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"Knowledge Level of Improved Oil Palm Cultivation Technique by Oil Palm Growers of Kolasib District in Mizoram, India"

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ABSTRACT

This paper emphasizes the knowledge level of improved Oil Palm cultivation technique towards the recommended technologies of Oil Palm in the State of Mizoram, India. Oil palm was introduced in Mizoram based on the recommendation of Dr. K.L Chadha committee (March 2004) after they had identified potential areas in the state. Knowledge level of the respondents was measured by preparing a list of knowledge items basing on the recommended practices implemented by the Department of Agriculture, Government of Mizoram. The recommended practices specified by the Department of Agriculture, Mizoram covered 18 aspects i.e. elevation, climate, soil, seed and seedlings, variety, optimum planting time, planting method, spacing, manures, fertilizers, method of fertilizer application, irrigation, intercultural operation, pollination, disease management, pest management, nutritional disease management and harvesting technique. Each practice was framed in a question form to obtain the response from the respondents. The answers to the questions were quantified by giving score '1' if they had knowledge about the practice and score '0' if they were not having knowledge about the practice. In the present study, the socio-economic characteristics of the respondents were considered as Independent variables and the level of Knowledge as the dependent variable. Through this study, it was concluded that the knowledge level of the respondents was medium about the different aspects of recommended ginger cultivation practices in the study area.

KEY WORDS: Knowledge, Recommended technologies, Dependent, Independent

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INTRODUCTION

Oil palm (*Elaeis guineensis*) is a species of palm which is commonly known as African oil palm or macaw-fat. It belongs to the family Arecaceae. It originated from West and South-West Africa, specifically from the area between Angola and Gambia. It spread to South America in the 16th century and to Asia in the 19th Century.

Oil palm is an unbranched monoecious solitary columnar trunk with short internodes which can reach up to 20 – 25m vertically on full maturity. It is the highest edible oil yielding plant among perennial oil-yielding crops, producing palm-oil and palm-kernel oil. The oil is commonly used for culinary as well as industrial purposes. Palm oil is also known as palmolein. Palm oil contributes 70% of total vegetable oil import of India and is one of the cheapest oils due to high productivity per hectare. It is composed of about 40 percent oleic acid (mono-unsaturated), 10 percent linoleic acid (poly-unsaturated), 44 percent palmitic acid (saturated) and 5 per cent stearic acid (saturated) fatty acids. The oil is mainly extracted from the fleshy mesocarp of the fruit which contains about 35-70% oil and from the palm kernel (seed) which contains about 50% oil. Palm oil is a natural source of antioxidant, vitamin E, constituent of tacopherols and tocotrienols. The natural antioxidants act as a scavenger of the damaging oxygen-free radicals, which play a protective role in cellular aging, cancer and atherosclerosis. It is good for heart as it reduces the blood cholesterol in humans. It is also used in the manufacture of soap, cosmetics, bakery products, antibiotics, gums, candles and other industrial products.

Oil palm was introduced in India at National Royal Botanical Gardens, Kolkata during the year 1886. It has been established as a successful crop in many states in the country which occupied a total area of 3.00 lakh ha up to the year 2015-16 (Status Paper on Oil palm, 2017)

The study was conducted in Mizoram, which is the southernmost landlocked state in northeast India sharing borders with three states namely, Tripura, Assam and Manipur. The state also shares a 722 kilometre border with the neighbouring countries of Bangladesh and Myanmar. Mizoram is the only state in Northeast where Oil palm is extensively cultivated. It ranks 4th (25,741 ha) among the oil palm cultivating states of India in terms of total area coverage. It also ranks 7th position (3753 MT) in terms of FFBs (Fresh Fruit Bunches) production; and 8th position (432 MT) in terms of CPO (Crude Palm Oil) production. Among all the states of India, Mizoram has the 7th highest potential area for oil palm cultivation with a potential area of 61, 000 ha. Therefore, Mizoram was purposively selected for the study.

Mizoram is constituted of 8 districts of which Kolasib district has the highest area under Oil palm cultivation. Kolasib district has the largest area under Oil Palm cultivation in the state i.e. 6788 ha and the production of FFBs in the district during 2016-2017 was 1961.55 MT which is the 2nd

highest in the state. Kolasib district also has the only oil palm processing mill in the state established by Godrej Agrovet Ltd. at Bukvannei on 14th April, 2014. Therefore Kolasib district was purposively selected for the study.

OBJECTIVE OF THE STUDY

To determine the level of knowledge regarding improved Oil Palm cultivation technique.

RESEARCH METHODOLOGY

Method of data collection

The study consisted of two types of data collection viz., primary data and secondary data. The primary data was collected through personal interview by the investigator using interview schedule developed for the purpose. Personal interview technique was also used to avoid the influence of other farmers and to enable free expression of views. The secondary data was collected from other relevant sources such as books, thesis, journals etc.

Sampling design:

The present study is limited to Kolasib district of Mizoram. Purposive sampling technique is used for the study.

The 2 Rural Development (R.D) blocks namely Thingdawl and Bilkhawthlir were selected and from each block, villages such as Khamrang, Kawnpui, Thingdawl, Bualpui and Buhchangphai, Bukvannei, Saihapui, Meidum were selected repectively.

From each of the selected villages, 15 farmers having established Oil palm plantation were selected making a total of 120 respondents.

FINDINGS AND DISCUSSION

A set of data pertaining to knowledge level of farmers with respect to recommended practices of oil palm cultivation has been analysed and presented in the following tables.

1. Knowledge level of oil palm growers about the recommended practices of Oil palm cultivation

In the present study, knowledge level refers to the farmers/ respondents knowledge about the recommended practices implemented by the Department of Agriculture, Government of Mizoram. The recommended practices specified by the Department of Agriculture, Mizoram covered 18 aspects i.e. elevation, climate, soil, seed and seedlings, variety, optimum planting time, planting method, spacing, manures, fertilizers, method of fertilizer application, irrigation, intercultural

operation, pollination, disease management, pest management, nutritional disease management and harvesting technique. The respondent's awareness about the practices was enquired. The respondents were assigned a score one (1) if they are aware of the recommended practices and a score of zero (0) if they are unaware about it.

In order to find the knowledge level of Oil palm growers knowledge index was calculated. From the given aspect a total of 54 questions were developed. Therefore, the maximum possible score is 54 while the minimum is zero (0). The total score obtained indicates the knowledge level of the respondents about the recommended practices of Oil palm cultivation.

Table 1.1 Knowledge of respondents based on the recommended elevation, climatic and soil requirement.

N=120

Sl. No.	Recommended practices	Frequency	Percentage
1.	Elevation 400-900 msl	63	52.5
2.	Climatic requirement: a) Rainfall 150mm/day	45	37.5
	b)Optimum minimum and maximum temperature required are 22-24° C and 29-33 ° C respectively	83	69.17
	c) 5 hours sunlight per day	39	32.5
	d) 80% humidity	26	21.67
3.	Soil a) Well aerated, deep loamy alluvial soil, rich in organic matter, is required for the proper growth of Oil palm.	120	100
	b) Extremely acidic or saline soils are not suitable for Oil palm	120	100

Table 1.1 showed that 52.5 per cent of the respondents were aware of the recommended practice of cultivating Oil palm at an elevation of 400-900msl. Table also showed that 37.5 per cent of the respondents knew that Oil palm required 150mm rainfall or water per day. The Table further revealed that 69.17 per cent of the respondents had knowledge regarding the optimum minimum and maximum temperature required i.e. 22-24° C and 29-33 ° C respectively. Table 1.1 also indicated that 32.5 per cent of the respondents knew that Oil palm require 5 hours of sunshine per day. Further, the Table also showed that 21.67 per cent of the respondent knew that 80% humidity is required by the palms. Cent per cent of the respondents knew that well aerated alluvial soil rich in organic matter is recommended for Oil palm and extremely acidic and saline soils are not suitable for Oil palm.

From the Table it is revealed that majority of the respondents were not aware of the exact elevation and climatic conditions required by Oil palm. But all the respondents are aware that well aerated, deep loamy alluvial soil, rich in organic matter, is required for the proper growth of Oil palm whereas, extremely acidic or saline soils are not suitable.

Table 1.2 Knowledge of respondents based on Seed and Variety.   N=120

Sl. No.	Recommended practices	Frequency	Percentage
1.	Seed and seedlings a)Propagation through seeds	120	100
	b) Selection of healthy seedlings	120	100
	c) Source of seedling	120	100
2.	Variety Tenera	64	53.34

Table 1.2 depicts that 100 per cent of the respondents were aware that Oil palms are propagated through seedlings in nurseries maintained by the Government and Godrej Agrovet Pvt. Ltd. 100 per cent of the respondents were also aware that selection of healthy seedlings is necessary for the proper establishment of the Oil palm plantation. As all the respondents received the seedlings from the Department of Agriculture they had knowledge about the source of seedlings. Table1.2 also revealed that 53.34 per cent of the respondents knew that the recommended variety was Tenera variety.

Table 1.3Knowledge of respondents based on planting time, planting method and spacing.

N=120

Sl. No.	Recommended practices	Frequency	Percentage
1.	Optimum planting time May- June	120	100
2.	Planting method: a) Transplanting 1 year old seedling with 12 functional leaves.	117	97.5
	b) Pit size 60cmx60cmx60cm	120	100
	c) Digging up pre-planting	120	100
	d) Placing 400g SSP and 50g phorate at the bottom of the pit	56	46.67
3.	Spacing of 9mx9mx9m	120	100

Table1.3 revealed that all the respondents were aware of the optimum planting time which is May-June. Also, 97.5% knew that 1 year old seedlings with 12 functional leaves must be transplanted in the plantations. The Table further showed that Cent per cent of the respondents were aware of the recommended pit size of 60cmx60cmx60cm and that the pit should be dug up pre planting. However, only 46.67 per cent of the respondents knew that 400g SSP and 50g phorate must be added at the bottom of the pit. Table 1.3 also showed that all the respondents had knowledge of the recommended spacing which is 9mx9mx9m.

Table 1.4 Knowledge of respondents based on manures, fertilizers and method of application.

N=120

Sl. No.	Recommended practices	Frequency	Percentage
1.	Manures Application of 50-100kg manure and 5kg Neem cake 3 months after transplanting.	55	45.83
2.	Fertilizers a) NPK 2:1:2 @200g/plant in the 1st year and doubled till 3rd year	68	56.67
	b)Magnesium sulphate 125g in the 1st year and doubled from the next year	69	57.5
3.	Method of fertilizer application a) 3 months interval	64	53.33
	b)50 cm away from the palm	62	51.67

Table 1.4 showed that 45.83 percent of the respondents were conscious of the recommended practice of application of 50-100kg manure and 5kg Neem cake 3 months after transplanting. Further, the Table revealed that 56.67 % of the respondents knew that the recommended dose of NPK for Mizoram condition is 2:1:2 @200g/plant for the 1st year, and that it should increase in double after each year till the third year and that it should remain the same after that. 57.5 % also knew that the recommended dose of Magnesium Sulphate for the 1st year is 125g and that it should increase in double each year. Table 1.4 showed that 53.33 percent of the respondents knew that fertilizers should be applied at 3 months interval and 51.67 percent knew that they must be applied 50 cm away from the plant.

Table 1.5 Knowledge of respondents based on irrigation.   N=120

Sl. No.	Recommended practices	Frequency	Percentage
1.	Irrigation a) 100-350 litre/day	58	48.33
2.	b) Micro irrigation has better water use efficiency as compared to basin method	120	100

Table 1.5 showed that 48.33 per cent of the respondents were aware of the recommended practice of irrigating each palm with 100-300 litre of water in the absence of rainfall. Further, the table revealed that 100 percent of the respondents knew that micro irrigation had better water use efficiency as compared to basin method.

Table 1.6 Knowledge of respondents based on intercultural operation.   N=120

Sl. No.	Recommended practices	Frequency	Percentage
1.	Weeding	120	100
2.	Basin- 1m in 1st year and increased to 3m till 3rd year	102	85
3.	Intercropping	120	100
4.	Ablation	120	100
5.	Mulching	120	100
6.	Cover crops	120	100
7.	Green manuring	120	100

Table 1.6 showed that 85 percent of the respondents knew that basin of 1m must be made in the 1st year and that it should be increased till 3m in the 3rd year. It is further revealed that 100 per cent respondents had knowledge about the remaining intercultural operations which include benefits of weeding, intercropping, ablation, mulching, growing of cover crops and green manuring.

Table 1.7 Knowledge of respondents based on pollination by insect.   N=120

Sl. No	Recommended practices	Frequency	Percentage
1	Pollination by Weevil	120	100
2	Release of Weevil after 1 and 1/2 year of transplanting	120	100

Table 1.7 showed that 100 per cent of the respondents had knowledge about pollination using Weevil and that they should be released in the plantation after 1 and ½ year of transplanting.

Table 1.8 Knowledge of respondents based on disease management.   N=120

Sl. No.	Recommended Practices	Frequency	Percentage
1.	Bud rot disease controlled by removing the rotten portion.	69	57.5
2.	Bunch failure disease and that it can be controlled by proper irrigation and assisted pollination.	67	55.83
3.	Bunch rot and that it can be managed by cleaning infected area and applying Carbendazim 1g mixed in 1 litre of water to the rest of the plant.	37	30.83
4.	Basal stem rot and that it can be managed by the application Trichoderma sp mixed in manure and supplied to the palm at 2-3 months interval @5-15kg/palm	27	22.5
5.	Brown end rot managed by the application of a mixture of Carbendazim 0.1% and Monochrotophos 1ml diluted in 1litre of water.	18	15
6.	Fruit rot prevented by timely harvesting of the matured fruits.	62	51.67
7.	Crown disease managed by application of mixture of 1g Carbendazim and 1 litre of water	26	21.67

Table 1.8 showed that 57.5% of the respondents had knowledge about Bud rot disease and its management. Bunch failure disease and its management were known by 55.83% of the respondents. The Table further revealed that 30.83% of the respondents were aware of Bunch rot disease and its management. Basal stem rot disease and it management were known by only 22.5% of the respondents. This is in line with the findings of [1]Kamu *et al*., [2]Iqlima *et al.* and [3]Kannan *et al.* Further, we find from the Table that 15 % of the respondents had knowledge about Brown end rot ad its management. 51.67% of the respondents had knowledge about Fruit rot and how it can be prevented. We also find from the Table that 21.67% of the respondents had knowledge about Crown disease and its management.

Table 1.9 Knowledge of respondents based on pest management.   N=120

Sl. No.	Recommended practices	Frequency	Percentage
1.	Slug caterpillar managed with the removal of infested part and treating the entire plant with Lambda Cyhalothrin 1ml mixed in 1 litre of water.	37	30.83
2.	Mealy bug eradicated by spraying Methyl parathion 1 ml mixed in 1 litre of water	35	29.17
3	Scales managed by spraying a mixture of 1ml Methyl parathion and 1 litre of water	40	33.33
4.	Bag worm by removal of infected area and treating the whole plant by injecting Monochrotophos 20ml mixed in 100ml of water.	30	25
5.	Chafer beetle eradicated by spraying a mixture of Quinalphos 2ml mixed with 1 litre of water.	27	22.5
6.	Termites controlled by spraying Chlorpyriphors 2ml mixed with 1 litre of water.	57	47.5
7.	Leaf web worm managed by injecting Monochrotophos 20ml in 100ml water	30	25
8.	Rhinoceros beetle managed by the application of Carbaryl 50 WP 50 @ 0.01% in the pit.	37	30.83

Table 1.9 had revealed that 30.83% of the respondents had knowledge about Slug caterpillar and its management. Mealy bug and its eradication were also known by 29.17%. The Table further revealed that 33.33% of the respondents had knowledge about Scales and their management. Bag worm and its management were known by 25% of the respondents. The Table also indicated that 22.5% of the respondents knew about Chafer beetle and their management. Termites and their control were known by 47.5% of the respondents. Further, the Table had revealed that 25% of the respondents were aware of the Leaf web worm and their management. 30.83% of the respondents had cited that they are aware of Rhinoceros beetle and its management.

The Table had revealed that the respondents possessed low knowledge regarding pest management. The respondents were aware of the pest and the damaged caused by them but they lack knowledge regarding the management practices.

Table 1.10 Knowledge of respondents based on nutritional disorder management.   N=120

Sl. No	Recommended practices	Frequency	Percentage
1.	Chlorosis: Application of Nitrogenous fertilizer 1200g/palm.	48	40
2.	Reduction in yield caused by lack of Phosphorus: application of SSP 600g/palm/year.	47	39.17
3.	Yellowing in young leaves, blotches in older leaves caused by lack of Potassium: Application of MOP 1200g/palm /year.	44	36.67
4.	White stripe caused by imbalance between N and P: Leaf nutrient analysis for proper diagnosis.	0	0

Table 1.10 had shown that 40 % of the respondents had knowledge about Chlorosis and its management. It was also revealed that 39.17 % of the respondents are aware of reduction in yield caused by lack of Phosphorus and that it can be managed by the application of SSP 600g/palm/year. It was further revealed that 36.67 % of the respondents were aware of the yellowing of leaves caused

by the lack of Potassium. 100 % of the respondents were not aware that leaf nutrient analysis is necessary for the proper diagnosis of white stripe caused by imbalance between Nitrogen and Phosphorus.

Table 1.11 Knowledge of respondents based on harvesting.   N=120

Sl. No.	Recommended practices	Frequency	Percentage
1.	Harvesting a) Optimum harvesting time: when the fruits turn orange in colour or when 5-10 fruits fall from the bunch	120	100
	b) Leaving 5 cm stalk after harvesting	91	75.83

Table 1.11 showed that cent per cent of the respondents had knowledge about the recommended harvesting time i.e. when the fruits turn orange or when 5-10 fruits fall from the bunch. Some of the respondents are informed by experts from Godrej Agrovet Pvt. Ltd. about the correct time of harvesting. Leaving 5cm stalk after harvest is recommended but only 75.83 per cent are aware of this practice.

Table 1.12 Distribution of respondents based on their overall knowledge of recommended practices of Oil palm cultivation.   N=120

Sl. No.	Level of knowledge	Frequency	Percentage	Mean	S.D
1.	Low (<25)	19	15.83		
2.	Medium(25-41)	78	65	33.47	7.72
3.	High(>41)	23	19.17		

Table 1.12 revealed that majority (65 %) of the respondents had medium (25-41) overall knowledge followed by 19.17 per cent of the respondents had high (more than 41) overall knowledge while 15.83 per cent of the respondents had low level (less than 25) overall knowledge of the recommended practices. This is in line with the findings of [4]Mior *et al.*

In spite of much training attended by the respondents the overall knowledge of the respondents was at the medium level. The possible reason could be due to the low level of knowledge regarding the management of pest and diseases. The plantations are managed with the help of experts from Godrej Agrovet Pvt. Ltd. So the farmers themselves do not feel the need to know details about the management of pest and diseases. The respondents also had low knowledge regarding nutritional disorders because of their rare occurrence in the area. Most of the respondents are above 50 years old so they also had problems in recalling the practices taught during training.

2. Correlation between independent variable and dependent variable

Table 2.1 Correlation of independent variables with knowledge level of respondents.

Sl. No.	Socio-economic factors	Correlation coefficient (r)
1	Age	0.07 NS
2	Sex	-0.12 NS
3	Educational status	0.27**
4	Marital status	-0.02NS
5	Family size	0.03 NS
6	Occupation	0.05 NS
7	Annual income	0.45 **
8	Income from Oil palm cultivation	0.25**
9	Size of land	0.23*
10	Extension contact	0.47 **
11	Training	0.46**
12	Training outside the state	0.56**
13	Experience	0.33**

*Significant at 5% level, ** Significant at 1% level, NS- Non significant

The findings presented in Table 2.1 revealed the relationship between the various socio-economic factors and level of knowledge of the recommended practices by the respondents.

The correlation value between **age** of the respondents and the level of knowledge is 0.07, which is statistically not significant. Thus, it can be concluded that increase in age of the respondents had no relationship with the level of knowledge of the respondents.

The correlation value between **sex** of the respondents and the level of knowledge is -0.12, which is statistically not significant. Thus, it can be concluded that sex of the respondents had no relationship with the level of knowledge of the respondents.

Findings from the table revealed that the correlation value between **educational status** of the respondents and the level of knowledge is 0.27, which is statistically significant at 1% level of significance. It can thus be concluded that higher educational status of the respondents had a positive impact on the level of knowledge of the respondents.

The correlation value between **marital status** of the respondents and the level of knowledge is -0.02, which is statistically not significant. Thus, it can be concluded that marital status of the respondents had no relationship with the level of knowledge of the respondents.

Findings from the table had revealed that the correlation value between **family size** of the respondents and the level of knowledge is 0.03, which is statistically not significant. It can thus be concluded that increase in family size of the respondents had no relationship with the level of knowledge of the respondents.

Findings from the table revealed that the correlation value between **occupation** of the respondents and the level of knowledge is 0.05, which is statistically not significant. It can thus be

concluded that occupation of the respondent had no relationship with the level of knowledge of the respondents.

The correlation value between **annual income** of the respondents and the level of knowledge is 0.45, which is found to be statistically significant at 1% level of significance. Thus, it can be concluded that annual income of the respondent had a positive relationship with the level of knowledge of the respondents.

The correlation value between **income from Oil palm** of the respondents and the level of knowledge is 0.25, which is found to be statistically significant at 1% level of significance. Thus, it can be concluded that income from Oil palm of the respondents had a positive relationship with the level of knowledge of the respondents.

Findings from the table had revealed that the correlation value between **size of land under Oil palm cultivation** and the level of knowledge is 0.23, which is statistically significant at 5% level of significance. It can thus be concluded that increase in the size of land under Oil palm cultivation **of** the respondents had a positive impact on the level of knowledge of the respondents.

The correlation value between **extension contact** of the respondents and the level of knowledge is 0.47, which is found to be statistically significant at 1% level of significance. Thus, it can be concluded that frequency of extension contact with of the respondents had a positive impact with the level of knowledge of the respondents.

Findings from the table had revealed that the correlation value between **training exposure** of respondents **within the state** and the level of knowledge is 0.45, which is statistically significant at 1% level of significance. It can thus be concluded that training exposure of the respondents within the state had a positive impact with the level of knowledge of the respondents.

The correlation value between **training exposure** of respondents **outside the state** and the level of knowledge is 0.56, which is found to be statistically significant at 1% level of significance. Thus, it can be concluded that training exposure of respondents outside the state has a positive impact on the level of knowledge of the respondents.

Findings from the table had revealed that the correlation value between **experience in oil palm cultivation** of the respondents and the level of knowledge is 0.33, which is statistically significant at 1% level of significance. It can thus be concluded that experience in Oil palm cultivation had a positive impact on the level of knowledge of the respondents.

Table 2.1 revealed that the independent variables viz., educational status, annual income, income from Oil palm cultivation, extension contact, training within the state, training outside the state and experience in Oil palm cultivation had a positive significant association with the knowledge

level of the respondents at 1% level of significance while size of land under oil palm cultivation had 5% level of significance.

Independent variables such as age, sex, marital status, family size and occupation had no significant relationship with the adoption level of the recommended practices.

Therefore, the null hypothesis (H_01) that states that there is no significant relationship between the independent variables and the knowledge level is rejected.

CONCLUSION AND RECOMMENDATION

The study revealed that 52.5 per cent of the respondents were aware of the recommended practice of cultivating Oil palm at an elevation of 400-900 msl. It was also found that 37.5 per cent of the respondents knew that Oil palm required 150 mm rainfall or water per day. It was further revealed that 69.17 per cent of the respondents had knowledge regarding the optimum temperature required i.e. 22-24° C and 29-33 ° C respectively. The study further revealed that 32.5 per cent of the respondents knew that Oil palm require 5 hours of sunshine per day. The study also showed that 21.67 per cent of the respondent knew that 80% humidity is required by the palms. Cent per cent of the respondents knew that well aerated alluvial soil rich in organic matter is recommended for Oil palm and extremely acidic and saline soils are not suitable.

Findings also revealed that 100 per cent of the respondents were aware of the method of propagation through seeds in nurseries. They are aware of the importance of selection of healthy seedlings and source from which they can be obtained. It was also revealed that 53.34 per cent of the respondents knew that the recommended variety was Tenera variety.

It was further revealed that 100 per cent of the respondents were aware of the optimum planting time, the recommended pit size and the recommended spacing. The study also showed that 97.5 per cent knew that 1 year old seedlings with 12 functional leaves must be transplanted in the plantations. It was also found that only 46.67 per cent of the respondents knew that 400g SSP and 50g phorate must be added at the bottom of the pit.

The study revealed that 45.83 percent of the respondents were conscious of the recommended practice of application of 50-100kg manure and 5kg Neem cake 3 months after transplanting. It was also revealed that 56.67 per cent of the respondents knew that the recommended dose of NPK for Mizoram condition is 2:1:2 @200g/plant for the 1st year, and that it should increase in double after each year till the third year and that it should remain the same after that. 57.5 per cent also knew that the recommended dose of Magnesium Sulphate for the 1st year is 125g and that it should increase in double each year. It was further revealed that 53.33 percent of the respondents knew that fertilizers

should be applied at 3 months interval and 51.67 percent knew that they must be applied 50 cm away from the plant.

Findings revealed that 48.33 per cent of the respondents were aware of the recommended practice of irrigating each palm with 100-300 litre of water in the absence of rainfall. Further, the study revealed that 100 percent of the respondents knew that micro irrigation had better water use efficiency compared to basin method.

It was revealed that 100 percent respondents had knowledge about the different intercultural operations such as weeding, intercropping, ablation, mulching, growing of cover crops and green manuring. The study also showed that 85 percent of the respondents knew that basin of 1m must be made in the 1st year and that it should be increased till 3m in the 3rd year.

It was further revealed that 100 per cent of the respondents had knowledge about assisted pollination using Weevil and that they should be released in the plantation after 1 and ½ year of transplanting.

Findings also revealed that 57.5 per cent of the respondents had knowledge about Bud rot disease and its management. Bunch failure disease and its management were known by 55.83 per cent of the respondents. It was further revealed that 30.83 per cent of the respondents were aware of Bunch rot disease and its management. Basal stem rot disease and it management were known by only 22.5 per cent of the respondents. Further, it was revealed that 15 per cent of the respondents had knowledge about Brown end rot and its management. 51.67 per cent of the respondents had knowledge about Fruit rot and how it can be prevented. Study also showed that 21.67 per cent of the respondents had knowledge about Crown disease and its management.

The study revealed that 30.83 per cent of the respondents had knowledge about Slug caterpillar and its management. Mealy bug and its eradication were also known by 29.17 per cent. It was further revealed that 33.33 per cent of the respondents had knowledge about Scales and their management. Bag worm and its management were known by 25 per cent of the respondents. The study further indicated that 22.5 per cent of the respondents knew about Chafer beetle and their management. Termites and their control were known by 47.5 per cent of the respondents. Further, the study had revealed that 25 per cent of the respondents were aware of the Leaf web worm and their management. 30.83 per cent of the respondents had cited that they are aware of Rhinoceros beetle and its management.

The study showed that 40 per cent of the respondents had knowledge about Chlorosis and its management. It was also revealed that 39.17 per cent of the respondents are aware of reduction in yield caused by lack of Phosphorus and its management. It was further revealed that 36.67 per cent of the respondents were aware of the yellowing of leaves caused by the lack of Potassium. 100 per

cent of the respondents were not aware that leaf nutrient analysis is necessary for the proper diagnosis of white stripe caused by imbalance between Nitrogen and Phosphorus.

The study showed that 100 per cent of the respondents had knowledge about the recommended harvesting time i.e. when the fruits turn orange or when 5-10 fruits fall from the bunch. Leaving 5cm stalk after harvest is recommended but only 75.83 per cent were aware of this practice.

It was found that majority 65 per cent of the respondents had medium overall knowledge (between 25 and 41) followed by 19.17 per cent of the respondents who had high (more than 41) and 15.83 per cent of the respondents who had low (less than 26) level of knowledge. The mean overall knowledge was 33.47 and the range of knowledge for each respondent was 22-52.

REFERENCES:

1. Anonymous. Statistical Abstract of Mizoram 2013. Directorate of Economics and Statistics. Government of Mizoram. 2013.

2. Anonymous. Status paper on Oil palm (OilSeeds Division) Department of Agriculture, Cooperation and Farmers Welfare. Ministry of Agriculture and Farmer's Welfare, Government of India. 2017.

3. Anonymous. Agriculture Department (Crop Husbandry). Government of Mizoram. http://agriculturemizoram.nic.in. Accessed on 26, July 2017

4. Anonymous. 2017. Food and Agriculture Organization. (FAO)

5. Anonymous. Statistical Abstract of Mizoram 2018. Department of Agriculture. Government of India. 2018.

6. Indian Council of Agricultural Research . Handbook of Horticulture. 2014; 661-665

7. Iqlima, N. I., Mohammed, A. A., Kamu, A., Kayat, F. and Zul Ariff, A. L. Study on knowledge level of Oil palm smallholder towards the Oil palm Basal stem rot disease. *Advances in Environmental Biology*. 2015; **9**(10): 1-5

8. Kamu, A., Boniface, B., Awang, A. R., Hassan, A., Ayob, M. A. and Yulo, S. K. Knowledge, perception and practices of Oil palm smallholders toward *Ganoderma* Basal Stem Rot disease in Sabah, Malaysia. *Journal of Applied Science and Agriculture.*2014; **9** (18): 1-7

9. Kannan, P., Peng, T. A., Ahmad, S. T., Seman, I. A., Rahman, A. K., Hashim, K., Bakar, H. A. and Omar, W. Knowledge assessment of Basal Stem Rot disease of Oil palm and its control practices among recipients of replanting scheme in Malaysia. *International Journal of Agricultural Research*. 2017.**12** (2): 73-81

10. Mior, S. N. M., Leman, A., Baharudin, M. R. and Ifwat, M. A. A Preliminary Study of knowledge, attitude and practices of pesticide use among Oil Palm Workers in Johor, Malaysia. MATEC Web of Conferences. 2016.

11. Syamal, M. M. Production Technology of Spices and plantation crops. Jaya Publishing House, Dilshad Garden, Delhi. 2014; 200-210