A Thirst for Food Resilience: Climate-Smart Water Knowledge Integrates UNFCCC and SDG Policies for Food and Agriculture

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The Sustainable Development Goals (SDGs) and UN Framework Convention on Climate Change (UNFCCC) represent innovative approaches to sustainability. However, the siloed nature of these processes is leading to missed synergies and opportunities. The goals of the SDGs depend on each other and on successful climate adaptation and mitigation efforts called for in the Paris Agreement. For example, to "end hunger, achieve food security and improve nutrition and promote sustainable agriculture" (SDG 2), the water and climate resilient actions of SDGs 6 and 13 must also be achieved, and the Paris Agreement implemented.

Recognizing the importance of a common agenda approach, the UN's Secretary Generals and Presidents of the General Assembly have suggested that a new mechanism be found to improve coherence between the SDGs and the UNFCCC's Paris Agreement. To achieve this, we suggest that freshwater serve as a unifying theme to bridge policy frameworks promoting food security, sustainable agriculture, and climate change resilience. Climate-resilient water management can help advance global food security and agricultural sustainability goals while simultaneously curbing the effects of climate change.

An alteration of the water cycle due to climate change threatens food security and nutrition globally. The primary instrument of negative climate impacts on food production and agriculture is generally freshwater (7) and evidence suggests that this relationship is already altering, or will compromise, food security and nutrition. This is due to reduced productivities in crops, livestock, and fisheries from changes in freshwater availability (4).

Agricultural impacts expose both urban and rural poor to higher food prices, and reduced income. Women, Indigenous peoples, family farmers, pastoralists, and fishers are disproportionately affected. In regions where basic food production and hunger are significant concerns, addressing climate adaptation — especially through water-related impacts — is essential to reduce long- and short-term threats to food security. Therefore, climate-resilient water resource management is a potentially powerful mechanism to achieve SDG 2 and global food security.

Sustainable Food Production, Supply Chains, Waste: More Adaptation, Better Mitigation

Viewed holistically, food security spans food production, consumption, and waste. These elements have important connections to climate mitigation and GHG emissions and sequestration, as well as a strong need for climate adaptation. Improved water efficiency and resource protection at the production level of food is critical given that the agriculture sector consumes more than 70 percent of global water resources.

However, food processing and end consumers are also important, given that an estimated one third of food produced is lost or wasted. Indeed, more people globally are now dying from obesity than hunger, illustrating that overeating is a significant and growing threat to food security and nutrition. More food may often be less important than better-produced, and more accessible nutritious food. Given how poorly matched the global food market is, a food systems perspective is timely in an era of high water risks and growing competition for uncertain water resources (3).

Bringing the policy tracks together to develop strategies to achieve SDG 2 targets while also curbing climate change would yield many co-benefits and help identify circumstances where trade-offs may be necessary. Coupling water resilience and food production for the entire system can substantially reduce water consumption and waste (and GHG) generation through prevention, reduction, recycling, and reuse. The private sector (from small farmers to large companies) has an important role to play in scaling up these approaches.

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Promoting Policy Coherence: Synthesizing SDG 2 and the UNFCCC at Global, National, and Local Scales

Just as the climate, water, and food sectors are interdependent and must be tackled holistically, a common policy agenda for food and climate security is critical. The application of new insights into climate-smart water management strategies can support this common agenda. Below are several recommendations that would promote policy integration of food and agricultural policies with climate change in order realize potential co-benefits as well as minimize conflict among sustainable development goals and agendas. These recommendations are intended to ensure that food and agriculture policies and projects meet their intended goals (and do not also damage or conflict with other sustainable development goals and agendas).

Mainstreaming Water Management through Finance | First, a core aspect of the new policy agenda should be financing. A wide range of investments that mainstream best practices for resilient water management are relevant and available. These cover all aspects of the food production, processing, consumption, and waste management cycle. Specific areas to include in finance screening include that water usage levels can be sustained (especially for agriculture) and that climate and water risks have been seriously considered.

Second, all best practices for resilient water management should include explicit linkages to SDG and UNFCCC targets and indicators. In the case of infrastructure investments, climate and water risk assessments should extend over the operational lifetime, rather than the financing period of the funding.

Informed and Uncertainty-Tolerant Allocation and Management | Third, the agenda considerations should include the assessment of project-level implications for water allocation and availability at the basin-scale. Water is transported across hydrological boundaries, such as for long-distance water irrigation networks, are the basin-scales to assess.

Fourth, governance and management relationships should be robust and flexible to adjust and compensate for a variety of climate impacts and shifting water conditions. Especially in transboundary basins, robust arrangements for water allocation can be essential for regional food security.

Integrated Assessments and Planning | Fifth, global and national climate and food agencies, riparian countries, and critical organizations (like basin management organizations or other international groups) must explicitly consider water allocation, governance relationships and commitments within national adaptation planning processes (including NDCs and NAPs where agriculture is identified as a major target). In addition, they must link the development and management plans for national agriculture, food processing, and water resources.

People-centered Approaches for Local Interventions | Finally, the agenda needs to bridge the gap between national and local stakeholders. Many of the most critical water management, climate adaptation, and food security questions occur at decentralized and small scales. The gap between data, and actual changes in behavior, is often deep and difficult to bridge. It requires capacity building and engagement from both public-private partnerships and innovation (e.g., connecting South Asian farmers to seasonal and short-term climate data to guide basic decision making via information technologies, and modern media). Equally critical is improving the climate basis for agricultural extension services (e.g., linking new insights into resilient water knowledge with relevant local practices, issues, and decisions).

Many institutions are moving quickly to support initiatives aligned with the above recommendations that would bring climate-resilient water management as the mechanism to bridge the UNFCCC and SDG policy domains and to de-silo the work in food security and climate change. Some of these efforts are listed as models of success on the AGWA website.

Models for Success

Freshwater can serve as a unifying theme to bridge policy frameworks promoting food security, sustainable agriculture, and climate change resilience. Many institutions are moving quickly to support initiatives that are aligned with the above recommendations – initiatives that would bring climate-resilient water management as the mechanism to bridge the UNFCCC and SDG policy domains and de-silo the work in food security and climate change. Some of these efforts are listed below as models of success.

1. *Inter-ministerial collaboration & fund*: Water has been a scarce resource for millennia in Morocco, and water scarcity has required more systematic approaches for both supply and demand (8). During CoP22 in 2016, the government of Morocco launched two initiatives for promoting resilient water policies to achieve food security in Africa. The first "Water for Africa" aims to adopt a priority action plan to improve water access and management in Africa. The second "Adaptation of African Agriculture" is intended to reduce the vulnerability of regional agriculture by promoting and fostering the implementation of specific projects to improve soil management, agricultural water control, climate risk management, capacity building, and funding solutions (5).
2. *Nexus Regional Dialogue Programme*: Increasing water scarcity challenges livelihoods and socio-economic development in the Middle East and North African region. Agriculture, the largest regional water user, is directly affected by increasingly frequent and severe droughts, attributed to climate change. Regional climate policies are benefitting from an integrated Water-Energy-Food (WEF) Security Nexus perspective. The nexus concept helps analyze sectoral linkages and their underpinning natural resources. Thus, adaptation does not come at the expense of food security or vice versa. The GIZ Nexus Regional Dialogue Programme is working with the GIZ Programme ACCWaM (Adaptation to Climate Change in the Water Sector in the MENA Region) to facilitate the adoption of a nexus roadmap on water allocation for the ministerial councils of the League of Arab States (LAS).

3. *People-centered climate resilient agriculture*: The ClimateAdapt project focused on paddy farming between 2012 and 2017. The project reached some 90,000 smallholders; approximately a third were women. Some 25,000 farmers received direct training on agriculture practices and climate adaptation in eight new centers. Farmer-led testing, refining, upscaling and implementation of new rice growing and irrigation technologies and of seed varieties resulted in a 40 percent reduction in water use and a 25 percent yield increase. The village centers supported interaction among farmers, extension workers, scientists, and stakeholders.[1] This work was done by Norwegian Institute of Bioeconomy Research, M S Swaminathan Research Foundation, Tamil Nadu Agricultural University, Hyderabad Water and Land Management Training Institute and International Water Management Institute.

4. *Territorial approaches for policy coherence*: Another successful model involves promoting a territorial approach to improve policy coherence between food security and water policies as well as the other related SDGs. A territorial approach allows vertical promotion (across sectors), horizontal (across levels of government) coordination, and capturing the multi-dimensionality of food security. It allows the diversity of different territories to be considered and leads to a better understanding of differences in development opportunities that are so often missed with one-dimensional or one-size-fits-all policies (6).

5. *Water re-use and recycling*: Given the constraints of an increasingly arid climate, Morocco has always placed food security and water at the heart of its priorities. The use of non-conventional water resources such as reuse treatment and recycling mechanisms diversifies sources of supply, especially in conjunction with water-efficient irrigation techniques, improved cropping techniques, and shifts to high value-added crops.[2] This work involves the Government of Morocco and the World Bank.

6. *Transboundary agro-ecosystem management*: Across a variety of national agricultural agencies and ministries over three countries, FAO implemented the Kagera river basin Transboundary Agro-ecosystem Management Project. Called Kagera TAMP, the initiative created a new management paradigm based on an integrated ecosystems landscape approach to generate local, national and global benefits. Said benefits include restoration of degraded lands; carbon sequestration and adaptation to climate change; agro-biodiversity conservation and sustainable use; and increased agricultural production. This approach contributes to food security, sustainable rural livelihoods and protection of the international waters of the wider basin. This work is done by UN FAO, GEF, and the governments of Rwanda, Uganda, and Burundi.

7. *Satellite data for citizens*: Now in beta form, the Water Productivity through Open access of Remotely sensed derived data (WaPOR) tracks agriculture water productivity over Africa and the Near East. With near real-time pixel level data, the portal can assist farmers in obtaining more reliable yields and irrigation authorities to modernize irrigation schemes.[3] The World Bank is implementing an 80 million USD project along similar lines in three water-stressed provinces in China as well.[4] This work is done by Kingdom of the Netherlands, UN FAO, and the World Bank.

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[1] http://www.thehindu.com/todays-paper/tp-national/tp-tamilnadu/climaadapt-likely-to-be-replicated-in-africa/article4608842, https://phys.org/news/2017-05-climate-smart-agriculture-food-future.html.

[2] Supported by the World Bank, Plan Maroc Vert combines these efforts to increase the value of water and soil, increasing the share of irrigated areas by water-saving systems to reach 50% of about 1.5 million hectares by 2020 and 70% by 2030. The World Bank has more recently engaged in a process to modernize Morocco's irrigation plan (http://documents.worldbank.org/curated/en/382561467999679050/pdf/PAD1208-PAD-P150930-R2015-0121-1-Box391474B-OUO-9.pdf).

[3] http://www.fao.org/in-action/remote-sensing-for-water-productivity/en/.

[4] http://www.worldbank.org/en/news/feature/2016/11/18/empowering-farmers-and-implementing-modern-irrigation-helps-china-reduce-water-consumption.

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About this publication

This background paper, prepared by the Alliance for Global Water Adaptation (AGWA) and its members, is a contribution to the discussions and activities at the Conference of Parties 23 (CoP). This year, the CoP will also focus on SDG 2 (Agriculture and Food security) and SDG 11 (Cities) in order to identify key areas of collaboration and interlinkages between the 2030 SDG Agenda and the Paris Climate Agreement.

Note on authors: Though all of the authors are associated with one or more institutions, we are writing here as individuals and members of AGWA: the Alliance for Global Water Adaptation, an international network to develop, synergize, and promote the emerging best practices and policies for resilient water resources management.

AGWA's member organizations stand committed to contribute to capacity building and support the integration and application of water knowledge in the climate mitigation and adaptation activities. This includes providing guidance and recommendations on how water management can contribute to an efficient implementation of the Paris Agreement and the 2030 Agenda. Its secretariat is hosted by Stockholm International Water Institute (SIWI).