FARMER'S PERCEPTION AND DETERMINANT OF HORTICULTURAL CROPS IN NAGALAND AND MANIPUR STATES

Prof. Amod Sharma and Th Motilal Singh*

Senior Professor & Ex. Head, Department of Agricultural Economics

School of Agricultural Sciences, Nagaland University

Medziphema Campus, District: Chumoukedima-797106 (Nagaland)

* In charge, PC & SMS (Extension), ICAR for NEH Region, KVK, Imphal (Manipur)

ABSTRACT

The present research work was undertaken to known about the farmer perception and determinant for adoption the horticultural crops and major production constraints faced by them, by selecting 50 respondents each from Dimapur and Kohima districts of Nagaland and 50 respondents each from Senapati and Thubal districts of Manipur by using purposive stratified simple random sampling technique with the help of data collected through personnel interview methods during the Agricultural calendar year 2019 to 2022 (contain 3 years survey field data). About the farmer's perceptions for the horticultural crops in the study area viz; pineapple and chilli both were selected due to the prominent crops; based on benefit-cost ratio pineapple crops of Nagaland was recorded as highest (3.31: 1) returns, followed by pineapple crop of Manipur (3.01: 1) state; also based on benefit: cost ratio, chilli crop of Manipur was recorded highest (2.70: 1) returns, followed by chilli crop of Nagaland (2.76: 1) state, respectively. About the perception level it increases by maximum 17 per cent for Dimapur Pineapple, followed by Thoubal Chilli was 16 per cent, Kohima Chilli was 12 per cent and minimum Senapati Pineapple was 10 per cent, respectively. About the major constraints faced by the respondents during the production the foremost was due to need of high investment on inputs, followed by size of land holding and lack of technical knowledge, respectively.

Key words: *Nagaland, Manipur, Perception, Determinant, Horticultural crops.*

INTRODUCTION

Indian agrarian basically consisting of land use pattern, cropping pattern, investment in agriculture, use of agriculture machinery and implements has seen rapid changes (Singh and Sharma, 2020a). The factors such as industrialization, population pressure, green revolution, new technology relating to agriculture development are responsible for changes in the agrarian structure. India with 2.38 per cent of global geographical area supports 17.00 per cent of total world population with 63.00 per cent depend on farming livelihood (GoI, 2020). These livelihoods need to be secured with sustainable as a holistic approach in adopting the best management practices in order to efficiently utilise the waste from the farm enterprise. Most probably by the end of 2030 the country population will be 1.32 billion (approx.), it will be very difficult for the government to increase the farm product by doubling the income (Chishi and Sharma, 2019; Singh and Sharma, 2021a; (Yani and Sharma, 2022).

MATERIAL AND METHOD

The collected data from the surveyed population was then organized and analyzed in view to fulfill the objectives by selecting the horticultural crops practiced in the study area have been analyzed being a predominant system adopted by the respondents by using appropriate statistical tools were described, then a complete list of farmers along with their holding size was prepared from each of the selected villages with the help of village headman / Chairman / pradhan of the respective villages. The sample size was done with simple random sampling without replacement (SRSWOR) base on population parameter to determine the final sample size.

RESULTS AND DISCUSSION

Table 1 reveals the present research is based on horticultural crops grown successfully in both the state viz; pineapple and chilli were common. 50 numbers of pineapple growers from Dimapur district and 50 numbers of chilli growers from Kohima district were selected from Nagaland state. 50 numbers of pineapple growers from Senapati district and 50 numbers of chilli growers from Thumbol district were selected from Manipur state.

Table 1. Sample respondents growing horticultural crops in the study area (n=200)

S. N.	District(s)	Horticultural crops	Frequency	Percentage
(A).	**Nagaland**			
1.	Dimapur	Pineapple	50	50.00
2.	Kohima	Chilli	50	50.00
(B).	**Manipur**			
3.	Senapati	Pineapple	50	50.00
4.	Thumbol	Chilli	50	50.00

The cost incurred on different horticultural crops were described in estimating the investment cost and return, which will help farmer's guidance in production planning and examining the efficiency of each horticultural crops in term of economics and profit; so to obtain the better horticultural crops; so two types of cost have been identified, analyzed and described viz; variable cost and fixed cost. Variable costs are those cost which changes with the change in proportion, whereas fixed cost are those cost which do not change with the change in proportion. (Singh and Sharma, 2021b).

Table 2. Comparative cost of different horticultural crops

Particulars	Dimapur	Kohima	Senapati	Thoubal
	Pineapple	**Chilli**	**Pineapple**	**Chilli**
A. Variable cost				
1. Seeds, fertilizers, manures, plant protection chemicals etc;	57656.17 (51.85)	3911.19 (3.26)	10083.33 (19.96)	59431.03 (52.97)
2.(a) Family labour cost	1678.20 (1.50)	2134.78 (1.78)	1850.00 (3.66)	1612.82 (1.43)
2.(b) Hired labour cost	8411.54 (7.56)	2517.39 (2.10)	3400.58 (6.73)	3428.82 (3.05)
2. Marketing cost	1376.28 (1.20)	1289.13 (1.07)	1080.55 (2.13)	1479.48 (1.31)
3. Interest on working capital	3806.95 (3.42)	3867.43 (3.23)	934.50 (1.85)	3884.78 (3.46)
4. Total variable cost	67256.04 (60.49)	69440.69 (58.03)	16509.50 (32.68)	68631.18 (61.18)
B. Fixed cost				
1. Rental value of land	35889.33 (32.27)	49379.21 (41.26)	29548.61 (58.50)	40582.90 (36.17)
2. Depreciation on farm implements	1851.46 (1.66)	1357.17 (1.13)	1202.50 (2.38)	1203.46 (1.07)
3. Interest on fixed capital	514.92 (0.46)	543.39 (0.45)	2410.16 (4.77)	561.53 (0.50)
4. Total fixed cost	43928.79 (39.50)	50211.38 (41.96)	34000.75 (67.32)	43553.66 (38.82)
Total cost (A + B)	111184.84 (100.00)	119652.08 (100.00)	50510.25 (100.00)	112184.85 (100.00)

(Parenthesis indicates percentage to total)

Table 2 revealed with regard to the cost of seeds, fertilizers, manures, plant protection chemicals etc; incurred the highest cost of ₹ 59431.03 for Chilli Thoubal, followed by ₹ 57656.17 for Pineapple Dimapur, ₹10083.33 for Pineapple Senapati and ₹ 3911.19 followed by Chilli Kohima, Rental value of land with ₹ 49379.21 on Chilli Kohima, followed by ₹ 40582.90; the total highest variable cost ₹ 69440.69 on chilli Kohima, followed by ₹ 68631.18 on Chilli Thoubal, ₹67256.04 on Pineapple Dimapur and lowest cost incurred ₹ 16509.50 on Pineapple Senapati and to depreciation on farm implements, the highest cost incurred ₹ 1851.46 on Pineapple Dimapur, followed by ₹ 1357.17 on Chilli Kohima, ₹ 1203.46 on Chilli Thoubal and lowest cost was incurred ₹ 1202.50 on

Pineapple Senapati. The highest interest on fixed capital was incurred ₹2410.16 on Pineapple Senapati, followed by ₹ 561.53on Chjilli Thoubal, ₹ 543.39 on Chilli Kohima and lowest cost was incurred ₹ 514.92 on Pineapple Dimapur (Kumar *et al.*, 2012a). Thus, highest fixed cost was incurred ₹ 50211.38 on Chilli Kohima, followed by ₹ 43928.79 on Pineapple Dimapur, ₹ 43553.66 on Chilli Thoubal and lowest cost on ₹ 34000.75 on Pineapple Senapati, respectively. (Pampi *et al.*, 2020).

Table 3. Cost of cultivation incurred on Horticulturalcrops

SN	Particulars	Dimapur	Kohima	Senapati	Thoubal
		Pineapple	Chilli	Pineapple	Chilli
1.	Cost A_1	73084.70	88871.57	47447.63	74428.58
2.	Cost B_1	73599.62	89414.94	49857.79	74990.10
3.	Cost B_2	115162.03	138794.15	79995.83	116778.75
4.	Cost C_1	75277.82	86749.74	51707.80	76602.92
5.	Cost C_2	116840.22	140595.64	81845.82	118391.57
6.	Cost C_3	128524.25	154655.18	90030.41	130230.76

Table 3 reveals the cost of cultivation of cost A_1 incurred the highest cost with ₹ 88871.57 on Chilli Kohima, followed by Chilli Thoubal with ₹ 74428.58, Pineapple Dimapur with ₹ 73084.70 and lowest cost incurred with ₹ 47447.63 on Pineapple Senapati. In case of cost B_1, incurred the highest cost with ₹ 89414.94 on Chilli Kohima, followed by Chilli Thoubal with ₹ 74990.10, Pineapple Dimapur with ₹ 73599.62 and lowest cost incurred ₹ 49857.79 on Pineapple Senapati; in case of cost B_2, Chilli Kohima incurred the highest cost with ₹ 138794.15, followed by Chilli Thoubal with ₹ 116778.75, ₹ 115162.03 on Pineapple Dimapur and lowest cost incurred with ₹ 79995.83 on Pineapple Senapati, respectively. However in case of cost C_1 the highest cost incurred with ₹ 86749.74 on Chilli Kohima, followed by ₹ 76602.92 on Chilli Thoubal, ₹ 75277.82 on Pineapple Dimapur and lowest cost incurred with ₹ 51707.80; however the cost C_2, Chilli Kohima incurred the highest cost with ₹ 140595.64, followed by Chilli Thoubal with ₹ 118391.57, ₹ 116840.22 on Pineapple Dimapur and lowest cost incurred with ₹ 81845.82; in case of cost C_3, Chilli Kohima incurred the highest cost with ₹ 154655.18, followed by Chilli Thoubal with ₹ 130230.76, Pineapple Dimapur with ₹ 128524.25 and lowest cost incurred ₹ 90030.41 on Pineapple Senapati, respectively. So, it may be concluded that Chilli Kohima incurred the highest cost, followed by Chilli Thoubal, Pineapple Dimapur and Pineapple Dimapur, respectively. (Ponnusamy and Kousalya, 2017).

Table 4 reveals in order to estimate the return the following types of farm income were calculated based on the data obtained and accordingly the B: C ratios were analyzed; the gross income from Pineapple Senapati was estimated highest with ₹ 320644.62, Chilli Thoubal with ₹ 293576.53, Chilli Kohima with ₹ 261240.52 and least cost was of Pineapple Dimapur, respectively. The net income was estimated highest Pineapple Senapati with ₹ 180049.03, followed by Chilli Thoubal with ₹ 176736.31, Chilli Kohioma with ₹ 143342.51 and least was Pineapple Dimapur with ₹ 102818.29. From the average B: C ratio of different horticultural crops was estimated that Pineapple Dimapur and Pineapple Senapati with BCR of 3.31 and 3.01, respectively; however Chilli Thoubal and Chilli Kohima has BCR of 2.76 and 2.70 respectively. It can be concluded that the combination of horticultural crops i. e; Pineapple growing has more promising outcome and Chilli have less BCR. (Ponnusamy and Kousalya, 2017).

Table 4. Comparative net return from different horticultural crop(s)

SN	Particulars	Dimapur	Kohima	Senapati	Thoubal
		Pineapple	Chilli	Pineapple	Chilli
1.	Gross Income	183588.34	261240.52	320644.62	293576.53
2.	Net Income	102818.29	143342.51	180049.03	176736.31
3.	B: C Ratio	3.31	2.70	3.01	2.76

Table 5. Multinomial logit regression model on adoption of horticultural crop(s) (n=200)

SN	Independent / explanatory Variables	Coefficient Estimates			
		Dimapur	Kohima	Senapati	Thoubal
		Pineapple	Chilli	Pineapple	Chilli
1.	X_1 (Age)	2.72** (0.343)	0.06 (0.022)	-0.13 (0.011)	1.24* (0.203)
2.	X_2 (Land holdings size)	-0.19 (0.232)	-0.24 (0.032)	-0.06 (0.265)	-1.02 (0.264)
3.	X_3 (Education level)	3.43** (0.762)	0.58 (0.065)	1.09* (0.324)	-0.25 (0.356)
4.	X_4 (Farming Experiences)	1.19* (0.321)	0.04 (0.234)	-0.08 (0.023)	1.85* (0.443)
5.	X_5 (Income)	3.31** (0.689)	1.02 (0.342)	1.01 (0.249)	3.29** (0.645)
6.	X_6 (Perception)	2.98** (0.648)	2.41* (0.496)	2.34* (0.267)	2.87** (0.545)

(Indicates significant at 5 per cent and ** Indicates significant at 1 per cent level of significance)*

Table 6. Multinomial Logit regression on adoption of horticultural crop(s)

SN	Independent / explanatory Variables	Marginal Effect			
		Dimapur	Kohima	Senapati	Thoubal
		Pineapple	Chilli	Pineapple	Chilli
1.	X_1 (Age)	0.15	0.01	0.02	0.08
2.	X_2 (Land holdings size)	0.01	0.01	0.01	0.05
3.	X_3 (Education level)	0.20	0.02	0.04	0.01
4.	X_4 (Farming Experiences)	0.03	0.01	0.01	0.03
5.	X_5 (Income)	0.20	0.04	0.09	0.18
6.	X_6 (Perception)	0.17	0.12	0.10	0.16

Table 5 revealed the multinomial logit regression on adoption of horticultural crops for their likelihood accessing among the four locations, for X_1 (Age) as explanatory variables on Pineapple Dimapur and for X_3 (Education level) on Pineapple Dimapur, for X_5 (Income) Pineapple Dimapur followed by Chilli Thouibal; even for X_6 (Perception) for Pineapple Dimapur and Chilli Thouibal were having significant role. (Singh and Sharma, 2020)b.

Table 6 reveals the selected four districts with two prominent horticultural crops viz; Pineapple and Chilli grown successfully in the study area; the maximum effect was found on Dimapur Pineapple crop increases by 1 per cent shows an increase in X_1 (Age) by 15.00 per cent of the respondents was found significant at 1 percent level and Thoubal Chilli increase by 1 per cent has enhance by 8 per cent was found significant at 5 percent level, respectively. Dimapur Pineapple increases by 1 per cent for an increase in X_3 (Education level) enhancing by 20 per cent increase found significant at 1 per cent level and Pineapple Senapati, also indicate increase by 5 per cent and found significant at 5 per cent level. Dimapur Pineapple and Thoubal Chilli both; indicates increase by 3 per cent for X_4 (Farming experiences) of the respondents was found significant at 5 per cent level. Dimapur Pineapple and Thoubal Chilli both were found significant at 1 per cent level indicate increase of 20 per cent and 18 per cent enhancement, respectively. Dimapur Pineapple and Thoubal Chilli both were found significant at 1 per cent and Senapati Chilli and Kohima Chilli both were also reported significant at 5 per cent level, indicates 17 per cent, 16 per cent, 12 per cent and 10 per cent enhancement about an increase in X_6 (Perception) level, respectively. (Yadav *et al.*, 2022).

Table 7. Constraints faced by the farmers during production of crops (n=200)

S N	Problems identified	RBQ	Rank
1.	Due to need of high investment on inputs cost	683	I
2.	Size of land holdings	579	II
3.	Lack of technical knowledge or training etc;	542	III
4.	Lack of availability of hired labour	512	IV
5.	Lack of financial facility / availability	475	V
6.	Transport facilities availability	460	VI
7.	Lack of irrigation water availability	425	VII
8.	Lack of price fluctuation	400	VIII

Table 7 reveals that existing all the constraints identified faced by the respondent during the production i. e; the foremost was due to need of high investment on inputs cost was ranked 1st, followed by size of land holding and lack of technical knowledge or training etc; which were ranked 2nd and 3rd respectively. The lack of availability of hired labour, lack of financial facility / availability, transport facilities availability, lack of irrigation water availability and lack of price fluctuation were ranked 4th, 5th, 6th, 7th and 8th, respectively. Similar study was carried out by Singh and Sharma (2021)a and Yani and Sharma (2022).

CONCLUSION

About the perception level of the respondent; it has been increase by maximum 17.00 per cent for Dimapur Pineapple crop, followed by Thoubal Chilli crop it was recorded as 16.00 per cent, Kohima Chilli was reported as 12.00 per cent and Senapati Pineapple was recorded as minimum with 10.00 per cent, respectively. Among the major constraints due to need of high investment on inputs cost was ranked 1st followed by size of land holding and lack of technical knowledge or training etc; which were ranked 2nd and 3rd respectively. It can also be concluded that lack of price fluctuation was ranked as 8th position, respectively.

RECOMMENDATIONS

Some policies can be drawn for further improvement related to farming and adoption viz;

- Systemic production may be opted for more remunerative prices.
- Weather Based Crop Insurance Scheme may encourage for better prices.
- Even by supply of quality inputs viz; seeds and other inputs.
- ICT knowledge for market intelligence knowledge should be disseminated.
- Interest rate of bank loans should be decrease for credit facilities.
- Value addition-cum-processing of horticultural crops may encourage for additional income.

ACKNOWLEDGEMENT

The authors are duly acknowledging to Sr. Prof. Jagdish Kumar Patnaik, the Hon' able Vice Chancellor Nagaland University, Nagaland for continuously encouragement.

Conflict of interest: It's to be declare that the authors don't have any competing interest.

REFERENCES

Chishi S Kanitoli and Sharma Amod (2019). Resource Use Efficiency on different farm size groups of Integrated Watershed Development Programmes beneficiaries in Nagaland. *International Journal of Current Microbiology and Applied Sciences.* **8**(6): 2135-2144.

GoI (2020). Agricultural Statistics at a Glance. Directorate of Economics and Statistics, Government of India, New Delhi.

Pampi P BS Meena Saikat Maji and Archana Bhatt (2020). Determinants of likelihood access for different livestock based enterprises by the farmers in Tripura, India. *Indian Journal of Animal Research*. **54**: 122-124

Ponnusamy K and Kousalya MD (2017). Impact of integrated farming system approach on doubling farmers' income. *Agricultural Economics Research Review.* **30**: 233-240.

Singh Th Motilal and Sharma Amod (2020)a. Cost and returns on various farm levels of selected major horticultural crops in the state of Nagaland and Manipur, India. *Plant Archives*. **20**(2): 9095-9103.

Singh Th Motilal and Sharma Amod (2020)b. Resource-use-efficiency analysis for the selected major horticultural crops in the state of Nagaland and Manipur, India. *Plant Archives*. **20**(2): 9113-9119.

Singh Th Motilal and Sharma Amod (2021)a. Implication of Indigenous Farming Practices on the Employment and Income Pattern for the Selected Horticultural Crops of Nagaland and Manipur States of India. *Plant Archives*. **21**(2): 859-863.

Singh Th Motilal and Sharma Amod (2021)b. A comparative study of the farmers' perception on the organic cultivation in selected horticultural crops of Nagaland and Manipur states of India. *International Journal of Creative Research Throughts*. **9**(4) April: 4702-4707.

Yadav Mukesh Kumar Sharma Amod and Singh Th Motilal (2022). A Sustainability approach of Income, Expenditure and Employment through different activities adopted under watershed programme in Nagaland. *Agricultural Mechanization in Asia*. **53**(2). February: 5591-5598.

Yani Paney and Sharma Amod (2022). Prioritization Strategies for the Resources of Traditional Paddy-cum-fish Culture in Lower Subansiri District. *Indian Journal of Agricultural Research.* **56**(3). June: 357-362.