



Multi criteria analysis for resolving conflicting river basin uses, Kenya

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Short title: Multi criteria analysis for resolving conflicting river basin uses, Kenya

Key Message: An integrated management of a river basin has to consider not only the different types of land uses within the basin but also the interests of different stakeholders in negotiating for a feasible and sustainable management strategy.

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What is the problem?

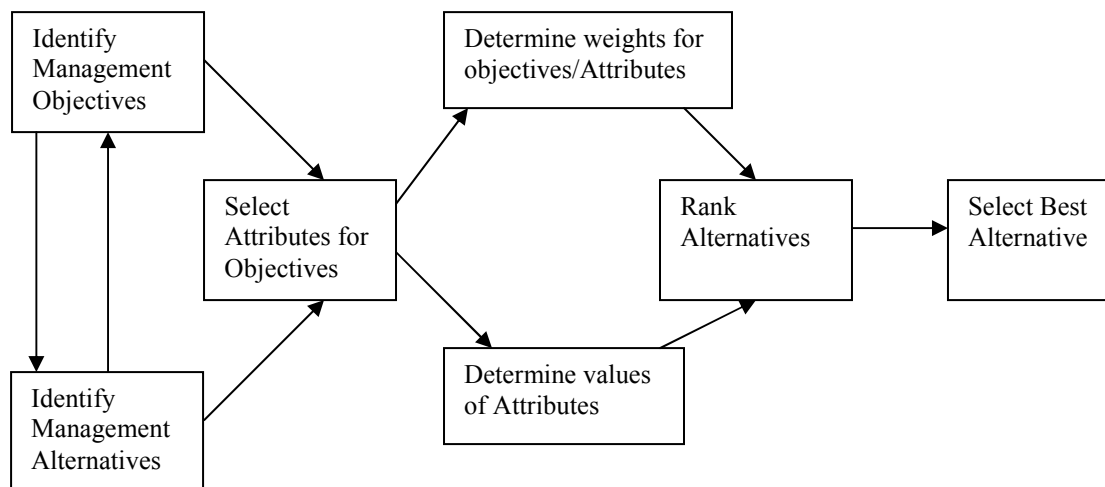
Kenya is experiencing alarming levels of land-based natural resource degradation manifested through high rates of deforestation, increasing desertification, soil erosion and degradation, pollution of water bodies and ineffective disposal of solid waste among others. To address the challenge of degradation of land based resources among other land related problems, the country set out to formulate a National land policy through a consultative and participatory process. The actual operationalization of the National land policy requires not only supporting legislations but a clearer understanding of the dynamics of natural resource management.

To achieve sustainable management of the environment, there is need to develop a harmonized land use system that minimizes the negative impacts of land uses on the environment. However, the relationship between land use policies and environmental management in the context of multiple uses and users with often conflicting objectives is not easily understood or resolved. For the case of a river basin, there is a wide range of users of the river water and the riparian land alongside it. These users vary from the farmers in the upper catchments, residential property owners, small scale enterprisers, large scale industrialists and the local authorities among others. The land users often use the water from the river and the riparian land in a way that degrades the river. For example farmers in the upper catchments often over extract water from the river to irrigate their crops while the industrialists downstream often discharge effluent into the river. In such situations various management alternatives must be presented to stakeholders and their values for different attributes of the resource be elicited. Based on their preferences for the different attributes, the best compromise management alternative can derived.

What approach was taken?

The study followed multi-attribute evaluation approach as was applied by Prato (2003). Multiple attribute evaluation provides a viable way to evaluate and compare alternatives that have attributes that are not measured in monetary terms. Determining attribute weights provides a pro-active way to get stakeholders involved in the decision-making process. The general framework of multiple attribute evaluation is illustrated in Figure 1 below.

Figure 1: General framework of multiple attribute evaluation



Source: Prato (2003)

The framework requires identifying management objectives and alternatives, attributes of the objective and weights of objectives and attributes. Alternatives are unique and specific to a given ecosystem and the management issues being addressed. In the particular case of the Nairobi river basin we conceptualized three very broad management alternative i.e. strict protection of the riparian reserves and the catchment, regulated use e.g. through extraction permits and an extreme case of open access. Weights represent the decision-makers preference for objectives or attributes.

What ecosystem services were considered and how?

Two important ecosystem services were considered i.e.

- i. Recreation service
- ii. Waste receptor

In the multi-criteria decision analysis the respondents were asked to rank these services alongside other direct use services of the river.

What input was required to do so?

Existing secondary data sources were used to generate information on land uses along the river and the level of degradation. Primary data was collected from sampled respondents among different stakeholders using a semi-structured questionnaire. The questionnaire captured the social demographic characteristics of the respondents, their perceptions of the river basin degradation, their ranking of alternative management strategies and also their ranking of different attributes of the river basin. The data from the questionnaires was analysed using two

statistical softwares (SPSS and STATA). The technique of multi-attribute evaluation was applied to analyse the collected data. This technique is based on weighted criteria that provide scoring guidelines against which various management options are rated. Due to the fact that multiple criteria have to be considered in rating any strategy, there is no single management option that can be said to be simply the best. Single-criteria decision models cannot give satisfactory results to the diverse and multiple stakeholders characterising a natural management scenario. A best-compromise solution must therefore be sought through a multi-criteria decision support model involving stakeholders with various views, which are inevitably competing and conflicting on various points.

What was the policy uptake, and what were the conditions for this effort to actually influence public management?

The findings of the study were used to lobby in the then-ongoing process of formulation of National Land Policy which was adopted by Parliament in December 2009. However, the full implementation of the findings is yet to be adopted in the basin wide management of the river. Based on the results the study made the following recommendations:-

- In order set up and effective regulated use system, all the relevant information on river basin including the bio-physical characteristics of the river, the land tenure arrangement on the different parts of the basin, numbers and profiles of different users e.t.c. should be pooled together. Such information will play an important role in setting up an integrated, effective and efficient regulatory use system at the basin level.
- In line with the recommendations of the National Land Policy there is need to institutionalize and formalize stakeholder participation in the management of the river basin. This can be achieved through formation of a stakeholder's forum for the Nairobi river basin consisting of the various the stakeholders including the government. Such a forum will help create common understanding of the importance of the river basin, facilitate communication between stakeholders.
- Besides integrating all stakeholders at the basin level, there is also urgent need to take a multi-sectoral approach in the management of the river basin. There are a wide variety of issues that run across sectors such as environmental management, agriculture, industrial development, commerce, public health, water among others. Multi-sectoral management approach can be achieved through harmonization of the various laws that govern the management of the river basin. Multi-sectoral approach can also be institutionalized through the formation of a basin level management authority. The authority would coordinate cross-sectoral issues and help resolve any conflicts that occur among stakeholders.
- There is also an urgent need to establish (or enforce where they exist) standards of processes and procedures for the access and utilization of the riparian land the waters of the river basin that are efficient, transparent and accountable in line with the National Land Policy. Currently, various stakeholders are using the waters of the basin with very little observance of procedures and processes.
- The management of river basin is a dynamic process that must take into account the prevailing state of economic development, changing profiles of the stakeholders, multi-lateral environmental agreements that the country might enter into and any other emergent issues that might arise in the future. Therefore, the management plans must be flexible and subject to continuous revision.

REFERENCES:

Prato, T., 2003; Multiple-Attribute Evaluation of Ecosystem Management for the Missouri River System; Journal of ecological economics 45: 297-309