

Engaging women in climate information services to address the gap in access to information for Climate-Smart Agriculture

Introduction

Globally climate change is causing a visible impact on the human and natural system over the past decade (IPCC, 2014). Besides existing challenges to deal with climate variability, changing climate is further challenging rural livelihoods in developing countries. Although its causes and remedy may be unknown to most of them, people are looking at their governments for relevant information in order for them to take adaptive decisions (McOmber et al. 2013). Despite the challenges this entails, credible climate information services that meet users' needs can build resilience against climate variability (Christel et al. 2018). Climate information services (CIS) are customized climate-related tools, products and information that will enable climate-smart, strategic decisions at various levels for a range of end-users (businesses, the public sector, and individuals), enabling a more systemic approach to risk management (EU, 2015).

Although women significantly contribute to the economy and society, as end users of climate information they are lagging behind man (UN, 2005). According to FAO (2011) this gender gap has a global pattern where women in agriculture are having less access to productive resources, financial assets and advisory services than men. In the perspective of Climate-smart Agriculture (CSA) this gender gap entails that women are not on a level playing field for applying CSA practices and using Climate Information Services for CSA as compared to men. This will widen the existing gender gap, and with the widening of this gap, sustainability will be further out of reach. CSA is the practice that sustainably increases productivity and income, adapts and builds resilience to climate change and reduces green house gas emission where possible (Palombi and Sessa, 2013).

At the same time, climate change is causing men (seasonally) migrating in search of work, and women getting increasingly more tasks in agriculture. This entails a change at user level of CIS for CAS (Huyer et al, 2016). Although in Bangladesh, women are often not recognized as farmers, about 61% of the women labour force in Bangladesh is involved in agriculture (Moni, 2016). Women are, in general, more involved in homestead crop cultivation and processing the harvest (post-harvest activities), and less in soil preparation, planting and intercultural operation though there are many exceptions (Jaim and Hossain, 2011). In recent years women's contribution in agriculture is increasing with increasing

migration of the male labour force to cities of Bangladesh (Moni, 2016; Hossain and Jaim, 2011; Birner et al. 2010).

Climate change impact in Bangladesh also affects gender roles as women greatly shoulder the suffering as a result of increased food and water insecurity (Balgis, 2009). While coastal women of Bangladesh could with reason be called the victims of climate change, on the other hand they are important agents of household and community resilience building (Ayers and Forsyth, 2009; Tanjeela and Rutherford, 2018). Therefore, future food security in coastal Bangladesh will heavily depend on women's capacity to lead CSA in coastal areas. And national food security, with increasing numbers of people residing in cities, will be a fallacy without strengthening the coastal agriculture. But coastal women have less access in all spheres of public life for making livelihood decisions because of limited mobility, access to information and decision making power (The Carter Center, 2016; Ahmed and Maitra, 2010). Minimizing the gender gap by increasing women's access to and use of Climate Information Service (CIS) will therefore both help in revealing the potential of CSA in adaptation, mitigation as well as in reaching food security.

Research shows that the degree of eagerness for scientific information; flexibility of the service and credibility of the provider are three important dimensions which significantly influence the use of CIS (Guido et al. 2019). Although women are a good channel of passing social information quickly, indigenous knowledge in understanding climate symbols and making use of weather forecasts is often found insufficient (Mwangu, 2020). However, valuing local information needs and local information sources is also important for minimizing the gap between local and scientific knowledge and can be done by integrating traditional indicators and scientific techniques in climate information systems (Tall, 2013).

As gender roles in agriculture are locally different and context specific, women's need for CIS will differ from those of men (Gumucio, 2018). Past studies identified gender inequalities in access, use and benefits of CIS with a suggestion to minimize gender gap (Mital, 2016; Clarkson et al. 2017; Stats4SD, 2017; Rengalakshmi et al. 2018; Gumucio et al. 2020). In the context of limited research on ways of engaging women to practical CIS, **this study wants to address the gender gap by recognizing the site specific needs and capabilities of rural women engaged in agriculture and create access for and engage with them in the use of CIS for CSA.** The further aim of this study is to investigate how women engagement with CIS shapes their decision making in CSA activities for building resilience in agriculture of coastal Bangladesh.

Review of Literature

The increasing climate change risk seeking an enabling environment in agriculture to address the food security challenge of growing population in the developing world (Gumucio et al. 2020, Huq et al. 2015, Islam et al. 2013). Accordingly the investment in climate services has increased to improve decision support (Sandstorm and Strapasson, 2017). It has been realized by all that access to creditable CIS increases resilience against climate risk (Christel et al. 2018).

Climate services is a new concept to common people of Bangladesh. However, it is assumed a novel way of curbing the climate change impact through mainstreaming the concept of climate services (Gawthrop, 2018). Despite late Bangladesh Academy for Climate Services (BACS) has been established in 2018 for widening the access to services and increasing resilience in the long-run. However, the key to climate services is focusing on services delivery. The climate information from the research must be translated into usable form and disseminated rapidly for farmers' decision support (CIMMYT, 2017). Tall (2013) in this regard tried to develop a tailored climate services which is a five-step process. Understanding the demand of end user, bridging the gap between scientific climate forecast and responsible agents for dissemination, co-production of climate services considering the end-users, effective delivery of services and assessment-based reconsideration is the key steps in the process. However, WMO paid much focus in delivering climate services to the vulnerable and resource poor group particularly the women for making the service inclusive.

International Center for Climate Change and Development (ICCCAD) in its program homepage declared that women and girls of Bangladesh are the backbone of building climate resilience¹. Although they disproportionately affected by climate change impact, they play a crucial role in adaptation and mitigation response. Considering the fact the SAKTEE project (Scaling climate change adaptation knowledge and technologies for empowering women, and to enhance social equity and disaster resilience in Bangladesh) is being implemented with active involvement of Bangladesh Center for Advance Studies (BCAS), ICCCAD, University of Manitoba and the Ministry of Women and Children Affairs Bangladesh.

However, access, use and benefits of CIS have been feminized pushing women at the outer margin (Nelson et al. 2010; Mital, 2016; Clarkson et al. 2017; Stats4SD, 2017; Rengalakshmi et al. 2018; Gumucio et al. 2020). Women's need as farm decision maker in the changing context of climate is being over looked (Huyer and Partey, 2020; Tanjeela and Rutherford,

¹<http://www.icccad.net/programmes/climate-change-and-gender/>

2018). Investment in quality and relevance of CIS for the specific user group is, therefore, imperative for building climate resilience (Gumucio et al. 2020).

Methodology

Selection of area, participants and crops

This piece of action research will be conducted in two purposively selected areas of Dumki Upazila (sub-district) of Patuakhali District. The probable areas are Srirampur and Angari Union (several villages makes a union) where state department of agricultural extension (DAE) has common interest groups. Purposive selection is assumed based on time, budget and convenience of the researcher in monitoring the clients and the collaboration with DAE. Two groups of women farmers will be formed with the help of Agricultural Extension Officer (AEO) and Sub-Assistant Agriculture Officer (SAAO) of the concerned block. Criteria to join the group will be established and discussed with the group and DAE. Prior to group formation adequate discussion session will be conducted with the women farmers to inform them about CIS and CSA. For strengthening the women engagement in group a weekly visit and monthly meeting will be arranged.

Sharing information on CSA

Women farmers need to be aware on CSA to participate the research. Therefore, immediately after formation of groups some meeting will be arranged to enlighten them on why CSA and what does it mean. The three pillars of CSA will be discussed with examples. However, prior to this they also need to understand the difference between weather and climate. Discussion will also be facilitated with the concept of climate change and climatic variability. Some historical climate information will be shared to depict the trend of change. At the end of the session women farmers will be able to recognize whether the climate changing or not? In this context the concept of climate information services (CIS) will be shared as a decision aid that it can make their agriculture climate smart.

Climate information services overall process

WMO's five step-process of climate services will be followed from need assessment to program evaluation (Tall, 2013). The steps are described below:

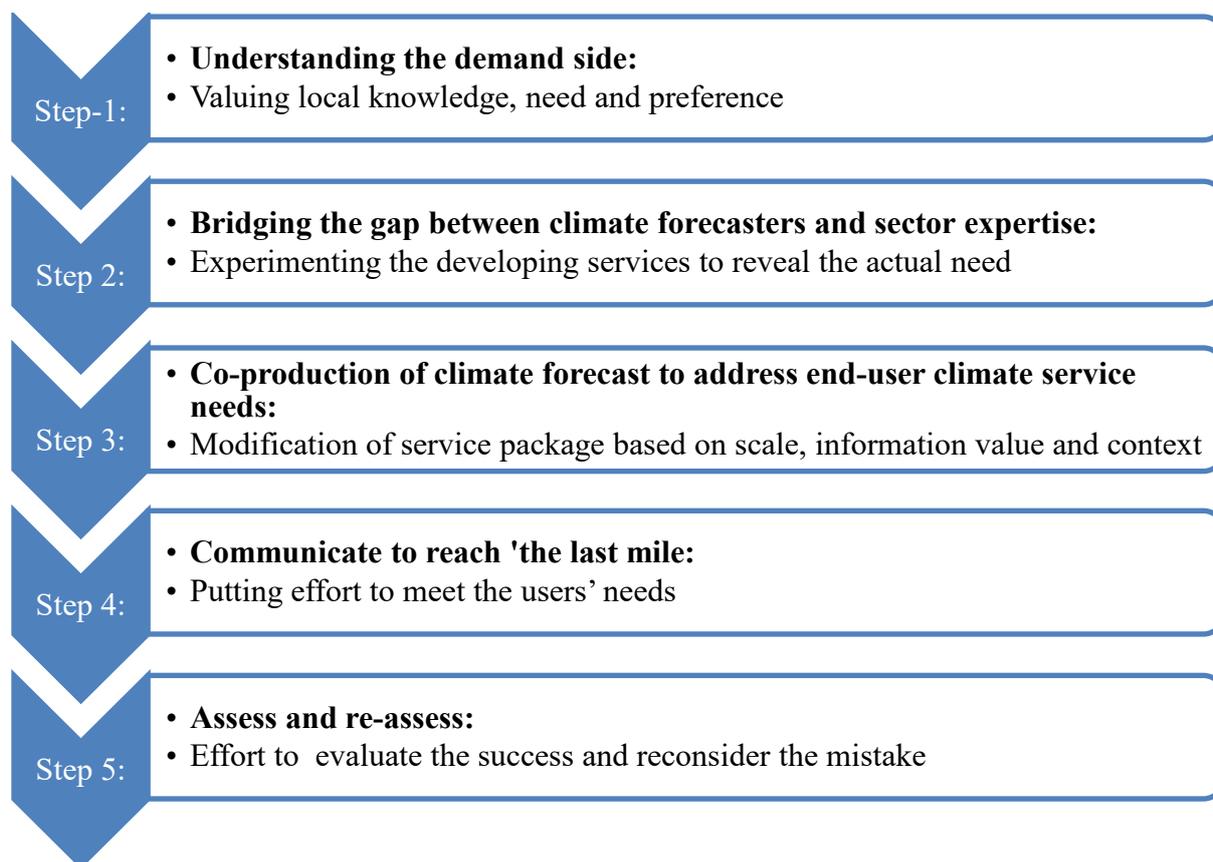


Figure 1: Steps of Overall Climate Information Services Delivery (Tall, 2013)

Step 1: Understanding the demand side

Understanding women farmers' demand also implies valuing traditional sources of information. They should be asked to indicate the available information sources, the sources they usually use and information gap they have observed. At the beginning a field visit will be done to select two case study areas. During field visit some randomly selected farm women will be interviewed to locate the useful participants for Focus Group Discussion. Attention will be paid on age, education level, involvement with agriculture and socio-economic conditions in determining group composition. Discussion topic of the FGD will explore their understanding on agriculture, climate risk, their local practices (for example land use, crop choice, livestock keeping, harvesting and processing choice, watering homestead garden) for decision making and time slot they spent for farming. It is also important to analyze what they are doing currently and how those are affected by climate. Therefore, a seasonal calendar will be prepared in participatory approach.

A questionnaire based structured interview will also be carried out to understand the present access of women to climate services and their interest in accessing the climate services. Availability, quality and quantity of information sources will also be evaluated. The

variability of the weather they experience and adaptive strategies they usually take will be taken into consideration. Based on gap between desired service and actual service exist, women's choice will be evaluated for effective communication platform.

The demand and access of the climate services will also be assessed from provider side. Extension officers will be interviewed to know what type of information they provide to the farm women, how often and how do women take decision based on the service. Do extension officers like providing climate services to the farmers as a delivery man? What kind of barriers limit them from smoothly delivering the services? And what kind of capacity development they need to overcome the barriers.

Finally expert views can be noted to link the key decisions of the end users and climate information need to execute the decision through tailoring the climate services.

Step 2: Bridging the gap between climate forecasters and sector expertise

To reveal the gap first it needs piloting the services among the participants' women. The involvement of extension personnel as intermediaries of the services will be ensured. To bridge the gap a good network with sector experts such as DAE, DoF, DLS, CIT Department PSTU, CIMMYT or other relevant organization's personnel will be established at the early stage of piloting. The forecast data such as rainfall, cyclone, temperature, salinity intensity etc. will be collected from web-portal, auto-updated weather app and ongoing research of PSTU.

The collected data will be processed into a smaller form for easy and quick understanding. The customized information will then be used for developing forecast. Two research assistants will help researchers deliver the climate forecast with multiple existing platforms such as mobile call, SMS, club notice board, messenger group or indirect media. Based on the delivery women's use and preference of the climate services and information platform will be determined.

Step 3: Co-production of climate forecast to address end-user climate service needs

Considering geographical scale, time of research, convenience of adding value to climate information, speed of delivery and national goal of digitalization an iterative virtual platform is assumed to deliver further downscaled information to meet the needs of farm women (end user). The coproduction also entails converting the information into various forms such as graph, image, text, voice etc and in the form of appropriate language. All these things will be done based on expert workshop of multi-disciplinary team and their recommendation.

Step 4: Mechanism to deliver the climate information and link to the cropping calendar

The climate information will be delivered based on the prioritized information sources, meteoblue weather app for example, which is able to forecast weather of a particular area with indication of precision level. The information will be transmitted using messenger app where all the women farmers will be connected along with their local extension agent. Messenger allows text, voice and picture therefore easy to cover the information need. Before leaving a group post the scientific forecast will be translated into local language for easy understanding. However, meteoblue app is not the only one to use. A variety of credible information from other sources can also posted for facilitating the climate smart agriculture. We also wish to connect these women farmers with CIMMYT mungbean information service (if possible) that use mobile phone call as weather forecast. Indirect media, such as club leaders, can also pass that virtual information to the others who do not use smart phone and internet. The member women will be further trained on using the mobile app-based weather information so that they can operate and understand the meteogram. Five days and fourteen days weather information will be channelized twice in a week to help decision support in farming activities. Women will be encouraged to freely interact in group regarding their problem and conveniences. Two smart-phones will be delivered to trained group leader (in case they have no smart phone) to voluntarily pass the weather forecast. The research period will focus the major crop season (Mungbean and vegetables) where climate services are relevant. The intervention period is assumed from November 2020 to June 2021.

Step-5: Impact assessment

Assessment is assuming a continuous process throughout the program tenure. The discrepancies and barriers will be noted during weekly visit and brought under consideration. However, a post evaluation will be conducted to compare the achievement. The degree of women's engagement in climate services and the level of decision support will be evaluated through both conventional and participatory approach including interview, FGDs and case study. The assertion is that combining the qualitative and quantitative approach triangulates the findings that either approach cannot do alone (Chow et al. 2010; Sandelowski, 2003). A paperless data collection technique will be followed using smart phone. Data will be automatically recorded in Google form and Excel sheet. SPSS software will be used for descriptive statistics and thematic approach and narratives will be used in interpreting the qualitative data.

Time Line of the Research (Nov 2020 to Aug 2020)

Weekly Activities	Nov				Dec				Jan				Feb				Mar				Apr				May				Jun			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Step-1: Understanding local....																																
Site selection, group formation	█	█																														
Making women aware on climate and CSA: 1 interactive lecture for each group			█																													
Preparation of need assessment instrument			█	█																												
Need assessment survey, FGDs and data processing					█	█																										
Step-2: Bridging the gap.....																																
Network meeting with sector expats						█																										
Starting the forecast and identifying gap							█	█																								
Step 3: Co-designing.....																																
Expert workshop for modification of the service									█	█																						
Step 4: Delivering the service...																																
Tailoring the service and facilitation											█	█	█	█	█	█	█	█	█	█												
Step-5: Evaluation.....																																
Evaluation survey and discussion																					█	█	█	█								
Data processing and writing draft report																							█	█	█	█						
Writing final report and journal article																											█	█	█	█		

Meeting schedule with advisor (Ms Catharien Terwisscha van Scheltinga)

Sl.	Meeting agenda	Date and time	Platform
1	Preparation of needs assessment instrument	17 Nov 2020 6-7 pm (BD)	MS Team
2	Network meeting	24 Nov 2020 3-4 pm (BD)	MS Team
3	Expert workshop	5 January 2021 3-4 pm (BD)	MS Team
4	Preparation of evaluation	16 March 2021 3-4 pm (BD)	MS Team
5	Analysis and planning the writing	13 April 2021 3-pm (BD)	MS Team

Research Budget

Sl.	Items	Rate	No.	Amount (EUR)
1	Travelling	Lump-sum	-	300
2	Establishing farm-women's club	500	2	1000
3	Meeting/discussion			300
4	Student assistant for 8 months	150	2	2400
5	Stationary/consumable	Lump-sum	-	100
6	Equipment:			
i	Tab/smart-phone (in case the group leaders do not have smart phone. Otherwise budget will be shifted to other cost such as publishing articles)	200	2	400
ii	Internet	Lump-sum		100
iii	Teaching aid	Lump-sum	2 set	100
iv	Printer and/or refill	Lump-sum	1	100
7	Others (eg. maintaining liaison)	Lump-sum	-	200
			Total	5000
Total in words: Five thousand Euro only				

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