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UTILIZATION OF ORGANIC FARMING PRACTICES AND MATERIALS BY SMALL SCALE FARMERS IN OGUN STATE NIGERIA

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Abstract

In Nigeria several small scale farmers make use of organic materials such as compost and manure to maintain soil organic matter and as sources of nutrients. The advantages of organic farming could include increased productivity and enhanced biodiversity of the farm lands and surrounding environment. This paper examined the utilization of organic of practices and materials, with highlight on farmers' demographics, knowledge of organic farming, attitude and constraint to use of organic practice and materials among small scale farmers' in Nigeria. The population consisted of all crop organic farmers registered with the agricultural departments then random sampling procedure was used to select 141 farmers in the study area. The data collected were analyzed with the aid of descriptive statistical tools while the hypotheses was tested using Pearson Product Moment Correlation (PPMC). Findings reveal that about half (50.4%) of the farmers were aged 51–60 years of age. While only (7.1% and 1.4%) were less than 30 years and above 60 years respectively. majority of the farmers were Christian (75%) adults (50.4%), males (86.5%), and married (78%) and own 1-2 acres of farm land (92.2%). The result showed there was high level of use of organic farming practice and materials among small scale farmers in Ogun State, as utilization of organic practice of management of soil fertility, Pest and disease control was high. It can be concluded that knowledge ($r = 0.468$, $p = 0.002$) affect the use and practice of organic agriculture leading to favourable attitude which also affected ($r = 0.187$, $p = 0.026$) the use of organic farming

Key words: organic practice, use, farmers, organic materials

INTRODUCTION

Organic farming is gaining importance in Nigeria, with strong indication of interest from farmers and researchers across the country. There is also a growing preference for organically grown foods among sizeable health conscious individuals. Reports from various studies reveal that Nigeria shows a strong potential for further developing the organic sector to meet export opportunities and create a more sustainable form of agriculture. The 2nd Africa Organic Conference report confirms that organic agriculture plays a key role in sustainable development, food security, poverty reduction, environmental security, climate change adaptation, human health, and preservation of indigenous knowledge, plant varieties and animal breeds as well as socio-cultural development (AOC2, 2012).

The smallholder farmers are responsible for the bulk of food crops produced in Nigeria and are characterized with low output. This is also true for organic produce. The low output of organic produce among small scale farmers, exist mainly in low knowledge of planting materials and lack of information of basic principles of organic farming. Be it as it may, organic farming is environmentally friendly and offers high premiums for organic produce.

The high cost of inorganic farm inputs and lack of support for conventional farming has led to some entire area spontaneously converting to organic farming (Balogun, 2010). Various organizations in Nigeria in partnership with international bodies have committed enormous efforts toward promoting organic farming among small-scale farmers who utilize on-farm resources.

This study was therefore commissioned to investigate the utilization of organic practices and materials with specific emphasis on farmers' demographics, access to information sources, knowledge of organic farming, attitude and constraint to use of organic practice and materials among farmers' in Nigeria.

MATERIALS AND METHODS

The study was conducted in two Local Government Areas (LGAs) of Ogun State in Southern Nigeria in 2013. The area is made up of Ikenne and Remo-North Local Government areas. The choice of Ikenne and Remo-North LGAs was made because of the concentration of farmers who are into organic farming in Ogun state.

The target population consisted of all smallholder organic farmers registered with the agricultural departments in the two LGAs identified above. A random sampling procedure was adopted during the selection of 141 farmers– 68 from Ikenne and 73 from Remo-North LGAs. This is about 20% of registered farmers who practice organic farming in the study area

A structured interview schedule was used to collect data from the 141 famers. The interviews were conducted by team of postgraduate research assistants, who asked questions directly from the interview schedule, filling out answers directly to avoid misinterpretations and inaccurate responses.

Measurement of variables

Farmers were asked a series of demographic questions, questions about the types of crops grown, information sources, and a series of items measuring their knowledge of organic farming materials.

a) Demographic questions: Farmers were asked to indicate their social and personal data which included age, gender, religion, marital status, farm size and types of crops grown, information sources, and educational status.

b) Information sources: Farmers indicated sources from which they obtain information on organic farming and frequency. Frequent sources were scored 1, occasional sources 2, and never zero. The highest, lowest and mean scores were determined. Scores above and below the mean score were designated high and low.

c) Knowledge of organic farming materials: Farmers asked to answer 10 questions, giving a true or false response. Maximum and minimum scores of 10 and zero were

possible. Overall knowledge scores were categorized as high (5-10) and low (less than 5).

d) Constraints to the use of organic farming: a list of 10 constraints was listed and farmers were asked to rank these constraints in order of severity: not severe was scored 0, severe was scored 1, and more severe was scored 2. Maximum and minimum scores of 20 and zero were possible. Overall constraint scores were categorized using the mean into either high effect or low effect.

e) Use of organic farming practices by the farmers: The use of organic farming practices is subdivided into application of management of soil fertility, pest and disease control and cultural practice in weed management. Management of soil fertility is also further divided into application of organic manure and intercultural practices, farmers were asked to indicate the items which the use and those they are not using from the list provided. Any item used was scored 1 while 0 was scored for practice not used. The highest, lowest, the mean scores and the standard deviation were then computed. The mean score obtained was used to categorize the level of use of organic farming in the study area as high and low use of organic farming practices

The data collected were analysed with the aid of descriptive statistical tools such as percentages, mean, frequency distribution, while the relationships were analysed using Pearson Product Moment Correlation (PPMC) and Chi-Square.

RESULTS AND DISCUSSION

Results provided in Table 1 show farmers' demographics. Findings reveal that about half (50.4%) of the farmers were aged 51–60 years of age. While only (7.1% and 1.4%) were less than 30 years and above 60 years respectively. majority of the farmers were Christian (75%) adults (50.4%), males (86.5%), and married (78%) and own 1-2 acres of farm land (92.2%). This finding match reports from previous studies by Oyesola and Obabire (2011) and Dipeolu *et al* (2006) that focused on farmers in Nigeria, which reported that agriculture is predominantly in the hands of older aged farmers. Also all the farmers had one form of education or another. Over 80% of the farmers either had secondary (44.7%), primary (25.5%) and tertiary (13.5%) education while educational attainment of 16.3% of them is informal. This high literacy level of farmers mirrors the assertion of Adeoye *et al* (2010) who stated that majority of organic farmers are literate, and this would go a long way in influencing the usage of organic farming practices.

Access of organic farming practices information among farmers

Results showed that farmers accessed information on organic farming from various sources However (57.4%) of farmers in this study regularly used radio to access organic farming information (M = 1.56 ± 0.57). This regular usage of radio for agricultural and development information among rural population mirrors the findings of FAO (2010) and Ayansina and Ayandiji (2010). Nearly 54% of the farmers obtain information fellow farmers (M = 1.30±0.84). Interestingly, the farmers occasionally rely on television (58.9%) and extension

agents (47.5%) for information on organic farming practices. The least used sources of information among the farmers were mobile phones (M = 0.51 ±.70), print media (M = 0.51, ±.75) and internet (M = 0.44 ±.68).

Table1. Demographic Frequencies of farmers (n= 141)

Variables	F	%
Age		
< 30	10	7.1
31-40	19	13.5
41-50	39	27.5
51-60	71	50.4
Above 60	2	1.4
Sex		
Male	122	86.5
Female	19	13.5
Religion		
Christianity	107	75
Islam	20	14.2
Traditional	14	9.9
Marital status		
Single	13	9.2
Married	110	78.0
Widow	3	2.1
Divorced	15	10.6
Farm size (Ha)		
1-2	137	97.2
3-4	3	2.1
Above 4	1	0.7
Educational Status		
No formal education	23	16.3
Primary education	36	25.5
Secondary education	63	44.7
Tertiary education	19	13.5

Table 2: Access of organic farming practices information among farmers

Sources of information	Regularly		Occasionally		Never		Weighted Mean	SD	Rank order
	Freq	%	Freq	%	Freq	%			
Radio	81	57.4	27	19.1	33	23.4	1.56	0.577	1
Fellow farmers	76	53.9	31	22.0	34	24.1	1.30	0.834	2
Television	49	34.8	83	58.9	9	6.4	1.28	0.793	3
Farmers association	55	39.0	64	45.4	22	15.6	1.23	0.786	4
Relatives	34	24.1	51	36.2	56	39.7	0.84	0.577	5

Extension agents	17	12.1	67	47.5	57	40.4	0.72	0.680	6
Phone call (GSM)	33	23.4	7	5.0	101	71.6	0.51	0.703	7
Print media	22	15.6	27	19.1	92	65.2	0.50	0.752	8
Internet and other ICTs	15	10.6	33	23.4	93	66.0	0.4468	0.680	9

Source: Field survey, 2013

Farmers' level of access to information organic farming practices is shown on Table 3. It reveals that over two thirds of farmers had low of access (65%), while only one third of them (30.5%) highly access information about organic farming (Mean= 8.5±0.642). Although a previous study reported high level of organic farming awareness exist among farmers in south-western Nigeria (Oyesola and Obabire (2011), this has not translated to high level of information access among farmers. This implies that the farmers still require information about organic farming practice to improve their involvement in organic farming.

Table 3: Farmers level of access to Information on organic farming practices

Information source	**Range**	**F**	**%**	**Mean**	**SD**	**Min**	**Max**
High	8.5 – 18	43	30.5	8.5	0.642	00	18
Low	0.0 – 8.0	98	69.5				
Total		**141**	**100.0**				

Source: Field survey, 2013

Farmers' knowledge of organic farming practices

Information on Table 4 shows knowledge of farmers on organic agricultural practices. It reveals that majority (89.4%) of the farmers posited that it was true that organic farming involves the use of animal waste, such as poultry waste, cow dung etc. as manure (M = 0.893 ±0.309). So also, 83.7% and 82.3% of the farmers adjudged true the statement that Organic farming involves allowing cleared weeds to decay on the farm to improve soil fertility rather than packing them off (M = 0.836 ± 0.37), and that Organic farming does not involve the use of chemical to control weeds, pests and diseases on the farm (M= 0.822 ± 0.383). This is an indication that farmers in the study area had a good knowledge of organic agricultural practices. This result supports the findings of Oyesola and Obabire (2011) that the farmers in Ekiti state have a good knowledge of organic farming practices. Also results on Table 2 further reveals that the knowledge of some practices of organic agriculture is not very high for some knowledge items. Thus 58.9% of the farmers viewed that cultural methods can only be used to control weeds in organic farming (M=0.588 ± 0.493), 62.4% suggested forage crops can be used to feed livestock in organic farming rather than using concentrate feeds (M 0.624 ± 0.486) while 63.8% taught that practising crop rotation is another method of improving soil fertility in organic farming (M 0.638 ± 0.482). These knowledge items suggest

the areas of information needs by the farmers so as to be able to ensure adequate practice of organic agriculture.

Table 4: Knowledge of organic farming practices

	Knowledge test	True		False		Mean	SD
		F	%	F	%		
1.	Organic farming involves the use of animal waste such as poultry waste, cow dung etc. as manure	126	89.4	15	10.6	0.893	0.309
2.	Organic farming involves allowing cleared weeds to decay on the farm to improve soil fertility rather than packing them off.	118	83.7	23	16.3	0.836	0.370
3.	Organic farming does not involve the use of chemical to control weeds, pests and diseases on the farm	116	82.3	25	17.7	0.822	0.383
4.	Method of planting cover crops can be used to control weeds, erosion and increase soil nutrients	110	78.0	31	22.0	0.780	0.415
5.	Organic farming encourages the activities of micro-organisms inhabiting in the soil	107	75.9	34	24.1	0.758	0.429
6.	Organic farming does not involves the use of synthetic fertilizers	101	71.6	40	28.4	0.716	0.452
7.	Pests and weeds can be controlled culturally in organic farming	91	64.5	50	35.5	0.645	0.480
8.	Practising crop rotation is another method of improving soil fertility in organic farming.	90	63.8	51	36.2	0.638	0.482
9.	Forage crops can be used to feed livestock in organic farming rather than using concentrate feeds	88	62.4	53	37.6	0.624	0.486
10.	Cultural methods can only be used to control weeds in organic farming	83	58.9	58	41.1	0.588	0.493

Source: Field Survey, 2013

Farmers' level of knowledge on Organic agricultural practices

On the overall, Table 5 reveals that 66.7% of the farmers have high level of knowledge on organic agricultural practices. It is therefore hoped that the farmers high knowledge of organic farming will help them to develop favourable attitude towards organic agricultural practices, as this is also expected to influence positively, their use of such organic agricultural materials and practice in the study area. This result agrees with Oyesola and Obabire (2011) which reported high knowledge level among farmers in selected Local government areas of Ekiti State.

Table 5: farmers' level of knowledge of Organic agricultural practices in the study area

Level of knowledge	Range of scores	F	%	Mean	SD	Minimum	Maximum
Low	1-6	47	33.3	7.31	1.69	0.00	10.00
High	7-10	94	66.7				

Source: Field Survey, 2013

Constraints to the use of organic farming technologies

The constraint to the practice of organic farming among farmers is presented on Table 6, the result shows that various constraints to the practice of organic agriculture in the study area, presented in both severity and rank order. The study reveals that poor transportation facilities for organic materials 57.4% (M=2.46 ± 0.691), unpleasant odour 43.3% (M =2.09 ± 0.882), and lack of research support for organic practices 39.0% (M = 2.26 ± 0.680) were the most severe constraints affecting the farmers in the study area. This relates to the findings of Balogun (2010) that one of the problems limiting organic agriculture in the rural areas is the problem of transportation. About half of the farmers also perceived high cost of organically grown crops 52.5%, organic farming being labour intensive 50.4% and lack of information on organic products 49.6% as severe constraints. This implies that the majority of the constraints bothers on information, capital and high cost associated with organic agricultural practice.

The result also reveals that poor transport facilities for organic materials, lack of research support, and lack of publicity for organic produce are ranked high in the study area. The least ranked constraints according to the study are that organic farming is labour intensive, high cost of purchase/production and the scarce nature of materials for organic agricultural practices.

Table 6: Constraints to the use of organic farming practices

Constraints to the practice of organic farming	**Not severe**		**Severe**		**More severe**		**Weighted mean**	**SD**	**Rank**
	F	**%**	**F**	**%**	**F**	**%**			
Poor transport facilities for organic materials	16	11.3	44	31.2	81	57.4	2.46	0.691	1
Lack of research support	19	13.5	67	47.5	55	39.0	2.26	0.680	2
Lack of publicity for organic produce	35	24.8	57	40.4	49	34.8	2.10	0.768	3
Problem of unpleasant odour	49	34.8	31	22.0	61	43.3	2.09	0.882	4
Lack of information about organic farming	29	36.9	70	49.6	42	29.8	2.09	0.706	4
Poor knowledge of benefits of organic crops	42	29.8	51	36.2	48	34.0	2.04	0.800	6
High cost of organically grown crops	39	27.7	74	52.5	28	19.9	1.92	0.687	7
Material for organic manure are not readily available	64	45.4	43	30.5	34	24.1	1.79	0.808	8
High cost of purchase/production	60	42.6	54	38.3	27	19.1	1.77	0.752	9
Organic farming is labour intensive	52	36.9	71	50.4	18	12.8	1.76	0.664	10

Source: Field Survey, 2013

Use of organic agricultural practice among farmers

Information on Table 7 presents the results of farmers' use of organic agricultural practices in the study area. On application of organic manure, the study reveals that the most utilized practice by the farmers in the study area were application of poultry manure 89.4%, (M 0.822±0.309) and application of farmyard manure 82.3% (M 0.823±0.383). This may be due to the presence of a number of poultry farms in Ogun State especially in Ikenne and Remo North Local government areas. On intercultural practice, the study reveals that 46.8% of the farmers least practice incorporation of crop residues (M 0.468±0.501). This may not be unconnected with the act of bush burning and slash and burn agriculture, which characterized a number of our rural areas today.

Pest and disease control is also further sub-divided into cultural, mechanical and biological control practices, and use of bio-pesticides/agents. On cultural practice, 80.1% farmers mostly used mixed cropping (M= 0.801±0.40) and76.6% timely sowing (M 0.766±0.424), while 45.4% least used seed treatment with bio-pesticides (M = 0.454±0.499).

On mechanical practices, 68.1% used collection and destruction of affected plant and shoots (Mean 0.681±0.468) and 56.7% monitored of pests on the farm (M= 0.567±0.497). However, below half of farmers 45.4% practiced conservation and encouraging of predators in the field (M= 0.454 ± 0.499).

In weed management, Timely hand-weeding was the most popular 93.6% (M=0.936±0.245), followed by good land preparation 80.9% and timely inter-cultivation 74.5%. The implication of many of these findings is that, while the knowledge of organic agricultural practices could have effect on its practice among farmers. Farmers used mainly those technologies that are very close to indigenous agricultural practices, which are also important organic agricultural practices. Other practices, especially those that involve some level of financial commitments and to which information is limited are only practiced by small proportion of farmers.

Use of soil management practices by farmers

Information on Table 8 shows that the majority (68.1%) of the farmer in the study area were using soil management practices in improving the fertility of the soil in the area (M = 4.84±1.40), while 31.9% were using these methods in improving their soil fertility. This implies that the farmers were highly educated on the use of soil management practices in improving soil fertility as they prefer using organic manure rather than buying expensive fertilizer that are not readily available to improve their soil.

Farmers use of pest and disease control practices

The mean was used to categorize the respondent use of pest and disease control methods to either low or high. Table 11 shows that, 63.1% of farmers in the study area were highly using pest and disease control practices (M = 7.20±2.64) while about 36.9% of the farmers were lowly using such practices to control pest and disease on their farm. This implies that farmers were highly aware of methods of pest and disease control in organic farming.

Table 7: Use of organic agricultural practice among farmers

	Organic farming practices	Use		Non –use		Mean	SD
		F	%	F	%		
Management of soil fertility							
A.	**Application of organic manure**						
1.	Application of farmyard manure	116	82.3	25	17.7	0.823	0.383
2.	Application of poultry manure	126	89.4	15	10.6	0.822	0.309
3.	Application of green manure	103	73.0	38	27.0	0.731	0.445
4.	Use of compost	84	59.6	57	40.4	0.596	0.492
B.	**Intercultural practices**						
1.	Timely weeding	110	78.0	31	22.0	0.780	0.416
2.	Maintaining optimum soil moisture to avoid leaching and mobility of nutrients	77	54.6	64	45.4	0.546	0.499
3.	Incorporation of crop residues	66	46.8	75	53.2	0.468	0.501
Pest and disease control							
A.	**Cultural practices**						
1.	Crop rotation with leguminous crops	104	73.8	37	26.2	0.737	0.441
2.	Practising mixed cropping	113	80.1	28	19.9	0.801	0.400
3.	Timely sowing of crops	108	76.6	33	23.3	0.766	0.424
4.	Trap cropping	69	48.9	72	51.1	0.489	0.502
5.	Seed treatment with bio pesticides	58	41.1	83	58.9	0.411	0.494
B.	**Mechanical practices**						
1.	Collection and destruction of affected plant and shoots	96	68.1	45	31.9	0.681	0.468
2.	Monitoring of pest on the farm	80	56.7	61	43.3	0.567	0.497
3.	Uprooting of alternate host plant	70	49.6	71	50.4	0.497	0.502
4.	Collection and destruction of egg masses/larva	58	41.1	83	58.9	0.411	0.494
C.	**Biological pest control practices**						
1.	Conservation and encouraging of predators in the field	64	45.4	77	54.6	0.454	0.499
D.	**Use of bio-pesticides/Agents**						
1.	Applying ash and cow dung	72	51.1	69	48.9	0.511	0.502
2.	Use of neem seed kernel extract to control worms and whiteflies	64	45.4	77	54.6	0.454	0.499
3.	Use of neem seed cake to control nematode/root disease	59	41.8	82	58.2	0.418	0.495
Cultural practices in weed management							
1.	Timely hand weeding	132	93.6	9	6.4	0.936	0.245
2.	Good land preparation operations (one ploughing followed by 2 harrowing)	114	80.9	27	19.1	0.809	0.395
3.	Timely inter-cultivation	105	74.5	36	25.5	0.745	0.438

Source: Field Survey, 2013

Table 8: Distribution of farmers based on the use of soil management practices

Use of soil management practices	F	%	Mean	SD	Min.	Max.
Low	45	31.9	4.84	1.40	0	7
High	96	68.1				

Source: Field Survey, 2013

Table 9: Distribution of farmers based on use of pest and disease control practices

Level of use of pest and disease control methods	F	%	Mean	SD	Min.	Max.
Low	52	36.9	7.20	2.64	0	13
High	89	63.1				

Source: Field Survey, 2013

Overall use of organic farming practices among farmers in the study area

The mean score was then use to categorize the overall usage as either low or high. Table 10 reveals that the use of the different organic agricultural practices is high among majority of famers 61.0% (M= 7.31±1.69). This high use of organic farming practices is greatly influenced by a good number of indigenous agricultural practices to which farmers have over the years been used. This then suggests that the arable crops produce that are available for purchase and consumption in Ogun State are reasonably close to being organically produced. Efforts should therefore be geared towards increasing farmers' financial capacity and knowledge base so as to well-equipped and better positioned to use more of these organic agricultural practices.

Table 10: Overall use of organic farming practices among farmers

Level of use	Range of scores	F	%	Mean	SD	Min.	Max.
Low	0 – 14	55	39.0	7.31	1.69	0.00	23.00
High	15 – 23	86	61.0				
Total		**141**	**100.0**				

Source: Field Survey, 2013

Test of hypotheses

The test determined whether or not significant relationship existed between age, farm size, sex, religion, marital status, educational status of farmers and the use of organic agricultural practices. The Pearson Product Moment Correlation (PPMC) results shows that age has a significant inverse relationship with the use of organic agricultural practices in the study area. That is, while the younger farmers used the organic farming practices more, their older counterparts used them less. This may not be unexpected as the older people may be irresponsive to change. Ogunyemi, (2005) established an indirect relationship between age and adoption of agricultural technology. No significant relationship was however established between farmers' farm size and their level of use of organic farming technologies/practices.

This implies that farmers' use of organic farming practice was not influenced by the size of their farms.

The chi-square analysis for the relationship between sex, religion, marital status and educational status, It is result reveals that Sex, religion and marital status also showed no significant relationship with farmers' level of use of organic farming practices. The study further reveals that educational status of farmers influenced their level of use of organic agricultural practice in the study area. This is expected since the education exposes farmers to information that placed them beyond the level of indigenous agricultural practice. Oyesola and Obabire (2011) argued that high literacy among farmers may enhance adoption of innovations that are related to organic farming.

Table 11: Analysis of test

Pearson Product Moment Correlation (PPMC) results

Variables	R	χ^2	df	CC	P	Decision
Age	-0.267				0.001	S
Farm size	0.001				0.989	NS
Chi-Square results						
Sex	...	1.487	1	0.102	0.223	NS
Religion	...	3.949	2	0.165	0.139	NS
Marital status	...	5.265	3	0.190	0.153	NS
Educational status	...	14.706	3	0.307	0.002	S

Source: Field Survey, 2013

Where S = significant and NS = Not significant

This hypothesis is out to test if there is a significant relationship between farmers' knowledge of organic materials and use of organic agricultural practices. Sangotegbe (2011) posited that knowledge of the problems and potential benefits of taking action is an important determinant of use of agricultural technologies. Buttressing this position, several studies have found that farmers' knowledge of organic materials positively and significantly affected their decisions to use soil conservation measures. (Anim, 1999; Araya and Adejaye, 2001) associated with these changes. In the light of this, thus another hypothesis tests for significant relationship between farmers' knowledge of organic materials and use of organic agricultural practices. The study reveals that at 5% level of significance, the level of knowledge of farmers in the study area significantly and directly influenced ($r= 0.468$, $p = 0.002$) the use of organic agricultural practice in the study area. This means, the higher the knowledge of organic related activities, the higher the use of such practice. Therefore, the null hypothesis is rejected. Maddison (2007) found that farmers' knowledge of changes in climate attributes (temperature and precipitation) is important for adaptation decision making. Sangotegbe (2011) also established significant relationship between farmers knowledge of climate change and adaptation strategies in Okeogun area of Oyo State.

Table 12: Relationship between farmers' knowledge and use of organic agricultural practices

Variables	r-value	P	Decision
Knowledge	0.468	0.002	S

Source: Field Survey, 2013

CONCLUSION AND RECOMMENDATIONS

From the foregoing, it can be concluded that there is high level of use of organic farming practice and materials among small scale farmers in Ogun State, as utilization of organic practice of management of soil fertility, Pest and disease control was high. It can be concluded that used most frequent sources of information on organic agricultural practices was radio as farmers had high level of access to information leading to high level of knowledge on use of organic and favourable attitude to use of organic farming despite the several constraints to practices among farmers. In line with this it is recommended that government should provide organic farming inputs at a subsidized rate to farmers.

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