Chapter 6

Assessment Process

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BOXES

FIGURES

TABLES

*This appears in Appendix A at the end of this volume.

Main Messages

The sub-global assessment process was dynamic and iterative. Assessments such as the MA that link science with policy aim to meet user needs and support decision-making on complex issues by providing a critical, objective evaluation and analysis of information, including indigenous and local knowledge. The three main stages of the assessment process, with some overlap between stages, were: an exploration stage, a design stage, and the implementation of the resulting workplan, which included review, validation, and communication of the findings. Throughout these stages, on-going communication, user engagement, and capacity building were flexible and iterative components.

Each sub-global assessment process was bounded by political, socio-economic, and environmental circumstances. The heterogeneity of these circumstances, as well as constraints such as the availability of information or particular expertise, necessitated a variety of approaches to using the MA conceptual framework. An exploration of the boundary conditions of each sub-global assessment, including institutions that could potentially implement assessment outcomes, should have been, but was not always, included in the exploratory stages of the assessment work.

The sub-global assessments had to overcome multiple constraints to make progress. Constraints included lack of data and limited financial support. Further challenges included meeting the fixed MA timeframe, gaining the trust of various users, establishing and maintaining user engagement, securing technical leadership, and building the capacity to conduct multiscale, integrated assessments. These constraints limited the scope of each sub-global assessment, in terms of the number of ecosystem services and aspects of human well-being that were included, the temporal and spatial scales considered, and the knowledge systems incorporated. However, constraints sometimes led to innovative approaches to overcome them—for example, the development of a novel index for assessing biodiversity intactness (Southern Africa) and a consensus-based approach to the assessment of soil quality by multiple Quechua communities in Peru. Sub-global assessments that incorporated different knowledge systems required more time and resources.

Working with assessment users was an important part of establishing the demand for an assessment and identifying the processes that could use the assessment findings. Engagement with users at the beginning of the assessment process helped to shape the assessment around the questions that were most important and useful to users. The sub-global assessments showed three broad categories of need for an assessment: (1) to summarize and synthesize information on complex issues to support decision-making; (2) to strengthen the capacity of users to assess and manage their resources, or to participate in resource management; and (3) to address gaps in knowledge for resource management. For the first two categories especially, the assessments involved strong user engagement throughout the process.

A governance structure that provided a forum for discussion was necessary in assessments that involved a *wide range of users.* Many sub-global assessments considered diverse user needs and needed to manage the tensions among users which often centered on the allocation of resources for competing needs. In meeting user needs, sub-global assessments often prioritized the components of the MA conceptual framework to be addressed.

Strong user engagement can result in the assessment process itself being as important as the assessment findings. On-going communication with diverse sets of users in the sub-global assessments led to a greater appreciation and understanding of the links between ecosystem services and human well-being. Local capacity was built to undertake assessments. In some cases, such as in San Pedro de Atacama in Chile, assessments catalyzed groundbreaking discussions on ecosystem management among different sectors of the local population.

Applying the MA conceptual framework to on-the-ground activities proved to be a challenge. The MA conceptual framework, along with the procedural guidelines set out by the MA, guided the work of the 34 sub-global assessments. Some sub-global assessments incorporated multiple temporal and spatial scales and different knowledge systems in their assessments. Incorporating multiple scales necessitated meeting the challenge of developing common variables and measures—a challenge not attempted by most of the sub-global assessments. Most assessments were also not able to fully address the linkages between ecosystem services, human well-being, and drivers of change. The reasons for this were varied and included lack of data, capacity, and/or resources, including expertise in social sciences. During the exploration and design stages, the teams underestimated the effort that would be needed to cover the scope of the work being developed, the number and diversity of the disciplines that needed to be involved, and the challenges of obtaining the wide range of data needed.

Capacity-building activities need to be an integral component of any assessment, but especially a complex one such as the MA. The sub-global assessments demonstrated the need to strengthen capacity for conducting integrated assessments. Many sub-global assessments did not have all of the required expertise to assess the various components of the MA conceptual framework, and thus capacity-building activities were initiated within individual sub-global assessments. In addition, the number and diversity of the sub-global assessments participating in the MA provided an ideal opportunity for capacity-building across the sub-global network through the exchange of experiences and lessons learned. Future attempts at incorporating sub-global components into global assessment processes will have to invest considerable funds and time in developing the capacity to use common tools or standards across different locations, in order to add insight to the global assessment and increase both capacity and knowledge at sub-global scales.

Assessments need champions. In many cases, specific individuals played key roles during different stages of an assessment, for example as external facilitators in determining and establishing the demand for the assessment and in providing leadership and sustaining the assessment process. In some cases, small dedicated teams of people championed the assessment together.

6.1 Introduction

The MA conceptual framework (see Chapter 1), which explicitly links ecosystem services with human well-being, served as a common starting point for all of the sub-global assessments. Use of the conceptual framework helped the teams conducting the sub-global assessments to focus on selecting specific ecosystem services (such as food, water, fiber, etc.) and aspects of human well-being considered to be important. Using this as a start, the teams then assessed the conditions and trends of ecosystem services and human well-being, and the drivers of change. The conceptual framework also guided the analysis of interactions and trade-offs among services, and the incorporation of possible responses and plausible future scenarios to further inform this analysis. Thus the sub-global assessments became an experiment in the application of the MA conceptual framework.

The MA design meetings developed a set of working guidelines on the selection process for the sub-global assess-

ments, which was approved by the MA Board. The Sub-global Working Group refined and agreed to a set of policies that were first developed at the design meetings. The selection process and policy documents offered guidance on the technical aspects of the assessment work, including issues of working at multiple scales, intellectual property rights, transparency, data management, peer review, the use and validation of traditional or local knowledge, and user engagement (relevant excerpts from these documents are provided in later sections of this chapter). Many of these aspects were also considered to be important components of the process developed at the global level. Assessments that applied to become part of the MA were required to follow MA policies on these issues, and to agree to use the MA conceptual framework. (See Chapter 2.) Subsequently, meetings of the Sub-global Working Group provided a forum for exchanging ideas on approaches to the assessment work, and the broad range of expertise, experience, and disciplines within the group influenced the development of many of the individual sub-global assessments. The working group itself thus formed an important part of the assessment process.

The global MA assessment largely followed a process built on the experiences and lessons learned from other global assessments conducted by groups of international experts, such as the Intergovernmental Panel on Climate Change. Given their widely varying political, environmental, and socioeconomic circumstances, the 34 MA sub-global assessments had to adapt their particular processes to accommodate these varying circumstances and needs. In particular, the sub-global assessments had to meet the needs of diverse sets of users, including communities and their knowledge in a respectful and effective manner.

This chapter first provides an overview of assessment processes based on international assessments such as the IPCC and UNEP's *Global Environment Outlook*. From this overview, it is apparent that the three main stages of the assessment process are:

- an exploratory stage,
- designing the assessment, and
- implementing the workplan. Sub-components include: assessment of chosen variables, and review and validation of the findings. In many cases, it is expected that some of the assessment parameters will be adjusted as the workplan is implemented, including through the review and validation process.

A fourth component of the assessment process that spans all the stages is on-going engagement and communication with users. This includes capacity-building, iteration on the assessment focus and process with users, and the final communication of assessment findings.

The whole assessment process is bounded by the location-specific context of the assessment, including the political, socioeconomic, and environmental parameters. Outside of this, but crucial to the saliency of the assessment, are the discussion of plans for use of the assessment findings and for future work, as well as reflections on the assessment process and outcomes. (See Figure 6.1 in Appendix A.)

This chapter analyzes the different approaches taken by the sub-global assessments for each of the main assessment stages, the limitations and strengths of these different approaches, the constraints and challenges faced by the assessment teams, and concludes with lessons learned that may benefit future assessments of this type. This is not an assessment of the ''success'' of each sub-global assessment (as many have not even been completed) or of the findings across assessments; the latter is dealt with in other chapters of this volume. Additional reflection on the assessment process at the community level can be found in Chapter 11.

This chapter draws on various sources of material, including:

- reports produced by the sub-global assessments for the use of the MA or for publication; many are available on the MA website (www.maweb.org);
- responses from sub-global assessments to a set of questions developed by the chapter author team at the working group meeting in June 2003 in Stockholm;
- material from interviews conducted by the chapter author team during working group meetings (October 2003 in Prague and February 2004 in Alexandria); and
- direct experience and/or observations of the authors who are team members of various sub-global assessments, or of others during field visits.

6.2 Overview of Assessments that Aim to Inform Decision-making

There are many forms of assessment, which differ in both their aims and approaches. Common examples include environmental impact assessments and strategic environmental assessments. As an example, EIAs are used for assessing the impacts that activities associated with a particular project may have on the environment and society. SEAs have been used at a more strategic level, for developing policies, plans and programs for natural resource management at national and sometimes regional levels, and often incorporate sustainable development goals (Watson et al. 2003).

The last twenty years have seen the emergence of international assessments that provide objective scientific information of relevance to policy-making, particularly for the environmental conventions such as the United Nations Framework Convention on Climate Change and the Montreal Protocol on Substances that Deplete the Ozone Layer. These assessments are context-dependent, relating to a particular issue at a particular time and in a given geographical domain. They are often referred to as assessments that form an ''interface between science and policy''; examples include the IPCC and the Ozone Assessment. The MA is the most recent example of such an assessment, aiming to provide assessment information to multiple conventions and the private sector, among others.

In the case of assessments that link science and policy, ''assessment'' is defined as a process through which scientists, decision-makers, and advocates interact to define relevant questions or issues, mobilize experts and expertise (Clark and Dickson 1999), and provide options for decision-

makers to consider. The MA conceptual framework defines an assessment as ''a social process to bring the findings of science to bear on the needs of decision-makers'' (MA 2003). The process is thus as important as the quality of the end product in determining the effectiveness of an assessment (Cash and Clark 2001). An important feature of this type of assessment is to reduce complexity and add value by summarization, synthesis, and sorting what is known and widely accepted from what is not known or not agreed upon (see also Fabricius et al. 2004). Levels of certainty on the findings are often expressed, either qualitatively or quantitatively, based upon the collective judgment of the authors.

Recent experiences from assessments attempting to link science and policy (including the IPCC, UNEP's GEO, and the Global Biodiversity Assessment), as well as academic studies on assessments (including the body of work on assessment processes produced by the Global Environmental Assessment project based at Harvard), have found that certain attributes of the assessment process are crucial for building an effective link between science and policy. These include transparency, legitimacy, saliency (or usability), and credibility. To achieve attributes in the eyes of multiple users generally requires that assessment outputs (such as reports) be policy-relevant, but not policy-prescriptive.

Experiences from assessments such as IPCC, the global MA working groups, and the various MA sub-global assessments, have shown that the exploratory stage of an assessment is important, but challenging and time-consuming. During this exploratory stage, the different and sometimes conflicting interests of potential users, as well as the socio-economic, environmental, and political contexts in the areas to be assessed, have to be explored. The initial stages of exploratory work also involve an extensive search for a diverse set of users, whose subsequent involvement helps in elaborating the need for, and scope of, the assessment. During this stage, a formal governance structure for the assessment is discussed, and then established when the assessment work is initiated. Right from the initial stages of the assessment, engagement and sustained communication with targeted users is emphasized.

Once the exploratory stage has been completed, an assessment team with the appropriate expertise and geographical coverage conducts the technical work of the assessment. This includes a peer review process, which is a means for ensuring the quality and relevance of the technical work. The review process also provides feedback on interim findings to users, and thus forms part of the on-going strategy of engagement and communication with users.

A strategy for communicating the assessment findings is essential to ensure that these findings reach the intended audiences. In many assessments, this communication strategy consists of meetings where the findings are discussed with users (an example is the IPCC plenary), press releases, and publication of the reports. Engagement with the media is an important component, as this ensures broader dissemination of the findings. While the communication of findings occurs at the end of the process, on-going engagement and communication with users lays the groundwork for the final communication of assessment findings, ensuring that these findings address the information needs of users.

6.3 Adaptation of the Generic Assessment Process

The sub-global assessment teams and users had nuanced interpretations of what an assessment is, and often varying priorities for their assessment work. The design of each of the sub-global assessments was thus adapted to the needs and priorities of the user groups involved, and resulted in flexibility in the use of the MA conceptual framework and in the design of workplans for the sub-global assessments. The MA Sub-global Working Group accommodated these variations, and did not insist on sub-global assessments following all of the MA guidelines strictly, recognizing that a significant number of assessments would have found it difficult to adhere to all of the guidelines.

The three main variations in emphasis among the sub-global assessments were:

- summarization and synthesis of relevant information for the benefit of specific decision-makers. Examples include SAfMA Regional, SAfMA Gariep, Laguna Lake Basin, Downstream Mekong, Western China, Norway, Argentine Pampas, Caribbean Sea, Portugal, Coastal BC;
- focus on the process of strengthening the capacity of the users to assess and manage their resources. Examples include Sinai, Vilcanota, Bajo Chirripó, India Local; PNG, India Urban; and
- strong emphasis on research. Examples include Tropical Forest Margins, Sweden SU, Wisconsin.

These categories were not mutually exclusive, and many sub-global assessments included all three elements in their work. However, the emphasis (in terms of the effort allocated to activities associated with each element) varied among assessments. The relative emphasis depended on how each assessment process was developed and what types of users were involved. Other relevant determinants included the reasons for initiating the assessment, the scale of the assessment, the governance structure of the assessment, and the degree of user involvement in the process. The approaches that were taken by the sub-global assessments for each of these process components are analyzed in subsequent sections of this chapter.

A common feature of many of the community assessments was the inclusion of primary research and data collection as a part of the assessment process. (See Chapter 11.) Local assessments needed to have fine-grained data that were sometimes not available in the literature, and thus needed to be collected by the assessment teams (Fabricius et al. 2004). Examples include the two Southern Africa community assessments (SAfMA Livelihoods, SAfMA G-M), Portugal, the two Sweden assessments (Sweden KW, Sweden SU), Bajo Chirripó, Vilcanota, and PNG.

Intuitively, the sub-global technical teams and users found the MA conceptual framework easy to understand. However, the challenges of carrying out an assessment that

could populate all the boxes of the framework (direct and indirect drivers of change, ecosystem services, human well-being; see Box 1.2) were significant. Add to that the need to analyze scenarios, responses, and trade-offs, at multiple scales and involving different knowledge systems, and the resulting enterprise was overwhelming for many assessments. During the exploration and design stages, the teams underestimated the effort that would be needed to cover the scope of the work being developed, the number and diversity of the disciplines that needed to be involved, and the challenges of getting the information for the proposed assessments. However, in many cases, the challenges were overcome by developing innovative assessment approaches and/or by adjusting the assessment design to fit the context.

6.4 Exploratory Stages

Initial exploration of a range of issues was necessary to decide whether an assessment should be undertaken; these included potential users and their needs; the intended scope of the assessment; funding possibilities; and individual and institutional capacities in the assessment area. Institutions—defined as ''rules that guide how people within societies live, work, and interact with each other'' (see Glossary)—operate at various scales, such as global, national, and subnational, and on the basis of formal and informal rules (Chambers et al. 2005).

The focus of the sub-global assessments was often related to who was leading the exploratory stage, as well as to the social, political, and environmental characteristics of the potential assessment sites. The exploratory stages for MA sub-global assessments, beginning with the first contact between an assessment initiator and the MA Secretariat, and ending with the start of the assessment's design stage, ranged from four months to three years, and averaged about 12 months. In the cases of SAfMA, Portugal, and Western China, the exploratory stage was shorter, as these assessments were catalyzed by people who had a good knowledge of the MA conceptual framework coupled with the ability to engage quickly with users and attract institutional interest and funding. In some cases, a pilot assessment (for example, Norway and SAfMA) was conducted to explore the feasibility of conducting a full assessment and acquiring sufficient funds. The design of a sub-global assessment and subsequent development of the workplan were closely linked to outcomes of the exploratory stage (as discussed later in this chapter).

6.4.1 Exploring Potential Need, Scope, and Users

In many places, the lack of a consensus, or simply the lack of information, on the links between ecosystem services and human well-being was seen as sufficient justification for conducting a sub-global assessment. In many cases, the lack of organized information on ecosystem services, in conjunction with conflict over resource management, formed the basis of the need for an assessment. Researchers, in particular, were quick to grasp the potential of assessment work, and in most cases initiated the assessment process. For example, in the Salar de Atacama in Chile, a lack of access to information on water quality and quantity in one of the driest areas in the world made it difficult for the users of that resource to design an acceptable water management plan. Latent conflict existed among these resource users (including mining companies, tour operators, and the local communities), in part due to the lack of information. Because the MA was soliciting assessment projects and offering some funding, capacity-building, and a credible international network, researchers in Chile and in other places developed proposals for sub-global assessments where they recognized a potential need.

Once a potential site and focus had been identified, the person or group initiating the assessment contacted stakeholders in that region to further discuss the need and the focus for an assessment. Exploratory workshops preceded the majority of the sub-global assessments and strongly shaped the processes of these assessments. For example, in São Paulo, Brazil, the Forestry Institute, proposing a sub-global assessment of São Paulo city and the surrounding greenbelt, convened a large set of users in a workshop to explore environment-related uncertainties in their decision-making processes. The sub-global assessment in northern Wisconsin chose to explore potential user needs by developing an initial set of future scenarios. These were then discussed and refined with users in workshops, to help them understand what kinds of information they might need to manage their social-ecological systems in the face of uncertainties about the future. In general, governments, non-governmental organizations, research institutions, and the private sector were canvassed and those that showed interest were invited to become involved in the assessment, usually in an advisory capacity. National and regional scale assessments often did not include local users in this capacity, at least not at the early stages. Portugal, for example, conducted a broad assessment of national user needs, but only saw the need to include local users as advisors later in the process. In general, it was not difficult to generate interest in the assessments, since the benefits of information and international networking were apparent to most users, especially those who were technically knowledgeable, or informed. (See Box 6.1.)

It was often a challenge to convince resource users at the community level of the relevance or usefulness of conducting an MA assessment. This was especially the case where outside teams proposed to conduct an assessment at the local level—local users, interested in developing more direct strategies for improving their well-being, did not necessarily value the information benefits from an assessment. This was the case, for example, in the SAfMA local assessments and San Pedro de Atacama. In contrast, organizations and communities in Vilcanota, Bajo Chirripó, São Paulo, and Pune (India) that proposed local assessments themselves envisioned the MA as a tool for building capacity and supporting local management of resources. However, even in some of these cases, tangible rewards were proposed in parallel to assessment activities to respond to both material and information needs simultaneously. For example, in Vilcanota, greenhouses were built for community assessment teams. These complementary activities were often devel-

BOX 6.1

Initiating an Assessment with Multiple Users: PNG

In September 2000, the MA issued a call for proposals to undertake "sub-global" assessments at local, national, and regional scales. This document included a set of selection criteria that would be used to evaluate the proposals. The Call for Proposals was circulated among a group of social scientists that had previously had some connection to PNG's Biodiversity Conservation and Resource Management Program—an initiative that had been funded by the Global Environment Facility from 1993 to 1998. One of the key lessons of the program had been that local communities in these areas are far more interested in development than in conservation, because they have been conserving their ecosystems for thousands of years, but are now lagging in their access to modern health and education services because of their small and scattered populations.

In some coastal areas, high *marine* biodiversity values are associated with very high population densities, and local communities are keenly aware of the limited capacity of their *terrestrial* ecosystems to supply the services required in the face of continuing population growth. The MA Call for Proposals happened to coincide with a spate of letters and reports from a number of small island communities that indicated the extent of this awareness.

After some consultation among relevant stakeholders in the national capital, Port Moresby, an abstract of a pre-proposal was submitted to the MA in late October 2000.

In November 2000, a meeting of national stakeholders was convened to discuss further development of the proposal. This meeting was attended by representatives of:

- three national government agencies—the Department of National Planning and Monitoring, the Office of Environment and Conservation, and the National Fisheries Authority;
- three research institutions—the PNG National Research Institute, the University of Papua New Guinea, and the Australian National University;
- two international conservation organizations—Conservation International and The Nature Conservancy; and
- two donor agencies—UNDP and the Australian Centre for International Agricultural Research.

The meeting agreed that the University of Papua New Guinea and the Australian National University would enter into a partnership to develop a more detailed proposal.

Further work on the proposal came to a halt when the MA Board decided to cluster the sub-global assessments in four focal regions, none of which would include PNG. The work was revived in May 2001, when the two universities were asked to recast the proposal as a study of "small islands under pressure" in Milne Bay Province. This was now to be a component of the Milne Bay Community-Based Coastal and Marine Conservation Program, which had been conceived as a reincarnation of the earlier Biodiversity Conservation and Resource Management Program in a coastal and marine setting. The new program, like its predecessor, would be funded by the Global Environment Facility and implemented by UNDP, but would have a provincial rather than a national focus, and would be executed by Conservation International in association with the Milne Bay Provincial Government.

Since the conceptual framework and methodology of the Milne Bay Project were still aligned with those of the Millennium Assessment, the MA Board approved the "PNG Local" assessment as a sub-global assessment at the end of 2001. The Milne Bay project itself would have two scales of assessment—the provincial scale and the community scale—and this appeared to justify its designation as a "local" assessment. However, the proponents were still interested in the possibility of gaining financial and political support for a broader national or regional assessment of *coastal* ecosystems, for which the Milne Bay Project could be treated as a sort of pilot project.

In May 2002, a workshop was convened in Darwin (Australia) to explore this possibility. The cost of this meeting was borne jointly by the MA and the Australian National University. The regional focus of the workshop was defined as "Tropical Australasia"—a term that covered northern Australia, Melanesia, eastern Indonesia, and East Timor. Sixty individuals from different countries and organizations within the region attended this meeting, and identified a number of local sites where an ecosystem assessment would be warranted. Where a site met the group's criteria, it was assumed that local communities would also have an interest in the process of ecosystem assessment, although this was only established at a later date.

The delayed inception of the Milne Bay project caused it to be modified further to meet the needs of various users and donors. Given the financial and temporal constraints on the conduct of the assessment of coastal ecosystems, the process of user engagement at the local and community scales was designed around the interests of those organizations that were already working with local communities on issues related to the management of coastal ecosystems, or around the existence of separately funded initiatives to identify and respond to local community needs. At the national scale, the users of this assessment are still identified as the organizations that originally endorsed the idea of conducting an assessment of "small islands under pressure."

oped during exploratory discussions with users before the assessments were initiated.

6.4.2 Boundary Conditions and Limitations

The need for an assessment and its potential scope was dependent on political, socioeconomic, and environmental circumstances that formed what could be called "boundary conditions" for each sub-global assessment process. The presence of relevant decision-making bodies, including government agencies, private sector companies, community groups, etc., and their capacity to use different kinds of assessment findings, influenced the information generated by each assessment. The level of formal education, the social context, local knowledge, and the capacity of users were important factors in the design of the peer review process and the communication strategy. Both external boundary conditions (such as the relative powerlessness of Quechua people at the national level in Peru) and internal boundary conditions (such as having no economists on an assessment team) influenced the assessment process and the goals of each assessment.

The dynamics among different groups of users were part of the boundary conditions of the assessment process that had to be addressed early in the process to maintain credibility in the eyes of all users. Almost all assessments had multiple users, and many had to manage conflicts among users.

For example, in the Salar de Atacama in Chile, user groups included indigenous communities, mining companies, and tour operators, and managing their conflicting agendas was an important factor in the design of the assessment. Regular open meetings eventually led to a degree of collaboration that had not previously existed among these user groups. In the Caribbean Sea assessment, users included the governments of nine different countries (including the Netherlands and France) as well as intergovernmental organizations. The tensions among these users necessitated careful planning of the assessment process; for example, too much iteration as part of the process would have aroused suspicion on the part some users. In the assessment in Coastal British Columbia, Canada, politics was seen by some to be damaging to the assessment process, and politically contentious issues sometimes fractured the advisory board that was set up for that particular assessment.

A number of the sub-global assessments reported a distinct degree of user fatigue over the course of the assessment work. At all scales, the long process of an assessment can cause fatigue even within the groups directing or advising the assessment process. The Southern Africa assessment's regular advisory committee meetings drew fewer attendees as the years went by. At the local level, fatigue was not solely due to the MA assessment activities but to the compounded effect of yet another study on the livelihoods and circumstances of local people (suggesting, perhaps, that past research has not been as rewarding for the communities as it has been for the researchers). In particular, the San Pedro de Atacama and Southern Africa local assessments encountered such user fatigue, due to numerous previous research studies in their assessment areas. To help overcome user fatigue or avoid it completely, many sub-global assessments continuously tried to demonstrate the benefits of the assessment to local communities. User fatigue is a serious concern and one that the science community will have to manage in order to continue to engage with local communities in future assessments.

Boundary conditions also included constraints faced by the assessment technical teams, including limitations in finances, data, the methods available for undertaking certain analyses, and the technical or experiential expertise needed in specific fields or locations. For example, little verifiable information was available for the Vilcanota region of Peru, where few biophysical and social studies had been conducted, and what information was available was sometimes withheld from the assessment team due to the ''ownership'' of such information. In many assessments, early exploration of how these constraints could be overcome was not undertaken, leading to subsequent iterations of the assessment design throughout the process and slow progress.

It appears that the leadership (either by an individual or an advisory body) was an important aspect in ensuring that constraints did not impede the progress of an assessment (see discussion of governance structures below). Key actors or leaders prevented many emerging constraints from becoming permanent barriers by anticipating these constraints and addressing them promptly, including by helping to secure funds (from private and public sources, at national and international levels) or setting up the right technical teams. Furthermore, overcoming constraints was often very context-specific. In assessments involving indigenous and local communities, incorporating local and indigenous knowledge into assessments was a challenge. In the Bajo Chirripó, India Local, and Vilcanota assessments, key individuals led the challenging process of developing new methodologies to link science and traditional knowledge.

6.4.3 Funding Sources

The sub-global assessments had access to a certain amount of funding originating from the MA itself, which was an important factor in the initiation of the assessments. The MA originally planned to fund nested multiscale assessments in three regions: Southern Africa, Southeast Asia, and Central America. Only the Southern Africa cluster of assessments was fully funded by the MA; the other clusters never got off the ground for various reasons including lack of strong interest, capacity, and funding. Full funding enabled SAfMA to proceed rapidly to implement its workplan within the MA timeframe, designing an assessment based on the MA conceptual framework, with a formal governance structure in which the technical team and advisory committee met and interacted frequently.

With no other regional nested assessments, the Sub-global Working Group and the MA Board decided to distribute a large part of remaining funds as ''seed funding.'' The MA distributed thirteen seed funding grants ranging between $5,000 and $15,000 to enable ''candidate'' sub-global assessments to develop strong proposals and secure further funding for their assessment activities. (See Chapter 2.) Additional core funding was provided to ten assessments, but in almost every case the amount was less than $100,000. (See Table 6.1.) Other funding sources for the sub-global assessments included national governments, the Global Environment Facility, bilateral and multilateral donors, national and international NGOs including charitable foundations, and research institutions.

The funding necessary to conduct an assessment depended on the scale of the assessment and the size and nature of the technical team. For example, some had to pay technical experts to conduct the assessment; while in other assessments the work was conducted on a voluntary basis. Research institutions involved students in the technical work, and in some cases assessments contributed funding to graduate students to participate in the assessment work (for example, SAfMA). All assessments made use of in-kind funding to a large extent, often underestimating the amount of time needed to complete a full assessment and thus overburdening the assessment teams. Estimated budgets for the assessments ranged from $5,000 to $10 million, but in some instances only a small portion of the funding was secured. For instance, the Tropical Forest Margins assessment obtained less than 10% of its original budget, which limited the assessment activities and led to some redesigning and rethinking of the assessment midway through the process.

Funding was probably the single biggest constraint faced by the sub-global assessments. Many found it more difficult

to raise funding than they had anticipated. As a result, many assessment teams were unable to fully implement their workplan; lack of funding was a key factor in how far individual assessments eventually diverged from the original conceptual design for the MA sub-global assessments. The fundraising difficulties included the lack of donors for assessment work at the sub-global scale, and the lack of multilateral and bilateral donors with funding categories suitable for MA-type assessments; assessments were seen to have a strong scientific research emphasis that did not deliver immediate outcomes to the communities involved. In recent years, bilateral and multilateral donors, and international NGOs, have tended to focus on poverty reduction, and assessment teams found it a challenge to demonstrate how their assessments would ''directly'' reduce poverty (even if they could produce evidence that it would contribute strongly in many indirect ways).

Potential users such as governments and the private sector, while showing interest in the sub-global assessments, were not usually forthcoming with funding. This suggests that many potential users of the assessment results were not convinced enough of their usefulness to be willing to channel scarce resources toward assessments, and that sufficient demand for the assessment outcomes was not established. An example is the Colombian coffee-growing region, which—despite a proposal very much following the MA conceptual framework and an impressive technical team with local expertise—was unable to attract a major donor two years after the initial proposal. Although the government of Norway provided a significant part of the funding for the Southern Africa assessments, after a pilot assessment in Norway itself, the branch of government responsible for national environment policies decided not to fund a full national assessment of Norway. Even where sufficient user demand was established, assessments aimed at local decision-makers, especially in developing countries, were often unable to secure funding from cash-strapped local users and had to rely on donors who were not the immediate users of assessment findings.

Delays in access to already secured funds also caused many assessments to lag within the MA timeframe. In Papua New Guinea, the release of secured UNDP/GEF funding was delayed for two years, and the assessment team had to rework their plans in order to move forward with small components of their full work program in the interim. In Bajo Chirripó, the assessment costs for the local level work were low, and yet interruptions in funding caused the assessment work to stop and start several times. This also caused frequent redesigning of the process. Most assessments tried to make do with the amount of funding they were able to raise and fit their process to the available budget, which caused components of the process to be removed from the original assessment design.

6.5 Initiation and Design Stages

Following the exploratory stage which identified users and their needs, the formal initiation of a sub-global assessment saw the establishment of an advisory committee and a technical team for the assessment. The design stage then built on the MA conceptual framework, where the design of the assessment was fine-tuned to the needs of users and the realities on the ground in different locations. This involved selecting which ecosystem services and other aspects of the MA conceptual framework to include in the workplan, and deciding how to allocate resources to each component of the assessment process. At this stage, assessment teams also needed to determine whether it was appropriate and/or desirable to conduct their assessment at multiple scales, according to MA guidelines. In many cases, the design stage also included an exploration of whether traditional and/or practitioner knowledge could, or should, be included in the assessment. Discussion of these topics can be found in Chapters 4 and 5, respectively.

The design stage did not actually end with the start of the core assessment work, as the process was iterative and continued to evolve as the workplan was implemented and as constraints and realities were faced. This section explores the process that was needed to design each assessment; further analysis of how the assessment teams assessed the condition and trends of particular ecosystem services and aspects of human well-being, response options and scenarios, is presented in those respective chapters in this volume.

6.5.1 Establishing the Demand for an Assessment

General interest and support from assessment users was enough to launch the sub-global assessments, but in some cases the engagement of decision-makers was superficial. Sustained user engagement is important for many reasons, especially for providing guidance on the direction of the assessment work, raising funds, and acting on the findings. (The importance of sustaining user engagement and developing an effective communications strategy is discussed later in this chapter.)

Some sub-global assessments were designed to respond to a specific demand for information from a particular set of users. For example, the government of China, after some initial discussion with UNEP and the MA Secretariat, contributed funding to develop the Western China assessment, in order to inform their 50-year development plan for that region. Similarly, the Caribbean Sea assessment was developed to provide information to support the proposal by the region's heads of state and government to have the United Nations designate the Caribbean Sea as a ''special area in the context of sustainable development'' (Caribbean Sea). Because these assessments were responding to information needs for specific purposes, the value of the work was immediately clear to the users and gained widespread support.

In some cases, assessments were initiated to provide general information bases, without a clear mechanism for using the information in decision-making. The information bases were seen to potentially help improve decision-making at various levels and by different types of decision-makers (at least 10 assessments fit into this category, including SAfMA, San Pedro de Atacama, Laguna Lake Basin, Downstream Mekong, and Portugal). For example, while it was clear that baseline information on water quantity and quality in the

Table 6.1. Sub-global Assessment Budgets and MA Funding Contributions. Funding sources for each assessment can be found at **www.millenniumassessment.org/en/subglobal.** * = an assessment scaled back its activities (for example from a national to a local assessment) and readjusted the budget accordingly.

Sub-global Assessment	Budget ($)	MA Seed Funding ($)	MA Core Funding ($)	Funding Acquired by December 2004 (% secured of total budget)
Altai-Sayan	750,000	15,000		2%
Tropical Forest Margins	3,000,000	6,780	80,000	7.50%
Coastal BC	3,200,000			100%
San Pedro de Atacama	100,000 (originally 200,000)	15,000	70,000	100% (of readjusted budget*)
Caribbean Sea	118,000		70,000	100% (of readjusted budget*)
Downstream Mekong	55,000 (originally 130,000)	5,000	55,000	100% (of readjusted budget*)
India Local	110,000	10,000		100%
Sweden KW		*on-going university-funded research*		
Laguna Lake Basin	90,000	10,218	74,000	100% (for stage 1)
Northern Range	48,000		41,000	100%
Norway	70,000			100% (for pilot stage)
PNG	500,000		44,000	100%
Portugal	135,000		32,500	100%
SAfMA	900,000		846,250	100%
Sweden SU		*on-going university-funded research*		
Western China	4,000,000		127,780	50%
Argentine Pampas		*on-going funded research*		
Bajo Chirripó	155,000	15,000		50%
Colombia	TBD			0%
Eastern Himalayas	25,000	50,000		50%
São Paulo	1,546,000			2%
Sinai	230,000	13,350		100%
Indonesia	95,000	29,854		75%
Central Asia Mountains	515,000	10,850		N/A
Arafura and Timor Seas		24,370		N/A
India Urban	5,000			100%
Wisconsin		*on-going university-funded research*		
Vilcanota	127,000	21,000	45,650	50%

Salar de Atacama desert in Chile was necessary in order to develop effective policy on water access in the area, it was unclear when, how, and by whom this information was to be used. The San Pedro de Atacama assessment team found it necessary to continuously justify the need for an assessment at each advisory committee meeting because some users were not convinced that the findings would be used by key decision-makers. On the other hand, some users saw the benefit in obtaining access to assessment findings, which could then be used to lobby decision-makers.

In places where formal decision-makers generally do not make environmental issues a priority, it was still found to be useful to undertake an assessment of ecosystem services and human well-being, as long as a receptive set of potential users of the findings or process was identified. For example, civil society groups were the primary identified users in the San Pedro de Atacama, Sweden KW, Vilcanota, Bajo Chirripó, Wisconsin, Sinai, and India Urban assessments.

Assessments that were initiated because of a pre-determined use for the outputs had some success in raising funds,

developing the process rapidly and keeping on track to deliver the outputs (examples include Coastal BC, Western China, and India Local). One caveat is that even when the use for the assessment outputs was clear to the technical team, the ability of local or national institutions to implement the assessment findings was often a limiting factor in the usefulness of the work. For example, in Bajo Chirripó, a local NGO attempted to develop resource management plans with local communities based on assessment findings; however, the communities did not have established institutions to implement the management plans effectively. This was also the case for regional assessments where effective cross-border resource management requires close cooperation between neighboring nations. For example, responses for rebuilding fish stocks in the Caribbean Sea, developed as a result of assessment findings, can only be effective if all nations in the region cooperate to fund conservation programs or implement new policies. The secretariats of regional intergovernmental bodies such as the Association of Caribbean States and the Caribbean Community will be the main agents for obtaining support from the various national governments in such endeavors.

6.5.2 Assembling a Formal User Group

The size and composition of the user groups in the sub-global assessments reflected the scope of each assessment. At early stages of the assessments, the technical teams were encouraged to include a wide range of users. The selection process document outlining the criteria for becoming an MA sub-global assessment included the following statement:

> *The assessment must centrally involve the intended users as stakeholders and partners throughout the process, from methodological design through the review process. Based on the experience with the initial abstracts submitted for sub-global assessments in October 2000, this criterion may be one of the most challenging for sub-global assessments to meet. One purpose of the multiple step selection process outlined in this document is to provide candidate sub-global assessments with the time (and in some cases financial support) necessary to establish a significant level of user involvement. (MA 2002)*

The paragraph refers to a ''multiple step selection process,'' which led most of the sub-global assessments to pass through a candidate stage. The rationale for this was to allow assessment teams time to develop diverse user groups that could contribute to the design of the assessments:

> *An important feature of an integrated assessment is the examination of the interlinkages among traditional ''sectors'' of development such as agriculture, water, energy, transportation, and ''environment.'' Another important feature is the integration of both natural and social sciences in the assessment process. All of the MA sub-global assessments must reflect these two core features of integrated assessment in the composition of the teams undertaking the assessment. (MA 2002)*

Almost all sub-global assessments involved national, regional, or local government agencies as users. (See Table 6.2.) A large number of the sub-global assessments identified local communities, NGOs, universities, and research institutes as important users in addition to the government agencies. The private sector (for example, the tourism industry, mining companies, logging companies) was involved in only five assessments, despite the MA goal to support a greater role for the private sector in environmental decisions (MA 2003). Indigenous communities were involved in six assessments. A useful exercise conducted by some sub-global assessments was to start their work by analyzing what user information needs the assessment could address, initially including as broad a set of users as possible (examples include Portugal, Norway, San Pedro de Atacama, Northern Range).

The choice of the user groups depended on the scale and focus of the assessment. In assessments that incorporated multiple scales, different users were identified at different scales, as would be expected. (See Box 6.2.) The initial choice of users was very much in the control of the people proposing the assessment, although most assessments remained open to interested parties. Because the involvement of key decision-makers is an important factor in the uptake of assessment findings, networking skills are particularly useful in an assessment hoping to link science with policy in order to capture the interest of high-ranking individuals in key institutions.

6.5.3 Establishing a Formal Governance Structure

The governance structure of an assessment is crucial to provide legitimacy and credibility to such an endeavor (Eckley 2001). Governance structures that encourage continuing and effective communication among scientific experts, decision-makers, and other user groups are likely to increase saliency for all groups. However, it is the tensions and divergent interests of these various groups that the governance structure also has to manage. The assessment process needs to respond to the changing and varied needs of its users, but also remain credible and focused.

Each sub-global assessment was influenced by governance at at-least two levels—the level of the MA Sub-global Working Group and the level of its own governing body. Given that the policies of the Sub-global Working Group were agreed on before many sub-global assessments joined the process, it was not surprising that the user groups of several individual assessments did not understand, value, or simply could not comply with all of the MA guidelines. Additionally, the global MA process and the governing bodies of individual sub-global assessments were focused on different priorities and outcomes for the assessment work. The global MA process wanted the sub-global assessments to contribute new knowledge and insights to a global understanding of the links between ecosystem services and human well-being while maintaining local relevance. The sub-global assessments themselves were not averse to these goals, but their primary motivation was to meet the needs of their own users at sub-global scales, with priorities ranging from developing local capacity to manage ecosystems to compiling baseline data on ecosystem services in previously

Table 6.2. Users Involved in the Sub-global Assessments

Sub-global Assessment	National, Regional, or Local Governments	Indigenous People	NGOs	Private Sector	Local Community Organizations	International, National, or Local Research Institutions	Multilateral Agency	Distributed Policy-makers
Altai-Sayan	X				X			
Tropical Forest Margins	X		X			X		X
Coastal BC	X	X		X				
San Pedro de Atacama	X	X		X	X	X		
Caribbean Sea	X		X			X		X
Downstream Mekong	X				X			
India Local	X		X		X	X		
Sweden KW	X				X	X		
Laguna Lake Basin	X		X			X		
Northern Range	X		X	X	X	X		
Norway	X			X				
PNG	X	X	X		X	X	X	
Portugal	X		X	X	X	X		
SAfMA	X		X		X	X		
Sweden SU	X				X	X		
Western China	X					X		
Argentine Pampas					X	X		
Bajo Chirripó		X			X			
Colombia	X					X		
Eastern Himalayas	X		X		X			
São Paulo	X							
Sinai		X				X		
Indonesia	X							
Central Asian Mountains	X		X			X		
Arafura and Timor Seas			X					
Indian Urban			X					
Northern Wisconsin						X		
Vilcanota		X	X		X			

unstudied areas. Ultimately, governance at the level of each assessment was responsible for the evolution of each sub-global assessment process.

6.5.3.1 Advisory Committees

The typical governance structure in many assessments included an advisory committee and a technical committee, which in some cases had overlapping roles (for example, SAfMA, Portugal, Western China, Laguna Lake Basin). The role of the advisory committee varied across assessments but included providing guidance to the technical team on what needs the assessment should meet (for example, Northern Range, SAfMA, and San Pedro de Atacama), ensuring progress, reconciling the needs of different users, distributing funds in an objective and transparent manner, and providing a platform for outreach. (See Box 6.3.) The presence of an advisory committee in some cases produced greater capacity for structuring the work and keeping the assessment process on track, especially where the advisory committee was given a formal role (for example, in SAfMA, Western China, and Coastal BC). In some assessments run by very small teams or by scientists focused on on-going research, advisory committees were either nonexistent or less involved in the assessment work (for example, in the Swedish assessments, Bajo Chirripó, and India Local). In most cases, this did not damage the credibility of the assessments to the local users, but engagement with a broader range of users was not achieved. In the cases of assessments that were continuations of on-going research, the lack of an advisory committee was made up for by governance structures unrelated to the MA, resulting in processes that diverged the most from the MA conceptual framework.

Ideally, the advisory committee manages the balance of power between the assessment users and within the technical team. A valuable part of the assessment process proved to be the dialogue and debate both between the advisory group and the technical team and among technical experts with different analytical models and expertise looking at the same problem (Fabricius et al. 2004). SAfMA, for example, was characterized by a high level of dialectical debate and

BOX 6.2

Engaging Users at Different Scales: SAfMA

The Southern Africa sub-global assessment was conducted at three scales in a fully nested design. The SAfMA component assessments were a regional scale assessment, two basin scale assessments, and several community assessments. The regional assessment covered 19 countries in mainland Africa that lie south of the equator. Nested within the regional assessment were the basin scale assessments covering two major drainage basins: the Zambezi and Gariep. Within SAfMA Zambezi and SAfMA Gariep, several "community-based" assessments were conducted at varying scales, from village to city to one that was a broader sub-region.

SAfMA Regional users included the Southern African Development Community environment, water resources, agriculture/food security, and development portfolios; national governments; the private sector; the media; and the public. SAfMA Gariep and SAfMA Zambezi contributed to the needs of governments, conservation, and agricultural agencies as well as catchment management authorities, respectively in South Africa/ Lesotho and Zambia/ Malawi/ Mozambique/Angola/Tanzania/Zimbabwe. For local assessments, the users were local communities, municipalities, common property associations, as well as local teachers and scholars.

Individuals representing user groups were invited to contribute to SAfMA as members of User Advisory Groups, one each for each of the various component assessments. Some were invited to be part of the SAfMA Advisory Committee that provided oversight and guidance. The different categories of SAfMA users were engaged in a variety of ways, ranging from their appointment on review panels to involvement in intensive workshops at regional, basin, and local scales.

SAfMA also engaged users through the "SAfMA Fellowship Program." Individuals from stakeholder organizations were invited to apply for SAfMA Fellowships, which entailed participation in SAfMA activities, reviewing SAfMA documents, and assisting with the outreach and dissemination of SAfMA materials. SAfMA fellows also acted as bridges between SAfMA and other programs in the region, and also took SAfMA messages to their organizations and countries.

Motivation and interest were secured by ensuring that users interacted and maintained dialogue with the technical experts, receiving regular feedback on how the assessment was progressing and in turn keeping the technical team informed of their expectations.

BOX 6.3

The SAfMA Governance Structure

SAfMA had a hierarchical governance structure consisting of the Advisory Committee (AC) and the Technical Committee (TC). The ten members of the advisory committee were representatives of the users at the regional scale and were responsible for representing the interests of the different stakeholders, balancing the various interests within the region, creating a receptive policy environment for the work and output of SAfMA, endorsing the SAfMA outputs, and directing the work of the technical teams. The technical committee consisted of the principal investigators of the various SAfMA component technical teams and were responsible for designing the assessment, harmonizing the methods, communicating among component assessments, monitoring progress, and producing a multiscale synthesis report. The SAfMA coordinator, appointed by the advisory committee and based at one of the stakeholder institutions in the region, had the role of linking the various SAfMA components and assisting the technical committee in the completion of its duties. The coordinator also acted on behalf of the advisory committee to oversee the implementation of approved plans. The advisory committee interacted with and maintained dialogue with the technical committee, received regular updates on how the assessment was progressing and in turn kept the technical committee informed of stakeholder expectations and perceptions.

emerged with novel assessment methods and tools that could be tested and compared across scales. Effective governance ensured that most debates were constructive and that the technical team remained productive. (See Box 6.4.)

6.5.3.2 Technical Teams

The technical work in the sub-global assessments was carried out by teams that typically included people of different backgrounds (associated with disciplines and/or cultures, thus ensuring that different views and knowledge were incorporated from the inception), gender, and age. The composition of the technical team varied depending on the scope, scale, and audience of the assessment. Team sizes in the sub-global assessments varied from four to more than a hundred people (larger teams included Western China, Tropical Forest Margins, and Coastal BC). Most teams involved about 30–40 people, although the bulk of the work was often done by a few people (often the youngest members of the assessment teams, with guidance from the more experienced/senior members). Teams that were based at research institutions engaged younger researchers in the technical work, thus building capacity for future assessment work; for example, in the Wisconsin assessment, graduate students were responsible for carrying out different components of the sub-global assessment over a number of years.

In some assessments where there was a high degree of local technical expertise (for example, São Paulo, Laguna Lake Basin, the Argentine Pampas), the technical teams carrying out the assessment were composed of mostly local researchers; within the local context, this increased the legitimacy and credibility of the results. In some cases, local experts or people who had previously established working relationships with user communities conducted the technical work, which automatically increased the level of trust between users and the technical team (examples include Northern Range, Caribbean Sea, SAfMA Livelihoods, Vilcanota, Bajo Chirripó, India Local, Sweden KW). This had the additional benefit of facilitating the incorporation of the assessment findings into decision-making processes. The decision to have outside researchers assessing local ecosystem goods and services can be tricky, as local users may see the outsiders as either credible experts or intruders. This perception can change as the assessment progresses; for ex-

BOX 6.4

Interaction between the Advisory Committee and the Technical Team: San Pedro de Atacama

Three months after the San Pedro de Atacama assessment started, an advisory committee was established consisting of 16 representatives from the diverse user groups in the project area: a local irrigation association, mining companies (4 environmental and sustainable development managers or general managers), the forestry and protected areas agency, the regional environmental agency, the regional indigenous peoples agency, a governmental program for indigenous people development (ORIGENES), the mayor of San Pedro de Atacama, the Indigenous Development Area (a governmental initiative for indigenous people development), a regional university, the Indigenous Peoples Council (*Consejo de Pueblos Atacameños*), and three tourism operators.

A trust-building process was necessary in order to have the various members of the advisory committee effectively working together. The issue of water scarcity provided an opportunity for members to sit down together to address a common issue. A number of conflicts over water scarcity had occurred previously between indigenous people and miners, and the opposed groups had never sat down formally to discuss the issue until brought together by the assessment. The discussions enabled the advisory committee members to:

- share information, knowledge, and experiences;
- attempt to integrate diverse perspectives;
- participate in a new forum for communication; and
- ultimately go beyond the initial agenda to discuss a broader range of topics in an unconstrained manner.

It was decided, however, that the advisory committee would not take final decisions on technical and budget issues for the assessment; it took on a consultative role in the governance of the assessment. RIDES, the institution conducting the technical work, retained the right to veto any suggestions from the advisory committee. In this assessment, the advisory committee did not play a technical advisory role, and therefore was not involved in checking the quality and robustness of assessment findings. Nonetheless, informal reviews of interim findings by the advisory committee likely contributed to more robust findings in several sections of their report. After five advisory committee meetings, this approach was evaluated as successful and appropriate to the objectives defined at the outset.

ample, in the San Pedro de Atacama assessment, outside researchers overcame initial distrust among some stakeholders.

6.5.3.3 Involvement of Institutions in Technical Work

Different types of institutions were involved in the technical work of the assessments. In most cases, these were research institutions, but in some cases this role was assumed by governmental and/or nongovernmental organizations. (See Table 6.3.) Although it is too early to come to conclusions about the impact of institutional involvement on assessment outcomes, in terms of the process, the assessments associated with research institutions—especially universities (for example, in the SAfMA, Sweden KW, Sweden SU, and Northern Range assessments) and larger research institutions (for example, the CGIAR centers in the Tropical Forest Margins assessment)—benefited from the high capacity to undertake assessments, in terms of both expertise and the availability of students and collaborators.

Table 6.3. Institutions Involved in the Technical Work of the Sub-global Assessments

Type of Institution	Examples of Sub-global Assessments
Research Institutes (often have high diversity of technical expertise)	Colombia, India Local, Laguna Lake Basin, PNG, Portugal, SAfMA, Sweden KW, Sweden SU, Tropical Forest Margins, Downstream Mekong, Argentine Pampas, San Pedro de Atacama, Caribbean Sea, Northern Range
Government	Coastal BC, Caribbean Sea, Norway, São Paulo, Western China, Colombia
Nongovernmental Organizations (can be small research institution)	Altai-Sayan, San Pedro de Atacama, Northern Range, India Urban, Caribbean Sea
Community-based Organizations (can be an NGO)	Bajo Chirripó, San Pedro de Atacama, India Local

The institutions involved in the sub-global assessments have in general been dedicated to environmental and sustainable development issues. Some assessments tried to extend the ownership of their work to other sectors (such as the private sector and non-environment government ministries). In the Argentine Pampas, on-going agricultural assessment work that had traditionally involved only research institutions from the agriculture sector expanded to include an assessment of human well-being in the region. This required new partnerships with researchers from other disciplines and organizations, a process that could lead to the development of more integrated responses to ecosystem change.

6.5.3.4 Governance-related Challenges

The sub-global assessments demonstrated a serious trade-off between an exhaustive consideration of user needs, meeting the timeline and design requirements of the MA, and their own assessment workplans. This trade-off meant that not all the ecosystem services or user needs identified were considered in some assessments (for example, SAfMA, Northern Range, Caribbean Sea).

The various advisory committees and technical teams had to decide how much effort to expend on building capacity among users so that they could become fully involved in the process, as well as how many different user groups to include in the process. In Bajo Chirripó, the process was temporarily stalled at the stage of coming to a consensus on user needs and their relationship with the MA conceptual framework. Before moving on with the assess-

ment work, it was important to this assessment for local indigenous communities to understand the MA conceptual framework and ecosystem concepts and to link these concepts to their own worldview. Due to technical, communication, and epistemological hurdles, this was a slow process. (See Chapter 5.) The Tropical Forest Margins assessment conducted a study on the challenges of conducting integrated assessments and found through an online survey of their technical team that there was an institutional contradiction on this issue. The majority of those polled agreed that the project,

> *. . . should reach out to a wider representation of groups within current countries (where the Alternatives to Slash-and-Burn consortium is active), including more and different types of local community associations and conservation groups, local government and civic organizations, local and national NGOs, policymakers and other officials at various levels (Tomich et al. 2004).*

However, the majority of those polled also agreed that since the collaborators of Tropical Forest Margins assessment,

> *. . . are overloaded with work, (the assessment) should focus on delivering results for farmers and national policymakers, who are core stakeholders (Tomich et al. 2004).*

This contradiction between idealism and realism reflects the trade-offs between advancing the assessment process and increasing the legitimacy and saliency of the assessment. This trade-off is exacerbated by the ''relatively little understanding of the tradeoffs involved in participation decisions; for example, how increasing public participation might increase political legitimacy, but might decrease the scientific credibility of the research designed to support the decision making'' (Clark et al. 2002). A way of overcoming this conflict and addressing the trade-offs was to establish a governance structure in the early stages of the assessment.

6.6 Implementing the Workplan

Having designed the assessment and developed the workplan to meet the goals of the assessment, the next step was to conduct the technical work. These stages were not completely sequential and compartmentalized, but rather iterative and closely interactive. In this section, the emphasis is on the process—examining the constraints and challenges faced by the technical teams during the assessment process and extracting the lessons learned.

As part of the implementation of the workplan, the technical teams assessed the various components of the MA conceptual framework according to their assessment design, modifying the process when confronted by constraints or evolving user needs. An analysis of the findings across the sub-global assessments can be found in Chapters 3, 7, 8, 9, and 10.

One of the lessons learned from the early stages of the technical work of the sub-global assessments was that many teams did not have the capacity to be able to effectively analyze the links between the drivers of ecosystem change, ecosystem services, and human well-being. In some cases, this changed as the assessments progressed and the technical teams instituted different ways of building capacity. (See Box 6.5.)

A crucial aspect of the MA, at both the global and sub-global scales, was the integration and synthesis of findings across the components of the conceptual framework and across scales. This integration and synthesis was often attempted toward the end of the process. The experience of the sub-global assessments suggests that planning for this latter stage at the beginning of the process greatly facilitated it, and that sufficient time should be designated for group discussion and reflection on assessment findings in order to produce integrated output. (Further discussion on how this was achieved can be found in Chapter 4.)

To ensure that the outputs from these activities were both credible and salient, the MA developed guidelines for conducting a peer review process. In many cases, a mechanism for validating information from practitioner knowledge or informal sources had to be incorporated into the review process (discussed later in this chapter).

6.6.1 Assessing Ecosystem Services, Human Well-Being, and their Condition and Trends

Ecosystem services in the MA conceptual framework were categorized into provisioning, regulating, supporting, and cultural services; this categorization was followed by all sub-global assessments. Biodiversity was a special case: in some cases, it was considered to be an ecosystem service, as well as a condition underlying the services provided by ecosystems. Human well-being had multiple components, including many aspects not directly reliant on ecosystem services.

In each sub-global assessment, the services and the human well-being aspects considered to be most important by users and the technical teams at that scale were included. The determination of what to include was based on consultation between the users and the technical team and took resource constraints into consideration (including time, money, and expertise). Many assessments included provisioning services (such as food, fiber, and water) and cultural services (mostly focusing on tourism), but not many considered supporting and regulating services, often due to lack of data. A common constraint was the lack of baseline data against which to measure changes in the condition of ecosystem services. Components of biodiversity (for example, distribution of certain taxa) were relatively well-assessed by most sub-global assessments.

Most sub-global assessments did not look at the links between ecosystem services and human well-being. Trade-offs among ecosystem services were also not considered in many of the assessments. This may have been because links and trade-offs were only addressed toward the end of the assessment process, when there was less time and fewer resources to complete the complicated analysis.

Data, mostly qualitative, on both ecosystem services and human well-being were obtained from reports, books, publications, and interviews with users. In general, the sub-global

BOX 6.5

Capacity-building for Conducting the Technical Work: Vilcanota

In some assessments, the necessary technical expertise for undertaking the assessment work had to be developed. Even within assessments that had access to experts from a large number of disciplines, teams often chose to train students and young scientists to undertake much of the work.

In the Vilcanota assessment, the local Quechua indigenous people provided the focus for the assessment work. The assessment was led by a local NGO based in Cusco (Asociación ANDES), but several Quechua communities were directly involved in assessing the state of ecosystem services in their mountain ecosystem, their own well-being, and potential responses to the changing environment based on their own values and priorities. The assessment process focused on the development of tools that the local people could use to assess their ecosystems, thereby both contributing to the MA process and helping the Quechua to disseminate their knowledge to other local communities as well as to the wider scientific and policy arenas.

One aspect of this capacity-building was the training of a local women's video team. The medium of film is closer to the Quechua way of communicating knowledge through oral tradition. This training was seen as critical to effective local participation in the assessment. The video products were produced in the Quechua language and were used for capacity-building and disseminating findings widely within Quechua-speaking regions. Filming the assessment process met specific challenges of a local assessment undertaken by local people themselves, by increasing the opportunity for local people and local organizations to access, understand, and apply the information and knowledge generated (or simply recorded) during the assessment process. The first video that the local team produced followed a series of meetings held in local villages to understand and adapt the MA conceptual framework to the Quechua worldview. As part of dissemination of their knowledge to the wider scientific community and contribution to the MA, the video was presented at the MA Bridging Scales and Epistemologies Conference in Alexandria, Egypt, in March 2004.

Asociación ANDES trained *tecnicos,* or technicians, in all the Quechua communities involved in the assessment. The technicians learned the basic concepts of the MA conceptual framework and participated in discussions on how to integrate the MA ecosystem and human well-being concepts with the Quechua worldview. At a technical meeting in June 2004, involving about one hundred participants from three local communities, the technicians were able to lead the community members through exercises focused on the assessment of soil quality at different altitudes in the region. As all the community members farm intensively and possess intimate knowledge of their land, they were usually able to reach consensus in their assessments. Both men and women participated in equal numbers at this meeting, although only one 1 out of 14 technicians was female. The members of each community chose the technicians democratically and, during a feedback session on the assessment process at the end of the meeting, the participants demonstrated satisfaction with the technicians and the process as a whole. The only complaint from some of the men present was that they too wanted to learn video techniques.

assessments provided a descriptive rather than a quantitative measure of the condition of ecosystem services. Observations and lessons learned include:

- In most cases, it was difficult to consider the full range of ecosystem services that the users and technical team thought was important.
- The teams concentrated on the ecosystem services for which it was easy to obtain quantitative or qualitative data (usually provisioning services), rather than those crucial to the human well-being in that location.
- The links between ecosystem services and human well-being were not well-addressed, mostly due to lack of data and/or methods. Approaches for this analysis should be investigated at the beginning of the assessment process, and the inclusion of more economists and social scientists should be an important consideration in the assessment design.
- Many assessments initially constrained by lack of data have now assembled baseline data and built significant capacity that will benefit future assessment work in those areas.

6.6.2 Determining Drivers of Change

The technical teams and user groups determined the drivers of ecosystem change within the sub-global assessments through literature reviews and discussion. The assessments focused on the drivers considered most pertinent to the changes in ecosystem services and human well-being occurring at the scale of the assessment. In most cases, the degree of ''controllability'' over each driver at that scale was examined, and both the technical teams and the users found that the classification of drivers as endogenous or exogenous was more useful within their processes than the classification of direct or indirect. Local and traditional knowledge was used to identify and determine the effect of drivers in some assessments. (See Chapter 7.) The sub-global assessments also identified the speed at which the drivers act, a measure that is likely to tie into the responses that can be developed for these drivers of change.

As with the analyses of the current status and trends of ecosystem services, many sub-global assessments cited lack of information as a constraint to identifying and analyzing drivers of change. In some cases, the choice of the drivers to include in the analysis may have been data-driven.

Observations and lessons learned include:

- Decision-makers prefer the classification of drivers based on the degree of control they could potentially exert over each driver.
- In the early stages, many sub-global assessments had neither the data nor a general understanding of the links between drivers of change (direct or indirect), ecosystem services and human well-being in their area. This changed as the assessments progressed, probably through discussions within their user groups and with the sub-global working group.
- A deeper understanding of the links between drivers of ecosystem change, ecosystem services and human well-being is needed to develop and discuss policy options. Participatory scenario work could facilitate such discussion. (See Chapter 10.)

6.6.3 Developing Responses to Address the Drivers of Change

In the context of the MA, responses are a range of policies and actions that affect the state and functioning of ecosystems. (See Chapter 9.) Responses to changes in the supply or quality of ecosystem services or in measures of human well-being would usually be developed to intervene with the direct and indirect drivers of change.

The technical teams, in consultation with the users, developed potential responses to changes in ecosystem services and/or human well-being or assessed past responses already put in place by local decision-makers. The appropriateness of responses was assessed using both scientific information and local and traditional knowledge. Most sub-global assessments identified responses to only the direct drivers of change and did not on the whole address many responses to indirect and/or exogenous drivers. Some sub-global assessments developed response options as part of scenario-building, with close involvement of users who would then be in a position to implement them.

Observations and lessons learned include:

- When developing response options, there is a need for understanding the complex links between the drivers of change, ecosystem services and human well-being, as well as the associated trade-offs.
- A lack of clear mechanisms or institutions for implementing responses, especially at the national or regional scale, acts as a disincentive for developing responses and in fact for conducting an assessment. One such mechanism would be to ensure that the advisory group is in a position to act on or implement the responses. In many cases, this may not be possible, but it is still important to identify a group that can make use of assessment findings and influence decision-making processes.

6.6.4 Developing Scenarios

Scenarios, or storylines representing a set of plausible futures, have been used in the last few decades for making decisions in the face of uncertainty. (See Chapter 10.) Uncertainty can result from lack of information (or ignorance of what information is available) or disagreement over what is known or knowable about the dynamics of interactions between humans and ecosystems. In developing scenarios, a set of questions or issues is first developed in conjunction with users, often revolving around key uncertainties. Next, findings of the assessment on the current state and recent trends of a system are examined and alternative pathways the system might take in the future are identified. The next steps involve developing the storylines and quantifying them, which is often an iterative process. The sub-global assessments that developed scenarios utilized methods based on these steps, but ended up with very different kinds of scenarios. This was due to differences in local priorities, the composition of groups involved in scenario development, available funding for scenario activities, among other factors. Many assessments did not develop scenarios at all.

The approaches taken to developing scenarios included exploring existing scenarios produced for that area or similar areas; adapting elements of the scenarios developed by the MA Global Scenarios Working Group; and developing new sets of scenarios based on scenario literature with input from users and other experts. The best way to initiate scenario work was found to be trial and error, although access to experts helped. A few sub-global assessments developed a set of steps (for example, SAfMA Livelihoods) or a framework based on their understanding of what was needed to develop the storylines, often through repeated workshops attended by users and the technical team. Largely qualitative stories based on major drivers of change were developed, usually for a 15–25 year time horizon (although some extended to 50 years). Communication of the scenario outcomes and feedback (including validation) from users was found to be helpful in identifying response options; it also provided a means of interaction between the technical team and the advisory group (for example, in the Portugal assessment).

The constraints to developing scenarios included timing and funding. (See Box 6.6.) The lack of existing scenarios and/or models that incorporate ecosystem services and their links to human well-being was a major constraint to scenario development at the sub-global level. In addition to having to explore methods for linking ecosystem services

BOX 6.6

Scenario Development: A Challenge for Many Sub-global Assessments

Scenario development in almost all sub-global assessments was hampered by two main factors: timing and funding.

Timing issues were related to the completion of the global scenario storylines and the scenario development exercises in each sub-global assessment. When those sub-global assessments developing scenarios had reached a stage where they needed guidance on scenario development and how to establish a link between the global and sub-global scenarios, the global storylines were not yet available in their final form. This led several sub-global assessments to independently create scenarios, where they had the expertise to do so. Assessments that did not have the technical capacity to develop scenarios simply did not even attempt it. Another timing issue was related to the late stage at which scenario development was usually attempted in the assessment process of each sub-global assessment. The focus in most sub-global assessments was primarily on examining drivers of change and the conditions and trends of ecosystem services and human well-being, these priorities were usually completed before scenario development was initiated.

Funding issues were directly related to these timing issues. When components of the assessment needed to be omitted because of lack of funding, scenarios were often the primary target. In many sub-global assessments, scenario development was considered somewhat less important than other assessment aspects. Even within SAfMA, where a full set of scenarios was developed, it was noted by a member of the technical team that priority was given to what was considered to be the main task of assessing conditions and trends of ecosystem services and human well-being: "Although scenario development was elaborate compared to the other assessments, less emphasis was actually given to scenarios and more to condition and trends" (Reinette Biggs, personal communication).

and human well-being, the teams also had limited capacity to develop scenarios/models that integrate conditions and trends of ecosystem services with drivers of ecosystem change and possible policy responses. Scenario-building was the most unfamiliar component of the MA conceptual framework to most sub-global assessments and this often led to delays in initiating scenario activities. (See Chapter 10 for an explanation of what scenarios are and how they were developed by sub-global assessments and the global MA Scenarios Working Group.)

Observations and lessons learned from the process of building scenarios include:

- Even with a general lack of existing scenarios and models that encompass links and feedback loops between ecosystem services and human well-being, appropriate expertise within the sub-global assessments or the ability to link the global scenario-building activities to the sub-global assessments can be drawn upon to develop scenarios.
- Assessment teams without previous experience can learn to develop scenarios through an iterative process, in consultation with global scenarios experts, and through trial and error.
- Draft scenarios can be used during the early stages of a sub-global assessment to initiate discussions with decision-makers on the key uncertainties they face, and on what information the assessment could supply to improve decision-making in the face of these uncertainties (this approach was used in the Northern Highland Lake District, Wisconsin, for example.)

6.6.5 Peer Review of Assessment Findings

The review process, through which the assessment findings are validated, is an essential step in the assessment process. The involvement of users in the review process also forms part of the communication strategy and contributes to on-going user engagement in the assessment process (discussed in the next section). Each sub-global assessment was responsible for developing the specific process for validating its findings, drawing on the MA guidelines on an acceptable review process and in line with the general MA requirement to include a formal review process. The most common form of validation used was peer-review of assessment reports. With the exception of SAfMA, Portugal, Northern Range, Caribbean Sea, Coastal BC, Laguna Lake Basin, and Sweden, most sub-global assessments had not yet conducted a formal peer review of their findings when this volume was being written. The MA thus organized a formal review of interim reports from each assessment to facilitate the writing of this volume. Many assessments found this ''mid-term'' review useful to the development of their work; it led to major revisions in some reports.

Based on the experiences of those assessments that underwent a review separate from the MA-managed review process, it was common for the advisory committee and technical team to develop a list of potential reviewers. The people on the list of reviewers were selected on the basis of their technical expertise and/or decision-making capacity, and were representative of the users of the assessment information and beneficiaries of the ecosystem services assessed. The existence of an advisory committee often aided in the review process, as the advisory committee included representatives from many user groups that could participate as reviewers of the assessment (see earlier discussion). The reviewers often included a combination of local people (usually with some technical expertise) and international experts, including those involved in other MA working groups (this combination of local and international reviewers was observed in SAfMA, Coastal BC, Laguna Lake Basin, Western China, Tropical Forest Margins, Northern Range, and Caribbean Sea). In some sub-global assessments (for example, SAfMA, Tropical Forest Margins, Sweden KW), the review process included the publication of assessment findings in peer-reviewed journals, which aided in the communication of results to a wider audience. In all cases, peer-review was an onerous and time consuming process, but was considered to be important for strengthening and ensuring the credibility of the assessment findings, and for obtaining feedback from users. In many sub-global assessments, as with the IPCC and the MA working groups, publicly available responses to the review comments were important for adding to the findings' transparency and objectivity.

Though peer-review is the most accepted form of validation, it is also important to ensure that appropriate techniques are used for getting input from different users at various scales. For example, in SAfMA, as the scale of assessment moved from regional to local, so did the balance of information availability—from formal, documented data typically regarded as being in the ''scientific'' domain to informal, tacit information contained in the life experiences of local residents and in folklore transmitted by oral tradition, or perhaps documented but not according to scientific standards (Fabricius et al. 2004). The distinction between ''formal'' and ''informal'' knowledge is not as clear or strict as is often thought, and at the level of broad principles, similar rules of use and validation apply to different types of information, although the validation procedures may differ. (See Chapter 11 for a discussion on local approaches to data collection and validation.)

6.7 Communication Strategy, User Engagement, and Capacity-building

An important task for the assessment teams was to identify their target audiences. The audiences were often defined by the scale of the assessment, but were not limited by this factor, and therefore were sometimes broader than the user group. In some cases, an effort was made to communicate the process and findings to the wider decision-making community and the general public with the aim of influencing understanding of the links between ecosystem services and human well-being in a wider policy context.

6.7.1 On-going User Engagement

The sub-global assessment experiences highlight that on-going interactions between assessment users and the techni-

cal team are necessary to maintain interest in the process and results, as well as to keep the focus of the work aligned with the needs of the users. In the Northern Range assessment, for instance, advisory group meetings were often combined with meetings of the technical team so that advisory group members could provide input and feedback on the assessment findings and process. In the São Paulo assessment, government users at a workshop were encouraged to prepare a realistic flowchart of their decision-making processes; this allowed the technical team to refine the focus of their assessment work to supply specific information needed to improve decision-making.

Where user involvement was strong, the assessment *process* became as important as the assessment findings. In the Portugal assessment, for example, the advisory group and other users participated in all of the research team meetings, and were active in scenario-building and in the qualitative assessment of ecosystem services. Their involvement was a capacity-building exercise (for example, in the development and use of scenarios) but also prepared them for the uptake of the assessment findings.

Strategies for user engagement were often dependent on the scale of the assessment and the networking capacity of the technical team. Other factors included the capacity of various users to engage in the process and understand the results; language differences; and the overuse of scientific terminology or jargon. The sub-global assessments used a range of diverse methods and techniques for engaging users, including workshops (such as in the Caribbean Sea and the Northern Range), interviews, focus groups (Northern Range), open houses, and informal consultations. More innovative methods were explored as well, such as SAfMA's use of theater for presenting scenarios, the involvement of schoolchildren in assessments in San Pedro de Atacama and the Western Ghats in India, and the filming of meetings and discussions for local dissemination in Vilcanota. These methods were developed in order to incorporate local knowledge for sharing and validating information, communicating results, and designing and discussing scenarios.

6.7.2 Capacity-building

Capacity-building activities served to overcome a variety of constraints faced by many of the assessments; in many cases, the outcomes of these activities are as, or more important than, the assessment findings. Capacity-building occurred at several stages of the assessment process. In some sub-global assessments, capacity-building activities began with an explanation of the MA and its conceptual framework to the potential users. In other cases, capacity-building focused on developing methods or expertise for data gathering and analysis, scenario-building, and analysis of responses.

Sub-global assessment teams met at MA Sub-global Working Group meetings to share methodologies and lessons learned, which helped in the capacity-building process. In addition, the MA provided funding under a program for partnerships and exchanges among sub-global assessments. (See Box 6.7.) Experience sharing within the network of sub-global assessments was key in allowing assessments with fewer resources to overcome some constraints, including the challenges associated with aspects of the technical work.

6.7.3 Developing Outputs and Communicating Findings

The communication of findings from the sub-global assessments was principally aimed at influencing the way decisions are made at the scales relevant to the assessment. The MA subscribed to the notion that outputs developed for communication should be relevant to policy-makers, but should not tell them what to decide (that is, they should not be policy prescriptive).

At the MA working group level, most assessments agreed with MA policy that assessment findings and conclusions "should be policy-relevant, but not policy-prescriptive." At local levels, however, some assessments planned to produce recommendations and enter directly into the policy arena, which they considered to be appropriate because their advisory body also included decision-makers. At the international level, for a scientific or technical team to develop recommendations is potentially contentious because it calls into question the objectivity of the scientific findings. One option that has worked in international conventions is for an advisory committee to develop recommendations based on the findings of the technical reports. This strategy may be used by some sub-global assessments in the future.

At the Sub-global Working Group level, the main product is a technical volume summarizing the experience and lessons of the MA sub-global assessments (that is, this volume). The audience for this volume includes decision-makers at the local, national, and international levels, and in particular organizations or donors interested in undertaking or funding sub-global assessments. In addition, each sub-global assessment provided two peer-reviewed documents for dissemination by the MA:

- a summary or interim report (depending upon their stage at the time of writing in late 2003), which provided information on the main conclusions (or interim findings) of the assessment. In October 2004, the sub-global assessments updated these reports, and they were subjected to a process of peer-review coordinated by the MA Secretariat, after which they were revised one last time; and
- a two-page summary, included in Appendix B of this volume, highlighting the main findings and/or process aspects of each assessment.

The MA facilitated the inclusion of several sub-global assessments in a documentary on the MA, produced by Earth Report for the BBC Network (released in March 2005). Some of the major findings and experiences of the sub-global assessments were reflected in this production.

For each sub-global assessment, the development of outputs and the communication of findings were heavily dependent on the schedules of the individual sub-global assessments. At the time of writing this chapter, SAfMA, India Local, San Pedro de Atacama, Caribbean Sea, North-

BOX 6.7

Sub-global Partnerships and Exchanges Program

A the first meeting of the MA Sub-global Working Group, held in Panama in June 2002, participants discussed the need to establish and enhance linkages among the MA sub-global assessments. These linkages were conceived of as being vertical (across scales and with the global working groups) and horizontal (among sub-global components of the MA). The MA initiated the program on partnerships and exchanges as a mechanism to foster linkage opportunities, in order to realize the full potential of the MA process and of individual sub-global assessments. The sub-global assessment teams had widely varying strengths but many were dealing with similar issues—albeit in very different social-ecological contexts. Two of these exchanges are summarized here.

San Pedro de Atacama–Western China Exchange

The San Pedro de Atacama assessment team participated in an exchange with the Western China sub-global assessment. Both teams were assessing the state of their drylands and modeling the hydrological systems in their particular regions. When the Chilean technical team visited the Institute of Geographical Sciences and Natural Resources Research in Beijing, the discussions revolved around issues of desertification, desalination, hydrology, modeling, and information systems. Despite the differences between these two projects in terms of infrastructure, number of researchers involved, and scale of the assessment, the San Pedro de Atacama team identified several useful lessons from Western China that could be applied to their own assessment:

- *Data management.* This included information management, metadata management techniques, and spatial data management based on remote sensing datasets.
- *Technical capacities.* The Western China project shared experiences on the use of satellite imagery to study changes in land use patterns.
- *Water resources management in drylands.* This subject was common to both assessments, but the way it was approached was quite different. Western China focused on identifying the processes that affect the ecosystem (for example, desertification and salinization) and analyzed the implementation of large technical solutions. The Chilean approach was limited to a baseline analysis of the current situation and put emphasis on the interrelation between human and social aspects and the ecosystem.

The exchange activity was completed with the visit of a Chinese technical team to Chile. Among the aspects that were seen to be of particular relevance for the Chinese teams were: the peculiarities of the Chilean dryland ecosystem and the Chilean approach to linking human well-being with ecosystem services, including techniques for including local stakeholders in the assessment process.

The Chilean and Chinese teams continue to foster further collaborations, including comparative research on subjects such as watershed hydrological modeling and training on land use information management.

Bajo Chirripó–Vilcanota Exchange

Both the Vilcanota and the Bajo Chirripó sub-global assessments were conducted by local NGOs with the strong participation of indigenous communities. The Quechua communities in the Vilcanota sub-region of Peru live in deforested rural areas and practice subsistence farming. These Quechua communities still live according to their traditional value system and have safeguarded their customs and beliefs from rapidly encroaching "globalization" factors associated with tourism and national education policies. In contrast, the Cabecar communities of Bajo Chirripó in Costa Rica have managed to safeguard their tropical forests, but not their traditional practices or beliefs. Preliminary assessment work identified the need to reestablish traditional ecosystem management practices, and the belief system that underlies these practices, in order to improve the state of ecosystem services and human well-being in Cabecar communities. To initiate MA activities in both Peru and Costa Rica, the assessment technical teams recognized that the MA conceptual framework would have to be adapted to their local worldviews in order for the concepts to resonate with the communities involved in the work.

The technical teams and community leaders from both assessments met in June 2004 in Cusco to discuss the adaptation of the conceptual framework to indigenous worldviews. Both groups agreed that an explicit acknowledgement of the need for reciprocity between humans and their environment is lacking in the MA conceptual framework. The Cabecar participants were fascinated by the traditional lifestyles of the Quechua people and their knowledge of agriculture and astronomy, but expressed concern for the deforested state of the mountains, the low levels of biodiversity, and the poverty of the people. After observing a large meeting of several Quechua communities that were gathered to assess the state of their soil, the Cabecar team commented that they would like to involve larger groups of local people in their assessment, and specifically more women.

ern Range and Portugal, had started to disseminate their final findings, although some assessments had distributed interim findings to wide audiences.

The task of communicating findings was most often undertaken by the lead institution involved in each sub-global assessment. Generally, the sub-global assessments found it difficult to plan for this final stage, partly because technical teams were more focused on completing the core assessment work than on thinking ahead to outreach strategies, and partly because communication strategies are complex and they evolved as the assessment process matured. As such, many sub-global assessments did not include this aspect of the assessment in their overall budget. To offset some of these costs, the MA made some extra funds available to sub-global assessments for communications.

One of the most important aspects in defining the target audience for communication of findings was scale. Some assessments aimed their principal communication activities at intergovernmental processes and specific regional programs (Caribbean Sea), whereas others focused on national governance structures (Northern Range, Portugal), or on communities and local governing bodies (San Pedro de Atacama, India Local, Vilcanota). The MA encouraged assessment teams to develop materials that could be disseminated outside the assessment locations, to amplify both the reach and impact of the work.

Within each sub-global assessment, the outputs produced (or planned) were diverse and depended both on the needs of the users and on the financial resources available for product preparation and dissemination. The most com-

mon products included reports and summaries (SAfMA, Northern Range, Caribbean Sea, Portugal, Tropical Forest Margins), brochures and pamphlets (Chile, Northern Range, SAfMA, Portugal, India Urban), atlases (Colombia), and educational material such as posters (Northern Range, Caribbean Sea, SAfMA) and calendars (San Pedro de Atacama, Northern Range). Vilcanota produced a video for the dissemination of findings from the assessment process to local communities, but it also attracted attention at the international level when shown at meetings and conferences. As a means of communicating their outputs, the sub-global assessments planned various activities. These included mainly workshops or meetings with users and involvement in decision-making processes at different levels.

Where funding was available, communication partners (such as media or communication specialists) were employed to enhance the potential reach of the assessment findings. SAfMA engaged such a partner and benefited primarily from the media contacts and networking the partner provided. The assessment team learned, however, that more targeted efforts to reach specific decision-makers was not within the domain of communication specialists, and was more effectively accomplished by their own team members. The lead institution in both the Northern Range and Caribbean Sea assessments initiated a program on environment and resource education, based on the knowledge and experience they gained from the assessment work; these institutions will provide on-going forums for the dissemination and use of assessment findings. Some assessments (for example, Tropical Forest Margins, Sinai, São Paulo, and Sweden) took advantage of the well-developed communication process of the global MA, and participated in national user forums organized to disseminate global MA findings, press conferences, and other activities.

Observations and lessons learned include:

- Individual consultation with users followed by group discussion is useful in getting user input and establishing effective communication.
- Advisory group members are a powerful means for communicating the assessment findings, and members should be chosen with this role in mind.
- Establishing the expected outcomes and benefits of the assessment during initial interactions with users increases users' substantive engagement and on-going participation.
- Communicating the MA conceptual framework to the various users builds capacity to understand its main concepts.
- Including a diversity of users in the review process is an important aspect of validation and feedback and thus a part of the communication strategy.

A number of challenges to effective communication noted by the assessment teams include:

- language barriers;
- the difficulty of communicating technical and scientific findings to the general public;
- limited access to the target audience, due to lack of telecommunication facilities and other factors;
- distrust between assessment users as a result of past and current conflicts;
- poor motivation of assessment users; and
- lack of funding, expertise, and capacity.

6.8 Reflections on the Assessment Process

The full challenge for all the sub-global assessments was to conduct an integrated assessment with a focus on both ecosystems and human well-being, and communicating the results to a set of users prepared to use the findings that were relevant to them. This required a multidisciplinary team and a governance structure to integrate the findings from different fields. Energetic and committed team members, adequate data, and readily available assessment methods (or the ability to develop them) were major factors contributing to the completion of the planned work.

Completion of the work is not, however, a measure of an assessment's success, as the full impact of the process and resulting reports can only be seen a number of years after completion of the work, in many cases. When an assessment is completed, it still remains to be seen whether decision-makers at different levels will be convinced of the importance of recognizing the links between ecosystem services and human well-being. An assessment of the impact of the sub-global assessments should be conducted at some point in the future, which will also allow further insights to be developed on the effectiveness of the sub-global assessment process. One measure of success will be if assessment teams and users capitalize on the capacity that was built during these processes and establish on-going programs of assessment and engagement.

All assessment teams cited the MA conceptual framework as a useful tool for communicating the link between ecosystem services and human well-being to their assessment users, as well as for organizing their work. At the local level, some communities rejected the worldview presented in the MA; achieving local ownership of the assessment process necessitated the translation of components of the framework into local terms and concepts. The result was increased saliency at the local level (and increased probability of continuing on with the assessment work)—as well as increased difficulty interpreting and comparing results across the sub-global assessments and with the results of the global-level assessment. (See Chapter 11.)

Some issues remain unaddressed regarding the philosophy that was used to argue for the ''bottom-up'' approach to designing the assessment processes. Ideally, assessments would have met the needs of local users, while at the same time enabling the MA to analyze the interactions among components of the MA conceptual framework in various sociopolitical and environmental contexts. In order to do this, the procedural criteria of the Sub-global Working Group would have had to be more strictly followed, and the sub-global locations selected in a top-down manner to ensure a strict multiscale, nested assessment design and greater comparability among assessments. Assessments could

have also been chosen strategically to allow for the analysis of particular components of the conceptual framework. For example, areas that are strongly affected by specific ''indirect'' drivers (such as rapid demographic changes in Southeast Asia, sociopolitical changes in the former Soviet Union, or changes in cultural and religious values in Bhutan) could have been selected in order to link these indirect drivers to a set of direct drivers of change in ecosystem services. The original concept was to be more selective in this manner (see Chapter 2); however, assessment selection was ultimately driven by user demand and interest on the part of scientists and the user community.

An important question to ask is whether it would have been possible to achieve the goals of greater comparability across assessments and global relevance without sacrificing the numerous assessments that did not seem able to meet strict top-down criteria, or sacrificing the saliency of the assessments to their local users? It should be noted that the initial attempt to be more stringent with the MA criteria was derailed by funding and capacity constraints. Future attempts at incorporating sub-global components into global assessment processes will have to invest serious amounts of money and time into developing the capacity to use common tools or standards across different locations, if they seek to add insight to the global assessment and increase both capacity and knowledge that is useful at the sub-global level.

SAfMA has provided the MA with its desired archetype of a multi-scale, nested assessment, and the full collection of sub-global assessments represents a colorful network of assessments that are salient to their local users and are developing diverse processes for assessing ecosystem services and human well-being. It is not unreasonable to suggest that many assessments in the latter category will have just as lasting, or possibly more lasting, an impact in their local contexts. In addition, some of the slower and more creative processes developing in places like Vilcanota, Peru, or the Western Ghats in India will offer insights at the global level on how various forms of knowledge can be used to inform decision-making, and what processes can be used to gather and validate the necessary information in an assessment.

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