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## **Participatory agro-climate information services:** A key component in climate resilient agriculture

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### **Key messages**

- ▶ Actionable agro-climate information starts with—and responds to—gender-based needs of farmers, integrated at all stages of the value chain.
- ▶ Inclusive and participatory multi-stakeholder communication platforms reduce bottlenecks, leading to more timely and relevant agro-climate information.
- ▶ Timely forecasts and accurate agro-climate advisories allow for timely nutrient inputs and resource efficiency leading to greenhouse gas emission reductions.
- ▶ Climate-informed decisions can reduce production losses and crop damage and should be costed as adaptation benefits in informed planning.
- ▶ Community groups' documentation of adaptation strategies should be used to improve longer-term adaptation strategies.



*Women are particularly affected by climate change as their roles are often associated with planting and tending of crops, which is time consuming if it needs to be repeated.*



## Introduction

Agro-climate information services are essential to farmers' decision-making. The value chain of such services typically entails: the production of seasonal and short-term weather forecasts by meteorological institutes, the integration of the forecasts into agro-advisories, and the dissemination of the agro-advisories through extension services. The Agro-Climatic Information Services (ACIS) for Women and Ethnic Minority Farmers in Southeast Asia Project looks to strengthen the value chain through a two-pronged approach: supply forecast information that better meets users' demand (top-down), translate the information into agro-advisories by integrating local knowledge and ensure feedback mechanisms that lead to adaptive learning (bottom-up) (Simelton et al. 2018a). The project was implemented by World Agroforestry and CARE between 2015 and 2018 in Vietnam, Laos and Cambodia in five project sites and among nine different ethnic minority groups.

## Key challenges for gender-sensitive and actionable agro-climate information services

Every year, farmers lose time, income and resources due to crop failures. Women are particularly affected as their roles are often associated with planting and tending, which are time consuming if they need to be repeated and because of their dependency on agricultural income. Losses in the agricultural sector due to droughts, floods and typhoons in Vietnam are currently estimated at 1.5% of GDP and could reach 11% across Southeast Asia within this century (OECD 2017; ADB 2015). Some of these weather-related crop losses can be avoided with actionable agro-climate information. However, prior to the ACIS project, a study with over 1,330 households across Vietnam, Laos and Cambodia showed that the actionability of climate services from the end user perspective, i.e. remote smallholder farmers, was compromised in various ways (see 'before' in Table 1).



*“When farmers translate the weather forecast into advisories for farming, they understand the information and make it useful for local needs.”*

- ▶ **Availability:** Forecasts and agro-advisories come through separate channels. While daily weather forecasts were available on TV or radio, the spatial and temporal resolution of the information was often too crude. Agro-advisories are instead often distributed via extension services and through loudspeaker systems, which affects accessibility.
  - Accuracy: The information was often inaccurate or irrelevant. The seasonal planting recommendations were based on climatology rather than actual seasonal forecasts. Moreover, the available information only covered a few main crops—typically rice, and one or two key cash crops, presumably grown as a monoculture—while smallholder farmers often have mixed farming systems with livestock.
- ▶ **Timeliness:** The disconnection between departments under different ministries (horizontally) and from national or provincial to village levels (vertically) caused delays. This means lost opportunities for timely recommendations, such as planting windows, pest treatment and disaster prevention.
- ▶ **Understandability:** The language used in the advisories was difficult to understand for many farmers. The advice was not available in ethnic languages or presented in a meaningful way, especially for the illiterate (Smytze and Simelton 2018). There are gender and cultural differences in the preference of the forecast format and in the interpretation of static weather icons, for example (Duong et al. 2017).
- ▶ **Accessibility:** Access to information is particularly hampered by infrastructure such as dysfunctional electricity and poor internet access, especially during extreme weather situations.
  - Generally, men had better access to advice than women, through extension and meetings.
  - The ability of farms to carry out the desired advice was often constrained by access to labour and resources.
- ▶ **Usefulness:** If all or some of the abovementioned indicators are not met, or relevant information is missing, the advisories fail to meet the farmers’ needs, which affects their usefulness. In some cases, failures in knowing what to ask for originated from the lack of a common language among meteorologists, planners and agricultural advisors to request relevant agrometeorological information (Simelton et al. 2018a).



Photo: Duong Minh Tuan / ICRAF

## Key lessons learned

The ACIS project shows that actionability can be improved at each step of the agro-climate information value chain (see 'after' in Table 1). This involves:

### ► Asking users what information they need and letting them co-design the product in rural development programs

Participatory Scenario Planning meetings enable testing and developing of new products and systems and obtaining feedback from different user profiles (e.g., gender, literacy, farming systems). The meetings can be incorporated into other community development activities, such as savings and loans activities, farmer field schools, and rural development programs. Learning to use different forecast sources helped in developing a habit of comparing different sources. In Vietnam, farmers who received training on climate information were more willing to pay for climate services.

Learning from farmers helps to avoid agro-advice with conflicting messages. In Laos, ethnic farmers already had diversified farming systems, which would contradict conventional advisories for monocropping systems. In the

absence of relevant forecasts, the farmers in Cambodia gathered 48 indigenous indicators for forecasting. In Vietnam, farmers and leaders rated tree and crop feasibility with specific weather stress, such as drought, typhoons etc., which were aggregated into charts that guided land-use planning and agro-advisories.

### ► Improving access to, and quality of weather forecasts

Ultimately, trust in the producers of the advisory and the services depends on their forecast skills. Furthermore, comparing different forecast methods with observations highlights the variability of forecasts and may help to identify which ones are correct more often or systematically over- or under-predicting (Roy et al. 2017). In Lao PDR, district automatic weather stations and new high-tech rain gauges allow verification of accuracy of produced forecasts and determine adjustment factors of future forecasts.

Agro-ecological zoning was conducted as the basis for downscaling farming calendars. While the process was time consuming, local planners were interested in its applications for exploring the feasibility of producing certain crops and alternative land uses.

**Table 1** – Selected key impacts of the ACIS project in Vietnam, Laos and Cambodia

<b>Actionability criteria</b>		<b>Producer</b> Meteorological department	<b>Producer/translator</b> of agro-climate advisories	<b>Transfer</b> Agricultural extension	<b>Users</b> Women and men farmers
<b>Availability</b>	Before	Weather forecasts available on TV or radio.	Traditional seasonal crop calendar.	Training and field extension.	Followed traditional/cultural crop calendar.
	After	Participatory stakeholder platform.			
		Forecasts published online.	Participatory scenario planning for wider selection of crops. Agro-climate advisories published online. Farmer Learning Network.		Shorter messages via loudspeakers. Farmer-designed indicators. SMS messages. Farmer-to-farmer knowledge sharing.
<b>Accessibility</b>	Before	Poor access to daily weather forecasts in Cambodia and Laos.	Ministry/Department of Agriculture had to pay Meteorology Department for forecast services.	Male extension staff and leaders visited male farmers. Loudspeakers did not reach all farmers.	Men had better access to advisories than women. Advisories were not needs-based, farmers' needs vary.
	After	Local knowledge and online forecasts combined. Downscaled forecasts.	Local co-investment to produce downscaled data. Real-time meteorology data collected and analysed.	Agro-climate advisory as bulletins on information boards, social media.  Feedback mechanisms in place to report on accuracy, timeliness and usefulness of advisories.	
<b>Timeliness</b>	Before	Disconnected actors between departments under different ministries (horizontally) and from national or provincial to village levels (vertically).			Lost opportunities for timely recommendations.
	After	The platform speeds up the information flow.			
<b>Understandability</b>	Before	Meteorological forecast indicators were not relevant for agronomic recommendations.		Language was too technical. Unavailable in ethnic languages or illustrated in a meaningful way, especially for the illiterate.	
	After	Improved understanding of indicators.		Agro-advisory and farmer networks are efficient communication tools.	Farmers co-design tools, know who to ask. Local knowledge is collected and used.
<b>Usefulness</b>	Before	Supply-driven meteorologists were not trained in agronomy.	Unaware what information and indicators to ask for.  Agriculture advisors were not trained in meteorology or climatology.		Supply-driven information. Nobody to feedback to.
	After	Automatic weather stations used for improving forecast skills.	Crop failures avoided. Farming systems compared with and without disaster impact to learn what adaptation strategies work.	Agro-advisories incorporated climate-smart agriculture. Farmer networks are efficient for other community activities.	Demand-driven information. Multiple benefits reported: less yield variability, improved resource use efficiency (less pesticide, fertilizer and labour inputs). Farmers seek required information and increasingly make informed decisions .



## Key impacts

The agro-climate information services contributed to reduced yield variability compared to control sites (Simelton et al. 2018b). This was because farmers could better time the planting or harvesting of specific crops, select more suitable varieties or crops, and plan the application of inputs.

### ► Actionable agro-advice helped with planning and resource use efficiency

*Reduced yield variability:* Better timing contributed to a comparatively smaller decline in cassava yields among farmers groups with participatory scenario planning compared to control sites. Farmers with tree-based systems, such as orange, tea and cardamom, were less affected by extreme weather events and recovered faster economically than those with monocultures.

*Improved resource use efficiency:* Farmers used less inputs because they paid more attention to the forecasts before making management decisions. This translates into more effective use of time and resources.

### ► Participatory agro-advice contributes to community learning and resilience

*Strong evidence of social learning, gender impacts and the values of it:* Farmers ranked community learning and knowledge sharing among the top three impacts of ACIS. When farmers in groups realized they were learning, they became more willing to share and discuss. Because advisories are discussed in interest or saving groups, women gained more influence in agricultural decisions both at home and in the community. Actions and recommendations for gender and social inclusion depend strongly on the culture. When new practices were introduced, women and men were given equal opportunities to join so as not to cement gendered tasks. Having female and male facilitators helped in fostering gender equality.

*Local actionability:* During a cold spell in 2015, village leaders who monitored the temperature on the farmer-managed automatic weather stations could take appropriate measures. In Cambodia, the project and agriculture department could speed up the protection measures against the mosaic disease on cassava.

## Policy Recommendations

It is in the governments' interest (especially in Cambodia, Laos and Vietnam) to enable proactive adaptation measures, hence, the following actions are recommended:

### 1. Provide evidence on how long-term planning and short-term adaptation interventions can avoid loss and damage.

Community-based agro-climate information can thus be costed as an adaptation benefit in investment plans and contribute to national commitments to Sustainable Development Goals, National Adaptation Plans and the Paris Agreement. This opens investment opportunities for co-funding via the Green Climate Fund, Global Environment Facility, and the World Meteorological Organization's Global Framework for Climate Services.

### 2. Align agro-climate information and recommendations with resilient farming practices

such as climate-smart agriculture, mixed farming systems and low emission strategies. Actionable agro-advisories imply preparedness for climatic as well as market uncertainty and risks by identifying available no-regret adaptation options.

### 3. Remove constraints for sharing meteorological data

across line ministries to make climate information more timely, accessible and useful.

### 4. Invest in closing information and capacity gaps

from the national to the subnational levels.

- Invest in improved accuracy of forecasts and downscaling procedures and upgrading and establishing a denser network of weather stations, coupled with the use of remote sensing information.
- Prioritize capacity building of subnational staff involved in producing, interpreting and translating weather forecasts into agricultural advice, risk and planning. Set up

systems for subnational dissemination of international meteorology meetings, such as the Monsoon Forum.

- National investment plans for education should target university programs and short training courses for local agricultural extension staff on agrometeorology to strengthen local capacity to respond to local demands of weather information.
- Appropriately include the needs, local knowledge and feedback from female and male end users. Develop agro-climate information with users and disseminate using multiple media and tools that are available for a range of literacy, language and technical needs. Consider incorporating information that influences farmers' decisions, such as market prices, insurance and policy support. Allow for farmer-to-farmer networks and local agro-climate intermediaries such as village meteorologists, social media, or call centres.

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## Further reading

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