Awareness of farmers on Weather based Agro advisory services in Telangana State, India

ABSTRACT

Agriculture production is significantly influenced by the weather. From seeding to crop harvest, it has a significant impact on all aspects of farming. Crop germination, establishment, growth, development and yield are all affected. Extreme weather conditions including drought, floods, heavy rains, heat waves, frost, hailstorms, cyclones, etc. may cause the farming community to suffer significant crop yield losses. Since the farming community will be aware of the upcoming weather conditions in advance, required adjustments may be made to farm level agricultural operations and decisions to lessen the consequences of unfavorable weather conditions. Therefore, Integrated Agro met Advisory Services will make it possible for the farmer to be informed of current and expected weather as well as advice to the farmer the best course of action to reduce losses caused by unfavorable weather conditions and increase the output of agricultural systems. A study was conducted in Telangana state to ascertain the degree of farmer's awareness on weather-based agro advisory services. Random sampling technique employed to collect data from 120 farmers. Ex-post facto research design was used for the investigation. The data with regards to level of awareness possessed by farmers about weather based agro advisory services, it is revealed that 38.33 % of them had the medium level of awareness followed by low level 35.01 % and high level 26.66% of awareness, respectively. All profile characteristics of respondents showed a significant correlation with the degree to which farmers were aware of weather-based agro advisory services, with the exception of education, annual income, farming experience, mass media exposure, and cropping pattern. Multiple linear regression value 77.61 per cent contributed to the extent of variation towards independent variables.

***Key Words**: Awareness, farmers, Regression analysis, weather based agro advisory services*

Introduction

The Indian economy is based primarily on agriculture. Agriculture is unique in that its output is highly reliant on the weather, unlike many other economic sectors. How effectively climatic conditions corresponding to the

optimal requirements of the crop are used to raise the crops has a substantial impact on the level of success of agriculture production and its economics. How well adverse environmental variables, such as moisture, temperature, wind, radiation, and biotic stress, which impede crop growth and development, are handled to lessen their adverse effects. In addition, management decisions that protect crops from extreme weather conditions are also important. The Information age has been correctly referred to as the current era. The most crucial component for societal advancement today is information. After oxygen, water, food, and shelter, it has been said that man's fifth requirement is information. Everyone requires information in order to live their daily lives. In agriculture, timely information is essential to making the best decisions and sustaining the expansion of agricultural activities. Farm production is increasing in a variety of ways thanks to the use of information in the agricultural industry. Making accurate decisions about which crops to sow, where to sell their goods, and where to buy inputs requires information on weather trends and other issues pertaining to agriculture (Bachhav, 2012). Though there is still a correlation between yield size and weather conditions, generally speaking, crop dependence are playing an important role on weather seems to be declining as science and contemporary technologies advance. However, crop loss can be considerably decreased by modifying the actions that are taken and are based on timely and accurate information provided.

With an increase in total food grain production from around 50 million tonnes at the time of independence to more than 330 million tonnes at present, the Green Revolution-driven expansion of agriculture in India has significantly contributed to the aggregate supply of food grains and ensured food security for the expanding population. Agriculture, however, is extremely susceptible to climatic and weather changes. A farmer can either leave these natural forces to their whims or attempt to make use of them. It is possible to quantify the likelihood of undesirable meteorological events and estimate the dangers associated with them if climatological data is available. It is also feasible to recognize hazardous weather patterns and to be better equipped to reduce damage with the help of climatological data. It would be unproductive to not employ climatological and meteorological data because agricultural activities are weather-sensitive. Weather and climate information is important throughout the entire crop cycle, from choosing the best crop or variety to post-harvest operations and marketing. If the advisories are provided in advance, it can be useful in motivating the farmer to organize and activate their

own resources in order to reap the benefits by sparingly using expensive inputs. In order to increase agricultural production, both in quantity and quality, farmers may be benefitted from using meteorological information to assist them using natural resources as effectively as possible (Mannava *et al.,* 2007). Agro meteorological data is provided in India by many ministries and organizations dedicated for enhancing the farming community and agricultural output through a variety of sources. The Indian Meteorological Department (IMD) set up a network of observatories across the nation and forecasts weather data. In addition to this, weather bulletins are also released, providing data on precipitation, temperature, humidity, and other aspects of weather. Through All India Radio (AIR) and Televisions (TV) stations, focus on delivering the information in a variety of regional languages. With the cooperation of Agricultural universities and research organizations in various states, the Agricultural Meteorological Division (AMD) of IMD maintains a network of agro meteorological observatories around the nation. The AMD creates weather calendars that assist farmers in scheduling agricultural operations to maximize the benefits of good weather and minimize the impacts of bad weather. Farmers are getting weather information from personal cosmopolite and other local sources in addition to mainstream media sources so they can plan and manage their crops for their sustainable livelihood in particular and food security in general. Farmers are unable to fully employ it even if it is available through various sources and methods. (Kumar *et al.,* 2013). The broadcast of meteorological information has become much simpler and more practical with the development of ICT and its quick integration into our daily lives. Information literacy is now greatly influenced by ICT. Today, farmers may receive meteorological information even more conveniently than they could a few decades ago. Hence there is every need to find out how farmers are making use of weather advisories by conducting research. Hence a study on Awareness on Weather based Agro advisory services in Telangana State, India has been conducted. Artikov and Lynne (2005) reported that a focus on changing both the farmers' and their societies' beliefs and values, and perceptions of weather and climate forecasts will greatly affect their use and influence. This is because the highly significant social norms variable in the decision-making underlines the importance of the human dimension in production decisions. Deemuth *et al.* (2011) claimed that how people utilize and interpret weather prediction information has a significant impact on how often they receive forecasts. The significance of each forecast "use" variable shows that different incentives influence how frequently consumers seek forecasts. Planning leisure activities is one of the forecast's most important purposes. This may be due to the fact that people tend to have

more control over leisure activities than the other activities looked at in the survey, which encourages them to seek forecasts more when making decisions about their leisure activities. Singh and Varshney (2016) conducted a study that found a substantial association between farmers' land holdings and their level of adoption. The amount of adoption of rice technologies rises when land holding units are changed. Nesheim et al. (2017) found that the information's accessibility, relevance, and reliability all affect how valuable it is from a farmer's standpoint. While some members criticized the services' validity and relevance, others provided a more favorable view of the offering, claiming that obtaining this information had value. The capacity to take preventative measures was the biggest benefit that subscribers valued in agro met information.

2. Materials and Methods

Ex-post facto research design was used for the investigation. The present study was conducted in Mahabubabad, Karimnagar and Nalgonda districts selected by using simple random technique. From each district, two mandals were selected by using simple random technique. The village-wise secondary data relating to farmers were obtained from Krishi Vignan Kendras, Agricultural Extension officers, Department of Agriculture, Agricultural scientists, etc. Agricultural Officers. Twelve villages were selected randomly. In each of the identified villages, 10 farmers were selected by using simple random technique. Forty respondents were selected from each of the district. Thus, the sample constituted for the investigation to 120 respondents. A well-prepared, structured and pretested interview schedule was used for collection of data. The study aimed to assess the level of farmer’s awareness on weather based agro advisory services and to find out the contribution of profile characteristics on the farmers awareness level towards weather based agro advisory services. Awareness is the degree by which the respondents are aware about the various weather information sources available through different medium like print media, electronic media, social media and traditional media. Descriptive and inferential statistics stools used such as arithmetic mean, frequency, percentage, standard deviation, rank, multiple linear regression. In the current study, it is an efficiency of analyzing level of farmer’s awareness on weather based agro advisory services. The responses of the respondents on each statement was obtained on three-point continuum with weightage of 3, 2 and 1

scores, respectively. Procedure followed by Abhilasha Deepa Minz with suitable modifications was used for the study. The statements were prepared with the help of research reviews and consulting experts of statistics, economics and extension discipline for deriving meaning of conclusions. The respondents were grouped into three categories on the basis of mean and standard deviation as a measure check. Multiple linear regression is combination of forward selection and backward elimination method. Stepwise regression is a process of building a model by successively adding or removing variables. In the present investigation, extent of utilization is response variable (Y) while the 10 parameters such as age(X_1), education (X_2), annual income (X_3), farming experience (X_4), size of land holding (X_5), extension contact (X_6), social participation (X_7), mass media experience (X_8), risk taking ability (X_9), cropping pattern (X_{10}) were predictor variables. The model of regression was represented as

$Y = \beta o + \beta 1X1 + \beta 2X2 + \ldots..+\beta 28X28 + e$ where,

Y = Extent of utilization of weather based agro advisory services by farmers

βo = Constant

$\beta_1, \beta_2 \ldots \beta_{10}$ = Coefficient of first causal variable (X1), Coefficient of second causal variable (X2),…, Coefficient of ten causal variable (X10).

X1 = Causal variable (Age)

X2 = Causal variable (Education)

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X10 = Causal variable(cropping pattern) e = Error

3. Results and Discussion

Awareness level of farmers about weather based agro advisory services

1. Overall Awareness level of farmers on weather based agro advisory services

It is evident from the data presented in Table 1 that most of the farmers (40.83 %) had medium level awareness on weather based agro advisory services followed by high and low level of awareness with 32.51 % and 26.66 % respectively.

Table 1. Overall Awareness level of farmers on weather based agro advisory services

(n=120)

S.No	Farmers (n=120)		
	Category	**Frequency**	**Per cent**
1.	Low level of awareness	32	26.66
2.	Medium level of awareness	49	40.83
3.	High level of awareness	39	32.51
	Total	**120**	**100.00**

It can be concluded that majority of the farmers are moderately aware on the weather based agro advisory services as they have low awareness on the means of weather based agro advisory services and moderate awareness on sources of weather based agro advisory services. In order to impart more awareness, efforts should be made by KVKs/ Agricultural officers to reach out more number of farmers and create awareness on importance of weather information in tackling weather change related issues and provide necessary trainings and other activities through latest communication technology.

2. Overall awareness Level of farmers on means of weather based agro advisory services

From the aforementioned findings from table 2. it can be concluded that greater number of the respondents (34.16 %) had low awareness on means of weather based agro advisory services, followed by 33.33 % and 32.51 % of them had medium and high awareness on means of weather based agro advisory services.

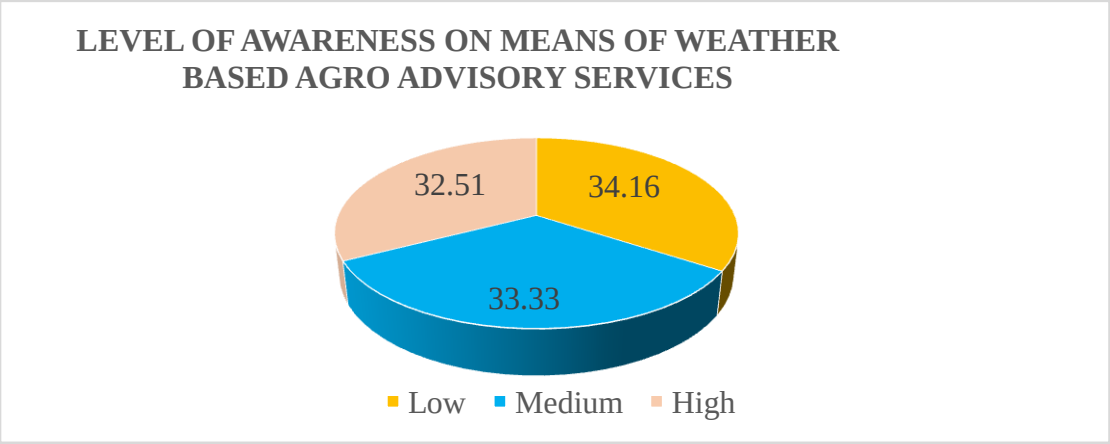

Fig.1 **Overall awareness Level of farmers on means of weather based agro advisory services**

Table 2. Distribution of farmers according to their level of awareness on means of weather based agro advisory services

(n=120)

SNO.	Level of Awareness on Sources of WBAAS	Frequency	Percentage
1.	Low	41	34.16
2.	Medium	40	33.33
3.	High	39	32.51
	Total	**120**	**100**

The possible reason might be the fact that considerable number of farmers awareness on means of weather based agro advisory sources was low because most of the farmers have their education upto middle school and illiterate status and they have low access to the weather based agro advisory services, their moderate exposure to mass media and they were also unaware of latest communication technologies. These results are in line with the results of Abhilasha Deepa Minz (2018).

The table 3. Indicates the individual aspect analysis of awareness level of farmers on weather based agro advisory services. The ranks assigned to each statement on awareness level of farmers on weather based agro advisory sources indicates that majority of the respondents were aware about electronic, social and print media as means of weather based agro advisory information *i.e,* T.V (Ⅰ Rank) followed by, Whatsapp (Ⅱ) Newspaper as means of weather information (Ⅲ). Besides being aware about traditional means they were also aware about mobile (Ⅳ)

you tube (Ⅴ). Lowest ranks were assigned to the aspects like vyavasaya panchangam (Ⅹ), aged people (Ⅹ), pujari (ⅪⅠ), face book (ⅩⅢ) and twitter (ⅩⅣ) providing weather information.

Further, the individual aspect analysis of awareness level of farmers on weather based agro advisory services revealed that farmers' had high ranks were assigned on awareness on electronic, social and print means of weather information i.e, on T.V, Whatsapp, newspaper, mobile, you tube because most of the farmers having access to these at their home. Lowest ranks were assigned to aspects like vyavasaya panchangam, aged people, pujari, facebook and and twitter because they were having least access with regards to these means of weather based agro advisory services and they were also unaware of the latest communication technologies.

Table 3. Individual aspect analysis of farmers according to their level of awareness on means of weather based agro advisory services

(n=120)

S.No.	Particulars		Fully Aware		Partially aware		Unaware		Mean score	Rank
			f	%	f	%	f	%		
1.	Print media	Newspaper	81	67.5	22	18.333	17	14.166	2.533	III
		Magazine	72	60	26	21.666	22	18.333	2.416	VI
2.	Electronic media	Mobile	74	61.666	33	27.5	13	10.833	2.508	IV
		Radio	65	54.166	37	30.833	18	15	2.391	VII
		T.V.	91	75.833	25	20.833	4	3.333	2.725	I
		Mobile Agriculture App	69	57.5	22	18.333	29	24.166	2.333	IX
		Website/Portals	61	50.833	41	34.166	18	15	2.358	VIII
3.	Social media	Facebook	55	45.833	23	19.166	42	35	2.108	XIII
		Whatsapp	84	70	24	20	12	10	2.6	II
		Twitter	29	24.166	38	31.666	53	44.166	1.8	XIV

		YouTube	79	65.833	22	18.333	19	15.833	2.5	V
4.	Traditiona lSources	Pujari	46	38.333	47	39.166	27	22.5	2.158	XII
		Vyavasaya Panchangam	52	43.333	45	37.5	23	19.166	2.241	X
		Aged people	51	42.5	47	39.166	22	18.333	2.241	X

f=frequency of farmers, Per cent = %

3. Overall Awareness Level of farmers on sources of weather based agro advisory services

The results of level of awareness on sources of weather based agro advisory services presented in table 4. Revealed that most of the respondents (39.16%) had a medium level of awareness, followed by low awareness and high awareness on sources of weather based agro advisory services with 35.83 % and 25. 01 % respectively.

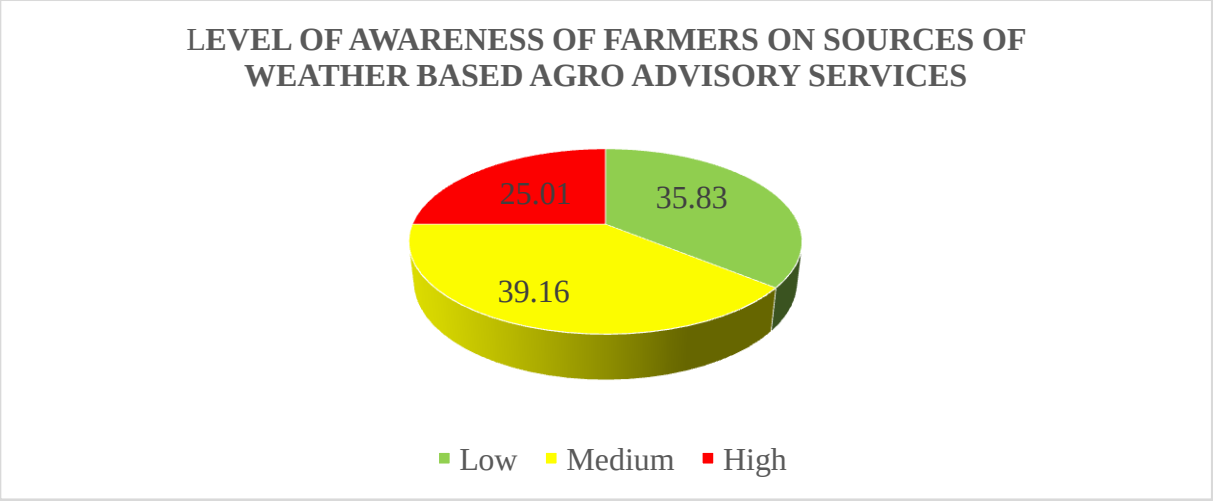

Fig 2. Farmer's level of awareness on sources of weather based agro advisory services

Table 4 farmers according to their level of awareness on sources of weather based agro advisory services

SNO.	Level of Awareness on Sources of WBAAS	Frequency	Percentage
1.	Low	43	35.83
2.	Medium	47	39.16
3.	High	30	25.01
	Total	**120**	**100**

The possible reason might be the fact that considerable number of farmers awareness about the sources of weather based agro advisory services was medium because of their established moderate linkages with various

means of information sources like mass media and less contact with the extension agencies 39.16% and farmers are mostly reliable on kvks as they believe kvks are near their vicinity and are ready to visit them as they believe kvks provide the valid information on their queries related to agriculture within no time. These results are in line with the studies of Shweta Kumari (2018).

Table 5. Distribution of the farmerss according to their level of awareness on sources of weather based agro advisory services

S. No.	Level of Awareness on Sources	Fully aware		Partially aware		Not aware		Mean score	Rank
		F	%	F	%	F	%		
1.	IMD	73	60.83	18	15	29	24.16	2.36	IV
2.	KVKs	95	79.16	16	13.33	9	7.5	2.17	I
3.	Research Station	72	60	37	30.83	11	9.16	2.50	II
4.	KCC	50	41.66	33	27.5	37	30.83	2.10	V
5.	SAU	70	58.33	33	27.5	17	14.16	2.44	III

Table 5. Vividly indicates that most of the farmers are aware about KVKs as source of weather based agro advisory services (Ⅰ Rank), this is because farmers were ready to visit KVK whenever they get doubts regarding new agricultural practices etc... As most of the farmers visit the research station for knowing/ obtaining any new variety of crop, so they aware of research station as source of weather based agro advisory services (Ⅱ). The scientists of SAU ranked (Ⅲ) as farmers feel they give the valid information. IMD was ranked (Ⅳ) as most of them get messages related to the weather based agro advisory services. It was followed by KCC (Ⅴ) as farmers hesitate to call and they feel direct contact with any extension personel yields good solution to their queries than phone call.

4. Overall awareness Level of farmers on importance of weather based agro advisory services

It was further observed from table 6. That most of the respondents 40.0% had low awareness on importance of weather based agro advisory services followed by 37.5% high and medium 22.5% awareness on importance of weather based agro advisory services.

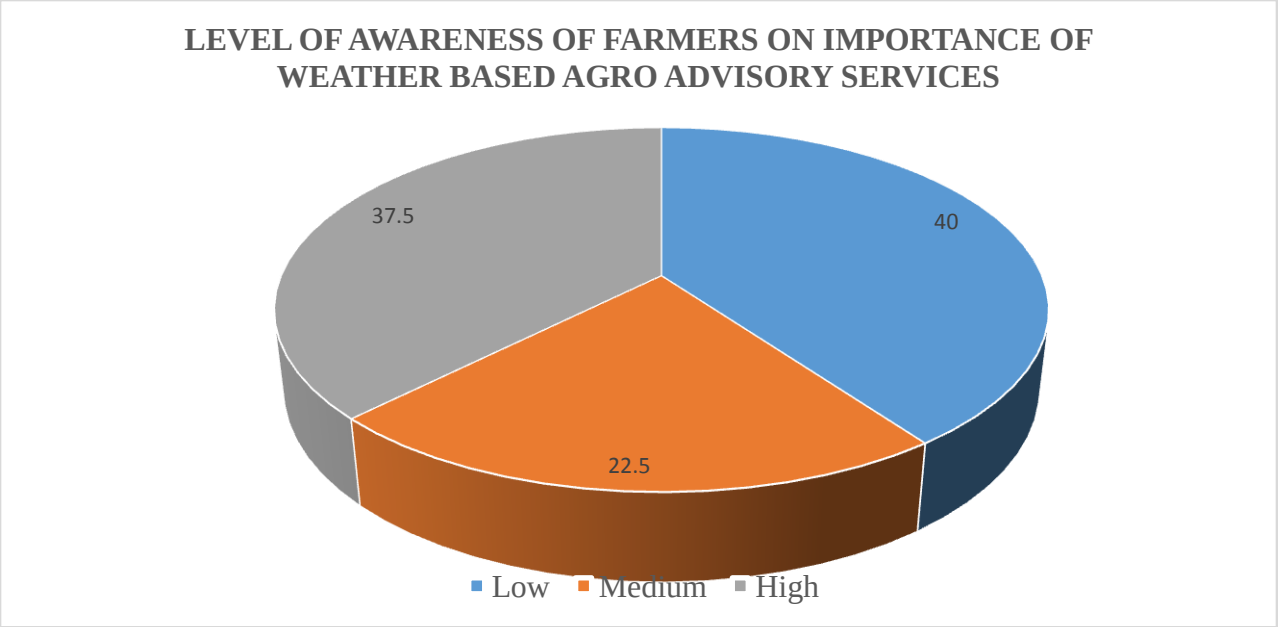

Fig 3. Level of awareness of farmers on importance of weather based agro advisory services

Table 6. Level of awareness of farmers on importance of weather based agro advisory services

SNO.	Level of Awareness on Importance of WBAAS	Frequency	Percentage
1.	Low	48	40.0
2.	Medium	27	22.5
3.	High	45	37.5
	Total	**120**	**100**

It could be due to the fact that considerable number (40.0 %) of respondents had low level of awareness on means of weather based agro advisory services, further majority of the respondents were illiterate and belonged to middle age group might influence the low awareness among them. The results are in confirmation with the results of Rajesh (2011).

A perusal of Table 7 presents the data obtained regarding the awareness of farmers towards the importance of weather based agro advisory services. Statements agreed by farmers were ranked accordingly, majority of the farmers agreed that "On the basis of Weather forecast farmer should change their farm operation to increase crop productivity" (Ⅰ), followed by "Weather forecasting can act an activity management tool in day to day life also" (Ⅱ), "Weather forecasting advisory services increase certainly in planning and executing farm operations" (Ⅲ), "Weather forecasting agro advisory services helps in better utilization of land" (Ⅳ). "Traditional weather forecast information does not specify natural disaster like cyclone, depression, drought and flood in a year"(Ⅴ), "The weather forecast will be useful in disseminating information in local language based on current and past data" (Ⅴ Ⅰ), "Weather forecast agro advisory can reduce the input cost and help farmers in reducing farm losses

"(VII), "Scientific weather advisory services are more accurate than traditional methods of forecasting in agriculture "(VIII), "Weather forecast information is more location specific, rather than generalized" (IX).

The reason for the low awareness on the statements, On the basis of Weather forecast farmer should change their farm operation to increase crop productivity, Traditional weather forecast information does not specify natural disaster like cyclone, depression, drought and flood in a year, Weather forecast agro advisory can reduce the input cost and help farmers in reducing farm losses, Weather forecasting agro advisory services helps in better utilization of land, Weather forecast information is more location specific, rather than generalized, Weather forecasting advisory services increase certainly in planning and executing farm operations, The weather forecast will be useful in disseminating information in local language based on current and past data, Scientific weather advisory services are more accurate than traditional methods of forecasting in agriculture, Weather forecasting can act an activity management tool in day to day life also, the reasons for low level of awareness on the means of weather based agro advisory services could be due to several reasons such as farmers' unfamiliarity with the modern communication facilities and delay in the publication of unawareness of the farmers about weather forecasting advisory services. Weather forecasting advisory services bulletin in news properly. Moreover the applicability and utility of the weather forecasting advisory services might not be properly understood by the farmers. Therefore, for making weather based agro advisory services popular among the farmers the training and awareness campaign must be launched regarding the awareness, utility applicability and profitability of utilizing of this technology in form and day to day work.

Table 7. Distribution of the respondents according to their level of awareness on importance of weather based agro advisory services

S. No.	Statements	Fully Aware		Partially Aware		Not Aware		Mean score	Rank
		F	%	F	%	F	%		
1.	On the basis of Weather forecast farmer should change their farm operation to increase crop productivity	107	89.16	11	9.166	2	1.66	2.875	I
2.	Traditional weather forecast information does not specify natural disaster like cyclone, depression, drought and flood in a year.	71	59.16	47	39.16	2	1.66	2.57	IV
3.	Weather forecast agro advisory can reduce the input cost and help farmers in reducing farm losses.	77	64.16	30	25	13	10.83	2.53	VII
4.	Weather forecasting agro advisory services helps in better utilization of land.	77	64.16	35	29.16	8	6.66	2.57	IV
5.	Weather forecast information is more location specific, rather than generalized.	55	45.83	51	42.5	14	11.66	2.34	IX
6.	Weather forecasting advisory services	106	88.3	7	5.83	7	5.83	2.825	III

	increase certainly in planning and executing farm operations.		3						
7.	The weather forecast will be useful in disseminating information in local language based on current and past data	73	60.83	41	34.16	6	5	2.55	VI
8.	Scientific weather advisory services are more accurate than traditional methods of forecasting in agriculture	61	50.83	42	35	17	14.16	2.36	VIII
9.	Weather forecasting can act an activity management tool in day to day life also.	105	87.5	12	10	3	2.5	2.85	II

12. Contribution of independent variables on awareness about weather based agro advisory services:

Table 8. shows the regression coefficient of independent variables with awareness about weather based agro advisory services of the respondents and it can be said that all independent variables taken together explains 77.6 % variability (R^2 = 0.776) in awareness about weather based agro advisory services. Through regression analysis, it was found that the Annual income 4.912 Cropping pattern 2.132 and Size of land holding 7.159 were positively significant at 1 % level of significance. Age 1.813, Extension contact 1.048 and Mass media experience 1.050 was also positively significant at 5 % level of significance while rest of the dependent variables were non-significant

TABLE 8. Multiple – linear Regression analysis between independent variables of farmers with level of awareness of farmers towards weather based agro advisory services

Sl.No	Independent variables	Regression coefficient	Standard error	't' value
1.	Age	1.611	0.888	1.813*
2.	Education	0.100	0.124	0.806^{NS}
3.	Annual income	0.992	6.220^{NS}	4.912**
5.	Farming Experience	0.062^{NS}	0.088^{NS}	0.703^{NS}
6.	Size of land holding	2.988	0.417	7.159**
7.	Extension contact	0.807	0.769	1.048*
8.	Social participation	0.021	0.096	0.222^{NS}
9.	Mass media experience	0.069	0.065	1.050*
11.	Risk taking ability	0.278	1.176	0.237^{NS}
12.	Cropping pattern	0.886	0.415^{NS}	2.132**

R^2 = 0.776

**Significant level at 1% *Significant level at 5% NS = Non- significant

In multiple linear regression analysis majority of respondents have positive significant at 1% level i.e. Annual income, Cropping pattern, Size of land holding, with regard to.

4. CONCLUSION

According to the study's findings, the majority of respondents had a medium awareness of weather-based agro advisory services (38.33%), as well as a medium understanding of the material contained in agro advisory service bulletins. As a result, it was recommended that other farmers who are unaware of the agro-advisory service be encouraged to use it by raising awareness through the media, and for regular use by farmers, weather-based agro advisory services must provide up-to-date information about available and newly released varieties, etc. Furthermore, farmers might not fully comprehend the application and utility of the weather forecasting advisory services. Therefore, a training and awareness campaign about the benefits, viability, and use of this technology in form and day-to-day operations must be initiated in order to make weather forecasting advisory services popular among farmers. Improvements must be made to the system that informs people about weather changes and provides early warning in order to prevent negative consequences in the near future. Additionally, the appropriate policy decisions must be made by the development departments to provide agricultural inputs at the proper time in the villages. To help farmers survive in unfavorable climatic conditions, they should offer support prices, insurance for all crops, and subsidies to specific producers.

Consent

As per international standard or university standard, respondents' written consent has been collected and preserved by the author(s).

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