



Weather Based Agromet Advisories – A Grass Root Level Analysis in West Godavari District of Andhra Pradesh

V. Deepthi ^{a++*}, J. Venkata Satish ^{b#},
E. Karuna Sree ^{b†}, K. Venkata Subbaiah ^{a++},
T. Vijaya Nirmala ^{a++}, A. Devivaraprasad Reddy ^{a++},
G. Shaliraju ^{a,b+++‡}, B. Srinivasulu ^{c^}
and J. V. Prasad ^d

^a KVK, Venkataramannagudem, Dr. Y. S. R. Horticultural University, West Godavari,
Andhra Pradesh-534101, India.

^b Dr. Y. S. R. Horticultural University, West Godavari, Andhra Pradesh-534101, India.

^c ICAR-ATARI, Zone-X, Dr. Y.S.R. Horticultural University, West Godavari,
Andhra Pradesh-534101, India.

^d Agricultural Extension, KVK, Dr YSR Horticultural University, India.

Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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⁺⁺ Scientists;

[#] DAMU Agromet SMS;

[†] Principal Scientist and Head;

[‡] Director of Extension;

[^] Principal Scientist;

*Corresponding author: E-mail: deepthi.vavilapalli@gmail.com;

ABSTRACT

Weather based agromet advisories –A grass root level analysis was conducted in West Godavari district of Andhra Pradesh during 2021-2022. Created two groups first group adopting the agromet advisory services and another group was not aware of agromet advisory services A total 150 farmers were selected for this study among them 100 farmers in AAS group and rest 50 farmers in non-AAS group. Ex-Post-Facto research design was used for this study. Data was collected by pre-testing followed by personal interview method. Statistical tools like frequency, percentage and weighted mean score were used. majority of the AAS farmers belongs to middle aged (52%),males(100%),high school education(41%) and received the AAS in kharif,rabi seasons (60%),irrigated (100%),land holders (80%) and semi medium farm size (37%).AAS farmers had positive perception and attitude towards AAS.. Significant results were observed in crop in case of growth and yield among the AAS farmers compared to non-AAS farmers. The AAS farmers reported that they got 13, 8.5, 12, 4.1, 6.7, 12 and 14 per cent of additional benefit in paddy, maize, groundnut, Blackgram, chilli, tomato and banana respectively. agro-met advisory services should reach to more number of people” was ranked first suggestion followed by conduct more awareness programmes on agromet advisory services.

Keywords: Agro met advisory bulletins; net income; AAS farmers; yield; non -AAS farmers.

1. INTRODUCTION

Weather is the most important factors that adversely affect the agricultural production. All the activities in agriculture starting from the field preparation to post harvest are influenced by weather. Every phase of growth and development in plants are closely related with by the weather [1]. Rainfall and its distribution in the agriculture create greater effect than any other weather parameters i.e temperatures, wind speed and direction, relative humidity and cloudiness. Almost 70% of the India's population depends on the agriculture sector. 43% land is used for agricultural activity. Minor climate variations have major impact on farm output. Agriculture is highly sensitive to weather and its variability [2].

Agromet advisory services provide weather and climate information along with farm management practices. These advisories empower farmers to climate risk minimization [3]. The adverse effect of weather on the farmer's livelihood can be reduced if the weather forecast and advisory services is used effectively [4,5]. Therefore, it is important to educate farmers about the value of agromet advisories in managing daily agricultural operations, which will lower losses and increase production [6]. Accordingly Agrometeorological Advisory Services (AAS) at the Agroclimatic zone level have been offered to the farming community by the National Centre for Medium Range Weather Forecasting (NCMRWF) under the Ministry of Earth Sciences (MoES), Government of India, in cooperation with the

India Meteorological Department (IMD), Indian Council of Agricultural Research, and State Agricultural Universities (MRWF) [7]. Hence Present study was conducted during the year 2021-2022 to know the frequency and coverage of weather forecast used by the farmers and perception of farmers towards AAS and impact of AAS on crop productivity and economics of farmers and qualities of AAS.

2. METHODOLOGY

Weather based agromet advisories –A grass root level analysis was conducted in West Godavari district of Andhra Pradesh during 2021-2022. Created two groups first group adopting the agromet advisory services (AAS farmers) and another group was not aware of agromet advisory services (Non AAS farmers). A total 150 farmers were selected for this study among them 100 farmers in AAS group and rest 50 farmers in non-AAS group. Ex-Post-Facto research design was used for this study. Data was collected by pre-testing followed by personal interview method. Statistical tools like frequency, percentage and weighted mean score were used.

Dr. YSR Horticultural university, Krishi Vigyan Kendra, District Agromet unit (DAMU) taking data in every Tuesday and Friday from Indian meteorological department Pune. Based on this forecast weather bulletins prepared and circulate among the 28 number of Whatsapp groups farmers in the district. Through these Whatsapp groups, agromet advisory bulletins prepared and disseminated to farmers (11280) and extension

personnel (573) on every Tuesday and Friday covering 905 villages in west Godavari district. Statistical tools like frequency and percentage were used.

3. RESULTS AND DISCUSSION

Results and discussion part covers the profile characteristics of AAS farmers, AAS farmer's perception towards agro-met advisory service, Impact of AAS on crop productivity and economics of cropping systems, Attitude of

farmers towards AAS and Suggestion given by the farmers.

Age: It was found that 29 % of the respondents fell under the young age group, while majority (52 %) of the respondents fell under middle age group (36–55 years) and the remaining 19 % were above 56 years of age which were classified as old age group. this shows that middle aged farmers are usually enthusiastic and try various technologies and have moderate experience in farming.

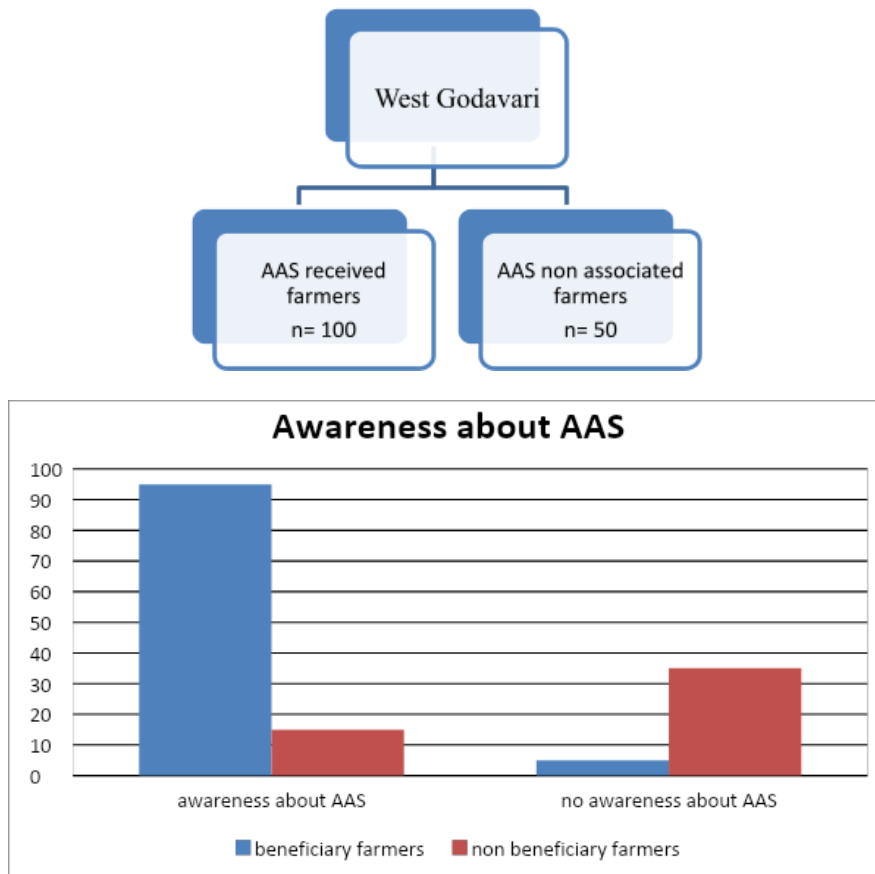


Fig. 1. Graph showing awareness about AAS

Table 1. Profile characteristics of AAS adopted farmers

Variable	Category	Percentage
Age	Young (Below 35 years)	29
	Middle (36 to 55 years)	52
	Old (more than 56 years)	19
Gender	Male	100
	Female	NIL
Education	Illiterate	6
	Primary school	12
	High school	41
	Intermediate	23

Variable	Category	Percentage
	Degree	12
	Post graduate	6
Season of crop	Kharif	30
	Rabi	10
	Both Kharif &Rabi	60
Type of farming	Irrigated	100
Type of farmer	land holder	80
	Tenant farmer	20
Land holding	Marginal	8
	Small	22
	Semi medium	37
	Medium	22
	Large	11

Gender: it was revealed that 100% of the respondents belong to male category. It could be inferred from the above results that farming is mostly dominated by the male farmers only female participation in farming is very less.

Education: High school educated comprised of 41 %, intermediate comprised 23 % primary school and degree educated comprised both of 12%, and the respondents who had no education and post graduate level comprised 6%. It could be inferred that the farmers who had higher level of education were able to adopt the AAS quickly when compared to less educated persons.

Season of crop: From the Table 1 it was revealed that both the kharif and rabi seasons farmers received the AAS up to 60%. during kharif season high temperature is noticed .after harvesting also , rainfall and temperature play a major role in post-harvest operations.in rabi cold waves occurance is more. Adoption of AAS in both the seasons helpful to farmers.

Type of farming: The farmers who received the AAS have 100% irrigation facility. most of the sample respondents belongs to delta area of west Godavari district only.

Type of farmer: from the study it was concluded that 80 % of the farmers are having land ownership and 20 % of farmers belongs to tenant farmers.both the owner and tenant farmers shows interest towards AAS.

Land holding: It could be observed from the Table 1 that majority (37.00%) of the farmers had semi medium farm size followed by medium, small farm size (22%), large farm size (11%), and marginal (8.00%) farm size.from the study it could be concluded that higher the land holding status farmers are more positive towards adoption of AAS.

3.1 AAS Farmer's Perception towards Agro-met Advisory Service in West Godavari District

The results on farmers perception about agromet advisory service revealed 65 % of farmers rated the service as very good on the scale of very poor to very good. Majority of the farmers 100 % agreed on necessity of AAS and felt that advisories based on predicted rainfall event is very much useful in their farming activities. Majority 88% of farmers perceived that AAS was essential and it helps to reduce the post-harvest losses followed by managing pest and diseases (75%) during cropping season. more than 85% of the farmers opined that real time agro met advisory services was helpful in harvesting stage followed by sowing stage 82% since dissemination of AAS services prior to cropping season with useful weather information particularly information on timely rainfall, temperature and humidity helps farmers to plan their farm activities specially land preparation and sowing activities timely and accurately, more than 91% of farmers perceived AAS was accurate timely available and 95 % of farmers expressed they regularly receive the biweekly weather forecast more than 92% of farmers opined that biweekly forecast of weather information was good as it helps to take short term decisions on farming activities. Preferred medium of weather forecast and Source of weather forecast is whatsapp and short message service (SMS) expressed by 47 & 46% of farmers. 97% of the farmers opined weather based advisories are useful in their day-today farming. 65% farmers opined weather information on rainfall most important for their farm operations followed by the cloud coverage. 50% farmers Preferred time to see weather advisories was 6-7 PM followed by 7-9 AM.

90% of farmers spread the weather based messages through whatsapp followed by oral discussion. 100% of farmers expressed that no production lost during the crop season at the time when weather based advisories are

received. findings of the study indicated that more than 95% of AAS farmers were satisfied with the agro met advisory services. These findings were also supported by the work of Manjusree R.V. et al. [8].

Table 2. AAS farmers perception towards agro-met advisory service

Parameters	AAS received farmers	
	Frequency (f)	Percentage (%)
Perception about AAS		
Very poor	8	8
Poor	22	22
Good	5	5
Very good	65	65
Necessity of AAS		
Yes	93	93
No	7	7
For which weather parameter AAS is essential		
Rainfall	100	100
Temperature	46	46
Cloud cover	80	80
Wind velocity	74	74
Benefit of AAS		
Yes	82	82
No	18	18
Which way you are benefited from AAS		
Reducing cost during sowing	67	67
Fertilizer application	62	62
Managing pest and disease	75	75
Avoid post-harvest losses	88	88
Reducing irrigation charges	40	40
At what stage of crop AAS is essential		
Sowing stage	82	82
Flowering stage	66	66
Fruit formation stage	55	55
Harvesting stage	85	85
Quality of AAS information disseminated		
Good	91	91
Average	6	6
Poor	3	3
Do you receive bi weekly forecast and agro advisory bulletin		
Yes	100	100
No	-	-
Regularity of weather forecast		
Regular	95	95
Somewhat regular	3	3
Irregular	2	2
Frequency of forecasting		
Daily	6	6
Weekly	2	2
Bi-weekly	92	92
Monthly	0	0
Source of weather forecast		
Whatsapp	36	36
SMS	8	8

Parameters	AAS received farmers	
	Frequency (f)	Percentage (%)
Both (Whatsapp ,SMS)	46	46
Oral	10	10
Preferred medium of weather forecast		
Whatsapp	37	37
SMS	9	9
Both (Whatsapp ,SMS)	47	47
Oral	7	7
How relevant/useful are the weather based advisories		
High	97	97
Partial	3	3
weather event most important for your farm operation		
Rains	65	65
Cloud coverage	25	25
Wind	10	10
Preferred time to see weather advisories		
5-7AM	5	5
7-9AM	25	25
12-2PM	10	10
3-5PM	10	10
6-7 PM	50	50
8-10PM	5	5
How do you spread message to others		
Whats app	90	90
Oral discussion	10	10
Average percentage of production lost during the crop season		
nil	100	100
Overall satisfaction about AAS		
Yes	95	95
No	5	5

3.2 Impact of AAS on Crop Productivity and Economics of Cropping Systems

Economic analysis of both the group of farmers were compared at every stage from land preparation to harvest and crop growth and yields were monitored regularly among them.

Impact of AAS on crop productivity and economics of cropping systems indicated that there was considerable benefit to farmers who are adopted and regularly follow the agromet advisory services over non adopted farmers. The percent gain in net income due to AAS was ranging from 4.1 to 14 %. The net returns realized by the AAS farmers was more as compared to non AAS farmers which was mainly attributed to timely adoption of farm advisories disseminated by the District Agromet Unit (DAMU). Further better crop management practices based on advisories such as timely sowing, selection of improved varieties, timely

application of fertilizer, pest and disease management, lifesaving irrigation and harvesting which help them to reduce the cost of cultivation over non AAS farmers. The high net returns and reduced cost of cultivation of different crops under AAS category. This was also evident from B:C ratios arrived from the results. The AAS farmers reported that 13, 8.5, 12, 4.1, 6.7, 12, 14% of additional benefit in paddy, maize, groundnut, Blackgram, chilli, tomato and banana. AAS services are provided to fruit crops during the stages of pre flowering, flowering, fruit setting and fruit development to harvesting for mango, banana, guava, acid lime and papaya. AAS especially during pre and post cyclone periods gained a huge positive response from the farmers by following timely harvesting advisories based on current and forecasted weather conditions saved 15 to 20 per cent of farmers income by avoiding losses due to weather variations. Similar results reported by the Ray M et al. [9] and Mummigatti. U.V et al. [10].

Table 3. Impact of AAS on crop productivity and economics of cropping systems

Crops	AAS farmers				Non-AAS farmers				Net returns % changeover non AAS
	Cost of cultivation/ha	Yields /ha	Net returns/ha	Benefit- cost ratio	Cost of Cultivation /ha	Yields/ha	Net returns/ ha	Benefit-cost ratio	
Paddy	36500	6.25 t	62925	1.73:1	41700	7t	55600	1.5:1	13
Maize	69500	85 q	83500	1.2:1	72500	83 q	76,900	1.06:1	8.5
Groundnut	38875	38.75q	209250	5.4:1	43500	40 q	185670	4.2:1	12
Blackgram	30000	22.5q	76250	2.54:1	34500	24 q	73200	2.1:1	4.1
Chilli	190000	75 q	260000	1.36:1	220000	79 q	243500	1.1:1	6.7
Tomato	28130	30q	59055	2.09:1	29912	27q	52592	1.75:1	12
Banana	198430	32.5t	268400	2.35:1	1872875	27.5 t	235342	2.26:1	14

Table 4. Attitude of farmers towards AAS

S. No	Particulars	Beneficiary of weather based agro advisory services		Non- beneficiary of weather based agro advisory services	
		Frequency	Percent	Frequency	Percent
1	Increase in the production of crop due to weather based agro advisory services.	100	66.66	50	33.33
		83	55.30	17	11.33
2	Farm income is increased through Weather Based agro advisory.	78	51.99	13	8.66
3	Received benefit from abnormal weather forecast and saving expenditure on irrigation and plant protection.	95	63.32	18	11.99
4	Saving expenditure on spraying of insecticides/pesticides/fungicides.	97	64.66	21	13.99

Table 5. Suggestions given by the farmers

S.No	Suggestions	WMS	Rank
1	AAS should reach to more number of farmers	1.93	1
2	Develop weather information based mobile application	1.47	6
3	Conduct more awareness programmes on agromet advisory services	1.81	2
4	Send the Weather based information in Short MessageService (SMS) form instead of whatsapp	1.54	5
5	AAS should cover the information on seed, planting material availability	1.72	3
6	mandal as a unit prepare and send the weather information.	1.63	4

It could be observed from the Table 4 that 64.66 per cent farmers saving expenditure in crop production by using information of spraying of insecticides/pesticides/fungicides from weather based agro advisory. Also 63.32% farmers benefited in saving expenditure on irrigation and plant protection. 55.30% farmers reported that increase in the production of crop due to availability of weather-based agro advisory. 51.99% reported that farm income is increased through weather based agro advisory. It could be inferred from the results that farmers who are received the AAS had positive attitude and who are not aware of AAS had a negative attitude. AAS highly useful for planning of spraying operations and scheduling of irrigation.

3.3 Suggestion given by the Farmers

It can be seen from the Table 5 that the suggestion “agro-met advisory services should reach to more number of people” ranked first for this purpose create more number of whatsapp groups and disseminate the AAS to more farmers groups. “Conduct more awareness programmes on agromet advisory services “ranked second many of the farmers not aware of AAS for this purpose conduct awareness programmes, trainings among the farming community. “AAS should cover the information on seed, planting material availability” ranked third. Along with crop management practices provide the information on availability of seed, planting material to the farmers.” mandal as a unit prepare and send the weather information” ranked fourth at present district agromet unit prepare the AAS based on divisional level each division again having 5-6 mandals prepare the weather based AAS mandal level instead of divisional level. “Send the Weather based information in Short Message Service (SMS) form instead of whatsapp” ranked fifth many of the farmers not having the smartphones for this reason send the AAS through SMS form.

“Develop weather information based mobile application” ranked last among the suggestions. Mobile applications connect the farmers fast and easy [11].

4. CONCLUSION

Based on the findings of the study, It was revealed that AAS farmers get higher yield and net returns than Non-AAS farmers because of using the agro-weather advisory, the crop of AAS farmers used to less cost of cultivation and the use of agricultural techniques increased the yield therefore resulted in higher net returns. Suggestions reported by the farmers were AAS should reach to more number of farmers, Conduct more awareness programmes on agromet advisory services and AAS should cover the information on seed, planting material availability. This study helpful for agro metrological researchers and administrators for planning the policy in the coming climate changing era.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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