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Development and issuance of value added weather-based agromet advisory services for groundnut (*Arachis hypogaea* L.) using IMD medium-range weather forecasts during Kharif season

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ABSTRACT

A field investigation was carried out during Kharif 2025 at the AICRP on Groundnut Field Unit, Zonal Agricultural and Horticultural Research Station (ZAHRS), Babbur farm, Hiriyur, Chitradurga, Karnataka, India, to develop and issue value-added weather-based Agromet Advisory Services (AAS) for groundnut using India Meteorological Department (IMD) medium-range weather forecasts. Weather forecasts (3-10 days) received twice a week from the Agromet Field Unit (AMFU), Hiriyur, together with real-time weather observations, crop growth stage and prevailing field conditions, were used to prepare Agromet Advisory Bulletins (AAB) comprising observed weather, forecast weather and stage-specific crop management recommendations. A total of 38 weather-based agrometeorological advisories were developed and issued from the pre-sowing stage to the post-harvest stage during the cropping season, covering land preparation (3 advisories), sowing (Mote *et al.*, 2024) [1], germination (Mote *et al.*, 2024) [1], vegetative growth (Rathore *et al.*, 2001) [2], flowering and peg formation (Mahadevaiah *et al.*, 2012) [3], pod development (Samui *et al.*, 2022) [4], maturity (Singh *et al.*, 2011) [5], harvest (Mote *et al.*, 2024) [1] and post-harvest management (AICRP-Groundnut, 2026) [6]. The advisories provided stage-wise recommendations on land preparation, sowing time, seed treatment, drainage, gap filling, nutrient and gypsum application, weed management, irrigation scheduling and plant protection measures, based on the interpretation of forecasted rainfall, temperature, relative humidity and wind conditions in relation to the prevailing crop growth stage. The bulletins were prepared in English and Kannada and disseminated through WhatsApp groups, SMS, direct phone contact, Krishi Vigyan Kendra. The study demonstrated that systematic integration of IMD medium-range weather forecasts with real-time field observations and crop phenology enabled the development of timely, location and stage-specific advisories, which serve as a practical decision-support tool for weather-informed and climate-resilient groundnut cultivation in the Central Dry Zone of Karnataka.

Keywords: Groundnut, Agromet Advisory Services, Medium-range weather forecast, IMD, Weather-based advisory, Kharif

Introduction

Groundnut (*Arachis hypogaea* L.), popularly known as the “King of Oilseeds,” is the third most important edible oilseed crop in India and plays a vital role in the country’s food and nutritional security. In Karnataka, groundnut is cultivated on 7.19 lakh hectares, producing 4.45 lakh tonnes annually, with the major share of the area under rainfed Kharif cultivation (Annual report, 2026) [6]. Being highly sensitive to weather during critical phenological stages such as germination, flowering, pegging and pod development, groundnut productivity fluctuates considerably under the variable and erratic rainfall, temperature and humidity conditions typical of the semi-arid tropics (Mote *et al.*, 2024) [1].

Agrometeorology provides a scientific framework for translating weather information into actionable farm-level decisions, thereby minimizing weather-related production risks. Weather services for Indian farmers were initiated by the India Meteorological Department (IMD) in 1945, and Agromet Advisory Services (AAS) were subsequently introduced in 1976 to reduce crop losses arising from adverse weather (Singh *et al.*, 2011) [5]. The National Centre for Medium Range Weather Forecasting (NCMRWF), established in 1988, provides medium-range weather forecasts of 3 to 10 days, primarily 3-7 days in advance, using Numerical Weather Prediction models, which form the basis for issuing location-specific agromet advisories (Rathore *et al.*, 2001) [2]. The programme, initially confined to a few locations, has since been expanded, restructured as Integrated Agromet Advisory Services in 2007 and renamed Gramin Krishi Mausam Seva (GKMS) in 2013, and presently operates through nearly 130-137 Agromet Field Units (AMFUs) across the country (Venkatasubramanian *et al.*, 2014; Laskar *et al.*, 2016) [7, 8].

Agromet Advisory Bulletins integrate observed weather, medium-range forecasts and the prevailing crop growth stage to generate stage-specific recommendations on sowing, irrigation, nutrient management, weed control, plant protection and harvesting, and are disseminated to farmers through multiple mass media and ICT channels (Mahadevaiah *et al.*, 2012; Chattopadhyay *et al.*, 2016)^[3, 9]. While several studies across India have reported the development and dissemination mechanisms of AAS for various crops and regions (Shrivastava *et al.*, 2003; Gupta *et al.*, 2008; Alugubelly *et al.*, 2021)^[10, 11, 12], stage-specific, value-added advisories tailored to groundnut in the Central Dry Zone of *Karnataka*, integrating real-time forecasts with crop phenology, have received relatively little attention.

Recognizing the need for a location-specific, crop-stage synchronized advisory framework, the present study was undertaken with the objective of developing and issuing value-added weather-based Agromet Advisories for groundnut during the *Kharif* season using IMD medium-range weather forecasts, so as to enable farmers to undertake timely and weather-informed crop management decisions.

Material and Methods

The field investigation was carried out during *Kharif* 2025 at the AICRP on Groundnut Field Unit, Zonal Agricultural and Horticultural Research Station (ZAHRS), Babbur farm, Hiriya, situated in the Central Dry Zone (Zone-4) of Chitradurga district, *Karnataka* (13°57'32" N latitude, 76°36'38" E longitude, altitude 606.1 m above mean sea level), under Keladi Shivappa Nayaka University of Agricultural and Horticultural Sciences (KSNUAHS), Shivamogga, with the objective of developing and issuing value-added weather-based Agromet Advisories for the groundnut crop grown during the *Kharif* season.

Medium-range weather forecasts (3-10 days), along with real-time weather observations comprising rainfall, maximum and minimum temperature, morning and evening relative humidity, wind speed and direction, cloud cover and bright sunshine hours, were obtained twice a week from the Agromet Field Unit (AMFU), Hiriya, under the India Meteorological Department (IMD). These formed the basis for the development of Agromet Advisory Bulletins (AABs) for groundnut.

Each Agromet Advisory Bulletin was developed by integrating three components. The first component comprised the observed weather of the preceding week, recorded at the meteorological observatory, which was used to assess prevailing field conditions. The second component consisted of the subsequent five-day IMD weather forecast, presented parameter-wise along with daily weather warnings and a summary of the expected weather situation. The third component involved the actual formulation of crop-specific advisories, developed by interpreting the observed and forecast weather in relation to the prevailing growth stage of the groundnut crop and existing field conditions. Stage-wise recommendations were accordingly framed on land preparation, sowing, seed treatment, irrigation scheduling, drainage, nutrient and gypsum application, weed management, and pest and disease control.

Advisories were prepared twice a week, every Tuesday and Friday, in both English and Kannada to improve accessibility and understanding among farmers. The developed bulletins were disseminated through multiple communication channels, namely WhatsApp groups, mobile SMS, direct phone communication, IMD mobile applications, Krishi Vigyan Kendra, to ensure timely and localized delivery of weather-based advisories to groundnut growers.

Results and discussion

Weather-based agromet advisories developed for groundnut

A total of 38 weather-based agrometeorological advisories were developed and issued for groundnut during *Kharif* 2025, based on medium-range weather forecasts obtained from AMFU, Hiriya (Table 1). The advisories spanned the entire crop period, from land preparation to post-harvest management, and were distributed across crop growth stages as follows: Land preparation, sowing, germination, vegetative growth, flowering and peg formation, pod development, maturity, harvest and post-harvest management. The concentration of advisories during the pod-development stage reflects the greater vulnerability of this stage to fluctuating rainfall and the consequent need for closer weather monitoring and more frequent guidance on moisture management and disease surveillance.

During the pre-sowing stage (25th SMW), dry weather with negligible rainfall was forecast, and farmers were accordingly advised to complete land preparation and procure quality seed and inputs while postponing sowing until adequate soil moisture was received; with the onset of light to moderate rainfall during the 26th SMW, ploughing during rain-free intervals and application of farmyard manure and tank silt were recommended. During the sowing stage (27th SMW), although temperature and humidity were favourable, residual soil moisture was inadequate, and farmers were advised to sow only under suitable moisture conditions, adopting seed treatment with fungicide, Rhizobium and phosphate-solubilizing bacteria (PSB), followed by pre-emergence application of pendimethalin.

Favourable rainfall and humidity forecast for the 28th SMW created conditions suitable for germination, but the possibility of temporary water stagnation necessitated advisories on improved drainage, gap filling and application of the recommended fertilizer dose (25:50:25 kg N₂:P₂O₅:K₂O ha⁻¹). During the vegetative stage (29th-30th SMW), moderate rainfall and high humidity favoured crop growth but also increased the risk of leaf miner, tobacco caterpillar and early leaf spot; advisories accordingly recommended improved drainage, regular pest and disease monitoring, hand weeding during the critical weed-competition period, and deferment of herbicide spraying until rain-free conditions prevailed, followed by post-emergence application of Imazethapyr once rainfall subsided.

During the flowering and peg-formation stage (31st-34th SMW), alternating dry spells and heavy rainfall events necessitated advisories on supplemental irrigation during dry spells to support peg formation, improved field drainage through furrow opening to prevent waterlogging, regular monitoring for rust, tikka leaf spot and stem rot, and timely gypsum application once rainfall subsided, to supply calcium for peg penetration and pod development. During the pod-development stage (34th-41st SMW), which received the largest number of advisories (Samui *et al.*, 2022)^[4], intermittent rainfall interspersed with dry spells required careful moisture management; farmers were advised to maintain optimum soil moisture through need-based irrigation, avoid excess irrigation during periods of adequate rainfall, undertake fungicidal sprays for rust and tikka leaf spot only during rain-free intervals, and continue field surveillance for foliar diseases and pod-feeding insects.

During the maturity stage (41st-43rd SMW), advisories shifted towards avoidance of irrigation and improvement of drainage under forecast moderate to heavy rainfall, with harvesting deferred until dry weather prevailed to minimize deterioration of pod quality. During the harvest stage (43rd-44th SMW), farmers were advised to restrict harvesting operations to rain-free periods and to thoroughly dry harvested pods to 8-10 per cent moisture content before storage, while the single post-harvest advisory (44th SMW) recommended storage of dried produce in clean, dry structures with regular monitoring for storage pests and fungal contamination.

Table 1. Stage-wise weather-based agrometeorological advisories issued for groundnut during *Kharif* 2025

Sl. No.	SMW	Date of Issue	Crop Stage	Advisory Developed
1	23	03-06-2025	Land preparation	• Carry out deep summer ploughing and remove perennial weeds.
	23	06-06-2025		• Plan for green manuring crops such as dhaincha or sunhemp and procure certified quality seeds.
	24	10-06-2025		• Prepare a fine seedbed, complete field preparation and ensure proper irrigation and drainage facilities.
	24	13-06-2025		• Ensure the availability of fertilizers and plant protection chemicals for timely crop management.
	25	17-06-2025		
	25	20-06-2025		
2	26	24-06-2025	Land preparation	• Rainy humid weather supports land tillage. • Begin ploughing during rain-free intervals. • Apply tank silt and FYM to improve soil structure.
3	26	27-06-2025	Land preparation	• Seed procurement from RSKs. • Avoid sowing until better rainfall is received. • Farmers with irrigation facilities can take up sowing before the expected rainfall for timely crop establishment.
4	27	01-07-2025	Sowing	• Seed treatment with carbendazim 2g/kg or thiram 2.5g/kg seeds. • After 24 hours, treat seeds with Rhizobium and PSB @ 25g/kg seed each using jaggery solution as adhesive. • Shade dry for 2-4 hours and then go for sowing. • Avoid sowing during continuous wet spells. • Resume sowing on after 1-2 dry days.
5	27	04-07-2025	Sowing	• Pre-emergence herbicide application of pendimethalin @1.3 L/acre within 3 days of sowing to control early emerging weeds. • Avoid spraying during windy conditions which causes spray drift, uneven distribution and poor weed control. • Avoid spraying before heavy rainfall which may cause herbicide wash off and reduce effectiveness.
6	28	08-07-2025	Germination	• Improve drainage to avoid water stagnation.
7	28	11-07-2025	Germination	• Gap filling and application of recommended fertilizers 25:50:25 NPK kg ha ⁻¹ .
8	29	15-07-2025	Vegetative stage	• Moderate rainfall and high humidity are expected, increasing soil moisture levels. • Improve drainage to avoid excess moisture stress and maintain healthy root growth. • Monitor for leaf miner, tobacco caterpillar and early leaf spot under humid conditions. • If leaf miner or early leaf spot incidence is observed, spray Chlorantraniliprole @ 0.2 ml/l of water against leaf miner and Hexaconazole @ 1 ml/l of water against early leaf spot during rain-free intervals.
9	29	18-07-2025	Vegetative stage	• Intermittent light rainfall and warm temperatures favour weed emergence. • Carry out hand weeding during the critical weed competition period to reduce nutrient and moisture loss. • Remove weeds that act as alternate hosts for pests and diseases.
10	30	22-07-2025	Vegetative stage	• Rainfall is expected in the coming days • Avoid herbicide spraying due to expected rainfall as efficacy may be reduced. • Continue monitoring for early leaf spot and rust, as humid conditions favour disease development. • If disease symptoms are observed, spray Chlorothalonil @ 2 g/l or Hexaconazole @ 1 ml/l of water during rain-free intervals to ensure effective disease control.
11	30	25-07-2025	Vegetative stage	• Rainfall is likely to subside, providing suitable conditions for field operations. • Post emergence herbicide application of Imazethapyr 300-400 ml/acre when weeds are at 2-3 leaf stage. • Spray can be done after 24 hours of rainfall once the leaves are dry. • Monitor the crop for leaf miner, aphids and thrips. If infestation is observed, spray Chlorantraniliprole @ 0.2 ml/l of water against leaf miner and Neem oil @ 5 ml/l or Imidacloprid @ 0.3 ml/l of water against aphids and thrips.

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Sl. No.	SMW	Date of Issue	Crop Stage	Advisory Developed
12	31	29-07-2025	Flowering Stage	• Dry spells may occur with reduced rainfall. • Provide irrigation during dry spells to improve peg formation and pod setting. • Monitor thrips and leaf miner incidence, which may increase under dry conditions.
13	31	01-08-2025	Flowering Stage	• Moderate to heavy rainfall and high humidity are expected. • Improve drainage by opening furrows to prevent waterlogging during flowering. • Monitor for rust, tikka leaf spot and stem rot under prolonged humid conditions. • If rust or Tikka leaf spot symptoms are observed, spray Chlorothalonil @ 2 g/l or Hexaconazole @ 1 ml/l of water during rain-free intervals. For stem rot management, apply <i>Trichoderma viride</i> to the soil around the root zone as recommended.
14	32	05-08-2025	Flowering Stage	• Adequate rainfall is expected during the period. • Irrigation can be skipped due to expected rainfall and adequate soil moisture. • High humidity may favour Tikka leaf spot and rust; monitor the crop regularly for disease symptoms. • If symptoms are observed, spray Chlorothalonil @ 2 g/l or Hexaconazole @ 1 ml/l of water during rain-free intervals to ensure effective disease management.
15	32	08-08-2025	Flowering and peg initiation	• Rainfall is expected during the advisory period. • Postpone gypsum application until rain-free conditions prevail to avoid nutrient loss. • Postpone plant protection chemical spraying since rainfall may wash off sprays and reduce effectiveness.
16	33	12-08-2025	Flowering and peg initiation	• Rainfall is likely to decrease, creating favourable conditions for field operations. • Application of gypsum 200 kg/acre to supply calcium for peg penetration and pod development. • Spray Imidacloprid (0.3 ml/l) and Chlorantraniliprole (0.2 ml/l) for effective management of sucking pests and caterpillars. • These operations should be resumed after rainfall. • Take up earthing up in groundnut under suitable soil moisture conditions for better peg penetration and pod development.
17	33	14-08-2025	Peg formation	• Heavy rainfall and high humidity are expected. • Provide proper drainage to prevent waterlogging and ensure healthy pod development. • Monitor the crop for stem rot, collar rot and leaf spot diseases under wet conditions. • If leaf spot symptoms are observed, spray Chlorothalonil @ 2 g/l or Hexaconazole @ 1 ml/l of water during rain-free intervals. For stem rot management, apply <i>Trichoderma viride</i> to the soil around the root zone
18	34	19-08-2025	Peg formation	• Humid weather conditions favour disease development. • Maintain optimum soil moisture and avoid excess water accumulation. • For rust and leaf spot spray mancozeb 2g/l or tebuconazole @1 ml/l.
19	34	22-08-2025	Pod development	• Moderate rainfall with favourable temperatures is expected. • Maintain balanced soil moisture for proper kernel filling and pod development. • Continue field scouting for rust, Tikka leaf spot, leaf miner, aphids and thrips. • If rust or Tikka leaf spot symptoms are observed, spray Chlorothalonil @ 2 g/l or Hexaconazole @ 1 ml/l of water. If leaf miner infestation is noticed, spray Chlorantraniliprole @ 0.2 ml/l of water. For aphids and thrips, spray Neem oil @ 5 ml/l or Imidacloprid @ 0.3 ml/l of water during rain-free intervals.
20	35	26-08-2025	Pod development	• Intermittent rainfall are expected. • Ensure proper drainage and maintain optimum soil moisture.

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Sl. No.	SMW	Date of Issue	Crop Stage	Advisory Developed
21	35	29-08-2025	Pod development	• Good rainfall is expected, ensuring adequate soil moisture. • Irrigation is not required due to sufficient rainfall. • Monitor the crop regularly for Tikka leaf spot and rust, as humid conditions favour disease development. • If symptoms are observed, spray Chlorothalonil @ 2 g/l or Hexaconazole @ 1 ml/l of water during rain-free intervals to ensure effective disease control.
22	36	02-09-2025	Pod development	• Dry spells may occur during the pod filling period. • Ensure adequate moisture and provide irrigation during dry spells to support kernel development. • Monitor for late leaf spot and rust and initiate timely control measures.
23	36	04-09-2025	Pod development	• Reduced rainfall and increasing temperature may lead to moisture stress. • Ensure adequate soil moisture through need-based irrigation. • Continue monitoring for foliar diseases and pod-feeding insects and adopt need-based management.
24	37	09-09-2025	Pod development	• Moderate temperatures and intermittent rainfall are expected during the maturity period. • Monitor crop maturity regularly and avoid excess irrigation to facilitate uniform pod maturation.
25	37	12-09-2025	Pod development	• Rainfall is expected during the advisory period. • Avoid field operations and postpone plant protection chemical spraying until rain-free conditions prevail. • Monitor disease progression as prolonged leaf wetness may favour foliar diseases.
26	38	16-09-2025	Pod development	• Continued rainfall and high humidity are expected. • Postpone pesticide and fungicide applications as rainfall may reduce spray effectiveness. • Regularly inspect fields for rust and Tikka leaf spot development under humid weather. • After rainfall subsides and during rain-free intervals, if disease symptoms are observed, spray Chlorothalonil @ 2 g/l or Hexaconazole @ 1 ml/l of water for effective management of rust and Tikka leaf spot.
27	38	19-09-2025	Pod development	• Humid weather conditions continue to favour disease development. • Avoid unnecessary irrigation and maintain optimum field conditions during maturity. • Spray recommended fungicides for effective management of rust and leaf spot diseases.
28	39	23-09-2025	Pod development	• Dry weather conditions may prevail with reduced rainfall. • Provide irrigation based on soil moisture status to avoid moisture stress during final pod filling.
29	39	26-09-2025	Pod development	• Dry spell conditions are expected during the period. • Ensure adequate soil moisture through need-based irrigation to support proper kernel development.
30	40	30-09-2025	Pod development	• Provide irrigation to maintain optimum soil moisture and prevent terminal moisture stress
31	40	03-10-2025	Pod development	• Provide irrigation if required to maintain optimum soil moisture and prevent terminal moisture stress
32	41	06-10-2025	Pod development	• Rainfall is expected during the advisory period. • Irrigation is not required due to adequate moisture from expected rainfall.
33	41	10-10-2025	Maturity stage	• Light rainfall is expected during the advisory period. • Irrigation is not required due to adequate soil moisture from the expected rainfall..
34	42	17-10-2025	Maturity stage	• Moderate to heavy rainfall is expected during the advisory period. Avoid irrigation and ensure proper field drainage to prevent water stagnation. • Delay harvesting until rain-free weather prevails and monitor the crop for pod maturity to minimize quality deterioration.

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Sl. No.	SMW	Date of Issue	Crop Stage	Advisory Developed
35	43	21-10-2025	Maturity stage	- Moderate to heavy rainfall is expected during the advisory period. Postpone harvesting until dry weather prevails. - Harvest the crop only under favourable weather conditions and ensure thorough drying of pods before storage.
36	43	24-10-2025	Harvest stage	- Light to moderate rainfall is expected during the advisory period. Undertake harvesting only during rain-free periods. - Harvest the mature groundnut crop using a wet pod thresher to minimize pod losses and ensure efficient threshing. - Dry harvested pods thoroughly before storage to prevent moisture-related losses and fungal contamination.
37	44	28-10-2025	Harvest stage	- Dry weather conditions are favourable for drying harvested pods. Dry the pods to about 8-10 per cent moisture content before storage. - Store the dried produce in clean and dry storage structures and regularly monitor for storage pests and fungal contamination.
38	44	31-10-2025	Post-harvest stage	- Dry weather conditions favour post-harvest drying operations. - Store produce in clean, dry storage structures and monitor for storage pests and mould development.

Note: SMW: Standard Meteorological Week.

The weather conditions prevailing during the cropping period, characterized by a maximum temperature range of 26.6-31.9 °C, minimum temperature of 19.8-22.1 °C, high relative humidity (RH-I: 79.1-90.3%; RH-II: 57.9-82.4%) and low wind speed (0.5-2.5 km h⁻¹), were largely favourable for groundnut growth, consistent with the thermal requirements reported by Boote (1982)^[13]. However, the highly uneven distribution of rainfall, with a peak of 143 mm during the 31st SMW and several weeks receiving no rainfall, necessitated close synchronization of field advisories with the forecast rainfall pattern to avoid both moisture stress and waterlogging (Prasad *et al.*, 2008)^[14]. The persistence of high humidity, particularly during the 31st-33rd SMW, while beneficial for vegetative growth, also created conditions conducive to spodoptera, late leaf spot and rust incidence, underscoring the importance of humidity- and rainfall-linked disease advisories (Samui *et al.*, 2022)^[4]. Low wind speed throughout the season further contributed to relatively stable microclimatic conditions, although in combination with high humidity it favoured disease development, necessitating vigilant advisory-based surveillance (Arulkar *et al.*, 2008)^[15].

The advisory on seed treatment with Rhizobium and phosphate-solubilizing bacteria together with pre-emergence herbicide application was aimed at enhancing biological nitrogen fixation, protecting against seed- and soil-borne pathogens and ensuring weed-free early crop establishment, in line with the recommendations of Alugubelly *et al.* (2021)^[12] and Ravindrababu *et al.* (2007)^[16], who reported that timely, weather-synchronized sowing and input application substantially improved crop establishment under rainfed conditions. Similarly, advisories on drainage management during the humid vegetative and flowering stages were consistent with the findings of Manjappa and Yeledalli (2013)^[17] and Ramaraj *et al.* (2023)^[18], who emphasized that timely field-operation scheduling based on forecast rainfall considerably reduced the adverse impact of excess moisture on crop growth. The scheduling of gypsum application and plant protection sprays strictly during rain-free intervals reflects established agro-advisory practice for improving input-use efficiency, as also reported by Bal *et al.* (2023)^[19] and Rao *et al.* (2015)^[20].

During the pod-development to maturity phase, advisory emphasis shifted towards moisture conservation through need-based irrigation and avoidance of excess soil moisture, consistent with the recommendations of Boote (1982)^[13], and disease-preventive fungicidal scheduling, in agreement with Shivaramu *et al.* (2018)^[21] and Manjunath *et al.* (2024)^[22]. The recommendation to postpone harvesting until dry weather prevailed and to dry pods to 8-10 per cent moisture content before storage was consistent with post-harvest management guidelines reported by Vashisth *et al.* (2013)^[23] and Kaur *et al.* (2024)^[24], aimed at minimizing moisture-related losses and fungal contamination.

Dissemination of the developed advisories through WhatsApp, SMS, direct phone contact, KVK prepared bilingually in English and Kannada, ensured wide accessibility and timely receipt by farmers, in agreement with the observations of Chattopadhyay *et al.* (2016)^[9] and Sayyad and Jadhav (2023)^[25], who reported ICT-based multimedia dissemination, particularly WhatsApp, as the most effective mode for delivering weather-based agromet advisories to farming communities.

Conclusion

A total of 38 weather-based, stage-specific Agromet Advisory Bulletins were successfully developed and issued for groundnut during Kharif 2025 by integrating IMD medium-range weather forecasts with real-time weather observations and crop phenology. The advisories, concentrated most heavily during the moisture-sensitive pod-development stage, provided timely guidance on land preparation, sowing, seed treatment, drainage, nutrient and gypsum management, weed control and plant protection, and were disseminated in English and Kannada through multiple ICT and conventional channels, principally WhatsApp. The study demonstrates that systematic synchronization of medium-range weather forecasts with crop growth stages provides a practical, replicable framework for developing location-specific, value-added agromet advisories that can help farmers reduce weather-related risks and improve decision-making in groundnut cultivation under rainfed semi-arid conditions.

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