Consultation Workshop on the Project: Consortium for Scaling-up Climate Smart Agriculture in South Asia (C-SUCSeS)

Brainstorming the Challenges and Opportunities of Tackling Climate Change in the Region

(March 23–March 24, 2022)

Organized by:

International Food Policy Research Institute, South Asia (IFPRI-SAR)

In collaboration with:

South Asian Association for Regional Cooperation (SAARC) Agriculture Center (SAC), Bangladesh

SAARC Afghanistan Bangladesh Bhutan India Maldives Nepal Pakistan Sri Lanka

SAARC Agriculture Centre

IFPRI INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE

SAARC Development Fund

IFAD Investing in rural people

Introduction

Consortium for Scaling-up Climate Smart Agriculture in South Asia (C-SUCSeS) is a four-year joint initiative between South Asian Association for Regional Cooperation (SAARC) Agriculture Center (SAC), International Food Policy Research Institute (IFPRI), International Fund for Agricultural Development (IFAD), and the SAARC Development Fund (SDF). The program aims to foster partnership and cooperation between SAARC, National Agricultural Research and Extension Systems (NARES), IFPRI, and SAARC governments on the Climate-Smart Agriculture (CSA) agenda. The project also intends to support agricultural researchers' to generate and facilitate delivery of technological solutions to smallholder and women farmers, with a specific priority on the intensification and resilience of smallholder agriculture, contributing, inter alia, to increasing water management efficiency, promote innovative, pro-poor approaches and technologies with demonstrated scaling-up potential, strengthen partners' institutional and policy capacities, enhance policy engagement, and generate and share knowledge.

The execution of the project involves, among other things, creation of inventory of CSA technologies, participatory research, CSA technologies assessment, policy analysis, identifying institutional constraint in scaling up CSA technologies, networking, and knowledge management. Considering the highly technical nature of the project's activities, it becomes imperative for the stakeholders to clearly understand the key deliverables before the initiation of the project in true earnest. Moreover, the virtual meeting is unable to help the stakeholders in understanding the technical issues with absolute clarity. Therefore, it becomes essential to conduct in-person meetings to elucidate the technicalities of the project activities unambiguously for the effective execution of the project. Additionally, the involvement of different stakeholders makes the implementation of the project complex and diverse. It becomes difficult for the Project Coordination Unit (PCU) at SAC to coordinate and collaborate with all the stakeholders without having any formal personal meeting. It is equally crucial to discuss the Program Implementation Manual (PIM) in detail at a common platform to clear ambiguities and create transparency for effective implementation of the project. Lastly, presentation of Monitoring and Evaluation (M&E) at this meeting will serve as a platform for effective execution of the project. Hence, all these reasons taken together make the conduction of this meeting in person essential.

Consultative workshops have become very popular in developing contexts to address new and emerging issues and seek professional solutions to it. This workshop aims at brainstorming the challenges and opportunities in tackling climate change in South Asian countries. Resource constraints determine each nation's strategies to deal with obstacles in its desired manner. Therefore, the workshop aims to provide a platform for the member countries to convene and discuss their problems and possible solutions so as to arrive at a consensus to develop an array of technologies to help mitigate the devastating effects of climate change on food and income security. The key goals and potential outcomes of this project are described below.

Objectives:

1. To discuss the technical aspect of the project activities in detail for clarity and to set the tone for the implementation of the project

a. To streamline common project management and implementation protocol for successful implementation

2. To carry out selection of CSA technologies in particular countries through experts' solicitation and establish monitoring and evaluation system for the project.

Desired outputs:

1. All the stakeholders gain a common understanding of all the technical aspects involved in the project implementation
2. Streamlining project management and implementation protocol for smooth execution of the project activities
3. Selection of best CSA technologies for the respective countries for implementation and establishing M&E system.

List of the participants and the agenda of the workshop is attached in the Annexure.

The day-wise proceedings for the workshop are described below.

Day 1 (March 23, 2022)

The program started with registration of all the participants attending the consultation workshop. Thereafter, the event began with welcome remarks from Dr. Shahidur Rashid, the Director of IFPRI-SAR, who joined virtually to welcome all the attendees in Nepal. The welcome remarks were followed by opening remarks by Dr. Md. Baktear Hossain (Director, SAC, Bangladesh) and special guest remarks by Mr. Roshan Cooke (Country Director for Nepal and Bhutan, IFAD) and Dr. Rajendra Prasad Mishra (Joint Secretary, Ministry of Agriculture and Livestock Development, Nepal).

Dr. Rashid welcomed all the participants to the 'Brainstorming Session on the Challenges and Opportunities of Tackling Climate Change in the Region'. He mentioned the continuous commitment required to foster climate resilient and sustainable food supply, while building inclusive and efficient value chains and trade systems which has led to regional partnerships with the Association of Southeast Asian Nations (ASEAN) and the Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC). Further, it was stated that the workshop provides an opportunity for collaborative efforts to generate evidence-based policy solutions that can accelerate climate-resilient and sustainable food supply in South Asia. Moving ahead, Dr. Rashid emphasized the urgent need to expand adoption of CSA technologies in the region as agriculture is highly risky, which has further magnified with climate change disrupting the agri-food supply chains in the region. The need to integrate climate change adaptation and mitigation strategies along with ensuring food, nutrition, and livelihood security of the people in the region was also stressed. The necessity for equitable distribution of resources, poverty alleviation, and gender empowerment to marginalized and underprivileged population in the region was also brought to the fore. It was also iterated that continuous collaboration among the member countries to support agriculture research will help in developing pro-poor technologies with potential to scale-up, which will assist in strengthening institutional and policy capacities, thereby enhancing policy engagement and knowledge dissemination among each other.

Finally, Dr. Rashid expressed his gratitude to Dr. Md. Baktear Hossain, Dr. Pramod Aggarwal, and Dr. Arun Kumar Joshi for agreeing to chair the technical sessions on identifying viable and gender-friendly CSA technologies and practices. He wished good luck for a fruitful discussion and hoped that joint efforts from all the member countries would yield opportunities and policy solutions on scaling-up CSA technologies in South Asia.

Dr. Hossain greeted all the participants from IFPRI and SAC, and focal points from all the member countries, IFAD, and SDF. He expressed his gratefulness to be a part of the workshop and thanked IFPRI for organizing the same. The World Bank study which states that the world will face higher food insecurity, whereby approximately 70 percent more food production than at present would be necessitated by 2050 to feed around 9 billion people, was cited. This challenge is intensified as both South Asia region and the agriculture sector as a whole are highly vulnerable to the adverse impacts of climate change. It was further mentioned that agriculture is a major contributor to global climate change, contributing around 20–30 percent of the total greenhouse gas (GHG) emissions. Additionally, he acknowledged that South Asian countries were working rigorously to curb the effects of climate change at the national level, and regional cooperation among member nations has the potential to develop economic capabilities and help the countries in navigating the problem on the global platform.

Dr. Hossain highlighted that the C-SUCSeS project aims to promote collaboration among NARES in the member countries, IFPRI, and SAARC governments to identify the obstacles and its possible solutions to deal with climate change in the countries of South Asia. The program intends to support the role of agricultural research to generate and facilitate the delivery of technological solutions to smallholder farmers with special focus on sustainable intensification and promoting resilience. Furthermore, the foci of the workshop were highlighted; namely prioritization of CSA technologies through cross-country learning, and discussions about other aspects of the project, including benefit–cost analysis, strategies to scale-up CSA technologies, policy constraints associated with scalability, and regional cooperation strategy to support scaling-up of CSA technologies among the SAARC countries.

Dr. Hossain concluded by mentioning the PIM and M&E system on a common platform for effective implementation of the project. The crucial role of the workshop as an important starting point for the successful implementation of the project was also underscored. Finally, he expressed his sincere thanks to the honorable special guest, national focal points of SAARC Member States, and the participants from IFAD, SDF, IFPRI, and SAC.

After the welcome remarks, two special guests, Mr. Roshan Cooke and Dr. Rajendra Prasad Mishra, addressed the audience.

Mr. Cooke thanked all the delegates and colleagues present at the gathering. He conveyed his pleasure in joining the meeting and mentioned that the project was a success of the long process that began in 2011. The discussion on the global food crisis in 2008–09, which Dr. Rashid had started, was continued, and he mentioned about the drought in Russia which severely affected the wheat production in the middle of the last decade. He stressed that the role of climate change at that time had been significant and vulnerability of monocropping systems was high. It was also observed that the recent COVID-19 pandemic has been a major setback for agriculture systems. Mr. Cooke further highlighted that 60 percent of global calorie intake comes from cereals, out of which approximately 60 percent is derived from rice. The dependence of South Asia on rice is very high and the changing climate pattern is creating a worrisome situation. Heat stress, combined with high humidity levels is very harmful for rice, and it is important to find ways to cope with the associated production related challenges given the high dependence on rice. He expressed his best wishes to all the dignitaries present in the audience for a fruitful discussion ahead.

The last inaugural address was made by Dr. Mishra to the audience. He welcomed all the guests to Nepal and expressed his warm greeting on behalf of the Ministry of Agriculture and Livestock Development, Government of Nepal. He expressed his pleasure in noting that the South Asian countries have forged a strong relationship with IFPRI to implement CSA project effectively. SAC's core work program focuses on bringing together agricultural research centers and extension agencies to develop and share knowledge on climate smart technologies and best practices and to develop scientific strategies for collective responses. He exhibited his confidence that SAC and IFPRI, along with the member countries, will yield

important outcomes through this two-day brainstorming session on climate change. Further, Dr. Mishra strongly urged all the experts to implement project activities diligently and actively participate in policy studies on CSA to pave the way for the scaling-up of women-friendly CSA technologies. This would contribute towards fostering regional cooperation for sustainable and resilient agricultural adaptation in the region. Additionally, it will also address the constraints on streamlining climate smart strategies and technologies through testing and validation of available technologies, policy analysis, knowledge sharing, capacity building, and development of strategies for the scaling up of such technologies in our region.

Dr. Mishra offered his deep gratitude to IFPRI for organizing the brainstorming session on climate change at a time when our region is grappling with climate change effects on the agricultural sector. He felt honored to have had the privilege of inaugurating the vital brainstorming session. IFPRI was applauded for effectively coordinating and networking with experts in the region for this two-day session. Lastly, all participants were wished a wonderful stay in Kathmandu.

Technical Session

The technical session took place after the inaugural session, which included presentations from all the member countries on the inventory of existing CSA technologies, opportunities, challenges, policy frameworks, and gender sensitive components of CSA practices. Ms. Jyotsana Dua gave a brief snapshot about the financial and administrative arrangements for the workshop and Mr. Kinzang Gyeltshen presented the overview and 1st Annual Work Plan Budget (AWPB) of the project prior to the research presentations.

Mr. Kinzang Gyeltshen started his presentation by presenting the genesis of the project in the form of a timeline extending from 2016 to 2021. In 2016, SAC–IFAD conducted a scoping study in CSA and the 3rd SAARC Agriculture Ministers meeting endorsed this study and urged for broader engagement with IFAD. In 2017, SAC–CGIAR roundtable meeting identified CSA as a high priority area, which led to SAC–IFPRI consortium to promote CSA with support from IFAD in 2018. In 2019, the 4th SAARC Agriculture Ministers meeting endorsed the project and IFAD managed to get on board SAARC Development Fund as co-financer of the project. This led to the signing of the grant agreements between SAC and IFAD on November 5, 2020, and SAC and SDF on October 27, 2021. This paved the way for the formal launch of the project on November 24, 2021. Mr. Gyeltshen went on to describe the goals and objectives of the project. The main goal is to promote sustainable and resilient agriculture intensification through enhanced capacity building to scale-up

CSA strategies and technologies. The key objectives of the project are to accelerate the identification and scaling-up of viable CSA technologies through national policy program and setting up an effective and efficient mechanism for knowledge sharing, policy dia¬logue, and cooperation. The four main components of the project were also enumerated, namely, scal¬ing-up technically viable and gender-sensitive CSA technologies for smallholder farmers, policy analysis and institutional development, knowledge management and capacity building, and project management.

Moving ahead, Mr. Gyeltshen highlighted the targeted beneficiaries, which included 7,500 direct beneficiaries in the SAARC region and 50,000 smallholder farmers, who will indirectly benefit from the program activities through knowledge dissemination and scaling-up of CSA activities. It was further highlighted that the budget allocation for each component is for a period of four years from 2021 to 2024. Finally, the status of current fund allocation to member countries and IFPRI was described, along with stating the names of the national focal points for respective countries and project steering committee members.

Presentation from Member Countries

Bangladesh: Dr. Md. Shahiduzzaman started his presentation by providing an overview of agriculture in Bangladesh along with statistics related to population, population growth rate, population density, rate of education, per capita income, total cultivable area, irrigated area, contribution of agriculture to GDP, growth rate in agriculture, cropping intensity, net cropped area, and gross cropped area. Further, statistics on land under different crops was provided where rice occupied the highest area of around 76 percent, followed by maize (3.15 percent), Potato (3.08 percent), oilseeds (2.19 percent), and wheat (2.21 percent). The progress of agriculture in the country measuring food production was delineated in lakh (100,000) metric tons (MT), where rice contributed around 386.07 MT, potato around 106.12 MT, and vegetables around 197.18 MT. It was also highlighted that Bangladesh stands first in jute export, second in jute and jackfruit production, third in rice, vegetables, and onion production, fourth in tea and fish production, and fifth in potato and guava production across the globe.

Moving ahead with the presentation, the strategies for agriculture, food and nutrition security taken at national level, which included increasing resilience in agricultural production systems, diversification in agriculture, establishment of commercial farms, introduction of precision agriculture, using nanotechnology in agriculture, and encouragement of solar power in irrigation systems were also mentioned. The various challenges besetting agriculture in the country were also propounded, including rising population, loss of cultivable land, river erosion, depletion of soil fertility and groundwater level, and climate change like salinity and drought which contributes around 60 percent. The various CSA techniques were then put forth, including conservation agriculture which encompassed zero tillage and strip tillage, conserving soil moisture whereby yield of maize and wheat increased by 5–10 percent, with a reduction in cost of production by 15–20 percent.

The characteristics of different ecosystems in the country were then introduced, including saline, charland, haor, and hill. Saline ecosystem was characterized as areas of submergence, deficient in available soil moisture, mono-cropped area, brief winters, with late harvest of T. aman rice, among other things. Charland ecosystem contains coarse soil texture, low organic matter, and low soil moisture and nutrients. Haor ecosystem land areas have acidic soil, nutrient deficiency, and are predominantly single cropped areas of primarily Boro rice. Lastly, hill ecosystem have areas which witness soil erosion and degradation, scarcity of irrigation water, low soil fertility, uneven land surface, with limited areas under cultivation. Dr. Shahiduzzaman mentioned about the impacts of climate change in the country, which included summers getting longer, irregular monsoons, heavy rainfall over short duration resulting in water logging, and increased frequency of floods, droughts, and salinity intrusion.

Bhutan: Mr. Jigme began his presentation by providing a background about the country, stating that less than 3 percent of area is under agriculture, and contributes around 17 percent to the country's GDP while providing livelihood to 57 percent of its population. The various challenges faced by agriculture include excess rainfall (1 percent), hailstorms (4 percent), drought (2 percent), landslides and soil erosion (1 percent), land shortage (14 percent), limited access to the market (15 percent), unproductive land (15 percent), pests and diseases (16 percent), insufficient irrigation supply (28 percent), crop damage by wild animals (43 percent), and labor shortage (53 percent). The impact of climate change is by way of reduction in agricultural water supply, erratic/excessive rainfall, loss of land and soil fertility, hailstorms, pests and diseases, and droughts.

Further, various CSA technologies developed in the country were presented. These included:

- improved planting and crop management (use of drought tolerant, pest and disease resistant, early maturing varieties of cereals and vegetables);
- soil conservation and nutrient management (manure, bio-gas slurry, terracing and land bunding);
- crop intensification techniques (maize intercropping with legumes, agroforestry in cardamom using shade trees); and
- improved water and irrigation management (sprinkler and drip irrigation in vegetables and fruits orchards, ridge system of planting for potatoes).

The five best CSA technologies were sustainable land management, climate smart irrigation, protected cultivation, electric fencing, and climate resilient varieties. The action plan created by the country to scale-up CSA practices include mapping and context analysis with stakeholders working on climate change related issues in the Department of Agriculture, desk review of CSA activities/documents, consultative workshop with researchers, district agriculture officers and extension officers, focus group discussions with farmer groups, interviews with farmers, and field visits to selected areas.

Further, the different challenges faced by the country in creating CSA inventory were presented, which include a paucity of records and documents on CSA and a lack of national capacity in terms of institutions, infrastructure, humans, and technology. Participatory research is limited to few technologies in the country, mainly implemented in southern and eastern districts, and primarily dominated by funding and implementing agencies. The various difficulties faced in carrying out participatory research are lack of

national capacity, limited understanding of CSA concept, framework, insufficient real-time data on climate and habitat change, budget issues, and lack of interest and time by the participants.

India: Dr. J. V. N. S. Prasad provided evidences on climate change in India, rise in maximum and minimum temperatures during monsoon season, increase in winter mean temperature, increase in incidences of heavy rainfall and floods, expansion of arid regions, and melting of glaciers. The projected impact of climate change on various commodities demonstrated by Dr. Prasad is as follows.

1. Rice – yield to reduce by 12 percent by 2040 under RCP 4.5
2. Wheat – yield loss up to 9 percent by 2040 under RCP 4.5
3. Maize – yield reduction up to 18 percent by 2040 under RCP 4.5
4. Mustard – yield loss of up to 12 percent by 2040 under RCP 4.5
5. Chickpea – yield decrease by 7–16 percent in AP

The flagship program of ICAR, National Innovations in Climate Resilient Agriculture (NICRA), was also mentioned. The main objectives of this program are to undertake strategic research on adaptation and mitigation, validate and demonstrate climate resilient technologies on farmers' fields, strengthen the capacity of scientists and other stakeholders in climate resilient agriculture, and support policy guidelines for wider scale adoption of resilience enhancing technologies and options. The challenge faced by them in this program is to enhance the resilience of Indian agriculture to climate variability and climate change. The major outcomes of the NICRA program were thereafter highlighted, which are as follows.

- Preparation of district agricultural contingency plans
- Establishment of state-of-the art climate change research infrastructure
- Assessment of district level risk and vulnerability of Indian agriculture done for 573 districts
- Developed eight climate resilient varieties/hybrids in four major crops (rice, green gram, lentil, and maize)
- Focused on establishing climate resilient villages in 151 vulnerable districts
- Training of large number of students on climate change research

Maldives: Mr. Amir Ali began his presentation by providing a background of the country. The archipelago consists of 1192 islands covering an area of 8,95,000 km^2 which depend heavily on tourism for revenue, and the share of agriculture in the national GDP as per 2018 statistics stands around 1.3 percent. There are 50 islands leased for agriculture purpose in the country. It is emphasized that crop production in the country is highly affected by climate change and will continuously be affected negatively due to reduced availability of water and sanitation aquifers, loss of land due to sea-level rise, growing heat stress on plants, and changes in rainfall patterns. Various CSA projects undertaken in the country

are introduced, including small-scale hydroponics systems (introduced in 2016) and Low Emission Carbon Resilient Development Project (between 2012 and 2017), in which 542 smallholder farmers from 7 islands were sensitized against climate change and adopting CSA practices such as rainwater harvesting, storage, and drip irrigation.

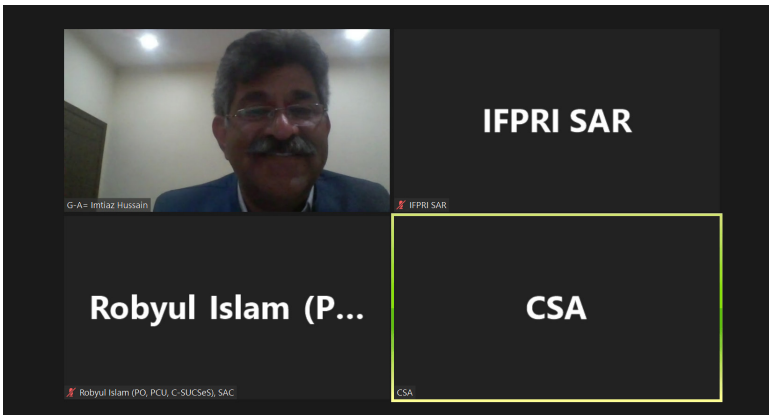
The key strategies and guidelines laid by the government includes Maldives Climate Change Policy Framework, 2015, Strategic Action Plan 2018–2023 which is aimed to reduce economic and ecological wastage from agricultural practices, and introduction of agro-forestry practices. The current status of CSA technologies adopted were then highlighted wherein it was stated that drip irrigation has been demonstrated in 6 agricultural islands since 2016 and irrigation equipment have been provided to 70 farmers, while infiltration gallery has been introduced in late 2021 and more than 50 farmers are working with it. Hydroponics system has been established in the backyard of 40 households on 4 islands, integrated pest management, use of improved varieties where new coconut varieties has come into practice in 2021, rainwater harvesting, and irrigation water storage techniques. A list of potential CSA practices enumerated included integrated nutrient management, integrated pest management, protected cultivation, cold and dry storage operated by solar energy, vertical farming, indoor farming, and infiltration galleries. On the other hand, the top five successful CSA technologies in the country have been hydroponics, drip irrigation, introduction of improved varieties, rainwater harvesting, and infiltration galleries. Finally, Mr. Ali presented the key issues and challenges faced by the country, namely, ineffective extension approaches, limited technical staff, high cost of transportation and logistics, high cost of inputs, inaccessibility of technologies and inputs by the households, and lack of motivation by the farmers due to limited market access.

Nepal: Dr. Amit Prasad Timilsina began with a brief introduction of the country, followed by inventory of CSA technologies, participatory research on CSA technologies, challenges in implementation of the project, and the way forward. It was pointed out that 60 percent of the country's population is engaged in agriculture, contributing around 25 percent to the national GDP. Around 0.7 to 1 million farmer households have already adopted CSA technologies in Nepal, resulting in 20–50 percent increase in crop yields with 5–10 percent increase in overall production. Around 0.5 million poor and vulnerable farmers have benefitted from CSA investment plans, with close to 3 million people including 0.5 million women farmers having gained from adoption of CSA technologies. Further, knowledge gap, limited project fund, lack of coordination, and incomplete and limited CSA documentation were stated as the key challenges faced in the preparation of CSA inventory.

The successful CSA technologies adopted in the country were laser land leveling (LLL), direct seeded rice (DSR), alternate drying and wetting method, green manuring, zero tillage in wheat, intercropping, water harvesting, stress tolerant seed varieties, solar pump-based irrigation system, and advisory from agro-met department. Additionally, the top five CSA practices mentioned were LLL, DSR, zero tillage in wheat, intercropping, and stress tolerant seed varieties. The main challenges faced by the farmers in adopting CSA techniques include

mindset, landholding size, suitable machine availability, lack of funds, and lack of expert staff. On the other hand, the main obstacles in networking and knowledge dissemination in the country are language barriers, funds, and migration. Lastly, the suggestions proposed by the focal member were organizing short orientation training on CSA before implementation, capacity building and awareness among the farmers, and increase in participation by private players along with government institutions.

Pakistan: Dr. Imtiaz Hussain started by laying out the country's basic economic characteristics. These included the contribution of agriculture to the country's GDP (around 20 percent), share of agriculture activities in employment at around 220 million or roughly 42 percent of the workforce, and the major crops cultivated in the country by way of wheat, rice, maize, cotton, and sugarcane. The current crop productivity of wheat is 2.97 tons/ha, rice is 2.52 tons/ha, maize is 5.97 tons/ha, sugarcane is 69.54 tons/ha, and cotton is 3.64 tons/ha. It was also stated that Pakistan ranks fifth on climate change risk and vulnerability index. Further, the livestock sector contributes around 78 percent to GHG emissions and crop sector contributes around 22 percent to GHG emissions.



Various CSA technologies that have the potential for scaling-up were thereafter enumerated. These included LLL, alternate wetting and drying method, raised bed/ridge furrow irrigation system, solar powered sprinklers for pulses, improved/drought tolerant seed varieties, zero tillage, DSR, crop calendars, integrated pest management, integrated nutrient management, crop diversification, and green manuring. Drought and heat tolerant wheat and cotton varieties have been adopted by around 20–30 percent in Punjab, Sindh, and Khyber Pakhtunkhwa (KP) areas by small and medium farmers. LLL has reduced irrigation loss by 25–30 percent and labor by 35 percent, while increasing crop yield by 15–20 percent. Raised bed/ridge furrow method contributes to saving water by 30 percent and has resulted in rise in maize and wheat productivity by 30 percent and 12 percent, respectively. DSR method has resulted in 10 percent higher yield of rice, 25 percent saving in irrigation water, and 33 percent decrease in GHG emissions.

The main challenges faced by the country in carrying out participatory research was deliberated upon, and included increased requirement of technical manpower, high costs, unwillingness of farmers to take risk, and lack of expertise. Further, Dr. Hussain laid out the key challenges in implementation of the project, which encompass financial constraints, unavailability of funds, and lack of collaboration among the member states. He also stated that the main drawback in networking and knowledge management is the policy shift from commodity-based approach to integrated/multi-dimensional approach. The presentation concluded with suggestions for effective and successful implementation of the project through joint planning of action plan, selection of common CSA techniques, regular meeting of partners, rise in exposure visits, and capacity building of institutions.

Sri Lanka: Dr. H. K. Kadupitiya began by showcasing the country's location, river basins, structure of village

tank cascade system, major irrigation schemes, climatic zones, rainfall pattern, and various climatic seasons present in the country. The yield potential of different crops was then presented in which it was shown that paddy has 4.3 t/ha, maize has 3.8 t/ha, big onion has 17.7t/ha, red onion has 13.8 t/ha, along with many more crops. Later, the trends in annual daily mean temperatures, and maximum and minimum temperatures were shown as an effect of climate change in Sri Lanka. It was also pointed out that the number of cold days and cold nights in a year were decreasing while warm days and warm nights have been increasing. Furthermore, the annual total rainfall shows an increasing trend while there are incidences of rise in one-day and five-day maximum rainfall in dry zones. The current policy priorities for CSA technologies in the country are to overcome and defeat climate change challenges, economize the use of water, promote sustainable land management, increase green cover, and strengthen CSA interventions focusing on the food systems.

Later, Dr. Kadupitiya highlighted the key agencies involved in carrying out CSA technologies, which included Ministry of Agriculture, National Department of Agriculture, Provincial Department of Agriculture, Department of Agrarian Services, Irrigation Department, Coconut Cultivation Board, and Tea Small Holding Authority. A list of potential CSA technologies for scaling-up was also presented, consisting of crop diversification, multi-purpose soil conservation bunds, solar powered micro-irrigation, parachute method of paddy cultivation, protected agriculture, rainwater harvesting techniques, application of biochar, rainwater recharging, and climate forecasting based on agro-met advisory and alerts. Finally, the main drawbacks that the nation faces while implementing CSA practices were highlighted, including fragmented organization structure, lack of established data sharing mechanism, weak collaboration among implementing agencies, lack of national inventory documents, and non-reporting of many operational CSA programs

Each research presentation was followed by a discussion from chairperson and co-chairpersons. The discussion captured the following points between the panelists and the country representatives.

- There is something lacking with the background provided behind adoption of CSA. The definition seems clear, but there is a lack of motivation around CSA.
- How does one label a technology as climate-smart?
- What are the principles based on which a technology is classified as CSA?
- A training session should be conducted to align the understanding of all stakeholders including representatives of member countries.
- A matrix needs to be developed to categorize CSA practices because water scientists may focus on water optimizing techniques while soil scientists may emphasize on techniques stressing on soil fertility or soil conservation. Therefore, a common matrix on the basis of which one can classify an activity as CSA is required.
- Prioritization of technologies should be backed by rigorous scientific logic and not based on practical or other reasoning.
- GHG emissions can be calculated and be included in the matrix, as GHG emissions form an important component for considering a technology as CSA or not.

- Formal capacity building workshop can be organized to study the various components of CSA.
- Scoring method can be developed to score each technology based on certain parameters to rank and order the CSA techniques.

The second technical session was based on a group activity that involved focal points from all the countries and the activity was based on prioritizing the CSA technologies for each country and the parameters based on which each national representative was choosing the CSA practices. The table given below

shows the technologies prioritized by each focal representative of member nations.

Country	CSA technology prioritized
Bangladesh	• Combine harvester • Improved seed varieties • Mulching • Rainwater harvesting • Zero tillage
India	• Broad Bed Furrow • Improved seed varieties • Resilient intercropping system • Zero tillage
Nepal	• Direct Seeded Rice • Zero tillage in wheat • Intercropping in maize crop • Laser Land Leveling in Terai region • Stress tolerant seed varieties

Country	CSA technology prioritized
Sri Lanka	• Laser Land Leveling • Micro irrigation • Parachute method of paddy cultivation • Multi-purpose soil conservation bunds • Solar powered water pumping systems

Bhutan and Pakistan were not involved in the above activity as they had attended the session virtually. This exercise was also followed by a healthy group discussion. The various parameters used by the countries to prioritize the technologies are given below.

- Production and yield of the crops
- Income of the household
- Ease of implementation of the technology
- Adaptation to the technology
- Cost of cultivation
- Women-friendly technology
- Off-farm activities
- Policy issues
- GHG emissions
- Stress tolerant seed varieties
- Marginalized and smallholder farmers
- Area under CSA technology

The comments received from the panelists included the following points.

- Most of the times one speaks about use of CSA as an on-farm activity while there are many off-farm activities such as storage, logistics, and many others. Experts should lay stress on non-farm activities also.
- Since Maldives is an archipelago, aquaculture can be an emerging industry which can be boosted, and revenue can be generated largely from it rather than from cultivation of crops.

- Farmers' perspective is important, and one should think about the primary stakeholders, that is, farmers, and understand their situation and act upon it.
- Ease of implementation of technology should be considered while implementing a technology.
- Combine harvester is a CSA technology in Bangladesh, as earlier large amounts of standing paddy crop used to get destroyed while harvesting manually or due to rainfall. Government has introduced about 70 percent subsidy on it which should be promoted more and more.
- Capacity building exercises should be conducted among the farmers to educate them around the benefits of CSA practices.
- Cost of cultivation is another important aspect which should be kept in mind while promoting CSA activities.
- Take learnings from the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS) studies on CSA technologies.
- Borlaug Institute for South Asia (BISA) has done lot of studies for the past 10 years which can help in ranking the CSA technologies.
- Information sharing among the member countries is a key aspect of the project.

After this small activity, next presentation was given by Mr. Himanshu Pathak on IFPRI's engagement with SAARC nations, benefit–cost analysis, strategies for scaling-up of CSA technologies, and various policy constraints associated with scaling-up, and the day finally culminated with the presentation on knowledge management (KM) and capacity building by Ms. Rebika Laishram.

Mr. Pathak presented three examples from literature to set out the way IFPRI plans to conduct the benefit–cost analysis for the CSA technologies. These examples were from 'Cost and Benefits of CSA practices in Tanzania' (Karanza et al. 2020), 'BC analysis of CSA options in South Africa: Balancing gender and technology' (Mutenje et al. 2019), and 'Costs and benefits of climate-smart agriculture: Case study in Guatemala' (Sain et al. 2017). The first two studies focused on calculating benefit–cost ratio based on calculating net present value (NPV), internal rate of return (IRR), and payback period, while the third study focused on conducting participatory research to calculate the ratio. For expanding the CSA technologies, he provided the two broad categories of policy, institutional, fiscal, and social constraints and strategies for scaling-up the CSA practices. Finally, the regional cooperation strategies were presented which included tariff and non-tariff barriers that SAARC countries have to face for scaling-up CSA technologies, develop approaches to share CSA knowledge among the member nations, and creation of a knowledge platform.

Ms. Laishram thereafter presented on KM and capacity building. She started by stating the objective of the KM is to disseminate knowledge sharing and evidence-based policy dialogues on CSA technologies and best practices. The functions and composition of CSA network (technical advisory committee, national networks, working groups, and CSA secretariat) was then expounded. It was also stated that the following points come under the ambit of the scope of work.

- Facilitating the alignment and engagement of all relevant stakeholders from governments, civil society, research and academia, farmers' associations, and the private sector

- Facilitate knowledge-sharing, research studies, and best practices
- Wider engagement through organizing annual forum/High Level Policy forums, to drive policy dialogues on the constraints of adoption and scaling-up of proven CSA technologies
- Develop and publish communication and outreach products
- Support coordination of exposure visits and capacity building workshops
- Identify opportunities for resourcing the network and develop proposals
- Developing Annual Work Plan

Thereafter, developing training materials and organizing exposure visits for CSA technology training and awareness building was elaborated upon while talking about the component of KM and capacity building. The support needed from the focal members for this purpose is to identify the regional training facilities, identifying existing CSA training materials, and support in translating training materials into local languages. Moreover, 13 case studies will be documented, including 3 each from India, Bangladesh, and Nepal, and rest from other countries. The learning routes that will be designed for information sharing would be policy roundtables and high-level policy conferences, compilation and dissemination of successful case studies, quarterly newsletter, and videos and illustrations on technology from farmer producer organizations. Lastly, Ms. Laishram presented the national and regional network structure, with the national network comprising of NARES, Farmer Producer Organizations (FPOs), research institutions, entrepreneurs, and related government technical agencies, while the regional network would be composed of focal member from each member country, representatives from regional partner organizations, and Technical Committee for Agricultural and Rural Development of SAARC (TCARD).

Day 2 (March 24, 2022)

The second day of the consultation workshop included presentations on M&E system by Mr. Md. Robyul Islam, Program Officer, PCU, SAC; program implementation manual by Mr. Kinzang Gyeltshen, Project Coordinator, SAC; SDF co-financing requirements, fund release, progress reporting, statement of expenditure, etc. by Ms. Rinzi Pem, Assistant Director, Social Window, SDF; and IFAD's supervision, mission, mid-term review, project completion and other requirements of IFAD by Ms. Sarah Fahmida Rahman, IFAD Project Focal, Italy. Finally, there was a vote of thanks from all the focal representatives and director from SAARC, Bangladesh.

Mr. Islam started his presentation by introducing the terms monitoring and evaluation; monitoring is the systematic and continuous collection, analysis, and use of information for management control and decision-making, while evaluation is a systematic and objective-wise assessment of an on-going or completed

project, its design, implementation, and results. The primary goal of M&E was thereafter laid out, which is to continuously assess the collective experiences of partnerships between the targeted beneficiaries, state, Non-Governmental Organizations (NGOs), and funding organizations to take systematic corrective action. According to IFAD 2012, M&E is about clarifying, deciding, gathering and analyzing, and explaining the reasons for success and failures of the project. It was explained that M&E is a participatory exercise and a dynamic process. Finally, the overall process of M&E was explicated, which comprised CSA policies mainstreaming to be monitored through documentation of government policy and programming documents, and agency-level implementation guidelines that would reflect recommendations and findings emerging from research and analytical work carried out in the project. This will be monitored through project M&E and annual progress reports. Lastly, it was mentioned that M&E reports and progress reports will be prepared by PCU with inputs from IFPRI.

Mr. Gyeltshen thereafter presented the PIM, where he started by stating the purpose, review, approval, and amendments related to PIM. The purpose of PIM is as follows.

- Serve as implementation guidelines for stakeholders.
- Provide processes and procedures to execute activities.
- Contain financial management and disbursement, reporting, and monitoring.
- Supplementary document to the GA and sub-GA.
- Guide as overall grant management and coordination from SAC.

The review, approval, and amendments to the PIM consist of the following guidelines.

- Program Steering Committee (PSC) will review and approve the PIM.
- IFAD will issue no objection to the PIM.
- Any amendment made shall be approved by PSC.

Further, he presented the roles and responsibilities of SAC, which is responsible to get clearance of AWPB and get No Objection Certificate (NOC) from IFAD, engage in high-level discussion with SAARC member states. Additionally, SAC will also convene policy dialogues, mobilize partners and maintain partnerships, maintain coordination, and provide office space and in-kind support for PCU. The names of key focal points from each member country and their key responsibilities were then mentioned, as were the key objectives and approaches of M&E. The knowledge management processes which were explained by the Ms. Laishram in her presentation were also highlighted. Mr. Gyeltshen also presented the financial management, reporting, and disbursement process for the project. Finally, the importance of C-SUCSeS project for South Asia was elaborated, which included the following points.

- Climate change is severely affecting the agriculture sector.
- SAARC embodies the desire of the peoples and governments of South Asia to work collectively to promote mutual understanding, good neighborly relations, and meaningful cooperation among the Member States.
- C-SUCSeS project is exactly striving to contribute to achieving these objectives.
- Strengthen regional cooperation for welfare of people through agricultural development.
- Build synergy to adapt to climate change and get access to international climate fund.

Following this presentation, Ms. Pem presented on SDF co-financing requirements, fund release, progress reporting, statement of expenditure, and other things. SDF social window eligibility guidelines, disclosures on fund release and disbursement, template for disbursement request, workplan, and quarterly reports, and M&E system was also explained. The last presentation of the day was put forth by Ms. Rahman on supervision, mission, mid-term review, project completion, and other requirements of IFAD. The IFAD's role in the project was categorized into three basic categories: overall supervision, partnership/policy dialogue, and share KM products. The timeline for the project was explained, mentioning the milestone, definition, and date by which each milestone is to be completed.

Next, the supervision mission of IFAD was laid out, classifying it into three broad categories:

- Fiduciary compliance – covering legal condition, financial management, procurement, and contracting.
- Performance assessment – progress towards objectives, activities and outputs, planning and budgeting, monitoring and reporting, governance and management, targeting, and gender equality.
- Implementation support – across regional and country levels.

The mid-term review process was also highlighted, which includes effective impact until now, timeline of program implementation, lessons learnt in design, implementation and management, decisions/actions, and program design efficiency, as was grant completion review, which included statement of expenditure, completion report, and audit opinion letter.

Lastly, all the focal members from the member countries expressed their thanks for the active participation in the workshop and expressed their willingness to actively participate in the project for its successful implementation and execution. Stress was also laid on the importance of promoting CSA activities which were women and small-holder friendly for enhancing sustainability and resilience in the agriculture sector of the South Asian economy. After this, Dr. Mamata Pradhan expressed vote of thanks to all the participants in the workshop for their active participation and fruitful discussion that was carried out among all the member countries. She thanked Dr. Aggarwal and Dr. Joshi for their active participation in the

brainstorming session and bringing out points to reflect upon and act accordingly. She thanked them for their comments and inputs on the procedure for ranking and prioritizing the CSA technologies through scientific approach. She also thanked Dr. Hossain and Mr. Gyeltshen for their constant support and active contribution in carrying out the project activities.

At the end of the session, Dr. Hossain expressed a vote of thanks to the audience present in the auditorium for their active involvement and engagement in the brainstorming session. He expressed his gratitude to all the focal members for their contribution in achieving sustainable and resilient agriculture with focus on technologies that are gender-friendly and suitable for small and marginal farmers. He also evinced hope that this continuous effort to strive for sustainability would continue in the future among all the member nations and would contribute to achieving food and nutrition self-sufficiency.

Annexure

Program Schedule:

Day 1 – March 23, 2022

Session	Speaker
Inaugural session	
Registration and tea	
Welcome remarks	Dr. Shahidur Rashid, Director, IFPRI South Asia (Virtual)
Opening remarks	Dr. Md. Baktear Hossain, Director, SAARC Agriculture Center, Dhaka, Bangladesh
Special guest remarks	Mr. Roshan Cooke, Country Director for Nepal and Bhutan, International Fund for Agricultural Development (IFAD)
Special guest remarks	Dr. Rajendra Prasad Mishra, Joint Secretary, Ministry of Agriculture and Livestock Development, Nepal
Group photo	
Tea/coffee break	
Technical session I Experts from SAARC member states' presentation on selection of climate smart agriculture (CSA) technologies for their respective countries Chair: Dr. Md. Baktear Hossain, Director, SAARC Agriculture Center (SAC) Co-chairs: Dr. Arun Kumar Joshi, CIMMYT Asia Regional Representative and MD, Borlaug Institute for South Asia (BISA) and Dr. Pramod Aggarwal, Regional Program Leader, BISA	
Workshop agenda and adoption	Dr. Mamata Pradhan, Research Coordinator, IFPRI
Financial and administration arrangement for workshop	Ms. Jyotsana Dua, Senior Office Manager, IFPRI
Overview of the project and 1st AWPB	Mr. Kinzang Gyeltshen, Project Coordinator, C-SUCSeS Project, Bangladesh
Bangladesh	Dr. Md. Shahiduzzaman, Chief Scientific Officer and head, On-farm research division, Bangladesh Agriculture Research Institute, Ghazipur, Bangladesh
Bhutan	Mr. Jigme, Principal Agriculture Officer, Agriculture Production Division, Ministry of Agriculture and Forests, Bhutan (Virtual)

Session	Speaker
India	Dr. J. V. N. S. Prasad, Principal Scientist (Agronomy), ICAR-Central Research Institute for Dryland Agriculture, Hyderabad, India
Maldives	Mr. Amir Ali, Director, Agriculture Training, Extension and Adaptive Research Section, Ministry of Fisheries, Marine Resources and Agriculture, Maldives
Nepal	Mr. Tika Ram Chapagain, Senior Scientist and Chief Agriculture Environment Research Division, Nepal Agriculture Research Council, Khumaltar, Nepal
Pakistan	Dr. Imtiaz Hussain, Deputy Director-General, PARC-National Agricultural Research Center, Islamabad, Pakistan
Sri Lanka	Dr. H.K. Kadupitiya, Director, Natural Resources and Management Center, Department of Agriculture, Peradeniya, Sri Lanka
Discussion and Q/A	
Lunch	
Technical session II CSA technologies and IFPRI's engagement with member states Co-chairs: Dr. Arun Kumar Joshi, CIMMYT Asia Regional Representative and MD, Borlaug Institute for South Asia (BISA) and Dr. Pramod Aggarwal, Regional Program Leader, BISA Moderator: Dr. Mamata Pradhan, Research Coordinator, IFPRI	
Prioritization of CSA technologies and cross-country learning	Co–chair and moderator
IFPRI's engagement with SAARC member countries: benefit–cost analysis; strategies for scaling-up CSA technologies policy constraints associated with sustainability with scalability; regional co-operation strategy to support scaling-up among SAARC member countries	Mr. Himanshu Pathak, Program Manager, IFPRI
Knowledge management and capacity building (CSA network, training, exposure visit, innovative knowledge sharing)	Ms. Rebika Laishram, Communication Specialist, IFPRI
Tea/coffee break	
End of day 1	
Welcome dinner	

Day 2 – March 24, 2022

Session	Speaker
Monitoring and evaluation system (M&E)	Mr. Md. Robyul Islam, Project Officer, PCU, SAC, Bangladesh
Program implementation manual (PIM)	Mr. Kinzang Gyeltshen, Project Coordinator, SAC, Bangladesh
SDF co-financing requirements, fund release, progress reporting, statement of expenditure etc.	Ms. Rinzi Pem, Assistant director, Social Window, SDF, Thimphu, Bhutan (Virtual)
IFAD's supervision mission, mid-term review, project completion and other requirements of IFAD	Ms. Sarah Fahmida Rahman, IFAD Project Focal, Italy (Virtual)
Concluding session	
Presentation of draft workshop proceedings	Rapporteurs IFPRI
Vote of thanks	Representatives from member countries
Vote of thanks	Dr. Md. Baktear Hossain, Director, SAARC Agriculture Center, Dhaka, Bangladesh
Lunch	
End of consultation workshop	

List of participants:

Name	Designation	Country
Dr. Rajendra Prasad Mishra	Joint Secretary, Ministry of Agriculture and Livestock Development	Nepal
Mr. Roshan Cooke	Country Director for Nepal and Bhutan, IFAD	Nepal
Dr. Md. Shahiduz-zaman	Chief scientific officer and head, On-farm research division, BARI	Bangladesh
Dr. J. V. N. S Prasad	Principal scientist (Agronomy), ICAR–CRIDA	India
Mr. Amir Ali	Director, Agriculture training, extension and adaptive research section, Ministry of Fisheries, Marine Resources and Agriculture	Maldives
Dr. Imtiaz Hussain (Virtual)	Deputy-Director General, PARC–NARC	Pakistan
Dr. H. K. Kadupitiya	Director, Natural Resources Management Center, Department of Agriculture	Sri Lanka
Mr. Jigme (Virtual)	Principal Agriculture Officer, Agriculture Production Division, Ministry of Agriculture and Forests	Bhutan
Dr. Amit Prasad Timilsina	Scientist (Agronomy), Nepal Agricultural Research Council	Nepal
Dr. Md. Baktear Hossain	Director, SAARC Agriculture Center	Bangladesh
Mr. Kinzang Gyeltshen	Regional Program Leader, C-SUCSeS Project	Bangladesh
Mr. Md. Robyul Islam	Program Officer, C-SUCSeS Project	Bangladesh

Mr. Md. Shazahan Islam	Finance Officer, C-SUCSeS Project	Bangladesh
Dr. Pramod Aggarwal	Regional Program Leader, BISA	India
Dr. Arun Kumar Joshi	CIMMYT Asia Regional Representative & MD, BISA	India
Dr. Shahidur Rashid	Director, IFPRI-SAR	India
Dr. Mamata Pradhan	Research Coordinator, IFPRI-SAR	India
Ms. Jyotsana Dua	Senior Office Manager, IFPR-SAR	India
Ms. Rebika Laishram	Communication Specialist, IFPRI-SAR	India
Ms. Anisha Mohan	Communication Associate, IFPRI-SAR	India
Ms. Shreya Kapoor	Research Analyst, IFPRI-SAR	India
Mr. Himanshu Pathak	Program Manager, IFPRI-SAR	India
Ms. Rinzi Pem (Virtual)	Assistant Director, Social Window, SDF	Bhutan
Ms. Sarah Fahmida Rahman (Virtual)	Regional Grant Analyst, Asia and Pacific Region, IFAD	Italy