# Chapter 2

## How to conduct an integrated wetland assessment

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This chapter provides a 'how to' guide for practically applying the integrated approach to a wetland assessment. It separates the assessment activities into three stages (preparation; field assessment and analysis; presentation and engagement) and eleven component steps. It gives recommendations based on our experience of using the toolkit in the two case studies presented in Section III.



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## How to conduct an integrated wetland assessment

*This section discusses how to plan and implement an integrated assessment. It includes the following stages:*

✔ *Preparation, orientation, and planning*
✔ *Field data collection*
✔ *Analysis and presentation*

## Overview

Putting integrated assessment into practice presents many challenges; most people have specific technical skills and experience which apply to only part of the process. For integration to work, everyone in the field team needs to have an awareness of the whole process. This will involve expanding the boundaries of each person's own study discipline, feeding into areas with which they are not familiar, and receiving input from researchers in other areas who may not understand the rationale or constraints of their own area. While this is challenging, such integration presents many opportunities to learn about the wider context of conservation and development which may lead to new insights into the problems facing conservation and development initiatives. There are obvious overlaps between the approaches already used in the three research areas. The challenge here is to maximise the synergies between these approaches, while minimising the costs and complexities of carrying out assessments across such a broad range of expertise.

Below, we present an integrated approach to wetland assessment, in order to demonstrate how the different approaches can be combined, and the natural links between them. The process follows the general approach of an integrated assessment using an integrated survey team, as

### *BOX 3: INTEGRATION IN PRACTICE: CHALLENGES AND BENEFITS*

The three main elements of the assessment (biodiversity, economic valuation, and livelihood) need to be coordinated and harmonized at each stage to maximise the value-addition of the integration process.

**Challenges of integration:** *integration is difficult to achieve because of*

- Disciplinary boundaries and jargon – those working in one discipline may not appreciate or understand the value or relevance of work in another
- Practical challenges of bringing together people from different disciplines – it is difficult to organize!
- Lack of existing models and tools for integrated work

**Benefits and synergies:** *integration is worth the effort because*

- It provides a more complete valuation of a wetland than can be achieved through separate studies conducted under each of the respective disciplines
- It helps to identify and address any conflicts of interest between objectives pursued by individual disciplines
- It leads to more systematic fieldwork, optimizing investigators' time and reducing respondent fatigue

**Practical ways to do this include:**

- Team preparation and awareness raising: clarification of concepts and issues so that all members, no matter what their specific background, attain a basic understanding of the overall process and its conceptual basis
- Holding an integrated field trial exercise: to learn to work together and practise the integrated approach, exploring the same issues from the different perspectives
- Frequent team interaction and communication; regular sharing sessions within the team across the disciplines during fieldwork to develop insights

**Table 3: Stages of conducting the integrated assessment**

| STAGE | STEP |
|---|---|
| 1. Preparation orientation, and planning | A1. Identify the management concerns, objectives, or issues to be addressed and the questions to be answered |
| | A2. Form a multi-disciplinary team and allocate roles and responsibilities |
| | A3. Review current state of knowledge and focal issues |
| | A4. Plan the field sampling programme and complete a planning matrix |
| | A5. Plan data collection according to opportunities and constraints |
| 2. Conducting the field assessment | A6. Pilot evaluation of field methods |
| | A7. Implement the main field assessment |
| | A8. Manage data |
| 3. Analysis, presentation, and engagement | A9. Analyse data and write-up |
| | A10. Presentation of results: spatial presentation employing a GIS-based approach |
| | A11. Stakeholder feedback and policy engagement |

illustrated in Figure 5. Here, all parts of the assessment are integrated, including the definition of the management issue which the assessment will address, the planning stages, carrying out the fieldwork, data processing and analysis, and the reporting and presentation to decision-makers and management stakeholders. The stages of integrated assessment are summarised in Table 3 and discussed in more detail in sections A1 to A11. The challenges and benefits of such an approach are outlined in Box 3.

## A1 Identify the management concerns, objectives, or issues to be addressed and the questions to be answered

- *Serves to focus the assessment*
- *Involve multiple national, regional and local stakeholders through a preliminary workshop or scoping mission*
- *The management issue should itself be 'integrated' in the sense of encompassing both environmental and social issues*
- *From the general management issue develop more specific questions*

Before undertaking a wetland assessment it is important to understand the management context, and to clearly define the issues which will be addressed. If the management issues are not clarified, and understood by all, the assessment runs the risk of lacking focus and cohesion. It is critical at this initial stage to ensure the various stakeholders and managers are fully involved in discussions and in formulating the aims of the assessment. The management issue can then be used to generate specific questions as a focus for the assessment.

The management issue should account for both conservation and development concerns, and this should be clearly reflected in the wording (see Box 4). It is likely to address current threats to the wetland (see B10), such as changes in water level or flow due to upstream dams or water abstraction, problems with over-harvesting or destructive harvesting practices, or proposed developments with potential negative impacts on biodiversity and local livelihoods. The assessment planned to address these issues should aim to demonstrate the wetland's combined ecological and social values for the attention of decision-makers so that informed policy decisions can be made to reduce or mitigate any loss of value.

In many cases the conservation and development agendas may be complementary; for example, the safeguarding of a globally unique habitat type, such as a flooded forest, may also improve livelihood security by maintaining fish stocks which rely on the flooded forest for spawning or feeding grounds. However, in some cases the two agendas may be conflicting; for example, where a threatened fish species is an important food source but

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*Scoping workshop in Dar es Salaam to identify the key management issues for the Mtanza-Msona case study assessment*

### BOX 4: EXAMPLE QUESTIONS FORMULATED THROUGH NON-INTEGRATED AND INTEGRATED APPROACHES

**Single discipline management questions**

*Biodiversity Assessment*

- Which areas of wetland have the highest diversity of globally threatened resident and migrant bird species?
- Which areas of the wetland provide seasonally flooded habitats?

*Economic Valuation*

- What is the total economic value of birds harvested from the wetland?
- What would it cost to provide the flood-control services supplied 'for free' by riparian wetlands?

*Livelihoods Analysis*

- What role does bird-hunting play in household subsistence and income generation?
- How effectively do participatory institutions for wetland resource use represent the interests of the poor?

**Integrated management questions**

✔ In the face of plans for alternative use of the wetland, how can we comprehensively document the current value of wetland resources to livelihoods, highlighting the potential loss of biological and livelihood value if the development activities proceed unmitigated?

✔ How can the wetland harvest activities of the poor be regulated to maintain or enhance their contribution to livelihoods without threatening important species or damaging wetland functions?

✔ How can the trade in wetland products be sustained and organized to bring greater benefits to those who actually live in wetlands and depend on them for a livelihood?

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*The Mtanza-Msona integrated assessment team*

current harvests are not sustainable, or where the conservation agenda may be of little interest locally (e.g. the conservation of a river dolphin which does not contribute to local livelihoods in any way). In these cases, considerable effort will be required to find a solution which has clear benefits for local people while satisfying any external objectives such as the conservation of threatened species, or production of power for beneficiaries some distance from the wetland itself.

Clarification of the management issue and the definition of key questions is best achieved through conducting a scoping mission or preliminary workshop to consult with local stakeholders. Such activities may also provide opportunities to gain permissions to work in the area and to identify people with appropriate expertise to take part in the assessments.

## A2 Form a multi-disciplinary team and allocate roles and responsibilities

Overall, the team should aim to provide following fields of expertise:

- *biodiversity survey*
- *economic valuation*
- *livelihoods survey and participatory research methods*
- *possibly ethnobiological methods*
- *georeferencing and spatial mapping*

*A team leader should be appointed who has a general understanding and appreciation of all relevant disciplines.*

### A2.1 Composition of the project team

The team should include specialists in each of the three main disciplines of biodiversity survey and conservation, economic valuation of wetland resources, and assessment of sustainable livelihoods. A team leader should be appointed who has an understanding and appreciation for the values and objectives of each of these three main disciplines. People with such an interdisciplinary background may be hard to come by but one area of study which is already multidisciplinary in this way is ethnobiology (or ethnobotany, ethnoecology) – a suitable person may be drawn from this pool of expertise.

The team should also contain a balanced gender composition as far as possible. Including both women and men in the team is particularly important for household and group interviews.

### A2.2 Roles within the team

The team leader plays a key role in ensuring that the assessment is conducted in an integrated manner. This requires that all team members are very well briefed in advance on the wider objectives of the assessment and that they fully appreciate the value and relevance of all information input from other disciplines. The team leader will need to ensure that the field sampling programme and literature surveys are designed such that each team member knows to collect all relevant information in addition to that directly relating to their own fields of interest. For example, a visit to a local market may provide information relevant to biodiversity conservation (e.g. the species harvested and their harvest locations), economic valuation (e.g. the income derived from the species harvested), and value to local livelihoods (e.g. the importance of the species as a key source of nutrition). It is therefore essential that each team member is fully briefed to collect all relevant information as the opportunity arises – such opportunities will be easily lost without a thorough briefing prior to conducting the assessment. The focus of this approach is the training of all individuals within the team to recognise and collate information from across disciplines.

Alternatively, integration can be achieved through bringing together a team of individuals specialized in each of the relevant disciplines to work together on a survey – this will also serve to encourage understanding of each other's methods and to increase the amount of information that can be collected. For example, if an economist does a market survey alone they may not notice if the fish being sold are of a single species or a number of different species – such information may be critical to the management of that resource. If a biodiversity specialist is also present for the survey then they should note the diversity of species and the necessary samples can be taken for later identification. Collecting information in an integrated way allows the link to be made between the resource (species) and value, and through to livelihood aspects such as the wealth class, gender or ethnicity of the fishers.

Local people should also join the team as resource persons whenever possible. This can be of great benefit in gaining the trust of interviewees, and in gaining access to local knowledge on the location and use of wetland resources. The team should,

however, be aware of any socio-political issues that may affect the quality of data collection. For example, if local power elites or protected area staff join the team they may intimidate local respondents or make them feel they must give the 'right' answer rather than the truth – and so affect the quality of the data. Sensitivity in dealing with this issue is most important.

## A3 Review current state of knowledge and focal issues

✔ *Identify and gather existing information*
✔ *Review information*

Before fieldwork commences a desk study should be conducted to collate all available relevant information from the existing literature. Sources of information will include published papers, 'grey literature' (e.g. project and government reports), and online databases (such as the IUCN Red List of Threatened Species™). Potential information sources to investigate include government departments, aid agencies, and conservation organisations. Local or national government agencies are a useful source for maps, census data and other government statistics. University staff can also provide very useful advice on sourcing relevant information.

Researchers must be well briefed to ensure they look for and capture all information of relevance to the management issue. This will require recognition and collation of information for all relevant disciplines beyond their own immediate fields of interest.

The literature survey will not only provide much information of relevance to the management issue but will serve to identify information gaps as a focus for the subsequent field assessment, and may additionally identify new issues for inclusion within the field assessment.

The literature survey should also normally aim to identify the current and predicted future threats to the wetland site in question. Given the potential for both upstream and downstream impacts on the site, this may therefore require the geographic focus of the literature survey to extend beyond the wetland site itself to include information for the wider catchment.

Key information and potential information sources may include:

- Trade and value of wetland species or species products: CITES (the Convention on International Trade in Endangered Species of Wild Fauna and Flora; www.cites.org); wetland livelihoods reports (e.g. www.wetlands.org or www.worldfishcenter.org), FAO (The Food and Agriculture Organization of the United Nations; www.fao.org)
- Wealth/Poverty status: National/District census data, livelihoods reports, health statistics (from health organization) or studies from NGOs or medical centres in the area, World Health Organisation

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*Project planning workshop for the Mtanza-Msona case study*

- Maps: Government mapping agencies, aerial photography companies, NGOs (see M2 and M3)
- Species information: IUCN Red List, local and international conservation NGOs, universities, local wildlife societies

### A3.1 Review information from the literature

On completing the literature survey, the team members need to meet to review the information collated. This allows key information gaps to be identified BEFORE planning the field assessment.

## A4 Plan the field sampling programme and complete a planning matrix

This step involves:

- *defining the geographic boundary for the survey*
- *defining a temporal boundary for the survey*
- *selecting species groups to survey*
- *identifying the wetland values to quantify*
- *defining the socio-economic boundaries – which groups to interview*
- *completing a planning matrix*

### A4.1 Identify which wetland values are priorities to quantify

There is a subset of cross-cutting information relevant to biodiversity conservation, economic valuation, and assessment of livelihoods (Figure 11). A particular management issue will relate to a different subset of the information, including some pure biodiversity information (e.g. a list of species present and

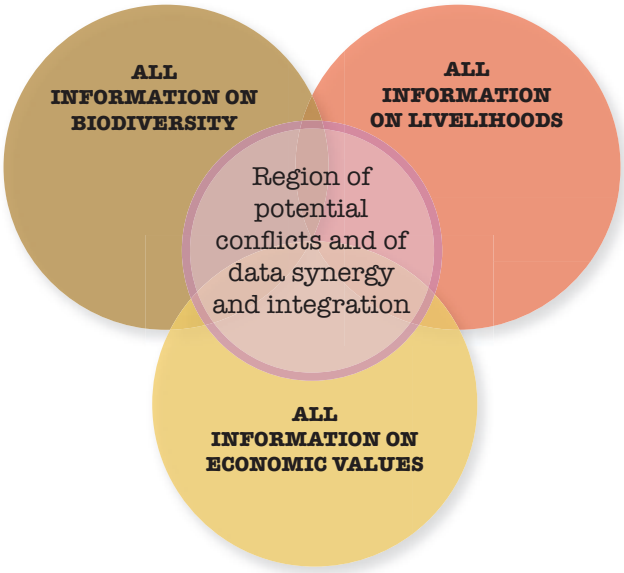


**Figure 11: The economic valuation and biodiversity and livelihood assessment information sets. The region of overlap illustrates where the objectives of biodiversity conservation and of economic and livelihoods development policy potentially conflict, but also where there are benefits and synergies from the integrated assessment approach**

their conservation status), some pure livelihoods information (e.g. a list of the ethnic groups present), and information which bridges the disciplines such as information on the value of biodiversity to livelihoods (also see Box 5).

At this stage of the planning process, the team needs to decide which subset of information to collect. This needs to be determined in an integrated way, involving researchers from the different subject areas, with a strong focus on identifying the links between the various information sets. Figure 12 shows the main types of information likely to be required by any integrated study, and the more obvious links between them.

### A4.2 Defining the assessment boundaries

This step involves defining the extent of the study, based on feasibility, budget, timetable, expertise, and natural, political, and social constraints (to name a few). It will result in a conceptual demarcation of the physical location(s) and socio-economic group(s) on which the study will focus.

### A4.3 Defining the geographic boundary

The study area itself should be clearly defined. Examples of wetland areas that could be a focus for study might include: the resource-use areas of a village or district; a wetland conservation site or protected area (e.g. a Ramsar Site or National Park); an ecologically defined area, such as a floodplain, estuary, or the catchment of a river or tributary; or an area containing a species or habitat of particular conservation or livelihood interest. Wetland boundaries are often fluid, and may vary between seasons and over time – it is therefore important to agree and map the exact boundary for the area on which the study will focus. The majority of the primary data will be collected within this boundary.

In almost all cases there will, however, be a need to collate secondary information from an area which extends beyond the boundaries of the core assessment area. For example, due to the high degree of connectivity within and between wetland systems, threats to a wetland site are likely to come from activities both upstream and downstream and sometimes distant from the wetland itself. In addition, secondary information may be available only on a large scale; for example, species information may be available for the entire river catchment or country only, and census information may be available at the district or regional level. Finally, in certain cases primary data collection may need to extend beyond the core assessment area, such as when people come from outside the immediate area to use the wetland resources at certain times of year, or where wetland resources are traded outside the assessment area.

### A4.4 Defining the temporal boundary

Information collated for a single point in time may not be sufficient to answer many of the key questions for the assessment. For example, if the management issue is livelihood security which happens to be highly dependent upon a seasonal resource, such as migratory fish species, then the assessment should aim

#### *BOX 5: WHY ALL BIODIVERSITY AND LIVELIHOODS INFORMATION MAY BE RELEVANT TO AN INTEGRATED STUDY*

While biodiversity forms the basis of a household's natural capital, it is nevertheless also important to consider other forms of capital that the household possesses, such as financial and physical capital, both to understand the relative importance of natural capital to the household, and because these other forms of capital may influence the ability of households to benefit from the natural capital (e.g. physical capital such as nets and traps are needed to capture fish and crabs).

Likewise while households may benefit directly from fish, crabs and molluscs by eating or selling them, other species groups also need to be assessed to contribute to our understanding of the ecosystem's health and threats to the ecosystem; certain indicator groups, such as dragonflies and molluscs, can be useful in doing this, although they may have little direct relevance to livelihoods

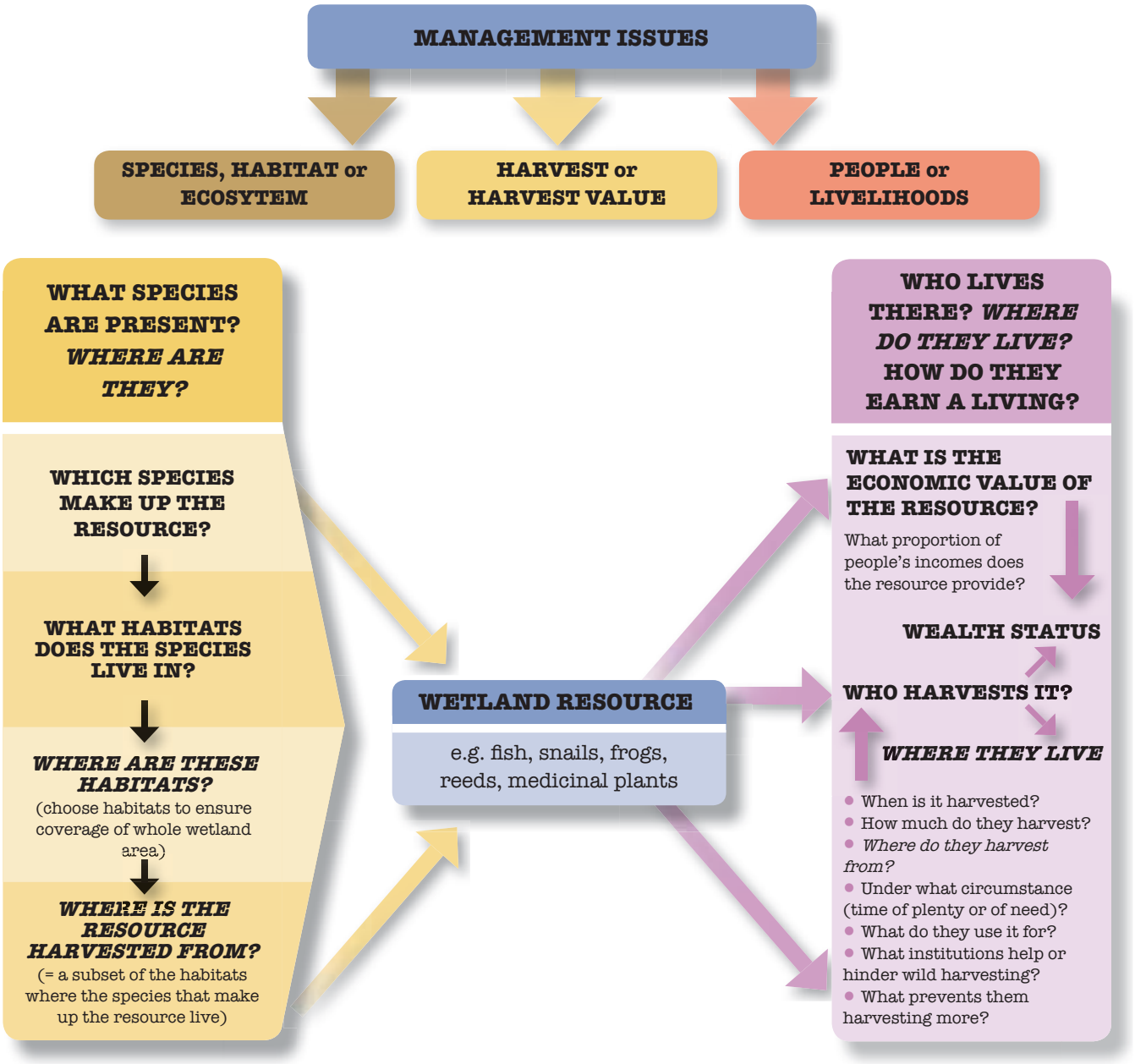


**Figure 12: The main information required as part of an integrated assessment, using wetland resources to link between species and livelihoods information, and highlighting the spatial information components (shown in italics)**

to cover a complete annual cycle. As most tropical wetlands experience seasonal differences in water level and flow, with subsequent effects on wetland resource use, the study period should usually aim to include both a dry season and a wet season assessment. In cases where it is not possible to visit the site in both seasons effort should be made to ask respondents how their livelihood activities, resource availability, and resource use change seasonally. Many species of birds and fish, for example, are migratory, and the timing of biodiversity survey will be important.

### A4.5 Selecting species groups to survey

It is not practical to survey all species within a wetland site so we advocate an approach in which a subset of species is assessed to provide a representative cross-section of the main components of a functioning wetland ecosystem. Selected species groups should aim to include those that are directly utilized, such as fish, as well as those with less obvious direct uses but which are nonetheless essential to the maintenance of a healthy functioning wetland ecosystem.

The species groups selected should be easy to identify and supported by a reasonable level of pre-existing information. We recommend: fin fishes; shell fishes (molluscs); dragonflies and damselflies; crabs and crayfish; frogs and toads; reptiles; birds; mammals; and selected aquatic plants. Given the wide range of trophic levels and ecological roles encompassed within these species groups, it is proposed that information on their distributions and conservation status, when combined, will be sufficient to provide a useful indication for the overall health of the associated wetland ecosystems.

### A4.6 Define the socio-economic boundary

Wetlands typically generate benefits for many stakeholders, both on- and off-site, and the human populations which receive these benefits or impact on wetlands may also vary between seasons or over time. It is therefore important to delineate the populations, stakeholders, and levels of scale that the assessment will focus on, and to have a thorough understanding of the policy, institutional and socio-economic context in which the wetland under study is being managed and utilized. This toolkit places an emphasis on the poorest members of wetland communities, and the socio-economic boundaries should be chosen taking this into account (for example, this might mean paying particular attention to seasonal migrants).

### A4.7 Identify which wetland values to quantify

Wetlands yield multiple goods and services and may also impart economic costs (e.g. as possible sources of disease). These costs and benefits may be direct and readily valued (e.g. provision of building materials) or indirect and difficult to value (e.g. purification of drinking water). Ideally all relevant costs and benefits should be valued in order to present a broad overview of the economic stocks and flows associated with the wetland (see Figure 51: Checklist #1). In reality only a subset of these may be valued, and these should be chosen on the basis of their relevance to the management issue (see Figure 52: Checklist #2). It is therefore most important to appreciate, and to make absolutely clear in the final report, that the wetland valuation undertaken is sure to underestimate the full benefit of maintaining that wetland as a healthy functioning ecosystem. Proposed alternative uses of the wetland may therefore, in some cases, appear to offer greater economic benefit than provided through preserving the wetland when the contrary may be true.

### A4.8 Complete a data collection planning matrix

The completion of a data collection planning matrix (Table 4 filled out for illustration, and a blank matrix is included in the Appendix) is a critical part of the assessment integration process. The objective is to ensure that all relevant information is collected through the minimum survey effort thus avoiding multiple time-consuming and expensive surveys being conducted at the same site when a well planned integrated assessment could have achieved the same result through a single visit. In this way the information returns from a single survey are maximised and we avoid the need for multiple surveys focused on collection of discipline-specific, and consequently restricted, information. For example, information on species' diversity, economic value, and importance to livelihoods may *all* be obtained during a single *integrated* survey, such as to a market, if the appropriate planning is carried out in advance. Survey returns can be maximised in this way through employing an integrated survey team composed of several experts from across the relevant disciplines, or though training a single surveyor in the full range of information required and on the methods required to obtain that information.

In order to maximise the information yield an integrated survey can be designed through completing a planning matrix (Table 4) as follows:

A) **The *management issue* being addressed is clearly defined in Box ❶ of the planning matrix.** This provides the starting point for determining the full range of information types required to address the management issue. For example, if the issue is very specific then the required survey information will likely be restricted to collation of only a few information types. If the issue is broader, such as a requirement to demonstrate the full value (direct and indirect) of a wetland, then the survey will need to collate a wider range of information using a greater number of survey methodologies.

B) All **data types required** to address the management issue are identified. A check mark (✗) is put against each of the '*Required data types*' in Box ❷. Please note — The data types shown are drawn from the Species Information Service database (SIS; see A8) and are the key data required to assess the conservation status of a species using the IUCN Red List Criteria; only a small subset of the potential range of data types are currently shown — any additional data types will need to be added as required for each specific assessment.

C) The range of **appropriate survey methods** is identified and the relevant methods can then be selected from Section II of this toolkit (or found elsewhere if necessary). Under each of the survey methods listed in Box ❸ a check mark is put against each of the required data types that can be collected using that particular survey method. For example, if species common names are identified in Box ❷ as being required you would put a check mark in each column under the survey methods through which this information could be obtained. For example the demonstration matrix in Table 4 shows that information on *species common names* might be obtained through i) market surveys, ii) biodiversity assessments, iii) focus group interviews, and iv) literature survey.

**Table 4: Assessment planning matrix**

| ❶ ***Specify management issue*** **being addressed (or purpose of assessment):**<br>e.g. *"How will a ban on resource harvesting (to meet objectives of biodiversity conservation) impact on local livelihoods?"* | | ❸ ***Select appropriate survey methods:*** *(see Section II for methods)* | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Household questionnaire | Market surveys | Biodiversity assessments | Focus group interviews | Key informant interviews | Wealth ranking | National/District data | Literature survey | Other Method… |
| ❷ **Identify required *data types:***<br>Basic data requirements for an integrated assessment<br>*- select those required to answer the management issue in question*<br>*- add in any new data type needed* | ***Required data types*** | E1–E6, L4–L9, L12–L13 | B9 | B1 – B11 | L6, L7, L12, L11 | L12 | L9 | L5 | A3 | |
| **Species status and distribution** | ✗ → | | ✗ | ✗ | ✗ | | | | ✗ | |
| **Habitat quality/ecosystem status?** | | | | | | | | | | |
| **Species common names** | ✗ → | | ✗ | ✗ | ✗ | | | | ✗ | |
| **Drivers of threats** | | | | | | | | | | |
| **Socio-economic status of target communities** | | | | | | | | | | |
| **Access rights to resource** | | | | | | | | | | |
| **Resource use** | ✗ → | | ✗ | | ✗ | ✗ | | | ✗ | |
| **Value to livelihoods** | | | | | | | | | | |
| **Economic value of ecosystem services (and disservices)** | ✗ → | | | | | | ✗ | | ✗ | |
| … | | | | | | | | | | |

Once the matrix has been completed it should become clear which types of information should be recorded when undertaking each type of survey. For example, before undertaking a market survey the researcher can look down the relevant column under 'Market Survey' in Box ❷ of the planning matrix and see the full range of relevant information types they need to collect – these will be the ones with check marks against them. In the example matrix in Table 4 you will see that a market survey can be used to provide information on i) species status and distribution, ii) resource use, iii) value to livelihoods, and iv) species common names.

The end product is the planning framework for an integrated assessment where the planning matrix, once completed, provides guidance on the full range of information that can be obtained through each survey method. This approach minimises the need for additional researchers (from the other disciplines) to revisit the same informants at a later date to gather additional information – it saves time and money, reduces interviewee fatigue, and ensures data are collected in a common format which can be integrated across disciplines as the data are linked at source.

### A4.9 Linking information

A significant difficulty encountered when integrating the findings from independently executed surveys is in linking the different sets of information for analysis. An integrated assessment aims to ensure the relevant information is collected in a format that will allow the data to be linked and analysed. The following provide examples of links (→) between different types of data:

1. **Uses of natural resources → identification of the species making up the resource**
   To link socio-economic information to biodiversity information, it is necessary to identify the component species of the resource when it is identified during work on economic valuation or livelihoods assessment. This requires socio-economic researchers to ask which species (using local names) people are referring to when they talk about

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*The combined biology, livelihoods, and economic assessment team at the Stung Treng Ramsar site*

resources, and for biodiversity specialists to match local names to the Latin names of species (or to specimens which can be identified later)[1]

2. **Natural resource harvest locations ➔ species found in those habitats**
   Local harvest locations should be georeferenced using a Global Positional System (GPS) unit so that they can be mapped and cross-referenced to the habitats which have been surveyed by the biodiversity specialists (see Chapter 3)

3. **Uses of natural resources ➔ user groups relying on those resources**
   When biodiversity surveys or economic valuations provide information on who harvests or uses resources and when, the researchers also need to be aware of distinctions which 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. Again this may be achieved if the biodiversity or economics researchers pass on information about the species which are harvested (with their local names) to the livelihoods team so they can bring that information into their own surveys, focus group meetings or key informant interviews

## A5 Plan data collection according to opportunities and constraints

✔ *Develop logistics for the field survey*
✔ *Produce assessment timelines*

Many factors will influence the content and timing of the field assessment. These are likely to include:

- *Time (deadlines, other obligations)*
- *Funding (budget and financial reporting deadlines)*
- *Expertise (skills and experience of team)*
- *Resources (transport, field equipment, computers and software)*
- *Politics (permits, permissions, access, conflicts)*
- *Institutional structures (networks, capacity, relationships)*
- *Social and cultural considerations (festivals, languages, customs)*
- *Natural events (seasonal factors and risks)*

These issues need to be considered during the early planning phases of the assessment and should be discussed and reviewed with local people and other stakeholders during an early scoping trip to the area. Seasonal issues such as access to sampling sites must be discussed and planned for.

## A6 Pilot evaluation of field methods

✔ *Develop and adapt integrated field tools*
✔ *Train the survey team*
✔ *Develop team understanding of the multidisciplinary approach*

A short pilot survey prior to initiation of the main field survey is essential. The pilot serves a number of purposes the most important of which is to help team members fully understand the objectives and field methods employed by the other members of the team. All team members should be encouraged to explain what information they are interesting in collecting and why it has relevance to the wider goals of the assessment. This pilot survey is the time when all team members should be encouraged to ask questions on any aspects of the work with which they are not familiar. This process is essential to success in building an integrated team with a joint understanding and purpose.

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*The Stung Treng Ramsar site biology team visits a fish trap during the initial biology survey*

The pilot survey should involve a brief initial trial period (ideally at least one or two days), either at a local wetland site or (preferably) at the assessment site itself, during which the team can practise applying the assessment methods and get used to working together. Added benefits from the pilot survey include:

- opportunity for team members to discuss the assessment objectives and to ensure all are in agreement - adapting plans will be much easier at this early stage
- identification and solving of unforeseen logistical issues
- opportunity for fine tuning of survey methodologies
- development of team spirit – working together for the first time as a multi-disciplinary team will undoubtedly be challenging
- if held at the assessment site, opportunity for the assessment team to familiarize themselves with the area and confirm the accuracy of maps, and to meet local communities and stakeholders.

## A7 Implement the main field assessment

- ✔ *Maintain field team networking and communication through daily meetings*
- ✔ *Maintain rapport with respondents based on mutual respect*
- ✔ *Observe research ethics*
- ✔ *Review the data emerging, identify any gaps, and amend fieldwork approach if required*

A detailed field survey plan should have been developed at this point and the survey team will have been assembled and have worked together during the pilot survey. The local residents should have been consulted and fully understand and agree with the purpose of the study, and be willing to facilitate and participate in the work. All necessary permissions should have been obtained.

A successful survey will benefit greatly from daily team meetings. The focus of these meetings might include:

- discussion of the day's findings and experiences
- planning and clarifying the next day's work
- collation, tracking and storage of information obtained by the various team members
- discussion and proposal of solutions to any problems that may have arisen
- ensuring that all essential linking information is being collected

The collection of linking data is most important. For example, local names of natural resources, as collected using socio-economic methods, should be linked to any samples or photographs of species collected through biodiversity surveys. Species common names can then be matched with scientific names and the findings of the biodiversity and socio-economic surveys can be linked and analysed as one. Likewise it is essential to ensure that habitats named as areas of resource harvesting can be matched to those habitats surveyed for species' composition. This is achieved through georeferencing of all survey areas using GPS equipment (see Chapter 6 for more information on mapping requirements).

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*A focus group meeting held in Mtanza-Msona during the integrated wetland assessment*

These daily meetings will undoubtedly place an extra burden on the team, and therefore need to be kept brief and relevant to the work of the whole team. The importance of these meetings needs to be emphasised to all team members at the start of the survey to encourage their participation. As the team members get to know each other better on an informal level much can be discussed over dinner, although a short formal meeting will be necessary to plan the next day's work.

An ethical approach to research must be followed and the ground rules should be made clear to all team members before beginning the surveys. Although this is a complex area, at core this means clearly explaining to respondents why you are collecting data, what you will do with the data, respecting their right to anonymity, and not representing or sharing data gathered without their prior informed consent.

## A8 Data management

- ✔ *Good practice in data management*
- ✔ *Data storage and management options – IUCN Species Information Service (SIS)*

Good practice in data collection, storage, and management must be observed. Serious consideration should be given to obtaining access to a laptop computer and power supply

during the field survey to ensure data are managed and backed up effectively. Some key practices include:

- customising data collection sheets for local use during the pilot survey
- assigning and clearly defining data management responsibilities
- daily checking of data sheets – this should not be left to the end of the survey
- regular write-up of field notes while fresh in the collector's mind
- early identification of information gaps in sufficient time to address them during the survey
- translation of data into the reporting language as necessary should ideally be completed with the interviewer in order that nuances in meaning are captured
- data should be entered as early as possible into a standardized database (for example, the IUCN SIS database), in open-source (free) software such as OpenOffice Base or Calc (see www.openoffice.org), or in suitable products such as Microsoft Access or Excel
- data should be backed up as often as practical (at least daily during the data-entry period)

As highlighted above (e.g. see *A4.9*) it is important to compile and store the data in a way which recognises the links between the different types of data, and facilitates integrated data analysis. One tool which can help to do this is SIS (http://sis.iucnsis.org) which has been designed to link data on species conservation, threats, ecology, utilisation and livelihoods values through the species scientific name.

The SIS data management system is now discussed in more detail as one example of a potentially useful tool for storing and managing information sets as would be generated through an integrated wetland assessment.

### A8.1 Data management using SIS

SIS is designed for both web-based use (restricted to registered users with access to the IUCN Red List database), and as a standalone version. The standalone version can be downloaded from http://sis.iucnsis.org. SIS does not hold georeference (spatial) data, so this information will need to be held and managed in a separate spreadsheet or database for later export into a Geographic Information System (GIS) package such as ArcView or ArcGIS. At present the SIS database is strongly focused on collation of data on species ecology, threats, conservation status, and utilization. The modules for storing information on the species' value to livelihoods are still quite limited and mainly serve to highlight those species of value to livelihoods as future subjects for additional, more detailed, livelihoods assessment. Nevertheless, this database represents a tool that does effectively integrate information on biodiversity, economic, and livelihoods values.

The major types of data linked to each species scientific name in SIS include:

- **Taxonomy:** this module holds information on the taxonomy of a species (i.e. Kingdom, Phylum, Class, Genus and Species). This information will be sourced during the literature survey. Also included are species common names which enables information from biodiversity surveys (where scientific names may be used) to be directly linked with data collected through socio-economic surveys (where species common names might be recorded)
- **General Information:** this includes a number of sub-sections, and would largely be completed where possible using published literature. All information should be referenced to source documents (papers, books) or to the experts who provided the information. Information can be input for:
  - ***Distribution****:* a general description of the species' geographic distribution
  - ***Population***: information on a species population size
  - ***Habitat and Ecology***: short notes describing a species' ecological requirements
  - ***Major Threats***: known and predicted threats to the species, in order of importance
  - ***Conservation Measures***: conservation measures that are either in place or are recommended
- **Extent of Occurrence:** a basic electronic map can be created to show the estimated distribution range of the species
- **Countries of Occurrence:** Country names are selected to indicate where a species is native, extinct, reintroduced, introduced or vagrant.
- **Habitat Preferences:** a species' preferred habitats can be selected from a list of options
- **Major Threats:** the major threats (past, present, and future) to the species can be selected from a list of options
- **Conservation Measures:** this provides a list of possible conservation measures which can be selected as 'in place' or 'needed'
- **Ecosystem Services:** the main ecosystem services associated with the species can be selected from a list of options and ranked by perceived importance. The geographic reach of the service benefits can also be indicated as local, national, regional, or global
- **Utilization:** human utilization of a species is recorded here. Information on the purpose or type of use (food, fuel etc,) is recorded as of importance at the subsistence, national, or international level. The primary forms removed from the wild are recorded along with the source of specimens (the wild, farmed etc)
- **Livelihood Value:** this section is designed to hold general livelihoods information collected by non-experts, as well as more detailed case study data; such as might be collected through an integrated wetland assessment. The section requires information on the quantity of a species that is

harvested, its monetary value, what products are made from it, who are the main users, and how much it contributes to people's livelihoods. It is possible to enter information for one or more products derived from the same species

- **Red List Assessment:** the risk of extinction for a species is recorded and the rationale is documented according to the IUCN Red List Categories and Criteria

The information stored in the SIS database will, for example, allow you, for a designated wetland which has been subject to an integrated assessment, to list and locate all threatened species in the wetland that are of economic value and of importance to local livelihoods.

*Kong Kim Sreng/Darwin Integrated Wetland Assessment Project*

## A9 Data analysis and write-up

✔ *The importance of linking data elements*
✔ *The benefits of spatial analyses*

The absolute importance in linking all aspects of the data through a common data element, in this case recommended to be the species scientific name, becomes very clear at the stage of data analysis. If the appropriate spatial and temporal links have also been established then the data can be analysed in a truly integrated manner. For example, correctly linked data would enable analyses to determine, for a specified lake: i) the conservation importance of the lake in terms of threatened species present; ii) the market value of species harvested from the lake; and iii) the sector of the local community most dependent upon those species. Potential conflicts of interest might also then be identified if, for example, harvesting levels are thought to be threatening the long-term survival of a threatened species, and solutions might be sought. Without the ability to identify species valued at the market place as threatened species (e.g. through linking common and scientific names), and to link the market survey data to the harvest location and species importance to local livelihoods, such integrated analyses would not be possible. Spatial analyses then provide great potential for identifying areas of potential conflict of interest and areas of importance to species conservation and local livelihoods. The spatial methodologies are dealt with in some detail in Chapter 6.

## A10 Presentation of results: spatial presentation employing a GIS-based approach

Decision-makers, whether in conservation or development sectors, are primarily concerned with choosing between different uses of land, funds, and other resources. For example, decisions might be required to: i) manage a wetland under strict protection or to allow for some form of sustainable use; ii) build a dam, irrigation scheme, or housing estate; iii) determine which infrastructure design option to invest in; or iv) zone a wetland for conservation or convert it to settlement or agriculture (assessing damage to a wetland). The assessment results need to be presented in ways that make sense to decision-makers, to help them weigh up the different funding, land, and resource management choices that wetland decisions involve. Spatial mapping provides a very powerful tool for presenting such complex information in a relatively simple manner.

Spatial mapping tools allow the visual presentation of information from across disciplines. The overall aim is to overlay a series of maps (or 'layers') to identify, for example, areas where conservation and development issues require priority action, and/or face conflicts of interest. This can be achieved using GIS technology.

Overlay maps might include information such as species' distributions, resource use areas, the value of resources, and where the people live who benefit. All this information can be presented on a single map in order to highlight those areas where biodiversity provides an essential resource to local communities, and particularly to the poorest members of those communities. The maps shown in Chapter 6 demonstrate how this might be achieved.

## A11 Feedback and policy engagement

An assessment alone will not have the desired impacts. To ensure that the assessment effectively informs policy and practice it is important that key stakeholders are engaged from the outset, and that the findings are promoted in a manner likely to ensure they are acted upon. This requires that the assessment outputs are presented at both local and national meetings/workshops where ample opportunity is provided for a constructive dialogue between all stakeholders and policy-makers. For this to be effective it is important that project outputs are translated into the local

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*A workshop held for key stakeholders in the management planning process for the Stung Treng Ramsar site*

language. The main project findings should be presented both in detail, as technical reports, and as policy briefs where the main findings and recommendations are summarised.

### A11.1 Local feedback

As soon as fieldwork is completed the field team should reflect upon and develop the initial findings. The initial findings can then be shared with the local stakeholders in a workshop, particularly involving the local people who have participated in and contributed time to the study. Local stakeholders can then determine how the assessment findings might be employed to address the management issue.

### A11.2 National feedback

The development of national wetland-related policy is likely to be a continuously evolving process in any country, as different organizations, interest groups and arms of the government seek to influence policy, management, and use of wetlands. If the assessment process is to successfully contribute to improved wetlands conservation and management, the team will need to understand the current status of the policy process in order to identify how best to constructively engage. Engagement through national dialogue at workshops, and through presentation of project findings both as detailed technical reports and as policy briefs, will help to facilitate understanding and progress in moving forward on addressing the management issue.

The wetland assessment team should maintain an ongoing engagement with the key stakeholders throughout the assessment to ensure that the study remains focused on the main policy related issues, that stakeholders' views are taken into account, and that stakeholders at all levels develop a sense of participation and even co-ownership of the findings.

## Further reading

Atkinson, P., Coffey, A., Delamont, S. Lofland, J. and Lofland, L. 2001. *Handbook of Ethnography*. Sage, London, UK.

Brown, N., Boulton, M., Lewis, G. and Webster, A. 2004. *Social Science Research Ethics in Developing Countries and Contexts'.* ESRC Research Ethics Framework Discussion Paper 3 (v2), Department of Sociology, University of York and School of Social Studies and Law, Oxford Brookes University, Oxford, UK. Available at: www.york.ac.uk/res/ref/docs/REFpaper3_v2.pdf

De Laine, M. 2000. *Fieldwork, participation and practice: ethics and dilemmas in qualitative research*, Sage, London, UK.

Mauthner, M., Birth, M., Jessop, J. and Miller, T. 2002. *Ethics in Qualitative Research*. Sage, London, UK.

Scheyvens, R. and Storey, S. 2003. *Development Fieldwork: A practical guide.* Sage, London, UK.

## Useful links

- British Sociological Association: www.britsoc.org.uk/about/ethic.htm
- British Psychological Society: www.bps.org.uk/about/rules5.cfm
- Social Research Association, Ethical Guidelines 2003: www.the-sra.org.uk/ethics03.pdf
- Association of Social Anthropologists of the Commonwealth: www.asa.anthropology.ac.uk/ethics2.html
- OpenOffice.org open source software: www.OpenOffice.org
- IUCN Red List database: www.iucnredlist.org
- IUCN Species Information Service: http://sis.iucnsis.org

[1] In some cases it may be acceptable to work with morphospecies, either as identified by local people or by researchers who do not have access to suitable taxonomic keys or identification experts. In this case, rigorous survey methods can still be applied to mapping these species and assessing their conservation status. However local names may not have a 1:1 relationship with species as recognised by taxonomists: some species may be grouped under one local name, while others may be split. See B12 for a discussion of alternative methods of biodiversity assessment.