



## Impact of COVID-19 pandemic on the constraints faced by smallholder rice farmers of Meghalaya

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### ABSTRACT

Rice is an important cereal crop of India. In Meghalaya state of NE India, significant increase in the production of rice was observed in recent years, however, the production is still much below the demand of the state and productivity below the national average. The COVID 19 pandemic and the resultant lockdown significantly affected the rice farmers, especially the small and marginal farmers with sustenance farming. The present study was taken up in Ri-Bhoi and West Jaintia Hills districts to study the impact of the COVID-19 pandemic on the smallholder rice farmers of Meghalaya by comparing the constraints faced by them before and during the pandemic. 98 rice farmers were sampled from 3 villages of each district. Important constraints confronting the farmers in rice production were lack of awareness on improved varieties, lack of training, unavailability of experts, unavailability of seeds and high cost/shortage of labors. COVID-19 pandemic specific problems identified were difficulty to procure/ unavailability of seeds and high cost of labour/shortage of labour. The study suggests thorough capacity building programmes with proper follow-ups, harnessing ICT tools and platforms for linking farmers with experts and promoting community/local seed entrepreneurs (seed producers) for supply of quality seeds to the farmers.

### 1. Introduction

Rice is the most widely consumed staple food for over half of the world's human population. In India rice is the most important cereal food crop occupying one-fourth of the gross cropped area. In India total production of Kharif rice during 2020-21 was estimated at 102.36 million tonnes. It is higher by 6.70 million tonnes than the previous five years' average production of 95.66 million tonnes (GoI, 2021).

In Meghalaya state of NE India, rice is a major food crop occupying 37.84 percent (104800 lakh ha) of the total cropped area (GoM, 2021). Though production of rice in the state increased from 200.67 thousand MT (2003-04) to 330.45 thousand MT (2016-17) (Meena *et al.*, 2018), the state was reported to be deficit in food grains by 49.21 per cent (Roy *et al.*, 2015). The state has experienced major breakthroughs in low-volume high-value crops but rice production is still much below the demand and bridging this gap should be a key priority (GoM, 2015). Even with the introduction of high yielding varieties of rice and improved crop management technologies, a wide gap between the potential and actual yields of farmers was observed (Singh

and Feroze, 2017). It is expressed that not only in Meghalaya but also in the entire NEH region, there is a dire need to increase the present rice productivity of the region to at least the level of the national average considering the ever increasing population in the region and also to maintain rice self-sufficiency (Konjengbam *et al.*, 2021). As per the Situational Assessment of Agricultural Survey 2019, 90 percent of the households of Meghalaya are small and marginal farmers with land holding of 2 hectares and less (Umdor, 2022) and studies need to target this category.

The COVID 19 pandemic and the resultant lockdown significantly affected the farmers, especially the small and marginal farmers with sustenance farming. Some of the distress reported are inability to carry out farming operations on time, unavailability of inputs, labours, etc., disrupted supply chain causing not only socio-economic but psychological consequences (Balu, and Kapse, 2020). The rice farmers of Meghalaya were no exception and were affected by the pandemic and lockdown. The study was undertaken in order to identify the constraints faced by the smallholder rice farmers of Meghalaya and compare

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constraints temporally before the pandemic and during the pandemic.

## 2. Methodology

The study was conducted in Bhoirymbong block of Ri-Bhoi district and Thadlaskein block of West Jaintia Hills District of Meghalaya. 98 small and marginal rice growers were sampled from 3 villages each of the two blocks. A list of constraints that rice farmers were likely to face was prepared through review of literature and Focus Group Discussion with non-sample rice farmers of the selected districts. The content of the list was validated by 6 experts consisting of faculty members in Agronomy and Agricultural Extension, officials of the State Department of Agriculture and local leaders. Changes in light of the validation were made. The final list comprising of 11 constraint statements was administered to the respondent rice growers. The respondents were asked to rate each of the listed constraints in terms of their frequency

of occurrence on a 4 point continuum of “rarely a constraint”, “sometimes a severe constraint”, “often a severe constraint” and “always a severe constraint” with a score of 1, 2, 3 and 4 respectively. The respondents were asked to score the constraint statements in two temporal categories of “before COVID-19 pandemic” (before 2020) and “during COVID-19 pandemic” (2020 and 2021). Kendall Coefficient of Concordance was used to establish the degree of agreement in ranking of the constraints and Wilcoxon Rank sign test was used to compare the constraints score across the two set of scores of each constraint item. Primary data was collected during April-June 2022.

## 3. Results and Discussion

### Profile of the respondents

The description of the profile of rice farmers sampled and interviewed for the study is presented in Table 1.

**Table 1.** Profile of the respondents

(n=98)

Sl. No	Variables	Category	Frequency	Percentage
1.	Age (in years)	Young(<35)	40	40.81
		Middle age (35-50)	44	44.89
		Old (>50)	14	14.28
		Mean	37.93	
		S.D	9.46	
2.	Gender	Male	53	54.08
		Female	45	45.91
3.	Level of education	Illiterate	38	38.77
		Primary	25	25.51
		Middle school	20	20.40
		Higher secondary	10	10.20
		Graduate or above	5	5.10
4.	Household size	Small (below 4)	17	17.34
		Medium (4-8)	53	54.08
		Big(above 8)	28	28.57
		Mean	6.80	
		S.D	2.11	
5.	Primary occupation	Agriculture	41	41.83
		Horticulture	19	19.38
		Agro-based subsidiary	15	15.20
		Business	6	6.12
		Salaried service	5	5.10
		Others	11	11.22
6.	Farming experience (in years)	Low (below 8)	22	22.44
		Medium (8-25)	57	58.16
		High (above-25)	19	19.38
		Mean	16.96	
		S.D	8.52	
7.	Annual family income (in	First quintile (10000-33000)	14	14.28

	Rupees)	Second quintile (33001-55000)	36	36.73
		Third quintile (55001-88000)	33	33.67
		Fourth quintile(>88000)	11	11.22
8.	Area under rice cultivation	Marginal (<1ha)	86	87.75
		Small (1-2 ha)	12	12.24
	Type of land Ownership	Privately Owned	24	24.48
		Leased in	73	74.48

Most of the respondents (44.89 %) were aged between 35 to 50 years. More than half of them (54.08 %) were males. 38.77 per cent of the respondents were illiterate, 25.51 per cent had primary level of education and 20.40 per cent attended upto middle school. Majority (54.08%) had medium household size of 4-8 members. The important primary occupation of the respondents were agriculture (41.83 %) followed by horticulture (19.38%), agro based subsidiary business (15.20%), salaried services (6.12%), other businesses (5.10%) and also others like day labourer were found to be 11.22 per cent. Around 36.73per cent of the respondents had an annual family income in the second quintile bracket (Rs. 33001-55000). A huge majority (87.75 %) of the respondents had marginal land holding while the rest had small land holdings. 74.48 per cent of them cultivated in leased-in land and only 24.48 per cent cultivate in privately owned lands.

#### Constraints faced by the rice farmers before and during the COVID-19 pandemic.

The eleven constraints statements and the corresponding mean score of the severity of the constraints overtime before COVID-19 and after COVID-19 are presented in table 2. The constraint statements are also ranked according to the mean score. When tied scores occur, each of the tied observations was given the average of the ranks they would have had if no ties had occurred (Siegal, 1956).

Kendall Coefficient of Concordance was used to establish the degree of agreement in ranking of the constraints in the two temporal categories. It was found that the Kendall's W score at .980 was highly significant at 5% level of significance indicating that there is a strong agreement in the ranking of the two set of scores. So, the overall/ mean rank of a constraint can be safely taken as the combined rank of the two ranks of the constraint item. So, the table indicates that the highest scoring constraint was "Unavailability of experts' guidance and advisory when required" (Mean Rank= 1.50) followed by "Lack of knowledge on improved rice varieties" (Mean Rank=1.75) and "Lack of training on technical aspects and management practices" (Mean Rank = 3.25).

Wilcoxon Rank Sign test was used to compare the score of the respondents before and during the pandemic and thus establish the impact of the pandemic on the constraints faced by the respondents. Details are presented in Table 3. It was observed that, of the 11 constraint items considered for the study, 4 constraints were found to have negatively significant Z indicating significant differences before and during the pandemic. The items were "Lack of knowledge on improved rice varieties", "Difficulty to procure/ unavailability of seeds", "High cost of seed", "and High cost of labour / shortage of labour". This indicates that the 4 mentioned constraints were encountered more by the farmers during the COVID-19 period as compared to the period before COVID-19 indicating significant impact of the pandemic.

**Table 2.** Mean Score and ranking of constraints faced by rice farmers before and during the COVID-19 pandemic

(n=98)

SL. No.	Constraints	Before COVID-19		During COVID-9		Overall Rank*
		Mean Score	Rank	Mean Score	Rank	
1.	Lack of knowledge on improved rice varieties	3.50	2.5	3.67	1	2 (1.75)
2.	Difficulty to procure/ unavailability of seeds	2.91	6	3.35	5	6 (5.50)
3.	High cost of seed	2.61	8	2.71	8	8 (8.00)
4.	Lack of training on technical aspects and management practices	3.50	2.5	3.40	4	3 (3.25)
5.	Reduction in yield due to climate change	2.50	9	2.52	9	9

						(9.00)
6.	High cost of labour/ shortage of labour	2.96	5	3.58	3	4 (4.00)
7.	Unavailability of experts' guidance and advisory when required	3.59	1	3.59	2	1 (1.50)
8.	High disease/pest incidence	3.06	4	3.07	6	5 (5.00)
9.	Unavailability/ high cost of fertilizers, pesticides, weedicides etc	2.90	7	2.98	7	7 (7.00)
10.	Low productivity	2.48	10	2.50	10	10 (10.00)
11.	Lack of knowledge and facilities for post-harvest storage and management	2.10	11	2.13	11	11 (12.00)
	<b>Kendall's W</b>					<b>.980**</b>

\* Figure in parentheses indicate mean rank; \*\* Significant at 0.05 level of significance

**Table 3.** Impact of COVID-19 pandemic on the constraints faced by the respondents (n=98)

Sl. No.	Constraints	Negative Rank	Positive Rank	Wilcoxon 'Z'	p
1.	Lack of knowledge on improved rice varieties	14.00	12.20	<b>-2.926***</b>	0.003
2.	Difficulty to procure/ unavailability of seeds	22.00	25.42	<b>-5.2288***</b>	0.000
3.	High cost of seed	5.50	6.70	<b>-2.352**</b>	0.019
4.	Lack of training on technical aspects and management practices	11.23	6.79	-1.706	0.088
5.	Reduction in yield due to climate change	0.00	1.50	-1.414	0.157
6.	High cost of labour/ shortage of labour	29.00	31.63	<b>-6.928***</b>	0.000
7.	Unavailability of experts' guidance and advisory when required	5.50	6.60	0.000	1.000
8.	High disease/pest incidence	3.00	4.00	-0.333	0.739
9.	Unavailability/ high cost of fertilizers, pesticides, weedicides etc	9.25	7.55	-1.358	0.174
10.	Low productivity	0.00	1.50	-1.414	-157
11.	Lack of knowledge and facilities for post-harvest storage and management	3.92	8.50	-0.869	0.385

\*\* Significant at 0.05 level of significance; \*\*\* Significant at 0.01 level of significance

The identified constraints are described and discussed hereunder in light of the findings of table 2 and 3:

1. **Lack of knowledge on improved rice varieties:** This constraint is ranked second highest also is significantly severe during the pandemic Farmers always seek rice varieties which are high yielding and possess other desirable traits. It is due to lack of knowledge on the available improve rice varieties, where to procure the seeds or suitability of available varieties in their ecosystem that do not allow them to get benefit of the varieties.
2. **Difficulty to procure/ unavailability of seeds:** The results reveal that difficulty to procure/unavailability of seeds on time were one found be the fifth most important constraint. Two decades back Prakash *et*

*al.* (1999) reported the same constraint for rice farmers of Meghalaya. This is especially relevant for hybrids and other improved varieties for which farmers had to depend on various institutions for supply. This constraint was significantly severe during the COVID-19 period due to the lockdown which led to closure of institutions and restricted movements of goods and persons.

3. **High cost of seed:** High cost of seeds is reported to be a constraint that the farmers sometimes encounters and the mean scoring was found to be 2.61 and 2.71 before COVID-19 and during COVID-19 respectively as shown in the Table 1. Nirmala *et al.* (2013) and Prakash *et al.* (2017) mentioned high cost of seed as one of the main constraints in their studies. This constraint was

also found to be significantly increased during the COVID-19 pandemic. Seeds, especially the hybrid and improved varieties, were costing much higher than their prices before the pandemic.

4. **Lack of training on technical aspects and management practices:** Capacity building is one of the most important means to increase the competency of farmers so that they can improve their farm performance. Without training efforts farmers may not be able to make full utilization of available resources. Thanh and Singh (2006) reported that lack of trainings were among the most important constraints as perceived by large percentage of farmers. Prakash *et al.* (2017) attributed unawareness of management practices as one of the major constraint restricting farmers for adopting recommended hybrid rice production. Singh and Feroze (2017) opined that the high yield gap of rice in Meghalaya may be due to lack of technical knowhow. Although this was the third ranked constraint, no significant difference was found before and after COVID.
5. **Reduction in yield due to climate change:** The results show that reduction in yield due to climate change has low scoring which indicates that this constraint is of low occurrence and importance in the study area. Thanh and Singh (2006) also reported that the agro-ecological constraints faced by farmers, ranked from more to less serious were related to dependence on monsoon.
6. **High cost of labour/ shortage of labour:** High cost of labour/ shortage of labour is the 4<sup>th</sup> rank constraint. Thanh and Singh (2006) also found that lack of labour was the most serious constraint perceived by farmers. This constraint was faced at a significantly higher level during the COVID-19 pandemic. Agricultural labour is both scarce and expensive in Meghalaya, particularly so, when the farmers need them the most – so much that even mobilizing labour is a challenge to them during the peak agricultural season (Kumar, 2021). This challenge was more severe during the pandemic peak periods which coincided peak agricultural periods.
7. **Unavailability of experts' guidance and advisory when required:** This constraint was calculated to be the top ranked constraint. Farmers need guidance and advisory by experts on various matters related to pest management, nutrient management, intercultural operations etc. The rice farmers expressed that their accessibility and contact with experts were very low all the time. Bhatt (2005) found that the key constraints of the respondents cultivating rice were no contact by extension agents (89.10%) and having no technical assistance (79.20%). Case of poor guidance by inexperience staff was also reported (Ravikumar *et al.*, 2004),
8. **High disease/pest incidence:** According to the result, high disease/pest incidence is a constraint which often causes a severe loss to the crop and is ranked the 5<sup>th</sup> most important constraint. Nirmala *et al.* (2013) also mentioned in their study that one of the main constraints was high pests/disease. Ravikumar *et al.* (2004) mentioned lack of knowledge about pest and diseases control as one of the major constraints faced by the rice farmers
9. **Unavailability/ high cost of fertilizers, pesticides, weedicides etc:** This constraint is ranked 7<sup>th</sup> by the respondents. Amedi (2014) results showed that high cost of inputs were among the five top most constraints faced by farmers. Interestingly there were no significant differences in the score of this constraint before and during COVID-19. It may be due to less dependency on external inputs for rice cultivation by the farmers
10. **Low productivity:** The result also reveal that low production has low scoring which shows that it is a constraint that is of low perceived importance to the farmers.. Although the matter of low productivity is emphasized many times, farmers seem to be quite content with the low yielding local varieties which they are accustomed to for ages. Sadvi *et al.* (2016) identified the constraint reduction in yields as an important constraint.
11. **Lack of knowledge and facilities for post-harvest storage and management:** The results presented in the table 1 showed that this is considered least important constraint by the farmers. All the sampled farmers are small and marginal farmers practicing sustenance farming. The harvest was used for either home consumption, selling within the village or nearby villages or given to the land-owners as sharecrop.

#### 4. Conclusion

In order to increase the production and productivity of rice among the small holder farmers of the state, the constraints reported in this study needs to be talked about with appropriate interventions. Although the study was conducted in the context of the COVID-19 pandemic, the findings are applicable and have implications for post COVID scenario also. Awareness on improved varieties and capacity building on cultivation and management practices is necessary. Harnessing available ICT tools and platforms to link the farmers and experts is also required to bridge the extension gap to a certain extent. It is suggested that local/ community seed entrepreneurs (seed producers) should be promoted so that interested farmers may be able to procure the seeds locally instead of depending on different institutes and traders.

#### 5. References

- Amedi, M (2014). Constraints among rice farmers under the MIDA agricultural credit programme in the Hohoe municipality. *International Journal of Novel Research in Marketing Management and Economics*, 1(1): 1-9.
- Balu, M.(2020). COVID-19: Bracing for agrarian crisis and food insecurity. Distress among marginal farmers and availability of food to migrant labourers has been largely ignored in union government's economic stimulus. <https://www.downtoearth.org.in/blog/economy/covid-19-bracing-for-agrarian-crisis-and-food-insecurity-71729>. Accessed on 25<sup>th</sup> June 2021.
- Bhatt, S.H. (2005). A study on technological gaps and constraints in cultivation of rice in Jammu and Kashmir Ph.D. (Ag.).Thesis submitted to JNKV, Jabalpur.
- GoI. (2021). Annual Report 2020-2021 Department of Agriculture, Cooperation and Farmers' Welfare, Ministry of Agriculture and Farmers' Welfare, Government of India. pp 6-7.
- GoM.(2015). A report of the state task force on agriculture development. Government of Meghalaya. [https://niti.gov.in/writereaddata/files/Meghalaya\\_Report\\_0.pdf](https://niti.gov.in/writereaddata/files/Meghalaya_Report_0.pdf). Accessed on 23rd June 2021.
- GoM.(2021). Department of Agriculture and Farmers' Welfare, Government of Meghalaya.[http://www.megagriculture.gov.in/PUBLIC/crops\\_rice.aspx](http://www.megagriculture.gov.in/PUBLIC/crops_rice.aspx). Accessed 25<sup>th</sup> June 2021.
- Kapse, P.P. (2020). Farmers' distress during the COVID 19 lockdown: Psychosocial Response. *The Lancet Global Health*, pp 1-14. [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3627250](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3627250). Accessed 25<sup>th</sup> June 2021.
- Konjengbam, N, S., Mahanta, M. and Lyngdoh, A.A. ( 2021). Rice Cultivation - A way of life for the people of North Eastern Hill Region of India, *Intechopen*. pp: 1-14.
- Kumar, K. N. (2021). Meghalaya's farm mechanization. The Shillong Times. <https://theshillongtimes.com/2021/09/14/meghalaya-farm-mechanization/> Accessed on 22<sup>nd</sup> May 2022.
- Kumar, R., Pathania, S., Lahmo,C., Peshin, R., Slathia, P.S. and Bhushan, B. (2017). Factors affecting the adoption of hybrid rice cultivation in Jammu district. *Advances in Social Research*, 3(2): 41-45.
- Meena, N.K., Singh, R. and Laitonjam, N. (2018). *Performance of agricultural crops in Meghalaya*. Biotech books, pp 16-18.
- Nirmala, B. ,Vasudev, N. and Suhasini. K. (2013).Farmer's perceptions on hybrid rice technology: A case study of Jharkhand. *Indian Research Journal of Extension Education*, 13(3):103-105.
- Prakash, A.,Singh, H.N., Shekhawat, R.S. and Sandu, S. (2017). Constraints faced by farmers in production of inbred and hybrid rice in Udham Singh Nagar district of Uttarakhand, India. *International Journal of Current Microbiology and Applied Science*, 6(12):2243-2247. DOI: <https://doi.org/10.20546/ijcmas.2017.612.259>. Accessed 22<sup>nd</sup> May 2021.
- Prakash, N., Pal, P. P., Kumar, R., Sundarambal, P and Bihari, B. (1999).Factors responsible for non-adoption of improved rice varieties among the tribal farmers of Meghalaya. *Indian Journal of Hill Farming*, 12 (1&2): 111-13
- Ravikumar, K.N., Rao, B.B and Lakshmi, S. K. (2004).Economics of major farming system in the north coastal zone of Andhra Pradesh.*Manage Extension. Research Review*, 5(1): 10-32.79.
- Roy A., Singh N.U., Dkhar D.S., Mohanty A.K., Singh S.B. and Tripathi A.K. (2015). Food Security in North-East Region of India -A State-wise Analysis.Agricultural Economics Research Review, 28: 259-266.
- Sadvi, P., Jagan, M., Reddy, M andRao, I.S. (2016). Constraints analysis in hybrid rice seed production. *Research Journal of Agricultural Science*, 7: 180-182.
- Siegal, S. (1956). *Non-parametric Statistics for the behavioural Sciences*. McGraw Hill Book Company Inc., New York.
- Singh, R. and Feroze, S.M. (2017).Yield gap analysis of rice cultivars in Meghalaya: An empirical study. *Indian Research Journal of Extension Education*, 17 (4):20-22.

- Thanh, N. C. and Singh, B (2006) Constraints faced by the farmers in rice production and export. *Omonrice*, **14**: 97-110.
- Umdor, S. (2022). Poor state with richest farmers in the country. The Shillong Times. <https://theshillongtimes.com/2022/01/13/a-poor-state-with-richest-farmers-in-the-country/> Accessed 15<sup>th</sup> May 2022.