# Effectiveness and Usefulness of Weather Based Agro-Advisory services among farmers of Prakasam district, Andhra Pradesh, India

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## ABSTRACT

Agricultural production depends upon many factors, of which weather is the major factor. Farmers do prevent crop failure and obtain high yields with greater financial returns if they are aware of real-time weather parameters such as temperature, relative humidity, wind speed, wind direction, and rainfall. Farmers might manage agricultural activities, from crop selection to post-harvest handling, by having the proper weather information at the right time. This helps them reduce crop losses. District Agro-Meteorological Unit (DAMU) under the scheme named GKMS (Gramin Krishi Mausam Seva) was set up at KVK, Darsi, Prakasam district. Bilingual AAS bulletins were prepared and disseminated to farmers. An Ex-post-facto research design was adopted for the present study. To study the effectiveness and usefulness of weather-based agro advisory services a random survey was done among 60 farmers of the Darsi block. Results revealed that farmers were in the range of young age to middle age category, most of them had secondary education and rely on television and newspaper for weather data. Results also revealed that 45.00 per cent responded as messages were moderately accurate, 50.00 per cent responded as messages were useful. The majority of farmers (60.00) checked the weather forecast before spraying insecticides and pesticides. Awareness should be created among farmers to use the weather forecast to select crops suitable for weather conditions.

## Introduction

Indian agriculture is highly dependent on monsoons. Weather and climatic information play an important role in agricultural production and management. Any weather variation in the middle of the growing season, such as a delayed monsoon, heavy rainfall, floods, droughts or periods of excessively hot or low temperatures would affect the crop growth and also the quality and quantity of yield. To reduce the effect on crop Indian agriculture weather forecasts are useful for farmers. The main objective of weather forecasts is to help farmers in decision-making of field activities viz., sowing, irrigation scheduling, fertilizer application, time of pesticide spray and weeding etc. Weather forecast also provides guidelines to the farming community in the selection of crops which was best suited to the antici-

pated climatic conditions.

Indian Meteorological Department (IMD) in collaboration with the Indian Council of Agricultural Research (ICAR) has set up a District Agro-Meteorological Unit (DAMU) in selected districts of the country under the scheme named GKMS (Gramin Krishi Mausam Seva). At present 660 DAMUs were installed at district KVK premises. Each district DAMU is being received the medium-range weather forecast from the respected Meteorological Centre (MC) on every Tuesday and Friday for eight weather parameters. In order to prepare the block level agro advisory bulletins, the received weather forecast is circulated to Subject Matter Specialists (SMS) of the Krishi Vignan Kendras, State Agricultural department and recommendations were collected. Based on the suggestions received from the scientist, bulletins of major crops and monthly operations of particular location were prepared and finalized. The prepared bilingual advisory bulletins were disseminated through SMS, WhatsApp, E-mails, GKMS portals, m-Kisan portals, State Department of Agriculture, Research stations and Non-Governmental Organizations (NGOs). The received weather information was utilized by the farming households and they plan the daily farming schedule. Therefore the present study was taken to know the effectiveness and usefulness of weather advisory services among selected farmers of the Prakasam district.

## Methodology

An Ex-Post-Facto research design was adopted for the current study. Prakasam district was located on the western shore of the Bay of Bengal. It is situated in a tropical region between14-57'-00" to 16-17'-00' of Northern latitude and 78-43-00' to 80-25'-00" of Eastern longitude. The district usually has maximum and minimum temperatures of 40.2 $^0$C and 20.3 $^0$C, respectively. During 2019-20 the actual rainfall received from the Southwest monsoon is 353.2 mm, whereas North-east monsoon is responsible for 271.5 mm. Due to the unpredictable monsoons, irregular rainfall, and a heavy reliance on tanks and wells for irrigation, the district's agricultural activity is deplorable. Under the scheme of GKMS, DAMU was set up at KVK, Darsi to disseminate timely and accurate weather information to the farmers. A random sample survey was conducted from 60 AAS (Agro-met Advisory service) user farmers from the

six villages which were adopted under KVK of the Darsi block. Primary data was collected by using a pre-tested structured interview schedule through the personal interview method. The frequency and percentage analysis were employed to evaluate the effectiveness and usefulness of agro-met advisory services among farmers.

## Results and Discussion

### General characteristics of farmers

### Age

From Table 1 it was revealed that, exactly half of the farmers (50.00 %) were middle aged followed by 31.7 per cent were young and 18.3 per cent of farmers were under old age category. Most of the farmers were in the range of young to middle age. The majority of the farmer respondents in the aforementioned categories were well-connected to the mass media and frequently checked their mobile devices for everyday weather updates.

**Table 1.** Distribution of farmers according to their age
(n=60)

| S.No. | Age category | Number | Per cent |
|-------|-------------|--------|----------|
| 1. | Young age (up to 35 years) | 19 | 31.70 |
| 2. | Middle age (36 to 50 years) | 30 | 50.00 |
| 3. | Old age (> 51 years) | 11 | 18.30 |
| | **Total** | **60** | **100** |

(Source: Survey data, 2022)

### Educational status

From Table 2 it was found that, nearly two-fifth of the farmers (37.00) had secondary education followed by 31.00, 17.00 and 12.00 per cent of farmers with higher secondary, primary education and

**Table 2.** Distribution of farmers according to their educational status
(n=60)

| S.No. | Education category | Number | Per cent |
|-------|-------------------|--------|----------|
| 1. | Illiterate | 2 | 3.00 |
| 2. | Primary education | 10 | 17.00 |
| 3. | Secondary education | 22 | 37.00 |
| 4. | Higher secondary | 19 | 31.00 |
| 5. | Graduate | 7 | 12.00 |
| | **Total** | **60** | **100** |

(Source: Survey data, 2022)

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graduates respectively. Also, a meager per cent (3.00) of farmers described themselves as illiterates. The results revealed that education plays a major role in acquiring day-to-day weather data, to make appropriate decisions in the field. The results are in line with Murugan and Karthikeyan (2017).

## Land holding

From Table 3 it was observed that, one-third of farmers (32.00) were small land holders, followed by 28.00 per cent, 23.00 per cent and 17.00 per cent of farmers were medium, marginal and large land holders respectively. The results revealed that the majority of farmer respondents were in the small and medium category of land holding as they were more careful in adopting suitable technologies to overcome the ill effects of climate change.

**Table 3.** Distribution of farmers according to their land holding

(n=60)

| S.No. | Land holding category | Number | Per cent |
|-------|----------------------|--------|----------|
| 1. | Marginal (< 1 ha) | 14 | 23.00 |
| 2. | Small (1 to 2 ha) | 19 | 32.00 |
| 3. | Medium (3 ha to 5 ha) | 17 | 28.00 |
| 4. | Large (> 6 ha) | 10 | 17.00 |
| | **Total** | **60** | **100** |

(Source: Survey data, 2022)

## Information source for weather data

From Table 4, it was inferred that, 35.00 per cent of farmers relied on television for daily weather data followed by nearly one-fourth of farmers (24.00) relied on mobile apps. It was also revealed that 18.00, 15.00 and 8.00 per cent of farmers relied on television cum newspaper, newspaper and AAS bulletins respectively. The results revealed that majority of farmers got weather updates through television, exclusively from channels like Dhoor Darshan national and Etv which gives a clear information to both illiterate and literate farmers. As farmer respondents were more in the range of middle to young age category, access to mobile apps was observed to know the weather updates. Daily newspapers like Eenadu, Sakshi and Andhra Jyothi had a separate section for weather updates which farmers can read in their leisure time and also disseminate to illiterate fellow farmers. The results are in line with Maini and Rathore (2011).

**Table 4.** Distribution of farmers according to their source information for weather data (n=60)

| S.No. | Information source | Number | Per cent |
|-------|-------------------|--------|----------|
| 1. | Television | 21 | 35.00 |
| 2. | Newspaper | 9 | 15.00 |
| 3. | Television + Newspaper | 11 | 18.00 |
| 4. | Mobile Apps | 14 | 24.00 |
| 5. | AAS bulletins | 5 | 8.00 |

(Source: Survey data, 2022)

## Effectiveness of Weather-based agro advisory services

### Timeliness of message

From Table 5 it was observed that, 43.00 per cent of farmers opined that message received about the weather forecast was late, followed by two-fifths of farmers (39.00) responded that the weather forecast received has coincided with crop growth and 18.00 per cent of farmers responded as they got the messages early. From the results, it was observed that most of the farmers got late weather forecasts. The reason might be non-synchronization in the sowing of crops, growing different crops in the same region as well as after receiving weather information from meteorological centres the results has to be customized to suit the local farmers. So, they need to rely on the previous days forecast. The results are in line with Srinivas *et al.,* (2017).

**Table 5.** Farmers response on the timeliness of the message

(n=60)

| S.No. | Timeliness of message | Number | Per cent |
|-------|----------------------|--------|----------|
| 1. | Early | 11 | 18.00 |
| 2. | Coinciding with crop growth | 23 | 39.00 |
| 3. | Late | 26 | 43.00 |
| | Total | 60 | 100 |

(*Source:* Survey data, 2022)

### Accuracy of message

From Table 6 it was inferred that, 45.00 per cent of farmers responded that weather forecast was with moderate accuracy followed by 35.00 per cent and 20.00 per cent of farmers gave responses as very accurate and not so accurate weather forecast respectively. The cause behind the moderate accuracy to high accuracy due to well refinement of collected weather information by expert meteorological team.

**Table 6.** Farmers response on accuracy of message

(n=60)

| S.No. | Accuracy of message | Number | Per cent |
|---|---|---|---|
| 1. | Very accurate | 21 | 35.00 |
| 2. | Moderate | 27 | 45.00 |
| 3. | Not so accurate | 12 | 20.00 |
| | **Total** | **60** | **100** |

(*Source:* Survey data, 2022)

The results were in accordance with Singh *et al.* (2015).

**Content usefulness of weather forecast**

From Table 7 it was revealed that, half of the farmers (50.00) opined that content disseminated in weather forecast was moderately useful followed by, 28.30 and 21.70 per cent of farmers responded that disseminated content was very useful and not useful respectively. Most of the respondents felt weather-based agro advisories were much more useful. The reason might be coverage of maximum weather parameters and detailed management practices of crops, poultry and livestock were included in the bulletins. The results were in line with Reddy *et al.,* (2017).

**Table 7.** Farmers response on content usefulness

(n=60)

| S.No. | Content usefulness | Number | Per cent |
|---|---|---|---|
| 1. | Very useful | 17 | 28.30 |
| 2. | Moderately useful | 30 | 50.00 |
| 3. | Not so useful | 13 | 21.70 |
| | Total | 60 | 100 |

(*Source:* Survey data, 2022)

**Preference of weather forecast**

From Fig. 1 it was observed that, 47.00 per cent of farmers preferred short-range weather forecast (1 to 3 days), one-fourth of farmers (25.00) preferred medium-range weather forecast (4 to 10 days) followed by 22.00 per cent of farmers preferred now cast (less than 24 hours) and only a few per cent of farmers (6.00) preferred long range forecast. Majority of the farmers preferred short range to medium range forecast. The cause behind this might be, weather forecast of less than a week time would help the farming community to plan the farm activities well in advance. The results are in tune with Prasad *et al.,* (2020).
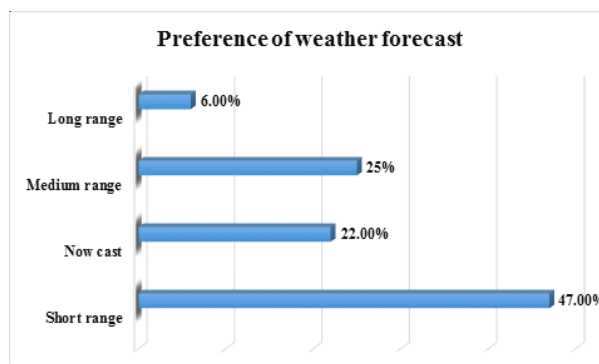


**Fig. 1.** Farmers preference for weather forecast

**Preference over weather parameters**

From Fig. 2 it was inferred that, 43.30 per cent of farmers preferred rainfall parameter under weather forecast followed by 26.70, 20.00 and 10.00 per cent of farmers preferred wind velocity, relative humidity and temperature parameters under weather forecast respectively. The reason behind more preference for rainfall might be, rainfall plays a major role in each stage of crop production. The findings are in tune with Dupdal *et al.* (2020).
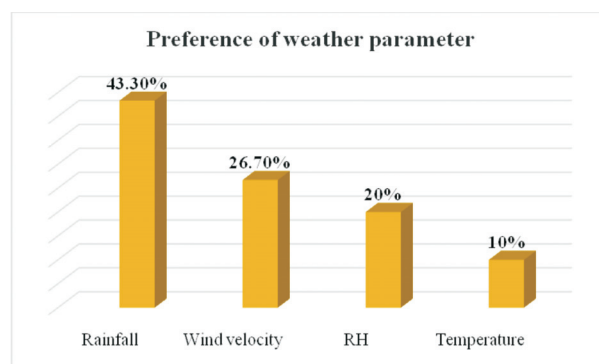


**Fig. 2.** Farmers preference over weather parameters
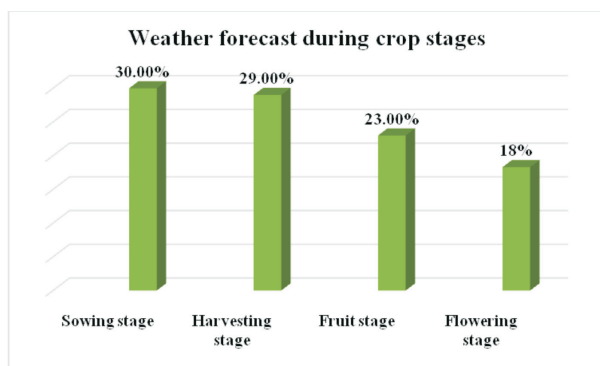
**Weather forecast in crop stages**

From Fig. 3 it was revealed that, 30.00 per cent of farmers opined forecast during sowing stage of crop was useful followed by 29.00, 23.00 and 18.00 per cent of farmers opined forecast during harvesting stage, fruit stage and flowering stage would be useful for them respectively. Majority of farmers opined that forecast was very useful at the time of sowing, harvesting and fruit stage. The reason might be to plan the sowing activities in the field, to take care of harvested produce from weather vagaries and also

**Table 8.** Distribution of farmers according to usefulness of weather based agro-advisory services (n=60)**

| S.No. | Statements | Number | Per cent |
|---|---|---|---|
| 1. | Reduction in cost of cultivation due to weather forecasting. | 18 | 30.00 |
| 2. | Increase in crop production after receiving weather information. | 21 | 35.00 |
| 3. | Decrease in irrigation charges after following weather forecast. | 26 | 43.30 |
| 4. | Introduction to new crops/new varieties/new practices according to the weather conditions. | 12 | 20.00 |
| 5. | Avoiding post- harvest losses and storing crop produce due to weather based agro advisory service. | 30 | 50.00 |
| 6. | Using the weather information in spraying of insecticides/pesticides/ fungicides. | 39 | 65.00 |
| 7. | There is benefit from abnormal weather forecast advisories related to animal husbandry. | 6 | 10.00 |

(Source: Survey data, 2022)                    (** Multiple responses)



**Fig. 3.** Farmers preference of weather forecast during crop stages

to spray pesticides and insecticides to crops especially in fruit setting stage. The results are in line with Praveen *et al.* (2022).

**Usefulness of weather based agro-advisory services**

From Table 8 it was observed that, 65.00 per cent of farmers used weather information for spraying operations followed by 50.00 percent avoided crop post-harvest losses succeeded by 43.30 per cent of farmers responded there is decrease in irrigation charges due to weather forecast followed by 35.00, 30.00, 20.00 and 10.00 per cent farmers responded that weather forecast was useful to increase crop production, to decrease the cost of farm operations, Introduction of new crops and varieties and to take care of livestock according to weather conditions.

The results revealed that majority of farmers planned the farm activities according to weather forecast and increased the crop production as well as reduced the cost of cultivation. Farmers also took care of post-harvest produce, reduced pests and diseases with appropriate application of pesticides and insecticides. Introduction of new crops and varieties like vegetables and pulses instead of regular growing crops was observed in the study area to minimise the losses from aberrant weather conditions. The results are in accordance with Manjusha *et al.,* (2019) and Khan *et al.* (2018).

**Conclusion**

The present study dealt with the effectiveness and usefulness of weather based agro advisories in the aspect of content usefulness to the farming community, message accuracy, timeliness, preference over weather parameters, forecasts and cropping stages etc. The results showed involves what is the accuracy of weather forecast disseminated, the message received time by farmers, the preference of farmers over weather parameters, types of forecast and cropping stages. The present AAS given by DAMU was very good and positive among AAS user farmers. The findings of the study revealed that farmers were in the range of young age to middle age category, most of them had secondary education and rely on television and newspaper for weather data. The results also revealed that messages which was disseminated by DAMU to farming community by parallel was received by most of the farmers, with moderate accuracy and very useful to the farmers. More focus of farmers was observed on spraying and irrigation operations. Conducting FAPs (Farmer Awareness Programs) is essential to educate farmers

about the need of choosing new crops based weather conditions in order to generate more revenue. At present, DAMU was disseminating the forecast at taluk/block/ mandal level this can be extended to village level in near future.

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