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Comparative economics of organic and inorganic wheat production in Western Maharashtra

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Abstract

All across the world, organic farming and food items have grown in popularity. The resource intensive ways of Indian agriculture has raised serious sustainability issues. Organic farming is one of the way found to meet the objectives of sustainable agriculture. India is the world's second-largest producer of wheat, accounting for almost 10% of global production. The present investigation was intended to depict the picture of cost and returns and sustainability in Pune district and it was aimed to examine resource use levels, cost and returns structure, resource use efficiencies, sources yield gap and sustainability of wheat production. The study was based on the primary data for the year 2020-21 collected from the randomly selected 60 wheat growers spread over six villages from purposively selected.

The tabular analysis techniques of averages, percentages, ratios, standard cost concepts, were used for interpretation of data. In addition, the Cobb Douglas production, output decomposition model and sustainability index were used for arriving meaningful findings.

The results of the study revealed that the total per hectare cost of cultivation under organic was higher i.e. Rs. 86031.26 than on inorganic wheat production (Rs. 76003.06). The per quintal production cost under organic wheat production was Rs 3849.27 nearly doubled of per quintal cost under inorganic wheat i.e., Rs 2120.62, because per hectare yield of wheat on organic grower's farm was lower (22.35 qt/ha) than an inorganic wheat production farms (35.84 qt/ha). The total per hectare returns obtained under organic wheat production were higher i.e. Rs.123614.35 than the inorganic wheat production (Rs 104260.00). The average market price was significantly higher for organic wheat (Rs 5335.00/ql) was significantly high as compared to market price under inorganic wheat (Rs 2750.00/ql). The estimated B:C ratio for organic and inorganic wheat cultivation were 1.38 and 1.29, indicated that organic wheat production was more profitable than inorganic wheat production even though the cost of cultivation was higher under organic farming in Pune District.

Keywords: Oral healthcare, anti-inflammatory, antibacterial, antifungal, analgesic, strong gums, tooth decay, toothache, redness, swelling in mouth, fresh breathe

1. Introduction

Organic agriculture is a production method that maintains the health of soils, ecosystems, and people, according to the International Federation of Organic Agriculture Movements (IFOAM). It realizes that organic farming integrates science, creativity, and tradition to benefit the environment as a whole, establish just relationships, and improve everyone's quality of life. The IFOAM's four guiding principles for organic farming are the principles of health, ecology, equity, and caring.

1.1 Global scenario for organic farming

Asia saw sustained significant growth in the organic industry. Consumer awareness of organic, locally grown food has grown in part as a result of COVID-19, and sales of organic goods have increased in several nations. In order to promote the growth of organic agriculture, many Asian nations created policies and tightened preexisting legislation. While COVID-19 had a favorable impact on the market in the majority of the countries, the inspection bodies were negatively impacted, having to conduct online inspections and delay the validity of certifications under the pandemic.

1.2 Area under organic farming

Across the world, organic farming and food items have grown in popularity. The overall area of cropland used for organic farming has increased during the last three decades. About 74.9 million hectares of land were managed for organic agriculture globally in 2020. Organic agricultural acreage has multiplied by five times since 1999. (2020). Oceania has the most acreage that is used for organic farming. Oceania thus takes the top spot with 35.9 million hectares of land total under organic farming, followed by Europe with 17.1 million hectares.

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The other significant locations for organic farming are Africa, Asia, Northern America, and Latin America. Nearly half of the world's organic farming acreage is in Oceania. Nearly 23 per cent of the world's agricultural land is organic, with Latin America coming in second with 13 per cent. Europe has seen a very steady increase in organic land over the years. Figure presents the specifics. (Source: The World of Organic Agriculture Statistics and Emerging Trends 2022)

Table 1: State wise area under organic farming in India (2016-17 to 2020-21), (Area in ha)

Sr. No	State Name	2016-17	2017-18	2018-19	2019-20	2020-21	Average	% Change
1	Madhya Pradesh	2292697	1156881	918303	1161015	1637730	1433325	-29
2	Rajasthan	539522	442134	632701	539246	481862	527093	-11
3	Maharashtra	292392	304075	261572	293135	371798	304594	27
4	Chhattisgarh	179752	191465	206181	208393	286685	214495	59
5	Himachal Pradesh	14377	170154	203848	204836	203737	159390	1317
6	Jammu and Kashmir	181608	180870	187003	215276	192770	191505	6
7	Karnataka	81949	105515	104962	170419	174424	127454	113
8	Uttar Pradesh	101460	192734	205981	132032	159308	158303	57
9	Gujarat	70495	85401	94709	95208	147866	98736	110
10	Odisha	99736	117910	127852	115677	96307	111496	-3

Source: APEDA, <https://www.apeda.gov.in/>

Madhya Pradesh has certified the most land among all the states, with the next greatest areas being in Rajasthan, Maharashtra, Chhattisgarh, Jammu and Kashmir, Uttar Pradesh, and Himachal Pradesh. The area under organic farming has been decreases during period from 2016-17 to 2020-21 (Table 1.1) in the states of Madhya Pradesh, Rajasthan, and Odisha because it showed negative growth i.e. -29 per cent, -11 per cent and -3 per cent, respectively. The Among the all states, Himachal Pradesh was showed highest growth rate (1317%). Sikkim (2016) and Lakshadweep (2020) made the astounding accomplishment of turning all of its arable land to organic certification. Source: APEDA, <https://www.apeda.gov.in/>

Considering the growing importance of organic farming and wheat production, as well as the very few of studies on comparing organic and conventional wheat production systems has been carried out so far, it has been planned to have an empirical study to throw a light on an different economical aspects of organic wheat production a study entitled "Comparative Analysis of Organic Vs Inorganic Wheat Production for Sustainable Farming in Western Maharashtra" was attempted with the help of following objectives.

2. Objectives of the study

1. To examine the cost and returns of wheat under organic and inorganic method of cultivation.
2. To analyse the resource use efficiency of organic and inorganic method of wheat cultivation.

3. Materials and Methods

3.1 Sampling Design

A multistage random sampling design was used to conduct the present study. The sampling design consists of 4 stages. Where in selected design, tehsils were primary unit of sample, village are secondary unit and the sample respondents were tertiary unit of sampling.

3.2 Selection of the study area

Organic farming is one of the instruments for improvement of sustainability of agriculture. So, it is getting popularized in the Maharashtra state and wheat production is concentrated in

1.3 State wise area under organic farming in India

The entire area under organic certification process (registered under National Programme for Organic Production) is 57.82 lakh ha (2020-21). This contains 16.81 lakh ha for collecting wild harvests and 41.01 lakh ha for cultivable land. The India is making spectacular progress in organic farm production. The state wise area under organic farming in India is presented in Table 1.

the pocket of Western Maharashtra. Hence Western Maharashtra region was selected purposively for the study.

3.2.1 Selection of the District

Out of 10 districts of Western Maharashtra, farmers nearly all districts practice organic method of cultivation. Pune is one of the leading district in numbers of organic growers, was selected purposively.

3.2.2 Selection of tehsils and Villages

On the basis of information of area of organic wheat concentration and number of organic farmers, three tehsils viz Baramati, Junnar, and Purandar tehsils were selected purposively. Similarly, the villages were also selected on the basis of number of organic farmers.

3.4 Analytical tools for data analysis

3.4.1 Estimation of Costs and Returns

The various components of costs were assessed using standard cost concepts as listed below to calculate the cost and returns. A basic tabular technique was used for this objective.

Cost 'A' = Value of purchased material inputs (seeds, FYM, chemical fertilizers/ organic fertilizer, plant protection) hired human labour, animal labour (hired or owned), hired farm machinery, irrigation charges, interest on working capital, depreciation on farm machinery and farm buildings, land revenue cesses and other taxes

Cost 'B' = The imputed cost, which is added to Cost 'A,' is made up of the rental value of owned land and interest on fixed capital. Cost B = Cost A + Rental Value of Land + Interest on Fixed Capital

Cost 'C' = It refers to the entire cost of producing, which includes all expenditures (actual as well as imputed). To arrive at cost C, the imputed value of family labours was added to cost 'B' Thus,

Cost C = Cost B + Imputed Value of Family Labour

4. Results and Discussion

4.1 Cost of cultivation under organic and inorganic wheat production

The cost of production is one of the parameters for judging the economic viability of organic wheat and inorganic wheat production. Analyzation of the cost of production of different types of crops can help the farmers in making better decisions on what and when to produce. Cost of production enables the small farmers to select appropriate inputs to reduce risk associated with weather or market fluctuations. The estimated results of per hectare cost of production are presented in Table 2. The results showed that the total cost of cultivation per hectare under organic and inorganic wheat production was Rs 86031.26 and Rs 76003.06, respectively. The per hectare cost 'A', cost 'B' and cost 'C' were worked out to be Rs 53177.61, Rs 78017.16 and Rs 81017.16, respectively at overall level. The average Cost 'A' for both inorganic and organic wheat farming was Rs 50021.49 and Rs 56333.72 accounted share for 65.82 per cent and 65.48 per cent to the total cost of cultivation, respectively. The further analysis of Cost 'A' revealed that, FYM cost (17.18%) was accounted for major contribution to the total cost under organic wheat cultivation followed by machine labour cost (12.13%) and seed cost (5.82%). Whereas, in inorganic wheat cultivation, FYM cost (15.52%) was major contributor to the total cost followed by machine labour cost (14.86%) and seed cost (6.13%). The

cost 'B' was estimated to be Rs 78017.16 with addition of Rs 18031.55 as rental value of owned land and Rs 6808 as interest on fixed capital to the cost 'A' and contributed to 96.30 per cent of total cost. Organic wheat cultivation found to be labour intensive. Because, the extra human labour required for intercultural operations, weeding, biopesticides and organic fertilizers preparation in organic wheat production. The plant protection cost Rs 2219 also more as compared to plant protection cost Rs 1264 under inorganic wheat due to per hectare requirement of plant protection measure in organic wheat was observed more as compared to inorganic wheat. It could be concluded from the overall comparison between cost of organic and inorganic wheat cultivation that, all the estimated production costs of Cost 'A' Rs 56333.72, Cost 'B' Rs 82631.26 and Cost 'C' Rs 86031.26 were observed higher under organic wheat as compared to cost of Cost 'A' Rs 50021.49, Cost 'B' Rs 73403.06 and Cost 'C' Rs 76003.06 under inorganic wheat. The above findings revealed that per hectare cost of organic wheat is high (Rs. 86031.26) than inorganic wheat (Rs. 76003.06) Therefore, the hypothesis has been accepted that the organic wheat cultivation is cost intensive than the inorganic wheat cultivation. These findings are in conformity with the outcomes of Charyulu and Biswas (2010) [3]. They observed that the total per acre production cost organic wheat (Rs.7539) was higher than conventional wheat cultivation (Rs.6436).

Table 2: Per hectare cost of cultivation of organic and inorganic wheat (Rs /ha)

Sr. No.	Cost Items	Organic Wheat (N=30)		Inorganic Wheat (N=30)		Overall (N=60)	
		Value	(%)	Value	(%)	Value	(%)
1	Seed	5005.00	5.82	4661.00	6.13	4833.00	5.97
2	Hired Labour	4150.00	4.82	2827.00	3.72	3488.50	4.31
3	Machine labour	10433.00	12.13	11292.00	14.86	10862.50	13.41
4	Bullock labour	4000.00	4.65	3200.00	4.21	3600.00	4.44
5	FYM	14781.00	17.18	11798.00	15.52	13289.50	16.40
6	Organic fertilizers	4432.00	5.15	0.00	0.00	2216.00	2.74
7	Chemical fertilizers	0.00	0.00	3334.00	4.39	1667.00	2.06
8	Organic plant protection measures	2219.00	2.58	0.00	0.00	1109.50	1.37
9	Inorganic plant protection measures	0.00	0.00	1264.00	1.66	632.00	0.78
10	Irrigation charges	3135.00	3.64	3643.00	4.79	3389.00	4.18
	Working capital	48155.00	0.00	42019.00	00.00	46412.50	00.00
11	Interest on working capital @ 6%	2889.30	3.36	2521.14	3.32	2705.22	3.34
12	Repairs	253.08	0.29	261.25	0.34	257.17	0.32
13	Depreciation on Farm Machinery and Implements	4916.00	5.71	5104.00	6.72	5010.00	6.18
14	Land Revenue	120.34	0.14	116.10	0.15	118.22	0.15
	Cost A	56333.72	65.48	50021.49	65.82	53177.61	65.64
15	Interest on Fixed Capital @ 10%	6545.00	7.61	7071.00	9.30	6808.00	8.40
16	Rental value of land	19752.54	22.96	16310.57	21.46	18031.55	22.26
	Cost B	82631.26	96.05	73403.06	96.58	78017.16	96.30
17	Total family labour	3400.00	3.95	2600.00	3.42	3000.00	3.70
	Cost C	86031.26	100.00	76003.06	100.00	81017.16	100.00
	Total Cost	86031.26	100.00	76003.06	100.00	81017.16	100.00
	Per quintal cost	3849.27		2120.62			

4.2 Returns from organic and inorganic wheat production

Returns obtained from organic and inorganic wheat production was calculated and presented in Table 3.

The total cost of cultivation in organic wheat (Rs 86031.26) was observed higher than the total cost under inorganic wheat (Rs 76003.06). The per quintal production cost under organic wheat production Rs 3849.27 was nearly double of per quintal cost under inorganic wheat i.e., Rs 2120.62, because per

hectare yield (22.35 quintals) of wheat under organic production was much less than yield (35.84 quintals) of wheat under inorganic production. The total returns obtained under organic and inorganic wheat production was Rs 123614.35 and Rs 104260.00, respectively. The majority of sample organic wheat growers in study area cultivate the local varieties of wheat.

Table 3: Per hectare cost and returns from organic and inorganic wheat production (Per hectare)

Sr. No.	Particulars	Organic Wheat (N=30)	Inorganic Wheat (N=30)	Overall (N=60)
1	Per Hectare Cost	86031.26	76003.06	81017.16
2	Yield (qtl.)	22.35	35.84	29.10
3	Price Per Quintal	5335.00	2750.00	4042.50
4	Main Produce (Rs.)	119237.30	98560.00	108898.60
5	By Produce (Rs.)	4377.00	5700.00	8038.50
6	Total Income (Rs.)	123614.30	104260.00	116937.10
7	Net Returns (Rs.)	37583.00	28256.94	35919.97
8	Per Quintal Cost (Rs.)	3849.27	2120.62	2984.94
9	B:C Ratio	1.38	1.29	1.34

The average market price under organic wheat (Rs 5335.00) was significantly high as compared to market price under inorganic wheat (Rs 2750.00). Therefore, the total net return obtained from organic wheat (Rs 37583.00) was higher than net return from inorganic wheat (Rs 28256.94). The estimated B:C ratio of 1.38 and 1.29 under organic and inorganic wheat cultivation, respectively, indicated that organic wheat production was more profitable than inorganic wheat production.

5. Conclusion

1. It could be concluded from the overall comparison between cost of organic and inorganic wheat cultivation that, the total per hectare cost of cultivation under organic was higher i.e. Rs 86031.26/ha than on inorganic wheat production (Rs 76003.06/ha). The per quintal production cost under organic wheat production was Rs 3849.27 nearly doubled of per quintal cost under inorganic wheat i.e., Rs 2120.62, because per hectare yield of wheat on organic grower's farm was lower (22.35 qt/ha) than an inorganic wheat production farms (35.84 qt/ha).
2. The analysis of per hectare returns under organic and inorganic wheat production revealed that, the total returns obtained under organic wheat production (Rs 123614.35/ha) were higher than the inorganic wheat production (Rs 104260.00/ha). The average market price was significantly higher for organic wheat (Rs 5335.00 /qtl) was significantly high as compared to market price under inorganic wheat (Rs 2750.00/qtl). The estimated B:C ratio for organic and inorganic wheat cuAccording to the results of the cost of cultivation it was concluded that the organic wheat production (Rs 86031.26/ha) was cost intensive than inorganic wheat production (Rs 76003.06/ha).

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