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Constraints faced by the paddy growers in adaptation to climate variability and suggestions to overcome them

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Abstract

The study was carried out in the three tehsil of Kolhapur district. With the use of an interview schedule that was specifically created, 150 paddy growers were personally interviewed in order to gather data. Ten independent variables, including personal, socioeconomic, and psychological traits of the paddy growers, were selected, and when necessary, specially designed schedules and tools were used to measure them. The results revealed that, the highest constraint faced by paddy growers is the higher cost of agricultural inputs, followed by the problem of low prices for produce in the market, difficulty in carrying out agronomic practices due to cloudy weather, higher labour wage rates, and the non-availability of labour in the village at the right time for agricultural work. Other constraints include lack of finance/credit facilities, non-availability of timely credit/loans from banks, lack of information about long-term climate change or weather forecasting, non-availability of timely inputs like seeds, fertilizers, pesticides, etc. in the village, lack of knowledge about appropriate adaptation strategies in paddy fields in response to climate variability, and the long distance to the regulated market from the village, which are ranked second, third, fourth, fifth, sixth, seventh, eighth, ninth, tenth, and eleventh, respectively.

Keywords: Paddy growers, climate variability, adaptation strategies.

Introduction

Rice (*Oryza sativa*), an important food grain crop in the world and staple food crop for more than two billion peoples in Asia. This crop is grown on an area of about 148 million hectares in the world with annual production of 591 million tonnes; Asian countries occupy an important position in rice production. Nearly 91 per cent of the total rice produced in Asian countries. China and India are the major rice producing country in the world together contributing 55 percent of rice production. (Source- International Rice Research Institute, Philippines).

In India, West Bengal ranks first in terms of area under paddy with 6.17 million hectares followed by Andhra Pradesh 5.90 million hectares. In terms of production of paddy West Bengal ranks first with production of 13095 million tonnes as regard to the productivity Andhra Pradesh rank first with 2.6 tones. Maharashtra ranks sixth whose productivity is 1.56 tones and which contributes 3 percent of share in total production of paddy in India, though the area under this crop is 15.38 lakh hectares, which produces 23.97 lakh tones.

Kolhapur is a major district in terms of both the area and production of paddy. It covers 94,729.87 hectares for paddy cultivation and produces 291,719.875 tonnes of paddy. The average productivity in Kolhapur is 3.08 tonnes per hectare. Kolhapur leads the region, with Gondia and Bhandara following behind. In contrast, Solapur district has a significantly lower area and production paddy. (Source: Department of Agriculture and Farmers Welfare, Govt. of India 2023).

Agriculture significantly impacts the environment as it supplies food and fiber to humanity, while climate plays a crucial role in determining agricultural productivity. Reduced rainfall and rising temperatures have severely affected agricultural output and food security (Parry *et al.*, 2007) [8]. India is one of the most impacted countries by climate change and natural hazards, largely due to its limited arable land, large population, heavy reliance on agriculture, dependence on monsoon rains, and insufficient technological and financial resources for adapting to climate change (BIRTHAL *et al.*, 2014) [3].

Specifically, crop productivity is expected to face considerable declines in the future due to climate variability and extreme weather events, such as droughts and floods (Gupta *et al.*, 2014) [5].

Adaptation strategies are defined as adjustments or changes in farming techniques or practices made by farmers to address or take advantage of climate variations. These adjustments can include alterations in crop production methods, soil and water management, flood control, land use, labour management, livestock care, financial planning, and family management to mitigate losses or capitalize on climate changes. To identify the most effective adaptation measures, it's crucial to consider both climatic and non-climatic factors that impact agriculture. Literature reviews often suggest adaptation strategies such as altering cultivation practices, shifting planting dates, employing water-saving methods, and optimizing nutrient management. However, it is important to recognize that many farmers are not familiar with climate-resilient production technologies. Despite this, farmers are adapting their practices in response to climate change to ensure sustainable production. Implementing these modifications can help reduce vulnerability, enhancing their socio-economic status and overall well-being.

Methodology

The study was carried out in the Kolhapur district of Maharashtra. This district was specifically chosen for the research due to its significant role in paddy cultivation in state. Consequently, the tahsils of Karveer, Hatkanagle, and Kagal in Kolhapur were intentionally selected as the focus areas for the study. Ex-post facto research design was followed for the investigation. The Kolhapur district comprises twelve tahsils:

Karveer, Shahuwadi, Panhala, Hatkanagle, Shirol, Radhanagari, Kagal, Bhudargad, Chandgad, Ajra, Gaganbawda, and Gadhinglaj. For the study, Karveer, Hatkanagle, and Kagal tahsils were purposively chosen due to their larger areas of paddy cultivation. Based on the number of paddy growers, 5 villages were chosen from each tahsil, resulting in a total of 15 villages selected for the study. 10 paddy growers from each village were chosen using a random sampling method. This resulted in a total sample of 150 paddy growers from the 15 villages for the study.

Results and Discussion

Constraints Faced by Paddy Growers for Adaptation Strategies towards Climate Variability

From Table No.1 It is observed that, Higher cost of the agricultural inputs (100.00%) followed by problem of Low price for the produce in the market. (96.00%), Due to cloudy weather, difficult to take up agronomic practices. (91.33%), Higher labour wage rate. (85.33%), Timely non availability of labours in the village for agriculture (56.42%), Lack of finance/ credit facility (52.00%), Timely non availability of credit/ loan from the banks(50.00%), Lack of information about long term climate change or whether forecasting (44.66%), Non availability of timely inputs Seeds, fertilizers, Pesticides etc. in villages (40.66%), Lack of knowledge regarding appropriate adaptation strategies in paddy fields in response to climate variability (40.00%), Long distance of the regulated market from the village(40.00%)ranked second, third, fourth, fifth, sixth, seventh, eighth, ninth, tenth and eleventh respectively. These results are in line with the results of B. Kumari (2014) [4].

Table 1: Constraints faced by paddy growers

Sr. No.	Constraints faced by paddy growers	Frequency	Percentage	Rank
1.	Higher cost of the agricultural inputs.	150	100.00	I
2.	Low price for the produce in the market.	144	96.00	II
3.	Due to cloudy weather, difficult to take up agronomic practices.	137	91.33	III
4.	Higher labour wage rate.	128	85.33	IV
5.	Timely non availability of labours in the village for agriculture.	79	56.42	V
6.	Lack of finance/ credit facility	78	52.00	VI
7.	Timely non availability of credit/ loan from the banks.	75	50.00	VII
8.	Lack of information about long term climate change or weather forecasting.	67	44.66	VIII
9.	Non availability of timely inputs (Seeds, fertilizers, Pesticides etc.) in villages.	61	40.66	IX
10.	Lack of knowledge regarding appropriate adaptation strategies in paddy fields in response to climate variability.	60	40.00	X
11.	Long distance of the regulated market from the village.	60	40.00	XI

Suggestions to overcome constraints faced by paddy growers in adaptation strategies for climate variability

From the Table No. 2 it could be seen that, majority of the paddy growers (100.00%) suggested for State Department of Agriculture should create awareness among the farmers about appropriate adaptation measures against climate variability followed The minimum support price for paddy crop produce should be determined based on the cost of cultivation, with specific criteria to ensure fair compensation (94.00%), Early warning has to be given to the paddy growers about

environmental changes through SMS (92.00%), State Department of Agriculture should take up some measures in providing production inputs at appropriate rate. (90.00%), State Department of Agriculture should give Incentives/support for increasing the usage of green manuring (78.00%), Crop insurance has to be extended to all crops (74.66%) Government should introduce mechanization subsidies or training programs to encourage adoption of farm machinery. (70.00%) and Agricultural Agencies should create awareness/support for increasing organic farming (68.00%).

Total 2: Suggestions given by the Paddy Growers to Overcome the Constraints.

Sr. No.	Suggestion	Frequency	Percentage	Rank
1.	State Department of Agriculture should create awareness among the farmers about appropriate adaptation measures against climate variability	150	100.00	I
2.	The minimum support price for paddy crop produce should be determined based on the cost of cultivation, with specific criteria to ensure fair compensation	141	94.00	II
3.	Early warning has to be given to the paddy growers about environmental changes through SMS	138	92.00	III
4.	State Department of Agriculture should take up some measures in providing production inputs at appropriate rate.	135	90.00	IV
5.	State Department of Agriculture should give Incentives/support for increasing the usage of green manuring	117	78.00	V
6.	Crop insurance has to be extended to all crops	112	74.66	VI
7.	Government should introduce mechanization subsidies or training programs to encourage adoption of farm machinery.	105	70.00	VII
8.	Agricultural Agencies should create awareness/support for increasing organic farming	102	68.00	VIII

Conclusion

The study concluded that constraints was higher cost of the agricultural inputs. Ranked first (100.00%) followed by Low price for the produce in the market (96.00%), Due to cloudy weather, difficult to take up agronomic practices. (91.33%), higher labour wage rate (85.33%). Majority of the respondents (100.00%) suggested for State Department of Agriculture should create awareness among the farmers about appropriate adaptation measures against climate variability followed by The minimum support price for paddy crop produce should be determined based on the cost of cultivation, with specific criteria to ensure fair compensation (94.00%), Early warning has to be given to the paddy growers about environmental changes through SMS (92.00%) and State Department of Agriculture should take up some measures in providing production inputs at appropriate rate (90.00%).

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