# A collective vision for agriculture climate services in the Asia-Pacific region

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**Early Online Release**: This preliminary version has been accepted for publication in *Bulletin of the American Meteorological Society*, may be fully cited, and has been assigned DOI 10.1175/BAMS-D-22-0100.1. The final typeset copyedited article will replace the EOR at the above DOI when it is published.

**FAO Asia-Pacific Agriculture Climate Service Week summary report**

**Who**: Around 270 participants from national agriculture, hydrological, and meteorological services, non-government organisations, private sector, and research institutions

**What**: Gathered to take stock of progress since the first Climate Services Week, explore and highlight innovations in climate services that support transformative agri-food systems, to promote knowledge exchange, collaboration, and partnerships, and to develop a collective vision for agriculture climate services in the Asia-Pacific region.

**When**: November 30th ~ December 3rd, and December 7th, 2021

**Where**: Online conference (via Zoom)

**Co-organizing institutions**: FAO, CGIAR, CCAFS, ICRISAT, SNU, WMO, and IFRC

The 2nd Asia-Pacific Agriculture Climate Services Week is a successive workshop to the 1st Asia-Pacific Agriculture Climate Services Week held in July, 2019. This conference convened many participants working in diverse sectors including agriculture, meteorology, hydrology, disaster risk management, and anticipatory action to promote knowledge exchange and cross-sectoral cooperation. The Week explored opportunities and challenges at the local, national, and regional level as well as innovations across involved sectors. The outcome will facilitate development of the collective roadmap for agriculture climate services (ACS) in the region. The theme of each day consists of each section of this paper, and pivotal ideas among what was discussed are stated.

- **Evidence-based climate resilient agriculture planning and investments**



Accepted for publication in *Bulletin of the American Meteorological Society.* DOI 10.1175/BAMS-D-22-0100.1.

Climate services are crucial for robust decision making and long-term investments for climate change adaptation. The uncertainty induced by climate change brought a paradigm shift in climate projection practices from a more deterministic (top-down) to project-based decision making (bottom-up), which allows quantification of the uncertainty thus allowing less-regret decision making. Adaptive management and robust decision-making in project design help manage climate risks and uncertainty. Furthermore, the importance of science-based climate information was highlighted as evidence for GCF project investments. Climate information needs to be clearly linked with climate mitigation and adaptation benefits of a project. High-resolution data collection and management would improve evidence-based foresight planning in the agriculture sector.

A couple of country examples of utilising climate services in long term planning were introduced to highlight challenges and opportunities. First, in the process of formulating the Long-Term Strategy for Carbon Neutrality (LTS4CN) in Cambodia using climate data, challenges included the collection and use of optimal climate data as evidence for long-term policy development in agriculture, as well as inter-ministerial collaboration. To address the issues, the next Nationally Determined Contribution (NDC) Expert Tool has supported the government with the planning, implementation, and evaluation of future climate policies. The forestry and other land use sector scenario was also introduced as a framework of long-term strategy building. Similarly, in Lao PDR, improving adaptive capacity in agriculture is the key long-term climate action strategy. It was highlighted that the scientific evidence-based approach can develop tailored adaptation actions. Combining adaptive capacity data and disaggregated livelihood zones can help policymakers in identifying geographical focus areas and appropriate interventions.

At the village level, blending scientific and technical expertise with local knowledge and a user-centred approach have been common suggestions to improve climate services. Tailoring climate services to farmers' needs by producing actionable information for specific locations was discussed to increase farmers' confidence in the services. However, upscaling from successful village-level pilot cases such as the Climate Smart Village case study in Telangana, India has been challenging due to the incoherence with the existing national climate change adaptation plans. There is a need to utilise climate data and information, such as climate hazards and impacts, to develop local-level long-term adaptation solutions as well as short-term planning. For instance,



Accepted for publication in *Bulletin of the American Meteorological Society.* DOI 10.1175/BAMS-D-22-0100.1.

the Strengthening Agro-climatic Monitoring and Information System (SAMIS) project and the Participatory Forest and Agriculture Land Use Planning tool help enhance the climate change adaptation capacity of Lao PDR and farmers' access to more tailored scientific information through the use of systematic foresight planning and village-level long term projections.

In conclusion, climate services are a powerful tool to support long-term decision-making on various spatial scales and increase the adaptive capacity of agri-food systems to climate change. However, direct uses of climate data in foresight planning for policies remain a critical challenge at multiple levels. It is necessary to understand the stochastic characteristics of different datasets from their inherent uncertainty, so as to support farmers, agriculture extension services, and supporting agencies to use the information wisely with less regret.

- **Agrometeorological services to address multiple hazards**

Agromet services are a decision aid service, derived from climate information, that assists agricultural stakeholders to make improved ex-ante decisions. Tailored climate information products in the agromet services can be used to improve and/or protect the livelihood of farmers in agricultural production by minimising the impacts of adverse weather. To enable scale-up and sustainable operation of agromet services, innovative business models and economic valuation are crucial. For example, AgroClimate combines various climate information with customised decision aid tools to provide agromet services for farmers. To overcome limited funding that hinders the sustainable operation, farmers and group subscription and web services to third parties are presented. Public-Private Partnership (PPP) was also suggested as an innovative solution. Working together with the government and NGOs through PPP can help reduce or waive service costs, increase accessibility, give more opportunities for education and training to farmers, financial and technical support from the private sectors.

Economic valuation of agromet services is becoming increasingly more important for agricultural decision-making and continued investments. A valuation framework is thus crucial to incorporate the forecast uncertainty and the potential value of climate forecast information. This can lead to increased adoption of the agromet



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services by farmers. In other words, economic valuation is an important tool to translate and deliver climate information to users. It can also help address usability gaps in agromet services. The case study of Bangladesh was presented as an example to share the finding that farmers are more willing to pay for the climate services when they are more actively engaged in the Farmers' Field School. Thus, tailor-made services and co-creation processes through two-way communication are needed to reduce the usability gaps and to inform the socio-economic value of agromet services.

In order to improve the dissemination of climate services to the last mile farmers and agri-food value chain actors in the region, several novel delivery mechanisms and key lessons learnt were explored. Firstly, co-production of tailored agromet advisories can help reduce gaps between services and actual demands, with the use of multiple accessible channels such as ICT tools and farmers' field schools. Secondly, it is important to engage the broader climate service value chain actors including producers, translators, and users to address last-mile challenges. However, there is still a weak collaboration among different institutions - agricultural, hydrological, and meteorological sectors and other local partners. To further improve delivery mechanisms, gaining farmers' trust in information is needed by aligning the information with their on-the-ground experiences and impacts, translating climate data into actionable information for farmers was recommended. Strong and purposeful bottom-up engagement using local language (e.g., through street plays) has proven to be highly effective for improving accessibility and connectivity to the last mile users.

- **Early warning system (EWS) and anticipatory action (AA) to transform the management of climate extremes/disasters**

Early warning systems and anticipatory action are an integral part of climate services. Technological advances in climate services have enabled us to better predict climate hazards and act early before disasters arrive. It was emphasised that EWS and AA should be integrated into disaster risk reduction, preparedness, investments, and policy decisions in climate action. AA approach helps better estimate climate impacts on agriculture, and helps identify efficient ways to lessen vulnerabilities.

A critical reflection on how far we have come with predicting climate crises and what we still need to achieve were discussed. Lack of historical data and limited



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forecast skills were commonly pointed out as major challenges. Contextualisation of EWS was recommended as the way forward. To do so, taking into account multiple layers of risk is important. For instance, EWSs need to consider complex interactions of risks in the case of Afghanistan, where conflict, food insecurity, and severe drought form a nexus of a complex emergency. Besides, more localised and downscaled forecast information is needed. Combining scientific forecasting models with the experiences of people can also help achieve contextualised EWS and AA. Engaging with users is thus crucial in order to understand what people want, why, and how they can act based on the forecast. This will help to design a more accurate trigger system and appropriate anticipatory actions. Several speakers further highlighted real-time and impact-based forecasting as a useful tool to monitor hazards and trigger timely anticipatory actions. In addition, establishing an ecosystem for risk management is needed to integrate vulnerability risk assessment, forward-looking impact analysis, climate change risk analysis, and identification of hotspots. Risk assessment from both hazard and vulnerability perspectives can better inform policymakers of risk areas and pressing needs.

In the second panel discussion, various meteorological and forecasting agencies shared good practices and innovations for the design and implementation of multi-hazard and impact-based EWSs. For instance, seasonal tropical cyclone outlooks are shared during the Pacific Islands Climate Outlook Forum (PICOF) that takes place twice a year to communicate the forecast information. Following the Forum, national met services inform key stakeholders about local impacts in the coming months. Similarly, ASEAN Climate Outlook Forum (ASEANCOF) also facilitates experts to share information and knowledge for the upcoming season with traceable, reproducible, and well-documented forecasting procedures. For improvement, more tailored early warning products and regular updates were suggested.

Further taking stock of the progress in early warning and forecasting technology, increased forecast timescales, better spatial resolution and lead times, increased use of ICT with GIS-based web portals, and information based analytics were highlighted. The role of satellite-based data to supplement ground-based data was also emphasised throughout the session. Improved decision support systems have not only allowed policymakers to pinpoint affected regions and decide what to do, but also let users and communities avoid hazards. Dissemination of early warning messages to the last mile was improved through mobile applications and social media through PPP.



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On the other hand, despite advances in early warning and forecasting technology, communication gaps remain between technical experts and users on the ground. Thus, the importance of establishing more robust linkages between the impact and climate drivers in forecasting was echoed throughout the session not only to improve decision making but also to enhance communication with users. User engagement is further required to provide localised and context-specific prediction for climate hazards.

- **Beyond crops – climate services for all sub-sectors and value chains**

Climate services can contribute to climate change adaptation of all sub-sectors in agriculture and across agri-food value chains in the Asia-Pacific region experiencing more frequent and intense climate hazards. Climate services can play an important role in post harvesting stages of value chains through providing short-term forecasts, advisories, and long-term structural interventions. However, access to climate services are currently rather limited for small-scale producers and value chain actors due to lack of coordination and investments. Therefore, mainstreaming climate change discussion including climate services across agri-food value chains is strongly recommended. Five priorities for climate services are as follows: incorporating climate change into assessment, managing environmental risks in both short-term and long-term through adaptation and forecasts, testing adaptive capacity with models, improving data collection skills and reducing costs, and providing information faster. The optimal timeframe for forecasts to target is weeks to months (sub-seasonal to seasonal) so that businesses can apply changes and plan ahead to minimise the impact of climate risks.

The agriculture sub-sector discussions were divided into two parallel sessions. In the first parallel session, practitioners in the forestry and livestock sectors discussed potentials of climate services to make the sectors more resilient to climate risks. Capacity building to raise awareness and tailored services through engaging with users were commonly highlighted to improve climate services in the sector. High-demand services include species distribution maps according to different climate scenarios that show ideal plant species, emergency wildfire EWSs, and information on bioenergy consumption to understand the demand. Technology development as well as user-friendly approaches were emphasised to improve climate services. Although the



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forestry sector is more dependent on the government service providers due to the poor accessibility and connectivity, this can also be an opportunity to integrate climate services for forestry to a national level action plan. Forestry practitioners recommended developing climate services to make it affordable, output-oriented, accessible, and adaptive to feedback. Livestock sector is also prone to changing climate and extreme weather events. For example, poultry is susceptible to heat due to the absence of sweat glands, and the economic loss could be considerable. Therefore, climate services can help minimise the impact of heat stress through informed uses of cooling systems, alarm systems, nutrition and functional additives, and genetic selection.

In the second parallel section, what type of climate services can be useful in the fisheries and aquaculture sectors and agri-food value chains beyond production were explored. Climate change has even harsher impacts on small-scale fisherfolks. Appropriate uses of ICT such as mobile apps and SMS services are proved to be efficient in delivering climate services targeted to artisanal fishers. For the older generation, however, traditional means such as radio can be more easily adopted. Additionally, artisanal fisheries and coastal communities generally use feature phones rather than smartphones and have limited access to data and the internet. Considering this context, services to provide location-based weather forecasts through SMS services were adapted by ISDApp in the Philippines. Beyond production, climate services can also be applied and integrated into different steps of agri-food value chains to better manage climate and weather risks.

In a separate session, plant health problems, which are one of the most significant impacts of climate change on crops, were discussed. In order to prevent and mitigate plant pests, appropriate legislation and management, phytosanitary regulations, and research and analyses against ongoing and projected pest risks were urged. The emphasis was on the importance of communication with neighboring farmers and stakeholders as part of key solutions.

- **Cross-cutting issues and the way forward**

The workshop was closed with sharing comprehensive ideas on the way forward to advance climate services in the agriculture sector in Asia and the Pacific. Firstly, the result of Koronivia Joint Work on Agriculture (KJWA) during COP26 was reflected.



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In line with the KJWA discussions, climate services are an important tool for decision-making in agriculture as well as for EWSs in the region. It highlighted the role of the Association of Southeast Asian Nations Climate Resilience Network (ASEAN-CRN) to translate scientific information into policies and increase the accessibility of climate services to users in the region.

To strengthen climate services for agriculture in the context of Pacific countries, limited data availability, workforce, technology, and institutional capacities remain challenges to overcome to enhance climate services. In addition, insufficient governance and coordination among stakeholders as well as lack of general awareness are also hindering factors. The key strategy for the Pacific is to facilitate collaboration and coordination between different experts as well as between other countries beyond the Pacific region. Specifically, efforts to link hydro-meteorological information with an agricultural perspective are still required. It is necessary to improve seven-day and sub-seasonal quantitative forecasts. Also, connecting meteorological indices to agricultural parameters would be beneficial when the experts disseminate the climate services and crop advisories to users. Sharing forecast uncertainties among stakeholders should also be included.

In the regional context, developing a regional-specific framework to advance ACS was discussed. WMO Regional Office for Asia and the South-West Pacific recommended four focus areas for the framework: weather, climate, and crop data collection at the local level; localised interpretation of global frameworks; use of weather and climate information at the local level; and improved communication with the end-users. WMO has set the Global Basic Observing Network (GBON) to improve the quality and availability of most surface-based data that used to be done in local stations. Expertise combined by WMO and FAO has the potential to contribute to the joint collaboration of the local-level key stakeholders.

The session was followed by three breakout group discussions on different topics. Group 1 talked about ***Developing credible ACS***. Free data access and MOUs were suggested to facilitate the cooperation to reduce or waive the costs. In addition, promoting communication between users and producers, and cultivating more experts in relevant disciplines were recommended to promote cross-sectoral collaboration and help develop reliable ACS. For capacity building, the need for education was echoed by several participants not only university students but also farmers and local extension



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workers. For instance, field schools at the local level can be a helpful means to build local adaptive capacity.

Group 2 discussed the ***Sustainable financing of ACS***. Improving the high accuracy of the ACS was suggested to build trust in the services. Issuing forecasts and advisories on a regular basis were also recommended to appeal to users. Additionally, promoting success cases through pilots and innovative partnerships with civil society organisations was also suggested to attract finance from the public and private sectors. Integrating ACS into NDC priorities and commitments in line with the Paris Agreement was also recommended for sustainable financing.

Group 3 discussion was on ***Leaving no one behind, harnessing technology advancements, and reducing the science gap***. To scale up the successful approaches to ensure ACS reach the last mile, climate field schools and common hubs were suggested to consolidate the efforts. Integrating traditional knowledge as well as local language into the design of climate services was also considered important. Similarly, social groups such as religious affiliation can be utilised as intermediaries to disseminate climate information. Regional technical working groups (TWG) need to be established to organise regular workshops sharing opportunities for successful cases and lessons learned with others and collaboration activities in regions. Regional TWG will be beneficial in reducing the science gap between countries by optimizing technology advancements through peer learning and sharing expertise in ACS. In addition, capacity building at multiple levels was put forward as recommended priority for efficient and effective delivery of ACS. Lastly, PPP can reduce or waive costs by combining resources from both public and private sectors, and therefore boost its effectiveness.

## Key takeaways

1. Climate services are crucial in supporting robust decision making of long term climate action policies and investments in the agriculture sector.
2. Cross-sectoral coordination and data sharing between different institutions and other key stakeholders can enhance the supply side of capacity for climate services.
3. User engagement through a bottom-up approach is highly recommended to improve climate services and to reach the last-mile users. Enhanced communication with users



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can ensure the collection of context-specific information as well as effective dissemination of forecast information.

4. Impact-based forecasting and economic valuation are important tools to communicate climate information to users for their decision making.
5. Innovative partnerships and collaboration among the government, private sectors, and NGOs can strengthen agriculture climate services by facilitating sustainable financing and providing more capacity building opportunities to the farmers and other agri-food value chain actors.

## Acknowledgments.

We thank all the workshop participants for their contribution to this workshop. We would also like to thank Cornelis Swaans for his helpful comments and checking the accuracy of this meeting summary.



Accepted for publication in *Bulletin of the American Meteorological Society.* DOI 10.1175/BAMS-D-22-0100.1.