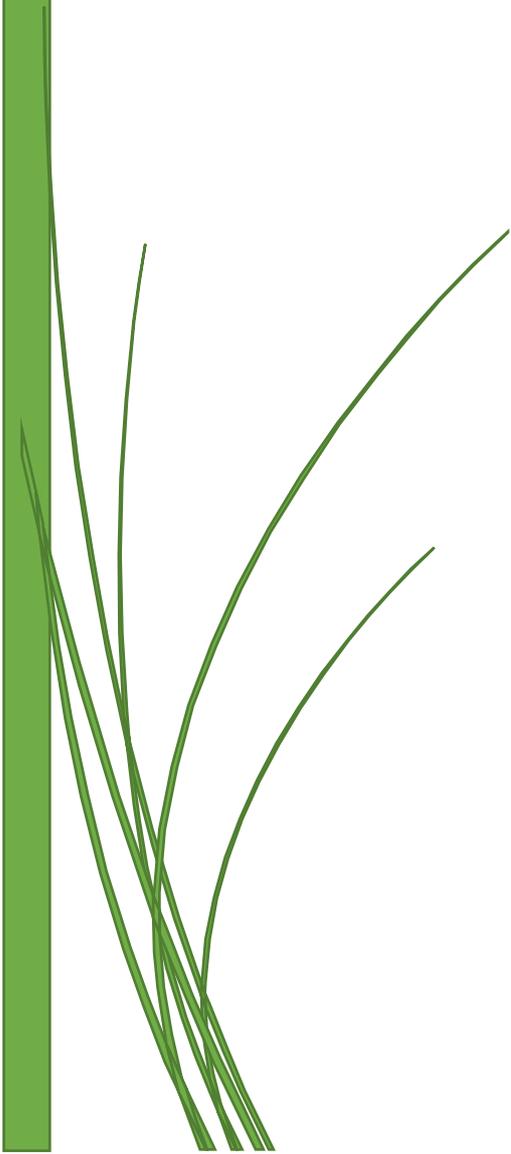




***Proceedings of the of meeting of Core
Group I for steering activities of South
Asia Forum on Agricultural
Meteorology***

Under the Theme

***Present Status and existing strategies for
meeting the need, gaps, requirements etc.
for operational Agromet Advisory Services
in South Asian Countries***



**Date: 13th February 2021 Time: 1600
Hrs IST to 1900 Hrs IST Venue: Virtual
Platform (The Google meet)**



The meeting was started by welcoming all the members of the Core Group I (list of the members is available in Annexure I) for steering activities of South Asia Forum on Agricultural Meteorology (SAFOAM) under the theme “Present Status and existing strategies for meeting the need, gaps, requirements etc. for operational Agromet

Advisory Services in South Asian Countries”. **Dr. N.Chattopadhyay** said that the present theme is one of the important pillars of the SAFOAM activities in future. He added that it is expected that the meeting would be highly productive and useful under the leadership of Dr. Santanu Kumar Bal and all the honourable advisors i.e., Dr. M.V.K. Sivakumar, Dr.B. V. Ramana Rao, Prof. U.C. Mohanty, Dr. S. Pasupalak and all other esteem members of this group. Before, handing over to Dr. Bal for moderation of the meeting, Dr. Chattopadhyay presented a brief introduction of Dr. Santanu Kumar Bal, Project Coordinator (Agrometeorology) I/c, AICRP on Agrometeorology (AICRPAM), ICAR - Central Research Institute for Dryland Agriculture (CRIDA), Santoshnagar, Hyderabad, India.

In the beginning, **Dr. Santanu Kumar Bal** welcomed once again to all and informed the way how he would like to conduct the meeting. He proposed that representative from each country in South Asia to speak initially a few words on the gaps, present strategies and how the gaps could be filled up. He briefly described the present system of



operation of Agromet Advisory Services rendered by the India Meteorological Department (IMD), being nodal agency, through Agromet Field Units (AMFU)/ District Agromet Field Unit (DAMU) under the Gramin Krishi Mausam Service (GKMS) project with the active support from the Indian Council of Agricultural Research (ICAR). He mentioned the different kinds of forecast generated by IMD and communicated to AMFU/DAMU for preparation agromet advisories. He informed that the different algorithms developed under All India Coordinated Research Project on Agrometeorology (AICRIPM), a project of Central Research Institute for Dryland Agriculture are used by the AMFU/DAMU in preparation of crop and location specific agromet advisories and disseminated through multichannel dissemination systems including SMS. He also mentioned that in addition to the above Governmental system,

some private organisations also issue agromet advisories in India. He added that, as far as SAFOAM is concerned, it would be good idea if we could hear the present agromet system in the respective countries as this would definitely help in further discussion on the present theme of the meeting. Afterwards he requested all the advisors to say a few words on the theme of today's meeting.



Dr. Manava Sivakumar, Founding Editor-in-Chief, Weather and Climate Extremes (Elsevier), Senior Consultant, WMO, Geneva, Switzerland mentioned that there is strong need to help and approach the farmers in South Asia using different technologies and information technology in particular. He added that there is tremendous increase & improvement in

technology these days and this technology should be exploited fully to communicate the information to the farmers, Ministry of Agriculture and other organisations and get the feedback from farmers and other users in each country in South Asia. He also said that the mobile technology should have added advantage as almost everybody affords/owns a mobile. He said that feedback information from the farmers in South Asia is extremely important. According to him, mobile technology should be used extensively for information communication including feedback from the farmers. He was of the opinion that each country should have a small room with an expert in different parts of the country so that they could send information as well as receive feedback information from the enormous population of farmers.

Prof. U.C. Mohanty, School of Earth Ocean and Climate Sciences, Indian Institute of Technology Bhubaneswar, Odisha, India said that India is very rich in operational Agromet Advisory Services and the same might be replicated in other countries in South Asian Region (SAR). He informed that now all the seamless forecast at different spatial and temporal range are available. He said that we should train others in SAR how these different weather products, agromet products, product matrix could be used in operational Agromet Advisory Services. He continued that we might arrange some capsule courses for our representatives in South Asia in this regard. He added that there is need to see what are the gaps, farmer's need etc., particularly from the prospective /representative farmers and questionnaires prepared by our experts on present status, gaps, need should be sent and obtain this information including feedback and



requirement. He said that wide circulation of questionnaires are essentially required to know the present gaps in agromet advisory services in different countries in South Asia. He added that after understanding the gaps in each country, our experts in India and other countries in consultation of international experts like **Dr. Sivakumar** could prepare capsule courses for the representative farmers in South Asia Region. He had given good example how the weather forecast in December was used in different parts of India to timely harvest and save the crop loss. He said that technology could be used to disseminate the information to the farmers at the faster mode as said by **Dr. Sivakumar** and also suggested that in addition to organise annual meeting, seminars, scientific interactions etc, there is need to create a mechanism so that this forum could assist in weather and climate services for the farmers in South Asia.

Dr. Sivakumar mentioned here about the organisation along with the detail programme including feedback mechanism of Roving Seminars on (10000) weather and climate services in agriculture in Asia, Africa and South America during his tenure as Chief of the Agrometeorology Division in World Meteorological Organisation. According to him, all of us should communicate the large population of poor farmers in South Asia that they were always welcome to share the feedback so that it would be possible to share the seamless operational decision in farm management. He informed that farmer awareness programme was organised in Bangladesh and Nepal under World Bank Project on Agromet Advisory Services and it was reported that farmers in these countries liked it. Replying to the query from **Dr. Bal, Dr. Sivakumar** said that if the various representatives of SAR need such information, experts from this forum might share this information and also even would visit to these countries and help them to organise the roving seminars.



Dr. S. Pashupalak, Former Vice Chancellor, Orissa University of Agriculture and Technology (OUAT), Orissa, India described his experience on Agromet Advisory Service system in Orissa. He stressed for more dissemination of agromet advisories and involvement of woman/female farmers along with male farmers to effectively use and disseminate the agromet advisories.

Thus, in roving seminar, importance might be given to both male and female farmers. Also talked about the proper use of state of art technology especially artificial intelligence in preparation and dissemination of agromet advisories in faster mode. He also mentioned different tools especially the analogue system and kinds of weather and corresponding agromet advisories in the past for preparation of agromet advisories. He said the primary data i.e.,

weather observations and weather forecast from IMD and secondary information i.e., crop state and state, pest and diseases information (photo from field condition) etc. should be effectively used for generating crop and location specific advisories. Arrangements might be made so that farmers be able to send pictures on ground realities to the concerned. According him, two-way process i.e., advisories from Agricultural Universities. Krish Vigyan Kendras (KVKs) and feedback from farmers both should be considered for preparation of advisories.

Dr. G. Sreenivas, Principal Scientist (Agro) & Head, Agro Climate Research Centre (ACRC), Agricultural Research Institute (ARI) & Professor Jayashankar Telangana State Agricultural University (PJTSAU), Rajendranagar, Hyderabad, Telangana, India. said that more emphasis might be given on different ICT technologies, WhatsApp, SMS mobile apps in



dissemination of Agromet Advisory to the farmers and other user community. He was emphasising on the correct interpretation of different agromet products including satellite products in the preparation of agromet advisories by those who are involved in preparation of crop and location specific agromet advisories. He said that there is strong need to provide effective training by the senior agromet experts to the agronomists at University level, personnel in Indian Council of Agricultural Research (ICAR) and especially who are the newly involved into the system for proper use of weather forecast, weather observation, crop conditions along with other inputs for preparation of agromet advisories.



Dr. V. R. Murthy, Professor and Head (Retired), Department of Agronomy Acharya N. G. Ranga Agricultural University ANGRAU, Bapatla Andhra Pradesh, India mentioned about three points based on his rich experience on the Agromet Advisory Services for the farmers. First, he referred the book

written by Dr. B. V. Ramana Rao on “Operational Agricultural Meteorology for Indian Society of Agronomy” wherein different dimensions (agrometeorological services, agroclimatic atlas, pests & diseases, drought monitoring etc) of the subject have been discussed, Secondly, he mentioned the technique of slate and pencils in preparation and dissemination of weather information, weather forecast and agromet advisories by the teachers to the students and

ultimately the farmers in a tiny village in India. Thirdly, he mentioned about the importance of past weather along with the weather forecast in preparation of agromet advisories.

Dr. Mazharul Aziz, Chief Instructor, Agriculture Training Institute, Department of Agricultural Extension (DAE), Former Project Director, Component-C of Bangladesh Weather and Climate Services Regional Project (BWCSR) of the World Bank, Sher-E-Bangla Nagar, Dhaka, Bangladesh nicely mentioned the newly and emerging Bangladesh Agromet Advisory Service System from its inception and his active involvement with the World Bank funded project on Agromet Advisory Services (AAS) project. He elaborated the preparation



of AAS bulletins (district, national levels), special advisories under extreme events and dissemination and also sharing of information among different committees including National Agromet Committee, different organisations including BMD, BWDB, etc. during preparation of advisories. He was mentioning specially about the BAMIS PORTAL (www.bamis.gov.bd) developed under this project. He added that ground information at local level is one of the limitations for preparation of crop and location specific agromet advisories in Bangladesh. He was mentioning about the lead time required for giving advisories as there are lot of exercises required for arrangements of labour, machineries for harvesting of crop and also informed how special advisories were issued during extreme events like AMPHAN cyclone in May,2020. According to him training is not the only supporting system for the useful advisories preparation, but also the agromet system should be institutional. He informed that the proposal was given to the Ministry of Agriculture, Bangladesh for opening of Agromet Wing , opening of agromet course in Agricultural Universities. He informed that from this year agromet course would be started in two leading Agricultural Universities (Bangladesh Agricultural University (BAU) and Bangabandhu Sheikh Mujibur Rahman Agricultural University (BSMRAU)) in Bangladesh. Also said that Department of Agricultural Extension is working with NGOs, RIMES etc. Dr. Aziz suggested that SAFOAM should work at policy level with Ministry especially Agricultural Ministry for opening as well as strengthening of operational Agromet Advisory Services in South Asia.

Dr. Bal asked what is the status of weather observation in Bangladesh. **Dr. Aziz** informed that at present 43 weather observatories are functioning well and the same is used in agromet advisory system.

Dr. Mohanty appreciated the initiative taken by Bangladesh in operationalisation of AAS in the country. Also asked whether the weather forecast at different temporal scale particularly 2, 4 pentad rainfall and temperature are available from BMD and whether these forecasts along with the seasonal forecast are being used in AAS. **Dr. Aziz** said all the weather forecast, as mentioned, are available and the same is displayed in BAMIS portal. He said that sub-seasonal forecast is being used in issuing advisories during flash flood and cyclone. **Dr. Aziz** continued that though BMD issue and update the seasonal forecast every month, he is reluctant on seasonal forecast as single phenomena like AMPHAN cyclone can damage the crops to great extent.

Dr. Pasupalak informed that the impact of cyclone track and corresponding advisories issued in West Bengal and Orissa are almost similar to that of Bangladesh. He suggested that whether Bangladesh can make a link or access this information from the Indian part in this respect. **Dr. Aziz** said that the Department Agricultural Extension is issuing short SMS under this condition and overall AAS is in developmental stage. Also said that he would communicate this idea to the concerned.

Mr. KHMS Premalal from Sri Lanka wanted to know what kind of information through BAMIS PORTAL are communicated farmers. **Dr. Aziz** explained that at present 30000 farmers were selected from the 15000 farmers' organisations, developed the infrastructure at district



and upazila level by providing instruments (TABS rain gauge, kiosk, weather board, agromet room) including focal persons at different districts and upazilas in Bangladesh. Different information generated based on the data received from BMD and BWDB and through BAMIS PORTAL are disseminated to the farmers and also Sub-Assistant Agricultural Officers who used to visit the, 12 farmer groups once a week and also SMS agromet

advisories are communicated to farmers through BAMIS PORTAL. **Mr. Premalal** requested **Dr. Aziz** to share the link for BAMIS PORTAL.

Dr. B. V. Ramana Rao, Editor in Chief, Journal Agrometeorology. Telangana State, India said that agromet service system should be two-way process. He also mentioned the following three issues which need to be improved for creating an ideal agromet advisory system in SAR.

1. Proper interpretation of weather forecast in regional and local perspective is highly essential
2. Identify critical operations where weather forecast can make an effective solution for carrying out operations in field
3. Able to get feedback whether weather forecast issued to the farmers are useful or not.



Dr. Tshering Wangchen, Head, Agromet Unit, Department of Agriculture, Government of Bhutan, Thimphu mentioned about the agromet set up and current activities going on operational agromet advisory services in Bhutan. He said that in Bhutan though the agromet service system has been started in 2019 at Agriculture and Extension Wing of the Department of Agriculture (DOA) and formally institutionalised, but the operational aspect much could not be done. He added that under agromet initiatives, there are number of issues and challenges. He informed that two national agencies i.e., National Centre for Hydrology & Meteorology (NCHM) and DOA are jointly operating this service in Bhutan. All the weather observation data and weather forecast are received from NCHM. He has also mentioned the insufficient workforce in DOA to carry out mandated service. However, number of organisations like Agriculture Research & Development Centre, National Plant Protection Centre, National Soil Survey Centre, Extension Division, IT Centre etc. are involved in this system. He said that agromet service is in infancy stage in Bhutan. He elaborated the Agriculture Decision Support System (ADSS) prepared by RIMES for generating agromet advisory on pilot mode in the country. This ADSS web portal is used for preparation and as well as dissemination of agromet advisories.. He said that though some training is given, agromet advisories generated through ADSS in still not used in community level as it is pilot mode operated in some districts and need for more validation, research development, capacity building and lack of IT knowledge. He added that because of insufficient and inaccurate data/information fed into the system, the performance of ADSS is not up to the mark. Also added the inadequacy of the R & D in agrometeorology for supporting ADSS. Though sizeable weather observatories are functioning, more weather observatories are required for carryout agromet advisory service in the country at district & block level. At present Government of Bhutan is really focussing on the advancement of AGROMET system. Mentioned some fund like GCF which are also supporting the project. Under the support of World Bank. presently “A Roadmap for Strengthening of Operational Agromet Advisory Services in Bhutan” have been prepared for onward activities on operational Agromet Advisory in Bhutan.

Dr. Chattopadhyay asked the present status of ADSS, the road, map, as mentioned and how SAFOAM. would support the recent initiatives of Bhutan in operationalisation of AAS. **Dr. Tshering** replied that ADSS is developed on machine learning and the deliverables coming out of the system were tested last few year. It appeared that the information like crop calendar and other data should be rectified and it was also felt that ADSS alone would not serve the purpose,

other areas should also be ventured. As far as support of SAFOAM is concerned, **Dr. Tshering** said that significant advancement has been made in operational agromet services in India and thus Government of Bhutan might solicit assistance from India.

Dr. Sivakumar commented that it would be good to bring together experts from the Agricultural Universities and prepare module/curriculum in Bachelors' level on climate change, weather and climate knowledge etc. **Dr. Tshering**: agreed to this proposal for building capacity to manage the agromet system in Bhutan. **Dr. Murthy** was referring of development of some basic lecture on meteorology/agrometeorology prepared by him and made available in you tube. He said that he, if required. would prepare such basic lecture series like basic courses of WMO and also ready to share with Bhutan as per the requirement and need.

Dr. Ramana Rao suggested that faculty members of Agricultural Universities, extension officers of Government and Agricultural Universities and others concerned should be aware of agromet products and its utilisation for agricultural management, agricultural development and critical operations in the field condition.



Dr. Shib Nandan Prasad Shah, National Project Director, PPCR: Building Resilience to Climate Related Hazards Project (BRCH), Agriculture Management Information System (AMIS) & Under Secretary (Tech), Chief of GIS & IT Section, MoAD, Kathmandu, Nepal said that the subject of Agromet Advisory Services started in 2015 in

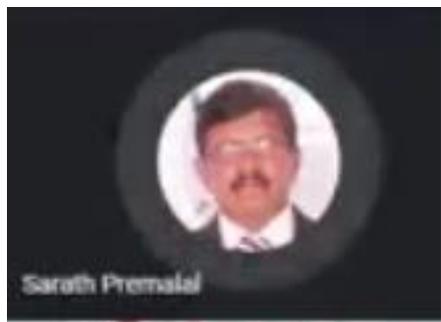
Nepal. With the World Bank assistance, agromet advisory services started in the country by joint collaboration between Nepal Agricultural Research Council (NARC) and Department of Hydrology & Meteorology. Using weather forecast along with the past weather and crop status; these services started for 26 districts in the country. AAS bulletins are issued on provincial level using the 72 hours forecast on every Friday and aiming to prepare in district level and local level agromet advisories in future. Agromet advisories are disseminated by the Agriculture information centre, Central agency for dissemination of information in Nepal. Dissemination is done through SMS, mobile apps, radio. Roving seminars in 26 districts for capacity building of the farmers were arranged for popularisation and awareness of the agromet advisory services. He has mentioned different short and long term plans for the improvement of operational Agromet Advisory Services. More attention needs to pay as climate is changing in Nepal along with capacity building on use of ICT technology and remote sensing application in agrometeorology, use of artificial intelligence, district and seasonal forecast. weather

insurance. According to him, PPP is not so strong in Nepal. Smart agriculture, AWS in Hill station, climate change adaptation programme might be encouraged.

Replying to the query of **Dr. Bal, Dr. Shah** said that under SAFOAM, transfer of knowledge and help in capacity building programme on smart agriculture, climate change adaptation plan under digital platform might be initiated. As India has long experience in above mentioned areas, the countries in SAR would likely benefit from India.

Dr. Ramana Rao said that agromet research is not strong in SAR and thus more initiatives/improvements are required in SAR. **Dr. Chattopadhyay** said that under SAFOAM, it is explored either to approach to donor agency to provide fund for research or assist to get funding from donor agencies. **Dr. Ramana Rao** also said that there is a need to identify agrometic analog across different countries in SAR as this is required for any country to interact the kind of people and kind of areas of interest for better understanding.

Dr. Chattopadyay appreciated the suggestions given by **Dr. Ramana Rao** and assured that such kind initiatives would definitely be taken under SAFOAM in future. **Dr. Murthy** also referred the definition of agroclimatic analog given by Dr. Ramana Rao and also elaborated and importance and its utility of Agroclimatic Analog in weather and climate service in agriculture.



Mr. Sarath Premalal, Former Director General of Meteorology described about the agromet advisory services in Sri Lanka. He said that the agromet bulletins are prepared on national level and disseminated to the different stake holders in provincial and national level. He also said that seasonal forecast is used in preparation of agromet advisories at national level. He further added that under Green Climate Fund of UNDP, efforts are being made to prepare agromet advisories at agroecological zones in three river basins in the country.



Dr. Giriraj Amarnath, International Water Management Institute (IWMI), Sri Lanka mentioned that IWMI is working at present in South Asia, Africa, Sri Lanka especially on drought monitoring as well as on weather insurance and other sectors. He informed that though India Meteorological Department and RIMES are very strong in data sharing, the same may not be available in other countries in South Asia. Even India, there is need to validate and evaluate the agromet advisories issued to the large number

of farmers in the country as number of cases generic advisories are provided instead of demand driven and also farm perspective and climate risk areas. He said that RIMES and Irrigation Department, Government of Sri Lanka jointly started working on agromet advisory system. He said that the issue of data sharing between National Hydrological & Meteorological Services (NHMS) and Department of Agriculture Department is still a challenging issue in SAR. According to him, skill of weather forecast from different organisations need to be improved and agromet advisories issued to the farmers should be demand driven and also based on risky zones. He referred two-way communication in agromet system in the state of Karnataka, India and similar initiative might be taken up in SAR. He added that SAFOAM could make guidelines for preparation of demand-based advisories and also for climate risk areas. He also stressed for issuing agromet advisories based on the available agri inputs at local level like kind of pesticides, drought, flood tolerant varieties etc. He specially mentioned a successful initiative at pilot scale in northern Sri Lanka made by IWMI, insurance company and local agrarian Govt. of Sri Lanka in issuing demand driven agromet advisories in local language. However, farmers' demand is that agromet advisories should be consistent and regular in nature. He continued that IWMI is doing similar project in Africa, Asia on drought related and pest and disease attack advisories etc. He stressed for coherence among different system & funds received from different organisations like World Bank, adaptation fund etc. He also stressed for inter-departmental coordination, understanding and institutional arrangement in agromet advisory system in SAR. He also suggested for preparation of SOP on information dissemination, multi-institution collaboration, two-way communication, socio-economic benefit etc. In this regard, he informed how the installation of automatic weather station by World Meteorological Organisation made lot of difference on socio-economic benefit not only in farm level but private sectors also. Besides, he was referring another successful mission of IWMI in coordination with Indian Institute of Tropical Meteorology (IITM) and Indian Institute of Technology (IIT), New Delhi on drought early warning system in Afghanistan using extended weather forecast and cloud-based system etc. and also future plan of replication of similar projects in Bangladesh and other countries in SAR. Also mentioned on IWMI's work on South Asia drought monitoring plan and contingency plan with close coordination with CRIDA.

Dr. Sivakumar said that there is relatively extended ocean region in Sri Lanka, India and other countries in SAR. Under this forum, it should be seen whether farmer, fisherman close to the ocean are getting right information. For appropriate information for their respective operations under different weather and climatic conditions is highly essential. Under this forum, we should

see the whole issue of the ocean, what kind of information are being provided and what the gaps and how we can improve the information and fill the gaps.

Reply to query of **Dr. Giriraj, Dr, Aziz** said that at the end of the project, BAMIS and all other credential of the Agromet Project of Bangladesh would be transferred to the ICT wing of the Ministry of Agriculture. Under the TONE system, hard ware software and other items used in the project would be handed over to the concerned. Besides, midterm evaluation was also done. Also mentioned that BAMIS is accessible to all the stake holders, private sectors, institutes/organisations of Bangladesh for its proper use.

Dr. Chattopadhyay said that how the BAMIS information was used by RIMES in providing advance information through IVR technology to the farmers to save the crop loss from flood condition. He requested Dr. Aziz to give a presentation on this subject in future and Dr. Aziz agreed to that. Also replied to the query of **Dr. Ramana Rao**, Dr. Chattopadhyay said that the capacity of generating seasonal forecast, under SASCOF initiatives and with the help of IMD, seasonal forecast is generated in SAR and hopefully these are used in different user sectors in South Asia.

Dr. Bal said that very useful discussion was made in the meeting and number of important points came out. Many experts have given useful suggestions. These are as follows.

1. What are the gaps, strategies?
2. Though different agromet products are available, proper use the same may be ascertained.
3. Linkages with IWMI, RIMES, WMO, WB, UNDP with SAFOAM may be established
4. SAFOAM may sit with policy makers to implement/improve the agromet advisory services
5. Data sharing
6. Linkages between NHMS & DOA
7. Capability of improvement of weather forecast
8. Need to increase the accuracy of weather forecast and convince respective governments
9. Usability of agromet advisories and feedback mechanism
10. Capacity building on use of agromet products
11. Funding issues
12. Socio economic aspects, economic assessment like installation of AWS BY WMO and NCARE economic assessment on AAS

Dr. Giriraj mentioned about UN Spider Organisation developed similar FORUM for sharing guiding on space information to the different countries who do not have the facility. Technical advisory team of this organisation used to visit those countries and help to get the space information and its utilisation. He said that similar technical advisory may be formed under

SAFOAM from the experts in South Asia and they can help in different core areas including disaster risk reduction in agriculture etc.

Dr. Chattopadhyay elaborated the conceptual idea of the SAFOAM in assisting the countries in development of operational agromet advisory services. He said that today is the first meeting of the forum and other five core group meetings would be organised during next one month followed by the workshop. As all the core groups are interconnected, a workshop will be organised inviting WMO, WB, RIMES, IWMI and other organisations with deliberation from different experts. He continued that this would help to prepare the road map how the SAFOAM would work for the agriculture community in South Asia

Dr. Sivakumar said that every agrometeorologists in South Asian Region should emphasis for IMS i.e., Improved Agrometeorological Services. They need to cooperate actively with the Agriculture Ministry, Scientists in Agricultural University/organisation and also how we can improve agrometeorology.

Dr. Ramana Rao wanted to know whether trained agromets are readily available in South Asian country and if not how to arrange training in agromet and how to train. Initial training to promote agromet advisory by increasing the capability and kind of interaction should be looked into. Besides, convincing capability on promotion of operational agromet advisory services among the agromet community should be increased.

Dr. Pasupalak said that two to three experts from India in addition to Dr. Chattopadhyay & Dr. Bal may be approached. All the experts in India can interact experts in other countries and discuss on present status, future strategies, and what would be the role SAFOAM in SAR.

Dr. Srinivas said that it has been anticipated that the frequency of extreme events would increase due to climate change. Proper training should be given to handle and reduce the impact of the frequent extreme events on crops. Moreover, capacity building programme should be arranged for ground and field workers to translate the new agromet and remote sensing products. Besides, those i.e., stakeholders, farmer, extension workers who are involved in adaptation measures should be trained. Still, this is major lacking in how to implement the advisories under such condition.

Dr. Bal said that continuous support is required to provide capacity building. **Dr. Bal** informed that CRIDA and IMD jointly prepared dynamic crop weather calendars for implementing weather-based decision. Once finalised, he would share the same.

Dr. Chattopadhyay said that minutes of the today's meeting would be prepared and circulated. Questionaries on gaps, strategies to fill the gap etc. would be communicated to the members of

SAFOAM in SAR which would ultimately be very helpful for preparation of concept note on the road map of SAFOAM

Dr. Giriraj said that SAFOAM could be a knowledge platform to help the countries in SAR.

Dr. Chattopadhyay also agreed to that

Recommendations of the Meeting

1. SAFOAM should be a knowledge platform to help the countries in SAR.
2. SAFOAM should work at policy level with Ministry especially Agricultural Ministry for opening as well as strengthening of operational Agromet Advisory Services in South Asia.
3. There is need to understand the present status, what are the gaps, farmer's need etc., in different countries in South Asia. Based on this information from each country, experts from India and other countries should prepare capsule courses for the representative farmers in South Asia Region.
4. Bring together experts from the Agricultural Universities and prepare module/curriculum in Bachelors' level on climate change, weather and climate knowledge correct interpretation of different agromet products including satellite products in the preparation of agromet advisories etc
5. Experts from this forum should share the information to various representatives of SAR on organisation of roving seminars and also even would visit to these countries and help them to organise the roving seminars. Involvement of woman farmers in roving seminars should be encouraged.
6. SAFOAM could make guidelines for preparation of demand-based advisories and also for climate risk areas
7. Under this forum, we should see the whole issue of the ocean, what kind of information are being provided and what the gaps and how we can improve the information and fill the gaps.
8. Linkages with IWMI, RIMES, WMO, WB, UNDP with SAFOAM may be established
9. Technical advisory team may be formed under SAFOAM from the experts in South Asia and they can help in different core areas including disaster risk reduction in agriculture etc.
10. Rich experience in operational Agromet Advisory Services in India should be replicated in other countries in South Asian Region (SAR).
11. Modern communication technology like ICT technologies, WhatsApp, SMS mobile apps should be exploited fully to communicate the information to the farmers, Ministry of Agriculture and other organisations and other users in each country in South Asia. Mobile technology should be used extensively for information communication including feedback from the farmers.
12. Agromet research is not strong in SAR and thus more initiatives/improvements are required in SAR.

Dr. Chattopadhyay once again thanked all the members for their active participation, sharing their ideas and also patient hearing for an extended time period and also wishing to meet all virtually shortly and periodically.

Meeting was ended at 19.00 hrs with vote of thanks

Annexure I

List of Members

Core Group I for steering SAFOAM activities

Theme I: Present Status and existing strategies for meeting the need, gaps, requirements etc. for operational Agromet Advisory Services in South Asian Countries.

Leader

***Dr. Santanu Kumar Bal**

Project Coordinator (Agrometeorology) I/c, AICRP on Agrometeorology (AICRPAM), ICAR - Central Research Institute for Dryland Agriculture (CRIDA), Santoshnagar, Hyderabad, India

Advisors

1. Dr Shailesh Nayak

Director,
National Institute of Advanced Studies (NIAS)
Former Secretary
Ministry of Earth Sciences
Government of India

*** 2.Dr. M.V.K. Sivakumar**

Founding Editor-in-Chief, Weather and Climate Extremes (Elsevier), Senior Consultant, WMO, Geneva, Switzerland

***3. Prof. U.C. Mohanty**, School of Earth Ocean and Climate Sciences, Indian Institute of Technology Bhubaneswar, Odisha, India

***4. Dr. S. Pashupalak**, Former Vice Chancellor, Orissa University of Agriculture and Technology (OUAT), Orissa, India

***5. Dr.Dr.B. V. Ramana Rao**, Editor in Chief, Journal Agrometeorology. Telangana State, India

Members

***1.Dr. Shib Nandan Prasad Shah**

National Project Director, PPCR: Building Resilience to Climate Related Hazards Project (BRCH), Agriculture Management Information System (AMIS) & Under Secretary (Tech), Chief of GIS & IT Section, MoAD, Kathmandu, Nepal

***2. Dr. Mazharul Aziz**

Chief Instructor, Agriculture Training Institute, Department of Agricultural Extension (DAE), Former Project Director, Component-C of BWCSR of The World Bank, Sher-E-Bangla Nagar, Dhaka, Bangladesh

***3. Dr. Tshering Wangchen**

Head, Agromet Unit, Department of Agriculture, Government of Bhutan,

4. **Ms. Han Swe**, Assistant Director, Agro-meteorological Division, DMH, Yangon;

5. **Mr. Ismail Hassanzadah**, Director, Policy and Coordination, General Directorate of Planning and Policy| Ministry of Agriculture, Irrigation and Livestock, Islamic Republic of Afghanistan

***6. Dr. Giriraj Amarnath**, International Water Management Institute, Sri Lanka

7. **Dr.(Mrs) Kamaljit Ray**, Sc-'G', Ministry of Earth sciences, Prithvi Bhavan, Lodhi Road, New Delhi-

8. **Dr. R K Mall**, Professor & Coordinator, DST-Mahamana Center of Excellence in Climate Change Research &, Coordinator, Environmental Science & Technology (RGSC), Institute of Environment and Sustainable Development, Banaras Hindu University, Varanasi, India

9. **Dr. Kirit N Shelat**, IAS (RTD), Executive Chairman, National Council for Climate Change, Sustainable Development and Public Leadership (NCCSD), Navrangpura, Ahmedabad

***10. Dr. R.N Sable**, Former Head, Agrometeorology Division, Pune Krihi Viswavidyalaya, Pune, Maharashtra

11. **Dr. Saon Banerjee**, Professor and Former-Head, Dept. of Agril. Meteorology and Physics, BCKV, Kalyani, Nadia, WB, India

12. **Dr Kulwinder K Gill**, Asstt. Agrometeorologist, CC&IL, PAU, Ludhiana, Punjab

13. **Dr M L Khichar**, Professor & Head, Dept Agricultural Meteorology, CCS Haryana Agricultural University, Hisar, India

***14. Dr. V. R. Murthy**, Professor and Head (Retired), Department of Agronomy ANGRAU, Bapatla, Andhra Pradesh, India

***15. Dr. G. Sreenivas**, Principal Scientist (Agro) & Head, Agro Climate Research Centre (ACRC), Agricultural Research Institute (ARI), Professor Jayashankar Telangana State Agricultural University (PJTSAU), Rajendranagar, Hyderabad, Telangana, India.

16. **Dr. Indira Kadel**, Department of Hydrology and Meteorology, Babarmahal, Kathmandu, Nepal.

17. **Ms. Swati Chandras**, Agricultural Meteorology Division, India Meteorological Department, Pune

18. Ms. Malathi Seetamraju, Agricultural Meteorology Division, India Meteorological Department, Pune

* = Attended the Meeting

Photo Gallery

