

How Can Information for Adaptation Decision Making be Collected and Disseminated?

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Question Five: How can information for adaptation decision making be collected and disseminated so as to advance integration of climate risks into plans and policies and be useful for those who need it most?

The author proceeds from the basis that capacity to produce internally, and use, information for development is limited in developing countries, and climate analysis information is particularly difficult to produce, as it requires availability of long term time series. His paper uses conceptual and functional models to provide insights into the process of assessing climate information needs, identifying the required data, developing adequate information for decision makers, and disseminating the end products to populations.

Introduction

Although leaders, scientists and development experts around the world have for a long time had difficulty in agreeing on a common strategy to overcome the negative impacts of climate change and variability (CC/CV) on human lives, livelihoods and nature, we all agree that no part of our planet is safe from these effects, and that developing countries, and poor communities are the most vulnerable to the same

phenomena. Africa experienced over the 20th Century a warming in the range of 0.26 to 0.5 degree Celsius per decade (Hulme *et al.*, 2001; Malhi and Wright, 2004, cited by Sherpard Zvigadza *et al.*, 2010), and by 2080 the expected increase in annual mean surface air temperature is estimated by the Intergovernmental Panel on Climate Change (IPCC) to vary between 3 and 4 degrees Celsius, under a medium-high emission scenario. The various disasters that hit the African continent regularly (droughts, floods, snow, heat waves, etc.) seem to confirm the effects of out-of-bounds changes in the global climate around the world.

As governance entails planning, it is a must for every government to develop initiatives aimed, on the one hand, at mitigating the effects of CC/CV, and, on the other, at adapting populations to the effects of the same CC/CV. Among the key questions linked to the fulfillment of the planning duty of country leaders and local government councils, availability of adequate information for taking the correct mitigation and adaptation decisions remains a real concern, particularly in developing countries. Indeed, in general capacity to produce internally, and use, information for development is limited in developing countries, and climate analysis information in particular is difficult to produce, as it requires the availability of long term time series, usually - and not surprisingly - lacking due to the characteristic low level of socio-economic and infrastructural development.

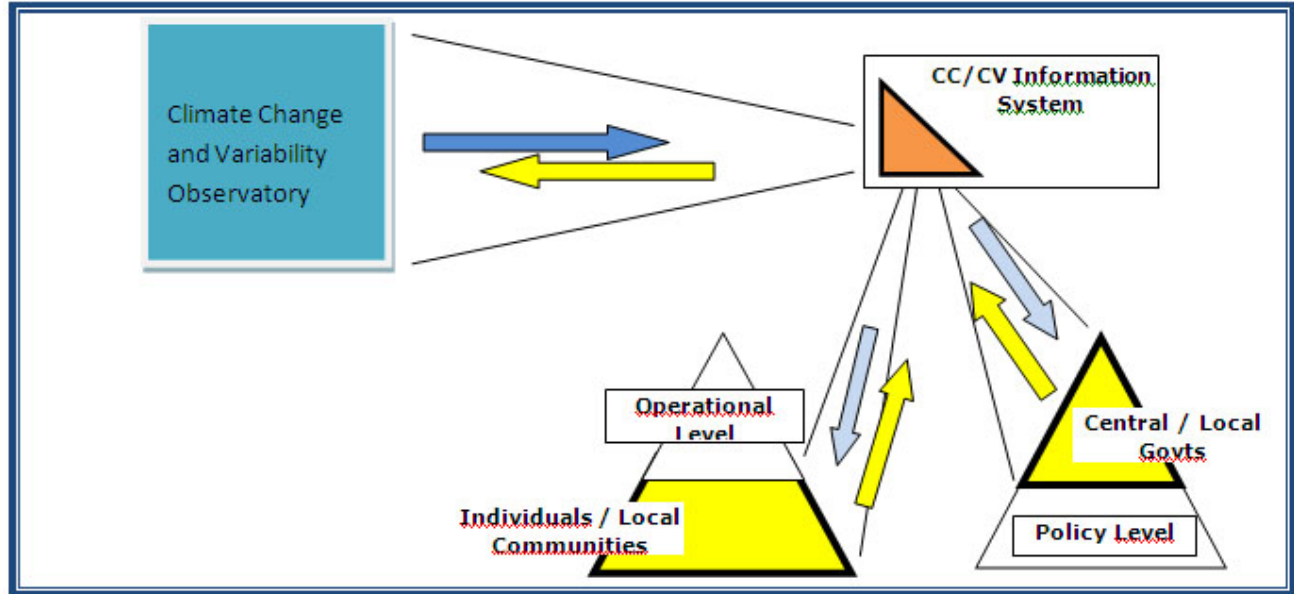
This short note attempts to provide insights into the process of assessing the needs, identifying the required data, developing adequate information for decision makers, and disseminating the end products to populations, as required by the need to plan and implement adaptation and mitigation measures in all sustainable development strategies.

A. Information for decision making in CC/CV Adaptation and Mitigation

In the present Climate Change and Variability (CC/CV) context, it is important to understand - actually to agree on - the type of information involved in the response actions undertaken for both preventive and reactive measures related to climatic risks. For the analyst, the principle of work is to derive information from data that are processed to meet a particular need.

A 1. Conceptual model

Fig 1 : Conceptual Model for the generation of CC/CV information for decision making



The conceptual model above reduces the universe to the following main features related to the issue being discussed:

- the decision making sphere divided into Policy and Operational scales;
- the CC/CV Observatory data field, encompassing what is observed, measurable and effectively measured from the Earth system as a whole;
- the Information system to be used by analysts to derive the required decision making information, including technology, scientific knowledge and models, strategic targets and the human and financial resources and organizational options necessary to operate the system;
- the various data and information flows involved.

A 2. Functional model

The corresponding functional model can be summarized as follows:

(1) the demand for information - see yellow ascending arrows - stems from the need to take decisions at two distinct levels:

- the policy level is in need of information to develop plans to integrate adaptation and mitigation measures in the various development strategies for the country as a whole, for the administrative divisions, municipalities, civil society, the research community, and local communities;
- the operational level in charge of putting into practice mitigation and adaptation techniques needs knowledge and best practice packages adapted to their needs. This group is composed of project team leaders operating in the field, local community leaders, individual farmers, herders, tourist facility managers, teachers, etc.

(2) To know what these two categories of decision makers' needs are exactly, Governments undertake user needs assessments, resulting in the identification of appropriate information products adapted to each case, and the corresponding series of input data to be collected and processed. This function is normally assumed by adaptation and mitigation studies that identify CC/CV information systems as appropriate tools necessary to map the needs expressed/assessed onto the products to be used in operational terms, for mainstreaming CC/CV into the development plans and strategies, and for putting the corresponding measures into practice.

(3) The CC/CV Observatory symbolizes all functions of data collection, exerted punctually or on a regular basis, and directly or indirectly related to the climate and its variables. It is a component of the conceptual model not necessarily incorporated into an actual institution. The CC/CV Observatory encompasses conceptually the functions of meteorology agencies, but also those of hydrologic and water resources management services, soil, forest, land, pastoral management agencies, climate-oriented research laboratories, remote sensing centers, in summary, all existing facilities in a country or abroad, producing data that can contribute in the knowledge and monitoring of the climate. It also includes the empiric knowledge of indigenous people and local cultural practices linked to the climate.

(4) The CC/CV Information System, on the basis of the demand for information (see the yellow horizontal arrow), selects from the observatory the appropriate data (see the horizontal dark blue arrow), taking into account the climate models to be used for the delivery of information products and services as output. The data collected are processed to produce the final information required for each initial need (see the two light blue arrows). To fulfill this analytical function, the CC/CV information system makes use of scientific research results in climate modeling, data integration in GIS, remote sensing digital image processing, spatial analysis combining biophysical CC/CV data and socio-economic data, etc. This function also includes the interpretation of the analytical results (information products) and their translation into digest added-value information for both the end users and the decision makers/policy makers.

The aim of this paper being to answer the basic question of how information for adaptation decision making can be collected and disseminated, the conceptual model above and its associated functional model, will serve as the background against which answer formulations will be attempted. The analyses for answering

these questions will consider the following key areas: collection on one hand and dissemination on the other.

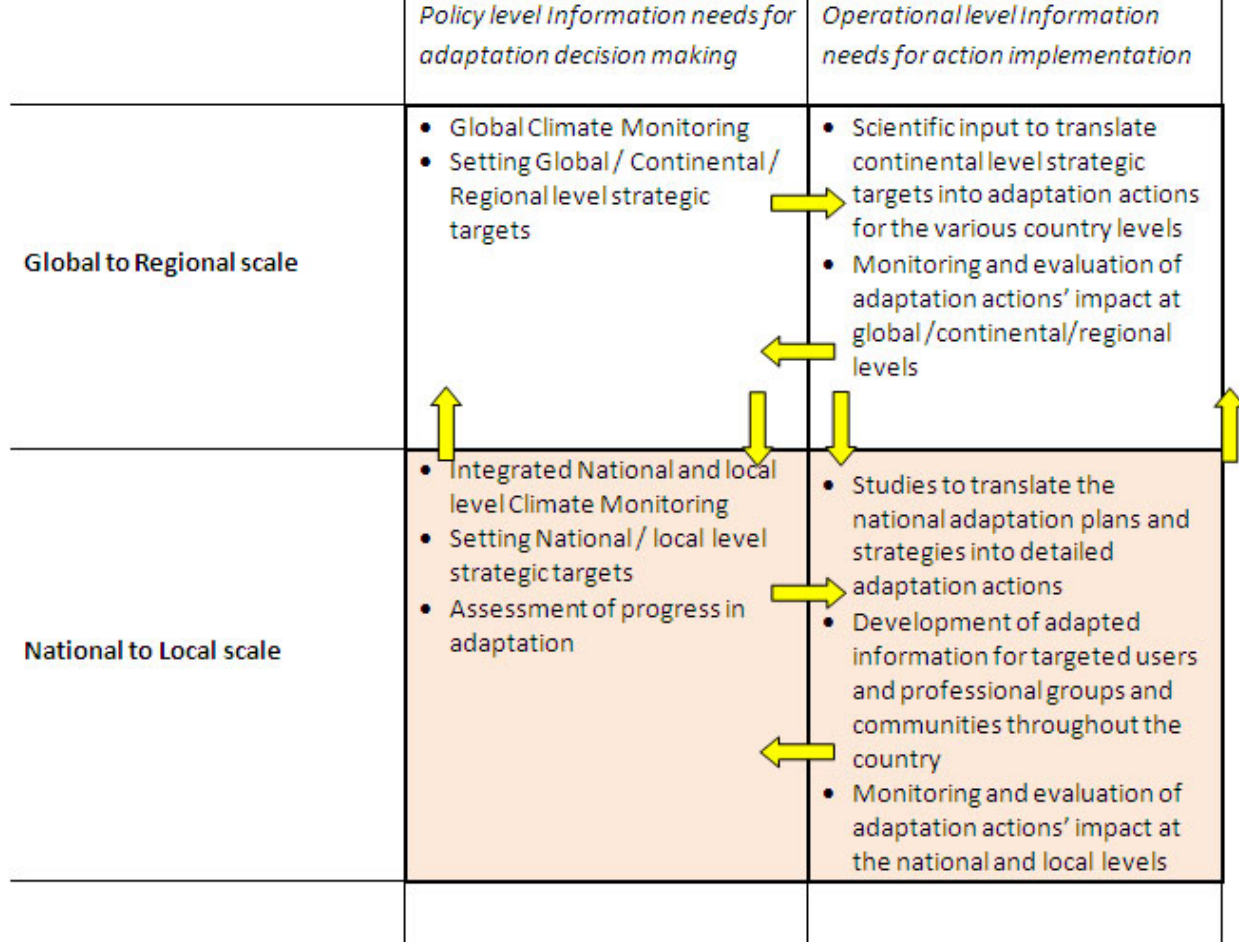
B. “Collection of Information” for Adaptation Decision Making

The policy question of this study is “How can information for adaptation decision making be collected and disseminated so as to advance integration of climate risks into plans and policies and be useful for those who need it most?” The first comment to make about the formulation of the policy question is that, as shown by the conceptual model above, information for adaptation decision making is not a resource readily available for collection. It seems more appropriate to talk about information generation or information production instead of information collection. However, it is easy to understand that the issue here is how to make information for adaptation decision making available. In other words, how can we make sure that the upstream actions necessary to create this information are undertaken on a sustainable basis?

To answer the question, it seems necessary to broaden the basis of the analysis by providing a synoptic view of the “information collection” processes, or more accurately, the processes followed to generate adaptation information for decision making and action, for the country and local levels together. Below is a 2D matrix showing the relationship between scales of information needs, and the information generation processes involved.

The matrix shows a bidirectional influence relationship between the global and regional/continental scale on one hand, and the national and local scale on the other hand. This means that the information generation process at national level is not independent from the upper level, for both policy decision making and actual implementation actions.

One can say that the required information is produced or generated through the following processes:



B 1. Climate Monitoring

Climate monitoring plays a key role in providing most of the information needed for adaptation decision making, but also for action. As exposed through the observatory feature in the conceptual model, key variables are constantly measured at strategic locations to provide input to the information system in charge of ensuring the appropriate processing, to deliver the added value information required for the adaptation decision making or implementation action. These in situ measurements are combined with, or complemented by remote sensing data to provide a modern basis for more and more accurate results in climate modeling. It is important to note that the climate observatory and information system also provide input to other sustainable development sectors such as food security, natural disasters management, environmental protection, bio-diversity preservation, etc.

In the CC/CV area, availability of long term time series is very important, as comparison is necessary between values in the past - at different dates and latitudes - and present values, to trace changes over time and express their magnitude in terms of deviation from known reference values. This requirement is a challenge for African countries and the developing world in general, as they are confronted with capacity to sustain the financial effort necessary to keep the

observatory infrastructure running, and to strengthen it in terms of improved coverage and technological upgrading. In Africa, WMO, the navigation security agencies, and environment / food security programs are the main sources of financial and technological support to government climate data collection actions.

The private sector should be involved in Africa and encouraged to contribute to the extension and running of national climate observatories and climate information systems. This can be done gradually by creating as an incentive, a market of climate-based services whereby the Government can play a role in standards definition and quality control over data collection and climate-related services delivery.

The climate monitoring function can also benefit from low cost contribution if local populations are involved, at least for the collection of basic data among the standard WMO meteorological data, such as rainfall, temperature and similar data whose collection does not require highly specialized skills. Farmers can be trained to take care of the measurement instruments and transmit data back to the central offices via SMS for example, if automatic direct transmission is not provided for.

In terms of incentives in climate data collection, one of the best models in West Africa is the one developed and used at the OMVS Environmental Observatory based in Dakar, Senegal. It is an intergovernmental network specialized in collecting in a participatory and decentralized manner, country level data in thematic layers, within the national perimeter of the Senegal River basin, and transferring these data to the headquarters of the Observatory for integration, processing and dissemination of the resulting basin-level information to all OMVS member States (Guinea, Mali, Mauritania and Senegal).

This observatory, although a subsidiary body of the intergovernmental policy institution called “Organisation pour la mise en valeur du fleuve Sénégal - OMVS” is fully independent from the latter and accountable for its publications as far as their scientific content is concerned. The regular and efficient functioning of this network is attributable, to a large extent, to intelligent, professional and financial incentives identified for the local focal institutions, and inside these institutions the national experts in charge of feeding regularly the data needs of the network. These actors are regularly gathered at the headquarters of the Observatory to discuss issues related to the performance of the network, and ways to improve their common action.

All these actions are governed by a regulatory framework, a two-level type of agreement between the OMVS and the contributing countries : (1) a policy level

framework agreement signed between the High Commissioner of the OMVS and each minister in charge of the river basin management sector in the four member States allowing the exchange of data, and (2) a detailed technical memorandum of understanding signed between the Director General of the Observatory and each local focal point for the collection and transmission of the required data to the Observatory. In addition, the clause of non disclosure of the data for any purpose other than the objectives of the Senegal River basin's management is strictly applied by the management of the Observatory.

Another instance of data collection model possibly applicable for adaptation decision making would be the network of the East-Africa Africover project, but it was not possible to check the current functionality of this network.

On the other hand, by mid-2011, it should be possible to enlist a new model of climate data collection and sharing at country level, in support of the Global Monitoring for Environment and Security (GMES & Africa) program. This model is the SAGA-EO model being implemented in five African countries where dynamic networks for sharing Earth Observation data (meteorological, hydrologic, remote sensing, water resources, etc.) for applications in the various sectors of sustainable development are being put in place.

B 2. Strategic targets setting

Setting strategic targets for adaptation to climate risks is as important as providing past and present information on the status of the climate and its variability and change. In the overall sustainable development process, consensus-based definition of strategic targets for adaptation is far from being a straight forward, trivial exercise to undertake. Taking into account the fact that low levels of literacy and basic education is a serious obstacle to easy buy-in of local communities regarding the projected measures proposed by the government experts and the scientific community, it is clear that efforts should be deployed to make strategic targets setting a politically correct and socially acceptable initiative.

Therefore, policy dialogue is necessary between the decision making group (sustainable development planners, policy makers) and the population in order to agree on what is reasonable to adopt as strategic targets conducive to participation of the same population. Thus, the complementary information necessary to make the adaptation ambition a reality can be derived from this process. It is the reason why the common definition of strategic targets appears as a step worth mention in the adaptation information generation process.

B 3. Assessment of progress in adaptation

Monitoring and evaluating the progress made as adaptation strategies are being implemented is another invaluable source of information for decision making. Indeed, appropriate and measurable indicators usually accompany all adaptation initiatives, and the values of these indicators, moving from initial state to achieved new state, are recorded and then compared with the targets. The gaps or the gains and their respective spatial distributions constitute a source of updated adaptation information useable as input data to further developments.

This shows that in every country, data accrued from the implementation of the various adaptation/mitigation projects could be used in national spatial databases, feeding into the CC/CV Information system. Unfortunately, these project implementation performance data are, most of the time, compiled just to meet reporting requirements, and then stored in drawers. To reach the goal of reusing these data in a friendly manner, an annual national prize rewarding the best contribution to the Adaptation/Mitigation Strategy of the government could be institutionalized, under which the results of each project concerned should be sent to the national CC/CV information system. The selection of the winner(s) should be made by a jury of which the manager of the CC/CV information system should be a member, or even the chairperson.

C. Dissemination of Information for adaptation/mitigation purposes

Although the Framework Convention on Climate Change is among the global environment initiatives of the Rio generation, adopted almost twenty years ago, National Action Plans for Adaptation (NAPA) to climate change and variability, the strategic instruments by which governments implement the Convention, are quite recent, at least in Africa. This explains why the strategy presented in these NAPAs starts with a series of sensitization campaigns to familiarize populations with the concepts behind mitigation practices and adaptation to climate change and variability, followed by capacity development initiatives in the same areas. To this end, specific tools are developed for the industry and the public, in the form of manuals of procedures and packages of adaptation best practices. The dissemination of information allowing individuals and groups to adapt to the changes and variability of the climate, and to mitigate the human input to these changes should follow the same FCCC solution path.

C 1. Dissemination of Mitigation-oriented information

The target audience here being the industry (manufacturing industry, transportation, forest industry, mining, cooling industry, etc.) disseminating mitigation-oriented information in Africa among these groups is not an issue as such, as business managers in these areas are generally - or increasingly - knowledgeable people. The difficulty resides less in understanding the issues involved, than in the willingness of those concerned to engage in the technical transformations or professional conversion usually necessary to adapt their production methodologies, technology and equipments to the mitigation standards.

However, the dissemination of the mitigation-oriented information should start with soft content messages explaining clearly the risks for society as a whole in the near future if nothing is done to comply with the UNFCCC requirements.

Availability of the Government to assist in the required transformations should be explored and possibly offered, as some donors such as the GEF invest in adaptive transformation initiatives. Then, after a reasonable period of time, more stringent measures should gradually follow.

In Africa in general, a particular group not to be set aside in the dissemination of mitigation information is the informal sector. Some groups inside this sector contribute, through their activities, to the degradation of the environment, with negative impacts on climate change and variability: these groups include, for example, cooling sector technicians fixing refrigerators and/or car air-conditioning systems on the streets, or in some kind of organized workplace, but without the required equipment to keep CFC gases from being released into the atmosphere. These actors should be regarded as a specific group to assist under a special mitigation initiative.

In a few countries in West Africa, another group from the informal sector to consider is motorcyclists in the main cities (Ouagadougou, Cotonou, Lomé, etc.). They contribute by their high numbers to urban air pollution through the emission of exhaust gases. This group also needs special attention under a specific mitigation initiative.

Typically, a strategy for mitigation information dissemination among these groups will consist of:

- a sustained sensitization campaign
- a survey of the targeted populations
- the development of specific mitigation best practice packages including:
 - o capacity development of the targeted population;

- o a clear alternative policy option to reduce motorcycle gas emissions to an insignificant level;
- o sustained follow up of the repair technicians' population to make sure that they apply the mitigation practices;
- o actual conversion of motorcycle users to public transport customers.

C 2. Dissemination of Adaptation-oriented information

As far as adaptation information dissemination is concerned, one should be prepared to deal with a variety of target populations (those affected by, or susceptible to, climate change impacts or variability). Typically, the NAPA will have identified the most vulnerable populations and sectors, and selected adaptation best practice packages for each group concerned.

The dissemination of adaptation information will consist of using the most appropriate channels per targeted population to provide them with the required information for an individual and collective change of behavior (regular newsletter, radio program, TV program, play on stage, etc.).

One of the best information dissemination models is the one developed by FAO under the Information for Action Programme, and essentially consisting of:

- Selecting the language in which to address the targeted population
- Defining the primary audience
- Developing the information material that should lead the reader to take action
- Formulating appropriate recommendations for decision making at the upper level

In summary, based on the NAPA content, detailed projects targeting specific user groups or actors will be implemented leading to strengthened capacity of the corresponding populations to make use of the adaptation information to face the risks inherent to climate change and variability, and to internalize this capacity and reflect it in their day-by-day behavior, individually and collectively.

Conclusion

Africa is a region where adaptation/mitigation information generation is necessary to meet specific user needs in the context of a changing climate. From information derivation based on CC/CV data field to its dissemination, the specific characteristics of the concerned country or region have to be taken into consideration, as a means to develop a sustainable mitigation/adaptation solution

based on the local conditions. In particular, the condition of human populations must be analyzed and used as an adapting factor, in respect of the NAPA options of the country.

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