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Socio-economic status of Mentha (*Mentha spp.*) Growers in Barabanki district of Uttar Pradesh

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Abstract
Indian agriculture is required to re-engineer with issues of climate change and to assure higher income from agriculture for farmers. Modernization of agriculture is not only conglomeration of knowledge, attitude and adoption of improved technologies for higher productivity, income and food security but also includes environmental and higher income security (i.e., doubling farmers' income by 2022). So, scientific cultivation of medicinal and aromatic crops with scramble of environment and higher income security is not an exception. This paper is an attempt to examine the existing socio-economic and modernization status of MAP growers in the Barabanki district of Uttar Pradesh, India; it will pave the way to accelerate the further modernization. Various socio-economic variables were included to examine the socio-economic status of MAP growers. Knowledge, attitude on improved technologies and status of adoption of improved technologies in mint cultivation by respondents were measured. Modernization index was calculated and respondents were categorized. Study showed that variables, namely, 'age', 'experience in mentha cultivation', 'education', 'land under mint cultivation', 'type of house', were positively and significantly correlated for characterizing the modernization of mint cultivation.

Keywords: Mentha, socio-economic, medicinal & aromatic plants (map), cultivation

Introduction
Mentha oil is most used in pharma industry, cosmetic industry, and FMCG sector as well as confectionery products. India is the world's largest mentha oil producer and exporter. The highest yield of mentha oil is in Uttar Pradesh. Uttar Pradesh accounts for about 80 percent of the total mentha oil production in the country. In the previous season, mentha oil production was very high. About 75 percent of mentha oil produced in the country is exported. Therefore, more foreign demand than domestic plays a big role in fixing prices. India is the world's largest producer and exporter of mentha oil which is widely used in as flavoring agent in food products including confectionery. India today dominates the world market contributing about 80% (30,000 tons) of menthol mint in various forms – Menthol crystals and powder, demontholised mint oil, and arvensis oil. Most importantly, CSIR, with its mint production enhancement technologies has generated employment to the extent of 648 lakh man days in the farms and 162 lakh man days in the industry.

Review of Literature
Singh *et al.* (2019) examined the menthol mint related relative economics related to existing competitive crop combination in Dudhwa Tiger Reserve and found that 62.50 per cent farmers were having the primary to post graduate educational qualification and rest of the 37.50 per cent farmers were having below primary level of education.
Thakur *et al.* (2018) revealed various kinds of socio economic related challenges faced by farmers during the study. Sampled farmers having low income level and less adoption of medical and aromatic plants cultivation practices.
Rajat and Sarawangi (2017) studied about comparative economic analysis between profit of food grain crops and Safed Musali crops. The study revealed about average farm business income of safed musli and found rupees 1.13 lakh per hectare. Both were also analyze regarding cost associated with soybean, sorghum, wheat, gram cultivation.
Kumar (2014) was conducted the study in lucknow and other realted four main menthal mint grower districts (Barabanki, Sitapur, Hardoi and Unnao) of U.P. Kumar also studies about socio-economic characteristics like age, gender and their level of education. Size of family, irrigation sources, annual income are the parameters for assessing the socio economic status. Majority of the menthol mint farmers belonging in joint family system.

Mint farmers have more than six members in a family.

Singh *et al.* (2011) has been carried out this study in Barabanki district, Uttar Pradesh on "An economic analysis of menthol mint cultivation" in the agricultural year of 2010. The study was on economics of menthol mint cultivation. The comparison between economics of cost and returns of conventional and non-conventional method of mint cultivation. The study was also about resource use efficiency of in menthol mint production. The study also emphasizes on costs in different proportions like hired human labor, distillation costs, irrigation charges and intercultural operations.

K. Sanjay *et al.* (2011) [3] reveals comparative study between two blocks of Barabanki districts in his study and found that average size of family was about 8.53 persons in the Dewa block and 7.02 persons in the Masauli block. 10.94 and 13.88 per cent populations were found to be illiterate in Dewa and Masauli blocks respectively. More than 66 per cent population was solely dependent on agriculture for livelihood. 1.32 hectare land was found as an average land holding in Dewa block and average land holding size was found to be 1.91 hectare in Masauli block. Near about forty per cent area was covered by menthol mint in cropping pattern of that selected area.

Method and Materials

Present research is based on primary data (during agricultural year of 2020) collected by researcher in selected area of research design. Barabanki district comprises of 15 blocks *viz*. Banikodar, Dariyabad, Dewa, Fatehpur, Haidargarh, Harakh, Masauli, Nindaura, Puredalai, Ramnagar, Sidhhaur, Sirauligauspur, Suratganj, Trivediganj. Among these blocks, Dewa and Fatehpur block occupies major area under mentha cultivation. Hence these two blocks was selected purposively for the present study.A complete list of all villages from these two blocks was obtained from respective block development office. Block Dewa and Fatehpur comprises of 125 and 197 villages respectively; out of which, 100 villages in Dewa block and 160 villages in Fatehpur block occupied major area under mentha cultivation, so out of five percent villages from each block i.e. five and eight villages were selected randomly for the study.

Descriptive statistics

A simple descriptive statistical tool like averages, mean, median and percentage was used to compare and interpret the results properly and the result was presented using tables and graph.

Averages

The average used in the present study relates to simple average.

An average was calculated by applying following formula:

Average = $\Sigma Xi / n$

Where,

ΣXi = sum of independent variables

n = number of observation in data

Percentages

Percentage is the number or ratio expressed as a fraction of hundredth. It is denoted using the percent sign "%". It is computed as;

Percentage (%) = X / N * 100

Where,

X = Respondents of desired class

N = Total number of respondents

Chi-square test

$$\chi_c^2 = \sum \frac{(O_i - E_i)^2}{E_i}$$

Oi= Observed value

Ei= Expected value

Result and Discussion

Table 1 implies that 186 respondents were there in study area out of which 116 (62.37 per cent) respondents have small size of farms group (up to 1 hectare), 42 (22.58 per cent) respondents have medium size of farms group (1-2 hectare) and 28 (15.05 per cent) respondents have large size of farms group. Average land under mentha cultivation in small, medium and large size of farm group were 0.68 ha, 1.34 ha and 2.83 ha respectively and average land holding was 1.61 hectare.

Table 1: Detail description of area under mentha cultivation in different size of farm group

S. n.	Particulars	Size of farm group			Total/Sample Average
		Marginal	Small	Semi-Medium	
1.	Size of farm group (in numbers)	116 (62.37)	42 (22.58)	28 (15.05)	186 (100)
2.	Size of land holding (Hectare)	<1	1-2	>2	-
3.	Total average area under mentha cultivation	0.68	1.34	2.83	1.61

Note: Figure in parenthesis indicates percentage of total

Age

It is evident from the table 2 that on overall bases, 52.69 per cent of mentha growing farmers were in the middle age group (31-50 years), Findings are supported by Kumar, A. (2019). Around 35.48 per cent farmer were in the old age group (>50 years) and only 11.83 per cent farmer were in the young age group (<30 years). It can be inferred that most of the Mentha growing farmers were mature and they were in middle age group, who generally possesses risk taking attitude. Median shows that most of the farmers were belong to near about 45 year age.

Table 2: Distribution of mentha growers according to their age

S. n.	Particulars (years)	Size of farm group			*f.*	*c.f.*	*Median*
		Marginal	Small	Semi-Medium			
1.	Young age (<30) or 11-30	14 (12.07)	6 (14.29)	2 (7.14)	22 (11.83)	22	44.76 Years
2.	Middle age (31-50)	63 (54.31)	19 (45.24)	16 (57.14)	98 (52.69)	120	
3.	Old age (>50 or 51-70)	39 (33.62)	17 (40.47)	10 (35.72)	66 (35.48)	186	
	Total	116 (100)	42 (100)	28 (100)	186		

Note: Figure in parenthesis indicates percentage of total

Education

Education level is an important factor for the development of individual, society and the nation as a whole. The term illiterate is used to designate a person who cannot read and write, and has/had no formal schooling or its equivalent. It is revealed from the table 3 that literacy percentage of respondents was observed 87.10 per cent while 12.90 per cent respondents were found illiterate. These finding are approximate same as the findings of Sanjay Kumar (2011) [3]. Further the educational standard of literate respondents in descending order was found as 24.73 per cent 20.97 per cent,15.59 per cent, 9.86 per cent, 9.14 per cent, and 6.99 per cent to the level of Primary, Middle, High School, Intermediate, Graduation and Post Graduate & above respectively. Hence, it can be concluded that majority of respondents 87.10 per cent were literate.

Table 3: Distribution of respondents according to their age in study area

S. n.	Particulars	Size of farm group			Frequency	Sample Percentage
		Marginal	Small	Semi-Medium		
1.	Illiterate	19 (16.38)	5 (11.90)	0 (0.00)	24	12.90
2.	Primary	36 (31.03)	6 (14.29)	4 (14.29)	46	24.73
3.	Middle	28 (24.14)	8 (19.05)	3 (10.71)	39	20.97
4.	High School	19 (16.38)	7 (16.67)	3 (10.71)	29	15.59
5.	Intermediate	7 (6.03)	4 (9.52)	6 (2.14)	17	9.14
6.	Graduation	6 (5.17)	7 (16.67)	5 (17.86)	18	9.68
7.	P.G. and above	1 (0.08)	5 (11.90)	7 (25.00)	13	6.99
	Total	116 (100)	42 (100)	28 (100)	186	

Note: Figure in parenthesis indicates percentage of total

Family type and family size

In this table 4 found that 50.00 per cent respondents of farmer families belongs to nuclear family system followed by 40.87 per cent farmer to joint family system and the only 9.13 per cent farmer families to extended family system. It shows that nuclear families mostly engaged in menthe growing. A perusal of the table indicates that 41.40 percent farmer families were observed such who had for all categories of farmer families belong to big family size (more than 6) followed by 40.86 per cent farmer from medium family (5-6) and only 17.74 per cent menthe growing farmers were found less than 4 (small family member). it also observed the total size of farm families (numbers) was 1181 (male 52.75percent and female 47.25 per cent. The average size of family was observed to be 6.35 percent members. These findings are supported by Kumar, A. (2014).

Table 4: Description about families of sampled respondents

S. n.	Particulars	Frequency	Sample percentage
1.	**Family types of respondents**		
	Extended	17	9.13
	Joint	76	40.87
	Nuclear	93	50.00
2.	**Family size (no. of person)**		
	Small family (less than 4)	33	17.74
	Medium family (5-6)	76	40.86
	Big family (more than 6)	77	41.40
3.	**Total size of farm families**	**1181 (Total number)**	
	Male	623	52.75
	Female	558	47.25
4.	**Average size of family**	6.35	

Description of Occupation

The main occupation is that which generates income more than 50% while the subsidiary below than that. It is clear from the Table 5 that in case of main occupation, the agriculture was emerged as main occupation 51.08 percent and While, in case of Agriculture and other farming 30.64 per cent, and the Agriculture and other service, followed by 18.28 per cent respectively. These findings were in line with findings of Singh, S.P. *et al.* (2019). There were 51.08 per cent respondents who had not any subsidiary occupation.

Table 5: Description of occupation in different size of farm groups

S. n.	Particulars	Size of farm group			Frequency	Sample Percentage
		Marginal	Semi-Medium	Medium		
1.	Agriculture	51 (43.97)	27 (64.28)	17 (60.72)	95	51.08
2.	Agriculture and other farming	37 (31.90)	12 (28.57)	8 (28.57)	57	30.64
3.	Agriculture and other service	28 (24.13)	3 (7.15)	3 (10.71)	34	18.28
	Total	116 (100)	42 (100)	28 (100)	186	

Note: Figure in parenthesis indicates percentage of total

Caste based distribution

Cast is a permanent type of social stratification of the society into higher and lower categories. The Table 6 indicates that maximum number of the respondents 46.78 per cent belonged to the backward caste and scheduled castes, while the OBC were 36.02 per cent and 17.20 per cent, general caste respectively.

Table 6: Caste based distribution of sampled respondents

S. n.	Particulars	Size of farm group			Frequency	Sample Percentage
		Marginal	Semi-Medium	Medium		
1.	OBC	23 (19.83)	5 (11.90)	4 (14.29)	32	36.02
2.	SC& ST	50 (43.10)	22 (52.38)	15 (53.57)	87	46.78
3.	GEN and others	43 (37.07)	15 (35.72)	9 (32.14)	67	17.20
	Total	116 (100)	42 (100)	28 (100)	186	100.00

Note: Figure in parenthesis indicates percentage of total

Types of house

Housing pattern refers to the habitation; the villagers get constructed and live there in with their family members. It is of various type *viz*., Hut, Kuchcha, and Pukka. It is clear from the table 7 that 90.87 percent own pakka house fallowed by only 9.13 per cent respondent are live in kachha house. Thus it is concluded that the majority of the respondents are live in own pakka house.

Table 7: Types of houses of sampled farmers

S. n.	Particulars	Size of farm group			Frequency	Sample Percentage
		Marginal	Semi-Medium	Medium		
1	Kachha house	15 (12.93)	2 (4.76)	0 (0.00)	17	9.13
2	Pakka house	101 (87.07)	40 (95.24)	28 (100.00)	169	90.87
		116 (100)	42 (100)	28 (100)	186	100.00

Note: Figure in parenthesis indicates percentage of total

Farming experience (years)

The things that you have done in your life, such as knowledge or skill that you get from seeing and doing something are experience.

The table 8 indicate the maximum number of the respondents 31-40 year farming experience holders were observed followed by 11-20 year farming experience belong to 26.89 percent, 21-30 year farming experience belong to 25.81 per cent, less than 10 years farming experience belong to 11.82 per cent and more than 40 years farming experience belong to only for 5.38 per cent were observed. Therefore it is evident for the table majority of respondent in farming experiences were 31 - 40 years were mostly engaged as mentha growers.

Table 8: Detail description of farming experience of mentha growers

S. n.	Particulars	Size of farm group			%	*f.*	*c.f.*	*Median*
		Marginal	Semi-Medium	Medium				
1.	<=10 or 1-10	14 (12.07)	6 (14.29)	2 (7.14)	11.82	22	22	24.93
2.	11-20	36 (31.03)	9 (21.42)	5 (17.86)	26.89	50	72	
3.	21-30	27 (23.28)	10 (23.81)	11 (39.29)	25.81	48	120	
4.	31-40	33 (28.44)	14 (33.34)	9 (32.14)	30.10	56	176	

5.	>=40 or 41-50	6 (5.18)	3 (7.14)	1 (3.57)	5.38	10	186	
	Total	116 (100)	42 (100)	28 (100)	100.00	186		

Note: Figure in parenthesis indicates percentage of total

Chi-square test for association between farming experience (years) and education of mentha growers

H_0= there is no association between level of education and farming experience

H_1= there is association between level of education and farming experience

Number of Respondents= 186

S+M+L=116+42+28=186

Table 9: Association between education and experience

Experience/ Education	1-10		11-20		21-30		31-40		41-50		Total of O values
	O	E	O	E	O	E	O	E	O	E	
Illiterate	3	2.83	6	6.45	12	6.19	3	7.22	0	1.29	24
Primary	9	5.44	13	12.36	3	11.87	19	13.84	2	2.47	46
Middle	3	4.61	9	10.48	12	10.06	10	11.74	5	2.09	39
High School	5	3.43	8	7.79	5	7.48	10	8.73	1	1.55	29
Intermediate	0	2.01	6	4.56	6	4.38	4	5.11	1	0.91	17
Graduation	1	2.12	5	4.83	6	4.64	6	5.41	0	0.96	18
P.G. & above	1	1.53	3	3.49	4	3.35	4	3.91	1	0.69	13
Total of O	22		50		48		56		10		186

5 per cent level of significance with 24 DOF

χ^2= 33.45 (calculated value)

Tabulated value = 36.42

Tabulated value > calculated value that means we accept the null hypothesis that means there no any association between farming experience and education of mentha growers.

Conclusion

The study related to objectives analyzes socio-economic profile of sampled respondents. Most of the respondents were belongs from small size of farm group having less than one hectare land. Respondents having middle age group was found more as compare to other age group. Sampled farmers found to be moderate having primary education. Respondents are likely with nuclear families. Agriculture is the main source of income and provides maximum occupation to the respondents. Respondents belongs from the schedule caste are more in study area. No any association found between farming experience and education of mentha growers.

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