

Review

Considerations for additional tools in ecosystems management: Lessons from Zambia

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Formal institutional ecosystems management has been in existence since the creation of the Yellowstone National Park in the United States of America in 1872. Subsequently, many countries, including Zambia have evolved both legislative and policy frameworks for protecting various ecosystems. This move implied creating institutions to manage such areas accompanied by a statute to police the given area. Offenders are punished for breaking the law that protects the given resource. The results from such actions have been a growing conflict between the local communities and the ecosystem or resource management institution. In order to create harmony, ecosystems managements, in some sectors have evolved new strategies of sharing management responsibilities and benefits with local communities. This specific resource is in the wildlife sector in Zambia. The need to balance management costs and the benefits from the ecosystem services thus arises. However, in order to strike a reasonable balance, consideration should be given to adopting additional management tools for evaluating ecosystems so that one can place an economic value on any given resource. The major tool that has seen wide application in Zambia has been the Environmental Impact Assessment (EIA). However, methods for carrying out economic evaluation of ecosystems exist and have been developed over the years elsewhere. They include the Travel Cost Method (TCM). This method uses a surrogate market to estimate a consumer surplus and is site specific. The second common method is the Contingent Valuation Method (CVM) that solicits for a respondents willingness to pay (WTP) for an improvement to an environmental good or the willingness to accept (WTA) for a loss or partial loss of an environmental good using a hypothetical market. As a tool, the CVM can also be used in calculating a cost benefit analysis for a project in a given area and there by arriving at an economic decision. The method can also be used in a failed or derelict ecosystem reclamation and restoration efforts. Any conservation effort should consider the local community needs.

Key words: Contingent valuation method (CVM), travel cost method (TCM), willingness to pay (WTP), willingness to accept (WTA), environmental impact assessment (EIA).

INTRODUCTION

Ecosystems are specialized depending on the goods and services that they offer. These goods and services are

not uniform and can therefore not be found everywhere. This specialization suggests an economic value on an

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ecosystem of any given locality. There is however an invisible gradient of value that follows this specialization as no ecosystem is the same. Even ecosystems that do not seem to have economic resources still provide natural goods and services that include life support systems to the beneficiaries. These include clean air water resources, fire wood and a host of natural materials.

Economic resources require an institutional arrangement to be in place for both management and conservation measures as the demand arises. Management arrangements will therefore require a legislative frame work in order to operate and create a working structure for the institution. In this way, a sustainable utilization of resources and the structures that guide sharing of the benefits that accrue from the ecosystem management and conservation will coincide. If this is not done, then the famous “tragedy of the commons” economic theory metaphor put by Garrett Hardin (1968) comes into play. The theory states that “individuals, acting independently and rationally according to each one’s self interest behave contrary to the whole groups’ long term best interests by depleting some common resource”. This trend can however be limited by a government intervention that would limit the amount of a common good that is available for use by any individual through permits for extractive economic activities such as mining, fishing, hunting livestock, grazing and timber harvesting. The second alternative, that is difficult to achieve, is for resource users to cooperate and conserve the resource for their own mutual benefit.

The economic value of an ecosystem would diminish at a faster rate if there are no institutional arrangements in place. Resources that an ‘economic’ ecosystem provides directly or indirectly to the public or the benefits that accrue are the subject of this discussion. Coupled with this is the conservation and management of such resources.

Roe et al. (2013) observe that conservation of biodiversity is critical, in that The Convention on Biodiversity (CBD) acknowledges that; “economic and social development and poverty eradication are the first and overriding priorities of developing countries”. In their new strategic plan for biodiversity 2011-2020 mission is to halt the loss of biodiversity thereby contributing to human well-being and poverty eradication. Global players believe biodiversity can indeed help alleviate hunger and poverty and promote good human health.

The challenge of institutions that manage ecosystems is in developing tools that will help not only in the management but will take on board the perceptions and views of respective local communities that live near a given resource. In doing so they could be working out reasonable economic benefits to the recipients. The Community Based Natural Resources Management (CBNRM) for example, is a new paradigm in natural resource management that has been generally been accepted as a working structure for both conservation of

natural resources and the sharing of benefits that accrue from the resource. The expectation from its use is that it will assist in the alleviation of rural poverty by empowering communities to manage resources for the long term social and economic benefits

This discussion raises issues for debate primarily on the invisible gradient of benefits that range from local benefits with an impact either in monetary terms or otherwise, to those that benefit people remotely placed from the local resident in the given resource area by way of using examples. Observations also raise issues on ecosystems and suggest an invisible gradient on their value apart from discussing the available structures for sharing of benefits with concerned local communities and the public at large. This discussion is not in any way based on empirical data research but is a commentary on the best practice for conservation and wise use of natural resources in Zambia given the current practice trends and how these can be harmonized. In order to enrich the arguments, examples from both past and current practices in Zambia are used and how these relate to the global trends of ecosystems management.

The use of the EIA in Zambia is as a result of a legal framework that has been put in place by the Zambian government as a way of protecting and enhancing the conservation of ecosystems in the country. The EIA is imposed on development projects. The valuation methods suggested are research based and are not part of the broader legal framework for Zambia. They however constitute an alternative approach to ecosystem management and can be adopted as management tools by various ecosystems and natural resource management institution in the country.

Ecosystems

Researchers in resource economics spend little time discussing ecosystems in their ecological context as these, one would argue, vary from each other despite carrying the same ecological definition. As a result there seems to be not only a variation of the ecosystems constitution but there is a silent economic gradient in their values that lacks detailed discussion. This silent economic gradient of ecosystems suggests that each ecosystem has a value that is tied to the goods and services that it provides to the end users (Figure 1). Some values can be attached to the monetary benefits that come out of a given natural ecosystem seen mainly from direct use of a given natural resource.

Wastelands, for example, would in the context of value, have a lower scale of units because of the use they provide to society. This use lies mainly in being dumping sites for industrial and domestic waste (especially where there is no waste recycling industries available) closed factories, quarries and brick pits constitute other forms of wastelands ecosystems. Wastelands can however be

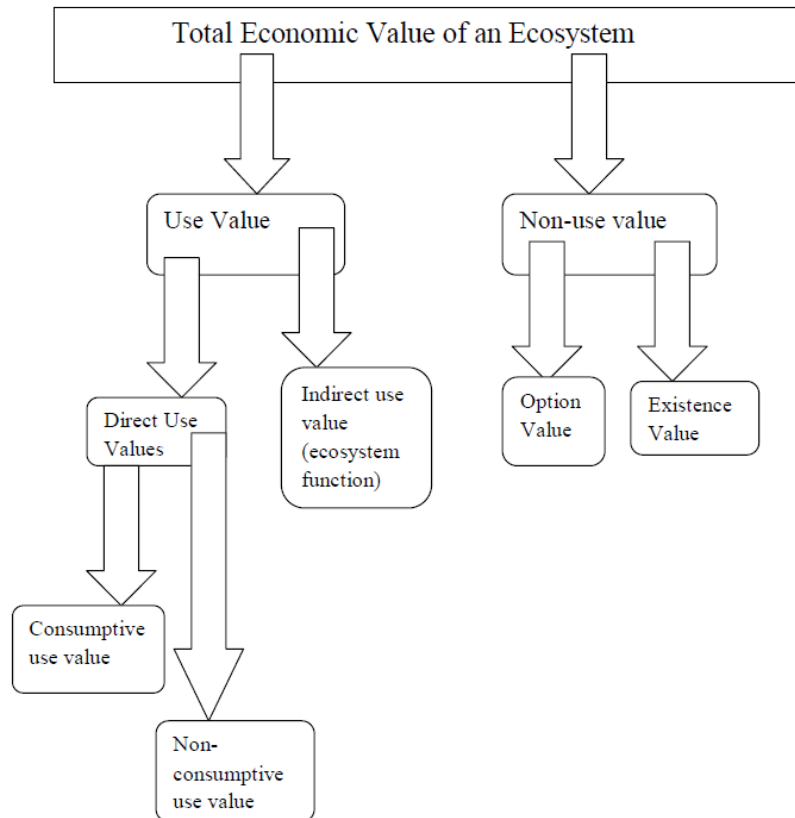


Figure 1. The ecosystem goods and services value relationship.

restored through land restoration and reclamation efforts by relevant institutions and become useful ecosystems again.

Urban ecosystems, are part of a broader ecological system, but affected by their surrounding environment. In both cases there is an element of the human activities impact on natural ecosystem in order to provide both urban and contemporary use of natural ecosystems through modification of such habitats.

Other ecosystems consist of natural ecological systems that are partially or totally undisturbed and thereby providing a pristine environment that provides both direct and indirect benefits to society. These include national parks, natural sites, water courses and forest reserves. The grading of ecosystems is a major subject of research and it would not be possible to deal with it without raw data.

Parallel to the economic gradient is the variations in the respective institutional legal frameworks that the management structures are based on for ecosystem management. In short there is no common legal framework for ecosystem management, as the case in Zambia. Each case of breaking the law that protects an ecosystem has its own penalties and punishment. This suggests that the law makers do not see the common ground in offences as one would see them in the criminal

sense. Acts against ecosystems legal protection are seen just as offences against a particular section of a respective act of the laws of Zambia that stipulates the offence or the fine. The prosecution will therefore use that given provision when presenting their case before court in seeking for a conviction. The resulting conviction will either pass a custodial sentence or a fine depending on what is prescribed by the respective law.

Placing value on an ecosystem

Most researchers in environmental economics agree that the total value of an ecosystem is quantified by taking both use and non-use values. The use value constitutes both direct and indirect use in addition to the option value, while the non-use value captures those elements that are unrelated to current, future and potential use. These include the existence and bequest value of a given ecosystem. However, placing a value on a variety of ecosystems can be a challenging task. The reasons being that there are diverse schools of thought driven primarily by an equal variety of disciplines. For example, Dziegielewska (2013) observes that there seems to be no consensus among environmental economists as to the exact placement of the option value among use and non-

use components because while some consider it as a use function others consider it as a non-use function because it is not related to any current use of the good.

In the utilitarian concept for example, the value of an ecosystem is based mainly on the services that the system provides to society based mainly on the utility that people derive from their use either directly or indirectly (use value) (MEA, 2005). Most of the ecosystems valuation can be obtained by the common methods that have been developed over time, namely, the contingent valuation method (CVM) and the Travel Cost Method (TCM). Their use is closely related to the users or the beneficiaries of a given resource and a given locality.

The Millennium Ecosystem Assessment (MEA, 2005) so far has been the most comprehensive survey on the state of the planet. The assessment conceptual framework looked at the interactions between biodiversity, ecosystem services, human well-being and drivers of change. The premise of the assessment was that changes that directly affect biodiversity such as population, technology and life style can lead to changes in drivers directly affecting biodiversity. These in turn result in changes to ecosystems and the services that they provide and there by affecting the human well-being.

The survey revealed that over the past 50 years humans have changed ecosystems more rapidly and extensively than in any comparable period of time in human history, primarily to meet the growing demands for food, fresh water, timber and fuel. This has led to a substantial loss in biodiversity on earth. Secondly, changes to ecosystems structures have contributed to substantial net gains in human well-being and economic development at a cost in form of degradation of many ecosystems services. Thirdly, the degradation of ecosystem services could grow significantly worse and could be a barrier in achieving millennium goals. The fourth finding was that the challenge for reversing the degradation of ecosystems while meeting increasing demands for their services can be partially met but these involve significant changes in policies, institutions and practices. The issues the survey raises are the valuation of ecosystem services (Daily, 1977). However, Arrow et al. (2000) argue that the value of an ecosystem as a whole may be more than the value of the sum of its parts owing perhaps to the complex ecological interactions. The development of valuation methods or their choice should therefore be seen in the suitability to aid a decision making process.

The current use of an Environmental Impact Assessment (EIA), in the Zambian context looks inadequate as the EIA looks at the possible impact a particular activity or development is likely to have on a particular ecosystem by giving the pros and cons of particular impacts. It also analyses the ecosystem legal frameworks that may be contravened in the course of a particular impact. Unfortunately, this tool has not been used to determine the benefits for local communities who may be beneficiaries

of returns from a natural resource in their respective areas neither is there adequate research that is usually put in place to investigate biodiversity loss from economic impacts.

THE METHODS

The evolution of the EIA, in Zambia, as a tool for assessment of impacts that any given activity will have on a specific ecological zone is a product of the global agenda driven by the World Conservation Union who published the World Conservation Strategy in 1980 (WCS, 1980). Respective countries adopted their national strategic plans in the years that followed. Zambia developed a national conservation strategy in 1985 (National Conservation Strategy, 1985). As a result of this strategy, a legal framework was initiated that led to the creation of environmental protection agency initially known as the Environmental Council of Zambia (ECZ) created under the Environmental Protection and Pollution Control Act of 1990 and now known as the Zambia Environmental Management Agency (ZEMA) under the Environmental Management Act Number 12 of 2011. The new act repealed and replaced the former act as an all-inclusive act on environmental issues. It has now become a legal practice and requirement that any project before it is undertaken passes the EIA provisions that are approved by ZEMA. The EIA however does not assist one to evaluate a given ecosystem and it comes with its own costs that come as a way of sustaining the institution, that is, the investor has to pay a certain percentage of the total investment cost to ZEMA for them to carry out the assessment and give their comments and consent for the project to go ahead or not.

In this discussion, the argument is to improve our valuation methods of ecosystems from just having an EIA, as the case at the moment, and to use additional tools for making assessment of a project before it is undertaken given the diversity of ecosystems in any given part of the country. Such assessments would reveal a broader perception by those affected by any impact on their respective ecosystem.

Environmental goods, in general, do not have a formal market and as such there is an economic failure because the market price that people pay to use natural resources is lower than the value society as a whole would be willing to pay for them. This results in a market failure and there is always a need for government intervention in the market to promote specific environmental goods and services.

In order to place value on environmental goods and services, one has to simulate a market in order to base their valuation of that particular ecosystem. McNally et al. (2003) suggest five basic approaches, namely market based, surrogate market based, hypothetical market based, cost based and benefits transfer. Each of these

valuation techniques employs specific approaches to the market. This discussion is limited only to the surrogate market or travel cost method (TCM) and hypothetical market Contingent Valuation Method (CVM) approaches. The two methods are discussed because they deal with consumer behaviour that exhibits both revealed and stated preferences. Data from both methods may be combined and can be used in joint estimation of parameters associated with attributes (Atkinson and Mourato, 2008). The stated preference is the umbrella term under which a number of survey methods are found. They construct a hypothetical market or a contingent market that elicits for preferences of specified policy changes (Bateman et al., 2002). The common survey method in this area is the CVM.

The contingent valuation method

The CVM technique was first used by Davis (1964) and has since been widely used for over 40 years. The technique relies on a well prepared and designed structured questionnaire, which is presented directly to a sample of relevant individuals about a well-defined public good such as a particular ecosystem and asks for their willingness to pay (WTP) for the improvement of such an ecosystem or environmental good in one scenario. The second scenario, the questionnaire will ask for the respondents willingness to accept (WTA) the loss or a decrease in the services of the same environmental good or services.

All individuals respond to the same situation. The assumption is that people have true but hidden economic values for environmental goods that can be revealed through the creation of hypothetical markets and that the value of any good depends on its utility to individuals (Hoevenagel, 1994). The sample size for administering the questionnaire will vary depending on the area one is dealing with. Users of the CVM do not suggest the number of respondents to be interviewed.

The ultimate aim of the CVM survey is to obtain an accurate estimate of benefits and sometimes costs of a change in the level of provisions of some public good. The results of such an estimate can then be further used in a cost-benefit analysis. However, in order to achieve the desired results, the survey must meet two criteria namely, the methodological imperative and the requirements of economic theory. The methodological imperative requires that the environmental scenario at hand be understandable and meaningful to the respondents. It should also be free of incentives that may bias the results (Mitchell and Carson, 1989).

The CVM has been extensively used in both developed and developing countries. It addresses a wide range on environmental issues that include among others water quality, outdoor recreation, species preservation, forest protection, air quality, biodiversity health impacts and

natural resource damage.

The premise behind this is that goods and services provided by biological resources do not have a market neither is there a surrogate market from which to derive their value. So one has to construct a hypothetical market by asking the respondents their WTP for an environmental benefit or how much they would be WTA a loss or partial loss of an environmental good or services. The WTP elicited values are contingent upon the particular hypothetical market hence the term contingent valuation (Knetsch and Robert, 1966).

The success of the method is contingent upon successful simulation of the market. It is the only valuation method that is a true measure of welfare changes based on the Hicksian demand curve. It is also the only technique that is able to capture existence and option values and also allows researchers to capture any environmental value as long as respondents are able to understand the question and answer truthfully (Atkinson and Mourato, 2008).

The method has its pitfalls and draw backs. These have to do mainly with sample and response biases. They include hypothetical, strategic, information and sample bias. In the hypothetical bias respondents will not be making real transactions, while in strategic bias respondents will make bids that are not a true reflection of the value because there is an opportunity of free ride. In order to eliminate these potential biases, one has to experiment with survey design and use different payment vehicles and careful sampling.

Other pitfalls include the choice one makes between WTP and WTA because the hidden issues of property rights may arise. This will give, in some instances, a higher WTA value than the WTP because of the property rights framework that may prevail.

Venkatachalan (2004) observes that the maximum WTP represents the amount of money income that has to be given up by the consumer to attain an increased level of utility. Similarly, the minimum WTA represents the amount compensation required to be provided to the individual so that they can attain an improved utility level in case the provision of the public good does not take place.

The travel cost method (TCM)

The revealed preference method or TCM relies on the consumer behaviour that leaves a foot print associated with the actual travel market. This allows the quantification of this behaviour pattern to create a surrogate market. Like in the CVM approach, the investigations here rely on a well-structured questionnaire that asks the consumer or the visitor to a recreational site, a series of questions related to their expenses for their visit. The questions may be extended to their income and other personal variables. However, such questions are

relevant only to adults who have to make decisions on expenditure and not to the accompanying children.

The advantage is that this is based on actual behaviour of the consumer. Knetsch and Roberts (1966) both recommend the TCM as an ideal method for valuing recreational activities. The method relies on variations in travel costs of site visitors in order to make a demand curve so as to estimate the consumer surplus (or the net willingness to pay) for the continued existence of the site. Habb and McConnell (2002) gave a further and elaborate overview of the travel cost method. It has been widely used to value non-market goods such as outdoor locations and recreational sites.

In both methods one would be paying attention to relationships between variables that speak to each other and those that have significant P-values ($P < .05$) from the statistical analysis. These results can then later be considered when making or incorporating them in policy formulations and management decisions on respective public goods.

Benefits and sharing of benefits

The methods discussed so far strongly suggest that there are some information on benefits that can be obtained from their use in the evaluation of ecosystems. The CVM results for example, can be used in the computation of a cost-benefit analysis on policy decision on whether an intended project should go ahead or not. Similarly, in the TCM benefits of a particular site will be seen from the consumer surplus that will be equated to the net willingness to pay for the conservation of that particular site.

Benefits may also be seen from a conservation point of view under some institutional arrangement that is operating under a given legal framework. Direct benefits may be a direct appropriation of known resources such as timber products, fisheries and a host of natural products because the beneficiaries have direct access to an ecosystem without a regulatory framework. Not all natural resources will be based in a protected area and not all ecosystems will enjoy a legislative protection because of the variations in the land use arrangements. However, there is always a government intervention to avoid the "tragedy of commons" scenario in most cases. It is this intervention that should balance the benefit sharing with people living close to the resources as they would if there was no intervention from a government.

The benefits gradient advocated above may also be viewed from the formal structures that may be available under the various legal frameworks and institutional arrangements as seen for example in the wildlife management sector. Benefits may have local impact and they may also have a spin off that gives a benefit avenue for non-local populations. Good examples may be seen from mining and hydro-power generation in Zambia.

Lumwana mine development

One of such investment in recent years is the Lumwana mine in the North-western part of Zambia (Figure 2) in the early 2002. Copper deposits had been known to exist since the 1930 explorations but they were seen to be of low grade ore. The site of the mine was once a forest reserve but was de-gazetted to pave way for an open pit mine. An EIA was conducted as a requirement by law. Upon passing the EIA, the mine operations commenced in earnest. Now Lumwana mine is one of the largest open pit mine in Zambia and in the world. At the time of its inception, it was said to be the largest mine venture in the world. The mine is located on traditional land and had to be surveyed and demarcated for the purpose of mining.

Benefits accruing to the local people have been seen mainly in the spin off from the infrastructure development, employment opportunities and trade. Government on the other hand has accumulated benefits in the form of taxes both employment and corporate accruals. There was no CVM survey, for example, to assess whether the local community was willing to accept the change in their protected forest status or indeed how much they were willing to pay to maintain the forestry reserve.

Information from such a survey would have been used in a cost-benefit analysis to assess the merits and demerits of the project. If these had been done maybe mining would have been a better form of land use because of the benefits that have been brought by the venture to the area. However, the benefits above do not follow a formal established structure but they are negotiated as and when the need arises for the local residents.

Kafue hydro-power development

Hydro-power generation has been a major investment in the last 50 years or so in Zambia, starting with the Kariba dam hydro-power located on the Zambezi River in southern Zambia where the river forms the border with Zimbabwe. The project was started and completed in the late 1950s to provide electricity for the growing industry in the country.

The Kafue gorge power station development followed in the late 1970s on the Kafue River. However, in order to establish the Kafue gorge power station, the Kafue River (Figure 3) had to be dammed at a place called Itezhi-tezhi mid-way, the river course in 1978. The reasons advanced were that, the dam would be used as a strategic reservoir to regulate the water flow in case of drought. The power station gorge is much further downstream from the dam wall where the water course is narrow and is bordered by a hilly escarpment, making it ideal for hydro-power generation.

Downstream, immediately from the dam wall, the water course passes through a unique wetland ecosystem called the Kafue flats that is an open flood plain and

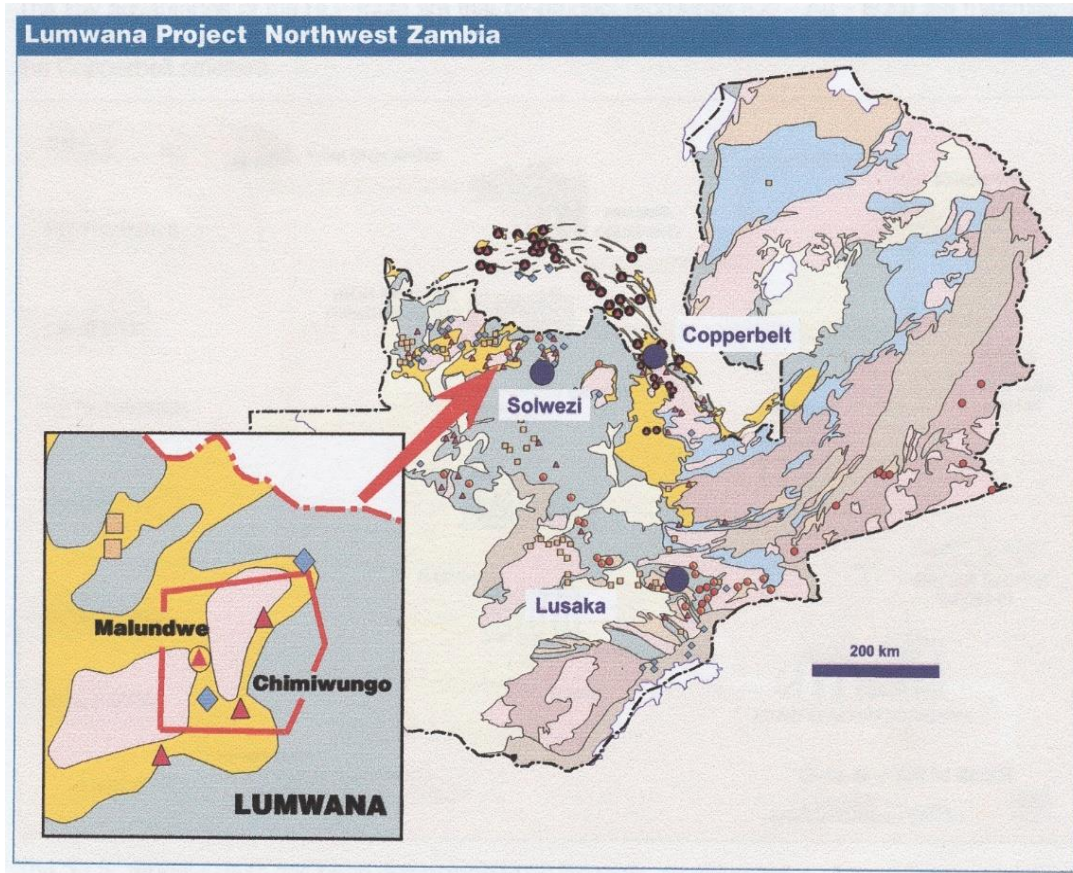


Figure 2. Lumwana project, northwest, Zambia. Source: Lumwana mine images.

covers 6,500 km². The wetland supports both domestic and wildlife populations, especially the Kafue lechwe antelope (*Kobus leche kafuensis*) that is unique to the area in that it is a wetland antelope feeding mainly on grass that is inundated annually. In addition to this, the river course supports the irrigation of a 17,000 hectare sugar cane plantation on its way down. Added to this demand is the water supply for the city of Lusaka that is drawn directly from river and pumped over 50 km to Lusaka by the water utility company for their urban clients.

The concern, prior to the dam construction, was the effect the regulation of water would have on the ecosystem and the support it gives to various life forms in the area. A research group, The Kafue Basin Research, was formed as a result of this plan to carry out studies in both scientific and social sciences, but very little was done on perceptions of the respective local communities that are along the water course up to the hydro-power station on the impact the project would have on their ecosystem using methods discussed above. During this time, there was no EIA mechanism in place (Howard and Williams, 1982). In addition to this, there are no structured benefits or any legislative frameworks available. The World Wide Fund for Nature (WWF) has

since established local community conservation participation in critical areas such as wildlife and fisheries management and how the domestic livestock grazing can be accommodated in the ecosystem.

Wildlife, as a resource, especially the mega-fauna, occupies a variety of ecosystems in Zambia and is probably the most complex of the resources to manage. The management interaction also cuts across multiple ethnic communities with varied customs and traditions including land use patterns. Zambia has 73 different ethnic groups around the country. A benefit sharing scheme has evolved over time as a way of mitigating excessive poaching of wildlife in different parts of the country.

Wildlife management sharing arrangements with the local communities in Zambia

Lewis et al. (1990) account for the genesis of the sharing of wildlife based benefits with local communities in Zambia as a tool to reduce illegal hunting of wildlife species and thereby engaging the local community in a shared resource management scheme. This was as a

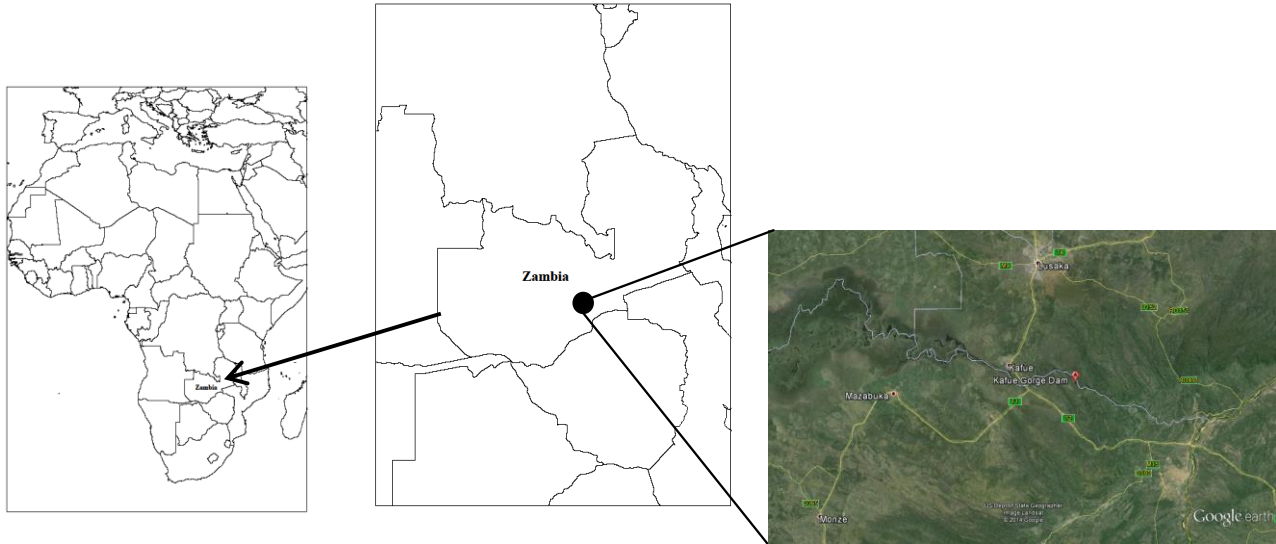


Figure 3. Africa, Zambia and the Kafue River system.

result of a successful experiment in the Lupande GMA in South Luangwa that was initiated in 1985-1987. The experiment was based on the premise that the wildlife department be allowed to retain some funds from the revenues that were at that time all retained by the central treasury in order to support management needs of the department and the local community benefits. Secondly, that the department employ and train local staff from the experiment base area above the normal staff strength. Lastly, those issues of wildlife management are dealt with in collaboration with the local community of the area.

The main reason for the experiment was to reduce the illegal off take (poaching) of a number of wildlife species in the area and in Zambia in general especially that of the black rhino and the elephant. The law enforcement measures were failing to contain the rate at which wildlife was being lost. The attention was turned on the attitudes of the local people on wildlife conservation given their participation in revenue sharing with the department of national parks and wildlife.

The success of this experiment in one locality led to the formulation of a general policy on wildlife management in Zambia on all the 35 GMAs. The policy was called the Administrative Management Design (ADMADE) adopted as a tool for wildlife management in Zambia. Its application had its own challenges because each locality had its own perception of the new policy. For example, Siachoono (1995) while carrying out a CVM assessment of the ADMADE policy in Mumbwa GMA with the local community found that the responses on WTP (44%) had lower monetary value while the responses on WTA (28%) had a higher monetary value. Mitchell and Carson (1989) propose four reasons for this phenomenon in contingent valuations surveys, namely: (a) rejection of WTA property rights, because people are motivated to give a higher

WTA value as a way of rejecting the property rights implied by the WTA, (b) that the respondents are cautious consumers in a CVM survey, (c) the value function is steeper for losses than gains. The function predicts a higher amount of compensation because WTA implies giving up a good and (d) that the WTP and WTA in contingent valuation surveys have unresolved implications for the possible differences in their values.

The dilemma for wildlife management in Zambia has been that GMAs and the national parks they support are actually sitting on traditional land that is controlled by traditional leaders. The dual land tenure in Zambia creates this dilemma. While the land may be said to be in the hands of the traditional leadership, the wildlife belong to the state just like in the minerals and oils below the land surface. This is what fuels the human-wildlife conflict in most of the GMAs. The ADMADE policy was seen as the solution to the perceived conflict for wildlife management.

The ADMADE policy has since been converted into a legal framework with the same meaning. The implication here is that it has provided a long time solution for wildlife management in Zambia. Section 5 of the current Zambia Wildlife Act of 1998 states that: the functions of the Zambia wildlife authority are to (a) control, manage, conserve, protect and administer national parks, bird sanctuaries, wildlife sanctuaries and GMAs, (b) share responsibilities of management of GMAs with local communities and (c) pay out such money into a fund established by community resources board from revenues payable (Zambia Wildlife Act, 1998).

Community based natural resources management (CBNRM)

ADMADE in Zambia has since evolved into a CBNRM

that has been supported by a legal framework. It is now a working paradigm for natural resources management designed to mitigate rural poverty and share both benefits and management responsibilities of wildlife with the local communities. CBNRM has now a wider application in sub-Saharan Africa and has also become a subject of debate by scholars.

Critics however, argue that the intended beneficiaries in the CBNRM model are treated as passive recipients of project activities (Pimbert and Pretty, 1995) and that as a result it has failed to deliver expected and predicted benefits. Improvements of the CBNRM model practice should therefore focus on creating a relationship between management institutions and the beneficiaries as they both relate to the environment. Established institutions should further play more of a mediating role between the resources and the beneficiaries. The complication arises however because such institutions are usually fragmented and do not function as one unit. There are varying legislative frameworks for each natural resource.

Communities on the other hand also vary from a homogeneous ethnic group in a rural area under one traditional leadership to a mixed population with a broad cultural and social divergence in more metropolitan areas. Blaikie (2006) sees a community as a spatial unit with a distinct social structure and a set of shared norms. In general, community members have an extended set of entitlements for different actors who command a bundle of user rights for environmental goods and services for their own well-being.

The wildlife management in Zambia, especially as it regards the mega fauna, has been active in engaging the respective local community in wildlife based areas in as far as the resource management is concerned. These efforts have been successful in an attempt to reduce, but not eradicate illegal hunting. However, there is still a need to employ methods that will give local perceptions as opposed to a country wide strategy on wildlife management. These perceptions would greatly assist in building a national policy framework or even lead to better legislative instruments for wildlife management.

Other resource management institutions such as fisheries, forestry, water and the respective land use management authorities have attempted to have similar arrangements with local communities, but these lack the harmony expected from joint resource management arrangements with local communities with well recorded and documented perceptions.

Conclusion

The CVM surveys have a broader application in environmental assessments in general as they can be used to value both use and non-use values. The TCM on the other hand is limited to direct use value as it relies mainly on consumer expenditure behaviour to find the value of a resource. The two are however not the ultimate

methods, but decisions on environmental policy issues and assessment of ecosystems in general would benefit from the employment of such methods at any given time.

There are challenges in using the methods and they include the educational level of the respondents and the vehicle one uses to put value on the environmental good being assessed. Monetary value may not be the best as most rural communities do not have disposable income. The strategy should include a pilot survey to seek for the best vehicle to use in the survey and select the best tool for use.

Land tenure in Zambia is still dual and traditional leaders (chiefs) still have a say in the land distribution. Such land is not surveyed and does not carry title but is seen as communal land for that particular ethnic group. This outcome has its implications on the property rights that the respondents may assume in a survey.

The current use of the EIA as a standard tool falls short of putting value on the ecosystem and raises concerns on the effect of the impact that may be affected with a particular project going ahead. This includes also the effect on the environment. EIAs are open to the public at large with various interests as a procedure before the implementation of a project and are not restricted to the local community. The EIAs often suffer from limitations and are sometimes prone to government control if the project is seen to be an economic life line for the country. Additional methods argued here can be used not only to put value on respective ecosystems but to cushion some of the limitations of the EIAs.

Conflict of Interests

The author did not declare any conflict of interest.

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