Original Research Article

Impact of Agro-meteorological advisory services in Wheat crop of Kushinagar district in Uttar Pradesh

Abstract

A study was conducted in April 2020 to assess the impact and usefulness of agrometeorological Advisory Services in increasing the production of wheat crops under DAMU KVK, Kushinagar. The two villages were selected for this study, and two groups of farmers were selected, namely, a group adopting the agrometeorological Advisories (50 farmers), regularly in their operations (AAS Farmers), and another group of farmers not aware of the agrometeorological Advisories (Non AAS Farmers) during the *rabi*season. The data were recorded from both the farmer groups, particularly on crop expenditure incurred by the farmers from land preparation to harvest at every stage, and crop growth and yields were observed regularly. The impact assessment was based on feedback that indicated a significant impact in terms of the use of the agrometeorological Advisory Service by farmers. The assessment study indicated that the farmers who adopted agrometeorological advisory services on a real time basis obtained a 28 % higher net return in wheat crops compared to Non-AAS farmers who benefited from timely agricultural operations, timely rainfall forecasting, recommended doses of fertilisers, efficient irrigation management, and standard plant protection majors in a required base manner during the crop growing period, as advised in biweekly bulletins. AAS farmers benefited from the timely application of fertilizers, timely and accurate weather forecasting, and timely agricultural operations to obtain a better yield in wheat crop as compared to Non-AAS farmers. Agrometeorological Advisory Services (AAS) might be used to be helpful to the farmers in managing changing weather, resulting in decreased input costs in agriculture and profitable agricultural production by adopting of weather based agrometeorological Advisory.

Keywords: Weather forecasting, AAS bulletin, impact, usefulness

INTRODUCTION

Agriculture in India is monsoon dependent and under such circumstances weather is one of the most important factors determining success and failure of agricultural production in India.To minimize the impact of unfavourable weather on agriculture and making decisions on their day-to-day agricultural operations farming community needs to be advised on timely by producing custom-tailored. At present, the yearly normal harvest due tooutrageous weather conditions lessen India's yearly Gross domestic product by 0.25 [1].The absence of timely and accurate agrometeorological information is a substantial barrier to efficient farm planning operations and may result in substantial crop losses[2]. By providing timely and accurate weather forecasts, it would be possible to reduce the loss to some extent. Weather varies with space and time, hence among all medium range forecast can helps much better for management of agricultural operations.Therefore, the improved

weather-based agrometeorological Advisory Services (AAS) greatly help farmers to take advantage of favourable weather and minimise the impact of aberrant weather situations.So, the forecast is more valuable from their point of view [3,4]. The timely weather forecasts offer the potential to reduce vulnerability to vagaries of weather[5].Farmers able to take advantage of the weather situation by utilising AAS in order to use the resource and reduce loss from unusual weather conditions [6].

MATERIALS AND METHODS

Kushinagar district is situated on 81° to 24° East longitude and 26 °to 45° North latitude. The temperature in the district ranges between 5°C and 43.4°C. It is comprised of 4 Tehsils and 14 Blocks. The impact of economic benefits of farmers adopting the agrometeorological Advisory Services, was analysed by conducting a field survey in four villages of two blocks in Kushinagar, about 100 farmers of different categories, such as big, marginal, and small, were identified in these villages under the "DAMU" project during the Rabi season of 2019–20. The four villages were selected for this study, as were two groups of farmers, namely, a group adopting the agrometeorological Advisories regularly in their operation (AAS Farmers) and other groups of farmers not aware of agrometeorological Advisories (Non AAS Farmers). In these four villages, out of 100 farmers identified, AAS information was issued for 50 farmers during the *rabi* season, and care was taken to implement the advisories by this group. The crop situation of these farmers was compared with nearby fields having the same crops, where the forecast is not adopted in Non AAS farmers' fields.The major objective of this programme is to advise on timely and need-based crop management practices. The IMD, Pune, provides weather forecasts every Tuesday and Friday, comprising information on rainfall, maximum and minimum temperatures, wind speed and direction, cloud cover, and maximum and minimum humidity. Based on the opinions from different disciplines, the agrometeorological are being prepared every Tuesday and Friday in Hindi as well as English language and communicated to the farmers on a real time basis through WhatsApp groups, telephone, SMS, etc. It contains weather-based agricultural advice for farmers, which includes weather-related information for the next five days, as well as information on agricultural operations like crop management, proper irrigation use, fertiliser amount, timing, and method, as well as management against diseases and pests.

RESULTS AND DISCUSSION

Rainfall and temperature played a very important role in wheat crop. Changing weather affects the wheat crop. Witnessing the changing climate and raising awareness about AAS among farmers is much needed. One rainfall was forecasted during the third week of October, and seeing the favourable temperature, timely sowing of the wheat crop was advised to farmers. Likewise, more rainfall is forecasted during the third week of January and other stages of crop production, which also helps farmers reduce irrigation costs and increase net returns. The results of farmer's awareness about AAS at DAMU, KVK Kushinagar shown in Figure 1 reveal that more than half of AAS farmers (58%) rated the agrometeorological advisory services as 'very good' on the scale of very poor to very good. In the mid-hill region of Himachal Pradesh, 38 percent of farmers rated agrometeorological advisories as excellent, and 29 percent of farmers rated good [7]. AAS was shown to be

necessary by almost 88% of farmers, who also felt that advisories based on forecasted rainfall events were the most beneficial for their farming activities. Weather advisories based on forecasted temperatures were considered to be the second-most helpful. These findings are in line with studies by Madison (2006) [8]. More than 76% of farmers believed that AAS was helpful and that it reduced the costs associated with agricultural production. Additionally, 90% 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 as per the weather and rainfall advisory issued by the centre well in advance (Table1). Moreover, 62% of farmers also said that AAS was helpful in managing pests and diseases during the cropping season. The majority of farmers (80%) opined that real-time AAS was essential during the sowing time as it helped farmers to prepare properly their farm activities according to need based weather advisories prior to the cropping season, particularly information on timely rainfall, temperature, and humidity. The results of the economic impact analysis indicated that there was a considerable benefit to farmers who adopted and followed weather advisories from time to time issued by DAMU, KVK, Kushinagar. The percent gain in income by the AAS farmers was to the tune of 28 percent over non-AAS farmers (Table 2). When compared to non-AAS farmers, AAS farmers generated a higher net income, which was primarily due to the timely adoption of weather advisories and effective crop management practises. Similar results were also found by Dupdal *et al.* (2020) [9] with an increase of 19-34 percent of income and Singh *et al*. (2020) [10] 22% more net returns for AAS farmers in comparison to non-AAS farmers. Nirwal *et al.* (2019) [11] also reported an additional benefit of 55.5 % and 50.3 in soybean and cotton + black gram crops respectively by adoption of AAS. The benefit cost ratios derived from the results also showed that the AAS category had a better net income and lower cost of production, which were also due to the judicious use of farm inputs based on the real time agrometeorological advisories. So, it may be said that the farming community benefited from the timely weather forecasts and advisories.

Table1. AAS farmer's perception about agrometeorological advisories

Farmer perception	*f*	%
Perception about AAS		
Very poor	2	4
Poor	7	14
Good	12	24
Very good	29	58
Necessity of AAS		
Yes	44	88
No	6	12

For which weather parameter AAS is essential		
Rainfall	48	96
Temperature	45	90
Wind velocity	42	84
RH	15	30
Benefit of AAS		
Yes	45	90
No	5	10
Which way you are benefitted from AAS		
Reducing cost during sowing	38	76
Managing pest and disease	31	62
Avoid post-harvest losses	44	88
Reducing number of irrigations	45	90
At what stage crop AAS is essential		
Sowing stage	40	80
Flowering stage	35	70
Harvesting stage	45	90
Quality of AAS information disseminated		
Good	40	80
Average	8	16
Poor	2	4

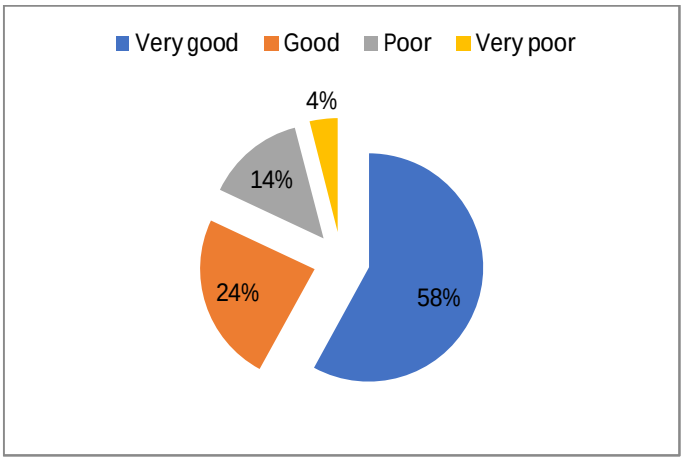

Fig1. Perception about agrometeorological advisories by AAS farmers

Table2. Economic impact of AAS on Wheat during 2019-20

Particulars	**AAS Farmer**	**Non AAS Farmer**
Variable Cost (Rs/ha)		
Tillage(Mechanical/Tractor)	3000	3500
Seed	5000	6250
Ferilizers		
Urea	1260	1650
DAP	3510	3510
MOP	1990	1990
Irrigation		
First Irrigation	1000	1000
Second Irrigation	-	1000
Third Irrigation	-	1000
Fourth Irrigation	1000	1000
Herbicides	1200	1500
Labours	3000	3500
Harvesting	6000	6000

Cost of Cultivation (Rs/ha)	**26960**	**31900**
Returns		
Yield of wheat (q/ha)	48	42
Price of wheat (Rs/q)	1800	1800
Yield of wheat straw (q/ha)	71	64
Price of wheat straw (Rs/q)	300	300
Value of wheat (Rs/ha)	86400	75600
Value of wheat straw (Rs/ha)	21300	19200
Gross returns	107700	94800
Net returns	80740	62900
B: C ratio	**2.99**	**1.97**

CONCLUSION

The research revealed that using the agrometeorological Advisory Bulletin, which is based on the current and forecasted weather, is a beneficial tool for saving input and increasing output and income. Inputs were used properly and timely, which resulted in lower production costs for AAS farmers. Increased net returns were the result of higher yield levels and lower cost of cultivation.

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