

## Strengthening climate data ecosystem for effective climate risk management at the household level



Policy brief

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## Summary

Climate data ecosystem (CDE) refers to systems (i.e. policies, processes, technology,) for capturing, recording, storing, analysing and sharing, and feed backing. Sharing quality climate data<sup>1</sup> and information<sup>2</sup> is essential for governments, organizations, and individuals to make informed decisions and take action toward building resilience to the impacts of climate change. Strengthening data-supported climate actions is critical for climate resilience planning in counties and enhances climate investments for community resilience building. The coordination of county Climate Information Services<sup>3</sup> (CIS) actors bridges the gap between climate information generators and primary climate information users. The work entailed an assessment of the status of the climate data ecosystem at the national, county, and local

levels; developing and testing tools; protocols and systems for strengthened county climate data ecosystem; and fostering the usage of investment-relevant climate data for effective decision making at county and household levels.

A key finding was that strengthened CDE is critical for enabling enhanced actors' coordination and informed climate investments. Additionally, to link inputs and impacts of climate change activities at county and community levels, there is a need to integrate modern and traditional forecasting. Further, the Usage of climate information is a household-based decision which is highly influenced by climate change awareness; perception; education level; culture and income levels.

### Key Messages

- 1. Climate information is a prerequisite to managing household level climate risks.*
- 2. Collaborative efforts between private and public actors are necessary to track and monitor climate investment flows.*
- 3. Public-private partnership is critical in data generation and information sharing.*
- 4. Policy and legislative frameworks need to be re-evaluated to strengthen counties and national departments (e.g. KMD) collaborations in climate data generation and dissemination.*
- 5. Operationalization of county climate information services plan is key towards building community resilience towards climate impacts*

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<sup>1</sup> consist of historical and real-time climate observations along with direct model outputs covering historical and future periods

<sup>2</sup> the transformation of climate related data together with other relevant information and data into customized products such as projections, forecasts, information, trends, economic analyses, assessments (including technology assessments), counselling on

best practices, development and evaluation of solutions, and other services in relation to climate or responding to climate change that are of use to society.

<sup>3</sup> Include immediate and short-term weather forecasts and advisories as well as longer-term information about new seeds and technologies and market developments.

## Challenge

Quality climate data is essential for the prioritization of challenges and identification of possible solutions to the impacts of climate change. Investing in climate data in particular could enhance the flow of climate finance particularly in establishing private sector financing which has been elusive as far as climate adaptation is concerned. However, fragmented climate data (and climate finance in particular) that currently exist at the national and county levels hinders state and non-state actors' ability to access comprehensive information for informed decision-making. Additionally, it has created a gap between what CIS providers understand as useful and what CIS consumers consider usable in their decision-making. These difficulties arise from the highly complex nature of the area of climate change data, in which a variety of stakeholders play a variety of roles, including data producers and users, funders, capacity builders, and a variety of other roles<sup>4</sup>. In light of this, there is need to strengthen climate data ecosystem to ensure the systematic generation, processing, and packaging of climate data. Dissemination of CI to specific users is key in supporting local climate actions focused at household and community levels in Kenya and across the globe. Adaptation Consortium (ADA) is helping to strengthen the climate finance data ecosystem at the county level with a focus on low-income. This is expected to contribute to data-driven decision-making on climate response and investments; enhanced coordination and effectiveness of climate investments; linking inputs and impacts of climate change activities at county and community levels.

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<sup>4</sup> [https://paris21.org/sites/default/files/2022-04/Envisioning\\_a\\_climate\\_change\\_data\\_ecosystem.pdf](https://paris21.org/sites/default/files/2022-04/Envisioning_a_climate_change_data_ecosystem.pdf)

<sup>5</sup>

<https://documents1.worldbank.org/curated/fr/7060>

## Need for Climate Data/Information

The most climate-vulnerable countries are often burdened with data gaps, such as inadequate historical climate data and socio-economic statistics for future projections. This is often due to the absence of systems that can gather and store such data. Even though there exist climate models, there is a need for customising and downscaling the models to local context for relevance. Climate models and limited technical expertise for interpretation can further limit a county's ability to provide accurate justification when designing and developing programmes.

The integration of CI into government policies is important because climate is a major driving factor for most of its economic activities notwithstanding advancements in the formulation of institutional frameworks, laws, and policies. Further, World Bank notes that the public sector must play a major role in catalysing Private Climate Finance and this is only practical with quality timely, precise, and comprehensive climate information.

The availability of user-centric CI enhances access to climate finance for resilience building. This is supported by a report from the World Bank that describes the importance of a continuous link between observers, models, forecasts, disseminators, other intermediates, and end users, particularly farmers<sup>5</sup>. In light of this, climate-smart development planning can reduce the impacts of climate-related disasters, improve food security, enhance water resource management, and build resilience<sup>6</sup>.

[21467995075539/pdf/103186-REVISED-PUBLIC-AG-GP-TAP-CIS-Providers-in-Kenya-WEB-02292016.pdf](https://documents1.worldbank.org/curated/fr/706021467995075539/pdf/103186-REVISED-PUBLIC-AG-GP-TAP-CIS-Providers-in-Kenya-WEB-02292016.pdf)

<sup>6</sup> United Nations Economic Commission for Africa. CLIMATE INFORMATION AND SERVICES: A fast-track course on application of climate information and services in decision making

## Assessment of the status of the existing Climate Data Ecosystem

A sound climate data ecosystem<sup>7</sup> is necessary for the effective management of climate risks, this is particularly important at the sub-national and community level where the household perspectives can help boost data quality and ensure appropriate adaptation measures and resilience building. In order to strengthen the CDE, there is a need for collaboration between, and sustained engagement of, stakeholders who produce climate information, intermediaries, and stakeholders who use the information. However, the existing climate data ecosystem at the sub-national level is not well coordinated and integrated right from data generation to usage. As a result, there exist some gaps in the ecosystem for instance, some data sources are overlooked such as indigenous knowledge; difficulty in data analysis and assessing the quality of the data; data not easily interoperable; unclear

channels of dissemination and overall application.

**Production of Climate Data:** KMD is the national meteorological agency mandated to collect and store climate data in the country. KMD is also charged with coordinating and managing the climate information provision framework.

Currently, KMD undertakes data collection through its own climate observing stations and also through collaboration with other institutions and volunteer observers. Apart from KMD, there are observers (individuals or institutions) who make climate notations voluntarily and transmit the data to KMD for use and storage such as the intergovernmental Authority of Development Climate Prediction and Applications Centre (ICPAC), Regional Centre for Mapping of Resources for Development (RCMRD) and International Crops Research Institute for the Semi-Arid Tropics (ICRISAT).

### Existing opportunities

- The monitoring & evaluation unit, Climate Change Unit, and other climate change governance structures such as those under the County Climate Change Fund (CCCF) are active and can be used as avenues for strengthening the generation, storage, and dissemination of climate data.
- Climate Change Fund by an act of the Assembly to effectively address the causes and consequences of climate change at county and local levels
- Climate data is actively generated in the county by Kenya Meteorological department and the data is routinely disseminated to the county technical team.
- Existence of other players (NGOs and private actors) in the county data ecosystem whose roles include resource mobilization, advocacy, influence, and support.
- There are existing public participation frameworks/systems for collective sharing and interpretation of climate forecasts. Community and service providers access forecast information and are able to develop stronger, flexible institutional links and coordinated plans to respond to the coming season's weather scenarios. Dissemination of this information through local media channels makes it accessible.
- Availability of local knowledge on indigenous indicators of climate monitoring and traditional weather forecasting. Integrating local knowledge with scientifically generated knowledge will bridge the gap between knowledge systems and increase the acceptability of climate forecasting information by the local community.

<sup>7</sup> Climate data ecosystem (CDE) refers to systems (i.e. policies, processes, technology,) for capturing, recording, storing, analysing and sharing, and feed

backing quality sharing quality climate data and information

**Processing of climate data:** Climate data analysis is done majorly by KMD and NDMA to enhance its usability. NDMA analyses climate data to provide drought early warning bulletins to targeted counties. Intermediaries such as KALRO and Kenya Red Cross among others package climate information to suit user needs. KALRO is supporting strengthening of agro-weather and climate information services, capacity building for agro-weather observation and forecasting and development of the ability to operate and maintain agro-weather and market information services in order to help farmer/pastoralists decide on what, when, where and how to embark on their farm activities and; Kenya Red Cross Society (KRCS) has partnered with Safaricom to introduce an SMS based information tool to provide timely early warnings for disasters and lessen the adverse effects on communities. It offers information on impending or upcoming natural disasters such as floods, famine and drought to enable users to make informed decisions. In the long run, it enhances disaster preparedness and strengthens community resilience to the impacts of climate change.

**Dissemination:** KMD, NDMA, private sector share CI through Participatory Scenario Planning (PSP) forums and the county steering groups (CSG) respectively. Additionally, ADA provides a breakdown of dissemination methods to the estimated 1.5 million served by the project in five counties: Makeni, Kitui, Isiolo, Garissa, and Wajir. Other actors include ADA, ICPAC and KRCS.

The shared CI can be accessed through online platforms and media communication channels such as bulletin/newspaper, at the community level, CI is disseminated via SMS, local radio stations, public *Barazas*<sup>8</sup> and extension officers.

**Usage and Feedback:** Usage of climate information is a household-based decision. The decision is influenced by climate change awareness; perception; education level; culture and income levels. For instance, most households in Makeni have a tradition of regularly planting maize therefore, they will not abide by the agro-climatic advisories. In Wajir County, households receive drought early warning bulletins from NDMA and advisories to sell off livestock early. However, this has not been a productive process due to the collapse of the market when they need to sell, since the supply becomes higher than demand as everyone is attempting to respond to the advisories.

Feedback on usage is received via CI users' champions. CI usage is also dependent on how well it blends with traditional forecasts. Communities provide feedback and engage with climate information producers and intermediaries through community dialogue forums. The dialogue is inadequate since they are usually donor-driven. This reduces efficacy in obtaining feedback from the communities to facilitate the quality production of user-centric CI.

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<sup>8</sup> face-to-face public community gatherings instigated by village officials for the purpose of attentive discussions

## Gaps in the existing climate data ecosystem

From the findings /study, some of the gaps identified include a Weak institutional framework for climate data management and usage in the county leading to, among other things.

- Inconsistencies/inadequate data use and dissemination;
- Non-integration and non-comparability of scientific and indigenous methods of the weather forecast;
- Insufficient financial motivation of community link personnel i.e. volunteers and climate data collectors; inadequate capacity building leads to inefficiency of community link personnel i.e. volunteers and climate data collectors; and
- Limited operational capacity i.e. data collection network and technical capacity on data management.
- A weak platform for climate data sharing results in limited access by major players i.e. donors and intermediaries.
- No county/local data platform to make climate data user-specific and informative.
- Complex climate data language and lack of public awareness and coverage.

Based on the identified gaps, some of the opportunities that could contribute towards addressing these challenges include:

- i. County taking a deliberate deep-dive role in collaborating with climate data

generations which may also involve alignment of the legislative framework for seamless national and county government levels operation.

- ii. User engagements to sensitize on the benefits of household resilient building using climate information.
- iii. Activation of private sector involvement in the climate data space.
- iv. Creation of climate data integration and generators and learning centres for coproduction.

## Building an Effective Climate Data Ecosystem

An effective climate data ecosystem is a more integrated approach that brings together all key climate actors that create, transform and use data at all levels. The proposed climate data framework reinforces the measurement platform for investment-relevant climate data (finance specific where possible) at the county level with a focus on county government actors including low-income households. The coordination of actors involved in CDEs at the county level promotes the quantification of climate finance to enhance transparency and accountability as follows:

- i. The county governments account for spending on CI services as well as private actors at county, sub-county, and community levels. Private actors include non-government entities, CBOs, and associations like saving and investments SACCOs and groups.

### *The proposed framework description includes:*

- *The private sector at the generation and dissemination levels includes entities that package CI to desirable user-specific formats such as agro-advisories and warning alerts.*
- *The intermediaries involve entities that share CI with the end users through different channels*
- *The feedback flow involves the use of CIMES as a platform to conduct climate barazas at local levels, for engagements between the data generators the County to enhance the usability of CI. These include: quantification of gaps in CI and climate finance.*
- *Counties to play storage and coordination roles to mainstream CI dissemination into county planning and budgeting.*

- ii. Household spending on climate-related investments which is usually part of private climate finance can be tracked, measured, and accounted for.

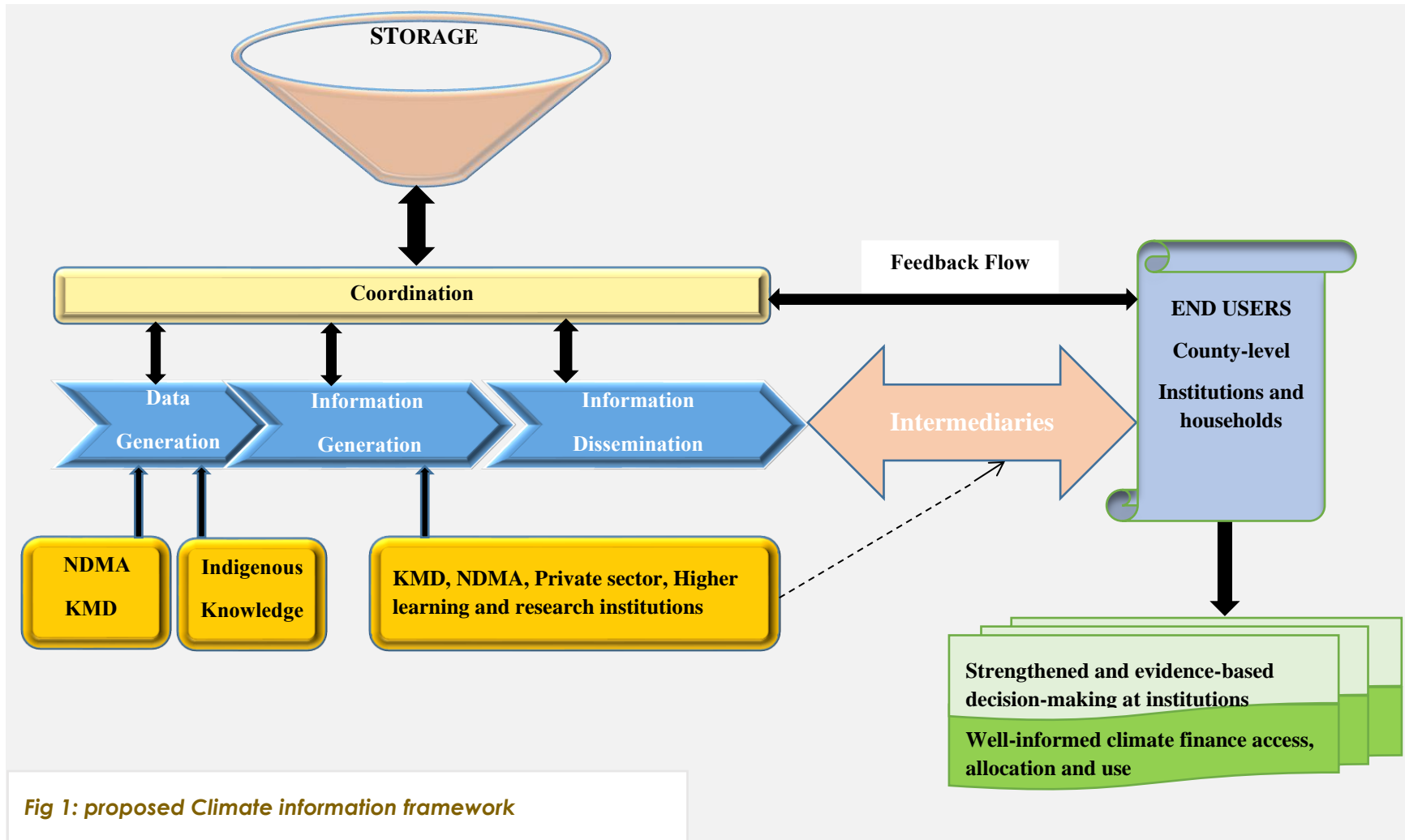
The county coordination also boosts the usability space to guarantee that users are continuously engaged and feedback is obtained through the county systems on CI use and adaptability measures. Additionally, the feedback can be linked climate-related investments of all community entities and households.

## Components of the desired Climate information Framework

CDE Value Chain	Key areas in the current Climate Framework	Key areas in the enhanced Climate Framework
<b>Production of Climate data</b>	Production of climate data currently undertaken by KMD	<ul style="list-style-type: none"> <li>The county governments where viable to support the production of Climate data currently undertaken by KMD and NDMA.</li> <li>A guide to integrating indigenous knowledge into science-based forecasting needs to be developed and implemented.</li> </ul>
<b>Analysis (processing) of climate Data</b>	Analysis of climate data is individually driven by KMD, NDMA, the Private sector and Higher learning and research institutions	<ul style="list-style-type: none"> <li>Counties to support climate data analysis discussion to impact efficiency. The analysis entities include KMD, NDMA, the Private sector, Higher learning and research institutions</li> </ul>
<b>Dissemination and feedback of CI received and usage</b>	CI dissemination is mostly donor-driven and involves national, county and community actors	<ul style="list-style-type: none"> <li>Activation of CIMES platforms for information flow and knowledge sharing between different players and stakeholders to effectively apply CI as part of M&amp;E information and evidence for policy formulation and decision-making.</li> <li>The CIMES platforms also allow CI discussions between the generators, analysts and intermediaries to improve on adoption and usage.</li> <li>CIMES platform to allow tracking and monitoring of climate-related investments at county and household levels.</li> </ul>

**Table 1: Components of the desired Climate information Framework**

## Proposed Climate Information Framework





## Way forward

Through the engagement of communities, and county and national stakeholders, Implementing the next set of activities and scaling out of the climate data ecosystem work is crucial due to the critical role CI plays in household-level resilience building and also the need to quantify climate-related investments, particularly at household levels. Based on the findings, it is hereby recommended that:

- National and county governments and the private sector ensure co-production is sustainable by actively integrating local knowledge forecasting and conventional climate information systems.
- The county government should strengthen the coordination of actors to improve and sustain the climate data ecosystem.
- The national and county governments should strengthen the engagement of relevant stakeholders particularly the private sector in the climate data ecosystem at all levels to support collaborative data-driven innovations and decisions at county and household levels.;
- Improving the legislative framework to promote stronger collaborations between the national and county governments engagements.

For further reading:

1. [https://paris21.org/sites/default/files/202204/Envisioning\\_a\\_climate\\_change\\_data\\_ecosystem.pdf](https://paris21.org/sites/default/files/202204/Envisioning_a_climate_change_data_ecosystem.pdf)
2. <https://documents1.worldbank.org/curated/fr/706021467995075539/pdf/103186-REVISED-PUBLIC-AG-GP-TAP-CIS-Providers-in-Kenya-WEB-02292016.pdf>
3. Climate Data Ecosystem National stakeholders' engagement draft report
4. Makueni County Climate Data Ecosystem draft report
5. Wajir County Climate Data Ecosystem draft report



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