welfare data, quoted in the Punjab Economic Survey 2020-21. The area under wheat went from 27.3% to 45% in the same period. Thus, between them, rice and wheat accounted for 85% of the cropped area in the state at last count. This shift towards mono cropping was brought about by assured procurement and price support, and came at the cost of maize, millets, barley, pulses and oilseeds, said the survey.

"Overemphasis on wheat-rice rotation has made our ecosystem unstable not only in terms of groundwater depletion…Diseases and pests can spread easily through swathes of mono cropped fields with no biological controls. Mixed cropping can prevent that," Ramesh Arora, former professor of entomology at PAU, told **IndiaSpend**. "Farmers should rotate crops on their fields every two-three years to prevent pests and pathogens becoming habitual to the land. Also plant more trees which provide habitat to birds who are the most effective biological controls against pests. Pesticides should be our last line of defence but sadly it has become the first priority."

Continuous cultivation without any crop rotation also depletes soil nutrients, resulting in weaker crops highly dependent on chemical fertilisers and pesticides. "Organic farmers know the importance of soil health and tend to rotate crops to maintain yields. They use natural methods of pest control and fertilise the soil regularly by growing green manure or nitrogen fixing crops," Seema Jolly, an organic farmer and coordinator of an organic market near Chandigarh, told **IndiaSpend**.

The state government has been promoting crop diversification, asking farmers to grow crops other than rice but with little success. Even after spending Rs 274 crore on a crop diversification programme during 2014-19, the sown area of rice increased by 7.18% in Punjab at the cost of other crops, found an audit report by the Comptroller and Auditor General (CAG) of India.

This year, the Punjab government reportedly asked farmers to grow moong (green gram) as the third crop in the (summer) window between wheat harvesting and growing rice. The government promised to procure the produce at MSP if the moong crop is followed by Basmati or PR 126 variety of rice, both of which take less time to grow and require less water compared to long duration rice. The announcement led to the cultivated area under moong rising by 77% over the previous season.

While the announcement was mainly seen as a move to increase farmers' income and to reduce the state's dependence on import of pulses, it will also reduce use of fertilisers in the subsequent rice crop. Moong fixes nitrogen in the soil, thus reducing the need for synthetic nitrogen fertilisers. However, the harvesting of the moong crop saw rampant use of weedicides.

Jagmohan Singh in Patiala town, general secretary of Bharatiya Kisan Union (Dakaunda), one of the farm unions which participated in the 2020-21 farmers protests against the three farm bills, feels crop diversification can be the first step towards sustainable agriculture. "Currently, most agro chemicals are used on wheat and rice. Once the government starts promoting alternate crops, the use of chemicals will reduce automatically. The crops which are introduced as replacement, however, should fetch the same profit as these two crops," he told **IndiaSpend**.

Organic farmers feel the state government needs to push for millets. "Millets would yield much greater benefits because they are known to be rich sources of nutrition, require less irrigation, grow without agro chemicals and leave no waste. Just shifting 10% of rice area to millets can bring a huge change," said Rahul Sharma, the IT engineer-turned farmer. "The produce can be provided to children under the mid-day meal scheme. So with one move, you can solve problems of malnutrition, groundwater depletion, food toxicity, and straw burning, besides conserving biodiversity."

Government support required

One of the issues farmers face when they shift to organic is drop in crop yield. "I suggest new farmers start with small plots. If they stop using chemical fertilisers at one go, there will be a big loss of yield which will dishearten them," said farmer Sher Singh. "After a few years of using green manure and bio-fertilisers, the soil regains its natural fertility and the production picks up while farmers get used to the new market."

Dutt, the social activist, feels the farmers not only need hand-holding but also financial assistance. "Besides the assured price and procurement of alternate crops, farmers need a transition package. If governments made them go for chemical farming during the Green Revolution, it's their duty to get them out as well by supporting organic farmers." Organic (and natural) farmers should also get assistance, which chemical farms get in the form of indirect subsidy on fertilisers and farm machines or research and extension services, he said.

The all-India fertiliser subsidy is expected to touch Rs 2.15 lakh crore this year, finance minister Nirmala Sitharaman said on May 21, 2022. This would be a 64% increase over fertiliser subsidy expenditure in 2020-21.

A transition package could also be linked to ecosystem services. "The government is currently supporting a system that's harmful for everyone. On the other hand, our organic farming uses less water and power, causes no chemical pollution, no straw burning, promotes biodiversity, provides more nutrition while also sequestering more carbon in the soil thus mitigating climate crisis. We should be rewarded for providing all these ecosystem services," said farmer Rahul Sharma. "Such incentives will also make organic food more affordable to poor and middle class families rather than being accessible only to the elite consumers."

Food and trade policy expert Devinder Sharma feels Punjab needs to breed new crop varieties that respond well to organic inputs rather than agro chemicals. "If Punjab could be the seat of the green revolution, it can also be the seat of the evergreen revolution but this would require a policy shift and research," he told IndiaSpend.

The existing infrastructure and marketing network needs to be reorientated towards organic, Sharma said, adding that the government can learn from Andhra Pradesh, where around 700,000 farmers have shifted to organic farming because of state government support, and research and extension services for them. [More in our next story on natural farming in Andhra Pradesh.]

We requested a comment from the director of agriculture, Gurvinder Singh, on how the state is supporting organic farming. He asked us to contact Punjab Agro Industries Corporation Limited, the nodal government agency for organic farming in Punjab.

Tarun Sen, a manager from Punjab Agro, said that they support farmers through training and awareness camps on organic farming. They also have a distribution channel for marketing of organic products.

"Government of Punjab through Punjab Agri Export Corporation Limited (PAGREXCO) is implementing the Organic Program by providing institutional support to the organic farmers of the State," the general manager of PAGREXCO, a subsidiary of Punjab Agro, said in an email response. They also train farmers for "Organic Farm Management as per organic certification standards and facilitating third-party certification", as per the email.

PAGREXCO also buys organic produce directly from its certified organic farmers at remunerative prices and markets the produce for the domestic and foreign market. They also help farmers in getting a "dedicated space allocated in government marketing yards/offices in cities for organic produce". PAGREXCO is running an 'Organic Hut' in Chandigarh, and that model will be replicated in other cities, the general manager wrote in the email.

Market and consumers

Image credits: IndiaSpend/Gurdeep Dhaliwal

An organic market at Kaimbwala village near Chandigarh on August 13, 2022.

In absence of substantial state support, farmers and concerned citizens have themselves tried to set up models of marketing and social support. They got together to organise weekly organic markets in which farmers brought their produce to central spots of major cities in Punjab for sale. This model worked well, but the pandemic and lockdown disrupted the whole set up.

"I was taking my produce to a private school in Jalandhar where the organic market was held every Sunday. After the lockdown, however, the market did not pick up and we also suffered heavy losses because the produce was not sold," said Sher Singh. "Now, I am just left with the 15-20 customers who are regulars for the last 12 years."

At the weekend organic farmers' market organised for two hours at a football academy in Kaimbwala village near Chandigarh, organisers were worried about the low footfall. "We are just getting around 25 customers which is not promising. Before Covid lockdown, we would have around 100-150 buyers. Maybe people have just turned to the online medium and are buying branded organic," said Seema Jolly, one of the coordinators of the market. "I think the government needs to step in and provide a space where the produce can be sold. We are trying to run this market since 2015 moving from one spot to another because there is no permanent place."

After making losses in the shop he opened in collaboration with other organic farmers, Kamaljeet Hayer has now taken to farm tourism. He has rabbits, parrots, ducks and hens besides a herbal garden, fruit trees and rooms made with traditional architecture which attract people from cities, who want to experience rural life. "I have also stopped dealing in vegetables and started processing perishable items to increase their shelf lives. The produce, including dry ration, oil and pickles, now gets picked up from the farm thus saving me the money on transportation. The farm has become profitable this year but it's still not substantial and can't sustain my family," Hayer said.

Rahul Sharma, who has built a steady customer base in and around Chandigarh, is keen on taking the business online. "Nobody has cracked the organic code yet. I am able to experiment because farming is not my main source of income. For an individual farmer to sell online, they need to set up a consistent production, processing and supply chain, get a GST number, approval from FSSAI, prepare packaging material and negotiate other procedural hurdles," he said. "Once that's done, they will find that shipping heavy packages like a 10 kg wheat flour pack does not make economic sense. Those who are able to do it either have deep pockets or bulk orders. I have no choice but to focus on items that can be sent in small packets like dalia."

Ashok Kumar of Sohangarh Rattewala village is thinking of getting back to farming after buying farm equipment. "I had sold off all those machines because they were of no use in organic cultivation," he said. "Will slowly procure them again and get back to the land. There is nothing else I know besides farming. But not organic this time."

Explained: What Is Natural Farming?

The government is pushing natural farming across India, without the use of chemical fertilisers and pesticides.

- By Shreehari Paliath | 27 July, 2022

Bengaluru: Nearly 3.8 million hectares, or 2.7% of the total area under farming in India, is farmed organically or through natural methods, which means using natural processes and inputs to improve the health of soil, crop yield and quality, a move away from commonly used chemical fertilisers and pesticides.

The objective of natural farming, said the government's 2021 Economic Survey, is elimination of chemical fertilisers and pesticides, the indiscriminate use of which pollutes the environment, and to promote "good agronomic practices", which means using science and technology to manage crops. In the 2022 budget speech, Finance Minister Nirmala Sitharaman announced that "chemical-free natural farming will be promoted throughout the country, with a focus on farmers' lands in 5-km wide corridors along river Ganga, at the first stage".

This move towards chemical-free farming is juxtaposed against a large workforce (43%) employed in agriculture and related jobs, a sector that contributes to just 18.8% of India's gross domestic product. Increased farmer indebtedness due to costly agricultural inputs like chemical fertilisers, pesticides, seeds, the increasing cost of cultivation, climate change, and low farm produce prices, have aggravated India's farm crisis, even as the government has said that farmer income will double by 2022.

But experts are divided on whether a complete transition to natural and organic farming would work in India's favour, especially if it is pushed top down, and follows a rigid definition of what natural farming entails.

Supporters of natural farming believe that it will reduce farm input costs, improve soil health and water efficiency and lead to an increase in farm produce prices. Though natural farming might be able to reduce costs and mean that farmers use methods that suit the agro-ecology of a region, say experts, there are concerns that yields from natural farming could be lower, especially in nutrient-deficient soil in many parts of the country.

While we need a forward-looking sustainable model in agriculture and not a revivalistic model that talks about farming practices centuries ago, existing [government] schemes are getting politicised, said G.V. Ramanjaneyulu, executive director of the Secunderabad-based nonprofit, the Centre for Sustainable Agriculture. "The focus should be on reducing agro-chemicals, water use and energy utilisation."

In a multi-part series, IndiaSpend will explore the different facets of natural farming, its implementation in India, and the possibility of success. In this first part, we explain what natural farming is, and where it is being practised in India.

What is natural farming?

India became food secure by using high yielding varieties of seeds, fertilisers to nourish the soil and pesticides to keep crop damage at bay. But this was accompanied with environmental damage through overuse of fertilisers, and impacted human and ecological health.

Due to the impact of the Green Revolution, "heightened further" by the pandemic, "there is an urgent need to scale up alternative approaches" of farming, wrote economist Mihir Shah, in a January 2022 report in the journal Ecology, Economy and Society.

In December 2021, during a conclave on natural farming, Prime Minister Narendra Modi emphasised the need for working on alternative methods of farming, while acknowledging the importance of chemicals and fertilisers in the Green Revolution. "We have to take our agriculture out of the lab of chemistry and connect it to the lab of nature," he said.

This refers to agroecology, which guides public policies towards sustainable agriculture and food systems, according to the Food and Agriculture Organization (FAO). While there is no specific set of practices that are classified as agroecological, it includes those methods that maintain and enhance natural processes related to soil, water and climate in agricultural production, reduce the use of purchased inputs, like fossil fuels and agrochemicals, and create resilient agroecosystems, noted a 2019 High Level Panel of Experts for Food Security and Nutrition (HLPE) of the FAO. These methods focus on promoting crop diversification, restoring and rebuilding natural cycles in the soil, and reducing water demand, among others.

Natural farming and organic farming, both come under agroecological practices and are terms used interchangeably in India. In natural farming the focus is on the use of bio inputs prepared from farm and local ecosystems instead of purchasing those from outside. "Organic farming is defined now more from a perspective of product certification. Except for such certification, organic and natural farming in India are largely similar," said Sridhar Radhakrishnan, activist and independent agriculture researcher based in Thiruvananthapuram.

What binds organic and natural farming proponents "is the thrust on the absence of application of chemical fertilisers or chemical pesticides during cultivation", said R. Ramakumar, an economist at the Tata Institute of Social Sciences (TISS). In organic farming, farmers might use "external agricultural inputs" such as rock phosphate, biopesticides and biofertilisers, he added.

"But [some] natural farming proponents argue that even these external applications are not required, as the farm itself can generate much of the inputs required," he said, adding that, "therefore, they call it Zero-Budget Natural Farming."

Zero-Budget Natural Farming is one of the many methods of natural farming, popularised by agriculturist Subash Palekar (later known as Subash Palekar Natural Farming). According to the approach, a concoction of natural inputs like cow urine and dung, jaggery, lime, neem among others are used to improve soil health, nutrients and reduce input costs, among other benefits.

In July 2022, the government announced that it would constitute a committee to "promote zero-budget based farming, to change crop pattern keeping in mind the changing needs of the country, and to make MSP [Minimum Support Price] more effective and transparent…". On natural farming the committee will make suggestions for programmes for value chain development, strategies to introduce natural farming curriculum in universities and suggest farmer-friendly alternative certification systems for natural farm produce.

Is natural farming better than 'conventional' farming?

Various state governments have supported organic farming as an alternative farming option in the last few decades. But there are debates worldwide on the impact on crop yield by transitioning to agroecological farming methods and discarding conventional practices that use chemical inputs, especially where soils are nutrient-deficient.

If biofertilisers, rhizobium and acetobacter can fix soil health to an extent, there is no need for heavy chemical use, said Ramanjaneyulu. This would also help the government cut spending on fertiliser subsidies, which cost Rs 1.4 lakh crore ($18.7 billion) in 2021-22 and are estimated to cost Rs 1.1 lakh crore ($14.7 billion) in 2022-23, which could rise to Rs 2.5 lakh crore due to higher import prices.

But compared to 'conventional farming', according to a 2019 ICAR-National Academy of Agricultural Research Management report, "organic products are usually 3-4 times more expensive due to higher labour cost, certification costs, handling costs and comparatively lower yields".

The jury is still out on which method or which combination of methods would be the best for crop yields. There are knowledge gaps on comparing relative yields and performance of different agroecological practices, according to the HLPE report.

"..out of the 504 times that yield results were recorded during 2014–19, 41% of the times yields were highest with organic approach, followed by 33% with integrated and 26% with inorganic approach," said the February 2022 CSE report that analysed the All India Network Project on Organic Farming (AI-NPOF) of the Indian Council of Agriculture Research and other scientific studies. It reported evidence of highest net returns and best soil health under the organic approach in study centres.

"There is scientific evidence on the benefits of natural farming, but the government has to take the initiative to formally collate like it did under AI-NPOF," said Vineet Kumar, deputy programme manager of Sustainable Food Systems at CSE.

On the other hand, the 2019 NAAS report highlighted that studies initiated by the Indian Council of Agriculture Research-Indian Institute of Farming System Research "clearly indicated that yield levels were drastically reduced in rice-wheat cropping system by 59% in wheat and 32% in basmati rice" when tenets of zero-budget natural farming were followed. It further showed a three-year natural farming experiment that showed "a yield decline" in crops tested which "established that food security will be seriously challenged along with farmers' income, if ZBNF [Zero Budget Natural Farming] is adopted".

There is concern that yields will fall with natural farming because 59% of soils in India are deficient in nitrogen, 49% are low in phosphorus and 48% are low in potassium, said Ramakumar. "Organic or ZBNF methods do not replenish enough nutrients in the soils as much as the plants uptake them every season."

Organic and natural farming can be scaled up only to a level, because of several reasons. These include a lack of a national action plan to promote organic and natural farming, dependence on expensive certification for organic produce, which smaller farmers cannot afford, inadequate funding, target-driven and timeline-based policies for natural farming, among others.

Why painting all other farming methods with one brush isn't right

When proponents of organic/natural farming use the term 'conventional farming', they use it to denote all cases of misuse or overuse of chemicals in agriculture, none of which are sanctioned by agricultural scientists.

"..condemning the technology that ushered in Green Revolution for the negative impacts on the environment and health is neither fair nor justified. It was the injudicious, indiscriminate and excessive use of agro-chemicals which is to be blamed," said a 2019 National Academy of Agricultural Sciences (NAAS) report on Zero Budget Natural Farming (ZBNF).

Some say scientific conventional farming can be considered closer to natural farming than most think.

Scientific farming involves the use of both organic manures as well as chemical fertilisers, but only where required, after a soil test and in prescribed quantities, which scientists call balanced nutrient management, said Ramakumar. "Similarly, they prescribe 'integrated pest management', where you use natural means to control pests and diseases and use pesticides only as a last option. I would like to consider this as 'conventional farming'."

Government schemes for natural farming

Organic farming policies and programmes in India

Ministry of Commerce and Industry

National Programme for Organic Production (NPOP) certification by Agricultural and Processed Food Products Export Development Authority (APEDA) since 2001

Certification: Third party
70% of India's organic area as on March 2020
1.15 million farmers registered on TraceNet portal as of March 2020
2.59 million MT food production in 2018-19
Wild harvest collection area of **1.49 million ha** in 2018-19

Ministry of Agriculture and Farmers' Welfare

National Mission for Sustainable Agriculture (NMSA) since 2014–15

Paramparagat Krishi Vikas Yojana (PKVY) since 2015

Participatory Guarantee System of certification for India (PGS-India)
21.5% of India's organic area as of March 2020

1.49 million farmers enrolled as of February 2020

Rs 1,632 crore allocated till November 2019

Mission Organic Value Chain Development for North East Region (MOVCDNER) since 2015
Certification: Third party
2.6% of India's organic area as on March 2020 **In eight** Northeast states **Rs 645** crore allocated till November 2019

Related schemes and institutions: National Centre of Organic Farming (NCOF) and National Project on Organic Farming (NPOF)

States/Union Territories

6.1% of India's organic area under state schemes or non-schemes as of March 2020

Organic Farming Policy 2005

Other supporting schemes
Rashtriya Krishi Vikas Yojana (RKVY) and Mission for Integrated Development of Horticulture (MIDH)

Participatory Guarantee System of certification for India (PGS-India)

Adopted by government in 2015-16
0.75 million farmers as of March 2020
0.21 million MT food production in 2018-19
For domestic market, not eligible for export

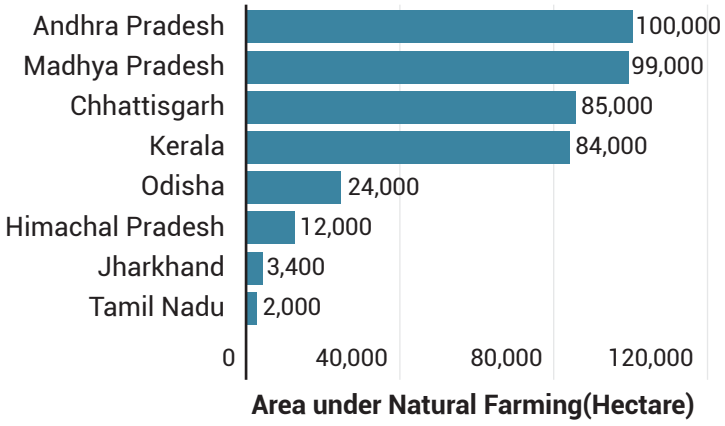
Source: https://www.cseindia.org/content/downloadreports/10346.

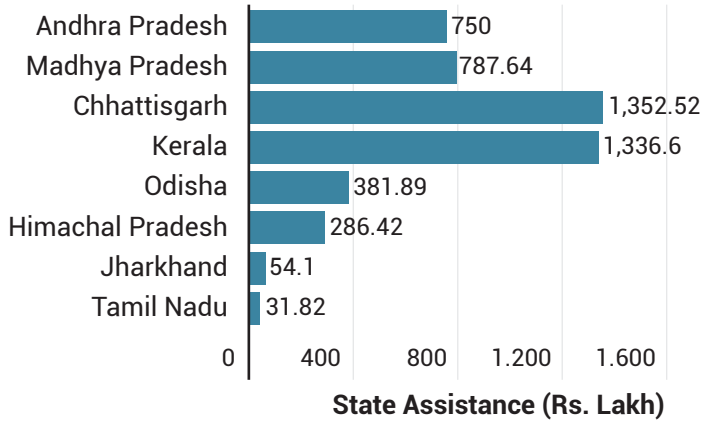
The Union government's 2005 policy on organic farming was "not successful in bringing necessary attention towards organic farming", noted a 2020 CSE report. Since then, the government has had several initiatives and sub-missions under the National Mission for Sustainable Agriculture (NMSA), which began in 2014-15, the Paramparagat Krishi Vikas Yojana (PKVY), which began in 2015, and the Mission Organic Value Chain Development in North East Region (MOVCDNER), which started in 2015.

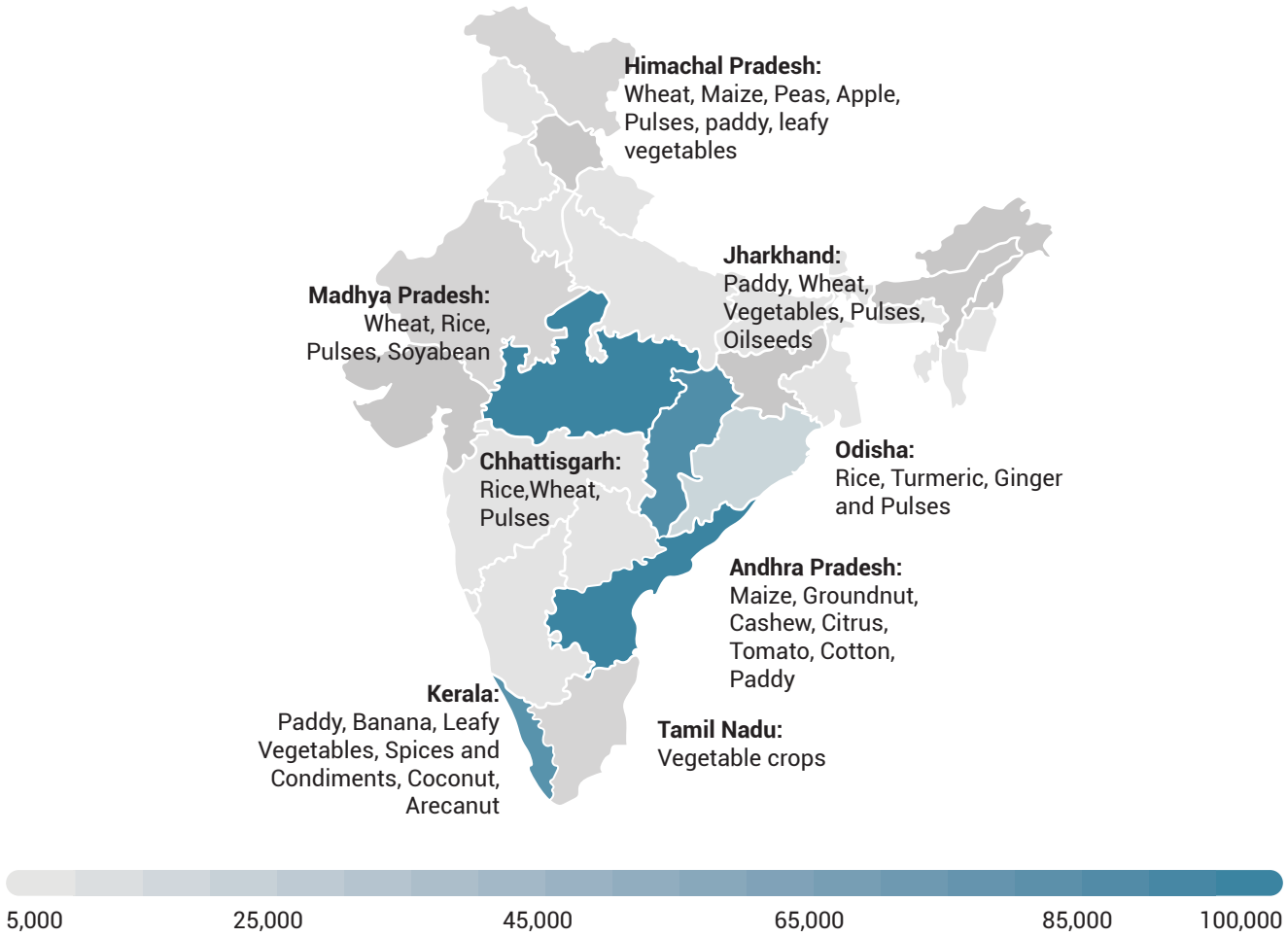
A scheme to promote chemical-free organic farming in clusters of land, PKVY provides financial assistance of Rs 50,000 per hectare for three years for creating farming clusters, capacity building, incentive for inputs, value addition like processing, packaging and marketing of organic produce.

In 2020-21, Bhartiya Prakritik Krishi Paddati (BPKP), a subscheme under PKVY, was launched to promote natural farming including Zero-Budget Natural Farming. Nearly 410,000 hectares has been covered in eight states with a total fund of Rs 49.8 crore. The 2022 allocation for PKVY is not clear and as of 2022-23 it has been rationalised under the Rashtriya Krishi Vikas Yojana, a Union government scheme to develop agriculture and allied sectors.

Bhartiya Prakritik Krishi Paddati (Indian Natural Farming Scheme)







Source: http://164.100.24.220/loksabhaquestions/annex/178/AU5429.pdf

Have other countries adopted natural farming?

There have been various agroecological initiatives in different parts of the world. In November 2021, 45 governments, led by the UK, pledged urgent action and investment to protect nature and shift to more sustainable ways of farming at the 26th Conference of Parties, the climate change conference in Glasgow, according to a UK government press release. It said that the commitments would help leverage over $4 billion of public sector investment into agricultural innovation to improve soil health, helping make these techniques and resources affordable and accessible to farmers.

In May 2020, the EU announced the Farm to Fork Strategy, as a part of the European Green Deal to "make food systems fair, healthy and environmentally-friendly". As part of the strategy, the European Commission announced a 50% reduction in the use and risk of chemical pesticides, and in the use of more hazardous pesticides by 2030.

But as countries are promising to transition to sustainable agriculture, Sri Lanka's experience of transitioning to the first organic farming nation failed. The country's government, which fell after weeks of massive protests and an ongoing economic crisis, had announced, in April 2021, that only organic farming would be allowed across the country. It proceeded to ban imports of chemical inputs, impacting millions of farmers. Following farmer protests, the ban was revoked in November 2021.

"The chemical fertiliser ban, combined with bad weather, led to falling crop yields and contributed to inflation hitting a 47-month high of 8.3% in October with food inflation at 11.7%," said a November 24, 2021 Reuters.

The way ahead

Experts believe that there are far too many debates on methods of natural and conventional farming, rather than the impact and design of the schemes being implemented.

For instance, Subash Palekar's method for Zero-Budget Natural Farming is considered too rigid, and has created a dichotomy about farm practices that were organic or natural, said Radhakrishnan, the independent agricultural researcher. "Although this is not a criticism of ZBNF, in some ways the government prioritises ZBNF over other agroecological farming practices."

In addition, "there are a lot of concerns about BPKP and PKVY", the government programmes, said Kumar of CSE. "Usually, these schemes are implemented by the state agriculture department who may not have adequate training on this."

There is a need to invest more resources, including trained agriculture staff, and funds for science and technology and research, to better understand organic and natural farming practices, experts say.

"A modern agricultural scientist may not even be able to explain why a concoction sprayed by a farmer increased yield in natural farming, while the scientist may understand how chemicals work," said Kavitha Kuruganti, a social activist with the Alliance for Sustainable & Holistic Agriculture (ASHA). There is a need for the government to support alternative farming methods rather than only supporting farming that uses chemicals, she added.

The 2022 Union budget announced that states will be encouraged to "revise syllabi of agricultural universities to meet the needs of natural, zero-budget and organic farming, modern-day agriculture, value addition and management".

The government needs to invest in processing and packaging of products, and ensure that products are procured in sufficient quantities to ensure remunerative prices for farmers. Due to gaps, for example, in PKVY, "..in the absence of direct linkages with processors, retailers and exporters, farmers are dependent on middlemen to market their produce", said the 2020 CSE report.

The agroecological methods need to be based on local contexts in various states and regions and use bio-inputs based on local ecosystems. Andhra Pradesh (AP community-managed natural farming) has established a ZBNF system to suit its requirements, while other states like Himachal Pradesh, Gujarat, Haryana, Karnataka and Kerala have also initiated it. Karnataka initiated implementation of ZBNF on a pilot basis in 2,000 ha in each of the 10 agro-climatic zones of the state.

Ramakumar reiterated that India needs to trust its agricultural scientists. "Only by practising scientific agriculture can we attain the goals of raising farm incomes, raising yields and reducing chemical use in agriculture. And this science has to be promoted in the public sector and not through private corporates."

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