Users Guide to Assessing the Socio-Economic Root Causes of Biodiversity Loss

Understanding the Biodiversity Loss Problem

The importance of biodiversity for meeting direct human needs and maintaining the ecological processes upon which a human survival depends have been increasingly recognized in the past ten years. Yet, at the same time, the rate of biodiversity loss continues to climb at an alarming rate. Traditional conservation approaches, which focus primarily or exclusively on a local level, are necessary but insufficient to address the magnitude of biodiversity loss occurring globally.

Increasingly, the conservation community has recognized the need to 'scale-up' the approaches employed to understand the loss of biological diversity. Such 'scaling-up' of conservation activities involves addressing a variety of social, economic, political and biological factors that operate at regional, national and international scales to drive biodiversity loss. These factors are the socio-economic root causes of biodiversity loss, or the set of factors that truly drive biodiversity loss, but whose distance from the actual incidences of loss, either in space or time, make them a challenge to identify and remedy.

In an effort to tackle the problem of biodiversity loss more effectively, WWF/ MPO has developed a practical method for analyzing and understanding the multiple and complex root causes of biodiversity loss. This methodology is known as the Analytical Approach.

How to Use This Guide

The purpose of this guide is to provide a step-by-step, practical methodology for conducting in-depth studies of the root causes of biodiversity loss. The Analytical Approach developed by WWF offers a way to balance both quantitative and qualitative data to gain a complete picture of what is driving biodiversity loss at various sites. It is intended to be used to complement rigorous and quantitative ecological or biological studies whenever possible. The Approach is primarily designed for use and adaptation by field staff, scientists and other conservation practitioners in the field who are interested in conducting root causes studies of their own.

This manual begins with a brief background on why a new approach for assessing biodiversity loss is needed. The reader is then taken through all of the steps of the Analytical Approach, from site selection to developing recommendations and writing up a report. Examples from the completed case study of the Calakmul Biosphere Reserve in Mexico are used to illustrate each step of the process. Boxes provide more detailed guidance for specific steps in the process, while practical process tips are found in the margins.
The Analytical Approach has been tested and refined in various regions of the world by WWF and its partners. Nonetheless, the Approach is best viewed as an evolving tool. Users are encouraged to experiment and adapt the approach to suit their own needs and circumstances. WWF/MPO welcomes feedback or suggestions from users.

**Incorporating the Analytical Approach in Project Management**

Root Causes Analysis using the Analytical Approach identifies and explains the key factors that truly drive biodiversity loss, including those factors that interact in complex and not-so-obvious ways. Ideally, this tool should be used in the early stages of the development of a project or an ecoregional plan. By identifying such factors prior to or during project design, project developers (or ecoregional planners) can make more strategic decisions for prioritizing conservation activities. They can adopt conservation strategies specifically targeted at the most important driving factors of biodiversity loss as identified by the Analytical Approach.

Root Causes Analysis can also be revisited during important evaluation phases within the project cycle. Initial case studies developed using the Analytical Approach serve as a qualitative socio-economic baseline. By comparing new case study results with initial case study results, project managers can assess how and if the forces driving biodiversity loss have changed over time. This type of analysis should be coupled with biological or other data, which is collected as part of normal project monitoring and evaluation processes. These combined analyses provide a thorough and important input for making informed decisions regarding how a project might be refined or adapted to better serve conservation objectives. Box 1 shows how the Analytical Approach might be incorporated into a typical project management cycle.

**Box 1: Integrating Root Causes Analysis into the Project Management Cycle**

The Analytical Approach is flexible enough to be adapted into existing assessment methodologies that an agency or institution might already have in place. Analytical Approach case studies easily feed into situation analyses for ecoregional planning exercises. The methodology used for conducting case studies also shares many similarities with other types of ‘threats-analysis’ methodologies currently used by various organizations.

**Why We Need a New Way to Look at Biodiversity Loss**

Loss of biological diversity is rapidly occurring across the globe. Immediate causes of such loss commonly include habitat alteration and loss, overharvesting, species and disease introduction, and pollution and climate change. Behind these proximate causes of biodiversity loss, however, lie a variety of social, economic, political and cultural factors that influence resource-use decisions at the local level. To successfully halt biodiversity loss one must understand and address these underlying socioeconomic root causes.
**Socioeconomic Root Causes of Biodiversity Loss** are the set of factors that truly drive biodiversity loss, but whose distance from the actual incidences of loss, either in space or time, make them a challenge to identify and remedy.

A growing body of research has already begun to explore the broader influences driving environmental degradation and biodiversity loss. These studies have primarily focused on five main areas, including demographic change; poverty and inequality; public policies, markets and politics; macroeconomic policies and structures; and social change and development. The insights provided by these studies provide an important background for conducting root causes analysis.

In reality, socioeconomic forces act simultaneously and in complex ways to affect resource use and biodiversity. Many studies of biodiversity loss to date have tended to take a disciplinary approach with a focus on the analysis of a single socioeconomic factor. Only a small number of studies have examined how different socioeconomic factors interact with each other and how these factors operate at different scales. There is an obvious need for the adoption of a comprehensive and unifying framework for understanding biodiversity loss that can handle a broad range of socioeconomic factors and their complex linkages.

The *Analytical Approach* was developed to provide a systematic and practical methodology for capturing the complexity of causal factors driving biodiversity loss at different scales. Using this interdisciplinary approach, researchers and conservation professionals are able to describe how all the various parts of the puzzle—from local demographic factors to national politics to international market forces—are linked together to drive biodiversity loss at a particular site.

The scientific community is calling for predictive, testable models of the relationship between root causes and biodiversity loss. Yet the nature of both the data required and the existing social science methodologies suggests that the development of such models will be exceedingly difficult, if not impossible, for most cases. Existing quantitative approaches to understanding resource use and biodiversity loss are inadequate to analyze the broad range of micro- and macro-level factors affecting local decisions. These approaches necessarily focus on only one or two pieces of the much larger puzzle. They tend to ignore both cross-scale and interdisciplinary issues in favor of precise analysis of a single factor, often at the micro-level, because of the dearth of appropriate data. Qualitative, intuitive thinking is the only methodological approach that can incorporate all of the relevant socioeconomic factors affecting biodiversity loss. Conceptual models, which are the foundation of the Analytical Approach, can describe complexities of socioeconomic relationships that cannot be captured using analysis of strictly quantifiable relations.

**How to Assess the Root Causes of Biodiversity Loss: Using the Analytical Approach**
The foundation of the Analytical Approach is the case study. Case studies serve the main purpose of explaining in detail the driving forces of biodiversity loss in order to provide the basis for developing effective policy changes for protecting a particular site.

The key to success when using the Analytical Approach rests on three main points:

- The consideration of a broad range of social, political, and economic factors, in addition to biological factors;
- The analysis of how these factors operate and are inter-linked at a variety of scales; and
- The application of the approach locally in the field by an interdisciplinary team of social and natural scientists.

The Analytical Approach uses both quantitative and qualitative tools to paint a complete picture of biodiversity loss. The results of the approach are ideally used in conjunction with rigorous quantitative biological studies and data, whenever available.

The main steps of the Analytical Approach are outlined below. While these steps provide a basic framework for assessing root causes of biodiversity loss, they can and should be adapted to meet the needs of particular conservation sites or research teams.

**The Case Study Process**

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How to Prepare

Select Site

The first step in the case study process is to *select a site*. A number of criteria may be used to select site:

- site is representative of a particular ecosystem
- site is representative of a particular social, economic or political situation
- site is of particular importance to the conservation of biodiversity
- site is currently experiencing significant biodiversity loss

The site should be large enough to generate adequate data for the analysis, but should not be so large that it encompasses a number of diverse and/or distinct social, political or economic situations. For national or ecoregional planning purposes, multi-site case studies may be appropriate. A comparison of different sites in an ecoregion is a useful way to determine which socioeconomic trends generally operate across the whole region, and which socioeconomic factors are more specific to a certain locality. Ultimately, such knowledge will allow for more appropriate targeting of conservation strategies and activities.

Select a Research Team

An *inter-disciplinary research team* of 4 to 6 members should be selected to carry out the study. Teams should consist of at least one natural scientist and representatives of several social science disciplines, preferably with some experience in policy analysis or analysis of complex societal-environmental problems. Possible team members would be economists, anthropologists, sociologists, rural development specialists or legal specialists. While some team members should be familiar with the site, people working full-time at the site may have some difficulty looking at local problems with a fresh perspective. A team leader should be appointed to coordinate the work of other team members.

Four Basic Steps of an Analytical Approach

Three fundamental questions should be asked for each site studied:

1. What are the underlying socioeconomic forces and circumstances driving biodiversity loss?
2. How are these root causes interlinked?
3. Which factors are key at local levels, which at regional levels, and which at national or international levels?

*Step 1: Conduct a Broad Information Search*
Research team members should conduct a broad information search to gather background information. The purpose of this information gathering is to be able to generate informed hypotheses regarding the potential forces that affect biodiversity at the site. In order to do so, team members must cast a wide net and will need to explore information pertaining to economic, political, and social issues. Because it is impossible to know at such an early stage exactly which factors may be affecting resource use practices at the site, information that describes local, national and international contexts should be explored. Team members will likely want to review several bodies of literature that may be available. Team members may also want to identify and conduct interviews with key informants, particularly when there is a lack of published or reliable materials available.

Regarding available literature, first teams may want to review WWF's *Root Causes of Biodiversity Loss: An Analytical Approach*. This document provides a rapid overview and critique of relevant research that has looked at socioeconomic forces driving biodiversity loss. The study reveals that such analysis has primarily been focused on five main categories including demographic change; inequality and poverty; public policies, markets and politics; macroeconomic policies and structures; and social change and development biases. Such an overview allows the research teams to follow up on particular ideas or sources of interest related to the case being studied. Second, research teams should identify and review materials discussing national policies and political-economy for the region of study. Third, researchers should compile and review all available information specific to the site of study, including maps of the area, research reports, government plans, and other relevant documents.

By gathering a diverse body of information the team will become familiar with existing hypotheses regarding socioeconomic causes of biodiversity loss. The review will also familiarize team members with various methodologies that may be employed for exploring the links between environment and socioeconomic factors.

**Example: The Case of Biodiversity Loss in the Calakmul Biosphere Reserve, Mexico**

Research team members reviewed literature on the local situation, the national context, and on generally recognized causes of biodiversity loss. Government and academic reports on agriculture, forestry, protected area policies, liberalization and impacts of international markets were reviewed. Literature specific to the Calakmul site, produced primarily by researchers and conservation groups, was consulted. This included studies of population growth, hunting patterns, attitudes toward development, resources use patterns and sustainable development project documents. General literature, included studies on the effects of population growth, incorporation into international markets, and poverty.

A literature review suggested the following hypotheses regarding biodiversity loss:

At the local scale:

- Expansion of chile production is causing extensive deforestation.
Population growth is causing expansion of agriculture and deforestation.

At the national scale:

- Liberalization of agriculture is causing expansion of commercial crops and a decrease in subsistence production.
- Changes in land tenure laws are encouraging clearing and sale of land.

At the international scale:

- Exposure to international markets makes local production of timber and staple crops unprofitable.
- NAFTA is increasing commercial agricultural production.

General hypotheses:

- Improved security of land tenure promotes conservation efforts and sustainable management
- Population growth is associated with environmental degradation.
- Poverty prevents sustainable resource use.

Practical Tip: The literature review should be as exhaustive as possible. Sources of information may include national, regional or local government offices and parastatal organizations, non-governmental organizations and project managers working at the study site, universities, and research organizations.

Step 2: Develop a Preliminary Conceptual Model

After a thorough review of available information, team members should meet to brainstorm about likely socioeconomic causes of biodiversity loss at the study site. These preliminary hypotheses are best generated by asking a series of questions (Who? What? and Why?) at each step of the analysis, following chains of explanation. That is, team members should start by looking at the local level and then move up the chain of explanation through interrelationships of local resource users with regional, national and international actors.

When generating hypotheses about biodiversity loss, the research team must think across different scales, looking at how events, policies, or institutional structures at the regional, national or international levels are affecting local resource use. The team must also consider the mechanisms by which the different scales are inter-linked. A good starting point for beginning to generate hypotheses is to ask questions regarding the five main categories of socioeconomic root causes of biodiversity loss that have been identified by
previous research. Box 2 below provides some examples of the types of questions team members may want to ask.

**Box 2: Sample Questions to Consider in a Case Study**

**Demographic Change**
- What patterns of demographic change are occurring?
- Is population growth associated with changing production patterns?
- Is population growth altering resource tenure patterns?
- What social, political, and economic changes are being driven by demographic change?

**Inequality and Poverty**
- Are large poor populations concentrated in less productive, more fragile lands and/or areas of high biodiversity?
- Is poverty preventing desired investments in conservation?
- Do tenure arrangements favor large and/or commercial producers?
- Is expansion of commercial production displacing populations?
- Are practices of wealthy landholders contributing to biodiversity loss?

**Public Policies, Markets, and Politics**
- Who has the power to shape policies and markets?
- Who is benefiting from policy and markets?
- Are any costs imposed on the consumption or degradation of natural resources? Who bears these costs?
- Whose access to "cheap" resources is favored?
- What values of biodiversity and natural habitats are ignored by markets?
- Does government policy favor increased exploitation and/or commercial production? Where are funds for development concentrated?

**Macroeconomic Policies and Structures**
- Have economic policy changes altered resource use patterns?
- What is the relation of production patterns to national and international demand and investment?
- What are the positions of small- and large-scale producers in markets?
- What forms of natural resource use do policies on trade and investment favor?

**Social Change and Development Biases**
- Does government policy favor frontier expansion and resource transformation?
- Do rural people see alternatives to current land use?
- What is happening to traditional social and cultural mechanisms for regulating resource use? Has social change promoted the breakdown of traditional resource use and consumption patterns?
- What social or cultural pressures are contributing to changing patterns of resource use?
- What social or cultural changes are promoting acceptance of new resource uses?

This brainstorming session should lead to the development of an initial conceptual model. Each conceptual model should be specific to the situation at the study site. It is not
possible to plug names into an existing model or to follow a checklist of factors to put into the model.

Practical Tip: When developing the initial conceptual model, it is useful to bring the entire team together in one place whenever feasible. By doing so, the experience of all team members can be put to use to debate issues, explore hypotheses and ask questions. By working through the process together during a focused session, team members may be more efficient, effective and thorough than they would be when using email, telephone or mail systems to provide their input into the conceptual model. One to three days should be allowed for in-depth discussion. A facilitator, which may or may not be the team leader (depending on facilitation skills) should guide the session to ensure that everyone's opinions are voiced in a meaningful way.

A conceptual model is an idea of how the components of a system fit together. It provides a descriptive picture or diagram of a set of relationships between certain factors that are believed to affect specific conditions at a site. A good conceptual model:

- Presents a detailed picture of the situation at the study site.
- Shows assumed linkages between factors affecting biodiversity at the study site.
- Shows both direct and indirect factors that are relevant.
- Includes all relevant factors that operate at different scales, including local, national or international.
- Is based on sound data and information.
- Results from a team effort.

Most conceptual models are presented in a diagram form that incorporates system components and flows between components. Key variables are identified and flows (usually represented by arrows) indicate causal relations and the direction of impacts. Although analysis starts with the local and works out to the global level, the model will not always appear as a direct chain of linkages across all scales. In some cases, distant factors will affect local behavior through effects at intermediate levels. Box 3 describes one way to create a conceptual model.

Box 3: Creating a Conceptual Model

1. Based on hypotheses of biodiversity loss generated by the research team, have team members identify and list key factors that influence biodiversity loss. These should include both direct and indirect factors.

2. Arrange factors in a diagram format (see practical tips). Biodiversity loss should be listed to one side of the workspace. Individual direct factors should all be placed to the other side of the workspace.

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1 Machlis & Forester 1996.
3. Based on the research team's existing knowledge, draw arrows to show how various threats relate to each other and how they influence biodiversity loss.

4. Repeat steps 2 and 3 for indirect threats.

At each step of the process team each team member should discuss their reasoning for the inclusion of certain factors and their own understanding of how factors are operating to affect biodiversity. This will likely involve considerable discussion and frequent rearranging of various factors and arrows. Team leaders should ensure that all team members are able to express their insights and that there is consensus on the final model that is adopted by the team. Team members should also make note of uncertainties in the conceptual model that are based on gaps in available information.

**Example:** *The Case of Biodiversity Loss in the Calakmul Biosphere Reserve, Mexico*

**Initial Conceptual Model**

**Practical Tip:** A useful way for project teams to begin developing a conceptual model is to cut out small pieces of paper (or use index cards) and write the hypothesized factors affecting biodiversity loss on individual pieces. These pieces of paper can then be laid on the ground or a big table over a large piece of paper. Team members should arrange the variables and draw arrows that connect them together to show how factors interact. Another useful technique would be to use a large chalkboard. Adequate time should be allowed for each of the team members to thoroughly explain their particular perspective. The team leader should play a coordinating role to ensure that all views are adequately considered and that there is agreement on the final model that is developed.

**Practical Tip:** In order to make conceptual models easier to understand, avoid crossing lines or arrows whenever possible.

**Step 3: Collect Data**

Development of the initial version of the conceptual model provides a basis for organizing data, defining gaps in the existing data, and setting priorities for further data
collection. Based on this information, the research team should develop a research plan for the collection of data in order to:

- Fill gaps in existing knowledge about the site.
- Verify or disprove the hypotheses developed in the conceptual model.

Decisions about how much research to do or the specific methodologies to be used will have to be made based on the resources and time available for conducting the study, and will vary from study to study.

Data collection will likely involve a variety of both quantitative and qualitative methods. Data collection will likely take place on local, as well as national and international levels. Several months should be allowed for this process and the team leader should play a coordinating role throughout this period. Drawing on the expertise of a variety of social and natural scientists that make up the research team ensures that appropriate methodologies are chosen and that the full range of socioeconomic causes are considered. Box 4 below shows common sources and methodologies that might be used for data collection.

**Box 4: Data Collection**

**Example: The Case of Biodiversity Loss in the Calakmul Biosphere Reserve, Mexico**

Using surveys and other social science methods, the research team collected data on:

- Local agricultural production for subsistence and for markets
- Local timber and non-timber production
- Local prices
- Local income from government programs
- Recent changes in land tenure
- National and international markets
- Deforestation rates
- Impacts of the biosphere reserve and other development programs

Additional literature was reviewed on probable impacts of NAFTA and liberalization, tenure policies, and resource use patterns and attitudes towards agriculture in similar regions in Mexico. As a result of this data collection, a number of initial hypotheses were brought into question. While some hypotheses were confirmed, others were disproved. New hypotheses were also formed.

For example, qualitative and quantitative data on chili production revealed that it is no longer making a significant contribution to deforestation. Information on local markets revealed that local production has little relation to national or international prices and
little connection to liberalized national decision-making. The initial literature review suggested that national policies affecting markets and land tenure and international demand for forest products were primary drivers of local resource use. New data that was collected showed that the most important linkages with regional and national scales were not through markets, but through policies and conflicts that stimulated migration into the region.

Practical Tip: The use of proxy indicators is one way to deal with a lack of specific quantitative data on biodiversity loss. Changes in land use or land cover or population measures for indicator species are all useful proxy measures. However, it is important to remember that different forms of land use or different kinds of habitat change will have different impacts on biodiversity.

**Step 4: Revise the Conceptual Model**

Once the data collection has been completed, the research team should meet again to review and amend the original conceptual model. As each member presents the data collected, the team should consider whether the initial hypotheses have been verified, or whether the model needs to be redesigned. New questions may be raised at this point which require further data collection. The final conceptual model should be agreed upon by all team members.

A well-designed model balances qualitative and quantitative data to explain links among socioeconomic factors and links between these factors and biodiversity loss. It provides sufficient information about the causes of biodiversity loss to support informed decisions for the development of sound conservation strategies. It will point to those factors that must be addressed in order to improve conservation. Because each site is different, conceptual models will vary from case study to case study. Some examples of different conceptual models are provided below.

**Example: The Case of Biodiversity Loss in the Calakmul Biosphere Reserve, Mexico**

Practical Tip: Conceptual models may become extremely complicated. Research teams may elect to break down models into subsystems to facilitate analysis. For larger sites, it may be useful to divide the site into smaller areas with distinct characteristics in order to begin to describe specific affects at the local level. For case studies using a comparative approach across a variety of sites, it may be useful to develop a conceptual model for each separate site, before generalizing about root causes across the sites.

**Using the Root Causes Analysis**
**Develop Recommendations**

Based on the case study, the research team should then develop preliminary recommendations. Recommendations will have to address complex inter-relationships of socioeconomic and environmental factors. The questions to be answered by preliminary recommendations include:

- What are the possible responses to these forces and circumstances that could reduce the pressure on biodiversity?
- How feasible is each recommendation? Does each recommendation include a discrete target, method, or group, which can initiate and complete this action?

In cases where resources are available, teams may wish to conduct a two to three day stakeholder workshop to present findings and obtain feedback on the root causes analysis, and to garner input for preliminary recommendations.

**Example: The Case of Biodiversity Loss in the Calakmul Biosphere Reserve, Mexico**

*It is important to note that recommendations developed from the root causes study are merely one preliminary starting point for a much longer and more comprehensive process.* The meaningful development and implementation of recommendations for halting biodiversity loss requires a broad consultative process with various stakeholders and policymakers involved. The case study provides a key input into this process as it draws attention to the important socioeconomic issues that must be considered in the consultative process.

The broader process of developing recommendations to halt the loss of biodiversity will be a significant undertaking that might take many forms depending on the time and resources available. While it is beyond the scope of this User Guide to provide detailed guidance for this process, some general considerations include:

- The need to include meaningful participation for all important stakeholder groups through stakeholder consultations (e.g. in the form of public meetings and dialogues during site visits by public officials, etc.).
- The need to stress the particular input of marginalized groups, such as the rural or urban poor. These groups may be most affected by changes in resource availability or use, but they often lack the organizational capacity or political voice to participate in public dialogues.
- The development of a set of action-oriented recommendations.
- Identification of support structures and resources necessary to implement agreed upon changes.
- Assignment of responsibility for carrying out recommendations to key actors and stakeholder groups. The respective role of each actor is determined by comparative
advantage, given the focus and scale of the recommendation (i.e. a recommendation dealing with a specific problem regarding economic development around a protected area might be best dealt with by a local NGO, while a recommendation regarding lack of consistency in national forestry policy would be best addressed by the relevant government ministry/agency).

Write a Case Study Report

Once case studies are completed, a thorough report should be written up to describe findings. Reports, like conceptual models will obviously vary among sites. However, the report should begin with a description of what is happening on the ground locally. After describing these direct causes of biodiversity loss, the report should move outwards to describe the regional, national and international factors affecting biodiversity at the local level. Description and data should be limited to materials that is directly relevant to the case. Socioeconomic causes should be indicated as specifically as possible. An example outline for the case study report is found in Box 5.

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<tr>
<th>Box 5: Outline for a Case Study Report</th>
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<tr>
<td>The basic outline for the case study report may include the following sections:</td>
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<tr>
<td>• <strong>Introduction</strong> (Brief summary of the study including mention of the primary proximate and root causes of biodiversity loss identified by the study.)</td>
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<tr>
<td>• <strong>Site Description</strong> (Description of relevant site features, such as type of ecosystem, important species, topography, climate, current land uses and natural resources available. Description of the importance of the site for biological diversity. Includes a map)</td>
</tr>
<tr>
<td>• <strong>Research Methodology</strong> (Describes thought processes that led to final conclusions—what questions were asked? Which hypotheses were examined, accepted and/or rejected? What specific assumptions were made?. Describes the sources and methodologies used for collecting data. Discusses the difficulties encountered, in terms of data collection or thought processes. Describes what further data or research would be useful to reach firmer conclusions.)</td>
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<tr>
<td>• <strong>Main Findings</strong> (Summarizes the main findings of the study. Includes graphs, diagrams, maps, etc.)</td>
</tr>
<tr>
<td><strong>Local Context</strong> (Describes findings at the local level. Focuses on the local activities that are the direct causes of biodiversity loss. Explains the relative importance of local factors in affecting biodiversity loss.)</td>
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<tr>
<td><strong>National Context</strong> (Describes those factors beyond the local level and up through the national level that are affecting resource use patterns and biodiversity. Describes both direct and indirect affects. May include national policies, laws, institutions, national</td>
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economics and markets, historical patterns of resource use, regional population movements etc. Explains the relative importance of national factors, for example if national factors are not important because of local failure to comply with environmental laws.)

*International Context* (Describes factors beyond national level that are affecting resource use patterns and biodiversity. May include international markets, trade patterns and agreements, exchange rate policies, international development programs and agendas, etc. Describes the ways in which these international level factors are directly or indirectly affecting the case study site and the links with national or local factors. Explains the relative importance of international factors)

- **Conclusions** (Summarizes the critical root causes of biodiversity loss and the links among various levels. Includes a simple diagram or conceptual model showing linkages among root causes, proximate causes, and biodiversity loss. Describes the future of the site, including trends, potential new threats, and opportunities.)

- **Recommendations** (Describes immediate actions that should be taken, issues for negotiation, threats that need to be addressed by policy work, areas for further study etc. Provides guidance on the process for developing and implementing recommendations.

- **Annexes and Bibliography**

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**General Considerations for Using the Analytical Approach:**
**Some Final Thoughts**

While implementing the Analytical Approach, research teams should consider the following points. These considerations are based on practical experiences of applying the Analytical Approach in the field to date.

- **Timeline.** The timeline for conducting a root causes analysis using the Analytical Approach will vary from study to study, depending on the size of the study area and the amount of time and resources available. However, experience with the Approach to date shows that case studies are generally conducted between a period of three months to one year. In many cases the longer time period is necessary when team members are affiliated with universities, NGOs or public agencies and are realistically unable to devote full time to a root causes analysis.

- **Data availability.** The Analytical Approach uses quantitative data to support a qualitative picture of biodiversity loss. However, a lack of quantitative data for sites may make it difficult to back up qualitative assertions. This may be particularly true for more remote sites. In other cases, the available data may be unreliable. To
compensate for this lack of reliable data, research teams may need to spend more time carrying out their own local surveys and studies. The availability of time and resources for carrying out these studies make prioritization of research plans extremely important.

One common problem that may be encountered is a lack of hard data on biodiversity loss. To address this, studies may have to assume that environmental changes, such as land-cover or land-use changes, have direct impacts on biodiversity. The use of such proxies may be sufficient to support qualitative assertions but are insufficient to make a quantitative link between human resource use and biodiversity loss.

- **Setting Limits to Models.** One particularly important consideration for research teams is deciding what time scale is sufficient for the investigation. In actuality, this type of analysis can be extended back indefinitely to reveal different operational root causes during different historical periods. Although such historical analysis may be illuminating, it is most important to determine which causes of biodiversity loss are still operating and are subject to intervention. Research teams can say that they have reached a "root cause" when they have identified a point at which one could successfully intervene in order to alter the loss of biodiversity. Root causes may be found at any level, ranging from local to international. In many cases, there will likely be a complex network of root causes rather than one single root cause.

- **Dealing with Contextual Factors.** Several studies pointed to some causal factors that did not fit easily into the five socioeconomic categories described above. These factors, including the effects of war, ideology, historical context and physical factors, such as accessibility of an area, are best classified as contextual elements. As they are immutable historical or physical facts, they do not offer points for intervention to slow or halt the loss of biodiversity. What is more important is how the current circumstances of these contextual facts may offer some points for intervention. For example, while a past war may have historically been the main driving force behind biodiversity loss, it is not considered a root cause since it cannot be changed. However, guns and weapons remaining from wars may be causing increased pressure on wildlife from hunting. The present effect of over-hunting, which can be changed, is a root cause of biodiversity loss.

- **Weighing causal factors.** One challenge research teams may face is how to assign priority to, or weigh, the various root causes that are uncovered. Because cause often cannot be measured quantitatively, the final judgements about their relative importance must be qualitative. To this end, the diagrams used to illustrate the conceptual models are useful since they indicate both direct impacts of a particular factor as well as indirect impacts. When thinking about root causes research teams should remember that in most cases, biodiversity loss is driven by several factors acting simultaneously, or that biodiversity loss is 'over-determined'. This means that while these factors are closely inter-linked through complex relationships, each on its own may be sufficient to cause biodiversity loss. Addressing one cause of biodiversity loss alone may have little impact if several others are also operating at
the same site. In these cases, the importance of systematically capturing both the multiplicity and the complexity of factors acting on biodiversity loss becomes even more apparent.

Other Resources


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