INTEGRATED WETLANDS ASSESSMENT:
An introduction to the IUCN Toolkit and the Mtanza-Msona case study

Policy Brief adapted from Springate-Baginski *et al.*, 2009

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This project has been funded by the UK government through Defra's Darwin Initiative, which draws on the wealth of biodiversity expertise within the UK to help protect and enhance biodiversity around the world.

I. OVERVIEW

Wetlands contain exceptional biodiversity significance, form an essential component of many local, national and regional economies, and often support adjacent communities' livelihoods. Wetlands are also one of the most threatened ecosystems.[1]

Poor consideration of the relationships between wetlands' interrelated biodiversity, economic, and livelihood dimensions is a major factor leading to their degradation. There are techniques to assess these values separately. However, there are few *integrated* methods to assess the connectivity between wetland values, or to express this information in ways that can inform real-world conservation and development planning. To contribute to addressing this methodological and information gap, IUCN[2] has developed an **Integrated Wetlands Assessment (IWA) Toolkit.** It provides methods and tools for assessing the status of and links between biodiversity, economics and livelihoods factors, with a focus on strengthening pro-poor approaches to wetland management.

IWA has several benefits, including providing a more holistic picture of wetlands' values, and the scope and nature of the dynamics between them. At the same time, putting integrated assessment into practice presents many challenges, including that most people have discipline specific skills, jargon, and experience. For integration to work, everyone needs to understand the process as a whole and move beyond their common boundaries.

The IWA Toolkit provides detailed guidance for an assessment based on several iterative steps across three stages: **preparation, conducting the assessment, and analysis**. For each stage and step, tools and methods are provided for economic valuation, biodiversity assessment, and livelihoods assessment. Throughout the Toolkit are examples of how these three assessment dimensions can be combined to ensure a process that provides – from problem definition to information presentation – an integrated understanding of wetland's dynamic status, threats, values, and uses.

IWA was pilot tested in two sites: the Stung Treng Ramsar Site, Cambodia, and Mtanza-Msona Village, Tanzania (see Figure 1). Assessment tools and integration techniques were adapted to each of the wetlands management contexts to provide policy relevant information in support of pro-poor conservation and wise use. The information from the pilot sites also informed the development of the final IWA Toolkit.

The IUCN IWA Toolkit is available from the IUCN Species Programme at: www.iucn.org/species/IWAToolkit

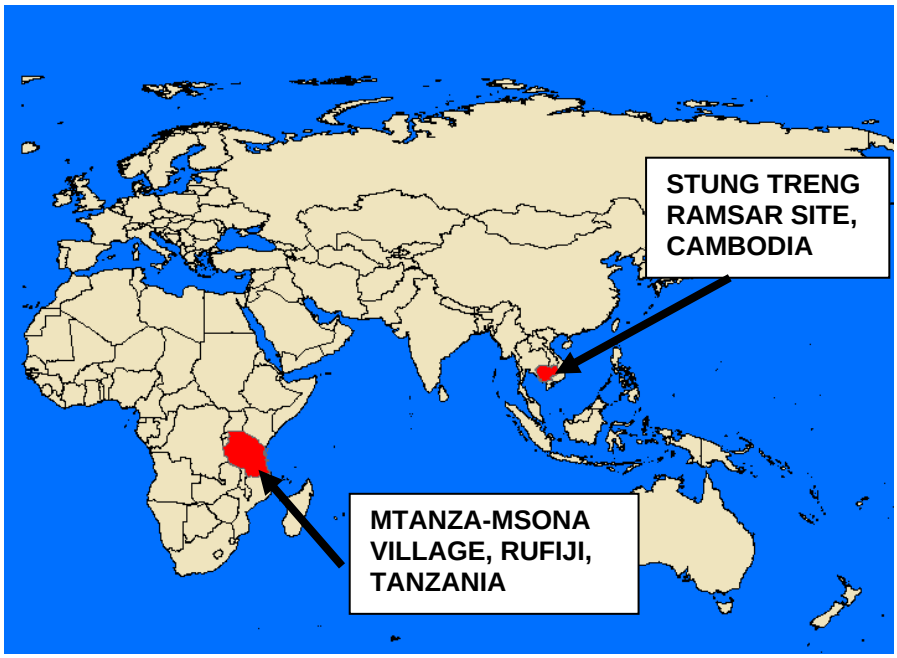

Figure 1: Two Case Study Assessment Sites

II. IWA TOOLKIT RATIONALE AND OBJECTIVES

Wetlands are natural or artificial areas "with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six metres".[3] They contain exceptional biodiversity significance, form essential components of economies, and support adjacent communities' livelihoods. Wetlands are also one of the most threatened ecosystems.[4]

Wetlands are hydrologically and ecologically connected with the broader natural landscapes. Their status, use, and management are also directly and indirectly impacted by their on-site and off-site socio-economic contexts. Understanding wetlands conditions, and assessing likely impacts of policy and management strategies, requires dealing with these complex factors in an integrated way.

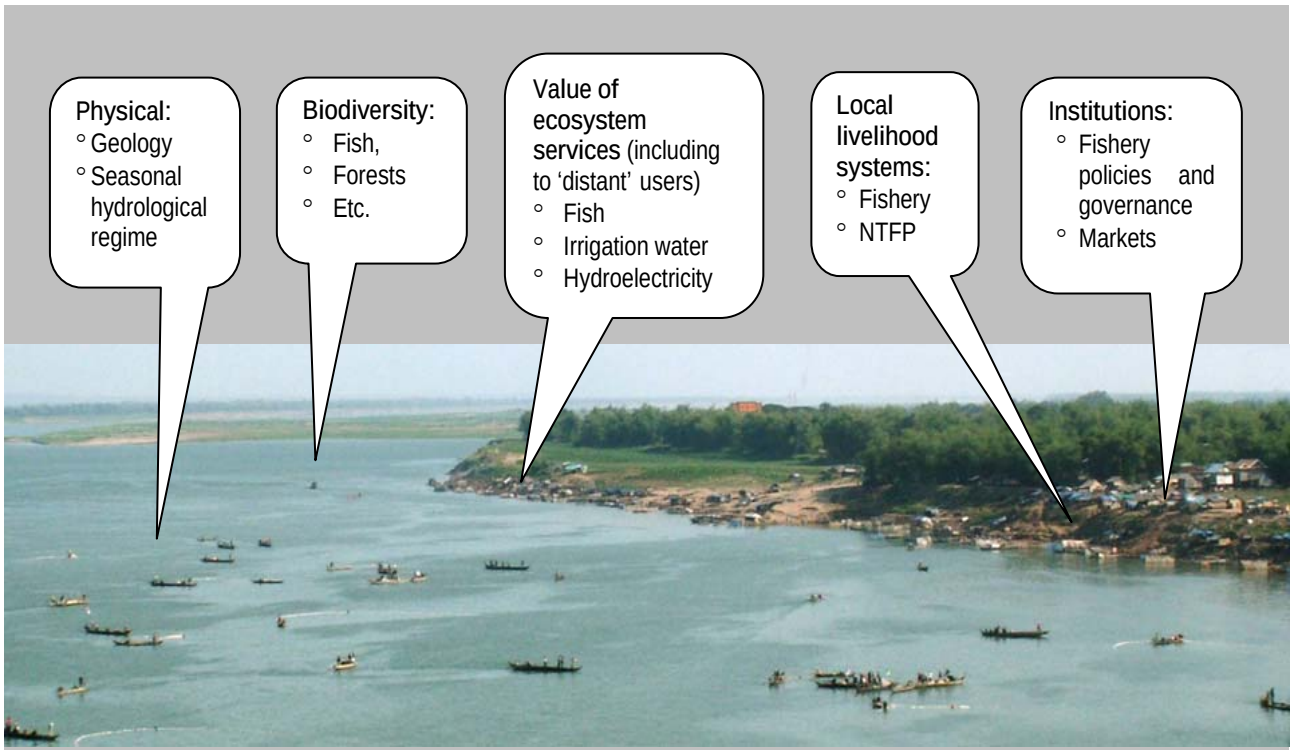

Figure 2: Interlinked aspects of a wetland landscape

Poor understanding and consideration of the ecological, economic, and social relationships that make wetlands valuable, and vulnerable, is a major factor leading to their degradation. While techniques exist to assess wetland values separately, managers lack *integrated* assessment methods that highlight inter-linkages and connectivity between factors.[5]

IUCN has developed an **Integrated Wetlands Assessment (IWA) Toolkit** to contribute to addressing this methodological and information gap. The Toolkit includes:

- A **framework** for making wetland management decisions, especially conservation and development trade-offs, through integrating biodiversity, economic and livelihood assessment;
- **Guidance on conducting an integrated assessment** and **methods sheets** for planning and carrying it out;
- Tools, methods and techniques for **biodiversity assessment**, **economic valuation**, and **livelihoods analysis** of wetlands;
- Tools, methods and techniques for presenting IWA data through **mapping**; and
- **Case studies** of IWA in a management context in Stung Treng Ramsar Site, Cambodia and Mtanza-Msona Village, Tanzania, and other examples throughout the document.

III. IWA BENEFITS AND CHALLENGES

Integrating assessment of wetlands biodiversity, economic, and livelihood considerations has several benefits, including, *inter alia*:

- Improving and deepening the insights gained with respect to each dimension, by highlighting their linkages;
- Providing a more holistic picture of wetlands' full values, including the scope and nature of dynamics between them; and
- Optimising assessment resources by integrating training, streamlining investigators' time, and reducing respondent fatigue.

At the same time, implementing IWA presents many challenges. For example:

- There are likely to be disciplinary boundaries and technical and language ('jargon') differences between those working on the assessment. Integration requires that everyone understand the whole picture and the value or relevance of work in the other disciplines.
- Integrated assessment will always require adaptation to the context, but the lack of relevant 'lessons learned' and existing models creates an additional challenge at this stage.

IV. IWA FRAMEWORK

The toolkit describes an assessment framework of roughly nine iterative steps across three stages, as illustrated in Table 1. All stages and steps are described in full detail in the Toolkit.

Table 1: Integrated Assessment Stages and Steps

Stage	Step
A. Preparation	1. **Identifying the management issue:** Wetland assessment should address particular resource use, management or policy issues, which should be developed with a range of stakeholders.
	2. **Forming the multi-disciplinary team:** The assessment team should include biodiversity, economics, livelihoods research specialists; people with inter-disciplinary skills; and people with experience in on-the-ground wetland planning and management.
	3. **Identifying the information required, framing the study and making sampling decisions:** This step includes defining the assessment boundaries (e.g., who and what will be included in the study, at what level of detail), the geographic boundaries, and the temporal boundaries. The information required is likely to include pure biodiversity, economics and livelihoods information, as well as cross-cutting information which bridges these disciplines.
	4. **Completing a planning matrix:** The Toolkit provides detailed recommendations and a template for planning and managing the collected data, including identifying information gaps and processes for getting integrated data at each step of the process.
B. Conducting the field assessment	5. **Planning and carrying out fieldwork:** Actually documenting the state of wetland biodiversity, identifying development and conservation pressures and threats, and understanding past, current and future management and policy responses.
	6. **Integrated data management and storage**
C. Analysis, write-up and presentation	7. **Integrated data analysis:** The assessment will involve methodologies traditionally used in biodiversity surveys, economic valuation assessments and livelihoods surveys. "Linking information" will also be collected, to ensure that information can be brought together to form a whole. The Toolkit provides specific examples and recommendations for linking information.[6]
	8. **Integrated presentation of results:** A GIS-based approach
	9. **Feedback and policy engagement:** Guidance on data analysis, emphasizing connectivity between biodiversity, economic and livelihood factors, and ensuring that information is presented in a practical and policy-relevant form which is appropriate and useful for planners and decision-makers in conservation and development sectors.

Economic Valuation

The economic valuation concepts and methods in the IWA Toolkit promote assessment of wetlands' ***total economic value***,[7] including:

- **Direct values:** raw materials and physical products used directly for production, consumption and sale, e.g., those providing energy, shelter, food, water supply, and transport.
- **Indirect values:** the ecological functions which maintain and protect natural and human systems through services such as maintenance of water quality and flow.
- **Option values:** the premium placed on maintaining a pool of species and genetic resources for future possible uses, some of which may not be known now.
- **Existence values:** the intrinsic value of ecosystems and their component parts, regardless of their current or future use possibilities, such as cultural, aesthetic, heritage and bequest significance.

One reason for the under-valuation of ecosystems is that, traditionally, economists have assessed natural ecosystems only in terms of *direct* values, especially commercial activities and profits. These represent only a small proportion of the total value of ecosystems. Focusing on total economic value presents a more complete picture of the economic importance of ecosystems, including the economic costs associated with their degradation.

Wetlands and their conservation also generate costs, which impact people's livelihoods and economic activities. As with benefits, wetlands costs have tended to be defined narrowly, focusing only on management costs. However, wetlands conservation can also pose costs by precluding, diminishing or interfering with other economic activities. Valuation must account for the full range of costs, including:

- **Management costs:** direct physical expenditures on the equipment, infrastructure and human resources required to manage wetlands;
- **Opportunity costs:** the value of other possible uses of time, land, money and other resources which were foregone for wetlands conservation, e.g., agricultural land uses or upstream water developments; and
- **Costs to other activities:** damage and interference to human and economic activities caused by wetlands resources and species, including human and livestock disease and injury, crop pests and sources of competition over resources.

The IWA Toolkit describes specific wetland economic valuation processes, methods, and tools which can be used in a series of assessment steps. These include:

- Identifying and categorising wetland benefits and costs to be covered by the study: There will be limited data, time and other resources for conducting a valuation study, so it may be necessary to decide which benefits and costs the study will cover, and how. Field checklists are provided in the Toolkit.
- Choosing appropriate wetland valuation techniques: The toolkit presents many methods for quantifying wetlands values, and describes the required steps, applicability, strengths, and weaknesses of each technique.
- Analysing and expressing the valuation data and presenting it in policy-relevant ways.

Interviewing fishers about the values of their catch as part of IWA in Mtanza-Msona
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Box 1: Piloting Integrated Assessment in Mtanza-Msona Village, Tanzania

Mtanza-Msona Village, located in the Rufiji Floodplain of Tanzania, has rich wetland resources and products that support local people's subsistence, income, and livelihoods. Local livelihoods of the village population of about 1,800 people (428 households) are based mainly on subsistence crop farming, along with wild-food and medicinal plant collection, small-scale trade, charcoal production, fishing and handicraft production.

The integrated wetlands assessment in Mtanza-Msona followed three broad phases:

(1) Preparation: The management objective identified during the preparation was to generate information for planning and implementation of on-the-ground wetland management activities in the village, and for advocating for support for integrated assessment from governments and donors.

(2) Conducting the assessment: An interdisciplinary field team carried out wet and dry season assessments of species diversity and resource harvest and utilization, including when, at what levels, how, and by whom these activities are carried out, and what their economic value is at household and village levels. Each team member was involved in collecting and discussing information relating to all three thematic areas and engaged in daily meetings to share information. Ongoing interaction with local government authorities and village residents helped continuous stakeholder feedback.

(3) Carrying out analysis and presentation: Extensive data analysis and reporting followed the assessment, and several activities were used to present findings and solicit feedback from local and national partners, including trainings, information briefs, and national and local discussions.

Key findings from the assessment in Mtanza-Msona included the following:

- All households use a variety of wetland resources to support their day-to-day livelihoods.
- Wetland resources have substantial economic value to households and the village as a whole, with total annual value of wetland resource use over TSh 226 million (528,353 per household, 123,571 per capita).
- Differentiation in the type and level of wetland activities across richer and poorer households demonstrate that, *inter alia*, the poorest households carry out a wider range of wetland activities, in part to spread risk and maximise available opportunities.
- Village area wetlands support high species diversity, with limited conservation and active management.
- Village area wetland habitats and species face 'off-site' and 'on-site' threats, including upstream alteration of water flow cycles through proposed dam construction.

Management implications include the following:

- More and stronger conservation management plans are needed for key species, together with effective community education and participation.
- Management plans need to be coupled with policies and activities that directly benefit local people for conservation efforts, and that otherwise off-set the conservation opportunity costs.
- Conservation measures need to ensure equitable impacts, including through careful consideration of impacts on the poorest or most vulnerable groups in the village.
- Conservation plans also need to operate at multiple levels to address both 'off-site' and on-site threats, e.g., by using an Environmental Flows framework.
- More information should be collected on the environmental requirements of the wetland species, and their importance to village livelihoods and economies.

Contributions: The IWA assessment report has already contributed to participatory forest resource assessment in the Mtanza-Msona village land forest reserve. The Mtanza-Msona Village Government is also using the KiSwahili assessment report to help plan a climate change vulnerability assessment, and is likely to use this report in their upcoming village land use planning activities. Additional activities that the assessment might help inform, as identified by village residents, include better farming support systems, eco-tourism development, and better communication about the threats to the wetlands. The assessment outcomes may also increase capacity to defend local resources and livelihoods from upstream development threats, e.g., dam construction, by providing information about wetlands' local and regional values. Going forward, there is interest in expanding the IWA model to other areas in Rufiji.

Lessons learned: From the pilot IWA in Mtanza-Msona Village, Tanzania we learned, *inter alia*,

- Integrated wetlands assessment can generate information that is comprehensive and policy relevant, and that provides a clear picture of the nature and scope of wetlands interrelated values.
- It takes time and resources to adapt the toolkit to the context, but this is a key upfront and ongoing step.
- Target audiences for the assessment information should be well understood to ensure that material is presented in useful ways. This may involve developing several documents that provide information at different levels of detail, and in different languages, and resources should be allocated accordingly.
- Assessment data may be most useful when it can be applied to specific, tangible concerns.

Biodiversity Assessment

Assessing the threat status and distribution of species helps generate information that can be integrated into decision-making processes. The information will also serve as a baseline for monitoring the impacts of development or management interventions and will enable adaptive management.

The biodiversity tools section of the Toolkit describes the methods needed to collect, store and display species information, and to assess the species' risk of extinction. Specific subject include:

- Planning a field survey
- Conducing species surveys
- Fish, mollusc, odonate, plant, and non-fish vertebrates survey sampling methods
- Documentation of wetlands conservation issues through field surveys
- Species threat status assessment (IUCN Red List)
- Alternative methods for biodiversity assessment

In all cases, a first step is to choose which taxonomic groups to focus on. These should be chosen collaborative by the project team, with reference to the questions which form the focus of the study. Available information on these species groups then needs to be collected, starting from secondary sources like literature and databases. Fieldwork will supplement secondary data, including specifying where species are found. Species can then be mapped to the habitats where they are found, including with their estimated risk of extinction. The species information can combined with information from other parts of the assessment, using linking information such as the local names for species and the habitat areas where species are harvested from.

Livelihood Assessment

The IWA Toolkit aim to achieve understanding of the following aspects of wetland-based rural livelihoods:

- livelihood patterns and strategies of wetland-dependent individuals and households, and how these are changing over time;
- particular livelihood features and constraints of poor households, as distinct from the better-off or richer families in wetland communities;
- institutional context at village level, with emphasis on the factors that inhibit livelihood choices and options for the poor; and
- community natural resource management institutions and their interactions with the livelihood strategies and access to resources of the poor in these communities.

The Toolkit suggests an overall framework based on the Sustainable Livelihoods Approach. Specific suggested fieldwork methods are based on the following criteria:

- Relatively easy to implement with a small team of one or two social science researchers, a wetland resource management specialist, and 2-3 field assistants or enumerators;
- Can be achieved within 7-10 days of research per village, with scope for follow up;
- Achieves a balance between cost, feasibility and statistical validity;
- Involves wetland resource users, local authorities and village residents in the research process through participatory techniques; and
- Provides for communication of local-level issues to decision-makers at district, national and international levels.

Biodiversity assessment in Mtanza-Msona
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V. CONCLUSIONS

The **IUCN Integrated Wetlands Assessment Toolkit** aims to help address the methodological gap in understanding the biodiversity, economic, and livelihood values of wetlands in an integrated way. General lessons and conclusions from the pilot tests in the Stung Treng Ramsar Site, Cambodia and Mtanza-Msona Village, Tanzania, include that:

- wetlands biodiversity significant is high;
- poor people and communities depend heavily on wetlands for their livelihoods;
- local and regional economies derive substantial value from wetlands;
- wetlands are under threat from 'development' and poorly regulated commercial exploitation; and
- integrated wetland assessment can promote improved policy and governance processes.

The tools and techniques for integrated assessment must be adapted to each site and management context, and thus the Toolkit does not provide a 'ready-made', out of the box application. It does, however, provide detailed guidance and a range of adaptable options to develop a tailor-made integrated assessment process that can fit any range of wetland types, socio-economic contexts, and scales. The toolkit thus goes a long way to supporting much needed integration of information about economic, livelihoods, and biodiversity dimensions for better wetlands management and use.

The IUCN IWA Toolkit is available from the IUCN Species Programme at:

www.iucn.org/species/IWAToolkit

Discussing IWA results in Mtanza-Msona
© Gita Kasthala

REFERENCES

Barbier, E., Acreman, M., and D. Knowler. 1997. Economic Valuation of Wetlands: A Guide for Policy Makers and Planners, Ramsar Convention Bureau. Gland, Switzerland.

Dudgeon, D., Arthington, A.H., Gessner, M.O., Kawabata, Z-I., Knowler, D.J., Le´veque, C., Naiman, R.J., Prieur-Richard, A-H., Soto, D., Stiassny, M.L.J., and Sullivan, C.A. 2006. Freshwater biodiversity: importance, threats, status and conservation challenges. Biol. Rev. (2006), 81, pp. 163–182.

Kasthala, G., Hepelwa, A., Hamiss, H., Kwayu, E., Emerton L., Springate-Baginski, O., Allen, D., and Darwall, W. 2008. An integrated assessment of the biodiversity, livelihood, and economic value of wetlands in Mtanza-Msona Village, Tanzania. International Union for Conservation of Nature, Tanzania.

Millennium Ecosystem Assessment. 2005. Ecosystems and Human Well-Being: Wetlands and Water, Synthesis. World Resources Institute, Washington, DC. Accessed at: http://www.millenniumassessment.org/en/index.aspx (April 2009)

Revenga, C., Campbell, I., Abell, R., de Villiers, P. & Bryer, M. 2005. Prospects for monitoring freshwater ecosystems toward the 2010 targets. Phil. Trans. R. Soc. B. 360

Ricciardi, A. and J.B. Rasmussen. 1999. Extinction rates of North American freshwater fauna. Conservation Biology 13: 220-222.

Springate-Baginski, O.,Darwall, W., Emerton, L., Allison, E., McIvor, A. and C. Bambaradeniya. 2009. A Toolkit for Integrated Wetland Assessment. Freshwater Biodiversity Assessment Programme, IUCN Species Programme, Cambridge, UK.

NOTES

[1] Millennium Ecosystem Assessment 2005

[2] The IWA Toolkit was developed through a partnership of the Freshwater Biodiversity Unit of the IUCN Species Programme, the Overseas Development Group of the University of East Anglia, and the IUCN Ecosystems and Livelihoods Group. The case studies were undertaken by local partners in Cambodia (IUCN Cambodia Liaison Office and Country Group 1, and the former *Mekong Wetlands Biodiversity Programme*) and in Tanzania (IUCN Tanzania Country Office and IUCN Eastern and Southern Africa Regional Office).

[3] Ramsar Convention on Wetlands. Examples include the following.

- Inland wetlands: Permanent and temporary rivers and streams; Permanent lakes and reservoirs; Seasonal lakes, marshes and swamps, including floodplains; Forested wetlands, marshes and swamps including floodplains; Alpine and tundra wetlands; Springs and oases; Geothermal wetlands; Underground wetlands, including caves and groundwater systems
- Coastal wetlands: Estuaries and marshes; Mangroves; Lagoons, including salt ponds; Intertidal flats, beaches and dunes; Kelp; Rock and shell reefs; Seagrass beds; Coral reefs

[4] Millennium Ecosystem Assessment 2005

[5] Assessment is the process of determining and describing the status, characteristics or worth of a particular wetland. It involves measuring particular variables which are considered important in conservation and/or development terms, and can be taken as indicators of the health of the wetland itself, its attributes, functions and workings, of the goods and services that it generates, and the human and natural processes it supports.

[6] Examples of linking information include the following.

- *Natural resource use ➔ Species Names:* To link socio-economic information to biodiversity information, when resource use is mentioned during economic valuation or livelihoods work, the component species that form these resources should be identified. Socio-economic researchers should ask which species (using local names) people are referring to when they talk about resources. Biodiversity researchers can then go with local people to match local names to the Latin names of species.
- *Natural resource harvest locations ➔ Habitats:* Local harvest locations should be geo-referenced using GPS so that they can be mapped, and cross-referenced with the habitats which have been surveyed by the biodiversity specialists.
- *Natural resource use ➔ User groups and conditions when used:* When biodiversity surveys or economic valuations collect information on who harvests or uses resources and when, they also need to be aware of distinctions the livelihoods team are interested in making, such as differences in ethnicity, gender, age, household size, home location and migration patterns of the user groups, and when the resource is important according to season, income, health or state of need. This may be achieved if the biodiversity or economic researchers pass on information about the species which are harvested (with their local names) to the livelihoods team.

[7] The concept of total economic value has now become one of the most widely used frameworks for identifying and categorising ecosystem benefits (Barbier *et al* 1997).

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