The Pharma Innovation Journal 2022; SP-11(9): 1611-1615

www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2022; SP-11(9): 1611-1615

www.thepharmajournal.com
Received: 10-07-2022
Accepted: 14-08-2022

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Utility perception about weather based agro-advisory services in Rewa district (M.P.)

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Abstract
A study was conducted during year 2020-21 to analyze the farmers perception about Agro-met Advisories Services (AAS) in terms of social economic benefit in Rewa district of Madhya Pradesh. For this purpose, two groups of farmers were selected namely, farmers who applied the recommendations of Agro-met Advisories Services regularly for their field operation and the other group of farmers who were not exposed of Agro-met Advisories Services (Non-AAS farmers). The data were collected by using individual schedule from 120 farmers among them 60 are beneficiaries of Agro-met Advisories Services (AAS) and 60 farmers who were not linked with AAS. Two categories *viz*. AAS and non-AAS farmers, consisting of 60 farmers in each category were selected through multi-stage stratified random sampling technique. The results revealed that 56.6% of AAS farmers viewed the advisories as 'very good' on the scale of very poor to very good. Non-AAS farmers lagged in both awareness and adoption of services when compared to AAS farmers. Farmers' age, education and land holding size were found to be crucial factors influencing farmers willingness for paid Agro advisory services. Economic impact revealed that there was increase of 19-34 percent of income for AAS farmers in comparison to non-AAS farmers. Thus, the application of Agro-met Advisory Bulletin based on current technology weather forecast is found to be very use full for doubling the production of crop and income of farmers.

Keywords: Adaptation, agromet, crop, forecasting, perception, weather

Introduction
In India weather services for the farmers was launched by India Meteorological Department (IMD) in the 1945. Presently these advisory bulletins or weather services are working at three levels such as National Agromet Advisory Bulletin, State Agromet Advisory Bulletin and District Agromet Advisory Bulletin. National Agromet Advisory bulletin are basically for national level agricultural planning & management. The prime user is Crop Weather Watch Group (CWWG), Ministry of Agriculture and Farmer Welfare. It was initiated by National Agromet Advisory Services centre, Agricultural Meteorology Division, India Meteorological Department. It is of great importance for all ministries (state & central), NGO, Organization for their use. State Agromet Advisory bulletin are basically for State level agricultural planning & management. The prime users are ACWWG (Agricultural Crop Weather Watch Group).

India Meteorological Department (IMD) is rendering district level weather based agromet advisory service called as "Gramin Krishi Mausam Sewa" since 2008 in India to mitigate weather and climatic risks and uncertainties. GKMS is multi-disciplinary and multi-institutional project. It involves all State Agricultural Universities (SAUs), Indian Council of Agriculture Research (ICAR), Krishi Vigyan Kendra (KVKs) Department of Agriculture & Cooperation and Farmers' Welfare, State Department of Agriculture, NGOs, Media Agencies etc. Under GKMS scheme weather- based crop and locale-specific agro-advisories for rural districts are formulated and communicated to farmers deploying various modes of transfer of technology e.g., radio, television, print media, internet, Kisan Call Centers and mobile phones.

Agro advisory services under DAMU has proven its worth in dissemination the weather based technical information to the farming community in desired manner. Included in a phased manner. This study was conducted to review the effectiveness, extent of relevance and adaptation of the Agromet Advisory Services (AAS) in enhancing the economic come and net profit.

A reliable and efficient system of medium range weather forecasting for various farm level decisions was established under the National Centre for Medium Range Weather Forecasting

(NCMRWF) at Delhi by Government of India for the application and popularization of weather forecasts in agriculture and allied sectors through agro meteorological Advisory Services (AAS).The major objective of AAS was to facilitate the farmers in capitalizing prevailing weather conditions in order to optimize the resource use and to minimize the loss due to harsh/aberrant weather conditions. The emerging ability to provide timely, skillful weather forecasts offers the potential to reduce human vulnerability to weather vagaries (Hansen, 2002) [11]. Therefore, agro advisory Services (AAS). Would have tremendous benefits in terms of optimum management of the adverse impacts of vagaries of weather. Keeping the role of agro advisory Services (AAS) in view it was established in the year 2019 by IMD and ICAR in selected KVKs of M.P. Under this service the need based and timely agro advisory are disseminated to the farmers through different modes *viz*. Whats App, SMS, Print media, KMA etc. In the context of Rewa district of M.P. AAS is being operate since 2019 in all the blocks of Rewa district in order to link the farmers with the weather forecast information and need based technological recommendations. Keeping this in view, the present study was an attempt to evaluate the benefits of agro advisory Services (AAS). In Rewa district of M.P.

Materials and Methods

Area of study

Rewa district of Madhya Pradesh is popularly known as white tigers in India. It is located at 24.55^0N latitude and 81.29^0E longitude 450 M above mean sea level (MSL). The district is situated in eastern part of Madhya Pradesh, Rewa district has 9 blocks. The district has total area 6240 sq.km with the total population of 23,65,106 as per 2011 census. The average rainfall in Rewa district is 1046 mm. In May months is the hottest month as mean maximum temperature range between 42 to 45 °C The south west monsoon is very precious for agriculture· sector. The medium range forecast being provided to farmer by Gramin Krishi Mausam Seva (GKMS), District Agromet Unit (DAMU) established at JNKVV- Krishi Vigyan Kendra, CoA-Rewa Madhya Pradesh· The sample for the study was 120 farmers of nearby villages of Rewa district namely, Semari Kala, Khokham and Rithi the categories of farmers includes marginal, small and medium. Among them 60 were using with AAS (Agro-met Advisory Services) and60werenot associated with AAS.

Data collection method

A structured interview schedule was developed to collect data on farmers perception about AAS and their characteristics. The data collected from the respondents were tabulated and analyzed using the appropriate statistical tools and techniques. The data were presented in frequency and percentage assess farmer'sperceptionaboutclimatechangeandtheiradaptationmea surestoclimate change. Frequency distribution was used to quantify the different personal, social, psychological and economical attribute of the farmers.

Results and Discussion

The results of socio-economic characteristics of respondents revealed that 60 percent of AAS farmers were old aged while more than half of sample farmers were in middle aged in case of non-AAS category. The age of farmers usually represents his experience in farming and old aged farmers might to have on lot of experience and knowledge about farming and associated risks involved in it. Nearly one-third of AAS farmers possessed higher secondary education whereas more than one-third of non-AAS farmers belonged to primary education group in the study area. Farming experience was significantly higher in case of AAS farmers (45%) as compared to non-AAS farmers (26.6%). As regards access to irrigation water was of marginally higher among AAS farmers (56.6%) in comparison to non-AAS farmers (50%). Agriculture was the way or source of income for both the categories of farmers. More than one-third of farmers in both categories were involved in off-farm activities for their additional source of income. More than half of the AAS and two-third of non- AAS farmers could not have access to institutional credit.

The results of farmer's awareness about AAS at District Agromet Unit (DAMU), KVK-Rewa center reveals that nearly 73 percent of AAS farmers were fully aware about the AAS services and 20 percent of farmers were partially aware about the services and only seven percent of AAS farmers were not aware about the services. As for as Non AAS farmers were concerned more than half (52.5%) were unaware about the AAS disseminated while less than one-fourth of non-AAS farmers fully aware about the service. It was also revealed from the results that farmers availed the AAS services through different mode of communication. The major source of information was AAS bulletin published and issued by the center (60%) followed by mobile communication (75%). AAS bulletins were published in regional language (Hindi) which helped the farming community to understand and follow easily. In addition, Farmers also got registered their mobile number at District Agromet Unit (DAMU), KVK-Rewa centre for getting need-based advisories through their mobiles.

From the Table 2, it is inferred that more than half of AAS farmers (56.6%) view the Agromet advisory services as 'very good' on the 3-point scale e.g., very poor to good and very good. Rana *et al*. (2005) [9] reported that 38 percent of farmers rated Agromet advisories as excellent and 29 percent of farmers rated good. About 85 percent of farmers agreed on essentiality of AAS and perceived that advisory based on predicted rainfall event is very much helpful in their farm activities followed by advisories based on the predicted temperature. These results are in conformity with studies of Maddison (2006). More than 75 percent of farmers perceived that AAS was beneficial and it helped in reducing the costs in agricultural production and more than two-third of farmers perceived that AAS was useful in reducing irrigation cost as AAS facilitate to plan farm activities timely the weather and rainfall advisory issued by the center well in advance. 60 percent of farmers also according to that AAS was helpful in pest- management during cropping season. Majority of agreed the farmers (82.5%) opined that real time AAS was critical at sowing stage as dissemination of need-based weather advisories prior to cropping season particularly information on timely rainfall, temperature and humidity helped farmers to plan their farm activities timely and accurately. About 75 percent of farmers perceived that micro-level AAS disseminated through District Agromet Unit (DAMU), KVK-Rewa centers was accurate, timely available and 70 percent of farmers opined that bi-weekly forecast information was good as it helped to take short term decision on farming activities. Further, farmers' willingness to pay for AAS indicates that less than one-third of farmers were willing to pay for services as majority of respondents were small and marginal farmers with limited resources and not capable to pay for service.

From results, it is also revealed that 75 percent of AAS farmers were presently satisfied with micro-level AAS issued by the District Agromet Unit (DAMU), KVK-Rewa center.

The factors influencing the farmers' willingness to pay (WTP) for AAS were determined through probit regression model. The results indicated that age of farmer; education level and size of land holding were crucial factors that significantly affected the farmers' willingness to pay for the services (Table3). Further, all the three socio-economic variables such as age of farmer, education level and holding size positively affected WTP for the services as evident from significant and positive coefficient (slope) of regression model and also demonstrate done to one relationship which denotes that higher the age, education level and size of and holding, then higher will be the WTP for the services.

Table 1: Socio-economic characteristics of farm households in study area (n=120)

S. No.	Particulars	Category	AAS Farmers		Non-AAS Farmers	Farmers
			f	%	*f*	%
1.	Age (Years)	Young (<35)	09	15.0	22	36.6
		Middle (36-45)	16	26.6	38	63.3
		Old (> 46)	35	58.3	09	15.0
2.	Education	Illiterate	05	8.3	18	30.0
		Primary	23	38.3	12	20.0
		Higher secondary	19	31.6	13	21.6
		Graduation	13	21.6	08	13.3
3.	Gender	Male	43	71.6	36	60.0
		Female	17	28.3	24	40.0
4.	Family size	Small (up to 5)	27	45.0	10	16.6
		Medium (6 to 8)	18	30.0	30	50.0
		Large (> 9)	15	25.0	20	33.3
5.	Family type	Nuclear family	45	75.0	40	66.6
		Joint family	15	25.0	20	33.3
6.	Farming experience	Low (up to 15 years)	18	30.0	18	30.0
		Middle (16-25 years)	15	25.0	26	43.3
		High (> 25 years)	27	45.0	16	26.6
7.	Social participation	Yes	25	41.6	16	26.6
		No	35	58.3	44	73.3
8.	Land holding (ha)	Marginal & small	20	33.3	25	41.6
		Medium	30	50.0	23	38.3
		Large	10	16.6	12	20.0
9.	Access to irrigation	Yes	34	56.6	30	50.0
		No	26	43.3	30	50.0
10.	Farmers' income (Rs)	Less than 50,000	16	26.6	20	33.3
		50,000 -100,000	20	33.3	18	30.0
		Above 100,000	24	40.0	22	36.6
11.	Off-farm occupation	Yes	24	40.0	25	41.6
		No	36	60.0	35	58.3
12.	Institutional credit	Yes	27	45.0	22	36.6
		No	33	55.0	38	63.3

Source: Field survey data

Table 2: Perception of AAS Farmers about Agromet advisories

Farmers perception	*f*	%
Perception about AAS		
Very poor	05	8.3
Poor	09	15.0
Good	12	20.0
Very good	34	56.6
Necessity of AAS		
Yes	49	81.6
No	11	18.3
Weather parameter for which AAS is essential		
Rainfall	54	90.0
Temperature	48	80.0
RH	36	60.0
Wind velocity	26	43.0
Benefit of AAS		
Yes	48	80
No	12	20
Usefulness of AAS		
Reducing cost during sowing	48	80
Managing pest and disease	36	60.0
Avoid post-harvest losses	22	36.6

Reducing irrigation charges	32	53.3
At what stage of crop AAS required most which		
Sowing stage	52	86.6
Flowering stage	35	58.3
Harvesting stage	32	53.3
Quality of AAS information		
Good	46	76.6
Average	08	13.3
Poor	06	10.0
Frequency of forecasting		
Daily	04	06.6
Weekly	16	26.6
Bi-weekly	40	66.6
Monthly	00	00.00
Willingness for pay based services		
Yes	18	30
No	36	60
Undecided	06	10
Overall satisfaction from AAS		
Yes	46	75
No	14	25

Table 3: Probit model for factors determining farmer's willingness-to-pay (WTP) for AAS

Variable	Estimated coefficient	Std error	t-ratio
Constant	1.767	1.062	1.662
Age	0.462	0.147	3.159***
Gender	-0.060	0.032	-1.867
Education level	0.985	0.404	2.448**
Family size	0.026	0.172	0.136
Land holding size	0.219	0.096	2.309**
Farming experience	-0.048	0.389	-0.115
Income level	0.368	0.422	0.868

Note: * and **Significant at 0.06% level and 0.01% respectively; df = 7; Chi-squared = 51.78.

Conclusion

The studies showed that the application of Agromet Advisory Bulletin, based on current and forecasted weather, is a useful tool for enhancing the production and income. AAS farmers received weather forecast based Agromet advisories, including optimum use of inputs for different farm operations. Due to judicious and timely utilization of inputs, production cost of the AAS farmers was reduced significantly. The utility of AAS as perceived by the farmers in of the present study highlights the need of its popularization among the farmers.

The micro-level AAS of District Agromet Unit (DAMU), KVK-Rewa center has helped in bringing out substantial awareness among farmers about adoption of weather-based advisories through the timely availability and quality of the service. The perception about advisories issued by District Agromet Unit (DAMU), KVK-Rewa center was very good and positive among AAS farmers. It helped the adopted farmers to take appropriate decision about their farm planning and better crop management thereby efficient utilization of existing farm resources. The economic impact study revealed that there were considerable benefits to farmers who adopted need-based weather advisories regularly issued by District Agromet Unit (DAMU), KVK-Rewa center as compared to non-adopted farmers. The study also revealed that micro-level AAS played imperative role in improving the productivity and farm incomes of those who adopted the AAS. However, majority of AAS farmers perceived that their willingness to pay for the services was low and they were ready to use advisories free of cost due to their farm resource on straits.

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