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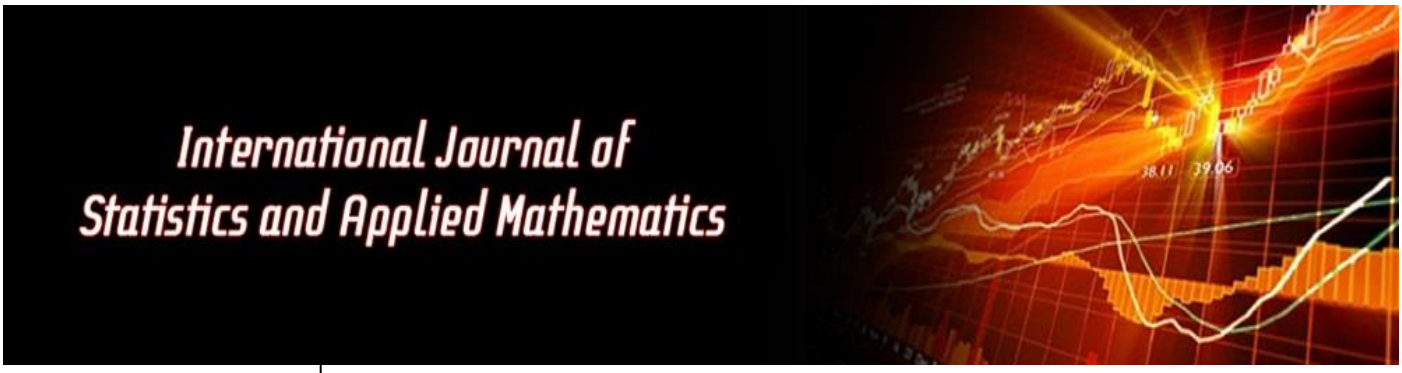

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Constraint analysis of paddy seed and grain production in Karimnagar district of Telangana using Garrett's ranking technique

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Abstract
The present study was conducted in Karimnagar purposively selected district of Telangana to identify the constraints perceived by farmers in grain and seed production of hybrid and open pollinated varities of paddy. From this district three Mandals i.e Vinavanka mandal, Manakondur mandal and Shankarpatnam mandal, were selected randomly among seed growing mandals for collecting primary data. From each mandal, one village was selected as a sample i.e Elbaka village (Vinavanka mandal), Utoor village (Manakondur mandal) and Kannapur village (Shankarpatnam mandal). Sampling was done covering all farm size groups. In every chosen village, a total of 60 farmers were selected for sampling. This selection was designed to encompass 20 farmers engaged in the production of Hybrid seeds, another 20 involved in the production of OPV seeds, and an additional 20 farmers focused on grain production. Consequently, the complete sample consisted of 180 farmers distributed among the three villages. Garrett' ranking technique was adopted to analyze the constraints as perceived by the respondents in Grain and seed production of paddy. The results revealed that major constraints perceived by rice growers were unfavourable weather conditions which ranked first with Garrett mean score around 85, followed by higher labour wage.

Keywords: Garrett's ranking technique, paddy grain production, paddy seed production, constraints

Introduction
Agriculture is the backbone of the Indian economy**.** Rice is grown in around 46.38 million hectares area in India with a production of 130.29 Million tonnes and an average yield of 2.809 tons per hectare during 2021-22. (Agricultural statistics at a glance 2022). Paddy is the principal food crop cultivated throughout the Telangana state providing food for its population, fodder to the cattle and employment to the rural masses. Any decline in its area and production will have a perceivable impact on the state's economy and food security. In Telangana paddy is the major food crop grown in 3.65 million hectares producing 12.3 million tons in both *kharif* and *rabi* seasons with an average productivity of 3.366 tons/ha during 2020-21 (4^{th} advance estimates). Telangana is contributing 9.44 per cent of national paddy production with 7.88 per cent of national paddy area. (source: Agricultural Statistics At a Glance 2022).
In order to achieve a bountiful harvest, it is imperative to have a high-quality crop, and this entails meticulous attention to numerous elements. These include ensuring the soil is fertile, using top-notch seeds, adhering to appropriate planting schedules, providing adequate irrigation, applying fertilizers, implementing weed control measures, safeguarding against pests and diseases, executing a successful harvest, carrying out threshing, processing, and ensuring proper storage. Any deficiency in any of these factors can significantly impede crop production. While all these factors play a crucial role in achieving a successful crop yield, it is worth noting that the quality of the seed stands out as a distinctive and paramount factor. It has the potential to increase yield by as much as 20%, and in its absence, the effectiveness of the other factors diminishes significantly.
Typically, following the rice harvest, farmers set aside a portion of the collected grain to serve as seed for the next planting season.

To these farmers, there exists no distinction between grain and seed. Nevertheless, in reality, grain primarily serves as our food source, and we generally do not concern ourselves with its quality or germination potential. Conversely, a seed is a living grain with the capability to give rise to a living plant, and it is reserved for the specific purpose of crop cultivation. Consequently, considerable attention is placed on factors such as its physical purity, germination capacity, seed moisture content, and genetic integrity. It is underscored that "every seed is a grain, but not every grain is a seed."

Telangana state is involved in production and supply of good quality seed to farmers all over India and also to other countries. Both the public and private sectors involved in seed production through contractual agreements with the farmers in the selected area. Therefore this paper attempted to study the actual constrains in both grain and seed production of paddy faced by farmers.

Review of Literature

Raj *et al.* (2008) [7] undertook a study to find constraints of the farmers in cultivation of hybrid rice in Orissa. The primary data was collected from 208 rice growers to find out the constraints in hybrid rice cultivation. They revealed that unavailability of quality seeds of selected variety, poor advisory services particularly training, demonstration and friendly approach, lack of price support for crop inputs, credit facilities, easy disposal of produce with remunerative price, poor attempt to develop consciousness and decision-making ability of the farmers as well as developing leaders among the people were the major constraints in hybrid rice cultivation.

Patel, Jain and Prasad (2019) [6] studied the production constraints faced by paddy grower farmers in Plain zone of Chhattisgarh and various suggestions given by them to overcome the constraints. The study relied mainly on primary data obtained by questionnaire and interview administered on a total of 240 farmers across three districts that constitute the plain zone of Chhattisgarh state. The major agro ecological, technical, socio-economical and marketing constraints perceived by farmers were high cost of insecticide, high cost of labor during peak periods, less quantity purchased Paddy from MSP. Important suggestions as given by the farmers were effective credit facility, effective implementation of crop insurance scheme as well as minimum support prices, along with arrangement for supply of quality seed, fertilizers, insecticides and pesticides etc.

Materials and Methods

Karimnagar is one of the major seed producing district of Telangana state and also is having wider area under production. Hence the district had been chosen purposively for the present study. From the district, three mandals i.e Vinavanka mandal, Manakondur mandal and Shankarpatnam mandal, were selected randomly among seed growing villages for collecting primary data. From each mandal, one village was selected as a sample i.e Elbaka village (Vinavanka mandal), Utoor village (Mankondur mandal) and Kannapur village (Shankarpatnam mandal). Sampling was done covering all farm size groups. In every chosen village, a total of 60 farmers were selected for sampling. This selection was designed to encompass 20 farmers engaged in the production of Hybrid seeds, another 20 involved in the production of OPV seeds, and an additional 20 farmers focused on grain production. Consequently, the complete sample consisted of 180 farmers distributed among the three villages. The interview schedule was used for data collection. The responses were converted to numerical scores using Garrett's ranking technique.

Henry's Garett Ranking technique: The constraints in seed and grain production were analyzed using Garrett's ranking technique. The ranks given by each respondent were converted into per cent position by using formula:

$$\text{Percent position} = 100 \times \frac{Rij - 0.5}{Nj}$$

Where, R_{ij} = Rank given to ith constraint by the j^{th} individual and

N_j = Number of constraints ranked by the j^{th} individual.

The estimated percent positions were converted into scores using Garrett's table. The mean score values estimated for each factor were arranged in the descending order. The constraint with the highest mean value was considered as the most important one and the others followed in that order.

Results and Discussion

Table 1, 2 and 3 represents the percent position and Garett score for OPV, hybrid varities and grain respectively.

Table 1: Percent position and Garett Score for open pollinated varities rice seed production

Ranks	Calculated value & percent position	Garrett score
1	$100 \times \frac{1-0.5}{15} = 3.33$	85
2	$100 \times \frac{2-0.5}{15} = 10.00$	75
3	$100 \times \frac{3-0.5}{15} = 16.67$	69
4	$100 \times \frac{4-0.5}{15} = 23.33$	64
5	$100 \times \frac{5-0.5}{15} = 30.00$	60
6	$100 \times \frac{6-0.5}{15} = 36.67$	57
7	$100 \times \frac{7-0.5}{15} = 43.33$	53
8	$100 \times \frac{8-0.5}{15} = 50.00$	50
9	$100 \times \frac{9-0.5}{15} = 56.67$	47
10	$100 \times \frac{10-0.5}{15} = 63.33$	44
11	$100 \times \frac{11-0.5}{15} = 70.00$	40
12	$100 \times \frac{12-0.5}{15} = 76.67$	36
13	$100 \times \frac{13-0.5}{15} = 83.33$	31

14	100 x $\frac{14-0.5}{15}$ = 90.00	24
15	100 x $\frac{15-0.5}{15}$ = 96.67	14

Table 2: Percent position and garett score for Hybrid rice seed production

Ranks	Calculated value & percent position	Score
1	100 x $\frac{1-0.5}{16}$ = 3.13	86
2	100 x $\frac{2-0.5}{16}$ = 9.38	76
3	100 x $\frac{3-0.5}{16}$ =15.63	70
4	100 x $\frac{4-0.5}{16}$ = 21.88	65
5	100 x $\frac{5-0.5}{16}$ = 28.13	61
6	100 x $\frac{6-0.5}{16}$ = 34.38	58
7	100 x $\frac{7-0.5}{16}$ = 40.63	55
8	100 x $\frac{8-0.5}{16}$ = 46.88	52
9	100 x $\frac{9-0.5}{16}$ = 53.13	48
10	100 x $\frac{10-0.5}{16}$ = 59.38	45
11	100 x $\frac{11-0.5}{16}$ = 65.63	42
12	100 x $\frac{12-0.5}{16}$ = 71.88	39
13	100 x $\frac{13-0.5}{16}$ =78.13	35
14	100 x $\frac{14-0.5}{16}$ = 84.38	30
15	100 x $\frac{15-0.5}{16}$ = 90.63	24
16	100 x $\frac{16-0.5}{16}$ = 96.88	14

Table 3: Percent position and Garett score for Paddy Grain production

Rank	Calculated value & percent position	Garrett score
1	100 x $\frac{1-0.5}{15}$ =4.17	83
2	100 x $\frac{2-0.5}{15}$ =12.50	73
3	100 x $\frac{3-0.5}{15}$ =20.83	66
4	100 x $\frac{4-0.5}{15}$ =29.17	61
5	100 x $\frac{5-0.5}{15}$ =37.50	56
6	100 x $\frac{6-0.5}{15}$ =45.83	52
7	100 x $\frac{7-0.5}{15}$ = 54.17	48
8	100 x $\frac{8-0.5}{15}$ = 62.50	44
9	100 x $\frac{9-0.5}{15}$ = 70.83	39
10	100 x $\frac{10-0.5}{15}$ = 79.17	34
11	100 x $\frac{11-0.5}{15}$ = 87.50	27
12	100 x $\frac{12-0.5}{15}$ = 95.83	17

From Table 4, it is found that failure of crop due to unfavorable weather conditions was perceived by majority of farmers as the first constraint in the studied area. Similarly, high wages of labour was perceived as the second constraint in the total studied population. High input cost (seeds, fertilizers, pesticides) and delayed payment by companies /marketing agencies were perceived as third and fourth constraint respectively.

The others constraints were dependence of farmers on companies for inputs and technical advices, non availability of storage facilities, Inadequate availability of quality inputs i,e seeds, fertilisers, pesticides, MSP after official and unofficial cut due to quality discrepancy which occupied 5th, 6th, 7th and 8th ranks respectively.

accessibility to extension services, Lack of marketing information, Lack of awareness about fair average quality and whether agreed price paid or not any deductions occupied 9th, 10th, 11th and 12th ranks respectively.

Besides, the constraints like inadequate institutional credit for production, low price of farm produce at the time of harvesting and no legal safeguard in place in case of dis-honoring the contracts by either parties were ranked very low occupying 13th, 14th and 15th ranks respectively.

Table 4: Ranking of constraints in OPV seed production.

Constraints faced by farmers producing OPV	Total score	Mean score	Rank
Failure of crop due to unfavourable weather conditions	5100	85.00	1
Inadequate availability of quality inputs i,e seeds, fertilisers, pesticides.	3197	53.28	7
High input cost (seeds,fertilisers, pesticides)	4146	69.10	3
Delayed payment by companies /marketing agencies	3896	64.93	4
Inadequate institutional credit for production	1927	32.12	13
High wages of labour	4360	72.67	2
Non availability of storage facilities	3272	54.53	6
MSP after official and unofficial cut due to quality discrepancy	2974	49.57	8
Dependence of farmers on companies for inputs and technical advices	3444	57.40	5
No legal safeguard inplace in case of dis honouring the contracts by either parties	1629	27.15	15
Whether agreed price paid or not any deductions	1997	33.28	12
Low price of farm produce at the time of harvesting	1666	27.77	14
Lack of marketing information	2595	43.25	10
Lack of awareness about fair average quality	2434	40.57	11
Accessability to extension services.	2958	49.30	9

From table 5, it is found that failure of crop due to unfavourable weather conditions was perceived by majority of farmer as constraint in the studied area. The case is same as that in case of OPV. Farmers are facing unexpected cyclones and heavy rains during critical stages. because of that both quality and yield are affected severely leading to low market cost and some times rejection by companies. At the same time no compensation mechanism is existed and no insurance. hence total selected farmers have give prior response to unfavourable weather conditions. Similarly, high wages of labour is perceived as the second constraint in the total studied population. As seed production involves separate operations synchronization, supplementary pollination, roguing, GA_3 application, separate Male and Female harvesting requires labour. So high wages of labour given second rank. Dependence of farmers on companies for inputs and technical advices and Non procurement of male seed by the company and not getting MSP price as A grade were perceived as third and fourth constraint respectively.

High input cost (seeds, fertilisers, pesticides), Inadequate availability of quality inputs i,e seeds, fertilisers, pesticides; No legal safeguard in place in case of dishonouring the contracts by either parties and lack of market information were other major constraints ranked at 5^{th}, 6^{th}, 7^{th} and 8^{th} position respectively.

Accessibility to extension services, Lack of awareness about fair average quality, Low price of farm produce at the time of harvesting and whether agreed price paid or not any deductions occupied 9^{th}, 10^{th}, 11^{th} and 12^{th} ranks respectively.

The low rankings of constraints such as MSP after official and unofficial cuts due to quality discrepancies, insufficient institutional credit for production, delayed payments by companies/marketing agencies and non- availability of storage facilities indicate that these issues are not particularly severe occupying13^{th}, 14^{th}, 15^{th} and 16^{th} ranks respectively.

Table 5: Garett Ranking of constraints for farmers producing hybvrid seed

Constraints faced by hybrid seed producers	Total score	Mean score	Ranks
Failure of crop due to unfavorable weather conditions	5160	86.00	1
Inadequate availability of quality inputs i,e seeds, fertilisers, pesticides.	3534	58.90	6
High input cost (Seeds, fertilizers, pesticides)	3606	60.10	5
Delayed payment by companies /marketing agencies	1416	23.60	15
Inadequate institutional credit for production	1560	26.00	14
High wages of labour	4445	74.08	2
Non availability of storage facilities	1044	17.40	16
MSP after official and unofficial cut due to quality discrepancy	2184	36.40	13
Dependence of farmers on companies for inputs and technical advices	4188	69.80	3
No legal safeguard inplace in case of dis honoring the contracts by either parties	3255	54.25	7
Whether agreed price paid or not any deductions	2292	38.20	12
Low price of farm produce at the time of harvesting	2559	42.65	11
Lack of marketing information	3098	51.63	8
Lack of awareness about fair average quality	2661	44.35	10
Accessibility to extension services.	2962	49.37	9
Non procurement of male seed by the company and not getting MSP price as A grade.	4027	67.12	4

From Table 6, adverse weather conditions emerge as the most pivotal factor, ranked at number one. This highlights the susceptibility of crop yields to unpredictable weather patterns, underscoring the critical importance of climate-resilient agricultural practices. Following closely in importance is the high cost of labor, ranked at number two. This suggests that labor expenses significantly impact the economic viability of farming operations, requiring strategies to manage these costs effectively. The third-ranked factor is the high input costs related to seeds, fertilizers, and pesticides, emphasizing the need for farmers to carefully control these expenditures.

The other constraints were Low price of farm produce at the time of harvesting; MSP after official and unofficial cut due to quality discrepancy; Delayed payment by companies /marketing agencies; Non availability of storage facilities; Lack of marketing information and Inadequate availability of quality inputs i,e seeds, fertilisers, pesticides occupying 4^{th}, 5^{th}, 6^{th}, 7^{th}, 8^{th} and 9^{th} ranks respectively.

Among the given constraints, inadequate availability of quality inputs like seeds, fertilizers, and pesticides ranks tenth, highlighting the necessity of access to high-quality agricultural inputs for successful farming. Further down the list, we find factors related to awareness about fair average quality (eleventh) and inadequate institutional credit for production (twelfth).

Table 6: Garett ranking of constraints faced by farmers producing paddy grain

Constraints faced by grain producers	Total score	Mean score	Rank
Failure of crop due to unfavorable weather conditions	4980	83.00	1
Inadequate availability of quality inputs i,e seeds, fertilisers, pesticides.	1935	32.25	10
High input cost (seeds, fertilizers, pesticides)	4058	67.63	3
Delayed payment by companies /marketing agencies	3180	53.00	6
Inadequate institutional credit for production	1232	20.53	12
High wages of labour	4282	71.37	2
Non availability of storage facilities	3014	50.23	7
MSP after official and unofficial cut due to quality discrepancy	3205	53.42	5
Low price of farm produce at the time of harvesting	3482	58.03	4
Lack of marketing information	2567	42.78	8
Lack of awareness about fair average quality	1637	27.28	11
Accessability to extension services.	2431	40.52	9

Conclusion

In conclusion, these tables offer valuable insights into the diverse challenges faced by farmers in different aspects of grain and seed production. Adverse weather conditions, labor costs, and input expenses consistently rank high across the board, underscoring the need for climate-resilient practices and cost-effective farming strategies. Seed production, like agriculture as a whole, has become less remunerative due to impact of climate and increase in cost of cultivation. Recognizing these constraints is essential for policymakers and stakeholders to develop targeted interventions and support mechanisms to booster India's agricultural sector.

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