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.

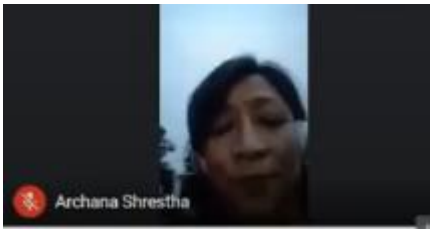
Dr. Santunu Kumar Bal, leader of Core Group I, has showed the present status on the availability of weather forecast at different resolution and its use, observatory network including soil moisture stations, status of preparation of agromet advisory service bulletins at national, district and sub-district 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.

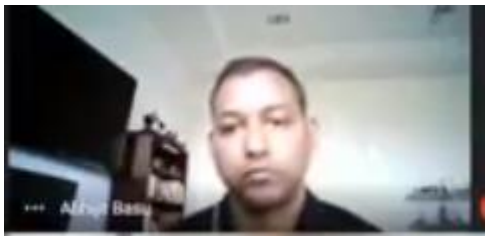
Dr. Bimal Bhattacharya, leader of Core Group III, presented the complete mechanism of use of satellite information/products in South Asia by providing useful directions. He has made very useful recommendations how the different satellite products at various levels with satellite information exchange 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.

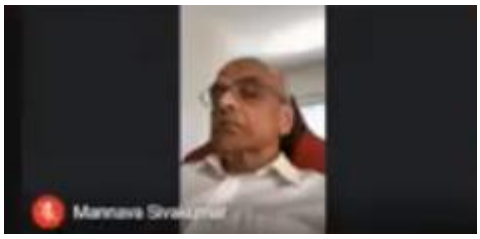
Dr. Chattopadhyay thanked Dr. Sivakumar & Dr. Mazharul Aziz for nicely conducted the session. Now for the next session i.e., panel discussion Dr. Chattopadhyay requested Dr Laxman Singh Rathore, Former Director General of Meteorology, International Consultant, The World Bank to kindly moderate the panel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

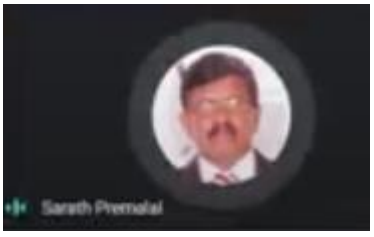
in a transboundary intiatives, he was not sure how the assistance from NABARD would work here. He was mentioning the financial assistance from DATATRUST which might be explored susequently

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.

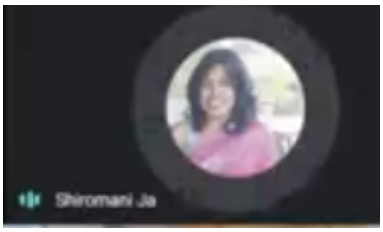
Dr. G. Srinivasan, Chief Scientist, Climate Applications, Regional Integrated Multi-hazard Early warning System (RIMES), Bangkok, Thailand said that all the core groups done very good job, prioritised, short listed the different activities under SAFOAM. He added that as far as roadmap is concerned, from 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.

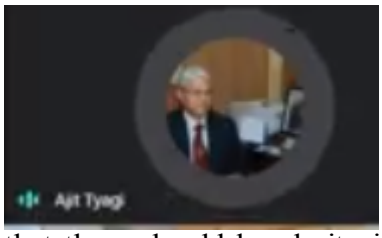


Mr. KHMS Premalal, Former Director General of Meteorology, Sri Lanka informed that at present as there is no climatolosist in Agriculture Department and no agricultural expert persom in Meteorological Department in Sri Lanka, thus there is need to creat agromet experts in these departmets. He said that 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.



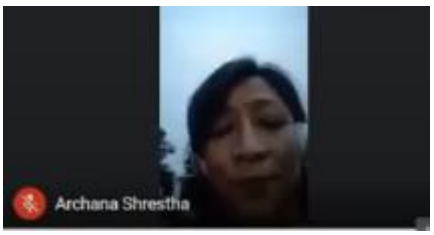
Prof. Ajit Tyagi, Air Vice Marshal (Retd) , Former Director General of Meteorology, India Meteorological Department said that South Asia Meteorological Association (SAMA) would be looking forward to work closely with the new initiative of SAFOAM together. He said that there should be clarity in the activities 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.

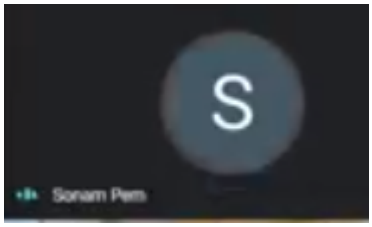
Dr. Y.S. Ramakrishna, Ex-Director, ICAR - Central Research Institute for Dryland Agriculture (CRIDA), India said that already all the core groups brought out the one of the major issue of capacity building with respect of manpower, infrastructure, data base. He suggested that each country should highlight 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.

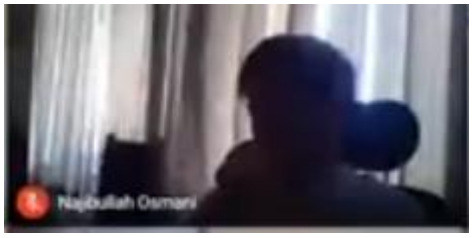
Mr. Abdul Muhsin Ramiz, Director Meteorology, Meteorological Service, Maldives said that Maldives is low lying island and at present Maldives is not giving any agromet services. but the services is the priority for Govt of the country and would be addressed in future. According to him, more stress would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

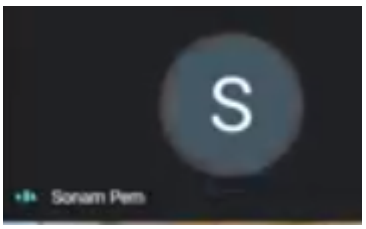
Dr. Orivaldo Brunini, Director, Agricultural Research Support Foundation, Brazil, Former Professor of Agrometeorology, Faculdade Luiz Meneghel, Brazil mentioned two aspects i.e. capacity building & operationalisation of agromet advisory services in South Asia. He also discussed about adaptation, agromet 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.



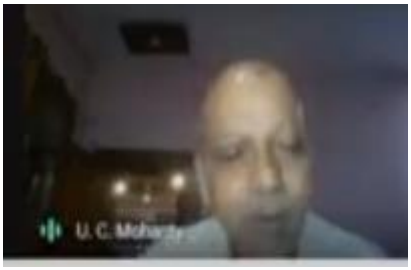


Ms. Han Swe, Assistant Director, Agro-meteorological Division, DMH, Yangon, Myanmar informed that though they are issuing agromet bulletins but that does not contain agromet advisories. She added that they are using seasonal weather forecast, supported by RIMES, in producing the agromet bulletin where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



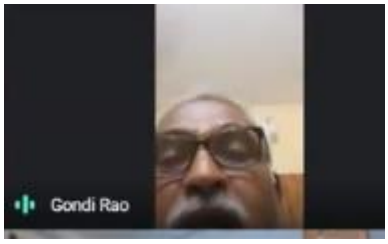
Prof. U.C. Mohanty, School of Earth Ocean and Climate Sciences, Indian Institute of Technology Bhubaneswar, Odisha, India said that this is an excellent platform where science would reach to the common man. He suggested for understanding of strength and weaknessfrom each country and learn from each other. 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

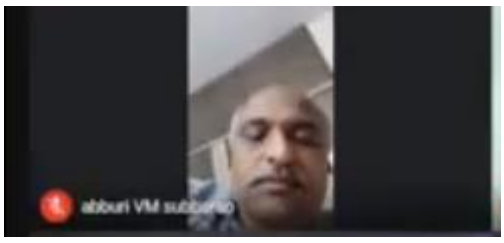
training programme as per the requirements of each country and involve the retired and working experienced agrometeorologist to provide the lectures in the training programme in collaboration with the concerned persons and departments in the respective countries.

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.

3rd Cross Street, Taramani Institutional Area, Chennai – 600 113, INDIA
Phone: +91-44-2254 1645 (Direct), 2254 1698, 2254 2699, Fax: +91-44-2254 1319, E-mail executivedirector@mssrf.res.in; murali@mssrf.res.in
Web: www.mssrf.org

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.

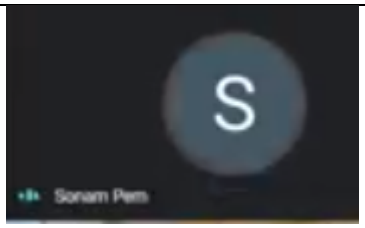
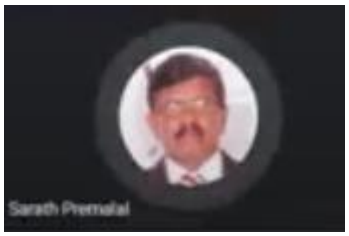
17.10-17.15	Remarks by the Chairman of the Session Dr. Manava Sivakumar, Founding Editor-in-Chief, Weather and Climate Extremes (Elsevier), Senior Consultant, World Meteorological Organisation.
	Session II : Panel Discussion on Preparation of Roadmaps & Implementation Strategies for SAFOAM Activities **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

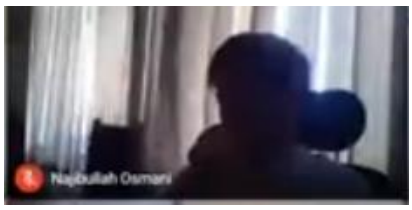
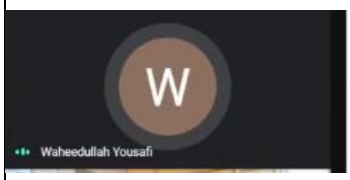
Annexure III

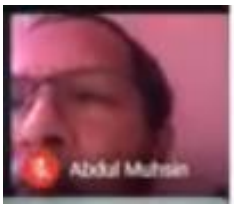
List of the Participants

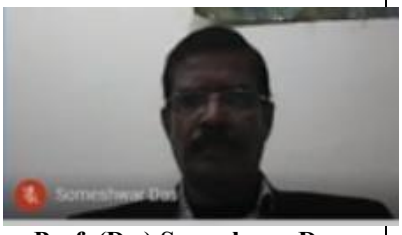
<table>
<tr><td colspan="3">International</td></tr>
<tr>
<td>Switzerland
 
Dr Mannava Sivakumar
Founding Editor-in-Chief, Weather and Climate Extremes (Elsevier)
Senior Consultant, WMO
mannavas@gmail.com</td>
<td>Brazil
 
Dr. Orivaldo Brunini
Director, Agricultural Research Support Foundation, Brazil
Former Professor of Agrometeorology, Faculdade Luiz Meneghel,
And Former Senior Researcher on Agrometeorology Agronomic Institute-IAC, Brazil
diretoria.presidencia@fundag.br</td>
<td>USA
 
Mr. Abhijit Basu
Founder and CEO Smartex Cognitive, XCED, APAC CEdMA, California, USA
abasu@smartex.me</td>
</tr>
<tr>
<td>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</td>
<td>Australia
 
Dr.A.K.S. Huda
School of Science, Western Sydney University, Australia
S.Huda@westernsydney.edu.au</td>
<td>Thailand
 
Dr. G. Srinivasan
Chief Scientist, Climate Applications
Regional Integrated Multi-hazard Early warning System (RIMES)
Asian Institute of Technology (AIT) Campus, P.O. Box 4, Klong Luang, Pathumthani 12120, Bangkok, Thailand
srini@rimes.int</td>
</tr>
<tr>
<td>Sri Lanka
 
Dr. Giriraj Amarnath
International Water Management Institute, Sri Lanka
a.giriraj@cgiar.org</td>
<td>Bangladesh
 
Dr. Abdul Muyeed
Consultant, CIMEET
& Former Director General, Department of Agricultural Extension, Bangladesh
muyeedbd61@gmail.com</td>
<td>Bangladesh
Dr. 
Mazharul Aziz
Chief Instructor
Agriculture Training Institute
Department of Agricultural Extension (DAE), Sher-E-Bangla Nagor, Dhaka-1207, *Former Project Director,</td>
</tr>
</table>

		Component-C of BWCSRP of The World Bank azizdae@gmail.com

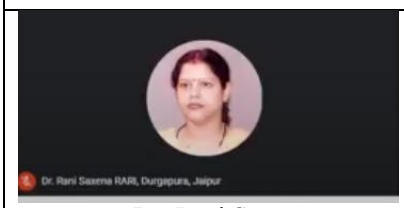
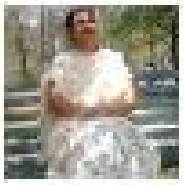
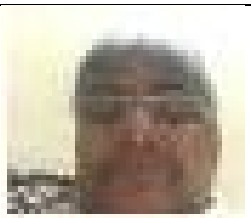
Bangladesh  **Dr. Md. Shah Kamal Khan** Project Director Agro-Meteorological Information Systems Development Project Component-C of Bangladesh Weather and Climate Services Regional Project, Department of Agricultural Extension (DAE), Khamarbari, Farmgate, Dhaka, Bangladesh kamalmoa@gmail.com	**Bangladesh**  **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 mrahman648@gmail.com	**Bangladesh**  **Dr Md. Shameem Hassan Bhuiyan** Senior Consultant Bangladesh Weather and Climate Services Regional Project World Bank & Chief Advisor Save Earth Climate Services Ltd.,Bangladesh shameembmd@gmail.com
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

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. Rameshwar Rimal** Technical Officer (Agrometeorology) National Agricultural Environment Research Centre (NAERC) Nepal Agricultural Research Council (NARC) P.O Box 5459, Kathmandu, Nepal Rameshwar Rimal <rameshwarrimal@gmail.com>,	**Nepal**  **Mr.Manoj Thakur, Former Senior** Scientist & Communication Officer ,National Agricultural Research Council (NARC), Nepal Thakur27819@gmail.com
Nepal  **Archana Shrestha, PhD** Deputy Director General, Meteorological Forecasting Division Department of Hydrology and Meteorology, Babarmahal, Kathmandu, Nepal. & Member, Board of Directors, Fulbright Commission-Nepal Fulbright Fellow & Member, 14th Executive Committee of Fulbright Alumni Association Nepal (FAAN) shresthamet@gmail.com	**Nepal**  **Dr. Indira Kadel** Nepal kadelindira@gmail.com Department of Hydrology and Meteorology, Babarmahal, Kathmandu, Nepal.	**Myanmar**  **Ms. Han Swe** Assistant Director, Agro-meteorologic, DMH, Yangon hanswedmh@gmail.com,
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

ismailhh.mail@gmail.com		
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
India  **Prof. U.C. Mohanty, FNA,** FASc, FNASc, FNAE Room No. – 309, SBS Building School of Earth Ocean and Climate Sciences Indian Institute of Technology Bhubaneswar Argul, Jatni-752050, Odisha, India ucmohanty@gmail.com	**India**  **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 Dr Mrutyunjay Mohapatra: Mrutyunjay Mohapatra <mohapatraimd@gmail.com>	**India**  **Dr.B V Ramana Rao** Editor in Chief, Journal Agrometeorology. Telangana State,Telangana State India buverarao@gmail.com
India  **Dr.Y.S.Ramakrishna** Ex- Director, CRIDA (ICAR) and Member, Advisory Committee National Disaster Management Authority (NDMA) and	**India**  **Dr VUM Rao** Former Project Coordinator (Agrometeorology) I/c AICRP on Agrometeorology (AICRPAM)	**India**  **Dr. Nabansu. Chattopadhyay** President, International Society for Agricultural Meteorology

Ex- Dr. E A H ROBERTS CHAIR on NRM (TRA), Tocklai Flat-108 Orchid Block, Green Meadows, Auto Nagar Junction, Near Karnati Gardens, Vanasthalipuram, HYDERABAD TELANGANA - 500070 INDIA ramakrishna.ys@gmail.com	ICAR - Central Research Institute for Dryland Agriculture (CRIDA) Santoshnagar, Hyderabad - 500059, INDIA vumrao54@gmail.com	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 nabansu.nc@gmailcom Alternate E-mail: nabansu_c@yahoo.co.in
India  **Dr. GGSN Rao** Former Project Coordinator (Agrometeorology) I/c AICRP on Agrometeorology (AICRPAM) ICAR - Central Research Institute for Dryland Agriculture (CRIDA) Santoshnagar, Hyderabad - 500059, INDIA ggsnrao@gmail.com,	**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
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

		Medium Range Weather Forecasting (NCMRWF) & India Meteorological Department, Ministry of Earth Sciences, New Delhi, P: somesh03@gmail.com, somesh 07@yahoo.com
India  **Dr. V. Geethalakshmi** Director Directorate of Crop Management, Tamil Nadu Agricultural University, Coimbatore - geetha@tnau.ac.in	**India**  **Prof (Dr) Surender Singh** PhD-Dual Gold Medalist, PDFs-Austria, Brazil, Italy & Switzerland Professor/Principal Scientist and Member, Expert Team - CAgM-WMO, Geneva Fmr Assoc Director (C&P), Adviser (Rectt), National Vice President - AAM and Professor & Head surendersd@yahoo.com,	**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.Mrinmoy Datta** Former Joint Director, ICAR Research Complex for NEH Region, Tripura and Former OSD & Principal, College of Agriculture (Tripura University), Govt. of Tripura mdatta2@rediffmail.com,	**India** **Dr Gopi Krishna Das** Director farms(seed & farm) & Head Of Department Agro meteorology Indira Gandhi Krishi Vishwa Vidyalaya Raipur, Chhattisgarh Dr Gopi Krishna Das: gk_das2005@yahoo.co.in,	**India**  **Dr.AVM Subba Rao** Principal Scientist ICAR - Central Research Institute for Dryland Agriculture (CRIDA) Santoshnagar, Hyderabad, India
India  Dr. Santanu Kumar Bal Project Coordinator (Agrometeorology) I/c AICRP on Agrometeorology (AICRPAM) ICAR - Central Research Institute for Dryland Agriculture (CRIDA)	**India**  Dr. Abdus Sattar Assistant Professor (Agrometeorology) Principal Investigator, AICRP on Agrometeorology Principal Investigator, AICRPAM-NICRA Project	 Dr.V.Radha Krishna Murthy Ph.D PGDES Professor and Head (Retired) Department of Agronomy ANGRAU, Bapatla A.P Email ID : vrkmurthy11@gmail.com

Santoshnagar, Hyderabad -	Nodal Officer, Gramin Krishi Mausam Sewa (GKMS) Project Centre for Advance Studies on Climate Change Dr.Rajendra Prasad Central Agricultural University, Bihar Pusa-848125, Samastipur sattar.met@gmail.com,	Contact : +91 9948140687
 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
India **Dr. B Ajithkumar** Assistant Professor & Head Department of Agricultural Meteorology College of Horticulture Kerala Agricultural University Vellanikkara- Thrissur Dr. B Ajithkumar: DR. B Ajithkumar" <ajithagromet@gmail.com>,	**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>,
 **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

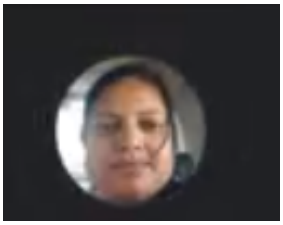
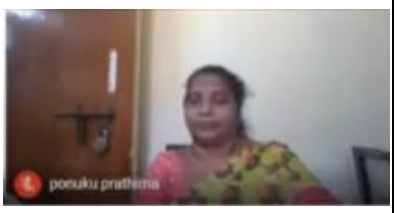
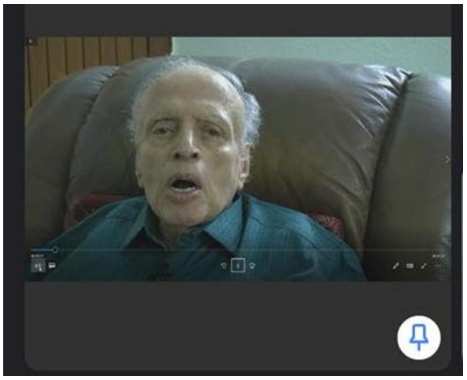
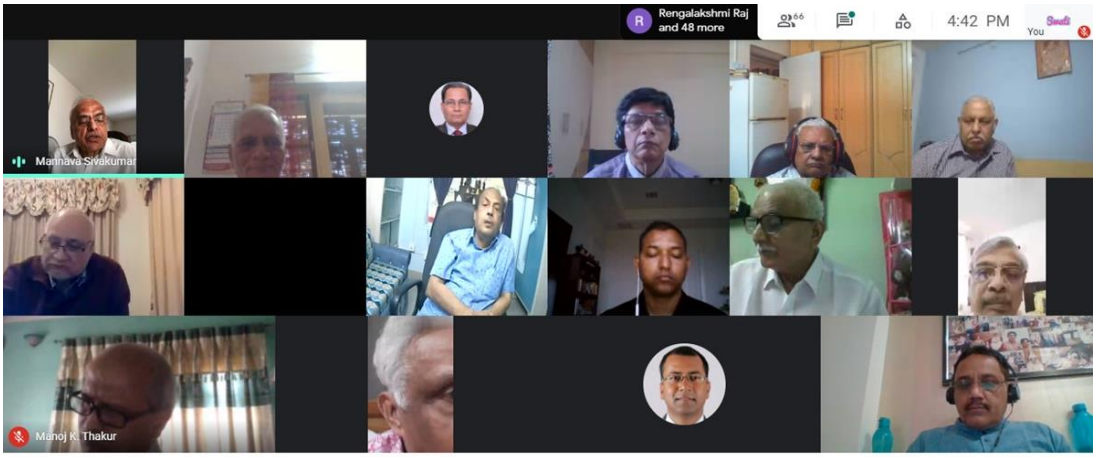
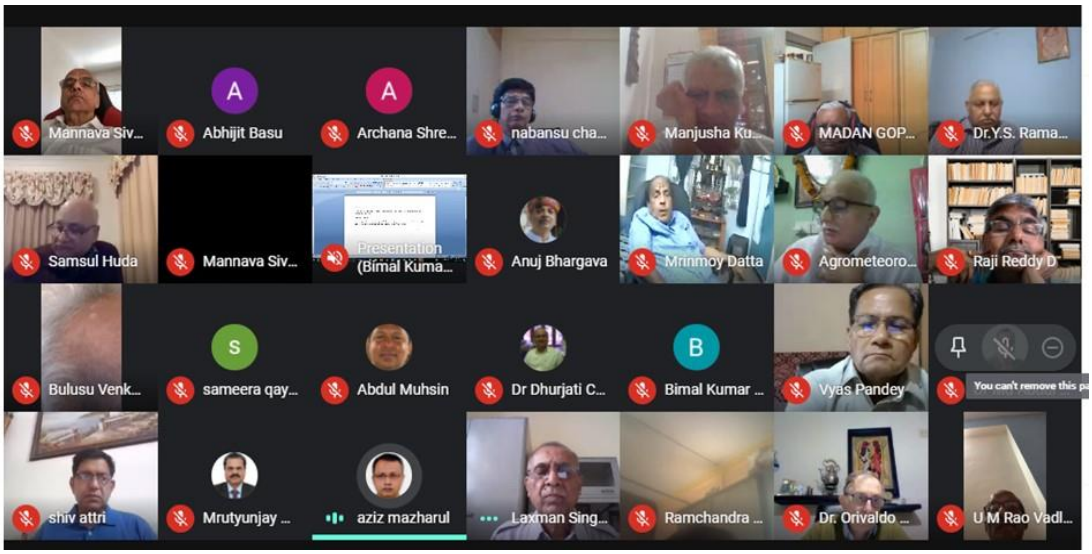
ICAR-Indian Agricultural Research Institute, New Delhi-110012, India ananta.iari@gmail.com		vksehgal@gmail.com
 **Dr. GSLHV Prasada Rao** Founder, Academy of Climate Change Education and Research, Kerala Agricultural University, Vellanikkara, Thrissur, Kerala, India International Agrometeorologist in PCM , Nepal gslhvprao@gmail.com,	 **Dr. 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) Space Applications Centre, ISRO Ahmedabad 380015, Gujarat, India bimalsac2019@gmail.com, bimal.vegetation@gmail.com	 **Dr..Arun Kumar Senapati** RRS, BCKV Kakdwip, 24- Pgs(S), W. B senapatiarunkumar@yahoo.com,
 **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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