Concept Note
for
A Validation Workshop on the Application of the Socio-Economic Benefits (SEB) of Climate Information Services (CIS) Framework in Disaster Risk Reduction (DRR) in Africa

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BACKGROUND

Hydro-meteorological hazards such as droughts, floods, strong wind, heat waves and others have huge impacts on the socio-economic and environmental settings of many African countries. This is because about 90% of all natural disasters on the continent and over 60% of socio-economic activities are weather and climate related. It is also estimated that hydro-meteorological related disasters could cause devastation to property and infrastructure and reverse the gains made in the continent by 10-20% of the Gross Domestic Product. Studies indicate that proper use and application of climate information services (CIS) into decision making process could help to build climate resilient economy and society (Vaughan and Dessai, 2014). The benefits of using CIS are, therefore, very huge as the scope of social and economic activities affected by weather and climatic conditions is enormous. Providing decision-makers with timely, accurate information on climate and weather variations can help to make decisions on the type and level of investments needed to build climate change resilient economy, society and environment. Hence, there is greater demands for better climate information and prediction services as the available information in many countries is not adequate to formulate policy/strategy that ensures climate smart development (Kadi et al., 2011a). However, the significant gaps in the quality and availability of climate information limit the realization of potential benefits of CIS in many sectors/countries. Moreover, assessing or quantifying the extent to which individual weather and climate services lives up to its promise is problematic. This leaves weather and climate service providers and funding agencies with very little information about the quality and relative value of weather and climate services (Vaughan and Dessai, 2014).

Demonstrating the socio-economic benefit of CIS can help to understand "*how*" and "*why*" users could use weather and climate information, to prioritize the types of information to be generated and to determine how best to disseminate that information (Lazo et al., 2009). According to Perrels et al. (2013), the societal value of, and benefits from, CIS can be greatly enhanced by establishing a much closer dialogue and sense of partnership between the provider and user communities at all levels. Experts in climate science and related fields should, therefore, work closely with policy-makers and end-users to formulate evidence based climate resilient policies

and strategies that aimed at minimizing the devastating effects of hydrometeor logical hazards while providing end-users with timely, tailored climate-related information and knowledge products that could reduce climate-related losses and enhance benefits.

As part of the process to demonstrate Socio-Economic Benefits (SEB) of CIS in climate sensitive sectors, the African Climate Policy Centre (ACPC) of the United Nations Economic Commission for Africa (UNECA) under the DFID-funded Weather Information and Climate Services (WISER) project has developed the framework that help to assess the economic and social benefits of CIS compared to the costs of investments. This Framework presents the steps required for the effective identification and use of indicators to support a sectoral and integrated analysis. It also allows the development of an integrated Cost Benefit Analysis (CBA) by considering three main analytical components: investment, avoided costs and added benefits. The assessment of SEB of CIS is, therefore, based on the amount of avoided costs and added benefits that an investment generates over time. This means that the cumulative benefits and costs are compared to determine the benefit to cost ratio of CIS implementation. A set of possible indicators of investment, broadly subdivided into capital and operation and management costs, training costs, certification costs, and government costs, is to be considered. Such framework is, therefore, one of the key strategies aiming at demonstrating the utility of timely and accurate weather and climate information in the decision making process could help to bring benefits to the economy, society and the environment.

APPROACH TO ASSESS THE SEB OF CIS

Various methodologies can be utilized including the system dynamic. A System Dynamics methodology is, therefore, used to create models that are descriptive and focus on the identification of causal relations influencing the creation and evolution of the issues being investigated. The System Dynamics based models are, in fact, the most commonly used as "*what if"* tools to provide information on what would happen in case of the implementation of a given policy/practice at a specific point in time under specific context. They identify and analyzed properties of real systems, such as feedback loops, nonlinearity and delays, via the selection and representation of causal relations existing within the system. In this study, the assessment of SEBs of CIS is done based on the amount of avoided costs and added benefits that the investments generate over time (Figure 1), meaning that cumulative benefits and costs are compared to determine the benefit to cost ratio of CIS investment using Systems Thinking and System Dynamics (using ***Vensim software***), which is a freely available software. The simulation models are created using building blocks that are common across countries (e.g. population, land use, and technologies) but with extensive customization at the sectoral level to capture the peculiarities of local contexts. The correct definition of system's boundaries as well as a realistic identification of the causal relations characterizing the functioning of systems being analyzed

(e.g., relating to the use of causality rather than correlation) are, however, the potential limitations of the simulation models employed in this study.

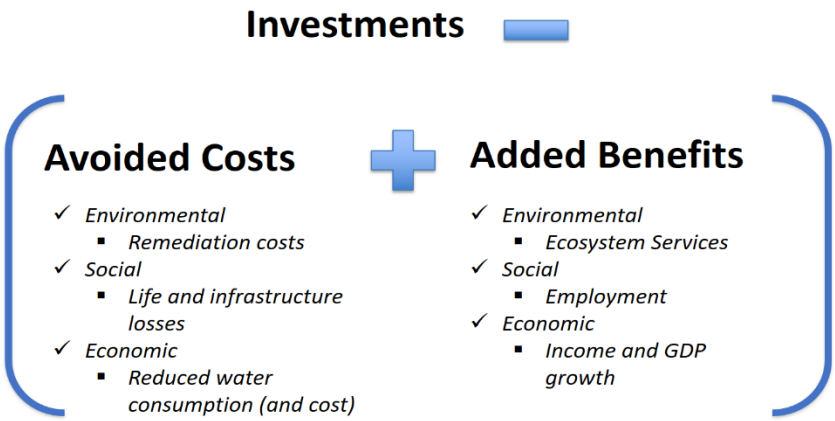

Figure 1: – Conceptual framework in use for the SEB analysis

a) *Investment:* From a public-sector point of view, investments refer to the allocation and/or reallocation of financial resources with the aim to reach a stated policy target (e.g. create enabling conditions for the development of sustainable businesses in a given country). From a private sector perspective, investments refer to the monetary costs of implementing a decision, such as complying with sustainability standards as well as the costs of production (e.g. the purchase of machinery and the transformation of production processes and techniques, potential additional labor and training costs).

b) *Avoided costs:* the estimation of potential costs that could be avoided as result of the successful implementation of an investment/policy. In the case of sustainability principles and processes, these refer to the use of green production practices (as a result of sustainability certification) and may include direct savings deriving from a more efficient use of natural resources, as well as indirect avoided costs, e.g. health expenditure, avoided losses from environmental degradation, and avoided payments for the replacement of key ecosystem services (UNEP, 2002).

c) *Added benefits:* the monetary evaluation of economic, social and environmental benefits deriving from investment/policy implementation, focusing on short-, medium- and long-term impacts across sectors and actors. In the case of sustainability certification these include enhanced access to markets, or the availability of premium prices for certified products. These are all additional benefits that would not be accrued in a business as usual scenario.

THE KEY STEPS IN THE SEB ANALYSIS

- *Identifying current and future vulnerability to climate variability and climate change*. This includes an assessment of the exposure of built capital and infrastructure, of the vulnerability of people and villages to extreme weather events, and of the potential sensitivity of economic activities to changing weather patterns.
- *Identifying indicators* that measure performance and vulnerabilities across social, economic and environmental dimensions. Since not all the impacts of climate change are economic, it is important to identify social and environmental indicators that could potentially be subject to economic valuation.
- *Identifying the potential benefits of the weather and climate service* and how these benefits will arise from the steps in the weather chain (from weather or climate information to end users). This should include all benefits, i.e. financial benefits as well as non-market benefits such as health.
- *Derive a baseline of the current situation* without the new information provision. Derive a baseline and, to the extent possible, quantify the potential social, economic and environmental impacts of climate change. This includes an assessment of the impacts across sectors and actors (e.g. households, private and public sector), as well as over time (e.g. short term vs. long term).
- *Identifying, simulating and analyzing alternative scenarios of action* (i.e. with different degrees of availability of climate information and uptake from local economic actors) to estimate deviations from the baseline.
- *Assessing the change from the baseline* with the new weather and climate services in place. This should include the potential benefits, but ensure that the efficiency losses along the weather chain are considered.
- *Assessing the costs of the project*, including investment in meteorological stations and operation provision (thus capturing equipment and resource (labour) costs).
- *Comparing benefits against costs*, estimating, to the extent possible the economic value of avoided social and environmental impacts, as well as avoided economic costs and benefits. The comparison of costs and benefits should also highlight the improve resilience by sector and economic actor, to better inform decision making.
- *Identifying omissions*, consider bias and undertake sensitivity analysis. When assessing costs and benefits it is crucial to acknowledge any missing information, or social and environmental impact that could not be monetize. This is to ensure that if a partial analysis is carried out, it is acknowledged that the results may be an underestimation of the SEB brought about by investments in weather information.
- *Exploring how benefits could be enhanced through interventions along the weather chain*. Through the implementation of complementary interventions across sectors and actors, and over time. The complementarity/synergy between investments in the

weather value chain and sectoral development targets explored, as this would increase the effectiveness of budgetary allocation, and other important data/information.

CUSTOMIZATION OF SEB TO DRR

It has been established that global disasters are mostly caused by hydrometeorological hazards (Vaughan and Dessai, 2014); and better weather and climate services leads to improved information including better forecasts, early warning systems and seasonal forecasting. In turn, these services provide benefits to users, and lead to positive outcomes from the actions and decisions they subsequently take. The focus on SEB of CIS with particular reference to DDR will, therefore, help in maximising the impact of weather and climate services for appropriate interventions along the chain. This approach look at the action and outcomes from the use of enhanced weather and climate services, and compares this to a baseline without this additional information, with the main difference of quantifying the benefit in DRR. There were a set of steps taken to apply the SEB framework to Disaster Risk Reduction including:

- Customize the SEB framework, methods and tools to evaluate their application in Disaster Risk Reduction;
- Establish and test the customized framework to drive uptake and investments in Disaster Risk Reduction various levels.
- Carry out analytical studies to show the need for investment in CIS and provide strategic guidance for investment in Disaster Risk Reduction;
- Analyze and develop indicators and trackers for CIS uptake in development of DRR policies, and others.

WORKSHOP OBJECTIVE

In order to consolidate the findings of the SEB study, there is need for organizing a workshop for various stakeholders to validate the results of the study. Hence, the specific objectives of the workshop, among others, will be:

1. To expose participants to SEB CIS/DRR modelling processes using Vensim Software;
2. To solicit inputs for the customized DRR model; and
3. To provide a series of hands-on training sessions on economic assessments of weather and climate forecast and their applications to decision making in DRR

EXPECTED OUTPUTS

The main results include:

- SEB framework, tools, methods for the operationalization of the assessment of the economic utility of weather and climate forecasts for decision making in selected sectors established,

- Community of practice on economic utility of weather and climate forecasts in the DRR decision making established; and,
- Comprehensive report detailing modelling processes, recommendations for scaling up results in other sectors produced.

DETAILS ON THE WORKSHOP

Organizers

- This event is being organized by the African Climate Policy Centre under the DFID-funded WISER project.

Organization/Style

- Solicited talk on SEB, Q&A, hands-on exercise

Participants

- The workshop will gather different stakeholders involved in the Disaster Risk Reduction from African member states, Regional Economic Communities (RECs), Regional Climate Centers (RCCs), Universities, Research centers, and others. The expected number of participants expected to be more than 60.

REFERENCES

Kadi, M., Njau, L.N., Mwikya, J. & Kamga, A. (2011). The State of Climate Information Services for Agriculture and Food Security in West African Countries. CCAFS Working Paper No. 5. Copenhagen, Denmark.

UNDP, 2002. "A Climate Risk Management Approach to Disaster Reduction and Adaptation to Climate Change", UNDP Expert Group Meeting on Integrating Disaster Reduction with adaptation to Climate Change, Havana.

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AGENDA

- To be circulated soon