



Task Force 6  
Accelerating SDGs: Exploring New  
Pathways to the 2030 Agenda



# FINANCING CLIMATE-SMART AGRICULTURE FOR SUSTAINABLE AGRI-FOOD SYSTEMS

July 2023

**Pramod Kumar Anand**, Visiting Fellow, Research and Information System for Developing Countries (RIS), New Delhi

**Krishna Kumar**, Visiting Fellow, Research and Information System for Developing Countries (RIS), New Delhi

**Sukrit Joshi**, Research Assistant, Research and Information System for Developing Countries (RIS), New Delhi

**P. Srinivasa Rao**, Fellow, Research and Information System for Developing Countries (RIS), New Delhi

**Rohit Saini**, Fellow, Research and Information System for Developing Countries (RIS), New Delhi

**Sambit Rath**, Associate Director, PricewaterhouseCoopers (PwC), Gurugram

**Pradyot Ranjan Jena**, Associate Professor, National Institute of Technology, Karnataka

**Beena Pandey**, Assistant Professor, Research and Information System for Developing Countries (RIS), New Delhi

**Rajesh Kalli**, Assistant Professor, Dayananda Sagar University, Bengaluru

**Chandan Kumar**, Manager, PricewaterhouseCoopers (PwC), Gurugram

**Pradeep Sahoo**, Manager, PricewaterhouseCoopers (PwC), Gurugram

**J. P. Mishra**, Director, Indian Council of Agricultural Research - ATARI, Jodhpur

**Neha Bharti**, Fellow, The Energy and Resources Institute (TERI), New Delhi

**Suruchi Bhadwal**, Senior Fellow and Director, Earth Science and Climate Change, The Energy and Resources Institute (TERI), New Delhi

**Sisira Prabhakar**, Project Associate, The Energy and Resources Institute (TERI), New Delhi


**Sakshi Bajpai**, Project Associate, The Energy and Resources Institute (TERI), New Delhi

वयुधैव कुटुम्बकम्

ONE EARTH • ONE FAMILY • ONE FUTURE



# **Abstract**




**A** critical concern related to the agri-food system is inadequate financing to meet the adverse impacts of climate change, and the extreme variability of global food security and nutrition to attain Sustainable Development Goal 2 (zero hunger). As per the 2022 Report of the United Nations Secretary General on SDGs, 720 to 811 million persons suffered from hunger in 2020, with between 118 to 161 million added to the list of the hungry since 2019.<sup>1</sup> Climate-smart


agriculture (CSA) interventions provide medium- to long-term opportunities but face financial challenges in the short term that slow efforts towards adaptation, mitigation, techno-economic diffusion, empowerment, access, equity, and inclusion. This brief recommends establishing and strengthening channels of financing through collaboration of all stakeholders including the private sector, multilateral banks, and public funding agencies for promotion of CSA.



# **The Challenge**



# **1**



**C**limate change is leading to increased frequency and higher variability of extreme weather events.


This is threatening sustainability of agriculture and food systems and affecting food security and livelihoods. The Intergovernmental Panel on Climate Change Report (2022) argues that climate change is already stressing food and forestry systems, which in turn are adversely affecting livelihoods of millions of farmers.<sup>2</sup> Climate change is among some of the major causes of food and nutrition insecurity, and the remaining 15 Sustainable Development Goals cannot be realised unless the SDG-1 on no poverty and SDG-2 on zero hunger are attained.<sup>3</sup>

Climate-smart agriculture (CSA) is essential to reduce climate vulnerability in the agriculture sector and promote global food security and nutrition to meet the needs of rising population and protect livelihoods and incomes. This existential threat has been worsened by the Covid-19 pandemic and ongoing geo-political conflicts. CSA is thus the key to secure both global food production and food security and help attain the 2030 Agenda and the related 17 SDGs.

CSA refers to a combined set of technologies and practices that improve farm productivity and increase resilience and adaptive strategies to climate variability. It also helps reduce emissions (mitigation) wherever possible<sup>4,5,6</sup>. This can help reorient agricultural practices to increase the ability of farmers to adapt to adverse climate change impacts and foster climate resilience.

The CSA approach however faces the overall challenge of ensuring adequate resources. These resources are critical to the transformation of the agri-food systems, address climate vulnerability, and promote enhanced risk management practices. The United Nations Environment Programme Emission Gaps Report (2022) states that food systems require rapid transformations across multiple domains, including shifting diets, protecting natural ecosystems, improving food production, and decarbonising the food value chains. Each domain of transformation comprises of several mitigation measures.<sup>7</sup> Obviously, the developed world has to take a lead to reduce carbon footprints.

Given that CSA involves a synergic approach encompassing financing



and technology, it needs to internalise both adaptation and mitigation strategies. Adequate financial and technological support should be given to developing countries, including least developed countries (LDCs) and Small Island Developing States (SIDS), for adaptation related actions to enable them to focus on mitigation related actions. According to the Food and Agriculture Organization (FAO), adaptation and mitigation need to be a part of development planning as well as investment strategies in agriculture.<sup>8</sup>

### Limited financial flows

Estimates of the financial costs of transforming agriculture and food systems to meet the SDGs and the Paris Agreement targets are wide. These range from an additional expenditure of US\$15 billion to US\$350 billion per year between 2022 and 2030.<sup>9</sup> In comparison, the financial flows in 2017-18 for climate change mitigation and adaptation in agriculture, forestry, land use, and natural resource management (AFOLU) sector, one of the components of food systems, amount to only US\$20 billion annually i.e., less than four percent of the total climate finance.<sup>10</sup> Such a shortfall of climate finance flows

in AFOLU, with an increased gap from what has been projected, threatens the sustainability of the agri-food systems given the rising global insecurity of food and nutrition.

As per the report of the Standing Committee on Finance (SCF) of the United Nations Framework Convention on Climate Change (UNFCCC), the average annual investment in mitigation, or measures with both mitigation and adaptation benefits related to AFOLU, as well as natural resource management, stood at US\$14.5 billion in 2019 and US\$17.8 billion in 2020.<sup>11</sup> Most of these investments recorded were by public actors including national, bilateral, and multilateral development finance institutions as well as governments. Notably, data on any private finance in the sector remains largely unavailable.

Table 1 indicates that even if viewed from the angle of uniformity of data source, the total climate finance is increasing. Its share however towards AFOLU which was even otherwise low, further declined after 2017-18. Notably, the annual inflow remains much lower than the projected requirement of US\$423.4 billion per year up to 2030.<sup>12</sup>

**Table 1: Global Climate Finance Flows in the agriculture, forestry, land use, and natural resource management sector (2014-2020)**

Year	Climate Finance for All Sectors (In billions of USD)	Climate Finance in AFOLU (In billions of USD)	Percent
2014/15	391	6–8	1.5-2.0
2017/18	574	21	3.6
2019/20	803	14.5	1.8
2020/21	850-940	17.8	1.9

Source: Authors' compilation from World Bank (2016), Climate Policy Initiative (2021, 2022), and UNFCCC (2022)<sup>13</sup>


According to the Report of the SCF (2022), the global climate finance flows reached an annual average of US\$803 billion in 2019-20 for all mitigation and adaptation activities, of which the climate finance flows in AFOLU were much smaller (about 1.8 percent).<sup>14</sup> Of course, given that agri-food systems are intertwined with other sectors of the economy, it is difficult to disentangle the flow of climate finance for these systems.

### **Financial access to vulnerable sections**

Vulnerable sections incur a higher cost of production, including cost or at least opportunity cost of family labour, which are then enhanced by information asymmetries and barriers

to accessing critical inputs. In many developing countries, these sections, including small farm holders and women, continue to face limited access to better knowledge, farm equipment, training, and many other constraints in adopting and implementing digital technologies such as precision farming and block-chain networks.<sup>15</sup> Moreover, women are already burdened with much unrecognised domestic and care responsibilities. As a result, contributions of these sections to agri-food systems remain sub-optimal.

There is an urgent need for countries lacking investments in the agriculture sector, like developing countries, including LDCs and SIDs to catch up with global standards of productivity to ensure food security and nutrition. As



per FAO's March 2023 assessments, as many as 45 countries are in need of external food assistance.<sup>16</sup> Of them, 33 are from Africa including Kenya, Somalia, and Nigeria, and nine are from Asia including Afghanistan, Pakistan, and Syria. The year 2022 has seen a decline in global cereals production by 1.3 percent since 2021. An FAO report projects that wheat production is also likely to fall by 1.3 percent in 2023 since 2022.<sup>17</sup> In the case of Africa, the major

reasons for the decline are adduced to be rainfall shortage (year over year leading to droughts), cyclones, and conflicts in several parts. The report further estimates cereal import requirements of low-income food-deficit countries in 2022-2023 at 43,913 (thousand tonnes), of which 19,290 (thousand tonnes) are required by countries in Africa, and 23,055 (thousand tonnes) are required by countries in Asia.<sup>18</sup>



# The G20's Role


# 2

## Strong ongoing commitments and actions

The G20 has been regularly discussing food security and nutrition issues and the commitments made in this regard have been reflected in respective summit declarations and Communiqués of Agriculture Ministers. The issue of climate change and climate resilient agriculture has also been repeatedly deliberated upon. In this endeavour, para 7 of the Matera Declaration 2021 on “Accelerating the adaptation of agriculture and food systems to climate change” show some essential pathways.<sup>19</sup> To promote climate adaptation in the food and agriculture sectors of developing nations, it emphasises the necessity of effective investment from climate finance. Additionally, it emphasises the significance of environmentally conscious, agroecological, and other cutting-edge strategies. Notably, G20 is in a position to nudge and steer policy and actions on agri-food systems given that it accounts for over two-third of the world population, more than three-fourth of the global trade, and above 85 percent of the global GDP.

## G20 and global technological progress for CSA

The G20’s commitment to SDG-17 including Technology Facilitation Mechanism (TFM) has opened possibilities for deeper global collaborations on technology. Within it, the first category could be collaborations to promote financially viable investments in climate smart technologies, which are likely to help in adaptation and mitigation, and which also require funds for farmers transitioning to these technologies. For example, drones or unmanned aerial vehicles are being introduced in the agriculture sector. The output from drones in the form of multi-spectral images can facilitate farmers in timely monitoring of crops. This will prevent loss on the one hand and enhance revenue on the other. In such cases, the lending institution need not micromanage potential viability of any individual component of the project. But the lending institution will first need to convince itself about the financial viability of the overall project, by focusing on medium to long-term. This will ensure that all farmers have access to new and emerging CSTs.



They can thus remain competitive and manage higher productivity, while reducing average cost of production year after year.

### **Climate financing to promote global public good**


To reduce the otherwise diminishing net present value of income flows, a global public good such as climate financing windows can be created. Promoting the creation of climate financing windows to support small farm holders can be the second category to collaborate upon. Although in such cases, long-term investments may be financially viable, they may not pay off immediately upon harvest. This would necessitate financing mechanisms that are forward looking, unlike prevailing crop loans. As the benefits of farmers' adaptation and mitigation measures are accrued in the medium to long term, that too as public good, mechanisms for repayments to harness such investments need to be made available. This will ensure widespread acceptability among farmers, especially small farm holders. The G20 can bring forth the asymmetry between short-term financing needs and the long-term benefits of global collaborations in financing instruments

that address this temporal issue. It also has a critical role in supporting innovations in financing, and risk management products that match the needs of CSA.

### **Unlocking the potential of vulnerable sections and countries for CSA**

The vulnerable sections face a plethora of binding constraints, not only on inputs, processing, and marketing, but also on awareness, techno-economic diffusion, empowerment, access, equity, and inclusion. As a result, contributions of these sections to agri-food systems are sub-optimal. Making diverse production choices, like the inclusion of low fertiliser and water consuming crops such as millets, that can adapt better to adverse climate events can also be helpful.<sup>20</sup>

In addition to inadequate investments and financing, lack of awareness about the CSA approach impedes technological dissemination, especially among small farmers. Given that many of these investments have only long pay-back periods, there is a need to provide and ensure access to finance with increased investments in the immediate



and short-run. Collaborations, especially on financing and technology are essential among all stakeholders of all developing countries, including the LDCs and SIDS.

CSA needs to integrate gender empowerment with technological developments to increase food productivity and nutritional security. CSA's inherently labour-saving technologies reduce the burden on women in menial jobs in the agricultural sector. In this context, we need to ensure that CSA policies, technologies, and tools are easily accessible, affordable, and user friendly for women farmers.


Substantial financial resources are therefore needed to transform food systems. Such investments in AFOLU are crucial for effective implementation, adoption, and inclusion of CSA in agri-food systems, and to take vulnerable people along with. Hand-holding for the creation of institutions that assist vulnerable sections of farmers, including smallholders, women, and youth is thus critical to meet the growing demand for food and agricultural commodities, to which the G20 remains committed. It should be kept in mind that the facilitation of financing channels is not for expenditure, but are a vision led investment for the future.



# **Recommendations to the G20**



# **3**



**T**he G20 should commit to promote collaborations in financing for CSA. This should include meeting investment costs of agri-food systems towards adaptation and mitigation through international development flows, and multilateral development banks supplementing domestic private and public funding.


The G20 nations should collaborate on supporting the exchange of best practices. This should include collaborations on viable long-term CSA financing instruments. Moreover, payback terms should be appropriately set to encourage investments given that benefits are often dispersed across the medium and long term. The focus of this recommendation is on resolving the asymmetry between benefits and the repayment of credits. The dispersal of benefits is over a larger number of years, whereas the repayment of credit is usually over a lesser number of years.

The G20 should also promote inclusive climate smart financing in developing countries, LDCs, and SIDs as well amongst the vulnerable sections in these countries.

The G20 nations should facilitate and disseminate new and emerging technologies in line with SDG-17. This would include promotion of innovations and transfer of technology, by involving stakeholders including the private sector, multilateral banks, and the public funding.

The G20 can promote the evolution of new models, such as payment for ecosystem and agro-ecological services. Another model could have beneficiaries pay transitioning farmers who join aggregation models like farmer producer organisations and self-help groups to increase farmers' incomes in coordination with sustainability measures. These models would internalise the negative externality of climate risk. Provisions similar to granting of carbon credits can also be internalised in such models.

The G20 can commit to capacity building, awareness, training, and knowledge dissemination for vulnerable sections including small farm holders, women, and youth for adoption of climate smart practices through the strengthening of aggregation models.



The earmarking of resources by multilateral channels for the cultivation of nutrition-rich and climate resilient crops like millets, pulses, vegetables, and fruits can be facilitated by the

G20. It can also commit to investing in nutrition-preserving infrastructure to prioritise nutrition security under climate change, which would also help in averting some avoidable health costs.

Attribution: Pramod Kumar Anand et al., “Financing Climate-Smart Agriculture for Sustainable Agri-Food Systems,” *T20 Policy Brief*, July 2023.

## Endnotes

---

- 1 United Nations Economic and Social Council, *Progress towards the Sustainable Development Goals Report of the Secretary-General*, New York, UN ECOSOC, April 2022, <https://unstats.un.org/sdgs/files/report/2022/secretary-general-sdg-report-2022--EN.pdf/>
- 2 Intergovernmental Panel on Climate Change, *Climate Change 2022: Impacts, Adaptation, and Vulnerability: Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*, Cambridge, IPCC, 2022, [https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC\\_AR6\\_WGII\\_FrontMatter.pdf](https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_FrontMatter.pdf)
- 3 P.K. Anand and Krishna Kumar, "Food and Nutrition Security in G20: Reflections and Critical Gaps," New Delhi, *RIS G20 Digest*, 2019, 19-29, <https://ris.org.in/sites/default/files/2021-09/G20%20Digest-July-August.pdf>
- 4 World Summit on Food Security, "Feeding the world, eradicating hunger, Background document for World Summit on Food Security", Rome, Food and Agriculture Organization of the United Nations, November 2009, <https://www.fao.org/3/k6077e/k6077e.pdf>.
- 5 Food and Agriculture Organization of the United Nations, *Developing a Climate-Smart Agriculture Strategy at the Country Level: Lessons from Recent Experience*, Rome, FAO, September 2012, <https://www.fao.org/3/ap401e/ap401e.pdf>
- 6 Food and Agriculture Organization of the United Nations, *Climate-Smart Agriculture Sourcebook*, Rome, FAO, 2013, <https://www.fao.org/3/i3325e/i3325e.pdf>.
- 7 United Nations Environment Programme, *Emissions Gap Report 2022: The Closing Window - Climate crisis calls for rapid transformation of societies*, Nairobi, UNEP, October 2022, <https://www.unep.org/emissions-gap-report-2022>
- 8 Food and Agriculture Organization of the United Nations, *Food Security and Agricultural Mitigation in Developing Countries: Options for Capturing Synergies*, Rome, FAO, October 2009, [https://reliefweb.int/attachments/7456424c-3793-38be-a1e0-bcb517d306ac/8D4D2EF6CA0566B6C1257665003C7537-FAO\\_Oct2009.pdf](https://reliefweb.int/attachments/7456424c-3793-38be-a1e0-bcb517d306ac/8D4D2EF6CA0566B6C1257665003C7537-FAO_Oct2009.pdf)
- 9 Eugenio Díaz-Bonilla, Ruben Echeverría, and Rob Vos, "Global Action for Climate Finance and Investments for Agrifood System Transformation," *T20 Policy Brief*, 2022, [https://www.t20indonesia.org/wp-content/uploads/2022/11/TF4\\_GLOBAL-ACTION-FOR-CLIMATE-FINANCE-AND-INVESTMENTS-FOR-AGRIFOOD-SYSTEM-TRANSFORMATION.pdf](https://www.t20indonesia.org/wp-content/uploads/2022/11/TF4_GLOBAL-ACTION-FOR-CLIMATE-FINANCE-AND-INVESTMENTS-FOR-AGRIFOOD-SYSTEM-TRANSFORMATION.pdf)
- 10 International Food Policy Research Institute, *Global food policy report: Climate change and food systems*, Chapter 5, Washington DC, IFPRI, May 2022, <https://doi.org/10.2499/9780896294257>.



- 11 United Nations Framework Convention on Climate Change, *Fifth Biennial Assessment and Overview of Climate Finance Flows*, Bonn, UNFCCC, 2022, [https://unfccc.int/sites/default/files/resource/J0156\\_UNFCCC%20BA5\\_2022\\_Report\\_v4%5B52%5D.pdf](https://unfccc.int/sites/default/files/resource/J0156_UNFCCC%20BA5_2022_Report_v4%5B52%5D.pdf)
- 12 Climate Policy Initiative, *Global Landscape of Climate Finance: A Decade of Data 2011-2020*
- 13 World Bank, *Making Climate Finance Work in Agriculture*, Washington DC, World Bank Group, 2016, <https://documents.worldbank.org/curated/en/986961467721999165/Making-climate-finance-work-in-agriculture>; Daniela Chiriac and Rosaly Byrd, “Leveraging Policy Tools to Improve Impact of Financial Instruments in Sustainable Agriculture Forestry and Other Land Use (AFOLU)” *Climate Policy Initiative*, October 18, 2021, <https://www.climatepolicyinitiative.org/publication/leveraging-policy-tools-to-improve-impact-of-financial-instruments-in-sustainable-agriculture-forestry-and-other-land-use-afolu/>;  
  
UNFCCC, *Fifth Biennial Assessment and Overview of Climate Finance Flows*; Climate Policy Initiative, *Global Landscape of Climate Finance: A Decade of Data 2011-2020*, Climate Policy Initiative, 2022, <https://www.climatepolicyinitiative.org/wp-content/uploads/2022/10/Global-Landscape-of-Climate-Finance-A-Decade-of-Data.pdf>.
- 14 UNFCCC, *Fifth Biennial Assessment and Overview of Climate Finance Flows*
- 15 V. Anbumozhi et al., “Digital Transformation of Agri-Food System: Policy Pathways for Greater Socio-Economic Inclusion, Sustainability, and International Cooperation”, *T20 Policy Brief*, 2022, <https://www.t20indonesia.org/wp-content/uploads/2022/10/DIGITAL-TRANSFORMATION-OF-AGRI-FOOD-SYSTEM-POLICY-PATHWAYS-FOR-GREATER-SOCIO-ECONOMIC-INCLUSION-SUSTAINABILITY-AND-INTERNATIONAL-COOPERATION.pdf>.
- 16 Food and Agriculture Organization of the United Nations, *Crop Prospects and Food Situation, Quarterly Global Report No. 1*, Rome, FAO, March 2023, <https://doi.org/10.4060/cc4665en>.
- 17 FAO, *Crop Prospects and Food Situation*
- 18 FAO, *Crop Prospects and Food Situation*
- 19 G20 Italy, “Matera Declaration on Food Security, Nutrition and Food Systems: A Call to Action in the Time of the COVID- 19 Pandemic and Beyond”, 2021, <https://www.g20.utoronto.ca/2021/Matera-Declaration.pdf>.
- 20 P.K. Anand and Krishna Kumar., “G20: Global Food and Nutrition Security amidst Stressed Supply Lines”, Volume 2, New Delhi, *RIS G20 Digest*, March 2022: 13-25, <https://ris.org.in/sites/default/files/2022-05/G20-Digest-March-2022.pdf>



वसुधैव कुटुम्बकम्

ONE EARTH • ONE FAMILY • ONE FUTURE