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Delivery of climate services to last mile users:

challenges and opportunities for scaling

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Summary

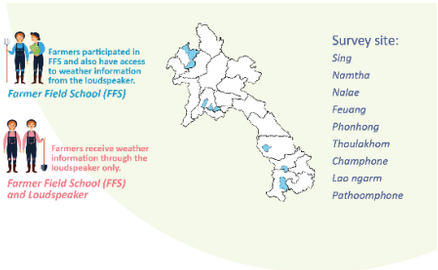
Weather and climate information plays an important role in the farming decisions made by smallholder farmers in Lao People's Democratic Republic. Timely, adequate, and reliable weather and climate information can help farmers make better informed decisions and thus minimize the adverse impacts of climate variability. This survey aims to collect information on farmers' access to weather information from loudspeakers, its use in farm activities, the challenges in accessing it, and the potential use of the internet and social media in disseminating it.

During the years 2019 to 2020, the Department of Agricultural Land Management (DALAM), of the Ministry of Agriculture and Forestry has been operating in various provinces to test the implementation and use of climate services for farmers. Innovative climate services that are specific for agricultural production are provided mostly by the Laos Climate Services for Agriculture (LaCSA), a near-real tool that is operated and maintained by the Department of Meteorology with inputs by the National Agriculture and Forestry Research Institute (NAFRI), and the Plant Protection Center. The LaCSA is available at www.lacsa.net and in the Apple and Android app stores.

The results show that loudspeakers have a wide reach and are valued by farmers. Farmers who have heard of accessing weather information from speakers use the resource when choosing crop variety. Those who have access to both farmer field schools and loudspeakers are more likely to adjust their planting schedule, while farmers who get their information only from loudspeakers often change their water management practices. More localized weather information is the main recommendation when it comes to improving weather services. Weather information should also be complemented by other types of support to improve its use. Examples of such support include technical guidance in improving farmers' understanding of the content of the weather information and adaptation practices. The distance between loudspeaker and farmer limits the reach of loudspeakers in disseminating advisories. A reliable and frequent schedule might help to reach farmers. Other potential information channels identified are radio and television. Though these channels can reach a wider audience, the content of the weather information might not be tailored to the specific community or location of the farmers. Improvements in technology such as internet, access to mobile phones and social media can also be tapped to improve the dissemination of weather information.

Adoption of CLIMATE SERVICES in Lao PDR

Strengthening Agro-climatic Monitoring and Information System (SAMIS) and Applying seasonal climate forecasting and innovative insurance solutions to climate risk management in Southeast Asia (DeRISK Southeast Asia)



LOUDSPEAKER BROADCAST LISTENERSHIP

78% listen to weather news

- *77% of farmers accessed weather information from loudspeakers*
- *Participation in FFS did affect access to weather information from loudspeakers*
- *2 out of 9 sites showed 42% or less access to weather information from loudspeakers*

Forecast information most important to farmers

- More than 84% of farmers valued the advisory received through loudspeakers and FFS

Daily and weekly forecast	96% / 82%
Seasonal forecast	88% / 84%
Crop calendar	78% / 62%

Others: water level, extreme events, pest and diseases

Information delivery channels available to farmers

- Most common support channels for farmers are the neighbours and local agricultural staff (about half)
- NGOs are relatively minor source of support to farmers, although more relevant for FFS farmers (about a third)

Neighbours	59% / 48%
Local agriculture worker	49% / 45%
Relatives	37% / 47%

Others: family members, NGO staff, village chief

Type of support needed by farmers

- Over 75% of farmers received technical support
- About half of the farmers received input materials
- Less than 10% of the farmers received financial support

Technical information	82% / 75%
Input materials	48% / 47%
Financial support	4% / 11%

Changes in farming practices based on forecast and advisories

85% of those who listened to the forecast changed their farming practices

Adjustments on farming practices based on forecast and advisories

- Over 85% of farmers changed practices as a result of access to advisories from loudspeakers
- Strategic planning related to selection of crop varieties, planting dates and water management were the main responses from farmers.
- Tactical responses were also implemented for a relatively lower number of farmers.

Use of other crop varieties	76% / 75%
Water management	40% / 60%
Shift on planting date	65% / 32%

Others: protect or cover the crops, pesticide and fertilizer application

Opportunities to improve the use of forecast and advisories

- Improve capacity of farmers to understand and improve usability by providing accurate and locally tailored information
- About a third (325) and half (44%) of FFS/speaker farmers had difficulty in describing areas for improvement of advisories and confirmed their usefulness

Improve capacity to understand climate information	28% / 23%
Build capacity to better apply climate information and advisories on farmers' decision-making	24% / 18%
Tailoring and provision of accurate climate information and advsories	28% / 23%

Farmers' recommendations to improve bulletin reading through community loudspeaker

- Half of farmers believe that locally tailored advisories is the most important area for improvement
- Farmers who accessed only the loudspeaker emphasized the need for translating weather information into agro-advisories and increased frequency on the broadcasts

Improve salience (more locally tailored information for the community)	59% / 46%
Timeframe (specific timeslot for the broadcast)	38% / 43%
Improve broadcast frequency	28% / 23%

Others: translate weather into agro advisories for crops or livestock

22% do not listen to weather news

- *77% of farmers accessed weather information from loudspeakers*
- *Participation in FFS did affect access to weather information from loudspeakers*
- *2 out of 9 sites showed 42% or less access to weather information from loudspeakers*

Reasons for not listening to loudspeaker broadcast

- Farmers who participated in FFS show less interest in advisories from loudspeakers
- Limited broadcast reach due to the remoteness of household locations was the main limitation for farmers without access to FFS

Sound from loudspeaker does not not reach the house (remote area)	17% / 52%
Absent during the broadcast (at work)	33% / 21%
Listening to loudspeaker broadcast is not a habit	8% / 21%
Others	67% / 29%

Others: Damaged speakers, poor location of speaker, can't understand the broadcast, nobody read the news

Preferred channels to receive advisories

- TV is the most preferred dissemination channel of farmers who do not listen to loudspeaker broadcasts

TV	88% / 83%
Radio	25% / 40%
Internet (Phone)	33% / 15%

Others: Extension staff, printed bulletins with infographics

Willingness to listen to advisories broadcasted through loudspeakers

- All farmers who did not access advisories indicated interest in accessing them

Interested in advisories through loudspeakers.	96% / 100%

Suggestions to improve advisories and dissemination

- Farmers in remote areas suggested improved frequency and timing of advisory broadcasts
- FFS farmers preferred improved timing of the broadcast and a comprehensive agro-advisory

Timeframe (specific timeslot for the broadcast)	50% / 96%
Frequency of delivery	38% / 90%
Integrate content about farm management (variety selection, fertilizer use, compost, pest and diseases)	42% / 21%

Others: Advisories on specific crops and livestock locally tailored information on cold months to improve coverage

POTENTIAL for ICTs

Farmers who have access to the internet

36% of the surveyed farmers have access to the internet

Farmers searching for weather forecast information through the internet

77% of those who have internet access searched for weather forecast information online

	73% / 80%

Climate information products accessed by the farmers via online

- About 30% of the farmers have access to internet (about half of FFS farmers indicated access to internet)
- A quarter of farmers access SAMIS advisories from internet sources. Facebook and Whatsapp were the most accessed sources.

Others (mobile phone, Google, TV, radio, village speakers)	26% / 72%
DMH Facebook	61% / 33%
Forecast bulletins through Whatsapp	55% / 18%
LaCSA	32% / 15%

Which among the online dissemination channels are often visited by farmers?

DMH Facebook	61% / 34%
Others (mobile phone, Google, TV, radio, village speakers)	24% / 64%
Forecast bulletins through Whatsapp	39% / 21%
LaCSA	18% / 10%

Source: Authors' own elaboration.

Abbreviations and acronyms

CS	Climate Services
FFS	Farmer Field School
DALaM	Department of Agriculture and Land Management
DONRE	District Office of Natural Resources and Environment
DMH	Department of Meteorology and Hydrology
LaCSA	Laos Climate Services for Agriculture
LNR	Lao National Radio
MAF	Ministry of Agriculture and Fishery
MONRE	Ministry of Natural Resources and Environment
NAFRI	National Agriculture and Forestry Research Institute
PALaM	Provincial Agricultural Land Management Office
SAMIS	Strengthening Agro-climatic Monitoring and Information System

1 Introduction

Lao People's Democratic Republic is a landlocked country where the majority of the population are small farmers involved in rainfed agriculture. Climate variability thus has significant impacts on agricultural production and farming decisions. For instance, a short-wet season can decrease production because of inadequate water to support crop growth. On the other hand, severe rainfall can cause crop damage because of flooding, erosion, and crop submergence. As temperatures are projected to increase, there are higher risks of drought and diseases. Due to the important role played by weather and climate in agricultural production in Lao People's Democratic Republic, it is important to deliver timely, reliable, and adequate forecasts to farmers. This information can help farmers make informed farming decisions that can address the adverse impacts of climate variability.

Many institutions in Lao People's Democratic Republic deliver weather and climate information. The Department of Meteorology and Hydrology (DMH) is mandated to provide scientific weather and climate services such as weather and flood forecasts, early warnings, and severe weather warnings nationwide. It disseminates information through TV, radio, newspaper, social media and official websites, as well as providing information to other government institutions and provincial offices. Early warning bulletins for local storms, heavy rain, strong winds, landslides, flash floods and floods are examples of warnings provided by the DMH[1].

The survey collects information on the socioeconomic profile of selected villages selected in the Strengthening Agro-climatic Monitoring and Information System (SAMIS) project, access to types of weather information, its potential use in farm activities, and the potential use of communication technology to improve the quality and delivery of weather and climate information to farmers.

[1] https://www.unescap.org/sites/default/files/2a_Akhome%20Thamalangsy_Disseminating%20and%20Sharing%20of%20Data%20on%20DRR%20in%20Lao%20PDR.pdf

2 Project background

The Strengthening Agro-climatic Monitoring and Information Systems (SAMIS) project aims to improve adaptation to climate change and food security in Lao People's Democratic Republic by enhancing capacities to generate and distribute scientific weather and climate information and promoting its use in decision-making among actors in the agricultural sector.

Among other milestones, the SAMIS project has developed the Laos Climate Services for Agriculture (LaCSA), a web/app-based agro-met service system. It archives and processes meteorological and agricultural data to provide agro-advisory services to next- and end-users such as smallholder farmers. It automatically generates and delivers tailored agro-advisories in the form of monthly and weekly bulletins to farmers by analyzing the meteorological and agricultural data from national databases and from field-level data collection by local partners.

Users can access LaCSA through the web (www.lacsa.net) and mobile application (Android/iOS). Other offline means such as community bulletins, loudspeakers, radio/TV broadcasting, and community and school posters are also available to those who are not familiar with internet use and IT tools. The bulletins contain district- and province-specific advisories for crop/livestock and pest/disease risks and climate-smart farming recommendations to help farmers cope with the identified risks. The farming recommendations are in English and Pasalao and are presented as structured tables, where the rows refer to farming activity and the columns feature recommended farming practices for each rainfall forecast (e. g. normal, wetter, and drier). DALaM, DMH, PPC, PAFO, PONRE, DAFO, DONRE are the main implementers of farmer field schools and village loudspeakers. Announcements using village speakers are carried out by village authorities. The Lao National Radio (LNR) has developed a training package. Monthly bulletins are also shared with LNR which they then forward to the radio station of each province.

III » Data collection

The selected villages where the survey was conducted are project sites of the SAMIS project. Five percent of the population per village was interviewed by trained government staff and took place in a government office. The survey focused on farmer access and use of weather and climate information from two channels, namely farmer field schools and loudspeakers. Table 1 shows the selected provinces and districts in the study.

Table 1 Selected SAMIS Provinces and Districts

Region	Province	District	Main crops	Areas of interest
North	Luang Namtha	Sing		
North	Luang Namtha	Nale	Upland rice	Upland rice farming
	Luang Namtha	Namtha		
Central	Vientiane	Fuang		
	Vientiane	Phonhong		
	Vientiane	Thoulakhom (Boungphao village)	vegetables	Vegetables Information for coffee
South	Saravan	LaoNgam	coffee	Agromet.info for rice farming
	Champasak	Pathoumphone	Lowland rice	Agromet.info for rice farming
South	Savannakhet	Champhone	Lowland rice	

Source: Authors' own elaboration.

To assess the impacts of the use of loudspeaker as an information dissemination channel, this report focuses on two main areas:

1. Evaluating the use of loudspeakers as the distribution channel of weather news. The survey asked different questions to the two groups of farmers:
   a. Those who listened to the weather news from loudspeakers; and
   b. Those who had never heard of the weather news via loudspeakers.
2. Assessing the use and potential of climate information distributed through the internet.

IV Results

A. Access to weather news

A total of 343 farmers distributed across the nine districts in five provinces in Northern, Central and Southern Lao People's Democratic Republic participated in the household survey (Table 2). Two of these districts, namely Champone (Savannakhet province, Southern) and Sing (Luang Namtha province, Northern), have existing farmer field schools where farmers can also access weather information in addition to loudspeakers. Farmers from these two districts comprise 31 percent (106/343) of the total number of respondents. These farmers are identified in this report as "FFS/speaker farmers." Their responses are compared with farmers in the remaining seven districts who received weather information through the loudspeaker only. There are two districts Nale and Namtha in Luang Namtha province (Northern); three districts Fuang, Phonhong, Thoulakhom in Vientiane (Central); LaoNgam district in Salavan province and Pathoumphone district in Champasak province (Southern). The farmers in these districts comprise 69 percent (237/343) of the respondents. These respondents are termed as "speaker farmers" in this report.

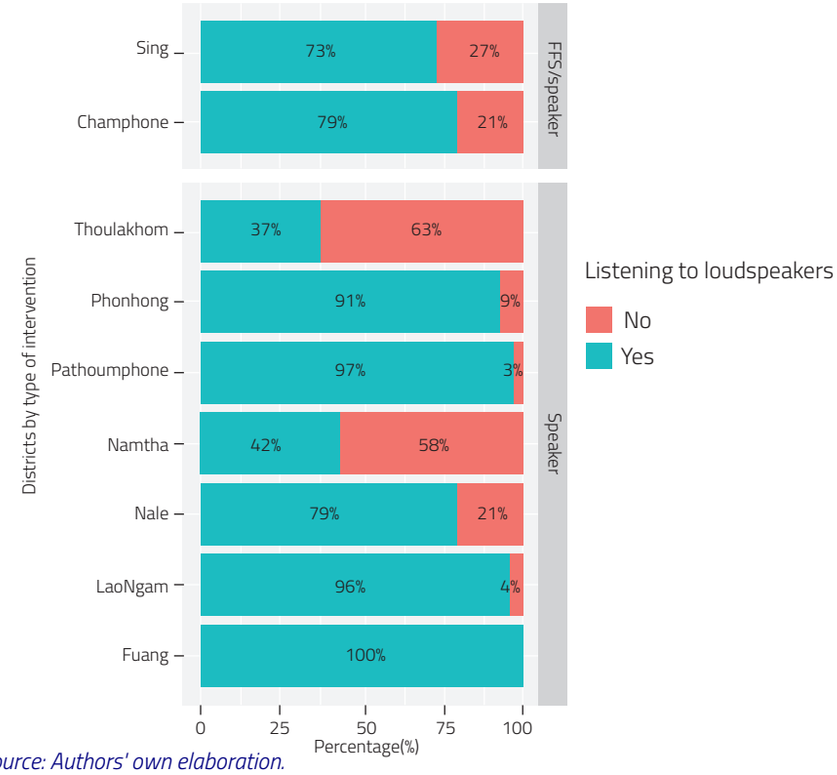
Table 2 FFS/non-FFS farmers by location and whether they listen to the community speaker or not.

Region	Province	District	Intervention	Listened to advisories from speakers				Total
				Yes		No		
				Count	Percent	Count	Percent	
North	Luang Namtha	Sing	FFS/speaker	19	73%	7	27%	26
South	Savannakhet	Champhone		63	79%	17	21%	80
			Subtotal	**82**	**77%**	**24**	**23%**	**106**
North	Luang Namtha	Nale	Speaker	19	79%	5	21%	24
	Luang Namtha	Namtha		14	42%	19	58%	33
	Vientiane	Fuang		35	100%	0	0%	35
Central	Vientiane	Phonhong		43	91%	4	9%	47
	Vientiane	Thoulakhom		13	37%	22	63%	35
South	Saravan	LaoNgam		26	96%	1	4%	27
	Champasak	Pathoumphone		35	97%	1	3%	36
			Subtotal	**185**	**78%**	**52**	**22%**	**237**
			Total	**267**	**78%**	**76**	**22%**	**343**

Source: Authors' own elaboration.

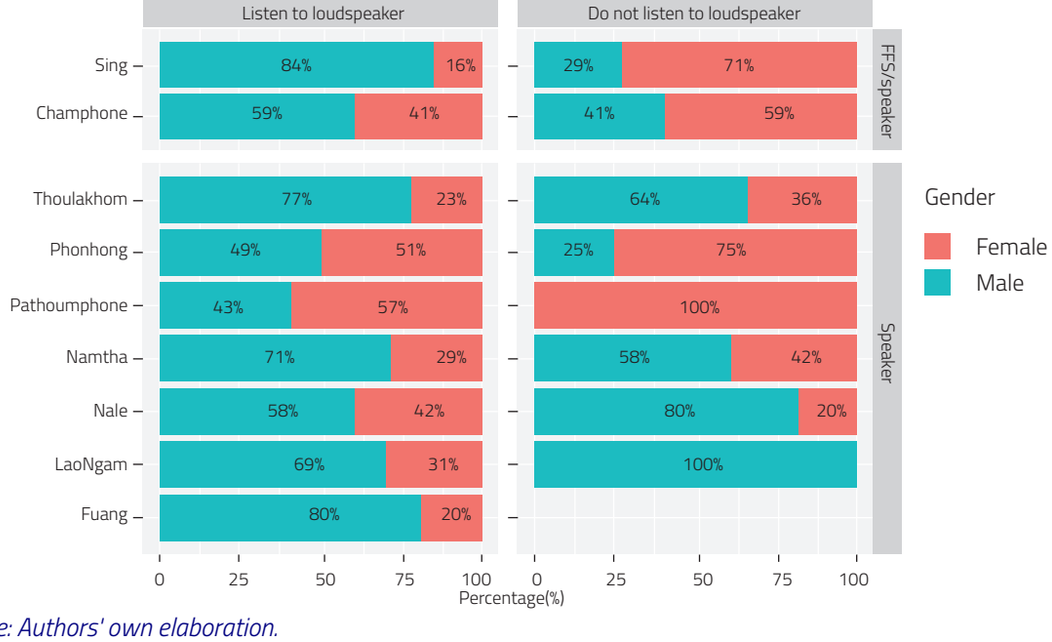
Figure 1 shows the percentage of loudspeaker listeners by district. In FFS/speaker districts, the share of loudspeaker listeners is relatively high at more than 70 percent. Meanwhile the share of listeners in "Speaker only" districts was found to vary. In Thoulakom, only 37 percent listen to loudspeakers, as against 100 percent in Fuang district. The south districts also have a high share of listeners at 96 percent.

Figure 1 Loudspeaker listeners by district



Source: Authors' own elaboration.

Figure 2 Loudspeaker listeners by district and gender



Source: Authors' own elaboration.

Across all respondents, 78 percent (267/343) claimed that they listen to the loudspeakers for weather news while the remaining 22 percent (76/343) stated that they do not use loudspeakers as a source of weather information (Table 2). In the two districts in both the North and South regions where FFS were organized, a high percentage of farmers listen to the weather news through the village loudspeakers (73 percent and 79 percent in Sing and Champhone districts, respectively). Meanwhile, farmers who listened to weather news through loudspeakers were at similar percentages at the remaining districts where speaker bulletins were the only intervention. Namtha district, Luang Namtha province (42 percent) in the North and Thoulakhom district, Vientiane province (37 percent) in the Central Lao People's Democratic Republic were exceptions with lower percentages of listeners.

Summary of findings:

- 78 percent of farmers accessed weather information from loudspeakers.
- Participation in FFS affected access to weather information from loudspeakers.
- 2 out of 9 sites showed 42 percent or less access to weather information from loudspeakers.

B. Loudspeakers as a source of weather information

A total of 267 farmers (78 percent of the total) were identified as speaker farmers, including 82 FFS/speaker farmers and 185 speaker farmers. For this report, these farmers are divided into two groups: Group 1 (those who use the information), and Group 2 (those who do not use the information).

1. Use of weather news from loudspeakers

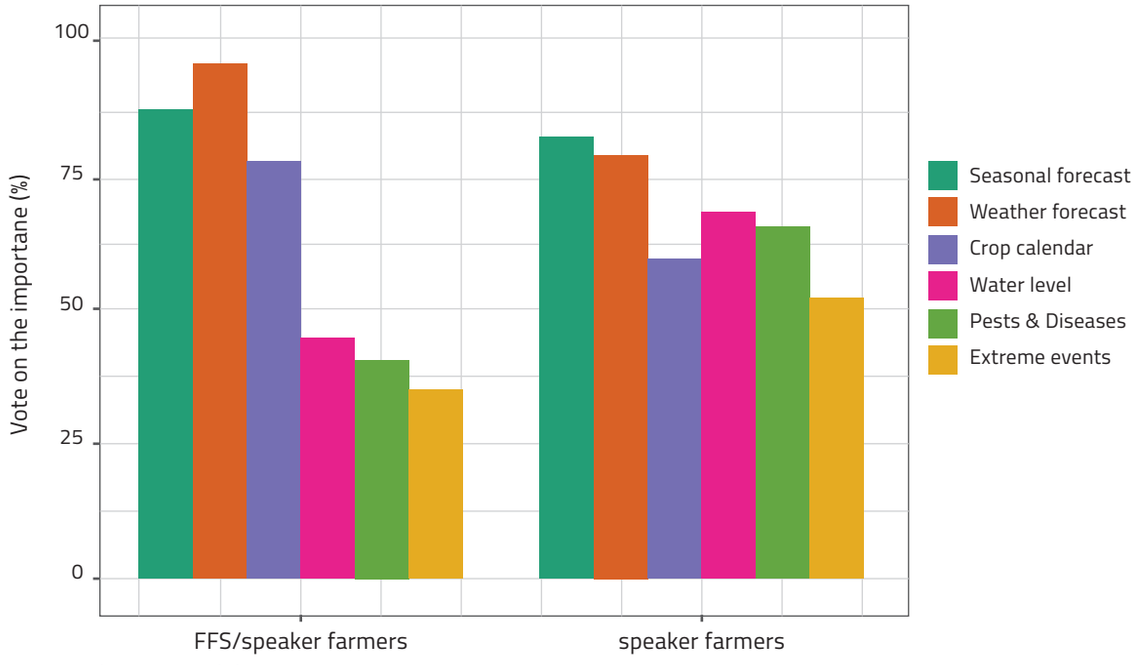
The patterns between the two groups are consistent in terms of responses around the importance of monthly seasonal and weekly weather forecasts, with percentage shares of no lower than 80 percent for both groups. There are differences in terms of a) more clearly defined priorities for FFS/speaker farmers on seasonal (88 percent) and weather forecast (96 percent); and b) relatively higher relevance of crop calendars importance for FFS/speaker farmers, with a share of 78 percent compared to 62 percent by speaker farmers (Table 3 and Figure 1). On the other hand, speaker farmers were found to have a greater understanding of the importance of other types of forecast such as: (a) water-level forecasts (69 percent); (b) pest and disease forecasts (68 percent); and (c) extreme event forecasts (55 percent). This is an early indication of the effect of FFS on farmers' perceptions on the value of weather forecasting data and more importantly, on their potential for adjusting crop calendars.

Table 3 Farmers' perceptions of the importance of information

Type of forecast	Number of farmers who claimed forecasts are important (Multiple response)			
	FFS/speaker (n = 82)		Speaker (n = 185)	
	Count	Percent	Count	Percent
Seasonal forecast	72	88%	155	84%
Weather forecast	79	96%	152	82%
Crop calendar	64	78%	115	62%
Water-level forecast	39	48%	127	69%
Pest and disease forecast	34	41%	125	68%
Extreme event forecast	28	34%	101	55%

Source: Authors' own elaboration.

Figure 3 Farmers' perceptions of the importance of information



Source: Authors' own elaboration.

Summary of findings:

- More than 84 percent* of farmers valued the advisory regardless of the type of intervention (loudspeakers or FFS).
  * Estimated number of farmers (total/female) based on the total target population.

2. Use of weather information

Among those who listened to the community speaker, 83 percent (68/82) of the FFS/speaker farmers stated that they changed their farming practice after receiving the forecast information, as against 88 percent (163/185) of speaker farmers (Table 4). On the other hand, 36 farmers received the bulletins but did not apply any changes to their practice. Based on these results, loudspeakers would seem to be a highly effective dissemination channel with a significant potential for scaling weather-based agro-advisories.

The survey of 343 respondents reported that 267 farmers had access to the bulletins via loudspeakers, and 231 farmers changed their farming practice accordingly. A total of 25 295 farmers received LaCSA bulletins via the two inventions. Of those, 7 468 farmers received both FFS and loudspeakers; 17 827 farmers received only loudspeaker information.

The SAMIS project has been scaling its agro-advisory services through the establishment of more weather stations, enhancing the capacity of DMH to translate climate information into agricultural recommendations with the collaboration of NAFRI, and developing new communication channels (through schools, mobile app development, social media) to reach more users of the platform. Considering the scaling effort of SAMIS, it is estimated that ≈20 717 (FFS/speaker Farmers) and ≈22 791 (speaker farmers) farmers could be potentially reached by the agro-advisory services based on the proportion of farmers that are currently receiving agro-advisory services by loudspeaker alone. Among the other benefits that climate services can provide is access to information to allow better farming decisions. Table 4 shows the types of farm management practices that were influenced by climate services.

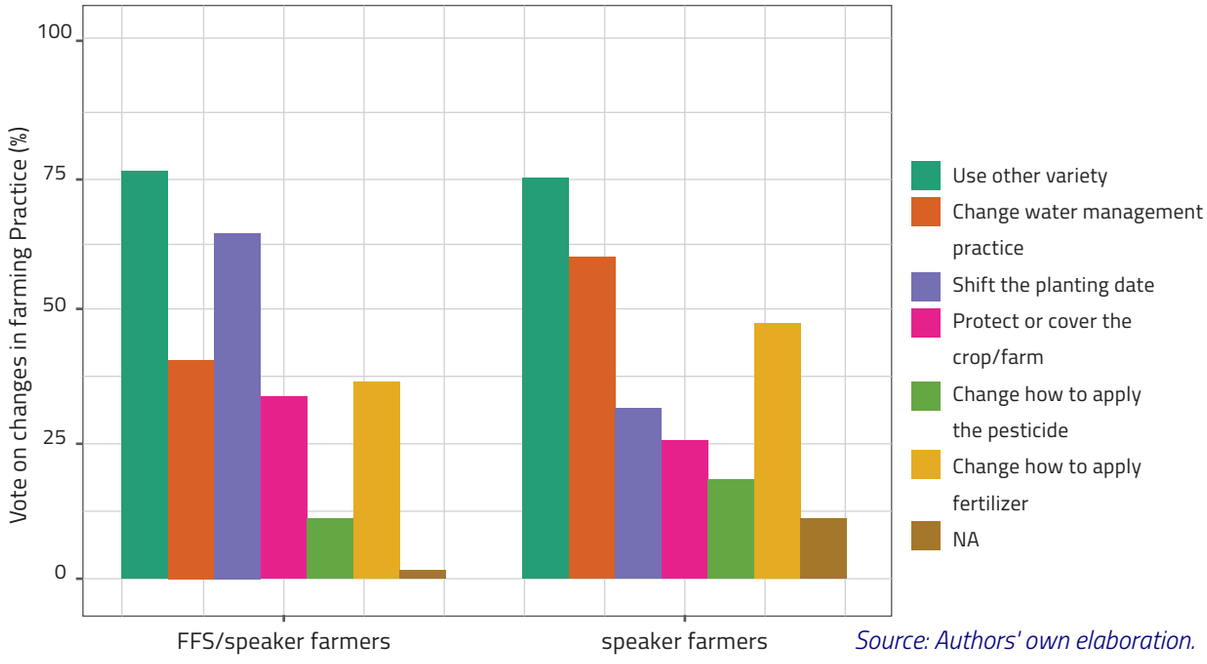
Table 4 Types of change in farm management resulting from access to advisories via loudspeakers or FFS.

Type of change	FFS/speaker farmers (n = 68)		Speaker farmers (n = 163)	
	Count	Percent	Count	Percent
Use other variety	52	76%	122	75%
Change water management practice	27	40%	98	60%
Shift planting date	44	65%	52	32%
Protect or cover the crop/farm	22	32%	42	26%
Change how to apply the pesticide	8	12%	31	19%
Change how to apply fertilizer	25	37%	79	48%
Other	1	1%	19	12%

Source: Authors' own elaboration.

Among the main types of adaptation practices that were changed as a result of the advisory, the change in crop variety posted the highest percentage (over 75 percent of farmers). FFS seemed to better prepare farmers to use advisories to change planting dates, with more than twice the number of farmers using this response compared to those who did not attend FFS. In contrast, FFS seemed to reduce the use of advisories in terms of changing water management practices. Speaker-FFS/speaker farmers adaptation responses also included changes in the respective use of fertilizers (48 percent/37 percent) or pesticides (19 percent /12 percent) .

Figure 4 Use of advisories to adapt farm management practices.



Source: Authors' own elaboration.

Summary of findings:

- Over 85 percent (21 390/10 746)* of farmers changed practices as a result of access to advisories from loudspeakers.
- Strategic planning related to selection of crop varieties, planting dates and water management were the main responses from farmers because of access to advisories. Tactical responses were also implemented for a relatively lower number of farmers.

  * Estimated number of farmers (total/female) based on the total target population

3. Challenges to use of advisories

Table 5 Areas for improving advisories provided to farmers

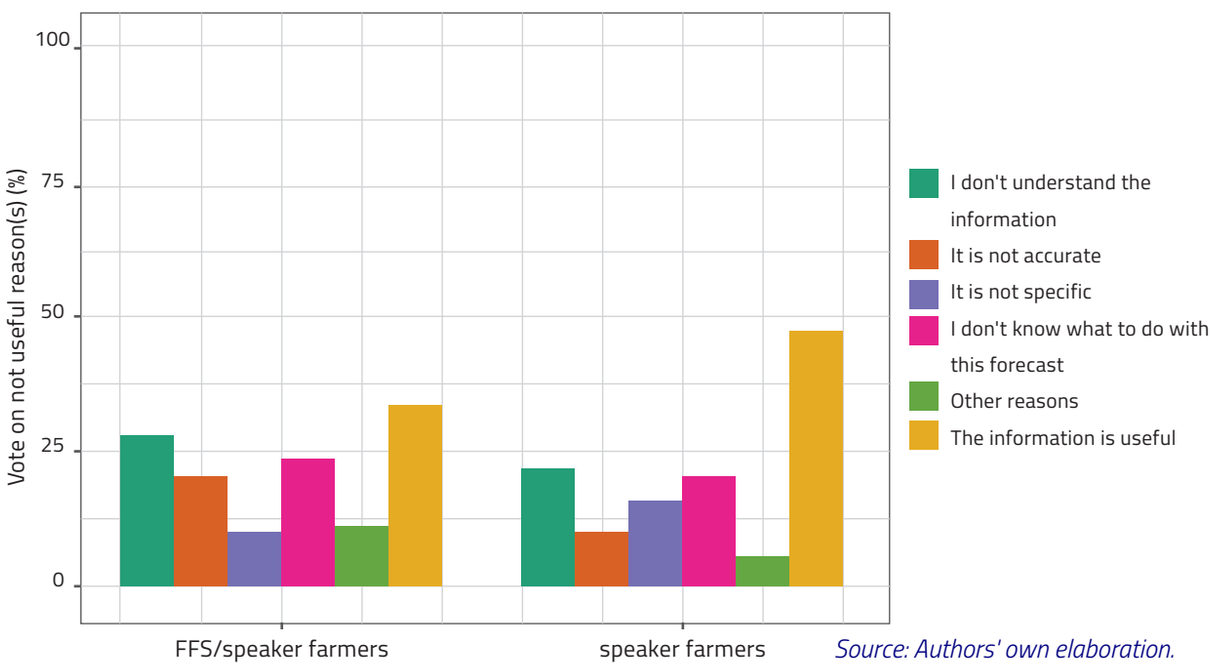
Response	FFS/speaker farmers (n = 82)		Speaker farmers (n = 185)	
	Count	Percent	Count	Percent
I don't understand the information	23	28%	41	22%
The information is not accurate	18	22%	16	9%
The information is not specific	8	10%	24	13%
I don't know what to do with this forecast	20	24%	33	18%
Other reasons	6	7%	9	5%
The information is useful	26	32%	82	44%

Source: Authors' own elaboration.

Note: Multiple-response question

A high proportion of FFS/speaker farmers indicated challenges when using the advisories provided, while a smaller percentage indicated that these were useful. Areas for improving the advisories varied from the difficulty of understanding the information and its use to lack of local tailoring or accuracy. Interestingly, when specifying other reasons, 3/6 FFS/speaker farmers mentioned the need for a weather station in their district (Champhone, Savannakhet province). About a third (32.5 percent) and nearly half (44 percent) of FFS/speaker farmers could not describe areas for improvement of advisories and confirmed their usefulness.

Figure 3: Challenges to the use of advisories by farmers



Source: Authors' own elaboration.

Summary of findings:

- Areas for improving the advisories varied from lack of capacity to understand or use the information to lack of local tailoring or accuracy.
- About a third (32 percent) and nearly half (44 percent) of FFS/speaker farmers could not describe areas for improvement of advisories and confirmed their usefulness.

4. Suggestions for improving advisories

While the previous question evaluated farmers' perceptions of possible limitations to the usefulness of the information, this question addressed areas for improvement in terms of advisory content and dissemination. Across both groups, a large share of farmers suggested improvements related to improved specificity and tailoring to the community (59 percent for FFS speaker farmers and 46 percent for speaker farmers). This was followed by the suggestion for a specific time slot for the broadcast (38 percent for FFS/speaker farmers and 43 percent for speaker farmers). There were also suggestions for increasing the frequency of broadcasts (32 percent for FFS/speaker farmers and 47 percent for speaker farmers). Farmers also suggested increasing the frequency of advisory broadcasts.

Farmers who have access to FFS were less interested in changing the frequency (32 percent) of the loudspeaker weather bulletin, but strongly suggested the need to tailor the contents of the bulletin (59 percent) to the community. Furthermore, in "Other", some respondents (12 percent) again specified the need for a station in the district to improve forecast accuracy. Speaker farmers expressed similar needs for improvements in broadcasting frequency (47 percent), locally tailored information (46 percent), broadcasting timeframe (43 percent) and the content of the agro-advisories (42 percent). Few speaker farmers (3) mentioned forecast accuracy issues or the need for a monitoring station in their area.

The difference between speaker farmers compared to FFS/speaker farmers, whose needs were more clearly defined, shows some evidence of a) the role of FFS in farmers' understanding of how weather and climate information are produced; and b) the importance of FFS as speaker farmers require further agro-advisories for crops and livestock.

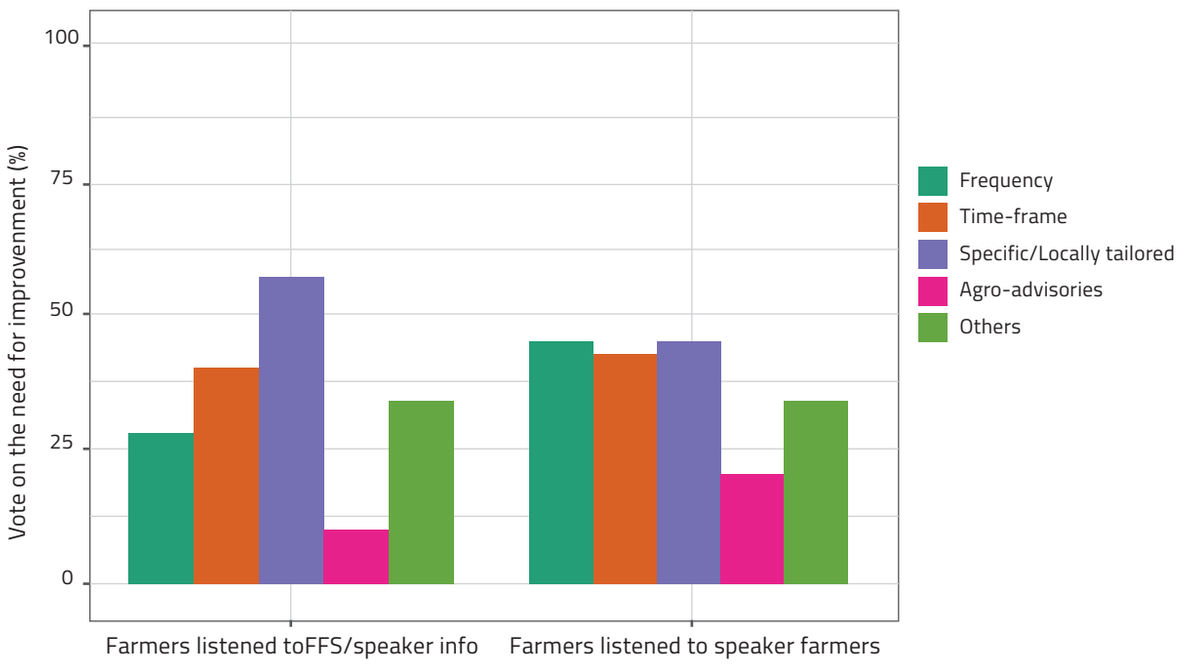
Table 6 Suggestions for improving loudspeaker information reading in the community

Suggestions for improvement	FFS/speaker farmers (n = 82)		Speaker farmers (n = 185)	
	Count	Percent	Count	Percent
Improved broadcast frequency	26	32%	87	47%
Time frame: specific time slot for the broadcast	31	38%	79	43%
Saliency: more locally tailored to the community	48	59%	85	46%
Agro-advisories vs weather forecast: translate weather into agro-advisories (crops or livestock)	18	22%	77	42%
Other				
- Improve the accuracy of forecasts ("No weather station"/(need to "install a station in district")	28	34%	64	35%
- Provide training and technical support	10	12%	3	2%
- Need more type of forecast for extreme events (hailstorm, typhoon)	5			
- Suggest other channels (TV, radio)				
- Increase number of speakers	1		1	
- Time of the delivery ("more often at the beginning of the season and very detailed")			1	
- Keep reading the forecast	1		1	
- None				
- Other (unrelated answer)			1	
	3		12	
			2	

Source: Authors' own elaboration.

Note: Multiple-response question

Figure 5 Areas for improving advisories identified by farmers



Source: Authors' own elaboration.

Summary of findings:

- Local tailoring of the advisory was the most important area of improvement (according to half of the farmers).
- A higher share of farmers without access to FFS indicated the need for translating weather information into agro-advisories and increased frequency of the broadcasts.

5. Sources of support for farmers

Both farmer groups showed similar responses to the support they receive. According to farmers, they get most of the help they need from their close network (family members and relatives, neighbours, extension staff or village chief) (Table 7, Figure 4). Meanwhile, NGO support was acknowledged by FFS/speaker farmers more than by speaker farmers. Family members and relatives (46 percent for FFS/speaker farmers and 56 percent for speaker farmers), neighbours (59 percent for FFS/speaker farmers and 48 percent for speaker farmers) were the key dissemination channel, followed by local agriculture staff/workers (49 percent for FFS/speaker farmers and 45 percent for speaker farmers), and village chiefs.

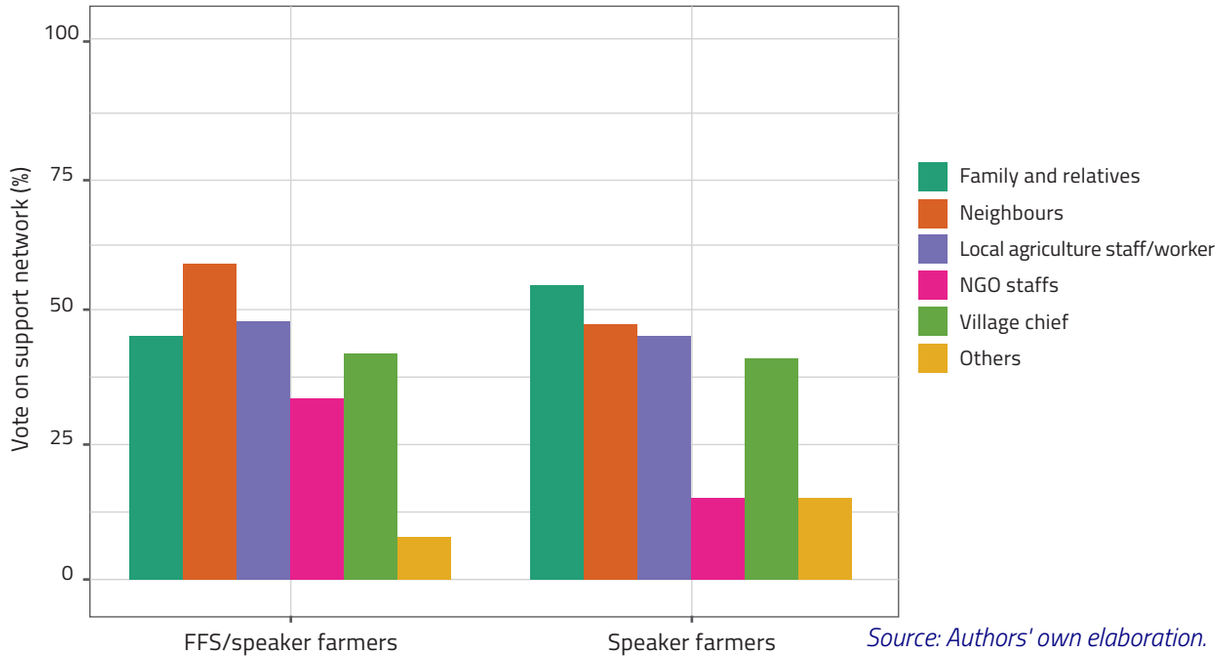
Table 7 Farmer support network

Support network	FFS/speaker farmers (n = 82)		Speaker farmers (n = 185)	
	Count	Percent	Count	Percent
Family members and relatives	38	46%	104	56%
Neighbours	48	59%	89	48%
Local agriculture staff/worker	40	49%	84	45%
NGO staffs	27	33%	30	16%
Village chief	33	40%	74	40%
Other	6	7%	30	16%

Note: Multiple-response question

Source: Authors' own elaboration.

Figure 6 Farmer support network



Source: Authors' own elaboration.

Farmers shared or discussed seasonal advisories with five other farmers based on their most common responses during the survey.

Summary of findings:

- Family members and relatives, neighbours, local agricultural technical staff are the most common (to about half) support channels for farmers.
- NGOs are a relatively minor source of support to farmers, although more relevant for FFS farmers (about a third of them).

6. Type of support provided to farmers

In terms of the type of support received by farmers, technical information (explanation of the information, practices needed to adopt, etc.) posted the highest percentage share (≈76 percent of farmers). This accounted for 82 percent of FFS/speaker information farmers and 75 percent of speaker information farmers. Half of the farmers in both groups also received support via input materials, with 48 percent and 46 percent share of FFS/speaker and speaker farmers respectively.

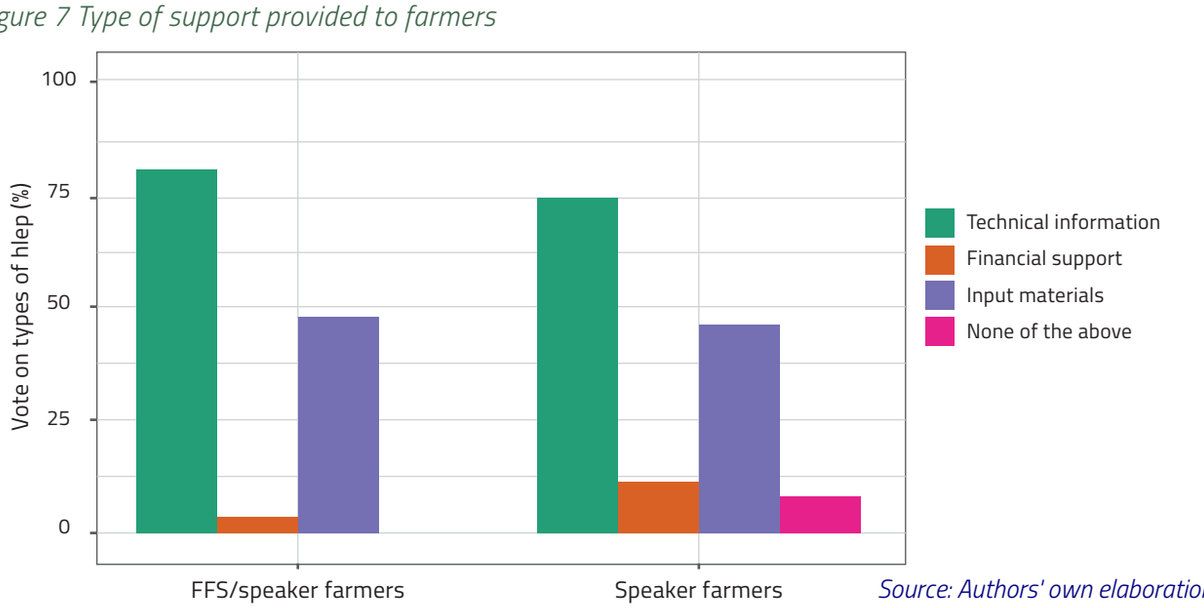
Table 8 Type of support farmers receive from their support groups

Type of support	FFS/speaker farmers (n = 82)		Speaker farmers (n = 185)	
	Count	Percent	Count	Percent
Technical information (explanation of information, practices to adopt, etc.)	67	82%	138	75%
Financial support	3	4%	20	11%
Input material	39	48%	86	46%
None of the above	-	-	17	9%

Note: Multiple-response question

Source: Authors' own elaboration.

Figure 7 Type of support provided to farmers



Source: Authors' own elaboration.

Summary of findings:

- Over 75 percent of farmers received technical support.
- About half of the farmers received input materials.
- Less than 10 percent of the farmers received financial support.

C. Farmers who did not access advisories

A total of 76 farmers from both groups did not listen to the speaker advisories, including 24 (23 percent) FFS/speaker farmers and 52 (22 percent) speaker farmers. This section discusses the challenges in accessing advisories from loudspeakers and preferred channels in receiving advisories.

1. Challenges in accessing advisories from loudspeakers

Half of the FFS/speaker farmers reported that the main reason for not having access to the advisories was because nobody reads (or listens) to the news (i.e the speaker-broadcast bulletin). This applies, for example to farmers in Nonsithan village, Champhone district, Savannakhet province. Meanwhile, in the same district, the speaker was reportedly broken in Xakheun-Neua village. In Sing district (Luang Namtha province), the speaker's broadcasting coverage was out of reach due to the farmers' remote locations.

In the speaker farmers group, most farmers who have not heard of the bulletins reasoned that their households were not reached by the broadcast – consistent with previous answers about not having access to the village loudspeakers. Other reasons for lack of access to the advisory mentioned included their remote work location (21 percent of farmers), or that they are not in the habit of listening to loudspeakers. In addition, being specified in "Other", in Boungphao village (Thoulakhom district, Vientiane province), a few respondents (4) mentioned that the speakers were broken; or "nobody reads the news". The same reason was also mentioned by farmers in Viengneua village, Namtha district and Khonechan village, and in Nale district of Luang Namstha province in the north.

The differences in responses between FFS and speaker farmer groups could be a basis for selecting farmers living in less remote areas to participate in the FFS. This could explain the lack of access to broadcasts for farmers living in remote areas and the reduced need for FFS farmers to use the loudspeaker advisory.

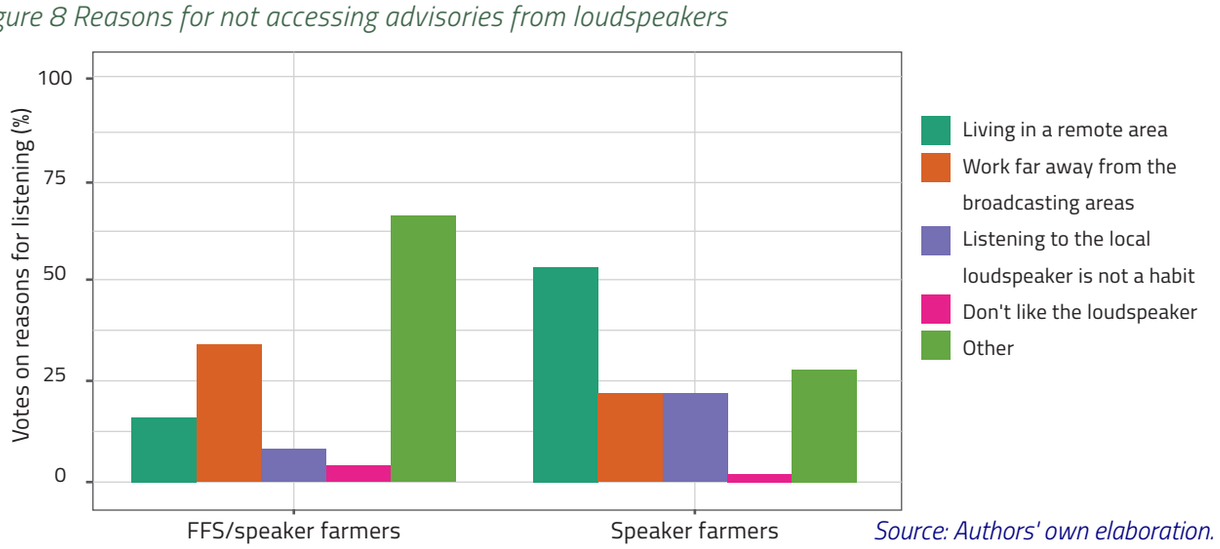
Table 9 Reasons for farmers not listening to the speaker

Reason for not listening to loudspeakers	FFS/speaker farmers (N=24)		Speaker farmers (N=52)	
	Count	Percent	Count	Percent
The broadcast cannot reach our house as I'm living in a remote area	4	17%	27	52%
My workplace is far away from the area when they broadcast the news	8	33%	11	21%
I am not in the habit of listening to the local loudspeaker	2	8%	11	21%
I don't like the loudspeaker	1	4%	1	2%
Other (grouping of similar answers): - Nobody reads the news - The speaker was broken - I don't understand - I cannot hear the loudspeaker (because of the house location – near the road and noisy; or in low areas; or as one respondent reported "My hearing is not good"	16 12 4	67% 50% 17%	15 9 1 2 3	29% 17% 2% 3% 6%

Note: Multiple-response question

Source: Authors' own elaboration.

Figure 8 Reasons for not accessing advisories from loudspeakers



Source: Authors' own elaboration.

Summary of findings:

- Farmers who participate in FFS have less interest in advisories from loudspeakers.
- Limited broadcast reach due to the remoteness of household locations was the main limitation for farmers without access to FFS.

2. Preferred channels for receiving advisories

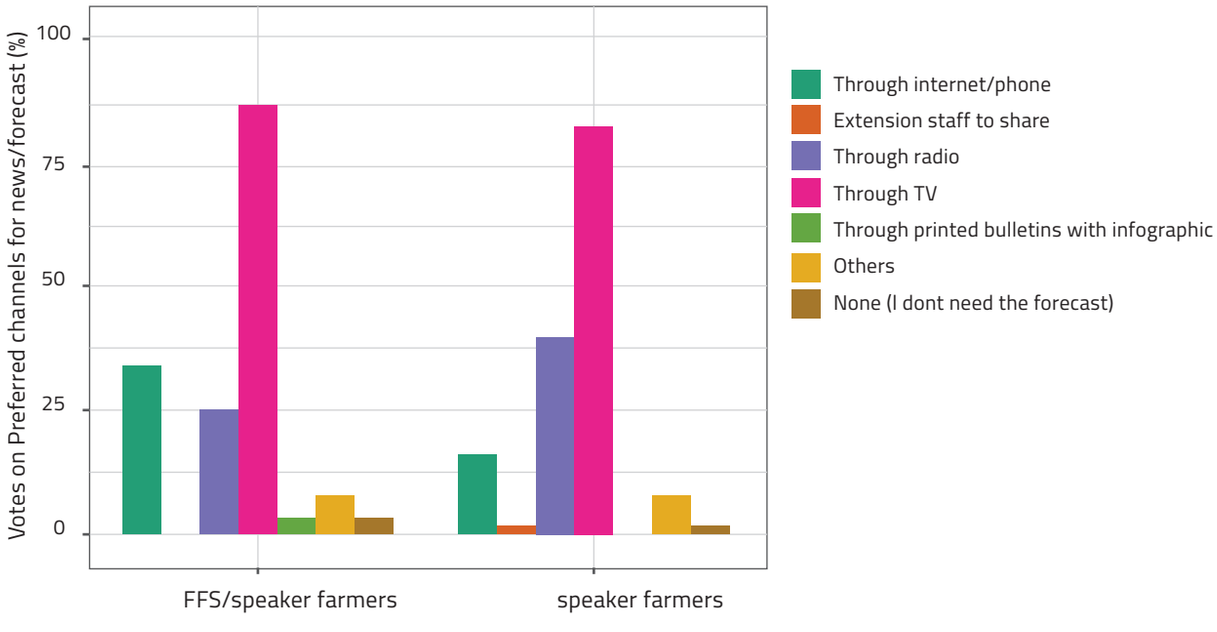
Both groups of farmers showed similar preferences regarding channels of communication for receiving the information. Doing so via the television outperforms other options at 88 percent and 83 percent by FFS/speaker farmers and only speaker farmers respectively. It is also worth mentioning that the location of the farmers is the main barrier to climate information dissemination through loudspeakers in the case of speaker farmers. This latter group thus responded that the second preferred channel was radio (40 percent), compared to a 25 percent share in the FFS/speaker farmers group. As FFS/speaker farmers seem to live in less remote areas, their second preferred option is via the internet/phone.

Table 10 Channels of communication preferred by farmers

Channels of communication	FFS/speaker farmers (N=24)		Speaker farmers (N=52)	
	Count	Percent	Count	Percent
Through internet/phone	8	33%	8	15%
Extension staff to share	0	-	1	2%
Through radio	6	25%	21	40%
Through TV	21	88%	43	83%
Through printed bulletins with infographic	1	4%	-	-
Other	2	8%	4	8%
None (I don't need the forecast)	1	4%	1	2%

Source: Authors' own elaboration.

Figure 9 Preferred communication channels for farmers who don't access loudspeaker broadcasts



Source: Authors' own elaboration.

Summary of findings:

- TV is the most preferred dissemination channel for farmers who don't access loudspeaker broadcasts.
- Other preferred modes are radio and internet/phone.
- Printed bulletins are least preferred.
- Farmers express a high demand for climate information. Because they previously did not receive the speaker bulletins, most of their needs concern being able to access the information rather than the content of the information itself.

3. Interest in loudspeaker-delivered advisories from farmers who have not accessed advisories

Almost all (FFS/speaker farmers 23/24 (96 percent) speaker farmers and 52/52 (100 percent)) of the group of farmers who claimed not to listen to a speaker stated that they are interested in and willing to receive climate information. In this report, they are classified as Group 3: they have not received climate info but are willing to. On the other hand, a small percentage (2/343) of the farmers who stated that they don't need the forecast by either a speaker or other approaches is classified as Group 4 in this report.

Summary of findings:

- Farmers who did not access advisories all indicated an interest in doing so.

D. Improvement suggestions for dissemination through loudspeakers

Improved forecast frequency (90 percent) and timeframe, particularly having a specific timeslot (96 percent) were among the preferred improvements suggested by speaker farmers. In their opinion, these suggestions would probably increase their chances of accessing the broadcast since the remoteness of their household or worksites was the main cause of lack of access. A smaller share of FFS/speaker farmers suggested improvements in the time slots for the advisories and the development of an agro-advisory that integrated several management activities in the farm.

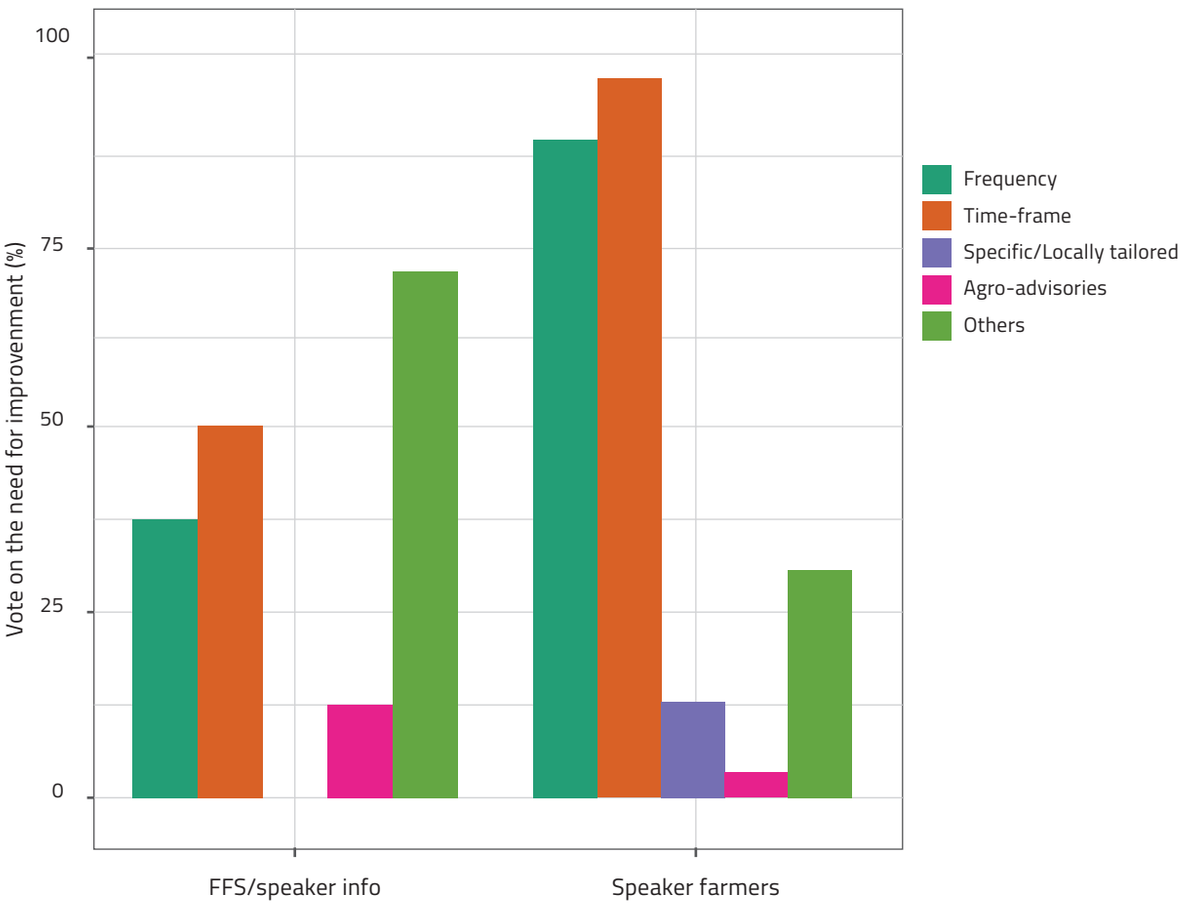
Table 10. Suggestions for improving access of loudspeaker information in the community

Suggestions for improvement	FFS/speaker farmers (N=24)		Speaker farmers (N=52)	
	Count	Percent	Count	Percent
Frequency: more frequent delivery	9	38%	47	90%
Timeframe: specific time slot for the broadcasting	12	50%	50	96%
Specific: more locally tailored to the community	-	-	7	13%
Agro-advisories: provide advice on what to do with crops and livestock to reduce risk	3	13%	2	4%
Need integrated content about farm management (variety selection, use of fertilizers and compost, pest and diseases, etc.) (This option was consolidated from relevant responses specified in "Others")	10	42%	11	21%
Other (grouping of similar answers) - Need a weather forecast - Need to know cold months - Need more speakers (i.e. improve broadcasting spatial coverage) - Need the speaker bulletin to be read - Other answers but not related to improving the reach of speaker bulletin (Need technical training, promotion for rice and irrigation improvement)	7 6 1	29% 25% 4%	6 2 1 1 2	12% 4% 2% 2% 4%

Note: Multiple-response question

Source: Authors' own elaboration.

Figure 10 Suggestions for improving advisory communication channels from farmers who did not access the advisories



Source: Authors' own elaboration.

Summary of findings:

- Farmers living or working in remote areas suggested improving the frequency and timing of the advisory broadcasts.
- FFS farmers preferred improved timing of the broadcast and a comprehensive agro-advisory.

E. The potential for ICTs to deliver advisories

In the second section of the survey, farmers were asked about their awareness of and access to SAMIS climate services products delivered through the internet. Specifically, the main SAMIS products investigated were: 1) The bulletin distributed through WhatsApp; 2) the bulletins updated through a mobile phone app called Laos Climate Service for Agriculture (LaCSA); and 3) the bulletins shared on the DMH Facebook.

1. Access to internet and SAMIS advisories from internet sources

The majority of farmer respondents from both groups (104/106 FFS/speaker farmers and 227/237 speaker farmers) responded to this question.

Of those who responded, half (51 percent) of the FFS/speaker farmers had access to the internet while the share was much lower among speaker farmers – only one fifth (21 percent). Farmer locations and infrastructure barriers could explain these results since speaker farmers living in more remote areas in two districts ®Namtha (Luang Namtha province) and Thoulakhom (Vientiane province) ®have more limited access to loudspeakers.

In both groups, a majority of farmers showed an interest in weather forecast and attempted to acquire this information from the internet. In particular, 73 percent (38/54) of FFS/speaker farmers and 80 percent (39/49) of speaker farmers responded the affirmative.

Twenty-three percent (23) of farmers surveyed access SAMIS's climate services and (CS) products through the internet. On the other hand, FFS/speaker farmers showed higher access rates through Facebook and WhatsApp while access for speaker farmers was mostly through mobile phones (app not specified).

Table 11 Types of CS products accessed by farmers through the internet

Type of CS product	FFS/speaker farmers (n = 38)		Speaker farmers (n = 39)	
	Count	Percent	Count	Percent
Forecast bulletins sent by WhatsApp	21	55%	7	18%
LaCSA	12	32%	6	15%
DMH Facebook	23	61%	13	33%
Other (grouping of similar answers)	10	26%	28	72%
- Mobile phone	6		19	
- Google	5		3	
- TV	4		9	
- Radio	1		3	
- Village speaker	1		5	
- Social media (YouTube, Facebook)			3	

Note: Multiple-response question

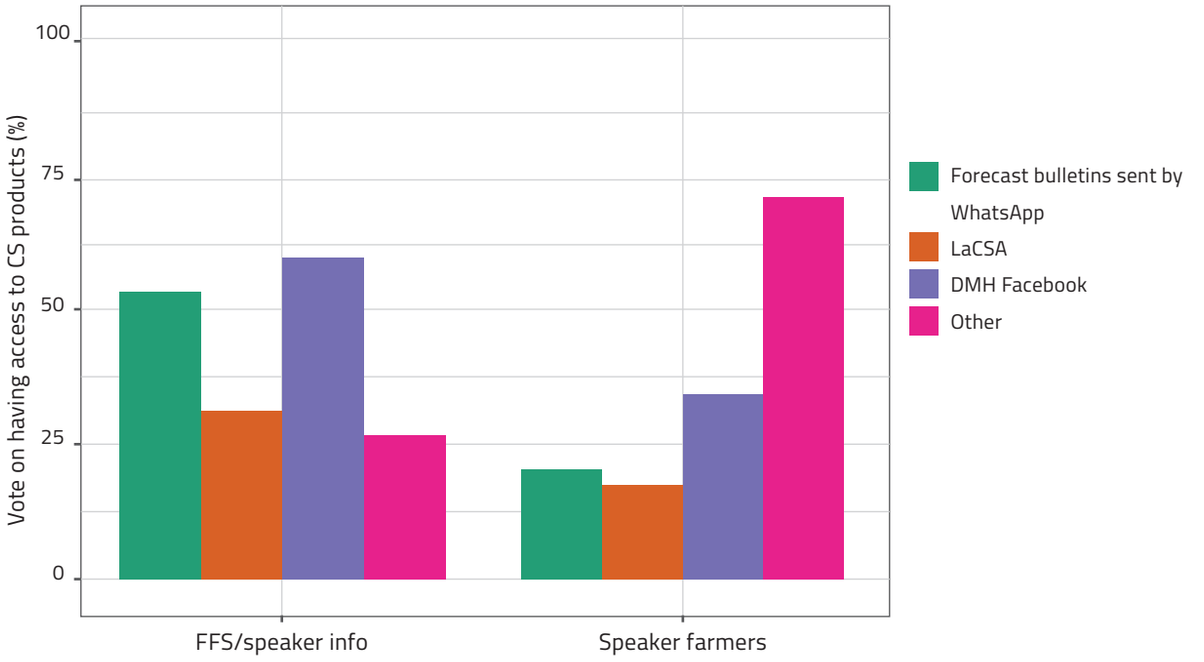
Source: Authors' own elaboration.

Of the 331 respondents who claimed that they have access to the internet, 77 farmers (23 percent) said that they have accessed SAMIS CS products. Farmers who attended FFS but have not received information from loudspeakers have much better ideas concerning where to find the LaCSA bulletins (via WhatsApp, LaCSA mobile app, or the DMH Facebook page) and have accessed other channels less (26 percent). In contrast, two thirds (72 percent) of non-FFS farmers access LaCSA content through other channels such as a mobile phone, Google, TV or radio.

There is a similar trend in farmer preference when choosing platforms to access the bulletins. DMH Facebook was most accessed with a share of 61 percent of FFS/speaker farmers and 33 percent share of speaker farmers. LaCSA bulletins through WhatsApp and LaCSA mobile app were mostly accessed by FFS/speaker farmers (55 percent and 32 percent, respectively) compared to the speaker farmers (18 percent and 15 percent, respectively).

Farmers' perception on the usefulness of the different dissemination channels showed similar results to those concerning access patterns.

Figure 11 Source of SAMIS advisories



Source: Authors' own elaboration.

2. Frequency of use of internet sources of SAMIS advisories

For FFS/speaker farmers, the DMH Facebook page (61 percent) was the most often visited CS channel, while WhatsApp (39 percent) bulletins and the LaCSA app (18 percent) were voted as useful but less utilized. The source most frequently accessed by speaker farmers (≈50 percent) was mobile phones (app not specified) followed by the DMH Facebook page (34 percent).

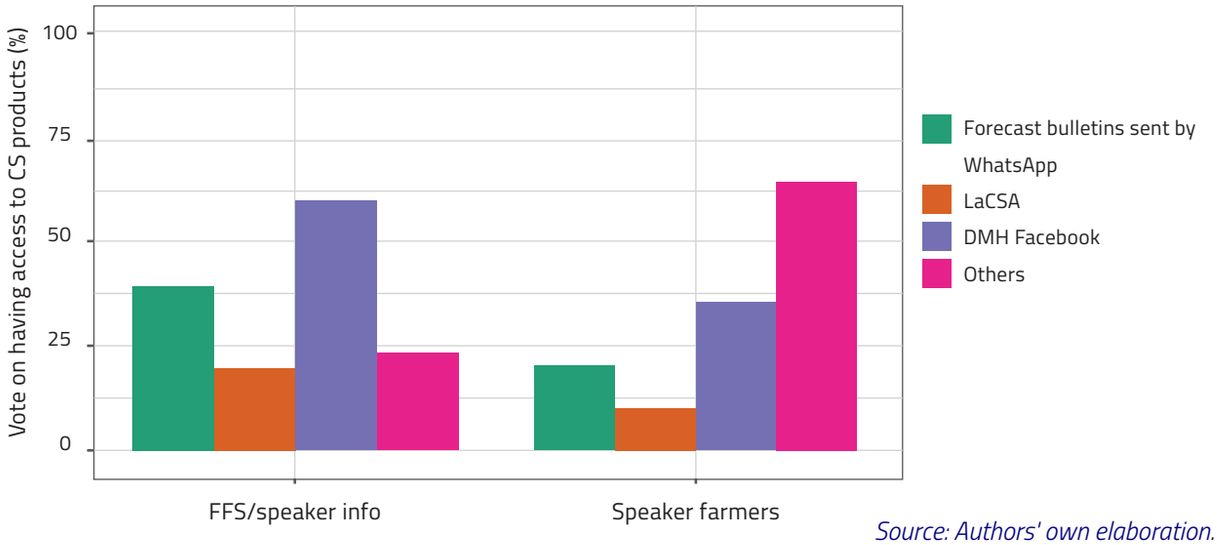
Table 12 Frequency of use of SAMIS advisories through internet-based channels

Type of CS product	FFS/speaker farmers (n = 38)		Speaker farmers (n = 39)	
	Count	Percent	Count	Percent
Forecast bulletins sent by WhatsApp	15	39%	8	21%
LaCSA	7	18%	4	10%
DMH Facebook page	23	61%	14	34%
Other (grouping of similar answers)	9	24%	25	64%
- Mobile phone (including app)	7		19	
- Google	4		3	
- TV	5		12	
- Radio			3	
- Village speaker	1		6	
- Social media (YouTube, Facebook)			1	

Note: Multiple-response question

Source: Authors' own elaboration.

Figure 12 Most accessed source of internet-based SAMIS advisories



Source: Authors' own elaboration.

Summary of findings:

- About 30 percent of the farmers have access to internet (about half of FFS farmers indicated access to internet).
- A quarter of farmers access SAMIS advisories from internet sources. Facebook and WhatsApp were the most accessed sources.

IV » Conclusions

The survey results show that the majority of farmers are aware of the benefits of CS benefits and have demonstrated their willingness to receive the information. Farmers who attended FFS are more aware of the importance of climate and weather forecasts, especially the crop calendar. The other proven effect of FFS was to help farmers better understand how the forecast information is produced and acquire more agro-advisories. This is reflected in farmers' perceptions of the bulletin's usefulness or otherwise, and suggestions for improvements.

Most of the farmers (more than 80 percent) claimed to have adjusted their farming practices based on the LaCSA bulletins they received from a community speaker, whether or not they had accessed additional interventions by attending FFS. The key difference between the two groups, however, was evident in terms of how they understood the information and the type of changes they would thus make based on the information received.

There is room for improving the CS information, especially in providing greater understanding, less technical, and especially more localized and tailored advisories for major crops. For farmers who receive the weather news through a community speaker, FFS/speaker farmers strongly recommended that CS information be more specific and tailored to their respective areas. For farmers who have not heard the weather news through the community speaker, this was mostly because of: (1) spatial coverage, i.e. farmers were living in remote areas or working far away from the broadcasting areas; or (2) nobody reads the news. Additionally, FFS/speaker farmers want improvements in CS content with other advisories on farm management operation such as: (1) seed/variety selection; (2) use of fertilizers, pesticides, pests & diseases control; (3) agriculture advisories for livestock and so on, rather than only climate and weather information for crops. On the other hand, the speaker farmers want improvements in access to information. TV is the most preferred channel for receiving the forecast by both groups of farmers who receive FFS/speaker and only speaker interventions.

In some districts/villages, farmers have less access to the internet. However, despite this situation, they actively search for climate/weather information through internet/mobile phone whenever possible, which shows the great need for this type of service. Different CS products distributed at scale on the internet were accessed by 23 percent of surveyed farmers. However, in farmers' views, CS products are only useful when they can be easily accessed.

VI » Annexes

Individual HH Assessment 2020

I. General information about respondent

Date dd-mm-yyyy .....
Village .....
Respondent Name: .....
Gender ◯ Male ◯ Female Spouse name (if any): .....
Ethnicity .....
Religion .....
Main language .....
Language spoken 2 .....
Language spoken 3 .....
Mobile number: .....

Household Population

Number of family members _ people .....

Household members

Household members	Relation to household head, Starting with household head as #1	Sex	Age .....
Marriage status	Other marriage status, specify……..	How many years have you lived in this village?	Highest completed level of education .....
Other education	What is your occupation? E.g. things you get paid for	How many years have you lived in this village?	Other occupation .....

HH member # 1

1	1-Relation to household head, Starting with household head as #1	1- Gender ◯ Male ◯ Female	1- Age .....
1- Marriage status ◯ 1. Married ◯ 2. Unmarried ◯ 3. Widow (er) ◯ 4. Divorced ◯ 5. Other	1 - Other marriage status, specify.....	1 - How many years have you lived in this village?	1 - Highest completed level of education ◯ 1. Unreadable ◯ 2. Non-formal ◯ 3. Primary ◯ 4. Secondary ◯ 5. Upper secondary ◯ 6. Vocational ◯ 7. College/uni ◯ 8. Postgraduate ◯ 9. Other
1- Other education	1- What is your occupation? E.g. things you get paid for ◯ 1. Farmer ◯ 2. Shop owner ◯ 3. Student ◯ 4. Govt. official ◯ 5. Labourer ◯ 6. Disabled ◯ 7. Other	1- Other occupation	

HH member # 2

2	2-Relation to household head, Starting with household head as #1	2- Gender ◯ Male ◯ Female	2- Age .....
2- Marriage status ◯ 1. Married ◯ 2. Unmarried ◯ 3. Widow (er) ◯ 4. Divorced ◯ 5. Other	2 - Other marriage status, specify.....	2 - How many years have you lived in this village?	2 - Highest completed level of education ◯ 1. Unreadable ◯ 2. Non-formal ◯ 3. Primary ◯ 4. Secondary ◯ 5. Upper secondary ◯ 6. Vocational ◯ 7. College/uni ◯ 8. Postgraduate ◯ 9. Other
2- Other education	2- What is your occupation? E.g. things you get paid for ◯ 1. Farmer ◯ 2. Shop owner ◯ 3. Student ◯ 4. Govt. official ◯ 5. Labourer ◯ 6. Disabled ◯ 7. Other	2- Other occupation	

HH member # 3

3	3-Relation to household head, Starting with household head as #1	3- Gender ◯ Male ◯ Female	3- Age .....
3- Marriage status ◯ 1. Married ◯ 2. Unmarried ◯ 3. Widow (er) ◯ 4. Divorced ◯ 5. Other	3 - Other marriage status, specify.....	3 - How many years have you lived in this village?	3 - Highest completed level of education ◯ 1. Unreadable ◯ 2. Non-formal ◯ 3. Primary ◯ 4. Secondary ◯ 5. Upper secondary ◯ 6. Vocational ◯ 7. College/uni ◯ 8. Postgraduate ◯ 9. Other
3- Other education	3 - What is your occupation? E.g. things you get paid for ◯ 1. Farmer ◯ 2. Shop owner ◯ 3. Student ◯ 4. Govt. official ◯ 5. Labourer ◯ 6. Disabled ◯ 7. Other	3- Other occupation	

HH member # 4

4	4-Relation to household head, Starting with household head as #1	4- Gender ◯ Male ◯ Female	4- Age .....
4- Marriage status ◯ 1. Married ◯ 2. Unmarried ◯ 3. Widow (er) ◯ 4. Divorced ◯ 5. Other	4 - Other marriage status, specify.....	4 - How many years have you lived in this village?	4 - Highest completed level of education ◯ 1. Unreadable ◯ 2. Non-formal ◯ 3. Primary ◯ 4. Secondary ◯ 5. Upper secondary ◯ 6. Vocational ◯ 7. College/uni ◯ 8. Postgraduate ◯ 9. Other
4- Other education	4- What is your occupation? E.g. things you get paid for ◯ 1. Farmer ◯ 2. Shop owner ◯ 3. Student ◯ 4. Govt. official ◯ 5. Labourer ◯ 6. Disabled ◯ 7. Other	4- Other occupation	

HH member # 5

5	5-Relation to household head, Starting with household head as #1	5- Gender ◯ Male ◯ Female	5- Age .....
5- Marriage status ◯ 1. Married ◯ 2. Unmarried ◯ 3. Widow (er) ◯ 4. Divorced ◯ 5. Other	5 - Other marriage status, specify.....	5 - How many years have you lived in this village?	5 - Highest completed level of education ◯ 1. Unreadable ◯ 2. Non-formal ◯ 3. Primary ◯ 4. Secondary ◯ 5. Upper secondary ◯ 6. Vocational ◯ 7. College/uni ◯ 8. Postgraduate ◯ 9. Other
5- Other education	5- What is your occupation? E.g. things you get paid for ◯ 1. Farmer ◯ 2. Shop owner ◯ 3. Student ◯ 4. Govt. official ◯ 5. Labourer ◯ 6. Disabled ◯ 7. Other	5- Other occupation	

HH member # 6

6	6-Relation to household head, Starting with household head as #1	6- Gender ◯ Male ◯ Female	6- Age .....
6- Marriage status ◯ 1. Married ◯ 2. Unmarried ◯ 3. Widow (er) ◯ 4. Divorced ◯ 5. Other	6 - Other marriage status, specify.....	6 - How many years have you lived in this village?	6- Highest completed level of education ◯ 1. Unreadable ◯ 2. Non-formal ◯ 3. Primary ◯ 4. Secondary ◯ 5. Upper secondary ◯ 6. Vocational ◯ 7. College/uni ◯ 8. Postgraduate ◯ 9. Other
6- Other education	6- What is your occupation? E.g. things you get paid for ◯ 1. Farmer ◯ 2. Shop owner ◯ 3. Student ◯ 4. Govt. official ◯ 5. Labourer ◯ 6. Disabled ◯ 7. Other	6- Other occupation	

HH member # 7

7	7-Relation to household head, Starting with household head as #1	7- Gender ◯ Male ◯ Female	7- Age .....
7- Marriage status ◯ 1. Married ◯ 2. Unmarried ◯ 3. Widow (er) ◯ 4. Divorced ◯ 5. Other	7 - Other marriage status, specify.....	7 - How many years have you lived in this village?	7 - Highest completed level of education ◯ 1. Unreadable ◯ 2. Non-formal ◯ 3. Primary ◯ 4. Secondary ◯ 5. Upper secondary ◯ 6. Vocational ◯ 7. College/uni ◯ 8. Postgraduate ◯ 9. Other
7- Other education	7- What is your occupation? E.g. things you get paid for ◯ 1. Farmer ◯ 2. Shop owner ◯ 3. Student ◯ 4. Govt. official ◯ 5. Labourer ◯ 6. Disabled ◯ 7. Other	7- Other occupation	

HH member # 8

8	8-Relation to household head, Starting with household head as #1	8- Gender ◯ Male ◯ Female	8- Age
.....	.....	.....	.....

8- Marriage status ◯ 1. Married ◯ 2. Unmarried ◯ 3. Widow (er) ◯ 4. Divorced ◯ 5. Other	8 - Other marriage status, specify.....	8- How many years have you lived in this village?	8- Highest completed level of education ◯ 1. Unreadable ◯ 2. Non-formal ◯ 3. Primary ◯ 4. Secondary ◯ 5. Upper secondary ◯ 6. Vocational ◯ 7. College/uni ◯ 8. Postgraduate ◯ 9. Other
	.....	.....	

8- Other education	8- What is your occupation? E.g. things you get paid for ◯ 1. Farmer ◯ 2. Shop owner ◯ 3. Student ◯ 4. Govt. official ◯ 5. Labourer ◯ 6. Disabled ◯ 7. Other	8- Other occupation
.....		.....

HH member # 9

9	9-Relation to household head, Starting with household head as #1	9- Gender ◯ Male ◯ Female	9- Age .....
9- Marriage status ◯ 1. Married ◯ 2. Unmarried ◯ 3. Widow (er) ◯ 4. Divorced ◯ 5. Other	9 - Other marriage status, specify.....	9 - How many years have you lived in this village?	9 - Highest completed level of education ◯ 1. Unreadable ◯ 2. Non-formal ◯ 3. Primary ◯ 4. Secondary ◯ 5. Upper secondary ◯ 6. Vocational ◯ 7. College/uni ◯ 8. Postgraduate ◯ 9. Other
9- Other education	9- What is your occupation? E.g. things you get paid for ◯ 1. Farmer ◯ 2. Shop owner ◯ 3. Student ◯ 4. Govt. official ◯ 5. Labourer ◯ 6. Disabled ◯ 7. Other	9- Other occupation	

HH member # 10

10	10-Relation to household head, Starting with household head as #1	10- Gender ◯ Male ◯ Female	10- Age .....
10- Marriage status ◯ 1. Married ◯ 2. Unmarried ◯ 3. Widow (er) ◯ 4. Divorced ◯ 5. Other	10 - Other marriage status, specify.....	10 - How many years have you lived in this village?	10 - Highest completed level of education ◯ 1. Unreadable ◯ 2. Non-formal ◯ 3. Primary ◯ 4. Secondary ◯ 5. Upper secondary ◯ 6. Vocational ◯ 7. College/uni ◯ 8. Postgraduate ◯ 9. Other
10- Other education	10- What is your occupation? E.g. things you get paid for ◯ 1. Farmer ◯ 2. Shop owner ◯ 3. Student ◯ 4. Govt. official ◯ 5. Labourer ◯ 6. Disabled ◯ 7. Other	10- Other occupation	

HH member # 11

11	11-Relation to household head, Starting with household head as #1	11- Gender ◯ Male ◯ Female	11- Age .....
11- Marriage status ◯ 1. Married ◯ 2. Unmarried ◯ 3. Widow (er) ◯ 4. Divorced ◯ 5. Other	11 - Other marriage status, specify.....	11 - How many years have you lived in this village?	1 1- Highest completed level of education ◯ 1. Unreadable ◯ 2. Non-formal ◯ 3. Primary ◯ 4. Secondary ◯ 5. Upper secondary ◯ 6. Vocational ◯ 7. College/uni ◯ 8. Postgraduate ◯ 9. Other
11- Other education	11- What is your occupation? E.g. things you get paid for ◯ 1. Farmer ◯ 2. Shop owner ◯ 3. Student ◯ 4. Govt. official ◯ 5. Labourer ◯ 6. Disabled ◯ 7. Other	11- Other occupation	

HH member # 12

12	12-Relation to household head, Starting with household head as #1	12- Gender ◯ Male ◯ Female	12- Age .....
12- Marriage status ◯ 1. Married ◯ 2. Unmarried ◯ 3. Widow (er) ◯ 4. Divorced ◯ 5. Other	12 - Other marriage status, specify.....	12 - How many years have you lived in this village?	12 - Highest completed level of education ◯ 1. Unreadable ◯ 2. Non-formal ◯ 3. Primary ◯ 4. Secondary ◯ 5. Upper secondary ◯ 6. Vocational ◯ 7. College/uni ◯ 8. Postgraduate ◯ 9. Other
12- Other education	12- What is your occupation? E.g. things you get paid for ◯ 1. Farmer ◯ 2. Shop owner ◯ 3. Student ◯ 4. Govt. official ◯ 5. Labourer ◯ 6. Disabled ◯ 7. Other	12- Other occupation	

HH member # 13

13	13-Relation to household head, Starting with household head as #1	13- Gender ◯ Male ◯ Female	13- Age .....
13- Marriage status ◯ 1. Married ◯ 2. Unmarried ◯ 3. Widow (er) ◯ 4. Divorced ◯ 5. Other	13 - Other marriage status, specify.....	13 - How many years have you lived in this village?	13 - Highest completed level of education ◯ 1. Unreadable ◯ 2. Non-formal ◯ 3. Primary ◯ 4. Secondary ◯ 5. Upper secondary ◯ 6. Vocational ◯ 7. College/uni ◯ 8. Postgraduate ◯ 9. Other
13- Other education	13- What is your occupation? E.g. things you get paid for ◯ 1. Farmer ◯ 2. Shop owner ◯ 3. Student ◯ 4. Govt. official ◯ 5. Labourer ◯ 6. Disabled ◯ 7. Other	13- Other occupation	

HH member # 14

14	14-Relation to household head, Starting with household head as #1	14- Gender ◯ Male ◯ Female	14- Age .....
14- Marriage status ◯ 1. Married ◯ 2. Unmarried ◯ 3. Widow (er) ◯ 4. Divorced ◯ 5. Other	14 - Other marriage status, specify.....	14 - How many years have you lived in this village?	14 - Highest completed level of education ◯ 1. Unreadable ◯ 2. Non-formal ◯ 3. Primary ◯ 4. Secondary ◯ 5. Upper secondary ◯ 6. Vocational ◯ 7. College/uni ◯ 8. Postgraduate ◯ 9. Other
14- Other education	14- What is your occupation? E.g. things you get paid for ◯ 1. Farmer ◯ 2. Shop owner ◯ 3. Student ◯ 4. Govt. official ◯ 5. Labourer ◯ 6. Disabled ◯ 7. Other	14- Other occupation	

HH member # 15

15	15-Relation to household head, Starting with household head as #1	15- Gender ◯ Male ◯ Female	15- Age .....
15- Marriage status ◯ 1. Married ◯ 2. Unmarried ◯ 3. Widow (er) ◯ 4. Divorced ◯ 5. Other	15 - Other marriage status, specify.....	15 - How many years have you lived in this village?	15 - Highest completed level of education ◯ 1. Unreadable ◯ 2. Non-formal ◯ 3. Primary ◯ 4. Secondary ◯ 5. Upper secondary ◯ 6. Vocational ◯ 7. College/uni ◯ 8. Postgraduate ◯ 9. Other
15- Other education	15- What is your occupation? E.g. things you get paid for ◯ 1. Farmer ◯ 2. Shop owner ◯ 3. Student ◯ 4. Govt. official ◯ 5. Labourer ◯ 6. Disabled ◯ 7. Other	15- Other occupation	

10. Do you hold any leadership position/s in the village?

- ◯ Yes > go to 11
- ◯ No > go to 12

11. If yes, what it is

.....

II. Weather news from the speakers

12. Have you heard about weather news from the speakers?

- ◯ Yes > go to 13
- ◯ No > go to 17

A. For farmers have heard the weather news

13. How often did you hear the news? When? Please state frequency (once, twice per week or per month, etc.)

- ◯ More than once a week
- ◯ Every week
- ◯ More than twice a month
- ◯ Once a month
- ◯ Other

13. Other

.....

14. At what time do you usually hear the bulletin from the speaker?

time slot 1
hh:mm

.....

time slot 2
hh:mm

.....

time slot 3
hh:mm

.....

15. Which forecast are important to you?

- [ ] Seasonal forecast
- [ ] Weather forecast
- [ ] Crop calendar
- [ ] Water level forecast
- [ ] Pest and disease forecast
- [ ] Extreme event forecast

16. Which forecasts are useful for your farm?

- [ ] Use other variety
- [ ] Change water management practice
- [ ] Shift the planting date
- [ ] Protect or cover the crop/farm
- [ ] Change how to apply the pesticide
- [ ] Change how to apply fertilizer
- [ ] Seasonal forecast
- [ ] Weather forecast
- [ ] Crop calendar
- [ ] Water level forecast
- [ ] Pest and disease forecast
- [ ] Extreme event forecast
- [ ] None
- [ ] Other

16. Other

.....

17. Did you use the forecast to adjust your farming practices?

- ◯ Yes > go to 18
- ◯ No > go to 21

18. How did you adjust your farming practices based on the forecast?

- ☐ Use other variety
- ☐ Change water management practice
- ☐ Shift the planting date
- ☐ Protect or cover the crop/farm
- ☐ Change how to apply the pesticide
- ☐ Change how to apply fertilizer
- ☐ Seasonal forecast
- ☐ Weather forecast
- ☐ Crop calendar
- ☐ Water level forecast
- ☐ Pest and disease forecast
- ☐ Extreme event forecast
- ☐ None
- ☐ Other

18. Other

.....

19. Did you discuss/share that information/forecast with other farmers?

- ◯ Yes > go to 18
- ◯ No > go to 21

20. How many other farmers did you discuss/share the forecast with?

.....

21. Which forecast is not useful for your farm? Multiple choice (WF, EE, P&D)?

- [ ] Use other variety
- [ ] Change water management practice
- [ ] Shift the planting date
- [ ] Protect or cover the crop/farm
- [ ] Change how to apply the pesticide
- [ ] Change how to apply fertilizer
- [ ] Seasonal forecast
- [ ] Weather forecast
- [ ] Crop calendar
- [ ] Water level forecast
- [ ] Pest and disease forecast
- [ ] Extreme event forecast
- [ ] None
- [ ] Other

21. Other

.....

22. Why are they not useful?

- [ ] I don't understand the information
- [ ] They are not accurate
- [ ] They are not specific
- [ ] I don't know what to do with this forecast
- [ ] Other

22. Other

.....

23. From whom do you seek help?

- [ ] Family members
- [ ] Neighbors
- [ ] Relatives
- [ ] Local agriculture staff/worker
- [ ] NGO staff
- [ ] Village chief
- [ ] Other

23. Other

.....

24. How many times did you ask for help?

.....

25. Which kind of help do you ask for?

- [ ] Technical information (explanation of the information, practices needed to adopt, etc.)
- [ ] Financial support
- [ ] Input material
- [ ] None of the above

26. Do you have any suggestion for improvement?

- [ ] Frequency: more frequent, less frequent (please specified)
- [ ] Time frame: specific time slot for the broadcasting
- [ ] Specific: more locally tailored to the community
- [ ] Agro-advisories: provide advice what to do with the crop or livestock to reduce the risk
- [ ] Other

26a. Frequency: more frequent, less frequent (please specified)

.....

26b. Time frame: specific time slot for the broadcasting

.....

26c. Specific: more locally tailored to the community

.....

26d. Agro-advisories: provide advice on what to do with the crop or livestock to reduce the risk

.....

26. Other

.....

B. For farmers have not heard the weather news

27. What might be the reason why you have not heard the weather news from the loudspeaker?

- ☐ The loudspeaker cannot reach our house as I'm living in a remote area
- ☐ I might go to work far away from the area when they broadcast the news
- ☐ I might miss the broadcasting as listening to the local loudspeaker is not my habit
- ☐ I don't like the loudspeaker
- ☐ Other

27. Other

.....

28. If we broadcast the weather, extreme event, pest and disease forecast on the loud speaker, would you like to listen to it?

- ◯ Yes -> go to 29
- ◯ No -> go to 30

29. Do you have any suggestion for improvement so you can hear the news/forecast?

- ☐ Frequency: more frequent, less frequent (could be specified)
- ☐ Time frame: specific time slot for the broadcasting
- ☐ Specific: more locally tailored to the community
- ☐ Agro-advisories: provide advice on what to do with the crop, livestock to reduce the risk
- ☐ Other

29a. Frequency: more frequent, less frequent (please specified)

.....

29b. Time frame: specific time slot for the broadcasting

.....

29c. Specific: more locally tailored to the community

.....

29d. Agro-advisories: provide advice on what to do with the crop or livestock to reduce the risk

.....

29. Other

.....

30. What other channels you would like to receive the news/forecast from?

- ☐ Through internet/phone
- ☐ Extension staff to share
- ☐ Through radio
- ☐ Through TV
- ☐ Through printed bulletins with infographic
- ☐ Other
- ☐ None (I don't need the forecast)

30. Other

.....

III. Weather news from the internet

31. Do you have access to internet?

- ◯ Yes > go to 32
- ◯ No > end the interview

32. Have you ever access to weather forecast from internet?

- ◯ Yes > go to 33
- ◯ No > end the interview

33. Have you accessed any of these following product through internet? Multiple choice

- ☐ Forecast bulletins sent by WhatsApp
- ☐ LaCSA
- ☐ DMH Facebook
- ☐ Other

33. Others

.....

34. Which one are useful to you? Multiple choices

- ☐ Forecast bulletins sent by
- ☐ WhatsApp
- ☐ LaCSA
- ☐ DMH Facebook
- ☐ Other

34. Other

.....

35. Which one did you use more often? Multiple choices

- ☐ Forecast bulletins sent by WhatsApp
- ☐ LaCSA
- ☐ DMH Facebook
- ☐ Other

35. Other

.....

End: Thank you for participating in our survey! SAMIS – DeRISK project team.

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