Proceedings of the Sensitisation Programme on Agro-meteorology in Afghanistan

Organised by the Ministry of Agriculture, Irrigation and Livestock Afghanistan

26th December, 2021

Participants

1.Mr. Abdul Rahman Rashid
Honourable Minister of Agriculture, Afghanistan
2.Mr.M. Sadrazam, Honorable Deputy Minister Technical, Afghanistan

3. alhaj.M. Abdul Ghafor , Director General, Planning and Program coordination, Ministry of Agriculture, Irrigation and Livestock (MAIL).

3. Dr.Waheedullah Yousfi, Agromet Expert and Coordinator, Ministry of Agriculture, Irrigation and Livestock, Afghanistan

4. Mr. Najibullah Osmani, GIS Specialist, GIS & AgroMet, Directorate of Statistic and Information Management, Ministry of Agriculture, Irrigation and Livestock (MAIL), Afghanistan

5.Representative from the Ministry of Energy & Water, Afghanistan

6. Representative from the Afghanistan Meteorological Department

7. Representatives from theAgriculture Faculty

8. Representative from the Geoscience Faculty, Kabul University

9.Dr Laxman Singh Rathore: President, SAFOAM

10.Dr. Nabansu Chattopadhyay, Secretary, SAFOAM

11.Dr A.K,S.Huda, Founding Member,SAFOAM

12.Dr. B V Ramana Rao: Founding Member, SAFOAM

13.Dr.Y.S. Ramakrishna: Founding Member, SAFOAM

14.Prof Dr M C Varshneya: Founding Member, SAFOAM

15.Prof. A.M.Sheikh: Founding Member,SAFOAM

16.Dr. Mazharul Aziz: Joint Secretary, SAFOAM

Dr. Raji Reddy: Founding Member, SAFOAM








Background of the Sensitisation Programme on Agro-meteorology

As we all know that South Asia is highly prone to extreme weather events and weather aberrations that frequently cut across national borders and result in major impacts on crops and live-stocks. Repeated exposure to such hazards and climatic variability often pushes the poor, particularly rural poor engaged in agricultural activities, into chronic poverty. This is likely to get worse with climate variability and change. Yet, in most countries in South Asia Region, despite demand, access to weather based information services is limited and the monitoring, forecasting, technical human resource capabilities and organizational arrangements that contribute to the supply of such information products and services, are not adequately in place. Because all the countries in South Asia are heavily dependent on agriculture, there is an urgent need to strengthen agrometeorological services in all of them.

South Asian Forum on Agriculture Meteorology (SAFOAM) was launched on 9th February 2021. The goal of this forum is to provide agrometeorological advisory services especially for the poor, unprivileged and unreached famers in South Asian Region (Afghanistan**, Bangladesh, Bhutan, India, Myanmar, Nepal and Sri Lanka, Pakistan and Maldives**). A number of Founding Members of SAFOAM from different member countries, representatives from different organisations and international experts presented the present status, gaps, need and challenges etc in operational agromet advisory services presently operating in South Asia Region along with useful suggestions for the proposed activities, structure and other technical and administrative issues, immediate plan and also the future strategies and activities.

The salient objective of the Forum is to bring together various functionaries working in area of agrometeorology to;

√ Share information about national

√ Agromet advisory services including outreach & challenges of these services

·√ Sharing common strategic mission & vision in adaptation & mitigation of future challenges of weather and climate on agriculture

√ Innovative approach in management of weather & climate hazards and extreme events to promote greater resilience in agriculture

√ Identify priority areas like use of reliable and timely sub-seasonal to seasonal forecast in agriculture, use of remote sensing on operational agro-meteorology services etc. to strengthen regional collaboration and;

√ Discuss and establish institutional arrangements needed to sustain and scale up ongoing national and regional efforts in the delivery of agromet services.

Based on the discussion and the useful recommendations made in launching meeting following six thematic areas have been identified.

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

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

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

4.Web Portal for South Asia Forum on Agricultural Meteorology.

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

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

To meet the goals of SAFOAM and to kickstart country specific activities, South Asian Forum on Agricultural Meteorology (SAFOAM), has started to launch country specific sensitization program. This program is mainly organized for higher Government officials at Ministry/ policy decision levels/ bureaucrats and policy makers, which will be an interactive session (2 to 3 hours) with two or three small illustrative presentations. Importance, economic aspects of Agrometeorological Advisory Services along with the case studies will be included in this program.

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Programme Details

This program was organized on Sunday i.e., 26th December, 2021 at 10:00 AM Afghanistan time in HE MAIL Minister's office. The meeting was chaired by HE MAIL Minister and his Deputies with high profile nominations from Afghanistan Meteorological Department (AMD), Kabul University (Agriculture and geoscience faculties) and Ministry of Energy & Water (MEW)/.

S No	Time	Topic	Resource Person
1	9:30 AM	Registration and setting up the IT equipment	IT
3	10:00 - 10.05AM	Welcome Address and Introduction of the Afghan participants	Mr. 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, Islamic Republic of Afghanistan
4	10:05 - 10:15 AM	Opening speech by HE MAIL Minister	M. Abdul Rahman Rashid
5	10:15 - 10:25 AM	Opening Speech by Honorable Deputy Minister Technical	M. Sadrazam
4	10:25 - 10:35 AM	Presentation on Present status of Afghanistan's Agrometeorological Services	Dr. WaheedullahYousfi Agromet expert and coordinator Ministry of Agriculture, Irrigation and Livestock Afghanistan
5	10:35 - 10:50 AM	Support from South Asia Forum on Agricultural Meteorology on development of operational Agrometeorological Advisory Services including economic benefit and environmental protection in agriculture sectors in Afghanistan	Dr. Nabansu Chattopadhyay Secretary, SAFOAM
6	10:50 - 11:05 AM	Expert Comments from the President of SAFOAM---10 minutes	Dr L.S.Rathore President, SAFOAM

7	11:05 to 11:15 AM	Comments from the international expert on agrometeorology (10 min)	Dr.A.K.S. Huda School of Science, Western Sydney University, Australia
8	11:15 to 11:25 AM	Interactive Session	Both sides
9	11:25 11:30 AM	Concluding remarks	Dr. WaheedullahYousfi /Dr Y.S.Ramakrishna, Ex- Director, CRIDA (ICAR), India

Sensitisation Programme on Agro-meteorology in Afghanistan was started at 10 AM on 26th December, 2021. The meeting was started with the welcome address.

Welcome Address

At the outset **Mr. Najibullah Osmani,** GIS Specialist, Head of GIS & Agro Met Unit, Founding Member of South Asia Forum on Agricultural Meteorology (SAFOAM), Directorate of Agricultural Statistics and Information Management (ASMIS), Ministry of Agriculture, Irrigation and Livestock (MAIL), Jamal Mina, Opposite of Kabul University, Islamic Republic of Afghanistan has given warm welcome to all the participants to the important meeting of SAFOAM. In the beginning he introduced himself to the members of the meeting. He said that not only himself but whole concerned communities in Afghanistan would be immensely benefitted by the wealth of knowledge and long-term experience on agrometeorology from the experts of SAFOAM in respect of impact of extreme events in agriculture including drought management and early warning system in Afghanistan. He conveyed his profuse thanks to the Honourable Ministers and Deputy Minister and the representatives from the Ministry of Agriculture, Irrigation and Livestock (MAIL), Ministry of Energy & Water (MEW), Kabul University, Afghanistan Meteorological Department and all the external participants of SAFOAM. Afterwards, he introduced Honourable Minister, Deputy Minister, Plan & Policy, Director, Plan & Policy, Geoscience Faculty of Kabul University, Agriculture Faculty. He then requested all the external participants to introduce themselves. Members from the Afghanistan side and from external participants briefly mentioned their expertise in the fields of Agricultural Meteorology including their experience in operational Agromet Advisory Services for the farming community in various parts of the world. Afterwards Honourable Minister and Deputy Minister were requested to kindly deliver their addresses to the members of the meeting.

Address by the Honourable Minister of Agriculture, Afghanistan

Mr. Chairman,

Distinguished Participants

Gentlemen.

It is my greatest pleasure to be with you this morning to officiate the opening of your virtual Workshop. I wish to thank you Mr. Chairman and the organizing committee for inviting me to this occasion. May I now take the opportunity on behalf of the Government of Afghanistan and on my own behalf to welcome the foreign participants and guests from other institutions in the country in this workshop.

I would like to commend South Asia Forum on Agro-meteorology (SAFOAM) arranging and facilitating the Workshop to sensitize senior Afghan management and policy makers on this important topic of agro-meteorology, which is key to successful agricultural production and marketing where more than 68% of the population is involved.

Mr. Chairman, this workshop is organized at the right time when a Afghanistan is going through drought for the second consecutive year which impacted irrigated and rainfed agriculture including rangeland and livestock sector. We as a new government are committed and working hard for the well being of our people especially farmers and herders.

The livestock sector in Afghanistan is predominantly consisting of the traditional herders, which may not be very productive but very important to the livelihood of farmers and cattle keepers. Over a number of years now there has been a lot of efforts put into this sector to improve its productivity. This sector is largely dependent on rangelands of the country, which are mostly located in central and western region of Afghanistan prone to frequent droughts and floods.

It is my hope that this Workshop will be the basis to address itself to these issues critically and come up with some interventions, which will help us solve some of the chronic problems, which limit our agricultural production as a whole.

Mr. Chairman, I wish to end here by wishing you all the best in your deliberations. The exchange of experiences from different countries represented here and exchange of notes amongst yourselves are the healthiest treasures that all of us are looking forward to reach our desired goals. I wish to thank you all again for your invitation and your attention.

At the end, I encourage each of you to share your experiences and expertise on this important science and anticipate that this workshop will be a great success. I would like to assure you of me and my teams utmost support in this regard.

Thank you very much

Abdul Rahman Rashid
Minister of Agriculture, Afghanistan

Address by the Honourable Deputy Minister of Agriculture-Technical, Afghanistan

There is hardly a branch of human activities as dependent on the weather as agriculture. Agricultural production is for a large part still dependent on weather and climate despite the advances in agricultural technology over the last half a century. More than ever, agro-meteorological services have become essential because of the challenges provided to many forms of agricultural production by increasing climate variability and associated extreme events as well as climate change, all of which are affecting the socio-economic conditions, especially for countries like Afghanistan where more than 68% of people are agriculture dependent.

The economic value of weather information products is steadily increasing, in Afghanistan, due to public awareness over the years. Agromet Unit is one of the vital departments of the Ministry of Agriculture, Irrigation and Livestock. This unit has 108 ground weather stations which records climatic parameters on daily basis. In addition, this unit is mainly responsible for assessment/analysis of atmospheric conditions and dissemination of agrometeorological information, quantification of weather parameters through field observation and GIS/RS (radar and satellites) techniques which are utilized for planning of agricultural operations in the country. It also plays a vital role in timing of cultural practices, such as ploughing, sowing/planting, mulching, weeding, thinning, pruning and harvesting and to some extent for early warning through its technical partners. Moreover, looking at the effects of weather and climate on soils, plants, animals, trees and related production in farming, the unit makes timely and efficient use of these data in relation to agriculture and early warning.

However, agro-meteorological services in countries like Afghanistan have to shoulder greater responsibilities due to lack of adequate resources, agriculture-based economy, greater population pressure, multi-dimensional projects, trans-boundary issues and climate change effects on the country in particular and the region in general. More and more demands pertaining to agro-meteorological information and services are expected from agromet unit of MAIL in the future, mainly due to farming system patterns, water management, weather-based pest and disease control, floods and droughts and early warning. The main tasks of Agromet are as follows:

1. Meteorological information collection and dissemination
2. Collection and analysis of climatic data for the design of irrigation and drainage projects
3. Information on crops, their growth stages and positive and negative factors affecting their growth

4. Food security studies
5. Agroclimatology for land use planning and crop zoning
6. NRM planning and management

Keeping in mind all the vast applications of climatic data collected through Agromet, this unit should be strongly supported and expanded both materially and financially. We should also keep in mind that agricultural production is directly linked with the availability and accuracy of short- or long-term weather and climate forecasts (data collection and analysis) or expected weather and climate patterns and without a clear policy support for Agromet unit and its services, yields with the available production means will remain below optimal even if we have best agricultural inputs in hand.

At least, I as a senior member of the ministry of agriculture, irrigation and livestock (MAIL, would like to commit and assure you for our highest support from Afghanistan.

Thank you very much for your time and technical discussions

M. Sadrazam

Honorable Deputy Minister Technical

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Address by The Director General, Planning and Program Coordination, Ministry of Agriculture, Irrigation and Livestock (MAIL) Afghanistan)

He praised the existing activities of agromet unit by saying that timely agro-meteorological information is key to successful agricultural production in countries like Afghanistan. He pointed out the importance of agromet advisory specifically in rain fed agriculture, rangeland and livestock management. At the end he assured of his full support in appoint of relevant professionals in the ministry.

Thank you very much for your time

M. Abdul Ghafor

Director General, Planning and Program coordination,

Presentation by Dr. Waheedullah Yousfi, Agromet Expert and Coordinator, Ministry of Agriculture, Irrigation and Livestock, Afghanistan on "Agrometeorology: A historical perspective, achievements and challenges".

"Agrometeorology Yousfi, Agromet Expert and Coordinator, Ministry of Agriculture, Irrigation and Livestock, Afghanistan, Founding Member of South Asia Forum on Agricultural Meteorology (SAFOAM) gave a presentation on "Agrometeorology: A historical perspective, achievements and challenges. He elaborated the genesis of the establishment, functions and maintenance of the weather stations in Afghanistan since 1983 and collection of different meteorological data. He mentioned that different agencies, donors and the Govt. of Afghanistan are involved in establishment a sensible network of weather stations in the country. He said that at present 108 (stations rain gages) are still active and collecting data in 34 provinces of Afghanistan. He also presented the current resources in respect of different weather stations from MAIL, AMD and MEW. He also informed that Agromet unit within MAIL was established in November 2013 after agromet project was handed over to the MAIL. Since then, the Agromet unit is functioning under the Statistics Directorate of MAIL which are producing weekly, monthly and seasonal bulletins for all stakeholders. He also showed how and what type of data are collected on meteorological parameters, crop information and also informed the different users of the data as mentioned. He mentioned different challenges and also presented the number of recommendations to strengthen the observational set up and agromet advisory in Afghanistan. Presentation of Dr, Waheedullah is attached along with the proceedings for more information.

Presentation by Dr. Nabansu Chattopadhyay, Secretary, South Asia Forum on Agricultural Meteorology (SAFOAM)

Dr. Nabansu Chattopadhyay, Secretary, South Asia Forum on Agricultural Meteorology (SAFOAM) presented on "Support from South Asia Forum on Agricultural Meteorology on development of operational Agrometeorological Advisory Services including economic benefit and environmental protection in

agriculture sectors in Afghanistan". Dr. Chattopadhyay showed the types of extreme weather events, like high temperature, drought and flood that are causing substantial crop damage in Afghanistan on recurring basis and also mentioned what could be the proposed measures to be taken to save the crops from this unfavourable weather. According to him, In the beginning, among others, SAFOAM would like to work with the counterpart in Afghanistan in different areas on capacity building, education and research. He made special mention on joint initiative to drought and flood control and also development of pest weather relationship and crop-weather calendars. Besides, he showed different training modules for agricultural officers to farmers, success stories of agrometeorology and economic impact of operational agromet advisory services in India and Bangladesh. At the end, Dr. Chattopadhyay showed a tentative structure of operational Agromet Advisory Services involving different organisations in Afghanistan. Presentation of Dr. Chattopadhyay is attached along with the proceedings for more information.

Address by the President of SAFOAM Dr. L.S. Rathore

Dr. L.S.Rathore, President, South Asia Forum on Agricultural Meteorology (SAFOAM) said that this is landmark day in the history of SAFOAM and also for the members for the development of operational Agromet Advisory Services in Afghanistan. He appreciated both the presentations made here mentioning the current level of weather information and services available in Afghanistan and what could be done in operating a sensible operational Agromet Advisory Services in the country. He said that basic components are available for initiating operational Agromet Advisory Services in Afghanistan. Basic information related to weather and sizeable amount of weather data from modest number of weather stations are very useful in this regard. However further augmentation may be made in this regard subsequently. He said that weather forecast is the mandate of the Afghanistan Meteorological Department and so far, good job has been done by the AMD; but customisation of forecast towards advisory preparation is required. For use of crop information in agromet advisories, though some crop information is available, here also further augmentation is required. Use of satellite information for current status of crop condition will be an important ingredient in this regard. As good amount of ground truthing in respect of soil data is available, more dynamic information particularly soil moisture, soil temperature using remote sensing can be made available for agromet advisory preparation. Though some pest and disease information are available, however periodic reporting of pest and diseases status initially at coarser scale and subsequently at smaller scale fine tuning may be made for AAS and also may have future plan for pest and disease forewarning. Dr. Rathore also emphasised for the. importance of marketing data for AAS. He also emphasised for close coordination among the different organisations like Ministry of Agriculture,

Irrigation and Livestock (MAIL), Ministry of Energy & Water (MEW), Kabul University, Afghanistan Meteorological Department, academia, agricultural research institute, extension agencies, dissemination agencies, disaster management organisation etc. Dr. Rathore discussed elaborately on the different action plans These are (i) Establishment of Agromet Coordination Platform involving MAIL AMD and other and he wished that this platform needs to be formalised. Action II AAS bulletin preparation taking into consideration of weather forecast, weather data, crop and pest and disease information at district level. Action III. Development of crop weather relationship and preparation of crop weather calendars for principal crops at district level and mentioned that responsibility may be given to experts in Afghanistan with the supports from SAFOAM. Dr. Rathore suggested to prepare agromet advisory service bulletin initially at central level and then decentralised at agroclimatic zone and district level. Dr. Rathore said that a strong dissemination mechanism is highly essential to communicate the required information to the user community involving multi-agencies like extension, IT people, multi-media like press, print and others and other multi-channel dissemination system. Besides, he talked about more on crop weather relationship, agromet products. remote sensing. drought indices, soil moisture. He said that it is required to Identify the groups/experts for products generation and also linking them through some mechanism to the organisations, SAFOAM experts on South Asia in execution of the job particularly product generation etc. through hand holding. Dr. Rathore also touched the action plan on development for capacity building for different components of AAS including products generation and also for users which should include user awareness programme which may be included in separate action plan. At the end he commented that without resources nothing is moved. As far resources are concerned, he referred to funding resources for manpower resources, infrastructure resources including observation system, computing system etc. He added that education programme and research should also be taken along with all the action plan to have self-style AAS system in Afghanistan. He also mentioned for funding to resources persons who can work with those involve in Afghanistan in AAS. According him, crop yield forecasting project can be taken up in second phase as it involves lot of capacity building issues, At the end Dr, Rathore said that he is very much hopeful that such initiative would be able to establish productive operational Agromet Advisory Service in Afghanistan in near future,

Address by the International Experts on Agrometeorology. Dr.A.K.S. Huda, School of Science, Western, Sydney University, Australia

Dr.A.K.S. Huda, School of Science, Western, Sydney University, Australia discussed initially on the different impacts of climate change and climatic variability on future crop production and also its importance in strengthening of agrometeorological research and services into mitigation and adaptation actions that can assist in addressing those issues. He stressed for high resolution observational data to support services and modelling, optimal combinations of remotely sensed, modelled and in-situ measured agrometeorological parameters which will need to be developed at high spatial and temporal resolution universally. He also mentioned the role of the agrometeorology on the agricultural value chain to help optimise their operations and climate sensitive food preservation during packaging, transport and storage, marketing. He also discussed on innovative approach priority areas in management of weather & climate hazards and extreme events sub-seasonal to seasonal forecast in agriculture, use of remote sensing on operational Agrometeorology services to promote greater resilience in agriculture. He also stressed for establishment of institutional arrangements needed to sustain and scale up ongoing national and regional efforts in the delivery of Agrometeorology services.

Interactive Session

Prof Dr M C Varshneya, Former Vice-Chancellor, Anand Agricultural University, Gujarat said that a committee may be formed with the representatives from Afghanistan and members of SAFOAM to address the various issue like present status and installation, reviving or replacement of weather stations as at present these are not in good condition due to some reasons. According to him, there is need to know the crop status, crop sown and also crops affected by drought condition and type of forecast could benefit the crop production under drought condition. He asked to collect crop

information at district if not available at district level, then nationally. He said that in addition to cereal crops, horticultural crops are to be reported to the committee as number of horticultural crops, dry fruits are grown in Afghanistan. In addition to that exact position of livestock status should also be reported and if possible remote sensing technique can be used in identification and mapping of different types of livestock. He also discussed on the promotion of high-altitude crops and pests and diseases problem in warehouses as all are very sensitive to weather and climate. He also discussed about the development of infrastructural facility, funding etc, and also support from SAFOAM for the development of operational Agromet Advisory Services in Afghanistan. He discussed elaborately on these above issues in the context of Afghanistan for development of operational Agromet Advisory Services in the country. He added that all the works might not be started in the first goal but a system may be developed by the proposed committee mentioned above. He also mentioned on establishment of education system with the support of SAFOAM. He stressed for the need of training on weather and climate services at different level of workers engaged with agriculture.

Dr. B V Ramana Rao, Eminent Agrometeorologist & Editor in Chief, Journal of Agrometeorology, India said that he is happy that SAFOAM made a good beginning with sensitization workshop for Afghanistan with the kind of enthusiasm shown by Afghanistan with participation and kind support of the Honourable Minister for Agriculture. This is a clear indication for taking up operational agromet advisory services in the near future to help the farming community. According to him agrometeorology and food security issues will be dominant throughout the world including

Afghanistan in the present century. He said that climate change and so much of climatic variability ultimately necessitate the development of agromet advisory services and sensitise the farming community to take appropriate actions to safeguard their crop production and profitability. He said that a road map should be prepared to take it further to see that operational AAS is a good success in Afghanistan. To start with the road map, there is need to assess the present situation in Afghanistan and what are the immediate priorities to make the agromet advisory services possible. The next step is to rope in the people from different organisations. sensitise and train them to participate in extending AAS to the farming community. Thus, SAFOAM should prepare a good roadmap for improving AAS in Afghanistan.

Dr. Ramana Rao also suggested that SAFOAM should plan to start a three to five days duration part time training course with one lecture of preferably one hour duration to illustrate the method of transforming a weather forecast to an agromet advisory (in interactive mode). This should cover identification of regions, predominant crops and critical/ weather-based operations to be carried at field level and so on. The Afghanistan Chapter of SAFOAM has to identify at least 10 to 12 officials

from among agricultural scientists and extension workers with good background of Agricultural Sciences. He is sure that during next couple of years a sensible AAS would be developed taking all the above-mentioned issue together.

Prof. A.M. Sheikh, Former Vice-Chancellor, Anand Agricultural University. Gujarat said all the important points for the development of the AAS and agrometeorology in particular in Afghanistan have already been spoken by the earlier speakers (Rathore, Varseneya, Ramana Rao). The most important thing is the variability of climate. Due to substantial climatic variability, thus the present status, availability of data needs to be analysed first. Looking at the climate variability, crop condition and the effect of this variability on the crop condition and with some hypothesis, the operational agromet advisory services may be started. Besides, on line data by extrapolating also may be used. He suggested to form a committee, discuss and line of action may be finalised. After couple of years fruits will come and benefit the Afghan farmers. All these things may be arranged suitably. Before funding from donors, we may start small training for agriculturists, meteorologists for analysis of data, instrumentation. After this training, they themselves will analyse and use the data. Crop data, soil data are required to prepare the advisories. SAFOAM involving all the experts will provide full support in executing the establishment of AAS in Afghanistan. He said that this initiative is really appreciable for the sake of farming community of Afghanistan.

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 project has explained how the Agromet Advisory Services has been developed during last four years in Bangladesh. According to him, in Bangladesh, the AAS project was started in 2017 fiscal year with the recruitment of consultants and also gathered all the relevant data and information like crop, agroecological zones, pests and disease, previous advisories existed in scattered way were gathered in 2018. It was World Bank umbrella, the project has been executed in the Department of Agricultural Extension (DAE), Ministry of Agriculture with substantial funding. DAE has been working in collaboration with the Bangladesh Meteorological Department (BMD) and Bangladesh Water Development Board (BWDB) in implementation of this services. This project is implementing. In 64 districts. At present there are 34 agromet stations including automated weather stations which are not sufficient enough for implementation of the project. Agromet Technical Committee has been formed by involving resources persons from BMD, BWDBD, other Research organisations to issue o agromet advisories at district level by DAE. Under this project, strong dissemination channel has been created to communicate the agromet advisories to the user community. At district, sub-district level of agricultural offices was provided equipment for dissemination also. Besides, 30000 lead farmers from

15000 farmers-based group were enrolled for sending SMS advisories especially during cyclone and other extreme events. Under this project district and national AAS bulletin are issued and uploaded in the Bamis Portal (www.bamis.gov.bd). Huge database of agromet advisories has been created under this project Model training course for different levels i.e., agricultural officers to farmers developed by RIMES and Practical Action are in operation now. Under the extension period of WB funding, automation of advisories. Agromet course in universities have been initiated including setting up of community radio in 14 regions digital and display board, opening of education programme. He informed that more than 2.7 million times Bamis portal were viewed as on today. He concluded that number of programmes have been executed under the project and also in near future more actionable will be done for the farmers in Bangladesh.

Dr. D Raji Reddy, Former Director of Research. P.J. Telangana State Agriculture University., Rajendranagar, Hyderabad, Telangana shared his rich experience in development of agromet advisory services during his assignment in Afghanistan under the World Bank project. He said that. there are 35 provinces and 400 districts with different agroclimatic zones in Afghanistan. According to him, the climate in northern part is different than southern part. As far as the information of natural hazards like drought, extreme temperature, flash flood is concerned, meteorological station data are sparse. He suggested that Afghanistan may follow the way the Bangladesh established the operational AAS in the country and also the adopt the example of Indian AAS. He reported that FAO have also done good work in Afghanistan. He said that though the World Bank project is operating in right direction, however, at present the same is on hold due to some reason. At present productivity of crops is relatively low and awareness for operational agrometeorology is lacking and also extension is week. He suggested to start operational AAS from zero level. According to him, the positive part is that productivity of crops can be doubled by using the weather and climate. He appreciated community development programme in Afghanistan. Dr. Reddy informed that World Bank proposed to set up a number of weather stations in the country. He also agreed with Prof. Varshneya that in addition to cereals, there is enough scope to produce fruit crops, horticultural crops, livestock, diary. He added that coordination among Kabul University and other departments would be useful. He also suggested to create a single platform by integration of other line departments. Agromet Advisory Service bulletins need to be prepared at centralised level and down to provincial level subsequently. According to him, this workshop has been organised at right time to help the Afghan Government. As agrometeorological research is not upto the mark, Afghan Research Council should promote research and also suggested some agromet courses in the university. and students should be sent to India under capacity building programme. According to him, there is great potential in improvement operational AAS in the country and any intervention will make improvement in crop productivity. He concluded

by saying that this is the right time that the joint venture of SAFOAM and government of Afghanistan may do wonders in climate services to agriculture in Afghanistan.

Dr Y.S.Ramakrishna, Ex- Director, Central Research Institute for Dryland Agriculture, India said that it is a bold initiative with good focus and support from the Ministers. According to him, at present operational Agromet Advisory Service in Afghanistan is not adequate; however, it may start with simple initiative and may follow the Bangladesh initiatives. He suggested to reset and revisit all the data system. He added that at present 108 weather stations are working and there is need to interpolate information to other areas of the country taking into the existing data linking with satellite information. He also said that as some good datasets are available, it is possible to use it for preparation of agromet advisories linking and roping of farmers through extension agencies, farmers inputs on crop condition and others and use of satellite data. He suggested to Involve dedicated people for training.

H also said that he is happy that a good beginning is made to the SAFOAM activities with the First meeting being participated by the Hon'ble Agriculture Minister, Hon'ble Deputy Minister and Many other Dignitaries and high officials in Afghanistan. It Augurs well for SAFOAM and encourages other countries in the region also to follow up activities with interested support from high officials in those countries. Such an activity will certainly help the program to take off at a high level in future.

The support given by the Dignitaries from Afghanistan to start a course curriculum in colleges will boost the manpower availability in the country and he is sure that similar responses will be received from other countries also in future. It is now evident that time has come to plan our activities in a systematic pattern to prepare programs of training to different level personal and also to suggest alternative simple methods for collecting and gap filling of data (may be coarse data that may not be of standard pattern but just to give an idea of the weather conditions prevailing in these data gap areas) so that it can serve some useful purpose to start with before standard equipment are set in in those areas. Interpreting satellite information and using simple type rain gauges installed and monitored in schools and colleges and offices by interested teachers/ students/ officials on a token payment can be a start. Such improvising steps that can be of help for data generation can be thought of. Also, simple training courses available could be compiled for use to initiate trainings at the earliest when the

interest and attention of top officials is on. These are some of his initial suggestions, which will help to take off quickly.

In addition to that, very useful suggestions/comments were made by the distinguished participants from Afghanistan. These are as follows.

Professor Abdul Ghyas Safi, Dean Faculty of geosciences of Kabul University

- Geoscience is the only faculty in Kabul University where meteorology is taught to students
- They requested assistance on meteorology syllabus from SAFOAM committee
- They also request to provide agromet data to students of this and other departments for using in their research studies
- They also requested to install an agromet station within the geoscience faculty for students
- We are prepared for any assistance with SAFOAM in this regard

Dr Poya, Lecturer in agriculture faculty of Kabul University

- Currently agriculture faculty doesn't have any subject of agro-meteorology taught in the faculty, however, if SAFOAM agrees they can jointly develop the syllabus and teach them in irrigation and agronomy departments of the faculty
- However, Dr Reddy proposed that first the faculty should start with a subject to under graduate students and then gradually they can think of a department within agriculture faculty

Engr Rohullah Beigi, Head of flood/drought forecast of Ministry of Energy and Water

- When we talk about irrigated and rainfed area, we need to consider snow also as most of the rivers are snowfed in Afghanistan and it forms big part of precipitation in Afghanistan. It was added the main precipitation season in Afghanistan is from October to May so most of the precipitation also occurs in the form of snow in most parts of the country.
- MEW through a JICA funded project (HYMEP) filled the met data gap from 1983 to2003 using satellite data
- They have handed over the 26 Met stations to Afghanistan Meteorology Department last year so MEW don't have my met station now and AMD has 29+26 meteorological stations

Dr. Chattopadhyay appreciated the suggestions made to assist Kabul University to start agromet course/curriculum in different forms in the University. He added that in doing so a number of resource persons would be available in Afghanistan to run the operational AAS in a sustainable manner. Dr. Raji Reddy also liked the proposition made by the Kabul University to start agromet course. However, he suggested that in addition to those initiatives may be taken up to start at least a basic course on agrometeorology in under graduate level. He also added that immediately a short course under virtual mode may be started, He also suggested that some persons from Kabul University may be sent to the Agricultural Meteorology Division, Pune to undertake training. Besides, guest lectures from the

experts of SAFOAM could also be arranged. Prof.Varshneya suggested that the existing syllabus on meteorology/agrometeorology of Kabul University may be shared with SAFOAM so that the same may be examined for further discussion. Dr. Ramakrishna suggested that specific requirements from Afghanistan like snow melt, evaporation, crop weather relation crop weather calendar etc may be shared for preparation of the curriculum on agrometeorology.

Concluding Session

Dr.Ramakrishna once again said that this is an excellent meeting. where we could able to hear the existing status of weather stations and level of agromet advisory services in Afghanistan, what are the requirements etc. As network of weather stations is inadequate, there is need to develop the kind of good network. According to him, with the existing stations plus stations added, satellite data, gridded data can be generated to fill the gap in the unrepresented areas and ultimate create some data base with cross check over the country and ultimately good information would be available for the country. He said that there is good potential to increase agricultural productivity by operating agromet advisory services in the country. As drought is chronic problem in Afghanistan, different available technology including drought assessment, management, post drought management strategies, rainfed agriculture system can be shared and applied. He said that interest for operational AAS may be created among the user community. He also talked about number of proposed programmes like training, education programme, inclusion of agrometeorology portion in bachelors programme with hydrometeorology. He also insisted to create job opportunity in agromet service and research so that number of students would show interest in enrolling themselves in agrometeorology courses.

As far as challenges on operational AAS is concerned, dedicated stuff required is required especially the observers who would record the weather observations. Besides, simple instruments like simple raingauges and develop a network which could be used in the advisory preparation. He also mentioned the involvement of farmers and schools in collection of rainfall observation which may not be absolutely correct but can be used with some approximation for getting rainfall pattern across the country and over 400 districts in the country.

Besides simple workshop like water balance, estimation soil moisture potential evaporation etc can be arranged and also may be included in the capsule course along with the gaps and information in the Afghanistan. Some of the technology beyond agrometeorology related to this subject like water harvesting in situ supplementing irrigation etc. He concluded that all these issues along with the feedback information from Afghan colleagues would ultimately increase the farmer productivity.

Dr Rathore said that we have covered almost all the areas as we planned to do through the workshop. We shared information on existing status, discussed the gaps and future challenges rendering targeted

service, identify priorities area including the action plans pave the way for initiating the service. The present status and existing strategies for initiating the service after need assessment in identifying the gaps and requirements etc are very important and critical component. When we talk about the need assessment having the background and objectives of the service, type of meteorology as a whole, we have now good idea on the implementation of action but it should initiate with the need assessment. What are the weather and climate information need? This is not only weather forecast, products, but also financial need, infrastructure needs, resource needs, capacity building needs, technological needs, communication and dissemination needs that will enable us to form a reasonable weather and climate information framework. When we talk about need assessment, assessment for vulnerability, adaptive capacity of the people of different livelihood be it agriculture, horticulture, livestock are very important. Thus, we need to examine all these aspect to the extent possible and how the various sectors are impacted. Non availability of meteorological information is the benchmark. . Zero level need to be defined before initiating the service. And we have already identified the gaps. He said that very good ground has been covered are ready to proceed further as discussed in today's workshop.

Action Points for Proposed Collaboration between Ministry of Agriculture, Irrigation and Livestock (MAIL) including other Line Departments, Afghanistan and SAFOAM on Setting up the Operational Agromet Advisory Service in Afghanistan

Based on the addresses of the Minister and Deputy Minister (Technical), Government of Afghanistan and other members of the workshop, following action plans have been proposed to setting up actionable operational Agromet Advisory Services in Afghanistan.

1. There is need to form a Country Chapter of SAFOAM in Afghanistan inviting the official/scientists from the Ministry of Agriculture, Irrigation and Livestock (MAIL), Ministry of Energy and Water, Afghan Meteorological Department, Kabul University and other line departments following the laid down constitution of SAFOAM. At least 10-15 members may constitute the Chapter. In depth discussion would be made between the Country Chapter of SAFOAM in Afghanistan and SAFOAM, Headquarters in India for implementation of the joint programme.
2. AAS coordination group which need to be formalised in Afghanistan. Establishment of institutional arrangements is needed to sustain and scale up ongoing national and provincial and district level efforts in the delivery of Agrometeorology Advisory Services in the country.
3. A committee may be formed with the representatives from Afghanistan and members of SAFOAM to address the various issue like status and installation or reviving of weather stations, promotion horticultural crops, livestock and high-altitude crops as all are very sensitive to weather and climate.
4. A good road map for setting up operational AAS in Afghanistan should be prepared. To start with the road map, there is need to assess the present situation in Afghanistan and the immediate priorities to make the agromet advisory services possible. The next step is to rope in the people from different organisations and train them to participate in extending AAS to the farming community.

5. There is need to assess the weather and climate information like weather information forecast, products including the financial need, infrastructure needs, resource needs, capacity building needs, technological needs, communication and dissemination needs that will enable us to form a reasonable weather and climate information framework. Besides, need assessment for vulnerability, adaptive capacity of the people of different livelihood like agriculture, horticulture, livestock may be worked out.
6. A separate meeting to brainstorm the setting of agromet education in Afghanistan may be organised. It is proposed to assist Kabul University to start agromet course/curriculum in different forms in the University. It is proposed that first the faculty should start with a subject to under graduate students and then gradually they can think of a department within agriculture faculty. It is also suggested that existing syllabus on meteorology/agrometeorology of Kabul University may be shared with SAFOAM so that the same may be examined
7. Short course training on preparation of agromet advisory services may be started. Besides, training on capsule course with the topics instrumentation, analysis of weather data, simple water balance, estimation soil moisture. Evapotranspiration, weather based forewarning models, crop weather relationships, use of satellite data in crop condition assessment, soil moisture estimation and different stress identification, etc may be organised.
8. SAFOAM should plan to start a three to five days duration part time training course with one lecture of preferably one hour duration to illustrate the method of transforming a weather forecast to an agromet advisory (in interactive mode). This should cover initiation identification of regions, predominant crops and critical/ weather-based operations to be carried at field level and so on. The Afghanistan Chapter of SAFOAM has to identify at least 10 to 12 officials from among agricultural scientists and extension workers with good background of Agricultural Sciences.
9. There is need to revisit the existing and proposed network of weather stations in the country.
10. In order to fill the gaps of data in the unrepresentative areas in the country, gridded data base may be created by considering the existing weather data from the network of stations and also satellite data. This may be used to prepare the agromet advisory at national level in the beginning and subsequently at provisional level and district level.
11. As drought is chronic problem in Afghanistan, a separate collaborative programme using the different technology, drought products, drought management including the in-situ water harvesting involving the experts of SAFOAM may be organised.
12. Required initiative may be taken up for Funding resources for manpower, infrastructure i.e., observations, computation etc.

Weather Observatory in Afghanistan

Automatic Weather Stations in Afghanistan

Radiation Observatory in Afghanistan

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