

## **Weather Based Agromet Advisories for Enhancing the Production and Income of the Farmers under Changing Climate Scenario**

**Ananta Vashisth, R. Singh, D.K. Das and R. Baloda**

*Division of Agricultural Physics, Indian Agricultural Research Institute,  
New Delhi– 110 012*

### **Abstract**

Agricultural production depends upon many factors, of which weather is the major factor. Weather varies with space and time, hence, its forecast can help to minimize the farm losses through proper management of agricultural operations. The complete avoidance of all farm losses due to weather factor is not possible but it can be minimized to some extent by making adjustments through timely and accurate information of weather forecast.

Weather forecast and weather based agromet advisories help in increasing the economic benefit to the farmers by suggesting them the suitable management practices according to the weather conditions. A study was, therefore, undertaken on adaptation of agromet advisory bulletin and economic impact of agromet advisory services for wheat and carrot during Rabi 2012-13 and for rice during Kharif 2012. For assessing the impacts of agromet advisory services, users of agromet advisory services (AAS) and non-users of agromet advisory services (non AAS) were selected from different villages of NCR. Results showed that the farmers, who followed the agromet advisories, are able to reduce the input cost and increases in the net profit as compared to the non AAS farmers in wheat, carrot and rice. This profit was due to the crop management done by the farmers according to agromet advisory bulletins. Thus, the application of agromet advisory bulletin, based on current and forecast weather is a useful tool for enhancing the production and income.

### **1. Introduction**

Weather is one of the most important factors determining success or failure of agricultural production. It effects on every phase of growth and development of plant.

Any variability in the weather during the crop season, such as delay in the monsoon, excessive rains, flood, droughts, spells of too-high or too-low temperatures would affect the crop growth and finally the quality and quantity of the yield. The losses in crop can be reduced by doing proper crop management in time by timely and accurate weather forecasts. Weather forecast also provides guidelines for selection of crops best suited to the anticipated climatic conditions. The objective of the weather forecasting is to advice the farmers on the actual and expected weather and its impact on the various day-to-day farming operations i. e. sowing, weeding, time of pesticides spray, irrigation scheduling, fertilizer application etc. and overall crop management. Weather forecast helps to increase agriculture production, reduce losses, risks, reduce costs of inputs, improve quality of yield, increase efficiency in the use of water, labor and energy and reduce pollution with judicious use of agricultural chemicals. Rathore *et al* (2001) discussed the weather forecasting scheme operational at National Centre for Medium Range Weather Forecast for issuing location specific weather forecast five days in advance. Damrath *et al.* (2001) reported that the statistical interpretation methods are used to increase the reliability of the precipitation forecast. The benefit by the farmers using agromet advisory bulletin and weather forecast for making farm-level decisions by farmers from different village have been discussed in this paper.

## 2. Materials and Methods

The Integrated Agromet Advisory Services located in the Division of Agricultural Physics, Indian Agricultural Research Institute (IARI), New Delhi has been serving the farming community in and around NCR. Progressive farmers have been taking keen interest in the agro-advisories and are the foremost beneficiaries. The major objective of this programme is to advise timely and need-based crop management practices. Weather forecast on rainfall, maximum and minimum temperature, wind speed, wind direction, cloud cover, maximum and minimum humidity are being received on every Tuesday and Friday from IMD, New Delhi. Once the forecast was received, the experts' opinion from different disciplines was obtained. Based on the advice, the agro advisories are being prepared on every Tuesday and Friday in Hindi as well as in English. These advisories are sent to IMD for preparation of national bulletins and are uploaded on the IMD website ([www.imdagrimet.gov.in](http://www.imdagrimet.gov.in)) in both Hindi and English. Bulletins are regularly communicated to the farmers on real time basis through telephone/ E-mail/SMS. Agro-met advisory bulletins are also sent by E-mail to local Hindi newspapers for publication and uploaded at the IARI website ([www.iari.res.in](http://www.iari.res.in)) in both Hindi and English. The bulletins are also sent to ATIC, KVK Shikohpur, KVK Ujawa, IKSL, NGO, ATMA, State Agriculture, e-choupal, Krishi Darsan and All India Radio through E-mail messages. The weather forecast based agro-advisory bulletin contains a summary of previous weeks' weather, deviation of weather from the normal value, weather forecast information for the next five days, crop management, which is based on weather forecast and giving warning to the farmers well in advance, regarding rainfall variation, its amount and other weather variables including pest/disease problems. Thus, farmers can decide on crop management options, application of nutrients and strategies to overcome other problems.

Weather forecast and weather based agromet advisories help in increasing the economic benefit to the farmers by suggesting them the suitable management practices according to the weather conditions. A study was, therefore, undertaken on adaptation of agromet advisory bulletin and economic impact of agromet advisory services for wheat and carrot during *Rabi* 2012-13 and for rice during *Kharif* 2012. For assessing the impacts of agromet advisory services, users of agromet advisory services (AAS) and non-users of agromet advisory services (non AAS) were selected for wheat, carrot and rice crop. The study area lays around 100 km range from IARI, New Delhi.

### 3. Results

Results showed that the farmers who followed the agromet advisories are able to reduce the input cost upto 6% in wheat, 9.6% in carrot, 7% in rice and increases the net profit by 0.9, 3 and 4% in wheat (Table 1), carrot (Table 2) and rice (Table 3) respectively as compared to the non AAS farmers, who did not follow the weather based information. AAS farmers were able to reduce the input cost up to Rs. 2618/acre in carrot, Rs. 836/acre in wheat, and 1071/acre in rice. Increases in the net profit were Rs. 4533/acre in carrot, Rs. 1041/acre in wheat and Rs 2213/ acre in rice compared to the non AAS farmers. More net returns of AAS farmers over non-AAS farmers can be due to low input cost, following weather based management practices and timely management of pests and diseases. This profit was due to the crop management done by the farmers such as timely land preparation and sowing, adoption of recommended seed rate and suitable varieties, timely weeding, harvesting and irrigation and pesticide applications, according to agromet advisory bulletins.

### 4. 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 agro-advisories, including optimum use of inputs for different farm operations. Due to judicious and timely utilization of inputs, production cost for the AAS farmers reduced. The increased yield level and reduced cost of cultivation led to increased net returns.

**Table 1:** Economic impact of AAS on wheat (Rs./acre) during *Rabi* 2012-13.

Type	Land Preparation/Sowing	Seed	Fertilizers & Manure	Pesticides/Insecticide/Herbicide	Irrigation	Harvesting / Threshing	Input Benefit	Yield (q/Acre)	Rs.	Net Benefit
AAS	2187.9	1367.4	2670.1	788.3	1984.8	4034.8	13033.3	17.2	23660.0	
Non-AAS	2322.4	1432.7	2714.5	644.7	2970.1	3784.8	13869.5	17.4	23865.1	
Benefit	134.5	65.3	44.4	-143.6	185.3	-250.0	836.2	0.2	205.0	1041.2

**Table 2:** Economic impact of AAS on carrot (Rs./acre) during *Rabi* 2012-13.

Type	Land Preparation/Sowing	Seed	Fertilizers & Manure	Weeding/ thinning	Pesticides/ Insecticide/Herbicide	Irrigation	Harvesting / Threshing	Input Benefit	Yield (q/Acre)	Rs.	Net Benefit
AAS Carrot Crop	2827.7	2032.4	2873.8	614.8	729.9	2500.9	13062.2	24641.8	85.6	58444.1	
Non-AAS Carrot Crop	2884.1	2334.1	3245.9	1081.6	735.2	3070.4	13908.1	27259.6	84.0	56529.4	
Benefit	56.4	301.7	372.1	466.8	5.3	569.5	845.9	2617.8	1.6	1914.7	4532.5

**Table 3:** Economic impact of AAS on Rice (Rs./acre) during *Kharif* 2012.

Type	Land /nursery preparation & Sowing	Seed	Fertilizer & Manure	Pesticides/ Insecticide / Herbicide	Irrigation	Harvesting & Threshing	Input benefit	Yield (q/acre)	(Rs)	Net profit
AAS	5152	454.4	1688	1300	2816	2808	14218.4	23.1	26663.6	
Non AAS	5160	463.4	1701.6	1674	3456	2834	15289	22.98	25521.0	
Benefit	8.0	9.0	13.6	374	640	26	1070.6	0.12	1142.6	2213.2

## References

- [1] Damrath, U., Doms, G., Frihwald, D., Heise, E., Richter, B. and Steppeler, J. (2000). Operational quantitative precipitation forecasting at the German Weather Service. *J of Hydrology*. 239 : 260-285.
- [2] Rathore, L. S., Gupta, Akhileshand Singh, K. K. (2001). Medium range weather forecasting and agricultural production. *Journal of Agric. Physics*. 1(1): 43