



# Preliminary Study of Organic Farming Practices in Southern Rajasthan, India

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## Authors' contributions

*This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.*

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## ABSTRACT

In the present age of global warming and changing climatic scenario, agriculture has to be more eco-friendly with resource-conserving technologies for achieving the sustainable food-livelihood-environmental security. With growing awareness on food safety and health issue, demand for organically produced products increased drastically. To understand the economics and status of Organic Farming practices, a case study was conducted in Southern Rajasthan in the year 2020-21. A convenient sample of 317 organic cultivators were selected through multistage simple random sampling technique and data were collected through a pretested questionnaire along with semi structured interviews. Preliminary study shows that the net returns per hectare received from organic farming were relatively higher or good enough as compare to conventional counterparts. An increasing trend of growing organic products were observed during the study period. The major constraints identified by the organic cultivators were non-availability of labour and organic certification followed by the high wage rate and insect pest attacks. Sustainable efforts from government organizations, research institutes, marketing cells, progressive cultivators, dealers, and policy makers are necessary for successful adoption of the organic farming.

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## 1. INTRODUCTION

The United Nations (UN) estimates that India has become the world's most populous country, surpassing China for that dubious distinction. From an ecological perspective, increasing population puts enormous pressure on land resources, leading to overconsumption, deforestation, water scarcity and affecting actual availability of resources [1]. In the present age of global warming and changing climatic scenario, agriculture has to be more environmentally friendly and needful attentions to be given to innovative resource conservation technologies which are more sustainable in long run [2]. As on today's environment consumers are more anxiety and aware towards food safety, quality, and health issues. To meet the situation, demand for organically produced products increased drastically with its global sell increasing more than threefold [3,4]. Because of that changing trends cultivation of organic farming gaining too much acceptance [5]. The International Federation of Organic Agriculture Movements (IFOAM) states that "Organic agriculture is a production system that sustains the health of soils, ecosystems and people." Organic farming has the potential to provide benefits in terms of nutritional value and health safety [6], promote soil health [7] environmental protection [8], conservation of non-renewable resources, improved food quality and socio-economic benefits [9]. India, produced around 1.35 million MT (2015-16) of certified organic products which includes all varieties of food products namely oilseeds, cereals & millets, sugar, cotton, pulses, medicinal Plants, tea, fruits, spices, dry Fruits, vegetables, coffee, etc. Further, the production is not limited to the edible sector but also produces organic cotton fiber, functional food products, etc. [10]. In Rajasthan, nearly 61% of the cultivable area comes on topography of arid and semi-arid zones, which characterized by low rainfall, poor soil fertility and low water holding capacity etc. with high temperature in summers, the incidence of insects, pests and disease is normal, State have low consumption of pesticides and fertilizers, which makes it easy to go for organic conversion without significant yield loss during conversion period. As per evaluations of the planning commission, about 15% of total cropped area can be brought under certified organic cultivation in the country. State has a potential to convert 5% of total cropped area (approx. 10 lakh hectare) very easily under

certified organic in the niche areas of seed spices, medicinal and herbal plants, fruit and vegetables and arid crops (Rajasthan organic farming policy, 2017). In case of Southern Rajasthan (*Udaipur, Banswara, Dungarpur, Pratapgarh, Sirohi, Rajsamand, Chittorgarh and Bhilwara*) have decent natural resources and default natural cultivation practices and therefore propose good scope of organic production to get benefit from international organic agricultural market through backward and forward institutional and stakeholder's linkages. Forest areas of tribal dominated districts of Rajasthan have good scope of wild collection under category of non-cultivated organic agriculture.

However, there is considerable latent interest among farmers in conversion to organic farming in India. But some farmers are reluctant to convert because of the perceived high costs and risks involved. Those who have converted are earning equal incomes to their conventional counterparts, if premium markets exist for organic produce. In this scenario, little studies are available to educate the farmers on the benefits of organic farming with particular attention on cost and returns and efficiency fronts over conventional counterparts. Hence this survey study mainly focuses on the issues like status and practices of organic farming, cost return structures and problem faced in cultivation. The study is designed to conduct a preliminary survey of organic farming, farm income analysis and viability of organic farming cultivation

## 2. METHODOLOGY

### 2.1 Study Area

For the completion of the study four districts *Viz. Udaipur, Chittorgarh, Banswada and Rajsamand* were selected. In these districts a considerable number of farmers are practicing organic farming. From each district different farmers were selected who are registered organic farmers or practicing organic farming for a minimum of two years. A convenient sample of 317 organic farmers were selected through available records. For selection of farmers multistage simple random sampling technique used. The initial data were collected through a pretested questionnaire along with semi structured interviews of various experts on organic farming.

## 2.2 Component of Study

The study has three main components: (i) The survey of default or registered organic farmers in Rajasthan, (ii) The screening of selected organic farmers, and (iii) Locale-specific case studies.

Organic farmers are defined as those farmers who practice organic farming or similar eco-friendly farming techniques for a minimum of two years or use of organic fertilizers and organic biocides and application of resource conserving technologies.

Exhaustive data on the qualitative and quantitative aspects of the farm operations were collected using PRA techniques, direct observation and verification of farm records in available cases in order to; record the different aspects of organic farming practices, analyze the problems faced by the organic farmers and the recommendations made by them and assess the profitability, productivity and viability of the organic farms. The socio-economic background of the farmers is looked at from two points – the size of the land holding and dependence on agriculture as a source of income. The rest is devoted to the description of organic farming practiced by the farmers. To tabulated the constraints faced by the farmers were ranked using Garrett’s ranking technique and to understand the input use pattern and status of cost, production, profit of the organic farmers

under kharif (maize) and rabi crops (wheat) Cost and return analysis were performed.

## 3. RESULTS AND DISCUSSION

### 3.1 Land Holding Size

A total of 317 respondents were observed during the different period (2015-2021) and information were collected. Household survey results shows that percent area under organic farming increased over the years (Fig. 1), may be due to the getting more favorable results of growing organic crops. An increasingly trend of cultivation were observed during the five years period of time. Farmers of the study area were allocating more land to the organic farming and receiving positive results.

### 3.2 Livestock Population and Animals per Household

In case of organic farmers, average number of animals were 7.68 (Table 2), which indicates positive relationship among organic grown farmers and ownership of farm animals. It was observed that out of 317 households, 53.39% households had 5 to 10 animals which indicate that economy of farmer is based on livestock, which provide a good scope for successful organic farming. Similarly, 7.63% of total households had more than 15 animals and less than 25% of total households had the animal population less than 5.0 (Table 3).

**Table 1. Year wise average land holding of agriculture land under organic farming**

Average land holding Year	2014-15	2015-16	2016-17	2017-18	2019-20	2020-21
Total land holding (ha.)	1.68	1.68	1.21	1.5	1.79	1.36
Area under organic agri. (ha)	0.7	0.63	0.75	1	0.84	0.95



**Fig. 1. Percent area under organic farming**

**Table 2. Livestock Population with organic farmers**

Items	No. of farmers	Total no. of farm animals	Average No. of farm animals
No.	317	2435	7.68

**Table 3. Number of animals per household**

S. No.	Animals Number	Number of households	% of total animals
1	Less than 5	78	24.58
2	5 to 10	169	53.39
3	10 to 15	46	14.41
4	More than 15	24	7.63
	<b>Total</b>	<b>317</b>	<b>100.00</b>

### 3.3 Water Sources to Organic Farmers

Majority of organic farmers depends on the seasonal rains as for crop cultivation. Major source of water are wells (41%) followed by the pond/tank (23%), borewell 14%), river (12%) and canal (10%). (Fig. 2)

### 3.4 Source and Methods of irrigation in the Cultivated Lands

The majority of the small and marginal farmers used motorized irrigation followed by diesel engines (Table 4). Some of the organic growers were observed to be innovative in terms of using effective indigenously developed methods of channeling, bunding, water retention and rainwater harvesting. Most of the farmers of the study area used traditional method of irrigation in the cultivated lands. As majority of organic growers used electrical motors (46%) followed by diesel operated pumps (28%) and so on for irrigation. Attention needs to be given to the water conservation techniques for saving the resources.

### 3.5 Use of Farm machinery

Results shows that majority of farmers used traditional method of farm machineries as it is easily available in the rural areas (Table 5). Uses of modern implements associated with the socio-economic status of the farmers, as large category farmers able to avail the facility of modern implements for maintaining large area.

### 3.6 Vermi-compost Production by Organic Farmers

Organic manures in the form of vermicompost obtained from the earthworm is one way to overcome the problems of low productivity.

Production of compost from organic wastes (agriculture and homestead), crop residues, plant litters, weeds and FYM are the common wastes available in the farm. Results obtained from the study show that average production of 6.29 tonnes/annum vermicompost production was achieved by small farmers categories (7.13 tones/ annum) followed by marginal farmers (6.90 tones/ annum), medium farmers (6.81 tones/ annum) and large farmers (4.32 tones/annum). (Fig. 3)

### 3.7 Use of Organic Inputs by Organic Farmers

Input use pattern in organic farms various inputs like FYM, Vermi-compost, oil cakes, neem oil, green Manures, bio- pesticides, biogas-digester liquids and bio fertilizer were used by the organic producer (Table 6). The use of the above inputs was limited in case of conventional farmers as they used more fertilizer and plant protection chemicals. Farm yard manure was used to the extent of 8.2 tons per hectare, vermicompost @400 tons, oil cakes @ 710 kg, green manures @ 2.3 kg, bio pesticide @ 2.4 kg etc. Inputs used are the average of all the respondents taken under the case study. Changes in price of vermicompost, FYM, green manures occurred as some of farmers produced it on his own farm and save the additional input cost. Overall, the input cost varies form Rs. 20000 to Rs. 30000, depending upon size of the farms, socio economic status of the grower.

### 3.8 Status of Cost, Production and Profit to Organic Farmers

Status of the cost, production and profit were quantified for the season (Kharif maize and rabi wheat crop) (Table 7). It was estimated that total cost of production in kharif maize was Rs 24988 and for rabi wheat it was Rs. 31674, after

considering the input cost and other managerial aspects. Final production of the products includes household consumption and marketable surplus. For quantifying the total profit, total production was taking into consideration for getting overall profit from organic farming. In

case of kharif maize estimated net profit was Rs. 7457 and Rs. 13946 at normal (@Rs. 15/unit) and premium price (@ Rs. 18/unit) respectively. In case of rabi wheat estimated net profit was Rs. 19683 and Rs. 27792 at normal (@Rs. 19/unit) and premium price (@ Rs. 22/unit) respectively.

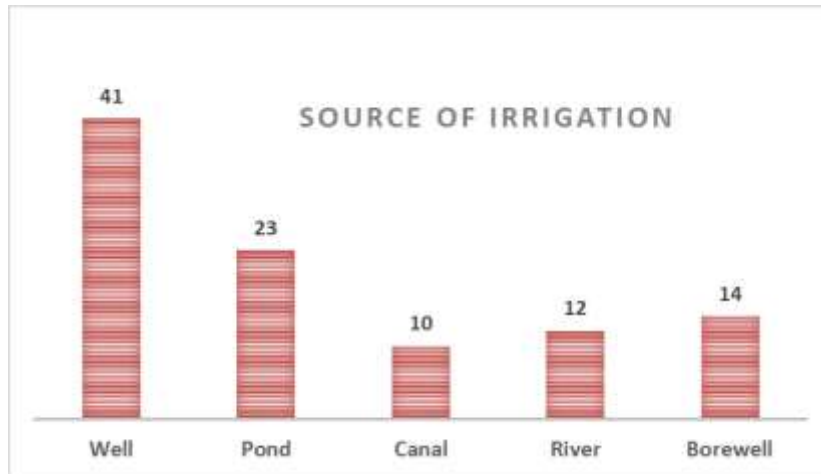


Fig. 2. Source of water to organic farmer

Table 4. Source of power for Method of Irrigation in the cultivated lands

Method	Diesel Pump	Electric motor	Traditional system	Diesel & None	Solar Electric	Wind	No inform.	Total
No. of farmers	89	146	32	22	3	0	25	317
% of Total	28	46	10	7	1	0	8	100

Table 5. Use of Farm machinery

Machinery	Tractor	Tiller	Harvester	Deshi Hal	Combiner	Other	Traditional	No Information	Total
No. of farmers	22	8	8	30	21	14	203	11	317
% of Total	6.9	2.6	2.6	9.4	6.8	4.3	64	3.4	100

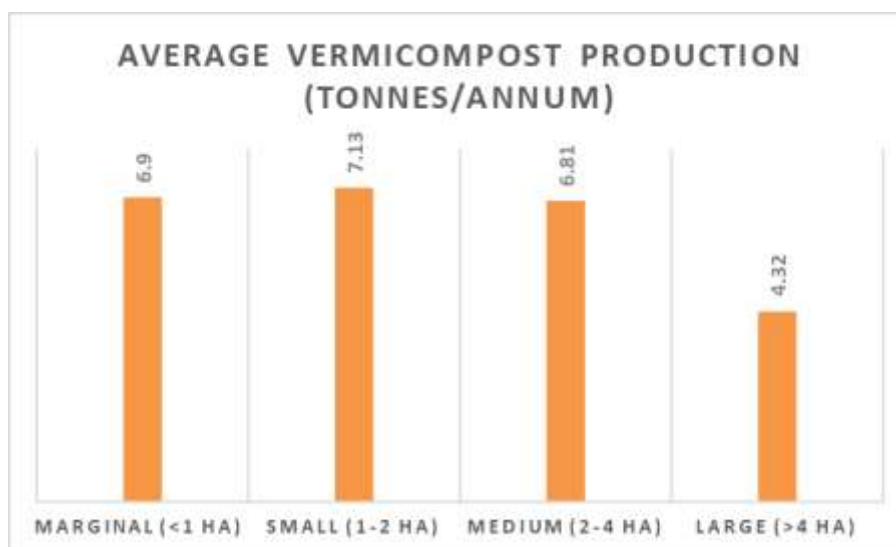


Fig. 3. Average vermicompost production (Tonnes/annum)

**Table 6. Input use pattern in organic farms (per ha/year)Inpu**

Sr No.	Inputs	Units	Qty	Price per unit	Value (Rs.)
1	FYM	Ton	8.2	1000	8200
2	Vermicompost	Ton	2.1	6000	12600
3	Oil cakes	Kgs	710	12	8520
4	Green Manures	Kgs	2.3	260	598
5	Bio- pesticides	Ton	2.4	55	132
6	Biogas-digester liquids	Lit	201	1	201
7	Bio fertilizer	Lit	2.5	80	200

**Table 7. Status of cost, production and profit to organic farmers Kharif Crop: Maize**

Sr No.	Items	Unit	Value
1	Production	Kg	2163
2	Household Consumption	Kg	990
3	Marketable Surplus		1173
4	Total Cost of Production	Rs.	24988
5	Total benefit @Normal Price (Rs 15/Unit)	Rs.	32445
6	Total benefit @Premium Price (Rs 18/Unit)	Rs.	38934
7	Net benefit @Normal Price (Rs 15/Unit)	Rs.	7457
8	Net benefit @ Premium Price (Rs 18/Unit)	Rs.	13946

**Rabi Crop: Wheat**

Sr No.	Items	Unit	Value
1	Production (Kg)	Kg	2703
2	Household Consumption (Kg)	Kg	1597
3	Marketable Surplus (Kg)		1106
4	Total Cost of Production (Rs.)	Rs.	31674
5	Total benefit @Normal Price (Rs 19/Unit)	Rs.	51357
6	Total benefit @Premium Price (Rs 22/Unit)	Rs.	59466
7	Net benefit @Normal Price (Rs 19/Unit)	Rs.	19683
8	Net benefit @ Premium Price (Rs 22/Unit)	Rs.	27792

**3.9 Marketing of Organic Produce**

The major problem quoted by many farmers was the poor marketing prospects of organic produce (Table 8). They emphasized on the need to develop marketing strategies as well as government and policy level support for organic

produce marketing. Consumer awareness on the high quality of organic produce, eco-labelling for the organic produce, competitive pricing, developing strategic urban markets, etc. were some of the other suggestions made by the farmers on the marketing of organically grown produce.

**Table 8. Market identity as organic produce**

Questions	Responses of farmers (No. or %)	
	YES	NO
Proper Market arrangement for selling of the produce	75 (64%)	43 (36%)
At starting any financial help/subsidy from government organization/Department	42 (35%)	76 (65%)
Do you have any training on Organic farming	53 (44%)	65 (56%)
Do you feel the need of improvement in market structure	88 (75%)	30 (25%)
Do you think cultivation of organic farming cheaper than conventional farming	66 (56%)	52 (44%)
Do you face constraints on selling product in market	75 (64%)	43 36%)

**Table 9. Problems faced in organic cultivation by sample farmers**

S. No.	Constraints	Mean Score	Rank Priority
1	Non-availability of labour	74.54	I
2	Organic certification	60.02	II
3	High wage rate	58.59	III
4	High attack pest and diseases	57.04	IV
5	Manure unavailability	36.50	V
6	Low productivity of organic farming	28.30	VI
7	Problem of selling of produce (Market Constraints)	23.50	VII
8	Processor unavailability	19.20	VIII
9	Limited knowledge access	18.42	IX
10	Price of the input	12.50	X

### 3.10 Constraints Perceived by Farmers in Organic Farming Practice

To analyze the constraints faced by the organic grower Garrett's ranking techniques were followed. The respondents stated, non-availability of labour and organic certification as the most faced difficulties followed by the high wage rate, high attack of pest and diseases, low productivity of organic farming, problem of selling of produce (market constraints) or finding local market, unavailability of processor for organic produce, limited knowledge or access to improved technologies. In addition, diseases like leaf blotch, rhizome rot, shoot borer and rhizome scale were the minor identified constraints. Hence, farmers had to spend a lot to control the attack of pest and diseases in the turmeric and cotton crops. Further, non-availability of adequate organic supplements, weak coordination to guideline, rules, regulations, certification process and input costs were appeared to be additional constraints. Small farm holders or marginal farmers discouraged by capital driven regulation of contracting firms. A joined welfare approach required from government and private players to motivate farmers to adopt the organic practice as a weapon to meet climate change, food quality and safety, health and sustainability issues [11-13].

### 4. CONCLUSION AND RECOMMENDATION

The results of the study on economics of production showed that the net returns per hectare received from organic farming were relatively higher or good enough as compare to conventional counterparts. For further boosting the organic production agriculture department /local organisation should take necessary steps to promote organic cultivation by conducting vigorous campaigns/demonstrations to increase

the interest of organic farming. Further, higher premium price and green marketing channel should be promoted by the Government for boosting organic cultivation. The results of the study show that an increase use of farm yard manure, neem cake, vermicompost, *jeevamirtham*, *panchagaviya* would increase the production of organic products. Hence, the extension infrastructure has to arrange for training programmes to popularise these inputs and also give technical guidance to organic farmers. The respondents stated, non-availability of labour and organic certification as the most faced difficulties followed by the high wage rate, high attack of pest and diseases. Further, Promotion of some of cheap and resource saving technologies (*Rishi krishi*, *panchagavya krishi*, *zero budget farming*, *zero tillage farming*, *natural farming*, *biodynamics farming*, *nateuco farming*, *Jaiva Krishi*), Setting up of processing, packaging, labelling units and trainings programmes should be further strengthened.

### COMPETING INTERESTS

Authors have declared that no competing interests exist.

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