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Perception and adoption of weather based agro advisory services by farmers in scarce rainfall zone of Andhra Pradesh

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Abstract

The study was conducted in Kurnool and Anantapur districts of Andhra Pradesh with sample size of 180. The objective of the study was to find out the perception of farmers on Weather based agro advisory services and their adoption. From the study it was found that 63.16% farmers received message in right time. Most of the farmers felt that message regarding pest and disease management was timely with mean score of 2.88 followed by weather forecasting. Sixty one percent agreed that the messages were useful. Message on drought mitigation strategy was more useful with mean score of 4.24 followed by information on availability of seed and seedling material. Seventy two percent farmers fully adopted the WBAAS. Pest and disease management message was highly adopted with mean score of 2.82, followed by Intercultural operations and weather forecasting.

Keywords: WBAAS (Weather based agro advisory services)

Introduction

Application of science and technology to predict the state of atmosphere for the future time and a given location can be called as Weather forecasting. The interactions of the weather with the crop and animal production systems are dynamic and often complex. Weather adversely affects the crop and animal health in the form of cyclones, floods, drought and pest outbreak. Selection of crops, planting material, irrigation scheduling, inter culture, insect and disease control and harvesting are strongly influenced by the weather.

Need for weather forecasting

It is estimated that about eight percent of the total crop losses can be avoided through improved weather forecasts. Better understanding of weather and its variability on the overall effect of the different processes contributing to agricultural production is necessary to adopt appropriate cropping system, soil and water management practices. Any appropriate forecast on weather has tremendous benefits in terms of pre-facto management of negative impacts of vagaries of weather. This is because of the cost of prefacto risk reduction due to weather is much smaller than the past -facto management losses. The availability of adequate information is critical for increasing agricultural productivity (Nain *et al.*, 2015) [3]. Small and marginal farmers, who make up the bulk of farmers in India, frequently lack access to correct information targeted at raising yields and pushing up crop prices (Panda *et al.*, 2019, Panda *et al.*, 2020) [5, 6] According to Patel *et al* (2020) [8] most of the farmers applied the advisories given by KVK on day to day farming activities. Patel. K. V., *et al* (2022) [7] also reported that most of the farmers have positive opinion about kisan mobile advisory services. In this context, it is necessary to study the effectiveness of weather based agro advisory services as perceived and adopted by farmers in Scarce Rainfall zone of Andhra Pradesh. The study was conducted to analyze the messages received in terms of timeliness of the messages, quality of messages, utility of messages and adoption of the messages in the study area

Materials and Methods

The study was conducted in Kurnool and Anantapur districts of Andhra Pradesh during August 2022. Three villages from Kurnool district and three villages from Anantapur district were purposively chosen as NICRA project was being implemented. A sample of thirty was drawn randomly from each village thus making sample size of 180 farmers.

Farmers perception and adoption towards WBAAS

The perception of farmers towards WBAAS was measured with structured schedule. The response of the farmers was taken on three- point continuum namely not at all, some times and always for timeliness of information. The scores given were 0, 1 and 2 respectively. For utility of information 0-4 score was given. For Adoption of WBAAS the response was taken on a three-point continuum (0-2) namely non adoption, partial adoption and full adoption.

Impact of weather based agro advisories on effectiveness of the messages

It is referred to the service provided by WBAAAs in right time to farmers regarding soil testing, availability of seed and planting material. Crop advisories in agriculture and horticulture, pest and disease management, weather forecast, livestock management, post harvest management and irrigation management. The perception of the farmers regarding the receipt of the information was collected and tabulated.

Perception on timeliness of information by study area farmers

From the table (1) it was evident that majority of the farmers in both the districts felt that the message on soil testing and soil preparation and soil health was sometimes timely (61.1%) followed by always timely (36.1%) and not at all timely(2.8%). With regard to message on crop management in agriculture crops majority of the farmers (56.1%) felt that the message was always timely followed by sometimes timely(41.7%) and not at all timely (2.2%).Majority of the farmers opined that the messages on crop management in vegetables and horticulture crops was sometimes timely (50.0%) followed by always timely (46.7%) and not at all

timely (3.3%).Regarding the availability of seed and planting material majority of the farmers (52.2%) opined that the message received was sometimes timely followed by always timely (44.4%) and not at all timely (3.3%). With respect to the message on pest and disease management, majority (90.0%) of the farmers opined that the message received was always timely, followed by some times timely (7.8%) and not at all timely (2.2%). Likewise for weather forecasting also majority of the farmers (73.9%) opined that the messages were always timely, followed by some times timely (22.8%) and never timely (3.3%). Regarding the message on drought mitigation strategies to save the standing crop majority of the farmers (82.8%) opined that the message was always timely, followed by some times timely (14.4%) and not at all timely (2.8%) Concerning the message on weather based livestock disease management majority of the farmers (73.9%) opined that the message received was always timely, followed by some times timely (22.8%) and not at all timely (3.3%). With regard to post harvest management majority (58.3%) felt that the message was always timely, followed by some times timely (37.8%) and not at all timely (3.9%). Regarding the water management for ID crops majority of the farmers (58.3%) judged that the message received was always timely followed by some times timely (37.8%)and not at all timely (3.9%). On the whole the score on timeliness of information depicts that majority of the farmers (63.16%) felt that the messages received are always timely followed by some times (33.83%) and never (2.9%).

The results are in accordance with the findings of Madan Singh *et al* (2015) ^[2] who reported that majority of the farmers received information in time related to soil and water conservation, seed material and pest and disease management. Kumbhare N. V. *et al* (2019) ^[1] also reported that the messages were timely received.

Table 1: Perception of Farmers on Timelines of information in the study area

S. No.	Statement	No. of farmers by Timeliness of information			
		Not at all timely	Sometimes timely	Always timely	Total
1	Soil testing & Soil preparation& soil health management.	5(2.8)	110(61.1)	65(36.1)	180(100.0)
2	Crop management in agriculture crops	4(2.2%)	75(41.7)	101(56.1)	180(100.0)
3	Crop management in vegetables and horticulture crops	6(3.3)	90(50.0)	84(46.7)	180(100.0)
4	Availability seed and planting material	6(3.3)	94(52.2)	80(44.4)	180(100.0)
5	Pest and disease management	4(2.2)	14(7.8)	162(90.0)	180(100.0)
6	Weather forecasting	4(2.2)	23(12.8)	153(85.0)	180(100.0)
7	Drought mitigation strategies to save the standing crops.	5(2.8)	26(14.4)	149(82.8)	180(100.0)
8	Weather based livestock disease management	6(3.3)	41(22.8)	133(73.9)	180(100.0)
9	Post harvest management	7(3.9)	68(37.8)	105(58.3)	180(100.0)
10	Water management for I D crops	7(3.9)	68(37.8)	10(58.3)	180(100.0)(00.0)
	Total Mean	5.3±0.37	60.9±10.49	113.7±10.64	180(100.0)
	Total %	2.9	33.83	63.16	100.0

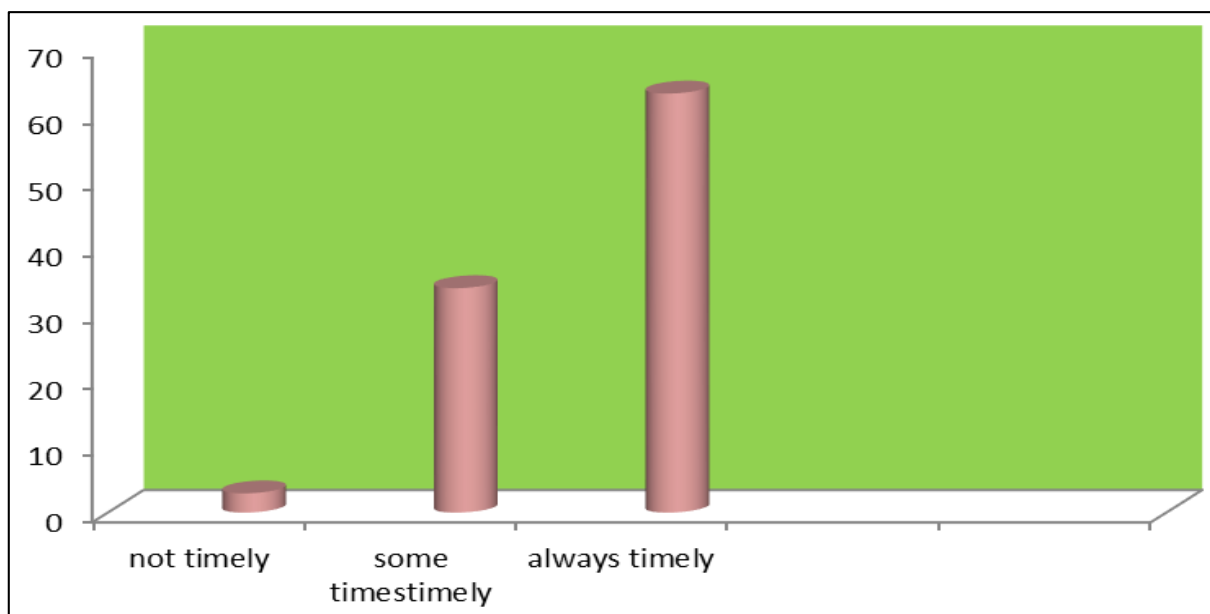


Fig 1: Depicting the mean score of the information on timeliness in scarce rainfall zone

Perception on timeliness of individual messages

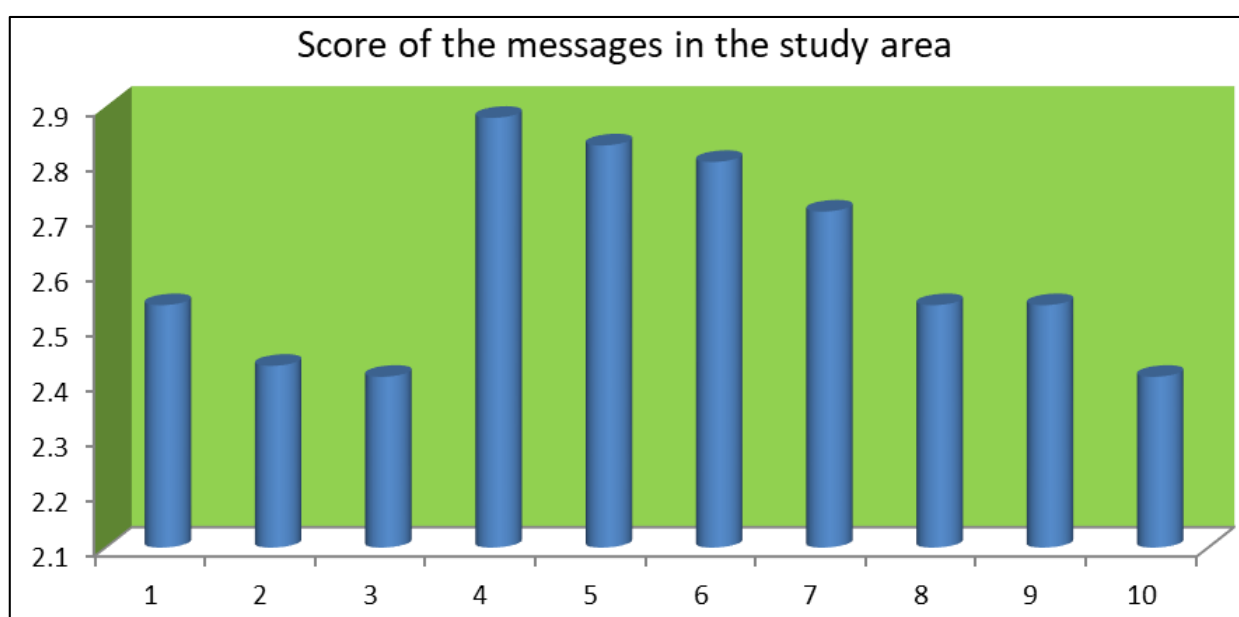
The table 2 and figure 2 the mean, standard deviation and coefficient of variation with regard to timeliness of information provided by WBAAS. The mean score of pest and disease management was 2.88 which states that farmers are informed about the incidence of pest and diseases and their management strategies at the time of cropping season followed by weather forecasting (2.82) and it was closely

followed by drought mitigation strategies (2.80). The lowest mean score obtained was 2.33 for Soil testing & Soil preparation & Soil health. The coefficient of variation for Water management for I D crops was high (22.70) which signifies that it was highly inconsistent among the farmers. But other parameters were consistent because of low coefficient of variation

Table 2: Descriptive statistics on Perception on timeliness of individual messages in the study area

Statistics	1	2	3	4	5	6	7	8	9	10
Mean	2.33	2.54	2.43	2.61	2.88	2.82	2.80	2.71	2.54	2.41
S.D	0.52	0.53	0.55	0.55	0.39	0.43	0.46	0.52	0.57	0.54
C.V (%)	22.67	21.24	22.56	22.81	13.59	15.35	16.65	19.35	22.55	22.70

1. Soil testing 2. Ag crop management 3. Crop management in horti 4. Seed material 5. Pest and disease mgt 6. weather forecasting 7. Drought mitigation strategies 8. Livestock diseases 9. Post harvest management 10. Water mgt for ID crops



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Fig 2: Score of the messages based on timeliness in the study area

Utility of information by Farmers in the Study area

The table 3 indicates majority of the farmers in the study area agreed (68.3%) that the soil testing information was utilized for farm management, followed by Strongly agree (18.3%) and neutral (12.8%). Most of the farmers agreed (63.3%) that the information was utilized for reduction in cost of cultivation. Twenty three strongly agreed and 12.2 percent of the respondents are neutral regarding the utility of information followed by strongly disagree (1.1%). With regard to crop management advisories in vegetables and horticulture crops most of the farmers (65.0%) agreed for its utility followed by Strongly agree (19.4%) and neutral (13.9%) and disagree (1.1%). Regarding the utility of information on new and improved varieties for enhanced yields majority of the farmers (66.1%) agreed, followed by Strongly agreed ((27.8%), neutral (3.9%) and disagreed (1.7%). Majority of the farmers agreed (66.7%) messages in right time reduced pest and disease incidence, followed by strongly agreed (23.9%), neutral (6.1%), disagreed (2.2%) and strongly disagreed (1.1%). Regarding taking up farm operations majority of the farmers agreed (57.8%) followed by strongly agreed (30.6%). However 7.2 percent are neutral and 2.8 percent disagreed

and 1.7 percent strongly disagreed. With respect to the utility of drought mitigating strategies majority (60.0%) agreed, followed by strongly agreed (33.3%), neutral (5.0%), and disagree (1.1%). Regarding the utility of advisories on management of livestock diseases majority farmers agreed (54.4%), followed by strongly agree (26.1%). However 15.6 percent are neutral on utility of the message and 3.3 percent disagreed. Concerning weather advisories to reduce post harvest losses majority of the agreed (57.2%) followed by strongly agreed (26.1%). However 12.8 percent are neutral, and 3.3 percent disagreed. Utility of information regarding saving of supplementary irrigation majority of the farmers agreed (56.1%) followed by strongly agreed (21.1%). However 18.3 percent are neutral, and 3.9% disagreed.

The mean scores in the table indicates that majority of the farmers agreed (110.7±2.8), followed by Strong Agreement (44.9±2.77) and Neutral (19.4±). The results are in tune with Rani Sexena *et al.*, (2015) [9] and sangeeta *et al.*, (2015) [10] who concluded that the application of weather forecast based agromet advisory bulletin is useful tool for sustaining the production and overall farm income.

Table 3: Utility of information by Farmers in the Study area

S. No.	Statement	SDA	D	N	A	SA	Total
1	Soil testing information is suited to my farm management	0(0)	1(0.6)	23(12.8)	123(68.3)	33(18.3)	180(100.0)
2	Crop management advisories decreased cost of cultivation in agriculture crops	2(1.1)	1(0.6)	22(12.2)	114(63.3)	41(22.8)	180(100.0)
3	Crop management in vegetables and advisories helped to increase yield in horticulture crops.	1(0.6)	2(1.1)	25(13.9)	117(65.0)	35(19.4)	180(100.0)
4	New and improved varieties o increased the productivity of crops.	1(0.6)	3(1.7)	7(3.9)	119(66.1)	50(27.8)	180(100.0)
5	Messages in right time reduced pest and disease incidence.	2(1.1)	4(2.2)	11(6.1)	120(66.7)	43(23.9)	180(100.0)
6	Weather forecasting was useful in taking up farm operations	3(1.7)	5(2.8)	13(7.2)	104(57.8)	55(30.6)	180(100.0)
7	Drought mitigation strategies to save the standing crops.	1(0.6)	2(1.1)	9(5.0)	108(60.0)	60(33.3)	180(100.0)
8	Advisories on livestock in managing the animal diseases.	1(0.6)	6(3.3)	28(15.6)	98(54.4)	47(26.1)	180(100.0)
9	Weather advisories to reduce the post harvest losses	1(0.6)	6(3.3)	23(12.8)	103(57.2)	47(26.1)	180(100.0)
10	Information provided reduced cost on supplementary	1(0.6)	7(3.9)	33(18.3)	101(56.1)	38(21.1)	180(100.0)
	Mean	1.4±0.266	3.7±0.70	19.4±2.78	110.7±2.8	44.9±2.77	180(100.0)
	%	0.77	2.05	10.7	61.5	24.94	

SDA- Strongly Disagree	D - Disagree	N- Neutral	A -Agree	SA- Strongly Agree
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Utility of individual messages by Study area Farmers

The table 4 and figure 3 depicts the mean, standard deviation and coefficient of variation with regard to quality of information provided by WBAAS. The mean score for Drought mitigation strategies to save the standing crops was high (4.24) which signifies that the farmers are well aware of the drought mitigation strategies. It was followed by information of new and improved varieties (4.19). Weather

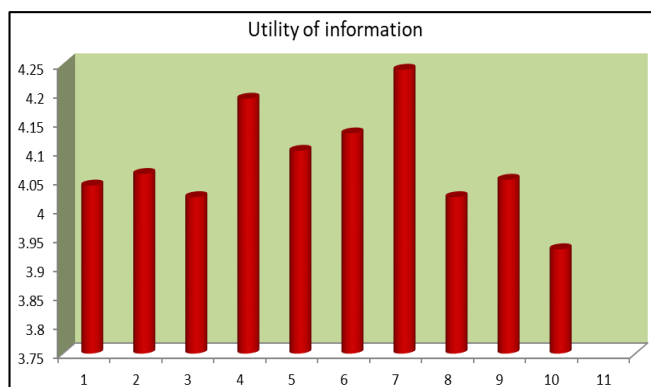
forecasting scored 4.13 followed by Pest and disease management (4.10). The coefficient of variation for water management in ID crops obtained was high (19.67) which signifies that it was highly inconsistent among the farmers. But other parameters were consistent because of low coefficient of variation.

Utility of Information

Table 4: Descriptive statistics on Perception on utility of information

Statistics	1	2	3	4	5	6	7	8	9	10
Mean	4.04	4.06	4.02	4.19	4.10	4.13	4.24	4.02	4.05	3.93
S.D	0.60	0.69	0.66	0.63	0.69	0.79	0.65	0.78	0.76	0.77
C.V (%)	14.89	16.90	16.32	15.10	16.93	19.17	15.28	19.30	18.69	19.67

1. Soil testing 2. Ag crop management 3. Crop management in horti 4. Seed material 5. Pest and disease mgt 6. weather forecasting 7. Drought mitigation strategies 8. Livestock diseases 9. Post harvest management 10. Water mgt for ID crops



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Fig 3: Score on utility of information in the study area

Adoption of Weather based Agro Advisory Services by the farmers

Adoption is defined as a decision to make use of all the weather based Agro Advisory services according to the circumstances. Adoption has been operational zed as willingness of farmers to adopt the messages received. Table 5 indicates that Crop advisory on Selection of crops based on weather was fully adopted by majority (55.6%) of farmers, followed by partial adoption (42.8%) and non adoption (1.7%). Farm Advisory on selection of crop varieties based on weather was fully adopted by majority (52.8%) of farmers,

followed by partial adoption (45.6%) and non adoption (1.7%). Farm Advisory on preparatory cultivation based on weather was fully adopted by majority (66.1%) of farmers, followed by partial adoption (32.8%) and non adoption (1.1%). Farm advisory on scheduling of supplementary irrigation based on weather was fully adopted by majority (76.1%) of farmers, followed by partial adoption (19.4%) and non adoption (4.4%). With regard to scheduling of plant protection measures based on weather was fully adopted by majority of the farmers (85.0%), followed by partial adoption (11.7%) and non adoption (3.3%). Monitoring of pest and diseases based on weather information was fully adopted by majority (78.9%) of the farmers, followed by partial adoption (18.9%) and non adoption (2.2%). Taking up inter cultivation operations were also fully adopted by majority of the farmers (84.5%) based on weather information followed by partial adoption (10.0%) and non adoption (5.5%). Taking up drought mitigation strategies was also adopted by majority of the farmers (81.1%) followed by partial adoption (17.2%) and non adoption (1.7%). Scheduling of harvesting operations based on weather information was adopted fully by majority of the farmers (76.1%) followed by partial adoption (20.0%) and non adoption. (3.0%). Health and nutritional care of the livestock based on weather information was fully adopted by majority of the farmers (64.4%) followed by partial adoption (29.4%) and non adoption (6.1%).

The study that majority of the respondents (72%) had fully adopted the weather based agro advisory services this reflects the mileage of the project.

Table 5: Extent of Adoption of Weather based Agro Advisory Services by the farmers in scarce rainfall zone of AP

S. No.	Statement	Non-adoption	Partial adoption	Full adoption	Total
1	Selection of crops based on the weather-based farm advisories	3 (1.7)	77(42.8)	100(55.6)	180(100.0)
2	Selection of varieties based on the weather-based farm advisories	3(1.7)	82(45.6)	95(52.8)	180(100.0)
3	Preparatory cultivation based on the weather- based farm advisories	2(1.1)	59(32.8)	119(66.1)	180(100.0)
4	Scheduling of supplementary irrigation based on the weather information.	8(4.4)	35(19.4)	137(76.1)	180(100.0)
5	Scheduling of plant protection measures based on weather information.	6(3.3)	21(11.7)	153(85.0)	180(100.0)
6	Monitoring the crop for incidence of pest and disease based on the farm advisories.	4(2.2)	34(18.9)	142(78.9)	180(100.0)
7	Intercultivation operations based on the weather-based farm advisory	10(5.5)	18(10.0)	152(84.4)	180(100.0)
8	Taking up drought mitigation strategies in standing crops like urea spray, Kno3 spray, etc.	3(1.7)	31(17.2)	146(81.1)	180(100.0)
9	Scheduling of harvesting operations based on the weather based information.	7(3.9)	36(20.0)	137(76.1)	180(100.0)
10.	Health and nutritional and care of livestock based on the weather based on advisory services.	11(6.1)	53(29.4)	116(64.4)	180(100.0)
		6.1%	29.4%	64.4%	100.0%
	Mean	5.7	44.6	129.7	180
	%	3.1	24.77	72.00	100

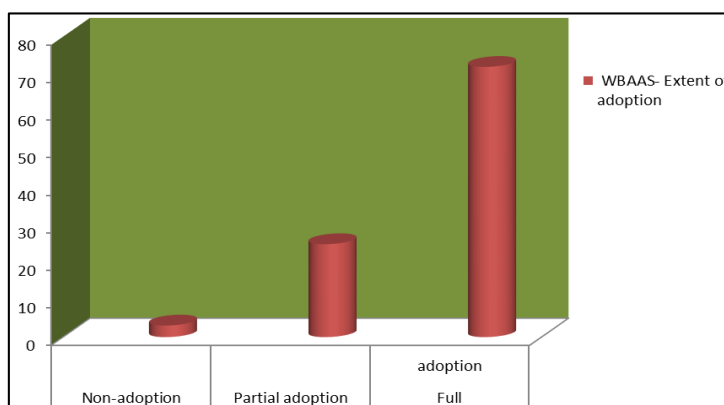


Fig 4: Extent of Adoption of Weather based Agro Adviosry services

Preference in adoption of technology through weather based agro advisory services by the farmers

The table 6 and figure 5 depicts the mean, standard deviation and coefficient of variation with regard to extent of adoption of WBAAS. The mean score of pest and disease management was 2.82 which states that farmers are well informed about scheduling of pest and diseases management in the cropping season followed by weather forecasting and taking up inter cultivation operations (2.79), which signifies that the adoption of information by the farmers was good. The lowest mean score obtained was 2.51 for selection of crop varieties. The coefficient of variation for livestock management obtained was high (23.46) which signifies that it was highly inconsistent among the farmers. But other parameters were consistent because of low coefficient of variation

It was evident that the adoption is high in case of scheduling pest and disease management in the cropping season is high due to the immediate and felt need of the farmers as the solution to their problem is sought immediately. The mean score for adoption of the crop varieties is low because farmers

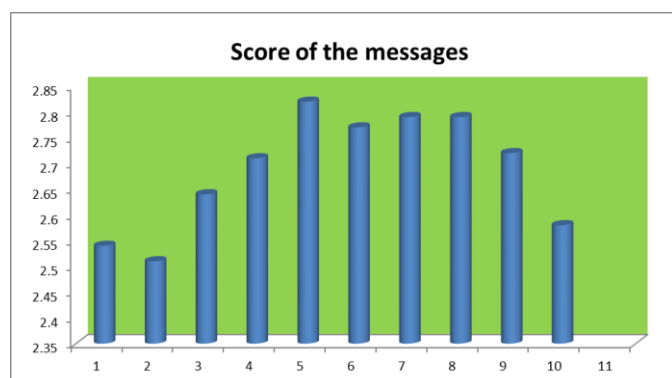
are not sure of the availability of the new seed and at times getting seed material is the biggest challenge farmers' face in adoption of the new varieties. However farmers adoption of weather information is improving and the farm decisions are related to weather information.

The results are in tune with the findings of Sonal Agrawal *et al* (2019) [11] who reported that medium level of adoption of recommended practices (61%) was observed in Kisan Mobile Sandesh beneficiaries. Majority of the young age group (57.26%) utilized KMS with high school education, medium size land holdings, and medium annual income. Economic motivation is high with higher information seeking behavior. KMS approach in addition to old approach gave confidence and trust between extension field functionaries and farmers. And also useful in obtaining feedback from the farming community, which help in proper transfer of technology. Vinayak N *et al* (2020) [12] also reported that reduction in crop loss with weather forecasting information specially with unseasonal rainfall.

Table 6: Descriptive statistics on adoption of weather based agro advisory services

Statistics	1	2	3	4	5	6	7	8	9	10
Mean	2.54	2.51	2.64	2.71	2.82	2.77	2.79	2.79	2.72	2.58
S.D	0.53	0.53	0.52	0.56	0.47	0.47	0.53	0.44	0.53	0.61
C.V (%)	20.97	21.25	19.53	20.56	16.56	17.13	18.95	15.91	19.44	23.46

1. Selection of crops 2. Selection of varieties 3. Preparatory cultivation 4. Supplementary irrigation scheduling 5. Scheduling of plant protection measures 6. Pest and disease monitoring 7. Intercultivation operations 8. Drought mitigation strategies 9. Harvesting operations 10. Care of livestock



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Fig 5: Depicting the score of the messages

Conclusion

It can be concluded that WBAAS are reaching the farmers in time and most of the farmers agreed that the messages given were useful and are well adopted by the farmers. As the services are helpful to farmers, these type of services should be available to all farmers in the country on regular basis to harness the full potential of agriculture.

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