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

Under the Theme:

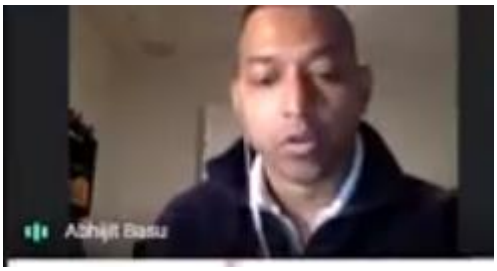
Build capacity in ICT program management and also build such cadre and mentor them for ensuring continuity of Agromet success and innovation sustenance

Date: 20th March 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 VI (list of the members is available in Annexure I) for steering activities of South Asia Forum on Agricultural Meteorology (SAFOAM) under the theme "**Build capacity in ICT program management and also build such cadre and mentor them for ensuring continuity of Agromet success and innovation sustenance**". **Dr. N. Chattopadhyay** said that he was really thankful to all the members of Core Group VI for participating in today's meeting and whole heatedly supported the formation and on-going activities of SAFOAM. He mentioned that the present theme was very important as it would cover wide range of activities of SAFOAM.. He added that it was sure that under the presence of all the honourable advisors and all other esteem members today's meeting would be highly productive and useful. , Before, handing over to **Mr. Abhijit Basu** for moderation of the meeting, **Dr. Chattopadhyay** presented a brief introduction of **Mr. Abhijit Basu** Founder and CEO Smartex Cognitive, XCED, APAC CEdMA, California, USA.



At the outset **Mr. Abhijit Basu** made couple of comments. He said that most of members in the meeting have ground experiences and thus they knew what were the challenges and how ICT could help and what were the ICT initiatives that might help the whole cause. According to him, ICT is an enabler. Two pieces of ingredients of ICT are technology and people. Like for other tool, it should be with capable hand to use it full potentials. ICT implementation consists of success and failure and the people who run the project and uses the existing and to be used technology always bring the actual outcome. He assured that he would help the proposed activities of SAFOAM by sharing his knowledge of latest technology. As far as customers experience in such initiative are concerned, he commented that farmers in the field are our customers, the people helping the farmers are customers and who use the technology are the customers. He said that we might be regarded us as think tank putting together the ideas. According to him ICT may be regarded as tool for connecting strategies to actual implementation. He requested **Dr. L.S. Rathore** to help and share his rich experience on implementation of ICT in producing and communication of information particularly on agromet advisories.

Dr. L.S. Rathore, Former Director General of Meteorology & International Consultant, The

World Bank said that novelty of all of us was that we were all doing the social service by helping food security and livelihood of farmer during our professional career and also post retirement period. The arena which we are currently addressing here how we are using of meteorological information in enhancing the farmer's better livelihood. According to him, at this juncture and challenges, three things are very critical & important under SAFOAM activities. These are (i) organisation of information of weather climate, crop, soil & pest data from diverse sources and driving the data for the decision-making process system; (ii) organising hand holdings for the countries, where operational AAS in infancy stage, for setting up agromet system in a relatively short time by grasping entire information on weather, climate, crop, derived information like crop weather relationships etc. This would be done through using tools in semi-automation mode deriving data, knowledge resources., (iii) thirdly use of ICT in dissemination of information and among the three, more weightages should be given on this point. He added that the value of the information was usually determined by the question rather dynamic questions received from the user community. He was referring about the value of the information communicated to farmers and also multi way of communications from all those directly or indirectly involved in the agromet advisory services. He requested to Mr. Basu and all the senior members, who spent most of the service career for the welfare of the farmers, to throw more light on the three aspects more in today's meeting, At the end, he elaborated the transformation from traditional packages to modern day of production and utilisation of Numerical Weather Products in weather forecasting which are being used more ease and confidence. He also requested **Dr. Akhilesh Gupta** to give more light on this aspect.

Mr. Basu appreciated **Dr. Rathore** so nicely touched upon the traditional and contemporary aspects but, according to him, information is the enabler and the pull of the information as per the customer experiences are more important, He suggested that the third aspect mentioned by **Dr. Rathore** may be given first priority and focus to get the more sense of the customer. **Mr. Basu** requested **Dr. Akhilesh Gupta** to give more in sight on this subject and present his thoughts in this respect.

Dr Akhilesh Gupta, Adviser/Scientist-G & Head, STIP-2020 Secretariat, Head, Policy Coordination & Programme Management (PCPM) Division, Head, Strategic Programmes, Large Initiatives and Coordinated, Action Enabler (SPLICE) Division and Climate Change Programme, Department of Science & Technology, New Delhi was mentioning the inception of agromet advisory services in India with five units initially and also extension of these units at district level. He added that this extension was happened not only technology of producing the information has changed but also the technology of consuming the information has changed and transform the thing. He described how the transformation of weather forecast from NWP (T80 models) over synoptic charts based generic weather forecast in producing the accurate weather forecast and its uses in agromet advisories. He also

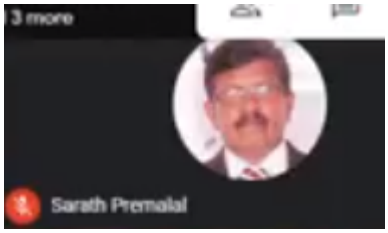
highlighted the role of ICT in information production and information dissemination. According to him, though initially the dissemination was relatively slow due to non-advancement in ICT, but today there is a sea-change in dissemination of information in urban and rural areas due to huge progress in ICT in dissemination particularly through different types of upgraded phones including mobile phones and communication of information through SMS, touch screen etc. He was mentioning about the substantial increase in tele density from 6% in 2003 to 68% today. As on today penetration of information is there and it reached to rural areas; however, there is need to better products and contents in the information usable to the farming community. He said that quantum communication is coming very fast and route with multiple kind of information, interacting with each other and ultimately reach out to user community. He also mentioned big technology like artificial intelligence, ML and others would be used extensively for next two years; however, we should be ready to use it. Huge kind of opportunity would be available and we should ready for that and grab the opportunity

At this point **Mr. Abhijit** commented that data structure and verifiable data should be perfect as this would ultimately build the powerful AI

Dr. Chattopadhyay mentioned how the perception on ICT changed over the last decade particularly in dissemination of information to the large number of farmers through SMS under PPP mode in India. He also elaborated the different key areas, i.e., ICT, mentor & success stories, taken for in depth discussion in the meeting

At this stage of the meeting almost all the members have joined and a quick round of introductions of the members was made. During the introduction all the members of the group informed their respective assignments during professional services for rendering the services in agriculture and especially to agricultural meteorology. And those who have retired, mentioned how they are involved with the welfare of the farmers. In addition to that all the members mentioned their close association with the subject of agrometeorology in the past and present as well.

Dr. Nachiketa Acharya, Associate Research Scientist, International Research Institute for Climate and Society (IRI), The Earth Institute at Columbia University, NY, USA introduced himself as statistical climate forecaster in IRI, Columbia, USA. He said that earlier in 2008 he worked as project staff under Extended Range Forecasting System (ERFS) project in India and producing the information tailored to the farmers in India. At present stationed at IRI, he has been working as climate scientist on improved version of the S2S forecast tailored to the farmers & involved in the activities of SASCOF, ASIANCOF, other ARCOFs. In addition to that, he is actively involved in BMD's capacity in improvement of weather forecast and also similar activities in nine African countries particularly improvement of capacity of sub-seasonal forecast in respect of when will start rain, dry spell, wet spell etc. He informed that he would really help the forum to share his experience on S2S and what are the limitation and tailoring the information to the farmers in South Asian Region (SAR).



At the outset, **Mr. KHMS Premalal**, Former Director General of Meteorology, Sri Lanka appreciated the efforts of organisation and discussion on different fields of agromet advisory under SAFOAM. He also informed his association with the operational agromet advisory services in Sri Lanka. He said that still the correct and timely information is not reaching to the farmer in Sri Lanka. However, he has a high hop that this forum would improve ICT capacity in dissemination of information as well as developing specific bulletins in member countries in South Asia including Sri Lanka.

While introducing himself in front of the members, **Dr. Gupta** said that the initiative of launching SAFOAM for the services of the farmers in SAR was indeed a great job. He said that he was sure that the present forum would be going to be a very important association which would contribute in a big way in SAR He also stressed for three areas (I) Interactions and organising of meetings involving the participants/representatives of SAR, which have already been taken up (ii) sharing of knowledge especially the best practices in operational agrometeorology with the member countries and (iii) after the cessation of the on-going pandemic situation, a physical meeting might be arranged inviting the representatives in SAR and the support and also funding required for such meeting/works would be extended by the Department of Science & Technology, Govt. of India.

After introducing himself **Dr. Rathore** gave emphasis on development of framework on the agromet services in SAR and outlined three areas among other activities under SAFOAM These are:(i.) going to do such areas which has not been done/doing before by the operational agencies and nobody has touched yet. He said though WMO and WB have initiated some work in this region, still there was a lot of voids in agromet system in SAR. (ii) introduction of e-community radio in dissemination of information in local languages in clusters of villages and capacitate large number of people at community level as it needs minimal cost, (iii), ICT tools should be used for capacity building programme which again an area of development of tools as at present, we have lot of resources

Mr. Basu briefed himself and shared his experience with the concept of customer in execution of project during so many years. He informed the significant variability of three aspects being discussed in today's meeting i.e., ICT, mentors and success stories in SAR, however there is presence of ICT in all the member countries. He discussed at length the role of ICT in data structure and management, ICT for capacity development and ICT for success stories. He wanted to know from **Dr. Gupta** about the reach of the information to the users.

In reply to the query of **Mr. Basu**, **Dr. Gupta** said that this, i.e., the issue of reach of information to the user, might not at present valid for India. At present mobile phone penetration is in rural and remotest villages in India. He said initially such activity started with progressive farmers which is not the scale now. According to him scale of dissemination is not an issue. Thus, information reach is there in rural areas but ease of content is missing. He said that his active involvement in the Science and Technology Innovation Policy Formulation initiative and an outcome of the project, he inferred that right information at the right people and right language was missing. He continued that at present 291 community radio in India were operating different parts of the country. He said that a pilot study was made by the Department of Science and Technology to observe the impact of disseminate information in 13

languages from 25 community radio centres, worked in a bimodal way. According to him, the observations were very encouraging and 2.5 lakhs feedback were received. He concluded that there was no issue in information penetration in rural areas; the issue was the lack of content penetration.

Mr. **Basu** said that though information network penetration was happening, but he was not sure how the content information actually usable by the farmer are taking place. He said that as farmers were now ready to take the information, more emphasis might be given on this issue. He also mentioned about the universal language for content in SAR including the touch screen where graphical representation of content is made available. He suggested that the content should be useful, understandable and applied in farmer's field with credentials. **Dr. Chattopadhyay** elaborated the reach out of the content in India by mentioning the economic assessment reports released by the Ministry of Earth Sciences (MoES), Government of India and also the reports prepared in Nepal & Bangladesh based on linker scale **Dr. Nachiketa** mentioned that State Agricultural Universities (SAUs) in India are doing excellent job in reaching out the content to the farmers in India and nowhere such system exists in SAR. In addition to that, the number of NGOs and other intermediaries are also involved in interaction as well as sharing of the content to the farmers. Considering Indian system as benchmark, he suggested for establishment SAU type system and also training to trainers (TOT) in the member countries in South Asia. **Mr. Basu** asked Dr. **Rathore** whether intermediaries are absolutely necessary.

Dr. Rathore said that intermediaries would always add value to the agromet system. He said that our role would be to enhance the capacity to understand with much ease and skilful manner and share the information to the farmers. He also elaborated the role of agrometeorology in agricultural marketing system and its rapid transformation across the country. According him, this is new and emerging area. He also suggested to capacitate the service provider in the process data for farmer and other users and linking to market

Dr. Gupta mentioned about the important project of potential of commercialisation on use of meteorological products &data in 2009. He elaborated the huge potential of agricultural market for national interest. According to him, private companies may be roped into the system. He said that a national policy might be framed on Public Private Partnership (PPP) mode for greater participation of private sectors in this system so that the objective of the government of India would be fulfilled. Additionally, he said that use of manpower, knowledge pool, dissemination technology including touch screen should be used to communicate the seamless information in local languages and their own languages from producers to the users.

Mr. Basu discussed elaborately the soil moistire sensors particularly the factors influencing soil moisture, calibration data, data acquisition, generation sharing of information with farmer also available in real time and its application. He said that this might be applicable to any data. So far discussion made, he commented that air ways might be the best way of dissemination of information along with the facility of chat radio, FAQ etc. **Mr. Basu** asked **Dr. Gupta** to comment on community radio based on his ground level experience.

Dr. Gupta has shared his experiences in different parts of the country including the north-east during the policy level initiative on DST's consultation programme on science. He added that extraordinary responses were received from the rural areas in the country in the form of feedback on the information sent through community radio especially in the north east, island

He inferred that though there is some limitation, community radio for dissemination of information should be used as a secondary channel of information to fill the gaps along with the other modes of dissemination.

Dr. Chattopadhyay said that in addition to the above dissemination system, the concept of Farmers awareness programme and Climate Farmer Field (CFFS) School might be included as climate resilient programme in SAFOAM. He aptly described the WMO's initiatives in organising FAP programme in Latin America, Africa and South Asia and CFFS in Indonesia.

Mr. Abhijit requested other members of the meeting to express their views particularly other points of the meeting especially on capacity building.

Dr.N.V. K Chakravarty, Retd.Principal Scientist (AgMet)& Head, Agril.Physics, ICAR-IARI, New Delhi, India was referring the issue of PPP model in AAS raised **by Dr. Gupta**. He said that sometimes the competitiveness and cooperation sprit conflicts under PPP mode and ultimately the purpose PPP mode could not be materialised. Thus, more efforts are required to establish cooperative atmosphere to resolve the issues. He was mentioning about the migration of rural farmers to urban areas and suggested to make agromet advisory service more popular and farming more profitable by proper use of climate service in agriculture

Dr. GGSN Rao, Former Project Coordinator (Agrometeorology) I/c, AICRP on Agrometeorology (AICRPAM), ICAR - Central Research Institute for Dryland Agriculture (CRIDA), Hyderabad, India discussed on traditional to mechanization, migration of farmers from village to urban, ways and means of profitable agriculture. Dr. Rao was also of the same opinion that through there is substantial improvement in ICT in dissemination of agromet advisories, still there is lacuna in the content of the same. He suggested that the content should be attractive and convincing to the farmers taking up the bottom-up line of approach. He informed that his interaction with the farmers showed that farmers need the very high resolution i.e., 1km weather forecast i.e., at village level. He stressed for issuing alert using nowcasting also to the farmers under extreme weather conditions instead of issuing generic agromet advisories. He said that model products derived from past weather, weather forecast, crop and pest information should be used for operational agromet advisory services. He also stressed for specific agromet advisories for urban, rural, coastal, low rainfall areas etc. He also agreed to **Dr. Rathore's** observation that market information would be very useful to the farmers for disposal of his harvested products in appropriate markets for better price.

Dr. Gupta appreciated the points raised **by Dr. Rao** on the need of high-resolution weather forecast. He informed that in India GFS and unified models were being used for high resolution weather forecast and also informed the schedule for the preparation of next generation weather forecast at finer scale. Also informed about NWF, ECMRWF & IBM's intervention in

producing 1km resolution weather forecast. He advised to avoid mismatch in the scale of weather forecast and the area considered for issuing agromet advisories

Dr. Rathore said that large number of issues and problems aptly mentioned could not be resolved under this forum. This forum would not compete with any of the agency; on the contrary would, supplement the national initiatives, augment and add value which are available in our disposal. These aspects should be clear in our mind. This forum would supplement the activities to be taken up by the member countries with the available knowledge pools and finance, if possible. He said that initially to take up the low hanging fruits. He mentioned that we definitely need finance and support without these nothing would be fruitful. Once again, he mentioned that at this point of time there was a need to identify the low hanging fruits and ride on kind of transformative process which can be done or happen with the existing data available freely in public domain and our disposal would be knowledge pool. He continued that we might seek information from the govt sources; however, it would take lot of time and energy. Thus finances, He said that out of the all the six themes identified under SAFOAM, this is the theme and web portal, we might generate business model, generate information marketable and ultimately generate revenue as well. Thus, we could set up arm support, data to donor agency as we need sustainable economic model and kind model. We might identify plethora of problems but select few things important to farmers and intermediaries and Govt to propagate it as ultimately govt wherefrom we seek support.

Mr. Basu said that business model is a good example wherefrom we could create success. He continued by saying that

1.Whole value chain is content which can help anybody for the business model. Content and knowledge pool help to create business model like soil moisture information for insurance.

2.Doing for somebody where from revenue can be generated give finances.

3. It has to be sustainable.

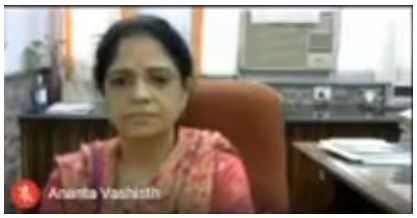
4.Content and services knowledge pool can be extended to the member countries taking the Indian conditions as benchmark.

5.Possible assistance may be provided the member countries and in this regard three basic information are required and these are weather, market and free data source.

Dr. Chattopadhyay said that as there is substantial variability of data and services among the countries in South Asia, slow and steady approaches from very elementary to advance stage of upgradation would be required. As agromet system is sustainable and there are number of successful case studies are available in India and Bangladesh, these may be shared with the other member countries to create interest and confidence in operational agromet advisory services. He explained how an initiative could be started with freely available satellite data on drought monitoring and also preparation of agromet advisories based on sub-seasonal forecast after making all the necessary home works i.e., sharing of data, organising specific training etc.

Mr. Abhijit agreed to what **Dr. Chattopadhyay**. He said that a basic level of benchmark of service along with the knowledge, which we have, in SAR is absolutely. Afterwards, further initiatives need to be taken up. We should see that there would be no distortion of interest while executive the programme on SAFOAM. He once again said that e-community radio concept could be a viable solution as its low cost and packet size is not so big and additionally number

of activities like FAQ, feedback, chat system could be performed. **Mr. Abhijit** requested **Dr. Anatha** what could be her role in SAFOAM activities in elevating the agromet services in the SAR



Dr. Ananta Vashisth, Principal Scientist & Nodal officer, GKMS Project, Division of Agricultural Physics, ICAR-Indian Agricultural Research Institute, New Delhi, India informed in detail the preparation and dissemination of agromet advisories for NCR, New Delhi. She commented that special attention should be given for multichannel dissemination system along with AI & ICT Models for real time communication of information to the farmers. She was emphasising on organisation of FAP and also share the success stories in India to create interest among the farming community on the necessity of these services in the member countries. She talked about the training modules particularly on weather beneficial and impact on crop; soil moisture, evapotranspiration irrigation, management of crop which might be imparted to the member countries. There was discussion on the proposed strategies in terms of modules, resource persons etc. for organising training programme.

Dr. Rathore mentioned for proper strategies of training for the new entrains from the member countries. He said in India, comprehensive training programme for 21 days are arranged at different levels covering the entire spectrum of agromet advisories from weather forecast, its translation, tools, to dissemination to feedback, economic assessment etc This training programme consists of different modules. As per the need of the member countries these training modules would be selected. Training would not be given in one goal; on the contrary in fragmented manner for those who are at the initial stage, simple module on forecast, observation and translation of the same into agromet advisory might be chosen. Then after having the filed experience, training with additional modules might be taken up.

Dr. Chattopadhyay said with satisfaction that the technical officers of GKMS project of India have agreed in principle that they would assist training to the new entrains from the member countries. He added that a proper institutional mechanism would be set up with the Governmental organisation before requesting them to be part such training programme.

Dr. Vyas Pandey, Emeritus Scientist (ICAR), President, Association of Agrometeorologists, Former Professor and Head, Department of Agricultural Meteorology Anand Agricultural University, Anand, Gujarat, India informed that the Agromet Association would be going to organise virtual training programme on "Climate Risk Management" as per the request from India Meteorological Department. The proposed training would be organised in 17 chapters of the Association inviting participant from neighbouring states. The expert members in the Association would be the resource persons for providing the training

Dr. Rathore said the beauty of these days that under the combined efforts of SASOAM, SAMA & Agromet Association in India, it is possible to organise such training programme and other activities. He added that Government needs these services as Government could not do all the works as their hands were full. He suggested to rope those who retired from service might be requested to provide training voluntarily. Besides, effective mechanism might be built

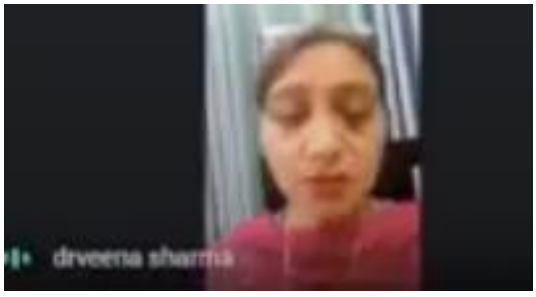
up for the people who are outside and inside the Government. Once everything would be clear in our mind what we are going to do, government may be approached for further cooperation.

Mr. Abhijit said that from the foregoing discussion it was clear that we have services, medium what would be the course content and its availability and the resource persons who could give the training and how to get the feedback on digital platform. He also said that it appeared that similar kind course content in India, resource persons from India. Agromet association in India, and other organisations in India might be involved in the training programme.

Dr. Rathore said that one thing might be clear in our mind that we would not provide service. Providing service is herculean task and might not be feasible. However, we would contemplate by creating web portal which have value to the service provider, organising capacity building programme, introduction of e-community radio, as an extended arm that become role model for the SAR and ultimately prepare the framework that could be modified by the intermediaries and user group. He said today we were doing brainstorming t and came to know where we were; afterwards different core groups would address different issues in the proposed workshop where further deliberation and refinement of the roadmap of SAFOAM would be made in holistic manner. Third phase related implementation which are far off but keep in mind

Dr. Chattopadhyay tried to present a clear idea how to proceed from the Core Group meetings to implementation phase through organising workshop, preparation of road map etc. He said that he has a high hope that SAFOAM would be a reality by developing number of linkages between SAFOAM headquarters to individual chapters in member countries and government to government etc as envisaged by all of us in spite of hurdles.

Dr. T. Prathima, Sr. Scientist (Agromet), RARS.Tirupati., Andhra Pradesh, India nicely informed the different dimensions of agromet advisory services being implemented successfully by her and team in Andhra Pradesh even upto block level and disseminating the information to Gram Panchayat level. According to her e-community radio for dissemination of information and other related activities would surely help the farming community. She said that the lacuna and needs in other countries should be understood first and accordingly the related information on pest weather information and other related information might be shared and this would be used after proper validation including organising training programme to effective use such information in the respective country.



Dr Veena Sharma, Technical Officer/Assistant Professor, Agtromet Section, SKUAST-Jammu, Jammu, J&K stressed upon the importance of past weather data for development of ICT tools and also irrigation advisory. Like weather data and weather forecast, soil moisture information is also equally important for timely and amount of irrigation. She also discussed the importance of portal including the languages to be used in the portal. According to her, it is very much necessary to know the correct information on agro-ecosystem, cropping pattern, weather, climatic condition in the member countries before helping them in preparation of agromet advisories. She stressed for

the need of automation in preparation of high resolution agromet advisories correctly and effectively useable by the farming community.

Dr. Nachiketa wanted to know whether RIMES has taken any initiative in automation of preparation of agromet advisories. **Dr. Rathore** said that such initiative has been made in Agromet Project in Bangladesh and the same could not been materialise and it was in developmental stage. **Dr. Chattopadhyay** also said that RIMES has developed ADSS system and experimentally for preparing the advisories for limited number of districts. **Dr. Rathore** mentioned similar project was also taken with Triple IT, Hyderabad but the outcome of the project was not encouraging on the user's point of view. Similar work was also carried out in Tamil Nadu Agricultural University. Thus, lot of work was carried out in this respect but because of the ideal data base not only weather but also crop, soil etc, such project could not be in place in operational agromet advisory services. **Dr. Chattopadhyay** also explained the existing automation of agromet advisories by RIMES in India Meteorological Department.

Like other Technical Officers of GKMS project in India, **Dr. Sanjay S. Wanjari** Ex. Associate Professor Agronomy /Agromet, Department of Agronomy: Akola (MS). Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Maharashtra, India informed how actively he was working for the preparation of agromet advisories particularly in Vidarbha region, Maharashtra. All the technical officers under GKMS project mentioned the on-going activities and also agreed to share the knowledge gained so far to the fellow agrometeorologists in the member countries. It has also been said that a proper mechanism would be developed to arrange capacity development programme involving the technical officer, GKMS project.

Dr. Chattopadhyay informed that **Dr. Nachiketa** was very resourceful person in generating sub-seasonal forecast and done good job in India, Bangladesh and now in African countries. He wanted to know how **Dr. Nachiketa** could help us in SAFOAM activities particularly use of sub-seasonal forecast in agriculture in SAR. In principle **Dr. Nachiketa** agreed to assist in generation of sub-seasonal forecast tailored to the farming community in member countries in South Asia. For better knowledge of the existing S2S, he explained the operational and experimental S2S systems in India & Bangladesh respectively. He opined that the output of sub-seasonal forecast needs to be different from seasonal forecast. He also described how IMD CFS model and IMDAA reanalysis data are being used in this regard. He said that he would explore how it would be possible to visit the member countries and help them to generate the sub-seasonal forecast. Alternatively, he said that IMD & BMD might take the lead role in organising such programme where he could be involved. **Dr. Chattopadhyay** appreciated **Dr. Nachiketa** for his willingness to cooperate in this regard and also for his idea in implementation of the same for SAR. **Dr. Rathore** also advised **Dr. Nachiketa** whether S2S could generate the information on sowing rain during monsoon season based on the threshold of accumulated rainfall available in CRIDA or IMD. **Dr. Chattopadhyay** also requested to explore to forecast flash flood in Bangladesh and Bhutan with sufficient lead time. **Dr. Nachiketa** said that each model has its own biases, he would try to value add to the SST corrected forecast generated by **Dr. Sahai** in Indian Institute of Tropical Meteorology (IITM) and could provide wet spell episode which could be combined with WRF forecast and ultimately be possible to provide inputs for sowing rain and flash flood. However, a lot of R & D would be required in this

regard. **Dr. Nachiketa** desired that SAFOAM could also take part in the SASCOF type of activities.

A quick round of discussion was made on the role on agency in weather data, weather forecast generation and also accountability of translated version of the later into the agromet advisory. It has been said thar NHMS is surely accountable in providing weather data and development of weather forecast whereas those who use this information they are accountable to the Weather Department, if funding is coming from the weather department. In different countries, full operation as mentioned, there are some similarities and dissimilarities

At the end of the meeting Mr. Abhijit thanked all the members of the meeting for their inputs and good conversation on number of important areas particularly on the different aspects of data in decision making process and tools for ICT along with the ICT in producing, application and dissemination of advisories. Besides, organisation training in different perspectives were highlighted nicely. One of the important outcomes of the meeting would be the introduction e-community radio for dissemination and other interactive system. Productive discussion on automation and use of sub-seasonal weather forecast in agriculture were made. He was sure more discussion would be made in future to make the SAFOAM in reality.

Recommendations of the Meeting

1. Under SAFOAM, activities which have not been touched/ done by any agencies, will be taken up.
2. There was a need to Identify the low hanging fruits and ride on kind of transformative process which can be done or happen with the existing data available freely in public domain utilising available knowledge pool
3. Efforts should be made to introduce of e-community radio in dissemination of information in local languages in clusters of villages and capacitate large number of people at community level as it needs minimal cost.
4. ICT should be used in producing, dissemination & capacity building programme in the member countries in South Asia
5. Penetration of better products and contents in the information usable to the farming community are the need of the hour.
6. Sharing of knowledge especially the best practices in operational agrometeorology with the member countries and
7. national policy might be framed on Public Private Partnership (PPP) mode for greater participation of private sectors in this system.
8. capacitate the service provider in the process data for farmer and other users and linking to agricultural market system.
9. Concept of Farmers awareness programme and Climate Farmer Field (CFFS) School might be included as climate resilient programme in SAFOAM
10. This forum would not compete with any of the agency; on the contrary would, supplement the national initiatives, augment and add value which are available in our disposal.
11. This forum would supplement the activities to be taken up by the member countries with the available knowledge pools
12. Artificial intelligence, ML and other state of art technology should be used in agromet advisory system.

13. It is essential to generate business model, generate information marketable and ultimately generate revenue as well for sustainable economic model.
14. As per the need of the member countries, training modules would be selected. Training would not be given in one goal; on the contrary in fragmented manner. Effective mechanism might be built up for the people who are outside and inside the Government.
15. Initiatives to use of sub-seasonal forecast in agriculture in SAR.
16. Considering Indian system as benchmark, establishment SAU type system and also training to trainers (TOT) in the member countries in South Asia are essential

Dr. Chattopadhyay once again thanked all the advisors and 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 the Members of Core Group VI

for steering SAFOAM activities

Theme VI: Build capacity in ICT program management and also build such cadre and mentor them for ensuring continuity of Agromet success and innovation sustenance.

Leader

****Mr. Abhijit Basu**

Founder and CEO Smartex Cognitive, XCED, APAC CEdMA, California, USA

Advisors

****1. Dr. L.S. Rathore**
Former Director General of Meteorology
International Consultant, The World Bank
Consultant, United nations Development Programme (UNDP)
Member, Advisory Board, National Disaster Management Authority (GOI)
Member, Research Council CSIR-NISTADS
Member, Appeal Committee, National Agricultural Education
Accreditation Board, ICAR
Vice President, Vigyan Bharti
President, Society for Rural Improvement

****2..Dr Akhilesh Gupta**
Adviser/Scientist-G & Head, STIP-2020 Secretariat, Head, Policy Coordination & Programme Management (PCPM) Division, Head, Strategic Programmes, Large Initiatives and Coordinated, Action Enabler (SPLICE) Division and Climate Change Programme, Chief Vigilance Officer (CVO), Room No 16B, Administrative Block, Department of Science & Technology, Technology Bhavan, New Mehrauli Road, New Delhi-110 016, INDIA

3.Mr. KHMS Premalal,Former Director General of Meteorology, Sri Lanka

4. Dr. G. Srinivasan ,
Chief Scientist, Climate Applications, Regional Integrated Multi-hazard Early warning System (RIMES), Asian Institute of Technology (AIT) Campus, Klong Luang, Pathumthani, Bangkok, Thailand

5. Dr Mrutyunjay Mohapatra
Director General of Meteorology,
Permanent Representative of India with WMO,
& Member of Executive Council, WMO
India Meteorological Department
Mausam Bhavan, Lodi Road, New Delhi-110003

6.Mr. A Karunanayake
Director General of Meteorology
Colombo, Sri Lanka

7.Dr. V. Geethalakshmi
Director (Crop Management),
Directorate of Crop Management,
Tamil Nadu Agricultural University, Coimbatore, India -

8. Dr. B.V.R. Punyawardene
Principal Scientist/ Director, Natural Resources Management Center (NRMC), Department of Agriculture, Ministry of Agriculture. Colombo, Sri Lanka
Members

1.Dr. Nachiketa Acharya**
Associate Research Scientist, International Research Institute for Climate and Society (IRI), The Earth Institute at Columbia University, Lamont Campus, 61 Route 9W, Palisades, NY, USA
2.Mr.Zahiruddin Imampoor
Director of Agricultural Statistics & Information System
Ministry of Agriculture, Irrigation and Livestock
Afghanistan

****3.Dr.GGSN RAO**
Former Project Coordinator (Agrometeorology) I/c
AICRP on Agrometeorology (AICRPAM)
ICAR - Central Research Institute for Dryland Agriculture (CRIDA)
Santoshnagar, Hyderabad, India -

****4.Dr.N.V.K Chakravarty**
Retd.Principal Scientist (AgMet)& Head, Agril.Physics, ICAR-IARI, New Delhi, India -

****5. Dr. Vyas Pandey**
Emeritus Scientist (ICAR)
President, Association of Agrometeorologists
Former Professor and Head, Department of Agricultural Meteorology Anand Agricultural University
Anand 388 110, Gujarat, India

****6. Dr. Ananta Vashisth**
Principal Scientist & Nodal officer
GKMS Project
Division of Agricultural Physics
ICAR-Indian Agricultural Research Institute, New Delhi, India -

7. Dr. AVM Subba Rao
ICAR - Central Research Institute for Dryland Agriculture (CRIDA)
Santoshnagar, Hyderabad, India -

8. Dr Gopi Krishna Das
Director farms (seed & farm) &Head of Department
Agro meteorology
Indira Gandhi Krishi Vishwa Vidyalaya
Raipur, Chhattisgarh, India -

**9.Dr.Sanjay S. Wanjari
Ex.ASSOCIATE PROFESSOR AGRONOMY /AGROMET,DEPARTMENT OF AGRONOMY: Akola (MS)444104.Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Maharashtra, India -

**10.Dr. T.Prathima,
Sr.Scientist(Agromet),
RARS.Tirupati.
Andhra Pradesh, India -

11.Dr..Arun Kumar Senapati
RRS, BCKV
Kakdwip, 24- Pgs(S)
West Bengal, India -

12.Dr.Shibani Chowdhury
Agromet Field Unit
Kakdwip
South 24 Parganas
West Bengal, India -

13.Dr. Shiromani Jayawardane
Director (Weather Forecasting)
Sri Lanka Meteorological Department
Colombo

14.Ms. Anusha Warnasooriya
Director (Climate and Agromet)
Sri Lanka Meteorological Department,
Colombo

**15.Dr. Nabansu. Chattopadhyay
President, International Society for Agricultural Meteorology
Executive Secretary, Global Federation of Agrometeorological Societies (Global FAMS)
Former Deputy Director General & Head & Scientist F, Agricultural Meteorology Division, India Meteorological Department
Former Chairman of Open Panels of Commission of Agricultural Meteorology, World Meteorological Organisation, Geneva
Former Senior International Agrometeorological Technical Consultant, Agromet Project, Bangladesh
Former Short Term Consultant: World Bank
Alternate E-mail: nabansu_c@yahoo.co.in

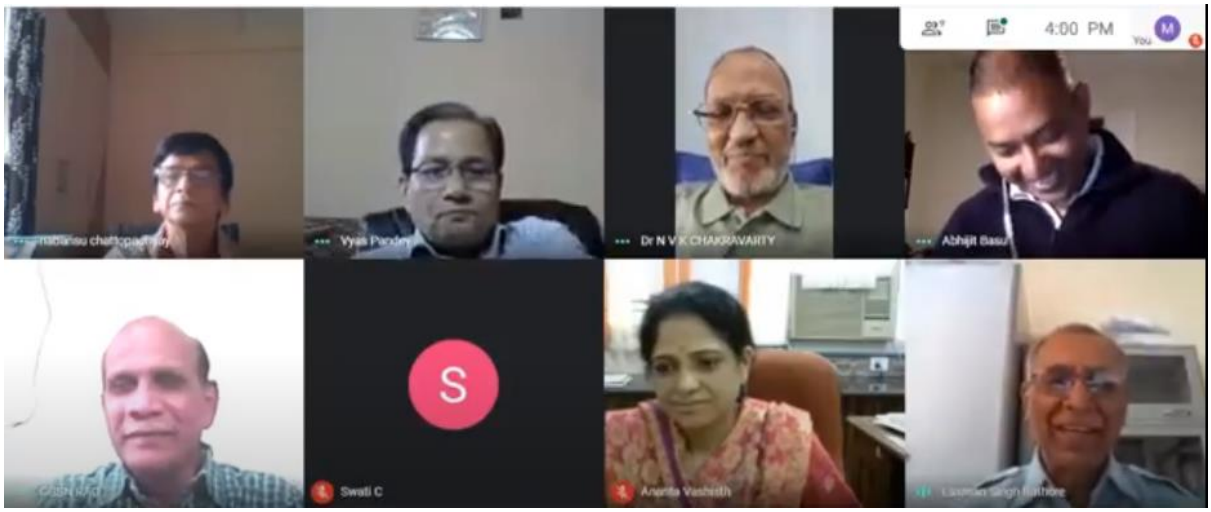
**16.Ms. Swati Chandras
Agricultural Meteorology Division
India Meteorological Department
Pune

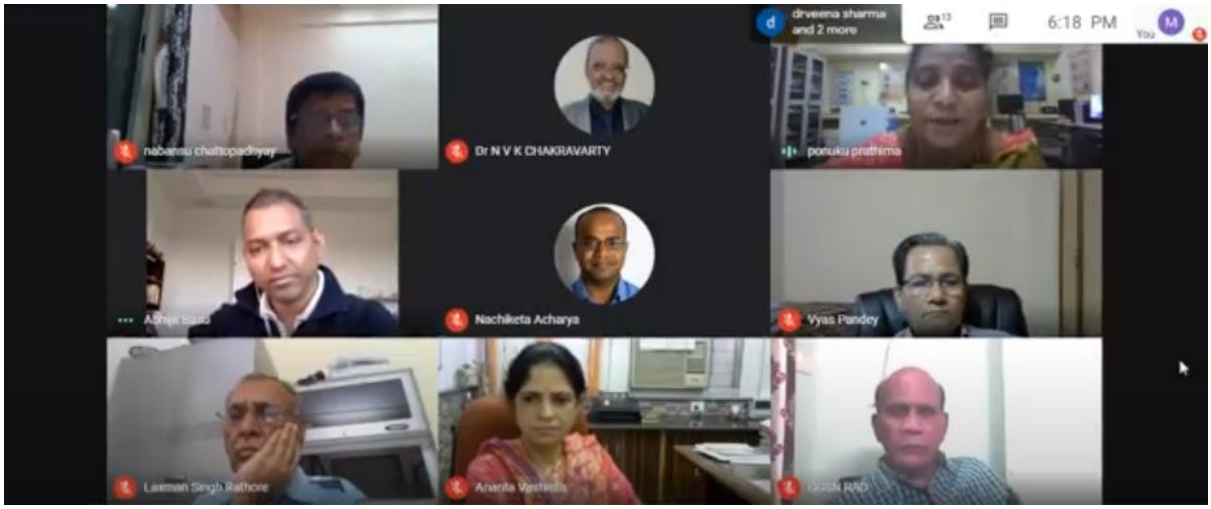
**17.Ms. Malathi Seetamraju

Agricultural Meteorology Division
India Meteorological Department
Pune

****= Attended the Meeting**

Photo Gallery

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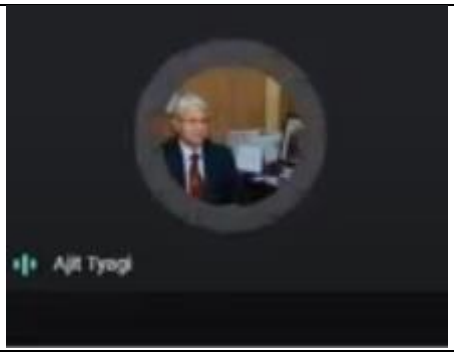
Vyas Pandey
Laxman Singh Rathore

Draft
Proceedings of the of meeting of Core Group IV for steering activities South Asia Forum on Agricultural Meteorology

Under the Theme:
Web Portal for South ASIA FORUM ON AGRICULTURAL METEOROLOGY

Date: 6th March 2021
Time: 1600 Hrs IST to 1900 Hrs IST
Venue: Virtual Platform (The Google meet)

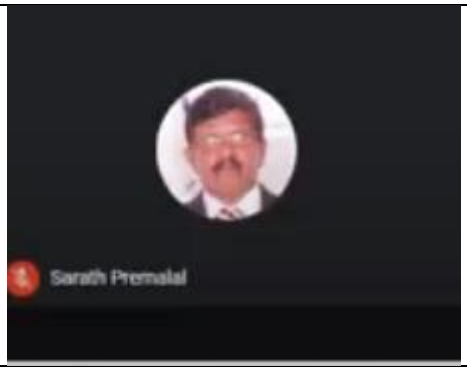
The meeting was started by welcoming all the members of the Core Group IV (list of the members is available in Annexure I) for steering activities of South Asia Forum on Agricultural Meteorology (SAFOAM) under the theme "Web Portal for South Asia Forum on Agricultural Meteorology". At the outset, quick round of introduction of the members was made. **Dr. N. Chattopadhyay** said that he was really thankful to all the member of Core Group IV for participating in today's meeting and whole heatedly supported the formation and on-going activities of SAFOAM. He mentioned that the present theme was very important as the Web Portal for SAFOAM would have the refection of different kinds of activities carried out for South Asia along with the progress of work and the level of cooperation among the member countries in South Asia. He added that it was sure that under the presence of all the honourable advisors and all other esteem members today's meeting would be highly productive and useful. Afterwards, Dr. Chattopadhyay started moderation of the meeting by requesting all the advisors and members of this group to present their views/commenrs/suggestions on how to go ahead on designing the website of SAFOAM looking at the various contents, its sustainability and completeness etc.



Prof. Ajit Tyagi, Former Director General of Meteorology, India Meteorological Department & Member, W.M.O. Executive Council said that according to him this platform for societal aspects would be the most effective. This initiative for creation of website for SAFOAM is highly welcome. According to him whatever the strong points in agromet advisory services of India and Bangladesh are generated that might be pulled together for the benefit of other countries in South Asia. An effective website is a primary vehicle for success of any initiative in real time. He continued by saying that during the present pandemic situation when physical contacts among the diverse background personalities in

the South Asian countries might not be possible, the SAFOAM website would be a good beginning as this would provide the current update of all the issues related to operational agromet advisory services. He was mentioning two important aspects of any impressive & interesting website; these are good website design and updating of the website with current and important and relevant issues which are itself challenging. He advised for developing the support mechanism which would ultimately make the website sustainable and get recognition from all. He said that he was sure that with the wide spread agromet experts in India and the remaining South Asian Region (SAR) all the activities of SAFOAM including the preparation and maintenance of website would be a great success. He assured that, as per the need, South Asia Meteorological Association (SAMA) would support SAFOAM activities in future.

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 of the World Bank, briefly mentioned about the Bangladesh Agromet Advisory Service System. He said that Agromet Advisory Services bulletins (district, national levels), are prepared in collaboration with Bangladesh Meteorological Department (BMD), & Bangladesh Water Development Board (BWDB). He said that as per the weather act of Bangladesh, for issuing any weather alert, advisories and special bulletins, permission from the Bangladesh Meteorological Department BMD is required. He wanted to know what would be the mechanism if the same would be issued under SAFOAM. He continued whether SAFOAM would seek permission from BMD in issuing the same as mentioned. **Dr. L.S. Rathore**, Former Director General of Meteorology, India Meteorological Department, International Consultant, The World Bank said that he would react to **Dr. Mazhar's** query shortly.



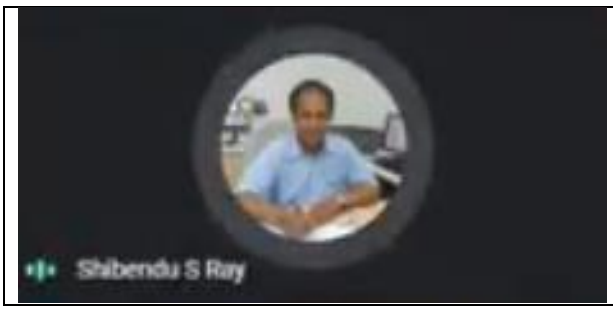
Mr. KHMS Premalal, Former Director General of Meteorology, Sri Lanka said that although there are number of websites on agriculture and other sectors in number countries and all over the world but

there are no dedicated website only targeting agricultural meteorology. According to him, the concept of agromet portal should focus the agricultural community and upload relevant agriculture and other meteorological information. He was referring his active involvement in World Food Programme on last mile services through development and maintenance of agromet portal in Sri Lanka where the national bulletins at agroecological zone are uploaded. He said that at present there is no provision for uploading local bulletins. It would be good idea to upload the local bulletins in agromet portal of SAFOAM. He said whether it is possible to prepare and upload composite maps for different remote sensing indicators like NDVI, VCI etc in the agromet portal which ultimately would help in providing compensation to the farmers during disaster situations like drought and floods under the climate change and climatic variability. He said that these composite maps, as mentioned, would also assist in the implementation of index-based insurance/ agricultural insurance in Sri Lanka

At outset **Dr. L.S. Rathore**, said that he was happy to see the work so far has been done from the launching of the forum. He said that overall structure of SAFOAM was being built up concurrently by building different components of the forum and as a result different groups were formed and working. Though the different Core Groups, formed after the launching of SAFOAM, were not working on together, still the all the Core Groups were working with full enthusiasm and are interlinked with each other and cross flow of the information was also happening among the Core Groups. This Core Group was mandated to develop the web portal which would be the face of the organisation. He really appreciated the work that has been done so far on the website particularly what could be the possible lay out, what could be the static and dynamic information and now there was need to deliberate on this particularly on the possible lay out of the website in terms of static, dynamic information, possible flow of information etc. and how to sustain as **Prof Tyagi** already mentioned. He said that first and foremost we should clear in mind the prime objectives of the forum when developing the website. Under this forum no replication of work, competition, repetition work done by the respective countries in SAR would be taken up; on the contrary the forum would capacitate the fellow agrometeorologists which are serving the different countries to facilitate by providing products that would keep us alive with the new information in regional basis and these products are nowhere available The novelty of the SAFOAM website would be to display the new products & information, like composite NDVI, VCI maps which are found any of the website in the world. He said that the face of the SAFOAM would be the website of SAFOAM. He pointed out though there is scope to include amount of information about SAFOAM like science of agrometeorology, organogram etc under static information, the most interesting and challenging would the dynamic information. The most important recipe would be the products as shown by Nabansu; however, we need to deliberate the new products most important by different countries and regular update of the same. **Dr. Rathore** fully agreed that sustainability of the website of SAFOAM would be great challenge to all of us. He said that we should really see the list of the products which could be included and which countries to be need these under the forum. Replying to the query of **Dr. Mazharul Aziz, Dr Rathore** said that all the open-source data and the information already available in public domain by different countries would be given access in our website to other. According to him this is not simple access but we need to prepare

a framework where we put our recipe in the front and supplementary information from other country would be given the link. He said that we have to put your recipe in the front and at the back hand the products and information generated by other country's link could be given under such circumstances and for that no legal permission would be required. According to him definition of SAFOAM zone should be revisited. He suggested that grid concept might be taken while preparing the composite map for any product as this would eliminate the dispute in country boundary. He also suggested that boundary of SAFOAM might be extended more on the southern side which would cover the south Indian ocean so that it would be possible to display meteorological information, satellite imagery, cloud imagery, SOI etc. over the adjacent ocean. He also guided on the registration of the domain and domain name issues of the SAFOAM website. At the end he complemented all the members of different Core Groups for their good work on SAFOAM initiatives.

During the launching programme of SAFOAM, **Dr. Abdul Muyeed**, Sectorial Consultant, Care Project, RIMES, World Bank & Former Director General, Department of Agricultural Extension, Bangladesh suggested to develop the website of SAFOAM. He said that so far, he heard from the members in today's meeting and also observing the draft website of SAFOAM, he was feeling very much enthusiastic. He said that the website of SAFOAM would have basket of information on agriculture, weather and allied sectors and all the countries of the South Asia could harvest and accommodate the same as per their need. He was confident that the website would take a good shape in future and in fact it would be the hub of the SAFOAM. He also suggested to link SAFOAM with South Asia Information Centre (SAIC) as this would help in registration of the website and developmental activities in future. He congratulated to all involved in developing the SAFOAM website. The website would be very helpful for South Asian countries as they could get access the information to be collected from different leading sources and organisation like NOAA. He was referring the preparation of agromet advisories through automation considering the crop calendar and other weather, crop inputs. Once again, he conveyed his happiness for the advancement in development of the SAFOAM website.



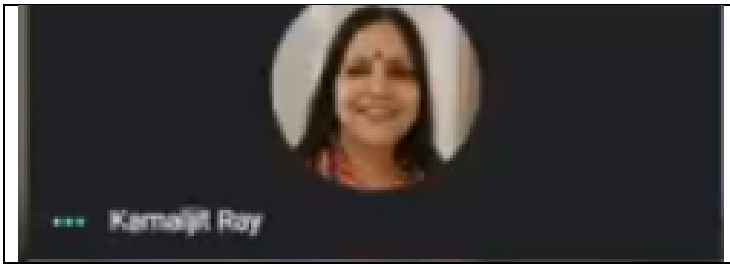
Dr. Sibendu Roy, Director, Mahalanobis National Crop Forecast Centre**,** New Delhi appreciated the initial plan for developing a good portal where number of satellite data/ information/products from

diverse and open sources were used in framing the website of SAFOAM. He also mentioned that in addition to the products like NDVI, VCI, TCI, PET, Insolation, soil moisture information from SMAP could also be included along with MODIS, NOAA, AWIFs data and other data at high resolution scale may also be taken into consideration in developing the website. He also mentioned different activities of Mahalonobis Crop Yield Forecasting Centre like issue of weekly crop weather situation, drought monitoring in India. He was of the same concern as expressed by **Dr. Tyagi** that it was relatively easy to launch website but great challenge would be the continuity in the updating of the information and products. As the weather and satellite images are changing very fast, updating should be done once a weekly or at least once in a fortnight interval. He also said that dedicated team should support this activity He stressed for appropriate mechanism to get the support and recognition from the governments in South Asian countries as Director General of IMD and Director General of Meteorological Departments of other countries in South Asia are also already supporting this initiative. According to him, at least recognition from Ministry of Agriculture, Ministry of Meteorological Department are desirable. Even international organisations like FAO, WB, WMO's recognition would be added advantage. He said that he would consider the forum as inter-governmental forum. Also, link could be given to MODIS, FAO, other organisations, international bodies, organisation, BAMIS portal of Bangladesh. He suggested that SAFOAM could be the member of Group on Earth Observations Global Agricultural Monitoring Initiative (GEOGLAM) which are issuing qualitative information of monthly crop condition through crop monitor website like exceptional bad, good and other categories. He was also the same opinion that country geographic boundary issue may be avoided, grid concept might be used in the preparation of composite products for SAR. He assured that on behalf of himself and MNCFC all support would be provided for the development of SAFOAM website in particular and also overall SAFOAM activities and also share the relevant information during the development stage of website.

Dr. Rathore said that we are all encouraged by **Dr. Ray's** deliberation. He said that definitely linkages would be established with Governmental organisations and international organisations but initially it is better to set up ourselves and establish a good footing of SAFOAM. **Dr. Rathore** wanted to know that beyond the boundary of SAR and beyond the climate and weather, FAO is generating different products and information for monitoring of pests like locust coming from Africa. As far as the SAFOAM is concerned how we get some information under such situation to issue some guidelines/products/information to take control measure against locust.

Dr Ray said this is very much pertinent question. **Dr. Ray** was referring the considerable incidence of locust in India and neighbouring countries during last two years especially during winter season. As far as the control measures of locust incidences in India are concerned, **Dr. Ray** informed that Remote Sensing Centre at Jodhpur, Rajasthan is the nodal organisation looking after the issue. He said that information on four parameters namely air temperature, soil moisture, vegetation condition and wind speed and velocity are used to take up control measure against locust. According to **Dr. Ray,** these above-mentioned data/information are globally available and may be used in other countries in SAR also. He stressed for generation of some fund as a dedicated team would be given such work for SAR. In addition to that, **Rd. Ray** said that these days residue burning after the harvest of the crop are creating big issue on health hazards. Utilising different parameters like thermal condition, it is now possible to provide qualitative information of residue burning in a particular area. Secondly, **Dr. Rathore** wanted to know from **Dr. Ray** how the drought monitoring system, like India could be implemented in different countries in SAR. **Dr. Ray** informed that in India drought manual has been developed for monitoring of drought in generic form. Taking the important aspects of the manual and other information of the respective country, drought monitoring in different countries in SAR is possible. He also mentioned about the work done by the International Water Management Institute,

Sri Lanka which are doing good work in this regard and IWMI may be taken in board in drought monitoring in South Asia. **Dr. Rathore** informed that **Dr. Giriraj Amarnath** from IWMI is also the Founding of SAFOAM and we would be in touch with him in future in this regard.



Dr. Kamaljit Ray, Advisor & Sc-'G', Ministry of Earth sciences, New Delhi said that this was a great idea & initiative and looking to be the part of the activities of the forum. She suggested that the proposed activities could be done alongside with the Governmental machinery. According to her, involvement of Government would further strengthen the forum. She added that all necessary supports from her end would be provided and any support from the Government is required, she would try her best to do this.

Mr. Vijay Deshpande, Scientist F, National Informatic Centre, Pune**,** Maharashtra introduced himself as statistician and also inform his experience in website development & IT solutions of various Government Organisations in the country. He said that prior to joining this meeting, he has prepared some points in regards to development of website of SAFOAM and he would like to share the same. According to him, there are two phases in the development of website. These are (i) design and development of website, (ii) Sustainability of the website to make the website long lasting and makes complete website. He has mentioned following points need to be considered during the phase one of the development of the website.

1. It should be easy to use
2. It should contain the latest contents related the theme of the website
3. Good relation with the customer, who used the website, should be maintained
4. Website should be mobile enabled.
5. As multi-country will be involved in the website operation, accessibility guidelines and multi-languages support system should exist
6. Open-source technology should be used as there would be no hurdles and easy to use and cost effective.

7. While preparing the website, certain data base standard needs to be followed otherwise it may not be possible to prepare any reports
8. It should be developed based on Content Management System (CMS) and have CMS rule, CMS access, roll back access etc.
9. Regular audit should be done to avoid any unwanted problem in the website.
10. There is need to keep history of the content of the website
11. Website should be free from vulnerability
12. Care should be taken so that there would be non chance of hacking of the website
13. Link should be given to other website to avoid any replication of the content
14. There is need for integration of the server, where the website hosted, with other servers.
15. It is very much essential to provide webservices to other websites. Cited examples of the experience of agromet website of India Meteorological Department with the Agricultural Universities
16. Website can be considered a good way of dissemination of content also
17. There is need to integrate server with email and SMS server.
18. Provision should be made to keep feedback system.
19. Support mechanism should be made for providing answers to the query raised from different sources.
20. Regular web security audit should be done

Mr. Deshpande said that all the above points should be considered at the time of the development of the SAFOAM website. He continued that under the phase two of the development of the website, sustainability aspect of the website should be taken into consideration to give the completeness of the hosting of the website. Following points need to be considered

1.Upgradation of the website should be done at different time intervals.
2. Web security should be done when there are substantial changes are made in the website
3. Monitoring of functional aspects should be done.
4. User maintenance should be made
5.Support mechanism should be established
6.Grivences mechanism of content providers should be addressed
7.Query asked should be resolved
8.Regular maintenance of the website should be done.
9. Though costly affair, efforts may be done to host the website in upgraded platform like Cloud server.
10.Managemen services of the website should exist.
11. When everything is obsolete, redevelopment of website should be considered

Dr. Rathore thanked **Mr. Deshpande** for giving the entire spectrum of the activities and what we required to do. He has underlined the need to institutionalise the entire process of the website. In doing so, we need finance, manpower and other things. In this regard we have an idea in mind to approach world Bank regarding hosting of the website and how to go about it. However, in the meantime whether **Mr. Deshpande** could help us to prepare the proposal including all the aspects he has mentioned. And concurrently we will approach donor agency for supporting this initiative. He has agreed to this proposal. However, he said that he has shared preliminary thoughts but more can be done on automation of different components of the website using artificial intelligence also. He continued that more attention might be paid to enhance the system and the portal.

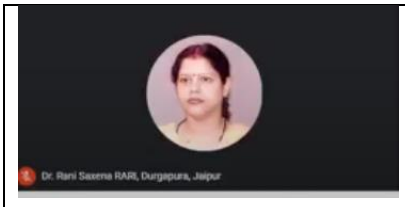
Dr. Orivaldo Brunini, Director, Agricultural Research Support Foundation, Former Professor of Agrometeorology, and Former Senior Researcher on Agrometeorology. Agronomic Institute-IAC, Brazil said that web portal is very important for the extension service persons for taking farming decision on daily basis. He has given a presentation and nicely explained how the SAFOAM website would look like. He mentioned elaborately an agrometeorological WEB PORTAL assistance program which must have the following basic missions:

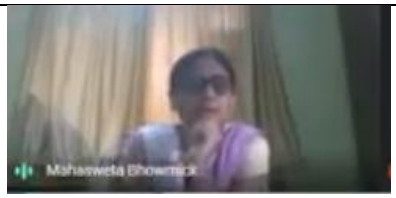
- A - increase the yield in food and fiber production
- B - reduce production costs
- C - reduce losses due to the effects of adverse weather and climate conditions
- D - minimize soil, water and air pollution caused by agricultural operations

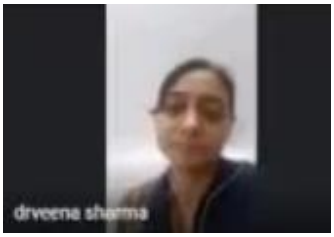
E - minimize energy expenditure in agricultural operations

He has also mentioned that it should contain overall general information for all countries including specific –for each country with basic and requirements and different users

Dr. Chattopadhyay requested the Technical Officers working in the Gramin Krishi Mausam Project, India Meteorological Department to give their comments/suggestions on the design, content and sustainability of the proposed website of SAFOAM.





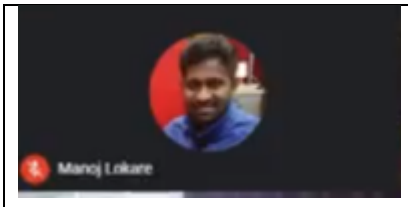


Dr. Rani Saxena, Asstt. Professor (Agrometeorology), Rajasthan Agricultural Research Institute (SKNAU, Jobner), Durgapura, Jaipur said that it was an honour for her to be part of the SAFOAM initiatives. She said that she would like to offer her services on the drought & locust assessment in South Asia as mentioned by **Dr. Ray**. She said that she would do her best to make the SAFOAM

initiatives highly successful. She also suggested that all the domain experts of the web portal of SAFOAM in different countries should be given chance to share their views.

Dr. Mahasweta Bhowmick, Technical Officer, Gramin Krishi Mausam Sewa. Kalyani Agro-met Field Unit, Bidhan Chandra Krishi Vishwavidyalaya. West Bengal, India informed all the important activities doing for the farming community in West Bengal, India. She also said that her rich experience would help her to associate herself in the multi-purpose activities of SAFOAM and SAFOAM web portal in particular.

Dr Veena Sharma, Technical Officer/Assistant Professor, Agromet Section, SKUAST-Jammu, Jammu, J&K said she was thankful for involving her in the SAFOAM activities. According to her, success stories from different countries in South Asia on operational agromet advisory services should be displayed as the same might encourage the fellow agrometeorologists in different countries in SAR. She also suggested that there should be some provision for membership corner should be there as this would help in applying and getting membership subsequently. She also requested to involve her in website development of SAFOAM.



Mr. Manoj Lokare, GeoSpatial Researcher, Aberystwyth University, United Kingdom, has developed the draft design of the web portal of SAFOAM presented by **Dr. Chattopadhyay**. **Mr. Manoj** said that he would like to work on the development of the website of SAFOAM under the able guidance of **Mr. Deshpande**. **Mr. A K Bhargava,** Former Assistant Meteorologist, India Meteorological Department, New Delhi has given suggestions on display of important features on agrometeorology in different countries including Sri Lanka through the website of SAFOAM. According to him positive as well as negative feedback information from the user community are equally important and should also be displayed through the website. He also stressed for display of soil testing information that would also help in irrigation advisories.

After the deliberations from the advisors and member**, Dr. Chattopadhyay** requested for open discussion by the advisors and members on the present theme

Dr. Mayeed requested to arrange a webinar, after finishing all the Core Group meeting, to present all the proposed important activities of SAFOAM inviting the donor agencies like UNDP, USAID, WMO, WORLD Bank etc and ultimately finalise the road map of SAFOAM supported and funding by the donor agencies as mentioned.

Dr. Chattopadhyay elaborated the overall future activities of SAFOAM and also the preparation of the concept paper collectively and its presentation in the proposed workshop inviting all the founding members of the forum for finalisation the same.

Dr. Mazhar said that as far the standard of agromet advisory services is concerned, India is in developed stage while Bangladesh, Nepal in developing and other countries in infancy or yet to start the services. Under such circumstance, something should be done to the countries which are in infancy or yet to start the operational agromet advisory services.

Dr. Rathore was referring the ideas outlined by **Dr. Mayeed & Dr. Mazhar** for assistance to the countries (Nepal, Bhutan. Sri Lanka, Afghanistan, Myanmar) which are initial stages. Dr, Rathore said that the products/assimilated products to be available in the proposed website would be very helpful. Therefore, it is needed to identify the needs of the countries, which are initial/infancy stage, and how the products mentioned in the web portal would be very helpful and further guidance in launching operational agromet advisory services in these countries

Mr. Deshpande was referring the verification of moderated district level weather forecast from the Regional Meteorological Centres/Meteorological Centres for preparation of district agromet advisories under the Gramin Krishi Mausam project in India. He mentioned that similar activities could be done through SAFOAM website on verification of agromet advisories prepared by the different countries in South Asia.

Dr. Chattopadhyay said that the SAFOAM might not involve in such operational activities of the member countries; however, the verification of weather forecast methodologies would be shared with the different countries in South Asia.

Dr. Brinini said the today' meeting is very important for providing services to the user community of South Asia through the website of SAFOAM. He also said that the weather forecast and agromet advisories to be communicated the farmers would be highly useful on food security issue in South Asia. He mentioned that organisation of workshop/webinar would be very helpful to know and apply new technologies in operational agrometeorology in South Asia. He requested to share the presentation made on the website to all the members of the meeting for providing more feedback in the issue.

Dr. Kamaljit said that along with other activities, it is proposed to kick start SAFOAM's activities with organising webinars by inviting the experts all of the world different topics to make it more popular. She added that these experts might be requested to present the different component of operational services, challenges, success stories so that the member countries in South Asia would be benefitted.

Dr. Rathore thanked everyone in the meeting for their brilliant comments/suggestions. He said that last couple of weeks we covered a good amount of turf; however, today's suggestions are also very valuable. As a result, this would take us to some different actionable points involvement and for that we need to work on few things. First actionable point is in architectural design of the website and aspects related to sustenance, finance, administration etc. Therefore, we need to bring out more clarity on that and prepare a kind of proposal with prototype website/webpage and share the same in the proposed workshop, as mentioned, in front of some donor agencies/officials to lure them to kinds of opportunity and also, we can offer them in order to sustain the efforts/activities by offering some supports from them. Under action point two, it is reiterated that SAFOAM would never involve itself as a kind operational mechanism replacing/competing with the member countries activities rather complement the efforts and generate produce the products. If not produce, there are some products which can be assimilated to enhance in a form accessible to the user group which could be official in agromet service people, engaged in research & development, intermediaries and even farmers also. The architectural design would be linked to the agromet advisory system in the region and globally would be helpful.

As mentioned earlier we are now at infancy stage and we would have good holding of the establishment of SAFOAM, we would definitely explore for institutional mechanism. We have definite got good suggestion and we will further refine our thoughts that attract funding and ultimate prepare sustainable road map for website of SAFOAM

Recommendations of the Meeting

1. There is need to develop good website design and updating of the website with current and important and relevant issues.
2. It is essential to develop the support mechanism which would ultimately make the website sustainable
3. There should be two phases in the development of website. These are (i) design and development of website, (ii) Sustainability of the website to make the website long lasting and makes complete website.
4. to display the new products & information, like composite NDVI, VCI maps which are not found any of the website in the world.
5. Website should give the access to all the open-source data and already the information available in public domain by different countries
6. Grid concept might be taken while preparing the composite map for any product as this would eliminate the dispute in country boundary.
7. Boundary of SAFOAM might be extended more on the southern side which would cover the south Indian ocean so that it would be possible to display meteorological information, satellite imagery, cloud imagery, SOI etc. over the adjacent ocean.
8. linkages should be established with agromet advisory system in the region and globally and Governmental organisations and international organisations.
9. Efforts should be made to generate of some fund to appoint dedicated team to design and development of the website, generation of products, regular updating and maintenance of the website.
10. Activities under SAFOAM should be done alongside with the Governmental machinery. as, involvement of Government, particularly Ministry of Agriculture & National Meteorological & Hydrological Services would further strengthen the forum.
11. Preparation of proposal for SAFOAM website considering all aspects of architectural design of the website and aspects related to sustenance, finance, administration design, development & sustainability. And concurrently donor agencies (UNDP, USAID, WMO, WORLD Bank etc) may be approached for supporting and sustaining the efforts/activities in this regard.
12. Organisation of webinars by inviting the experts all of the world to make SAFOAM more popular.
13. SAFOAM will not involve itself as a kind operational mechanism replacing/competing with the member countries activities rather capacitate and complement the fellow agrometeorologist which are serving the different countries to facilitate by providing the agrometeorology's products. If not produced there are some products which can be assimilated to enhance in a form accessible to the user group which could be official in agromet service people, engaged in research & development, intermediaries and even farmers also

Dr. Chattopadhyay once again thanked all the advisors and 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 IV for steering SAFOAM activities

Theme : Web Portal for SAFOAM

Leader

***** Dr. Nabansu. Chattopadhyay

President, International Society for Agricultural Meteorology

Executive Secretary, Global Federation of Agrometeorological Societies (Global FAMS)

Former Deputy Director General & Head & Scientist F, Agricultural Meteorology Division, India Meteorological Department

Former Chairman of Open Panels of Commission of Agricultural Meteorology, World Meteorological Organisation, Geneva

Former Senior International Agrometeorological Technical Consultant, Agromet Project, Bangladesh

Former Short Term Consultant: World Bank

Alternate E-mail: nabansu_c@yahoo.co.in

Advisors

***1.Dr. L.S. Rathore**

Former Director General of Meteorology

International Consultant, The World Bank

Consultant, United nations Development Programme (UNDP)

Member, Advisory Board, National Disaster Management Authority (GOI)

Member, Research Council CSIR-NISTADS

Member, Appeal Committee, National Agricultural Education

Accreditation Board, ICAR

Vice President, Vigyan Bharti

President, Society for Rural Improvement

***2. Air Vice Marshal (Retd) Prof. Ajit Tyagi**

Chairman, IDC Foundation

Senior Adviser, IRADe

Member, WMO Working Group on Tropical Meteorology

Former Director General of Meteorology &

Member, W.M.O. Executive Council

Immediate Past President, Indian Met Society

Patron

India Water Foundation

***3. Dr. Orivaldo Brunini**

Director, Agricultural Research Support Foundation, Brazil

Former Professor of Agrometeorology, Faculdade Luiz Meneghel,

And Former Senior Researcher on Agrometeorology .Agronomic Institute-IAC

Brazil

4. Prof. U.C. Mohanty

School of Earth Ocean and Climate Sciences

Indian Institute of Technology Bhubaneswar

Argul, Jatni-752050, Odisha, India

***5. Dr. Abdul Muyeed**

Dr.Abdul Muyeed

Sectorial Consultant

Care Project,

World Bank

RIMES.

Former Director General

Department of Agricultural Extension (DAE)
Khamarbari, Farmgate, Dhaka, , Bangladesh

***6. Dr. Sibendu Roy**

Director

Mahalanobis National Crop Forecast Centre

New Delhi

Members

*1. **Dr.(Mrs) Kamaljit Ray,**

Sc-'G', Ministry of Earth sciences,, Prithvi Bhavan,, Lodhi Road,, New Delhi

*2. Dr. Mazharul Aziz

Chief Instructor

Agriculture Training Institute

Department of Agricultural Extension (DAE)

Sher-E-Bangla Nagor, Dhaka-1207

Former Project Director, Component-C of BWCSRP of The World Bank

Founding Member: South Asia Forum on Agricultural Meteorology (SAFOAM)

Member: Bangladesh Meteorological Society (BMS)

Cell: +8801712119259

***3. Mr. KHMS Premalal**,

Former Director General of Meteorology, Sri Lanka

*4. **Mr. Vijay Deshpande,**

Scientist F

National Informatic Centre (NIC),

Pune

Maharashtra

5.Ms. Sabai Lwin

Assistant Director, Agro-meteorological Division, DMH, Yangon, Myanmar

6.Dr. U Kyaw Kyaw

Director, Yangon Region, Myanmar

7.Mr. Shiva Prasad

Senior Meteorologist, DHM, Nepal

8.Dr. Gslhv Prasada Rao

Founder
Academy of Climate Change Education and Research
Kerala Agricultural University
Vellanikkara – 680 656, Thrissur, Kerala, India

*__9.Dr..Rengalakshmi__

M.S.Swaminathan Foundation

Chennai

Tamil Nadu

10.Dr. B Ajithkumar

Assistant Professor & Head

Department of Agricultural Meteorology

College of Horticulture

Kerala Agricultural University

Vellanikkara- Thrissur

*__11.Dr.Rani Saxena__

Asstt. Professor (Agrometeorology), Rajasthan Agricultural Research Institute (SKNAU, Jobner), Durgapura, Jaipur

*__12.Dr Veena Sharma__

Technical Officer/Assistant Professor,Agtromet Section, SKUAST-Jammu, Jammu, J&K

13. Dr. Sameera Qayoom

Associate Professor,

Nodal Officer ICAR (Edu.)

Srinagar, J&K

*__14.Dr.Mahasweta Bhowmick__

Technical Officer

Gramin Krishi Mausam Sewa

Kalyani Agro-met Field Unit

B.C.K.V.,

W.B.

India

*__15.Mr.A K Bhargava__

Former Assistant Meteorologist

India Meteorological Department

New Delhi

*__16.Ms. Swati Chandras__

Agricultural Meteorology Division

India Meteorological Department

Pune

***17.Ms. Malathi Seetamraju**

Agricultural Meteorology Division

India Meteorological Department

Pune

***18.Mr. Manoj Lokare**

GeoSpatial Researcher, Aberystwyth University ,United Kingdom

*** = Attended the Meeting**

Photo Gallery

Former Short Term Consultant: World Bank

Draft
Proceedings of the of meeting of Core Group V for steering activities South Asia Forum on Agricultural Meteorology

Theme:

New Dimension of Agromet Advisory Services in hill region in South Asian Countries

Date: 13th March 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 V (list of the members is available in Annexure I) for steering activities of South Asia Forum on Agricultural Meteorology (SAFOAM) under the theme "**New Dimension of Agromet Advisory Services in hill region in South Asian Countries**". **Dr. N. Chattopadhyay** said that he was really thankful to all the member of Core Group V for participating in today's meeting and whole heatedly supported the formation and on-going activities of SAFOAM. A quick round of introductions of all the members of the meeting was done. He mentioned that the present theme was very important as the science of agrometeorology and operational services in particular in plain land were comparatively better position present days than the hilly region. According to him, in the hilly areas, there are number of constrains like slope in the hill, insufficient weather observation, maintenance of observatories, large variation of temperature along the slope within a short distance, frequent extreme weather events, landslides etc. He also said that it has been mentioned elsewhere that remote sensing may solve a number of problems under such inadequate infrastructure facilities in hills. He said that he was sure that under the leadership **Dr. Archana Shrestha**, Deputy Director General, Meteorological Forecasting Division, Department of Hydrology and Meteorology, Kathmandu, Nepal and presence of all the honourable advisors and esteem members today's meeting would be highly productive and useful. Before, handing over to **Dr. Archana Shrestha** for moderation of the meeting, **Dr. Chattopadhyay** presented a brief introduction of Dr. Archana Shrestha.

At the outset**, Dr. Archana** said that as significant areas in South Asia were in the hilly region and the challenges in providing the services in hills, compared to plain lands, were high, the theme of the meeting was highly appropriate. Afterwards **Dr. Archana** gave a detail presentation mentioning the different common issues and also some relevant issues pertaining to hilly areas.

Dr. Archana added that as within the hilly region there is diversity in weather, diversity in cropping pattern, etc. special attention needs to be taken up to handle these issues in preparation of crop and location specific advisories in hills. According to her, there is also need for dense observational network as inadequate observation network still persists in some of the member countries in South Asia Region (SAR).

Discussion was made on integrated agrometeorological information particularly on seamless weather and climate forecast that could help in taking up strategic and tactical decisions in agriculture meaningfully. As far as the skilful forecast and its utilisation in agriculture is concerned, data assimilation and model development, production of medium range and sub-seasonal to seasonal forecast were mentioned meticulously. It has also been suggested that customized agromet products

including the satellite products particularly in hilly areas would be useful for providing crop and location specific agromet advisories at very high-resolution scale in hills. Agricultural information particularly the crop state and stage and pest & diseases information varies considerably along the different locations in the hills. Thus, special care should be taken to record the ground observation which are used as a component in preparation advisories for the farmers in the hills. Here satellite information may serve efficiently. The idea of increasing the number of weather stations (at least one rain-gauge and on SSS) to understand local variation of weather and climate in hill areas was appreciated as weather/climate varies with a very short distance. Besides, following suggestion were made to improve the operational agromet advisory services in hills.

1. Development of forewarning models of pest & diseases is very important in hills. Pest weather relationship studies have not been done sufficiently; however, this aspect is very important to understand behaviour of insect-pests and diseases in relation to prevailing weather conditions. Such understanding would be beneficial for developing useful forewarning models. Developing thumb rule/forewarning models in terms of weather parameters on development of insects-pest & diseases may be very useful for quality agromet advisory services.
2. Crop-weather relationship studies have not been done sufficiently till date for different crops in a locality in hills. However, such types of studies are very important not only adoption of better crop management practices for increasing productivity of the crops both in terms of quality and quantity, but also generating quality agromet advisories.
3. Identification of the location specific weather hazards/aberrations/extreme events and prepare contingency crop plan according to the prevailing weather constrains in that locality, as well as also by considering experienced/observed changes of weather and climate of the locality.
4. Promotion of multidisciplinary research in agrometeorology is very important so as to identify crop management, disease pest management or evolving effective adaptation and mitigation strategies in view of impact of climate change.
5. There is the requirement of development of interactive and dynamic application (decision support tools), so as to support farmers by providing need based specific advisories to the farmers**.** Moreover, strengthening weather based agro-advisory services not only though use of modern technologies and tools, but also involvement of NGOs, government organizations, mainly by developing farmers to farmers contacts (farmers' network with the climate smart farmers in the nodes of the farmers net).

It has been discussed that because of difficult terrain, dissemination of agro-met advisory is challenging in hills particularly through extension services. It has been suggested that along with the conventional approach and along with mobile phones for dissemination, some innovative approaches in this regard might be thought off e.g., introduction of community radio in dissemination of information in local languages in clusters of villages and capacitate large number of people at community level as it needs minimal cost. Formation of WhatsApp groups of crops specific, block level farmers have also been suggested

An important discussion was made on the coproduction particularly in respect of collaboration between meteorologist and agriculturist at policy level, scientific and implementation level. Still there are some countries in South Asia, the operational agromet services either has not started or at the initial stage; more discussion should be made by the meteorologist and agriculture with the respective Governments to convince the need of the services under the climate variability and projected climate change. Besides, both meteorologists and agriculturists should jointly prepare road map on development of strategies, need for specific meteorological and agromet products and finally the implementation strategies for operationalization of agromet advisory services. One important point to take care of in the hills is micro climate-based advisory for which micro climatic studies are a must. Adoption of model villages for pest and disease app development and advisory based on such inputs can also be beneficial as a large portion of produce is lost due to diseases and pests. Studies on modification of microclimate in the crop field and animal houses are very important aspects not only for identifying better management practices of crop for higher productivity, but also for effective management of pests and disease management. It is to be mentioned that there are number of examples area available of controlling insects-pest and diseases through modification of crop microclimate without applying any chemicals.

As the agromet advisory services involve manpower at different level i.e., meteorologist/agriculturist, intermediaries and farmers, capacity building programme should be organized at different levels with appropriate modules so that better communication skill among meteorologists and agriculturist, farmers would be developed. More efforts should be required to make farmers weather information responsive. At the ground level. farmer awareness programme, farmer field schools should be organized to make the farmers more climate resilient.

At present the skill of the weather forecast at different temporal and spatial scale are different in the member countries in South Asia. Thus, under the SAFOAM, regional collaboration on weather/climate forecast would be very helpful. Indian Institute of Tropical Meteorology & India Meteorological Department jointly issue sub-seasonal weather forecast for South Asian region. Some mechanism may

be established for data sharing of meteorological observation across the South Asian Region (SAR). This would definitely help in improvement of weather and climate forecast in SAR. It has also been said that the lacuna and needs in other countries should be understood first and accordingly the related information on pest weather information and other related information might be shared and this would be used after proper validation including organising training programme to effective use such information in the respective country. It is very much necessary to know the correct information on agro-ecosystem, cropping pattern, weather, climatic condition in the member countries before helping them in preparation of agromet advisories. Sharing knowledge and lessons learned from regional projects on development of standard agromet products (especially in hilly regions) not only help at technical level but also in the implementation (national) level in operational agromet advisory services in the member countries in South Asia.

Networking among the member countries need to be improved. Annual/biannual South Asian Agricultural Meteorology Workshop may be arranged. It is also suggested that SAFOAM could also take part in the SASCOF type of activities. It was also suggested to organise webinars on important topics on agrometeorology & monthly e-meet to discuss their feedback and other problems. Cooperation amongst member countries for exchanging ideas through organizing seminars, trainings etc were also highlighted.

Curriculum development on agriculture meteorology under Department of Meteorology of the Universities and Agriculture Universities in South Asia and proper strategies of training for the new entrains from the member countries were discussed elaborately. It was said that in India, comprehensive training programme for 21 days are arranged at different levels covering the entire spectrum of agromet advisories from weather forecast, its translation, tools, to dissemination to feedback, economic assessment etc This training programme consists of different modules. As per the need of the member countries these training modules would be selected. Training would not be given in one goal; on the contrary in fragmented manner for those who are at the initial stage, simple module on forecast, observation and translation of the same into agromet advisory might be chosen. Then after having the filed experience, training with additional modules might be taken up. Training on weather smart advisories to location specific undergraduates was also suggested.

It has been informed that a number of countries in South Asia have initiated project on climate change adaptation in agriculture. Such initiative may be shared with other countries for better livelihood and food security of farmers in SAR. Ultimately SAFOAM may share and contribute its inputs on Strategic planning/vision for the Climate Change Adaptation in agriculture in South Asia to in IPCC Reports.

Recommendations of the Meeting

1. Special attention needs to be taken up to handle the diversity in weather, large variation of temperature along the slope within a short distance, frequent extreme weather events, landslides diversity in cropping pattern, etc in preparation of crop and location specific advisories in hills.
2. . There is need for dense observational network as inadequate observation network still persists in some of the member countries in South Asia Region (SAR). Full utilisation of remote sensing data/information/ products may be explored especially for the unrepresentative area in respect of weather observation for preparation of agromet advisories.
3. Development of customized agromet products for hills should be made.
4. Development of forewarning models of pest & diseases & crop-weather relationship & promotion of multidisciplinary research in agrometeorology in hills should be made.
5. Identification of location specific weather hazards/aberrations/extreme events and prepare contingency crop should be done.
6. Introduction of community radio in dissemination of information in local languages in clusters of villages and capacitate large number of people at community level should be made.
7. Promotion of micro climate-based advisory based on micro climatic studies should be made.
8. Organisation of capacity building programme at different levels with appropriate modules so that better communication skill among meteorologists and agriculturist should be developed.
9. . Annual/biannual South Asian Agricultural Meteorology Workshop should be arranged.
10. Coproduction particularly in respect of collaboration between meteorologist and agriculturist at policy level, scientific and implementation level is recommended.

Dr. Chattopadhyay once again thanked all the advisors and 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 the Members of Core Group V

for steering SAFOAM activities

Theme V: New Dimension of Agromet Advisory Services in hill region in South Asian Countries.

Leader

**** Dr. Archana Shrestha**

Deputy Director General,

Department of Hydrology and Meteorology, Nepal

Advisors

1.Prof. Ajit Tyagi

Air Vice Marshal (Retd) Prof. Ajit Tyagi

Chairman, IDC Foundation

Senior Adviser, IRADe

Member, WMO Working Group on Tropical Meteorology

Former Director General of Meteorology &

Member, W.M.O. Executive Council

Immediate Past President, Indian Met Society

Patron

India Water Foundation

2.Dr. Y.S.Ramakrishna

Dr.Y.S.Ramakrishna, Ex- Director, CRIDA (ICAR)

and

Member, Advisory Committee

National Disaster Management Authority (NDMA)

and

Ex- Dr. E A H ROBERTS CHAIR on NRM (TRA), Tocklai

Flat-108 Orchid Block, Green Meadows, Auto Nagar Junction,

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TELANGANA - 500070

INDIA

****3.Mr. KHMS Premalal**

Former Director General of Meteorology

Sri Lanka

4.Dr.Saraju Baidya

Director General, DHM, Nepal

Members

1.Dipak Bhandari

Executive Director, NARC, Nepal

2.Jagdish Karmacharya,

National Project Director, PPCR_BRCH, DHM, Nepal

3.Dr. San San Win

(Head of Plant Protection, Assistant Director, Department of Agriculture, Yangon office)

Myanmar

4.Ms. Sonam Pem

Consultant

Agromet Project

Bhutan

5.Dr Raihana Habib Kanth

Chief Scientist FoA SKUAST Kashmir, India

**6.Dr Parminder Kaur Baweja

PRINCIPAL SCIENTIST – AGROMETEOROLOGY, DIRECTORATE OF EXTENSION EDUCATION, DR Y S PARMAR UNIVERSITY OF HORTICULTURE, AND FORESTRY NAUNI- SOLAN 173230 (Himachal Pradesh), India

**7.Dr. Sameera Qayoom

Associate Professor,

SKUAST Kashmir, India

Nodal Officer ICAR (Edu.)

**8.Dr. Latif Ahmed

Assistant Professor, SKUAST Kashmir, India

****9.Dr. S.K. Sharma**

Professor & Deputy Director Instructions, RVSKVV, Gwalior., Rjapancham Singh Marg, Near Aakashwani, Gwalior, India

10.Dr. U.P.S.Bhadauria

DEAN

Rajmata Vijayaraje Scindia Krishi Vishwavidylaya

CAMPUS- B.M. College of Agriculture,

Jaswadi Road, Khandwa (M.P.)- India

****11.Dr. Prsanta Neog**

Professor cum Nodal Officer, Gramin Krishi Mausam Sewa (GKMS), Sonitpur AMFU, Co-PI, AICRPDA-NICRA Project, Dept of Agrometeorology, B.N. College of Agriculture, AAU, Biswanath Chariali, Sonitpur – 784176. Assam, India

12. Mr. Rameshwar Rimal**, National Agricultural Environment Research Centre, Nepal

13. Ms. Shanti Kandel**, Department of Hydrology and Meteorology, Nepal

14. Dr. Madan Sigdel**, Central Department of Hydrology and Meteorology, Tribhuvan University, Nepal

15. Ramhari Acharya**, Central Department of Hydrology and Meteorology, Tribhuvan University, Nepal

16. Dr. Krishna Panta**, Consultant, FAO, Nepal

****17.Dr. Nabansu. Chattopadhyay**

President, International Society for Agricultural Meteorology

Executive Secretary, Global Federation of Agrometeorological Societies (Global FAMS)

Former Deputy Director General & Head & Scientist F, Agricultural Meteorology Division, India Meteorological Department

Former Chairman of Open Panels of Commission of Agricultural Meteorology, World Meteorological Organisation, Geneva

Former Senior International Agrometeorological Technical Consultant, Agromet Project, Bangladesh

Former Short Term Consultant: World Bank

Alternate E-mail: nabansu_c@yahoo.co.in

****18.Ms. Swati Chandras**

India Meteorological Department, Pune

****19.Ms. Malathi Seetamraju**

India Meteorological Department, Pune

****= Attended the meeting**

Minutes of the of meeting of Core Group II for steering activities South Asia Forum on Agricultural Meteorology

Under the Theme

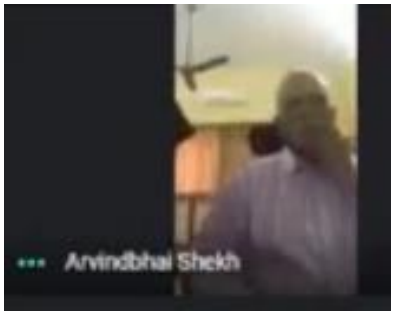
Administration/Constitution/ By Laws/ Finance etc. for SAFOAM

Date: 20th 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 II (list of the members is available in Annexure I) for steering activities of South Asia Forum on Agricultural Meteorology (SAFOAM) under the theme "**Administration/Constitution/ By Laws/ Finance etc. for SAFOAM**". At the outset all the members introduced themselves. **Dr. Chattopadhyay** said that the present theme is very important as all SAFOAM activities in future will be steered out based on this subject. He added that it is expected the meeting would be highly productive and useful under the leadership of Prof.A.M. Sheikh and all the honourable Advisors i.e., Dr. L.S. Rathore, Prof. M C Varshneya &Dr. V.U.M. Rao and all other esteem members of this group. Before, handing over to Prof.A.M. Sheikh for moderation of the meeting, Dr. Chattopadhyay presented a brief introduction of Prof. A.M. Sheikh, Former Vice-Chancellor, Anand Agricultural University, Gujarat, India.



At the outset, **Prof. Sheikh** welcomed all Advisors and esteem members of Core Group II for attending the meeting. Prof..Seikh initally briefed about the salients on-going and proposed activities of the SAFOAM from the second week of February, 2021. He mentioned the different core groups formed with specific themes. Afterwards, Prof. Sheikh gave a brief presentation on the background and objectives on the formation of SAFOAM and also the points for discussion on preparation of different components of constitution like nomenclature and objectives of the forum, membership, fees, fellowship, administration etc. He said that he has prepared and comminicated the the draft concept paper/proposal on "Constitution of theSouth Asian Forum on Agricultural Meteorology (SAFOAM**)"** mentioning all the components elaborately to all the members of this group for making the discussion more conveniently. He requested all the Advisors initially to give their comments on the draft proposal of constitution

Prof. M C Varshneya, Former Vice-Chancellor, Anand Agricultural University, Gujarat, India said that he has gone through the draft proposal on constitution of SAFOAM and also congratulated Prof. Sheikh for preparing the same so meticulously covering all the required points in this aspect. He said that the name of the forum is very much apt as it includes the countries in South Asia region. However, he felt that if other countries in South East Asia want to join in the forum based on merits of function of SAFOAM, then what would be the policy of the forum. He commented on the different types of membership mentioned in the

proposal. According to him, scientific organisations related to agriculture/ agrometeorology may be considered as institutional members and the farmers' association in the form of NGOs may also be included as institutional members as they are the direct beneficiaries of the services of agrometeorology. As far as the membership fees are concerned, he suggested a lump sum of rupees ten thousand for individual member and Rupees one lakh for institutional member. Membership fees for other national and international organisation like WMO, World Bank and state Government, may be discussed elaborately.

Prof. Sheikh said that though we can make out some framework on the membership and fees for membership under different categories, in depth discussion would be made in the General Body meeting and Executive Body meeting to take the final decision in this regard.

Dr. V.U.M. Rao, *Former* Project Coordinator (Agrometeorology) I/C, AICRP on Agrometeorology (AICRPAM), ICAR - Central Research Institute for Dryland Agriculture (CRIDA), Santoshnagar, Hyderabad, INDIA congratulated all the members of the Group and especially to Prof. Sheikh for preparing the proposal of Constitution so nicely. According to him, the name of the forum should be South Asia Forum on Agricultural Meteorology. He said that in depth discussion on a number of issues like the location of Head Quarter, formation of chapters in each country, transfer of money, country member should be made in today's meeting and also in GB and small committees may be formed to look after all the above-mentioned issues judiciously. According to him NGOs may be allowed to become member of the forum. He also added that initiation of such initiatives itself is a great job. He said that he would not take much time at this stage of the meeting and like to discuss more when all the issues would be discussed individually.

Prof. Sheikh again mentioned that some of the points raised by **Dr. Rao** would be discussed at length in General Body meeting and Executive Committee meeting as well.

Dr. Chattopadhyay said that SAFOAM has started with nine countries including Myanmar. It may be good idea to establish the SAFOAM with the nine countries initially and make it operational with credential. Afterwards, we may accept the offer to include other countries in South East Asia (Thailand, Vietnam and others) with change in nomenclature of the forum.

Dr. Chattopadhyay continued that proper justification may be worked out to fix the membership fee in different categories of membership.

Prof. Sheikh said that this is an important issue and would be discussed in the General Body meeting. He also reiterated that any periodical changes in the decision of constitution and related matter might be made with the approval of the General Body meeting. **Prof. Sheikh** also asked whether forum or society or association would be appropriate here. **Dr. Chattopadhyay** mentioned that already Hydromet Forum in South Asia has been formed under the active initiatives of World Bank and two meetings of the forum, one in Geneva and another in Kathmandu, were organised. Preliminary discussion with World Bank on the formation and nomenclature of SAFOAM have been discussed. It seemed that World Bank has agreed to this proposal in principle. **Dr. Rao & Prof. Varshneya** both agreed with FORUM as society and association have different connotations.

With due consent of the Advisors and members of the group, **Prof. Sheikh** started systematic point by point discussion on the draft constitution prepared by him.

1. Initially he read out the first para of the constitution

"*The constitution of the South Asian Forum on Agriculture Meteorology (SAFOAM) comprises the Statutes and the Rules and Regulations.*

The Statutes contained in section A, lay down the basic constitutional framework under which the Forum shall operate. The business of the Forum in matters of detail other than those covered by the Statutes shall be governed by the Rules and Regulations, continued in section B, enacted in conformity with Article 9 of the Statutes"

The same was agreed by **Prof. Varshneya & Dr. Rao, Dr. L.S. Rathore,** Former Director General of Meteorology, India Meteorological Department mentioned that the word "International" should come in the preamble part as this is an international forum.

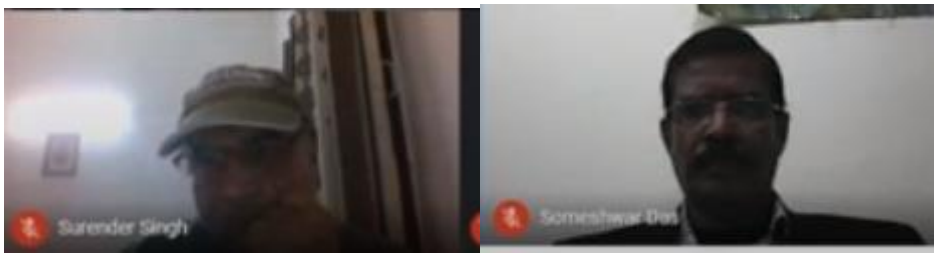
2. Unanimously agreed that name of the forum would be South Asia Forum on Agricultural Meteorology (**Article 1.1**).

3. It has been agreed that at present the location of registered office/ headquarters, as mentioned in the proposal, may be kept vacant. After all the organisation of all the core group meetings, General Body meeting, Executive Committee meeting, the same may be decided (**Article 1.2**).

4. **Article 1.3 & 1.4** were agreed. (attached the draft proposal on Constitution)

5.**Article 1.5**: Societies Registration Act 1860 has been mentioned in the proposal. **Prof (Dr.) Surender Singh**, Professor & Head, Dept Agricultural Meteorology, CCS Haryana Agricultural University, Hissar, India said that the year of Society Registration Act in India might be changed to 2012. **Dr. Someshwar Das**, Professor, Department of Atmospheric Science, Central University of Rajasthan, Bandar Sindri, Kishangarh, District - Ajmer, Rajasthan commented that the Society Registration Act depends upon on the location where actually registration is made but for India it

is same. However, it was decided that the subject may be looked into based on the correctness of the issue.



5. **Article 1.6** is regarding the affiliation of the forum with any other professional society with similar scientific aims and objectives. It has been agreed.

6. Article1.7 is regarding change/amendment of Constitution: **Prof. Sheikh** said that if any changes are made in the constitution, it should be approved at General Body meeting/ Executive Body meeting and the same should be communicated to the Charity Commissioner/ Registrar. He added that if this is not done, the forum may be deregistered. **Prof. Varshneya** said that not only constitution, but also annual report financial report should be submitted every year. **Prof. Sheikh** said that it's our moral responsibility to inform and get the necessary corrections done in the constitution.

7. Under **Article 2.2**, it was suggested to include World Bank, ADB for making useful collaboration for strengthening of SAFOAM**.**

8. Under **Article 2.3 (i**), research need to be replaced by the Research and Development.

9.As there was little scope for SAFOAM to contribute to IPCC, this statement mentioned in **Article 2.3 (iv**) may be deleted.

Dr. S.D. Attri, Additional Director General of Meteorology (SG), AASD, India Meteorological Department, said that the name of the forum should be on Agricultural Meteorology, already mentioned, as it is broad based which it may create more scope as WMO, industry and other organisations at present are promoting different applications in agricultural meteorology like meteorology in livestock etc. **Dr Rao** mentioned that option may be kept open, we may discuss afterwards and decision may be taken subsequently.

10. In depth discussion was made on the criteria of Founding Member. It has been decided that all the 106 persons who have given the consent to be the Founding Members, would be considered as Founding Members. However, for registration purpose around 11 persons, already been identified as Founding Members, would be chosen for signing the proposal and these persons would be considered actually founded the forum. Besides, the 11 persons would be chosen in such a way that at least one member for each country should represent under SAFOAM. Besides, arrangement would be made to get the signatures of all the 11 persons mentioned above.

11. It has been agreed upon that there would be no category for annual member as it involves annual accounting and other recurring responsibilities and formalities. Under life member, following decisions have been taken.

a.He/ she should be from Agriculture and Science branch.

b.A token money as membership would be taken. This money would not be considered as earning revenue. For earning revenue, different mechanisms need to be set up.

12. It has been decided that Foreign membership may not be required as the forum itself is international . If any foreign personel outside the South Asia desire to join as member, he or she may be allowed to join as life member. However, ultimate decision in this regard may be taken up in General Body/ Executive Committee meeting.

13. Discussion was made on institutional, industry and corporate members. It has been decided that all three categories should be combined in one category for getting added advantage in handling the issue. However, more discussion could be made in GB.

14. Farmers Association in the form of NGO might be included as category member.

15. No membership fee concession would be given to Founding Members.

16. The last known address (Physical electronic) of a Member shall be considered as a valid mailing address for correspondence by the Association.

17. The statement made under **ARTICLE 4 –GENERAL BODY** as "The General Body can amend any Statute of this Constitution provided more than **three-fourth** of the total ballots received in favour of it" would be replaced by "The General Body can amend any Statute of this Constitution provided more than **two-third** of the total ballots received in favour of it"

18. Subsequently wherever (**Article 4.5, Article 4.**6) such number has been mentioned in the proposal, this would be replaced by **two third**.

19.Article 5.1 should be written as "The Forum will have an Executive Council (here in after called the Council). The Council to be formed as stated hereafter in this article **will have fair**

representative from member country and function and arrange for the conduct of the business of the Forum according to the Statutes and Regulations in force.

20. Article 5.2. The sentence "One member from each South Asian country" should be replaced by "At least one member from each South Asian country".

21. **Article 5.2.2**. "The sentence "Secretary and the Treasurer shall be from the Headquarter of the Forum" should be replaced by "Secretary and the Treasurer shall be preferably from the Headquarter of the Forum"

22. **Article 8.1**. Second para. There is no need to write the number (fifteen). It has also been proposed that for big country like India, Bangladesh more than one chapter may be constituted.

23. **Article 8.2 (g):** There should not be any transfer of money from one chapter to another chapter and also to Head Quarter as "The Foreign Exchange Regulation Act (FERA)" is involved in transfer of currency from one country to other country and this is cumbersome process and it should be avoided. Each chapter should be given financial liberty to spend money for good cause and under intimation to the Headquarter.

24. **Article 10.1**. Mention also electronic communication.

25. **Under Regulation 3.2.4**. Thirty members should be replaced by 2/3 majority.

26.**Under Regulation 3.2.6**. 25% should be replaced by 2/3 majority.

27. **Under Regulation 3.2.9.** Fifteen members should be replaced by 2/3 majority

28. **Under Regulation 3.3.3.** 30% should be replaced by 2/3 majority.

29. Under **REGULATION 7: DUTIES AND POWERS OF TREASURER:** Treasurer should be responsible for arranging and doing the audit. Here it should me mentioned that individual chapter will do their audit as per the law of land and they should send audit report to the Headquarter where consolidation of all the audits reports will be made.

30. **Under REGULATION 10**: **FUNDS.** Rupees 20,000 should be deleted as this is not required.

At the end of the meeting **Dr. Rathore** appreciated **Prof. Sheikh** for doing commendable job in preparing the draft proposal of constitution and he is also thankful to **Prof. Sheikh** and his team in Group II. He also said that he is thankful to **Dr. Someshwar Das** for sharing good inputs in respect of the preparation of the proposal.

Prof. Sheikh expressed his happiness the way the meeting could be conducted and also said that he is really thankful to **Dr. Rao**, **Prof. Varshneya** and all other members for their inputs and advises during the course of the meeting. He also requested that all the members of this group may communicate their further views so that he would incorporate the same.

On request **Mr.Rameshwar Rimal** from Nepal has expressed his views on today's meeting.

Dr. Rao said that first meeting on today's theme with smaller group members seems to be alright but it needs more discussion with bigger group members i.e., General Body as major part of the proposal are written on Indian context and also Indian experts have joined in the meeting. He agreed that the inputs may be obtained from the founding members SAFOAM from other countries in South Asia.

Prof. Varshneya appreciated once again to **Prof. Sheikh** and his full team for preparing the proposal highlighting all the rules and regulation etc. He suggested that based on today's discussion, **Prof. Sheikh** may prepare the next version of the draft proposal of the constitution of SAFOAM and then the same may be circulated to all the members of the forum for their expert comments. He added that the members to whom the draft proposal would be sent, they should either give comments or to communicate no comments. Based on the comments to be received from the members **Prof. Sheikh** may again prepare the next version of the draft proposal which may be placed in the General Body meeting for discussion and final version of the proposal. He continued that until and unless the constitution of SAFOAM is finalised, it may not be possible to take up further work under SAFOAM. Final constitution may be placed to the different Government agencies and concerned for onward actions.

Based on the above mentioned discussion, following recommendations were made at the end of the meeting.

1. *Prof. Seikh was requested to prepare the next version of the draft proposal of the Constitution of the SAFOAM.*
2. *It has been agreed that the next version of the draft proposal of the Constitution of the SAFOAM would be communicated to the Founding Members of the member countries of South Asia for their comments/ suggestions on the proposal.*
3. *Based on the comments/suggestions from the Founding Members of the member countries of South Asia, Prof. Seikh would be requested to modify the proposal.*
4. *Prof. Seikh would be requested to present the Modified proposal in the General Body Meeting for finalisation of the same.*

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 II

for steering SAFOAM activities

Theme II: Administration/Constitution/ By Laws/ Finance etc.for SAFOAM

Leader

*** Dr.A.M. Sheikh**
Former Vice-Chancellor
Anand Agricultural University, Gujarat

Advisors

***1.Dr. L.S. Rathore**
Former Director General of Meteorology
International Consultant, The World Bank
Consultant, United nations Development Programme (UNDP)
Member, Advisory Board, National Disaster Management Authority (GOI)
Member, Research Council CSIR-NISTADS
Member, Appeal Committee, National Agricultural Education
Accreditation Board, ICAR
Vice President, Vigyan Bharti
President, Society for Rural Improvement

***2. Prof. Dr. M C Varshneya**
Founder Vice-Chancellor
Anand Agricultural University, Anand and
Kamdhenu University, Gandhinagar, Gujarat
Chairman Western Zone of NICRA Project,ICAR,New Delhi
Chairman, Institute of Rural Development and Education, Pune
Member, RAC, NBSS & LUP,(ICAR) Nagpur
Governor's Nominee, on Maharashtra Agricultural Universities Recruitment Board (MAURB), (MCAER), Pune
Former President, Association of Agro-Meteorologists (AAM)
Former President of Indian Agricultural Universities Association IAUA)

***3.Dr. V.U.M. Rao**
Former Project Coordinator (Agrometeorology) I/c
AICRP on Agrometeorology (AICRPAM)
ICAR - Central Research Institute for Dryland Agriculture (CRIDA)
Santoshnagar, Hyderabad, INDIA

Members

***1.Mr.Rameshwar Rimal**
Technical Officer (Agrometeorology)
National Agricultural Environment Research Centre (NAERC)
Nepal Agricultural Research Council (NARC)
P.O Box 5459, Kathmandu, Nepal

2.Ms. Dechen Tshering
Disaster Risk Management Specialist (co-Task Team Leader) of the Disaster Risk & Climate Change Unit, South Asia region, Bhutan

***3.Md. Mizanur Rahman**

Senior National Consultant
Agro-Meteorological Information Systems Development Project
Component-C of Bangladesh Weather and Climate Services Regional Project,
Department of Agricultural Extension (DAE)
Khamarbari, Farmgate, Dhaka, , Bangladesh

4.Ms. Sabai Lwin
Assistant Director, Agro-meteorological Division, DMH, Yangon, Myanmar

5.Dr. B.V.R. Punyawardena
Principal Scientist/ Director, Natural Resources Management Center (NRMC), Department of Agriculture, Ministry of Agriculture, *Sri Lanka*

6.Dr.Md. Shameem Hassan Bhuiyan
Senior Consultant
Bangladesh Weather and Climate Services Regional Project
World Bank&Chief Advisor
Save Earth Climate Services Ltd.Bangladesh

7.Dr. Muhammad Hanif
Chief Meteorologist of Pakistan Meteorological Department

8.Ms. May KhinChaw
Director of Met Division, DMH;Myanmar

9.Shri B. Mukhopadhyay
Former Additional Director General of Meteorology (Reseach)
India

10.Dr. D Raji Reddy
Executive Chairman, National Council for Climate Change, Sustainable Development and Public Leadership (NCCSD), Patel Block, Rajdeep Electronic's Compound, Near Stadium Six Road, Navrangpura, Ahmedabad

***11.Dr. S.D. Attri**
Additional Director General of Meteorology (SG), AASD
Head (Urban Meteorology & Climate), Head (Information System & Knowledge Resource Development Division) & Executive Editor, Mausam
Head (Legal) and Vigilance Officer
Member, Expert Team, Commission for Agril. Meteorology, World Meteorological Organisation, UN, National Vice-President, Indian Association of Air Pollution Control (DC)
India Meteorological Department, Ministry of Earth Sciences
Government of India,

***12.Prof (Dr) Surender Singh**
Professor & Head
Dept Agricultural Meteorology
CCS Haryana Agricultural University, Hisar, India

***13.Dr. Someshwar Das**
Professor, Department of Atmospheric Science
Central University of Rajasthan
Bandar Sindri, Kishangarh, District - Ajmer,
Rajasthan

14.Dr. Sanjib Bandyopadhyay
Deputy Director General of Meteorology,
Regional Meteorological Centre,Kolkata, West Bengal

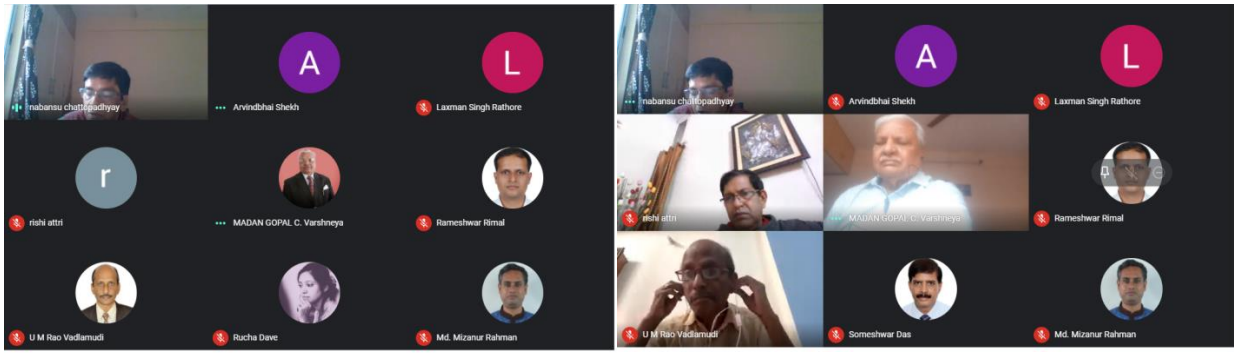
15.Dr. Narayan Singh Solanki
PROFESSOR, AICRP on Agrometeorology, Dept. Of Agronomy, Rajasthan College of Agriculture, MPUAT, Udaipur

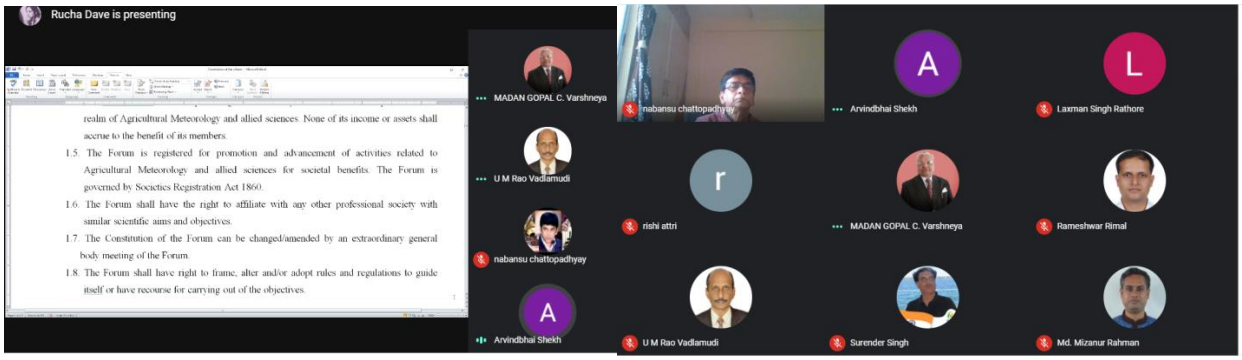
***16.Dr. Rucha Dave**

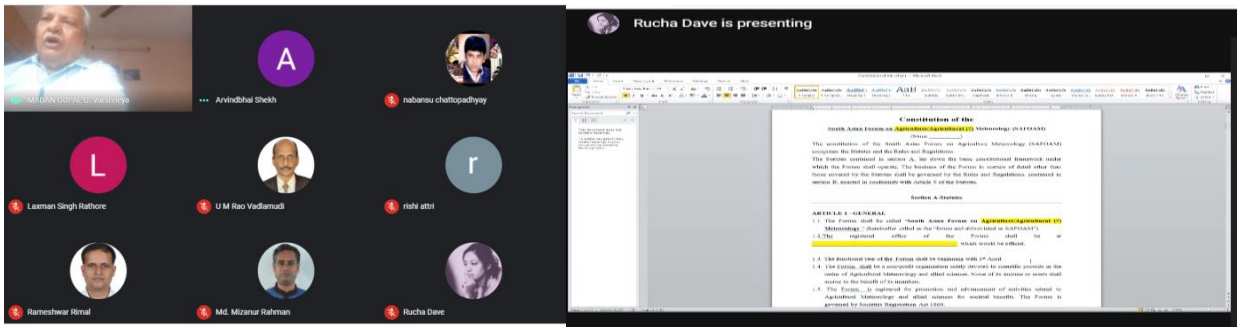
Anand Agri, Univ, Gujarat
***17. Ms. Swati Chandras**, Agricultural Meteorology Division, India Meteorological Department, Pune
***18.Ms.MalathiSeetamraju**, Agricultural Meteorology Division, India Meteorological Department, Pune

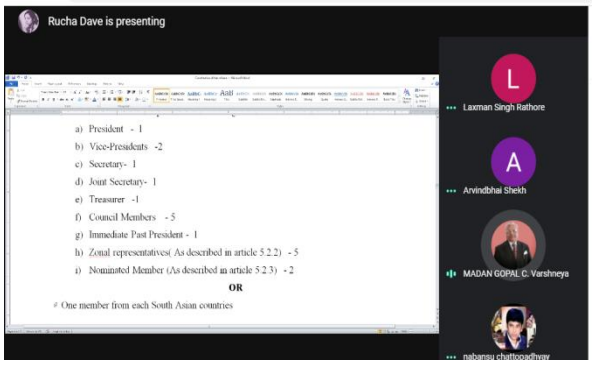
*** = Attended the Meeting**

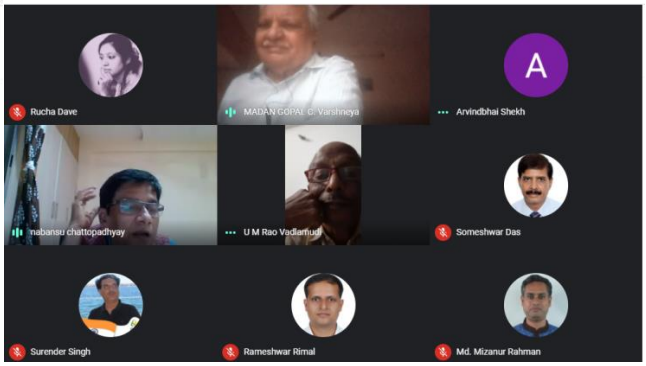
Photo Gallery








Rucha Dave is presenting
a) President - 1
b) Vice-Presidents -2
c) Secretary- 1
d) Joint Secretary- 1
e) Treasurer -1
f) Council Members - 5
g) Immediate Past President - 1
h) Zonal representatives(As described in article 5.2.2) - 5
i) Nominated Member (As described in article 5.2.3) - 2
OR
One member from each South Asian countries
Laxman Singh Rathore
Arvindbhai Shekh
MADAN GOPAL C. Varshneya
nabansu chattopadhyay


Rucha Dave
MADAN GOPAL C. Varshneya
Arvindbhai Shekh
nabansu chattopadhyay
U M Rao Vadlamudi
Someshwar Das
Surender Singh
Rameshwar Rimal
Md. Mizanur Rahman

Draft
Proceedings of the of meeting of Core Group III for steering activities South Asia Forum on Agricultural Meteorology

Under the Theme :
Utilisation of satellite derived products in Agromet Advisory Services for South Asian Countries

Date: 27th 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 III (list of the members is available in Annexure I) for steering activities of South Asia Forum on Agricultural Meteorology (SAFOAM) under the theme "Utilisation of satellite derived products in Agromet Advisory Services for South Asian Countries." At the outset, quick round of introduction of the members was made. **Dr. Chattopadhyay** said that present theme is very important as it has been agreed in the first meeting that there is a large gap, need in the area of application of satellite and satellite derived information in agriculture. He said that in depth discussion would be made on current status and gap areas for the utilization of satellite-based agromet/biogeophysical products in agromet advisory services for South Asian Countries. He continued that it has been shown in the first meeting of SAFOAM that Honourable Prime Minister of India dedicated SAARC satellite for the Services of Meteorology & its Application in South Asia. Honourable Prime Minister of India has actually extended his slogan '**Sab Ka Saath Sab Ka Vikas**' to India's neighbourhood essentially to service the needs of the poor in South Asia. He added that it is expected the meeting would be highly productive and useful under the leadership of Dr. Bimal Bhattacharya and all the honourable Advisors i.e., Dr. L.S.Rathore &, Dr. V. Geethalakshmi and all other esteem members of this group. Before, handing over to Dr. Bimal Bhattacharya for moderation of the meeting, Dr. Chattopadhyay presented a brief introduction of Dr. Bimal Bhattacharya. Group Director, Biological and Planetary Sciences and Applications Group (BPSG), Earth Ocean Atmosphere Planetary Sciences and Applications Area (EPSA), Sci./Eng. - G & Science Team Leader (AVIRIS-NG Airborne campaign), Co-Chair, Indo-French (ISRO-CNES) spaceborne thermal IR (TRISHNA) mission, Space Applications Centre (SAC), ISRO, Ahmedabad 380015, Gujarat, India.

While introducing himself **Mr. Manoj Thakur,** former Senior Scientist & Coominication Officer, National Agricultural Reseach Council was referring his association with the climate resilience project in Nepal. He said earlier days farmers never cared and gave attension to the effect of weather parameters. However, at present frmers in Nepal have shown confidence and appreciate the information generated by the meteorological and hydrological fusion products for agriculture in Nepal. He also mentioned some good studies made in Nepal in this regards. He also mentioned that under the PPCR project on agromet funded by the World Bank Agromet Advisory Services (AAS) bulletins were prepared for 26 districts based on 72 hours forecast and also his association with this project particularly in preparation of agromet bulletins. He also said that that the PPCR project has

been completed and further initiatives were taken up for further continuation of the project.He has a high hope that the farmers would be immensely benefited by the initiatives taken under SAFOAM.

Dr. Bimal Bhattacharya said that we are fortunate to have with us the mentor like **Dr. L.S.Rathore**, Former Director General of Meteorology, India Meteorological Department (IMD). He requested **Dr. Rathore** to set up the tone of the meeting based on his rich experience on different dimension of the subject of agrometeorology especially on operational agromet advisory services.

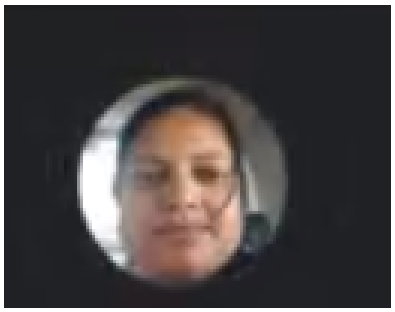
Dr. Rathore mentioned that there are number of constrains in application side of agrometeorology especially in South Asia. Therefore, need was felt to establish the SAFOAM to resolve the shortcomings of operational agrometeorological services in South Asia Region (SAR). He mentioned that though many of us at present are not associated directly with the profession, but still, most of us have the concept of institutional mechanism back in our mind. He said that three important requirements in operational Agromet Advisory Services (AAS) in SAR are (i) characteristics of crop, (ii) characteristics of soil and (iii) characteristics of pests and diseases. He said that today it is possible to use the high-resolution space products after proper massaging with the ground observations. Under this forum, one of the important tasks before us would be to generate products for entire South Asia and place in seamless digital platform to prepare agromet advisories and corresponding AAS bulletins. He was referring three challenges on the use of remote sensing products in agriculture. These are (i) identify and enlist the remote sensing products, (ii) preparation of quality of products using different techniques and using ground truth, (iii) establish the mechanism for hand holding to the user community to use these products for preparation of more robust agromet advisory bulletins. According to him, these satellite products may be generated daily, weekly and also other temporal scale as per the need of the user community. He mentioned that more challenges would be on the development of institutional mechanism along with good Standard Operating Procedure (SOP). for process-based simulation of remote sensing products. Besides, biggest challenges would the manual intervention. He said that in today's meeting these issues may be discussed at length.

Mr. Abhijit Basu, Founder and CEO Smartex Cognitive, XCED, APAC CEdMA, California, USA appreciated the way **Dr. Rathore** highlighted the meeting points for wider discussion. He wanted to know how the information, as mentioned above, would be reached to the farmer for their use and how the Government of India would be approached for dealing and sharing with the cost intensive remote sensing data in South Asia Region (SAR).

Dr. Rathore said that in South Asia the operational agromet advisory services are in different stages. In India and Bangladesh, it is at advanced stage, in Nepal, Sri lanka, Pakistan in modest stage, in

Bhutan & Afghanistan it is initial stage and it has yet to start in Maldives. As per the capability, these remote sensing data would be chewed by those who prepare the bulletins. Even some progressive farmers can use this information from the website. Secondly as far the Govt. of India's involvement on this initiative and sharing of data is concerned, **Dr. Rathore** informed that Govt. of India is very keen in such collaboration in South Asia. Initially, there is need to establish a good footings in the forum and subsequently Govt. of India might be approached with clear transparency.

Dr. Bhattacharya said that it would better if he could informed the members what is the present status and on-going activities on the utilisation of satellite data in agriculture in India. Initially he has given the functions and the data generated from geostationary and polar orbiting satellite. He said polar orbiting satellite is used for primarily crop discrimination, crop acreage etc. and geostationary satellite generate meteorological products and also products for agricultural sectors. Also mentioned the manual interventation & automation required to generate quality information and made useful for preparation of agromet advisories. He added that from 2008, SAC and IMD have been working in this regard. NDVI data from INSAT CACCD was used for preparation of agromet advisories. He also mentioned the road map prepared in 2014 jointly by IMD, SAC and other organisation on "Use of meteorological information in agriculture in India". He mentioned the INSAT DATA PROCESSINF SYSTEM called **IMDPS** system developed in IMD, New Delhi by SAC to obtained the data and information from the geostationary satellite. At present number of products like maximum amd minimum LST, NDVI, predicted NDVI, surface soil moisture at the block level for 32 districts are provided to IMD for preparation of advisories. He also mentioned how these products could be used for irrigation advisories, forewarning of pests & diseases incidences. He informed that INSAT coverage is all over South Asia. He informed on the Govt of India's policy on sharing data with the neighbouring coutries. He also suggested for validation of the products from INSAT 3D & INSAT 3R for use to reduce the error for effective use. He flagged the recent development in data sharing policy of SAC.



Dr. Bhattacharya requested **Ms. Malathi Seetamraju,** Agricultural Meteorology Division, India Meteorological Department, Pune, , India to inform the members on the present activities between IMD & SAC. **Ms. Malathi** said that in two modes i.e., operational and research, the satellite data are used. Two indicators i.e., NDVI and VCI are respectively used for monitoring crop vigour and yield forecasting whereas TCI, VHI etc. are used primarily on research mode. At present PET data obtained

from satellite is also used in water balance studies. She mentioned the future activities to be taken up on this area.

After the deliveration of **Dr. Bhattacharya** and welcoming **Dr. V. Geethalakshmi, Director** (Crop Management),Directorate of Crop Management,, Tamil Nadu Agricultural University,, Coimbatore , India, **Dr. Rathore** mentioned that this is the most opportune time to initiate the proposed activities under SAFOAM. He added that as far as the use and availability of geospatial data at fair resolution are concerned, these are now available in public domain. At this juncture modesoperandi should be established. According to him,World Bank has already supported the activities of Hydromet Forum and in principle agreed to form and support the SAFOAM. He also said that we may explore some funding from World Bank or other donar agencies for generation of products on operational mode.

Dr. Geethalakshmi, mentioned that is a great initiative and she is excited to the part of the same. She added that under the climatic variability and climate vagaries, such approaches are need of the hour in SAR. She informed that at present weather data are generated on daily basis from a good network of observatories in Tamil Nadu and the same data might be used for validation of the products already been generated by SAC.

Dr. Rathore has mentioned that at this stage we need to develop the strategies and road map to use the satellite product in agriculture in SAR looking at the priority. First priority would be what we can launch immediately considering the different level of use of remote sensing in the respective country followed by the capability to use remote sensing products and the remote sensing products skill level. Initially i.e., in phase 1. identify the remote sensing products/data which are globally and freely available and can be shared with SAR. Prepare the list of the products and concurrently put and display in proposed web portal of SAFOAM and then it would be recognised worldwide. Add value in phase two and three. In phase two, enhancement of capacity building programme should be taken up. In phase three, research work as discussed by **Dr. Geethalakshmi and Mr. Abhijit** might be taken up. According to him, paddy is a good suggestion for working with remote sensing data in SAR.

Dr. Bhattacharya appreciated the advices made by **Dr. Rathore** on the proposed priority works, challenges and ultimately the road map and works to be taken up at different stages of SAFOAM activities and said that his suggestions would be taken up subsequently.

Shri R.R. Mali, Technical Consultant, Government of Maharashtra, India & Former Deputy Director General & Head & Scientist F, Instrument Division, Division, India Meteorological Department mentioned his association with the World Bank Funded Pokra project of the Govt. of Maharashtra. Elaborate discussion was made on the validation of soil moisture index derived from the soil moisture sensor, to be installed shortly under the project, with the soil moisture data generated by the SAC. It has been agreed that **Shri Mali** would take up the work further with SAC in consultation with the Govt. of Maharashtra.

Dr. Chattopadhyay elaborated the overall future activities of SAFOAM and also the preparation of the concept paper collectively and its presentation in the proposed workshop inviting all the founding members of the forum for finalisation the same.

Replying to query from **Dr. Chattopadhyay, Dr. Bhattacharya** said that a proper mechanism would be worked how training programme for the representatives of SAR could be organised shortly without much hindrance involving SAC, IMD and other organisations. He also mentioned the different training programmes for SAC for national and international participants.

Mr. Manoj Thakur from Nepal said that the SAFOAM activities are very much pertinent. He mentioned details of the four level of information i.e., surface analysis map for various parameters, 3 days WRF forecast, visible and infrared satellite pictures and extended range weather forecast along with the weather outlook are used in preparation of AAS bulletins for 26 districts on weekly basis in Nepal. He also mentioned the shortcomings in respect of crop models, limited manpower, training with limited skill in translation of remote sensing information in operational mode. He explained how they are getting the satellite for public and commercial mode

Mr. Abhijit said that there is need to develop common strategy on availability of satellite data and also said as far the requirement of advisory, a few indicators may be chosen to begin with.

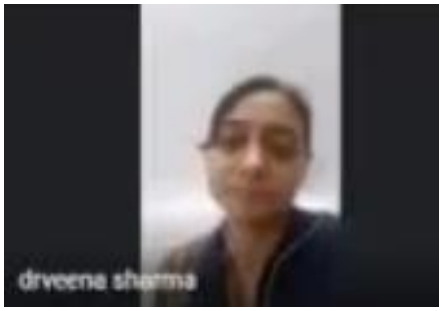
Dr. Bhattacharya agreed to **Mr. Abhijit** suggestion to take up and focus on some common products available and which can serve the farmers requirement in SAR. He informed **Mr.Thakur** that though there are some restrictions, INSAT products are freely available to research purpose and consumption by the public organisation also.

Dr. Bhattacharya discussed on research in modelling, use of current products, need of the product and also flagged the requirement for the R & D and operational use. He specially mentioned on irrigation & pest advisory. He said that at present in collaboration with ICAR, forewarning of mustard aphid in Rajasthan are being issued operationally 15 days before incidence of the pest at different levels including economic threshold level using both weather and satellite information.

Dr. Geethalakshmi appreciated the irrigation advisories taking consideration of satellite information to replace supply-based irrigation to demand based irrigation as more than 50 per cent water could be saved by this approach. He was referring the supply-based irrigation during monsoon season in Tamil Nadu. She also mentioned the potential of satellite information in forewarning of pest and disease incidence by citing some experiments she carried out some field experiments using reflectance data from handhold instruments and also added that such methodology might be applied to control fall armyworm incidence in maize crop. If satellite data is available, such experiment could be taken up on wider areas.

Dr. Bhattacharya explained the on-going activities on demand-based irrigation advisories based on graphical interface technique, generalised crop coefficient, local information and development of Apps connected to server.

Dr. Chattopadhyay said that this could be considered as excellent research problem. However, at present we may discuss more on the operational aspects with the readily available information followed by display in appropriate platform and capacity building as advised by **Dr. Rathore**. He said that, if agreed to, we may send request all the founding members of SAFOAM in the SAR to send their requirements in respect of present status of remote sensing data, access of remote sensing data, capability of use the data, training requirements, success stories etc. **Dr. Bhattacharya** was requested to prepare the form in the form of questionaries for onward sending the same to the concerned as mentioned.



Dr. Veena Sharma, Technical Officer/Assistant Professor, Agromet Section, SKUAST-Jammu, Jammu, J&K, India was mentioning the importance of soil moisture information in providing irrigation advisory particularly in drought prone areas and drought year. She added that soil moisture information from satellite is useful to those areas when network of observatory is relatively poor. Thus, under SAFOAM, if this information could be provided to SAR, it would be very useful for preparing the irrigation advisory. Dr. Bhattacharya informed that satellite derived soil moisture in coarse resolution (36 km * 3 6 km) are available globally. But with some radar data and other method soil moisture information at 10 km resolution is possible. He wanted to know with justification that what is best resolution for soil moisture information required for giving proper agromet advisories

Afterwards, a very important discussion was made on application of satellite information on livestock and poultry. **Dr. A. Natarajan**, Professor and Head, Animal Feed Analytical and Quality Assurance Laboratory, Veterinary College and Research Institute, Namakkal, Tamil Nadu, India, said that as on today not much work was on this subject was done in India and probably in South Asia. Participating into the discussion, **Dr. Bhattacharya** mentioned that satellite information might be very useful on preparation of fodder map and type of fodder map especially green fodder assessment. This would help in livestock management involving logistic also. Besides, discussion was also made on the utilisation of satellite information on pasture, dairy, forestry etc. **Dr. Rathore** appreciated the discussion and given his advised and direction in including the subject as one of the important activities of SAFOAM.As the subject is interesting and emerging in South Asia, **Dr. Natarajan** would be requested to prepare a concept note on this subject for SAR and present the same virtually in front of the members of SAFOAM.

At the end **Dr. Geethalakshmi** mentioned about the weather insurance supported by the remote sensing data and yield forecasting using weather and satellite information would useful in SAR. Besides, initiatives mentioned throughout the meeting need to be operational.

Dr. Bhattacharya said that he is thankful to all the members of the meeting for valuable suggestions. He said that he has noted all the major points. He said that the forms as discussed earlier sent to all the countries in SAR. Initiatives would be taken on capacity building on the generation and using satellite data in agriculture, involve academia in exchange programme on research and development, use of satellite information in livestock management, satellite derived high resolution soil moisture, use of remote sensing in weather-based insurance. All the above comments/suggestions need to documented in the form of proceedings within a month and ultimately be presented in the proposed workshop for the finalisation of the document in the form of road map. He said this is a good initiative but it is long drawn process. Though there are in built institutional formalities/restrictions/modalities exist, but efforts would be made to effectively use the huge information satellite information in agriculture sectors in SAR.

Recommendations of the Meeting

It has been agreed that efforts need to be made to utilise the satellite information in agriculture in South Asia with proper planning looking at the different levels of availability of skilful satellite information/products and capability of use of same in agriculture etc. Following recommendations were made in this regard.

1. Implementation of the activities should be done at different levels.
2. In the first level, identification of the common & skilful satellite products/indicators, which have proper value and usages in agriculture should be made in South Asia.
3. Display of all the products/indicators in South Asia should be made on digital platform.
4. Mechanism should be developed to get access the satellite products/indicators by all the countries in South Asia obliging the data policy among different member countries.
5. Promotion of exchange programme on Research and Development especially on irrigation advisory, forewarning of pest and disease, crop yield forecast, weather-based insurance etc.
6. Explore to prepare fodder map, types of fodder map for green fodder assessment utilising the satellite information. Usability of satellite information in dairy, pasture, forestry sectors also may be ventured.
7. Preparation questionaries for obtaining information from the countries in SAR in respect of present status of remote sensing data, access of remote sensing data, capability of use the data, training requirements, success stories etc

Dr. Chattopadhyay once again thanked **Dr. Bhattacharya** and 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.

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Annexure I

List of Members

Core Group III for steering SAFOAM activities

Theme : Utilisation of satellite derived products in Agromet Advisory Services for South Asian Countries.

Leader

***Dr. Bimal K Bhattacharya**

Group Director, Biological and Planetary Sciences and Applications Group (BPSG), Earth Ocean Atmosphere Planetary Sciences and Applications Area (EPSA), Sci./Eng. - G & Science Team Leader (AVIRIS-NG Airborne campaign), Co-Chair, Indo-French (ISRO-CNES) spaceborne thermal IR (TRISHNA) mission, Space Applications Centre, ISRO, Ahmedabad 380015, Gujarat, India

Advisors

1.Dr Akhilesh Gupta

Adviser/Scientist-G & Head, STIP-2020 Secretariat, Head, Policy Coordination & Programme Management (PCPM) Division, Head, Strategic Programmes, Large Initiatives and Coordinated, Action Enabler (SPLICE) Division and Climate Change Programme, Chief Vigilance Officer (CVO), Room No 16B, Administrative Block, Department of Science & Technology, Technology Bhavan, New Mehrauli Road, New Delhi-110 016, INDIA

2. Dr. Sibendu Roy

Director, Mahalanobis National Crop Forecast Centre, New Delhi, India

3. **Mr. A Karunanayake**

Director General of Meteorology,
Sri Lanka

*****4**. Dr. V. Geethalakshmi**

Director (Crop Management), Directorate of Crop Management, Tamil Nadu Agricultural University, Coimbatore, India-

Members

1.**Dr. Giriraj Amarnath**

International Water Management Institute

Sri Lanka

2.Mr. Tshencho Dorji

Dy. Chief Meteorology Officer
Weather & Climate Services Division
National Center for Hydrology & Meteorology
Royal Government of Bhutan, Thimphu, Bhutan

***3. Mr. Manoj Thakur,**

Senior Scientist, NARC**,** Nepal

4.Ms. Swe Swe Oo,

Head of Seed Division, Assistant Director, Department of Agriculture, Yangon office, Myanmar

5.Dr (Md). Mizanur Rahman

Senior National Consultant, Agro-Meteorological Information Systems Development Project, Component-C of Bangladesh Weather and Climate Services Regional Project, Department of Agricultural Extension (DAE), Khamarbari, Farmgate, Dhaka, Bangladesh

6.Mr.Zahiruddin Imampoor

Director of Agricultural Statistics & Information System
Ministry of Agriculture, Irrigation and Livestock
Afghanistan

7.Dr. Vinay Sehgal

Division of Agricultural Physics
Indian Agricultural Research Institute, New Delhi, India

***8. Mr. Abhijit Basu**

Founder and CEO Smartex Cognitive, XCED, APAC CEdMA, California, USA

9.Dr. Abdul Wadood

Prof. & Chairman, Deptt. of Agrometeorology and Environmental Science & Director Research, Birsa Agril. University Ranchi, Director Research, Ranchi, Jharkhand, , India

***10. Dr. Natarajan A**

Professor and Head
Animal Feed Analytical and Quality Assurance Laboratory
Veterinary College and Research Institute,
Namakkal - 637 001
Tamil Nadu, , India

11.Dr. Abdus Sattar

Assistant Professor (Agrometeorology)
Principal Investigator, AICRP on Agrometeorology
Principal Investigator, AICRPAM-NICRA Project
Nodal Officer, Gramin Krishi Mausam Sewa (GKMS) Project
Principal Investigator, FASAL Project
Principal Investigator, Modleing Radiative and CO2 Fluxes in Rice-Wheat System (SAC, ISRO)
Officer In-charge, Agrometeorology Division
Centre for Advance Studies on Climate Change
Rajendra Prasad Central Agricultural University, Bihar
Pusa, Samastipur, , India

***12. Dr. Veena Sharma**

Technical Officer/Assistant Professor, Agromet Section, SKUAST-Jammu, Jammu, J&K, , India

***13**. **Dr. Nabansu. Chattopadhyay**

President, International Society for Agricultural Meteorology

Executive Secretary, Global Federation of Agrometeorological Societies (Global FAMS)
Former Deputy Director General & Head & Scientist F, Agricultural Meteorology Division, India Meteorological Department.

***14. Shri R.R. Mali,**

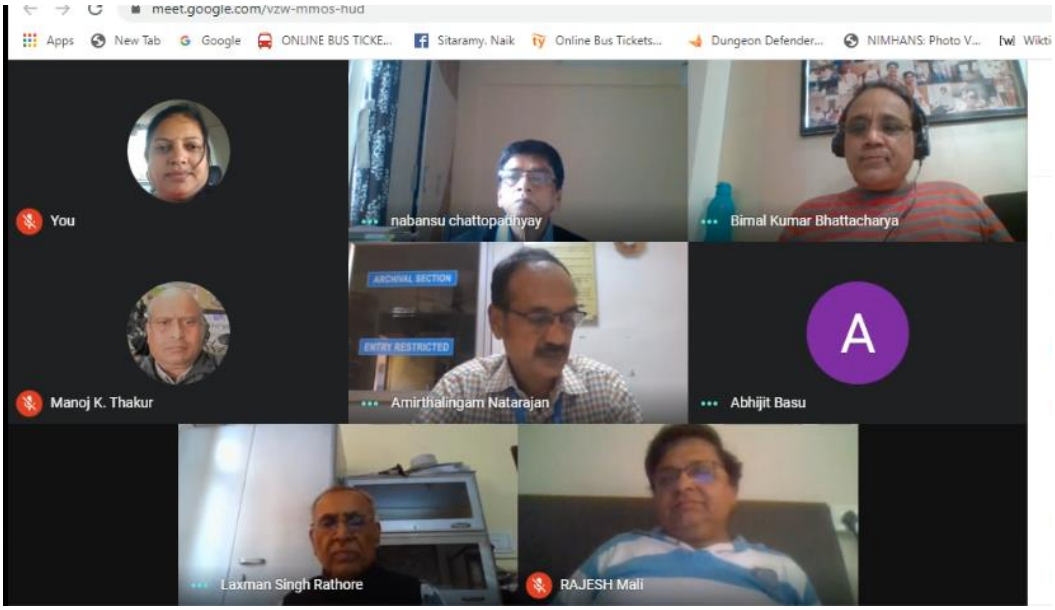
Former Deputy Director General & Head & Scientist F, Instrument Division, Division, India Meteorological Department.

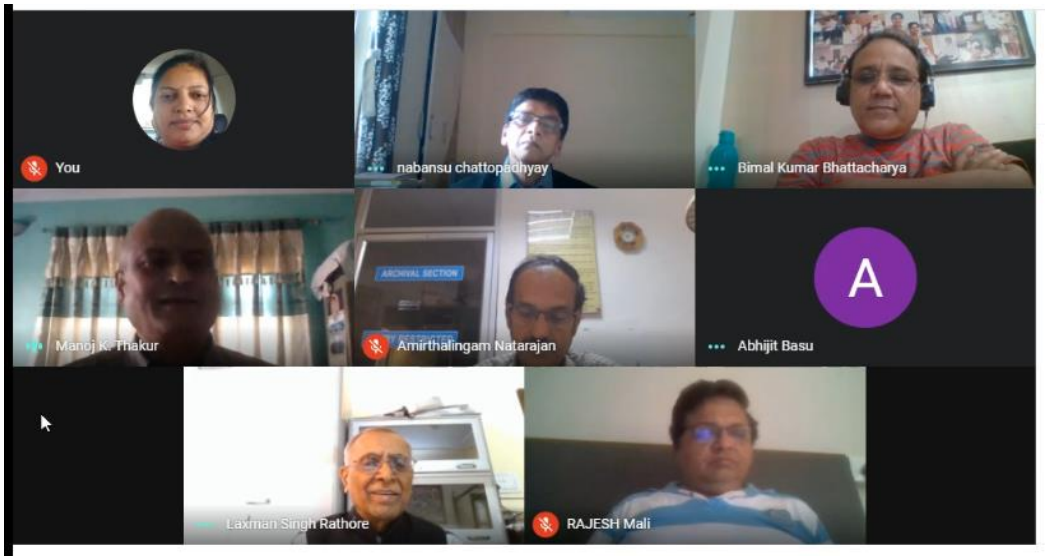
***15. Ms. Swati Chandras**, Agricultural Meteorology Division, India Meteorological Department, Pune, , India

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

*** = Attended the Meeting**

Photo Gallery





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 2021Time: 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 questionaries 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 questionaries 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 (BWCSRP) of the World Bank, Sher-E-Bangla Nagor, 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 Cente, National Soil Servey 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.

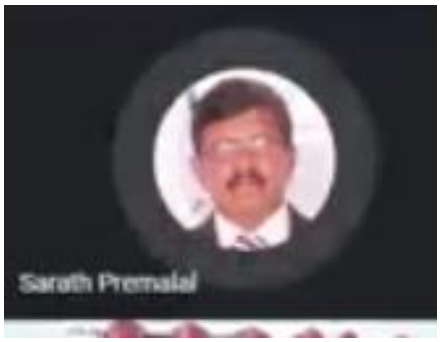
Dr. Shib Nandan Prasad Shah, National Project Director, PPCR: Building Resilience to Climate Related Hazards Project (BRCH), Agriculture Management Information System (AMIS) & Under Secretary (Tech), Chief of GIS & IT Section, MoAD, Kathmandu, Nepal said that the subject of Agromet Advisory Services 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 and 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 exerts. 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 BWCSRP of The World Bank, Sher-E-Bangla Nagor, 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.

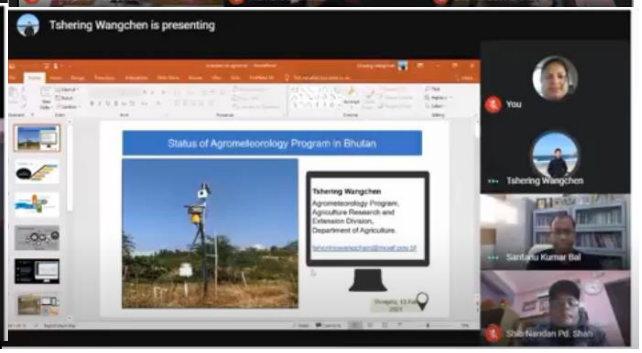
16.**Dr. Indira Kadel**, Department of Hydrology and Meteorology, Babarmahal, Kathmandu, Nepal.

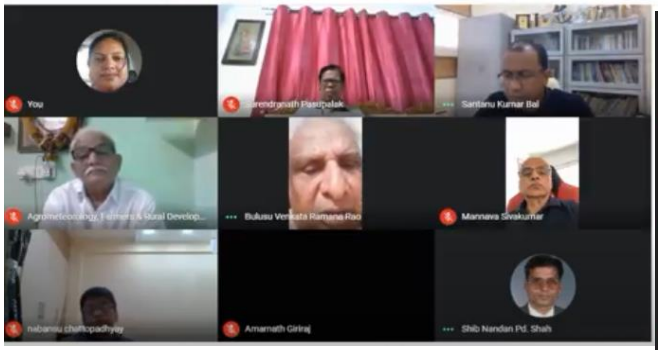
17.**Ms. Swati Chandras**, Agricultural Meteorology Division, India Meteorological Department, Pune

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

*** = Attended the Meeting**

Photo Gallery





Proceedings of the General Body Meeting of South Asia Forum on Agricultural Meteorology

Date: 8th August 2021

Time: 1600 Hrs IST to 1900 Hrs IST

Venue: Virtual Platform (The Google meet)

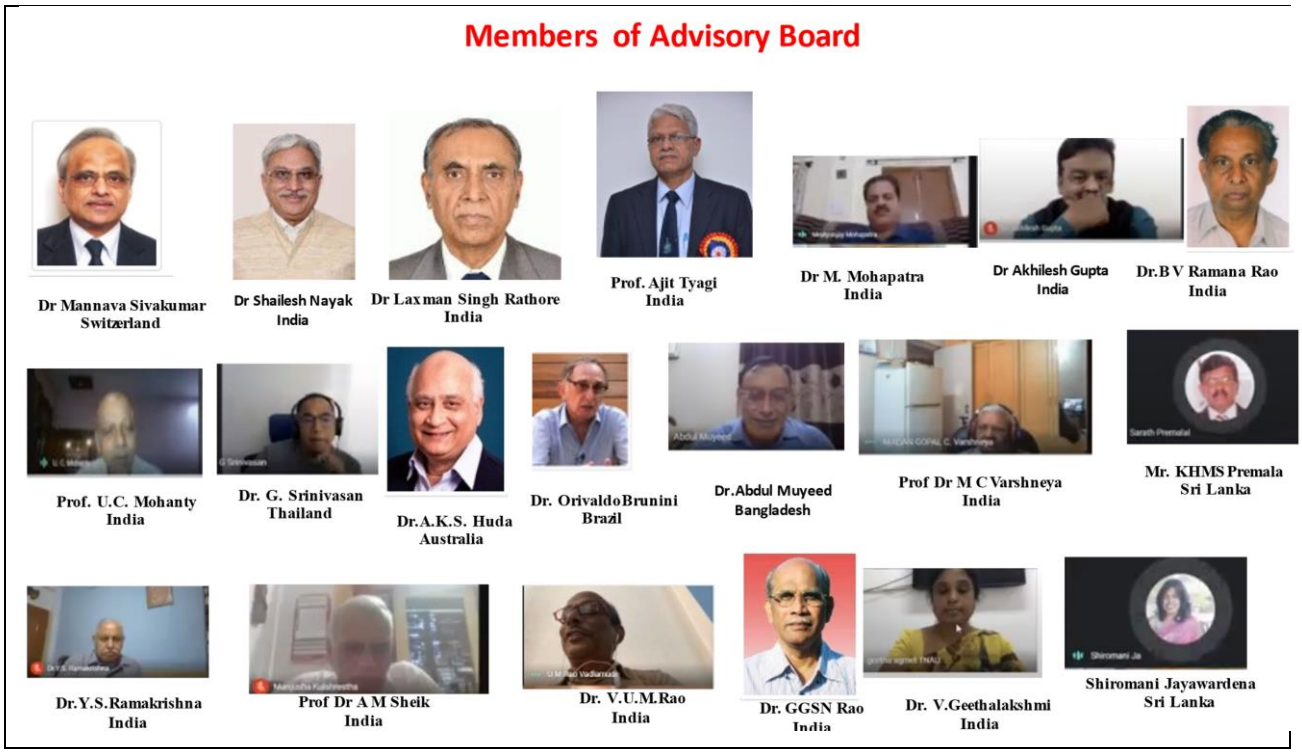
The General Body meeting of South Asia Forum on Agricultural Meteorology (SAFOAM) was started by welcoming all the participants by **Prof. A.M.Shekh**, Former Vice-Chancellor, Anand Agricultural University, Gujarat. 51 participants from the member countries in South Asia including the international experts from USA, Brazil, Switzerland and Australia attended the meeting (list of the participants is available in Annexure I). Prof. Shekh said that it was great pleasure for all of us to participate in first G.B. Meeting of SAFOAM on 8th August i.e. today and good opportunity for the agrometeorologists in South Asia to participate in such a forum to exchange ideas of training programme for knowledge of the students, resource persons, including collaborative programmes and other aspects of agrometeorology. He mentioned that this forum has been created with this background. He also added that the rules and regulation including constitution aspects of the forum have already been discussed, agreed and approved in the workshop of SAFOAM organised in July, 2021 and also, he added that other agenda points would be discussed shortly. He requested all the members of the forum to actively participate in the discussion for finalisation of the different points that would be presented in front of all of them as these would help all of us to take the activities of the forum in the right direction within definite time frame. He wished for fruitful discussion and great success of the meeting.

After giving brief background and proposed outcomes of the meeting, **Dr. Y.S. Ramakrishna, Ex-Director,** ICAR - Central Research Institute for Dryland Agriculture (CRIDA), India started to moderate the meeting and asked **Dr. N. Chattopadhyay** to introduce all the agenda points of the G.B. meeting through presentation for discussion and finalisation of the same. In the beginning, Dr. Chattopadhyay briefly mentioned about the background, objectives of organising the G.B. meeting. He said that he would present the agenda points one by one for discussion. Initially Dr. Chattopadhyay mentioned the four major areas of SAFOAM activities. These are sharing of knowledge on advancement, dissemination and application of the knowledge of science of Agriculture Meteorology among the member countries followed by promotion of agromet research, interaction among all persons, bodies, institutions (private and/or state-owned) and industries and for better linkage between the between agrometeorological communities and policymakers. Then Dr.Chattopadhyay started to show the different agenda points sequentially.

The proposed functions & constitution of the Advisory Board was presented and discussed as follows.

- Finalise the constitution of SAFOAM, roadmap and future action plans.
- Guide and approve the work plan of the programme initiated by the different committees before its implementation.

- The Advisory Board will initiate formation of other sub-committees. It was also suggested that one or two senior professionals from academia and research institutions may also be a part of the Advisory Board.
- Organise at least one meeting within 6 months to review the overall performance of the forum and, if need be, advise accordingly.



Dr. Ramakrishna said that overall picture of the Advisory Board has been given by mentioning the proposed responsibilities of the Advisory Board and the list of the member identified for the Advisory Board. He opened the discussion on the above points and offered comments from the members.

Dr.M.V.K.Sivakumar, Founding Editor-in-Chief, Weather and Climate Extremes (Elsevier), Senior Consultant, WMO, Geneva, Switzerland said that it has been very nice to be the part of the Advisory Board and got the opportunity to attend the number of meeting organised by SAFOAM. He said that at present we were at good footing in India by forming different committees for the operational agromet advisory services, but there are number of countries in South Asia that are lacking in these areas and thus the Advisory Board should move forward to implement the different activities as mentioned in different meetings of SAFOAM organised earlier especially for the countries lacking behind and the farmers in these countries badly need these services for the better livelihood. Dr.Sivakumar said that the role of the Advisory Board would be to develop meticulous work plan/agenda for rest of the months in 2021 and 2022 for those countries and collect their comments in these regards to move forward.

Dr.A.K.S Huda, School of Science, Western Sydney University, Australia said that he was honoured to be the part of the SAFOAM activities and he would support the same at his best. He complemented the activities so far mentioned particularly the four areas as outlined by Dr. Chattopadhyay. He said that he would be happy to contribute as far as possible in all the activities particularly promotion of research, funding. In addition to that, he would like to involve in different collaborative works and development of deepening relationship with member countries in development of agrometeorology, agroclimatology for the better livelihood in South Asia.

Dr. Orivaldo Brunini, Director, Agricultural Research Support Foundation, Brazil, Former Professor of Agrometeorology, Faculdade Luiz Meneghel, Brazil said that the it was very good to see the straight forward presentation and action under SAFOAM initiatives. According to him, these initiatives were very much required for food policy, food quality, food security in South Asia. He also said that all the action plans particularly in research, capacity building etc.were articulated nicely. .

Prof Dr M C Varshneya, Former Vice-Chancellor, Anand Agricultural University, Gujarat said that research and climate change issue were very important in South Asia particularly in the present day of envirinment. He stressed to put more thrust on climate change and policy issues which would directly help the respective government. He also said that he would try to give his best in the area of research, education, policy framing and also interact/contact with the government body in the member countries in South Asia for framing the policy on different aspect of agromet services, education &research programme in the member countries of South Asia.

Dr.B. V. Ramana Rao, Editor in Chief, Journal Agrometeorology. Telangana State, India said that it was a good idea to form the Advisory Board (Steering Committee) which should give more focuses/evolve policy on research, education and agrometeorological development for the benefit of the farmers. In addition to that it is required to know the status of research, agromet education and skill of different spatial and temporal weather forecast and its usefulness for application in agriculture in the member countries. He also mentioned that the vision of SAFOAM should be that after 5 or 10 years, all the countries in South Asia should be almost at the same level to develop strategies for providing the need based agromet services to the users.

Dr. Ramakrishna appreciated all the comments made by the members so far. He said that this was an umbrella committee and under this different committees would be formed and requested all of them to give their comments more when the other committees would be presented shortly. **Dr. Ramakrishna** asked **Dr. Chattopadhyay** to continue his presentation**.**

As far as the **Capacity Building programme** is concerned, following proposed activities and Committee Members were presented.

- Training Need Assessment should be conducted in all member countries prior to arrange capacity building programme.

- Knowledge transfer among member states and generation of quality manpower through various training programs.
- Capacity budling programme on manpower, infrastructure, data base, agromet advisory services should be organised country wise depending on the strength & weakness and priority basis.
- Capacity building should not only be given to agrometeorologist, but for farmers and industries govt officials, extension officers, service providers.
- Identify the groups and voluntary scientists, agrometeorologists retired and working experienced agrometeorologists who could really help to fill the gaps so that SAFOAM can help in improving the capacity of those groups who will ultimately supports other groups and this should be taken as top priority.
- More stress should be given on capacity building in practical form to those countries where it is lagging very much.
- Professional training, particularly on subjects specific to the region delivered by experienced professionals.
- Association of Agrometeorologists in India may be involved in providing training programmes.
- Prepare a short-, medium- and long-term calendar for arrangement of capacity building programmes.
- Capacity building programmes through Farmer Awareness Programme, Climate Field School etc. should be arranged.
- Capacity building of the mountain communities in relation to improving their livelihood through climate-smart agricultural practices (integrating crops and livestock)

Prof. U.C. Mohanty, School of Earth Ocean and Climate Sciences, Indian Institute of Technology Bhubaneswar, Odisha, India suggested that first priorities should be given to gather the information from the different real stake holders/ communities the actual need on the ground. For this expert team in SAFOAM should prepare the comprehensive questionnaire, survey & collect the information on need, gap areas from the member countries that would give significant boost in the activities of SAFOAM so far planned. He added that based on the end users, requirement, it is required to share that information to the other committee members and designate experts & resources to address these issues in terms of application.

Dr. Ramakrishna fully agreed to the proposition of **Dr. Mohanty**. He said that particular committee has been formed with the group leader whose responsibilities would be to collect there information as mentioned on different areas and share the same with the different committees for making suitable plans to perform the assigned activities. He said that all the committees are interlinked, only beginning has been made in this regard.

Dr. Chattopahyay said that initiatives on this aspect have already started by the group leader of this committee and more would be done subsequently.

Dr. Ramakrishna requested **Dr. Santunu Kumar Bal,** the Group Leader of the Committee to express his views based on the above comments.

Dr. Bal said that this was just beginning. Some feedback information has been collected from the member countries through questionnaire in a very short time. However, detailed plan would be made in terms of gathering information as discussed above and more members would be added to this

committee. Also, he was looking for the entire plan of the SAFOAM so that an effective strategy could be prepared slowly and steadily in consultation with the the members of other committes.

Dr. Mazharul Aziz, Chief Instructor, Agriculture Training Institute, Department of Agricultural Extension (DAE), Bangladesh said that under the agromet project in Bangladesh, three capsule training programmes have already been prepared and also imparting training to graduate agricultural officers, sub-assistant agricultural officers, directly working with the farmers, and also for the farmers in Bangladesh. Also developed the manual for the three categories training programme and the same is available in the Bamis Portal (www.bamis.gov.bd) exclusively created for the operational agromet advisory services in Bangladesh. According to him, Bangladesh has the capacity now to provide such training to the members countries actually needed.

Dr. GSLV Prasada Rao, Founder, Academy of Climate Change Education and Research, Kerala Agricultural University, Vellanikkara, Thrissur, Kerala, India mentioned about the agromet project of Nepal. He stressed for continuity of the activities of agromet project in Nepal including the training programme. He also appreciated the various information disseminated to the users through the website in Nepal. He pointed out the sustainability issue in all the above aspects in the country. He also mentioned the on-going plan of education on agrometeorology in Nepal and requirement of possible funding to initiate such initiative.

Dr. Mazharul Aziz mentioned that after the completion of the on-going world bank funded agromet project in Bangladesh, the handover of the project would be made to the appropriate wing of the Department of Extension of the Ministry of Agriculture for its continuity and for providing services to the farmers in sustainable manner. He also added that agromet course in post-graduate level would be started this year in two leading Agricultural Universities in Bangladesh.

At this point **Dr. Ramaa Roa** said that we should at first identify the thrust areas on research and for that we should focus on the capacity building programme to meet the thrust arae and formulate effective programme which should be made more interesting to the people in this region.

Dr. Mohanty mentioned that weather and climate information would have great role in the next green revolution in all the countries in South Asia. He stressed for the introduction of education capsule course in each school. He informed that agrometeorology was not included in Environmental Science programme in different universities. He stressed for need to include the course on weather, climate & agriculture even from the school level so that importance of the subject would be understood by the prospective farmers in different sectors of agriculture i.e. fishery, livestock, poultry and this would help us immensely in future.

Dr. Ramakrisna supported the views expressed by Dr. Mohanty. According to him the meteorology/agrometeorology subjects should be included from the school level. He said that need assessment from each area like research, education, capacity building should be made and SAFOAM

should work on it. As far as education capsule course at school level is concerned, education committee might look into this aspects. In addition to that it was also said that agrometeorology should cover the selection of seed to post harvest and storage of crops.

Mr. KHMS Premalal, Former Director General of Meteorology, Sri Lanka stressed for the capacity building programme for the top-level officers, including bottom level officers, particularly for preparation and dissemination of agromet advisories by citing the on-going activities on agromet advisory preparation by the Meteorological & Agriculture Department in Sri Lanka

Dr. Sivakumar shared his rich experience on different types of capacity building programme organised by the World Bank during his assignment as Senior consultant in Nepal and Bangladesh as well and also preparation of some documents on capacity building. Also, he mentioned about the roving seminars orgarised by the World Meteorological Organisation (WMO) in Asia, Africa and Latin America. He also mentioned his interactions with the Agricultural University on introduction of Agromet Course in University in Nepal and Bangladesh. He said that appropriate action has already been taken in both the countries to take it forward.

As far as **Education Programme** is concerned, following information was shown.

As large number of resource persons in the field of agrometeorology is required for carrying out operational agromet advisory services and agrometeorological research following activities are proposed to be taken up.

1. SAFOAM should take initiative with the respective Government agencies and Agricultural Universities in South Asia to promote & support, to open up Agromet Course in agricultural universities in the member countries of South Asia.
2. Prepare the curriculum in the science of Agricultural Meteorology and related disciplines. There is need to spend considerable time planning the modules and make several of them available through online resources.

4. Short course on agromet bulletin preparation, dissemination, agromet research for enhancing agrometeorology in South Asia.

5. SAFOAM could provide human resources as lectures or professors so that such initiative can be taken up to offer degree in meteorology or agrometeorology in universities in South Asian Countries.

6. Support to arrange Post-graduate and PhD studentships.

Prof Varshneya suggested that before preparing the education programme for any country, we should know the input materials readily available and what is the present level of education and also what types of farmers along with the need of the country and who would be the participants and ultimately what types of output are expected including from the farmers of that country. He said that education programme could be prepared based on the need of the country from pre to post degree levels. He also said that webinar-based training programme could be arranged as number of experts are available with us. through SAFOAM programme. He suggested to arrange 30-40 lectures including basic subjects of agrometeorology along with country specific subjects through the training programme.

As far as the **Research programme**, following proposed activities and Committee Members were presented.

1.To encourage and promote research in science of Agricultural Meteorology and related disciplines.

2. Promote collaborative research in agrometeorology involving agricultural universities on generation of new agromet products, climate change, climatic variability coordinated products drought, flood and other extreme events may be taken up.

3.Under the collaborative research programme, more stress may be given to research on virus, bacteria, fungi and weather.

4. Knowledge transfer and guidance in agromet research should be the integral part of collaborative research programme.

5. Climate and climate change issues and its impacts in agriculture still not addressed adequately in national and regional level should be considered.

6. More work in research and development should be for use of more information on weather and climate so that true agromet advisories can be issued to the farmers.

7.Assit in preparing research project and arrangement of funding from different national and international funding agencies.

8. Encourage young scientists by arranging some funds to work on the subject of agrometeorological research.

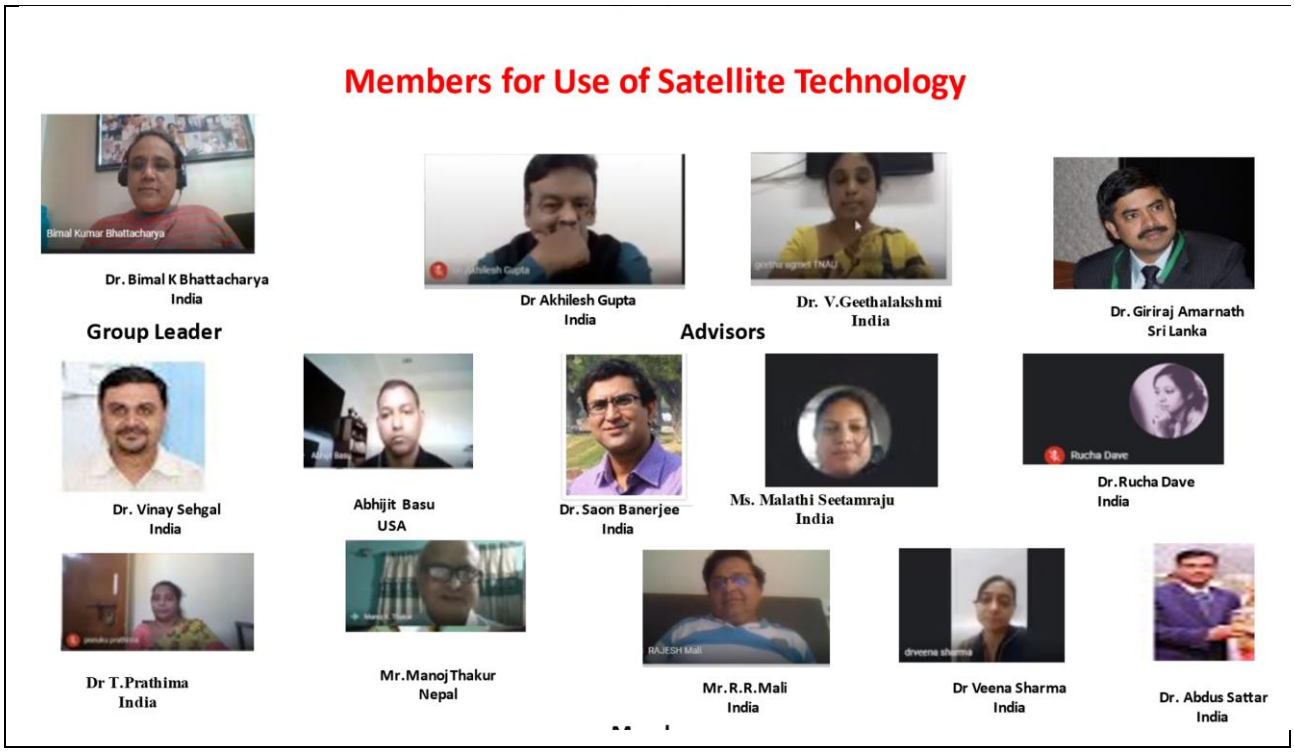
Scientific Committee is to play important role of promoting research and carrying out capacity building in South Asian Countries. Scientific Committee consist of senior faculty members, scientists and researchers. Scientific Committee may constitute subject specific sub committees of Scientists.

Under the Research programme, special attention would be paid to use of satellite information in product development as an effective tool for preparation of agromet advisories and hill development utilising different agrometeorological information and location specific products. Proposed works and committees are presented below.

Use of satellite information

- Documentation of satellite product catalogue, sources, links, data policies.
- Identify high, moderate and low priority implementable work elements.
- Formulate strategy and mechanism for training and student exchange.
- Sharing of methods of quality check of satellite and observational data for its proper use.

- Initiatives on product generation including satellite products for South Asian Region and display in the web portal of SAFOAM.
- As far as application satellite technology is concerned, arrange to provide technical advisory for preparation of good agromet advisory.
- Prepare some proposals in niche areas for international funding.



Hill Development

- ✓ Initiative on mutual collaboration to operationalise agromet advisory services in hilly areas of South Asia.
- ✓ Micro-level research in hill areas and improvement of weather data collection network.
- ✓ Development of forewarning models of pest & diseases in hills for quality agromet advisory services.
- ✓ Development of crop-weather relationship studies for different crops in different localities in hills.
- ✓ Identification of the location specific weather hazards/aberrations/extreme events and prepare contingency crop plan according to the prevailing weather constrains in that locality.
- ✓ Promotion of multidisciplinary research in agrometeorology to identify crop management, disease pest management for adaptation and mitigation strategies to reduce impact of climate change.

- ✓ Strong collaborative research between Meteorologists and Agriculture experts (especially in the universities and government institutions in hill dominant states.

As far as the **Regional & Global Cooperation** is concerned, following proposed activities and Committee Members were presented.

- ❖ Foster regional collaboration and cooperation in to science of Agricultural Meteorology and allied sciences and support the efforts of national Meteorological, Agriculture, Hydrological, Horticulture, Veterinary science and Animal husbandry, ICAR, WMO, World Bank, ADB, CAGRI, IPCC, FAO and other international entities working in the South Asian region.
- ❖ Linking with regional projects like RIMES, ADPC.CARE may be made. All the regional projects are expected to support as it is regional initiatives and these regional projects may synergise the activity of SAFOAM.
- ❖ SAFOAM & SAMA should work together to address all the relevant regional activities in collaborating mode and use Atmospheric Science & Ocean Science for the use of common man.
- ❖ SAFOAM should use the SASCOF to build the capacity of different NMHS in building and issuing seasonal &sub-seasonal and impact-based weather forecast for the farmers in South Asia.
- ❖ For carrying out research programme on interdisciplinary science involving physical science, earth science and biological science, a national or international institute on agrometeorology may be set up. Such recommendation may be made to all the SAARC countries through SAFOAM platform. As setting up of such institute may not be an easy task at this stage of the

forum and existing SAARC system but such concept may be included or explored with the in-built existing SAARC system.

- ❖ Request may be made to World Bank to allocate an extra day or session for showcasing SAFOAM activities in the next South Asia Hydromet Forum (SAHF) programme.

As far as the **Funding** is concerned, following proposed activities and Committee Members were presented.

- ➢ For SAFOAM to make a meaningful knowledge platform in sustainable nature, some resources in terms of funding should be pursued and arranged collectively.
- ➢ SAFOAM should seek resources for research, development and capacity building for member countries.
- ➢ Though SAFOAM is not profit organisation, some projects with some financial assistance may be taken.
- ➢ International donors like DATATRUST, UNDP, FAO, USAID, WB, Norwegn Embassy, Swiss Development Corporation, should be explored.
- ➢ Generation of fund through registration fee from the members of the SAFOAM.

As far as the **Monitoring** is concerned, following proposed activities and Committee Members were presented.

- ✓ As a knowledge platform, explore sharing of mechanism for monitoring of agrometeorological parameters, crop-weather relationship, pest-disease-weather relationship, development of tools and products which relate to agrometeorological data, weather forecast and other specific agromet deliverables.
- ✓ Besides conventional monitoring, monitoring of drought, flood and other extreme events including soil moisture, crop conditions should be considered.
- ✓ Monitoring of crop condition(soil moisture stress & pest & disease attack) using satellite observations.

As far as the preparation of **Web Portal for SAFOAM** is concerned, following proposed activities and Committee Members were presented.

- Preparation of proposal with prototype website/webpage for SAFOAM website considering all aspects of architectural design of the website and aspects related to sustenance, finance, administration design, development & sustainability.
- Display the new products & information, like composite NDVI, VCI maps which are not found any of the website in the world.
- Website should give the access to all the open-source data and already the information available in public domain by different countries.
- Appoint dedicated team to design and development of the website, generation of products, regular updating and maintenance of the website.
- And concurrently donor agencies (UNDP, USAID, WMO, WORLD Bank etc) may be approached for supporting and sustaining the efforts/activities in this regard.

As far as the **ICT Applications** is concerned, following proposed activities and Committee Members were presented.

- Initiatives to be taken up for enabling required ICT to the various Member countries in South Asia.
- Use of such technology should help to access, analyse the data and various information for taking decisions in formulation of agromet advisories for the farmers.
- It is essential to access, analyse, comprehend and take decisions on the service providers in different NMHSs in this region using ICT.
- ICT in Amazon and Bhuban initiatives of Indian Space Research Organisation (ISRO) should be explored.

As far as the **Publication, Awareness Programme & Institution of Award** is concerned, following proposed activities and Committee Members were presented.

- SAFOAM can arrange publish e-newsletters periodically reporting its activities and special news related to Agricultural Meteorology of the member countries so that meaningful development & activities would reach to the large number of persons.
- . Arrange to publish suitable statements, press releases, posters, pamphlets, books, periodicals, brochures, etc. on topics relevant to the objectives of the Forum.
- The proceedings of Annual General Body Meetings and the papers presented at such meetings shall be published at the discretion of the council in such form as the council may decide.
- Organize e-conferences, webinars, celebrate special days such, the WMO day, Ozone day, World Environment day, etc. together with the member countries for creating awareness among the people.
- Create awareness and appreciation for science of Agricultural Meteorology and allied sciences, among all sections of the society.
- Award Fellowships and awards to deserving persons for making significant contributions to the aims and objectives of the forum.
- Instituting awards for best MSc/ PhD thesis for promoting education and best research paper awards for promoting research,

- Awards to encourage young generation for recognition of their outstanding contributions made in the field of Agricultural Meteorology and inspiring young researchers/ scientists of the member countries. Awards will also be there for Institutional encouragement.

Dr. Ramakrishna said that a clear picture has been emerged for the implementation strategies of the SAFOAM after the presentation of Dr. Chattopadhyay. According to him, we should try to contribute to make SAFOAM at operational stage at the earliest. Now he said that the session was opened for discussion.

Dr. Sivakumar proposed that he would try to publish selected r papers on South Asia in the journals ???. Publication of newsletters and distribution of flyers etc to the government agencies and other would definitely creat interest on the operational agromet advisoryservices in South Asia.

Prof. Mohanty discussed elaborately on capacity building programme including education in South Asian Region (SAR) and said that these programme should be organised meticulously looking at the recipient end. He said different country specific capsule courses might be prepared a series of lecture by the experts could be arranged. Besides, he said that the subject of agrometeorology should be included in the Environmental Science as at present only Botany is included at present. According to him, as climate change, water use, adaptation, agrometeorology would lead to the the better management of agriculture and in turn increased and sustainable food production in South Asia, more stress should be provided in education programme. He also suggested to include the subjects like selection of seed and post harvest technology in the education programme. He added that under the

present circumstances, series of webinar for school to higher level by theexpert should be arranged. He advised that registration money from the members should be collected in local currency by the local chapters in the member **countries.**

Dr. Mahasweta Bhowmick, Technical Officer, Gramin Krishi Mausam Sewa. Kalyani Agro-met Field Unit, Bidhan Chandra Krishi Vishwavidyalaya. West Bengal, India suggested to organise local languages involving famer for local need arrnge that would be useful. Dr. Ramakrishna said this is apt suggestion and also incorporated.

Prof. Varshneya touched a number of important initiatives. According to him, as far as the capacity building is concerned, need for each country should be assessed and initially some elementary programme might be initiated. He said that number of training manual, capsule course at different levels are available in India, Bangladesh and other, the same could be shared with the other countries as per their need. He also mentioned on the improvement of the data collection in all the countries in South Asia.

Prof. Shekh suggested number of innovative activities like control experiment, artificial intelligenge, machine languages including the subject of animal husbandry, fishery etc. **Dr. Ramakrishna** appreciated the ideas of Dr. Shekh but said that we are at initial stage now and surely implement the same at the other phase of the forum.

Dr. Bal suggested for the active initiatives by the committees of the Regional & Global Cooperation & Funding at the initial stage. Based the success of these committees, other committees might plan their activities. He also suggested for inclusion of more members in each committee of the forum

Dr. Ramakrishna advised **Dr. Bal** to prepare the questionnaire along with suitable notes to the member countries and share with the other committees to plan their activities judiciously. He opined that all the activities should proceed simultaneously for implementation of the activities so far mentioned at the earliest.

Dr. Ramana Rao said that there was a need to sensitise the people in the beginning and to creat interest for the subject of agrometeorology and its importance in the present & future especially under climate change scenario. He also suggested to prepare needful and attractive capsule courses for the agricultural scientists for special aptitude for agrometeorology**.**

Dr. Jadhav that more stress might be given to the capacity building for the rural farmers especially woman farmer related to climate change.

Dr Raihana Habib Kanth, Chief scientist FoA SKUAST Kashmir said that she would provide full support to the works identified for her and also suggested to include climate change relation with crop yield for farming among the other areas of activities of the forum.

Dr. Md. Shah Kamal Khan, Project Director, Agro-Meteorological Information Systems Development Project, Bangladesh said that he said that he was very happy to be part of the forum. He also said that more attention might be paid for the sustainability of the forum as there were number of committees which would work on the number of activities pertaining to the South Asian Region. He also wanted to know how the internal experts would help the forum being member as the forum was meant for South Asian Region. He also suggested to include committee for dissemination and extension.

Dr. Ramakrshna said that all the activities mentioned here covered the short-, medium- and long-term plan judiciously. Dr. Chattopadhyay agreed with Dr. Kamal and said that legality of the formation of the forum would be taken care off and participation of international experts was discussed at length in the earlier meeting and agreed they would be the life member of the forum

Dr. R.N. Sable, Former Head, Agrometeorology Division, Pune Krihi Viswavidyalaya, India shared his rich past experience and his involvement on providing the services in the state of Maharashtra in India. He elaborated different training programme provided for the manpower development for the services on agrometeorology and the use of different social media in dissemination of information and education puroses. Dr. Ramakrisna appreciated the work especially the training programme and requested Dr. Sable to share the training material to the member countries as these would be highly beneficial to them. Even he might provide the link to access the such information.

Dr. Raji Reddy, former Director of Research, Professor Jayashankar Telangana State Agricultural University (PJTSAU), Rajendranagar, Hyderabad, Telangana, India said that a status paper might be prepared based on today's presentation followed by discussion. According to him, there is need to priorities the activities so far planned. He opined that basic subjects on agrometeorology should be included along with the subjects of country specific under the edicational programme. He also discussed on the problem of dissemination of agromet advisories and possible solutions involving ectension agencies and other. He also emphasised for preparation of training module and inclusion of models under research domain.

Dr. Rengalakshmi M.S.Swaminathan Foundation, Chennai, Tamil Nadu, Indiaappreciated the comprehensive programme so far developed for SAFOAM' s future activities. She highlighted three important issues like capacity building programme from policy makers to farmers, regional cooperation and highlight the gap areas in the existing programme and its possible solutions through newsletter and other publication on regular basis.

Dr.Nachiketa Acharya,Assistant Research Professor, Center for Earth System Modeling, Analysis, and Data (ESMAD), Department of Meteorology and Atmospheric Science, Pennsylvania State University, USA said that SAFOAM should have international visibility especially to World

Meteorological Organisation. He added that South Asian Seasonal Climate Outlook Forum (SASCOF) for northeast monsoon would be held in September 2021 and SAFOAM's presence and activities in South Asia Region should be presented for wider publicity and attraction to the international community and international organisation as well.

After the formation of Advisory Board & different committees, Dr. Chattopadhyay presented the draft Executive Council and the duties of the power of the President, Vice-Presidents, Secretary, Joint Secretary, Treasurer, members of Executive Council, Council Members, National Representatives, Country Chapters, Members of the Forum, fee structure for members, funding & opening of Bank Account, location of Head Quarter, official Email and group email of SAFOAM & Twitter handle, facebook account, and YouTube channel , Whats Apps, linkdin of SAFOAM for live streaming its programmes ,logo of SAFOAM & Plan for 2021

Duties and power of the President and Vice President

a) To preside at all meetings of the Forum and of the Council, and to regulate the Proceedings at such meetings
b) To ensure that due effect is given to the Statutes and Regulations in force.
c) To decide on the interpretation of any Rules, in the case of doubt as to the interpretation of any of the Rules, the President's interpretation shall hold until the next meeting of the Council, when the interpretation of the Rule should be discussed and finally determined. The matter could be referred to the General Body, if the Council so feels.
d) In matters calling for urgent action, the President may adopt such measure as in his discretion the circumstances demand and report his action subsequently to the Council.
e) In the absence of the President, meetings of the Forum may be presided over by a Vice-President.
f) In the case of a longer continued absence of the President, the Executive Council may designate one of the Vice-Presidents to perform the functions of the President.

Duties and powers of the Secretary

a) To Conduct the correspondence of the Forum and of the Council, and to sign all letters and papers emanating from the Forum.
b) To attend the meetings of the Forum and of the Council. To take minutes of the proceedings of such meetings during their progress; and at the commencement of every such meeting, to read aloud the minutes of the previous meeting.
c) Organise lectures, exhibitions, meetings, symposia, workshops, conferences, and discussions on any topic or theme related to science of Agricultural Meteorology and related disciplines.

d) At the general meetings, to announce the presents made to the Forum since their last meeting; to read the names of members, the original papers communicated, and the letters addressed to the Forum required to be so read out.

e) To prepare for submission to the Annual General Meeting a list of members corrected to the close of the previous year.

f) To enter or cause to be entered, in the Minute books, all the proceedings of the Forum and of the Council before the following meetings, and to see that all letters and papers and documents of every kind connected with the business of the Forum are properly filed and preserved.

g) To exercise general supervision and affairs of the Forum, and to assist in carrying out the Regulations and Orders made by the Council.

h) To incur contingent expenditure as may be necessary for carrying out the functions of the Forum as defined by Council from time to time.

Duties & powers of the Joint Secretary

a) In the absence of the Secretary, the Joint Secretary will perform the duties of the Secretary with prior authorisation from the Secretary or President.

b) He/She would assist the Secretary in discharging his/her duties and such other duties as assigned by the Secretary from time to time.

Duties and powers of Treasurer

- The Treasurer shall be responsible for handling the funds of the Forum and also the property vested in the name of the Forum.
- He shall be responsible for the maintenance of accounts, appointing auditor and get accounts audited of the Forum and shall present the audited statement of accounts for the year at the Annual General Meeting.
- He shall also furnish the Council, information regarding the financial position of the Forum when called upon to do so by the Council.

Other Functions of Council

- The Council shall hold office for two years, and it will be incumbent on the Council to complete the election process well before its term expires.
- Secretary shall be from the Headquarter of the Forum. The treasurer can be from each participating country where chapter is formed.
- The Council will arrange to set up its office and may arrange for the following:

i. construct, build, lease, hire or rent any premises, land, building, service or any facility to house the offices and other activities of the forum.

ii. purchase, hire or lease or dispose of any equipment for the forum.

iii. recruit, hire or employ any person or persons or agency for the work of the forum when required and to terminate their services when no longer required.

National Members

Functions

- National Members are representatives of SAR countries and shall be responsible to attend all the meetings of the Executive Council and General Body.
- They shall contribute to the activities as assigned by the Executive Council and carry forward the objectives of SAFOAM, including enhancing membership from their respective countries.

List National Members/Zonal representatives (9) (one member from each SA countries).

Dr. Santunu Kumar Bal
India

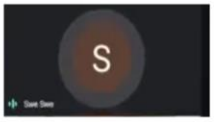
Dr Md. Shameem Hassan Bhuiyan
Bangladesh

Dr. Indira Kadel
Nepal

Mr. TsheringWangchen
Bhutan

Mr. Abdul Muhsin Ramiz
Maldives

Anusha Warnasooriya
Sri Lanka



Ms. Han Swe
Myanmar

Dr. Muhammad Hanif
Pakistan

Mr. Waheedullah Yousfi
Afghanistan

Country Chapter

- SAFOAM will have financially autonomous country chapters to manage finances for activities in their respective countries. The council of the country chapter will have elected members, chairman, secretary, treasurer and committee members.
- The Council may at its discretion or on receipt of a request in writing to create a branch of the Forum for furtherance of the objectives of the Forum. Such a branch shall be called a Chapter of the Forum. There can be more than one chapter from the same country.
- Each Chapter shall be constituted and its affairs carried on in accordance with rules and regulations to be laid down from time to time by the Council.
- Each Chapter shall have a Chairman, Secretary and Treasurer. If the strength of Chapter's member is 50, a Joint secretary and Two members may be taken and if the strength of the chapter is 100 then a Co-Chairman and Two additional members may be taken as office bearers. This will constitute the Chapter Management Committee.

- The two year term of the Chapter Management Committee shall be concurrent to that of the Council.

Members of the Forum

a) Founding Member
b) Life Member
c) Student Member
d) Institutional Member
e) Stakeholder Member
f) Patron
g) Honorary Fellow

Details is given in Constitution (Communicated)

Fee structure for members

- ❖ The Forum is professional non-profit organization for promotion of Agriculture Meteorology and allied sciences and their application for wellbeing of the public and sustainable development.
- ❖ The Council may recommend a fee structure and it will be authorized by the General Body of the Association. The Council may provide different rates for different membership classes, based on the cost-of living in represented countries.
- ❖ Efforts will be continued to increase the membership of SAFOAM. The membership fees for life member, associate member, and student member will be kept affordable to enable more members to join the association.

REGULATION: FUNDS

- The funds of the Forum shall consist of
    a) Subscriptions
    b) Donations
    c) Grants from Government or other interested parties
    d) Sale of journal and other literature published by the Forum
    e) Advertisements in the Publications of the Forum
    f) Registration fees collected from delegates of seminar organized by the Forum
    g) Proceeds from exhibits of industries/ business enterprise/ institution (Govt. and Private as well) in seminar/ symposia organized by Forum chapter
- As transfer of funds from one country to another will be difficult, SAFOAM may have financially autonomous country chapters to manage finances for activities in their respective countries.

- There may be bank accounts as decided by GB from time to time.
- Orders and payments up to an amount which shall be decided by the council from time to time shall be valid on the signatures of the General Secretary and Treasurer of SAFOAM.

Location of Head Quarter, Secretariate & Registration of SAFOAM as an international society

The Headquarter needs to be established based on the country's rules and regulations of opening international bank account, FCRA, Income Tax return, etc.

At present the location of SAFOAM Secretariat may work virtual either in Kolkata or Jaipur, India. The Secretariat of the Association will be operating through online mechanisms.

In due course of time General Body may decide about the physical location and organizational structure of the Secretariat.

SAFOAM should be registered as International Society.

Logo of SAFOAM

Official Email and group email of SAFOAM

Official Email: Created

USER ID:safoam2021@gmail.com

Group E-mail: Created

safoam2021@googlegroups.com

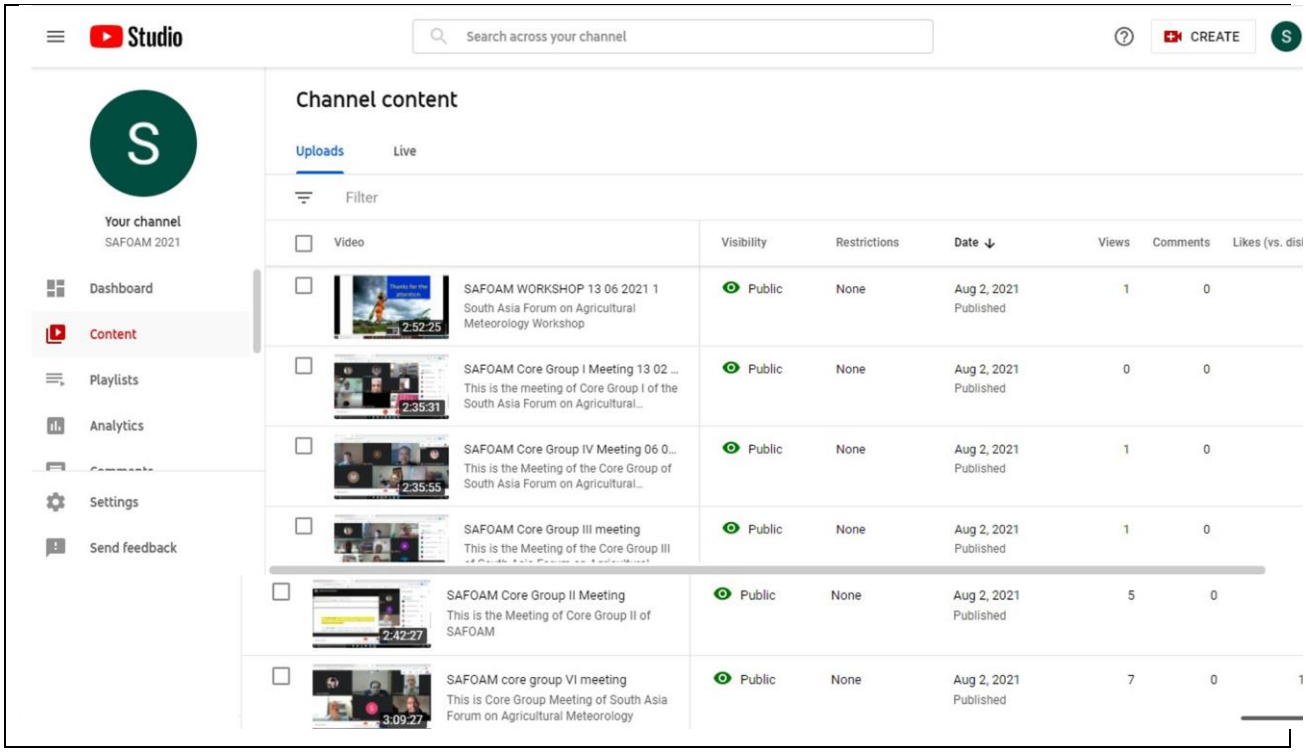
Facebook: Created

Facebook
SAFOAM

Twitter: Created

userid: SAFOAM2021

Ytube Channel: Created



Whats App Group: Will be created shortly

LinkedIn: Will be created shortly

To start with, it is proposed that the agreed Executive Committees may start work in a provisional manner. The activities as per plan 2021 need to start without waiting for organogram, registration, etc. Once the activities start and things get matured, the Executive Committee may be constituted as per the laid down procedures mentioned in the Constitution. Some of the salient work schedule under different committees have been mentioned. It is proposed that individual committee may organise meeting and finalise the work plan under immediate (short), medium and long term basis.Individual committee should take the concurrences from the Advisory Committee and others to finalise the work plan.

Plan for 2021

- Finalisation of the constitution and registration of the SAFOAM.
- Creation of google group to share ideas, views, and information exchange among the members.
- Logo of SAFOAM approved by the Members.
- Hosting of the Web Portal of SAFOAM.
- Formulation of Funding Mechanism. Submission and arrangement for funding to take up a few activities as outlined earlier.
- Take up 2-3 activities under short term period on capacity building, education, research, monitoring, publication etc.
- A series of Webinars and one E-conference, lectures on topic of regional importance to be organized. All the activities should take place mostly in Cyberspace to minimize financial aspect.
- Focus on regional cooperation and collaboration like SAARC, SASCOF programs etc.
- Some collaborative work with RIMES and others.
- To work closely with newly formed SAMA & South Asia Hydro-Met Forum.
- It was suggested that the group meetings under different categories may be conducted initially on monthly basis and later it could be quarterly.
- Publish quarterly e-Newsletter.

Open for questin

Huda; talked about funding and initiatve to arrange funding. Here he requested sivakuma as he had ling experience . also discuss about the initiatve ob liiy rgion for climate smart agriculture, livelihood improvement.

Dr S D Attri, Additional Director-General, India Meteorological Department Great shape
Funding
Start programme

Dr. Sameera Qayoom ,Associate Professor, Nodal Officer ICAR (Edu.), SKUAST Kashmir appreciated all the proactive initiatives of SAFOAM. She suggested for creation of whats app group of SAFOAM for regular interaction and updating of information and activities among the members of SAFOAM and inclusion of crop & health subject in the proposed activities and presence of somebody from hill region in the Education Committee.

Dr.Md Abdul Muyeed, National Sectoral Expert- Agriculture, World Bank CARE For South Asia Project, RIMES-Bangladesh, Former DG, DAE, Ministry of Agriculture said that all the committee and the related action points were prepared judiciously. He said that SAFOAM would get matured step by step.

Dr. Sivakumar said that headquarter of SAFOAM in Kolkata at present was an appropriate suggestion and he agreed to that. He said that there should be definite plans for next twelve months and strictly follow the activities month by month so that appropriate information would reach to the farming community.

Latif and **Veena,** Technical Officer/Assistant Professor, Agtromet Section, SKUAST-Jammu, Jammu, J&K s gave useful comments and suggestion

Dr. AVM Subba Rao, Principal Scientist, ICAR - Central Research Institute for Dryland Agriculture (CRIDA), Hyderabad, India wanted to know the possible linkages and cooperation between SAFOAM and Association of Agrometeorologists in India & ACRIPAM. Dr. **Dr.Chattopadhyay** said the dialogue in this respected has been discussed between the Association & SAFOAM. However, more detail discussion would be made in future. Similar strategies would also taken with ACRIPAM also.

Dr. Ramana Rao justified the location of the Headquarter of SAFOAM at present in Kolkata. He requested all the members generaously contribute to SAFOAM not inputs also for finance

Dr. GGSN Rao, Former Project Coordinator (Agrometeorology) I/c, ICAR - Central Research Institute for Dryland Agriculture (CRIDA), Hyderabad, India wanted to know the structure for membership fee and the currency to be used in this regard. Dr. Ramakrishna replied that some intial discussion was made earlier and more would be done in future.

Dr. Brunini said that all the programmes outlined so far under SAFOAM were quite impressive and he assured that he would fully support the monitoring programme of the forum. He appreciated the capacity building programme of the forum.

Prof. Parminder Kaur Baweja, Directorate of Extension Education, Dr Y S Parmar University of Horticulture & Forestry Nauni Solan, Himachal Pradesh explained nicely the impact of climate change especially increased temperature on the pronounced forest fires in South Asia. She the future projection in increase in temperature would have significant bearing on the biodiversity, deforestation and forest fire. He appreciated the inclusion of this subject in SAFOAM's activities. She also presented her work on different forest fire models in India.

Prof. Ajit Tyagi, Air Vice Marshal (Retd) , Former Director General of Meteorology, India Meteorological Department said that South Asian Meteorological Association would provide all supports to SAFOAM in regional activities in South Asia. He added that both SAMA & SAFOAM could jointly orhanise different activities like outreach programme, webinar on climate change etc. He advised that SAFOAM should plan some realistic activities during next one year including short term need based capsule courses. He said that there lied great future for SAFOAM as eminent agrometeorologists in SAR would greatly contribute

Dr. Mahanty suggested to include at least one member from SAMA in the Council of SAFOAM as ?????. Dr. Ramakrishna said that the point was well taken.

At this stage of the meeting, all the proposals as per the agenda of the meeting were approved by the General body meeting and it was recorded

Dr. Ramakrishna said that the power point presentation of today's meeting would be communicated to all the members shorty and also requested to send their further suggestions/views on the agenda points presented in the meeting.

In the concluding remarks, **Prof Varshneya** appreciated the way the meeting was conducted . He mentioned that useful discussion and suggestions were made to refine the implementation strategies of SAFOAM. He appreciated the support by Dr. Sivakumar and other members for the meaningful growth of SAFOAM. He talked about the constrains in money transfer from one country to other and also suggested for collection of registration fee by the individual chapers in different countries in South Asia. According to him, climate change is visible now and it would dominate in future; it is the right time to form SAFOAM to address the climate change issues in South Asia. He also shared his rich experience on agrometeorological services and also his interactions with the farmers.Besides, he talked about technology transfer, social media for dissemination of informationmore about capacity building, education programme. He strongly believed that SAFOAM would be stonger day by day with the participation of agrometeorologists and agricultural scientists from different sectors of agriculture in South Asia. He wished for the great success of SAFOAM

The meeting was ended with vote of thanks by Dr. Mazharul Aziz.

Annexure II

INVITATION

You are cordially invited to the General Body Meeting

of

South Asian Forum on Agriculture Meteorology (SAFOAM)

Programme

Welcome Address by Prof. A.M. Shekh, Former Vice-Chancellor, Anand Agricultural University, Gujarat, India.

Introduction of the following the Agenda of the Meeting" by Dr. Nabansu Chattopadhyay

(Moderation by Dr. Dr.Y.S.Ramakrishna)

Agenda 1: Members of different Committees (Advisory Board, Capacity Building, Education, Research, Regional & Global Cooperation, Funding, Monitoring, Web Portal, ICT Application, Publication, Awareness Programme & Institution of Award)

Agenda 2: Executive Council Members & Council Members

Agenda 3: National Members/Zonal representatives

Agenda 4: Country Chapter

Agenda 5: Members of the Forum

Agenda 6: Fee structure for members

Agenda 7: Funding & Opening of Bank Account

Agenda 8: Location of Head Quarter, Secretariate & Registration of SAFOAM as an international society

Agenda 9: Official Email and group email of SAFOAM & Twitter handle, Facebook account, and YouTube channel of SAFOAM for live streaming its programmes

Agenda10: Logo of SAFOAM

Agenda 11: Plan for 2021

Agenda 12: Any other Points

Concluding Remarks by Prof Dr. M. C. Varshneya

Former Vice-Chancellor, Anand Agricultural University

Gujarat

Vote of Thanks by Dr. Mazharul Aziz, Chief Instructor, DAE, Bangladesh

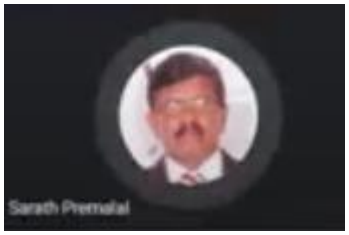
Date: 8th August, 2021 (Sunday) : Time:16.00 IST (4 P.M)

Annexure III

List of the Participants

International		
Switzerland  **Dr Mannava Sivakumar** Founding Editor-in-Chief, Weather and Climate Extremes (Elsevier) Senior Consultant, WMO mannavas@gmail.com	**Brazil**  **Dr. Orivaldo Brunini** Director, Agricultural Research Support Foundation, Brazil Former Professor of Agrometeorology, Faculdade Luiz Meneghel, And Former Senior Researcher on Agrometeorology Agronomic Institute-IAC, Brazil diretoria.presidencia@fundag.br	**USA**  **Mr. Abhijit Basu** Founder and CEO Smartex Cognitive, XCED, APAC CEdMA, California, USA abasu@smartex.me
USA  **Dr. Nachiketa Acharya** Assistant Research Professor, Center for Earth System Modeling, Analysis, and Data (ESMAD), Department of Meteorology and Atmospheric Science Pennsylvania State University University Park, PA 16802	**Australia**  **Dr.A.K.S. Huda** School of Science, Western Sydney University, Australia S.Huda@westernsydney.edu.au	**Bangladesh**  **Dr. Abdul Muyeed** Consultant, CIMEET & Former Director General, Department of Agricultural Extension, Bangladesh muyeedbd61@gmail.com
Bangladesh  **Dr. Mazharul Aziz** Chief Instructor Agriculture Training Institute	**Bangladesh**  **Dr. Md. Shah Kamal Khan** Project Director Agro-Meteorological Information Systems Development Project	**Bangladesh**  **Md. Mizanur Rahman** Senior National Consultant Agro-Meteorological Information Systems Development Project

Department of Agricultural Extension (DAE), Sher-E-Bangla Nagor, Dhaka-1207, *Former Project Director, Component-C of BWCSRP of The World Bank azizdae@gmail.com	Component-C of Bangladesh Weather and Climate Services Regional Project, Department of Agricultural Extension (DAE), Khamarbari, Farmgate, Dhaka, Bangladesh kamalmoa@gmail.com	Component-C of Bangladesh Weather and Climate Services Regional Project, Department of Agricultural Extension (DAE), Khamarbari, Farmgate, Dhaka, Bangladesh mrahman648@gmail.com

Srilanka  **Mr. KHMS Premalal,** Former Director General of Meteorology, Sri Lanka spremalal@yahoo.com	**Nepal**  **Mr. 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 snpshah@gmail.com,	**Nepal**  **Mr.Manoj Thakur, Former Senior** Scientist & Communication Officer ,National Agricultural Research Council (NARC), Nepal Thakur27819@gmail.com

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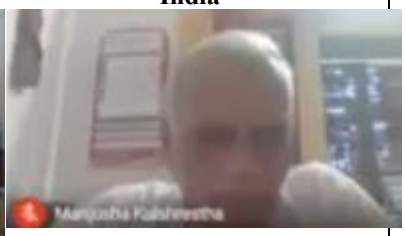
India  **Dr. GGSN Rao** Former Project Coordinator (Agrometeorology) I/c	**India**  **Prof Dr M C Varshneya** Former Vice-Chancellor Anand Agricultural University Gujarat mcvarshneya@gmail.com	**India**  **Prof. A.M.Sheikh** Former Vice-Chancellor Anand Agricultural University Gujarat amshekh15@yahoo.co.in

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India  **Dr S D ATTRI** Addl Director-General Head (Urban Meteorology & Climate) Head (Information System & Knowledge Resource Development Division) & Executive Editor, Mausam Head (Legal) and Vigilance Officer Member,Expert Team, Commission for Agril. Meteorology, World Meteorological Organisation, UN Lodi Road, New Delhi sdattri@gmail.com	**India**  **Dr. Vyas Pandey** Emeritus Scientist (ICAR) President, Association of Agrometeorologists Former Professor and Head, Department of Agricultural Meteorology Anand Agricultural University Anand 388 110, Gujarat, India Dr. Vyas Pandey: "Dr. Vyas Pandey" <pandey04@yahoo.com>,	**India**  **Dr.AVM Subba Rao** Principal Scientist ICAR - Central Research Institute for Dryland Agriculture (CRIDA) Santoshnagar, Hyderabad, India
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India  **Dr. Latif Ahmed** SKUAST Kashmir	**India**  **Dr Raihana Habib Kanth** Chief scientist FoA SKUAST Kashmir raihanahabib@gmail.com,	**Dr. Sameera Qayoom,**  Associate Professor, Nodal Officer ICAR (Edu.)

		Dr. Sameera Qayoom: sameera qayoom <sameera.qayoom@gmail.com>,
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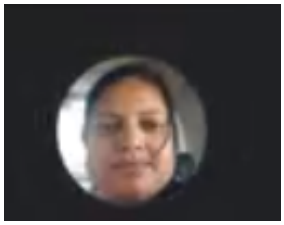
 **Dr. GSLHV Prasada Rao** Founder, Academy of Climate Change Education and Research, Kerala Agricultural University, Vellanikkara, Thrissur, Kerala, India International Agrometeorologist in PCM , Nepal gslhvprao@gmail.com,	 **Dr. R.N.Sable,** Former Head Agrometeorology Division Pune Krihi Viswavidyalaya drrnsabale@gmail.com,	,  **Shri A K Bhargava** Former Assistant Meteorologist India Meteorological Department, New Delhi bhargava1953@gmail.com
India  **Ms. Malathi Seetamraju** Agricultural Meteorology Division India Meteorological Department Pune malathi.imd@gmail.com,	**India**  **Ms, Swati Chandras** Agricultural Meteorology Division India Meteorological Department Pune swati_imd@yahoo.com,	**Nepal** Amit Prasad Timilsina, Ph.D. Scientist (Agronomy) Specialization: Agronomy; Climate Assessment and Impact National Agricultural Environment Research Center, NARC Khumaltar, Lalitpur, Nepal
India	India	**India**

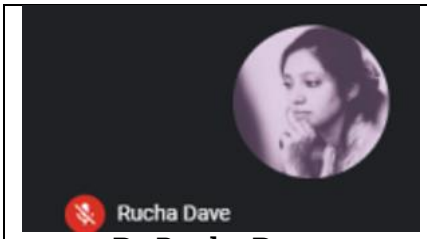
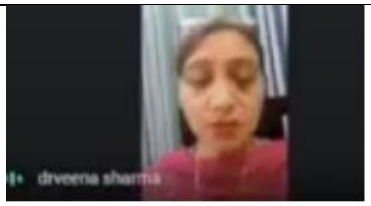
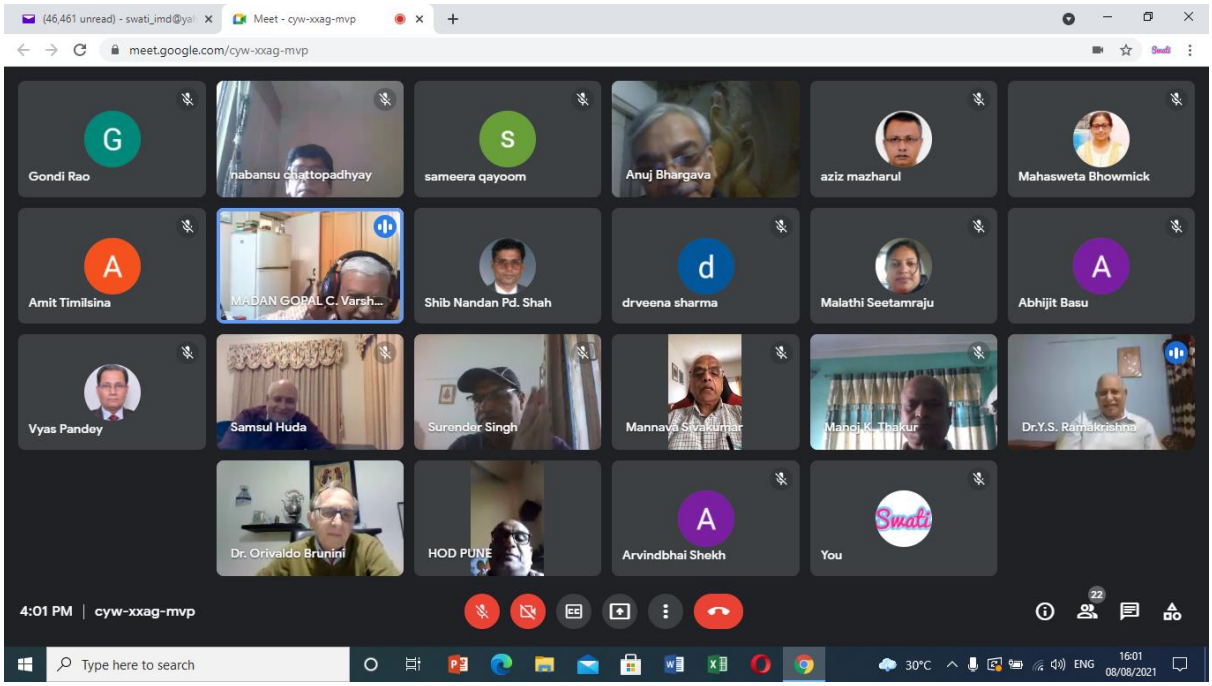
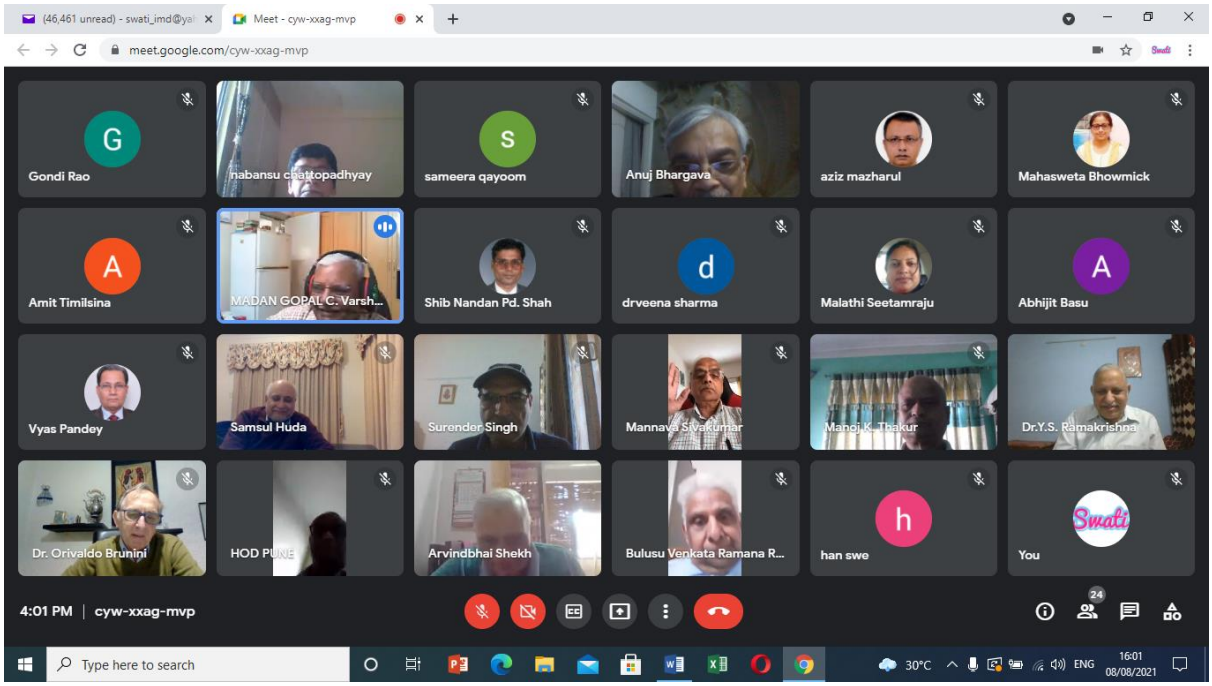
 **Dr.Rucha Dave**, Anand Agri, Univ, Gujarat	 Dr. G. Sreenivas, Principal Scientist (Agro) &Head, Agro Climate Research Centre (ACRC), Agricultural Research Institute (ARI), Professor Jayashankar Telangana State Agricultural University (PJTSAU), Rajendranagar, Hyderabad-30 Telangana, India	 Dr Veena Sharma Technical Officer/Assistant Professor Agtromet Section SKUAST-Jammu Jammu, J&K **page**

Photo Gallery

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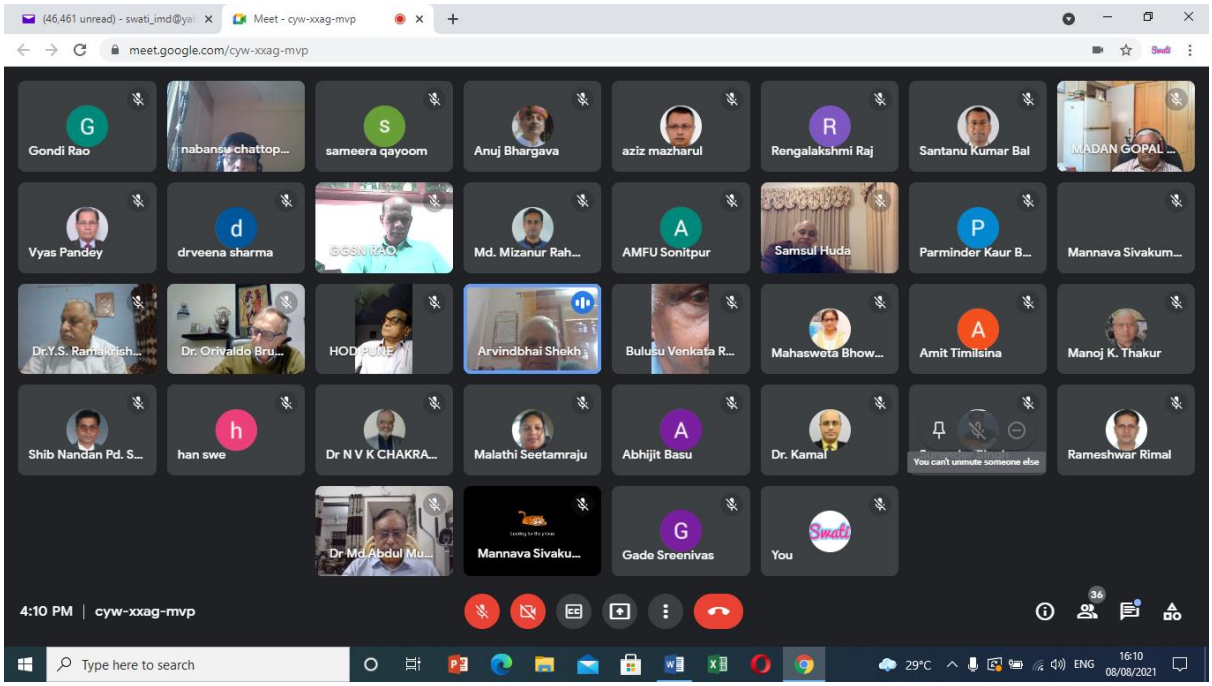
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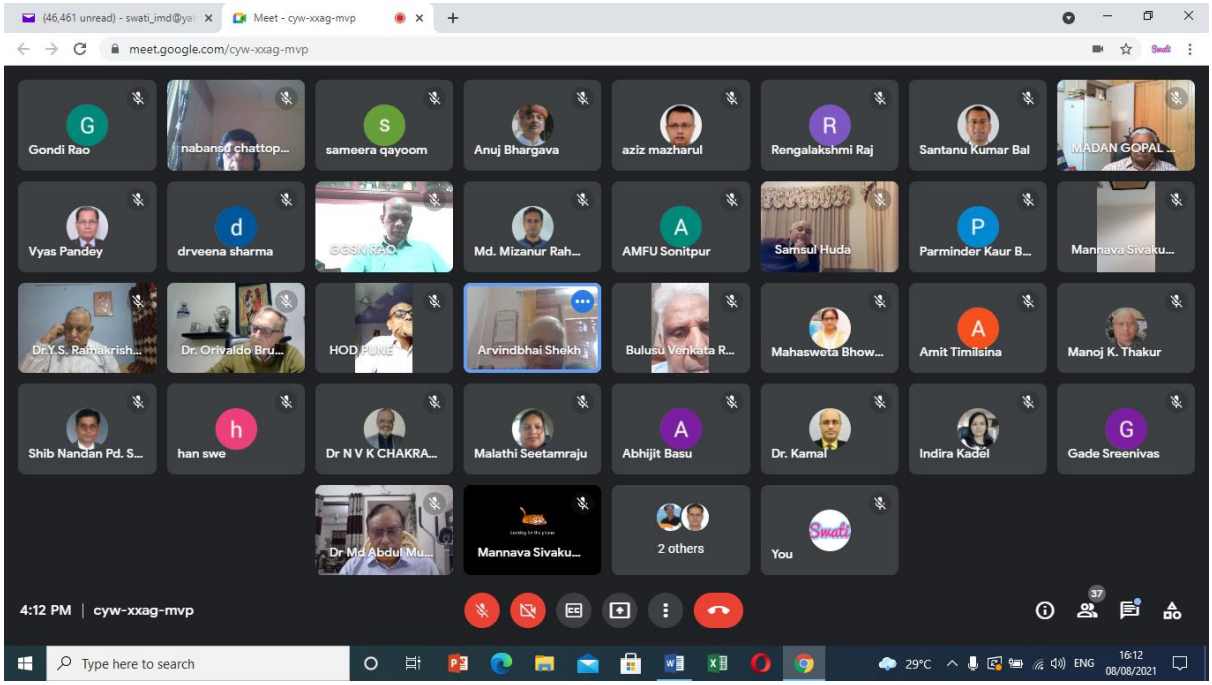
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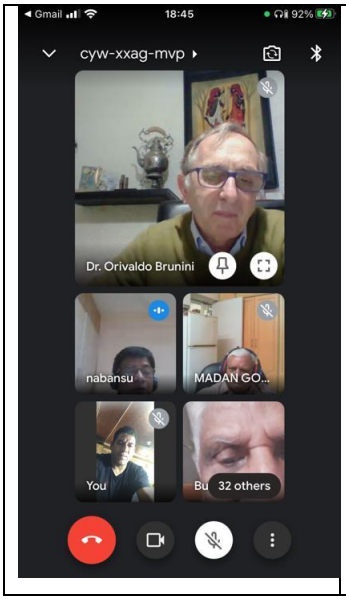
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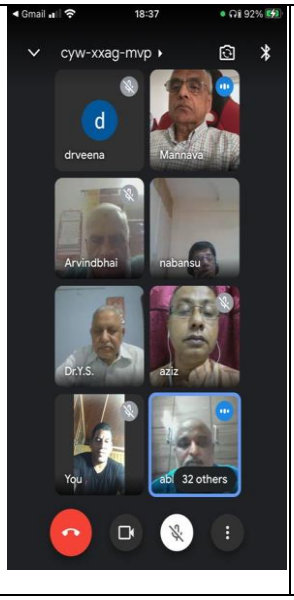
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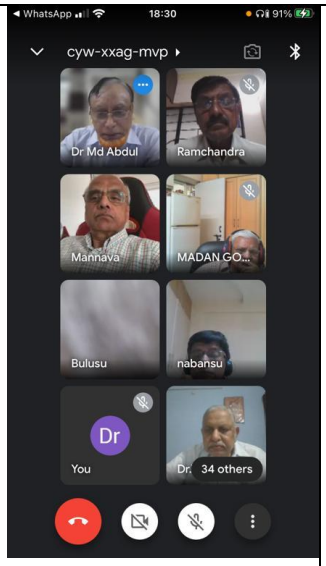
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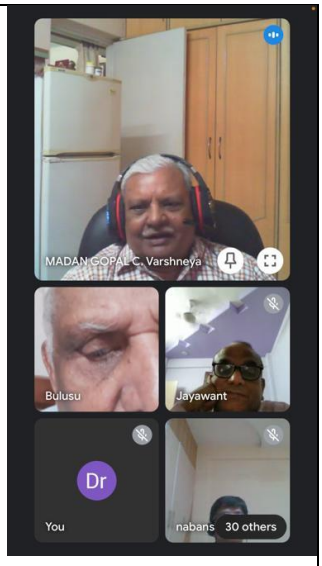
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Proceedings
Workshop
on
Steering the Activities of South Asia Forum on Agricultural

Agromet Station in Afghanistan

Cyclone Warning in Sri Lanka

Manned Class A Station in Bhutan

Roving Seminar in Nepal

Training Programme on AAS in Bangladesh

Feedback under AAS System in India

Maldives Meteorological Services

Agrometeorology in Pakistan

Myanmar Meteorological Department

Date: 13th June 2021

Time: 1600 Hrs IST to 1900 Hrs IST

Venue: Virtual Platform (The Google meet)

The workshop was started by welcoming all the participants from the member countries in South Asia including the international experts from USA, Brazil, Switzerland and Australia and distinguished personalities from number of international organisations like Regional Integrated Multi-hazard Early Warning System (RIMES), International Water management Institute (IWMI) in the "Workshop on Steering the Activities of South Asia Forum on Agricultural Meteorology (SAFOAM)". 72 participants attended the meeting (list of the participants is available in Annexure III).

It has been informed that in depth discussion among the members of the forum was made by organising different Core Group meetings. Subjects of discussion in these meeting covered from present status of agromet advisory services, gap area, requirements, challenges, constitution, use of satellite information, web portal, services in hilly areas and ICT, agromet success and innovation sustenance in South Asia. Besides, a number of useful recommendations were made to steer the activities in reality in South Asia Region. Afterwards need was felt to organise workshop inviting all the members, international experts and funding agencies where further deliberation and refinement of various ideas and finally the preparation of the roadmap of SAFOAM as well as implementation strategies would be made in a holistic manner.

In view of that the workshop was organised on .13th June,2021. There were two sessions (Programme Details is available in Annexure II) in the workshop. In the first session, Group leaders of the different Core Groups were requested to deliver a brief presentation mentioning the salient points of discussion made in the respective Core Group meetings along with the recommendation for getting suggestions from the broader group meeting in the workshop. In the second session, panel discussion for preparation of road map and ultimately the implementation strategies were made.

Dr. M.V.K. Sivakumar, Former Chief, Agricultural Meteorological Division, World Meteorological Organisation (WMO), Founding Editor-in-Chief, Weather and Climate Extremes (Elsevier), Senior Consultant, World Meteorological Organisation (WMO) was requested to conduct the first session as Chairman and Dr. Mazharul Aziz, Former Project Director of Agromet Project in Bangladesh & Chief Instructor, Agriculture Training Institute, Department of Agricultural Extension, Bangladesh to act as Rapporteur.

In his inaugural remarks, Dr. Sivakumar said that he was very happy to see that a number of experts ,working on different fields of agrometeorology, participated in the worksshop and would deliver and share information on different aspects like national agromet advisory services, common strategic mission and vission including adaptation and mitigation of future challenges in agriculture, promote reliable seasonal and sub-seasonal weather/climate forecast, innovative approaches in managagement of weather and climate hazards in agriculture and finally the institutional collaboration in national and regional cooperation.Dr. Sivakumar requested all the Core Group leaders to present briefly on the topics already been assigned to them.

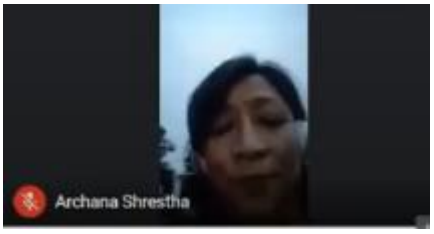
Dr. Santunu Kumar Bal, leader of Core Group I, has showed the present status on the availability of weather forecast at different resolution and its use, observatory network including soil moisture stations, status of preparation of agromet advisory service bulletins at national, district and sub-district levels, availability of experts in translation of weather forecast into advisories and proper use of agromet products including satellite information/products in preparation of agromet advisories, indicators for drought and flood monitoring, dissemination, awareness programme, dedicated web portal, scope for agromet research and agromet course in five countries (Nepal, Bhutan, Bangladesh, Sri Lanka & India) in South Asia. It has been shown that there is disparity in the availability of infrastructure, availability of manpower, execution of work related to preparation of agromet advisory bulletins, agromet research and agromet education. Among others, Dr. Bal recommended for creating knowledge platform to train manpower w.r.t. translation of weather forecast, agromet products and ultimately preparation and dissemination of agromet advisory and management of weather/climate hazards and also stress for promotion of agromet research and agromet education.

Dr. A.M.Sheikh, leader of Core Group II, presented on the proposed constitution of the SAFOAM in terms of administration/constitution/ by laws/ finance etc. According to him, as SAFOAM would be a non-government organization, all the administrative formalities along with rules and regulations have to be formulated. He clearly outlined the objectives of the forum by mentioning for helping towards advancement, dissemination and application of the knowledge of science of agricultural meteorology in South Asia along with encourage and promote research in science of agriculture meteorology and related disciplines. He mentioned categorically the issues like membership and fees, administrative setup, rules and regulations, duties and power of the president, vice president, secretary, treasurer, audit and accounts, amendments. Dr.Shekh informed that the draft write of the proposed constitution of SAFOAM has already been communicated to all the members and he requested to send comments/views based on the draft constitution and as well as the presentation made by him today as the constitution needs to be approved by General Body along with decision of fess for different categories, generation of funds ,formation of executive council &finalization of headquarter.

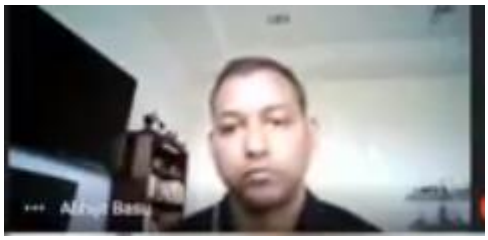
Dr. Bimal Bhattacharya, leader of Core Group III, presented the complete mechanism of use of satellite information/products in South Asia by providing useful directions. He has made very useful recommendations how the different satellite products at various levels with satellite information exchange policy could be initiated as per the requirements of the member countries in South Asia, He has suggested to obtain the requisite information from the member countries to prepare the roadmap of SAFOAM on this subject. He has also mentioned some useful common & skilful satellite-based agromet products/ indicators like crop moisture index (preferably for rice initially), crop specific irrigation advisories, products for crop insurance, surface soil moisture (finer resolution) which could be prepared and useful in South Asia. At the end, he suggested to identify implementable work elements at different levels and to prepare a strategic plan for providing training to the representatives in South Asia for utilising satellite products in agromet advisories.

Dr. Nabansu. Chattopadhyay, leader of Core Group IV, explained the different proposed features and activities to be carried out for the development of proposed web portal of SAFOAM. He mentioned that the novelty of the SAFOAM web portal would be to display the new products & information which are not found any of the website in the world. He said that four areas namely the architectural design, sustainability of the web portal, administration and finance would be considered in the development and operationalisation of the web portal. He also showed the different static and dynamic information to be displayed in the web portal. In addition to that, he informed that different national, regional and international websites would be linked to the web portal of SAFOAM. He also shared the different phases of development of the web portal.

Dr. Archana Shrestha, leader of Core Group V, highlighted three important issues regarding agromet services in hilly areas in South Asia. These are challenges of hilly regions in agromet advisories, potential solutions and need & potential activities of SOFAM. Under challenges of hilly regions in agromet advisories, she mentioned about the diversity in weather and climate particularly large variation of temperature along the slope within a short distance, frequent extreme weather events, landslides etc. Besides, she mentioned about limited access to infrastructure/development process & technology along the difficult terrain and ultimately very limited research on crop/pest/weather relation, agromet products. According to her, increase in weather observations stations, use of information technology/media & research/pilot studies would be the potential solution to address the challenges mentioned above. For hill region, Dr. Archana recommended for development of forewarning models of pest especially



under micro-climatic condition, crop-weather relationship studies and identification of the location specific weather hazards/aberrations/extreme events and prepare contingency crop plan according to the prevailing weather constrains in that locality. She also suggested to include two activities in the roadmap of SAFOAM. These are (i) studies on micro climate-based advisory and micro climatic studies & (ii) full utilisation of remote sensing data/information/ products especially for the unrepresentative area in respect of weather observation for preparation of agromet advisories



There were number of issues mentioned in Mr. Abhijit Basu's, leader of Core Group VI, presentation as envisaged from the title of the presentation "Build capacity in ICT program management, build cadre and mentor for ensuring agromet success continuity and innovation sustenance". He mentioned different facets of ICT especially ICT enablement. He touched different areas of intervention like sub-seasonal forecast, information dissemination challenges. He mentioned two interesting areas of introduction in South Asia. These are dissemination of information through e-radio in local languages and ICT tools use for capacity building programme. Among others, he recommended for identification of the low hanging fruits and ride on kind of transformative process which can be done or happen with the existing data available freely in public domain utilising available knowledge pool, sharing of knowledge especially the best practices in operational agrometeorology with the member countries and national policy might be framed on Public Private Partnership (PPP) mode for greater participation of private sectors in this system.

Dr. Sivakumar thanked all the Core Group Leaders for their constructive and productive presentations. He said that all the presentations might be communicated to the participants and requested all to send their questions and remarks, because of time constraints, so that appropriate response would be sent accordingly. As suggested, all the presentations have already been communicated to all the participants of the workshop. However, once again the presentations are attached herewith.

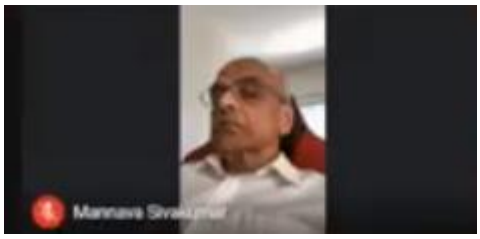
Dr. Chattopadhyay thanked Dr. Sivakumar & Dr. Mazharul Aziz for nicely conducted the session. Now for the next session i.e., panel discussion Dr. Chattopadhyay requested Dr Laxman Singh Rathore, Former Director General of Meteorology, International Consultant, The World Bank to kindly moderate the panel discussion on preparation of roadmaps & implementation strategies for SAFOAM activities.

Dr. L.S.Rathore started moderation by mentioning that the SAFOAM activities were steered up at the three levels. At the first level, concept of roadmap has been initiated and as a result six core groups with relevant themes have been formed. At the second level, six core group meetings were organised where in depth discussion was made on different thematic areas in order to make the foundation of roadmap of SAFOAM. According to him, second level of distillation is marvellous. He said that today, we are at the third level of distillation which is very important as we are going to finalise the roadmap as well implementation strategies of SAFOAM. He said during the discussion on roadmap, special attention might be made on the implementable ability of the different activities of SAFOAM at the proposed regional platform where agrometeorological services would be rendered efficiently. Before asking the panellist to speak, Dr. Rathore has given the gist of the presentation made by the six core group leaders. He said that the basic idea in SAFOAM that we are kind of voluntary agrometeorologists, part of us is working and part of us have retired, which indicate a very good human resource pool with lot of experience & knowledge. He mentioned that SAFOAM is required to create a knowledge platform across South Asia and even beyond the limits of South Asia subsequently. He requested all the panellist to make specific recommendations with respect to both roadmap and implementation.

He mentioned that different core groups have already mentioned different aspects of activities. As knowledge platform, the first approach would be to understand the monitoring of agrometeorological parameters, crop-weather relationship pest-disease-weather relationship, development of tools and products which relate to agrometeorological data, weather forecast and other specific agromet products. Second aspects are related to development of regional policies implementing some idea related to agrometeorology respecting to the sovereign nations and laws of land with framework and we should have clear idea of sphere of work and limitations. Other aspects are indicating inadequacy of data, inadequacy of products and tools, inadequacy of monitoring, inadequacy of availability of manpower &capacities. So, these are underlying aspects and existing gaps which we need to discuss and how we would take our activities in respect of preparation of roadmap and implementation. According to him, as far as dissemination is concerned, fortunately we have strong foothold and awareness is increasing because of skilful forecast and also awareness particularly in respect of climate change. Other aspects education in agricultural meteorology which have established fairly well in India and the same in Bangladesh is emerging. However, this needs further initiative in this arena in other countries and what SAFOAM can play role here. Besides conventional monitoring, monitoring of drought, flood, soil moisture, crop conditions etc. is very critical. Product generation of satellite products and display in web portal, new dimension in Hills, more importantly in building

ICT paradigm have been distilled in earlier level satisfactorily. He said that we would to distil process in third level fairly. He requested panellists to give critical and focus suggestions on what are the activities in immediate future, medium and long term and what should be the implementation strategies. Finance is also important and need to include in the roadmap. Dr. Rathore requested all the participants that constitution of SAFOAM may be looked into and share views on line

As this point, Dr. Rathore requested the panellists to share their, thoughts in respect of proposed roadmap & implementation strategies of SAFOAM.



Dr. M V K Sivakumar said that he could understand from the presentations of core group leaders that there are some countries in South Asia which are very much behind in several aspects on agrometeorology in comparioson to other countries. And as far as roadfmap of SAFOAM is concerned we should see how the advance countries in agromet services can really help the other countries where the same is lacking very much.Thus the former countries should help the latter on promotion in agromet advisory services. As a part of of the implementation strategy is concerned, countries where good progress have made so far, help the countries where progress not up to the mark as the poor farmers in these countries are really need help to come out of the poverty level and improve their livelihood.

Dr.A.K.S. Huda, School of Science, Western Sydney University, Australia said that it is great start & good progress with knowqlege network experience with good intention and hopefully we would be able to go foreward . He was referring the issue of funding. He added that for anything to be done need somere resources which would be required to make SAFOAM more active and sustainable. He was hopeful that collectively we would be able to arrange funding for SAFOAM.

At this point Dr. Rathore said that we need to develop strong bridge with the govt and govr agencies like NMHS and requested Dr. Mrutyunjay Mohapatra to address**.**

Dr. Mrutyunjay Mohapatra, Director General of Meteorology, India Meteorological Department, Permanent Representative of India with WMO said that impressive presentations were made by the different six groups leaders on various aspects of SAFOAM. He said that South Asia region is very different from other regions of world in terms of physiography, capacity,product development, and hence services to the farmers. SAFOAM can have very big role in providing some kind of forum for exchage of knowledge and act as knowledge bank by prividing support and hence integral development in this regiont. Hand holding will the key success point of SAFOAM in this region. He said that capacity for farming

community, forecastersservice proivider and other lot of initiative for exchage of knowledge can be taken up .. In South Asia weather forecast is also developed like other region, but there is need to convert the same in layman language. There are limitations in different countries in tools and technology so as to convery weather forecast According to him,thus key success would be content delivery system which can be triggering and also useful and help farmers by providing impact based information to the farmimg operation in South Asia region. Also mentioned that it is essential to enable required ICT to the varios countries to access, analyse, comprehend and take decions on the service provder in different NMHSs in this region and different service providers able to provde various information and its dissemination. He also stated that key points are capacity building not for agrometeorologist, but for farmers and industries.

Dr. Mazharul Aziz, Chief Instructor, Agriculture Training Institute, Department of Agricultural Extension (DAE), Bangladesh said that sub-district level location specific agroclimatic information would be very much beneficial for farmers in the South Asian Region.

Prof Dr M C Varshneya, Former Vice-Chancellor, Anand Agricultural University, Gujarat congratulated all the presenters. He said that corona virus opened up new horizon. According to him, there may be possibility that disease may spread from crop to animal and human to atmosphere and ultimately would pose huge problem to us. Thus more stress may be given to research on virus, bacteria, fungi and weather. He stressed for validation of satellite data using data collected from drone for making the satellite data more useful. Mentioned about data quality and for that maintenance of automatic weather station and standard observatory. He also mentioned on exploring the trainig of farmers using financial assistance from NABARD (National Bank for Agricultural Development) and also provision of jobs for the deserving agrometeorologists.

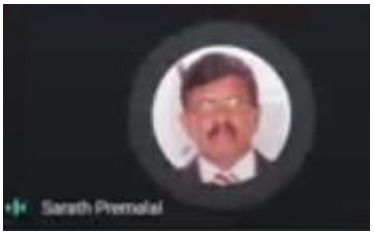
Dr.Rathore appreciated for his valuable insight of the sublect. However, he said that as we would go in a transboundary intiatives, he was not sure how the assistance from NABARD would work here. He was mentioning the financial assistance from DATATRUST which might be explored susequently

Dr. Abdul Muyeed, Sectorial Consultant, Care Project, RIMES, World Bank & Former Director General, Department of Agricultural Extension, Bangladesh said that our present achievements should be presented to the international donors like UNDP, FAO, World Bank and request for

funding. For accurate data, he suggested to approach to NOAA, UK Met office and others. According to him linking with regional projects like RIMES, ADPC, CARE might be initiated. He also mentioned about generation of fund through registration fee from the members of the SAFOAM.

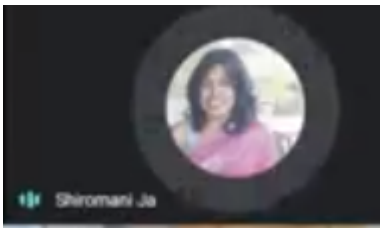
Dr. G. Srinivasan, Chief Scientist, Climate Applications, Regional Integrated Multi-hazard Early warning System (RIMES), Bangkok, Thailand said that all the core groups done very good job, prioritised, short listed the different activities under SAFOAM. He added that as far as roadmap is concerned, from each group couple of points might be taken up, prioritise for short, medium amd long term basis. He said that as SAFOAM would be knowledge platform, capacity improvement would be crucial. He continued, as mentioned, in SAFOAM, group of voluntery agrometeorologists would be involved in different activities, thus there is need to -identify tasks taken, assess and improve the capability to do so and also availability of the resources and improve capacity which could be given online or remotely. He assured that RIMES's support would be there as it is regional intiatives and RIMES would look forward to synerzie the activity of SAFOAM.

Mr. Giriraj Amarnath from International Water management Institute suggested that in addition to agrometeorology, other services developed in other secotors like fishery, risk manment system miight be considered to complete the eco system and also take the services of the private sectors as well. According to him, ICT in Amazon model and Bhuban Platform initiatives of Indian Space Research Organisation (ISRO) could be brough in and see they could help us in a big way. He mentioned that not much discussion was not figure out on the uncertainity of weather forecast as discussed earlier. He also mentioned on transition of data for wider risk management to complete the over all value chain and development of working in a partnership mode.

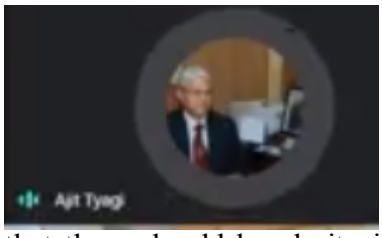


Mr. KHMS Premalal, Former Director General of Meteorology, Sri Lanka informed that at present as there is no climatolosist in Agriculture Department and no agricultural expert persom in Meteorological Department in Sri Lanka, thus there is need to creat agromet experts in these departmets. He said that though Sri Lanka has taken some initiative in this regard; SAFOAM might provide technical support & technical advise in this regard by arranging some certificate course in South Asia Region. He stressed for collaborative research programme which would be much useful in this region. He has suggested to form Agromet Advisory body and for improvement of constitution. He said that as SAFOAM is not profit

organisation, some projects with some financial assistance might be taken to make SAFOAM sustainable.. As far as application satellte technology is concerned, he suggested to provide technical advisory for preparation of good agromet advisory



Dr. Shiromani Jayawardena, Director (Forecasting and Decision Support), Department of Meteorology, Sri Lanka said that she agreed all the points mentioned by Mr. Premalal & Mr. Giriraj. She informed there is no University at present in Sri Lanka offering degree in meteorology or agrometeorology. Thus, she requested so that SAFOAM could provide human resources as lectures or professors so that such initiative could be taken up in university, Sri Lanka.



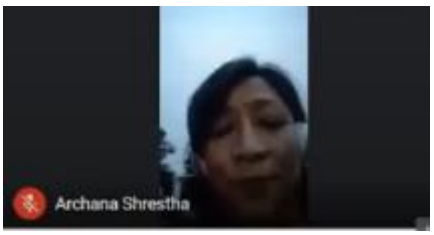
Prof. Ajit Tyagi, Air Vice Marshal (Retd) , Former Director General of Meteorology, India Meteorological Department said that South Asia Meteorological Association (SAMA) would be looking forward to work closely with the new initiative of SAFOAM together. He said that there should be clarity in the activities of SAFOAM, it should not replicate the operational agromet advisory services already being provided in the member countries, on the contrary enable to additional knowledge which they can impart especially the countries where it is lacking . He also highlighted climate and climate change issues and its impacts in agriculture as there are still not addressed adequately in national and regional level., He also talked about the operationalisation of timescale weather forecast i.e. short to extended range weather forecast and preparation of agromet advisories at block level and farm level which required knowledge testing. Like other previous speakers, he echoed the importance of capacity building to be provided by SAFOAM in this region as. He complemented the six core groups of SAFOAM for laid down the foundation of the forum and looking forward the next steps of work of SAFOAM and once again foreseeing the stong bonding between SAFOAM & SAMA in performimg rgional activities in collaborating mode.

Dr. Rathore assured Dr. Tyagi that we were looking forward strong bonding between SAFOAM and SAMA and other regional platforms and we should work together and appreciated his word of wisdom.

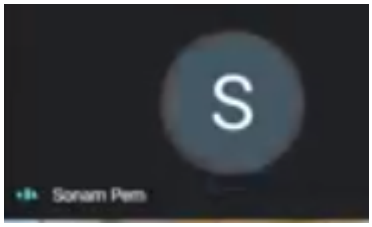
Dr. Y.S. Ramakrishna, Ex-Director, ICAR - Central Research Institute for Dryland Agriculture (CRIDA), India said that already all the core groups brought out the one of the major issue of capacity building with respect of manpower, infrastructure, data base. He suggested that each country should highlight what are the issues they really need help and same may be proritised some of them which are exactly needed and SAFOAM can identify the groups and voluntary scientists who could really help to fill the gaps so that SAFOAM

can help in.improveing the capacity of those supports the groups who will ultimately supports other groups and this should be taken as top priority. Also focus should be on important weather events which are causing lot of damage like drought, floods,pest and diseases and hilly ecosystem.

Dr. Shib Nandan Prasad Shah, Under Secretary (Tech), Chief of GIS & IT Section, MoAD, Nepal said that roadmaps should be yearwise. First year what are the activities to be done and how it would be implemented.. For preparation of roadmap, there should be different categories like ICT platform, data availability capacity building, For capacity building we should give focus on preparation of agromet bulletn by agriculturist and meteorologist. First year prelimiary and second year advance training should be arranged. Focus should be given to farmer.. We should look on products including satllte products using PPP mode even with Also Core group meetings at regular intervals for implemenation of roadmap of SAFOAM should be arranged.



Dr. Archana Shrestha, Deputy Director General, Department of Hydrology and Meteorology, Nepal informed that agromet project in Nepal is now extended phase. She was referring the advanced stage of agromet advisory services in India and in this context felt that experiece sharing, coordinated application of products step by step like spi drought for monitoring would be highly useful and ultimately would be very helpful at farmers level and policy level. She also mentioned hilly perspective at microlevel including adaptation, collaborative reserch with university which would be help the Meteorological Department (DHM) in a big way.



Ms.Sonam Pem, Consultant, Agromet Project, said that Bhutan is much behind in agrometeorology,not having any agromet experts. Capacity building from scientist to farmers govt officials, extension officers levels are necessary. She requested that SAFOAM can assist in providing the capacity building.

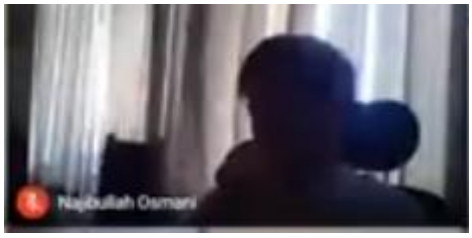
Mr. Abdul Muhsin Ramiz, Director Meteorology, Meteorological Service, Maldives said that Maldives is low lying island and at present Maldives is not giving any agromet services. but the services is the priority for Govt of the country and would be addressed in future. According to him, more stress would be given to capacity building and also requested to include Maldives into product chart so that Maldives would be benefited.

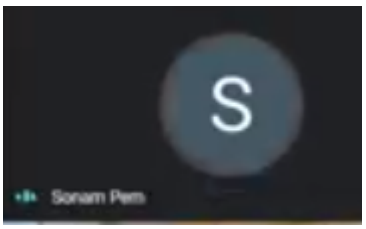
Dr. Orivaldo Brunini, Director, Agricultural Research Support Foundation, Brazil, Former Professor of Agrometeorology, Faculdade Luiz Meneghel, Brazil mentioned two aspects i.e. capacity building & operationalisation of agromet advisory services in South Asia. He also discussed about adaptation, agromet bulletin preparation in South Asia, more integration of agronomist & agrometeorologist and farmers, services to the farmers, on line teaching, short couse on agromet bulletin, dissemination of agromet research for enhancing agrometeorology in South Asia.

Mr. Ismail Hassanzadah, Director, Policy and Coordination, General Directorate of Planning and Policy, | Ministry of Agriculture, Irrigation and Livestock, Islamic Republic of Afghanistan appreciated the way the workshop was organised particularly the presentations of the group leaders were very good/ He said that he learnt a lot from the workshop and requested to share all presentations as these would be useful to them.

Mr. Waheedullah Yousfi, Agromet expert and Coordinator, Ministry of Agriculture, Irrigation and Livestock, Islamic Republic of Afghanistan said that he was representing on behalf of livestock and irrigation department. He talked about the shortcoming of agromet advisories in respect of no proper institutional footprints in producing the agromet advisories and also said that in spite of its presence in agriculture and meteorology department, he said that the agromet advisories is not trully going to farmer but to the central part of communicationnsystem having ICT facilities.

Mr.Najibullah Osmani, GIS Specialist, Directorate of Statistic and Information Management, Ministry of Agriculture, Irrigation and Livestock (MAIL), Islamic Republic of Afghanistan appreciated the way the workshop was organised and requuested to share presentatins for follow up.



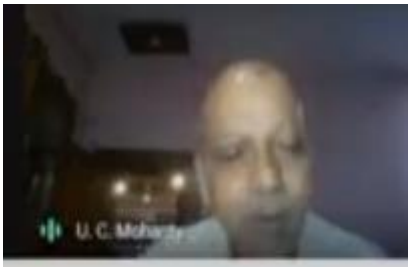


Ms. Han Swe, Assistant Director, Agro-meteorological Division, DMH, Yangon, Myanmar informed that though they are issuing agromet bulletins but that does not contain agromet advisories. She added that they are using seasonal weather forecast, supported by RIMES, in producing the agromet bulletin where some advisories for farmers are given, However, they are on experimental mode

working and exploring to prepare advisories under World Bank project. She also said that though they have agricultural universities, the research in agrometeorology is very limited and she requested support from SAFOAM in providing agromet advisory to the farmers and also in agromet research.

Dr. V. Geethalakshmi, Director of Crop Management, Tamil Nadu Agricultural University, Coimbatore, India said that the activities might be made as short, medium, long term basis and initially with low hanging fruits. Besides, SAFOAM may organised some International forum. As far as the finance is concerned, approach might be made to Norwegn Embassy, Swiss Development Corporation. She assured that she would subsequently provide more information in this regard.

Dr.B. V. Ramana Rao, Editor in Chief, Journal Agrometeorology. Telangana State, India suggested that as Agromet Advisory Services is the end product in the member countries in South Asia, a good beginning somewhere else is highly required for such successful mission. Thus a solid planning in the beginning giving the priorities involving the expertise and minimum manpower for next five years should be made to achieve the targetted goals.



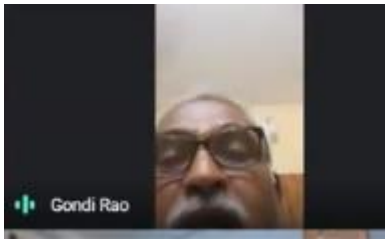
Prof. U.C. Mohanty, School of Earth Ocean and Climate Sciences, Indian Institute of Technology Bhubaneswar, Odisha, India said that this is an excellent platform where science would reach to the common man. He suggested for understanding of strength and weaknessfrom each country and learn from each other. He added that capcity buiding programme might be taken up step by step along with applications & side by side awarenes among people in thse countries. During the preparation of roadmap, the issue of climate change, adaptation might be included as future activities. He had a high hope that SAMA & SAFOAM would work together and use Atmispheric Science & Ocean Science for the use of common man. He also said that for the sustainability of SAFOAM, a good roadmap is very much required. He concluded by saying that same enthusian should be continued to make SAFOAM in reality.

Dr. GGSN Rao, Former Project Coordinator (Agrometeorology) I/c, ICAR - Central Research Institute for Dryland Agriculture (CRIDA), Hyderabad, INDIA said that SAFOAM could arrange publication in the form of Newsletter so that periodic development & activities would reach to the large number of persons. Secondly, he urged that SAFOAM might encourage young scientists by arranging some funds to work on the subject of agrometeorology. He also emphasised on arranging

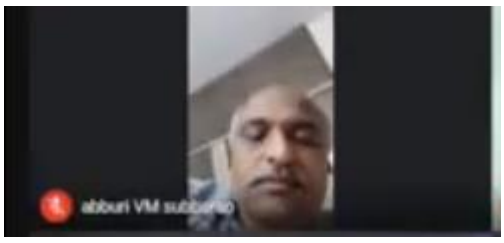
training programme as per the requirements of each country and involve the retired and working experienced agrometeorologist to provide the lectures in the training programme in collaboration with the concerned persons and departments in the respective countries.

Dr. Vyas Pandey, President, Association of Agrometeorologists, Former Professor and Head, Department of Agricultural Meteorology, Anand Agricultural University, Anand, Gujarat, India assured that Association of Agrometeorologists in India would be happy to help SAFOAM in various activities including traing programm and also whereever help is required by SAFOAM.

Dr S D Attri, Additional Director-General, India Meteorological Department appreciated for excellent presentations and discussion and lots of interesting points which have already been brought out so far made in the workshop. He said that we should proritise the proposed activities including capacty building involving NGOs. He also streesed for dual mechanism on arrangingment of funding and also creating bonding with national, regional and global organisation for continuous development of SAFOAM.



Dr. GSLV Prasada Rao, Founder, Academy of Climate Change Education and Research, Kerala Agricultural University, Vellanikkara, Thrissur, Kerala, India said that as per his observations, dissemination of agromet advisories in India is really appreciable and web portal of Nepal on agromet advisories is really wonders. He stressed for use of more information on weather and climate so that true agromet advisories might be issued to the farmers and for that more work might be taken up in research and development. Dr. Rao informed that Tribhuvan University in Nepal has come forward to open up M.Sc. course in Agrometeorology & Livestock Meteorology and at present need financial assistance.



Dr.AVM Subba Rao, Principal Scientist, ICAR - Central Research Institute for Dryland Agriculture (CRIDA), Hyderabad, India said that all the presentation delivered are very good and also brought out the different issues in issuing agromet advisories. According to him, more stress might be given on capacity building in practical form to those countries where it is lagging very much.

Dr. A.M.Sheikh said that agromet advisories are the end product and being used in extension services, however more stress might be given on reserch programe interdisciplinary science involving physical science, earth science and biological science and for that a national or international institute

on agrometeorology might be set up. He felt that such recommention might be made to all the SAARC countries through SAFOAM platform. He informed that such initiative were taken earlier but it could not be materialised, however he felt that this might be appropriate time and platform to address the issue.

Dr. Rathore said that this is an excellent proposition. However, he felt that setting up of such institute might not be an easy task at this stage of the forum and existing SAARCsystem but such concept might be included or explored with the in built existing SAARC system.

Dr. Nachiketa Acharya, Assistant Research Professor, Center for Earth System Modeling, Analysis, and Data (ESMAD), Department of Meteorology and Atmospheric Science, Pennsylvania State University said that capacity building of National Meteorological & Hydrological Services in respect of seasonal forecast & sub-seasonal is essentially required. He suggested that SAFOAM should use the SASCOF to build the capacity of different NMHS in building and issuing seasonal & sub-seasonal and impact-based weather forecast for the farmers in South Asia.

Dr. Rathore said that this is an apt suggestion.

At the end of the panel discussion **Dr. Rathore** said that it was a very good distillation and very honesty himself praised the part of community where kind of thought process put together so that it was possible to gather very good points for preparation of roadmap and implementation strategies. He added that though there were time constraints, however all the panellist gave wonderful suggestions/apt comments within limited time. He also requested all the participants to communicate their views and further suggestions/ clear cut thoughts which would help in preparation of roadmap and implementation strategies. He thanked all the panellist and other participants of the programme for whole hearted cooperation in conducting the session.

Dr. Chattopadhyay profusely thanked Dr. Rathore for conducting the panel discussion so meticulously and as a result so important views/ apt suggestions ultimately could be gathered and this might help us to prepare the roadmap and implementation strategies.

As per the programme schedule, at the end of the programme, it was not possible to show the recorded visionary address of **Dr. M.S. Swaminathan** as the same was not audible. As per the request of all the members/participants, Prof. MS Swaminathan's message to the participants of the South Asian Forum on Agricultural Meteorology (SAFOAM) Workshop is enclosed in Annexure I.

Dr. Swaminathan is very much motivated for the subject of Meteorology especially for Agrometeorology. When contacted and requested, **Dr. Swaminathan** immediately agreed to address all of us in the workshop in spite of the fact that he was not keeping well. Thus, we are really grateful to him.

Also pleased to share with you the video message from Prof Swaminathan addressing SAFOAM workshop. Kindly click on the link to play the video.

https://mssrfresin-my.sharepoint.com/:v:/g/personal/rajams_mssrf_res_in/EUZB-4dhHGdBsQFeBeG9cP8BrnfkoNW1HRHr7fLnXwHL0g

After the link opens with a MSSRF logo, please press the play button for playing the video. You may use your headphones to hear his address clearly.

At the end, **Mr.Manoj Thakur,** Former Senior Scientist & Communication Officer,National Agricultural Research Council (NARC), Nepal gave the vote of thanks.

Way Forward for Preparation of Roadmap & Implementation Strategies

Based on the suggestions & elaborate discussions among the participants of workshop, following decisions were made towards preparation of roadmap and implementation strategy.

Capacity Building

1. The status of agromet services in South Asia varies in each country. Strength and weaknesses in terms of providing agromet advisory services in each of Member countries should be identified. SAFOAM can assist in providing expertise to train human resources, developing infrastructure and data base and launching agromet services to all stakeholders, agrometeorologists, farmers, industries, government officials, extension officers, service providers, etc.
2. As SAFOAM to function as a knowledge platform, group of agrometeorologists have volunteered to provide support to identify tasks for developing products and services, assess and improve the capability to execute these tasks.

Education & Research

3. Promotion and providing support in designing syllabus, etc. to start Agromet Course in agricultural universities in the member countries, is second important activity.
4. Collarative research involving agricultural univerties on climate change, climatic variability, drought, flood and other extreme events to be taken up.
5. Climate and climate change issues and its impacts in agriculture to be addressed at national and regional levels.

Linking with Regional & Global Project & Initiatives

6. Linking with regional projects like RIMES, ADPC.CARE to be made. SAFOAM activities to be synergised with these regional projects.

7. SAFOAM and South Asian Meteorological Association (SAMA) to work together to address all the relevant regional activities.
8. A National or International Institute on Agrometeorology may be set up, along with national institutes in each country, to carry out research programme on interdisciplinary science involving physical science, earth science and biological science. This recommendation to be conveyed to all the Member countries.

Use of Satellite information

9. A detailed documentation to be carried out describing utilisation of satellite data, quality checks, generation of and services.
10. The products and services are to be provided through web portal of SAFOAM.

Funding

12. International donors like DATATRUST, UNDP, FAO, USAID, WB, Norwegn Embassy, Swiss Development Corporation, should be explored.

Enabling ICT in AAS

13. Initiatives to be taken up for enabling required ICT to the various Member countries in South Asia. Use of such technology should help to access, analyse the data and various information for taking decions in formulation of agromet advisories for the farmers.

Gap Areas

14. It is necessary to address issues related to data, products and tools, monitoring mechanisms availability of manpower and capacities and provide solutions.

Regional Monitoring Mechanism

15. A mechanism for monitoring of agrometeorological parameters, crop-weather relationship, pest-disease-weather relationship, development of tools and products which relate to agrometeorological data, weather forecast and other specific agromet to be developed. Monitoring of drought, flood soil moisture, crop conditions should be a priority.

Regional Policy

16. Development of regional policies for implementation of different activities of SAFOAM by respecting to the sovereign nations and laws of land with framework.

Development in hills

17. A special emphasis should on to operationalise agromet advisory services and micro-level research in hilly areas of South Asia.

Publication

18. SAFOAM to initiate a publication of Newsletter to inform all stakeholders about periodic development and activities of member countries.

The initiatives so far taken under the knowledge platform of SAFOAM is encouraging and all the proposed strategies mentioned above will surely going to serve as mandate of SAFOAM. Besides, the growth of discipline of Agrometeorology in all the member countries of South Asia and SAFOAM should serve as a MODEL for regional cooperation in the rest of the world.

19. .

Annexure I

M.S. SWAMINATHAN RESEARCH FOUNDATION

MSSRF
Science for Sustainable Development

Prof M S Swaminathan
Founder Trustee

Prof MS Swaminathan's message to the participants of the

South Asian Forum on Agricultural Meteorology (SAFOAM) Workshop

13th June 2021

I am happy that nine countries of South Asia have come together today to study the linkages between the monsoon productivity and profitability. I am happy that modern technology like remote sensing will be used here. We used remote sensing for the first time at the influence of late Dr Vikram Sarabhai on coconut root wilt and that was a great success in mapping the intensity of disease occurrence in Kerala.

The climate advice today is a sophisticated and requisite for the farmers. The length of the rainfall, the intensity of rainfall, length of sunlight, all of them are important for farmers. Therefore, sharing information from a common background which is going to be done here is an important advance in enabling the farmers. Empowerment of farmers depends upon the provision of information, the right information at the right time on one hand and on the other hand all have the access to climate forecasting through the advisory group on climate and agrometeorology. The agrometeorology is an emerging science. For long time, we heard meteorology, but now we get agrometeorology. Climate has a profound influence on agriculture in all the countries represented here. Climate is very important, because it influence the market and now hence the market surplus and market arrival can be mapped.

In all these nine countries, the monsoon and the market are closely linked and therefore we have common information to share. Through sharing information, all of them can benefit and this kind of interaction is very important. Therefore, I congratulate the organisers. This is a timely meeting and I hope the aftermath of this meeting will be felt in this years' production. It is very important initiative because we all have seen the problem like corona and many diseases and pests. Today with the help of modern technologies we can anticipate the disease prevalent, disease outbreak, and they all can be anticipated. Therefore, it is important that these nine countries they can join together and if all of them share the information, then control will be possible. Because the monsoon and the market, they are linked together and this can be done only if they work together and one method is remote sensing.

I congratulate the organisers and wish the meeting very great success.

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Annexure II

Programme Details

Date: 13th June, 2021

Opening of Workshop	
16.00 - 16.05	Opening Remarks by Dr. Nabansu Chattopadhyay. President, International Society for Agricultural Meteorology, Former DDG, IMD
Session I : Presentation on different themes by the Group Leaders of different Core Groups of SAFOAM	
Time: 16.05-17.15	
Chairman : Dr. Manava SivaKumar	**Rapporteur : Dr. Mazharul Aziz**
16.05 - 16.15	Presentation on "Present Status and existing strategies for meeting the need, gaps, requirements etc. for operational Agromet Advisory Services in South Asian Countries" by *Dr. Santanu Kumar Bal Project Coordinator (Agrometeorology), Central Research Institute for Dryland Agriculture (CRIDA), Santoshnagar, Hyderabad, India & Leader of the Core Group I, SAFOAM.
16.15 - 16.25	Presentation on "Administration/Constitution/ By Laws/ Finance etc. for SAFOAM" by Prof. A.M. Sheikh, Former Vice-Chancellor, Anand Agricultural University, Gujarat, India. & Leader of the Core Group II, SAFOAM.
16.25 - 16.35	Presentation on "Utilisation of satellite derived products in Agromet Advisory Services for South Asian Countries" by Dr. Bimal Bhattacharya Sci./Eng. – G, Applications Centre (SAC), ISRO, Ahmedabad 380015, Gujarat, India & Leader of the Core Group III, SAFOAM.
16.35 - 16.45	Presentation on ""Web Portal for South Asia Forum on Agricultural Meteorology" by Dr. N, Chattopadhyay, President, International Society for Agricultural Meteorology & Leader of the Core Group IV, SAFOAM.
16.45 - 16.55	Presentation on "New Dimension of Agromet Advisory Services in hill region in South Asian Countries" by Dr. Archana Shrestha, Deputy Director General, Meteorological Forecasting Division, Department of Hydrology and Meteorology, Kathmandu, Nepal & Leader of the Core Group V, SAFOAM.
16.55 - 17.10	Presentation on "Build capacity in ICT program management and also build such cadre and mentor them for ensuring continuity of Agromet success and innovation sustenance" by Mr. Abhijit Basu Founder and CEO Smartex Cognitive, XCED, APAC CEdMA, California, USA & Leader of the Core Group VI, SAFOAM.

17.10-17.15	Remarks by the Chairman of the Session Dr. Manava Sivakumar, Founding Editor-in-Chief, Weather and Climate Extremes (Elsevier), Senior Consultant, World Meteorological Organisation.
	Session II : Panel Discussion on Preparation of Roadmaps & Implementation Strategies for SAFOAM Activities **Time: 17.15-17.50** **Panellists** **Dr Shailesh Nayak, Ms. Arati Belle, Mannava Sivakumar, Mr. Robert Stefanski, Dr. Orivaldo Brunini, Dr. Ajit Tyagi, Dr Mrutyunjay Mohapatra, Dr Akhilesh Gupta, Dr. G. Srinivasan, B V Ramana Rao, Prof. U.C. Mohanty, Dr.Y.S.Ramakrishna, Prof Dr M C Varshneya, Dr. Shib Nandan Shah, Dr. Abdul Mayeed, Shri Premlala, Dr. Muhammad Hanif, Dr. Tshering Wangchen, Ms. Han Swe, Zahiruddin Imampoor** **Moderator: Dr. L.S. Rathore**
17.50-17.55	Visionary Address by Prof. M.S.Swaminathan, Father of India's Green Revolution & Founder of the MS Swaminathan Research Foundation
17.55 – 18.00	Vote of Thanks by Mr. Manoj Thakur, former Senior Scientist & Communication Officer, National Agricultural Research Council, Nepal

Annexure III

List of the Participants

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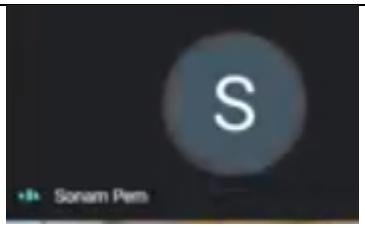
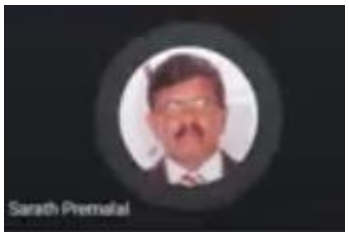
Bangladesh  **Mr..Md.Golam Maruf** Former Director General Department of Agricultural Extension (DAE), Khamarbari, Farmgate, Dhaka, Bangladesh gmarufdae@gmail.com	**Bhutan**  **Mr. Tshering Wangchen** Dy. Chief Agriculture Officer Agriculture Research and Extension Division, Department of Agriculture Ministry of Agriculture and Forests Tshering Wangchen tsheringwangchen@moaf.gov.bt	 **Mrs. Sonam Pem** Consultant Agromet Project Bhutan sonampem.pem@gmail.com
Srilanka  **Mr. KHMS Premalal,** Former Director General of Meteorology, Sri Lanka spremalal@yahoo.com	**Srilanka** **Anusha Warnasooriya** Director(Climate Change & Research) Department of Meteorology colombo-07 Sri Lanka rashanthie@yahoo.com	**Nepal**  **Shiromani Jayawardena** Director (Forecasting and Decision Support) Department of Meteorology Colombo 07, Sri Lanka shirojaya2000@yahoo.com

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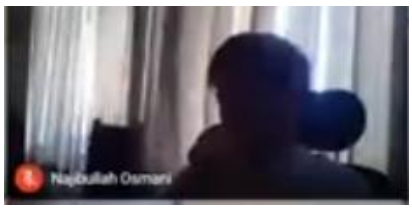
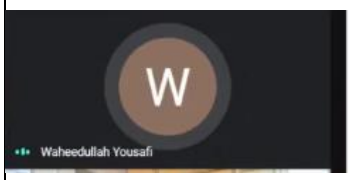
Afghanistan  Ismail Hassanzadah| Director, Policy and Coordination General Directorate of Planning and Policy| Ministry of Agriculture, Irrigation and Livestock Islamic Republic of Afghanistan	 **Najibullah Osmani** GIS Specialist GIS & Agro Met Department Directorate of Statistic and Information Management Ministry of Agriculture, Irrigation and Livestock (MAIL) Jamal Mina, Opposite of Kabul University najibullah.osmani10@gmail.com	 **Mr. Waheedullah Yousfi** Agro met expert and coordinator Ministry of Agriculture, Irrigation and Livestock waheedullahy@gmail.com

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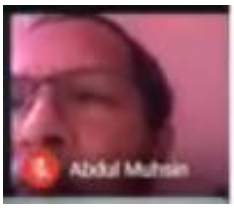
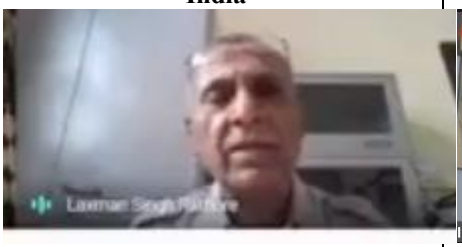
Maldives  **Mr. Abdul Muhsin Ramiz** Director Meteorology email: abdul.muhsin@met.gov.mv Maldives Meteorological Service, Hulhule', 22000, Rep. Of Maldives P: +960 30370220 / +960 3323084 M: +960 7776349 email: abdul.muhsin@met.gov.mv	**India**  **Dr Laxman Singh Rathore** Former Director General of Meteorology International Consultant, The World Bank Consultant, United nations Development Programme (UNDP) Member, Advisory Board, National Disaster Management Authority (GOI) Member, Research Council CSIR-NISTADS Member, Appeal Committee, National Agricultural Education Accreditation Board, ICAR Vice President, Vigyan Bharti President, Society for Rural Improvement lrathore@gmail.com	**India**  **Prof. Ajit Tyagi** Air Vice Marshal (Retd) Prof. Ajit Tyagi Chairman, IDC Foundation Senior Adviser, IRADe Member, WMO Working Group on Tropical Meteorology Former Director General of Meteorology & Member, W.M.O. Executive Council Immediate Past President, Indian Met Society Patron India Water Foundation ajit.tyagi@gmail.com
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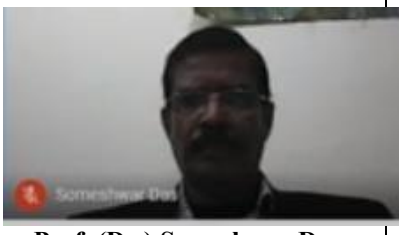
India  **Dr.N V K Chakravarty** Retd.Principal Scientist (AgMet) & Head,Agril.Physics, ICAR-IARI, New Delhi-110027 nvkchak@gmail.com	**India**  **Dr. Vyas Pandey** Emeritus Scientist (ICAR) President, Association of Agrometeorologists Former Professor and Head, Department of Agricultural Meteorology Anand Agricultural University Anand 388 110, Gujarat, India Dr. Vyas Pandey: "Dr. Vyas Pandey" <pandey04@yahoo.com>,	 **Prof. (Dr.) Someshwar Das** Convener, South Asian Meteorological Association (SAMA) Former Professor, Department of Atmospheric Science, Central University of Rajasthan, India Former Scientist-G/Adviser, National Centre for

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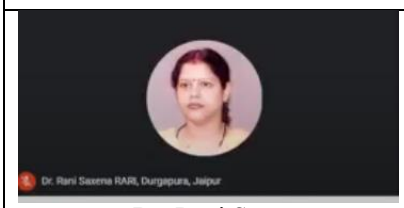 Dr. Rani Saxena Asstt. Professor (Agrometeorology) Rajasthan Agricultural Research Institute (SKNAU, Jobner) Durgapura, Jaipur mathurrani@rediffmail.com,	**India**  **Dr..Rengalakshmi** M.S.Swaminathan Foundation Chennai Tamil Nadu rengalakshmi@mssrf.res.in,	**India**  **Dr. Latif Ahmed** SKUAST Kashmir
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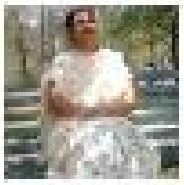
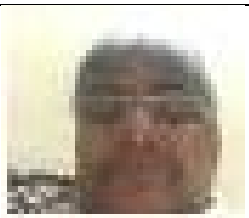
 **Dr. Mahasweta Bhowmik** Gramin Krishi Mausam Sewa Kalyani Agro-met Field Unit B.C.K.V., W.B., India bhowmickmahasweta2012@gmail.com,	**Mr. Prasanta Neog** Professor cum Nodal Officer Gramin Krishi Mausam Sewa (GKMS), Sonitpur AMFU Co-PI, AICRPDA-NICRA Project Dept of Agrometeorology B.N. College of Agriculture AAU, Biswanath Chariali Sonitpur - 784176 Assam neogprasanta@rediffmail.com,	 **Dr Kulwinder K Gill** Asstt. Agrometeorologist CC&IL, PAU, Ludhiana Punjab kgill2002@gmail.com,
 **Dr. (Mrs.) Ananta Vashisth** Principal Scientist & Nodal officer GKMS Project Division of Agricultural Physics	 **Dr. Raji Reddy** Hyderabad dandareddy009@gmail.com	 **Dr. Vinay Sehgal** Division of Agricultural Physics Indian Agricultural Research InstituteNew Delhi, India

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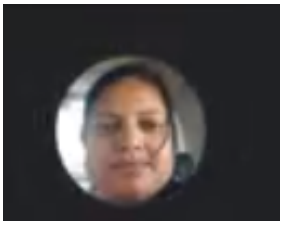
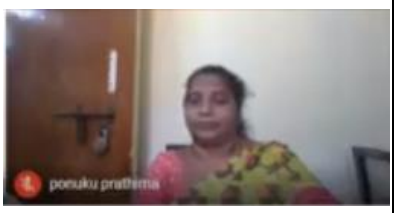
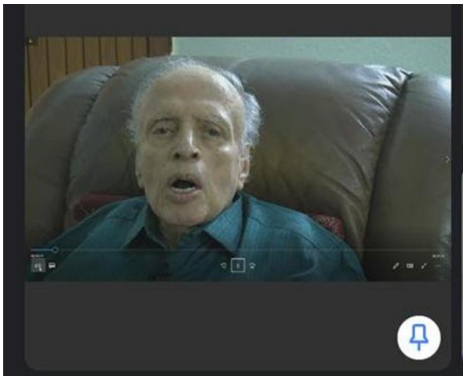
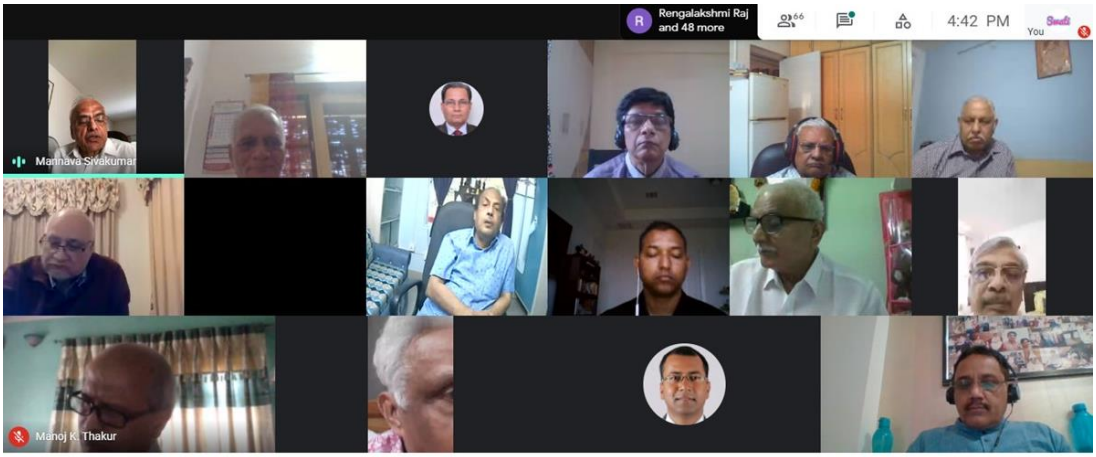
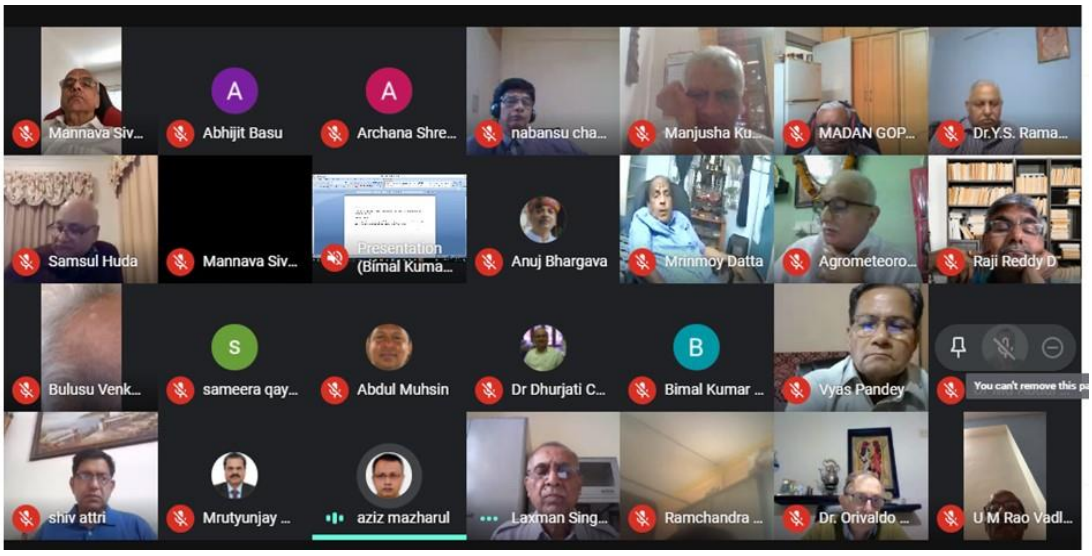
 **Dr. Saon Banerjee** Professor and Former-Head Dept. of Agril. Meteorology and Physics BCKV, Kalyani, Nadia, WB, India. Former visiting Scientist, University of Edinburgh. sbaner2000@yahoo.com,	 **Dr. R.N.Sable,** Former Head Agrometeorology Division Pune Krihi Viswavidyalaya drrnsabale@gmail.com,	 **Ms. Malathi Seetamraju** Agricultural Meteorology Division India Meteorological Department Pune malathi.imd@gmail.com,
 **Ms, Swati Chandras** Agricultural Meteorology Division India Meteorological Department Pune swati_imd@yahoo.com,	 **Shri A K Bhargava** Former Assistant Meteorologist India Meteorological Department, New Delhi bhargava1953@gmail.com	 **Dr T.Prathima** Sr.Scientist (Agromet), RARS.Tirupati. Andhra Pradesh ponukuprathima@gmail.com

Photo Gallery







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