The 5th Global Science Conference on
CLIMATE-SMART AGRICULTURE 2019
8-10 October 2019
Bali, Indonesia

Conference Summary

The 5th Global Science Conference on Climate-Smart Agriculture brought together over 410 participants, from more than 200 institutions, based in over 60 countries. This included participants from research institutions, governments, private sector and civil society, to catalyze action oriented partnerships for a transformation in our food systems, under a changing climate. Detailed summaries of thematic discussions are captured in this document, together with these highlights:

Communicate and Cooperate

This conference was about transformation and moving from science to action. To move forward, scale up and move to actions we need to build partnerships between science, the private sector, finance institutes, governments and civil society.

- *Science-based decisions require good science but also need a focus on the questions what science can do for practice and what can others do with science?*
- *Examples of new innovative technologies targeting farmers and other end users, financial and business models were presented at the conference.*
- *Loneliness is bad for brains and action, so get out and start connecting and build partnerships.*

Develop new business models

Transformation in food systems requires new business models, including:

- *New business models for research, e.g., avoiding salinity intrusion in over 600,000 hectares of rice in Vietnam through proper agro-climatic advisories.*
- *New models of technology development and deployment, e.g. the conference led to prioritisation of about 50 innovation combinations that participants came up.*
- *New models of paying for results, e.g. through the Agresults initiative.*

Show leadership

Transformation in food systems in response to climate change requires leadership, from businesses, governments, research institutions and civil society. The conference identified a number of opportunities and examples for showing such leadership, including:

- *Private sector are taking leadership, examples from Rabobank, Yara, Olam, Esoko, ITC, One Acre Fund and others were shared at the conference.*
- *Governments are showing leadership, and examples were showcased from Asia, Africa and Latin America, including the Government of Indonesia efforts to seek knowledge inputs to scale CSA investment in the country.*
- *Plans to organize a high-profile event for CEOs to build a coalition of CSA leaders and engage with government and public finance.*

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Address the implementation gap

Several global goals and targets exist with respect to climate change and food systems, but efforts to achieve these are not on track. This requires action to address the implementation gap, including:

- *Addressing the 'missing middle' for more effective policy implementation, e.g. as done through county level action in Kenya.*
- *Efforts to scale proven technologies and practices, e.g. solar irrigation in India..*
- *Digitizing agriculture, e.g. as done by Olam through the Olam Farmer Information System.*
- *Matchmaking to link science to action, e.g. through platforms like the Global Alliance for Climate Smart Agriculture.*

Identify levers for change

The food system is an incredibly complex one, and transformational change is only possible if the right levers are identified. The following levers for change were discussed in the conference:

- *The second set of Nationally Determined Contributions, offers an opportunity to develop farmer-centered NDCs that better address the goals of CSA (national, meso and local organization).*
- *Empowerment of women and youth as catalysts of change, e.g. through efforts of the International Fund of Agricultural Development (IFAD)'s Adaptation for Smallholder Agriculture Programme (ASAP).*
- *Enabling collective actions by farmer and consumer organizations, e.g. in Malawi and Zimbabwe.*

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Parallel Thematic Sessions

Report back from for rapporteurs

Theme 1: Empowering farmer and consumer organizations, women and youth

***Theme Leaders**: Australian Centre for International Agricultural Research (ACIAR), CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS), Global Resilience Partnership (GRP)*

Summary
Collective actions by farmers and consumers are key to driving transformational change in food systems to promote resilience of farmers at the bottom of the pyramid. At the same time, actions are needed to create conducive enabling environments that encourage producers, the private sector, business owners, researchers, investors and policymakers to innovate in ways that promote gender equality, sustainable land management, empowerment of farmers, and opportunities for youth. This theme focused on lesson learning from actions that build capacity and empower farmers, consumers, women and youth and their networks as part of the efforts to drive demand-driven solutions.

Expected outcome
Identify best practices and priorities to mobilize knowledge and action-oriented partnerships following up on commitments at the UN Climate Action Summit to empower farmers, consumers, women, and youth.

What progress was made towards achieving the expected outcome?
Farmer groups can empower women. Group membership enables women to access the inputs and services required to adopt CSA technologies, including finance, access to markets and aggregators, and information/extension. The involvement of women farmers, both separately in women's SHGs and/or in producers' organizations in each stage of the agricultural research process builds their capabilities and confidence to adopt CSA practices/technologies, promote transformation and are a scaling mechanism. Gender-responsive information dissemination channels, packaging, and trade-offs need to be explored. Democratic and equal approaches to benefits of CSA approaches result in sustainable and risk-averse land management for women and men. Strategies need to be developed to increase women's access to formal institutions for information, inputs and finance. As we empower women and men as well as farmer cooperatives, we need to consider the inclusion of agricultural insurance products in the technological packages and forge empowerment for resilient partnerships. Food system approaches need to take into account multi-stakeholder partnerships with suppliers, agro-dealers, markets and financial institutions, as well as healthy food and environmental management approaches for agriculture.

What are the key knowledge related issues which emerged under this theme? Including in knowledge production, transfer, translation, etc.

- Institutions need to make radical shifts from 'business as usual' for them to empower women farmers. There is evidence that institutions can make such shifts and be more intentional in addressing gender relations that disempower women. The business case needs to be made to target and reach women with services, technologies and information.
- Tailor-made CSA information that is equally accessible to women and men boosts women's decision-making power on agricultural issues at the household, community and national level. Women's informal social networks are an effective platform for reaching women with information and insurance.
- The strong informal connections among women farmers present opportunities for adoption and scaling tested of validated CSA technologies. Multi-stakeholder innovations platforms aid linkages between women and men farmers with formal institutions and the private sector.

- We need to avoid silos through interdisciplinary and multidisciplinary stakeholder partnerships to reach farmers, and connect them to information on sustainable approaches, as well as markets and finance.
- Indicators have been developed and used to measure women's empowerment as a result of CSA interventions in terms of decision making at household and community levels, control over income, and participation in decision making on farm production.

Did you identify concrete actions under this theme (research or action), to be undertaken in the next two years? If so, what are these actions, who will lead them?

- Make a deliberate effort to influence policy and utilization of results from gender studies in policy formulation and implementation. Translate gender-disaggregated data into information that policymakers can use and communicate it in a language comprehended by policy makers and other actors.
- Involve the private sector in scaling CSA practices/technologies – need to convince the private sector about the economic viability of CSA technologies.
- Partnerships among different stakeholders – farmers, private sector, extension, and civil society – are successful and sustainable when all participants experience concrete benefits.
- Test different business models to increase the adoption of climate-smart practices/technologies by women and men farmers for the adaptation, resilience, and mitigation of climate change impacts. What is the business case for reaching women farmers?
- Move beyond counting numbers of women and men in projects and show the impact of our research. We need to show the associations between inter-sectionalities – ethnicity, race, religion, etc. and adoption of CSA practices/technologies for sustainability and resilience.

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Theme 2: Digitally enabled climate-informed services

***Theme leaders**: International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Olam International*

Summary

Agriculture is behind many sectors in the application of information and communication tools. This theme focuses on addressing this gap, and generating lessons for application of digital tools, disruptive technologies and big data, in extension, early response systems and adaptive safety nets.

Expected outcome

Knowledge and action oriented partnerships are mobilized to support public and private sector stakeholders to scale the application of digital technologies for CSA implementation at scale.

What progress was made towards achieving the expected outcome?

Private sector organisations are making progress in digitalizing their value chains and are delivering information, marketing services using digital channels (climate services are often included). Most often, the private sector is targeting farmers in commercially driven arrangements. The publically funded research institutions therefore remain key to delivering also in the agro-ecologies and situations where private sector may not have the motivation to reach. Furthermore, much of the knowledge and domain expertise is with the research organisations. This expertise must continue to be utilized in building the capacity of national research and extension systems (NARES) and enabling the possibilities for bringing the digital revolution to them. There remain many possibilities for scaling digitally enabled services through or in partnership with private sector.

What are the key knowledge related issues, which emerged under this theme? Including in knowledge production, transfer, translation etc.

- There is an urgent need for generating evidence of the success and failure of digital agriculture initiatives. This is best done by neutral entities like CGIAR or CCAFS.
- There is also a need for knowledge platforms like the ones hosted by CCAFS and IFAD. These platforms could take the lead on establishing standards for validation claims of digital initiatives and could also help interested actors be aware of the various present and past initiatives. Efforts should be made to increase the visibility of the CCAFS and IFAD platforms that are already serving this purpose.
- Knowledge platforms can take many forms and purposes - ranging from simple products to organizing and curating complex scientific information for consumption by private sector and farmers. Knowledge platforms can also enable open access to scientific data that is produced by publicly funded R&D institutions adhering to FAIR principles.
- The success formula evidenced in large scale farming communities has to be translated to smallholder context.
- Different value chain players have different knowledge needs and interests from R&D. Eg. Seed companies – on field performance trials vis-à-vis financial institutions who are more interested in historical weather and yield data for provisioning of insurance products. Some kind of data requirements to actors mapping could be undertaken to inform a more nuanced debate on this topic
- Data ownership, access and sharing is extremely complex. This has to be dealt through effective governance and institutional mechanisms for smooth and effective Private-Public partnerships.
- To sustain climate information services beyond projects, the concept of “bundling” climate services with seed, fertilizer, agricultural credit, or insurance looks to be the preferred option, at least for the private sector.

Did you identify concrete actions under this theme (research or action), to be undertaken in the next two years? If so, what are these actions, who will lead them?

- Commissioning impact assessment studies on digitally enabled climate information/advisory services and establish standardized, minimal and harmonized metrics for a more rigorous evaluation of the impact of such digital interventions. Preferably, such studies should be undertaken by neutral institutions like CGIAR or CCAFS
- Undertake an exercise to map and display an overarching/holistic architecture that can address issues ranging from data sourcing, standards, ownership, sharing and also map out the integration of various smaller modules (applications) in service of the farmer. Such a map could help identify the process and institutional gaps to orchestrate an ecosystem of actors to digitally enable and deliver services at the last mile
- Raising the profile of existing knowledge platforms – CCAFS, Big Data platform and IFAD.

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Theme 3: Climate-resilient and low-emission practices and technologies

***Theme leader**: Commonwealth Scientific and Industrial Research Organisation*

Summary

Technologies and practices which enhance resilience and enable farmers to take low emissions development pathways are crucial, and the focus of this theme is to identify emerging innovations and lessons from their application, including innovative ideas for scaling up technologies and practices.

Expected outcome

Foster partnerships and information sharing to facilitate the development and implementation of CSA technologies at scale.

What progress was made towards achieving the expected outcome?

At this session, participants worked on combining seemingly disconnected technologies and practices that in combination could accelerate transformative change throughout the global food system (agriculture, land-use, food value chains, and nutrition and food security). The participants paired up identify complementarities and synergies, as well as key barriers and challenges to achieving the potential benefits of these combined technologies. The session brought people together and got them to creatively think about agricultural technologies, innovations and practices in new ways. The discussion focused on key action points for driving change in the short and medium term.

What are the key knowledge related issues which emerged under this theme? Including in knowledge production, transfer, translation etc.

- Need for awareness raising, training of farmers and consumers.
- Need to integrate different views and align agendas.
- Need to identify pilots and champions for transformation.
- Need to develop business cases that set out the costs, benefits and plausible pathways for taking innovative technologies to scale.
- Knowledge related to legislative process and policy formulation that can support innovative pathway.

Did you identify concrete actions under this theme (research or action), to be undertaken in the next two years? If so, what are these actions, who will lead them?

- Synthesis of about 50 innovation combinations that participants came up with, led by Mario Herrero and Daniel Mason-D'Croz (CSIRO) and Rathana Peou and Philip Thornton (CCAFS), fed back to participants
- Working paper and Info Note from the session
- A mailing list of interested participants to facilitate further communication and collaboration on combining innovations and research for more impactful outcomes.

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Theme 4: Innovative finance to leverage public and private sector investments

***Theme leaders**: Executive Office of the President of Indonesia, CCAFS*

Summary
This theme focuses on mobilizing the finance needed to drive a food systems transformation, identifying financial mechanisms to de-risk private capital (for example, blended finance), including incentives for technology uptake.

Expected outcome

- Ideas and focus areas identified for the Government of Indonesia to scale investment in CSA.
- Changes needed in policy and business processes to incentivize CSA investment in Indonesia identified.

What progress was made towards achieving the expected outcome?
Participants identified a rich list of action areas on both Days I (for the general case) and II (for Indonesia) for both outcomes. Panellists convened prior to the session on Day II to discuss priority actions and during the session made recommendations to the session chair as a representative of the Office of the President of Indonesia. The co-chairs discussed producing a policy brief.

What are the key knowledge-related issues that emerged under this theme? Including in knowledge production, transfer, translation etc. (Maximum 3-5 bullet points)

- Lack of evidence-base and data for evaluating the bankability and impacts of projects. Information that does exist is fragmented and concentrated at the farm and commodity level due to the cost of sharing information. Access to data that does exist is uneven.
- Potential to digitize measurement, credit assessment and transaction costs for climate investment in agriculture and allied sectors
- Need to improve knowledge for behavior change among farmers, the supply chain and finance community to shift to new practices
- Need to develop metrics to measure direct and indirect benefits of CSA to incentivize climate investment private sector and increase participation of farmers.
- Valuation of nonmonetary costs and benefits in climate investment projects

Did you identify concrete actions under this theme (research or action), to be undertaken in the next two years? If so, what are these actions, who will lead them?

- Organize high-profile event for CEOs to build a coalition of CSA leaders and engage with government and public finance. Discuss how to enable government and public finance entities to unlock and de-risking of climate investment to make actions in scale. Have each CEO take responsibility to lead on one aspect of CSA.
- Develop match-making facilities for investors to meet producers and others in the supply chain to address food loss and CSA.
- Formulate bankable projects for climate investment with significant enough scale/diversity/quantity with public and private funds to ensure success cases. Create a pipeline of projects by securing upfront investment in “early-stage business models (e.g. startups) with long development lead times and technical assistance requirements.
- Strengthen governance in the food system including regulatory measures that could drive climate action and direct finance to agriculture/allied sectors.

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Theme 5: Reshaping supply chains, food retail, marketing and procurement

***Theme leaders**: University of Oxford, University of Queensland*

Summary
This theme takes cognizance of the need for system-wide actions to drive transformation, and focuses on reshaping supply chains from farm to fork, including new models of business-to-business coordination, new diets and consumer choices and efforts to manage food loss and waste.

Expected outcome

- Ideas to inform policies and strategies for reshaping supply chains.
- New research agendas on supply chain management including reducing food loss and waste, new diets and more efficient supply chains.

What progress was made towards achieving the expected outcome?
Partial. The contributed papers, and hence those from which the organisers could select material for this session mainly covered (i) reducing food loss and waste (FLW) and (ii) diets. Both sets were valuable in addressing their respective aspects of reshaping supply chains, and both identified potential mitigation angles. But the Session were not able to consider the major aspects of food retail, marketing and procurement. There is a substantial research base in these downstream aspects and this needs to be better attracted to the Conference; the 'agriculture' word could well be the challenge to developing a fuller food system discussion.

What are the key knowledge related issues which emerged under this theme? Including in knowledge production, transfer, translation etc.

- Willingness to change behaviour vs actually changing
- Methods to assess the system-wide implications of interventions aimed at reducing FLW and improving diets
- Boundary definitions in defining LCA and 'currencies' for trade-off analyses
- Importance of balanced outlook in discussion dietary change for health, environment and enterprise/livelihoods
- Broadening notion of 'trade' to 'exchange' to account better for incorporation of non-monetary issues (e.g. environment, health, enterprise and livelihoods, morals and ethics; …) in reshaping food systems.

Did you identify concrete actions under this theme (research or action), to be undertaken in the next two years? If so, what are these actions, who will lead them? (Maximum 3-5 bullet points)

Research issues

- Business-business links and the 'missing middle' (links only between primary production and nutrition are insufficient). WBC-SD could lead.
- LCA boundaries (variables, and at a range of levels on time and space scales) and full cost accounting. FoodSIVI could lead.
- Analysis of opportunities and risks of reshaping supply chains: ?

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Theme 6: Fostering enabling policies and institutions

***Theme leaders**: World Bank, International Food Policy Research Institute*

Summary
This theme recognizes the central and complementary role that enabling policies and institutions play to support transformation. The focus will include innovative approaches to policy design and implementation, land governance and reforms, and trade rules, among others.

Expected outcome
Ensure that lessons from CSA implementation and research which enable efforts to guide the formulation as well as effective implementation of climate-smart policies and institutions are incorporated in key national (NDC) and can inform and guide international (KJWA) processes.

What progress was made towards achieving the expected outcome?

- Discussion between researchers and CSA practitioners made clear that there are many challenges to scaling up CSA technologies and practices, even they are shown by research to deliver the triple wins (they raise productivity, and hence incomes, as well as improve adaptation and contribution to mitigation through co-benefits). The main challenge is access to information and knowledge about these technologies and the relevance of them to farmer circumstances. It is important to ensure that the technologies are relevant to farmers' contexts, and especially viewed from a perspective of their livelihoods, not as technical solutions to isolated issues.
- Progress can be made if increased attention is given to drawing on available research, commissioning new research to answer open questions—such as engaging producers to understand what they need and want, and improving communications between local, national and international stakeholders, as well as research agencies and organizations.
- A particular concern is that many NDCs are top down. In many cases, it is difficult for ideas based on real-world experience to bubble up through current communication channels to influence national policies.

What are the key knowledge related issues which emerged under this theme? Including in knowledge production, transfer, translation etc.

- What are the reforms that contribute most effectively to climate outcomes while improving the livelihoods of farmers?
- This requires micro-level livelihood-based research on CSA technologies for smallholders.
- Create inclusive mechanisms for science and policy dialogue.
- Need to consider CSA outcomes in a broader framework encompassing the entire food system, eg trade and energy policies that influence agricultural value chains
- Need more holistic research on integrated farming systems that encourage adoption of CSA technologies.
- Need to undertake research on gendered impacts of CSA technologies, and impacts on young people.
- Better understanding the political economy of policy making to make policy analysis more effective.
- Need to work across the food system to identify policy issues beyond farm level.

Did you identify concrete actions under this theme (research or action), to be undertaken in the next two years? If so, what are these actions, who will lead them?

- Building on local networks, begin to bridge the gap between science, markets and policy analysis to better address political economy constraints in policy making (national, meso and local organization)
- Use these networks through a participatory and fact-based set of consultations to develop farmer-centered NDCs that better address the goals of CSA (national, meso and local organization).

- Research on establishing mechanisms for information-sharing and coordination across researchers, donors and producers (national, meso and local organization).
- At the regional level, develop better mechanisms for information sharing and coordination on best practices and on development of NDCs that contribute strongly to CSA scale-up. (regional and national organizations).
- At the global level, encourage preparation of NDCs that maximize the alignment of NDCs with local goals and needs, are prepared through a participatory process and take advantage of the mitigation potential of CSA. (UNFCC)
- Support capacity building on developing agricultural emission inventories with standardized tools to account for agriculture's contributions to emission reduction in the process of developing the NDCs (UNFCCC).