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Production and marketing constraints faced by the Chakhao (*Black scented* rice) farmers in value chain of Chakhao in Manipur

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Abstract
The present study was conducted in Imphal West and Imphal East district of Manipur to analyse and study the constraints faced by Chakhao farmers during production and marketing process and suggest various measures to mitigate the problems. Garett's ranking technique was employed to rank the constraints identified through interview scheduled. The major production constraints identified were lodging, the lack of space for sun drying and lesser yields as compared to other paddy variety. Farmers proclaimed that low farm price was a major issue pertaining in marketing of Chakhao and the lack of market was also one of the major constraints associated with it. A varietal improvement and adoption of SRI method of cultivation could provide a more efficient way. And moreover, it is very much needed to develop a modern standardized price mechanism by the competent authorities to control the price monopolization by the traders alone.

Keywords: Production and marketing constraints, Garett's technique, Chakhao

Introduction
Chakhao (Black Scented Rice) also referred to as super food and black gold of Manipur is a unique rice variety of Manipur known for its special aroma and glutinous nature with high anthocyanin content which possessed anti-cancer property. It was granted the Geographical Indication (GI) tag on 20th April, 2020 (GI No. 602) for its uniqueness characteristic feature and nutritional benefits. There are four varieties of black scented rice identified by the Department of Agriculture which are found in Manipur namely Chak-hao Poreiton, Chak-hao Amubi, Monkhang Chak-hao, Chak-hao Poreiton Arangbi. Among these four black scented rice varieties, Chak-hao Poreiton is rated best in quality. The demand for black scented rice has been increasing over years. At present, there is a big demand of black scented rice from abroad and outside Manipur due to its peculiar desirable characters like colour, taste, aroma etc. Historically, black rice was considered to be a royal delicacy and forbidden for common people in Asian countries such as China and Indonesia (Kushwaha, 2016) [8]. In China, during the imperial period, common people were not allowed to store/cultivate black rice without the approval from authorities hence it was called 'forbidden rice' or 'imperial rice' or emperor's rice or purple rice or longevity rice.
Growing black rice, which has its roots in north-east India, is becoming popular in other regions as well, among farmers. It's extensively grown in Odisha, West Bengal, Tamil Nadu, Puducherry and Jharkhand and commonly consumed in Manipur. The demand for black rice has been increasing in today's world because of its superior nutritional quality due to the presence of antioxidants and phenolic compounds. It is also rich in beneficial amino acids like lysine and tryptophan which possesses health benefits.
The black glutinous aromatic rice of Manipur is in demand in the domestic market, as well as has possibilities for export. The black aromatic rice of Manipur is served in standard hotels as a top-rated variety. Initiatives should be taken to identify the potential areas of Chakhao cultivation and adequate awareness about its nutritional values and market price to the farmers of that particular region to promote and popularize Chakhao cultivation in the State.

Materials and Methods
The present study was carried out in Imphal West and Imphal East district of Manipur which was purposively selected for the study as in accordance to the highest area and production of Chakhao in the State.

A total of 140 farmers was selected through simple random proportionate sampling method from twelve villages of the four blocks selected purposively from the two districts. The primary data was collected using pre-tested interview schedule. And the identified constraints were ranked accordingly using the Garett's ranking technique.
It was calculated using the formula below:

$$\text{Percent position} = \frac{100(R_i - 0.50)}{N_{ij}}$$

Where,
R_{ij}=rank given of the i^{th} item by the j^{th} individual
N_{ij}= number of the items by the j^{th}individual

The percent position of each rank was converted into scores by referring tables given by the Garrett and Woodworth. Then for each factor, the scores of the individual respondent were added together and divided by the number of respondents for whom scores are added. The mean scores for all the factors are ranked by arranging in descending order.

Result and Discussion
The major constraints were identified and ranked based on the severity as perceived by the respondent farmers. A total of six production constraints were identified in the study area. Figure 1 illustrated the said six constraints along with its score and rank.
Majority of the farmers revealed lodging to be the most severe problem while cultivating Chakhao scoring a percent of 70.93. Farmers have proclaimed that since Chakhao is naturally an organic crop, even the slight increase in the dose of manures causes lodging. Moreover, the traditional variety which are mostly cultivated are of long type which are quite sensitive to wind speed.
58.65 percent of the farmers complained that there is lack of space for sun drying the harvested Chakhao. Similar finding was put forward by Thuzar L and Broos M. 2019 [9] regarding paddy production in Myanmar. Drying plays an essential role in maintaining the quality of Chakhao especially the anthocyanin content during milling. Wet or partially dried Chakhao paddy causes brokerage and scrap off the black color of the paddy which is the anthocyanin content. Thereby, it only yields less income with worst case scenario of unsold stock. As Chakhao yields less in comparison with other paddy variety, it brings less net return which was make up by the higher cost per kg. And so, 58.09 percent of the sampled farmers stated that it was one of the major problems from their part as majority of them are marginal farmers with small surpluses. Similar finding was pointed out by Asem *et al.*, 2015 [10] in black rice. This very could be resolved by introducing improved variety without affecting the originality.
About 45.10 percent of the farmers identified lack of subsidies as their constraints in regards to organic cultivation of Chakhao. The result aligns with C. Ramesh 2018 [11] concerning paddy and Shende *et al.* 2020 [12] also reported similar findings in regards to black rice cultivation in Nagpur. Organic cultivation of Chakhao is quite labour intensive and require high maintenance of the field to prevent any leakage from nearby fields as Chakhao is also quite sensitive to fertilizers. Since most of the farmers belong to the marginal category, farmers are not able to invest in agricultural machinery because of the lack of capital and insufficient support both from government and non-government organizations which hinder farmers from modernizing their farming process or product quality.
Awareness plays an important role in the adoption of organic Chakhao cultivation. It provides improved and scientific method & impart knowledge to the farmers suitable for the system. But a few numbers of farmers are aware of the importance of training and not many attended the training programme due to information gap. 35.52 percent of the farmers pointed out that there is lack of awareness programme held which are actually helpful to them and gives insight about the proper ways and manner of organic cultivation scientifically. The result coincides with Chanu *et al.*, 2022 [13] findings on Chakhao production and marketing along with Lakra *et al.*, 2017 [14] regarding constraints of paddy. Most of them stated that they found the training hard to understand and it should be more on laymen terms while explaining.
Chakhao despite being a drought and stress tolerant crop, a proper drainage management is still required as the cultivation of Chakhao in the study is based on rainfed farming. Weather is an unpredictable phenomenon and hence proper arrangement should be made before for in times extreme condition to avoid crop failure. Farmers complained that there are no enough canals to support all the fields that out of hilly streams areas and suffer when there is unnecessary water due to heavy rainfall as there are no proper drainage system. With a total score of 32.20 percent this problem bagged the six ranked.

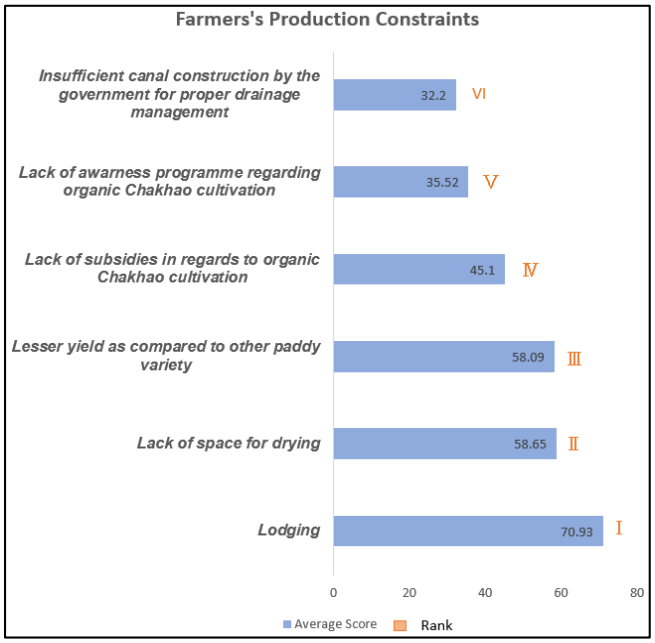

Fig 1: Schematic representation of production constraints perceived by the Chakhao farmers (percent average score basis)

Figure 2 revealed the constraints encountered by the sampled Chakhao farmers during marketing. More than half of the farmers stressed on the issue pertaining from the low farm price. Chakhao yields lower in comparison with other paddy variety which was already a problem and with the low farm price the farmers are getting, the situation took another turn where farmers are opting to switch to another crop.
One of the major constraints pointed out by the farmers was the lack of market to sold their produce. Gurung *et al.*, 2010 and Saravakumar N. and Kiruthika N. 2015 [15, 16] observe

similar findings on rice marketing. Scoring a percent of 58.97 second rank was assigned to this constraint which played a major role in the dramatic decline of Chakhao cultivation in Churachandpur district of Manipur which once was the lead district contributing in both area and production basket of Chakhao in Manipur. Utmost attention should be given to the development of systematic marketing channels without any rooms for foul play by the stakeholders involved to encourage the farmers to cultivate Chakhao which has become a global phenomenon to realize better benefits.

Assigned as the third rank, farmers claimed that they have limited access concerning the current market information and knows nothing of the current trend. The observation aligned with the results of Basyal *et al.*, 2019 [1]. As result they have been countlessly taken advantage and exploited by the traders and other intermediaries. This matter requires the promotion of extension services in and around to promote the welfare of farmers. Storage problems was ranked last among the four major problems identified. They stated that they do not have proper space for storing the produce to prevent from rodent attacks. Further they also had to maintain the quality of Chakhao given the improper and insufficient space as the value can be easily decreased.

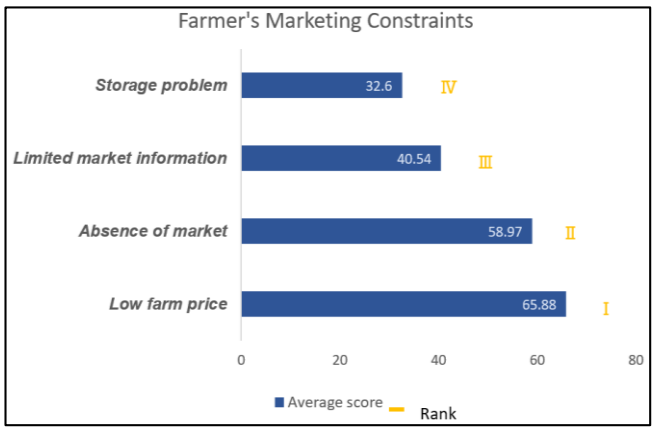

Fig 2: Schematic representation of marketing constraints faced by the farmers (percent average score basis)

Conclusion

The major constraints were identified and ranked based on the severity as perceived by the respondent farmers. A total of six farmer's production constraints were identified in the study area. Majority of the farmers revealed lodging to be the most severe problem while cultivating Chakhao. Farmers complained that there is lack of space for sun drying the harvested Chakhao and it yields less as compared to other rice. Moreover, farmers lack subsidies and training programmes from the competent authorities which provides them scientific knowledge. The major marketing constraints encountered by the farmers were the low sale price which contradicts their hard work, lack of market to sold their produce and so on. It is very much evident from the study that there existed a lack of awareness among the farmers concerning the organic Chakhao cultivation which resulted from the lack of training session to impart knowledge to the farmers. Moreover, a wide gap also existed between the development of technologies and their transfer to actual farming situations. Hence the constraints perceived by the farmers could be overcome by following proper strategies like conducting awareness programmes, provision of contract farming, creation of proper storage and scientific facilities and provision of low interest credit facilities will encourage the Chakhao farmers to cultivate Chakhao extensively.

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