

Info Note

Foundations for common approaches to measure global adaptation actions in the agriculture sector

Highlights from an analysis of existing climate adaptation frameworks

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Key messages

- Climate adaptation has been on the back seat of the international policy agenda for many years; the Paris Agreement and relating Global Goal on Adaptation (GGA) provide new momentum to frame adaptation as a global responsibility and to call for collective measurement approaches.
- Decisions on potential global adaptation targets and measurements need to build on existing collections of frameworks, indicators and metrics that provide valuable learning opportunities, rather than reinventing processes.
- Reviewing what national M&E systems already track in terms of adaptation may be a pertinent way to advance discussions on how the GGA can be translated into practice via bottom-up, country-driven approaches.

Adaptation has been the linchpin of climate risk management strategies as far back as the early 2000s, as the concept started to gain traction on global and national climate policy agendas. Billions of dollars have been invested in adaptation work ever since, with nearly every development agency including it on their agendas (Schipper, 2006). However, the financing gap remains high especially in developing contexts, where investments in climate adaptation are expected to cost two to three times more by 2030 than current estimates and disbursements (UNEP, 2016). This not only calls for increased finance, but also suggests a need to strengthen monitoring and evaluation (M&E) that would deliver a more accurate picture of progress so far, gaps, and course corrections required for timely adaptation finance and implementation.

This brief synthesizes learnings from an initiative led by World Agroforestry (ICRAF) and the CGIAR Climate Change, Agriculture and Food Security Research Program (CCAFS) to map and describe key frameworks for measuring adaptation in the agriculture sector. This aims to inform reflections on setting global aspirations for adaptation and on identifying common measurement approaches that allow to assess adaptation effectiveness more consistently across scales. The work initiated in the context of assessing entry points for national measurement and reporting systems for climate-smart agriculture (Nowak et al., 2019) and has since been inspired by blooming discussions around the role of global public policy for adaptation (WWF, CARE and Action Aid, 2016; Ngwadla and El-Bakri, 2016).

Findings from this analysis show that groundbreaking innovations in the area of adaptation metrics are highly unlikely; valuable foundations have already been laid out. Instead, additional effort should target stock taking of already-developed work to better account for synergies with existing processes and to strengthen information systems to improve data collection and reporting.

Context

Within the ambit of the United Nations Framework Convention on Climate Change (UNFCCC), global target-setting efforts have largely happened in the area of mitigation (global greenhouse gases [GHG] emissions reduction and carbon sinks), with Parties committing to periodically report on progress towards targets laid out in the Nationally Determined Contributions (NDCs). They are also encouraged to periodically communicate adaptation priorities, plans, actions, and needs through a-NDCs¹ and

¹ The adaptation component of the NDC.

relevant channels. Yet defining universal adaptation objectives has proven challenging. Climate impacts are context-specific and uncertain, while adaptation responses are diverse and vary across time and spatial scales, yielding many possible results and outcomes.

The Global Goal on Adaptation (GGA) included in the Paris Agreement elevates adaptation in the global policy process. It is a starting point in international collective planning, providing dim normative guidelines on how countries may address vulnerability and identify adaptation needs. Yet it does not offer guidance on target setting, which means that global aspirations around climate adaptation are yet to be unified. The Global Stocktaking (GST) mechanism is now mandated to set modalities for reviewing, in light of equity and the best available science, the collective progress and ambitions for adaptation every five years (starting with 2023).

As per the GGA, countries are encouraged to use available adaptation metrics in design of their National Adaptation Plans (NAPs), National Adaptation Programme of Action (NAPA) and NDCs, thus taking the opportunity to reflect on appropriate measurement approaches and to make use of available resources to ensure a more uniform reporting process. Yet the information on available frameworks is scattered in reports and results frameworks of tens of organizations that have worked for years on climate change adaptation.

Without standardized data collection and reporting formats, dozens of initiatives for adaptation M&E have proliferated. These range from country-led M&E systems designed around National Adaptation Plans (NAPs), National Adaptation Programmes of Action (NAPAs) and NDCs (GIZ and IISD, 2014), to isolated frameworks used by development funders, partners and implementers to assess adaptation progress of programmes and projects. Some stocktaking efforts exist, but these are significantly fragmented and usually inadequately resourced. Critically assessing efforts to design M&E frameworks seem to be a pertinent and constructive way to advance discussions on operationalizing the GGA and on turning it into *the* blueprint for a global pulse-taking on adaptation.

Stocktaking of previous efforts

Our research represents an ambitious step in this sense. We seek to explore globally comparable adaptation topics and to identify opportunities for collective M&E. We targeted adaptation frameworks that have shaped major policies and decisions in countries, in regions and globally

and that are available electronically. A total of 25 frameworks were analyzed, acknowledging that many more may have been left out, especially frameworks that measure adaptation at micro (project) level. Here, we discuss only 10, as they provide sufficient proof that adaptation metrics have been well thought out to suit specific contexts and needs and provide important learnings that can feed into endeavors to operationalize the GGA and support GST efforts.

We looked at the main adaptation themes included in theories of change and results frameworks and grouped them around the key dimensions that define the GGA: vulnerability, adaptive capacity and resilience². A fourth layer was added, exposure and sensitivity, as these represent critical reflections on risks (their magnitude and impact) and were observed to be recurrent topics in some of the major adaptation frameworks.

A myriad of opportunities

Table 1 serves as a conversation starter. It summarizes key findings from our mapping exercise with the view to broaden adaptation planners' perspective by outlining what is already available in terms of adaptation approaches and measurements. The list of frameworks is not exhaustive but offers a snapshot of available resource and generates a call to action for complementing these stocktaking efforts. Many learnings can be drawn from existing adaptation frameworks. Below we outline some of these reflections.

Inconsistent terminology. Our analysis confirmed the lack of agreement on how adaptation is approached conceptually and applied in practice. The "universal" definition coined by UNFCCC³ is vague enough to allow for adaptation to be used arbitrarily and interchangeably with resilience, adaptive capacity and vulnerability, giving rise to countless theories of change and narratives for climate risk management. While the abundance of perspectives and approaches does justice to context-specific needs and opportunities, inconsistent use of concepts is problematic. It increases the likelihood of designing inconsistent, inappropriate, or even duplicated adaptation responses at the same location⁴. Divergent interpretations of the relation between these concepts also makes it difficult to identify common grounds for measurement and reporting. Evidence shows that the lack of a coherent framing for adaptation (given political, ethical and ethical considerations) is what pushed it away from the global policy agenda for many years (Schipper 2006; Stadelmann et al., 2015).

expected climate and its effects. In human systems, adaptation seeks to moderate or avoid harm or exploit beneficial opportunities. In some natural systems, human intervention may facilitate adjustment to expected climate and its effects." (IPCC, 2014)

⁴ For instance, adaptation actors working on the same site suggesting their own way of doing adaptation work or doing the same work under a different name.

² Article 7.1 of the Paris Agreement defines the GGA as: [the goal of] "enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change, with a view to contributing to sustainable development and ensuring adequate adaptation response in the context of the global temperature goal".

³ The Intergovernmental Panel on Climate Change (IPCC) defines adaptation as "The process of adjustment to actual or

Table 1. Select adaptation frameworks relevant for the agriculture sector

| Framework name, institution | Year | Scope | Adaptation themes |
|--|------|--|---|
| Technical guidelines for NAPs , UNFCCC LDC EG | 2012 | Provides guidance sample indicators for countries to develop NAPs | Suggests approaching adaptation capacity from an individual, institutional and societal/systemic capacity perspective. |
| Notre Dame Global Adaptation Index (ND-GAIN) , University of Notre Dame | 2014 | Likely the only global climate adaptation dataset to date showing countries' vulnerability to climate and readiness to leverage investment for adaptive actions. | Adaptation as a function of vulnerability (defined through exposure, sensitivity and adaptive capacity indicators) and readiness (economic, governance, social). Considers six life-supporting sectors : food, water, health, ecosystem services, human habitat and infrastructure. |
| Repository of Adaptation Indicators , GIZ & IISD | 2014 | Lists of adaptation indicators built on an extensive review of national and sub-national M&E systems. | Three categories of adaptation indicators: (1) adaptation context (focus on observed climate impacts on socio-ecological systems); (2) adaptation actions (implementation strategies); (3) adaptation results (possible results of adaptation, i.e. increases in yields and incomes). |
| Tracking Adaptation in the Agricultural Sector , FAO | 2017 | A comprehensive indicators sheet that approaches adaptation through reducing vulnerability, strengthening adaptive capacity and enhancing resilience. | Four indicator themes and several categories: (1) natural resources and ecosystems (availability and access to quality water, land and forests; status of ecosystems functioning, etc.); (2) agricultural production systems (production and productivity, sustainable management of production systems, impacts of extreme events and climate change, etc.); (3) socioeconomics (food security and nutrition, access to basic services, to credit, insurance and social protection in rural areas, income and livelihood diversification); (4) institutions and policy (institutional and technical support services, financing for adaptation and risk management, etc.). |
| Tracking adaptation and measuring development (TAMD) , IIED | 2015 | A guidance framework to national governments for assessing institutional climate risk management (CRM) and adaptation performance. | CRM is approached from a climate hazards and an institutional adaptive capacity perspective. Adaptation is used interchangeably with resilience and vulnerability and defined in terms of assets (physical and financial), access to services , adaptive capacity , income and food access , safety nets , livelihood viability (in face of shocks/stresses), institutional and governance context , infrastructural contexts and personal circumstances . |
| Resilience Atlas , Conservation International | 2015 | A multi-country spatial dataset that shows countries' resilience via exposure, sensitivity and vulnerability. | Exposure/sensitivity : variables related to rainfall, temperature, population, forest change, surface water, natural disasters, degradation, marine life) Vulnerability : understood as a function of natural capital (e.g., forest cover), human capital (e.g., education) and manufactured capital (e.g., access to electricity). |
| Adaptation Fund (AF) – Core Impact Indicators , UNFCCC | 2015 | A list of core indicators used by AF in monitoring and reporting processes of AF-funded projects and programmes | Adaptation topics: - threats and hazards ; - institutions and capacity to minimize exposure to climate variability risks; - awareness and actions ; - infrastructure and services (including health and social); - ecosystems services and natural assets ; - livelihoods (e.g., % of households having more secure (increased) access to livelihood asset); - policies (e.g., number, type and sector of policies introduced or adjusted to address climate risks). |

Table 1 (continued)

| Framework name, institution | Year | Scope | Adaptation themes |
|--|------|---|---|
| Results-Based Management Framework for Adaptation to Climate Change Under the Least Developed Countries Fund and the Special Climate Change Fund, GEF | 2014 | Results framework for the GEF Adaptation Program | Structured around three objectives with associated outcomes and indicators: (1) Reduced vulnerability of people, livelihoods, physical assets, and natural system (e.g., type and extent of assets strengthened to withstand the climate change impacts); (2) Strengthen institutional and technical capacities for effective climate change adaptation (e.g., number of people/geographical area with access to improved climate information services); (3) Integrate climate change adaptation into relevant policies, plans and associated processes ; |
| Climate Resilient Development Index, European Commission | 2015 | A list of 102 resilience indicators compiled from a review of gray and peer-reviewed literature. | Resilience framed as a function of: (1) Exposure and Climate (natural hazards, population density, refugees per place of residence, internally displaced, population in low elevation coastal zones). (2) Vulnerability (Gini index, poverty rates, age dependency ratio, agriculture value added, forest area, water dependency) (3) Adaptation , defined as: - adaptive capacity (e.g., ecosystem vitality) - coping capacity (e.g., improved sanitation, hospital beds, etc.), - mitigation capacity (e.g., CO2 emissions) and - development indicators (e.g., literacy, life expectancy, income index, internet users, etc.) |
| Vulnerability Sourcebook, GIZ | 2014 | A conceptual framework for assessing vulnerability. Indicators suggested are not prescriptive, but suggested measurement possibilities. | Dimensions of vulnerability: (1) exposure and sensitivity , approached through precipitation (e.g., average daily rainfall), land use (e.g., classified land cover map) and topography indicators (e.g., slope gradient); (2) adaptive capacity defined in terms of poverty (e.g., gross domestic product, household income spent on basic needs, etc.) |
| Vulnerability Index, IFAD | 2017 | Lists of indicators on adaptive capacity and exposure / sensitivity used in IFAD's projects and programmes. | Exposure defined as a factor of index of variability per capita food production, value of food imports, natural hazards, water; Sensitivity : food price volatility, share of food expenditure by the poor, prevalence of undernourishment, rural/urban divide in access to improved water and sanitation); Adaptive capacity : child malnutrition, fertilizer use, growth in per capita food production index, infrastructure in rural areas. |

Common grounds. Many frameworks have thematic areas in common. Some of these include, among others, physical and financial assets, food and nutrition, and natural capital, many of which already align to the Sustainable Development Goals (SDGs) agenda. These suggest that a plausible way to address countries' reluctance towards using standard indicators and metrics is to encourage the use of similar domains across the different reporting levels (global, country, program, project). This would ensure some degree of comparability across aggregate thematic areas, while helping to capture the variety of context-specific actions, processes, results and outcomes that adaptation so much calls for.

Thematic gaps. Some adaptation-relevant themes are overlooked by many frameworks but are critical for

understanding the complexity and diversity of vulnerability, adaptive capacity and resilience. One example is human health, highlighted sporadically in M&E systems, despite being coined as a key tenet of adaptive capacity by the UNFCCC, alongside income and education. Significant evidence highlights the risks and modalities through which climate change impacts human health (e.g. flood- and drought-related deaths, respiratory illnesses from air pollution, vector-borne diseases, etc.); yet less attention has been given to how health determines people's condition to take on new climate-related changes and shocks. In rural areas, where social service infrastructure is typically precarious, human health-targeted adaptation strategies (e.g., access to nutritious food, to healthcare services) are key measures to ensure survival and prosperity of the farming sector, already vulnerable to climate change.

Thresholds. Few frameworks mention or explicitly establish thresholds in social, natural and man-made systems. The Notre Dame Global Adaptation Index (ND-GAIN) uses a baseline minimum and maximum for the data (encompassing values observed across all countries) and reference point to indicate the “status of perfection” (“zero vulnerability or full readiness”) (Chen et al., 2015). Understanding the point at which adaptation efforts are sufficient or need to be complemented with additional measures (e.g., mitigation) is critical for adequate finance planning. Adaptation metrics need to be accompanied with explicitly formulated, acceptable levels of adaptation which should be revised periodically, to reflect that adaptation is a changing goal in a changing climate.

Short vs. long term visions. Adaptation M&E frameworks highlight measurement approaches for both short-term objectives and processes (e.g., institutional set-ups, policies and plans available for managing climate risks) and long-term changes (e.g. development/ wellbeing outcomes and indicators). Climate change adaptation will likely have to be both incremental (i.e., scale existing efforts) and transformative (i.e., enable dramatic shifts, use new tools and activities) (Carter et al., 2018) and M&E frameworks need to reflect this. Including both short- and long-sighted actions and metrics to track completion and effectiveness helps to highlight options for various adaptation pathways, acknowledging that different options are tight to different time frames.

Multi-sectoral approaches to adaptation. Agriculture intersects with many other development sectors, such as environment, health, infrastructure and public works, among others. Few frameworks acknowledge these linkages, by approaching capacity from a broader perspective (e.g., nutrition, access to water services, to public hospitals, to roads, availability of a mobile network, etc.). Without doubt, multi-sectoral approaches to adaptation planning and measurement creates additional challenges for coordinating and harmonizing data collection and reporting; yet they also help to design a more diverse menu of adaptation actions, building on synergies and maximizing adaptation resources available within different development areas.

Adaptive capacity. There are many possible ways to assess the extent to which systems are able to adapt to new changes and eventually transform. Adaptive capacity has many dimensions and measurement possibilities and the frameworks analyzed showcase this abundance. An important added value to this discussion on measurement approaches is the suggestion to zoom out from the individual, to institutions and the society/system when looking at adaptive capacity. Such approach recognizes that climate will not only affect farms and natural resources, but entire systems where economic and social relations are embedded. It calls for tailoring metrics in such

a way as to capture action at various levels and not only across sectors and timeframes.

Leveraging existing datasets. Although imperfect and inconsistent throughout years and indicators, there are data repositories that countries and actors can already rely on in their effort towards more harmonized reporting. Examples include: established national systems to track progress on the SDGs (scattered around national development plans, NAPAs, NDCs, etc.), datasets available through FAOSTAT, FISHSTAT, AQUASTAT, the World Health Organization, the World Development Indicators, World Governance Indicators, the Global Footprint Network, the Earth system Grid Federation, among others. Additional effort is needed to map additional data sources and assess the type, quality and reporting frequency of data included. Moreover, as countries will likely need to collect additional and better data, strengthening national information systems will be required, thus potentially also solving issues of asymmetric information availability across countries.

Conclusions and policy implications

The synthesis presented illustrates the many precedents that exist for climate adaptation thinking and the richness of these for advancing on discussions around the GGA. A pertinent step forward is to define few common themes that help define global ambitions (like the SDGs) and that countries can then build on, to ensure relevance for their development contexts. A systematic review of ambitions and metrics set out in NAPAs will also be critical for steering a country-driven, bottom-up process. This would also help to ensure that M&E information is useful at multiple levels and solve concerns that top-down approaches may bring forward metrics irrelevant for decision-making (not actionable by countries).

Coherence and coordination among development partners, bilateral and multilateral agencies financing work will also be required. While they may have similar broad understandings of adaptation and resilience, the approaches to invest in these vary significantly, influencing planning, implementation, evaluation and financing processes. Understanding how they support national and global processes, how their comparative advantage will help to build common pathways.

For more information on this on-going research agenda and to get access to the framework compilation, contact Andreea Nowak, a.nowak@cgiar.org.

Further reading

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