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A COMPARATIVE STUDY OF THE FARMERS' PERCEPTION ON THE ORGANIC CULTIVATION IN SELECTED HORTICULTURAL CROPS

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ABSTRACT

A study on the farmers' perception on the organic cultivation for the selected horticultural crops viz.; pineapple, potato and cabbage was undertaken during the period 2018 to 2020 in the state of Nagaland and Manipur. The analysis of the data from the selected districts reveal that the total cultivated area is found maximum in Nagaland as compare to Manipur. The total overall land holding in Nagaland is recorded as 106.25 ha; while in Manipur it was recorded as 92.18 ha. While in Manipur state, maximum ploughing is recorded at marginal farmers with 2 ploughing, followed by small and medium farm size group, as 3 times ploughing is concerned, marginal farmers are maximum followed equally by small and medium, whereas 4 ploughing is concerned, very few are doing 4 & above ploughing in Nagaland for the pineapple crop. For the potato crop, 3 to 4 ploughing are found maximum in both the state. Very few are adopting 5 & more ploughng for potato crop in Manipur whereas it is found maximum in medium farm size group. In case of cabbage, maximum is found with 3 & above ploughing on medium farm size. The extent of adoption of (FYM) farm yard manure (in t/ha) across the different farm size group of Nagaland and Manipur shows that maximum FYM is used by the medium adopters, followed by low adopter and very few are found in the high adopter of Nagaland state. With respect to the state of Manipur, maximum are medium rate adopter followed by low rate and it is least on high adopter of pineapple crop. As for potato crop is concerned, medium farms were found maximum for medium rate adopter of FYM followed by low rate and very few are under high rate of adopter in Nagaland state. As Manipur is concerned, it is also found in the same trend with maximum on medium, followed by low and least on high rate adopter of FYM for potato crop. As cabbage crop is concerned, it is also following the same trend of pineapple and potato with maximum on medium rate, followed by low rate and least on high rate on cabbage in Nagaland state. Even the Manipur also follow the same trend for cabbage crop.

***Keywords*:** Horticultural, organic, ploughing, adoption, perception.

INTRODUCTION

Struggle for food has been the basis for survival ever since mankind had evolved. From the nomadic people to the settled or permanent groups or communities, agriculture or farming has becomes the only primary means or of way of existence. Indigenous peoples have different ways of life in their specific boundaries. Of these, farming in their own way for socio-economic development is considered to be an unavoidable aspect of the indigenous people living in different parts of the world. So, indigenous farming is associated with indigenous people and its various forms of indigenous cultures and agricultural practices that have been developed and practiced by the Indigenous peoples. In fact, Indigenous farming is a way of life and it encompasses the social, economic, cultural and political purview too (Singh and Sharma, 2020a).

Again, the current burgeoning issue of climate change and its impact has a fuller capacity or tendency of altering the crops-livestock's production and productivity level too. Further, climate change has also resulted in altering or changing the crop-livestock's habitation of the present certain ecosystem. It is also estimated that the India's population will reach 1.51 billion by 2030. Again with the advancement of Health Sciences, Indian consumers are realizing on the healthy food for the future perspectives. The present Government of India also emphasizes on the Doubling of Farm Income through various technologies intervention on sustainable approach by 2022. Bringing or balancing the entire scenario on the sustainable basis requires integrated and cumulative efforts of different Stakeholders from Top to Bottom or Bottom to Top approach through indebt study and understanding of the present existing systems and their nature of resource management patterns (Singh and Sharma, 2020b).

The North-Eastern states of India are inhibited by several Indigenous people having various cultural, political, social and economic values. The region has a rich flora and fauna and is considered as biodiversity Hotspot of many crops. North-Eastern region has a huge potential for growth and development in agriculture and allied sectors as the region is endowed with various Indigenous socio-economic aspect of farming. The Apatani; Bun; Zabo; Zero Tillage and Fruit-Based system of farming can be mentioned. The region is considered or assumes as low uses of synthetic inputs and

even some states are declared as Organic states and many more are on the pipeline of organic states. In fact, majority of the agricultural land areas are declared as "Organic by Default" and even some states are also considered as less or minimum inorganic user states (Pongener and Sharma, 2018).

Manipur and Nagaland are the two adjoining states out of the seven states of North-Eastern States of India. These states are inhabitated by many Indigenous people having special or peculiar system of social and economic life. Zhuming; Zabo; Zero-Tillage and Fruit-Based Farming system are some of the exemplified ones and many system are still left untouched in many pockets or areas from extensive study (Meena *et al.*, 2012).

Bringing the agricultural scenario of these two states on the sustainability forum; assessing the various form and system of existing agricultural practices and their recommended practices that have been existing and adopted/ adopting is the need of the hour so as to come up with the concrete findings and recommendations for future course of action and a handy manual for the Planners and Policy makers is the real core of the study. Thus, a thorough study and understanding of various *Indigenous Agricultural Practices* of these two agriculturally important states has been taken up on the theme "A Comparative Study of the Farmers' Perception on the organic cultivation of the selected horticultural crops of Nagaland and Manipur of India" so as to assess the sustainability of such practices in the region (Singh and Sharma, 2020d).

OBJECTIVES

1. To study the socio-economic determinants of the respondent's farm households
2. To assess the farmers' information and perception on the organic cultivation for the selected horticultural crops

MATERIALS AND METHODS

A multi-stage- random sampling technique have been used for the selection of sample units. Both purposive and cluster sampling method have been used for the selection districts, blocks from the states of Nagaland and Manipur and finalization of the sample size. In the last stage of sampling, the farmers who cultivate pineapple and potato& cabbage from these two states were surveyed for the selection of districts; blocks and villages. 300 farmers (150 respondent farmers from Manipur and 150 respondent farmers from Nagaland) were selected for each crop (i.e. 50 farmers / crop) for the data collection of the above crops. Data from the respondents were subjected for tabulations and further analyzed using various statistical measures (Singh and Sharma, 2020c).

RESULTS AND DISCUSSION

Table 1 reveals that the age group's of farm households for the two states show that Manipur populations are higher than Nagaland in the 3rd category (19 to 59 years) in regard to the age-group. Whereas comparing among the districts of Manipur, Senapati district is having the highest farm household/ population in the category 3 and Thoubal district has recorded the lowest population in the 4th category. The maximum family members are recorded in Manipur on category 2, while in Nagaland state maximum family members is recorded in category. whereas, among the district, maximum family members is recorded in Kohima district, followed by Senapati and Thoubal district, while Dimapur is found to be least on category II. Similar studies were carried out by Sharma (2016).

The maximum land holding size is found to be maximum in small category, followed by medium category and large category across the different farm size respectively. Among the district, maximum households are recorded in Senapati followed by Kohima and dimapur district while it was least in thoubal on Small farm group, whereas, in the medium farm group, Senapati district recorded the highest households followed by Thoubal, Kohima and Dimapur. In case of large category, Kohima district recorded the highest land holding followed by Senapati, Thoubal and Dimapur district, respectively. Comparatively the farm household's income is higher in Manipur than the Nagaland states. The study on the farmer's access to farm loans shows that the maximum no of farmer are not availing the loans from the banks and it accounts for 79.00 per cent of the respondents in the two states, i.e. Nagaland & Manipur. Similar studies were carried out by Sharma (2016); Mozhui and Sharma (2020).

The results of the study on the head education level of the sample respondents shows that the maximum numbers of sample respondent head's education level comes under the II category (upto primary) followed by III-category (pre-matric), IV-category (matric), I-category (Illiterate), V-category (intermediate) and VI- category (graduate & above) respectively. Similar studies were carried out by Sharma (2016).

Table 2 reveals that the farmers' network regarding their farm information reveals that the Manipur state is comparatively higher in both the low & medium categories of farmer whereas it is higher in Nagaland state in the high category. In case of farmer's exposure to extension facilities, Kohima district is found to be maximum followed by Senapati, Thoubal and Dimapur districts in low category of farmers. Whereas in the medium category, Dimapur district is found to be maximum followed by Senapati, Thoubal and Kohima districts. In the high category, Dimapur district is recorded highest followed by Senapati, Kohima and Thoubal district, respectively. Similar studies were carried out by Sharma (2016); Mozhui and Sharma (2020).

Table 3 reveals that the distribution of the sample respondents and their sources of knowledge reveal that the maximum numbers of household comes in the medium-category followed by low and high categories. In the low category, Senapati district was recorded highest followed by Kohima, Dimapur and Thoubal district respectively. Whereas, in the medium category, Kohima district rank first followed by Senapati, Thoubal and Dimapur. In case of high category, Thoubal district was recorded maximum followed by Kohima, Senapati and Dimapur districts respectively. Similar studies were carried out by Sharma (2016).

Table 4 reveals that the analysis of the frequency of the Extension personnels visited in the study areas are categorized into low, medium and high categories with the maximum numbers of respondents on the low category followed by medium and high categories respectively. In the low category, Kohima district is found to be maximum followed by Senapati, Thoubal and Dimapur districts. Whereas in the medium category, Dimapur district is found to be maximum followed by Senapati, Thoubal and Kohima districts. In the high category, Dimapur district is recorded

highest followed by Senapati, Kohima and Thoubal district, respectively. Similar studies were carried out by Panneerselvam *et al.*, (2012).

Table 5 reveals that the maximum numbers of the sample respondents are in the medium category and found highest in the Nagaland state and low in Manipur state. In the low category, Senapati district is the highest followed by Thoubal, Kohima and Dimapur, respectively; whereas in the medium category, Kohima district is found to be maximum followed by Senapati, Dimapur and Thoubal district. In case of high category, Dimapur district rank first followed equally by Senapati and Kohima and Thoubal district, respectively. Similar studies were carried out by Shuya and Sharma (2018).

Table 6 reveals that the households is concerned it was recorded maximum on medium farm, followed by small and marginal in Nagaland, while in Manipur, marginal farmers are maximum with equal no of small and medium group for pineapple crop. For the potato crop is concerned, maximum is found on medium group followed small and marginal in Nagaland. In case of Manipur, maximum is found on the marginal followed by small and medium respectively. Again for the cabbage crop growers, it was found maximum on medium, followed by small and the least in marginal in Nagaland. As Manipur is concerned, maximum growers was found for marginal followed by small and least on medium farm size group. In totality, crops areas was worked out to be 106.25 ha and 92.18 ha in Nagaland and Manipur states respectively. Similar studies were carried out by Panneerselvam *et al.* (2012).

Table 7 reveals that the study of numbers of ploughing for land preparation on the selected horticultural crops of Nagaland and Manipur have been accounted and found that in Nagaland, up to 2 ploughing is found maximum followed by 3 ploughing and very few with 4 ploughing are found for pineapple crop. While in Manipur state, maximum ploughing is recorded at marginal farmers with 2 ploughing, followed by small and medium farm size group, as 3 times ploughing is concerned, marginal farmers are maximum followed equally by small and medium, whereas 4 ploughing is concerned, very few are doing 4 & above ploughing in Nagaland for the pineapple crop. Overall, up to 2 ploughing is found maximum in both the state followed by 3 ploughing and 4 & above ploughing, respectively. For the potato crop, 3 to 4 ploughing are found maximum in both the state. For 2 ploughing, maximum are found on medium and marginal for Nagaland and Manipur respectively. Very few are adopting 5 & more ploughing for potato crop in Manipur whereas it is found maximum in medium farm size group. In case of cabbage, maximum is found as 3 & above ploughing on medium farm size followed by small and marginal in Nagaland state whereas in Manipur it is found maximum on marginal farm followed by small and medium. Less farm households practices 2 times ploughing in both the states. Similar studies were carried out in the line by Sharma (2016); Mozhui and Sharma (2020).

Table 8 reveals that the extent of adoption of farm yard manure (in t / ha) across the different farm size group of Nagaland and Manipur are categorized as high (2.50 t & above), medium (1.26 t to 2.50 t) and low rate (up to 1.25 t) adopters respectively. Even for the pineapple crop, maximum FYM is used by the medium adopters, followed by low adopter and very few are found in the high adopter of Nagaland state. With respect to the state of Manipur, maximum are medium rate adopter followed by low rate and it is least on high adopter of pineapple crop. As for potato crop is concerned, medium farms were found maximum for medium rate adopter of FYM followed by low rate and very few are under high rate of adopter in Nagaland state. As Manipur is concerned, it is also found in the same trend with maximum on medium, followed by low and least on high rate adopter of FYM for potato crop. As cabbage crop is concerned, it is also following the sane trend of pineapple and potato with maximum on medium rate, followed by low rate and least on high rate on cabbage in Nagaland state. Even the Manipur also follow the same trend for cabbage crop. Similar studies were carried out in the line by Shuya and Sharma (2018).

Table 1 : Socio-economic determinants of the respondent's farm households

A.	**Age Group of Farm households**							
S.N.	**Categories**	**Dimapur**	**Kohima**	**Nagaland**	**Thoubal**	**Senapati**	**Manipur**	**Total**
i.	Up to 12 years	150	196	346	157	241	398	744
ii.	13 to 18 years	62	167	229	45	187	232	461
iii.	19 to 59 years	154	315	469	159	364	523	992
iv.	60 & above	30	31	61	18	23	41	102
Total		396 (**35**)	709 (**64**)	1105	379 (**31**)	815 (**68**)	1194	2299
B.	**Family members of Farm households**							
i.	5 to 6 members	2	16	18	0	4	4	22 **(7)**
ii.	7 to 8 members	32	64	96	40	60	100	196 **(65)**
iii.	9 to 10 members	14	13	27	10	31	41	68 **(22)**
iv.	> 10 members	2	7	9	0	5	5	14 **(4)**
Total		50	100	150	50	100	150	300
C	**Land Holding Size of the Farm households**							
i.	Small	33	61	94	18	64	82	176 **(58)**
ii.	Medium	14	27	41	28	30	58	99 **(33)**
iii.	Large	3	12	15	4	6	10	25 **(8)**
Total		50	100	150	50	100	150	300
D.	**Farm Income of households**							
i.	Low	13	12	25	22	9	31	56 **(18)**
ii.	Medium	17	70	87	25	76	101	188 **(62)**
iii.	High	20	18	38	3	15	18	56 (18)
Total		50	100	150	50	100	150	300

E.	**Farmers' Debit/ Loan Status of the sample respondents**							
i.	Yes	18	19	37	3	22	25	62 **(20)**
ii.	No	32	81	113	47	78	125	238 **(79)**
Total		50	100	150	50	100	150	300
F.	**Head Education level of the sample respondents**							
i.	Illiterate	3	18	21	11	19	30	51 **(17)**
ii.	Upto Primary	14	32	46	14	30	44	90 **(30)**
iii.	Pre-matric	17	24	41	13	25	38	79 **(26)**
iv.	Matric	13	7	20	12	20	32	52 **(17.33)**
v.	Intermediate	2	10	12	0	5	5	17 **(5)**
vi.	Graduate & <	1	9	10	0	1	1	11 **(3)**
Total		50	100	150	50	100	150	300

Table 2 : Farmers' Network of the sample respondents

S.N.	Category	Dimapur	Kohima	Nagaland	Thoubal	Senapati	Manipur	Total
1.	Low	4	41	45	12	37	49	94
2.	Medium	20	48	68	31	59	90	158
3.	High	26	11	37	7	4	11	48
Total		50	100	150	50	100	150	300

Table 3 : Source of Knowledge of the sample respondents

S.N.	Category	Dimapur	Kohima	Nagaland	Thoubal	Senapati	Manipur	Total
1.	Low	28	36	64	12	42	54	118
2.	Medium	16	52	68	17	50	67	135
3.	High	6	12	18	21	8	29	47
Total		50	100	150	50	100	150	300

Table 4 : Frequency of the Extension Agents Visits on the sample respondent's farm

S.N.	Category	Dimapur	Kohima	Nagaland	Thoubal	Senapati	Manipur	Total
1.	Low	12	82	94	29	73	102	196 **(65)**
2.	Medium	23	13	36	17	19	36	72 **(24)**
3.	High	15	5	20	4	8	12	32 **(10)**
Total		50	100	150	50	100	150	300

Table 5 : Farmers' Training on Organic Cultivation in the sample respondents farm

S.N.	Category	Dimapur	Kohima	Nagaland	Thoubal	Senapati	Manipur	Total
1.	Low	12	19	31	29	65	94	125 **(41)**
2.	Medium	22	73	95	17	27	44	139 **(46)**
3.	High	16	8	24	4	8	12	36 **(12)**
Total		50	100	150	50	100	150	300

Table 6 : Area allocated under Horticultural crops cultivation on different farm size

S. N.	Area under horticultural crops (ha)	Nagaland				Manipur			
		Marginal	Small	Medium	Total	Marginal	Small	Medium	Total
1.	Pineapple crop	14	17	19	50	18	16	16	50
2.	Potato crop	22	32	46	100	43	34	23	100
3.	Cabbage crop	21	36	43	100	42	36	22	100
Total Cultivated area (ha)		6.16	10.71	17.10	33.97	8.10	10.40	13.60	32.10
Total area (ha)		9.68	23.04	39.56	**106.25**	19.35	22.10	18.63	**92.18**

Table 7 : Numbers of ploughing / Level for land preparation

S.N.	No's of Ploughing for land	Nagaland				Manipur			
		Marginal	Small	Medium	Total	Marginal	Small	Medium	Total
(a).	**Pineapple crop:**								
1.	Up to 2	12	11	12	35	11	10	9	30
2.	2 to 3	2	6	5	13	5	4	4	13
3.	4 and above	0	0	2	2	2	2	3	7
Total		14	17	19	50	18	26	16	50
(b).	**Potato crop:**								
1.	Up to 2	3	5	8	16	5	4	3	12
2.	3 to 4	17	23	31	71	36	27	18	81
3.	5 and above	2	4	7	13	2	3	2	7
Total		22	32	46	100	43	34	23	100

(c).	**Cabbage crop:**								
1.	Up to 2	4	5	5	14	4	3	2	9
2.	3 and above	18	27	41	96	39	31	21	91
Total		22	32	46	100	43	34	23	100

Table 8 : Extent of adoption of FYM for the selected horticultural crops

S.N.	Average FYM rate (t/ha)	Nagaland				Manipur			
		Marginal	Small	Medium	Total	Marginal	Small	Medium	Total
(a).	**Pineapple crop**								
1.	High rate (≥2.51)	0	0	1	1	0	1	2	3
2.	Medium (1.26 - 2.50)	11	12	11	34	12	11	9	32
3.	Low (up to 1.25)	3	5	7	15	6	4	5	15
(b)	**Potato crop:**								
1.	High rate (≥2.51)	1	0	2	3	0	0	3	3
2.	Medium (1.26 - 2.50)	18	24	41	83	39	29	18	86
3.	Low (up to 1.25)	3	8	3	14	4	5	2	11
(c).	**Cabbage crop:**								
1.	High rate (≥2.51)	0	0	4	4	1	1	2	4
2.	Medium (1.26 - 2.50)	20	23	40	83	39	28	18	85
3.	Low (up to 1.25)	2	9	2	13	3	5	3	11

POLICY RECOMMENDATIONS

1. The different selected horticultural activities and the adoption rate of mentioned activities is lower among the farmers across the different farm sizes. It necessities farm level education, awareness and capacity building among farmers to take the advantage and adoption of different development programmes of government in time.
2. Establishing financial framework for sustainable functioning of the selected horticultural crops and participatory planning has been found significant for upliftment of the farm household's economy.
3. During the study period, most of the farmers have been facing the transportation problems with high cost; illegal taxes and marketing infrastructures resulting in the low net income. These need immediate attention from the concerned authorities.
4. Farmers are deprived from getting the farm loans and are not well awarded of the existing National Agricultural Schemes for which every stakeholder must intervene for availing the facilities for creation of large employment and income generation avenues in the North-Eastern Region of India.

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