Alliance Bioversity & CIAT

University of Southern Queensland

WORLD METEOROLOGICAL ORGANIZATION

CGIAR INITIATIVE ON Asian Mega-Deltas

DeRISK SE Asia

STEPS TO CO-DEVELOP AGRO-CLIMATIC BULLETIN (ACB)

FOR LOCAL AGRICULTURAL PLANNING AND DECISION-MAKING

Supported by:

Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection

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IKI INTERNATIONAL CLIMATE INITIATIVE

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About DeRISK SE Asia
The project Applying seasonal climate forecasting and innovative insurance solutions to climate risk management in the agriculture sector in Southeast Asia, or DeRISK SE Asia, is led by the World Meteorological Organization (WMO) and co-implemented by the University of Southern Queensland (USQ) and the Alliance of Bioversity International and the International Center of Tropical Agriculture (Alliance Bioversity & CIAT). With funding support from from the International Climate Initiative (IKI) of the Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection (BMUV), the project aims to develop climate risk management systems, best practices, and insurance products that will shield smallholder farmers and businesses across the agricultural value chain in key Southeast Asia countries from physical and financial disaster associated with climate change. It assists governments in developing national and regional adaptation and risk management strategies. To know more about our project, please visit: https://deriskseasia.org/.

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FOREWORD

In Vietnam, climate change and variability magnify vulnerabilities of smallholder farmers, threatening their agricultural livelihoods. In addition, climate information services do not always reflect the local farmers' needs, putting farmers at risk of making inappropriate decisions on what and when to plant and how to manage.

To reduce the risks and help farmers better adapt to climate variability and change in Vietnam, the Department of Crop Production of the Ministry of Agriculture and Rural Development (MARD-DCP) has coordinated with the Alliance Bioversity & CIAT through the DeRISK project since 2018 to facilitate implementation of Agro-Climatic Bulletins (ACBs). Since then, ACBs have been implemented in 8 provinces of the Mekong River Delta and South-Central Coast, including Tien Giang, Tra Vinh, Kien Giang, An Giang, Soc Trang, Hau Giang, Can Tho and Ninh Thuan.

The project applied a participatory demand-driven approach for co-development and dissemination of agricultural advisory based on seasonal climate and weather forecast using bulletins in different formats. To implement the activities, a technical working group (TWG) of relevant stakeholders was established in each province (representing different sectors, such as agriculture and hydrometeorology, levels of government, and farmers). Based on the feedback from pilot provinces, advisories are applied effectively by farmers. ACBs are disseminated through multiple communication channels such as A0 printed posters, Zalo farmers' groups, loudspeakers and meetings of commune and Farmers' Union. The ACBs helped farmers to adjust the farming calendar, select suitable crop varieties, and reduce pesticides and fertilizer use, and has contributed to increased crop productivity, reduced production cost and ensured farmers' agricultural profits.

Receiving positive feedback from the provinces participating in the DeRISK project, MARD-DCP has issued official letters to direct the provinces in the Mekong River Delta to continue and scale ACB implementation. At the same time, MARD-DCP has collaborated with the provinces and the DeRISK project to document and develop a guide on ***"Steps to Co-develop Agroclimatic Bulletin (ACB)***

for Local Agricultural Planning and Decision-making". This guide aims to support ACB development and dissemination throughout the Mekong River Delta, South Central Coast, and country in the coming years.

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CONTENTS

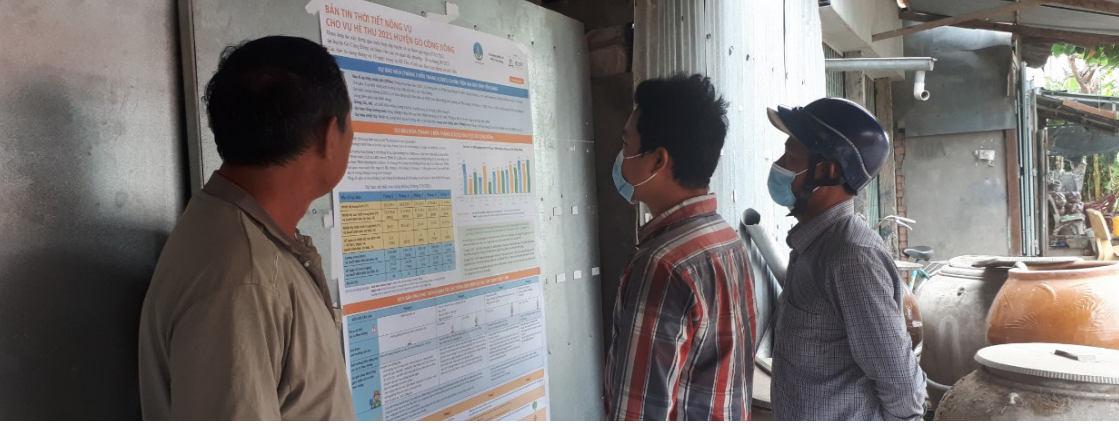
Acronyms

ACB	Agro-Climatic Bulletin
CPC	Commune People's Committee
CS	Climate services
DARD	Department of Agriculture and Rural Development
DCP	Department of Crop Production
DED	District's Extension Division
District DARD	District Office of Agriculture and Rural Development
DivCP&PP	Division of Crop Production and Plant Protection
IASC	Integrated Agriculture Services Center
MARD	Ministry of Agriculture and Rural Development
MRD	Mekong River Delta
NCHMF	National Center for Hydro-Meteorological Forecasting
PHMC	Provincial Hydro-Meteorological Center
RHMC	Regional Hydro-Meteorological Center
SCC	South-Central Coast
SPRM	seasonal planning and review meeting
Sub-DCP	Sub-Department of Crop Production
TWG	Technical Working Group

Glossary

climate	Average weather conditions for a particular location over a long period, usually covering several decades.
climate change	Non-random change in climate that is measured over several decades or longer. The change may be due to natural or human-induced causes.
climate data	Historical and real-time climate observations along with direct model outputs covering historical and future periods.
climate product	A derived synthesis of climate data by combining them with climate knowledge to add value.
climate risk	The potential for climate change to create adverse consequences for human and ecological systems.
climate service	A service providing climate information in a way that assists decision-making by individuals and organizations. It requires appropriate engagement to produce timely advisory for early action and preparedness based on user requirements.
climate variability	Variations in the mean state and other climate statistics (standard deviations, the occurrence of extremes, etc.) on all temporal and spatial scales beyond those of individual weather events. Variability may result from natural internal processes within the climate system (internal variability) or from variations in anthropogenic climate changes (external variability).

monthly or 10-day weather forecast	Refers to forecast information of different factors (temperature, precipitation, humidity, etc.) for the next month or next 10 days.
probability	Chance or likelihood that a particular climate event or condition will occur in the future. Forecasts are generally based on outputs from multiple climate models, which makes the final ensemble forecasts probabilistic in nature.
seasonal forecast	A range of possible changes that are likely to occur in the forecast season ahead (e.g., 3 to 6 months). (note that it is impossible to predict daily weather variations in specific areas months in advance due to the chaotic nature of atmospheric circulation).
uncertainty	State of incomplete knowledge about the future condition of the climate that can result from a lack of information or from disagreement about what is known or even knowable. Uncertainty in climate forecasts is generally expressed as a probability format (e.g., 65% chance of rainfall tomorrow).
weather	State of the atmosphere at a particular place during a short period of time involving the temperature, humidity, type and amount of precipitation, air pressure, wind, and cloud cover.



INTRODUCTION

This guidebook is about managing climate risks and provides a step-by-step manual for the development of climate-informed agricultural advisories or Agro-Climatic Bulletin (ACB). It is based on experiences of a pilot in the Mekong River Delta (MRD) and South-Central Coast (SCC) by the Alliance Bioversity & CIAT with the Department of Crop Production of the Ministry of Agriculture and Rural Development (MARD-DCP), and local partners in MRD and SCC. Alongside capacity building materials for training sessions, the manual aims to support the implementation and scaling of ACBs to other districts and provinces in the MRD and SSC and other regions in the country.

Working together on climate information services

Delivering climate services (CS) to end-users in agriculture requires multi-disciplinary and inter-institutional collaboration with an agreed framework or work plan for implementation. Understanding the perspectives of the end-users is essential in tailoring climate information products, agro-advisories, and delivery mechanisms. The CS delivery process involves a mix of national, sub-national, and community level stakeholders.

Figure 1 illustrates the link between actors and their major roles and function in the provision of CS for agriculture.

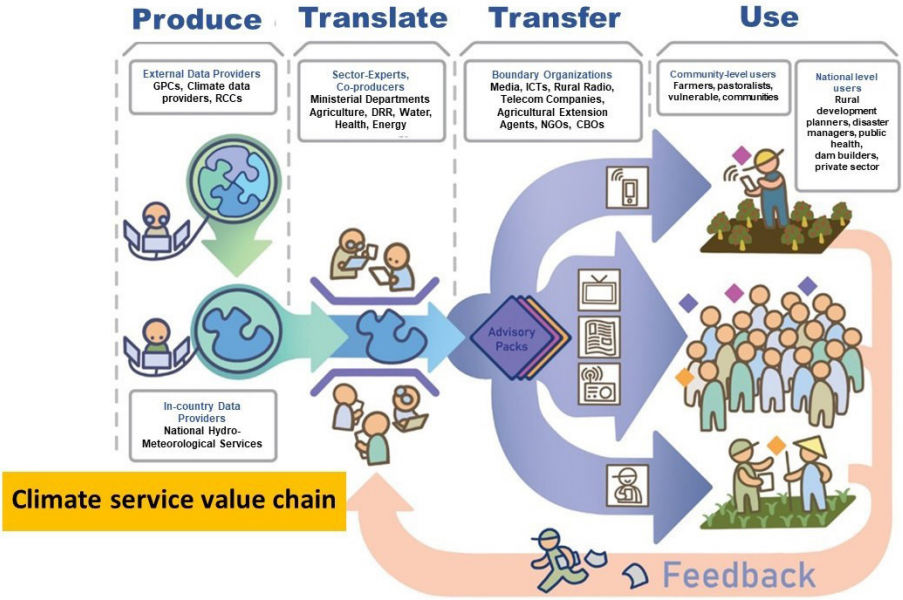


Figure 1. Linking actors across climate service (CS) value chain (*Adapted from WMO [2018]*).

The distinct functions (and actors) of CS are further explained in this table (Tesfaye et al, 2020).

CS Functions (actors)	Definition
Produce (*Data producers*)	The provision of meteorological information products (historical, monitored and forecasts)
Translate (*Sector experts, co-producers*)	Converting climate information into decision-relevant prediction of impacts and management advisories through participatory approaches and/or using decision support tools
Transfer (*Boundary organisations, media*)	The delivery of climate information, agricultural impacts and advisories to end users
Use (*Community-level users, national-level users*)	Incorporation of climate information into institutional and individual planning and management decisions
Governance (*across CS functions and actors*)	Processes and institutional arrangements that support co-production, coordination, monitoring and evaluation, quality control and accountability

Purpose and target users of this guide

This guidebook aims to provide instructional guidance for provincial and district-level stakeholders in Vietnam (e.g., agricultural staff, extension officers) who are engaged in the process of producing, translating, and disseminating climate information and agro-advisories through ACBs for improved outreach and use.

This guidebook targets two different types of users:

- **Leaders and managers:** those responsible for leading or managing agricultural programs and services – for which the guide provides an overall overview of approach and process
- **Implementation officers/staff:** those responsible for implementing agricultural programs and services – and for which the guide provides detailed step-by-step instructions

Local stakeholders are working primarily with smallholder farmers and agribusinesses, providing support such as training, capacity building and other support services that will help farmers make better decisions towards improving their agricultural production and incomes. Figure 2 illustrates the key steps for co-development of ACB with smallholder farmers as target end-users.

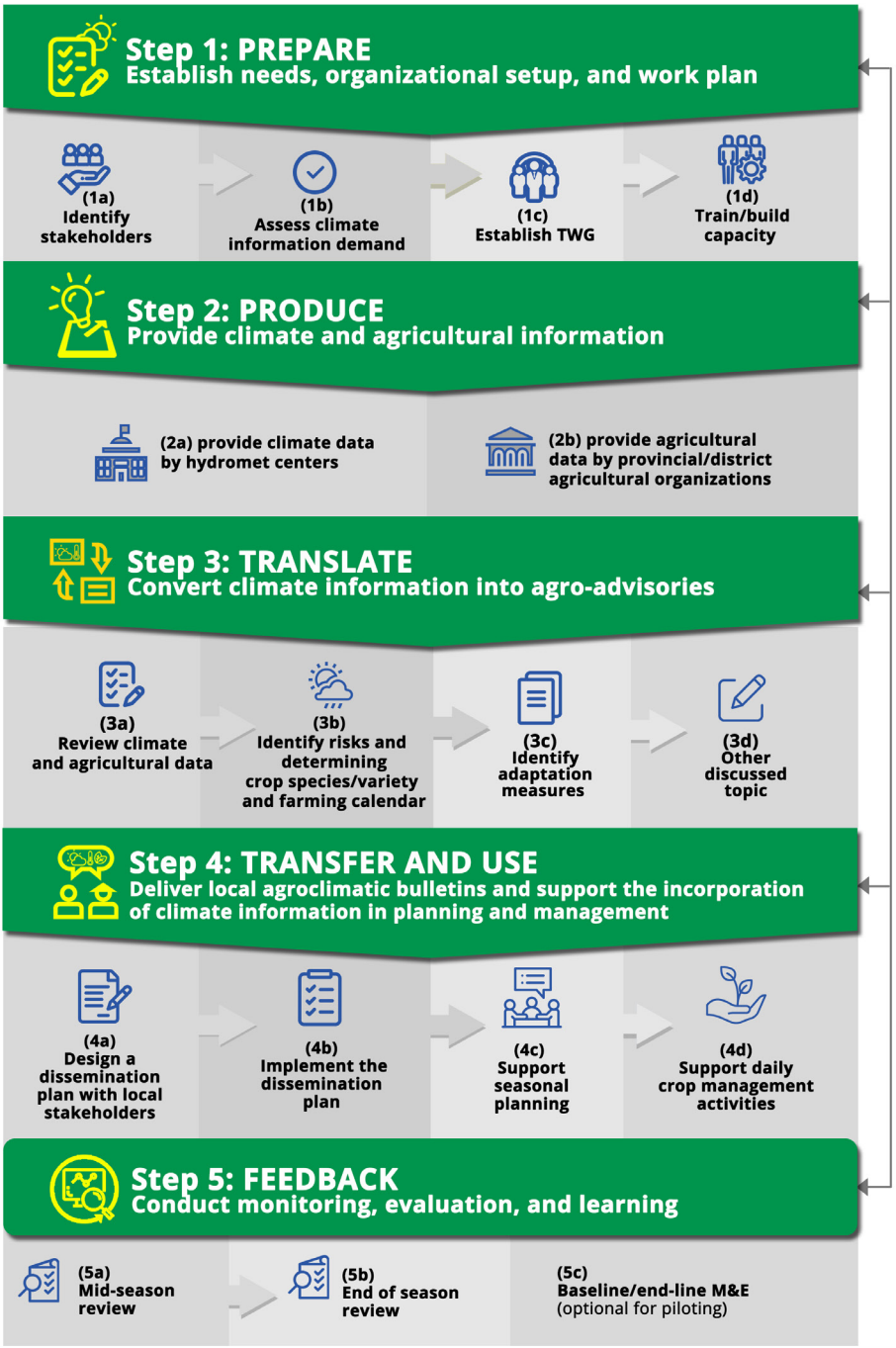


Figure 2. A step-by-step guide for co-development of Agro-Climatic Bulletins

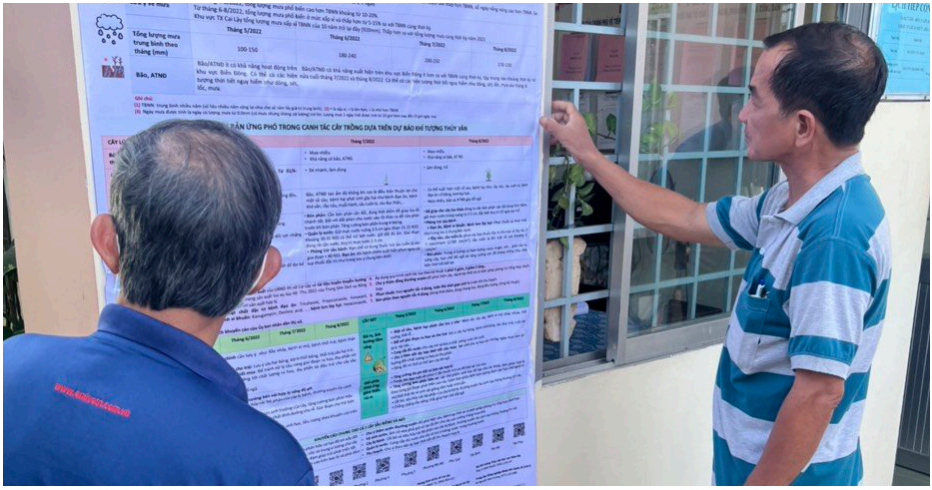
General Notes for Users:
The What, How, Who, When, Where, and Why

1. The "Why": Weather extremes brought about by climate change are becoming more frequent and severe. These can have a direct impact on agriculture, such as heat waves, droughts, floods, and storms, but also indirectly through pests, diseases, salinity, etc. Localized and tailored agro-advisories based on seasonal climate and short-term weather forecasts can improve agricultural planning and decision making (e.g., on appropriate crop varieties, planting date, and crop management) and increase the resilience of smallholder farmers to climate-risks.

2. The "What": This booklet provides a step-by-step guide for the co-development of local ACBs (Figure 2). It consists of 5 main steps, which are carried out with the participating institutions. The key steps reflect the different CS functions along the CS value chain. The activity diagram for each step is chronologically associated with the growing season of the target crop(s). Following this sequence step by step, provides a practical and logical process to help in the generation of the ACB as an instrument in planning and decision making.

3. The "How": The co-development of ACBs is a participatory process involving different actors along the CS value chain. This includes organizations that can provide localized climate and agricultural data, agencies that can translate this information in tailored advisories, those who are responsible for dissemination, and finally the users. It requires strong coordination and regular interaction to ensure that scientific, technical, practical, and user perspectives are included and acknowledged in the development, dissemination, and use of ACBs. To support this process, this guide explains for each step the purposes, method, facilitators, key stakeholders, as well as activities to reach specific objectives.

4. The "Who": Initially, the process is led by the Department of Crop Production and Provincial Department of Agriculture and Rural Development (DARD) to set up the structure and mechanisms, possibly with external support. Then, the subsequent steps and



activities will be facilitated by the Technical Working Group (TWG) (with sub-DCP as the group leader) at the provincial level and by district DARD / Division of Crop Production and Protection (DivCP&PP) or Integrated Agriculture Services Center at the district level. However, the facilitator and TWG's members can be adjusted in other locations, depending on the identified roles and responsibilities of key stakeholders involved in ACB development in that area.

5. The "When": The guide covers the whole growing season. It includes both seasonal and monthly/10-day ACBs. The preparation and data collection for the seasonal bulletin already takes place before the season starts, so that the bulletin can be shared in time and inform decisions on crops, variety, planting etc. Depending on the crop and length of season, the bulletin could be updated and produced mid-season. The 10-day bulletins must be developed every 10 days through a quick succession of data collection, translation and dissemination which are often conducted on the 1st, 11th and 21st of the month. The first 10-day bulletin of the month is often combined with monthly bulletin and developed at the first day of the month. The timing of activities should be agreed upon by the stakeholders, depending on types of crops and specific biophysical, environmental, and social conditions in the area.

Timeline for seasonal-based ACB

Step	Type of ACBs	2-3 months before season	2-3 weeks before season	Start season	Mid-season	End of season	Post-season
Step 1 Prepare	Seasonal ACB & 10-day ACB	*Sub-step 1a, b, c					
		Build capacity					
Step 2 Produce	Seasonal ACB	**					
	10-day ACB			10st, 20nd and the last day of the month			
Step 3 Translate	Seasonal ACB		**				
	10-day ACB			1st, 11th and 21st of the month			
Step 4 Transfer & Use	Seasonal ACB		**				
	10-day ACB			1st, 11th and 21st of the month			
Step 5 Feedback	Seasonal ACB & 10-day ACB				Mid-season review	End of season review	
		Baseline survey				Endline survey	

Note: *sub-step 1a) identify stakeholders, 1b) assess climate service demand, 1c) establish Technical Working Group. **timing of seasonal-based ACB can be adjusted based on updated seasonal forecast as necessary (normally ACB can be updated and disseminated 2-3 weeks before mid-season).

6. The “Where”: This guide was developed based on experiences from pilot activities in MRD and SCC with rice as the main target crop. However, since the guide focuses on the process, it could apply to other regions and target crops as well. While the guide can be applied for developing ACB at different scales, for scaling purposes it seems most suitable to organize the process at provincial or district level, with district-level bulletins that can be adapted to the specific need and variation within each district. It is important to agree on the organizational structure and flow of information and the targeted downscaled level of ACBs from the very first stakeholder meetings.

Finally, this guidebook does not provide a blueprint. It remains important to be flexible and adapt the implementation process and activities based on the conditions in each province, district, or even commune. For some steps, it may not be necessary to follow all the activities described in this guide. Step 5 is meant to provide feedback on the process and results with key actors to see how the process and agroclimatic bulletin can be adapted and improved based on the local context.

Key steps to co-develop Agro-Climatic Bulletin (ACB)

Step 1: PREPARE
Establish needs, organizational setup, and work plan

Objective: Agree with relevant stakeholders on the need of CS for priority crops and their engagement and willingness to participate in the activity and Technical Working Group (TWG).

Methods: Desk review, meeting, and short survey/interviews with key stakeholders

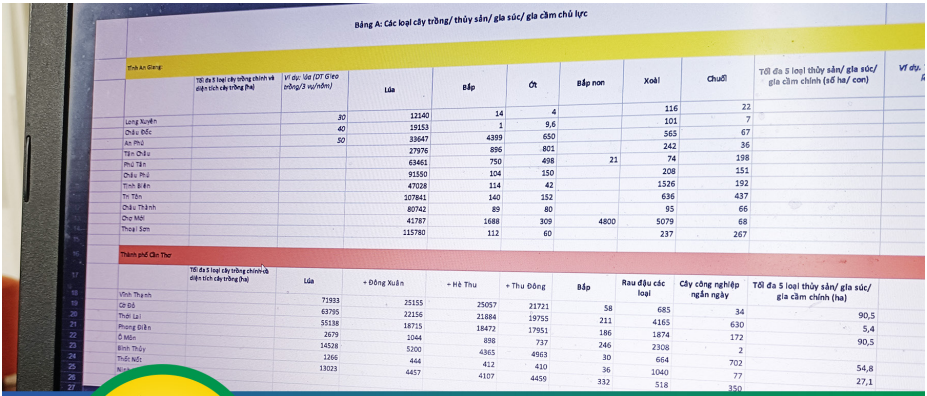
Facilitator: Provincial DARD

Other key stakeholders: Sub-DCP, Integrated Agriculture Services Center (IASC), Division of Crop Production and Plant Protection (DivCP&PP), Extension Center, Regional Hydro-Meteorological Center (RHMC), Provincial Hydro-Meteorological Center (PHMC), District DARD, Irrigation Works Operation Limited Company, agricultural communal officers, and farmer representatives.

Sub-step	Key information/outputs
1a. Identify stakeholders and their role in CS	• Map relevant stakeholders and roles in the process of generating, translating, transferring, and using information.
1b. Assess the demand for climate information	• Key crops/production systems and crop calendars with growth stages identified • Climate-related risks for key crops' growth stages (based on past 10 years) determined • Available adaptive measures to the climate risks synthesized • Users' need of climate nformation (variables, climate data and products) and forecast types (seasonal, monthly, decadal) identified • Timeline for development and dissemination of climate information and agro-advisories agreed among stakeholders
1c. Establish the TWG	• Identify who should be involved in the TWG among the identified stakeholders in the sub-step 1a • TWG established at provincial and/or district levels with clear roles/responsibilities • A decision letter signed by the provincial DARD/sub-DCP • An official ACB development work plan with clear key activities, communication plan, actors, timeline, and budget developed and issued by DARD or sub-DCP. Example of TWG decision letter and work plans can be found in Appendix 1.
1d. Strengthen capacity of TWG members for effective CS delivery	• Training needs assessed • Training plan developed based on assessment of needs among relevant stakeholders • Workshops/trainings provided based on resources (before and during implementation). For examples of training Materials, see Appendix 1.

Notes

- The overall budget for ACB development needs to be developed and planned with stakeholders. It is particularly important to discuss how to get forecast information and from whom. Is there existing forecast information that can be used or is extra budget required to purchase downscaled forecasts? And how to solve extra budget needs? Appendix 1 provides an overview of key budget items to be considered.
- Training courses are preferably provided during the initiation stage of the project, but they can also be part of a longer-term capacity building process, whereby on-the-job training activities can be organized throughout the season. Some training materials from the DeRISK project can be referenced via Appendix 1.



Step 2: PRODUCE
Provide climate and agricultural information

Objective: To generate climate and agriculture data which provide inputs for translation into tailored agro-advisories.

Methods: Existing reports and database, field visit and observations, forecast generation tools and software.

Facilitator: TWG lead

Other key stakeholders:

- Climate data : met office such as Regional Hydro-Meteorological Center (RHMC) or Provincial Hydro-Meteorological Center (PHMC)
- Agricultural data: Sub-DCP, District DARD, IASC or DivCP&PP
- Other: Irrigation Works Operation Limited Company for hydrological and environmental information.

Sub-step	Key information/outputs
2a. Provide climate data	• Past climate data: past observation data for relevant weather variables; past decadal or seasonal forecasts for the past term of target bulletins, if forecast validation is required • Future (next) climate data: seasonal, monthly, and decadal forecasts for relevant weather variables. Examples of seasonal and 10-day forecast from RHMC are in the Appendix 1.
2b. Provide agriculture data	• Past and current agriculture data: past long-term crop monitoring (record) data; current crop status (agronomic practices, inputs, phenology, pest disease occurrence) and agro-environmental data (water condition, salt concentration, soil status, and market information).

Notes

- Forecast variables, frequencies, and timeline can be updated based on the feedback of farmers and experience during implementation of ACB.
- Climate and agricultural data will be collected and used for translation in advisories in Step 2.

Step 3: TRANSLATE
Convert climate information into agro-advisories

Objectives: Develop tailored agricultural advisory for priority crops to next and end-users using different formats based on seasonal climate and weather forecasts. Main bulletins include:

(1) Seasonal ACB based on forecasts predicting future climate trends for 3-6 months. Data are being used to develop recommendations on crop management, such as planting period, selection of variety, irrigation need and input supply.

(2) Monthly and 10-day ACBs include information on monthly and 10-day weather forecasts, information on crop status, pest and disease incidence, and recommendations for short-term planning such as planting dates, fertilizer application, water management, pest, and disease management, harvesting and drying.

Methods: TWG meeting, joint finalization of bulletins via online modes (email, Zalo group or shared online link)

Facilitator: TWG lead

Other key stakeholders: Sub-DCP and DivCP&PP/IASC, other members of the TWG such as District DARD, RHMC/PHMC, Irrigation Works Operation Limited Company

Key topics during TWG meeting	Key information/outputs	
	Seasonal ACB	Monthly/ 10-day ACB
3a. Review climate and agricultural data		
Brief review of agricultural data Preferably shared by the TWG (usually Sub-DCP or District DARD)	What is the current/most recent status of selected crops, e.g., expected harvesting date, pest and disease occurrence? What is the traditional season window (planting and harvest window)? What are the major climate risks to crops?	What is the current crop growth and health status? What is the recent occurrence of climate risks and crop damages by climate-related risks and pests and diseases on the field? (e.g., pests' names, population density/disease severity, affected areas, current farmers' adaptation measures)
Brief review of climate data Preferably shared by the RHMC or PHMC	What will be the most likely climate conditions for the next season when compared to 'normal' years and to last year (e.g., forecast for salinity intrusion, average temperature, maximum and minimum temperature, number of hot days, rainfall, onset of rainy season, etc.)	What were the weather conditions in the past 10 days, which can be compared with the above-mentioned agriculture data to identify potential cause-result relationship between them? What are the predicted weather conditions over the next 10 days?

3b. Identify risks and determining crop species/variety and farming calendar		
Determine crop variety and calendar	What will be the potential climate-related and environmental risks based on the seasonal forecasts that will affect the crop selection and farm calendar? How will the risks affect crops? And why? What is the best planting and harvesting windows and most suitable varieties to avoid the predicted risks or to take advantage of favorable weather conditions?	
Identify risks associated with crop growth stages for next season	What will be the growth stages of selected crops across months during the next season? What will be the climate-related and environmental risks throughout the season (e.g., risks of drought, excess water, salinity, unusual rain, flood, storm) to crop growth stages and management activities? What are the potential impacts of climate-related and environmental risks to crop growth stages and management activities throughout the season (e.g., seedling died, pests and diseases, crop fallen, etc.)?	What will be the main risks from the predicted weather conditions over the next 10 days based on current crop growth and health status? What are the potential impacts to the current crop growth stage caused by the main climate-related and environmental risks?

3c. Identify adaptation measures		
dentify adaptation measures based on the most suitable season window and varieties	What will be the required adaptation measures to avoid or reduce impacts of risks for the season and per crop growth stage (e.g., farm design, water management, fertilizer application, pest and disease prevention and control and other management practices) Are there any resources that need to be prioritized or prepared before the start of the season for implementing identified adaptive measures? What is the suitable tone or language used for the recommendations based on the probability (confidence level) of seasonal forecast?	What will be the required adaptation measures to avoid or reduce the impacts of risks for the current crop growth stage and the next periods (e.g., water management, fertilizer application, pest and disease prevention and control and other management practices) What is the suitable tone or language used for the recommendations based on the certainty (confidence level) of the weather forecast?

3d. Other discussed topics	
Discuss bulletin format for different dissemination channels	Ideally, communication channels and pathways should be identified during step 1 (training workshop or separate TWG meeting) when developing ACB development work and budget plan. However, during TWG meeting, stakeholders can discuss and adjust the communication plan based on the updated feedbacks from users. Key questions to cover are: • Which formats (e.g., A3 poster, A0 poster, Zalo, and/or loudspeaker script) of different type of ACBs should be developed? • What formats/layout are most appropriate and suitable after implementing on the sites? How could this be improved? • What contacts (names, institutions, and/or telephone numbers) and logos need to be included?
Agree on ACB templates	• The template for loudspeaker script can be made by using Microsoft word file (See Appendix 1 for loudspeaker script template) • Template for seasonal and 10-day bulletins (powerpoint, JPEG, PDF): Stakeholders can draft bulletin in the power point format and export it as picture (JPEG) or PDF files for sharing through Zalo or printed posters. Templates for seasonal and 10-day ACB as well as instruction to adjust and export JPEG version of ACB from power point can be found in the Appendix 1. The example of seasonal and 10-day bulletins can be seen in Figure 3 and Figure 4.
Notes • Format should be based on dissemination plan. Since seasonal bullets will be provided 1 or 2 times per season and will remain relevant throughout the season, it is suitable to share through printed poster. For monthly/10-day bulletin which need to be quickly updated and shared and only relevant for short period, sharing through loudspeaker and/or zalo groups (or other social media) seems more appropriate. For all these media we need to take into account how end users make use of these different media. A mixture of different communication channels may be most appropriate.	

Title, references and logos

Seasonal forecast from November 2021 to March 2022 for Tien Giang province

Seasonal forecast from November 2021 to March 2022 for Go Cong Dong district, Tien Giang province

Risks and impacts along crop growth stages and recommended adaptation actions for key crops (e.g., rice, dragon fruit, vegetable)

Source of information and contact

BẢN TIN THỜI TIẾT NÔNG VỤ CHO VỤ ĐÔNG-XUÂN 2021-2022 HUYỆN GÒ CÔNG ĐÔNG

Sở Nông nghiệp và PTNT Tiền Giang

Alliance

Theo dương lịch

Được hợp tác xây dựng qua cuộc họp cấp tỉnh có sự tham gia ngày 12/10/2021 online và phần thảo thảo luận tiếp sau của các huyện tham vấn các cơ quan địa phương. Số ra tháng 10/2021. *Các bản tin hàng tháng và 10 ngày trong vụ ĐÔNG XUÂN sẽ tiếp tục được xây dựng và phổ biến.*

DỰ BÁO MÙA CHUNG TRÊN ĐỊA BÀN TỈNH TIỀN GIANG VÀ VÙNG NGỌT HÓA GÒ CÔNG

	Tháng 11/2021	Tháng 12/2021	Tháng 1/2022	Tháng 2/2022	Tháng 3/2022
ENSO	Chuyển sang trạng thái La Nina từ tháng 10/2021- các tháng đầu năm 2022 (xác xuất 75%)				
Xâm nhập mặn	Xâm nhập mặn ở mức sớm và sâu hơn so với TBNN, khả năng ở mức tương đương mùa khô năm 2020-2021 (không gay gắt như năm 2019-2020, một số thời điểm có thể xấp xỉ năm 2015-2016). Cao điểm: nằm trong khoảng giữa tháng 2 đến đầu tháng 4/2022 sau đó sẽ giảm dần.				
Nhiệt độ trung bình	25.5 – 27.5 độ C, xấp xỉ và thấp hơn TBNN; Nhiệt độ thấp nhất 23.5-25.0 độ C, có ngày xuất hiện nhiệt độ thấp nhất xuống dưới 20 độ khoảng từ tháng 12 đến tháng 02 năm sau				
Bão, triều cường	Triều cường: 5-9/11; 2-8/12. Gây ngập vùng thấp Tân Phú Đông, Tân Thới, Tân Long...khoảng 1 tuần, ảnh hưởng sinh hoạt và sản xuất.		Bão và Áp thấp nhiệt đới ảnh hưởng trực tiếp Tiền Giang		
Kịch bản xâm nhập mặn (1g/l) đến từng khu vực theo tháng			Đến Cống Xuân Hòa, huyện Chợ Gạo (cách cửa biển 45km)	Đến thành phố Mỹ Tho, (cách cửa biển 50 km)	Đến Đồng Tâm, huyện Châu Thành (cách cửa biển 60km)

DỰ BÁO CHI TIẾT LƯỢNG MƯA KHU VỰC NGỌT HÓA GÒ CÔNG

- Tổng lượng mưa dự báo 90-110 mm, ở mức xấp xỉ và cao hơn TBNN từ 10-25%.
- Mùa mưa kết thúc muộn vào cuối tháng 11; mưa trái vụ xảy ra từ tháng 12-tháng 3; chủ yếu vào tháng 1

THÁNG	Tháng 11/2021			Tháng 12/2021			Tháng 1/2022			Tháng 2/2022			Tháng 3/2022		
Yếu tố dự báo	Dự báo 2021	Thực đo 2020	TBNN	Dự báo 2021	Thực đo 2020	TBNN	Dự báo 2021	Thực đo 2020	TBNN	Dự báo 2021	Thực đo 2020	TBNN	Dự báo 2021	Thực đo 2020	TBNN
Lượng mưa (mm)	90- 110 (>)	105.2	78.9	30-40 (÷, >)	26.6	28.2	10-20 (÷, >)	6.6	6.1	3-5 (÷, >)	2.2	3.2	5-9 (÷, >)	0	7.5
Số ngày có mưa (ngày)	10-13	10	12	2-4	5	3	0-3	2	1	0-3	2	1	0-2	0	1

Ghi chú:
- TBNN: trung bình nhiều năm (số liệu nhiều năm cộng lại chia cho số năm lấy giá trị trung bình) ÷ là xấp xỉ; > là lớn hơn; < là nhỏ hơn (TBNN)
- Xuất đảm bảo dự báo là phần trăm (%) khả năng dự báo đúng.
- Ngày mưa được tính là ngày có lượng mưa từ 0.0mm (có mưa nhưng không có lượng) trở lên. Lượng mưa 1 ngày tính được tính từ 19 giờ hôm nay đến 19 giờ ngày mai.

KỊCH BẢN ỨNG PHÓ TRONG CANH TÁC CÂY TRỒNG DỰA TRÊN DỰ BÁO KHÍ TƯỢNG THỦY VĂN

CÂY LÚA	Tháng 11/2021	Tháng 12/2021	Tháng 1/2022	Tháng 2/2022	Tháng 3/2022
Rủi ro có thể xảy ra	• Mưa.	Mưa ít	Có khả năng xuất hiện bão và áp thấp nhiệt đới ảnh hưởng trực tiếp	Hạn hán, xâm nhập mặn	Hạn hán, xâm nhập mặn
Giai đoạn sinh trưởng	Gieo sạ-Mạ- đẻ nhánh *Lịch gieo sạ: 01-10/11/2021 (nhằm ngày 27/9 đến ngày 06/10 AL).*	Đẻ nhánh - đòng	Trổ- chín	Thu hoạch	
Ảnh hưởng tiềm năng	Mưa lớn ngay sau gieo sạ, làm lúa mọc không đều, trôi hạt, lúa bị chết.	Đạo ôn, sâu cuốn lá.	• Sâu cuốn lá, rầy nâu, đạo ôn cổ bông cổ gié, lem lép hạt • Đổ ngã do mưa bão		
Giải pháp ứng phó giảm thiểu rủi ro	• **Chuẩn bị đất**: cày xới đất để vùi rơm rạ, cỏ dại sau đó rút nước để xả phèn và phun dung dịch nấm trichoderma kết hợp bón vôi cần thực hiện tối thiểu 15 ngày trước khi gieo sạ • **Làm đất**: + Cày trục bón lót phân lân hoặc vôi . + Trên ruộng cần làm các rãnh thoát nước, để sổ xả phèn, mặn. • **Mật độ gieo sạ**: 100-120 kg/ha. • **Giống khuyến cáo:** Nàng Hoa, OM 5451, VD 20, Đài Thơm 8,... • Áp dụng tuân thủ theo quy trình canh tác lúa 1 phải 5 giảm.	• Cần có kế hoạch trữ nước phù hợp. • Để giúp lúa đẻ nhánh tốt: bón phân cân đối, đúng thời điểm, giữ mức nước ruộng 3-5 cm (cho giai đoạn 15-25 ngày sau gieo). Khoảng 30-35 ngày sau gieo có thể rút bớt nước, đủ giữ đất ẩm để rễ phát triển mạnh, giảm đổ ngã sau này; Bón phân cân đối giữa N-P-K. • Hạn chế sử dụng thuốc trừ sâu cuốn lá vào giai đoạn này. • Chú ý thăm đồng thường xuyên để phát hiện sâu, bệnh kịp thời. • Phun các loại thuốc đặc trị đạo ôn khi bệnh mới xuất hiện.	• Theo dõi bản tin thời tiết nông vụ 10 ngày để có biện pháp canh tác hợp lý. • Chú ý thăm đồng thường xuyên để phát hiện sâu, bệnh kịp thời • Cần có kế hoạch trữ nước ngọt. • Phun ngừa bệnh trừ nấm, vi khuẩn ở giai đoạn trổ lẹt xẹt và trổ hoàn toàn để ngừa bệnh. • Sử dụng các loại thuốc đặc trị nấm, vi khuẩn.	• Thu hoạch khi có khoảng 85-90% số hạt trên bông đã chín. • Cần chuẩn bị kế hoạch thu hoạch hợp lý phù hợp đảm bảo nguyên tắc phòng chống dịch bệnh.	Sau thu hoạch lúa cho đất nghỉ, cày ải phơi đất.
LƯU Ý CHUNG	(1) **Theo dõi thông báo kế hoạch sản xuất của UBND huyện và tài liệu tuyên truyền của Trung tâm Dịch vụ nông nghiệp.** (2) **Theo dõi bản tin thời tiết nông vụ 10 ngày để có biện pháp canh tác hợp lý.** (3) **Thăm đồng thường xuyên để phát hiện kịp thời các đối tượng gây hại.**		(4) **Sử dụng thuốc phòng trị thuộc nhóm ít độc và thuốc sinh học, liều lượng theo khuyến cáo trên bao bì và phải đảm bảo thời gian cách li.** (5) **Chủ động tích trữ nước ngọt để tưới cho cây trong các tháng mùa khô 2022.**		

CÂY THANH LONG	Tháng 11/2021	Tháng 12/2021	Tháng 1/2022	Tháng 2/2022	Tháng 3/2022
Rủi ro có thể xảy ra	Mưa nhiều gây ngập úng cục bộ, bệnh đốm nâu có thể phát triển mạnh.	Mưa nhiều gây ngập úng cục bộ, bệnh đốm nâu có thể phát triển mạnh.	• Mưa bão có thể xảy ra • Hạn hán xâm nhập mặn	Xâm nhập mặn, thiếu nước.	Xâm nhập mặn, thiếu nước.
Giai đoạn sinh trưởng	Bông, trái non.	Trái non, thu hoạch.	Trái non, thu hoạch.	Thu hoạch.	Cắt tỉa cành.
Ảnh hưởng tiềm năng	Mưa nhiều có thể gây ngập úng cục bộ	Chuyển hạn bất ngờ gây stress cho cây	• Mưa bão gây ngập úng. • Nguy cơ thiếu nước tưới.	Thiếu nước tưới.	Thiếu nước tưới.
Giải pháp ứng phó giảm thiểu rủi ro	• Chủ động khơi thông mương, cống, có kế hoạch bơm thoát nước tránh gây ngập úng. • Tích trữ nước mưa khi mùa mưa chuẩn bị kết thúc.	• Hạn chế bón phân hóa học ưu tiên bón phân hữu cơ cho cây. • Tủ gốc giữ ẩm cho cây.	• Chủ động tủ gốc giữ ẩm cho cây. • Đối với cây mới trồng cần có biện pháp che nắng cho cây. • Cắt cành tạo tán cho cây, tỉa bớt nụ hoa. • Chủ động trữ nước ngọt.	• Tưới nước tối thiểu cho cây. • Bón phân hữu cơ, bổ sung vi lượng cho cây. • Nắng hạn kéo dài có thể phun phân bón lá, bổ sung canxi, magie, silic,... giúp tăng sức đề kháng cho cây • Không xông đèn	• Bón phân hữu cơ, bổ sung vi lượng cho cây • Nắng hạn kéo dài có thể phun phân bón lá, bổ sung canxi, magie, silic,... giúp tăng sức đề kháng cho cây. • Không xông đèn
LƯU Ý CHUNG	1) **Theo dõi thông báo kế hoạch sản xuất của UBND huyện và tài liệu tuyên truyền của Trung tâm Dịch vụ nông nghiệp.** 2) **Theo dõi bản tin thời tiết nông vụ 10 ngày để có biện pháp canh tác hợp lý.**		3) **Áp dụng đúng các biện pháp phòng trừ dịch hại trên cây thanh long như khuyến cáo.** 4) **Chủ động tích trữ nước ngọt để tưới cho cây trong các tháng mùa khô 2022.**		
Khuyến nghị cho các cây khác	**Cây rau:** - Chú ý theo dõi dự báo thời tiết 10 ngày để thu hoạch, gieo hạt hợp lý. - Bón phân cân đối, hợp lý tăng cường bón phân hữu cơ tạo độ tơi xốp đất và tăng khả năng hấp thu chất dinh dưỡng cho rễ. - Sử dụng thuốc phòng trị thuộc nhóm ít độc và thuốc sinh học, liều lượng theo khuyến cáo trên bao bì và phải đảm bảo thời gian cách li. - Chủ động tích trữ nước ngọt để tưới cho cây trong các tháng mùa khô 2022.				

"Mời bà con quét mã để vào nhóm zalo nhận bản tin thời tiết nông vụ: Dùng chức năng quét mã QR trong zalo (biểu tượng quét mã bên trái hình dấu +) **quét mã vạch tương ứng với xã của anh/chị.".**

Tân Phước | Tân Tây | Tân Hòa | Phước Trung | Bình Ân

Bản tin được xây dựng với sự hỗ trợ của nghiên cứu "Áp dụng dự báo thời hạn mùa và các giải pháp bảo hiểm tiên tiến vào quản lý rủi ro khí hậu trong ngành nông nghiệp ở Đông Nam Á", gọi tắt là De-RISK Đông Nam Á của Trung tâm Nông nghiệp Nhiệt đới Quốc tế (CIAT) trong khuôn khổ hỗ trợ Cục Trồng trọt – Bộ NN&PTNT thí điểm áp dụng dự báo thời tiết, khí hậu vào sản xuất nông nghiệp cho tỉnh Tiền Giang. Sản phẩm được xây dựng trên cơ sở hợp tác giữa CIAT với các cơ quan các cấp tỉnh Tiền Giang - Sở Nông nghiệp và PTNT/ Chi Cục Trồng trọt và Bảo vệ Thực vật, Trung tâm Dịch vụ Nông nghiệp huyện Gò Công Đông, Phòng Nông nghiệp và PTNT huyện Gò Công Đông,Đài Khí tượng Thủy văn khu vực Nam Bộ. Thông tin dự báo khí tượng thủy văn trong bản tin này là do Đài Khí tượng Thủy văn khu vực Nam xây dựng. Trung tâm Dịch vụ Nông nghiệp huyện Gò Công Đông thảo luận với Phòng Nông nghiệp và PTNT huyện Gò Công Đông, Chi Cục Trồng trọt và BVTV tỉnh Tiền Giang và nhóm De-RISK Việt Nam xây dựng nội dung.

THÔNG TIN LIÊN LẠC:
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Bà Nguyễn Thị Yến Nhi, 0367.277.598

Trung tâm Dịch Vụ Nông nghiệp huyện Gò Công Đông
Ông Trần Thanh Duy, 0976.468.014

Phòng NN&PTNT huyện Gò Công Đông
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Đài Khí tượng Thủy văn khu vực Nam Bộ
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Ông Nguyễn Duy Nhiệm, 0971.601.651

On behalf of: Federal Ministry for the Environment, Nature Conservation and Nuclear Safety of the Federal Republic of Germany

INTERNATIONAL CLIMATE INITIATIVE (IKI)

WORLD METEOROLOGICAL ORGANIZATION

UNIVERSITY OF SOUTHERN QUEENSLAND

Figure 3. An example of seasonal (A0) bulletin for Go Cong Dong district, Tien Giang province.

Alliance

Theo dương lịch

BẢN TIN THỜI TIẾT NÔNG VỤ HUYỆN KẾ SÁCH

Tình hình chung của tỉnh Sóc Trăng

- Ban ngày trời nắng, mưa xuất hiện chủ yếu về chiều và chiều tối mưa nhiều hơn và khả năng có mưa diện rộng, có nơi mưa vừa, mưa to
- Trong ngày 13-14/6, ngày 16/6 và từ ngày 18-20/6. Tổng lượng mưa xấp xỉ TBNN, dao động từ 50-80mm. Nhiệt độ dao động từ 28-29 độ C

Lưu ý

- Đề phòng sét, gió giật mạnh, lốc xoáy kèm theo trong những cơn dông. Cuối tuần khả năng mưa to, mưa cao nhất là ngày 19/6.

DỰ BÁO THỜI TIẾT 10 NGÀY TỚI Từ 11– 20/6/2022 HUYỆN KẾ SÁCH

➢ Ngày 11, 12 và 15/6

- Ban ngày trời nắng, ít mưa, chiều tối có mưa dông, mưa chủ yếu với lượng nhỏ, cục bộ có mưa vừa, khả năng mưa từ 60-80%.
- Nhiệt độ trung bình 26 - 34°C
- Độ ẩm tương đối 75 - 78%

➢ Ngày 13, 14 và ngày 16/6

- Trưa chiều và chiều tối có mưa dông diện rộng, đề phòng có mưa vừa, mưa to, khả năng mưa từ 70-90%13-14/6 .
- Nhiệt độ trung bình 25 - 32°C
- Độ ẩm tương đối 81 - 86%

➢ Ngày 17/6

- Khả năng có mưa có mưa rào
- Nhiệt độ trung bình 26 – 31°C
- Độ ẩm tương đối 78%

➢ Ngày 18/6 – 20/6

- Ban ngày trời nắng gián đoạn, trưa chiều và tối có mưa dông diện rộng, đề phòng có mưa vừa, mưa to, khả năng mưa từ 70-90%
- Nhiệt độ trung bình 26 – 31°C
- Độ ẩm tương đối 79 – 85%

Chú ý: 1. Lượng mưa 1 ngày tính được tính từ 19 giờ hôm nay đến 19 giờ ngày mai. **2. Trung bình nhiều năm (TBNN):** số liệu mưa nhiều năm cộng lại chia cho số năm lấy giá trị trung bình.

KỊCH BẢN ỨNG PHÓ TRONG CANH TÁC CÂY TRỒNG DỰA TRÊN DỰ BÁO KHÍ TƯỢNG THỦY VĂN

CÂY LÚA

Giai đoạn sinh trưởng

- Tập trung giai đoạn đẻ nhánh

Rủi ro có thể xảy ra

- Mưa nhiều vào buổi chiều và tối (cần lưu ý thoát nước đề phòng ngập úng), độ ẩm không khí cao thích hợp sâu bệnh phát triển

Ảnh hưởng tiềm năng:

- Dịch hại chủ yếu: đạo ôn lá, sâu cuốn lá và chuột gây hại ở mức độ nhẹ.

Giải pháp ứng phó giảm thiểu rủi ro


- Đối với bệnh đạo ôn lá hạn chế bón thừa phân Đạm, khi thấy vết bệnh xuất hiện sử dụng các gốc thuốc đặc trị như: *Tricyclazole, Pycoxystrobin, Azoxystrobin* ...

KỊCH BẢN ỨNG PHÓ TRONG CANH TÁC CÂY TRỒNG DỰA TRÊN DỰ BÁO KHÍ TƯỢNG THỦY VĂN

CÂY LÚA (tiếp theo)

➢ **Dự kiến tình hình dịch hại trong thời gian tới**

- Thời tiết ban ngày trời nắng, mưa nhiều vào buổi chiều và tối, độ ẩm không khí cao thích hợp nấm bệnh và sâu cuốn lá phát triển. Cần chú ý bệnh đạo ôn lá kết hợp với thối thân do vi khuẩn.


- Thăm đồng thường xuyên để phát hiện dịch hại kịp thời và có biện pháp phòng trị mang lại hiệu quả cao.

KỊCH BẢN ỨNG PHÓ TRONG CANH TÁC CÂY TRỒNG DỰA TRÊN DỰ BÁO KHÍ TƯỢNG THỦY VĂN

CÂY LÚA (tiếp theo)


- Hạn chế phun thuốc ngừa sâu cuốn lá ở giai đoạn lúa đẻ nhánh, chỉ phun thuốc khi mật số sâu 25 – 50 con/m2 ở tuổi 2,3.


- Đối với chuột cần dọn sạch cỏ dại xung quanh bờ ruộng; gieo sạ tập trung , đồng loạt; đối với các ruộng thường xuyên bị chuột gây hại thì sử dụng hàng rào Nylon bao quanh ruộng

KỊCH BẢN ỨNG PHÓ TRONG CANH TÁC CÂY TRỒNG DỰA TRÊN DỰ BÁO KHÍ TƯỢNG THỦY VĂN

CÂY BƯỞI

Giai đoạn sinh trưởng:

- Cây đang thời kỳ cuối giai đoạn ra hoa - đậu trái non – trái đang phát triển

Rủi ro có thể xảy ra:

- Mưa nhiều vào buổi chiều và tối, độ ẩm không khí cao thích hợp sâu bệnh phát triển

Tình hình sâu, bệnh hại:

Bệnh nấm hồng, sâu đục trái gây hại ở mức độ nhẹ

Giải pháp ứng phó giảm thiểu rủi ro:


- Khi phát hiện sâu đục trái xuất hiện tiến hành phun thuốc chứa hoạt chất : *Spirotetramat, Flubendiamide* để phòng trị sâu đục trái.

KỊCH BẢN ỨNG PHÓ TRONG CANH TÁC CÂY TRỒNG DỰA TRÊN DỰ BÁO KHÍ TƯỢNG THỦY VĂN

CÂY BƯỞI

- Thường xuyên kiểm tra vườn nếu phát hiện có bệnh nấm hồng thì tiến hành phun các thuốc đặc trị.
- Thường xuyên cắt tỉa và tiêu hủy cành bị bệnh, cành lá bên trong tán tạo điều kiện thông thoáng cho cây.

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CÂY VÚ SỮA

Giai đoạn sinh trưởng:

- Cây giai đoạn ra hoa – đậu trái

Rủi ro có thể xảy ra:

- Mưa nhiều vào buổi chiều và tối, độ ẩm không khí cao thích hợp sâu bệnh phát triển

Tình hình sâu bệnh:

- Ghi nhận sự xuất hiện sâu ăn bông và rệp sáp dưới ngưỡng gây hại

Giải pháp ứng phó giảm thiểu rủi ro:

- Thường xuyên vệ sinh vườn tạo độ thông thoáng cho cây, thu gom tàn dư.
- Gia cố bờ bao chủ động thoát nước khi có mưa lớn
- Thường xuyên kiểm tra vườn phun thuốc trừ sâu ăn bông, rệp sáp (nếu có) trước khi hoa nở.
- Không dùng các hoạt chất: *Acetamiprid, Cypermethrin, Permethrine, Fipronil, Carbendazim, Azoxytrobin, Difennoconazole, Iprodione, Chlorothalonil*

Bản tin được xây dựng với sự hỗ trợ của nghiên cứu "Áp dụng dự báo thời hạn mùa và các giải pháp bảo hiểm tiên tiến vào quản lý rủi ro khí hậu trong ngành nông nghiệp ở Đông Nam Á", gọi tắt là De-RISK Đông Nam Á của Trung tâm Nông nghiệp Nhiệt đới Quốc tế (CIAT) trong khuôn khổ hỗ trợ Cục Trồng trọt – Bộ NN&PTNT thí điểm áp dụng dự báo thời tiết, khí hậu vào sản xuất nông nghiệp cho tỉnh Sóc Trăng. Sản phẩm được xây dựng trên cơ sở hợp tác giữa CIAT với các cơ quan các cấp tỉnh Sóc Trăng - Sở Nông nghiệp và PTNT/ Chi Cục Trồng trọt và Bảo vệ Thực vật, Trạm Trồng trọt và BVTV huyện Kế Sách, Phòng Nông nghiệp và PTNT huyện Kế Sách, Đài Khí tượng Thủy văn khu vực Nam Bộ. Thông tin dự báo khí tượng thủy văn trong bản tin này là do Đài Khí tượng Thủy văn khu vực Nam Bộ xây dựng. Trạm Trồng trọt và BVTV huyện Kế Sách thảo luận với Phòng Nông nghiệp và PTNT huyện Kế Sách, Chi Cục Trồng trọt và BVTV tỉnh Sóc Trăng và nhóm De-RISK Việt Nam xây dựng nội dung.

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Figure 4. An example of 10-day bulletin (for dissemination in Zalo groups) for Ke Sach district, Soc Trang province for the period of 11-20 June 2022.

Step 4: TRANSFER AND USE
Deliver local agroclimatic bulletins and support the incorporation of climate information in planning and management

Objective:

- Develop and implement dissemination plan based on local contexts and characteristics of end users to ensure timely, effective, and efficient delivery of agroclimatic bulletins.
- Support end users to better understand and make informed decisions based on information provided by ACBs.

Methods: A consultation or a meeting with the TWG members and farmers

Facilitator: TWG lead

Other key stakeholders: DARD, IASC, District's Extension Division/Farmer's Union, District DivCP&PP, CPC, communal agricultural officers, village head, Women's Union, Youth Union, communication center/unit of district (e.g., Center for Culture, Sports and Communications) or communes, agricultural input shops, cooperatives.

Sub-step	Key information/outputs
4a) Dissemination plan developed with local stakeholders *(Can be discussed during meeting for developing work plan in step 1 and in the TWG meeting in Step 3)*	• Potential communication channels identified such as Zalo app (through existing and/or newly established farmers' Zalo groups), SMS, Facebook group, website, loudspeaker broadcasting, radio/TV, installing (hanging) printed bulletin posters, delivery of printed bulletins by extension officers, village heads, agricultural input shops, cooperatives, women's unions, and farmer's unions. • The appropriate channels prioritized and selected: using indicators such as accessibility, understandability, timeliness, and cost-effectiveness • Communication plan developed: what is it exactly that needs to be disseminated (e.g., number of bulletins and posters to be printed, color vs black and white, and printing material including water-proof vs non-waterproof for posters)? Who will disseminate? How will the dissemination plan be carried out, by when and where?
4b) Implement dissemination plan	• After the dissemination plan is developed,the leading organization(s) would need to coordinate with relevant supporting stakeholders to disseminate information based on the plan. • Careful attention needs to be paid at the start of the season to ensure that farmers receive the (first) seasonal bulletin at least 2-3 weeks before planting.
4c) Support seasonal planning	• Planning here refers to longer-term decisions based on seasonal forecasts. These refer to decisions on whether to plant a specific crop based on climate risks, to adjust planting date, to select a different variety, or stock take agricultural inputs to cope with the predicted climate risks. Some considerations that need to be made are: ▪ Which lands belong to low-, medium-, or high-risk areas and what alternative options, such as crops, cropping land, varieties, maximum cropping period, do farmers have?

	▪ How flexible are the next/end users in changing the planting dates and to what extent does that address key climate risks based on seasonal forecast? ▪ What alternatives do farmers have in terms of varieties that may be more tolerant for certain climate conditions. ▪ What other (long-term) crop management decisions can farmers make based on climate and agricultural data available. ▪ Support farmers to understand technical terminology and use of ACBs, for example by integrating ACB explanation in governmental technical trainings. Technical terms can be simplified or defined to make ACB easier to understand and relevant for users.
4d) Support the daily crop management activities	▪ Crop management decisions that can be supported, include: ▪ Irrigation: involves water balance calculations based on rainfall, effective rainfall, runoff, evapotranspiration, and soil moisture ▪ Shelter from strong wind: access to weather forecast can help shelter or shade planning to reduce physiological stresses on crops. ▪ Ground cover (mulching): e.g., straw cover or artificial materials are used to modify the heat and moisture balance in the soil to benefit the crops. Mulches are useful in conserving moisture, reducing temperature extremes, and minimizing erosion. ▪ Storage: weather may affect the quality of crops and modify storage environments, resulting in losses of product quality and economic value

Notes

- This step ensures that ACB is communicated rather than simply disseminated. It is important to understand the users' behavior in receiving and sharing information, as well as the communication infrastructure, to identify the most appropriate communication channels. This will vary significantly from one location to another. In addition, local government can encourage communes to establish farmers' Zalo (or social media) groups for more effective information sharing and learning.

Step 5: FEEDBACK
Conduct monitoring, evaluation, and learning

Objective: Monitor and evaluate overall structure and process of ACB development and dissemination for learning and improvement.

Method: Review meetings, short survey questionnaires to users, baseline/ endline survey, social network, village/commune meetings.

Facilitator: TWG lead

Other key stakeholders: District DiviCP&PP / IASC for leading data collection at the district level, end users and other actors along the climate service value chain.

Sub-steps	Key information/outputs
5a. Mid-Season Review (MSR)	Mid-Season Review (MSR) aims to evaluate the contents and structure and the effectiveness and efficiency of dissemination channels of ACBs, especially 10-day bulletin. Key issues to be discussed: • Content of ACBs such as forecast accuracy and, types and detail level of information included in the advisory, what can be added or removed, the details of forecast indicators and agricultural recommendations. • Design, format, icons, and language of ACBs. • Suitability and effectiveness of dissemination of ACBs, including how many farmers have accessed ACBs? By which channels? From whom? Frequency and timing. • Actors that should be included to support ACBs development and dissemination The key activities include: - *Prepare guide questions.* Develop a list of key topics and questions to be reflected during the mid-season review workshop. Share these with the TWG members, so that they can reflect on them before the meeting. - *Collect feedback in advance.* Before the meeting, it is good to collect some feedback of stakeholders along climate service value chain, especially farmers, about the contents, designs, formats, language of ACBs as well as the reflections on communication channels. Data can be collected directly by talking to them or by calling them. Questions can be structured using same questions, or semi-structured based on certain topics. See Appendix 1 for an example of mid-season questions. - *MSR workshop*: Organize a TWG meeting mid-season; ensure that all key stakeholders and farmer representatives are present and make a report of the meeting with key issues and recommendations for improvement.

5b. End of season review (ESR)	The End of Season Review (ESR) looks back at the overall structure and processes as well as the results of ACB application. The end of season review is important as a learning moment in time, whereby different stakeholders get a better understanding of what went well and what not, and what can be done to further improve the service for the next season. Key topics include: • General observations on feedback from farmers regarding content, dissemination channels, frequency, accuracy of information and recommendations • Perceptions of the farmers on the bulletins • Most effective dissemination channels for farmers • Farmers' use and application of information in the bulletin in agricultural production • Challenges on understanding and effective use of the information in the bulletin • Support given to farmers to enhance understanding and use of information • Additional information needed by the farmers as part of the seasonal and 10-day bulletins • Integration of bulletin dissemination in regular village meetings • Adaptation with COVID19 situation in the village The key activities include: - *Prepare guide questions*. Develop a list of key topics and questions to be reflected during the end of season review workshop. Share these with the TWG members, so that they can reflect on them before the meeting. See appendix 1 for an example of end of season questions. - *Collect feedback in advance*. Before the meeting, it is good to collect some feedback of stakeholders along climate service value chain, especially farmers, about the structure, process, and the results of ACB application. Data can be collected directly by talking to them or by calling them. Questions can be structured using same questions, or semi-structured based on certain topics. See Appendix 1 for an example of end of season questions and meeting's discussion tools. - *ESR workshop*: Organize a TWG meeting at the end of season; ensure that all key stakeholders and farmer representatives are present and make a report of the meeting with key issues and recommendation for improvement.

5c. Baseline/ end-line M&E (optional)	Once every few seasons it might be good to do a more thorough assessment of the impact of the provided services. The is mainly focused on end-users such as farmers, cooperatives, but also other stakeholders who have been involved in the generation, translation, and transfer of climate services. To be able to make reliable statements of the impact, it is important to conduct both a baseline at before the first season, and an end-line after several seasons (which can then be repeated again if it is considered useful). The following elements and methods can be considered. • *Survey*. A survey among end users helps to understand the situation before and after the implementation of climate services. - Make research design with representative sample. - Develop a questionnaire based on key topics (livelihood, production system, crops, farmer's knowledge, attitude and practices, the use of climate services, perception of climate services, other support received, key challenges experienced etc.). A survey with closed questions is preferred to facilitate easy analysis. - Data entry and analysis - Validate key results with key stakeholders. • *Key Informant Interviews*: This is focused on people with specific knowledge or expertise who can provide valuable feedback on overall structure and process or on specific elements (important that these are from different levels and representing different functions along the CS value chain). • *Focus groups*: mainly focused on groups of end-users (in case of both men and women, then preferably separate), but may also focus on specific CS functions, e.g., around generation, translation, or transfer of services.

Notes

- The feedback can also be collected through Farmers' Groups (Zalo groups), village/commune meetings, etc. The extent to which these methods are applied depends very much on the resources available and the importance that leading agencies give to a more thorough assessment. However, where a mid-term and end of season review are more integrated elements of an interactive approach to the development and implementation of climate services, quantitative data can be important to show the social, economic, and environmental value and impact in numbers. For instance, costs and benefit analysis (with control farmers/groups for comparison) for implementing ACB can be conducted to assess effectiveness of the approach.

Organizational flow for seasonal and 10-day ACB development - experiences from MRD and SSC

Organizational flow for seasonal and 10-day ACB development - experiences from MRD and SSC

Critical to an effective ACB co-development process is the effective coordination and flow of information between relevant stakeholders. This section describes the organizational structure for the development and dissemination of seasonal and 10-day ACBs based on the experiences from MRD and SCC under the DeRISK SE Asia project. It can be adapted based on the actual conditions and the roles of stakeholders in the other provinces.

The experiences from the DeRISK SE Asia project showed that for scaling purposes, it is most effective if the ACB development process is coordinated at the provincial level with the extensive contribution of the district level in terms of implementation and technical contribution. District and province have complementary roles:

- District DARD or DivCP&PP is the one in charge of drafting ACBs based on consultation results from TWG members during the TWG meeting (Step 3) and implements all related field implementation activities together with commune level actors (e.g., collecting data for the review meetings, report the progress and results of ACB application at the district level).
- The provincial sub-DCP under DARD instead takes the role of initiating formation of the TWG, developing work plan, reviewing and approving the final content of ACBs, synthesizing reports and results of ACB implementation from participating districts, coordinating the TWG and review meetings and proposing work plan and policy advocacy for scaling at the provincial level.

Due to the specific characteristics of the seasonal and 10-day bulletins, the devleopment process and flow of information between stakeholders is slightly different. These will be visualized and explained below.

Organizational flow for development and dissemination of Seasonal ACBs

For the organizational flow of seasonal ACB development, see Figure 5.

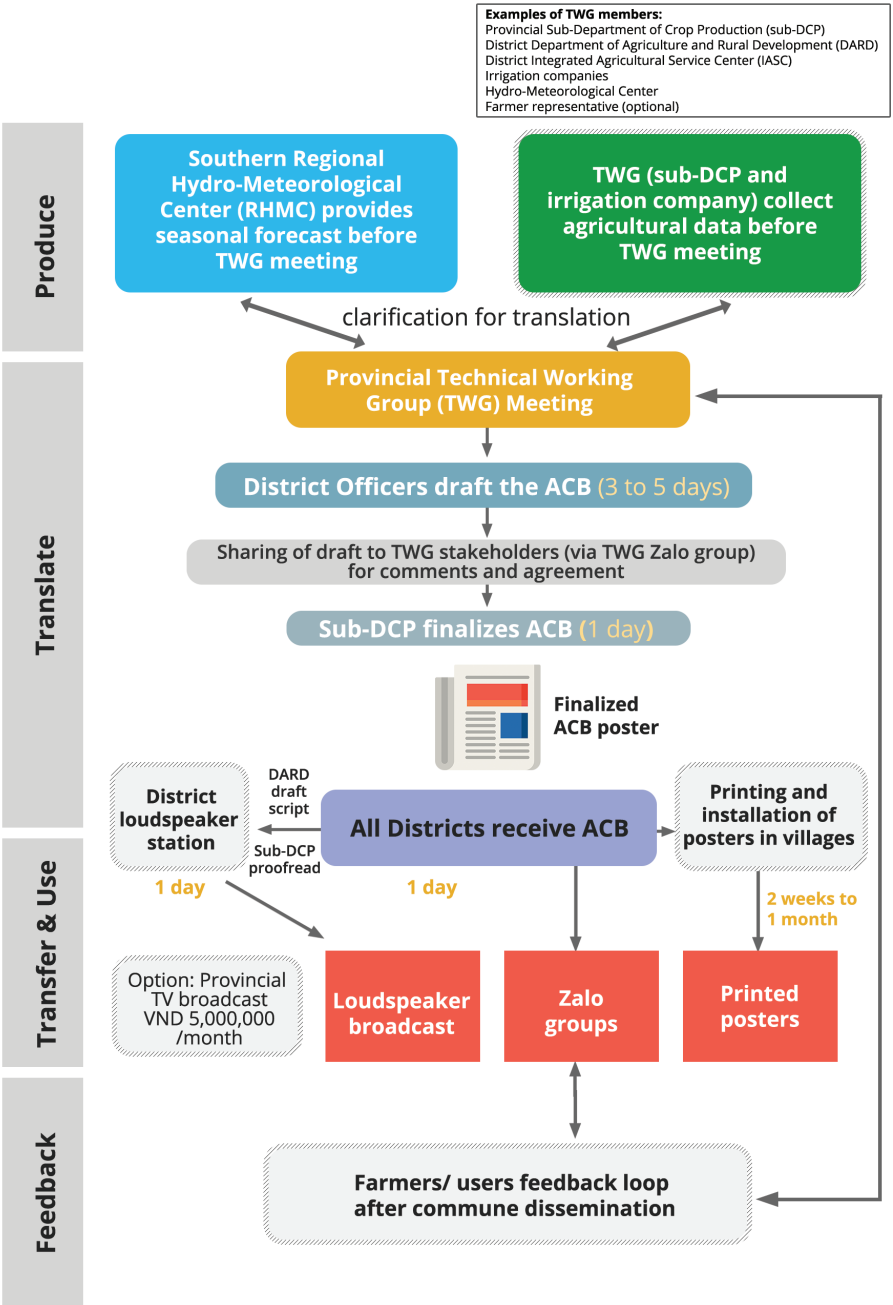
Produce: the two most important actors during the production step are the officers from hydro-metrological centers at province/regional or national level, and agricultural staff from Department of Agriculture and Rural Development (DARD) or sub-Department of Crop Production who were identified as the leading organization of the TWG. The hydromet officers will produce historical weather and climate data and seasonal forecast for the coming season (3 to 6 months). Agricultural officers and sub-DCP will generate agricultural data. The agricultural data and climate data will be shared by these two actors to all TWG members via online channels (Zalo and email) to review the information before the TWG meeting in which stakeholders will discuss and draft the seasonal ACB. The agricultural and climate information should be shared about 3 weeks before the crop season.

Translate: All stakeholders in the TWG meeting will review the climate and agricultural data, discuss risks and agree on adaptation strategies, 2-3 weeks before the crop season. That is why it is important that different perspectives are represented, including hydromet, agriculture, farmer, irrigation/water use, etc. At this stage, the district DARD or DivCP&PP will need 3-5 days to synthesize the discussion points from the TWG meeting and draft the seasonal ACB. A draft version of the seasonal ACB will then be shared with all TWG members for feedback and improvement (1 day). District DARD / DivCP&PP will need 1 day to revise and complete the final version before sharing the ACB with provincial sub-DCP for finalization and approval for dissemination. On the same day, district DARD/DivCP &PP will export the seasonal ACB from power point version into PDF, Zalo pictures, and script formats for printing and sharing.

Transfer and use: Different seasonal ACBs formats will be disseminated to commune level through Zalo, loudspeaker and printed posters. The poster ACB format may take around 2 weeks to be placed in public areas while it takes only a short time (within the same day when commune staff receiving ACBs) to share ACBs via Zalo and loudspeakers. Commune and district agricultural staff will follow up with further support (e.g., training on how to use ACBs, incorporating ACBs information into other technical agricultural training, providing additional technical advice on agricultural practices to adapt to climate variability).

Feedback: information can be collected through field visits, Zalo groups and during review meetings

Figure 5. Organizational flow for seasonal ACB development



Organizational flow for development and dissemination of 10-day ACBs

For the organizational flow of 10-day ACB development, see Figure 6.

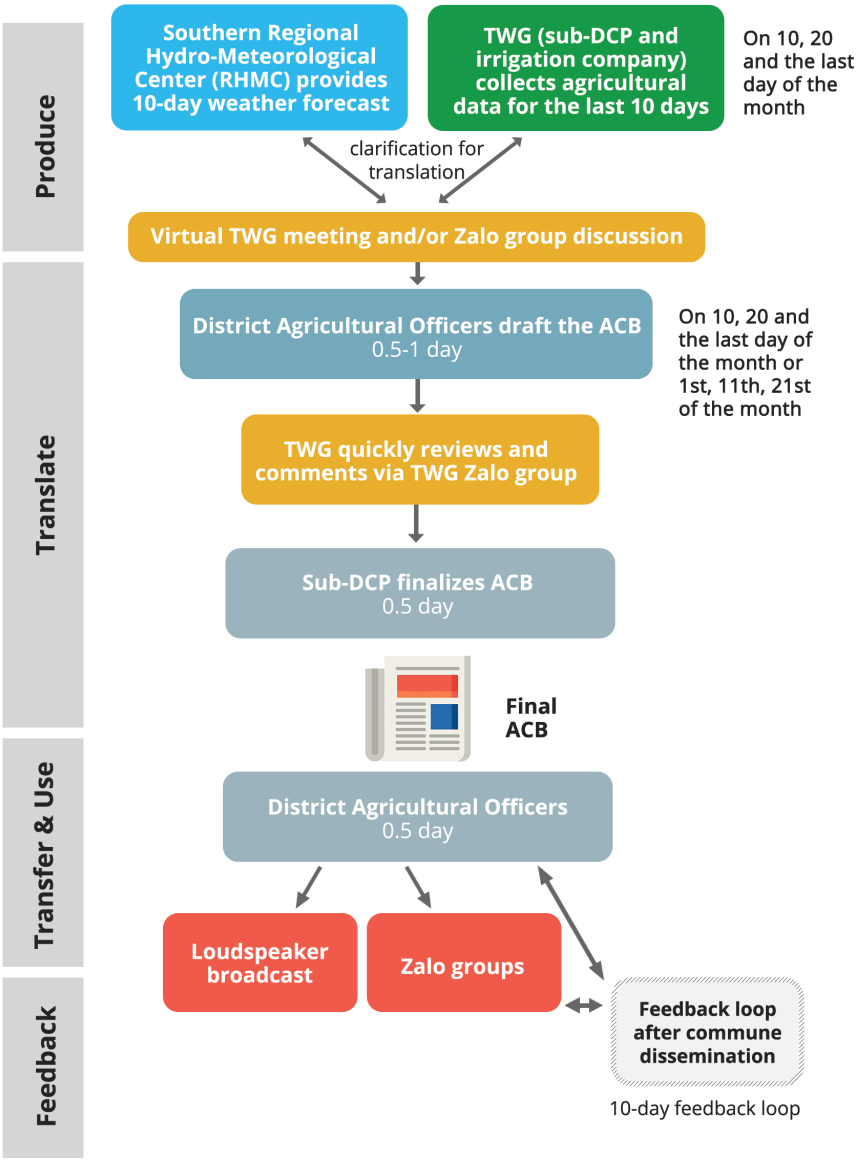
Produce: In the production step, met officers will produce 10-day weather forecast on the 10th and 20st and the last day of the month. Agricultural officers of DARD/sub-DCP will generate agricultural data for the last 10 -day period. The hydromet and agricultural officers will directly share the 10-day weather forecast and agricultural data with all TWG members via Zalo and email.

Translate: The data will be translated into 10-day ACB through a virtual TWG meeting and Zalo group discussion on the same day or a day later (1st, 11th, 21st of the month). All stakeholders in the virtual TWG meeting will review the climate and agricultural data for the next 10 days, discuss risks and agree on adaptation strategies. At this stage, the district DARD or DivCP&PP will need 0.5 to 1 days to synthesize the discussion points from the TWG meeting and draft the 10-day ACB and share with TWG members via Zalo for review and comments. District DARD/ DivCP&PP will address the comments and share it to sub-DCP for final review and approval before sharing to farmers in the Zalo groups and via loudspeaker.

Transfer and use: As soon as possible (normally on the same day with translation step), district DARD/ DivCP&PP will disseminate 10-day ACB through Zalo groups, loudspeakers and commune staff for further information sharing. Commune and district agricultural staff will follow up with further support for ACB application (e.g., incorporating ACBs information into other technical agricultural training, establishing farmers' Zalo groups and increasing number of members in farmers' Zalo groups, providing additional technical guidance on farm management practices, providing updated short-term/ early warning weather information and water regulation)

Feedback: information can be collected through Zalo groups or during review meetings.

Figure 6. Organizational flow for 10-day ACB development



Appendices

Appendix 1: Templates and examples of materials used in the ACBs development process

For step	File name	Link and/or QR code for template or example
	All files	
1	An example of TWG establishment decision letter and work plan	
1	Training material	
1	Example of list of expenses/ budget examples	
2	Examples of seasonal forecast	
2	Examples of 10-day weather forecast	
3	Proposed program of TWG meeting	
3	Template of seasonal bulletin (A0 poster format)	
3	Examples of seasonal agro-climatic bulletin (A0 poster format)	
3	Template of seasonal bulletin (zalo picture format)	
3	Template of 10-day agro-climatic bulletin (zalo picture format)	
3	Example of ACB bulletin (loudspeaker scripts format)	
3	Climate term explanation list	
3	How to edit and export JPEG version of bulletin from power point	

5	Examples of mid and end of season review meetings' agenda/ programs	
5	Example of mid review meetings' questionnaires	
5	Example of end of season review meetings' questionnaires	
5	Example of end of season review meeting's discussion tools for getting feedback/ reflection on the process of bulletin development and dissemination	

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- Stakeholders at the district and commune levels of the above eight provinces such as district DARD, department of crop production and plant protection, Integrated Agriculture Services Center, extension services
- Regional/provincial hydro-meteorological services
- Other relevant organizations and individuals in MRD and SSC that contributed to this manual.

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