ECONOMIC TOOLS FOR VALUING WETLANDS IN EASTERN AFRICA

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Cover photo: Lake Kyojja, Masaka District, Uganda

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1. ECONOMIC VALUATION AND WETLANDS CONSERVATION

Valuation forms a key exercise in economic analysis and provides important information for wetlands conservation. The basic aim of valuation is to determine people's preferences – how much they are willing to pay for, and how much better or worse off they would consider themselves to be as a result of changes in the supply of, different goods and services. Valuation provides a means of quantifying the benefits that people receive from wetlands, the costs associated with their loss, and the relative profitability of land and resources uses which are compatible with wetlands conservation vis-à-vis those economic activities which contribute to wetlands degradation. Valuation helps to predict and understand the economic decisions and economic activities which impact on wetlands integrity and status.

Due to the wide, variable and often unclear ecological, economic and management boundaries of wetlands, and because many wetlands goods and services are never bought or sold, they are particularly difficult to value. The economic benefits generated by wetlands, and the economic costs associated with wetlands degradation or loss, are frequently overlooked – by government and private industry, as well as by the land and resource users in wetland areas. As well as resulting in decisions being made or activities being carried out which have negative impacts on wetlands, this omission has meant that the potential of wetlands to generate income, subsistence and other benefits has been underemphasised in both conservation and development policy, planning and practice.

Attaching monetary values to wetlands goods and services aims to make them directly comparable with other sectors of the economy when activities are planned, policies are formulated and decisions made. Especially, wetlands valuation helps to:

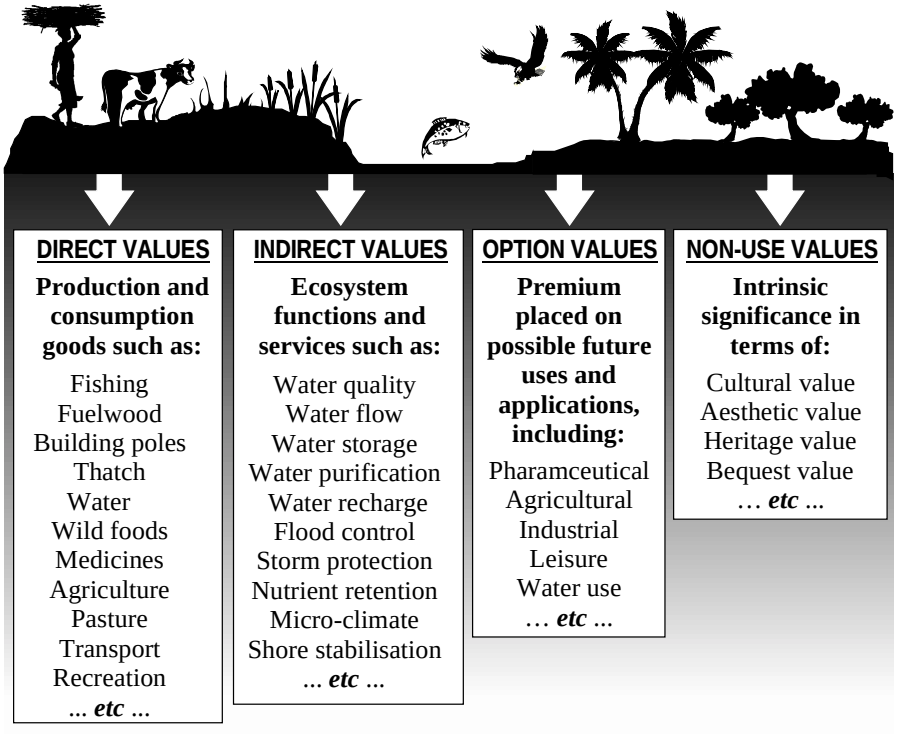
- Demonstrate the ***high value associated with wetlands conservation***, and underline that wetlands provide quantifiable economic benefits to individuals, households, government, the national economy and global community;
- Highlight that ***significant and wide-ranging costs are incurred by wetlands degradation and loss*** in terms of economic efficiency, equity and growth, public expenditure, private profits and livelihood security;
- ***Justify wetlands conservation*** as an economically beneficial investment and land-use option to government, the private sector and local communities;
- ***Improve and rationalise wetlands management*** by integrating business and economic concerns into conservation strategies;
- ***Provide incentives for wetlands conservation*** by ensuring that adequate economic benefits accrue from wetlands to the groups who are responsible for, and bear the costs associated with, their conservation;

- Identify ***sustainable sources of funding and financing mechanisms*** for wetlands conservation at community, private sector, government, and international levels.

2. DEFINING WETLANDS ECONOMIC BENEFITS

Economists and decision-makers have traditionally seen the value of wetlands in terms of the raw materials and physical products that they generate for human production and consumption, especially focusing on commercial economic activities such as fisheries, agriculture, urban and industrial water supplies. These direct uses however represent only a small proportion of the total value of wetlands, which generate economic benefits far in excess of just physical products.

Figure 1: The total economic benefit of wetlands



When valuing wetlands goods and services it is necessary to take account of the full range of economic benefits associated with wetlands, as illustrated in Figure 1, including:

- ***Direct benefits*:** the raw materials and physical products which are used directly for production, consumption and sale including those providing energy, shelter, foods, agricultural production, water supply, transport and recreation;
- ***Indirect benefits*:** the ecological functions which maintain and protect natural and human systems through services such as maintenance of water quality, flow and storage, flood control and storm protection, nutrient retention and micro-climate stabilisation, and the production and consumption activities they support;
- ***Option benefits*:** the premium placed on maintaining a pool of wetlands species and genetic resources for future possible uses such as leisure, commercial, industrial,

agricultural and pharmaceutical applications and water-based developments, some of which may not be known now;

- ***Existence benefits*:** the intrinsic value of wetlands species and areas regardless of their current or future use possibilities, such as cultural, aesthetic, heritage and bequest significance.

All of these benefits have a value because they contribute to economic activity and enhance human welfare. Valuation attempts, as far as possible, to take account of all the components of the total economic benefit of wetlands.

3. VALUING WETLANDS GOODS

3.1 MARKET PRICES

The simplest and most straightforward way of finding out the value of wetland goods is to look at their market prices – what they cost to buy or are worth to sell. These prices reflect what people are willing to pay for wetlands products, the value that they place on them.

Collecting data about market prices, purchases and sales is a good way of quantifying the value of wetland goods which can be easily bought and sold. For example fish, firewood, reeds and thatch are all usually sold in local markets. Handicrafts such as chairs, mats and baskets as well as crop and livestock products also typically have a market in urban centres and retail outlets. All of these prices can be used to calculate income accruing from the sale of wetlands goods, as well as being applicable to wetlands goods which are collected and used only within the household because they represent expenditures saved or potential income from wetlands utilisation.

Box 1: Using market prices to value the use of reeds on the Barotse Floodplain, Zambia

Reeds form an important part of rural life on the Barotse Floodplain because they are used to manufacture houses, courtyards, mats and fishing apparatus. Questionnaires and observation yielded data about the quantity of reeds required to construct different items, the number of different items used by households and their average lifetime. As the purchase price of reeds was known, it was possible to use this information to calculate the value of household reed use – some 704.5 million Zambian Kwacha per year.

3.2 PROBLEMS WITH APPLYING MARKET PRICES TO WETLANDS GOODS

Market prices – where they exist – are undoubtedly a useful way of quantifying economic values. They are however often difficult to apply to wetlands goods. A major problem is that many wetlands products have no market at all – for example those which are used for subsistence purposes only and never sold. In other cases prices are distorted because of taxes, subsidies, monopolies or various other market interventions and do not reflect the real value of wetlands products – for example crop and livestock product purchases are often subject to government monopolies, or are heavily subsidised.

Where no market exists for wetlands products, or markets are distorted, it is necessary to find alternative methods for valuation. These are described below.

3.3 PRICE OF ALTERNATIVES OR SUBSTITUTES

Even where wetland products have no direct market they often have close substitutes which can be bought and sold. For example if wild foods were not available people might have to meet their nutritional requirements from purchased foods, kerosene may be a substitute for firewood or iron sheeting for thatching grass, road transport might be an alternative to lake and river travel.

The prices of these substitute goods represent what it would cost to buy the next best alternative if wetlands products were not available. They can be used as a proxy for the value of wetlands goods because they reflect the amount of money that they are worth in terms of expenditures saved.

Box 2: Using the market price of substitute products to value papyrus use in Bushenyi District, Uganda

Households living in Kisoorooza West RC1 use papyrus for a range of domestic purposes, including house construction, carpets, baskets and firewood. Because it is difficult to find a market price for these items, their value was calculated by looking at the price of marketed alternatives or substitute products – to a total village value of over USh 2 million a year. For example for roof thatch the market prices of tiles were used, for ceilings boards were used, for carpets rubber sheeting was used, for baskets plastic bowls were used and for fuel firewood was used.

3.4 COLLECTION AND PRODUCTION LABOUR

Even when wetlands products have no market prices or close substitutes people spend time and labour collecting and preparing them. This labour usually has a price – for example it is reflected in the prevailing casual agricultural wage rate or the potential income which could be generated if labour was allocated to other productive activities.

The labour or time spent collecting and preparing wetlands products for consumption can be used to estimate their worth. It represents the value of wetlands goods in terms of foregone wages or income – the amount of cash which could have been generated if the time used for the collection and preparation of wetlands goods had been allocated to other activities.

3.5 CONTINGENT VALUATION

Even when wetlands goods are not marketed, people place a value on them. This value may simultaneously reflect many different attributes of wetlands products including their consumption value, social and traditional significance – for example the perceived benefits of products such as wetland agriculture, medicines and wild foods commonly combine utilitarian and cultural aspects. Contingent valuation methods have become one of the most widely-used techniques used to quantify environmental benefits which have no market and whose value simultaneously incorporates multiple components. They are also one of the only approaches which can be used to estimate the option and existence values associated with wetlands.

Contingent valuation is not based on observed market behaviour or prices, but instead infers the value that people place on wetlands goods by asking them questions directly. They set up a hypothetical scenario where products could be bought or sold and elicit bids about how much people would be willing to pay to use or consume them, or how much compensation they would be willing to accept for the loss of their use. They ask questions such as "how much would you be willing to pay for a bundle of thatching grass?", "if no river transport were available what bus fare would you be willing to pay to reach place *x*?" or "how much compensation would you accept for the loss of the right to fish lake *y*?".

Contingent valuation methods are a particularly good way of valuing wetlands products which have no market, are not consumed directly, or have strong cultural or traditional importance in addition to their actual use. They are also useful in cases where, even though market prices may exist, it is impossible to estimate the quantity of wetlands goods consumed.

Box 3: Using contingent valuation and travel cost methods to assess the recreational value of Lake Nakuru, Kenya

Lake Nakuru National Park is an important international tourist destination. Although fees are charged to enter the park, these underestimate the total value that tourists place on the wetland and its component species, especially flamingos. A travel cost survey of visitors elicited information about length of stay, travel costs, place of origin and visitation rates, distinguishing between resident and non-resident tourists. The contingent valuation survey asked visitors how large their personal total costs of travel were, how much they would be willing to increase their expenditures to visit the park, how much they would contribute to a fund to clean up and control the urban pollution which threatens the park, and how much they would contribute to a project to conserve flamingos (all measures of willingness to pay); and the minimum reduction in trip costs that they would be willing to accept should there be no flamingos (a measure of willingness to accept compensation). The results of these surveys demonstrated that the annual recreational value of wildlife viewing in Lake Nakuru National Park was between US$ 7.5-15 million, of which over a third was accounted for by flamingos.

(Source: Navrud, S. and Mungatana E., 1994, 'Environmental valuation in developing countries: the recreation value of wildlife viewing', Ecological Economics 11: 135-151)

3.6 TRAVEL COSTS

Wetland areas often hold a high value for tourists and local visitors as a recreational or leisure destination – for example for sailing, swimming, walking, game-viewing, bird-watching or picnics. Even when people do not pay a fee to enter or use wetlands for recreational purposes they expend time and money to visit them. These expenditures reflect the value that visitors place on wetlands.

The travel cost method of valuation calculates costs incurred in visiting and using wetlands – for example including petrol, bus fares, labour time, accommodation and other charges. It then constructs a demand function relating visitation rates to travel expenditure, which expresses the extent to which people use wetlands at different cost levels, and allows consumer surplus – the value received from wetlands over and above what is actually paid – to be calculated.

3.7 PARTICIPATORY VALUATION

Contingent valuation usually elicits monetary bids from people in order to estimate wetland values. People however frequently become suspicious when faced with a scenario involving payments, taxes or compensation. They will often under-quote the amount of money they would be willing to pay for wetlands goods if they fear that such charges may actually be made in the future, and over-quote the compensation they require if they think there may be a possibility of actually receiving payments. Additionally, many wetlands products are used within the context of a subsistence economy where cash is not the main medium of local value. Cash-based contingent valuation is often an inappropriate method for valuing wetlands utilisation in developing countries.

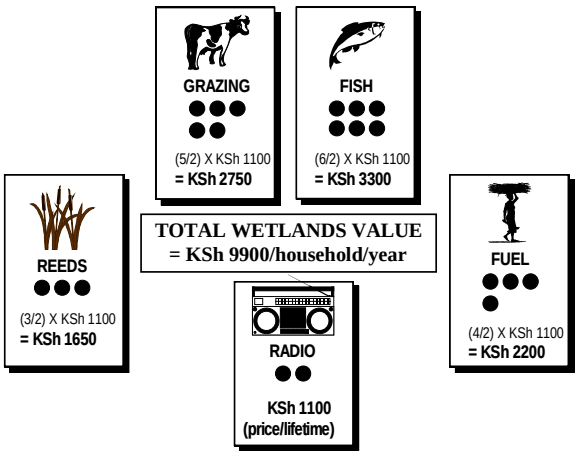
Participatory valuation, although sharing some characteristics with contingent valuation, does not use cash amounts to express wetlands values. Instead it asks people to value wetlands products in terms of other locally important products or categories of value. It allows respondents to choose a numerâire for valuation which is a commonly used, marketed and valued product – for example cattle, a radio or a sack of maize – and express the worth of different wetlands products in terms of this numerâire using PRA techniques such as ranking or proportional piling.

Box 4: Using participatory valuation to value wetland utilisation in Sacred Lake, Kenya

Wetland resource form an important part of domestic subsistence and local livelihoods around Sacred Lake wetlands. The bulk of wetlands products are used within the household only, and are never bought or sold. Wetlands utilisation is also highly variable at different times of the year. Many wetlands uses are illegal. People are reluctant to speak openly about their activities because they fear arrest. Some wetlands activities also have ritual or cultural significance, and knowledge is considered the preserve of specialist groups. For all these reasons it was necessary to use an indirect technique for valuation which would allow people to define wetland values within the context of their own perceptions, needs and priorities rather than according to cash amounts.

Whereas households proved reticent in the face of direct questioning, drawing and manipulating pictures of different wetlands activities was found to be a good means of stimulating discussion. These pictures were used to value wetlands utilisation. Because cash measures had little relevance in a subsistence economy such as that around Sacred Lake, it was necessary to find a numeraire for valuation which formed part of the local socio-economy, had wide significance as an item of value, and could be translated easily into a monetary amount. Households chose a radio as the most appropriate measure of local value.

Picture cards depicting wetlands activities were laid out together with a picture of a radio. Each household then distributed 20 beans as counters between these different activities and the numeraire card. It was thus possible to measure the perceived value of wetlands products in terms of radio equivalents, and translate each wetland product into a cash amount based on the market value of a radio, giving a total annual value for wetlands utilisation of KSh 9,900 per household.



4. VALUING WETLANDS SERVICES

4.1 MARKET PRICES AND STATED PREFERENCE METHODS

Some of the techniques described for valuing wetlands products can be applied to their ecosystem functions – if actual or substitute markets exist (for example the price of clean water, the substitute cost of chemical fertiliser over floodplain nutrients), or when clear links between wetlands services and economic benefits are recognised (for example willingness to pay for pure water, flood control or water storage). Because of the indirect impact of wetlands services on production and consumption, as they typically have no market and due to the fact that they generate wide-ranging off-site economic benefits it is however usually necessary to find additional methods to value wetlands services. These are described below.

4.2 REPLACEMENT COST

If wetlands ecosystem functions and services are no longer available it is sometimes possible to replace them by alternative means. For example decline in wetlands water storage functions might lead to the construction of reservoirs and dams, loss of floodplain inundation could require the application of chemical fertilisers, decrease in water quality would require the construction of water treatment and purification plants, loss of riverbank protection may lead to the need for artificial reinforcement.

These replacement costs represent the value of wetlands services which can be at least partially replicated by artificial or man-made means. They reflect the expenditures saved by the presence of naturally occurring wetlands and their accompanying ecosystem functions.

Box 5: Using replacement costs methods to value floodplain grazing around the lower Tana River, Kenya

Most of the land around lower parts of the Tana River is semi-desert, where pastoralism forms the major mode of production. Pastoralist livestock herds are entirely dependent on floodplain grazing in dry seasons and droughts. Estimates of total livestock populations, their water and pasture requirements, and the annual contribution of the flooding regime to herd sustenance were made. The value of the Tana River floodplain in terms of dry-season grazing was quantified by calculating the costs of replacing this pasture and water by artificial means – by the provision of irrigated grasslands and watering points – to a value of some KSh 19 million a year.

4.3 EFFECT ON PRODUCTION

Wetlands services support other economic processes. For example their water-related functions maintain downstream income, employment, production and consumption generated by hydropower, irrigation, urban water supplies, floodplain agriculture, grazing, fisheries and other wild resource uses. Where these economic activities have a market value it is possible to look at changes in production and consumption arising from changes in the status and integrity and wetlands. These effects on production reflect the indirect contribution of wetlands services to economic output.

Box 6: Using the effect on production approach to value floodplain agriculture on the lower Tana River, Kenya

Some 23,000 households cultivate an area of 34,500 ha which depends on the annual flooding regime of the Tana River. The value of the Tana River's flooding regime in terms of support to downstream agriculture was valued using effect on production methods – at an average annual farm income of KSh 62,000, floods have an agricultural value in excess of KSh 14 million a year.

4.4 DAMAGE AVOIDED AND PREVENTIVE EXPENDITURE

Wetlands services, as well as generating economic benefits, help to avoid economic costs – for example by maintaining waterflow and minimising flooding or by protecting riverbanks and shorelines. Calculating the value of damage occurring as a result of the loss or irrevocable degradation of wetlands – for example the costs of destruction to houses, roads, bridges and farms caused by flooding – provides a way of valuing wetlands services in terms of losses avoided and costs saved.

Alternatively, wetlands services can be valued by looking at how much it would cost to set in place measures to prevent the damage arising from their loss. For example flood control barriers might be needed to offset or prevent negative impacts associated with the loss of wetland flood control services, water treatment works might be needed to prevent reservoir siltation associated with loss of wetlands silt-trapping functions.

Box 7: Using the damage avoided approach to value flood control functions of the Tana Delta wetlands, Kenya

Wetlands and mangroves on the Tana Delta provide important flood and storm control functions, protecting coastal infrastructure and settlements. This function was partially valued by looking at the damage avoided to roads and bridges by the control of annual floods – a total present value of some KSh 275 million in terms of re-establishment and maintenance expenditures avoided.

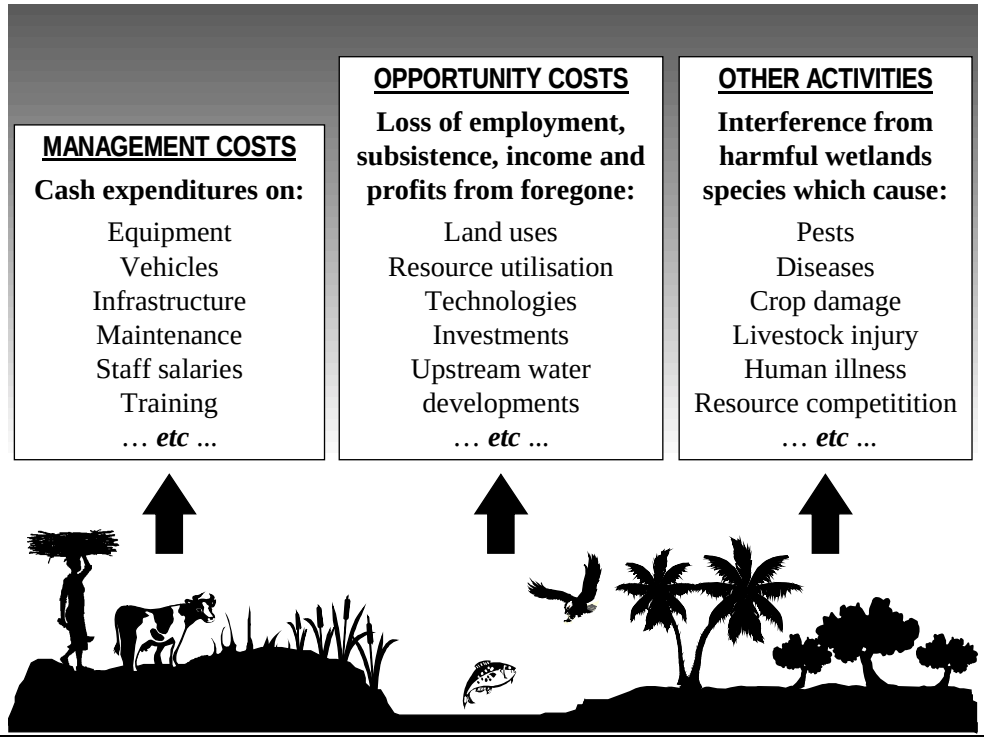
Box 8: Using the preventive expenditure approach to value shoreline protection functions of coastal wetlands in Seychelles

Coastal marshes and mangroves play an important role in shoreline stabilisation, erosion control, flood and storm protection on Mahé Island in the Seychelles. The value associated with these functions was calculated by applying a preventive expenditure approach. In the absence of wetlands services it would be necessary to construct groynes and flood barriers to offset or prevent coastal erosion and damage to infrastructure, to a total cost of some SR 3.9 million a year.

5. DEFINING AND VALUING WETLANDS ECONOMIC COSTS

Wetlands conservation is not cost free. It is necessary to recognise these costs in valuation, alongside the benefits associated with wetlands. As is the case for benefits, wetlands costs have tended to be defined narrowly by economists in the past, focusing only on investment and recurrent costs incurred to the government institutions concerned with wetlands management. As well as direct physical expenditures, wetlands however give rise to costs because they preclude, diminish or interfere with other economic consumption and production activities.

Figure 2: The total economic cost of wetlands



Valuation must take account of the full range of economic costs associated with wetlands conservation, as illustrated in Figure 2, including:

- ***Management costs*:** direct physical expenditures on the equipment, infrastructure and human resources required to manage wetlands;
- ***Opportunity costs*:** the alternative uses of time, land, money and other resources required for wetlands conservation which could have generated income and profits had they been used differently or allocated elsewhere such as agricultural land uses or unsustainable resource utilisation activities foregone in wetland areas, wetlands-polluting industrial technologies and production processes precluded or upstream water developments prevented;

- ***Costs to other activities*:** the damage and interference to human and economic systems caused by wetlands resources and species, including human and livestock disease and injury, crop pests and sources of competition over resources.

All of these costs lead to economic losses because they require cash, necessitate expenditures, decrease income or reduce livelihood options. Valuation, in addition to making a monetary estimate of wetlands benefits, attempts to quantify the total economic costs associated with wetlands.

5.1 VALUING WETLANDS COSTS

5.1.1 Management costs

The direct costs of wetlands can be calculated by identifying the labour, equipment, infrastructure, vehicles and other investment and recurrent expenditures required for their management. In most cases these can all be valued at market prices.

Box 9: The management costs of wetland National Parks in Kenya

The direct costs of conserving two of Kenya's major wetland National Parks – Lake Nakuru and Saiwa Swamps – were calculated by analysis of the annual budgets of the Kenya Wildlife Service, the national agency responsible for their management. In total staff, equipment, infrastructure and maintenance costs for the two wetland National Parks were some KSh 20 million a year.

5.1.2 Opportunity costs

The three main opportunity costs associated with wetlands conservation are the cash and subsistence losses arising from curtailing unsustainable wetland resource utilisation activities, the income and output which could have been generated by converting wetlands into other land uses, and the income and employment foregone by not implementing upstream developments or production processes which would have a negative impact on wetlands. All of these opportunity costs can usually be valued using effect on production techniques.

Box 10: The opportunity costs of conserving Lake Mburo National Park, Uganda

Three main opportunity costs are incurred by conserving Lake Mburo National Park – constraints on livestock and agricultural land uses and restrictions on natural resource utilisation. These opportunity costs were calculated by applying an effect on production approach to valuation. Agricultural opportunity costs were valued by assessing the total area of the park which us suitable for crop and livestock production, and calculating the potential returns from these activities – some USh 137.3 million a year for livestock or USh 6.6 billion a year for mixed agriculture. The opportunity cost of conservation in terms of resource use foregone was assessed using survey data identifying the proportion of adjacent households who wished to exploit particular resource in the park but were prevented from doing so, and calculating the potential annual value of these utilisation activities foregone – some USh 226 million a year.

5.1.3 Costs to other activities

The costs to other activities resulting from the conservation of wetlands areas and species are most often valued using either effect on production or human capital approaches.

While the former is particularly applicable to the costs associated with crop and livestock damage from wetlands bird and animal pests, the latter is specifically focused on human health and productivity.

Box 11: Crop damage costs associated with Lake Mburo National Park, Uganda

Wetlands animal and bird species cause significant crop damage to nearly a fifth of the farms situated in Parishes around Lake Mburo National Park. The value of these costs was calculated using an effect on production approach, looking at harvest losses and time spent in guarding crops against wild animals – a total cost of some USh 5 million per km of Park boundary or USh 375 million a year.

The human capital approach to valuation establishes a dose-response or cause-effect relationship, linking for example the prevalence of water-borne illness or the incidence of injuries and death caused by wetlands animals with increased human disease and decreased productivity. It adds up the loss of earnings and costs of medical treatment and health care arising from harmful wetlands species.

Box 12: Using human capital methods to calculate the economic cost of pesticide poisoning around Lake Naivasha, Kenya

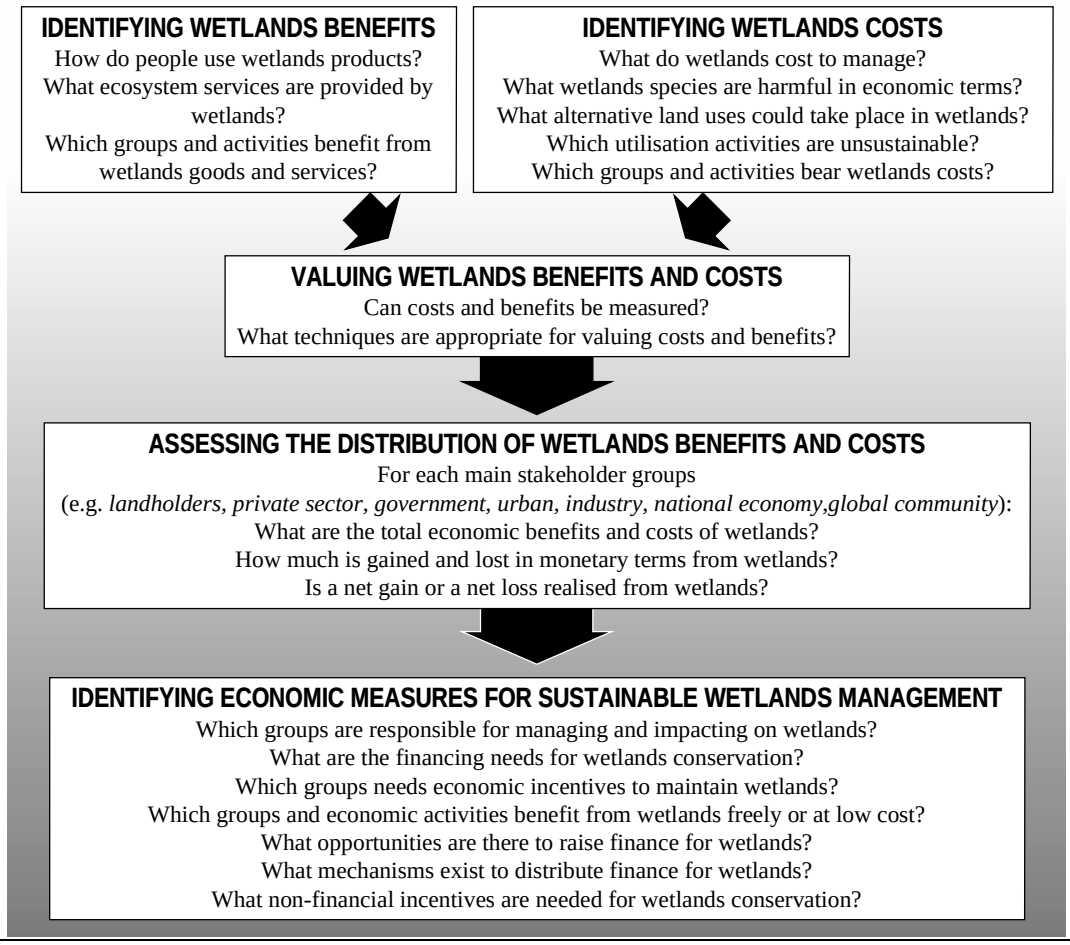
The human costs associated with pesticide poisoning resulting from horticultural and floricultural activities irrigated from Lake Naivasha were valued using human capital valuation techniques. The frequency of pesticide applications and resulting incidence of illness for different crops was calculated, and valued in terms of the costs of medical consultation, drugs and work days lost – to an average cost of some KSh 5,000 per poisoning case or up to KSh 1,800/ha of agricultural production.

6. USING VALUATION IN WETLANDS ECONOMIC ANALYSIS

6.1 STAGES IN WETLANDS ECONOMIC ANALYSIS

Wetlands valuation, although an interesting exercise, is not an end in itself. The aim of valuing wetlands goods and services is to provide information which can be used to carry out further economic analysis which will identify better, more sustainable and more equitable ways of managing wetlands, their benefits and costs.

Figure 3: Stages in the economic analysis of wetlands



As illustrated in Figure 3 the economic analysis of wetlands for management purposes follows four basic stages, which include but are not limited to valuation:

- ***Identifying wetlands economic benefits and costs:*** A first stage in economic analysis is to identify which products and attributes are associated with wetlands, how they in turn relate to human production, consumption and welfare, and to which major groups wetlands benefits and costs accrue;

- ***Valuing wetlands economic benefits and costs:*** Having identified wetlands economic benefits and costs, appropriate techniques for valuation can be chosen and monetary estimates of wetlands values made;

- ***Assessing the distribution of wetlands economic benefits and costs:*** After quantifying wetlands values, the distribution of wetlands benefits and costs between different stakeholder groups can be assessed. By determining the type and level of benefits and costs accruing at different levels and to different activities it is possible to identify who gains and who loses, and by how much, from the presence of wetlands;

- ***Identifying economic measures for sustainable wetlands management:*** The final stage in economic analysis is to draw together information on the magnitude and distribution of wetlands benefits and costs so as to identify, under current conditions, which groups need additional finance and incentives for wetlands conservation, and how these funds and incentives can be generated.

6.2 USING ECONOMIC VALUATION FOR SUSTAINABLE WETLANDS MANAGEMENT

Findings of the economic analysis resulting from valuation provides a number of important tools for sustainable wetlands management, including:

- ***Justifying wetlands conservation to government by underlining its high economic value and demonstrating that wetlands loss and degradation constitute real economic costs:*** For wetlands conservation to be accorded a high priority by government it must be justifiable in social, economic, development and political terms. Wetlands compete with other sectors of the economy, for budget allocations and against development imperatives which favour the promotion of economic activities which contribute to wetlands degradation. Valuation underlines the fact that wetlands goods and services contribute to national income, export earnings, employment and subsistence, to industrial production, export earnings and fiscal revenues. It also highlights the long-term costs of wetlands degradation to all these economic indicators. By emphasising their important role in economic growth and equity, and demonstrating the public expenditures saved by their maintenance, valuation provides a strong and much needed justification for government to allocate scarce resources to wetlands conservation.

- ***Highlighting the need for local-level economic incentives for wetlands conservation:*** Local landholders are usually the groups who have the most potential to influence the status and integrity of wetlands through their economic activities, especially through agricultural conversion, resource over-harvesting and the dumping of wastes and effluents. As long as wetlands generate a lower – or less tangible – level of benefits than they cost at the local level, landholders will have few incentives to conserve them. Valuation provides a means of quantifying the level of wetlands benefits which accrue at the local level and comparing them with costs incurred by wetlands conservation, including the opportunity costs of unsustainable land and resource utilisation activities foregone. It identifies areas where landholders are

capturing insufficient value for wetlands to compete with other destructive land and resource uses, and highlights areas where it is necessary to set in place additional local economic incentives for conservation.

- ***Identifying economic instruments and financing mechanisms for wetlands conservation:*** Wetlands conservation, and the groups who bear its costs, require funds. Valuation, because it analyses the magnitude and distribution of wetlands costs and benefits, highlights conservation financing needs. It also pinpoints the groups who benefit freely or at low cost from wetlands, or who carry out activities which degrade wetlands without being penalised for the harm they cause, thereby identifying niches for capturing additional revenues which can be redistributed to the groups who bear the costs associated with wetlands conservation.

6.3 METHODOLOGICAL LIMITATIONS TO WETLANDS VALUATION

Valuation is a useful tool for wetlands conservation because it highlights a range of costs and benefits which have in the past often been ignored by planners, policy-makers and decision-makers. Valuation techniques however only provide tools which help to make better and more informed decisions about wetlands management – they are not ends in themselves, and have a number of shortcomings and weaknesses. There are a number of methodological issues and limitations which should always be borne in mind when carrying out wetlands valuation:

- Wetlands valuation is usually, of necessity, ***partial***. Most quantified estimates of the economic benefit of wetlands goods and services focus only on selected components of their value. They should be taken as a minimum estimate of the total economic value of wetlands;

- The ***reality of wetlands values*** is sometimes limited. They are rarely "real" values and often do not exist in terms of concrete prices and income. Rather than definitive or binding figures, most values should be seen as indicative estimates which present a guide to what wetlands may be worth, for use in planning, decisions and policy;

- The value of wetlands is ***unequally distributed*** between people and over time. Most valuation techniques do not take account of this differentiation or variability. Different people have different perceptions of the value of wetlands, and these may vary at different times. Economic valuation is usually based on a particular person's or group's conception of what a particular wetlands good or service is worth at a specific point in time. It is not necessarily universally valid, or extrapolable between different groups, areas, species or over time;

- The loss of wetlands goods and services can have ***irreversible effects***. Wetlands loss and habitat degradation can lead to the complete collapse of human livelihoods, the permanent loss of consumption and production possibilities, or the total extinction of wild species. The full risk or ultimate implications of these losses , or how the loss of one species or habitat may affect other resources or activities in the future, is not known. The final or knock-on effects of wetlands loss can never be fully quantified or reflected in economic valuation;

- Some wetlands benefits will always be ***unquantifiable and unmeasurable*** because the necessary scientific, technical or economic data is not available. Other aspects of wetlands valuation which relate to human life or religious and cultural significance involve ethical considerations, especially when they are used to argue that specific activities or particular people's needs are more desirable or important than others. It is impossible to value wetlands fully, and in some cases it should not even be attempted.