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Economic impact of periodic meteorological advisories in Kushinagar district

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Abstract

This investigation was carried out during Kharif 2021 in order to assess the use of disseminated advisory bulletins and their economic feasibility in rice crops. During Kharif 2021, a survey was carried out in four blocks of the Kushinagar district, which falls under the North Eastern plains zone of Uttar Pradesh, to examine the effectiveness of agro advisories issued from KVK, Kushinagar as per weather periodicals available Indian Meteorological Department, Delhi. The impact was assessed on feedback in terms of the use of the agro-meteorological Advisory Services. The crop was monitored (AAS farmers) throughout the season as compared to neighboring plots wherein the situation of these farmers was compared with nearby fields (non-AAS farmers). Expenditures incurred under inputs, labor, etc. were regularly pinned down to get a general idea of the cultivation practices followed/adopted. Farmers who followed the agreement advisories fetched nearly 11.89 percent higher yields besides an 18.42 percent reduction in input cost as compared to non-AAS farmers. These results were found similar to the study conducted by Singh. S.P. 2020. According to the assessment study, farmers who used real-time agro-advice services received a 22% greater net return on their wheat harvest. The net economic gain can be attributed to the crop management practices employed such as timely field preparation and sowing, fertilizer application, need-based weeding, harvesting, irrigation, and judicious pesticide treatments.

Keywords: Weather forecasting, impact, AAS bulletin

Introduction

Effective plans need to be laid out in addition to good management to ensure agricultural productivity which is critically dependent upon weather. Hence periodic forecasts in all temporal ranges are desirable for agricultural practices. A reliable, on-time weather forecast has the potential to lower vulnerability to weather vagaries (Hansen, 2002) [2]. Plant growth and yield are subject to the influence of several weather parameters at every stage. Among all weather parameters, temperature and rainfall have the most significant effects on plants. Rainfall patterns (delayed, excessive, stagnant, prolonged, or other such untimely vagaries) affect crop growth and ultimately influence the yield quality and quantity. Additionally, vagaries like natural floods, extreme short-lived temperature fluctuations, drought, and cyclones, as well as significant weather variables like residual humidity and others have an impact on farmers' decisions regarding crop management, crop selection, and the proper use of inputs.

Key farm management operation decisions if taken under the influence of forecasts as provided under advisories are capable of significantly boosting the morale and providing the ultimate benefit to the farmers as reported by fellow coworkers (Everingham *et al*, 2002; Gadgil *et al*, 2002 and Ingram *et al*, 2002) [7, 1, 8]. The objective of the agro-met advisory service is to utilize the meteorological data in real time for various agricultural operations. Agro advisory services' main goal is to inform farmers about weather predictions and provide them with guidance on how to manage their farms on a daily basis to ensure the sustainability of their farming operation. Hence the initiative to evaluate the usefulness and impact of AAS among farmers was undertaken through this study.

Farmers can efficiently manage their crop with the ulterior goal to achieve higher production that too of good quality by following these weather periodicals. The benefit is countered have been discussed further in this paper.

Materials and Methods

Kushinagar is situated at 83° 47'13" E Longitude to 26° 30'16" N 81° latitude at 75 m altitude which comes under the Middle Gangetic Plain Regions of Uttar Pradesh. Southwest Monsoon (June-Sep) is predominant in the district. Kushinagar district receives 1145.1 mm annual rainfall. The temperature in the district ranges between 4°C and 44.4 °C. It is comprised of 14 Blocks and 4 Tehsils. Paddy, wheat, and Sugarcane are the three most predominant crops in the district.

A field survey was designed and implemented considering the landholdings (big, marginal, and small) of the farmers from villages selected under the "DAMU" project during the Kharif season, in 2021. The present study was conducted under the DAMU (District Agro-met Unit) project at District Kushinagar. The sole objective of DAMU is to periodically disseminate need-based ICM advisories to the farmers. The survey was conducted during the Kharif season in the year 2021 at 4 blocks of Kushinagar district which comes under the North Eastern plains zone of Uttar Pradesh to document the role of agro advisories follow-up as issued from KVK Kushinagar based on the weather forecast given by IMD. Eighty farmers i.e. 40 responding (AAS Farmers) and 40 non-responding (non-AAS farmers) farmers were selected for rice crop. The data was collated through personal interviews. It included Expenditure incurred under input costs labor, irrigation, etc., regular crop monitoring, and providing real-time solutions to farmers regarding any vagaries affecting the crops. The AAS generally forewarns

the farmers of any likely incidence of weather aberrations in the coming five days to empower them to take up judicious crop management practices.

Result and Discussion

Temperature and rainfall patterns are the two key climatic factors that influence rice crop production. Fig. 1 reveals that out of 40 AAS farmers, 24 farmers (60%) rated the AAS as 'very good' on the four-level scale of very poor - very good. Rana *et al.*, 2005 [5] from a previous study conducted in the mid-hill region of Himachal Pradesh reported that 38% of farmers rated AAS as "excellent" while 29 % of farmers rated it "good". Only 8% of farmers rated the AAS "very poor" which needs accurate analysis in the near future. Around 55 % of farmers found the Accuracy of AAS Bulletins very good followed by 27.5% of farmers rated it "good".

Table no. 1 shows the perception of AAS farmers about agro-meteorological advisories. It is clearly seen from the table.1 that 97.5 % of farmers opted for rainfall as the most essential weather parameter, followed by temperature. Around 72 % of participants believed that advisories were helpful in reducing input costs. More than 85 % of farmers believed that the AAS was helpful in lowering irrigation costs because it allowed farmers to plan their activities on the farm in a timely manner (Table 1). Moreover, 47.5 % of the respondents also said that advisory bulletins delivered through WhatsApp helped in avoiding post-harvest losses.

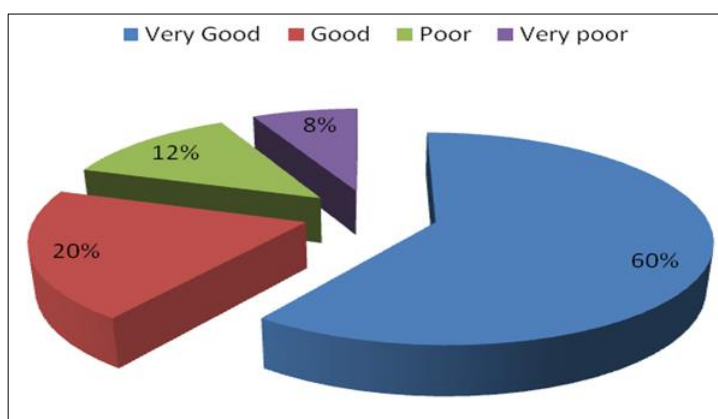


Fig 1: Perception of AAS farmers about agro-meteorological advisories

Table 1: AAS farmer’s perception of agro-meteorological advisories

Farmer perception	Frequency	Percentage (%)
Perception about Agro Advisory Services		
Very Good	24	60
Good	8	20
Poor	5	12.5
Very poor	3	7.5
Accuracy of AAS Bulletins		
Very Good	22	55
Good	11	27.5
Poor	7	17.5
Which weather parameter is most essential?		
Rainfall	39	97.5
Temperature	33	82.5
Relative humidity	31	77.5
Benefits of AAS		
Reducing in input costs	29	72.5
Saving number of irrigations	34	85
Avoid post-harvest losses	19	47.5

Table no 2. Represents the sensitivity of rice growth stages to weather. High temperature and rainfall during the grain-filling stage of the crop are of extreme significance as the grains shrink which ultimately lowers yield quality and

productivity. High temperature and high humidity during the booting stage were primarily identified to be the causes of lesser elongation of the grains by the farmers.

Table 2: Crop growth stages and a corresponding sensitivity to weather

Crop stage	Meteorological Week	Weather Parameter of Significance	Effect of Weather parameter
Seedling	23-26	Rain	Reduced growth vigor and mortality due to insufficient rain
Transplanting	27-29	Temperature	The detrimental effects of high temperatures were observed
Tillering	30-31	Temperature	Prevalent low night temperature drastically reduced tillering
Panicle initiation	32-33	Wind speed	Panicles were observed to be desiccated under the influence of high wind speeds
Booting	33-35	Temperature	High temperature is the cause of reduced elongation of grain and also renders susceptibility to rainfall
Heading	36-39	Temperature	Highly sensitive to temperature above the normal range
Flowering	40-41	Temperature	High temperature induces anthesis sterility and delayed flowering (Long days)
Grain filling stage	41-43	Rainfall	Sensitive to high rainfall
Maturity	43-44	Strong wind	Strong winds cause lodging

Results as evident from Table 3 show that farmers who followed the advisories fetched nearly 11.89 percent higher yields as non-AAS Farmers. Fig.2 depicts the graphical representation of the input costs comparison of both AAS farmers as well as those not following AAS for paddy. AAS farmers saved 18.42 percent input cost in rice seed cost as compared to non-AAS farmers. The AAS farmers had a 22.4 % lower cost of cultivation compared to non-AAS

farmers. These results were found similar to the study conducted by Singh. S.P. 2020^[6]. The study finally indicates a 22 % higher net return by following real-time advisories duly disseminated. This profit was due to the integration of crop management practices implemented in a judicious manner. Readiness to embrace and follow up on weather-based advisories reduced input costs in an indirect way for the beneficiary farmers.

Table 3: Estimated economic impact of periodic advisories (esp. Rice crop) during Kharif 2021

Particulars	Benefited Farmers (AAS)	Non AAS Farmers
Cost (INR per hectare)		
Seed procurement	3100	3800
FYM	2700	3000
Fertilizers and micronutrients	3070	3845
Human labor	5800	6500
Pesticide	800	1200
Weedicide	650	1400
Irrigation		1000
Miscellaneous	6000	8500
Harvesting	3800	4200
Total costs incurred for various inputs	25920	33445
Production (Quintals per hectare)	41.2	36.3

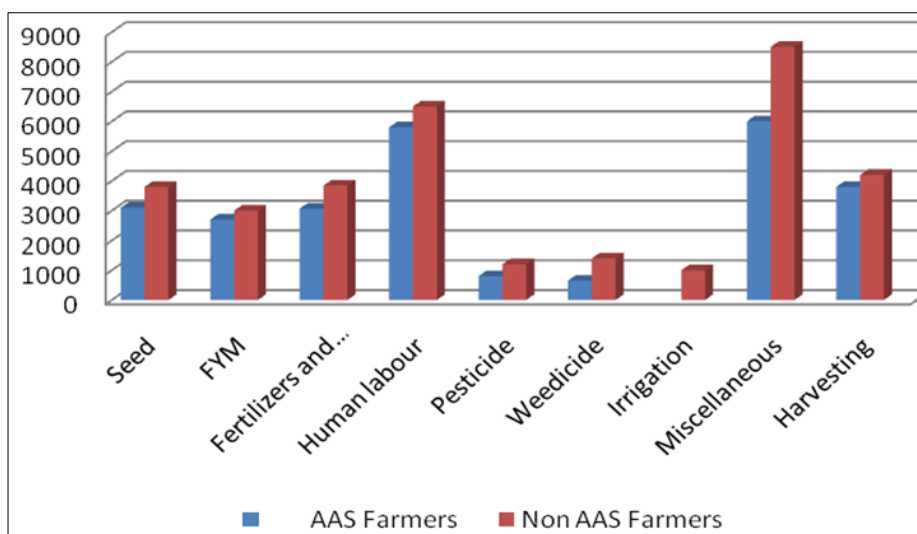


Fig 2: Comparison of input cost of beneficiary and non-beneficiary farmers for Paddy

Conclusion

The availability and application of periodic (5-day) advisory bulletin forecasts can evidently be a useful tool to enhance the production of crops and get more remunerative returns. Agro-advisories as made are inclusive of the latest available resources from different sources striving to optimize the use of inputs thus reducing the crop management costs for the AAS farmers. These bulletins have facilitated the adoption of scientific technology packages and practices besides awareness of crop management in a judicious manner. These also empowered the farmers and different associated stakeholders to venture safely into a new era of hitherto unknown commercial marketing of the product by adopting post-harvest technologies. The increased yield level and reduced cost of cultivation led to increased net returns. As from above it can be concluded that the weather and related advisories issued periodically by the KVK brought considerable benefit to farmers who acted upon the suggestions. But it is just the beginning and the accuracy of the forecast needs to be further refined and available for a longer duration (10-15 days) so as to let the farmer plan well in advance. Besides the reach of advisories should also be ensured to the masses keeping in view the resources at the farmer's disposal.

Reference

1. Gadgil S, Seshagiri Rao PR, Narahari K. Use of climate information for farm-level decision-making: rainfed groundnut in southern India. *Agricultural Systems*. 2002;74(3):431-457.
2. Hansen JW. Realizing the potential benefits of climate prediction to agriculture: Issues, approaches and challenges. *Agricultural Systems*. 2002;74:329-330.
3. KK Gill, PK Kingra, Ritu. Economic impact analysis of agro-advisory services during Kharif season in the central plain agro-climatic region of Punjab. *Journal of Agro meteorology*. 2010;12(1):141-143.
4. Ray M, Patro H, Biswasi S, Dash SR, Dash AC. Economic Assessment of Weather-Based Agro met Advisories in Keonjhar District, Odisha. *Vayu Mandal*; c2017, 43(1).
5. Rana RS, Prasad R, Kumar S. Reliability of the medium-range weather forecast in the mid-hill region of Himachal Pradesh. *Journal of Agro meteorology*. 2005;7(2):297-303.
6. Singh SP, Mishra SR, Kumar V, Saran B, Jaiswal P. Economic impact and usefulness of agro met advisory services for wheat crop of Siddhartha Nagar district of Uttar Pradesh. *The Pharma Innovation Journal*. 2020;SP-9(12):71-74.
7. Everingham YL, Muchow RC, Stone RC, Inman-Bamber NG, Singels A, Bezuidenhout CN. Enhanced risk management and decision-making capability across the sugarcane industry value chain based on seasonal climate forecasts. *Agricultural Systems*. 2002 Dec 1;74(3):459-77.
8. Roncoli C, Ingram K, Kirshen P. Reading the rains: Local knowledge and rainfall forecasting in Burkina Faso. *Society & Natural Resources*. 2002 May 1;15(5):409-27.