KNOWLEDGE GAP OF RECOMMENDED PRACTICES OF GINGER GROWERS IN WEST GARO HILLS DISTRICT, MEGHALAYA

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ABSTRACT

In the north-eastern region of India, ginger is mainly grown in jhum fields, which are scattered across the hillsides and tribal areas throughout the region with Meghalaya as the highest producer of ginger in NER. A research was conducted during the year 2021-2022 in West-Garo Hills district of Meghalaya State. Following the multi stage sampling method, two RD blocks i.e., Rongram and Dalu were selected with a total of 120 respondents from six villages for the study. Descriptive research design was followed in this study so as to know the knowledge gap of ginger growers on recommended practices. The study concluded that,quality planting materials were unavailable in the study area which led farmers to often cultivate the local varieties i.e. 'Tura local' and 'Meghalaya local'. The cultivation is done mostly in hilly terrain and some parts of plain and they followed ginger cultivation in jhum field. Majority of them possessed high knowledge on land preparation, proper time of sowing, favourable climate and soil for maximum yield. None of the respondents knew about seed treatment and only one-third knew about manures and fertilizers which otherwise is important practice for enhancing the yield. The knowledge on plant protection was negligible. Almost all of the respondents had good knowledge on harvesting, processing and storage. One of the major finding through this study was that,the freshly harvested ginger was directly sold in the market fetching very less price by the ginger growers due to unavailability of processing and quality storage units. The knowledge level of the respondents on recommended practices of ginger cultivation practices in the study area was medium level.The findings of the studies are expected to have an impact on policy-making aimed at uplifting the socio-economic status of farmers by creating awareness and teaching the ginger growers about the benefits of following the improved cultivation practices.

(Key words: Ginger, recommended practices, West-Garo hills, Meghalaya, knowledge gap, local varieties)

INTRODUCTION

Ginger (*Zingiber officinale Rosc.*) is a medicinal spice plant that botanically belongs to 'Zingiberaceae' family. It is an herbaceous perennial plant cultivated for its rhizome which is a modified stem. The consumed part of ginger is rhizome, often called 'ginger root'.India is the largest producer of ginger having a share of 40 per cent in world ginger production which has a total production of 2225 TMT followed by Nigeria with 13.84 per cent , China with 11.8 per cent and Indonesia with 5.53 per cent . India is also leading in the area of ginger with 40.1 per cent followed by Nigeria with 17 per cent, China with 12.07 per cent and Nepal with 4.29 per cent in the year 2020-21 (Anonymous, 2021). The North-Eastern region comprising of states of Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura has tremendous potential for production of spice crops. The climatic condition of the region is highly suitable for cultivation of a large number of spices such as ginger, turmeric, chilli, bay leaf (tejpata), large cardamom, coriander and garlic. Among all the spices, ginger is the main cash crop supporting the livelihood and improving the economic conditions of many ginger growers of the north eastern region

Ginger is grown in almost all the states of the region but the leading states are Meghalaya, Mizoram, Arunachal Pradesh and Sikkim (Rymbai *et al*., 2018). Generally, in NEH Region, ginger is cultivated under jhum system. However, it is advised to adopt bed system of planting which is known as bun in Meghalaya, zabo in Nagaland, tila in Tripura and Assam and terrace in Sikkim. While, preparing land, minimum tillage operations may be adopted. Meghalaya is the 23rd state of India located in the North-eastern region of the country. The production of ginger is highest in Meghalaya followed by Mizoram and Arunachal Pradesh (Jha and Deka, 2012). Panme and Thangjom (2021) concluded that ginger has the potential to stimulate income of the poor rural farmers of the area as major crop and will provide supplementary additional income along with other crops.

Although ginger is now grown in almost all over Meghalaya, Garo hills district has one of the highest areas

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under ginger cultivation and contribute more than half of the total ginger production from the state. West Garo hills produced 15542 metric tonnes of ginger from 2331 hectares with 6668 kg ha^{-1} of yield in 2020-21 (Anonymous, 2021a). Rongram block produced highest in West Garo hills, district i.e 5845 metric tonnes from 845 hectare with 6909 kg ha^{-1} of yield and Dalu block had less production i.e 346 metric tonnes from 53 hectare in 2020-21 (Anonymous, 2021).Though ginger production is the highest in Meghalaya among the North eastern states of India farmers of the state are facing various challenges, like low productivity, non-availability of quality planting material, lack of storage facilities and inadequate post-harvest processing units, forcing the growers to sell their produce just after harvesting as fresh only in very less price. Therefore, it is crucial to give attention to all aspects of cultivation to improve the status of ginger cultivators in the study area.

MATERIALS AND METHODS

A research was conducted in West-Garo Hills district of Meghalaya State because ginger is one of the most important crop of this district which produced 15542 metric tonnes of ginger from 2331 hectares with 6668 kg ha^{-1} of yield in 2020-21 (Anonymous, 2021). Following the multi stage sampling method, two RD blocks i.e., Rongram and Dalu were selected purposively for the study since they are prominent regions of ginger cultivation within the district whereby a total of 120 respondents were selected from six villages (3 villages from each rural development block) for the study.Descriptive research design was followed in this study so as to know the knowledge gap of ginger growers on recommended practices.

In the present study, the knowledge level indicates the amount of knowledge and understanding that the respondents have for ginger cultivation. Knowledge level were categorized by giving score '1' to those respondents who has the knowledge about the ginger cultivation and '0' to those who don't have knowledge about the ginger cultivation practices. A total of 23 questions were prepared about the ginger cultivation practices. Knowledge index was developed to measure the knowledge level of the ginger growers. The calculation of knowledge index was done by the score obtained by individual respondents divided by maximum achievable score. The formula for calculation of knowledge index is given below:

$$\text{Knowledge Index} = \frac{\text{Total score obtained in knowledge}}{\text{Total achievable score in knowledge}} \times 100$$

Table 1. Categorization of respondents based on knowledge level

Sl. No.	Knowledge	Range
1	Low	$< \mu - \acute{o}$
2	Medium	$\mu \pm \acute{o}$
3	High	$> \mu + \acute{o}$

RESULTS AND DISCUSSION

Knowledge level of the ginger growers about improved ginger cultivation practices

In the present study, the knowledge level indicates the amount of knowledge and understanding that the respondents have for ginger cultivation. The knowledge level of the respondents were measured with the help of a structured interview scheduled was prepared based on the recommended practices expressed by the District Horticulture Office, West Garo Hills, Meghalaya.

Table 2 revealed that 69.1 per cent of the respondents had knowledge of ginger variety specially about 'nadia' and 'vareda' but due to unavailability of planting material they often cultivate the local varieties i.e. 'Tura local' and 'Meghalaya local'. Similar findings were reported by Jongbo (2019) where the respondents possessed good knowledge on ginger varieties. The cultivation is done mostly in hilly terrain and some parts of plain and they also follow the ginger cultivation in jhum field. It was also found that 72.50 per cent of respondents had knowledge about land preparation followed by 65.83 per cent had knowledge about climate, 71.67 per cent had knowledge on soil and majority (64.17 %) had knowledge about proper time of sowing. In study area, majority of the respondents carried out the sowing of ginger in the middle of the April.

Table 3 showed that 20.83 per cent of the respondents had knowledge of seed rate and 52.50 per cent had knowledge about spacing. 100 per cent of the respondent had no knowledge about seed treatment, while 71.67 per cent had knowledge on propagation method.

Only one third (32.5 %) of the respondents had knowledge on the benefit of using manure and fertilizers, however, application of manure enhanced the productivity of ginger as concluded by Ezung *et al.* (2020), where the study reported that, "application of vermin-compost in greengram not only increased the yield but enhanced the productivity of the system and maintained the sustainability of the soil.

Table 4 showed that 27.50 per cent of the respondents had knowledge on mulching while majority 71.67 per cent had knowledge about weeding.Similar findings were reported by Odyuo *et al.* (2022)where more than half of the respondents had knowledge level about the intercultural operations like mulching and weeding.

Table 5 explained that 3.33 per cent and 2.50 per cent of respondents had knowledge about insect and diseases while, the rest did not have the knowledge, it might be because of lack of technical knowledge. While 2.50 per cent had knowledge on disease management i.e treating the seed with mancozeb while rest had the knowledge that seed rhizomes are to be selected from the disease-free gardens as the disease is seed borne, only 0.80 per cent had knowledge about insect management while majority did not possess the knowledge,it might be because they have not

attended any training.Whereas, majority per cent have knowledge of cultural management of disease like selection of well drained soils for planting, soil solarization and removal of disease clumps from the field.However, the awareness on the benefits of organic management practices can be created to get more return from the field as reported by Behera *et al.* (2018) reported that the use of organic fungicides in ginger field had shown its long term effects due to establishment of rhizospheric competent strains and mycoparasitism.

Table 6 revealed that 65 per cent of the respondents had knowledge of harvesting that crop is ready to harvest after 8 months of planting whereas, 68.33 per cent respondents had knowledge about processing but they usually don't follow because they sell direct after harvest and moreover, they store the mother rhizome for the next year plantation. Majority 80 per cent of the respondents had knowledge about storage of ginger. Sangma and Kalita (2022) reported that, post-harvest loss were one of the critical problems faced by ginger growers in Oragitok village, West Garo hills. Ginger production and sales in the entire Garo hills district are impacted as a major portion of the ginger output comes from the Oragitok village area.

Overall knowledge level of the respondents

To measure the knowledge gap of the respondents, knowledge index was developed. The respondents were categorized based on low, medium and high, based on the mean and standard deviation. Table 7 revealed that 70.00 per cent of the total respondents had medium knowledge level; 18.33 per cent had high knowledge level and only 11.67 per cent had low knowledge level. The overall knowledge level of the respondents was 46.60 per cent in the study area and thus the knowledge gap was 64.40 per cent.Therefore, based on the overall results, it was

concluded that the knowledge level of the respondents on recommended practices of ginger cultivation practices in the study area was medium. This finding was similar with the results of Bheemudada and Natikar (2016) where, in their study on knowledge level of farmers about ginger cultivation practices in Uttarakannada, Karnataka revealed that majority of the farmers 45.83% had medium level of overall knowledge on ginger cultivation.

The results of this study were, two third of the respondents had fair knowledge of ginger variety specially about 'nadia' and 'vareda' but due to unavailability of planting material they often cultivate the local varieties i.e. Tural local and Meghalaya local. The cultivation is done mostly in hilly terrain and some parts of plain and they also follow the ginger cultivation in jhum field. Majority of them possessed high knowledge on land preparation, proper time of sowing, favourable climate and soil for maximum yield. None of the respondents knew about seed treatment and only one-third knew about manures and fertilizers which otherwise is important practice for enhancing the yield. The knowledge on plant protection was negligible and majority per cent had knowledge of cultural management of disease like selection well drained soils for planting, soil solarization and removal of disease clumps from the field. Almost all of the respondents had good knowledge on harvesting, processing and storage. Based on the overall results, it was concluded that the knowledge level of the respondents on recommended practices of ginger cultivation practices in the study area was medium.

Thus, the results of the studies are expected to have an impact on policy-making aimed at uplifting the socio-economic status of farmers by creating awareness and teaching the ginger growers about the benefits of following the improved cultivation practices.

Table 2. Knowledge level of respondents based on varieties, land preparation, climate, soil, sowing time   N=120

Sl. No.	Practices	Frequency	Percentage
1	Varieties- Nadia, Maran, Vareda	83	69.17
2	Land preparation-It requires 3-4 ploughings to bring the soil into fine friable.Ginger should not be planted in a same field year after year.	87	72.50
3	Knowledge on Climate	79	65.83
4	Knowledge on Soil	86	71.67
5	Sowing time	77	64.17

Table 3. Knowledge level of respondents based on seed rate, propagation, spacing, seed treatment, manuring and fertilizer   N=120

Sl. No.	Practices	Frequency	Percentage
1	Seed rate-: 18-20 quintals rhizomes of 20-25 g are required for one hectare land	25	20.83
2	Propagation- Ginger is propagated through ginger rhizomes.	86	71.67
3	Spacing- A distance of 30 cm between the rows and 25 cm between the plants is considered ideal for ginger.	63	52.50
4	Seed treatment	0	0
5	Manuring and fertilizers	39	32.5
6	Irrigation- The critical stages for irrigation are during germination, rhizome development (135DAP) and rhizome initiation (90DAP)	56	46.67

Table 4. knowledge level of respondents based on mulching, weeding, intercropping, crop rotatio
N=120

Sl. No.	Practices	Frequency	Percentage
1	Mulching	33	27.50
2	Weeding	86	71.67
3	Inter cropping	15	12.50
4	Crop rotation	31	25.83

Table 5. Knowledge level of respondents based on disease, insect, disease management, insect management, Cultural management of disease management   N=120

Sl. No.	Practices	Frequency	Percentage
1	Disease- Soft rot is the most destructive disease of ginger	4	3.33
2	Insect- Stem borer (*Prodioctush aematicus*)	3	2.50
3	Disease management- Treatment of seed rhizomes with Mancozeb 0.3% for 30 minutes before sowing and drenching at 30 and 60 DAP	3	2.50
4	Insect management	1	0.83
5	Cultural management of disease	96	80.00

Table 6. Knowledge level of the respondents based on harvesting, processing and storage N=120

Sl.No.	Practices	Frequency	Percentage
1	Harvesting: Harvesting for vegetable purpose starts at 180 DAP It is ready for harvesting after 8 months of planting that is when the leaves turn yellow and start drying	78	65.00
2	Processing: Processing of ginger involves peeling, sun drying, polishing and grading	82	68.33
3	Storage	96	80.00

Table 7. Distribution of the respondents based on overall knowledge level   N=120

Sl. No.	Category of knowledge	Frequency	Percentage	Mean	SD
1	Low (<32.24)	14	11.67	46.60	14.36
2	Medium (32.24-60.96)	84	70.00		
3	High (>60.96)	22	18.33		

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