



PARTICIPATORY CLIMATE INFORMATION SERVICES SYSTEMS MAPPING IN SENEGAL

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Cover Photo: Village participatory CIS mapping in Keur Moussa Ndiaye Credit: Catholic Relief Services

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ACRONYMS AND ABBREVIATIONS

ANACIM	Agence Nationale de l'Aviation Civile et de la Météorologie (<i>National Civil Aviation and Weather Forecast Agency</i>)
ANCAR	Agence Nationale de Conseil Agricole et Rural (<i>National Agricultural and Rural Advisory Agency</i>)
ANIDA	Agence Nationale d'Insertion et de Développement Agricole (<i>National Insertion and Agricultural Development Agency</i>)
CCAFS	Climate Change, Agriculture and Food Security research group
CGIAR	Consultative Group on International Agricultural Research
CINSERE	Service d'Information Climatique pour Accroître la Résilience au Sénégal (<i>Climate Information Service to Increase Resilience in Senegal</i>)
CIS	Climate Information Service
CISRI	Climate Information Services Research Initiative
CNAAS	Compagnie Nationale d'Assurance Agricole du Sénégal (<i>National Senegalese Agricultural Insurance Company</i>)
CRS	Catholic Relief Services
CRSA	Conseil Régional de Sécurité Alimentaire (<i>National Food Security Council</i>)
DEEC	Direction de l'Environnement et des Établissements Classés (<i>Directorate for Environment and Classified Establishments</i>)
DFC	Décentralisation Fonds Climats (<i>Climate Fund Decentralization</i>)
DREEC	Division Régionale de l'Environnement et des Établissements Classés (<i>Regional Division for Environment and Classified Establishments</i>)
ECOWAS	Economic Community of West African States
FAO	Food and Agriculture Organization
GIE	Groupement d'Intérêts Économiques (<i>Economic Interest Group</i>)
GTP	Groupe de Travail interdisciplinaire (<i>Interdisciplinary Work Group</i>)
HURDL	Humanitarian Response and Development Lab
ICRAF	International Centre for Research in Agroforestry
IRI	International Research Institute
ISRA	Institut Sénégalais de Recherche Agricole (<i>Senegalese Institute for Agricultural Research</i>)
Khoy	Divination and forecast practice
MAER/DA	Ministère de l'Agriculture et de l'Équipement Rural/ Direction de l'Agriculture (<i>Ministry of Agriculture and Rural Equipment/ Agriculture Directorate</i>)
NGO	Non-Governmental Organization
PAFA	Projet d'Appui aux filières agricoles (<i>Agricultural Sector Support Project</i>)
PAFA/E	Projet d'Appui aux Filières Agricoles (<i>Agricultural Sector Support Project</i>)
PASA	Projet d'appui à la sécurité alimentaire (<i>Food Security Support Project</i>)

PMSD	Participatory Market System Development
PPP	Public Private Partnership
SDDR	Service Départemental de Développement Rural (<i>District Rural Development Service</i>)
SE-CNSA	Secrétariat Exécutif du Conseil National de Sécurité Alimentaire (<i>Executive Secretariat, National Food Security Council</i>)
SODEFITE X	Société de Développement et des Fibres Textiles (<i>Development and Textile Fiber Company</i>)
UCEM	Union des Comités Écologiques du Mininka (<i>Union of Mininka Ecological Committees</i>)
URAC	Union des Radios Associatives et Communautaires (<i>Union of Associative and Community Radios</i>)
USAID	United States Agency for International Development
WFP	World Food Program

EXECUTIVE SUMMARY

Within its Learning Agenda on Climate Information Services in Sub-Saharan Africa, USAID has funded the Climate Information Services Research Initiative (CISRI). CISRI consists of four Work Streams. Through its second Work Stream, implemented by Mercy Corps, Catholic Relief Services (CRS), and Practical Action, it aims to understand the factors influencing climate information access and use to help farmers improve their livelihoods in a context of climate variability and change. This Work Stream piloted a participatory climate information services (CIS) mapping methodology in Niger and Senegal that includes five iterative stages: 1) framing the system; 2) preliminary CIS mapping; 3) empowerment; 4) participatory mapping of CIS actors, external environment and support services; and, 5) learning, impact and feedback. This report summarizes the pilot in Senegal, which took place after the first pilot in Niger, and was led by CRS and Practical Action.

Smallholder farmers in Senegal dependent on rain-fed farming systems are particularly vulnerable to the effects of climate variability and change, as they rely on often insufficient and variable rainfall. To mitigate these climate-related risks and build farmers' resilience to climate variability and change, the Senegalese government has created an institutional framework for climate services¹ to accompany the implementation of climate change adaptation projects and programs. For the last few years, climate adaptation projects that include climate information dissemination have been implemented in Senegal. The Kaffrine region in particular has become a kind of laboratory for experimenting with CIS access, adoption and use. Types of climate information that are shared include seasonal forecasts, 10-day bulletins, and 72-hour and daily forecasts.

In Senegal, as part of Stage 1 (Framing the System) the CISRI Senegal team interviewed 24 actors at the national level as well as those involved in programs in Kaffrine within the CIS system, including CIS producers, intermediaries and smallholder farmers. A literature review was also conducted to better understand the CIS system in Senegal. Preliminary mapping was conducted internally to visualize the known actors and inform decisions on focus areas and objectives for the pilot. Following these first two stages, empowerment and participatory CIS mapping stages took place in five villages involving 100 farmers, and in their respective communes. At commune level, 125 participants, including farmers and local officials, participated. Participatory mapping workshops were held at the regional level in Kaffrine (40 participants) and at the national level in Dakar (43 participants).

The empowerment and local-level mapping exercises enabled farmers to identify CIS constraints and opportunities, and express their CIS needs. With this experience, farmers were better equipped to meet other system actors at regional and national levels to share their perspectives and carry out joint mapping together. The results of the participatory CIS mapping identified multiple actors that are directly involved as intermediaries in climate information dissemination between the Civil Aviation and Meteorology Agency (ANACIM), which is the main weather forecast information producer in Senegal, and the smallholder farmers. These intermediary actors play key roles in providing information to farmers; however, participants involved in the mapping workshops expressed that the mapping helped them to see just how many actors were involved, and how that large number of intermediaries may be contributing to a lack of efficiency and timeliness in diffusing CIS.

Participatory CIS mapping showed that climate information access, adoption and use differ among end users. Farmers from some villages benefitted from climate smart agriculture (CSA) projects that included experimentation sites (referred to as *champs tests* or "test fields") that demonstrated the benefits of using CIS for cropping decisions.

¹ GFCS helped set up a national framework for climate services in Senegal: <https://www.wmo.int/gfcs/node/75> as well as an action plan: <http://www.wmo.int/gfcs/node/863>

Other farmers have been involved in projects that diffuse CIS, though they do not have a strong knowledge base on how to use the CIS. In villages like Medina Sy, there are no CIS programs present. With these differences in projects and programs targeting different villages, the CISRI team noted a wide difference in farmers' access to and ability to use CIS for agricultural purposes.

Participatory CIS mapping highlighted that in some villages, female farmers are marginalized in terms of CIS access or use. Their knowledge of the actors, services, and external environment in the system is limited in comparison with men. However, in two communes where women's groups are strong and are connected to female CIS relays and projects, women demonstrated a better understanding of the CIS system. Women also shared that they use climate information for reasons beyond agriculture, such as to secure their children and family assets during the rainy season when a storm is predicted, while men did not express such uses of climate information.

While participants identified numerous challenges related to the CIS system, they also identified opportunities during the participatory CIS systems mapping at the village, commune, regional and national-level workshops. These included suggestions related to climate information dissemination in local languages, for example, sending voice messages in Wolof rather than French. Additionally, scaling the climate test fields methodology and promoting good practices in climate information use was perceived by national participatory CIS mapping workshop participants as a good way to ensure adoption and effective and efficient CIS use. Stakeholders also suggested strengthening the capacity of farmer end-users, particularly women, to understand and use CIS; and continuing to engage all actors, including in the strategic level, research, CIS programs, technical services and communicators, to work in synergy to improve the access and use of CIS, within the broader agricultural market system, to improve yields and ensure farmers' food security.

Overall, stakeholders found that the participatory mapping approach was valuable for helping them to understand how they could improve the CIS system in Kaffrine. They appreciated the opportunity to meet and engage with each other, hear each other's perspectives and find common ground in the suggestions to improve the system. Actors expressed how useful it was to have all stakeholders together at the final workshop, from local to national levels, and especially to hear farmers' perspectives. Further follow-up would be useful to see how the action plans discussed at the workshops end up being put in place over time.

The Senegal pilot of this participatory CIS systems development methodology helped to identify several potential improvements that can be made to the methodology in the future, and particularly underlined how important Stage 5 is to follow-up on action plans made by CIS stakeholders during the workshops. Participants in the pilot appreciated the exchanges among actors all across the system and were able to expand their understanding of challenges and opportunities by learning about different points of view. However, without follow-up, it may be difficult to ensure that such encounters build on the identified opportunities and lead to the desired changes in the system. When this methodology is used in the context of a longer-term project which has the space for this follow-up, it holds promise for bringing actors together and creating the foundations for positive change within a CIS system.

INTRODUCTION

In Senegal, as in many countries in Sub-Saharan Africa (SSA), rain-fed farmers are exposed to the effects of climate change, particularly variations in the rainy season starting date, changes in rainfall volume and distribution, temperature variations, and occurrence of extreme events such as strong winds or off-season rains. Senegal's groundnut production zone, which includes the Kaffrine region, is found in the Sahelian and Soudanian zones, and experiences strong rainfall variability between years. To respond to this variability, which increases farmers' vulnerability, government and international development organizations have initiated programs for climate adaptation and agricultural development in the Kaffrine region. These programs include the Climate Change, Agriculture and Food Security (CCAFS) research program of the Consultative Group on International Agricultural Research (CGIAR); the United Nations Food and Agriculture Organization (FAO) climate resilience projects; Oxfam and World Food Program (WFP) 4R program; Climate Smart Villages developed by the Senegalese Agricultural Research Institute (ISRA); and the Climate Funds Decentralization (DFC) project led by IED-Africa.

Despite the many interventions taking place, the climate information service (CIS) system in Kaffrine still faces challenges, as do CIS systems in many countries and regions across SSA. To better understand and address the challenges in SSA, Mercy Corps and their partners developed the USAID-funded Climate Information Services Research Initiative (CISRI). CISRI, a component of the wider Learning Agenda for Climate Information Services in sub-Saharan Africa, was designed to improve understanding of climate information systems, users, and impact. Coordinated by Mercy Corps, CISRI builds on the expertise of consortium partners: Catholic Relief Services (CRS), Practical Action PAC, Clark University's Humanitarian Response and Development Lab (HURDL), Columbia University's International Research Institute for Climate and Society (IRI), the CGIAR's CCAFS research program, and the International Centre for Research in Agroforestry (ICRAF). CISRI works alongside a partner consortium, Sustainable CIS, led by Winrock. Together, the Learning Agenda seeks to better understand how to develop effective, sustainable, country-led CIS programs in SSA and support decision-makers with tools for CIS production, delivery and use to improve food security and increase farmers' resilience in the face of extreme climate events.

As part of this initiative, one of CISRI's Work Streams has piloted a participatory methodology to understand and improve CIS systems using participatory systems mapping. CRS and Practical Action implemented this approach in Senegal between September 2017 and April 2018 after Mercy Corps, CRS and Practical Action piloted it in Niger in 2017. This methodology is a practical tool for CIS stakeholders to help them improve the functioning of their CIS systems through the engagement, empowerment and inclusion of all actors, including farmer end users. It is not a research tool, but rather a programmatic process that can be used to help identify areas for improvement and stimulate collaborative action to improve a CIS system.

PROJECT OBJECTIVES

The objectives of the pilot in Senegal were to test and adapt the participatory CIS mapping methodology approach by building on the pilot in Niger, mapping with stakeholders the existing CIS system in Kaffrine to understand factors within the system that influence climate information access and use in order to improve current and future CIS interventions and programs.

These objectives contribute to the key research questions guiding the overall CISRI project:

1. What are the internal and external factors of a CIS system that promote or limit the access, use and effectiveness of climate information?
2. What CIS approaches, structures and innovations best support the uptake, use and effectiveness of information for end-users and under what circumstances?

3. What are the key intervention points to improve the effectiveness of CIS systems?

The participatory systems mapping methodology is designed to identify internal and external factors perceived by stakeholders all along the climate information services “chain” that enable or limit the flow of CIS information. CISRI’s participatory mapping approach contributes to the learning questions above, particularly by including end users along with other stakeholders in identifying approaches, structures and innovations within the system that could be solutions to the blockages that stakeholders identify to the flow and use of CIS. As part of the mapping exercise, stakeholders, including farmers, identify key leverage points that have potential to improve the effectiveness of the system at multiple levels. CISRI tested this methodology to see whether it can be useful in helping stakeholders themselves to identify their own key intervention points for improvement, and helping them to better understand user needs and take steps to make their CIS systems more effective.

METHODOLOGICAL APPROACH

Presentation of the study area

The CISRI team chose the Kaffrine region (see map below) to pilot the participatory CIS mapping methodology. Five villages (identified by the red dots on the map below), along with their commune administrative centers (identified by the blue squares on the map below with the full commune area outlined in blue), were identified for the pilot.

The Kaffrine region is the heart of the groundnut production zone and is one of the main agricultural production areas in Senegal. Most smallholder farmers in Kaffrine depend on rain-fed agriculture with increasing seasonal and inter-annual rainfall variability. Kaffrine records average rainfalls of around 500 mm per year in the North, 600 mm in the Center and 800 mm in the South-West. In this context, climate information is necessary to support decision-making for agricultural production. In accessing seasonal, ten-day and daily forecasts, farmers can make informed decisions and initiate actions such as choosing adapted seed varieties, deciding when to plant, and applying fertilizer at the appropriate time. Using CIS to inform these decisions can help farmers to stabilize yields and maintain or improve household food security despite climate variability and change.

The Kaffrine region was targeted for several reasons, including harmonizing with other planned CISRI activities, CRS presence in the region to coordinate on-the-ground logistics, and the presence of numerous CIS interventions. As neither CRS nor Practical Action had specific CIS projects in the country to apply the methodology to at the time of the pilot, the team chose an area where other actors were present and would have the ability to carry forward any learning and outcomes from the pilot in their ongoing CIS projects. For that reason, five villages were chosen based on the presence of institutions and projects working on agricultural development and climate information dissemination (see Table 1).

Four of the five chosen villages were involved in CIS projects led by such organizations as ISRA, IED-Africa, and Oxfam. The fifth village was involved in an agriculture project with CRS that did not specifically include CIS diffusion, and was included to identify differences between villages that had and did not have specific CIS interventions. It is important to note that the pilot included only five villages and the methodology is not designed to contribute to in-depth research analysis on differences between villages, but rather to a holistic participatory process to improve the system more broadly.

The second pilot to be carried out in Niger will provide a better understanding of the applicability of the methodology in a region with less developed CIS interventions. Considering findings from that pilot, the first pilot

in Niger, and this one in Senegal will help inform uses of the methodology in various contexts of more and less developed CIS systems, with different sets of actors.

Commune	Village	NGO or institution	Projects	CIS Diffusion/Project elements
Ndiognik	Daga Birame	ISRA/CNRF /CCAFS	Climate smart villages	Climate information as part of broader climate change adaptation project
Missirah Wadène	Keur Omar Daga	Ministry of Agriculture	PAFA (Agricultural Sector Support Project)	Climate information and agricultural product processing
Dianké Souf	Medina Sy	CRS/NCBA-CLUSA	Millet Business Services Project (MBSP)	No project-related climate information diffusion
Fass Thiékène	Keur Moussa Ndiaye	OXFAM/WFP/ La Lumière	Initiative 4 R	Climate information as part of the 4R Rural Resilience Initiative
Ida Mouride	Darou Wolof	IED-Africa	Climate Fund Decentralization (DFC) Project	Climate information diffusion

Table 1. Intervention communities in the Kaffrine region

Ndiognick Commune

The Ndiognick commune has a population of 29,976 in 56 villages². Groundnut, millet, maize and sorghum are the main crops, with watermelon, sesame and horticulture production beginning to increase due to agricultural program interventions.

Dianké Souf Commune

The Dianké Souf commune comprises 32 villages for a population of 19,740³. Agriculture is the main activity, with mainly groundnut, millet, maize and sorghum production, in addition to sesame and watermelon. During the rainy season, women also practice horticulture.

Missirah Wadène Commune

The Missirah Wadène commune has 44 villages with 18,896 inhabitants whose main activities are agriculture and livestock production⁴. The main crops are groundnut, millet and maize. Horticulture is mainly practiced by women.

Ida Mouride Commune

The Ida Mouride commune has 51 villages with a population of 19,079 inhabitants⁵. Agriculture is practiced by over 97% of the population. Groundnuts and cereals such as millet, maize and sorghum are produced, and horticulture is mainly cultivated in the Nianidiabolong valley, a flood valley crossing the commune from East to West on approximately 26 kilometers.

² Situation économique et sociale régionale en 2013. Service Régional de la Statistique et de la Démographie de Kaffrine, Avril 2015.

³ Situation économique et sociale régionale en 2014. Service Régional de la Statistique et de la Démographie de Kaffrine, November, 2015.

⁴ Situation économique et sociale régionale en 2013. Service Régional de la Statistique et de la Démographie de Kaffrine, April 2015.

⁵ Recensement Général de la Population et de l'Habitat, de l'Agriculture et de l'Élevage (RGPHAE) en 2013. Interim Report, March 2014.

Fass Thiékène Commune

The Fass Tchiékène commune comprises 38 villages with a population of 15,867. Groundnut, millet, maize and sorghum are produced, and rice was recently introduced in the lowlands. Rainy season horticulture is also practiced by women.

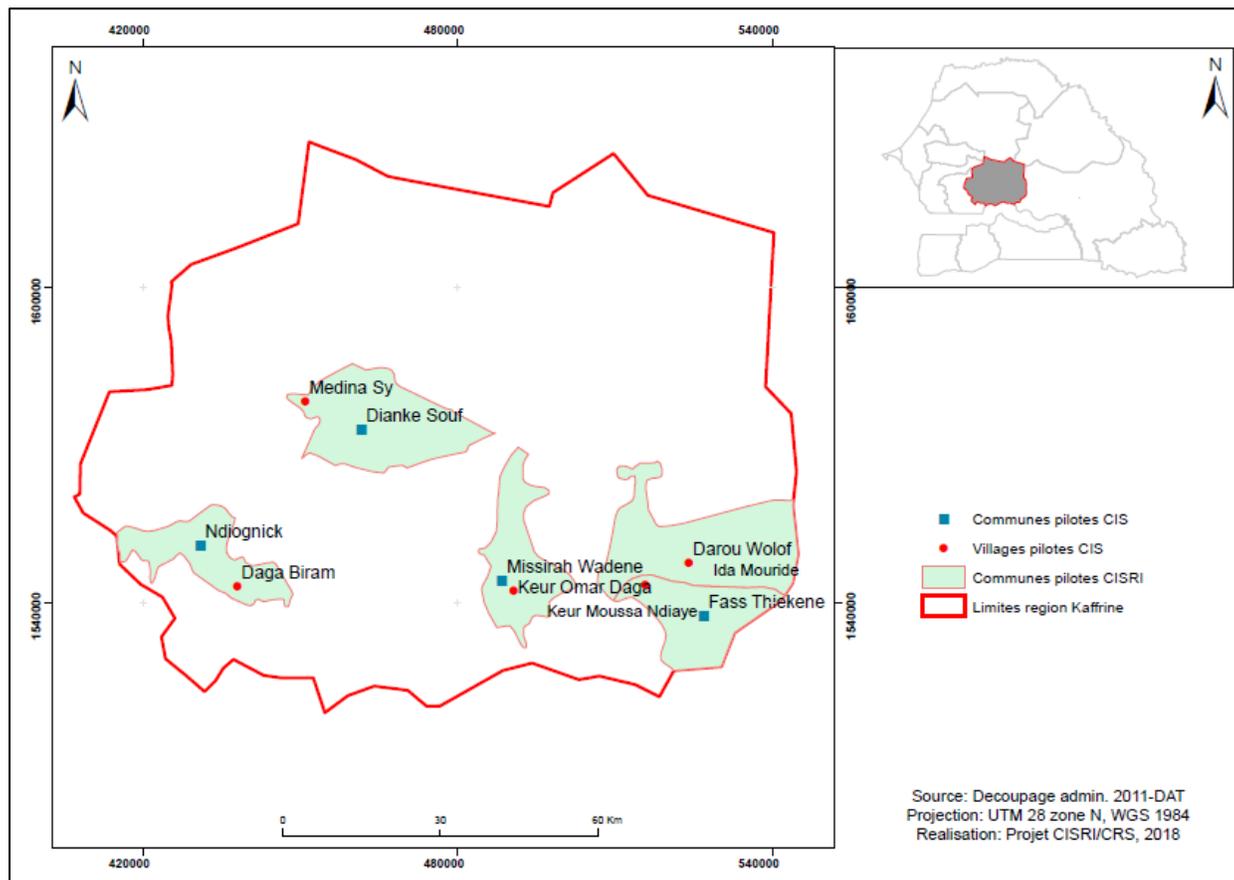


Figure 1. Map of the CISRI project intervention areas in the Kaffrine region. Red dots indicate villages where the village mapping took place, blue squares indicate the commune administrative centers where the commune mapping workshops took place, and the larger blue shaded areas indicate the commune area covered by the administrative centers within the region.

Presentation of the CISRI approach

CISRI's participatory systems mapping approach for CIS was adopted from the Participatory Market System Development (PMSD) methodology, developed by Practical Action. PMSD is designed to bring together the key people within a particular market system to address obstacles and leverage opportunities to improve market conditions for everyone. PMSD is based on three main principles: systems thinking, participation and facilitation. The CISRI team saw an opportunity to adapt this methodology and to apply its underlying principles to facilitate user-driven improvements in a CIS system. During the Senegal pilot, the team tested and refined this approach through a series of participatory systems mapping workshops.

The methodology comprises five main stages implemented through an iterative process:

Stage 1: Framing the System

CRS, Practical Action and Mercy Corps completed this first stage from September to December 2017. This stage

included:

- Desk research to identify relevant, existing CIS projects and programs. This literature review helped inform the choice of target villages for the mapping pilot and stakeholder engagement activities.
- Initial internal meeting to prioritize where to conduct the pilot, identify with whom to engage, and explore the CIS systems and farmer typologies to include in the pilot.
- Interviews with stakeholders active in the national and regional CIS system. The team spoke with government and research institutions; multilateral organizations and NGOs; local government programs; radio station directors; representatives from local farmers' organizations, including women's organizations; mayors and community leaders in communes and villages in Kaffrine. This initial stakeholder engagement was the foundation for the participatory activities that followed in later stages, by gaining stakeholders' interest and motivation to participate.

Stage 2: Preliminary CIS systems mapping

This stage took place in September 2017, providing an initial picture of the CIS system in Kaffrine. The preliminary map identified actors involved in climate information production, dissemination and use, and a first understanding of the relationships between actors, the external environment, and services used for climate information dissemination. The preliminary mapping helped the team begin to identify which actors to interview and engage. The systems mapping followed the methodology tested in Niger with three main components, shown in Figure 2 below. These are: 1) system actors and information flows (placed in the middle); 2) the services and support functions (inputs, services and advice that the key actors need to fulfill their responsibilities and roles) and; 3) the external environment (aspects that shape the way the system works, for example, political, social, and economic factors).

Stage 3: Empowering CIS stakeholders through capacity building

This stage involves reinforcing the ability of actors in the CIS system to participate and interact proactively with other more powerful actors involved in the CIS system. The capacity strengthening activities during stage 3 depend on stakeholder needs and knowledge gaps. In general, they include developing skills in advocacy, dialogue, identifying constraints and opportunities, and understanding basic concepts related to climate change and CIS. The competencies that were strengthened included: end users' ability to understand the CIS system and the way information flows; end users' ability to explain challenges and needs in terms of access to information; and their ability to explain factors preventing them from using the information to make decisions. Stages 3 and 4 were implemented in the Kaffrine region simultaneously, between December 2017 and February 2018.

Importance of actor empowerment

Empowerment activities were undertaken as part of the participatory CIS mapping sessions, between December 12 and 22, 2017 at the village level and January 7 to 19, 2018 at the commune level. Empowerment activities at the regional level were held on February 8. This important stage aimed to strengthen actors' capacities relative to the CIS system, its complexity, its challenges and opportunities. It also gave farmers and other actors an opportunity to learn more about CIS and its utility for agricultural decision-making. This capacity strengthening and learning helped address the doubts some of the farmers had regarding forecast reliability.

Small group mapping sessions were held with groups of men and women separately, considering that women may be more comfortable sharing their perspectives with other women first. After group sessions, male and female participants gathered in plenary to share the results of their mapping and revise it together. This experience helped men and women to assert themselves, express their CIS needs, actively engage, reinforce their confidence, and prepare to meet and discuss with other stakeholders at the regional and national levels.

The empowerment exercises involved: i) improving participants' knowledge and understanding of the CIS system and their ability to identify constraints and appropriate solutions; ii) defining responsibilities that lie with farmers, local government, CIS intermediaries and CIS producers such as ANACIM, to effectively address challenges; and iii) helping them identify trustworthy individuals who would represent them in the next CIS mapping process workshop.

As participants' levels of access to and use of CIS differed, facilitators identified male and female smallholder farmers during the small group discussions who had personal experiences using CIS to inform their agricultural practices, and when the male and female groups came together in plenary after their mapping, facilitators asked those farmers to share their experiences with the group. This experience sharing generated much interest and raised farmers' awareness of CIS.

Stage 4: Participatory mapping of CIS systems

This stage consists of a series of participatory CIS systems mapping workshops. By involving CIS actors and stakeholders at the national, regional and local levels, the workshops help establish trust and collaboration and build relationships to generate tangible changes in the perceptions and behaviors of stakeholders. Participatory mapping workshops are a way to involve stakeholders, including farmer end users, in co-designing solutions to improve CIS access and use. In Senegal, these workshops were carried out from December 2017 to March 2018.

At the village and commune levels, male and female farmers gathered to discuss and map their perspectives of the CIS system at the same time as the empowerment activities described above. At the village level, representatives were selected by the farmers themselves to participate in the CIS mapping at commune level. The small groups of men and women in each village selected one male and one female farmer to represent them at the commune level meeting. Farmers selected their representatives based on the person's good participation in the group, their ability to speak in public without fear, and their perceptions of that person's influence, rather than whether that person was the most familiar with CIS. This selection process was repeated at the commune workshops to identify representatives to attend the regional workshop, again choosing one male and one female from each commune-level workshop to attend the regional workshop. The regional CIS mapping workshop gathered actors representing all five communes, government regional (DRDR) and district (SDDR) technical services, and representatives from agriculture and climate change adaptation projects and programs. For the national workshop, the facilitation team played a more direct role in identifying farmer participants from among those who had participated in previous workshops in order to include those who would be able to understand some French. Farmer participants in the national workshop – both male and female – tended to be leaders or presidents of farmers' groups from their respective villages or communes.

Women were actively involved in the CIS mapping workshops at each level, with separate mapping exercises and discussions for men and women at village and commune level, that then came together to share their different perspectives. For each village and commune workshop, after introducing the CISRI project to the larger group, the farmers then split into male and female groups. This helped to better focus on gaps in system understanding and to give women a voice in expressing how the CIS system worked for them. The participatory approach provided a space for actors to understand the system more clearly and to share their thoughts on challenges and potential solutions related to the system.

CIS mapping comprises three levels (Figure 2) including:

- Actors, including those who produce the CIS, the end-users, and the dissemination intermediaries in between. These actors can be institutional, individual or collective.
- Support services and functions, including channels and means that actors use to facilitate climate information reception, understanding, observation and sharing from national to community levels.

- The external environment, including political, economic, social and cultural factors that are positive or negative and may influence climate information dissemination, access, use and decision making.

The participatory CIS mapping exercise highlighted many challenges and constraints in the CIS system at the local, regional and national levels. At each workshop, participants discussed solutions and roles and responsibilities to address the various challenges.

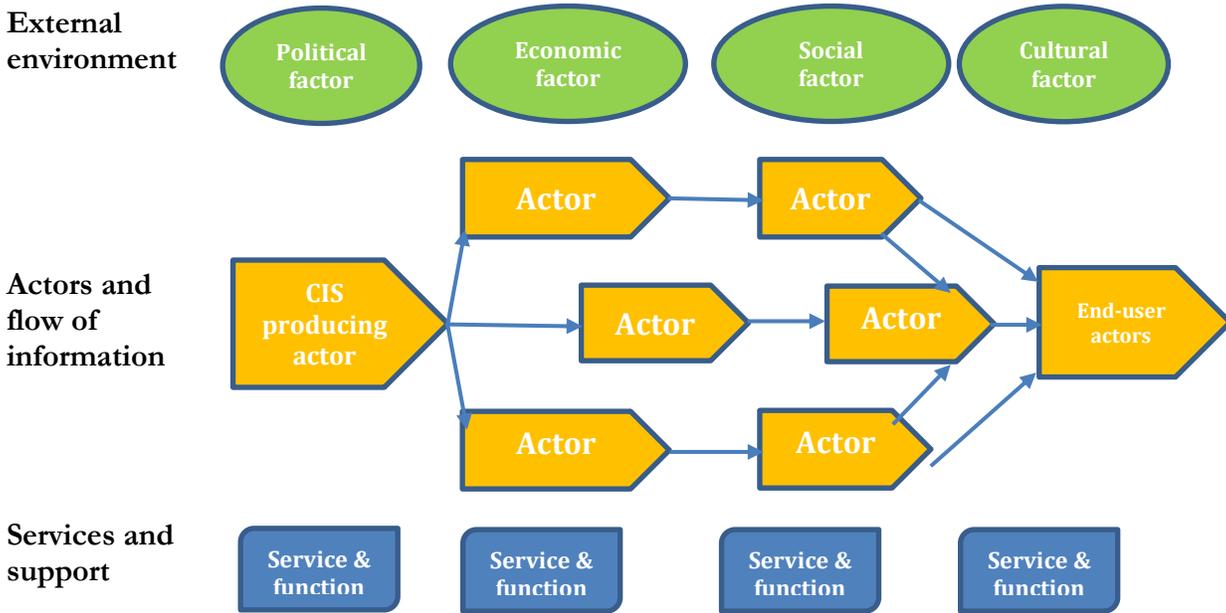


Figure 2. CIS systems mapping model, based on the PMSD mapping approach

Stage 5: Learning, impact and feedback

This stage involves ongoing learning and reflection throughout the process to monitor how the approach is working and adapt when necessary, learning along the process and assessing impact within the CIS system that results from the activities. As indicated in the methodology, the stages are not linear, and stage 5 in particular continued as an iterative process during the initial framing of the system and while implementing empowerment and mapping workshops. In this pilot, stage 5 included evaluation activities after each workshop. Internal meetings were also held frequently with the team to reflect on what we were learning and how to improve both the methodology itself and the potential for impact.

A learning meeting was also conducted with key “champions” of the methodology to gather their reflections on the process and methodology. After the CIS regional mapping workshop on February 8th, the team shared the approach and preliminary results with champion actors at national level who had shown a level of interest in the project. These actors included representatives from FAO, WFP, USAID/CINSERE and Senegalese Institute for Agricultural Research (ISRA). ANACIM was also invited but unable to attend. ANACIM did, however, attend the national level mapping workshop and was engaged and enthusiastic about the mapping. This learning meeting enabled the team to gather these actors’ suggestions and advice and engage them prior to the national CIS mapping workshop. The champions expressed an interest in the mapping methodology as a useful tool that could add value

to their projects and institutions by highlighting areas to improve the CIS system and providing end user perspectives.

Due to the pilot's 6-month timeframe, more in-depth accompaniment for actors that would be expected for this stage was cut short, and longer-term engagement to follow through on impact after the national level workshop was not possible. For example, during this stage it would be ideal to follow up at village level with the results of the national-level mapping, but this was not done. See the recommendations section below for more on these limitations.

RESULTS AND DISCUSSIONS

CIS system actors in the intervention areas

The CIS mapping in Kaffrine shows the complexity of the climate information system. While different villages and communes noted different actors within the system map, a number of key actors emerged across many of the maps. According to both the desk review and the participatory CIS mapping process, the key producer of climate information is ANACIM. Because of its role in producing climate information and making it available to populations, ANACIM collaborates with numerous agriculture and climate change adaptation projects and programs and government initiatives in Kaffrine.

Actor interviews and literature review results show that there are several types of climate information produced and made available to populations: i) seasonal forecasts – every year, the meteorological services makes forecasts at the beginning of the rainy season, giving indications on the type of season, such as its projected intensity and duration; ii) ten-day bulletins, which are compiled by and disseminated through the Interdisciplinary Technical Workgroup (GTP)⁶; iii) 72-hour forecasts, to predict climate hazards for the following three days; and iv) daily forecasts. During the village and commune level mapping, farmers most often referred to seasonal and daily forecasts, while many actors who participated in regional and national level workshops, mainly GTP members, also mentioned ten-day and 72-hour climate forecasts. No actors discussed longer term, such as 5-year or 10-year, forecasts.

Another key CIS actor described by numerous groups were the Saltigues. As advisors of Kings and guardians of indigenous knowledge in the Serer ethnic group in Senegal, the Saltigues produce predictions called “*Kboy*.” These predictions relate to the future of chiefs, natural or political disasters that could impact the country, as well as seasonal weather conditions for agriculture. To make predictions for the agricultural season, the Saltigues hold a retreat before the beginning of the rainy season during which they conduct mystical ceremonies. This tradition used to be followed mainly by the Serers in the Fatick region but has now become a widely publicized national phenomenon. *Kboy* constitute another fundamental climate information source for farmers and are broadcast by the media. The Saltigues also offer advice on which crops to prioritize, which is of interest to smallholder farmers. The Saltigues were mentioned in almost all CIS mapping workshops, from the village, commune and regional levels up to the national level.

Farmers did not mention any contradictions between the Saltigues and the ANACIM forecasts, nor how the two are related. However, the CISRI facilitation team suggests based on their experience that there may be collaboration or communication between ANACIM and the Saltigues, and they point out that the Saltigues' forecasts are more

⁶ The GTP - Groupement de Travail Pluridisciplinaire - is an inter-ministerial technical working group led by the national meteorological agency ANACIM, which meets regularly during the rainy season to share updates on the progression of the rainy season and to develop information and advisory messages for farmers, herders and other stakeholders. The information and advisories are published every 10 days in an agro-meteorological bulletin. Regional and departmental GTP have been established in some areas, to help interpret, adapt and disseminate information and advisories to end users.

general than ANACIM's, describing qualitative amounts of rain expected, while ANACIM provides more quantifiable information. While farmers did not discuss any conflict or issues of trust when deciding which forecasts to follow in the event of contradictions, the CISRI team felt that in general farmers will trust ANACIM forecasts more, except in the Fatick region where the Saltigues tradition is strongest. However, this was not discussed in the participatory mapping workshops.

Many climate adaptation and resilience projects and programs act as intermediaries in climate information dissemination. They collaborate with ANACIM to receive and relay climate information to producer groups, mainly in their intervention zones, through facilitators or extension agents. Among projects and programs identified by CIS system actors, the following were highlighted during the participatory mapping exercises:

- Naatal Mbay is a USAID Feed the Future project. This project aims to improve agricultural productivity, partnering with ANACIM for monitoring and better use of CIS in its intervention areas. In the Kaffrine region, Naatal Mbay provides climate forecasts from ANACIM to end users in several communities. Among the communities where CISRI was active, Médina Sy and Dianké Souf villages and Ida Mouride commune mentioned Naatal Mbay's presence.
- The Décentralisation Fonds Climats (DFC) project led by IED-Africa (Innovation Environment Development) organizes pre-season forecast workshops for farmer end users in collaboration with agriculture technical services such as SDDR (the district rural development services) and the National Agricultural and Rural Advisory Agency (ANCAR). During this annual activity, community radios broadcast key information from the workshop on ANACIM's seasonal forecasts. The DFC project also promotes farmer use of rain gauges to familiarize them with the use of rainfall data for decision making. DFC was included in the men's and women's maps for Darou Wolof village and its respective commune, Ida Mouride; however, it was also mentioned either as an actor or as part of the external environment in all other communes except Diankhe Souf.
- ISRA's National Forest Research Center (CNRF) has a Climate Smart Agriculture (CSA) project funded by CCAFS that has become a model for disseminating and promoting the use of CIS. Since 2011, this project has piloted a demonstration and experimentation site in the Daga Birame village where climate information is an integral part of a package of technologies for good agricultural practices. CNRF, in partnership with ICRAF, implemented a participatory approach for climate services integrated with farming. This intervention model has not yet been scaled up despite interesting results. However, the men's map in Darou Wolof village also mentioned ISRA's demonstration sites as part of the external environment.
- In Sikilo and Ngodiba villages (not included in the village mapping exercises), the FAO project "Integrating Climate Resilience into Agricultural and Agropastoral Production Systems for Food security in Vulnerable Areas Using the Farmers Field School Approach" included CSA practices. In this project, FAO experimented with climate information for targeted farmers who benefitted from capacity strengthening for CIS use.
- The WFP has worked with the NGO La Lumière and Project 4R, as an intermediary in climate information dissemination. The village of Keur Moussa Ndiaye is part of this project and both men and women included this project as part of their maps. The project transmits climate information to field agent relays and helps end users understand CIS. La Lumière, whose activities in the Kaffrine region mainly focused on women's savings groups, started its climate information dissemination activities in 2017, mostly in the Koungheul district.

- The National Insertion and Agricultural Development Agency (ANIDA) is a Senegalese government institution established to improve agricultural productivity. It is active in Missirah Wadène and Ida Mouride communes, where it set up test fields and is working with farmers, providing a packet of information on climate and improved agricultural techniques. ANIDA was not specifically cited in the village or commune maps.
- SODEFITEX (Cotton Textile Fiber Development Company) was cited as a CIS actor in the Missirah Wadène commune and the Keur Omar Daga village. It provided farmers with a pluviometer to measure and monitor rainfalls. This cotton company was not often mentioned by actors during the CIS mapping process.
- The Agricultural Sector Support Project (PAFA – Extension) is a program of the Senegalese government funded by the International Fund for Agricultural Development (IFAD) to fight poverty through agriculture, mainly millet and rice, and livestock farming. The Food Security Support Project in Louga, Matam and Kaffrine (PASA LouMaKaf), is mostly active in the Koungheul valley. Both of these projects provide their target farmers with climate information, and one or the other was included in maps in all communes except Ida Mouride.
- Government decentralized technical services (MAER/DA, DEEC, DREEC, DRDR, SDDR, ANCAR) also play a strategic role in the climate forecast dissemination process. As members of the local GTPs, they are both dissemination intermediaries and a source of agricultural advice for farmers and development projects/programs in the agriculture sector. ANCAR in particular was included in maps in multiple communes, including by women and men in two communes, and by men in two villages.
- Communication structures, especially Union of Associative and Community Radios (URAC), play an important role in disseminating climate information through community radio stations. Before and during the rainy season, community radios regularly prepare programs in collaboration with agricultural technical services to provide farmers with forecasts and practical recommendations. They are the most widely used diffusion channel at the local level for both ANACIM and Saltigues seasonal forecasts. They collaborate with projects for wider dissemination of information from forecast workshops and sensitize end users on how to use the climate information. All maps at village and commune level included radio journalists and some also included television.
- The contribution of grassroots community organizations should also be noted, such as Union of Mininka Ecological Committees (UCEM) that works in collaboration with ANACIM to organize forecast workshops for the benefit of farmers. UCEM has relay producers in the Koungheul district, with whom it shares climate information. Another example is the Groups of Economic Interest (GIEs): groups of people, typically women, with the common objective to develop their economic activities. GIEs can also be used to share climate information at weekly meetings.
- Community relays are indispensable intermediaries in the climate information dissemination chain in their village or commune. They are usually volunteers, facilitating information flow between smallholder farmers and projects and organizations that are active within their community. In addition to climate information, they may monitor and provide information on the pluviometers installed in villages or communes. They collaborate with village chiefs, imams and marabouts. Most of the village and commune maps included relays, with the exception of the women’s map in Medina Sy, men’s and women’s maps in Darou Wolof village, and women’s maps in Missirah Wadene and Diankhe Souf communes. This underscores women’s observation that relays communicate more with men than with women, and their recommendation to include more women relays.

- At the mapping exercise at the Kaffrine regional workshop, stakeholders cited resource persons and town criers as actors who share climate information, particularly hazards, with local populations. Interestingly, this had not come up at village and commune mapping workshops, so perhaps occurs in villages or communes other than those targeted.

During the participatory systems mapping, the team also considered gender dimensions in CIS access and use. The mapping exercises and surrounding discussions highlighted women's typically more limited access to information as well as their non-agricultural use of CIS to secure their children and family assets prior to storms. Despite being highly involved in agricultural production, women are often the least involved actors in the CIS system at the village, communal and regional levels. Women expressed that they receive climate information through conventional communication channels, such as community radio and telephones, as well as through word of mouth and from their husbands. Weekly conversations organized by women are also opportunities to exchange information about traditional environmental climate indicators such as birds, insects and tree foliage. However, in some cases, women reported that their husbands did not share climate information with them, and in one village, women were not aware that there was a relay in their community as he only shared climate information with men. Regarding use of the CIS, women expressed challenges in being able to act on the information due to lack of decision-making control over land and lack of access to land.

Men expressed a number of different ways that they receive climate information. During the village level mapping exercise, community radio was most often mentioned, along with relays (project community volunteers) and other programs collaborating with ANACIM. The most widely followed radio stations in the Kaffrine region are the national radio stations: Pakala FM, Bambouck FM, Malème Fm, Nganda Fm, Diiné Ji Fm, Kaffrine. The weather forecast bulletins disseminated on national TV were mentioned by the commune and region-level actors, in contrast to the village level where this communication means is not widespread due to the lack of electrical power.

Traditional knowledge on climate indicators is used by men as well as women. Some farmers, especially the older ones, observe environmental and astrophysical indicators that allow them to make seasonal forecasts. Farmers indicate that traditional indicators are an opportunity to acquire climate information, even if they are increasingly observing shifts in the periods when indicators appear. Typical indicators used relate to observations of the foliage of certain trees (baobab) or the arrival of certain bird or insect species that indicate the type of season to come. However, there is limited sharing of these traditional forecasts because of customary and religious considerations. It is possible that the Saltigues predictions are also based on traditional, indigenous knowledge along with their mystical ceremonies.

CIS support services

There are numerous support services used to make climate information available to end-users in Kaffrine. During the CIS mapping workshops, participants noted the support services related to CIS on the bottom of the map and in discussions. Those most often mentioned by CIS system actors included:

- Network coverage of different mobile phone operators, which give easy access to messages and phone calls from ANACIM or NGOs relaying climate forecasts to relays in their intervention villages. However, coverage is not uniform and remains insufficient in communities that are far from antennas. This could cause delays in climate forecast reception.
- Community radios covering the different parts of the region, which play an important role in climate information dissemination. In some places, electrical network failures, especially in the Kougueur and Malème Hoddar districts, are a constraint to the accessibility of climate information via radio.

- Pluviometers, which farmers reported as a useful service to collect rainfall data, provide an opportunity to monitor the fields and understand the quantity of rain needed to cultivate certain crops, and were included in most men's and women's maps.
- The National Agricultural Insurance Company (CNAAS), which fosters access to information, plays an important role in covering agricultural risks such as drought and rain deficits. Its index insurance program for maize and groundnut in the Kaffrine region has been beneficial for some farmers.
- Microfinance institutions such as Crédit Mutuel allow farmers to access financial resources to better prepare for the season without waiting for grants from government services.
- Internet was rarely mentioned by CIS actors during the mapping exercises, but for those who do have internet access, it is a good source of information. Climate information is also available through television for male and female farmers who have access. As noted above, this was mainly at the regional or commune level and not included in village level maps.

These services mentioned by actors during the CIS mapping exercises confirm those identified through the literature review and during interviews with CIS system resource persons.

CIS system external environment

The third element in the systems mapping approach relates to the enabling or external environment. This step in the mapping process revealed a high degree of engagement and social connection among actors in Kaffrine. Information flows easily by word of mouth through meetings, including those held at women's associations. The municipal council in most communes is also an opportunity for relaying information at the communal level. At village level, socio-cultural and organizational systems also play an important role. For example, in Daga Birame, the involvement of the village chief and the imam in climate information dissemination and sharing has ensured collaboration between the village and its development partners.

In general, the Kaffrine region has an environment that is conducive to climate information dissemination, with participants noting a number of positive factors in the enabling environment. These include:

- The presence of projects and programs working in the agriculture sector and the many community radio stations facilitating CIS diffusion. For example, in Daga Birame, participants felt that the existence of a climate-smart village, which serves as a laboratory to test climate change adaptation technologies within farmer field schools, creates an environment that is conducive to climate information dissemination as all farmers who are involved are committed to using CIS.
- Relays contribute to a better understanding of the benefits of climate information use in their communities. These relays have experimented with and adopted CIS to improve their agricultural production and can be models for others. However, it was noted that there are few female relays and male relays do not always share information with women farmers.
- The presence of the GTP was also mentioned as part of the enabling environment. The GTP reflects on and disseminates ten-day climate information during the rainy season. The district-level GTPs give recommendations according to the information they receive and develop a newsletter that is circulated at the district level.

- Participants thought that existing groups, such as savings groups, helped to strengthen social cohesion, which could be an opportunity to facilitate climate information sharing within such groups.
- According to many actors in the national and regional workshops, CNAAS plays a key role in the external environment through agricultural risk management.

In some villages, there are multiple programs working on CIS, which can support a positive environment for climate information dissemination. However, there is often a lack of collaboration between agricultural technical services such as ANCAR, SDDR, climate change adaptation projects, and even between community radio stations in terms of harmonization and program sharing. Stakeholders participating in the systems mapping workshops highlighted this as a constraint within the enabling environment to making the CIS system more efficient for the benefit of end users.

While the purpose of organizing the mapping workshops in different villages where various projects are present was not to compare or evaluate the projects, we can see differences in the complexity of the maps varying from one village/commune to another. Maps in villages with numerous projects were more complex than those in villages with few projects. For example, the maps in Medina Sy village and Diankhe Souf commune, where no CIS-specific project exists, had the least complex maps with few actors noted. The village of Darou Wolof also had very simple maps produced by men and women. The local ANACIM relay did not receive forecasts and simply sent precipitation data from their rain gauge to ANACIM, and the DFC project in that village did not yet include CIS activities. The most complex maps with the greatest number of actors, displaying the most thorough knowledge of the system, were in the Ndiognick and Fass Tiecken communes and their villages, where the ISRA/CCAFS and the Initiative 4R projects take place, respectively.

As described above, women described challenges in terms of receiving and using CIS. However, in the Ida Mouride commune, the women's map included slightly more actors and complexity than the men's map, potentially due to the presence of 20 women's groups that have formed a union at the commune level and are well-organized and linked to projects. The Fass Tiecken commune women's map was also more detailed than the men's map, citing numerous NGOs as actors, perhaps partly due to the presence of a dynamic female relay from the IED-Africa project who manages a demonstration plot and receives SMS alerts from ANACIM, sharing these with other women. These communes provide examples of where women are organized and sharing information. Having their voices in the room for the regional and national workshops ensured that other actors recognized their issues. This was demonstrated by the number of gender-related constraints and opportunities that were prioritized at those workshops (see discussion below).

National Participatory CIS mapping workshop

The national-level participatory CIS mapping workshop was held on March 14 in Dakar. This workshop was an opportunity to bring together many CIS system actors (see Annex 4 for a list of participants), giving them an opportunity to reflect on the CIS system through the participatory mapping exercises and discussions. The workshop comprised group work and plenary sessions and its objectives were:

1. To facilitate and improve relationships between CIS system actors
2. To test the mapping methodology with the CIS system actors
3. To create a map of the CIS system in Kaffrine with national actors and analyze the CIS challenges and opportunities for CIS diffusion, as well as any priority actions that actors could undertake to improve the system for end-users
4. To gather input and recommendations on the methodology

Participants included journalists (mainly radio), male and female farmers; members of farmers' organizations; local government representatives; regional agriculture technical agents; CIS program officers for projects implemented by

NGOs and institutions, research structures and agricultural insurance; an ANACIM representative; and an honorable representative and member of the Environment Commission in the Economic Community of West African States (ECOWAS) parliament.

The national mapping exercise used the map developed at the Kaffrine regional workshop as a base to which participants could add, move or remove actors, services or external environment factors according to their perception of the CIS system. This approach stimulated many exchanges in the four small workgroups. Producer input was seen as very valuable. There was generally a lot of similarity between groups, with only a few exceptions. The national-level CIS map that emerged from the four groups included 45 actors, 12 support services and functions and 18 external environment (economical, political, social and cultural) factors (see Annex 2 for the maps).

At the national workshop, a male and a female farmer both shared their experience with CIS. These farmers had participated in the empowerment and CIS mapping process at village, commune, and regional levels prior to coming to the national workshop. Their presentations highlighted the CIS dissemination channels, how they use CIS, and how applying CIS helped them improve their production and thus their livelihoods. They highlighted the intermediary actors involved in CIS dissemination in their communities, and they also shared their perceptions of challenges that need to be addressed to make the CIS system more efficient.

After these presentations and the small group mapping, the participants were organized into five thematic groups (farmer end users, projects and programs, research institutions, government institutions, and communicators/media) to reflect on the identified opportunities, analyze their importance and prioritize them. Each group's results were then shared in plenary and a comprehensive list of priorities was established (see Table 4 below). The farmers, both male and female, had been well prepared during the empowerment phases at the village, commune and regional level and contributed strongly to formulating recommendations to improve the CIS system.

Following the national mapping workshop, one of the journalist participants worked with the CISRI team to create a newsletter to share actors' testimonies of their involvement in the CISRI project and their perceptions of the CIS system. The actors talked about how the systems mapping will help them improve their intervention strategies in CIS. The newsletter will be shared with all actors.

ANALYSIS

Challenges and opportunities in the CIS system

A number of challenges and opportunities were highlighted during the CIS system mapping workshops. It is not surprising that many of these challenges align with challenges cited in the research that has been conducted on CIS. This methodology is not intended to uncover new challenges, but to help orient actors to the challenges within their own system, to help actors see the challenges from each other's perspectives – including end user perspectives – and to help them decide on what steps they can take at their respective levels to address those challenges. The following is a summary of the main challenges and opportunities that were identified, and prioritized by the group at the final workshop.

Smallholder farmers who participated in the village and commune level mapping workshops reported that weather forecasts influence their decisions regarding crop choices. They recognized the need to adapt crop varieties to climate forecasts and diversify crops to better cope with climate variability. Spatial precision in forecasts is, however, one of the main constraints according to farmers, as well as timely access to information, especially for pre-season forecasts. Farmers suggested that annual workshops should be organized before the first rains to share

this information. They also said that the inadequate number of relays, particularly for remote villages and for women, poses another constraint.

Access to CIS appears to be project-driven: in communities targeted by projects, lead farmers and relays receive information and have the opportunity to collaborate with technical services such as SDDR and ANCAR. However, farmers in communities not targeted by projects often do not receive the CIS. During the workshops, they expressed the desire to participate in such projects, and were aware of and convinced of the usefulness of CIS. Many villages do not receive assistance from agricultural technical services or CIS projects to help them master climate information use.

Women remain relatively marginalized in the CIS system. Despite the existence of multiple intermediary projects diffusing climate information, women's main access to climate information is limited to radio and word of mouth as reported in villages such as Darou Wolof, Médina Sy and Keur Omar Daga. They rarely receive training in how to use CIS in their farming activities despite a few positive examples of projects reaching women with this information.

During the village and commune level CIS mapping workshops, farmers identified their lack of information on dry periods during the season as one of the main issues in the CIS system. To adapt to these dry periods, some farmers grow sesame (*Sesamum indicum*), a crop that is resistant to water-stress in the face of short or long rainfall gaps. This adaptation strategy is based on farmers' empirical experience but also on recommendations from technical service agents (SDDR and ANCAR) during community radio pre-season programs. The farmers think that seasonal forecasts should come with advice on crop varieties that are adapted to topography and soil types in the different areas. However, they also reported that access to quality seeds that match the CIS advice is limited and they receive the seasonal forecast too late, by which time decisions regarding seed variety and seed purchases have already been made.

Farmers mentioned the lack of climate information at the end of the rainy season as another issue. For example, wind is a weather parameter that ANACIM produces daily and that is useful for post-harvest tasks, especially groundnut and millet winnowing. Wind information dissemination could also help farmers prevent brush fires that are frequent in the Kaffrine region.

Traditional seasonal climate forecasts are also still important. Many farmers consider the Saltigues forecasts that they receive through community radio and television. Observations from environmental indicators are also used.

Another constraint raised by farmers was the language used for CIS dissemination, with written messages and radio announcements usually in French, and the use of technical terms that may be misunderstood. Farmers receiving SMS alerts from ANACIM by phone mentioned language as a blocking factor. Most smallholder farmers who participated in CIS mapping cannot read French and had to have the messages translated for them to understand their content. Some of the population is educated in Arabic or literate in Wolof, so climate information dissemination in French is difficult to understand and use. Farmers recommend using voice messages in Wolof and other local languages.

While relays were recognized as an important source of CIS, farmers also highlighted some issues in terms of relays not having enough time to share information with everyone. Women farmers in particular highlighted the insufficient number of relays and the need for female relays. As climate information is mostly disseminated during the fieldwork period, it is difficult for one relay to go around all village farms to inform farmers.

Challenges and Opportunities Identified at Village, Commune and Regional-Level

As described above, during the participatory CIS mapping workshops at the village and commune level, smallholder farmers discussed challenges that, in their opinion, make the CIS system inefficient, as well as suggestions for how to improve the CIS system. Overall, similar challenges and opportunities were identified in village and commune level workshops (Table 2). Village and commune level workshops were used not only to map the CIS system with farmer end users, but also as part of the empowerment stage to build capacity and prepare the farmers to share their perspectives with other actors.

The objective of the regional CIS mapping workshop in Kaffrine was to strengthen actors' understanding of the CIS system through participatory CIS mapping and discussion of its challenges and opportunities, as well as to empower actors to express their perspectives related to the system in a wider group. The workshop took place on February 7, 2018 with the participation of 40 stakeholders, including the Kaffrine Deputy Governor in charge of Development; government agencies (SDDR, DRDR, ANCAR, PAFA-Extension); implementing non-governmental agencies (PASA-Loumakaf, DFC); local officials, representatives from community radio stations (Pakala FM, Bambouck FM and Kaffrine FM); male and female farmers; and farmers' associations. After mapping the CIS system, participants analyzed the challenges linked to climate information dissemination and the opportunities to improve the CIS system. Table 2 organizes the constraints and opportunities at village/commune (V/C) and regional (R) level as they relate to access to CIS, the quality of the CIS, and the uptake and use of CIS.

TYPE	#	LEVEL*	CONSTRAINTS
Access	1	V/C	Inappropriate language use for climate information dissemination
		R	Challenge for farmers to understand technical terms used by ANACIM in forecasts
	2	V/C	Insufficient number of relays to facilitate climate information dissemination
		R	Insufficient number of relays and insufficient women's involvement in the climate information dissemination system
	3	V/C	Poor phone network coverage in many villages
	4	R	Climate information dissemination on the radio at inconvenient times and languages for farmers
	5	R	Difficulties mobilizing technical services to facilitate awareness-raising programs on community radios
6	R	Lack of workforce, logistics and financial means in technical services	
	7	R	Disparities between districts in access to CIS
Quality	8	V/C	Information deficit on CIS at end of the rainy season
		R	Difficult access to CIS after the rainy season for post-harvest climate information needs
	9	V/C	Lack of knowledge of dry periods during the rainy season
	10	V/C	Lack of precision on inter-month rainfall variability (rainfall distribution)
Uptake and use	11	R	Low level of guidance for <u>end users</u> by technical services
	12	V/C	Lack of training for women on climate information use
	13	R	Lack of CIS ownership by <u>end users</u>
	14	V/C	Very limited access to land for women due to men's monopolization of good land
	15	V/C	Difficult access to seeds that are adapted to the seasonal forecasts due to delayed availability-and lack of financial means to obtain them
	16	V/C	No scaling up of climate adaptation test fields to allow <u>farmers</u> from other communities to benefit

Table 2. Summary of CIS-related constraints and opportunities identified at the village/commune and regional-level workshops

TYPE	#	LEVEL *	OPPORTUNITIES
Access	1	V/C	Disseminating CIS in Wolof for voice messages, radio and TV
		R	Disseminating CIS by voice messages in local languages (Wolof) with simplified terms
	2	V/C	Increasing the number of relays, including women relays, and strengthening capacity on climate change/CIS
		R	Increasing the number of relays, especially women, for better gender sensitivity in resilience
	3	V/C	Improving phone network coverage to better receive CIS
	4	R	Adapting CIS radio broadcast times to farmers' break time (between 7-9 pm)
	5	R	Facilitating collaboration between technical services and community radios
	6	R	Involving all districts in the Kaffrine region in the same way
	7	R	Putting in place a flat rate contribution mechanism for farmers for continuous CIS access
8	R	Strengthening technical service logistics, human and financial resources for efficient local interventions	
Quality	9	V/C	Providing forecasts and information on predicted dry periods and their duration
	10	V/C	Providing information on inter-month rainfall variability to help decision-making
	11	V/C	Providing CIS on wind and other indicators at the end of the rainy season
Uptake and use	12	V/C	Strengthening women's capacities in the use of CIS for agricultural production
		R	Sensitizing and training end users on CIS and publicizing farmers' experiences in CIS use
	13	V/C	Scaling up climate adaption test field experiences and providing better extension services
		R	Reinforcing farmer guidance and increasing the number of agricultural advisors
	14	V/C	Facilitating women's access to land and good practices for agricultural land rehabilitation
	15	V/C	Providing agricultural advice on varieties that are adequate for the soil types and promoting short-cycle varieties
	16	V/C	Agricultural credit institutions facilitate credit access and are involved in CIS

*V/C=village/commune; R=region

At the village and commune level, participants perceived most constraints to do with CIS quality and uptake and use (7 out of 10). They identified 3 specific improvements in quality that are needed (table 2), whereas at the regional workshop, none of the proposed solutions had to do with quality. At the regional workshop, most of the constraints identified had to do with access to CIS (6 out of 9).

Three constraints were identified at village/commune level and at regional level. These are:

1. Inappropriate language use for climate information dissemination / challenge for farmers to understand technical terms used by ANACIM in forecasts.
2. Insufficient number of relays to facilitate climate information dissemination (village level further specified insufficient women's involvement in the climate information dissemination system).
3. Information deficit on CIS at end of the rainy season and after the rainy season for post-harvest climate information needs.

Four solutions were identified at village/commune level and at regional level. These are:

1. Disseminate CIS in Wolof by voice messages, radio and TV with simplified language.
2. Increase number of relays, especially women relays, and strengthen their capacity on climate change/CIS for resilience.
3. Strengthen end users' capacities (especially women's) in the use of CIS for agricultural production and share farmers' experiences.

4. Provide better extension services: increase number of agricultural advisors, scale up climate adaption test field experiences, reinforce farmer guidance.

Challenges and Opportunities Identified at National-Level

At the national CIS mapping workshop held in Dakar on March 14, 2018, stakeholders discussed constraints and opportunities after mapping the CIS system (Table 3). Some constraints are specific to a category of actors; for example, CIS end-users, intermediary actors, or the CIS producing agency (ANACIM). Workshop participants discussed opportunities to address these constraints, and prioritized the opportunities, voting for those they thought were of highest priority. The column on the right of Table 3 lists the prioritization results and shows four general priority groups based on the number of votes received. The process for prioritizing the opportunities did not capture who prioritized which opportunities, nor did a prioritization process or a discussion of priorities happen during the village and commune mapping workshops. These weaknesses have been noted in the recommendations section below, since being able to see how the different groups view the challenges and opportunities could provide useful information to participants and facilitators as they work towards changes in the system and take ownership over planned actions.

Description of constraints	Description of opportunities	# Votes
Lack of funding for relays and radios	Adapting dissemination languages to local languages	13
Challenges regarding local language information dissemination; technical nature of forecast terms	Using Regional Food Security Council (CRSA) for actor synergy and coordination	13
	Climate service management through national policies	13
Lack of synergy between CIS programs and lack of understanding of roles and responsibilities	Making climate information system sustainable	13
	Women's empowerment and better involvement in climate information dissemination	12
Poor project/village or producer targeting	Sensitizing politicians to climate information considerations in budget planning	11
ANACIM budget constraints related to climate information provision	Voice messages in Wolof and text messages in French/ message dissemination platform for relays	10
Lack of political will	Making climate information understandable (use of more user-friendly terminology)	10
Insufficient local and state authority involvement	Build political will for information use ownership	10
Insufficient agricultural funding/ insufficient resources for technical guidance for smallholder farmers	Increasing the number of female relays/ strengthening women's capacity and ensuring equity in the number of relays	10
	Creating action synergies at the level of the climate change platform (C-CASA) actors	9
Lack of producer training on climate information use	Scaling up the climate adaptation test field method and disseminating/publicizing results	9
Poor relay capacity to ensure training/ dissemination	Promoting national climate information framework operation	8
Radio and TV not always available + lack of electrical power	Reinforcing ANCAR's role in information system	8
Timing of radio program broadcast when farmers are not available	Inclusion of seed providers in the climate information dissemination chain	8
Delays in climate information for end users	Training Farmer Organizations on climate information use	7
Insufficient resources for relays to function	Improved local government involvement	7
Insufficient forecast on rainy season start, dry periods, and end	Putting in place a harmonization framework with ANACIM involvement	5
Lack of female leadership	Sensitizing local governments to the integration of climate information into planning	5
No integration of gender in climate information dissemination	Server at ANACIM	3
	Projects working with ANICIM	3
	Involving imams and women's groups in climate information systems	3
	Simplifying very technical terminologies	2
	National climate service framework – decree already signed	1
	Making gender policy on land access more efficient	1
	Involving women's organizations in climate information disseminations	1

Table 3: Identification of constraints and opportunities and prioritization of opportunities for the CIS system at national workshop

Presentation and analysis of Kumu digital mapping

During the participatory CIS mapping process, the mapping was carried out using cards and flip chart paper. To organize and better visualize the data and enable the team to combine and compare maps from different villages and communes, the online software Kumu ([linkhttps://kumu.io/](https://kumu.io/)) was used. All individual maps created by village and commune-level groups (men and women) and regional and national workshop participants were recreated in a digital format. Using Kumu helped to visualize the connections between actors within the map. To better appreciate farmers' perceptions according to gender, men's and women's maps at the village and commune levels were compared, merging together the men's village and commune maps and the women's village and commune maps. This helped identify the most influential actors in the CIS village and commune level system for men and women. Looking at the individual maps from each village and commune also revealed differences and similarities among them (see Annex 2 for examples of Kumu maps and pages 20-21 for more discussion of these differences and similarities).

Combining maps helped identify differences between male and female CIS users and village and commune perceptions. There are on average 7.7 actors at the village level and 10.2 actors on the commune level, showing a higher complexity within the system when involving commune actors along with farmers in the mapping exercise. The main actors identified by men in villages included: ANACIM, community radios, relays, male and female farmers, Saltigues, ISRA, and ANCAR. For women, these actors are also among the most influential within the climate information dissemination chain, in addition to the PASA-LouMaKaf project and UCEM.

The Kumu maps show that men and women listed a similar number of factors related to the external environment at the village level. There are, however, large disparities between villages in terms of the number of factors listed. This variation indicates a difference in CIS system knowledge among women, with villages that had strong women's groups trained in CIS developing more detailed maps. Combining maps developed by men at the village level shows that the main external environment factors for the CIS system are: the existence of pluviometers; the presence of relays; the existence of test fields; and access to community radios. The factors more often listed by female farmers were telephone network coverage, social cohesion and the existence of women's groups in villages, and access to community radios.

There were no significant gender related differences in the types of support services mentioned, except for the mosque, cited by men in the Daga Birame village, and the Internet, cited by men in the Ndiognick commune.

When individual maps from villages or communes are merged together, Kumu depicts the various actors using circles that are proportionally sized based on how often the actor or the factor had been mentioned in the individual maps. This helps the team with analysis. For example, looking at the merged commune maps, the size of the circle for relays is larger for the men's merged map than for the women's merged map, indicating that more men's groups included relays in their maps. Across all villages, for women, ANACIM, relays, and Saltigues were most frequently mentioned as key actors, while men at village level cited ANACIM, relays, and radio journalists, indicating that radio may potentially be accessed more by men than by women. Due to the limited number of villages included, broad assumptions should not be made, and the facilitated discussion during each workshop provides more detailed understanding about the different map elements, but the Kumu maps are useful to support the analysis and can shed light on connections between actors that may not immediately be apparent when looking at individual flip charts.

Another benefit of the Kumu maps is that when using the software, it is possible to click on each actor and see how they are connected to others. This interactive feature is particularly useful in complex maps where there are many arrows and it is difficult to see the connections in a print or PDF version. Clicking on ANACIM, for example, will highlight all of the actors that ANACIM directly connects with. PDF versions have also been created and are provided in Annex 2.

METHODOLOGY IMPLEMENTATION & LESSONS LEARNED

Usefulness of CIS mapping and CISRI approach for actors

Participants found the participatory mapping to be a relevant exercise that informed them of other actors intervening in the CIS system, with particular appreciation for the inclusion of farmers' perspectives. Many actors had a very limited understanding of the CIS system to start with, but through the mapping process, they could get to know other actors, understand the connections between them, identify bottlenecks and, most importantly, reflect jointly on opportunities with the other participants. This is reflected in how the maps evolved from village workshop maps that included only a few actors, to more actors in commune level maps, and even more at regional and national level workshops. This is not to say that only farmer perspectives grew over the course of the pilot; even CIS producers and intermediaries evolved their perspectives of the system by meeting representatives from projects that they didn't previously know and hearing from end users about the ways that they received and used the information.

According to participants, the participatory approach used by CISRI was very engaging. Farmers were able to participate actively in discussions and share their challenges in the presence of the main CIS provider in Senegal (ANACIM), intermediaries (projects, programs, radio stations) and government technical services. During the mapping workshops, participants realized that the climate information dissemination chain is long. As the information needs to be acted upon within short timeframes to make decisions, participants identified addressing inefficiencies in the chain as a top priority during the national CIS mapping workshop. They recommended working to simplify the dissemination chain so that end users can have access to the information in a timely way.

Lessons learned in pilot implementation in Kaffrine

The main lessons learned during the CISRI project implementation in Senegal include:

- The questionnaire and guide used for village and commune workshop facilitation was adapted from that used in the Niger pilot. It was adapted for the context in Kaffrine and shortened based on recommendations from the Niger team.
- At the end of each empowerment and CIS mapping workshop, facilitators asked participants to evaluate the CISRI facilitation approach and their understanding of the project and its objectives. These assessments helped the team document experiences and adjust to improve the next workshops. For example, many farmers suggested that facilitators provide more information on the causes and manifestations of climate change. These suggestions helped reinforce explanations during empowerment activities at the village and commune level.
- The participatory approach used and the ease with which workshops were facilitated built participants' confidence and encouraged them to get involved. This involvement was

reinforced by sharing of experiences among farmers that attracted much interest from the participants.

- In villages, all smallholder farmers spoke Wolof, despite some being from the Serer or Fula ethnic groups. For this reason, all discussions took place in Wolof. To facilitate farmers' understanding and participation in the mapping, facilitators used different approaches depending on the village context. In one village, all group members had been to Koranic school and could write in Arabic, thus they decided to use Arabic to draw their map. In other villages, participants wrote in a mixture of French, Wolof or Arabic while the dialogue continued in Wolof, and in other villages facilitators and participants used symbols to represent the actors on the map. This flexibility to adapt the implementation to the context ensured involvement of all participants regardless of literacy level.
- The strong male (6) and female (3) farmer delegation at the national workshop was considered an inclusive approach. Although some of the farmers had difficulties expressing themselves in French, facilitators made sure they understood the discussion and provided translation if they preferred to express themselves in Wolof.
- There are multiple actors in the CIS system, but synergy across projects is lacking, with projects acting independently of what already exists rather than collaborating effectively. This came out as a key area for further work during the workshops.
- CIS programs such as CINSERE and DFC report that their participation in the national workshop helped them confirm assumptions from their monitoring and evaluation activities on women's participation in climate information dissemination.
- Manobi, a firm providing integrated information system services working in index insurance, in collaboration with CNAAS, stated that its participation in the national CIS mapping workshop helped them realize that there are potential opportunities in the CIS system. A Manobi representative stated: "We have discovered a new potential market and we will analyze how to adapt our business model." Interestingly, while Manobi participated in the national workshop, private sector actors in CIS had not been discussed in the previous mappings at village, commune or regional level. This remains an area for further development.

CONCLUSION AND RECOMMENDATIONS

The CISRI project successfully implemented a participatory CIS mapping methodology that brought together multiple actors to improve understanding of the CIS system and identify practical opportunities to improve it. The mapping exercises revealed numerous factors that support or limit access to and efficient use of climate information by smallholder farmers. While the challenges themselves are not necessarily new or surprising, the engagement with all actors together within the system for the first time allowed for a deep exchange that has the potential to catalyze meaningful change.

Participants at village, commune, regional, and national level mapping workshops identified opportunities to make the CIS system more efficient. The CISRI systems mapping methodology was considered innovative by several CIS partners, as they expressed that it can help them address challenges they are facing in project implementation and readjust their interventions.

Outcomes from the participatory CIS mapping workshops included recommendations for actions that participants felt were necessary to improve the system. At the national-level workshop, participants recognized which actions they themselves could take to address these recommendations. Several of these are summarized here.

Farmer participants identified ways to improve their use of CIS. They suggested that the climate adaptation test field model be scaled up. This model includes CIS access and use along with the promotion of other climate smart agriculture practices. This suggestion was raised at village, commune, regional and national mapping workshops. Many farmers also appreciated that the mapping workshops helped them to better understand the CIS system in general, to learn from each other, and to meet other stakeholders. Amdiatou Dieng, a farmer from Ndiognick commune, said, “These meetings helped me to get to know other climate information actors...we shared and came up with different pathways to solutions.” Overall, farmers expressed that they were able to present their perspectives while also acquiring new understanding.

The group of journalists at the national CIS mapping workshop recommended the wide-spread use of interactive radio programs broadcast in the local language to give actors, especially farmers, an opportunity to share experiences of accessing and using CIS, thereby reaching more farmers with CIS sensitization. Community radio stations recognized the need to broadcast forecasts not only in Wolof but also in the other local languages in the area of radio coverage. Through discussions with farmers, they also recognized the need to plan CIS broadcasting at times when farmers are listening, typically in the evening. The Kaffrine region community radio representatives also discussed with partners the need to sign MOUs and partnership agreements to promote the sharing of good sensitization programs on CIS and agricultural practices, developed with CIS resource persons, who they were able to meet during the workshops.

Participants from research institutions such as ISRA also recommended promoting and publicizing the results of climate adaptation test fields that have applied CIS in cropping decisions. They suggested policy briefs and fact sheets in an accessible format. They also suggested that research partners can support improving the system by gathering feedback from CIS end-users to improve understanding of CIS impacts on livelihoods and decision-making.

Government and other leadership actors came up with a number of actions relevant to their roles to improve the CIS system. These include the need to consider CIS when defining national policies related to agriculture and climate change adaptation. To accomplish this, they suggest awareness-raising efforts for decision-makers, such as Government, Congress, and Economic, Social and Environmental Council members, to involve them in promoting a more efficient CIS system to serve end users. They also suggest advocating with local officials for their involvement in the CIS system.

The government stakeholders also highlighted the need to provide ANACIM with sufficient human, financial and material resources to assist CIS actors at a larger scale. These stakeholders also mentioned the need for Public-Private Partnerships (PPPs) for end users to have effective access to climate information at a minimal cost (low user or subscriber flat rate contributions). The National Food Security Council Executive Secretariat (SE-CNSA) suggested during an interview following the national workshop that PPPs are one way to improve the sustainability of CIS.

Overall, stakeholders appreciated the participatory CIS systems mapping methodology and felt that it provided a framework for collaborating to identify challenges and solutions for the CIS system in Kaffrine. They appreciated the opportunity to meet and engage with each other, hear each other’s perspectives and find common ground in the suggestions to improve the system.

Actors expressed how useful it was to have all stakeholders together at the final workshop, from local to national levels, and especially to hear farmers' perspectives. For example, Kader Toure, from the Agriculture Directorate and Ministry of Agriculture and Rural Development, said, "It is a new approach that we are not used to; the actors themselves participated in the diagnosis of strengths, weaknesses and constraints.... This [mapping] approach also helped decision makers understand actors' common conceptions of issues related to climate change and how to find appropriate solutions."

Recommendations and perspectives on improving the methodology

As described above, the methodology was seen as a useful and positive approach to engage end users along with other actors in the CIS system to identify areas for improvement; however, in reflecting on the pilot, the CISRI Senegal team provided feedback on the methodology and process that will be used to inform the final versions of the methodology guidance documents. These observations are summarized here.

During the entire process, having a team with good facilitation skills to gain the participation and interest of stakeholders was key, as well as flexibility to adapt when challenges arose. Adapting the methodology to each context, considering socio-cultural realities, is also important to the successful participation of all stakeholders.

One recommendation for future uses of this methodology is that the challenges and opportunities that are identified during the mapping be prioritized more systematically. While the national mapping workshop prioritized the opportunities, information was not captured on who prioritized what, and a more in-depth discussion on these priorities was not held. In addition, it would be helpful to include prioritization activities during village and other mapping workshops to better capture participants' perspectives on what should be prioritized first, or which actions, if addressed, are seen to have the ability to reach the greatest number of people. Other criteria for prioritization may also be explored. Such prioritization exercises could also help feed into stage 5 to help orient follow-up activities with different stakeholder groups who may be prioritizing different solutions across the system.

Knowing who prioritized which opportunities could also help broaden actors' perspectives on what is seen as important; for example, whether men and women identify the same priorities, or how national level actors and end users' perspectives differ or are similar on which priorities to address first. Furthermore, identifying these different views on priorities can help actors to see from others' perspectives and work together, while also helping to orient action planning around improvements to the system that each actor group may be able to address.

Another recommendation from this pilot would be to capture youth perspectives. While separate groups with men and women allowed for dynamic exchanges, and when brought together, helped men to understand more clearly the challenges faced by women, youth perspectives were not specifically sought out. In the future, practitioners using this methodology could make a concerted effort to identify youth perspectives on the CIS system and include youth voices in the workshops from village to national levels.

Since this pilot was short-term, stage 5 activities were very limited. Unlike the first Niger pilot, where the CRS-led BRACED SUR1M project was able to follow up with certain stakeholders after the end of the pilot and carry forward changes to the system for a more sustainable diffusion of CIS to farmers, the Senegal pilot did not have such a connection to a project which could continue to monitor the process after the national level workshop. The Senegal pilot attempted to engage "Champions" and involve projects such as those led by Oxfam, IED

Afrique, ISRA, WFP and others in order to stimulate the work on stage 5, but these efforts would be more effective if there was a clear plan and resources in place, which this pilot was unable to do. Longer-term engagement on stage 5 is not possible in the context of a six-month project; one needs to be able to follow through several agricultural seasons to give stakeholders opportunities to put changes in place and monitor those changes over time for continued improvement. The team considers that the methodology would be most useful where resources are available to follow stage 5 through to support actors in making the identified changes to the system. Another potential way to use the methodology would be to start with stages 1-4, using the participatory engagement of stakeholders in analyzing desired change to inform the design of funding proposals for longer-term engagement programming on stage 5.

The Participatory CIS Systems Development methodology was adapted from Practical Action's Participatory Market Systems Development (PMSD) methodology. The idea behind this was that CIS systems could be improved using similar participatory tools and mapping exercises that bring together all stakeholders, including end users, who can be empowered to contribute their perspectives to the process of change. Overall, the adaptation of PMSD to a CIS system context worked well, with stakeholders appreciating the participatory nature of the methodology. CIS producers and intermediaries often express that they want to include end user perspectives; this methodology provides one way to do that. End users have much to contribute, and these pilots demonstrated that their participation can help instigate ideas and momentum while providing a "reality check" to other actors.

While the PMSD adaptation for CIS systems has shown promise in these pilots, not everything has been directly transferable from the market systems to CIS systems. For example, there is typically a demand-driven interest to improve a market system, which can provide momentum for change. In CIS systems in many SSA countries, there is still limited demand for CIS, so these "pull factors" for more efficient systems are less of a motivator than they could be in market systems. Stakeholders must identify other motivations to improve the system beyond user demand. Additionally, in a market system, relationships between individuals may, in some cases, be more direct, meaning that improving some connections between individuals could have a large impact on improving the system as a whole. In contrast, a CIS system may be more complex, with multiple institutions and funders involved, and more complicated information being transmitted. In either case, having people involved who champion the change at all levels is necessary for long-term improvements to the system.

ANNEXES

Annex 1. Photos of workshops

Annex 2. Figures of Kumu maps

Annex 3. Questionnaire and guide used for local level workshops:

Annex 4. List of participants at the national CIS mapping workshop

ANNEX 1. PHOTOS OF WORKSHOPS



Photo 1: Empowerment session with the Keur Moussa Ndiaye village farmers



Photo 2: Discussion after the empowerment and CIS mapping with men in the Ndiognick commune



Photo 3: Empowerment and CIS mapping with women in the Ida Mouride commune



Photo 4: CIS mapping at the national Senegal workshop in Dakar



Photo 5 (above) and 6 (below): National workshop participants prioritize the identified opportunities



ANNEX 2. KUMU MAPS

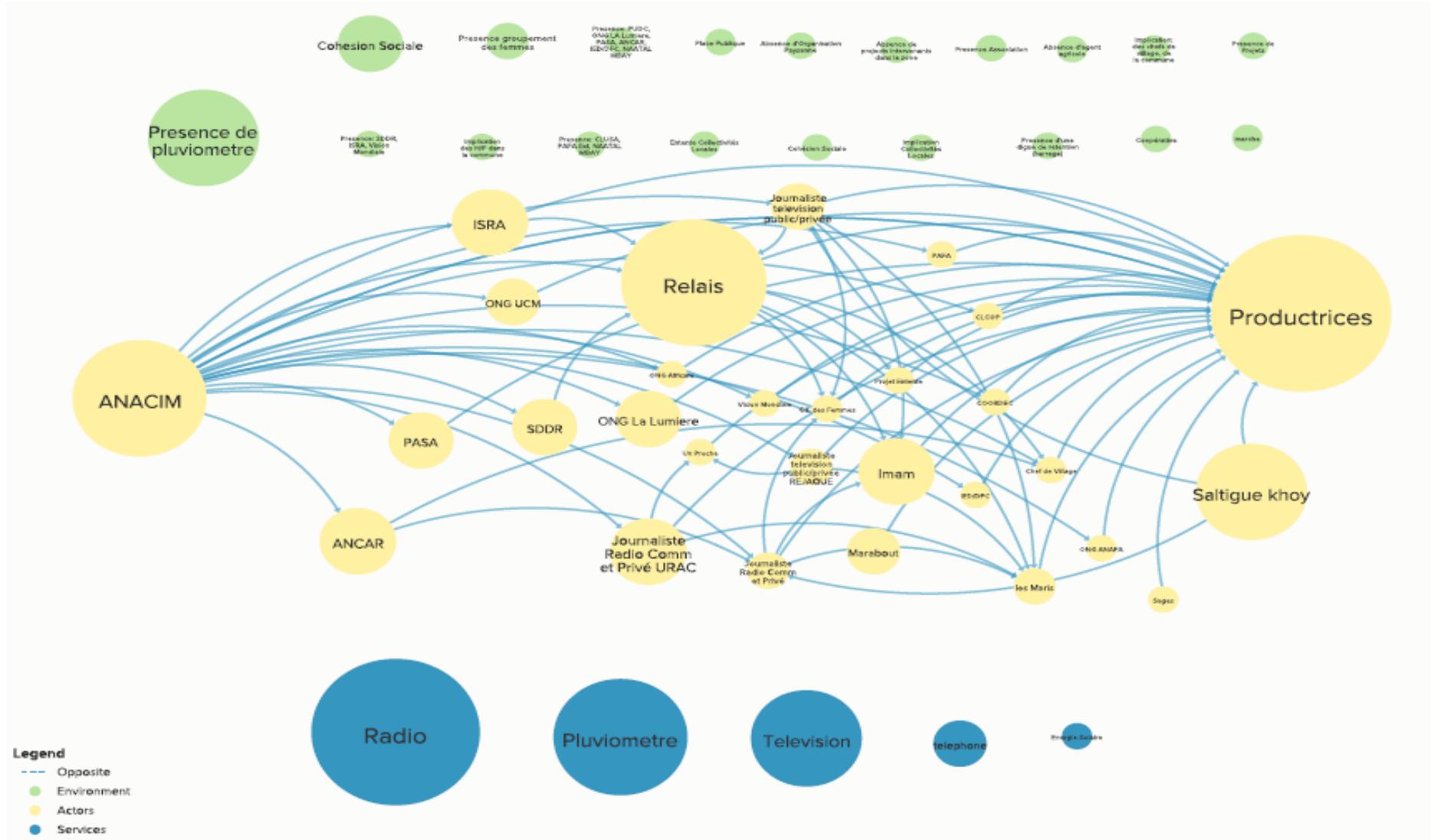


Figure 1. Kumu map of combined village level women’s maps

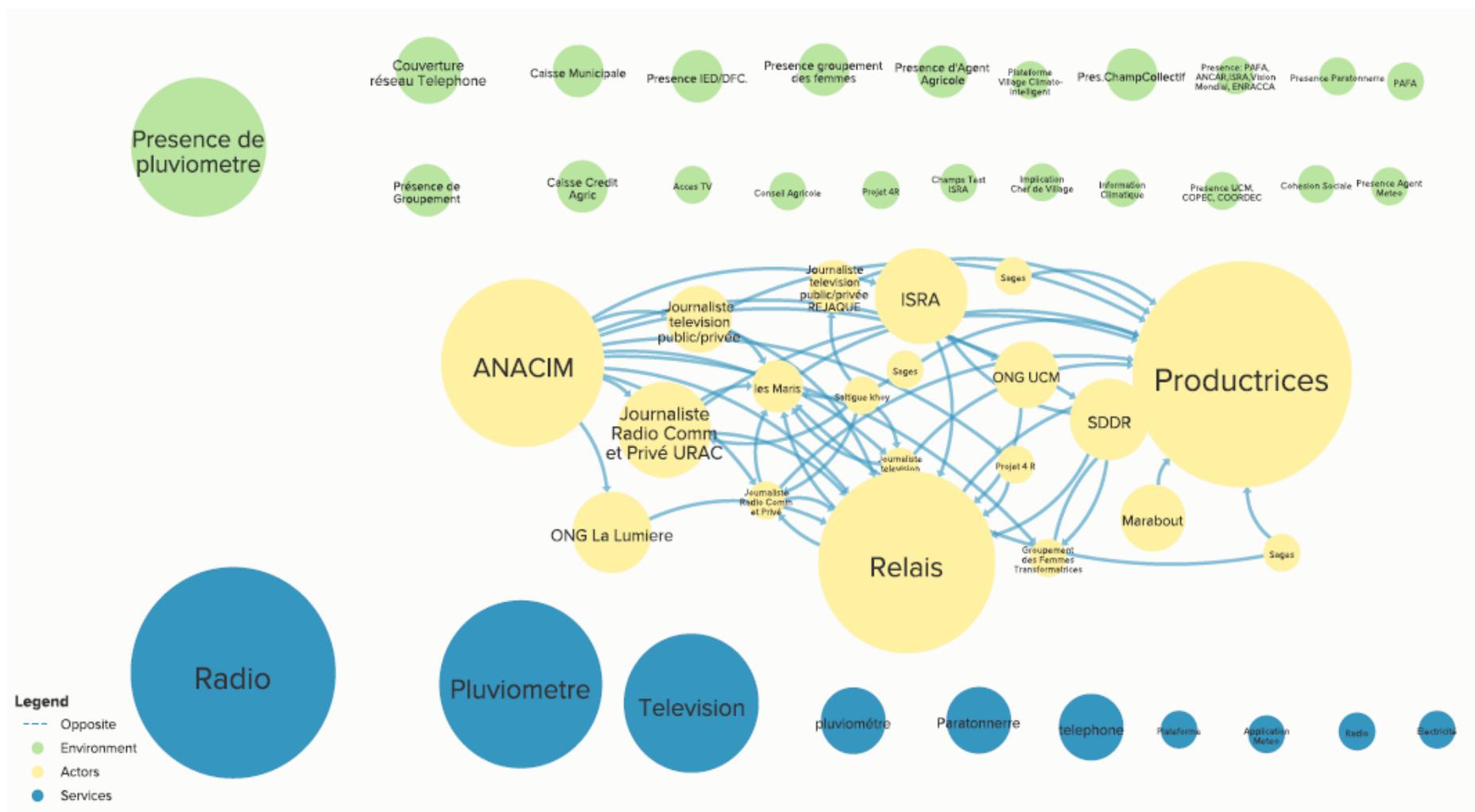


Figure 3. Kumu map of combined commune level women’s maps

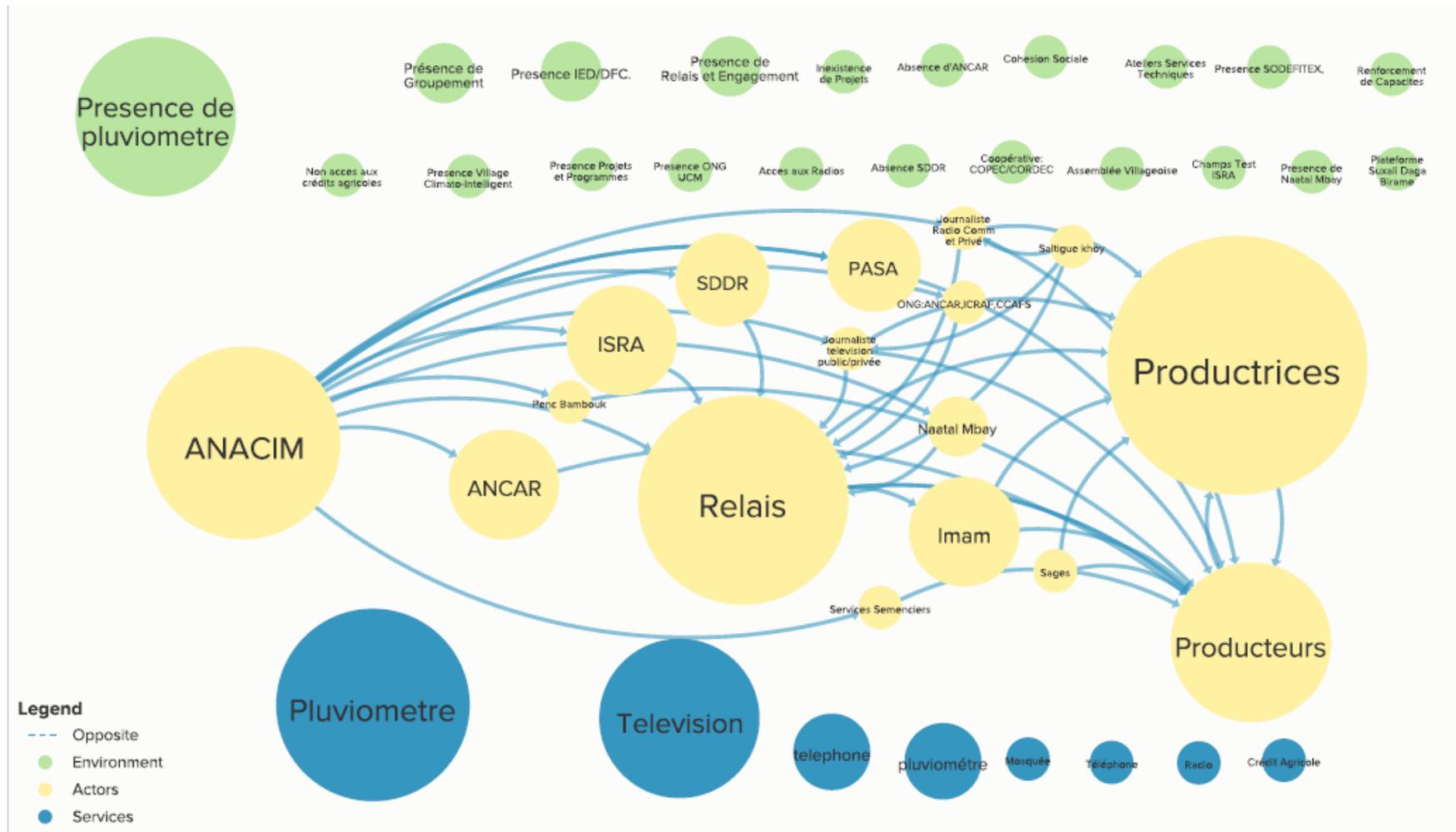


Figure 4. Kumu map of combined commune level men's maps

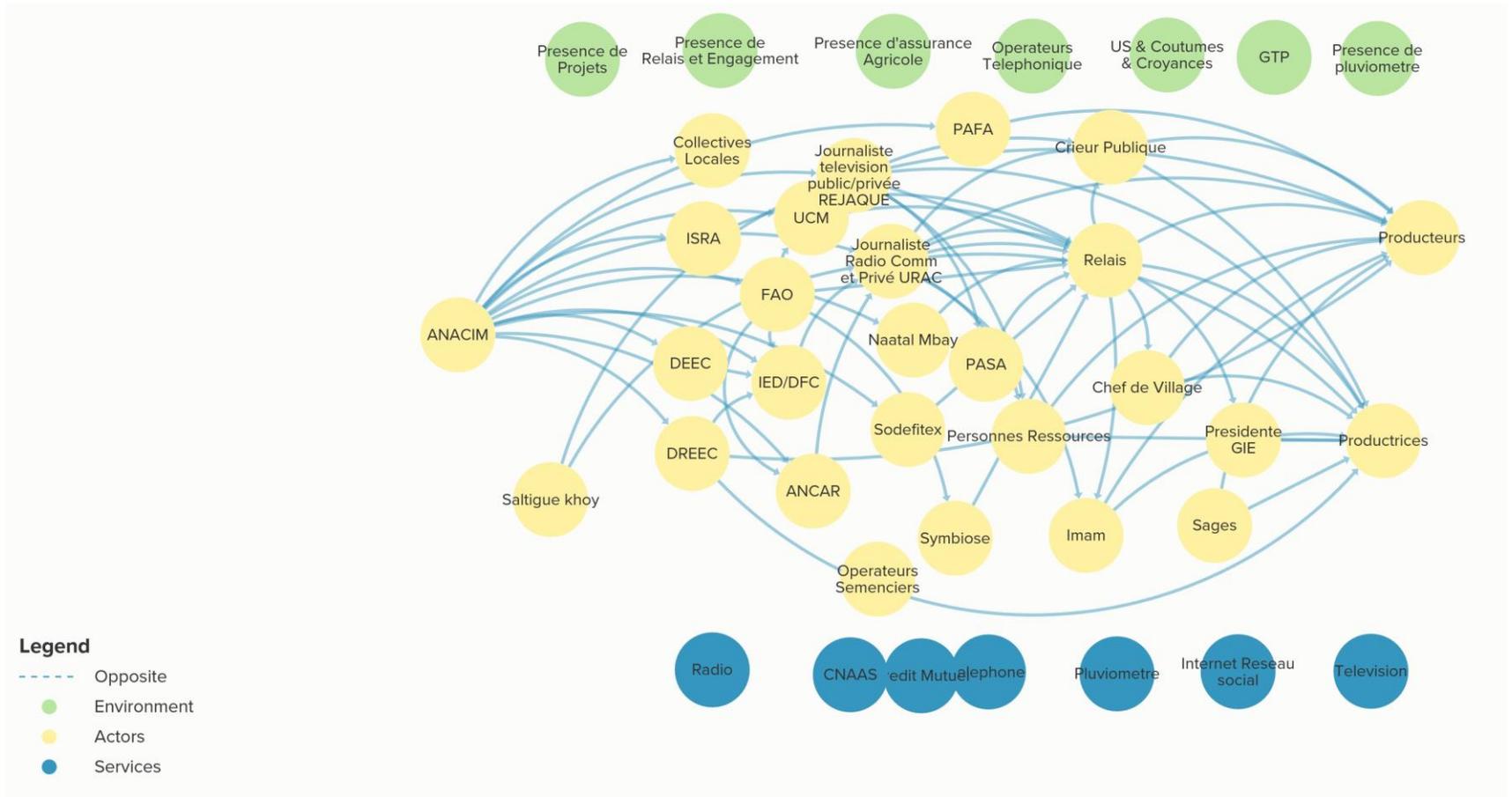


Figure 5. Kumu map of Kaffrine regional level map

ANNEX 3. QUESTIONNAIRE AND GUIDE USED FOR VILLAGE-LEVEL WORKSHOPS

Date:

Village:

Introduction

Presentation of the CISRI project and its objectives

A. Questions during mapping

1. For rain-fed agriculture, what are men's agricultural speculations? Women's?
2. What are the environmental indicators and local knowledge you rely on for climate forecasts (e.g. animal behavior, appearance of vegetation)?
3. What projects are active in your community in the area of rain-fed agriculture?
4. How many of you receive climate information through a project? Which project?
5. What are the types of climate information you receive?
6. What are the means through which you receive this climate information?
7. What role do village leaders (village chief, Imam) play in climate information communication?

B. Questions at the end of mapping

1. What are the challenges linked to climate information reception means?
2. What is the most useful climate information?
3. What is not useful? Why?
4. How did this information impact what you do? If you do not do anything, why?
5. Once you have received climate information, what actions do you take? (e.g. buying early varieties, where do the means/services come from)?
6. What are the main climate hazards you are facing?
7. What are the impacts of these climate hazards on rain-fed agriculture?
8. Thinking about the main climate risks you have identified, do you think that the climate information you are receiving is appropriate to your needs?

C. Reflection on challenges, opportunities and responsibilities

- Is the climate information you receive accurate/reliable?
- Is it received timely and in an accessible language?
- What are the safest climate information dissemination channels?
- What other types of climate information would you want to receive, apart from the ones you usually receive?
- Are you guided by technical structures when choosing crop varieties that are adapted to seasonal forecasts?
- What are some opportunities to address the challenges that were identified?

D. Workshop evaluation:

1. Was the presentation of the CISRI project and its objectives clear?
YES / NO
2. What do you mostly remember about the CISRI project?

3. Were discussions on the CIS issue and the facilitation approach useful for you?
YES / NO
4. How would you rate the CIS mapping exercise?
Interesting *Neutral* *Uninteresting*
5. Do you think that everybody had an opportunity to participate during the workshop?
YES/NO
6. What would you suggest to improve the workshop in the future?

ANNEX 4. LIST OF PARTICIPANTS AT THE NATIONAL CIS MAPPING WORKSHOP

PROJECT CISRI NATIONAL CIS MAPPING WORKSHOP			
	FIRST AND LAST NAME	STRUCTURES	ACTOR CATEGORIES
1	Mamadou GAYE	District Council KAFFRINE	Local government
2	Mohamed Wilane	KAFFRINE FM	Communicator
3	Aby Drame	BRACED/ Enda Energie	Communicator
4	Omar Ndiaye	PAKALA FM	Communicator
5	Issa Toure	NETW. JOURN. CLIMATE (REJAQUES)	Communicator
6	Ousmane Ndiaye	BAMBOUCK FM	Communicator
7	Bacacar Sene	NETW. JOURN. CLIMATE	Communicator
8	Sokhena Guisse	SECSNA	State
9	Idy Niang	Governance/DREEC Kaffrine	State
10	Ndeye Rokhaya Sall	DEEC	State
11	Ousseynou Ndione	DEEC	State
12	Christian Magne Lambal	DRDR	State
13	Mme Oulimata Guiro	PARL. COMMISSION - ECOWAS	State
14	Abdou Kader Toure	AGRICULTURE DIRECTORATE/CCASA	State
15	Abdouramane Gueye	AGRICULTURE DIRECTORATE	State
16	Babou Gueye	ANCAR	State
17	Mamadou Lamine Diop	ANACIM	State
18	Amanda Lewis	CRS	Facilitation
19	Deguene Pouye	CRS	Facilitation
20	Kristine Lambert	Mercy Corps	Facilitation
21	Madior Fall	CRS	Facilitation
22	Mary Alen	PAC	Facilitation
23	Patrick Williams	CRS	Facilitation
24	Simon Sambou	CRS	Facilitation
25	Sokhna R. Gaye	PAC	Facilitation
26	Malick Ndome	OXFAM	Implementers
27	Luc Kafando	MANOBI	Implementers
28	Djadji Ndiaye	DFC	Implementers
29	Yacine Fall	PAM	Implementers
30	Abdoulaye Deme	PASA-LOUMAKAF	Implementers
31	Elhadj Abdou Gueye	NAATAL MBAY	Implementers
32	Ibrahima Samb	Prod.CM. Ida Mouride	Producer
33	Ousmane Thiall	Prod.Daga Biram	Producer
34	Amdiatou Deng	Prod.CM Ndiognick	Producer
35	Mariama Keita	G.F. SIKILO	Producer
36	Backa Cisse	G.P. Diamagadio	Producer

37	Coumba Dieng	Dep. Mayor, Prod.	Producer
38	Malick Drame	Prod.CM Missirah	Producer
39	Adja Awa Diouf	Cons, Prod. Ass. Presi.	Producer
40	Serigne Bassirou Niang	Prod. Keur Moussa Ndiaye	Producer
41	Thierno Daouda BA	President. Bambaaré	Producer
42	Diamilatou Sanogo	ISRA/CNRF	Research
43	ISSA Ouedraogo	USAID/CINSERE	Research