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Organic farming, a better option for enhancing farm income: A study on ginger crop in North Eastern Hill Region of India

S. CHIPHANG[1*], R. SINGH[1] AND S.M. FEROZE[2]

[1]*School of Social Sciences, College of Post Graduate Studies in Agricultural Sciences, CAU(I), Umiam, Ri-Bhoi-793103, Meghalaya, India*

[2]*Department of Agricultural Economics, College of Agriculture, CAU, Iroisemba-795004, Imphal, Manipur, India*

**singyala@gmail.com*

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ABSTRACT

Organic farming is recognized as one of the most reasonable alternative farming systems for overcoming the challenges of climate change and for its positive effect on human health, sustainability of soil, water and crop yields. The study was conducted in North Eastern Hill Region (NEHR) adopting multistage sampling technique. Sikkim was selected purposively as the control state and Meghalaya was selected based on the highest production of ginger in the region. East Sikkim district and East Garo hill were selected out of which Nangdok block from east Sikkim district and Dambo-Rongjeng block from East Garo hill were selected randomly. A cluster of 1-2 villages were selected randomly from each block. At the last stage 60 respondents, 30 organic adopters and 30 non-adopters were selected using probability proportional to size method. Standard defined techniques, independent t-test and Cohen's d test were applied. The study revealed that the cost of cultivation was lower for the organic adopter (₹ 69797.31 ha^{-1}) as compared to the non-adopter (₹ 71974.50 ha^{-1}). The net income of the organic adopter was Rs 10569.35 per ha, which was higher than the non-adopter (₹ 5500.50 ha^{-1}). The yield was also found to be significantly higher for the organic adopters (7209.96 kg ha^{-1}).

Key words: Cost of cultivation, net income, North Eastern Hill Region, organic farming, yield

INTRODUCTION

Organic farming is often perceived to be a better option for the environment than conventional farming as it has significant advantages like increasing farmers' income, reducing external input cost, increasing employment opportunities and enhancing food security by increasing the purchasing power of the people (Ramesh et al., 2005; Jouzi et al., 2017). It is also recognized as one of the most reasonable alternative farming systems for overcoming the challenge of climate change (Gomiero et al., 2008) due to its positive effect on human health, sustainability of soil, water and crop yields (Blaise, 2006). The organic farming has an enormous potential in generating beneficial effects socially and environmentally. However, it is essential to assess its performance in terms of its economics which ultimately influences the adoption of any technology. Economic advantages of organic farming were reported by various researchers, lower cost of cultivation on organic farming (Kumar et al., 2006), productivity differences between the organic and the conventional farming, gross return and net returns were higher in organic farming (Singh and Grover, 2011; Laxmi et al., 2017). Organic farming also offers a solution for sustainable agricultural as well as the reduction in the cost of production during long run (Thakur and Sharma, 2005; Laxmi et al., 2017).

India is bestowed with lot of potential to produce all varieties of organic products due to its various agro-climatic regions. In various regions of the country, the inherited tradition of organic farming is an added advantage. India's organic share of total agricultural land is 0.7% as per 2015 data (FIBL and FOAM, 2017). The total area under organic certification during 2015-16 was 5.71 million hectares. The North Eastern Hill Region (NEHR) contributes about 6.53% of the total area under organic certification in India (APEDA, 2017). Among the NEHR, Sikkim contributes 5.21% of the organic land (since it is the organic state), Meghalaya (0.67%). Despite of being an organic sector by default, studies related to the economic benefits of organic farming are lacking. So, the study has been undertaken with the objective to assess the economics of ginger crop in the NEHR.

MATERIALS AND METHODS

The study was conducted in North Eastern Hill Region (NEHR) adopting multistage sampling technique. Sikkim being an organic state was selected purposively as the control state and Meghalaya was selected based on the highest production under ginger. East Sikkim district from Sikkim and East Garo hill district from Meghalaya were selected for the study. Nangdok block from east Sikkim district and Dambo-Rongjeng from East Garo hill were selected randomly. From the selected blocks a cluster of 1-2 villages were selected randomly. At the last stage 60 respondents (30 organic adopters and 30 non-adopters) were selected from a cluster of villages using probability proportional to size method.

Description of the study area

Costs and return of respective crops taken for the study were worked out by applying the well-defined standard techniques (Johl and Kapur, 2015). The independent t-test was applied to determine the significant difference between the means. Cohen's 'd' test was conducted to determine the effect size of the standardized difference between two means. Cohen's d was determined by calculating the mean difference between two groups and then dividing the result by the pooled standard deviation.

$$Cohen's\ d = \frac{(\text{Mean difference})}{(\text{Pooled standard deviation})}$$

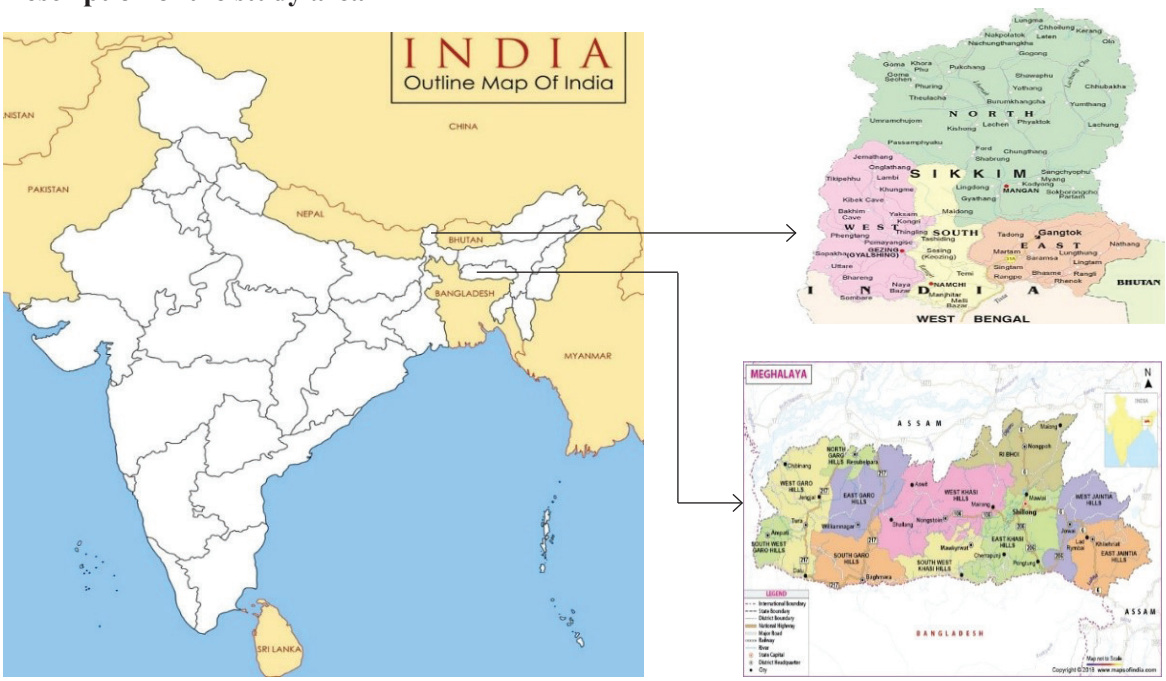

Fig. 1. Location map of Sikkim and Meghalaya, India

Sikkim

Sikkim borders Tibet in the north and northeast, Bhutan in the east, Nepal in the west, and West Bengal in the south. Gangtok is the capital of Sikkim. As a part of Himalayan region, Sikkim is notable for its biodiversity, including alpine and subtropical climates. About 15.36% of the total geographical area is devoted to agriculture. The net cultivated area of the state is 56.64 thousand ha and 11.31% is under irrigation (GoS, 2014). Maize is the major cereal crop, being cultivated in an area of 0.39 mha, followed by rice (0.11 mha) and buck wheat (0.03 mha). Majority of the farmers belongs to small and marginal category (GoS, 2014).

East Sikkim district

East Sikkim district occupies the south-east corner of Sikkim at a latitude of 27° 30' N and longitude of 88° 67' E and with a geographical area of 954 sq. km. Teesta is the major river in the district. The district ranks first in population (2.83 lakh) where about 58.81% of the population are rural based (Anonymous, 2011). It also ranks first in literacy rate in Sikkim (83.85%). Lepchas and Bhutias are the major tribes found in the district. Temperatures range from the maximum of 22°C in summer to a minimum of 4°C in winter. The district receives an annual rainfall of 3894 mm. The net sown area of the district is 18.10 thousand ha (GoS, 2014).

Meghalaya

Meghalaya covers an area of 22,430 square kilometers approximately. The population of Meghalaya is estimated to be 29.67 lakh with the literacy level of 74.43 (Anonymous, 2011). The state with its capital Shillong, located at an elevated range of 1,496 metres above the sea level is famous for its beauty. The western part of the plateau, comprising the Garo Hills region with lower elevations, experiences high temperatures for most of the year. The Shillong area, with the highest elevations, experiences generally low temperatures. The maximum temperature in this region rarely goes beyond 28 °C, whereas sub-zero winter temperatures are common. Khasis, Jaintias and Garos are the major tribes of the state. Unlike the other states, Meghalaya followed a matrilineal system where the lineage and inheritance are traced through women.

East Garo Hills district

In 2012, East Garo Hills district was reorganized to form a new district out of the erstwhile Resubelpara sub-division. The district is bounded by South Garo hills on the south, West Garo hills on the west, West Khasi hills on the east and North Garo hills on the north. The total geographical area of the district is 2603 sq km with population of 3.18 lakh (GoM, 2017). Williamnagar is the capital of the district. The district is divided five blocks namely, Resubelpara, Dambo- Rongjeng, Songsak, Samanda and Kharkutta block (GoM, 2017).

RESULTS AND DISCUSSION

Economics of ginger cultivation

The total cost of ginger cultivation for the organic adopters were ₹ 69797.31 ha^{-1} which was lower compared to the non-adopter (₹ 71974.5 ha^{-1}). The cost incurred on human labour was found to be one of the major cost components in both the organic and inorganic farms. For the organic adopter, cost incurred on labour was Rs 30214.68 ha^{-1} constituting 43.29% of the total cost while for non-adopters cost incurred on human labour was ₹ 32548.41 ha^{-1} accounting 45.22% of the total cost. Cost incurred on seeds was the major cost component for the organic adopter constituting 44.21% while for the non-adopter it constituted 42.19%. The rental charges accounted 8.01% and 7.70% for organic adopter and non-adopter respectively. The rental charges were followed by manure (4.13% for organic adopter and 1.39% for non-adopter respectively. Depreciation of farm assets constituted 0.36% and 0.28% of the total cost respectively. The per cent difference on organic farm compared to inorganic has also been worked out and found that the cost on human labour and fertilizer were lower in organic by 7.17% and 100%. The cost on manure, seed, depreciation of farm assets were found to be higher in organic farming but the total cost of ginger cultivation was lower in case of organic by 3.02% (Table 1). Lower cost incurred in organic cultivation for various crops

were reported by Kshirsagar (2008), Singh et al. (2006), Kumar et al. (2006) and Waykar et al. (2006). Mawthoh et al. (2019) in their study on Potato found better yield while applying organic manure.

Significant difference was observed only in fertilizer and manure but human labour and seed were found to be statistically not significant. The effect size d was estimated at 0.69 and 0.82, which is a very large size effects in the FYM and fertilizers.

Table 1. Cost of ginger production

Particulars	Organic (₹ ha^{-1})	Inorganic (₹ ha^{-1})	Per cent difference (Over inorganic)
Human labour	30214.68 (43.29)	32548.41 (45.22)	-7.17
Manures	2883.33 (4.13)	1002.78 (1.39)	187.53
Fertilizers	0.00 (0.00)	2320.00 (3.22)	-100.00
Seed	30860.13 (44.21)	30363.08 (42.19)	1.64
Depreciation	251.67 (0.36)	198.57 (0.28)	26.74
Rental charges	5587.50 (8.01)	5541.67 (7.70)	0.83
Total cost	69797.31 (100.00)	71974.50 (100.00)	-3.02

Note: Figures in the parentheses indicate the percentage to the total

Table 2. Results of independent t test for mean difference of paid out cost

Particulars	Organic	Inorganic	Mean difference	t value	Effect size d
Human labour	30214.68	32548.41	-2333.73	1.31NS	
Manures (FYM)	2883.33	1002.78	1880.55	2.65**	0.69
Fertilizers	0.00	2320.00	-2320.00	3.17***	0.82
Seed	30860.13	30363.08	497.05	0.40 NS	
Total	63958.15	66234.27	-2276.12	0.92 NS	

Note: *** and ** indicate 1 per cent and 5 per cent level of significance, NS indicates Non significance respectively

There was a significant difference in the average yield of ginger for the organic adopter and non-adopter with the mean difference of ₹ 1387.89 kg ha^{-1}. The organic adopter earned a gross income of ₹ 80366.67 ha^{-1} while the non-adopter earned ₹ 77475.00 ha^{-1}. The net income of the organic adopter was ₹ 10569.35 per ha^{-1} which was higher than the non-adopter (₹ 5500.50 ha^{-1}), but it was statistically not significant. The effect size 'd' was estimated at 0.89, signifying a large effect for yield (Table 3). Risk attitudes of organic and non-organic farmers was compared with a Bayesian random coefficient model and positive traits were observed for organic farmers (Gardebroek, 2006).

Table 3. Returns from organic and inorganic cultivation

Particulars	Organic	Inorganic	Mean difference	t value	Cohen's d
Yield (kg ha^{-1})	7209.96	5822.06	1387.89	3.46***	0.89
Gross income ha^{-1}	80366.67	77475.00	2891.67	0.57 NS	
Net income ha^{-1}	10569.35	5500.50	5068.85	0.84 NS	

Note: *** indicate 1 per cent and NS indicates non significance respectively

CONCLUSION

The study has assessed the economic viability of organic farming in the NEHR, taking ginger as a reference crop. The study concluded that the cost of cultivation was lower for the organic adopters compared to the non-adopters. The net income of the organic adopter was ₹ 10569.35 per ha^{-1} which was higher than the non-adopter (₹ 5500.50 ha^{-1}). The yield was significantly higher for the organic adopters (₹ 7209.96 kg ha^{-1}). Thus, the study concluded that the organic ginger cultivation was economically more profitable and can enhance farmers income.

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REFERENCES

Anonymous, 2011. Census of India, Ministry of Home Affairs, Government of India, New Delhi. www.censusindia.gov.in.

APEDA, 2017. National Program for Organic Production (NPOP). Data. http://apeda.gov.in/apedawebsite/organic/data.htm. Accessed on 20 December 2018.

Blaise, D. 2006. Yield, boll distribution and fibre quality of hybrid cotton (*Gossypium hirsutum* L.) as influenced by organic and modern methods of cultivation. *J. Agron. Crop Sci.* **192**: 248-256.

FIBL and IFOAM, 2017. Organics International. http://www.organic-world.net/yearbook /yearbook-2017.html. Accessed on 10 December 2018.

Gardebroek, C. 2006. Comparing risk attitudes of organic and non-organic farmers with a Bayesian random coefficient model. *Eur. Rev. Agric. Econ*. **33**: 485–510.

GoM. 2017. *Statistical Handbook of Meghalaya*, Directorate of Economics and Statistics, Government of Meghalaya. Shillong, Meghalaya.

GoS. 2014. *Comprehensive Progress Report*, Sikkim Organic Mission. Government of Sikkim.

Johl, S.S. and Kapur, T.R. 2015. *Fundamentals of Farm Management*. Kalyani Publishers, New Delhi, India.

Jouzi, Z., Azadi, H., Taheri, F., Zarafshani, K., Gebrehiwot, K., Passel, S.V. and Lebailly, P. 2017. Organic farming and small-scale farmers: main opportunities and challenges. *Ecol. Econ*. **132**: 144–154.

Kshirsagar, K.G. 2008. Organic sugarcane farming for enhancing farmers' income and reducing the degradation of land and water resources in Maharashtra. *Indian J. Agric. Econ*. **63**(3): 396-405.

Kumar, S., Thakur, D.S., Chauhan, S.K. and Sharma, K.D. 2006. Impact of drought on cost and returns from cereal crops under different organic and inorganic farming systems in Himachal Pradesh. *Agric. Econ. Res. Rev*. **19**(2): 227.

Laxmi, S., Sen, C. and Singh, R. 2017. Profitability, potential and progress of organic onion production: evidences from Nalanda district of Bihar. *Econ. Affairs* **62**(1): 33-38.

Mawthoh, J., Ray, L., Singh, A., Singh, N. and Dhivya, R. 2019. Performance of potato (*Solanum tuberosum* L.) with organic inputs in north eastern India. *e-planet* **17**(2): 117-122.

Ramesh, P., Singh, M. and Rao, A.S. 2005. Organic farming: Its relevance to the Indian context. *Curr. Sci*. **88**: 561-568.

Singh, I.P., and Grover, D.K. 2011. Economic viability of organic farming: an empirical experience of wheat cultivation in Punjab. *Agric. Econ. Res. Rev*. **24**(2): 275-281.

Singh, J., Singh, G.P. and Rajkishor. 2006. Present status and economics of organic farming in the district of Udham Singh Nagar in Uttaranchal. *Agric. Econ. Res. Rev*. **19**(2): 135-144.

Thakur, D.S. and Sharma, K.D. 2005. Organic farming for sustainable agriculture and meeting the challenges of food security in 21th century: An economic analysis. *Indian J. Agric. Econ*. **60**: 205-219.

Waykar, K.R., Yadav, D.B., Shendage, P.N. and Sale, Y.C. 2006. Economics of grape production under organic and inorganic farming in the Nasik district of Maharashtra state. *Agric. Econ. Res. Rev*. **19**(2): 240.