



AUDA-NEPAD
AFRICAN UNION DEVELOPMENT AGENCY

Enhancing social inclusion and gender transformation in agricultural extension through effective and targeted communication

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About AUDA-NEPAD

The African Union (AU) Development Agency-NEPAD (AUDA-NEPAD) is Africa's first-ever continental technical and development agency. The foundation of AUDA-NEPAD is built on the New Partnership for Africa's Development (NEPAD) that was established as Africa's continental renewal and development programme by the AU in 2001 and championed through the then NEPAD Secretariat, based in Midrand, South Africa. The NEPAD vision represented a common pledge by African leaders to eradicate poverty and foster Africa's sustainable economic growth and development through the promotion of regional and continental integration, through the inclusion of Africa in global processes and through the empowerment of socially disadvantaged groups, such as women and children.



About AICCRA

The Accelerating Impacts of CGIAR Climate Research for Africa (AICCRA) project contributes to the construction of an African future that is climate-smart and driven by science and innovation in the agricultural field. It is led by Alliance of Bioversity International and CIAT and supported by a grant from the World Bank's International Development Association (IDA).

AICCRA works to increase access to climate-smart agriculture (CSA) technologies for millions of smallholder farmers across Africa. When farmers have improved access to technology and advisory services they can plan for climate-related events, thereby safeguarding their livelihoods and ensuring food security. However, women farmers and other marginalised groups, do not access the climate information and climate-smart technology and practices to the same extent as men due to entry, structural and systemic barriers. To address this disparity, AICCRA adopts a socially inclusive and gender-transformative approach, working to understand the power dynamics and social contexts that influence the scaling of CSA and climate information services (CIS). Explore AICCRA's work at aiccra.cgiar.org.



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Foreword



Africa is heavily reliant on rainfed agriculture and so the projected changes in climate and weather present an immense challenge in ensuring food and nutrition security. It is within this context that AUDA-NEPAD recognises the critical impact climate change will have on smallholder food producers, particularly women farmers and other marginalised groups and as such has taken proactive steps to support regional and country-level interventions through its Gender Climate Change and Agriculture Support Program (GCCASP), funded by Norad. The GCCASP places special emphasis on empowering rural women, and other marginalised sections of society, enabling them to better cope with the adverse effects of climate change. By closing policy and institutional gaps, building the capacity of women smallholder farmers, establishing and strengthening women's platforms, and investing in the scaling of successful and innovative practices, including climate-smart agriculture (CSA), AUDA-NEPAD strives to foster resilience and inclusivity within African agriculture.

The adoption and scaling of CSA is paramount to solving the multidimensional climate, inclusivity and food security challenge, offering more

resilient, productive, sustainable, and equitable agriculture. Successful CSA requires the timely delivery of accurate, reliable and locally specific climate information for improving smallholder farmers' decision making. However, various barriers hinder the accessibility and uptake of agro-climatic information and knowledge by smallholder farmers, adversely affecting their agricultural productivity, particularly that of women and other marginalised groups. Therefore urgent action is necessary to ensure that climate information and climate-smart solutions are communicated in a strategic, targeted and socially inclusive manner.

This report explores agricultural extension for smallholder farmers, particularly women farmers, with a focus on the effective communication of climate-smart agriculture and climate information services (CIS). Furthermore, it provides valuable recommendations for social inclusivity based on innovative cases. It also investigates a range of communication pathways and strategies for reaching a diverse range of potential beneficiaries, empowering them with the information needed for improved farm-level decision making in the face of climate change. Such tangible actions have the potential to pave the way for a more climate resilient and inclusive agricultural sector, and ultimately a food secure Africa.

H.E Ms. Nardos Bekele-Thomas

CEO – African Union Development Agency (AUDA-NEPAD)



Executive summary

Robust agricultural extension and climate information, and the effective communication thereof, can help to increase the resilience of men and women to cope with the impacts of climate change, to anticipate risks, as well as to increase their incomes and agricultural productivity. However, due to various entry, structural and systemic barriers, women and young farmers, and other marginalised groups, do not have equal access to climate information and related knowledge on climate-smart technologies and practices. To address this disparity, there is a need to adopt more socially inclusive and gender-transformative communication approaches, working to understand the power dynamics, barriers, and social contexts that influence

the scaling of climate-smart agriculture (CSA) and climate information services (CIS) in particular environments. Through the effective and tailored production, translation, transfer and use of climate knowledge and information, women and men's participation in, and potential to benefit from, CSA can be enhanced. Furthermore, the adoption of participatory and inclusive approaches can strengthen the active and meaningful engagement of women and youth in decision making processes, building their agency, and helping them navigate and negotiate opportunities and risks for more sustainable futures.

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Key messages

- Equitable access to climate information services (CIS) and agricultural extension can enhance the inclusion, engagement and empowerment of women and youth in climate-smart agriculture (CSA) for more sustainable outcomes. When given access to climate information and the resources to implement CSA, women farmers are as likely as men to adopt the practices and technologies.
- There are multiple ways to communicate climate information and CSA interventions to farmers, the effectiveness and suitability of which vary with the local context. Different methods are better suited to different environments.
- A number of entry, structural and systemic barriers need to be overcome for meaningful inclusion of marginalised groups in extension services.
- Key actions to overcome the different barriers include conducting user needs assessments and monitoring gender and youth empowerment; ensuring communication materials are suited to women's education and literacy levels and that the content is tailored to their needs; ensuring farmer participation in information dissemination and knowledge sharing; incorporating indigenous knowledge and using local languages, as needed;
- and building the capacity of women and young farmers to access and apply information through training programmes.
- Effective and inclusive CIS is an entry point to encourage strong leadership of rural women, increasing their role in decision making on the farm and enhancing the uptake of new climate-resilient practices. Inclusive CIS and CSA extension can contribute to gender equality by addressing the needs and priorities of both women and men.
- Networks and partnerships with government and non-state actors can be leveraged to advance CIS and CSA communication. This includes working with private sector entities to address barriers to information access and to sustainably deliver knowledge and CSA technologies to farming communities.
- Further research is needed to explore the broader geographic characteristics that influence and hinder local opportunities for access and use of CIS and CSA. These include factors that interrelate with women and young people's agency to access CIS and pursue CSA options, based on their own priorities and abilities. If not addressed, these barriers to CIS access further reinforce marginalisation and climate vulnerability.

Acronyms and abbreviations

AICCRA	Accelerating Impacts of CGIAR Climate Research for Africa
AUDA	African Union Development Agency
CIS	Climate Information Services
CSA	Climate-Smart Agriculture
CSV	Climate-Smart Village
FAO	Food and Agriculture Organization of the United Nations
FFS	Farmer Field School
GDP	Gross Domestic Product
ICT	Information and Communications Technology
NEPAD	New Partnership for Africa's Development
NGO	Non-Governmental Organisation
USD	United States Dollar

Introduction

Climate change presents an enormous challenge to Africa's food security, especially for smallholder food producers whose livelihoods depend on rainfed agricultural production systems. CSA offers solutions to sustainably increase agricultural productivity and farmers' incomes without degrading natural resources, to adapt to climate change and to reduce greenhouse gas emissions where possible. This can be achieved through the adoption of numerous climate-smart practices and technologies, the support of effective enabling environments comprising strengthened institutions, relevant policy frameworks and innovative financing options, and the application of accurate and relevant CIS for informed decision-making.

There is much research and evidence to demonstrate the economic and production benefits that can be realised through access to robust climate information. In Rwanda, for example, farmers that regularly used CIS demonstrated productivity gains of 24%, and income gains of 30% more than the control population (Birachi et al., 2020). In Senegal, farmers with improved access to CIS realised up to 20% gains in income, which was attributed to improvements in land preparation, crop choice, and planting and harvesting dates (Chiputwa et al., 2020). In addition, economy-wide models suggest that the widespread use of CIS, in the form of seasonal forecasts, in Kenya, Malawi, Mozambique, Tanzania, and Zambia can increase Gross Domestic Product (GDP) by an average of USD 113 million per annum (Rodrigues et al., 2016). More recently, in Ethiopia, an improved use of weather and climate services resulted in an estimated 5% gain in GDP (Beyene et al., 2020).

Despite the known multiple advantages of applying CSA at scale, agriculture in most African economies is still characterised by low productivity and poor resilience to climate change. This is partly attributed to the barriers of accessing agro-climatic information and knowledge, as well as other factors related to CIS and CSA uptake and scaling

(Muhanguzi and Ngubiri, 2022). Access to extension services and information, including participation in capacity building and training, leads to a significant increase in the uptake of CSA (Ogisi and Begho, 2023). However, women farmers in particular have exceedingly low levels of access to extension and information, with studies indicating a reach of only 20% (Huyer et al., 2021). This is amplified when intersectionality (e.g. socio-economic class, race, ethnicity, age, religion, and caste) is considered (Dinh et al., 2022). In turn, these disparities in access to information affect the agricultural productivity of marginalised groups, such as young people, and present a missed opportunity for an all-inclusive, economy-wide response to addressing poverty and food insecurity.

Urgent efforts are therefore needed to ensure that extension channels for communicating climate information and climate-smart solutions to smallholder farmers are socially inclusive, reaching all members of farming communities, with a specific focus on access to women and youth. This requires specific efforts to ensure that the dissemination of information is strategic, targeted, and reaches diverse audiences with timely and contextualised messaging. Effective communication involves the exchange of ideas, opinions, knowledge and data so that the message and its purpose are clearly understood. Ultimately it should assist all farmers with identifying climate-related problems, raising awareness, encouraging dialogue, sharing solutions, and influencing behavioural change.

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This report explores social inclusion¹ in agricultural extension with a focus on communication methods for effective uptake of climate information and CSA practices. Different channels of extension are described with their associated learnings and innovative cases of gender and social inclusion are highlighted. Communication pathways

and strategies are investigated for reaching marginalised groups and informing farm-level decision making and the associated advantages and disadvantages, including barriers to access, are indicated. The paper concludes with recommendations for socially inclusive and climate-smart agricultural extension.

BOX 1: Key terms

- **Climate-smart agriculture (CSA)** is an approach that seeks to increase sustainable productivity, improve climate resilience and adaptation, reduce greenhouse gas emissions where possible, and enhance food security and development goals (FAO, 2013).
- **Climate information services (CIS)** is the production, translation, transfer and use of climate knowledge and information to inform effective decision making (Vaughan and Dessai, 2014).
- **Social inclusion** involves increasing the opportunities of marginalised groups to access resources and improve their rights to sustainable food systems. It encompasses dimensions related to gender, socio-economic status, ethnicity, disability and age (CGIAR, n.d.; FAO and CCAFS, 2013; World Bank, 2013).
- **Gender equality** refers to the equal rights, responsibilities, and opportunities of women and men (OSAGI, 2001).
- **Empowerment** is the process of gaining control over one's life; it allows people, individually and collectively, to act on issues they deem important (Luttrell et al., 2009).
- **Strategic communication** is a specialised approach to disseminating and receiving information. It involves communicating a particular message, through a specific channel, to a target audience, at a select time. It uses feedback from the process to stay relevant (SIMPPLR, n.d.).

The importance of socially inclusive extension services for effective uptake of CIS and CSA

When women farmers and marginalised groups have access to climate information and the necessary resources to implement CSA, they can be as likely as men to adopt the practices and technologies, and in turn, experience increased empowerment (Dinh et al., 2022; Hariharan et al.,

2018; Mutenje et al., 2019; Twyman et al., 2014). Importantly, increased access to CIS enhances decision making by youth and women farmers, and thereby improves their agricultural output and opportunities (Huyer et al., 2021).

¹ It should be noted that although the report explores social inclusion, focus is placed on gender inequality. This is because the most relevant data and research available focuses on women farmers, with some but not much information available on youth and other marginalised groups.

Yet the uptake and use of CIS and CSA by women and young farmers is restricted. IWMI (2020) identify three types of barriers to women's access to CIS:

- **Entry barriers**, which includes the unequal access to assets; limited decision-making ability; socially defined roles; lack of control of technology; unaffordable information and communications technology (ICT) devices; exclusion from needs assessments; and other complexities surrounding patriarchal systems.
- **Structural barriers**, including gender inequalities in various institutions, households, communities, and markets (local to global), as well as a culture of exclusion.
- **Systemic barriers**, such as CIS programmes that assume homogeneity or projects that specifically target farmers who are better able to adopt innovations.

The gender relations which determine women farmers' access to climate information and their control of CSA technologies are complex and often result from context-specific social and cultural norms and power relationships (Mapedza et al., 2023). Furthermore, the vulnerability of women and men farmers to climate-related risk differs according to their varied roles and

responsibilities. For example, time poverty affects women's ability to attend meetings and participate in training courses. Women farmers also have less time available to interact in public spheres, to engage with agricultural extension services, and to become members of collective action initiatives. In addition, women are less likely to have access to, and control over, communication devices such as mobile phones, televisions, and radios. Even where women do have access to information their capacity to use it can be limited due to low literacy levels resulting from unequal access to education or limited decision-making power.

Gender relations affect the channels used to communicate climate information with farmers as well as the participatory processes for the co-production of technological solutions. When women farmers and other marginalised groups are excluded from the co-production of CSA innovations, they are inadvertently restricted from adopting the agricultural advancements aimed at helping them cope with climate risks (Dinh et al., 2022; Mapedza et al., 2023). Therefore, to ensure the equal distribution of benefits, it is critical that food security and climate-resiliency initiatives take gender considerations into account from the earliest stages of planning (Gumucio and Schwager, 2019).

The evolution of communication methods for climate-smart agricultural extension

Historically, the communication of agricultural information and improved practices took place through face-to-face interactions, such as between extension agents and farmers, or directly through farmer-to-farmer exchanges. Originally, extension services were a means for transferring technologies developed in research stations and farm management practices to farmers using 'top-down' institutions of delivery. This was followed by the use of print-based materials, such as posters, brochures, and pamphlets. In the mid-20th century, the development of radio and television allowed for the creation of mass media agricultural programmes, which reached larger audiences. The Green Revolution, which brought new technologies and practices to agriculture,

led to an increased need for extension services to disseminate information to farmers.

In the late 20th century, the advent of new technologies, such as computers, the internet, mobile phones, and social media provided new communication tools for delivering information to farmers (Sylvester, 2017). In many cases, the shift towards communication via digital and online platforms opened new avenues for extension, such as web-based training programmes, online discussion forums, and social media. This meant that farmers with adequate access to digital technologies and the internet could access a wealth of information and resources without having to travel to meet with extension agents.

BOX 2: What is 'mass media'?

Media is a vehicle of communication for disseminating information from the source to the target audience. Media intended for large audiences is called **mass media**. Some examples include:

- Digital (e.g. the internet (social media and websites) and mobile mass communication);
- Electronic/broadcasting (e.g. television and radio);
- Print (e.g. magazines, newspapers and bulletins); and
- Traditional (e.g. theatre).

The 21st century has seen an increase in the use of social media, mobile applications, and other digital technologies to engage with farmers and deliver information in new and innovative ways (FAO, 2017). For example, farmers can receive text messages with important weather updates and market information, and they can use mobile apps on their smartphones to access extension resources or provide evidence for

crop insurance claims. Digital technology has the potential to greatly increase the reach and impact of agricultural programmes, particularly in rural areas where access to information can be limited. However, it is important to recognise that connections in rural areas are often not dependable, tend to be low-bandwidth, and many farmers still do not have smartphones.



Present-day communication methods for climate-smart agricultural extension

There are several methods used for communicating climate information and CSA solutions to farmers including in-person engagement; print; radio and television programmes; theatre and local extension co-production; and digital technology (e.g. social

media, mobile and web-based platforms). The communication channels have varying levels of effectiveness depending on the local contexts and present different advantages and disadvantages for social inclusion.



In-person engagement

Extension workers and representatives of commercial firms tend to engage farmers in-person to share information, either on an individual basis or in small groups. This may include interactive workshops and field days which provide practical learning experiences and allow farmers to see the methods and technologies in action, ask questions and engage with experts and other farmers. Farmer networks, such as cooperatives, farmers' groups and farmer unions, enable farmers

to access information as well as verify the best practices to implement. The ability to receive immediate feedback is a key benefit of in-person communication methods. A drawback of in-person engagement is the cost, particularly as the public agricultural extension sector in African countries is typically underfunded. However, there is potential to address this challenge through merging with private sector-led advisory services (Nwafor et al., 2021).

BOX 3: Gender inclusive, interactive workshops

AICCRA Ghana conducted a CIS trainer-of-trainers (ToT) workshop. Key topics included climate change impacts, adaptation and mitigation options; CIS; the interpretation of historical climate information and graphs; seasonal forecasts; and short-term forecasts and warnings. A variety of participants took part in this training including extension agents and lead farmers. Women made up 31% of participants (Yeboah et al., 2022). Key learnings from the training included a need to simplify content with graphic materials including photos and pictures, a need to ensure content is locally applicable and context-specific, and a need to provide immersive experiences with field-based learning.

Farmer-to-farmer information dissemination is commonly practiced in farmers' groups and cooperatives and is beneficial in that it is cost free. Furthermore, research suggests that farmers learn the most about new agricultural practices from

other farmers. Information dissemination that is participatory and driven by farmers themselves is considered crucial for enhanced CSA adoption and scaling (Wakesho et al., 2018).

BOX 4: Successful farmer-to-farmer learning in Vietnam

As part of the Agro-Climate Information Services programme, farmers from My Loi Climate-Smart Village² in Ha Tinh Province, Vietnam, demonstrated a selection of CSA practices (home gardens, agroforestry systems, building simple meteorological stations, amongst others) to visiting local leaders, agricultural extension workers and fellow farmers from Quang Binh Province. The workshop allowed the farmers to exchange ideas, relevant knowledge and practices. The workshop was so successful that the visitors invited the My Loi farmers to their districts to conduct training sessions. A key learning from

the workshop was that although media-based materials, infrastructures, and campaigns assist in sharing CSA information to a wide audience, gathering farmers together in one place to enable them to learn from each other is perhaps the most valuable form of communication (Celeridad, 2018). Media, in this case, served as a complementary form of communication. In addition, to ensure social inclusion, this programme specifically targeted women and youth through existing women and youth groups, such as through a partnership with the local Youth Union (Beal et al., 2021).

Another important in-person means for communicating CSA is Farmer Field Schools (FFSs). FFSs were originally developed as an alternative to top-down extension methods. The FFS provides a participatory group-based learning approach that combines concepts and methods from agroecology, agroclimatology, and experiential learning through regular field observations and group analysis. The approach blends local and technical knowledge, enhancing the ability of farmers to think critically and make informed decisions on priority issues, including climate and food security (Hengesbaugh et al., 2020). FFSs address the need to integrate

indigenous and scientific perspectives in agroecology and assist farmers in determining the CSA practices and technologies best suited to their context. FFSs address gender inequality by determining the specific needs and priorities of men and women farmers. Information and training content is then tailored based on the local gender-specific needs (FAO, n.d.). Furthermore, FFS staff and facilitators are trained on social inclusion and social vulnerability. Lessons learnt on the successful implementation of gender-responsive practices are shared to demonstrate how FFSs can promote and reinforce social inclusion.



Although there are multiple benefits to in-person engagement such as immediate feedback for both farmers and extension providers, the encouragement of social learning which allows for rapid and cost-free scaling, enhanced trust in climate-smart solutions due to evidence of success through demonstration plots, and the opportunity to follow-up with farmers to monitor and evaluate uptake and results and thereby tailor solutions accordingly, it can present barriers to social inclusion if not carefully considered, as follows:

men sourced more information from extension officers than women farmers (Waaswa et al., 2021). In the same area, women farmers gathered more information in-person from neighbours and friends than men did. This is despite evidence indicating that when women are the target of extension services the benefits are felt by both women and their children.

- Extension services in developing countries are typically not sensitive to gender and do not consider different preferences in communication channels. For example, a study on communicating information on CSA practices and technologies to smallholder potato farmers in Kenya found that

- Entry barriers, such as specific membership requirements (e.g. membership fees, land ownership, or status as head of household) can restrict women from taking part in farmers' groups and cooperatives (Mapedza et al., 2023).

² My Loi CSV was a part of the CSV initiative in the country funded by the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS) and managed by the World Agroforestry Centre (ICRAF) Vietnam.

- Cultures that impose gender segregation are structural barriers to accessing information, such as women being restricted from participating in workshops, field days and meetings, which are common vehicles for sharing information and/or for capacity development. Similarly, male agricultural extension officers may not be permitted to interact with women farmers in particular socio-cultural contexts unless consent is given by a male family member.
- In some cases, agricultural institutions assume farmers to be male and target them accordingly. There have even been situations where female extension staff reinforce gender inequality by inviting only male farmers to agricultural extension meetings (Mapedza et al., 2023). This is a form of systemic barrier and results in women farmers, who have different experiences of climate risk and vulnerability, and subsequently different needs, being excluded from accessing and co-developing climate information and/or CSA technologies.

To address gender inequality in agricultural extension services, AUDA-NEPAD through their Gender Climate Change and Agriculture Support Program (GCCASP), conducted a ToT workshop which focused on CSA, gender and gender mainstreaming, post-harvest handling, and business management and access to finance. Participants from each GCCASP country took part, with representatives from the Ministries of Agriculture, Environment, Gender, Trade as well as non-governmental organisations (NGOs). The next step is for the workshop participants (trainers) to conduct trainings for extension officers to ultimately improve engagement with smallholder women farmers, build their capacity and enhance their resilience to climate change.

BOX 5: Importance of understanding the needs of women farmers

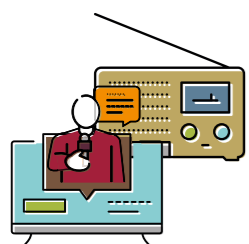
An intervention in Kaffrine, Senegal, used participatory action research (PAR) methods to compare women and men farmers' needs and preferences for information on droughts and rain cessation. The difference in information needs was influenced by women's tendency to plant later in the season. Local social norms dictate that women work on men's plots before their own and wait to use men's farming equipment (Gumucio et al., 2018). These and other findings were used to develop guidelines for providing more relevant CIS to women. The guidelines were then used by Senegal's National Meteorological Service to develop targeted early warning advisories and hazard surveillance measures (Tall et al., 2014).



Print media

Print media, such as newspapers, agricultural magazines and bulletins can be used for disseminating climate information and knowledge on climate smart technologies and practices to smallholder farmers who do not have access to digital platforms. A key benefit of print media is it can be customised to the local context, to cater to the specific needs and interests of smallholder farmers in a particular region. It also allows for the inclusion of local languages, examples, and illustrations that resonate with the target audience, making the information more relatable and understandable. Sharing CSA success stories in magazines and newspapers can be an effective way to raise awareness and inspire others to adopt sustainable farming practices. Furthermore, data provided in traditional print media materials, such as reputable newspapers and magazines with long-standing reputations for reliable reporting, are typically trusted and therefore used by farmers.

Constraints to disseminating information via print media include difficulties in distributing materials to remote areas with poor road infrastructure and the lead times are typically longer than for digital platforms due to the printing and distribution processes. As climate information can change rapidly, any delays in updating and disseminating information results in outdated or less relevant content. The production and transportation of print media materials can also be costly, thereby affecting the frequency of dissemination and resultant uptake. In addition, high illiteracy rates amongst smallholder farmers can limit their access to printed information. This has gender inequality implications, as for example, some studies indicate a higher preference for accessing CIS via newspapers by men farmers, as they typically have higher levels of education than women (Henriksson et al., 2020; Ngigi and Muange, 2022). This is typically the case in Sub-Saharan Africa, where in 2020, 72.5% of adult men were literate, as opposed to 59.4% of women (Kamer, 2022). Another disadvantage of print media is the difficulty in monitoring smallholder farmers' uptake of information and practices, making it a challenge for institutions and organisations implementing CSA initiatives to measure their reach and impact.



Television and radio

Broadcasting agricultural and climate information via radio and television stations has a greater reach than in-person methods. Radio and television programmes are particularly useful for reaching rural audiences where internet connectivity is limited. For example, in Tanzania, radio and television programmes are known to reach most rural areas and there are some radio stations which specifically target semi-urban and rural areas of the country (Mtega, 2018). In the arid and semi-arid areas of Kenya a study by Bullock and Katothya (2022) found that radios are perceived as the most accessed, easiest to access and most reliable source of climate information.

Participatory radio and television CSA campaigns involve a series of programmes broadcast to a targeted farming community to assist them in adopting a particular practice or technology. This approach is highly inclusive, with farmers actively involved in (Hudson et al., 2017):

- Selecting the improvement or innovation to be featured;
- Discussing the advantages and disadvantages of adopting it;
- Making an informed decision about whether to adopt the improvement; and
- Providing practical advice during the adoption process.

An outcome evaluation survey to assess the effectiveness of participatory radio campaigns across four countries (Ethiopia, Malawi, Tanzania and Uganda) indicated that they were effective at increasing awareness and at facilitating farmers' decisions to adopt the promoted practices. Some results included (Hudson et al., 2017):

- Listening to more programmes was associated with higher scores on knowledge quizzes;

- Listening to the radio programmes resulted in a higher number of households implementing at least one of the promoted practices in Malawi, Tanzania, and Uganda; and
- More than 80% of members of listening groups in Malawi and Tanzania implemented at least one of the practices discussed in the radio campaigns.

Key learnings from the use of radio to communicate CIS in Kenya included (Bullock, 2023):

- The timing of agro advisories is critical as farmers need sufficient time to plan e.g. buy inputs and prepare their land;
- Most of the listeners said they would try out the suggested activities, with older and younger women more likely to follow advice than younger and old men;
- It was perceived that change in gender relations would be more likely if husbands and wives listened to the broadcasts together; and
- Early evening was said to be the most suitable time for household members to listen to broadcasts together.

Similarly, farmers in Senegal suggested an adjustment in the broadcast times of agricultural shows to when they would most likely be available to listen. To target both women and men farmers it was recommended that programs be broadcast after 6pm for women and before 9am for men (Yessofo et al., 2022).

Radios and televisions are important communication technologies, but they are typically owned by men. Such ICT devices are commonly unaffordable for women farmers thereby presenting an entry barrier to their access to climate information and contributing to their marginalisation. This underscores the

importance of assessing the appropriateness of communication channels to women's specific circumstances (Mapedza et al., 2023).

Another key challenge to communicating climate information via television or radio is that it can be too technical for journalists to relay. For example, in Ghana, journalists from community radio stations said that historical climate information

was inaccessible to them as the graphs were too complex to read. To resolve this issue, AICCRA organised participatory training workshops for the journalists in collaboration with Ghana Meteorological Agency (GMet). As a result, 68 media organisations were trained to effectively communicate climate and weather information and advisories to farmers (Martey et al., n.d.).

BOX 6: Participatory radio for effective information sharing

FARM RADIO INTERNATIONAL

Since 2018, Farm Radio International has implemented the 'Scaling Her Voice on Air' project across four West African countries (Ghana, Burkina Faso, Senegal and Mali) to improve gender equality and food security of small-scale farmers, focusing on women and youth. The radio programme uses interactive and entertaining scenarios to encourage men to change their way of thinking. Some of the positive results include (Farm Radio International, 2022):

- A total of 124,331 telephonic interactions with programme listeners, with 73% of women respondents saying they felt more confident in using ICT to amplify their voices.
- In Ghana, 95% of surveyed listeners reported an increased knowledge of good agriculture and nutrition practices.
- In Mali, Burkina Faso and Senegal, 89% of men and 85% of women surveyed in listening communities indicated that they are trialling good agricultural practices.

- Community listening groups in Burkina Faso, Mali, and Senegal said the radio programmes had a positive effect on gender transformative practices, as follows:

- 94% reported improved access to land for women;
- 96% said the programmes helped reduce gender-based violence;
- 95% indicated an increase in joint decision-making; and
- 96% said there had been improvement in the sharing of chores.

Farm Radio developed a series of radio programmes on climate change, prompting listeners to share their ideas, knowledge, needs, and experiences using an Interactive Voice Response System. A total of 3,494 people from the four countries contributed (Yenkasa, 2022). The data was analysed and the resulting report, [Listening to Rural People](#), was submitted to the United Nations Food Systems Summit (UNFSS) in 2021.

The learnings included:

- A need for women-only phone lines;
- Training is needed on the use of keypads (literacy is important);
- Women need to do the voice recordings for women; and
- Promotion is needed within women's groups / listening groups.

COMMUNITY MARKETS FOR CONSERVATION'S FARM TALK RADIO

Community Markets for Conservation (COMACO) is a social enterprise which supports wildlife conservation and small-scale farmers in Zambia. COMACO gave more than 2,000 solar and wind-powered-radios to farmers' groups so they could listen to weekly shows called Farm Talk (Liche, n.d.). Farm Talk is an hour-long talk show which focuses on conservation

farming programmes, nutrition, gender and family planning, family business, leadership development and livestock care in the Luangwa Valley. The show involves conversations with small-scale farmers who share their stories on adopting sustainable land management practices. The conversations showcase women farmers' achievements which has enabled women listeners to learn new skills such as poultry production. As the show involves farmer interviews and is broadcast in local languages it is easily accessible for most audiences. Some positive outcomes from the show include (Liche, n.d.):

- Women have adopted village banking and are empowered to undertake more farming activities;
- Listening clubs are motivational, especially for women;
- Radio gives illiterate farmers access to information; and
- Poaching has declined and subsequently wildlife numbers are increasing.

Shamba Shape Up, Kenya's first agricultural television show, lends a good example of sharing information with farmers in an entertaining way. The show aims to "raise knowledge of good farming and nutrition practices, promote positive attitudes towards improved farming methods and ultimately change the ways in which farmers improve their production of crops and livestock, adopt healthy eating practices and adapt their practices to accommodate climate change" (*Shamba Shape Up*, 2023). It educates smallholder farmers to seek the right inputs and support by providing visual evidence of the benefits. To ensure the content is relevant, farmers are engaged annually to determine what they are interested in learning and what they have learnt and adopted from the show. This ensures a bottom-up approach

which addresses the challenges that farmers are facing on the ground. *Shamba Shape Up* has an interactive SMS system through which viewers can request free leaflets on the various topics covered by the show. Furthermore, the show has a call centre and mobile information service, *iShamba*, which can be used by farmers to instantly receive assistance. Some of the positive results include (AECF and Reading University, 2014; Smith, 2022):

- The show is widely received, it reaches 8 million viewers in Kenya.
- Nine out of ten farmers who watched the show said that it was their most trusted source of agricultural information.

- Ninety-six percent of viewers said they have learnt something new by watching the show.
- Ninety-three percent of farmers have claimed to have made a change which they attributed to the show.
- As a result of the changes they made, 63% of farmers reported better yields and incomes.
- Women dairy farmers who made changes based on information from the programme reduced the gap in gross margins between them and male dairy farmers.

Based on *Shamba Shape Up*, the agricultural reality show '[Munda Makeover](#)' premiered on Zambia National Broadcasting Corporation in November 2022. It is produced in English, Tonga, Bemba and Nyanja. Facilitated by AICCRA, the programme aims to scale out CIS and CSA by targeting smallholder farmers, increasing their farm productivity and incomes and improving

their resilience to climate change. The show unites researchers, development organisations and the private sector in informing farmers of CIS and CSA whilst simultaneously entertaining them. It emphasises the role of women in farming, aiming for a 50% female audience (Nohayi, 2023). Furthermore, small- and medium-sized enterprises which deliver cost-effective technologies and services to farmers to improve their productivity are promoted through the show.

The show travels around Zambia highlighting the challenges faced by farmers on the ground and provides expert advice and best practice demonstrations to live audiences. The show follows the growing season and associated sequential challenges such as soil testing, seed selection, planting, pest and disease management, crop management, post-harvest loss, storage and market access. Livestock and financial management and nutrition are included throughout.

BOX 7: Valuable learnings from the Munda Makeover show

The production of *Munda Makeover* generated some important communication learnings (Homann, 2022):

- Communication via television in Zambia targets wealthier households as it is not as accessible in the very remote rural areas. Radio is more commonly used by the rural poor and is currently used as a communication channel by existing development initiatives. As a result there is a need to use both forms of media.
- There is need for media channels to work together, not as competitors.
- There is a need to have a dedicated phone line to receive feedback from farmers.
- The feedback from farmers should be used to produce subsequent episodes with subject experts responding to the farmers' queries.
- There is a need for localised co-creation of materials to ensure content is tailored to farmers in far-reaching areas.
- For practices and technologies to be adopted there is a need to move beyond one-way information dissemination to true education, so that farmers understand how to use the information.



Theatre and local extension co-production

Theatre and local extension co-production through videography and photography provide information dissemination options which farmers can participate in. Participatory means of information dissemination can empower rural communities to take action to solve their own problems, communicate with other communities, as well as voice their needs to decision-makers. Videography and photography are novel means for positive behavioural strategies in

teaching and learning (Wakesho et al., 2018). Farming communities or groups take their own photographs and produce their own video recordings and in so doing bring people together to share stories and discuss everyday challenges and solutions. Theatre provides entertainment but can also be used to educate; it makes learning exciting whilst simultaneously creating awareness on how to solve problems. It unites emotion and learning.

BOX 8: Sharing knowledge through an agroecological film festival

The Collaborative Crop Research Programme organised a film festival for small-scale farmers from South America and Africa to share their agricultural knowledge. The festival, 'Films for agroecology by those in agroecology,' comprised films on topics such as agroecology, soil health, nutrition and food security. For example, Tanzanian farmers produced a film on intercropping maize with pigeon peas. The pigeon peas served as a pesticide protecting the maize from armyworms whilst providing the additional benefit of improved soil quality. The finding was then shared with relatives from neighbouring communities. Additionally, the Programme enabled farmers to work in farmer research networks, allowing them to share knowledge with their peers and carry out research with the assistance of universities and development organisations (Tobias, 2021). The programme is proving successful as farmers report that they are more confident.

"I am not afraid of difficulties." - Honorine Ouoba (a sorghum beer brewer from Burkina Faso).

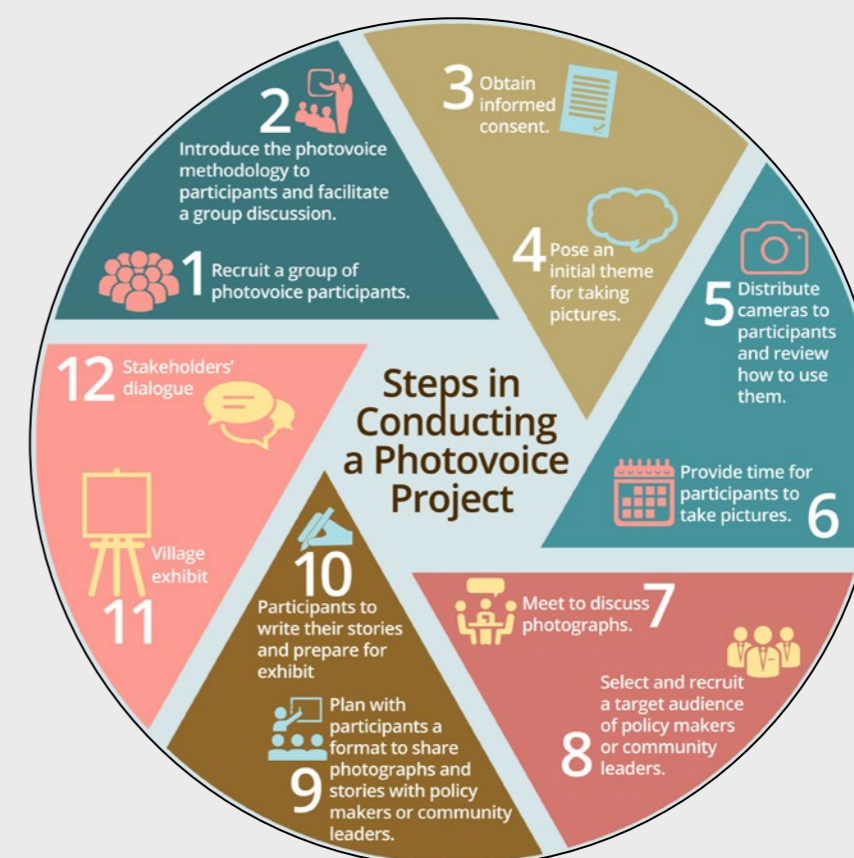


Foodtank online editorial. Image: Annie Spratt, Unsplash

BOX 10: Visual storytelling to communicate climate change adaptation strategies

Photovoice was implemented across six districts in Uganda. The project involved capturing images with mobile phones to identify and understand gendered climate change adaptation strategies in rural areas (Kawerau and Birner, 2020). The project was carried out in collaboration with the Ugandan Ministry of Agriculture, Animal Industries and Fisheries (MAAIF) and the Africa Institute for Strategic Animal Resource Services Development (AFRISA). Focus group discussions were held with women, men and youth groups in each district to gather information on their livelihoods, general agricultural activities and gender-specific activities as well as their perceptions and experiences of climate change. They were then trained on taking photographs with mobile phones and asked to capture their climate-smart practices and strategies. Subsequently,

at a joint group meeting, selected photographs were shared with the women, men and youth groups who then indicated the practices they deemed most important in adapting to climate change. This resulted in lively discussions during which women generally mentioned fewer strategies compared to the men and youth. However, the women had captured similar numbers of photographs to the other groups which provided valuable insight into their adaptation strategies. Photovoice allowed the women farmers to share their knowledge of innovative solutions for coping with changing climate conditions (Kawerau and Birner, 2020). This information could then be used to enhance rural development in a socially inclusive way by communicating the perceptions and needs of smallholder farmers, including women and youth, to policymakers.



Steps for conducting a Photovoice project (Source: Bernardo et al., 2017)



Digital technology

Digital technology can be used to improve farmers' access to important agro-climatic information (e.g. market information and weather forecasts) which when applied can increase their yields, income, and resilience to climate shocks. Digital technology can also be used to facilitate resource sharing and to identify network and market opportunities to assist farmers in growing their businesses. Internet penetration and the ownership of mobile phones has allowed farmers in remote rural areas to access targeted agricultural information through text, voice messages and social media. However, literature on gender and technology indicates that women benefit less than men from technological innovations within the agricultural sector (Mapedza et al., 2023). Women farmers and marginalised communities face a combination of entry and systemic barriers to digital technology such as affordability, digital skills, education, language barriers and literacy.

Women-owned agricultural enterprises in Africa tend to lack the digital skills needed to take advantage of technology and the benefits it can offer (Nchake, 2022). Enhancing women's digital literacy enables them to access timely and relevant agricultural information which, when applied, can increase productivity. Given that women significantly contribute to agricultural labour and the majority of women in developing countries rely on agriculture for their livelihoods, building women's capacity in digital literacy has the potential to reduce poverty in Africa.

Mobile phones

The growing ownership of mobile phones and access to the internet has led to an exponential increase in ICT-based agricultural information services. However, evidence suggests that mobile use and access amongst rural women in developing countries is limited due to a variety of factors such as low technical literacy, lower mobile phone ownership, access costs, perceptions

of the internet, time required to learn how to use the internet, and fluctuations in income (GSMA, 2022a). Therefore, to enhance the inclusion of women in agro-advisory services delivered through mobile apps it would be necessary to provide a service that is freely available, not dependent on connection to the internet and to build the target users' digital and agricultural skills. For example, in Mali, AICCRA is harnessing the potential of an inclusive business model and a mobile app to scale CSA and CIS and transform rice farming. RiceAdvice is a freely available app that provides agroclimatic advice to farmers to enhance their coping capacity. The app assists farmers to make informed management decisions through return-on-investment calculations, target yields and budget allocations. RiceAdvice is easily accessible as it does not require an internet connection other than for app updates. Around 16,225 farmers (4,957 women) have benefited from personalised recommendations using the app with support from the AICCRA-Mali project (Dossou-Yovo and Mohapatra, 2022). In partnership with AICCRA-Mali, the Syngenta Foundation facilitated loans to Centers for Mechanized Agriculture (CEMA) and trained young service providers (40% of whom were women). The Syngenta Foundation supports AICCRA-Mali in building the capacity of women farmers to apply the RiceAdvice guidelines. As a result women farmer's fields have seen higher average yields (1.0 t/ha) compared to that of men (0.8 t/ha) (Dossou-Yovo and Mohapatra, 2022).

Education and literacy levels present key systemic barrier to accessing and engaging with text-based information on a mobile app. Many languages in Africa are primarily oral and not written (Nick, 2023). This has been overcome in Senegal (where close to half of the population cannot read or write) through the sharing of WhatsApp voice notes. Farmers, researchers, and NGOs use WhatsApp to disseminate information on climate-smart practices. For example, the Senegalese agency for agricultural advice (Agence Nationale de Conseil Agricole et Rural (Ancar)) created voice notes

on the production of homemade fertilizer and shared the technique with 40 WhatsApp groups. The practice has reached over 10,000 farmers, enabling them to increase their yields and become less dependent on expensive synthetic fertilizers (Thompson, 2023). This is particularly useful in a country where there is approximately one extension agent per 10,000 farmers. Key benefits of the voice notes include the ability to listen to them repeatedly, to ask questions, and to share their experiences.

BOX 10: Making an app for agro-climatic advice that is gender-responsive

Lersha, meaning 'for agriculture' in Amharic, provides a digital service which enables farmers in the Amhara and Oromia regions of Ethiopia to access evidence-based, agro-climatic advice effectively and timeously. Advisory content is provided or verified by the Ministry of Agriculture. Lersha also facilitates access to agricultural inputs and machinery hire. Agents offer credible advice on how to use the inputs purchased from the Lersha marketplace. Through the Lersha platform farmers can access a mobile application, a call centre and Lersha agents. Lersha currently supports 44,160 smallholder farmers, has 88 Lersha agents, 1,310 development agents and 172 machinery service providers (Lersha, 2023).

BECOMING GENDER-RESPONSIVE

In 2022, Lersha and its partners held workshops on the role of digital agro-climatic advisory services in promoting CSA practices. Open sessions were held during the workshops to consult with women farmers, in their preferred languages, on their agricultural challenges and advisory needs. Engaging with women farmers was recognised as critical to generating context appropriate solutions. The women farmers were eager to share their knowledge and experience. A farmer from Arsi Zone said, *"Do not forget about us. We women work on farmlands just as much as the men. We also grow garden vegetables, raise chickens and rear livestock in our smallholdings. We*

are concerned about how climate change will affect us; so we need advice on what measures we should take while engaging in these activities."

Several women indicated phone ownership and literacy levels as barriers to receiving digital agro-climatic advisory services (Abdella, 2020). In-person visits and demonstrations, as they have received in the past, were the preferred means of information dissemination. The women also highlighted the importance of indigenous knowledge and traditional community groups for support. The engagement generated the following key learnings:

- The importance of identifying the agricultural activities that women farmers are most engaged in (e.g. vegetables and poultry) to ensure they are included in agro-advisory services.
- The need to understand the barriers to women farmers' receipt and use of agro-climatic information. For example, addressing the gender gap in phone ownership and literacy by adopting information dissemination pathways that involve in-person engagement and traditional community groups.
- The need to incorporate indigenous knowledge in digital pathways, for example, aligning local names with scientific terminology.

Social media

The use of social media has grown rapidly. By January 2023, there were approximately 4.7 billion users worldwide (Statista, 2023). Social media is a novel means for sharing agricultural information with farmers and platforms such as Facebook, Twitter, and WhatsApp are commonly used by agricultural development programmes to rapidly disseminate information. As it is an engaging form of media, it can be used to exchange ideas, to collaborate, to host dialogues, to discover new partners, as well as to access policy makers (Ghosh et al., 2021). It is beneficial for sharing agricultural information as it is low cost, it allows for direct communication with experts, and it can reach large audiences.

Agricultural organisations, NGOs, and government agencies can create dedicated social media accounts to disseminate climate information and content on CSA practices and technologies to farmers. The social media platforms can be used to share information, videos and imagery of best practices in the implementation of CSA. These platforms can also be used to host interactive webinars and live streams (e.g. Facebook Live and Instagram Live) giving farmers the opportunity to ask questions and share their experiences.

The use of social media as a channel for communicating climate information and climate-smart interventions with smallholder farmers presents gender and social inclusion challenges. These include entry barriers for women and youth, such as a lack of control over, and the unaffordability of, ICT devices used to access social media. A study by Kimani et al. (2019) on social media use by smallholder farmers in Kiambu sub-County in Kenya, found that education, age, and gender affected social media familiarity. Most farmers who had attained post-secondary education had good knowledge of social media as opposed to none of the farmers who had no formal education. Women farmers were less familiar with social media than men farmers, which correlated with the findings on education, as men farmers were typically better educated. Young farmers were more familiar with social media than those of an advanced age which presents an opportunity for attracting more youth to engage sustainable agricultural activities i.e. through social media promotions and their inclusion in the participatory development of programmes and CSA innovations.

BOX 11: Sharing knowledge on good agricultural practices through social media

Arifu is a free, digital learning platform in Kenya which enables farmers to access information on good agricultural practices via SMS, WhatsApp, and Facebook Messenger. As the learning platform is interactive it has replaced in-person information dissemination reducing the cost of

delivery from USD 20 to USD 1 per farmer. Arifu has assisted 250,000 farmers, empowering them to improve their farming activities, production and incomes (Mercy Corps, n.d.). The Arifu chatbot has also allowed thousands of marginalised people, including refugees, to gain new livelihood skills.

Gamification

“Gamification is the use of games across society, culture and technology for purposes other than mere entertainment” (Fernandez et al., 2021). Games and simulations are not a new concept in climate change communication; they have been used for around forty years and their application has grown in the last decade. Games can be used to improve knowledge and awareness as well as to change behaviour. Effective gamification in climate change supports learning by providing experiences in real or simulated contexts and encourages individual or group reflection. Gamification is beneficial for CSA and CIS communication for the following reasons (Fernandez et al., 2021): Gamification is beneficial for CSA and CIS communication for the following reasons (Fernandez et al., 2021):

- It can be adapted to the local context and thereby provide relevant guidance and feedback.

- It can alter social norms and risk concerns in terms of the adoption of new farming practices.
- It allows players to fail with little to no consequence.
- It facilitates social engagement, for example, in multiplayer games or through fictional characters.
- Learning is enhanced using visual representation, immersion, interaction, and self-assessment.

As modern gamification is typically implemented digitally it presents several entry barriers to marginalised groups with limited access to ICT devices and the internet. Furthermore, gamification often assumes a level of education, a level of English proficiency as well as digital literacy skills that may not be prevalent in rural communities, and particularly amongst marginalised groups.

BOX 12: Gamification for entertainment and communication

GAMIFICATION FOR IMPROVED WEATHER FORECASTS

Despite the growing number of organisations offering CIS, only a small number of farmers in Kenya receive big data-driven agronomic information and advice. To address this, the [‘Let it rain’](#) initiative was developed and delivered by a team comprising Mediae Company,³ a gaming studio based in Nairobi known as Usiku Games, and Alliance of Bioversity International and CIAT. The game was hosted by the popular farming television show ‘Shamba Shape Up’ which is funded by the private sector and development sector partners. Essentially, ‘Let it rain’ is a platform

that gamifies weather prediction to incentivise farmers to use agro-advisory services as well as to crowdsource weather information (CGIAR, n.d.). The information obtained is then used to improve weather forecasts.

The game involves farmers guessing the start of the rainy season, thereby generating national dialogue on the relevance of weather forecasts. The game is advertised using video advertisements and is promoted on the iShamba platform, Twitter and Facebook. Initially, 25,000 people signed up to play. Alliance of Bioversity International and CIAT monitored the first rainfalls in each of the 10 counties and compared the amounts received

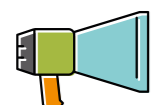
³ A small social enterprise producing sustainable and research-based media productions to meet the informational needs of East Africans.

with the participants' guesses. Forty-five winners were announced across the 10 counties, they received their prize money (USD 1,000 divided between the winners in each county) via M-Pesa, a mobile phone-based money transfer service (CGIAR, n.d.). Most of the winners invested their prize money in their farms, mainly as input purchases or by acquiring small livestock.

PLAYING GAMES TO IMPROVE AGRICULTURAL DECISION-MAKING

In 2022, International Crops Research Institute for the Semi-Arid Tropics launched a mobile gaming app known as MRIDA (Managing resources for integrated development of agriculture⁴) to encourage smallholder farmers in India to adopt CSA practices to improve

soil carbon and increase crop yields and build resilience (Jackson, 2022). The gaming app aims to sensitise farmers on fertiliser use, crop selection, biochar application and irrigation and to improve their decision-making. For example, using the app, players can see the impacts of individual and collective action on resources such as groundwater, which is decreasing in many areas of India. The game is played by a group of players who take on the role of farmers deciding which crop to grow in the dry season. The choice of crop becomes increasingly difficult as water scarcity increases. The game comprises multiple rounds and concludes when a maximum number of rounds is reached or when the groundwater resources are depleted. The length of the game and the amount of income made by the farmers is determined by the players' decisions. The game can be applied to several regenerative or CSA practices.



Combined communication methods

Each communication method described above has numerous advantages and disadvantages. For example, in-person communication can foster trust through relationship building, it enhances learning through live demonstration and ensures relevancy of information and practices through direct feedback. However, poor infrastructure can hinder access to certain rural areas, the timing of visits can contribute to gender exclusion and the cost of salaried officers and transportation can render it more costly than other methods. In this light, a combined communication approach can be the most effective means for reaching farmers. For example, a study by Wakesho et al. (2018) of participatory videography and drama in western Kenya found that drama was beneficial in attracting large crowds and generating interest. However, the participatory videography method had better educational

outcomes, as farmers understood a concept in more detail than through the drama approach. As a result it was recommended that drama be used as an introductory method to attract people and for teaching the basics of the concept, thereafter the knowledge could be built upon using other methodologies such as participatory video. In the arid and semi-arid areas of Kenya, having access to multiple information channels was preferred as each was said to present their own challenges. The subsequent verification of the information with an agricultural expert was deemed important. Men farmers appeared to have access to more diverse sources of information than women (Bullock and Kathooya, 2022). Similarly, studies have found that mass media plays an important role in providing initial climate information and introducing CSA practices to

farmers, however, it is common for farmers to consult other farmers, extension workers or experts whom they trust prior to adopting or rejecting a particular innovation (Huyer et al., 2021; Rodrigues et al., 2016). Therefore, by combining both mass media and in-person communication approaches the benefits of each method can be realised.

Justdiggit, a non-profit organisation working to regreen degraded farmlands throughout Africa, has successfully applied a multi-pronged communication approach involving Champion Farmers, a movie roadshow on sustainable land use, an SMS service to disseminate information on regreening practices and to continuously motivate farmers, as well as the Kisiki

Hai radio programme which simultaneously entertains and informs farmers to adopt regreening practices. Justdiggit has reached over 291 million people globally and has led to the intensive restoration of 300,000 ha of land and the regeneration of 9.7 million trees. M-Omulimisa, a Ugandan agricultural technology company, has also successfully applied a combined approach involving agricultural extension and ICT. It uses village agents and mobile phone technology to provide a bundle of agricultural services such as improved seed, fertiliser, and agricultural insurance and loans, as well e-extension, inputs distribution and output marketing. The network of village agents reaches over 200 farmer groups comprising more than 8,000 members.



M-Omulimisa connects farmers with extension agents and input organisations (Source: M-Omulimisa, 2023)

The success of combined communication approaches can be accelerated through the stimulation and leveraging of partnerships and networks. Communication strategies that support partnerships and networks and linkages within and across the networks can maximise reach and impact. The combination of partner or network strengthening and ICT or mass media communication channels can provide an effective

means for development programmes and agri-businesses to enhance uptake of CIS and CSA. For example, in Ghana, a partnership between a private ICT company, Esoko, and GMet allowed for the delivery of weather information to farmers in climate-smart villages using a mobile phone platform. A thousand geo-referenced farmers (33% women) were targeted to receive information (Partey et al., 2019).

⁴ Mrida also means 'soil' in Hindi

The platform gave farmers access to a call centre which delivered the climate information vocally in their local dialect, this approach was adopted to prevent the exclusion of illiterate farmers. The information included total rainfall, the onset and end of the rainy season, and a ten-day forecast as well as market alerts and agro-advisories to

assist the farmers in understanding and using the information. A survey indicated that the CIS received by the farmers improved their decision-making abilities and as a result, crop failure was reduced, and household food security was improved for both men and women.

BOX 13: Leveraging networks to advance CIS and CSA communication



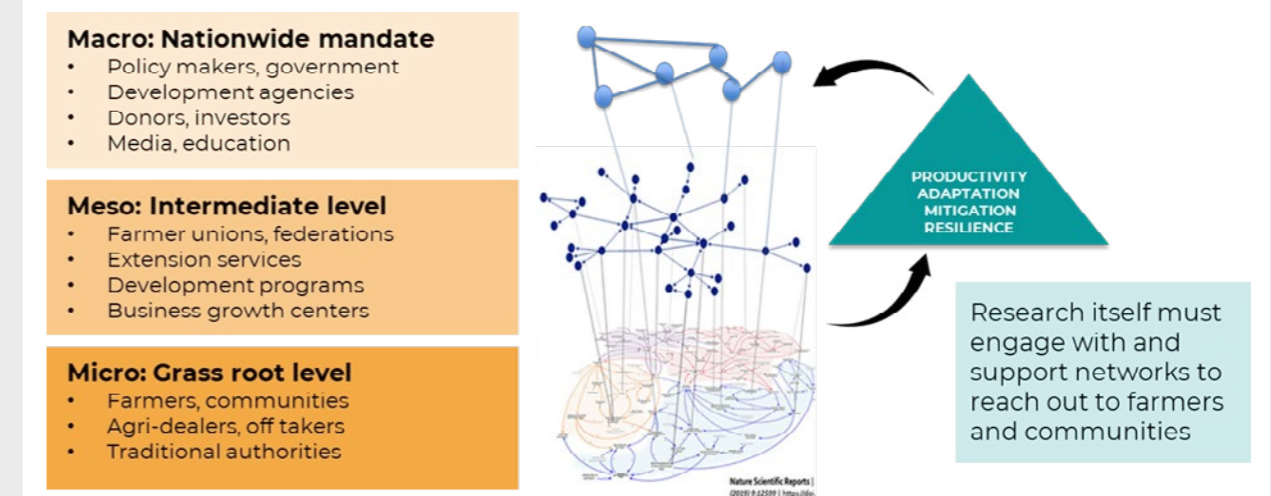
In Zambia, AICCRA is adopting an innovative networking approach, focused on building climate and agribusiness partnerships, to provide CIS and CSA products to smallholder farmers. The goal is to reach 300,000 farmers in 2023 (Homann-Kee et al., 2022).

This novel communication planning approach takes into account different actors and levels and unpacks their dynamic connections, as follows (Tui et al., 2022):

- **Micro level:** Communities operate at the micro or grassroots level where decisions on the adoption of climate innovations are made. Communication via radio programmes is important for supporting extension officers and farmers' organisations who work at this level to provide context appropriate climate information to farmers. Radio is considered the most accessible communication channel for the majority of farmers.
- **Meso level:** Businesses and information and technology service providers work at the meso level and farm communities are some of their

key clients. For example, television or multi-media interventions at this level provide agri-business solutions to early adopters and farmer institutions, extension services and development programmes, whilst radio assists more with building on the content at the micro-level.

- **Macro level:** Effective enabling environments are needed for successful stakeholder and network connections at the micro and meso levels. For example, policies need to be well aligned for agribusiness and investment opportunities, capacity development, and the removal of barriers to business. Dialogue is needed across these levels, and it is critical that macro level decision-makers are well informed.



Network strengthening for accelerating impact at multiple levels (Source: Homann-Kee et al., 2022)

In addition, AICCRA Zambia has identified the need to focus on gender equity and social inclusion by considering groups with lower educational levels and understanding women's barriers to using climate information. AICCRA Zambia undertakes various activities to strengthen gender equity and social

inclusion, including building partnerships with the private sector and hosting multi-stakeholder dialogues structured to advance inclusivity and empowerment, and providing opportunities to students and young entrepreneurs through an internship and innovation grant programme (Tui et al., 2022).

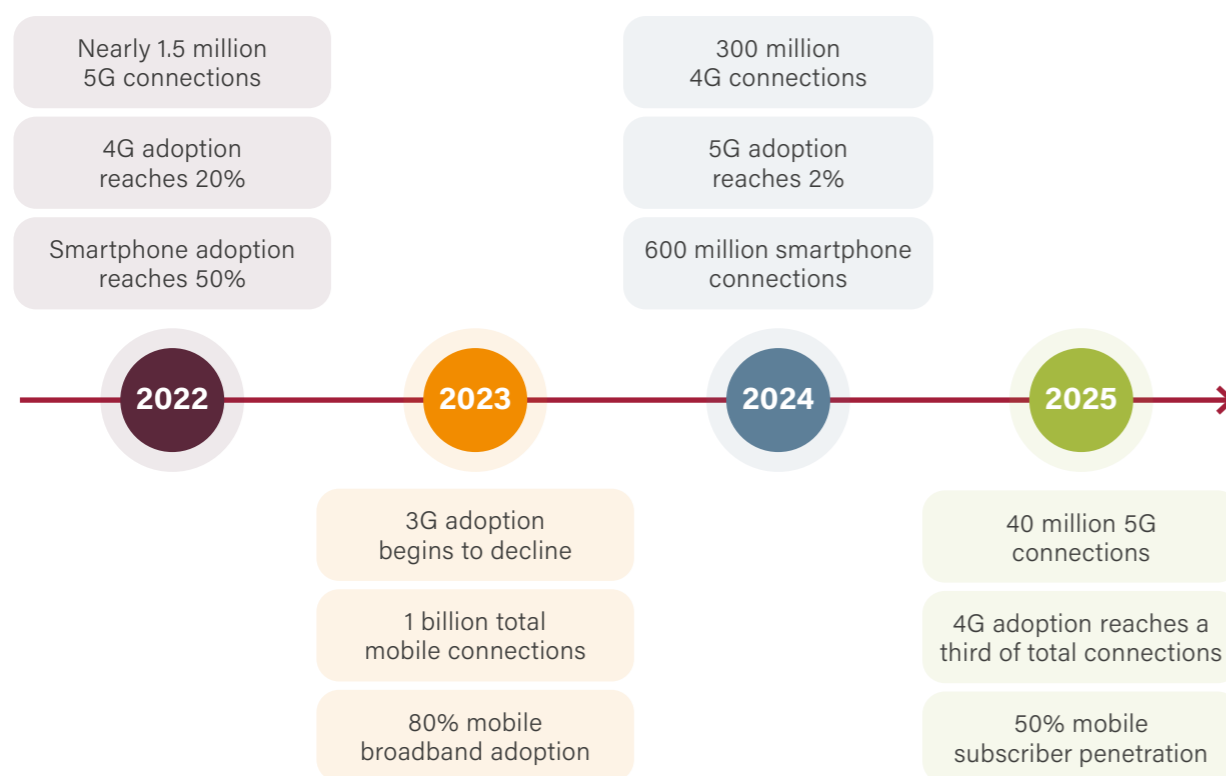
The future of communication methods for climate-smart agricultural extension

Methods for communicating climate information and CSA interventions will continue to evolve, driven by significant advances in technology and a desire to reach farmers in more effective and efficient ways. The trend towards digital and

mobile-based climate-smart extension is expected to continue into the future as new technologies emerge and more farmers gain access to the internet and mobile devices.

Key trends to watch

- Increasing mobile connectivity:** In 2022, 40% of the adult population of Sub-Saharan Africa (SSA) was connected to mobile internet services and around 44% lived in areas covered by mobile networks but did not subscribe to mobile internet services (GSMA, 2022b). The main barriers to the use of mobile services are affordability and a lack of digital skills. However, the mobile industry is expected to expand rapidly in SSA with an estimated one billion mobile connections in 2023, 600 million smartphone connections by 2024 and a mobile subscriber penetration of 50% by 2025 (GSMA, 2022b).



Key milestones for the mobile industry in Sub-Saharan Africa to 2025 (Source: GSMA, 2022b)

- A rapidly growing youth population:** In 2021, 42% of SSA's population comprised of children younger than 15 years of age (Statista, 2023). It is therefore projected that mobile subscription numbers will continue to increase as young consumers move into adulthood. This is an important trend to monitor as the young subscribers are expected to be more capable of adopting technological advancements and will have improved access to high-speed 4G and 5G connectivity and digital services (GSMA, 2022b).

- Gender disparity in mobile internet and smartphone ownership:** The mobile internet gender gap in low- and middle-income countries reduced from 25% in 2017 to 15% in 2020, with the gender gap being widest in South Asia and SSA. In South Asia, the mobile internet gender gap reduced from 67% in 2017 to 36% in 2020 but has since increased to 41% (GSMA, 2022a). This increase is attributed to a rise in adoption by men but no notable increase amongst women, for example, in India, men's mobile internet use increased from 45% to 51% whilst women's usage stagnated at 30% (GSMA, 2022a). Over the past five years, the gender gap in smartphone ownership reduced in low- and middle-income countries, from 20% in 2017 to 16% in 2020, but then increased slightly due to the increasing gender gap in South Asia and SSA. The gap is also greater in rural areas than urban. Presently, women are 18% less likely than men to own a smartphone. These disparities mean that women have lower access to the mobile phone enabled CIS and CSA communication services. The top reported barriers to mobile ownership and

internet use are access, affordability, low literacy levels and poor digital skills, safety and security, and gender norms (GSMA, 2022a). In addition, men are better connected via digital agriculture applications. This in turn leads to data collection by big tech companies that is predominantly for men, further entrenching male perspectives and needs in the innovation and development of new services in this sector (Porciello et al., 2021).

- Increase in the use of mobile money platforms:** The use of mobile money has been on the increase, which has significant empowerment effects on women and those without formal bank accounts. In Kenya, for example, over a period of approximately 5 years, mobile money enabled 194,000 households to move out of poverty—the majority of which were female-headed. M-Pesa influenced changes in financial behaviour in the form of financial resilience and saving, with many people moving out of agriculture and into small business as a result. Mobile money has also been shown to be a platform that gives women control over their finances (Ndiaye, 2013).

BOX 14: Orange partners with UN Women to close the digital gender gap

In March 2022, Orange, the dominant telecommunications operator in West Africa, and UN Women initiated a partnership to tackle the challenges of digital inclusion and the economic empowerment of rural women. This collaboration seeks to improve the access of rural women to digital technology and new market opportunities through the 'Buy from Women Initiative.' It also disseminates

information, such as weather warnings, and provides digital financial information and services. The Orange Foundation offers technical expertise, network resources and existing infrastructure in digital skills, technologies, and digital inclusion. To date, this initiative has been implemented in Côte d'Ivoire, Mali, Rwanda, South Africa and Senegal (GSMA, 2022b).

- The increasing use of social media:** Social media usage in Africa has grown in conjunction with the increase in internet access. Facebook is the continent's most popular website, with more than 233 million subscribers as of December 2022. In all regions in Africa, except for Southern Africa, men constitute the majority of social media users. In Southern Africa, women overtook men as the main users of social media increasing from 50% in 2020 to 51% in 2022 (Galal, 2022).

Key barriers and recommendations for enhancing gender and social inclusion in CSA communication

Drawing upon the findings of the project cases and relevant literature, the following barriers to effective and socially inclusive CIS and CSA communication were identified, and key actions are recommended to overcome these barriers:

Level of education and literacy



Systemic barrier: Means of CIS and CSA information dissemination often assume a minimum level of education and literacy. However, in developing countries, women are typically less educated than men due to patriarchal norms prioritising schooling for boys (Mapedza et al., 2023). Farmers with lower levels of education are less able to access technical information and require tailored means of communication.



Recommendation: Information needs to be packaged in a way that is appropriate to the literacy and education levels of the targeted beneficiaries. In-person communication methods and practical demonstrations can provide useful channels for reducing such disparities. Voice-based services, as opposed to SMS, make information accessible to users with low literacy levels. Additionally, the use of local names and terminology versus scientific language and jargon can improve the accessibility of information, and information in the local languages of targeted farmers is key.

Digital literacy



Systemic barrier: Women farmers in developing countries tend to have inadequate digital literacy skills to apply ICT to their farming practices. This contributes to a digital divide and poverty amongst rural communities (Alant and Bakare, 2021).



Recommendation: Targeted capacity development programmes are needed to enhance the digital skills of women farmers to enable them to be both users and producers of ICT solutions. This is especially important given the current trends towards digital and mobile-based extension.

Prioritisation of men farmers in development interventions



Systemic barrier: Development interventions tend to target farmers who are well positioned to adopt the changes needed to adapt to climate change. This often excludes marginalised groupings, including women and young people, resulting in information that is targeted to or produced by men and of little use or relevance to women farmers.



Recommendation: Targeted recipients need to be sex and age-disaggregated so that information is differentiated according to the needs of men, women, youth and other vulnerable groups. Such an approach ensures that CIS and CSA content and technologies are relevant and accessible to each user group.

Access to financial resources



Entry barrier: Poor smallholder farmers are often restricted from accessing agricultural information due to the costs involved (Muhanguzi and Ngubiri, 2022). This includes transport to demonstration plots and field days, the purchasing of radios, television sets or mobile phones and the associated costs of airtime and data. This is particularly the case for women and young farmers who typically have lower access to financial resources. In addition, women and young farmers often cannot afford membership fees to participate in farmers' groups and cooperatives (Gumucio and Schwager, 2019).



Recommendation: Partnerships with financial institutions, agricultural development organisations, NGOs, community-based organisations, government bodies and/or the private sector should be leveraged to address financial barriers to information access.

Ownership of communication assets



Entry barrier: Men tend to own radios, televisions and mobile phones, which further marginalises women farmers. The gender gap in ownership of digital technologies is wider in rural areas in all regions and is attributed to affordability, lower education levels, lack of technological literacy and gender norms (Borgonovi et al., 2018).



Recommendation: Use or develop alternative information delivery channels suited to women farmers local context e.g. SMS messaging (in cases where smartphone ownership is low) or in-person communication. Furthermore, women champions within the community can be identified to disseminate information, for example, women who own their own mobile phones can undergo training and be incentivised to share information with other women.

Lack of female and youth representation in mainstream communication channels



Systemic barrier: A lack of female and youth representation in communication channels normalises their exclusion and can adversely affect their uptake of information (Bullock, 2022). In addition, a lack of female representation in participatory communication channels, such as television and radio programmes with call-in functions for feedback and questions, can deter women from taking part as they tend to be more comfortable engaging with other women.



Recommendation: Female and youth representation should be prioritised in communication channels such as through the inclusion of female/young presenters or hosts for television programmes and radio broadcasts respectively.

Gender segregation in activities



Entry barrier: Cultures that impose gender segregation can prevent women from accessing farmers' groups and extension services and participating in training workshops (Gumucio and Schwager, 2019).



Recommendation: Partner with women's groups to disseminate information directly to women farmers.



Time poverty



Entry barrier: Women farmers face time poverty challenges as their roles and responsibilities also extend to selling produce, childcare and household upkeep. This can restrict their access to information sources with limited time available to learn from agricultural education programmes.



Recommendation: Women farmers should be engaged at their regular meeting places to prevent disruptions to their daily routines. CIS and CSA communication programmes and workshops should be scheduled to accommodate women's limited mobility and work schedules. Invitations to attend trainings should be issued with ample time to allow women to adjust their daily schedules accordingly. Furthermore, ensure that ICTs or media devices are appropriate to women's livelihood activities and/or save them time.

Power dynamics

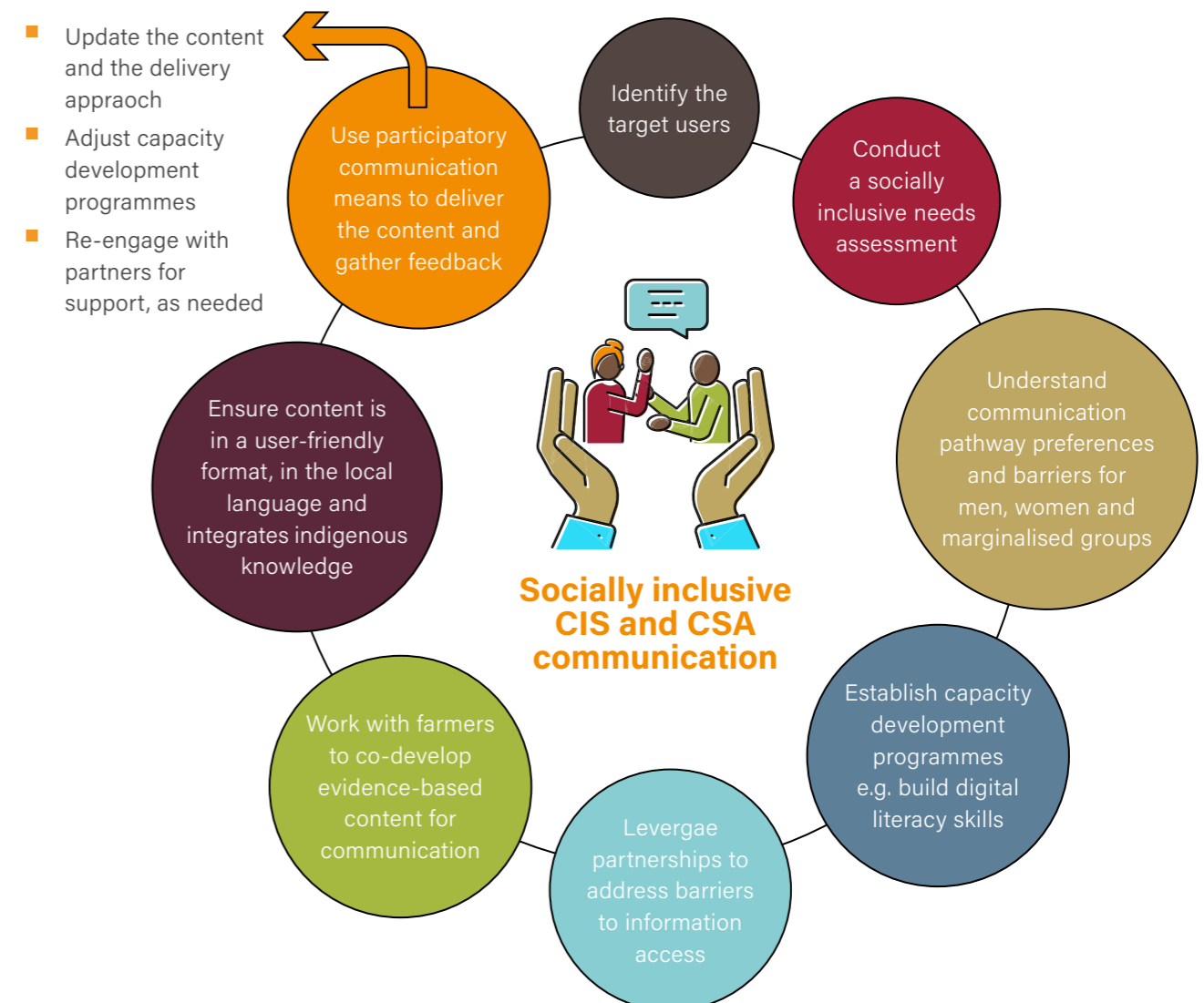
Entry barrier: Unequal power dynamics affect women's agency and their ability to make decisions.

Recommendation: Acknowledge the socio-cultural norms that influence gendered roles and responsibilities. Partner with local civil society organisations with experience in social change processes concerning gender roles and behaviours workshops (Gumucio and Schwager, 2019). Collaborate with women's groups, which can serve as vehicles to enhance women's self-confidence and agency. Facilitate community dialogue on enhancing women's CIS decision-making. Monitor and evaluate empowerment to assess gender performance and make improvements accordingly.

Gender differentiated needs

Entry barrier: Women and men farmers have different needs when it comes to CIS and CSA as they have different experiences of climate risk and vulnerability and undertake different farming activities. Women tend to manage activities that generate lower incomes or provide produce for household consumption (e.g. vegetables and poultry). The types of activities undertaken affects the types of weather and climate information that is useful to women and men.

Recommendation: Prior to, and during, a CIS or CSA communication programme, it is important to conduct user needs assessments, in an inclusive and participatory manner, to understand the suitability of different communication channels as well as the information and technological needs of farmers. Participatory communication empowers women farmers to take action to solve their own problems, share knowledge with other women farmers, as well as voice their needs to decision-makers.



Proposed approach for communicating CIS and CSA in a socially inclusive way



Conclusion

Socially inclusive communication channels are key to enhancing farmers' capabilities of adapting to climate change and variability challenges, whilst reducing poverty and food insecurity. By addressing the various entry, systemic and structural barriers to effective CIS and CSA communication, women, men, and marginalised people will have equitable access to the information they need to make informed and empowered decisions. Socially inclusive communication of CIS and CSA practices and technologies therefore presents a key opportunity to transform and climate-proof agricultural production, as well as to contribute towards positive changes in gender norms.

There are numerous steps that can be taken to enhance the reach and uptake of CIS and CSA practices and technologies for women. For example, while multiple and varied mass media channels of communication should be used to rapidly disseminate information and create awareness about climate change and CSA, in-person forms of communication are also needed to foster trust and encourage changes in the behaviour of both men and women. In addition, information dissemination that is participatory and driven by farmers is most effective and low cost, with women as the principal actors in these communication programmes. To

enhance uptake, information needs to be simple, evidence-based and continuously updated to be reliable and relevant. Indigenous knowledge, including local names and terminology, needs to be incorporated into CIS as traditional methods and cultural value are perceived to be more trustworthy than science-based forecasts amongst some communities and the use of local language enhances accessibility. In addition, networks and partnerships with government agencies, research institutions, civil society, agri-businesses and media, amongst others, should be leveraged to address barriers to information access and to sustainably deliver knowledge and CSA technologies to farming communities, and particularly to women.

This paper explores a multitude of communication channels, highlighting the trade-offs of adopting particular approaches and the implications for social inclusion. Further research is needed to explore the broader geographic characteristics that influence and hinder local opportunities for access and use of CIS and CSA. These include factors that interrelate with women and young people's agency to access CIS and pursue CSA options, based on their own priorities and abilities. If not addressed, these barriers to CIS access further reinforce marginalisation and climate vulnerability.

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