Article

Farmers Perceptions and Barriers to Organic Farming Adoption: Evidence from Himachal Pradesh

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Abstract

This study examines farmers' perceptions and the adoption of organic farming in Himachal Pradesh, focusing on factors influencing the shift from inorganic to organic practices. Data were collected from 400 farmers across Kangra and Mandi districts using a structured questionnaire. Statistical tools, including *t* tests and χ^2 tests, were used to analyse socio-economic differences, cost structures, benefit–cost ratios and perception-related factors such as input availability, training, marketing constraints and profitability. Findings reveal that organic farmers are younger, more educated and better trained than inorganic farmers. While inorganic farming offers higher yields in crops such as wheat and paddy, organic farming demonstrates lower input costs and better profitability for crops such as maize and peas. Differences in perception significantly affect adoption decisions. The study emphasises the importance of policy support in farmer training, input accessibility and market infrastructure. These measures can enhance the adoption of organic practices, contributing to sustainable agriculture in hilly regions.

Keywords

Organic farming, perception, adoption

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Introduction

Indian agriculture in the post-independence era has witnessed a dramatic transformation. India suffered from an acute shortage of food grains until the 1960s.

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It primarily depended on foreign food aid through programmes such as Public Law 480 (PL 480), also known as the Agricultural Trade Development and Assistance Act of 1954, to meet its needs. However, the government measures to enhance food security by boosting food production through the implementation of the Green Revolution in the 1960s completely revolutionised agricultural production (Oyesola & Obabire, 2011). The Green Revolution, powered through the use of high-yielding crop varieties, advanced irrigation techniques and modern farming practices, significantly enhanced the productive capacity of Indian agriculture and made India not just self-sufficient but a surplus nation. However, the long-term adverse effects of these modern agricultural practices on the fertility of land, human health, water table, etc., have seriously questioned the sustainability of these agricultural practices. Thus, the popularity of organic farming is growing worldwide because it aligns agricultural production systems with goals such as increased productivity, farm revenue, food quality and environmental sustainability (Uhunamure et al., 2021). It focuses on growing crops and rearing livestock in a way that works in balance with nature, avoiding the use of chemical pesticides and synthetic fertilisers.

The sustainability of current farming practices in India has been questioned recently. Organic farming has become a prominent alternative approach aimed at promoting sustainable agriculture by conserving the environment and safeguarding long-term food security. The state of Himachal Pradesh, with its diverse topography and a limited presence of pollutants, is a highly suitable region for the practice of organic farming. It is located in the northern part of India and has been actively promoting and implementing organic farming techniques to preserve the environment, enhance soil fertility and ensure the production of healthy and chemical-free agricultural products. The Himachal Pradesh government has introduced various measures to support and promote the adoption of organic farming among cultivators. To encourage this shift, it provides financial assistance and subsidies aimed at facilitating the transition to organic agricultural methods. This encompasses support for acquiring organic inputs, such as bio-fertilisers and biopesticides, and the creation of vermicompost units. Training programmes and seminars are also organised to provide farmers with knowledge and understanding of the fundamental concepts and techniques of organic farming. These programmes cover topics such as composting, seed treatment, crop rotation and pest management through natural methods.

The government has also established model farms in several regions of Himachal Pradesh to demonstrate successful organic agricultural practices. These agricultural establishments function as educational hubs for farmers, offering hands-on demonstrations of organic farming techniques. The cultivation of indigenous and traditional crop varieties that are well-suited to the local agro-climatic conditions is prioritised. Periodic awareness campaigns are also implemented to foster awareness among agricultural practitioners and consumers regarding the advantages of adopting organic farming practices and the significance of consuming food free from chemical additives.

Efforts are also being undertaken to establish market linkages for organic produce originating from the state of Himachal Pradesh. To support this, farmers are

incentivised to acquire organic certification for their agricultural products, as it aids in guaranteeing product quality and attaining more favourable prices within the organic market. These steps have facilitated the practice of organic farming in Himachal Pradesh, which is seeing a surge in popularity. However, there is still massive scope for expanding organic farming in the state, and steps need to be taken to facilitate farmers' further adoption of organic farming.

Positive perception of farmers is very important for the adoption of organic farming; the present article aims to uncover the perception of organic farmers regarding seven key dimensions, namely, knowledge and training, availability of inputs, production cost, marketing, profitability, government aid and environmental sustainability. Organic farmers' perception of these key dimensions will help identify the major problems and bottlenecks that might impact the further adoption of organic farming in the state.

Review of Literature

Organic farming practices hold a crucial place in promoting the sustainability of agriculture. However, its adoption by farmers is affected by multiple factors. These factors associated with the adoption of organic farming can be majorly grouped into four main categories, namely demographic characteristics, farm structure, psycho-behavioural factors and supportive factors (Sapbamrer & Thammachai, 2021). The adoption of organic farming is influenced by various demographic characteristics, such as age, gender, education level, marital status, income and the size of the household. The age of the farmer has been negatively associated with the adoption of organic farming (Métouolé Méda et al., 2018; Rana et al., 2012; Singh et al., 2015). Higher levels of education among farmers were observed to have a positive correlation with the adoption of organic farming practices (Azam & Banumathi, 2015; Genius et al., 2006). Female farmers are also reported to exhibit a higher likelihood of adopting organic farming in comparison to male farmers (Azam & Banumathi, 2015; Métouolé Méda et al., 2018). In addition, a greater household size has been positively associated with the likelihood of adopting organic farming methods (Wollni & Andersson, 2014).

The psycho-behavioural factors impacting the adoption of organic farming include the attitude and perception of farmers regarding different facets of organic farming. The positive attitude of organic farmers about its environmental benefits was associated with higher adoption of this practice (Genius et al., 2006; Lapple & Van Rensburg, 2011). Risk-averse farmers were found to exhibit a lower likelihood of adopting the practice of organic farming (Haris et al., 2018; Lapple, 2010). Among the farming factors, farm size is found to be negatively associated with the adoption of organic farming, partly due to high labour requirements (Khaledi et al., 2010; Liu et al., 2019; Mala & Maly, 2013). Technological challenges and the requirement for more labour input by the farmers were found to negatively impact the adoption of organic farming (Schneeberger et al., 2002). Further, lower production costs and higher prices, thus higher profitability, positively impacted the adoption process (Panneerselvam et al., 2012). Problems

related to attacks by pests served as a hindrance in the adoption process (Alotaibi et al., 2021).

Factors facilitating the adoption of organic farming include the presence of effective marketing support (Khaledi et al., 2010), availability of proper training (Karki et al., 2011; Singh et al., 2015), access to proper resources such as adequate water supply (Pinthukas, 2015), and credit facilities (Rana et al., 2012). Further, technological support (Khaledi et al., 2010) and the availability of subsidies (Genius et al., 2006; Mala & Maly, 2013) also increased the adoption process significantly. Thus, raising knowledge, offering training, and expediting the certification procedure may change farmers' perceptions and encourage organic farming practices (Uhunamure et al., 2021).

The reviewed literature highlights the pivotal role of farmers' perceptions in influencing the adoption of organic farming practices. In this context, the present study aims to assess the variations in farmers' perceptions and examine their impact on the adoption of organic farming in Himachal Pradesh.

Materials and Methods

This research relies on primary data gathered from Himachal Pradesh using a structured questionnaire. The sample size was calculated employing the Cochran formula, outlined as follows:

$$n_0 = \frac{Z^2 pq}{e^2},$$

where n_0 is the desired sample size, Z is the z value corresponding to the selected level of precision, p refers to the proportion of the population possessing the attribute in question, $q = 1 - p$, and e refers to the level of precision. Taking a 95% level of confidence and maximum variability exhibited by $p = 0.5$, the sample size was calculated as follows:

$$n_0 = \frac{(1.96)^2 (0.5)(0.5)}{(0.05)^2} = 384.$$

In order to account for non-response errors, a round-off figure of 400 was used for the study. A multistage stratified sampling approach has been used to collect primary data. Out of 12 districts of Himachal Pradesh, two districts were selected, namely Kangra and Mandi districts (see Figure 1). These districts were chosen due to their relatively high concentration of farmers engaged in organic farming practices. Two blocks were selected randomly within these districts. The two blocks from Kangra district were Nagrota Bagwan and Sulah, and Mandi Sadar and Seraj were from Mandi district.

The perception of farmers regarding organic farming practices was assessed across seven major dimensions, namely knowledge and training, availability of inputs, production cost, marketing, profitability, government support and environment and sustainability. The data regarding these perceptions was obtained by

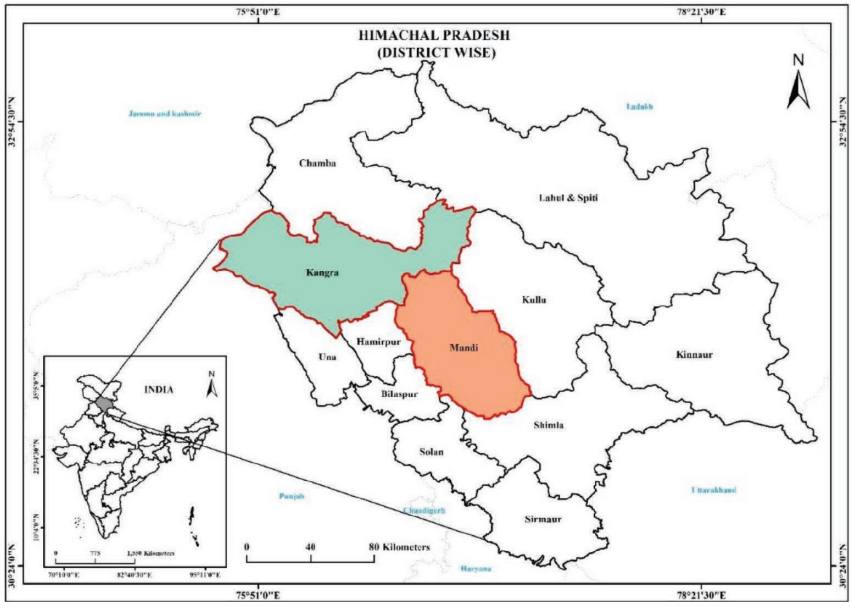

Figure 1. Showing the Location of the Study Area.

administering a Likert scale questionnaire. Since attitude cannot be measured directly, different sets of questions were used to capture the attitudes of farmers about different dimensions. In order to ensure the reliability of this set of questions in capturing different attitudes, the Cronbach αtest was performed. It is estimated using the following formula:

$$\alpha = \frac{N\bar{C}}{\bar{V} + (N-1)\bar{C}},$$

where N denotes the total number of items, $\bar{C}$ represents the mean inter-item covariance, and $\bar{V}$ signifies the average variance of the items. A given set of items/questions is said to be a reliable measure of a variable if the value of Cronbach's α comes out to be 0.70 or above. After ascertaining the reliability, descriptive statistics were employed to present a clear picture of the attitude of farmers.

Further, in order to determine if the difference in perception of organic and inorganic farmers was significant across these key dimensions, the *z*-test of mean difference was used. The test statistic was calculated as follows:

$$z = \frac{\overline{x_1} - \overline{x_2}}{\sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}}},$$

where $\overline{x_1}$ and $\overline{x_2}$ refer to the mean of perception for organic and inorganic farmers, respectively, σ_1 and σ_2 refer to the standard deviations of organic and inorganic

farmers across the dimensions, and n_1 and n_2 refer to sample sizes of organic and inorganic farmers.

Results and Discussion

This section presents the results regarding the perception of farmers across the seven dimensions, namely knowledge and training, availability of inputs, risk in production, marketing constraints, profitability, government aid and environment and sustainability. First, the Cronbach α test was administered to ensure that the questions taken up in the study to measure the perception of farmers across these seven dimensions are internally consistent. The results of the same are presented in Table 1.

The questions designed to assess various farmer perceptions regarding organic farming demonstrated internal consistency, as indicated by a Cronbach's αvalue exceeding 0.70. Thus, the questions aimed at measuring the attitude of these dimensions could be considered as reliable estimates of the said attitude.

Table 2 presents the results for the perception of farmers regarding different dimensions related to organic farming procedures and practices. A score of 1 in the questions indicates complete disagreement with the statement/question, while a score of 5 indicates complete agreement. Depending on the nature of the questions, the score thus indicates either a positive or negative perception of farmers regarding different dimensions that impact their decision to adopt organic farming practice

Perception regarding the availability of knowledge and training about any farming practice is critical in fostering its adoption. Farmers are expected to adopt organic farming if they perceive that the information regarding its practice is easily accessible. It helps to reduce uncertainty, aid in developing required skills and provide proper support networks to understand the process and benefits of organic farming. Overall, with a mean score of 3.86, organic farmers reported a better perception of the availability of knowledge and training on organic farming practices in Himachal Pradesh. The inorganic farmers had a less positive perception, with a mean score of 2.93. Significantly higher mean scores across all individual questions reflect this. Thus, a better perception of knowledge and training related

Table 1. Value of Cronbach's α Among Items Across Each Perception.

Perception	Cronbach's α	Number of Questions
Knowledge and training	0.809	5
Availability of inputs	0.825	6
Risk in production	0.814	4
Marketing constraints	0.894	5
Profitability	0.950	7
Government support	0.855	5
Environment and sustainability	0.875	4

Source: Computed from the field survey.

Table 2. Perception of Knowledge and Training among Farmers in Adoption of Organic Farming.

S. No.	Questions	Organic	Inorganic	Difference
1	There is adequate guidance and training.	3.92	2.97	0.95[a] (10.51)
2	There is availability of training at regular intervals.	4.03	2.98	1.05[a] (13.46)
3	You have a good understanding of seed variety, seed rate, seed treatment and time of sowing.	3.83	2.86	0.97[a] (12.90)
4	You have a good understanding of the different types of crops and their suggested dosages.	3.75	2.92	0.83[a] (10.83)
5	You have sufficient knowledge about how to make bio-insecticides.	3.78	2.96	0.82[a] (11.70)
	Mean of all five items	3.86	2.94	0.92[a] (16.42)

Source: Computed from the field survey.

Notes: Figures in the parentheses refer to *z*-values.

'a' indicate significance at 0.01 and 0.05 levels for a two-tailed *z*-test.

to organic farming practices seems to be a contributing factor in the adoption of organic farming in the state.

Another major requirement in farming practice is the regular availability of good-quality inputs as presented in Table 3. Any shortage in inputs directly impacts agricultural productivity. In the questions probing the availability of inputs of organic farming, a higher score, above 3, shows positive perception and a lower one exhibits negative perception. Overall, the perception regarding the availability of inputs such as seeds, irrigation facilities, bio-fertilisers and biopesticides was poor among both types of farmers, as indicated by low scores of 2.34 for inorganic farmers and 1.65 for organic, which is less than 3 for both. However, this perception was even worse among the inorganic farmers, as indicated by a significantly lower score of 1.65.

Production-related risks in farming profoundly impact the stability of agricultural production and productivity. It serves as a great disincentive to invest in agriculture and thus impedes its progress. A negative perception regarding production risks associated with organic farming can hinder its adoption among farmers currently practising inorganic methods. In the question about production risk, a higher score indicated a high perception of risk and vice versa (see Table 4). Thus, a higher-than-average score of 3.49 indicates a negative perception of organic farmers about production-related risks.

Both organic and inorganic farmers reported negative perceptions regarding risks associated with organic farming practices, as indicated by the mean scores of 3.49 and 4.09 for both types of farmers. This negative perception was common for the availability of all types of major production risks, like risks related to low

Table 3. Perceptions of Availability of Inputs in Adoption of Organic Farming.

S. No.	Questions	Organic	Inorganic	Difference
1	Good-quality seed	2.53	1.61	0.92[a] (9.80)
2	Proper irrigation facilities	2.05	1.68	0.37[a] (4.56)
3	Labour availability	2.52	1.64	0.88[a] (10.53)
4	Required manures and bio-fertilisers	2.48	1.65	0.83[a] (9.52)
5	Supply agencies are nearby.	2.10	1.64	0.46[a] (5.92)
6	Good availability of Biopesticides	2.34	1.72	0.62[a] (7.11)
	Mean of all six items	2.34	1.66	0.68[a] (10.06)

Source: Computed from the field survey.

Notes: Figures in the parentheses refer to z-values. 'a' indicate significance at 0.01 and 0.05 levels for a two-tailed z-test.

Table 4. Perceptions of Risk in Production Among Farmers in Adoption of Organic Farming.

S. No.	Questions	Organic	Inorganic	Difference
1	There is a risk of low yield.	3.81	4.03	−0.22[b] (−2.54)
2	There is a risk of insect attack.	3.29	4.08	–0.79[a] (−11.03)
3	There is a risk of weeds.	3.33	4.09	−0.76[a] (−9.82)
4	There is a risk of low quality.	3.54	4.17	−0.63[a] (−8.02)
	Mean of All four items	3.49	4.09	−0.60[a] (−10.28)

Source: Computed from the field survey.

Notes: Figures in the parentheses refer to z-values. 'a' and 'b' indicate significance at 0.01 and 0.05 levels for a two-tailed z-test.

yield, insect attack, weeds and low quality. However, inorganic farmers reported significantly higher perceptions of risk and, thus, more negative perceptions in comparison to their organic counterparts.

Marketing agricultural products is critical to ensure agriculture's economic viability. It helps connect the farmers and consumers effectively, thus ensuring an efficient supply chain and maximum benefit for both parties. In the absence of proper marketing facilities, the agricultural producer will not be able to reach the

Table 5. Perceptions of Marketing Constraints Among Farmers in Adoption of Organic Farming.

S. No.	Questions	Organic	Inorganic	Difference
1	Lack of purchasing agencies for organic products	4.03	4.17	−0.14 (−1.63)
2	Dependence on a middleman for disposal	3.94	4.23	−0.29[a] (−4.03)
3	No purchasing agencies in the rural area	3.99	4.15	−0.16[b] (−2.04)
4	A scarcity of marketing information	4.05	4.18	−0.13 (−1.57)
5	The market for organic products is unstable	4.06	4.16	−0.10 (−1.16)
	Mean of all five items	4.01	4.18	−0.17[a] (−2.85)

Source: Computed from the field survey.

Notes: Figures in the parentheses refer to z-values.

'a' and 'b' indicate significance at 0.01 and 0.05 levels for a two-tailed z-test.

right consumer and thus will not be able to fetch the right prices for the products. In the question about marketing constraints, a higher score indicated higher marketing constraints and vice versa. Thus, a higher-than-average score of 4.01 indicates a negative perception of organic farmers about marketing facilities.

Overall, organic and inorganic farmers had very high negative perceptions about the availability of marketing facilities for organic produce, which is shown by a mean score of 4.01 for organic and 4.17 for inorganic farmers (see Table 5). Both types of farmers reported a lack of availability of proper purchasing agencies, dependence on middlemen, lack of information about marketing facilities and instability of the market. Although inorganic farmers recorded significantly higher scores than their organic counterparts, this difference was not very wide. Thus, based on findings related to this dimension, it can be concluded that the marketing of organic products is one of the major issues related to organic farming practices.

Profitability is the cornerstone of any economic activity. As long as the farmers do not hold a positive perception of the profitability of their operations in organic farming, the adoption of this farming practice cannot reach its full potential. In the question pertaining to profitability, a higher score indicated a poor perception of profitability in organic farming and vice versa. Again, both organic and inorganic farmers reported negative perceptions, with a mean score of 3.78 and 4.17 regarding the profitability of organic farming practices in Himachal Pradesh as shown in Table 6. There were concerns regarding high production costs, low prices, higher preparatory costs, lack of demand, spoilage, transportation costs and lack of proper packaging facilities. However, inorganic farmers reported significantly higher scores across all the questions and across this dimension, indicating a more negative perception regarding its profitability.

Table 6. Perceptions of Profitability Among Farmers in Adoption of Organic Farming.

S. No.	Questions	Organic	Inorganic	Difference
1	High production cost	4.05	4.30	−0.25[a] (−2.82)
2	Low prices of organic products	3.60	4.19	−0.59[a] (−7.10)
3	The initial set-up costs for organic farming are higher compared to inorganic farming	3.72	4.11	−0.39[a] (−4.77)
4	Lack of high demand for organic products	3.79	4.20	−0.41[a] (−4.44)
5	The danger of spoilage during storage	3.73	4.12	−0.39[a] (−4.29)
6	Transportation costs are very high	3.87	4.16	−0.29[a] (−3.27)
7	Lack of proper gardening and packaging facilities	3.75	4.12	−0.37[a] (−4.53)
	Mean of all seven items	3.79	4.17	−0.38[a] (−5.89)

Source: Computed from the field survey.

Notes: Figures in the parentheses refer to z-values.

'a' indicate significance at 0.01 and 0.05 levels for a two-tailed z-test.

Government facilities play a vital role in promoting the adoption of organic farming practices. Providing extension services and financial incentives helps create a supportive ecosystem for the widespread adoption of organic farming. A higher score in this dimension indicated the availability of government support and, thus, a positive perception. Both organic and inorganic farmers had a strong positive perception, with a mean score of 4.17 and 3.64 regarding this aspect of organic farming (see Table 7). There was a perception of the excellent availability of loan facilities, subsidies, testing facilities, etc., provided by the government. However, again, organic farmers reported significantly higher scores than the inorganic ones, thus indicating better perception across this dimension (see Table 7).

Organic farming is beneficial for environmental stability, as it minimises the ecological impact of agricultural practices. If the farmers have a positive perception regarding the sustainability and benefits of organic farming as opposed to inorganic practices, it might further motivate them to adopt it. Both groups of farmers again reported favourable perceptions of the sustainability of organic farming and environmental benefits, with organic farmers reporting significantly higher scores, with a mean score of 4.23, than their inorganic counterparts, with a mean score of 4 (see Table 8).

Based on the assessment of the perception of organic and inorganic farmers across these seven dimensions, it can be concluded that organic farmers have better perceptions than inorganic ones. However, both groups reported poor

Table 7. Perceptions of Government Facilities Among Farmers in Adoption of Organic Farming.

S. No.	Questions	Organic	Inorganic	Difference
1	Availability of loan facilities	4.14	3.71	0.43[a] (4.71)
2	Proper government facilities	4.21	3.60	0.61[a] (7.47)
3	Availability of agriculture officers	4.20	3.36	0.84[a] (12.06)
4	Availability of subsidy	4.11	3.73	0.38[a] (4.97)
5	Sufficient testing facilities (soil, products, etc.)	4.18	3.84	0.34[a] (3.65)
	Mean of all five items	4.17	3.65	0.52[a] (8.57)

Source: Computed from the field survey.

Notes: Figures in the parentheses refer to z-values.

'a' indicate significance at 0.01 and 0.05 levels for a two-tailed z-test.

Table 8. Perceptions of Sustainability Among Farmers in Adoption of Organic Farming.

S. No.	Questions	Organic	Inorganic	Difference
1	Inorganic farming is not sustainable.	4.22	3.86	0.36[a] (4.65)
2	Inorganic farming leads to unhealthy food production.	4.24	4.14	0.10[b] (1.24)
3	Inorganic farming leads to the pollution of water.	4.28	3.93	0.35[a] (4.39)
4	Inorganic farming is associated with exposure to chemicals.	4.18	4.09	0.09 (1.12)
	Mean of all four items	4.23	4.00	0.23[a] (3.64)

Source: Computed from the field survey.

Notes: Figures in the parentheses refer to z-values.

'a' and 'b' indicate significance at 0.01 and 0.05 levels for a two-tailed z-test.

perceptions about the availability of inputs, production risk, profitability and marketing facilities available for organic farming in Himachal Pradesh.

Conclusion and Suggestions

The study found that both organic and inorganic farmers of Himachal Pradesh have a positive perception of the availability of knowledge and training, government support and environmental sustainability associated with the practice of

organic farming. However, their perception of the availability of inputs, production cost, marketing and profitability of organic farming was poor. Availability and efficient distribution of good-quality inputs were found to be deficient in the state. Further, farmers' perceptions of the profitability of organic products were found to be poor. They also reported higher risks associated with organic farming yield, coupled with marketing bottlenecks. These perceptions were notably unfavourable among inorganic farmers in the state and may serve as a barrier to their adoption of organic farming practices.

The following measures are proposed to support the shift towards sustainable farming and encourage the adoption of organic agriculture:

- *Expand access to farmer training and field-level guidance*, especially in bio-input preparation, seed treatment and organic certification processes.
- *Decentralise the distribution of quality organic inputs*, including seeds, bio-fertilisers and biopesticides, to effectively reach remote farming communities.
- *Invest in organic market infrastructure*, such as dedicated procurement centres, certification support, storage and marketing platforms, to reduce middleman dependency.
- *Empower women and engage youth* through targeted schemes and cooperatives, as they are more inclined towards adopting sustainable practices.

These recommendations are essential for policymakers, NGOs, and agricultural planners to strengthen the organic farming ecosystem in hill states such as Himachal Pradesh and support sustainable, inclusive agricultural development.

Declaration of Conflicting Interests

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