

Sikkim: Making of the First 100% Organic State of the World

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Abstract

A small Indian state, Sikkim, sitting in the lap of the Himalayas, took a revolutionary step by deciding to turn 100% organic. This made Sikkim the first state in the world that is 100% organic. No other state in India has been even close to achieving this. In 2021, Sri Lanka attempted to do the same but ended up with disastrous consequences. President Rajapaksa declared a ban on synthetic fertilizers and pesticides almost overnight. It was impossible for the farmers to change their agriculture practices suddenly. After COVID, Sri Lanka was already facing a foreign exchange crisis; it was worsened with this step since agriculture production plummeted. It is reported that 9 out of 10 Sri Lankan families had to skip meals due to food shortages. Compared to this, the experiment in Sikkim was very systematic. Sikkim decided to turn organic in 2003-04. It gave itself ten years to change the situation on the ground, and it was only by 2015 that it declared itself a 100% organic state. The ban on chemical inputs was made official only in 2015. One hundred farmers from South Sikkim were interviewed by the researcher. It was found that, indeed, no farmer used any chemical inputs and that Sikkim, even after 20 years of experimenting, remains a truly organic state. This paper shows the path taken by Sikkim to become a fully organic state. It shows how the entire process was planned systematically. It also notes the way the farmers adapted to this change – how the cropping pattern changed, as well as the difficulties that the farmers faced while adopting organic farming. The paper looks into the replicability of this operation and also the scalability. We conclude that it is not feasible to scale up Sikkim's experiment, and it is also difficult to replicate it. But still, the experiment is successful because Sikkim looks poised to remain organic, mostly by choice.

Keywords: 100% Organic State, Sikkim Agriculture, Scalability of Organic Farming

INTRODUCTION

Sikkim is recognised as the first state in the world to go 100% organic. The UN Food and Agriculture Organisation conferred an award to Sikkim for this achievement in 2019. This paper talks about the process that Sikkim went through to achieve this feat.

Sikkim is one of the smallest states in India, situated in the lap of the Himalayas. There are no planes, only undulating land. The variation in elevation is extreme – from the shores of Teesta at 750 feet to Kanchenjunga at 28,200 feet. About two-thirds of its area is covered by high and snow-capped mountains. Of the remaining area, 46% is under forest land (Envis Centre Sikkim, 2007). Only 11% of the total area of the state is cultivable. The density of the population, hence, is very low – it was just 86 persons per square kilometre in 2011. The total population of the entire state was just 610,577 (Census, 2011) – much lower than even the cities in India. Most people live in rural areas in small hamlets or villages. There are no major industries here; the main occupations are agriculture and government services.

Sikkim is one of the Indian states that have a high human development index. 81% of the population is literate (Census, 2011), which is higher than the Indian average. The Infant Mortality rate is just 5 per 1000 live births as opposed to 27 for India (knoema.com). The Net State domestic product per capita for Sikkim is the third highest in India, next only to Goa and Delhi (NSO, Government of India). Sikkim became a part of India in 1975 when it was underdeveloped. But good administration by its leaders made it one of the fastest-growing states.

LOGIC FOR TURNING ORGANIC

Agriculture productivity in Sikkim was always low. There are few sources of perennial irrigation. Only 15%

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of the agricultural land is irrigated. Sikkim agriculture is mainly rainfed. The mountains are difficult terrain to cultivate in – terrace cultivation requires constant maintenance. Roads are few and narrow, making it difficult to reach markets for inputs. Because of these factors, Sikkim farmers never used many chemical inputs – there was little accessibility to such inputs and hence low awareness.

The 1970s was the decade when the green revolution started in India. By the 1980s, it had spread to most parts of the country. Sikkim government also tried to encourage the use of chemical inputs and hybrid seeds by giving subsidies, but it met with little success. Some farmers started using the HYV seeds, but as mentioned earlier, irrigation was not feasible, and accessibility to chemical fertilisers and pesticides was low. Inorganic farming was not adopted much by the farmers. However, farmers in South Sikkim did start using these inputs.

In 2003, the Sikkim government realised that the limited spread of chemical inputs could actually be a boon. If Sikkim decides to eliminate these inputs that are anyway not used very widely, it can become a totally organic state. Its produce will be purer than other organic farming lands in India simply because there would be no leeching of chemicals into the organic fields through the neighbouring fields. This way, even if the productivity of the Sikkim farms remains low, the value of its crops will increase. It will become a low-volume-high-quality agriculture state.

In addition, it was also realised that tourism is an important contributor to Sikkim's urban economy. If Sikkim goes totally organic, the state can be advertised as serving mainly organic food. It was not expected that normal restaurants and hotels would serve totally organic food (because organic products are expensive). The vision of the government was to slowly encourage homestays so that the tourists could not only stay in Sikkimese houses but also get to personally pick organically grown fruits and vegetables that they would eat. Thus the state can be advertised as the one that would give the tourists pure air (the air quality index, even in its capital Gangtok is always good – always below 50), pure water (coming straight from the streams of the glaciers in the Himalayas) and pure chemical free organic food.

Thus a decision was made in 2003 to turn Sikkim into a 100% organic state. The intention was declared, and it

was decided that by 2015, the state should be completely chemical-free.

THE PROCESS OF CHANGE

It was a democratic government in Sikkim. There was no desire to impose a decision on the people. The government started its reforms by slowly withdrawing subsidies on chemical inputs. Subsidies are given to encourage the use of something. Reduction of subsidies would only imply that the government does not want to support a certain practice.

In 2003, the Sikkim government was giving 40% subsidy on urea. The subsidy was reduced a little, then a little more after some time, and so on. There was no ban on fertilizer use. Only economics was used. In India, the demand for fertilizer is considerably elastic with respect to price. This knowledge was used to discourage the use of chemical fertilizers. The farmers were anyway not using chemical fertilizers very much, so as the subsidies were gradually brought down to zero, the farmers showed little inclination to buy urea.

At the same time, the government started giving grants for building the infrastructure needed for starting organic farming. The most important input that was needed was fertilizers. The government provided both the expertise and material to make the pits. Nurseries were made to grow earthworms. These worms were distributed free of charge to the farmers to start vermicompost. Training sessions for making compost were held in different places across the state.

Since the days of the green revolution, the government in Sikkim used to distribute quality seeds free of cost or at a very low rate to the farmers. The government continued this practice even after 2003 but started giving more seeds for fruits and vegetables to encourage the production of horticultural crops that were more suited to the soil and climate of the state and were also high-value crops.

This process of slowly changing the mindset of the farmers and guiding them towards organic farming continued for 12 years. Only in 2015 chemical farming was officially banned. If someone was found doing organic farming, a fine of Rs. one hundred thousand was imposed, together with 3 months in jail (India Times, 2022; Byju's; Government of Sikkim).

FARMERS' REACTION TO THE DECISION TO GO ORGANIC

Farmers of South Sikkim were closer to Bengal and were exposed to chemical farming. Many were using chemical inputs like DAP and urea for farming. They reported that as the subsidies were reduced, they had to reduce the use of chemical fertilisers. But the soil needed to be healed for organic farming. One farmer reported growing only chillies on his field while treating the soil with organic fertilisers. Another farmer reported that he did not grow anything on the soil for a year. Then started growing a little. They survived on government rations. Also, the government gave a cow to many families. Milk income from the cow also helped them in surviving. Around the same time, a government scheme came that offered one government job per family. Thus for many families, salaries became the main source of household income.

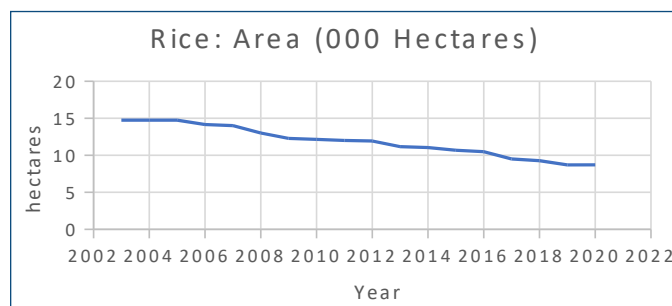
As we moved North, beyond Gangtok, the answer pattern changed. Farmers told us that they never used chemical inputs. Also, almost all of them reported that farming was mainly for self-sustenance and not for the market. Low productivity seemed like a non-issue for them. They did not seem to have been affected by the government's decision to go 100% organic.

The political situation of Sikkim needs to be also mentioned here to explain how there was no opposition to such a radical move. The then Chief Minister, Mr Pawan Kumar Chamling, ruled Sikkim from 1994 to 2019. He was so popular that in Sikkim, there was no opposition party. In 2004, his party won 31 of 32 seats, and in 2009, it was a clean sweep, with all 32 seats going to Chamling. With no opposition to speak of, it was not very difficult to push through the reforms.

CHANGE IN CROPPING PATTERN

As the process of turning Sikkim into an organic state and making agriculture a high value crop sector progressed, cropping pattern for the state started changing. The figures given below show how the cropping pattern moved from cereal centric to horticulture centric.

Rice



Source: ENVIS Hub, Sikkim: Area, Production and Productivity of Rice in Sikkim (sikenvis.nic.in).

Fig. 1: Area under Rice, Sikkim (2003-2020)

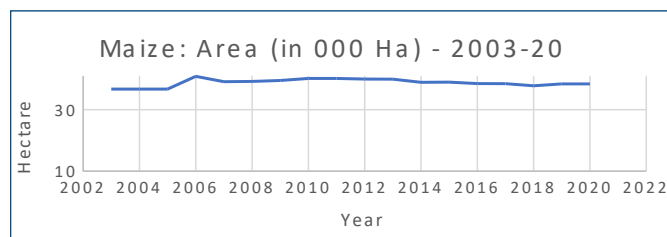
As is evident from Fig. 1, the area under rice is declining. Rice is an important part of Sikkimese diet. It used to be an important crop. But its acreage has declined from 14,740 Ha in 2003 to 8,700 Ha in 2020. If we run a semi-log regression,

$$\text{Log (area)} = \alpha + \beta (\text{year}),$$

β directly gives the rate of growth. The semi-log regression is statistically significant with R square .97 and t statistics as -25.4. It shows that the rice acreage is falling at the rate of 1.4% per year.

Maize

Maize is the most important crop in South Sikkim. The Sikkimese diet often includes maize, and it is also fed to animals. Fig. 2 gives the trend in the acreage of maize.



Source: ENVIS Hub, Sikkim: Area, Production and Productivity of Maize in Sikkim (sikenvis.nic.in).

Fig. 2: Area under Maize, Sikkim (2003-2020)

The area under maize is almost constant: it ranged from 36,700 Ha in 2003 to 38,390 Ha in 2020. Since there is hardly any change, the semi-log regression shows that there is no statistically significant trend. The R square is insignificant at 0.02. Therefore, unlike rice, the cultivation of maize continues. It still remains one of the most important crops for Sikkim.

Other Crops

Similar to the above results, we found that other significant crops are also losing acreage. Wheat acreage declined by 12% per year. Acreage under finger millet, barley, pulses and oilseeds also decreased.

Fruits and Vegetables

Unlike the foodgrains, time series data on fruits and vegetables was not easily available. We could find data only for five years, from 2009-2013. The trend, as can be seen from Table 1, is increasing for fruits. If the year 2009 is not considered, then the trend was increasing even for vegetables. During our interaction with 96 farmers from

South Sikkim and from a village close to Gangtok, we also found that each farmer was growing vegetables.

Table 1: Area (in Hectares) Under Fruits and Vegetables

	<i>Fruits</i>	<i>Vegetables</i>
2009	12200	28700
2010	17500	23900
2011	13400	25000
2012	14700	25600
2013	16000	26100

Source: State at a Glance, Sikkim Vol 1(4), 2015.

PRODUCTIVITY OF CROPS

As mentioned earlier, agricultural productivity has always been less in Sikkim. Cultivation is more for subsistence there and not so much for the market. Most farmers produce for themselves and sell only the little surplus that remains.

The crucial question is, as the state moved towards becoming an organic state, was productivity adversely affected? We present here the data of two cereal crops in Table 2 and that of fruits and cereals in Table 3.

Table 2: Productivity Trends in Rice and Maize

<i>Year</i>	<i>Rice Productivity</i>	<i>Maize Productivity</i>	<i>Year</i>	<i>Rice Productivity</i>	<i>Maize Productivity</i>
2003-2004	1437	1554.5	2012-2013	1790.27	1700.03
2004-2005	1466	1585	2013-2014	1815.74	1723.64
2005-2006	1539.35	1664.85	2014-2015	1828.2	1768.8
2006-2007	1515.9	1588.49	2015-2016	1845.25	1753.56
2007-2008	1632.14	1600	2016-2017	1856.02	1766.11
2008-2009	1709.23	1677.04	2017-2018	1856.24	1767.34
2009-2010	1705.79	1637.72	2018-2019	1856.29	1767.93
2010-2011	1727.63	1647.82	2019-2020	1858.08	1769.03
2011-2012	1757	1680.85	2020-2021	1860.61	1769.68
% increase	29.47877523	13.84239			

Source: Envis Hub, Sikkim.

The productivity of rice increased by 29% in the last 17 years, i.e. by 1.7% per year. The maize productivity increased by about 14% during the same period, giving the growth rate in productivity to be 0.8% per year.

Thus there has been some increase in productivity over the years, but it shows that the introduction of organic farming at least has not resulted in lesser production and productivity in cereals.

Table 3: Productivity in Fruits and Vegetables

Year	Productivity - Fruits (mt/ha)	Productivity - Vegetables (mt/ha)
2009-10	1.5	5.1
2010-11	1.5	5.1
2011-12	1.7	5.1
2012-13	1.6	5.2
2013-14	1.5	5.2

Source: State at a Glance, Sikkim Vol 1(4), 2015.

Table 3 shows that the productivity has been more or less stagnant for fruits and vegetable crops. Farmers have adopted the cultivation of vegetables, but either they do not seem to have learnt the techniques of getting better yields, or the possibility of having an increasing productivity trend does not exist in organic farming.

In short, there have been little gains made in productivity by the farmers. Fortunately, there have been no losses. But by switching to the higher-valued crops of spices, fruits and vegetables, farmers might have increased their incomes.

PROBLEMS WITH ORGANIC FARMING

- *No Solution for Pests/Diseases*

Organic farming does not have very good remedies for plant diseases. While talking to farmers, we were told that if they find a plant getting some fungus or pests, they just remove that plant. Farmers talked about using some remedies like neem oil, cow urine, wood ash, pheromone traps, etc., but the general consensus was that these are not very effective. The most effective remedy is just to uproot the plant and throw it away. However, if the pests spread far and wide, there is no solution.

Some methods like crop rotation and crop mix are also used for preventing diseases. Some biopesticides are there now, but not much is known about them in Sikkim.

- *Production of Organic Fertilizer*

The farmers told us that the process of making fertilisers takes six months. If you have a large farm (which most farmers do not have), the manure made at home might not be enough. Even if you are ready

to buy it from the market (it is not expensive; only Re 1 a kilo), there is no supply. Farmers told us that they use fertiliser only while sowing the seeds. It is not needed after that.

We met a progressive farmer who grows the highest cardamom in the region. He told us that his home production of fertilisers does not meet even half of his needs. He would like to have more fertilisers, but there is little supply in the market. He said that if he can put in more fertilisers, he knows that productivity will increase.

The innovative organic farmers of Gujarat and Maharashtra also have talked about the scarcity of manure when it comes to organic farming. Unless there is commercial production of manure, it will be difficult to sustain the widespread practice of organic farming.

- *Marketing Issues*

There are two issues with marketing of organic products:

- The productivity is low, so the fixed costs are spread over a lesser quantity. That makes organic products more expensive. When compared with the products of chemical farming, these products cost almost double. That reduces the demand for these products.

- The products need to be certified by a government agency that these are produced in a 100% organic manner. All farmers have not been reached yet with this certificate. Therefore farmers are not getting the prices that they deserve to get.

- *Low Productivity*

The productivity of the organic farms is lesser compared to the HYV technology. That is the reason it is often asked whether the world can feed itself if every farm turns organic.

Sikkim suffers from all these problems. Yet, it is successful in sustaining the organic practice. This is because the plants grown are sturdy and suitable for the agro-climatic conditions of the region. They do not face many episodes of pest/disease attacks. Except for 2 farmers (out of 94 that we spoke to), all others said that the manure that they get from their livestock (most have only one cow)

is enough for them because their lands are small. Also, because of the method of cultivation that they use – it requires them to put in fertilizers only once in six months while sowing the seeds.

Marketing is usually a problem that many inorganic farmers in India also report as a major issue. They complain that (a) the volume that they produce is usually difficult to transport, and (b) perishable crops often rot before they are picked up by the traders. Sikkim farmers do not report these problems. The production is mainly for home consumption there. They do not have too much to sell. That is why none of the sample farmers reported difficulty in selling their produce.

If prices are high, the consumers can complain. We talked to some consumers in the main vegetable market of Sikkim. They say that as it is, everything is expensive in Sikkim due to its difficult terrain and poor roads. They do not mind paying some more money to get the best quality vegetables..

IS SIKKIM'S EXPERIMENT SCALABLE?

Sri Lanka crumbled when it decided to become 100% organic, while Sikkim has successfully remained organic for almost 20 years now. The difference was in the procedure. Sikkim turned organic gradually, ensuring that there was no sudden and rude shock to the system. The government had put in place many supports, too – a cow per family, one government job for each family, and sufficient rations distributed through the public distribution system. All these helped the farmers to absorb the shock of lower production in the initial years when the soil had to be treated to become suitable for organic farming.

Since Sikkim's model was successful and has been sustained over time, is it a replicable and scalable model? We feel that it is not. The following are the reasons for our deduction:

- Sikkim could make its farmers adopt organic farming. Such a radical change would not be politically possible in other democratic states. Sikkim could pull this off because there was practically no opposition in the state assembly. Rarely would a state have a government with such a majority.

- Agriculture is for subsistence in Sikkim. Farmers were used to low productivity. States with commercial agriculture would not be able to absorb the losses arising out of the reduction in productivity. As it is, incomes are declining in the agriculture sector. Such a move would hasten that process and could result in widespread protests.
- If productivity remains low in organic farming, it is not possible for a nation to convert fully to this method. It would be difficult to feed millions of its citizens with this method.
- Transition to organic farming has to be accompanied by providing adequate income support so that the incomes of the farmers do not decline. It is possible for a small state to do it, but it is not so possible for a large nation like India; the money required for income support will be too large.
- Organic fertilisers require a lot of cow dung and other mulch. And the processing takes months. Shortage in fertiliser supply can become a major issue.
- The battle against pests has never been convincingly won by humans. Chemical farming has at least some effective methods; organic farming has none. This can become a major hurdle.

CONCLUSION

This study shows that Sikkim could remain organic just because the population has found other sources of income and is not much dependent on agriculture. But it does not seem like a workable model for other regions.

At the same time, offering pure air, water, and food could be a great strategy to attract tourists. Sikkim government should work towards popularizing the homestays. It should also make the certificate of “100% organic” reach to all its farmers. The organic Sikkim can then lead to more tangible benefits for its population.

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