Comparison of the Organic Farmers' Crop Production Practices with prescribed Standards

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Abstract

This paper studies the status of organic farming in the state of Andhra Pradesh with an objective to compare the agricultural production practices of the organic farmers with the prescribed organic crop production standards. The aim is to find out the deviations in practices followed by the organic farmers from that of the prescribed standards.

Findings of the study outline the existing crop production practices of organic farmers under conversion requirements, farm designing, land preparation, seed / plant materials and sowing, crop diversity, weed management, irrigation schedule, fertilization policy, plant protection measures, contamination control, post harvest storage and processing, packaging and labeling, record keeping.

The results reveal that the practices of Warangal farmers (71.88 per cent), East Godavari (60.94 per cent) and Chittoor (50 per cent) matched with that of prescribed organic crop production standards. However some of the important principles of organic crop production were not taken care of. Hence it is essential for the promoters to educate and create awareness among the organic farmers about organic crop production standards to ensure that they reap the benefits of certification.

India being the second most populous country in the world, agriculture and food security are the main concerns of the country. Agricultural production, especially food grains has increased to 210 MT over the last few decades in India. This achievement is a contribution of the Green revolution and has led to food self sufficiency in India. However, the spill over effects of the Green revolution have resulted in challenges to sustainability of the soil and the environment.

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Sustainable production at higher levels becomes possible only when the factors leading to the continued maintenance of soil health are adequately taken care of. The modern farming systems aim at maximizing production through the use of increased quantities of external inputs such as fertilizers and plant protection chemicals without due consideration to their ill effects. Consequently, the traditional agronomic practices such as green manuring, use of farm wastes either as such or after composting and other soil ameliorative measures have vanished from the existing farming systems. This has resulted in a slow but steady decline in the productive and recuperative capacity of the soil.

During the last few decades, the approach and outlook towards agriculture and marketing of food has seen a quantum change worldwide. The focus is more on quantity and appearance rather than intrinsic or nutritional quality. This commercialization of farming has also had a very negative effect on the environment. In the name of growing more to feed the earth, we have taken the wrong road of sustainability. This is where organic farming comes in. Prior to the Green Revolution, farmers in India were largely dependent on the monsoon, organic matter from farm animals and the previous year's harvest for meeting the seed requirement. Organic farming is a system of producing agricultural and animal husbandry commodities by the use of organic inputs without disturbing the natural balance. This is an age-old concept in India, which changed during the first green revolution. Organic farming has the capability to take care of each of these problems. Besides, the obvious immediate and positive effects organic farming has on the environment and quality of food, it also greatly helps a farmer to become self-sufficient in his requirements for agro-inputs and reduce his costs.

In the era of globalisation, WTO opened up opportunities for earning foreign exchange even in agricultural exports and emerging areas. Indian Agriculture must become efficient, competitive, low cost and sustainable and the possible alternatives available to the farming community and country are organic farming and integrated use of organic and inorganic farming methods. Agricultural exports are also focused on pesticide free or chemical residue free food because of the increased health consciousness among the consumers. In this direction, present day agriculture is shifting from modern to organic farming. Organic agriculture system is based on ecological principles and applying ecological practices to maintain soil fertility to manage crop and animal health and to keep soil and water in a good condition without the use of chemical inputs (Siddaraju and Rajendran, 2006).

Andhra Pradesh is a state with very diverse agricultural production systems, exposure to a long coast-line, continuous harnessing of river water for irrigation, varied agro climatic situations and existence of different types of soil, natural vegetation, precipitation patterns and above all, hard working and innovative farmers, that offer unlimited possibilities for adoption of novel farming practices. There is excellent untapped potential for export of fruits such as mango, banana and citrus, spices like chillies, food grains like rice, pulses and plantation crops such as cashew, coconut and medicinal and aromatic plants. The farmers need institutional and technical support to take forward the concept of organic farming resulting in an era of Sustainable Agriculture through Organic Agriculture. With this background an effort was made to study and report the status of organic farming in the state with an objective to compare the agricultural production practices of the organic farmers with the prescribed organic crop production practices as per standards. The aim was to find out the deviations in practices followed by the organic farmers with that of the prescribed organic crop production standards.

Methodology

An exploratory research design was followed to conduct the present study in 6 mandals comprising of 12 villages of Warangal, East Godavari and Chittoor districts of Andhra Pradesh. A total of 60 organic farmers were selected based on stratified random sampling method. An interview schedule was developed in congruence with the organic crop production standards. The farmers were interviewed on their farms about the practices they follow and the researcher's observations with respect to organic production standards were also recorded.

Arbitrary scales are developed on adhoc basis and are designed largely through the researcher's own subjective selection of items. The researcher first collects few statements or items which she/he believes are unambiguous and appropriate to a given topic. Some of these are selected for inclusion in the measuring instrument and then people are asked to check in a list, the statements with which they agree. These scales can be developed very easily, quickly and with relatively less expense. They can also be designed to be highly specific and adequate.

To quantify the organic crop production practices followed by the respondents, the overall response regarding each practice was put on a 3 point continuum. Practices which closely followed organic standards (within 20% limit) were graded with 2 points, practices which were opposite to the prescribed standards (within 20% limit) were graded with 0 point, practices in between these two were graded with 1 point.

For example, according to Indian organic crop production standards, seed material must be from organic source or conventionally produced but chemically not treated can be used. So, if 80-100 percent farmers use organic seed or conventionally produced but chemically not treated seed, grade point will be 2. If, 21-79 percent farmers use organic seed or conventionally produced but chemically not treated seed, grade point will be 1, if, 0-20 percent farmers organic seed or conventionally produced but chemically not treated seed, grade point will be 0. As such, the overall score for all practices was calculated. Maximum possible score = number of practices compared x 2.

Findings and Discussion

The existing practices of organic farmers were compared with the Indian National Standards – National Standards for Organic Production (NPOP 2005). Findings of the study outline the existing crop production practices of organic farmers as/under conversion requirements, farm designing, land preparation, seed / plant materials and sowing, crop diversity, weed management, irrigation schedule, fertilization policy, plant protection measures, contamination control, post harvest storage and processing, packaging and labelling, record keeping.

Conversion requirements

From table 1 it is observed that cent per cent organic farmers of Warangal district only maintained conversion plan which contained details related to basic data of the farm, farm map, soil analytical data, crop production practices, plant protection measures, animal husbandry details, crop rotation plan and details on seed and planting materials. The trend might be due to the fact that, sample selected in Warangal district was in their 3rd year of conversion plan, where as in case of other districts, farmers were in their first year of conversion and are not abreast of the minute details about the conversion plan and due to lack of proper instructions from the promoting agencies.

It is also observed that cent percent of organic farmers have not reverted their organic plot to conventional farming after realizing the benefits of organic farming. The reasons for non adoption might be that, the sample selected for the study hails from the tribal community and the entire village to the maximum extent were practicing organic farming. Hence, they might have felt that it was not necessary to adopt bio-fencing and isolation distances which are essential for controlling contamination from external inputs / outside etc.

Farm Designing

It is evident from Table 1 that, majority (78.33 per cent) of the organic farmers constructed the cattle shed, compost yard at a comparatively higher elevation than the cropped area to prevent water logging inside the cattle shed. None of the organic farmers had constructed an office to maintain farm records required for proper inspection and certification of the farm by the certifying agencies. Forty eight per cent of organic farmers have planted the boundary of the farm with MPTs like Neem, *Daincha*, Subabul, and Pongamia. This might be due to the fact that majority of the organic farmers in the study area were grouped under the category of marginal and small farmers with low annual family incomes.

Land Preparation

From table 1 it is clear that cent per cent organic farmers adopted summer ploughings, *in situ* incorporation of crop residue, and proper cleaning of the farm implements before using in the organic plots. The reason for the total adoption was probably that, operations / practices like summer ploughing and incorporation of crop residues was the common practice among the farming community.

Seed and Planting Materials

It is evident from the table that while cent per cent organic farmers of Warangal district have used the certified seed, East Godavari organic farmers used locally available chemically untreated seed / plant material, and Chittoor organic farmers used hybrid seeds for cultivation. This might be due to the fact that, in case of Warangal, Super Spinning Mill from Chennai supplied the certified seed on agreement of supply of seed cotton, whereas in case of East Godavari and Chittoor districts non availability of certified seed made the farmers depend on the locally available and hybrid seeds. Majority (70.00 per cent) of the organic farmers followed biological seed treatment with *Trichoderma viridi, Rhizobium, Pseudomonas* in organic system. It was also evident that cent per cent organic farmers have adopted uniformity in sowing/planting, proper spacing and population stand was maintained by the farmers.

Crop Diversity

From Table 1 it is clear that the majority (68.33 per cent) of the organic farmers adopted inter cropping with the crops like cowpea, red gram, and maize and 40.00 per cent of organic farmers adopted crop rotation practice with pulses and oilseeds like Green gram, Bengal gram, Cow pea, Sunflower, Ground nut and Sesame.

Weed Management

With regard to weed management, cent per cent organic farmers adopted only manual weeding methods and 45.00 per cent of organic farmers adopted intercropping for smothering weeds. The organic farmers adopted manual weeding in order to use weeds as biomass for composting.

Irrigation Schedule

From Table 1 it is observed that cent per cent of organic farmers of all the three districts under the study area adopted proper irrigation schedule and 15-20 days interval was followed. Flood irrigation, ridge and furrow and drip (surface) methods of irrigation were adopted by the farmers.

Fertilization Policy

It can be observed from the table that majority (70.00 per cent) of the organic farmers adopted the incorporation of crop residue, green manuring, green leaf manuring and composting practices during the land preparation and majority of them depended on on-farm sources for the supply of nutrients to the soil. It was also found that a majority (48.33 per cent) of the organic farmers depended on various products like, bio-fertilizers, aminosis, certified organic fertilizers, *ganajeevamruth* and *panchagavya* for growth promotion in crops. It was also found that, a majority of the East Godavari (40.00 per cent) and Chittoor (60.00 per cent) organic farmers adopted the practice of split application of organic manures i.e. 75 per cent at basal and 25 per cent at later stages. This might be due to the fact that, to become successful organic farmers, soil fertility must be enhanced and supply of the nutrients under organic farming has to be met through organic sources.

Pest and Disease Management

It can be observed in Table 1, that cent per cent organic farmers adopted physical/mechanical methods of pest management, followed by botanicals / plant preparations (83.33 per cent) and bio pesticides (68.33 per cent). This might be due to the fact that, in organic farming pest control strategies are largely preventive, rather than reactive. The balance of cropped and uncropped areas, crop species and variety choice, and the temporal and spatial pattern of the crop rotation seek to maintain a diverse population of pests and their natural enemies and disrupt the life cycle of pest species.

Contamination Control

It was evidenced that only 33.33 per cent of organic farmers adopted the suitable buffer zone and majority (73.33 per cent) used all the by-products available on the farm for composting. The reason could be that, they were in the first year of conversion plan and might also not be aware of the importance of this practice in organic farming.

Harvesting and Processing

From the table, it is evident that cent per cent organic farmers adopted separate harvesting, processing and storage operations for organic and conventional produce. To avoid the possible contamination from outside and to maintain product integrity, farmers might have adopted this practice.

Packaging and Labelling

The study revealed that 60 per cent of the organic farmers adopted biodegradable packaging material such as white cloth bags while 66.67 per cent of organic farmers followed proper labelling procedure to convey clear and accurate information to the consumers. Since a majority of the organic farmers of Warangal district were in the third year of conversion and exported their produce to the European Union with the help of Oorvi, they have resorted to the above practice. In East Godavari, most of the organic farmers were in their first year of conversion and have sold their produce as in common agricultural markets along with conventional produce. In case of Chittoor district majority of the organic farmers were selling their produce in the Organic Bazaar established by WORD NGO in collaboration with IIRD.

Conclusion

From the above comparison the following conclusions were made based on the organic farmers crop production practices followed by them. The results revealed that the practices of Warangal farmers (71.88 per cent cases) matched with that of prescribed organic crop production standards. In East Godavari district it was 60.94 per cent organic and in case of Chittoor organic farmers practices were 50 per cent organic in nature i.e. the practices followed were in agreement with that of organic crop production standards.

Ironically, even with 72 per cent of organic practices followed in Warangal, 61 per cent organic practices followed in East Godavari district and 50 per cent of organic practices followed in Chittoor district, farmers of the study area would not

qualify as certified organic producers, since some of the important principles of organic crop production were not taken care of. As for example, maintenance of farm record and conversion plan is essential for certification and conversion to organic farming, but the organic farmers of East Godavari and Chittoor had not adopted farm record keeping. Bio fencing and suitable buffer zone should be provided according to NPOP. If the whole farm is not converted, it must be ensured that organic and conventional parts of the farm are separate and inspectable (3.1.1.2 and 3.1.1.5 standards of NPOP) which was not taken care by the organic farmers of East Godavari and Chittoor districts. Other practices like crop diversity (40.00 per cent) (NPOP 3.2.3.1), use of bio pesticides (3.2.5.1 NPOP) was adopted by only 45 per cent in East Godavari and 60.00 per cent in Warangal district but not by cent per cent of the farmers. Likewise there are some other practices which were not taken care of by the organic farmers of the study area. Hence it is essential for the promoters to educate and create awareness and improve the knowledge among the organic farmers about organic crop production standards. This may ensure that they reap the full benefits of certification through price premiums on their organic produce.

Table 1. Comparison of the Organic Farmer's Crop Production Practices with prescribed Organic Crop Production Standards

S. No.	Crop Production Practices and What standards say	What organic farmers followed							
		Warangal (n = 20)		East Godavari (n = 20)		Chittoor (n = 20)		Total (N = 60)	
		f (%)	Score	f (%)	Score	f (%)	Score	f (%)	Score
1	**Conversion requirements**								
	Farm diary-Farmer should provide the convaersion plan details which include-Basic data of the farm, Farm map, soil analytical data, water quality data, crop production practices, plant protection measures, crop rotation plan & details on seed & planting materials.	20 (100.00)	2	0	0	0	0	20	1
	Bio-fencing boundary must be provided between organic & conventional farming fields.	0	0	09 (45.00)	1	0	0	09 15.00)	0
	Farm once converted to organic should not be reverted to conventional farming.	20 (100.00)	2	20 (100.00)	2	20 (100.00)	2	60 (100)	2
2	**Farm Designing**								
	The cattle shed, compost yard, store house should be at a comparatively higher elevation than the cropped area to prevent water logging inside the cattle shed and Compost yard should be adjacent to the cattle shed and biomass from nearby trees and shrubs surrounding the cattle shed can be used.	19 (95.00)	2	17 (85.00)	2	11 (55.00)	1	47 (78.33)	1

S. No.	Crop Production Practices and What standards say	What organic farmers followed							
		Warangal (n=20)		East Godavari (n=20)		Chittoor (n=20)		Total (N=60)	
		f (%)	Score	f (%)	Score	f (%)	Score	f (%)	Score
	On the boundary of the farm, MPTs like Neem, Pongamia, Subabul Erythrina or any other local trees to be planted 10 m apart.	11 (55.00)	1	07 (35.00)	1	11 (55.00)	1	29 (48.33)	1
	An office of 5m X 5m may be constructed to maintain farm records required for proper inspection and certification.	0	0	0	0	0	0	0	0
	Bunds should occupy 1-2% of the total cultivated area and on the bunds seasonal vegetables, fodder crops etc, could be planted.	0	0	0	0	0	0	0	0
	A storehouse should be maintained to stock the farm implements and the produce after harvest and it should be rat & damp proof and windows and doors could be lined by fine mesh.	03 (15.00)	0	0	0	0	0	03 (05.00)	0
3	**Land Preparation**								
	Summer ploughings for in situ moisture conservation.	20 (100.00)	2	20 (100.00)	2	20 (100.00)	2	60 (100.00)	2
	Incorporation of crop residues / green manuring/green leaf manuring is must.	18 (90.00)	2	16 (80.00)	2	08 (40.00)	1	42 (70.00)	1
	Proper cleaning of machinery before using in organic fields i.e. salt water.	20 (100.00)	2	11 (55.00)	1	14 (70.00)	1	45 (75.00)	1

S. No.	Crop Production Practices and What standards say	What organic farmers followed							
		Warangal (n=20)		East Godavari (n=20)		Chittoor (n=20)		Total (N=60)	
		f (%)	Score	f (%)	Score	f (%)	Score	f (%)	Score
4	**Seed/Plant materials and Sowing/Planting**								
	Only certified seed and plant materials should be used. If organic seed is not available, chemically untreated inorganic seed materials may be used and Genetically engineered plants and seed are not permitted.	20 (100.00)	2	20 (100.00)	2	0	0	40 (66.67)	1
	Seed treatment must be done with biological sources only.	20 (100.00)	2	09 (45.00)	1	13 (65.00)	1	42 (70.00)	1
	Uniformity in sowing dates, proper spacing, maintenance of optimum plant population should be maintained and gap filling - certified seed and plant materials should be used.	20 (100.00)	2	10 (50.00)	1	0	0	30 (50.00)	1
5	**Crop diversity** Several short duration crops can be cultivated as inter crops. 15(75.00)	15 (75.00)	1	15 (75.00)	1	11 (55.00)	1	41 (68.33)	1
	Crop rotation with legumes and deep rooted crops must be adopted. 08(40.00)	08 (40.00)	1	08 (40.00)	1	08 (40.00)	1	24 (40.00)	1
6	**Weed management**								
	Manual weeding may be adopted in the early stages of crop and it serves as biomass for composting.	20 (100.00)	2	20 (100.00)	2	20 (100.00)	2	60 (100.00)	2

S. No.	Crop Production Practices and What standards say	What organic farmers followed							
		Warangal (n=20)		East Godavari (n=20)		Chittoor (n=20)		Total (N=60)	
		f (%)	Score	f (%)	Score	f (%)	Score	f (%)	Score
	Cultivation of cover crops/grain legumes and mulching with weed slashing and shade leaf litter etc. Can be followed for smothering of weeds.	05 (25.00)	1	15 (75.00)	1	07 (35.00)	1	27 (45.00)	1
7	**Irrigation schedule** Proper irrigation at critical stages and avoid excessive irrigation.	20 (100.00)	2	20 (100.00)	2	20 (100.00)	2	60 (100.00)	2
8	**Fertilization policy**								
	Crop residue incorporation, green and green leaf manuring, and vermicompost.	18 (90.00)	2	16 (80.00)	2	08 (40.00)	1	42 (70.00)	1
	Use of biodegradable materials from microbial/plant/animal origin only permitted.	11 (55.00)	1	08 (40.00)	1	10 (50.00)	1	29 (48.33)	1
	Split application of organic manures is recommended to apply 75% as basal and 25% at later stage.	0	0	08 (40.00)	1	12 (60.00)	1	20 (33.33)	1
	Use on-farm sources only.	18 (90.00)	2	18 (90.00)	2	12 (60.00)	1	48 (80.00)	2
9	**Plant protection measures**								
	Physical and mechanical methods of pest, disease and weed management must be followed - summer ploughing, trap & barrier crops, field & plant sanitation, removal of insect infected leaves and fruits, diseased plants, Pheromone traps/sticky traps, Bird perches allowed	20 (100.00)	2	20 (100.00)	2	20 (100.00)	2	60 (100.00)	2

S. No.	Crop Production Practices and What standards say	What organic farmers followed							
		Warangal (n=20)		East Godavari (n=20)		Chittoor (n=20)		Total (N=60)	
		f (%)	Score	f (%)	Score	f (%)	Score	f (%)	Score
	Use of bio pesticides/bio herbicides and bio agents only permitted.	12 (60.00)	1	09 (45.00)	1	17 (85.00)	2	38 (68.33)	1
	Botanicals / Preparations from Neem, *vavilaku*, custard apple, pongamia and cow urine and dung preparations can be used as repellents and pest control measures	20 (100.00)	2	15 (75.00)	1	15 (75.00)	1	50 (83.33)	2
10	**Contamination control**								
	Suitable buffer zone should be maintained between organic & conventional block to prevent possible contamination with chemicals	20 (100.00)	2	0	0	0	0	20 (33.33)	1
	The by- products like leaves, stem, Husk could be recycled to the field for composting.	20 (100.00)	2	16 (80.00)	2	08 (40.00)	1	44 (73.33)	1
11	**Harvesting, and processing**								
	In case of holdings having both conventional and organic farming activities, the harvesting, processing and storage should be done separately.	20 (100.00)	2	20 (100.00)	2	20 (100.00)	2	60 (100.00)	2
	Water and salt may be used as organic products.	0	0	0	0	0	0	0	0
12	**Packaging and Labelling**								
	Use eco-friendly & biodegradable packaging materials.	20 (100.00)	2	20 (100.00)	2	20 (100.00)	2	60 (100.00)	2

S. No.	Crop Production Practices and What standards say	What organic farmers followed							
		Warangal (n=20)		East Godavari (n=20)		Chittoor (n=20)		Total (N=60)	
		f (%)	Score	f (%)	Score	f (%)	Score	f (%)	Score
	Labelling shall convey clear & accurate information on the organic status of the product.	20 (100.00)	2	10 (50.00)	1	10 (50.00)	1	40 (66.67)	1
	Total score obtained	-	**46**	-	**39**	-	**31**	-	**36**

References

National Programme for Organic Production. (2005). Guidelines for organic production and processing. Sixth edition, Department of Commerce, Ministry of Commerce and Industry, New Delhi. www.apeda.org.

Sharma Promila (2004) Status of Marketing of Organic Products in Mountain region of Uttaranchal, India. 6th IFOAM-Asia Scientific Conference " Benign Environment and Safe Food" 7th -11th September 2004, Yangpyung/ Korea.

Subrahamanyeswari B and Mahesh Chander. (2008). Compatibility of animal husbandry practices of registered organic farmers with organic animal husbandry (OAHS): an assessment in Uttarakhand. Indian Journal of Animal Sciences. 78(3):322-327.

Siddaraju V.G and Rajendran S. (2006). Organic Farming System: Issues and concerns. Kurukshetra. 54(9):20-23.

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