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Trend and Growth Pattern of Organic and Inorganic Farming in Rajasthan

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ABSTRACT

Organic farming is getting more attention in India because people are becoming careful about their health and the environment. Rajasthan is one of the top three organic producing states of the country, although most of its farm land is still under inorganic (chemical-based) farming. This paper studies the trend and growth pattern of organic and inorganic farming in Rajasthan using secondary data taken mainly from the National Programme for Organic Production (NPOP) of APEDA, the Agricultural Statistics of Rajasthan (2011-12 to 2023-24) and the Rajasthan Economic Review (2025-26). The growth of certified organic area (2011-12 to 2024-25) and organic production (2015-16 to 2023-24) is measured with annual growth rates, the compound annual growth rate (CAGR) and a semi-log trend model. The results show that the organic area grew nearly twenty times at a CAGR of about 25.8 per cent and organic production grew nearly ten times at a CAGR of about 28.7 per cent, and both trends are statistically significant at the one per cent level. Even after this fast growth, organic farming covered only 2.76 per cent of the cultivated area of the state in 2024-25, while 97.24 per cent remained under inorganic farming. The study concludes that organic farming in Rajasthan is growing fast but is still very small in size when compared with inorganic farming. It is suggested that certification should be made cheaper and simpler and marketing facilities should be improved so that more farmers can take up organic farming.

Keywords: Organic farming, inorganic farming, Rajasthan, NPOP, compound annual growth rate, trend analysis, semi log trend model.

1. Introduction

Organic farming is a way of farming in which crops are grown without chemical fertilisers, chemical pesticides and other artificial inputs. It depends on natural inputs such as farm yard manure, compost, green manure, bio-fertilisers and crop rotation. According to IFOAM –

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Organics International (2008), it is a farming system that works with natural cycles and tries to protect the health of the soil, the surrounding environment and the people who depend on it. The Codex Alimentarius Commission (1999) too treats it as a whole-farm approach that relies mainly on good farm management and locally available natural resources rather than on bought chemical inputs.

Inorganic farming, also called conventional or chemical farming, is the common system of farming in which chemical fertilisers, pesticides, weedicides, high yielding seeds, machines and assured irrigation are used to get the highest possible yield. This system gave India the Green Revolution and is still the main system of farming in the country and in Rajasthan. However, its long and heavy use has created problems such as falling soil fertility, pollution of ground water and harmful effects on human health.

Because of these problems, organic farming has received growing attention from the government and from consumers during the last two decades. In India, certified organic farming works under two systems. The first is the National Programme for Organic Production (NPOP), which is run by the Agricultural and Processed Food Products Export Development Authority (APEDA) under the Ministry of Commerce and Industry. The second is the Participatory Guarantee System for India (PGS-India). India has the largest number of organic producers in the world (FiBL & IFOAM, 2024). Within the country, Rajasthan has regularly remained among the top three organic states along with Madhya Pradesh and Maharashtra (National Centre for Organic and Natural Farming, 2024).

It is commonly believed that organic farming in Rajasthan is growing. But how fast it is growing, and where it stands against the large inorganic farming base of the state, has not been examined in a systematic way. The present paper tries to fill this gap by analysing the trend and growth pattern of organic and inorganic farming in Rajasthan with the help of the latest available data.

2. Review of Literature

Ramesh et al. (2010) studied certified organic farms in different states of India and compared them with similar conventional farms. The study found that the yields on organic farms were about nine per cent lower, but the cost of cultivation was also lower and the produce received premium prices. As a result, organic farmers earned higher profits than conventional farmers, and the quality of their soil also improved.

Gopinath et al. (2025) reviewed the studies on organic farming in the rainfed areas of India. The review pointed out that rainfed areas already use very small quantities of chemical inputs, so they can be shifted to organic farming easily and at a low cost. The authors suggested that such areas should be given priority in organic farming programmes.

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Kumar Jain et al. (2026) studied the problems faced by organic farmers in Southern Rajasthan. The study reported that 94 per cent of the farmers faced the problem of low production, 78 per cent found the cost of certification high, and 44 per cent did not have proper marketing facilities for their organic produce.

3. Objective of the Study

The objective of the study is as follows:

To analyse the trend and growth pattern of organic and inorganic farming in Rajasthan.

4. Hypothesis

The hypothesis of the study is as follows:

H_0: Organic farming in Rajasthan has not registered a statistically significant growth trend in comparison to inorganic farming.

5. Data Sources and Methodology

The study is based on secondary data. The data on organic area and production have been taken from the National Programme for Organic Production (NPOP) of APEDA (npop.apeda.gov.in). The data on total cultivated area have been taken from the Agricultural Statistics of Rajasthan (2011-12 to 2023-24) and the Rajasthan Economic Review (2025-26). The study covers the area under organic certification from 2011-12 to 2024-25 and organic production from 2015-16 to 2024-25.

The following simple measures have been used in the study:

(i) Total certified organic area = Certified organic area + Area in conversion. (Under NPOP, a farm has to pass through a conversion period of about three years before it becomes fully certified. The area in this waiting period is called the area in conversion.)

(ii) Total cultivated area = Net sown area + Current fallow land.

(iii) Area under inorganic farming = Total cultivated area − Total certified organic area.

(iv) Organic area as per cent of cultivated area = (Total certified organic area ÷ Total cultivated area) × 100.

(v) Total certified organic production = Production from the certified organic area + Production from the area in conversion.

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(vi) Inorganic production = Total production − Total certified organic production.

(vii) Organic production as per cent of total production = (Total certified organic production ÷ Total production) × 100.

(viii) Annual growth rate (%) = [(Value in current year − Value in previous year) ÷ Value in previous year] × 100.

(ix) Compound Annual Growth Rate: CAGR = $[(V_t \div V_0)^{(1/n)} - 1] \times 100$, where V_0 is the value in the first year, V_t is the value in the last year and n is the number of years between them (Gujarati, 2003).

(x) Semi-log trend model: $\ln(Y_t) = a + bt + u_t$, where Y_t is the area or production in year t, a is the intercept, b is the trend coefficient and u_t is the error term (Gujarati, 2003). The compound growth rate from this model is $(e^b - 1) \times 100$, and the t-test on b tells whether the growth is statistically significant or not.

Both CAGR and the semi-log model have been used in the study, and there is a reason for using the two together. CAGR is a simple measure which gives one average growth rate for the whole period, and it makes comparison with other studies easy. But CAGR uses only the values of the first year and the last year and ignores all the years in between. The semi-log model removes this weakness because it is fitted on the data of all the years. It also gives a t-value, with which it can be tested whether the growth is statistically significant or only a matter of chance. Further, farm area and production normally grow in percentage terms every year, and the semi-log model fits this kind of growth well (Gujarati, 2003). For these reasons, CAGR has been used for a simple description of growth and the semi-log model has been used for statistical testing.

6. Results and Discussion

6.1 Current Status of Organic and Inorganic Farming

In 2024-25, the total certified organic area of Rajasthan (fully certified area plus area in conversion) was 5,51,750 hectares. This was about 13.9 per cent of India's certified organic area, and the state stood third in the country in organic production after Maharashtra and Madhya Pradesh (Table 1). But within the state, organic farming covered only 2.76 per cent of the cultivated area, and the remaining 97.24 per cent was under inorganic farming. In simple words, Rajasthan's organic sector is big when compared with other states, but very small when compared with the state's own farm land.

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Table 1. Status of Organic and Inorganic Farming: Rajasthan and India (2024-25)

Indicator (2024-25)	Rajasthan State	India
Certified organic area (ha)	3,03,762	22,54,324
Area in conversion (ha)	2,47,988	17,13,714
Total certified organic area (ha)	5,51,750	39,68,038
Total certified organic production (MT)	5,67,439	46,99,793
Organic share of cultivated area (%)	2.76	2.8%
Inorganic share of cultivated area (%)	97.24	97.2%

Source: *APEDA, Organic Certification Data under NPOP 2024-25 (npop.apeda.gov.in); Agricultural Statistics of Rajasthan (2023-24), Rajasthan Economic Review 2025-26.*

6.2 Trend in Area under Organic and Inorganic Farming

Table 2 shows the area under organic and inorganic farming in Rajasthan from 2011-12 to 2024-25 along with the total cultivated area of the state. The organic certified area increased from only 27,892 hectares (0.14 per cent of the cultivated area) in 2011-12 to a peak of 5,80,680 hectares (2.91 per cent) in 2022-23, and then came down a little to 5,51,750 hectares (2.76 per cent) in 2024-25. This is a growth of nearly twenty times in fourteen years, which works out to a CAGR of about 25.8 per cent. On the other hand, the area under inorganic farming always remained above 97 per cent of the cultivated area, though its share slowly came down from 99.86 per cent in 2011-12 to 97.24 per cent in 2024-25.

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Table 2. Area under Organic and Inorganic Farming in Rajasthan (2011-12 to 2024-25)

Year	Total Cultivated Area (Ha)	Organic Area (Ha)	Organic (%)	Inorganic Area (Ha)	Inorganic (%)
2011-12	1,95,11,101	27,892	0.14	1,94,83,209	99.86
2012-13	1,93,48,247	38,289	0.20	1,93,09,958	99.80
2013-14	1,96,70,525	66,020	0.34	1,96,04,505	99.66
2014-15	1,93,77,451	1,07,523	0.55	1,92,69,928	99.45
2015-16	1,96,21,771	1,55,021	0.79	1,94,66,750	99.21
2016-17	1,96,59,348	1,51,610	0.77	1,95,07,738	99.23
2017-18	1,96,44,981	2,08,571	1.06	1,94,36,410	98.94
2018-19	1,95,67,130	2,23,991	1.14	1,93,43,139	98.86
2019-20	1,95,87,257	2,87,578	1.47	1,92,99,679	98.53
2020-21	1,96,22,592	2,98,686	1.52	1,93,23,906	98.48
2021-22	1,97,14,518	4,88,905	2.48	1,92,25,613	97.52
2022-23	1,99,24,875	5,80,680	2.91	1,93,44,195	97.09
2023-24	1,99,28,048	5,80,092	2.91	1,93,47,956	97.09
2024-25	2,00,01,363	5,51,750	2.76	1,94,49,613	97.24

Source: APEDA, Organic Certification Data under NPOP (npop.apeda.gov.in); Agricultural Statistics of Rajasthan (2011-12 to 2023-24); Rajasthan Economic Review (2025-26).

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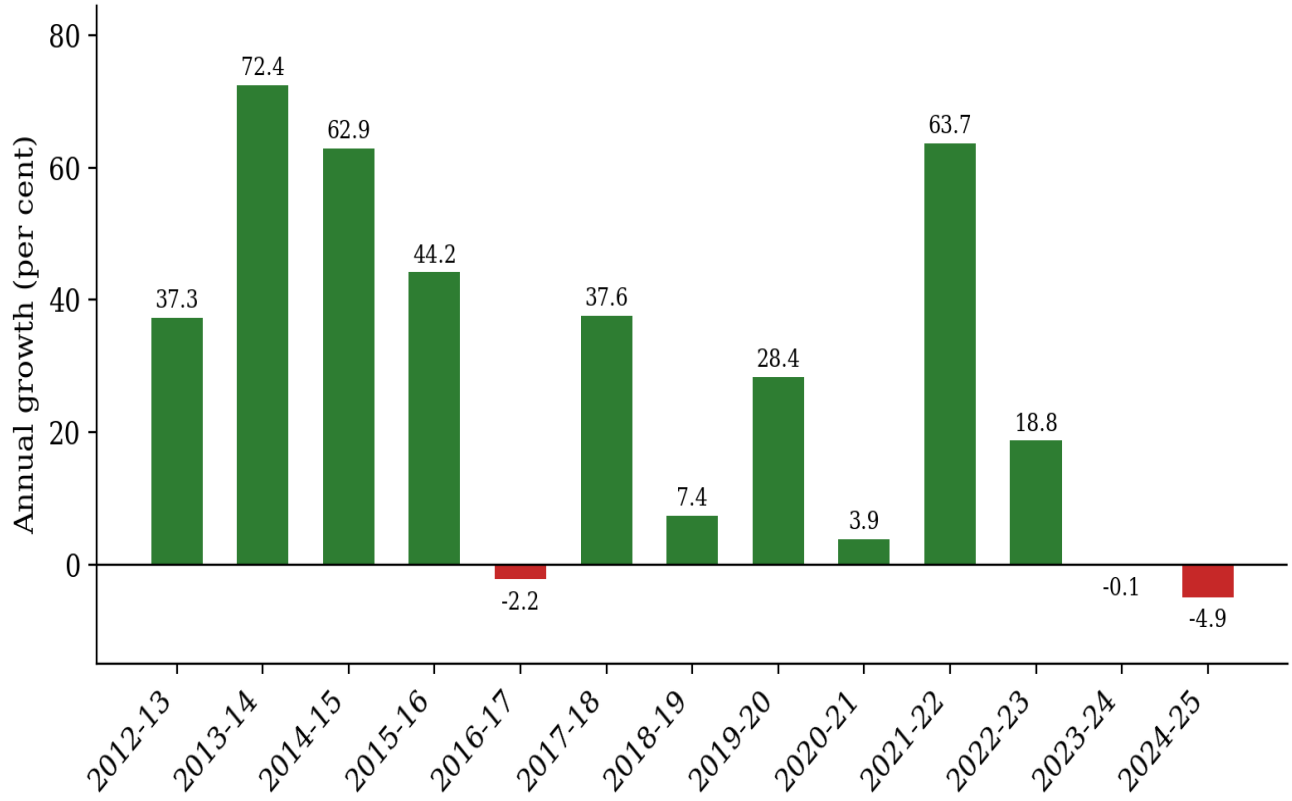
Figure 1. Annual Growth in Organic Certified Area, Rajasthan (2012-13 to 2024-25)



Source: Computed from Table 2.

Figure 1 shows the year-to-year growth in the organic certified area. The growth has not been smooth; it shows big ups and downs, and there are clear reasons for this. In the early years (2013-14 and 2014-15) the base was very small, so even a small addition of area looked like a very big percentage jump (72.4 per cent and 62.9 per cent). Certification under NPOP is also given and renewed in groups, so when a big farmer group joins the programme the area jumps suddenly, and when some farmers do not renew their certificates the area falls suddenly. The fall of 2.2 per cent in 2016-17 took place because some operators did not renew their certification. The big jump of 63.7 per cent in 2021-22 came when large new areas were brought under conversion with the push of schemes such as the Paramparagat Krishi Vikas Yojana (PKVY). In the last two years the area has become almost flat, partly because the cost of certification is high and marketing support is limited. Thus, the ups and downs seen in Figure 1 are a natural feature of certification data and do not mean that actual farming in the state was unstable.

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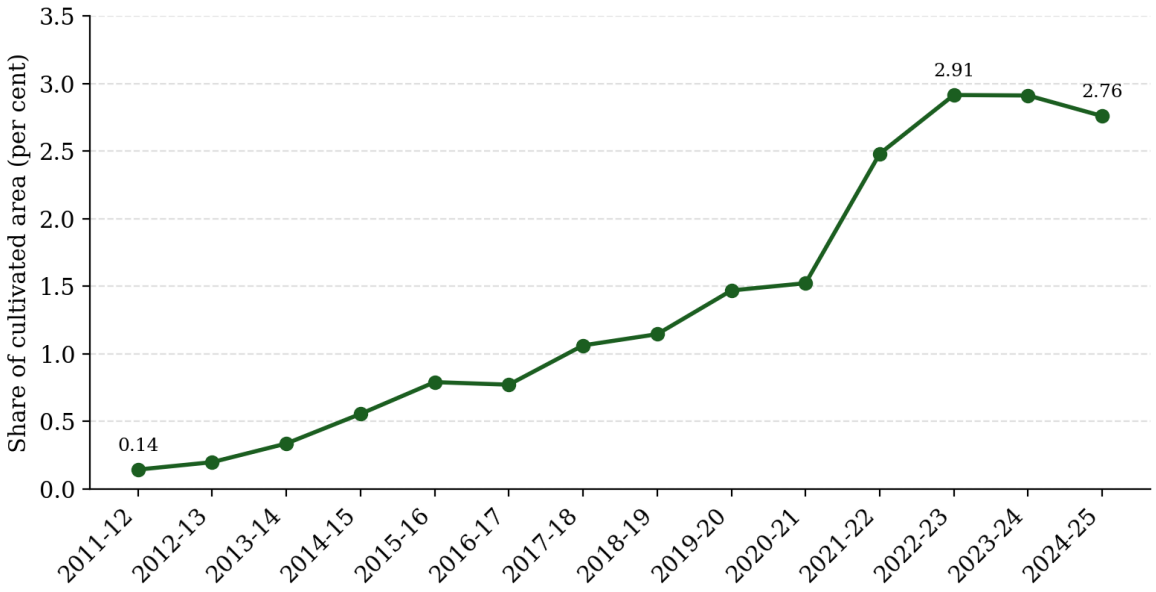
Figure 2. Organic Area as Percentage of Total Cultivated Area, Rajasthan (2011-12 to 2024-25)



Source: Computed from Table 2.

Figure 2 shows the organic area as a percentage of the total cultivated area. Unlike Figure 1, this line moves up in a steady manner, from 0.14 per cent in 2011-12 to 2.91 per cent in 2022-23, with only a small dip at the end (2.76 per cent in 2024-25). This rising line shows that, in spite of the yearly ups and downs, the share of organic farming in the farm land of the state has been increasing continuously, and the share of inorganic farming has been falling by the same amount.

6.3 Trend in Organic Farm Production

Organic production grew even faster than area. As Table 3 shows, the total certified organic production rose from 58,534 tonnes in 2015-16 to 5,67,439 tonnes in 2024-25, that is, nearly ten times in ten years, at a CAGR of about 28.7 per cent. Production increased in nine out of the ten years. The only fall came in 2022-23, when production went down by about 6.9 per cent. Inorganic production, on the other hand, remained the main source of farm output and stayed above 99 per cent of the total production until 2022-23 and was close to 99 per cent in 2023-24.

One point in Table 3 is worth noting. The share of organic farming in the total production of the state was only about one per cent in 2023-24, even though its share in the cultivated area was about 2.76 per cent (Table 2). The reason is that organic farming does not use chemical

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fertilisers, so the yield per hectare is generally lower. As a result, organic farming covers a larger share of the area but gives a smaller share of the production.

Table 3. Organic and Inorganic Farm Production in Rajasthan (2015-16 to 2024-25)

Year	Total Certified Organic Production (MT)	Organic (%)	Inorganic Production (MT)	Inorganic (%)	Total Production (MT)
2015-16	58,534	0.20	2,95,73,159	99.80	2,96,31,693
2016-17	64,245	0.18	3,48,42,359	99.82	3,49,06,604
2017-18	94,029	0.29	3,27,87,476	99.71	3,28,81,505
2018-19	1,34,613	0.39	3,45,54,729	99.61	3,46,89,342
2019-20	1,69,224	0.44	3,83,59,220	99.56	3,85,28,444
2020-21	2,56,386	0.64	4,00,90,756	99.36	4,03,47,142
2021-22	3,46,961	0.91	3,77,68,095	99.09	3,81,15,056
2022-23	3,22,973	0.80	3,99,09,386	99.20	4,02,32,359
2023-24	4,00,927	1.02	3,89,44,408	98.98	3,93,45,335
2024-25	5,67,439	—	—	—	—

Source: Organic production – APEDA, Organic Certification Data under NPOP (npop.apeda.gov.in); inorganic production and total production Agricultural Statistics of Rajasthan (2015-16 to 2023-24). The organic certified production is the commercial output meant for sale and not the actual production. Inorganic production and total production for 2024-25 were not available at the time of study.

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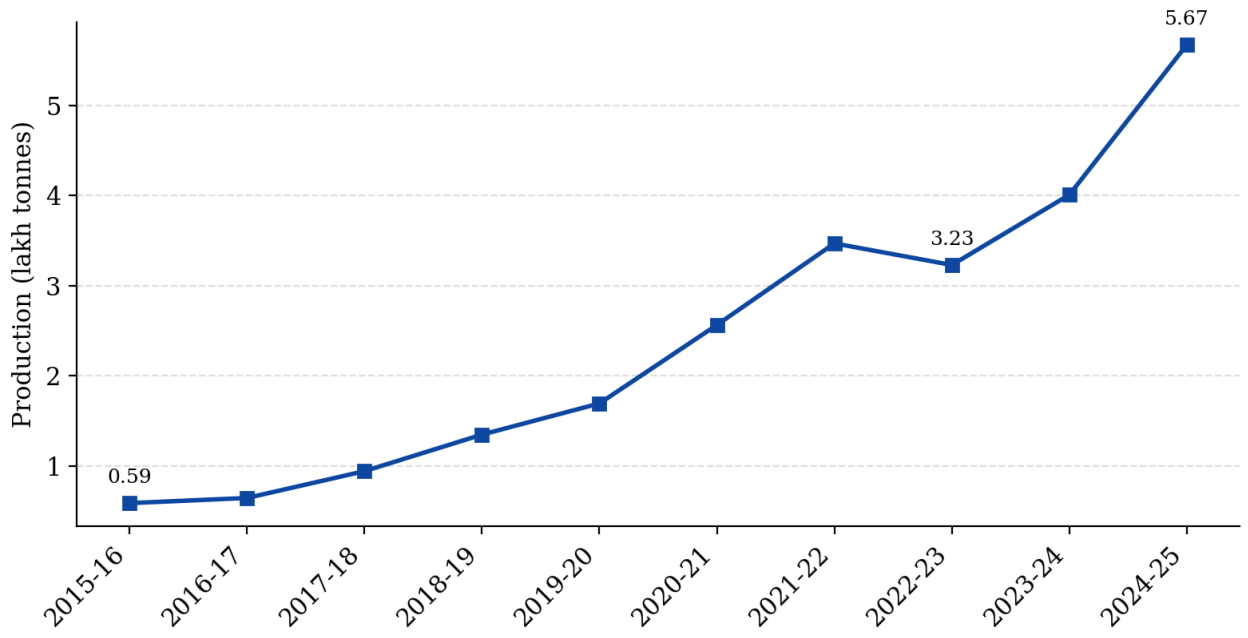
Figure 3. Trend in Organic Certified Farm Production, Rajasthan (2015-16 to 2024-25)



Source: Computed from Table 3.

The fall of 2022-23 seen in Figure 3 was not special to Rajasthan; certified organic production fell in the whole country in that year. The main reasons were a fall in the export demand for Indian organic products and the delisting of some certification bodies by the European Union in 2022, which reduced the certification capacity and raised the costs of the exporters (Press Information Bureau, 2025). Since most of the certified production is linked with exports, the fall in demand appeared as a fall in recorded production. Production recovered quickly in the next two years. It is also worth noting that in 2023-24 and 2024-25 production rose sharply even though the area did not increase. This happened because the large area which had entered the conversion period in 2021-22 became fully certified and started giving full output. This is also the reason why production has grown faster than area over the whole period.

6.4 Test of Hypothesis

To test the hypothesis, the semi-log trend model $\ln(Y_t) = a + bt + u_t$ was fitted on the area and production of both organic and inorganic farming. The estimated values of the intercept (a), the trend coefficient (b), the standard error of b, the t-statistic, R^2 and the compound growth rate are given in Table 4.

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Table 4. Semi-log Trend Estimates for Organic and Inorganic Area and Production

Variable	Period	n	a	b	SE of b	t-value	R^2	Growth Rate (% p.a.)
Organic area	2011-12 to 2024-25	14	10.4234	0.2289	0.0171	13.40**	0.94	25.72
Organic production	2015-16 to 2024-25	10	10.7166	0.2587	0.0153	16.96**	0.97	29.53
Inorganic area	2011-12 to 2024-25	14	16.7836	−0.0005	0.0004	−1.31 (ns)	0.13	−0.05
Inorganic production	2015-16 to 2023-24	9	17.2415	0.0323	0.0072	4.47**	0.74	3.29

*Source: Computed from APEDA NPOP data and Agricultural Statistics of Rajasthan (2023-24). ** denotes significance at the 1 per cent level ($p < 0.01$); ns denotes not significant. Growth rate = $(e^b - 1) \times 100$ from the semi-log model. The inorganic production trend is for 2015-16 to 2023-24, as the 2024-25 figure was not available.*

For organic area, the trend coefficient b is 0.2289 with a t-value of 13.40, and for organic production b is 0.2587 with a t-value of 16.96. Both the t-values are significant at the one per cent level, and the R^2 values (0.94 and 0.97) show that the model fits the data very well. The growth rates obtained from the model (25.72 and 29.53 per cent per year) are very close to the CAGR values, which confirms that the results are reliable.

The picture for inorganic farming is very different. The trend coefficient for inorganic area is almost zero (b = −0.0005) and its t-value (−1.31) is not significant, which means that the area under inorganic farming has stayed almost flat over the whole period. The inorganic production did rise, but only at about 3.29 per cent per year, which is very small when compared with the 29.53 per cent per year growth of organic production. In other words, organic farming grew nearly nine times faster than inorganic farming, and this is why the share of organic farming kept rising while the share of inorganic farming slowly came down.

These results clearly reject the null hypothesis. Organic farming in Rajasthan has registered a statistically significant positive growth trend, and this growth is much faster than that of inorganic farming, whose area showed no significant trend and whose production grew only

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slowly. The share of inorganic farming in the cultivated area accordingly came down from 99.86 per cent in 2011-12 to 97.24 per cent in 2024-25.

6.5 Challenges and Prospects

The fast growth of organic farming in the state faces some problems. A field study in Southern Rajasthan found that 94 per cent of organic farmers reported low production, 78 per cent found the cost of certification high and 44 per cent had no proper marketing facilities (Kumar Jain et al., 2026). At the same time, the prospects of the sector are bright. A large part of Rajasthan is rainfed and already uses very little chemical input, so it can be converted to organic farming easily (Gopinath et al., 2025). Organic produce gets premium prices, which keeps it profitable even when the yields are somewhat lower (Crowder & Reganold, 2015). The Rajasthan Organic Farming Policy, 2017 and schemes such as PKVY also support the sector (Government of Rajasthan, 2017).

7. Conclusion

The study shows that organic farming in Rajasthan has grown at a fast and statistically significant rate. The certified organic area increased nearly twenty times between 2011-12 and 2024-25 and organic production increased nearly ten times between 2015-16 and 2024-25, with compound growth rates of about 25.8 and 28.7 per cent per year. Production has grown faster than area because the land brought under conversion in the earlier years has now started giving fully certified output. The share of organic farming in the cultivated area of the state has gone up steadily from 0.14 per cent to 2.76 per cent, and to that extent the hold of inorganic farming has loosened, though it still covers about 97 per cent of the farm land.

The growth, however, has not been smooth. It has come in waves, with big jumps when government schemes pushed new areas into certification, and small falls when farmers did not renew their certificates or when export demand fell. The flattening of the area in the last two years is a warning sign that the first easy phase of expansion may be over. The future growth of the sector will now depend on how well the problems of high certification cost, low yields during the conversion period and weak marketing are solved. If these problems are handled properly, organic farming can grow from a small niche into an important part of the agriculture of Rajasthan, which will be good for the income of the farmers, the health of the consumers and the soil and water of the state.

8. Suggestions

On the basis of the findings of the study, the following suggestions are made:

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1. The cost of organic certification should be reduced and the process should be made simple, so that small farmers can also get their farms certified. Group certification through farmer groups and farmer producer organisations should be encouraged.
2. Separate mandis or sale counters for organic produce should be set up in the main cities of the state, so that farmers actually receive the premium prices for their produce.
3. Farmers should be given training in preparing and using organic inputs such as compost, vermicompost and bio-pesticides, and these inputs should be made available locally at reasonable rates.
4. Farmers should be given financial support during the three-year conversion period, when the yields fall but the premium prices are not yet available.
5. The rainfed districts of the state, which already use very little chemical input, should be given priority in organic farming schemes.
6. Data on organic area and production should be published regularly at the district level, so that the progress of the sector can be watched properly.

References

APEDA. (2025). Organic certification data under NPOP 2024-25: Production and area. Agricultural and Processed Food Products Export Development Authority, Ministry of Commerce and Industry, Government of India. https://npop.apeda.gov.in.

Codex Alimentarius Commission. (1999). Guidelines for the production, processing, labelling and marketing of organically produced foods (CAC/GL 32-1999). FAO/WHO.

Crowder, D. W., & Reganold, J. P. (2015). Financial competitiveness of organic agriculture on a global scale. Proceedings of the National Academy of Sciences, 112(24), 7611–7616. https://doi.org/10.1073/pnas.1423674112.

Government of Rajasthan. (2024). Agricultural statistics of Rajasthan (2011-12 to 2023–24). Directorate of Economics & Statistics. (2024). Statistics Department, Rajasthan.

FiBL & IFOAM – Organics International. (2024). The world of organic agriculture: Statistics and emerging trends 2024. Research Institute of Organic Agriculture (FiBL) and IFOAM – Organics International.

Gopinath, K. A., Visha Kumari, V., Sowjanya, J., Bhargavi, B., Rajkumar, B., Sunitha, B., Lavanya, N., & Singh, V. K. (2025). Organic farming in rainfed areas of India: A review. Indian Journal of Agronomy, 70(Special Issue), S11–S19.

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Government of Rajasthan. (2017). Rajasthan organic farming policy 2017. Department of Agriculture, Government of Rajasthan.

Government of Rajasthan. (2026). Economic review 2025–26. Directorate of Economics & Statistics, Statistics Department, Rajasthan.

Gujarati, D. N. (2003). Basic econometrics (4th ed.). McGraw-Hill.

IFOAM – Organics International. (2008). Definition of organic agriculture. IFOAM – Organics International.

Kumar Jain, D., Sharma, S., Meena, D., Kumar, A., & Kumari, D. (2026). Constraints of organic farming practices adoption in Southern Rajasthan, India. Asian Journal of Agricultural Extension, Economics & Sociology, 44(2), 75–81. https://doi.org/10.9734/ajaees/2026/v44i22893.

National Centre for Organic and Natural Farming. (2024). Status of organic farming in India. Ministry of Agriculture & Farmers Welfare, Government of India. https://nconf.dac.gov.in.

Press Information Bureau. (2025, December 4). Export of organic food products [Press release]. Ministry of Food Processing Industries, Government of India. https://pib.gov.in/PressReleasePage.aspx?PRID=2198689.

Ramesh, P., Panwar, N. R., Singh, A. B., Ramana, S., Yadav, S. K., Shrivastava, R., & Rao, A. S. (2010). Status of organic farming in India. Current Science, 98(9), 1190–1194.

Ramesh, P., Singh, M., & Rao, A. S. (2005). Organic farming: Its relevance to the Indian context. Current Science, 88(4), 561–568.

Reganold, J. P., & Wachter, J. M. (2016). Organic agriculture in the twenty-first century. Nature Plants, 2, 15221. https://doi.org/10.1038/nplants.2015.221.

Seufert, V., Ramankutty, N., & Foley, J. A. (2012). Comparing the yields of organic and conventional agriculture. Nature, 485(7397), 229–232. https://doi.org/10.1038/nature11069.

