Methodology for an economic valuation and potential investment opportunities for the Trans-Boundary Conservation Area (TBCA) between Kenya and Tanzania

1 Background

Contiguous countries share an array of coastal and marine resources and ecosystems, which transcend national boundaries thus necessitating collaborative approaches including joint management of these shared resources. Kenya and Tanzania share such resources e.g. coral reefs, seagrass beds, mangroves, and fisheries among others at their point of convergence at the coast. The Contracting Parties to the Nairobi Convention through COP Decision CP8/6 have supported the concept of a "Transboundary marine protected area between Kenya and the United Republic of Tanzania as an example of a cross-border management system of marine protected areas".

The Governments of Kenya and Tanzania through their national Institutions (Kenya Wildlife Service (KWS) and the Marine Parks and Reserves Unit (MPRU)) respectively have initiated a bilateral initiative between their two countries to investigate the options and possibility for developing a coastal and marine Trans-Boundary Conservation Area (TBCA) between the two countries. To contribute to this process these agencies (with support from the Nairobi Convention and WIOMSA) carried out an assessment and developed a background document on the current situation and potential options for taking the process of establishing the TBCA forward. In addition, a study carried out by WCS and WIOMSA investigated the legal and institutional frameworks that would be needed to support the development of the TBCA. A Core Group of stakeholders from the two governments, NGOs, and communities has been established and has held several consultative meetings to discuss options for the TBCA since 2015.
The proposed TBCA spans a terrestrial and marine ecosystem extending from the northern boundary of the Diani-Chale Marine National Reserve in Kenya to the southern boundary of Mkinga District in Tanzania. Discussions have been held on the viability of including the Pemba Channel and the western coast of Pemba Island into the proposed boundary to account for ecosystem connectivity within the TBCA. The TBCA would provide protection to highly sensitive and endangered ecosystems and species, i.e. highly significant marine and coastal biodiversity.

The key purpose of the proposed TBCA would be to provide protection to ecological infrastructure and biodiversity, while at the same time also optimizing the benefits and investment opportunities provided by these systems to neighboring communities and other beneficiaries. The key benefits of the TBCA have been discussed in a Joint Technical Paper[1] and includes the following:

1. Ecological significance and benefits of joint management of extended area, including contiguous and connected habitats, as well as areas of regional significance
2. Socio-political benefits, including international cooperation; connecting communities and cultures across artificial borders; joint tourism initiatives and cross border learning.

An economic valuation of the TBCA is required to serve as a basis for a business case towards the establishment of a collaboratively managed area between the two countries. Much work has been done on the ecological structure and functioning of the system, however, information is lacking on:

[1] Undated, A PROPOSED MARINE TRANSBOUNDARY CONSERVATION AREA BETWEEN KENYA AND TANZANIA, Joint Technical Paper by The Marine Parks and Reserves Unit, United Republic of Tanzania, and the Kenya Wildlife Service, Republic of Kenya

1. The value of the resources
2. Future management scenarios to ensure ecological risk management, sustainable use and optimal benefits flows, and
3. Investment opportunities to optimize the benefits.

The work proposed in this assignment builds on and amplifies the existing work and would rely extensively on the knowledge gathered to date. It would also require extensive consultations with all relevant stakeholders.

The work would further capture the benefits of the proposed TBCA as a scenario, to be compared against the baseline/status quo of not having a TBCA, and thus result in a cost-benefit analysis.

2 Approach and Methodology

2.1 Overview of method

A three step methodology is required as part of the economic valuation of the TBCA:

1. An environmental and resource economic valuation is required to link the TBCA to human well-being. This requires the development of requisite chains of causality, linking ecological assets, through an ecosystem services framework, to the "conventional" economic models of the two countries. This valuation would quantity the current and potential benefits that the TBCA would produce into the country economies.
2. Realistic TBCA management scenarios need to be designed and costed in detail (at long term management plan level). These plans need to reflect the resources and actions required for protection. Multiple management scenarios may exist and may have different cost implications. This analysis needs to be linked to the benefits valued in step 1 above. Together, steps 1 and 2 would provide the basis for cost-benefit analyses of various management options.
3. Based on the outputs of the above two steps, an investment analyses needs to be performed to determine the extent to which benefits (i.e. ecosystem services) may be optimized. This could include for instance developing business cases for eco-tourism investment leading.

Based on the outputs of the above, decision-makers would receive the following outputs:

- A thorough and highly-detailed and evidence-based business case for establishment of the TBCA
- A quantification of economic benefits derived by neighboring communities and the respective countries' fiscus
- A set of investment plans including cost and benefits analysis of various incentives schemes and market-base instruments.

2.2 Background to the field of Environmental and Resource Economics

The field of environmental and resource economics (ERE) specialises in the valuation of ecosystems and natural assets.

The field of ERE has a long development history, going back 80 years. Most recently, the Millennium Ecosystems Assessment (MEA) (a process that was established out of the World Summit held in Johannesburg in 2002)[2] radically changed the way we value ecosystems.

Since the publication of the MEA, a large toolbox of bespoke valuation techniques have been refined and developed, through which such valuation can be done.

UNEP and Prime Africa® has been instrumental in this process and has developed and published several world first techniques. We have also applied it in multiple countries across multiple natural resource types.

2.3 Approach

There are several principles underlying a valuation of ecological assets, such as marine assets:

1. Ecological assets underlie or produce ecosystem services which are the benefits that humans or the economy receive.
2. Ecosystem services have been classified formally through several UN Environment initiatives. Some ecosystem services provide tangible benefits that can be valued in monetary terms and on an annualised basis. Other ecosystem services play a role to regulate process and are akin to an insurance value – these are more difficult to measure.
3. Different ecosystem services require different valuation methods, suited to decision-making requirements of the project. Internationally accepted best practices exist for each valuation method.
4. The discounted value of ecosystem services equals the asset value of the ecological assets.
5. The valuation methods selected should enable scenario-based analysis. This means that a change in policy, management regime, hazard or natural resource use, should be measured as an independent variable in the valuation method, and further translate into a change in estimated asset value.
6. The valuation will be evidence-based. To this end, best available data and databases will be used, complimented by published scientific knowledge. Where required, expert assessments would be done.

2.4 Proposed Ecological Asset Classes

A preliminary set of five asset classes have been identified and includes:

1. **Biodiversity assets** comprise a complex range of assets which have significant indirect economic value (refer to Table 2 for a definition). It thus includes biotic and abiotic features of ecosystems, as well as the processes that take place as part of ecosystem functioning. So this would specifically include **critical key Species identified[3], Mangroves, Coral reefs, Seagrass beds, Rocky shores and intertidal mud flats**.

[2] https://sustainabledevelopment.un.org/milesstones/wssd

[3] Undated, A PROPOSED MARINE TRANSBOUNDARY CONSERVATION AREA BETWEEN KENYA AND TANZANIA, Joint Technical Paper by The Marine Parks and Reserves Unit, United Republic of Tanzania, and the Kenya Wildlife Service, Republic of Kenya.

2. Fish stocks available for subsistence and commercial fisheries.
3. .

All assets will be identified and named within an MPA asset register.

Table 1. Defining biodiversity

Biodiversity is described by Noss (1990), in a seminal paper, to be more than simply the number of genes, species, ecosystems, or any other group of things in a defined area. Noss (1990) rather favors a characterization of biodiversity that identifies the major components at several levels of organization which includes composition, structure, and function. Composition has to do with the identity and variety of elements in a collection, and includes species lists and measures of species diversity and genetic diversity. Structure is the physical organization or pattern of a system, from habitat complexity as measured within communities to the pattern of patches and other elements at a landscape scale. Function involves ecological and evolutionary processes, including gene flow, disturbances, and nutrient cycling. - *Conservation Biology 4(4):355-364 · December 1990*

2.5 Ecosystem services

All ecosystem services (ES) identified, unique to each asset class, will be classified and an appropriate valuation technique used to value each. The most appropriate classification system will be used, based on Millennium Ecosystem Assessment and TEEB[4] classifications, definitions and nomenclature. The TEEB process is a UN Environment driven initiative that continue the valuation work started through the MEA. The classified ES will be listed in the MPA asset register.

2.6 Chain of causality

In Step 1.2 of the work (see Table below) we perform a comparative risk assessment (CRA). This is an assessment of the risks to ecological assets. The CRA proceeds as follows: we categorize each ecological asset, and describe the ecosystem services dependent upon it. We then identify all hazards that may put the assets at risk (e.g. oil spills, over fishing, climate change, etc). Thereafter, for each asset-hazard permutation, we perform a risk assessment using IPCC risk assessment methodology. The output of this goes into the valuation and the formulation of management scenarios.

Very importantly, the CRA is ideally performed with significant stakeholder and expert input.

2.7 Valuation techniques, Valuation and Baseline asset valuation

We propose to use ecosystem service valuation techniques suited to assignment. We would thus use basic techniques using data available from existing databases, from data-mining and form collection of any additional data that may be available.

[4] "The Economics of Ecosystems and Biodiversity" - http://www.teebweb.org/

Three valuation techniques would be used:

1. Willingness to pay (WTP) valuation of biodiversity based on the GEF investment data-base. This is particularly important for MPAs with high biodiversity value and large sensitive zones. Prime Africa® has developed this specific technique in 2012 and have applied it successfully for a number of country studies for the UN Environment and IUCN.
2. Fish stock static valuation, separately for each key sub-class. Well established valuation techniques exist for this.
3. Travel Cost Method (TCM) valuation for MPAs with eco-tourism services.

The resultant models will be run in the MPA asset register. It will be presented in a cost benefit analysis (CBA) architecture.
The output of this work will generate a baseline asset value reflecting the current state or status quo of MPA asset value.

2.8 Management Scenarios

It is noted in work done to date that stakeholder have identified "*several threats (in addition to those posed by climate change) to the area that can be mitigated through the establishment of a TBCA. These include declining fisheries, destruction of marine and coastal habitats, deforestation, coastal flooding and salt water intrusion, sedimentation, pollution and the alteration of freshwater flows, terrorism and insecurity, and political apathy towards conservation issues*."[5]

To address these management and policy challenges we propose to develop three scenarios, in consultation with stakeholders, that would represent three different levels of investment in MPA ecological assets. In the respective scenarios, enhanced levels of investment would lead to improved management of MPA assets through improving the quality of the assets and/or increasing the asset base. Broadly, the three management scenarios would be defined, and compared against the Baseline or Status Quo. The scenarios are as follows:

1. Scenario 1: Status Quo / Baseline
2. Scenario 2: Achieving Compliance with best practice in MPA Management. Such best practices are normally captured in the MPA Management Plans. MPA management authorities are often severely resource constrained w.r.t. management plan implementation. Thus, developing best in class management plans, and annual plans of operation (APO) and securing the budgets and resources for implementing these, present a major challenge for the management authorities. Thus, in this Scenario, we envisage/foresight a comprehensively implemented and costed MPA Management Plan (please note the work will onot include the development of an MPA management plan, rather, it would foresight the costs and benefits of such a plan.)

The details of each Scenario would be developed and finalised in consultation with relevant stakeholders.

[5] Undated, A PROPOSED MARINE TRANSBOUNDARY CONSERVATION AREA BETWEEN KENYA AND TANZANIA, Joint Technical Paper by The Marine Parks and Reserves Unit, United Republic of Tanzania, and the Kenya Wildlife Service, Republic of Kenya.

The Enhanced Protection and Expanded Area scenarios would be defined based on a MPA management assessment tool. For each scenario, concept-level Annual Plans of Operations would be developed and costed.

2.9 Time frame

All valuations and costing will be done for a time period of 50 years.

2.10 Cost benefit analysis model and model outputs

We will develop a cost-benefit analysis (CBA) model which would enable the comparative and absolute assessment of each scenario against the baseline. The CBA model will be structured in an Excel spreadsheet and will conform to the basic good practices applied in financial modelling. It can be structured to fit into any financial modelling to be conducted by other Parties. The detailed architecture, specifications and outputs of the model can be designed at project inception.

2.11 Economic Impact Assessment

It is also possible to quantify the macro-economic impact of the various scenarios. This can be achieved through adapting an existing Social Accounting Matric (SAM) and model the effects of MPA investment to measure macro-economic indicators such as GDP impact, economic multiplier effects, job creation, fiscal benefits and balance of payments.

This would have to be done for two countries.

2.12 Stakeholder and expert input

A study of this nature is highly reliant on stakeholder and expert inputs. This ideally takes place as follows:

1. At project inception, we would propose a project inception workshop where all stakeholders share expectations and data availability. At this point, working relations are formalized. In the midst of the COVID-19 pandemic, we would propose to design a suitable set of Inter-net based work sessions with relevant stakeholders.
2. During Step 1.2 (see Table below), we would perform the chain of causality assessment in partnership with project stakeholders. This will ensure that all assets are captured, with linked ecosystem services and linked risk assessments. In addition, management scenarios to be modelled in the following steps, are formulated in this process.
3. Deliverable review by stakeholders can be done throughput the study process.
4. A final workshop is conducted at the end of the project. As stated above, we may have to do this on a suitable online platform.

With respect to the stakeholder engagement, we would rely on Focal Points, to be appointed by the Convention, to facilitate workshops and work sessions.

2.13 Methodological steps

Figure 1 below sets out the methodological steps of the process. We envisage the process to unfold as follows:

- Step 1.1: Asset Analysis
    - The existing systems description (see footnote 1), together with the documents and maps listed in the references, will be used to inform the asset analysis.
    - An asset analysis – ES starter document will be developed, and this will serve as a basis for an inception workshop – to be held online.
    - Further 1:1 work sessions with experts identified by the Convention will be held to complete the asset classification.
    - This step will be highly dependent on local experts.
- Step 2.1: ES analysis
    - This will be done using comparative risk assessment methodology. Each asset class will be linked to its relevant ecosystem service functionalities in a categorized manner. The outputs will be a narrative description of all chains of causality, combined with an assessment of risk (hazards, likelihoods and consequences by asset class). This analysis forms the basis for connecting natural assets to the formal economy and is key to running the scenarios to follow.
    - The CRA will first be drafted off desktop by Prime Africa and will then be refined using appropriate work sessions with experts.
- Step 1.3: Ecosystem services valuation
    - Work done to date have revealed a strong emphasis to be placed on the asset classes and ES's listed in section 2.4 and 2.5.
    - Valuation techniques will be limited to those that can use existing data and benefits transfer techniques.
- Step 1.4: Macro-economic linkages
    - This is has been simplified – it will conduct quasi-value chain assessment focused on the economic sectors directly benefitting from the proposed TBCA. No economic modeling will be conducted.
- Step 2.1: Scenario Design
    - In this step we will foresight the costs and benefits of the TBCA, as a single future scenario. This will require a description of the future desired state of the TBCA, and identification of the management actions required to reach this state.
    - High level costing of these management actions need to be performed.
- Step 2.2: Cost-Benefit Analysis
    - In this step we would first run the baseline/status quo management regime (i.e. no TBCA) as a Status Quo Scenario.
    - Secondly, we would run the TBCA Scenario (designed in step 2.1) as an alternative Scenario.
    - The CBA will be done by comparing the TBCA Scenario to the Status Quo Scenario.
    - Indicators used will include asset value, ES value, GDP effect, job creation and others.
    - We will also provide an expert assessment of the ecosystem evaluation guideline developed by the WIOSAP project.

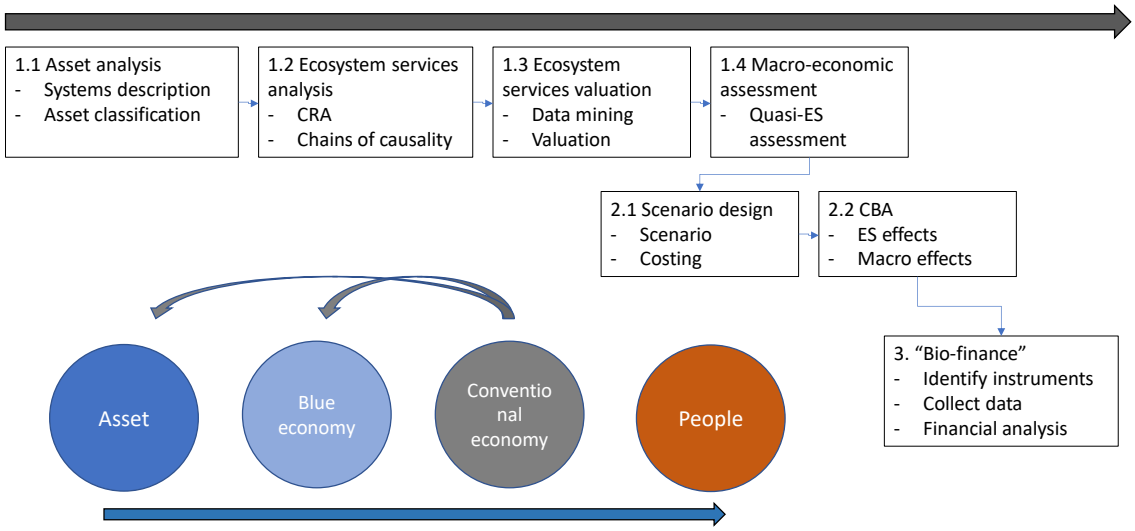

Figure 1. Overview of methodological steps.