

## STATUS OF GRAPE PRODUCTION PRACTICES IN CHAMPHAI DISTRICT, MIZORAM, INDIA

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### ABSTRACT

Champhai district is the only district in Mizoram State of India where grape production practices is being carried out extensively and only the two wineries in the state is also located in this district and was selected purposively for the present study in the year 2016-2017 with the objective to study the socio-economic profile of grape growers and to assess to the adoption of improved grape production practices by the grape growers. Descriptive research design was used for the study. A sample size of 100 respondents was selected from 4 villages namely Hnahlan, Ngur, Vengsang and Zotlang. Findings revealed that majority (51%) of the respondents were aged between 42 to 59 years, majority of the respondents (37%) were educated upto middle school and majority 78% and 70% of the respondents had medium size of land holding and medium annual income. Further 40% of the respondents had low level of social participation, 66% of the respondents had low level of extension contact. Findings also revealed that majority (79%) of the respondents had medium level of utilization of mass media and majority (93%) of the respondents had medium level of knowledge of the recommended practices for grape cultivation. The variables namely, land holding, income, training, extension contact, mass media exposure, education and knowledge in grape production practices had positive and significant association with the adoption level of the respondents while social participation, experience and age did not have significant association with the adoption level of the recommended practice for grapes production practices. The study inferred that, there was a vast technology gap in adoption of key practices such as fertilizer application and organic manure application. Both method and result demonstrations need to be conducted to educate and motivate wine grape growers for the adoption of these practices. Extension participation, mass media participation and training exposure showed positive and significant relationship with adoption level of wine grape growers. The line department should essentially organize extension activities during off season followed by regular field visits and interaction meetings to promote increased adoption of wine grape production technologies. The study concluded that the average annual income was 1 68,644 from the average production of 4804 kg which indicates a good source of livelihood. Therefore, it is important for the government to give the necessary inputs as well as incentives to encourage grape cultivation on a more scientific and sustainable level.

(Key words: Grape, production, practices, adoption, Mizoram).

### INTRODUCTION

Mizoram is the 23<sup>rd</sup> State of the Republic of India in the North Eastern region of India. It has an area of 21,087 sq.km and is characterized by rolling hills, valleys, rivers and lakes. According to 2011 census, it has a population of 1,091,014 and literacy rate of 91.58%. Mizoram lies between 21°.58' N to 24°.35' N latitudes and 92°.15' E to 93°.29' E longitudes. There are 8 districts in Mizoram namely Aizawl, Kolasib, Champhai, Mamit, Lunglei, Serchhip, Lawngtlai and Saiha. Champhai district is the only district under grape cultivation. Grapes cultivated here are mostly

wine grapes (Anonymous, 2014). According to 2011 census, Champhai district has a population of 125,370 with a population density of 39 inhabitant sq<sup>-1</sup> km and a literacy rate of 95.91%. The district comprises of four Rural Development Blocks: Champhai, Khawbung, Khawzawl, and Ngopa. In winter the temperature varies from 10°C to 20°C and in summer, the temperature varies between 15°C and 30°C. The district is ideally suitable for large scale and commercial cultivation of Horticultural, Floricultural and Agricultural crops (Anonymous, 2011).

The Directorate of Horticulture, Government of Mizoram took an initiative step of cultivating grapes in

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Champhai district. Grape was believed to be a promising fruit crop of this region and measures were taken to popularize grape cultivation in this region. Trainings were conducted and the benefits of growing grapes were well disseminated.

Bangalore Blue is the variety being cultivated which is very suitable for red wine (Port Wine). The wine produced from this variety is branded as 'Zawlaidi' or Love potion in Mizo. Grape Growers' Society have been formed and two wineries one each at Champhai district and Hnahlan district have been successfully established with the assistance of Horticulture Department in the year 2007. The wine produced from this district is being marketed in different parts of Mizoram only as of now. The Department of Horticulture has also introduced different varieties like 'Tempranillo', Pusa Navrang and Pusa Urvashi. In addition, Taiwanese varieties like 'Kyoho' and 'Muscat' are also under trial cultivation. (Anonymous, 2014)

Champhai district is the only district in Mizoram where grape production practices had been carried out extensively and the only 2 wineries in the state were also located in this district. Therefore, for the present investigation, Champhai district was selected purposively with an objective to study the socio-economic profile of grape growers and to study the adoption of improved grape production practices by the grape growers.

## MATERIALS AND METHODS

The present study was conducted in Champai District of Mizoram State in India during the year 2016-2017. Descriptive research design was adopted in this study and a sample size of 100 respondents was selected from 4 villages namely Hnahlan, Ngur, Vengsang and Zotlang. From each of the selected villages, 25 grape growers who had been growing grapes extensively were selected purposively to constitute a sample size of 100 for the study. Independent variables included age, education, total land holding, annual income, training exposure, extension contact, experience, social participation, mass media exposure and knowledge were taken to study the characteristics of the respondents while adoption was taken as the dependent variable.

In the present study, the socio-economic characteristics of the respondents were calculated using statistical tools like frequency and percentage. Here, 'adoption' was referred to the acceptance of package and practices of grape production techniques recommended by the state agriculture department of Mizoram. The questions covering full range of cultivation practices of the crop were framed. Schedule of adoption covering included three aspects- their frequency of use was scored as full adoption (2), partial adoption (1), and no adoption (0). Based on the total score obtained, respondents were classified into three categories of adoption level, viz., Low, Medium and High, using mean ( $\mu$ ) and standard deviation (SD) values.

$$\text{Adoption index} = \frac{\text{Total score obtained}}{\text{Maximum possible score}} \times 100$$

Correlation coefficient is the index of the degree of relationship between two continuous variables. It is symbolized by 'r'. The correlation coefficient (r) is given as the ratio of covariance of the variables X and Y to the product of the standard deviation of X and Y. The data was analysed by simple correlation analysis.

$$r = \frac{XY - (\sum X)(\sum Y)}{\sqrt{[\sum X^2 - (\sum X)^2][\sum Y^2 - (\sum Y)^2]}}$$

Where X and Y = original scores in variables X and

XY = each X multiplied by corresponding Y, then summed

$\sum X$  = sum of X scores

$\sum X^2$  = each X squared, then summed

$(\sum X)^2$  = sum of X scores, squared

$\sum Y$  = sum of Y scores

$\sum Y^2$  = each Y squared, then summed

$(\sum Y)^2$  = sum of Y scores, squared

## RESULTS AND DISCUSSION

### Socio-Economic Profile of respondents

Table I shows that majority (51%) of the respondents belonged to the middle aged category i.e. 42 to 59 years (Bhagylaxmi *et al.*, 2013) and majority (37%) of the respondents had education up to middle school and only 2% of the respondents were illiterate (Modi *et al.*, 2013). Most of the respondents (78% and 70% respectively) had medium size of land holding (Khalache and Khaire, 2007) and medium annual income (Babanna, 2001; Jha, 2012). Similar results of small to medium size land holdings by majority of the respondents of tribal farmers were also reported by Bhoyar *et al.* (2018) in Melghat region of Maharashtra State and Khan *et al.* (2009) in Chattisgarh state of India. It was also found that majority (40%) of the respondents had low level of social participation and only 29% had high level of participation. With regard to experience of grape cultivation majority (86%) were in the 8-12 years or middle level category. Majority (54%) of the respondents had attended an average of 2 days training programme followed by more than 2 days by 29% respondents while 9% of the respondents attended only 1 day training programme and 8% of the respondents did not attend any training programme. The study also revealed that majority (66%) of the respondents had low level of extension contact followed by medium (24%) level of extension contact and high (10%) level of extension contact. 72% and 91% of the respondents' never contacted the Horticultural officer and ATMA agency for information. The majority (93%) of the respondents had medium level of knowledge and none of the respondents were observed in low level of knowledge category. Findings also revealed that majority (79%) of the respondents had medium level of utilization of mass media followed by high (14%) level and low (7%) level utilization of mass media sources. 70%, 68%, 36%, 52% and 1% received information sometimes from radio, television, printed materials, exhibition and internet respectively. It was also found that 22%, 64%, 39% and 99% of the respondents never received information from

radio, exhibition, printed materials and internet respectively.

#### Adoption of improved grape production practices

Table 2 shows that majority (82%) of the respondents partially adopted the recommended practice of land preparation while only 18% of the respondents fully adopt. Majority (67%) of the respondents partially adopt the recommended spacing of 5-6 x 4 ft while 33% of the respondents fully adopt the recommended spacing of 5-6 x 4 ft. All of the respondents had adopted cutting method of propagation of grape vines. The correct time of planting was adopted by cent per cent of the respondents. None of the respondents fully adopted the recommended dose of manures and fertilizers, it was inferred that majority (97%) of the respondents were partial adopters and the remaining 3% were non adopters of the usage of manures and fertilizers, however, research done by Khandagle *et al.* (2019), concluded that, “the use of balanced fertilizers either alone or integrated with organic manure (FYM) have helped in increasing organic carbon content of the soil, which is an indicator of soil health improvement”. Irrigation was not adopted by any of the respondents in their vine yards. With respect to training method, 45% of the respondents adopted fencing system and 33% adopted pandal system and the remaining 22% adopted both pandal system and fencing system. All the respondents followed pruning in January to February. Mulching was partially adopted by 49 % of the respondents while 41% did not adopt and the remaining 10% are fully adopted. Systemic insecticides were used to control the insect pests. Powdery mildew was controlled by using mancozeb. Bordeaux mixture was used to control downy mildew. Anthracnose was also controlled by using Bordeaux mixture and Bavistin. All the respondents harvest their berries in the month of July to August depending on its maturity. Perforated boxes were used for storing the harvested grapes.

#### Correlation of independent variables with dependent variable

Table 3 revealed that, independent variables such as the size of land holding, annual income, education, training exposure, extension contact, mass media exposure and knowledge were found to have positive and significant relationship with extent of adoption of grape production practices which was considered as the dependent variable.

From the above results, it is inferred that, majority of the respondents were educated, middle aged, having medium annual income and size of land holding, experience, training exposure, mass media exposure, knowledge and low level of social participation and extension contact. The farmers face problem in irrigation and water management practices thus proper training about water harvesting and its management is required. All the respondents faced problem in terms of marketing while eighteen per cent of the respondents faced transportation problem. The farmers also stressed on the problem of not having any grape expert in the district. Pests and diseases had become resistant to the chemicals used. Effective pest and disease control measures should be introduced by the Horticultural department. Chemicals used must be changed often to avoid resistance by pest and diseases. Grape growers were not so particular about quality management aspects of grape. There is a need to educate them in this regard. The respondents had problem with respect to lack of knowledge about improved farm practices. Awareness must be spread among the grape growers about improved farm implements. This can be achieved by keeping in touch with the extension functionaries in their respective area.

The study indicated a vast gap in adoption of key practices such as fertilizer application and organic manure application, as they are not being followed by many, as per the recommendation. Both method and result demonstrations need to be conducted to educate and motivate wine grape growers for the adoption of these practices. The respondents also expressed non-availability of organic manure when required as the main reason for the present status. The concerned department must look into this and make manures available in required quantity and at required time. Leaves and twigs which were locally available were used as mulch materials. Extension participation, mass media participation and training exposure have shown positive and significant relationship with adoption level of wine grape growers. The line department should essentially organize extension activities during off season followed by regular field visits and interaction meetings to promote increased adoption of wine grape production technologies. It was also found that the average annual income was ₹ 68,644 from the average production of 4804 kg which indicates a good source of livelihood. Therefore, it is important for the government to give the necessary inputs as well as incentives to encourage grape cultivation on a more scientific and sustainable level.

**Table 1. Distribution of respondents according to their socio-economic profile N100**

Sl. No.	Variable	Category	Frequency	Percentage
1	Age	Old age (More than 59 years)	14	14.00
		Middle age (42-59 years)	51	51.00
		Young age (Less than 42 years)	18	18.00
2	Education	Illiterate	2	2.00
		Primary	26	26.00
		Middle	37	37.00
		Upto class X	21	21.00
		Upto class XII	8	8.00
		Graduate	5	5.00
		Post graduate	1	1.00

3	Land Holding (ha)	More than 2.43	18	18.00
		0.71 to 2.43	78	78.00
		Less than 0.71	4	4.00
4	Annual Income (Rs.)	High (More than 256039.3)	16	16.00
		Medium (82030.7-256039.3)	70	70.00
		Low (Less than 82030.7 )	14	14.00
5	Social participation	High (More than 1.8)	29	29.00
		Medium(0.04-1.8)	31	31.00
		Low (Less than 0.04)	40	40.00
6	Experience	High (More than 13 years)	7	7.00
		Medium (8 to 12 years)	86	86.00
		Low (Less than 7 years)	7	7.00
7	Training	More than 2 days training	29	29.00
		2 days training	54	54.00
		1 day training	9	9.00
		0 day training	8	8.00
8	Extension contact	High (More than 1.1)	10	10.00
		Medium (0.3-1.1)	24	24.00
		Low (Less than 0.3)	66	66.00
9	Knowledge	High (More than 17.32)	7	7.00
		Medium (17.07-16.82)	93	93.00
		Low (Less than 16.82)	0	0.00
10	Mass Media Sources	Television	1.33 (Mean)	I (Rank)
		Radio	0.86 “	II “
		Exhibition	0.36 “	III “
		Printed Matter	0.7 “	IV “
		Internet	0.01 “	V “

**Table 2. Distribution of the respondents based on their adoption of recommended practices**

N=100

Sl. No	Practices	Full adoption		Adoption level		No adoption	
		F	%	Partial adoption		F	%
1.	Land preparation	18	18.00	82	82.00	-	-
2.	Spacing: 5-6ftX4ft	33	33.00	67	67.00	-	-
3.	Propagation methods: Cutting	100	100.00	-	-	-	-
4.	Time of planting:						
	i)Potting: Feb	100	100.00				
	ii)Field: April-June	100	100.00				
5.	Manures and Fertilizers						
	i)FYM@20kg/haii)NPK	2	2.00	98	98.00		
	@ 200:200:100kg/ha	2	2.00	95	95.00	3	3.00
6.	Irrigation: Feb to April	-	-	-	-	100	100.00
7.	Training & Pruning:	100	100.00	-	-	-	-
	Training:i)Pandal system	33	33.00				
	ii) Fencing system	45	45.00				
	iii)Both	22	22.00				
	Pruning:i)Jan-February	100	100.00				
8.	Mulching	10	10.00	49	49.00	41	41.00
9.	Pest :i)Flea beetle , Leaf hopper ,Thrips (Malathion, Monocrotophos)	41	41.00	58	58.00	1	1.00
10.	Disease:i)Powdery mildew (Mancozeb)ii)Downey mildew (Bordeux mixture @1%)	48	48.00	49	49.00	3	3.00
	iii) Anthracnose(Bavistin)	17	17.00	61	61.00	22	22.00
		0	0.00	16	16.00	84	84.00

			257				
11.	Harvesting:July-August	100	100.00	-	-	-	-
12.	Post harvest handling:Stored in perforated boxes	93	93.00	7	7.00	-	-

**Table 3. Correlation of independent variables with adoption level**

Sl. No.	Variables	Coefficient correlation
1	Age	-0.114 <sup>NS</sup>
2	Education	0.198*
3	Size of land holding	0.452**
4	Annual income	0.380**
5	Training exposure	0.521**
6	Experience	0.144 <sup>NS</sup>
7	Social participation	0.194 <sup>NS</sup>
8	Extension contact	0.373**
9	Mass media exposure	0.378**
10	Knowledge	0.352**

\*\* Significance at 1% level of probability

\* Significance at 5% level of probability

<sup>NS</sup> Non-significant

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