



Research Article

ASSESSMENT OF ECONOMIC PROFITABILITY OF WEATHER BASED AGRO ADVISORY SERVICES ON RICE

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Abstract: A study was conducted to assess the economic impact of weather forecast based agro advisories on transplanted and direct seeded rice during kharif season of 2017. Total 30 numbers of beneficiary farmers i.e. users of agro-advisory services (AAS) as well as 30 numbers of non-beneficiary farmers i.e. non-users of agro-advisory services (non AAS) were selected from three blocks of Malkangiri district of Odisha. Study revealed that cost of cultivation was found lower in the case of AAS farmers who have successfully adopted weather based agro-advisory for transplanted as well as direct seeded rice as compared to non AAS farmers. AAS farmers obtained 6.7% and 3.7% more production for transplanted and direct seeded rice respectively over non AAS farmers. Further, AAS farmers produced more yield with less expenditure. Percent gain in net return to the tune of 19.74% and 20.18% for transplanted and direct seeded rice, respectively by AAS farmers over non AAS farmers. Thus, the application of weather based agro advisories are useful tool for enhancing the productivity and income of rice farmers in study region.

Keywords: Agro Advisory, Economics, Impact, Rice, Weather

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Introduction

Weather conditions during crop growing period plays a significant role for increasing agricultural produce. Variable and uncertain weather is a common fact for increasing crop loss in every year. Out of a total 142.1 mha of cultivated area in India, dry land accounts for 91.0 million hectares and in the foreseeable future also nearly 60% of Indian population will still continue to depend on dryland agriculture. Dryland agriculture is subject to high variability in relation to area under sown, yield of crops in relation to production, productivity and output. These variations are the results of aberrations in weather conditions, especially for rainfall. Such monsoonal delays have repercussions on the programme of agricultural activities for the entire cropping year. Even after the onset of monsoon and the commencement of planting, there may be monsoonal withdrawal causing moisture stress on plants and creating difficulties in the adoption of recommended practices and also affects the cultural practices timely, ultimately causing significant loss in yields and outputs. In all, aberrant weather accounts for approximately three fourth of the annual loss in farm production both directly and indirectly. Timely weather information allows farmers to plan their farm operations in such way that minimizes the costs and crop losses as well as helps in maximizing the yield gains. Some of the early studies revealed that the farmers who followed weather based agro advisory was getting more yield from different crops [1-3]. In Odisha rice covers about 69% of the cultivated area with covering of 63% of the total area under food grains [4]. It is the staple food of almost the entire population of Odisha; therefore, the state economy is directly linked with improvements in productivity level of rice. So, the present investigation has been conducted with the objective to assess the potential benefits of Agro-Advisory services on rice crop.

Materials and Methods

The study area was located in the Malkangiri district of South Eastern Ghat Zone of Odisha. It lays between 17°45'N to 18°40'N latitudes and 80°10'E to 82°E longitude. The climate in the district is warm and sub-humid with maximum temperature ranging from 25°C to 46°C and minimum temperature ranging from 12°C to 30°C. The average annual rainfall is about 1667.6 mm with 79.4 average rainy days. Weather forecast data is received from MC Bhubaneswar on each Tuesday and Friday on amount of rainfall, cloud cover, maximum and minimum temperature, relative humidity, wind speed and wind direction. The data are clarified by a team of expert and agro-advisory bulletin is prepared with the help of expert members based on the information on weather forecast, crop condition obtained from the farmers' field (such as crop growth stage, incidence of pest attack and diseases and water stress) and weather condition of previous days. The present study was conducted by Agromet Advisory Service (Gramin Krishi Mausam Sewa) unit Malkangiri located in the KVK, Malkangiri during kharif season of 2017 in transplanted and direct seeded rice. To know the impact of weather based agro advisories, total 30 numbers of beneficiary farmers i.e. users of agro-advisory services (AAS) were selected purposively from three blocks namely Malkangiri, Korkunda and Kalimela of Malkangiri district. The same number of non-beneficiary farmers i.e. non-users of agro-advisory services (non AAS) were also selected from the respective blocks thus making total sample size of 60. Regular observations were made on the situation of farmer's field. Further, economic impact was assessed based on the input incurred during all cultural operation from land preparation to threshing. While calculating gross return prevalent market price (Rs.1550/- per quintal) for sale of rice was considered. Net return was calculated by deducting cost of cultivation from gross income and benefit cost ratio was calculated by dividing total cost of cultivation to gross return.

A structured interview schedule was prepared for collecting the relevant data. The data were tabulated and analysed with help of appropriate statistical tools.

Results and Discussion

During monsoon period predicted rainfall for the district was 512, 620, 573 and 529 mm for June, July, August and September months of 2011, respectively [Fig-1]. Against these predicted amount, different blocks under study received about 35.92-126.31% rainfall. This indicates that there was deviation between predicted and observed value. So, there is some scope for improvement in rainfall forecast in terms of quantity. Lowest accuracy for rainfall prediction in monsoon season was also reported in others area [5]. Among the different blocks, Malkangiri found closer to predicted amount followed by Korkunda and Kalimela [Fig-1].

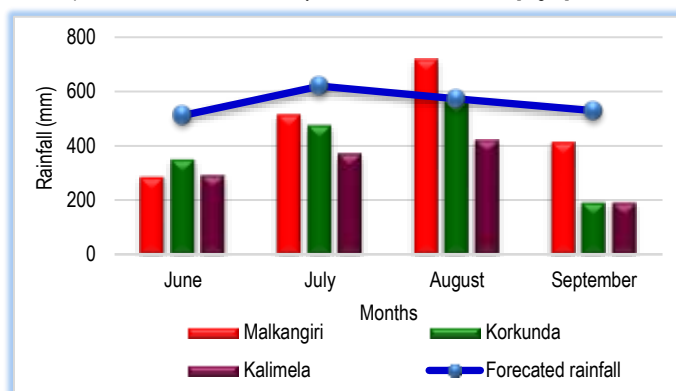


Fig-1 Comparison between districts predicted rainfall with observed rainfall of selected blocks (Malkangiri, Korkunda and Kalimela) during monsoon season of 2011.

The total cost of cultivation was found lower in the case of AAS farmers who have successfully adopted weather based agro-advisory for transplanted as well as direct seeded rice [Table-1]. Differences in cost of cultivation might be due to differences in expenditure for fertilizer and micronutrient, pesticides as well as wages for human labour. In case of transplanted rice, there was 52.93% higher expenditure incurred by AAS farmers due to use of micronutrients whereas in direct seeded condition more use of DAP resulted in higher cost involved in the category of fertilizers and micronutrients by non AAS farmers [Table-1]. In both cases higher cost involved for pesticides mainly because of use of herbicides by AAS farmers. Use of man power for weeding was the reason for too much more cost require for human labour for non AAS farmers as compare to AAS farmers. Total cost of cultivation in transplanted and direct seeded rice observed higher by non AAS farmers was also reported in others study but in some cases cost of cultivation found more by AAS farmers [6-10].

Table-1 Expenditure incurred under different field operations of rice in respect to AAS and non AAS farmers

Particulars	Transplanted		Direct seeded	
	AAS farmers	Non AAS farmers	AAS farmers	Non AAS farmers
Seed	990	990	1540	1540
FYM	3000	3000	3000	3000
Fertilizers & Micronutrients	6882	4500	2602	2900
Pesticides (including weedicide)	2990	1700	2600	1500
Human labour	21110	25320	17935	19623
Animal and machine labour	9750	9750	8000	8000
Total Cost of cultivation	44722	45260	35677	36563

There was considerable increase in yield by AAS farmers as compared to non AAS farmers. 50.35 and 33.47 q/ha rice yield were recorded by AAS farmers as against 47.15 and 32.28 q/ha by non AAS farmers for transplanted and direct seeded rice, respectively [Table-2]. This may be due to following of advisories issued by the AAS units contain advises on different aspects from initial field operation to maturity. The economic impact studies indicated that there was considerable benefit to farmers who adopted the advisories disseminated by AAS unit, Malkangiri. Gross return, net return and benefit cost ratio were Rs. 78043/ha, Rs. 33321/ha and 1.75 in case of AAS farmers for transplanted rice [Table-2].

Further, Gross return, net return and benefit cost ratio of Rs. 51873/ha, Rs. 16196/ha and 1.45 recorded by AAS farmers for direct seeded rice. Percent gain in net return recorded by 19.74 and 20.18% for transplanted and direct seeded rice by AAS farmers over non AAS farmers [Fig-2]. AAS farmers produced more yield with less expenditure is the reason for higher benefit obtained from this category of farmers. Increment in net return of AAS farmers in rice was also reported on previous study [8-10].

Table-2 Economic impact of agro advisory on rice in respect to AAS and non AAS farmers

Particulars	Transplanted		Direct seeded	
	AAS farmers	Non AAS farmers	AAS farmers	Non AAS farmers
Cost of cultivation (Rs./ha)	44722	45260	35677	36563
Yield (q/ha)				
Mean	50.35	47.15	33.47	32.28
SD	3.93	2.90	1.70	2.07
Gross return (Rs./ha)				
Mean	78042.50	73087.67	51873.33	50039.17
SD	6096.07	4493.75	2635.50	3215.97
Net return (Rs./ha)				
Mean	33320.50	27827.67	16196.33	13476.17
SD	6096.07	4493.75	2635.50	3215.97
Benefit cost ratio				
Mean	1.75	1.58	1.45	1.35
SD	0.14	0.10	0.07	0.09

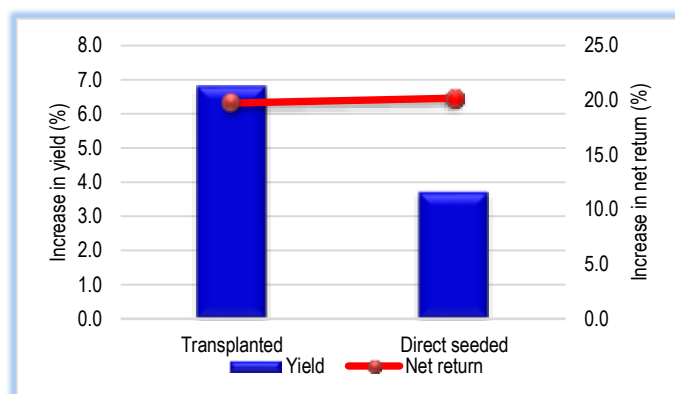


Fig-2 Percent increase in yield and net return by AAS farmers as compared to non AAS farmers (transplanted and direct seeded rice)

Conclusion

There was a variation in differences by different blocks for district level predicted rainfall with observed rainfall in monsoon season. So, need to be initiate block level forecasting for higher accuracy. In view of economic profitability those farmers followed weather based agro-advisories benefited more from the rice cultivation.

Application of research: The research paper will be helpful for the organisation and research institutes those are providing agro advisory to the farmers. The information and agro advisories should be timely, need based and it should be location specific one.

Research Category: ICT based extension, *Ex Post facto* study

Abbreviations:

AAS: Agro Advisory Services, GKMS: Gramin Krishi Mausam Sewa

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Author Contributions: All authors equally contributed

Author statement: All authors read, reviewed, agreed and approved the final manuscript. Note-All authors agreed that- Written informed consent was obtained from all participants prior to publish / enrolment

Study area / Sample Collection: Regional Research Technology Transfer Station, Malkangiri, Odisha. Blocks selected Malkangiri, Korkunda and Kalimela, Sample size-60(30 AAS farmers and 30 Non AAS farmers)

Cultivar / Variety name: *Oryza sativa* - Paddy Var MTU -1010

Conflict of Interest: None declared

Ethical approval: This article does not contain any studies with human participants or animals performed by any of the authors.

Ethical Committee Approval Number: Nil

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