

MONITORING, EVALUATION AND ADAPTIVE MANAGEMENT IN THE  
ARAUCARIAS DEL ALTO MALLECO MODEL FOREST OF CHILE

By

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B.S.F, University of British Columbia, 1990

A thesis submitted in partial fulfillment of  
the requirements for the degree of

MASTER OF ARTS  
in  
ENVIRONMENT AND MANAGEMENT

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April, 2010

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Abstract

Monitoring and evaluation (M&E) is an important management tool within regional sustainability initiatives. This paper explores how M&E can be most effectively applied to help the Araucarias del Alto Malleco Model Forest (AMMF) promote community and natural resource sustainability, and how adaptive management can support the achievement of these goals. The current monitoring and evaluation program at AMMF is comprehensive and results based, corresponding to the desired outcomes and impacts outlined in the strategic plan. It genuinely seeks community feedback, but is overly complex and not well implemented to support the effectiveness of AMMF programs. Opportunities for improvement to the program include adherence to indicator design principles, better integration of M&E within model forest operations, feedback loops, clarity of objectives, and narrowing the focus to areas which are relevant to management decisions and continual improvement. Adaptive management can support the innovation focus of AMMF and provide greater depth to the existing repertoire of model forest planning tools.

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## Acknowledgements

This thesis project would not have been possible without the support of Washington Alvarado, General Manager of the Araucarias del Alto Malleco Model Forest (AMMF) of Chile. Washington's readiness to open AMMF operations to the scrutiny of the research process, and his unwavering enthusiasm for exploring new approaches made the project a memorable and truly worthwhile learning process from start to finish.

The help of María Inés Bustos, model forest anthropologist, was crucial for the development of the interview questions, the interview protocol and the interviewing process itself. I also wish to thank all of the people who generously gave their time for the interviews, and the AMMF staff members who participated in the Resilience Assessment workshop in Manzanar. This workshop was made possible with funding from the CUSO Volunteer Partnership Fund.

Glenn Brown, my thesis supervisor, was endlessly patient with providing his perspectives and insights, frequently over long Skype calls between Chile and Canada, and what amounted to countless hours reviewing my numerous drafts as the thesis slowly evolved. Finally, to friends and family, especially Karla, for patiently enduring the many hours, evenings and weekends that were dedicated to the completion of this project.

## Introduction

Monitoring and evaluation (M&E) has become an increasingly important tool within global efforts toward achieving environmental, economic and social sustainability (Mrosek, Balsillie & Schleifenbaum, 2006; Natural Resources Canada [NRCan], 2000). At national and international scales, sustainability criteria and indicators for M&E are important tools for defining, monitoring and reporting on ecological, economic and social trends, tracking progress towards goals, and influencing policy and practices (Montreal Process, 1998; NRCan, 2000; United Nations, 2000, 2008). At regional and sub-regional scales M&E is important for assessing the sustainability of local practices, and can be an important tool to assist with management planning (Center for International Forestry Research [CIFOR], 1999; Montaña, Arce & Louman, 2006; NRCan, 2000).

Monitoring and evaluation as a tool for learning and continual improvement has been increasingly viewed as key to the success of conservation projects and the sustainable management of natural resources (Meffe, Nielsen, Knight, & Schenborn, 2002; Stem, Margoluis, Salafsky, & Brown, 2005). Continual improvement approaches to M&E include *performance management* frameworks (Behn, 2003) designed to maximize the effectiveness of projects or programs. *Results-based management* (Swiss, 2005) is one such performance management approach commonly used in government and non-governmental organizations. Monitoring and evaluation programs that use feedback to promote learning and continual improvement are also core to the experimentation and systems-based approach to environmental management called *adaptive management* (Biodiversity Support Program [BSP], 2001).

Despite the availability of these management tools the success of conservation efforts remains vulnerable to how effectively they are applied (Schreiber, Bearlin, Nicol, & Todd, 2004). Managers commonly do not have the capacity to effectively monitor progress and evaluate success at landscape and regional scales (Failing & Gregory, 2003; Sayer, Campbell, Petheram, Aldrich, Perez, Endamana, et al., 2007; Stem, Margoluis, Salafsky & Brown, 2005). Due to the complexity of socio-ecological factors associated with conservation projects, Margoluis, Stem, Salafsky & Brown (2009) emphasize that project planning and evaluation is wrought with challenges.

Monitoring and evaluation is promoted as an important planning and management tool within the International Model Forest Network based in Ottawa, Canada. Model forests are geographically defined landscapes that range from several thousand to several million hectares in size. They use a participative governance framework, local collaboration, international networking, innovation based approaches, and local capacity building as strategies to improve the sustainability of forested ecosystems and their associated communities worldwide (IMFN, 2008). Canada introduced the model forest concept at the 1992 United Nations conference on Environment and Development and there are now approximately 50 model forests located in North, Central and South America, Europe, Russia, Asia and Africa.

Canadian model forests have played an important role in the development of criteria and indicators for sustainable forest management (NRCan, 2000). The continual improvement focus of M&E is promoted by the IMFN as a tool for effective program planning and management within individual model forests. Guidance is available to

model forests for the application of the results-based management approach (IMFN, 2004, 2007) to monitoring and evaluating the impacts of model forest programs.

In June of 2007 I approached the regional network of model forests for Latin America, the Caribbean and Spain (Ibero-American Model Forest Network) about collaborating on a thesis research project related to adaptive management. We concurred on the value of exploring opportunities to benefit from adaptive management in model forests. Later that year the Araucarias del Alto Malleco Model Forest (AMMF) in Chile expressed interest in having the research conducted at their site in northern Patagonia. General Manager Washington Alvarado was preparing to undertake a results-based monitoring and evaluation process to assess the impacts of the 2005-2008 strategic plan, the goals of which were to improve socio-ecological sustainability in the region. Due to the importance of M&E to the success and continual improvement of model forest impacts we agreed to direct the research toward maximizing the effectiveness of the results-based M&E program. The features and potential applications of adaptive management would also be explored.

## The Research Location and Research Questions

### *The Research Location*

The Araucarias del Alto Malleco Model Forest (AMMF) is located in the Ninth Region of Chile (see Figure 1). It is a mountainous region bordering Argentina to the east and the Rio Blanco (White River) basin to the west. The model forest area encompasses approximately 400,000 hectares of forest, rangeland, farms, parks, national protected areas, and the municipalities of Lonquimay and Curacautín. The north boundary is marked by the 2865 meter high Lonquimay Volcano, which last erupted in 1988. To the south the model forest is bounded by the 3125m Llaima Volcano which has been erupting periodically since January of 2008. The population within the area of the model forest, including municipalities and outlying rural communities is approximately 27,000.



*Figure 1.* Araucarias del Alto Malleco Model Forest Location in Chile

Note. From *Strategic Plan 2005-2008* (p. 8), by the Araucarias del Alto Malleco Model Forest, Curacautín, Chile. Reprinted with permission.

The landscapes encompassed by the model forest are ecologically rich and culturally diverse. The area's diverse temperate forests have traditionally played an important role culturally and in meeting daily subsistence needs. The region is home to the unique Monkey Puzzle trees (*Araucaria araucana*), the seeds from which have been a staple item in the diet of local indigenous populations over generations.



*Figure 2.* Monkey Puzzle Trees and the Lonquimay Volcano as Viewed Near Quinquen

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The model forest region presently suffers from interconnected issues of poverty and intense pressures on the environment. A thriving forest industry developed early in the 20th century and then collapsed in the 1990's due to overharvest and a lack of adequate policies with respect to reforestation and sustainable yield. A much smaller, remnant forest industry operates today. It includes the collection of firewood and

smelting of charcoal, the harvest and marketing of non-timber forest products, and the harvest of fast growing introduced timber species including Radiata Pine (*Pinus radiata*) and various species of *Eucalyptus*.

Since the collapse of the once much larger forest based economy the region is now among the poorest in Chile. Agricultural activities include wheat and other cereal grains, and the free range grazing of sheep, goats and cattle. Intense pressure from grazing has resulted in the extensive erosion of soils in some zones.

The Araucarias del Alto Malleco Model Forest was established in 2002 with the aim of strengthening local collaboration and involving the full spectrum of local stakeholders with tackling the region's environmental and economic issues. The Model Forest is not a land owner or forest tenure holder. It is intended to be an instrument for facilitating inclusive and partnership-based approaches to achieving local sustainability. Input from community members and the 22 member board of directors is used to plan a program of activities that range from capacity building for sustainable forest management and the development of new markets for non-timber forest products, to research, leadership training, regional planning and micro-credit programs that support the establishment of family-based businesses. The model forest's holistic approach to achieving sustainable development means that the interconnectedness of forests with poverty and other socio-economic factors must be considered. For this reason the AMMF program of activities is diverse.

### *The Research Questions*

With such a broad, multifaceted program, the task of planning model forest activities and assessing their impacts is complex, and it must be done with very limited

resources. With these factors in mind, General Manager Washington Alvarado requested that the research assess the effectiveness of AMMF's results-based M&E framework: Improvements to the effectiveness of the M&E program would logically lead to improvements to the ability of AMMF to achieve its strategic plan objectives. In addition, we agreed to explore how adaptive management could further support the model forest with achieving its goals. Due to the interaction and mutual learning among communities within the International Model Forest Network it is likely that the research findings will be a potential asset not only to AMMF but also to the other model forests internationally.

The following research questions form the basis of this thesis:

*Research question one.*

How can monitoring and evaluation be most effectively applied to support AMMF and other model forests with promoting economic, ecological and social sustainability at regional levels?

*Research question two.*

What is the potential value of adaptive management for helping AMMF and other model forests achieve their goals for the sustainable management of forests and other natural resources?

## Literature Review

### *Varied Purposes and Approaches to Monitoring and Evaluation*

Despite the significant interest among natural resource practitioners for incorporating M&E within conservation projects confusion exists with regard to its effective application (Salzer & Salafsky, 2006). There are several distinct purposes for monitoring and evaluation (Failing and Gregory, 2003; Stem et al., 2005). Managers are not always clear on which purpose and its corresponding approach is most suitable to meet specific program needs (Stem et al., 2005).

In some cases M&E focuses on assessing the condition of biological or socio-economic criteria to improve existing information about factors of concern, such as health or population levels (Salzer & Salafsky, 2006). Stem et al. (2005) refer to these as *status assessment* approaches to M&E. In the field of natural resource conservation, status assessment approaches help managers decide where to focus management efforts by providing information about threats to species or other ecosystem related factors. The findings from status assessment M&E can influence policy and management decisions at broader levels (Stem et al., 2005). Typically, however, status assessment is not linked to specific management activities. That is, status assessment M&E does not provide direct feedback on the effectiveness of specific programs or policies (Salzer & Salafsky, 2006; Stem et al., 2005).

The Millennium Development Goals project (United Nations, 2000), is an example of a global scale status assessment approach to M&E that is intended to measure progress toward sustainability and influence policy decisions at the international level. In the case of forests, the Montreal Process is one approach that works toward obtaining

international agreement on criteria for sustainable forest management, and monitoring progress toward achieving it (Montreal Process, 1998). At local levels the development of criteria and indicators can be useful for defining and tracking regional forest sustainability and the effects of practices within specific forest management units (CIFOR, 1999; NRCan, 2000), and community forest tenures (Montaño, Arce & Louman, 2006).

Second, monitoring and evaluation can be used for *accountability* purposes (Moynihan, 2005; Stem et al., 2005). It can be used to indicate project compliance with required parameters and demonstrate to funding agencies, donors, or the public that resources have been used appropriately. This type of M&E can also be used to verify management practices for the purposes of forest certification (CIFOR, 1999).

A third purpose for M&E is referred to by Failing and Gregory (2003) as *tracking performance*, and by Stem et al. (2005) as *effectiveness measurement*. This approach to M&E is intended to measure the impacts of management actions in order to provide feedback on progress toward goals and the effectiveness of program interventions. In effectiveness measurement, performance frameworks such as results-based and adaptive management incorporate the results of M&E into project cycles designed to facilitate continual improvement (Conservation Measures Partnership, 2004; IMFN, 2004; Moynihan, 2005). A common challenge for resource managers is deciding how many resources to allocate toward effectiveness measurement M&E versus the status assessment approach mentioned above (Salzer & Salafsky, 2006).

Fourth, M&E can be used in a research context to assist with the “gathering or generation of knowledge about a subject to gain a better understanding of the topic”

(Stem el al., p. 297), and to “discriminate among competing hypothesis” (Failing and Gregory, 2003, p. 122). In this context adaptive management uses M&E to facilitate the testing of assumptions about cause and effect, or how specific resource management policies will produce desired outcomes when immediate action is required but insufficient information is available to make informed decisions (BSP, 2001).

Failing and Gregory (2003) define a fifth purpose for monitoring and evaluation. They explain that M&E can be used in a *decision analysis* context to provide insight for choosing amongst a range of policy options. In this case indicators are designed to be used as decision criteria. Failing and Gregory caution that significant misunderstanding can exist around the difference between M&E for decision making and M&E for tracking performance.

In the model forest context a range of these varied purposes for M&E are utilized. The Canadian Model Forest Network has made significant progress in the development and use of local level indicators (LLI) to define and track sustainability in Canadian forests and for use in forest certification (NRCan, 2000). The government of Argentina is currently utilizing their model forest program to pilot a similar status assessment approach to M&E (Secretaría de Ambiente y Desarrollo, 2009). In addition, effectiveness measurement and accountability approaches to M&E are suggested for use within individual model forests through the use of *results-based management* (RBM). The objectives of the recommended RBM framework (IMFN, 2004) are to support individual model forests to rigorously define and evaluate desired program impacts, support the improvement of management processes, enhance accountability to stakeholders and donors, and demonstrate the effectiveness of model forests.

With such varied purposes for monitoring and evaluation it is not surprising that the distinctions between their uses can overlap and become blurred. In Figure 3 I have illustrated the varied approaches, purposes and applications for M&E discussed above and how they might fit within the model forest context. Some overlap between approaches, purposes and applications is apparent, such as my interpretation that results-based management is applicable both to accountability and effectiveness measurement. There also appears to be some overlap between the tracking and influencing purposes of status assessment and effectiveness measurement. I have indicated that adaptive management seems relevant both to effectiveness measurement and to research purposes.

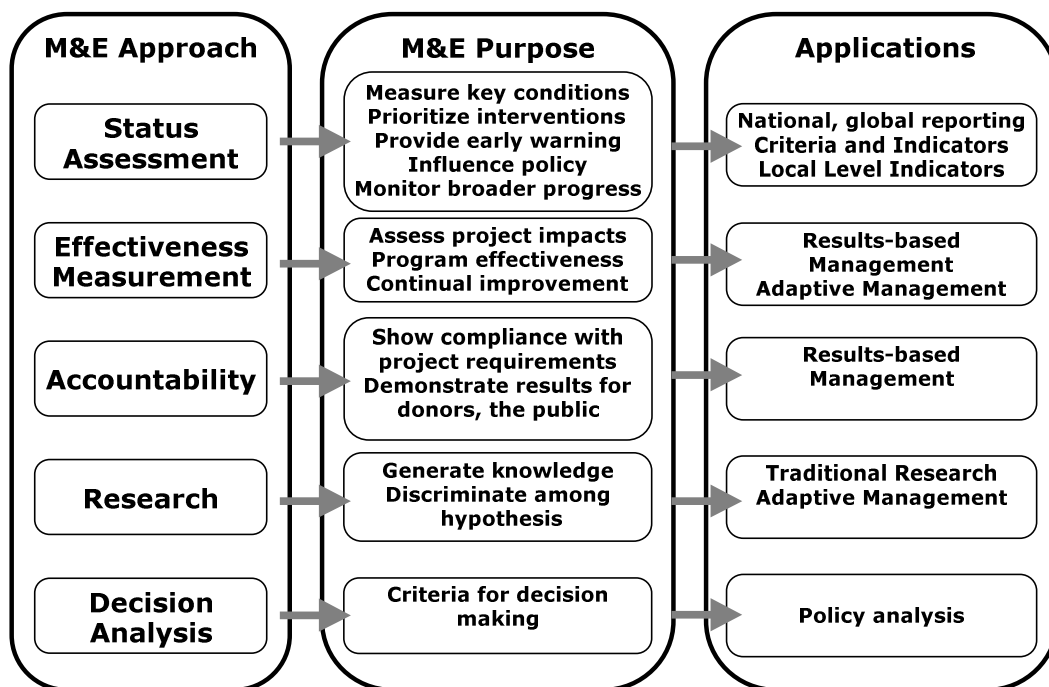


Figure 3: Purposes for M&E as Potentially Applied in Model Forests

Note. Adapted from, Monitoring and Evaluation in Conservation: A Review of Trends and Approaches (p. 298), by C.

Stem, R. Margoluis, N Salafsky, & M. Brown, 2005. *Conservation Biology*, 19, 295 - 309.

In light of the Araucarias del Alto Malleco Model Forest's current emphasis on results-based management the remainder of the literature review focuses largely on the challenges and optimum application of effectiveness measurement and accountability focused M&E. Given the potential overlaps with other approaches, however, and my desire to keep the research connected with the overall M&E context, other M&E approaches and purposes are considered. As well, in order to address the second research question, adaptive management and its potential applications in the model forest context are explored.

#### *Results-based Management for Sustainable Development Projects*

Results-based management is commonly used by international development NGOs (Swedish International Development Cooperation Agency [Sida], 2005) and by national and international government agencies (Canadian International Development Agency [CIDA], 2009; United Nations Development Program [UNDP], 2002). The UNDP's stated objectives for its results-based M&E program include accountability, improved learning, informed decision making and performance, and a sound framework with which to conduct strategic planning. They define results-based M&E (p. 5) as "the measurement and assessment of performance in order to more effectively manage the outcomes and outputs known as development results." CIDA (2008) defines RBM to include measuring progress to objectives and benefiting from lessons learned to improve knowledge and decision making.

To help project planners define how a program or project will eventually lead to the achievement of desired environmental, economic or social conditions, RBM uses

some specific terminologies. Project *inputs* are the financial and other resources dedicated to making a project happen, while *outputs* are the immediate products or results (UNDP, 2002; IMFN, 2004). Examples of outputs could include the quantity of workshops conducted, the amount of people trained, or the number of studies completed.

Project *outcomes* are the immediate changes in condition as a result of a project, such as greater environmental awareness as a result of training workshops. *Impacts* (IMFN, 2004) are longer term changes that result from earlier outputs and outcomes. More sustainable management of local forest resources could be an example of program impact, as could improvements to regional living standards. The IMFN further distinguishes impacts into short, medium and long term. Short and medium term impacts are more closely tied to direct project results at the project location and adjacent areas. Long term impacts are expected to extend to broader society and correspond to ultimate program objectives. Impacts can also be unintended and harmful.

In RBM, the assumed cause and effect relationships between program inputs, outputs, outcomes and impacts are organized in a tabular format known as a *logic model* or *results chain* (CIDA, 2008, IMFN, 2004). The process of developing and summarizing each of the steps in the logic model or results chain is referred to as the *logical framework approach* (Sida, 2005). In Figure 4 I have illustrated the results chain sequence and how it is linked to monitoring and evaluation.

Each output, outcome and impact in the results chain is assigned an *indicator*. Indicators are defined as “units of information that are measured over time and that document changes in a specific condition” (Margoluis & Salafsky, 1998, p. 92). The *monitoring* component of results-based M&E is the collection and tracking of data

specific to each indicator so that the level of achievement of specific objectives can be determined. *Targets*, defined as a “quantifiable level of outcome or impact being sought” (IMFN p. 39) identify the desired levels or changes in condition for each indicator.

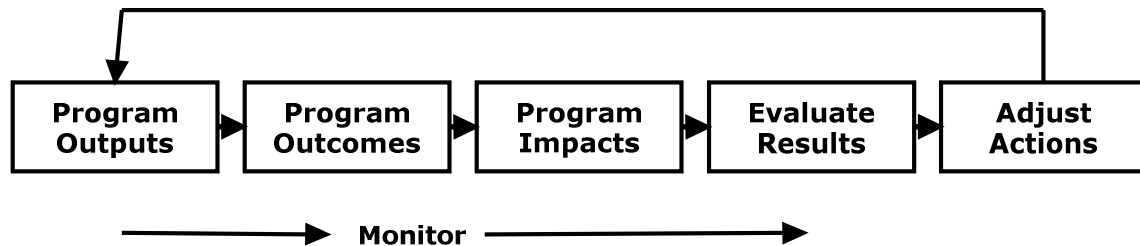


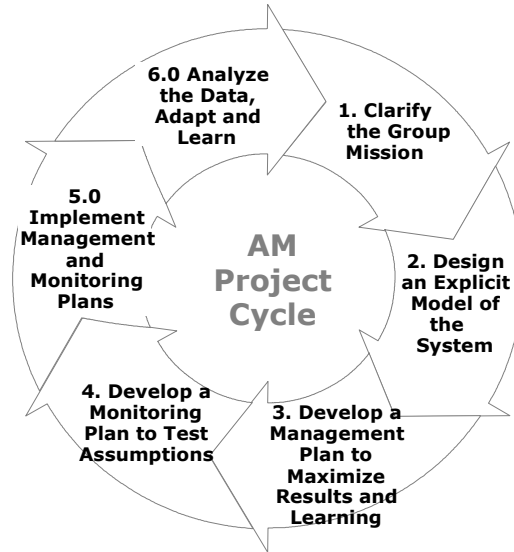
Figure 4. How the Results Chain and M&E are Linked.

*Evaluation* assesses the degree to which targets were achieved, the factors that contributed to success or failure (UNDP, 2002), and whether the assumptions in the results chain about cause and effect were correct (Margoluis and Salafsky, (1998). Evaluation should result in recommendations for improving program effectiveness, (UNDP), which if implemented, complete the RBM *project improvement cycle* consisting of planning, implementation, monitoring, evaluation and adjustment (CIDA, 2009; IMFN, 2004; UNDP, 2008).

#### *The Systems and Experimental Focus of Adaptive Management*

Adaptive management was developed by C.S. Holling and his colleague Carl Walters in the 1970s. It was intended to provide a rigorous framework for developing and testing assumptions and policies to deal with complex natural resource issues when immediate action is required but the scientific knowledge base is incomplete (BSP, 2001; Schreiber, Bearlin, Nicol, & Todd, 2004). While adaptive management uses a project

improvement cycle (Figure 5) which is similar to that described above for RBM, it is distinct from RBM due to its systems-based approach and purposeful experimentation.



*Figure 5. The Adaptive Management Project Cycle*

Note. Adapted from, *Adaptive Management: A Tool for Conservation Practitioners*, (p. 34), by the Biodiversity Support Program, 2001, Washington D.C.

A key element to adaptive management is the recognition of the complexity of natural systems and the development of a model to help understand this complexity (Gunderson, Holling & Light, 1995; BSP, 2001; Schreiber et al., 2004). Often the model is a simple conceptual model, displayed as boxes and arrows that describe how a system is believed to function (e.g. Margoluis & Salafsky, 1998; World Wildlife Fund, 2005). Sometimes the model is a more complex mathematical model or computer simulation.

Developing the model helps to better understand factors and relationships that influence (and sometimes threaten) the system of concern (Gunderson, Holling & Light, 1995; BSP, 2001; Schreiber et al., 2004). It also helps in developing assumptions about the causes of environmental issues and compare alternative courses of action (BSP,

Schreiber et al., 2004; Stringer et al., 2006). Schreiber et al. note that simple models are often more appropriate, require less data and can be completed faster. The process of developing a model can also be helpful for developing a shared understanding of the problem and the potential solutions (Margoluis and Salafsky, 1998). Model development fits within phase two of the adaptive cycle shown in Figure 5.

Gunderson et al. (1995) discuss how traditional attempts to control ecological variables have frequently resulted in large scale systems failures such as fisheries collapse or insect outbreaks. In an effort to avoid these past mistakes, adaptive management is being applied in a range of formats by a number of organizations internationally. These include the British Columbia Ministry of Forests (1999) and international conservation organizations.

The World Wildlife Fund, Conservation International and the Nature Conservancy use adaptive management as a tool to successfully manage conservation projects (Conservation Measures Partnership, 2004). Pierce Colfer (2005), discuss how the Center for International Forestry Research (CIFOR) is experimenting with an *adaptive collaborative management* approach that accounts for the inherent uncertainties in forest-social systems, avoids standardized solutions and works closely with local people to create conditions for change. Walker and Salt (2006), discuss how a learning, experimentation based approach that fosters novelty and innovation helps build community and ecosystem *resilience*. Along with Plummer and Armitage (2007) they define resilience as a system's ability to absorb disturbances and still maintain its fundamental attributes and functionality; that is, avoid a fundamental change of state or regime.

The adaptive management process can be helpful with decision making and community engagement in multi-stakeholder settings. Mog (2005) found that it was important to the success of a project in the Philippines led by the International Centre for Research in Agroforestry. Adaptive management helped engage local stakeholders by encouraging farmer-led experimentation and informal exchange of information among community members.

Plummer and Armitage (2007), and Armitage, Berkes and Doubleday (2007), discuss *adaptive co-management*, which usually involves two or more major stakeholders collaborating together. They feel that adaptive management's active experimentation approach has enriched the effectiveness of natural resource governance through the facilitation of shared learning amongst groups of stakeholders that include government agencies. Stringer, Dougill, Fraser, Hubacek, Prell, & Reed et al. (2006) found that several steps of the adaptive management cycle, including the development of conceptual models, indicators and the monitoring process itself can serve as forums for engagement, consultation, power sharing and shared learning.

#### *Challenges with the M&E Aspects of Results-based and Adaptive Management*

In order to effectively assess and recommend improvements to the implementation of an M&E program such as that of AMMF it is important to be aware of the strengths and potential difficulties that could be encountered. The literature suggests that despite the importance of monitoring and evaluation to results-based and adaptive management, M&E is vulnerable to deficiencies in its application. There are predictable kinds of challenges that often occur and if these are not addressed then the potential value

of M&E may not be realized. Following are nine major challenges, with some of the responses to them recommended in the literature.

*Clarity of objectives and end goals.*

The design and effective implementation of M&E becomes significantly more difficult when program objectives are not clear (Margoluis et al., 2009; Schreiber et al., 2004). Failing and Gregory (2003, p. 125) emphasize that for the development of decision related indicators it is critical that program objectives be “measurable, understandable, relevant to the policy alternatives under consideration, and sensitive to meaningful thresholds.” They observe that managers frequently neglect to define the fundamental objectives, which they refer to as the *endpoints*. If the intention is to manage for forest biodiversity, for example, they argue that the term biodiversity is not sufficiently clear by itself. Fundamental reasons for the protection of biodiversity would be more likely to encompass specific issues such as the protection of a specific ecological service like water quality or habitat for a targeted species.

Failing and Gregory (2003) stress that lack of clarity around endpoints presents difficulties for assigning relevant indicators to measure progress. They emphasize the importance that each indicator should relate to the achievement of its corresponding end point and be linked directly to a relevant management or policy question. It seems reasonable that this challenge would be applicable to the indicator approach of RBM.

*Excessive complexity*

One of the common challenges to M&E is excessive complexity. Sida (2005) found that for development NGOs the logical framework approach can quickly become

unmanageable, with overwhelming numbers of indicators. Complex LFA frameworks can be difficult to communicate to program partners, and the training and investment required to manage the process is beyond the reach of some NGOs (Sida).

Behn (2003) cautions that the confusion which arises from having large quantities of performance indicators can hinder the learning process rather than support it. In the case of adaptive management, Salzer and Salafsky (2006) found that overly complicated M&E frameworks can divert a large proportion of limited resources away from project implementation.

To avoid these types of difficulties it is best to keep M&E programs relatively simple and limit the number of indicators (Failing & Gregory, 2003; BSP, 2001; Sida, 2005; UNDP, 2002). The Conservation Measures Partnership (2004, p. 13) recommends focusing M&E programs on “what you need to know” by linking them closely to goals, objectives and activities. They also recommend that indicator monitoring activities be incorporated within regular management routines where possible to minimize duplication and minimize extra work. Sayer, Campbell, Petheram, Aldrich, Perez, Endamana et al. (2007) recommend focusing data requirements on existing sources and minimizing the collection of primary data. Their suggested M&E framework accommodates a minimum of 25 and a maximum of 40 indicators.

#### *Challenges with indicator design.*

Sida (2005) found that the design of appropriate indicators is a common challenge for development NGOs. They state that there is frequently confusion between indicators and objectives. Indicators (which should be units of information measured to document change) can be inappropriately written to resemble targets (quantifiable levels of outcome

or impact being sought). Sida cautions that when indicators are confused with objectives in this way projects can mistakenly drift toward achieving the indicators instead of keeping the original objectives as the prime focus.

The data needed for measuring indicators should be feasible and realistic to collect (Sida, 2005). The UNDP (2002, p. 69) observes that practicality - that is, “how easy it is to obtain and analyze data for the indicator,” is a key test for effectiveness. Sayer et al. (2007, p. 2686) recommend that indicators be “easy to understand and use by local land users.” Margoluis and Salafsky (1998) suggest that indicators for adaptive management should be precise, consistent and sensible and linked to objectives. The methods for data collection should be cost effective, reliable, feasible and appropriate. Clear Horizon (2005), and the UNDP suggest using the SMART rule (specific, measurable, achievable, relevant and time-bound) to assess the effectiveness of indicators and minimize quantity.

While quantitative indicators are preferred where possible, a complementary mix of quantitative and qualitative is best (IMFN (2004). The UNDP (2002) agrees, stating that while quantitative indicators are more efficient, qualitative indicators may be preferable when measuring changes to attitudes and behaviors. Stem et al. (2005) feel that a mix that includes both qualitative and social variables is best.

It may not always be possible to find cost effective indicators that measure outcomes or impacts directly. In these cases it is recommended that proxy indicators are used (Sit & Taylor, 1998; CMP, 2004; IMFN, 2004; UNDP, 2002). Instead of measuring an intended impact directly, proxy indicators assess the condition of a related factor. It is

hoped that a change in condition or level of the substitute factor will predictably correspond to changes in the targeted outcome or impact.

*Systems understanding.*

Insufficient planning and design, particularly with respect to understanding the dynamics of the system in which management actions are intended to intervene can result in the failure of adaptive management (Schreiber et al., 2004). The complex biological, social, economic and cultural interactions associated with conservation projects must be understood for evaluation to be effective (Plummer & Armitage, 2007; Margoluis et al., 2009), and for effective indicator design (Failing & Gregory, 2003). Margoluis et al. argue that conceptual models are preferable to results-based management's logic model approach as they more fully illustrate cause and effect relationships and help to define assumptions about how project interventions will achieve desired results. This makes it easier to design indicators that monitor the validity of the key assumptions about how project strategies will achieve desired impacts.

*Baseline data.*

Effective monitoring and evaluation should incorporate *baseline* data (Behn, 2003; IMFN, 2004; UNDP, 2002). The baseline is a record of the condition of key variables at the project start. With the baseline as a reference point it is possible to measure progress from starting conditions forward towards desired impacts. Margoluis et al. (2009) observe that baseline data is commonly absent and this is a challenge for effective evaluation of conservation projects.

In the absence of baseline data it is sometimes still possible to estimate what the baseline was at project commencement (Margoluis et al., 2009; UNDP, 2002). The UNDP suggests asking people for their perceptions about how conditions have changed during the time period of the project. In their example for a local governance project (p. 67), stakeholders might be asked the question: “Compared to three years ago do you feel more or less involved in local decision making?” While this type of approach is not able to quantify the amount of change it may be enough to indicate whether change has occurred and in which direction.

*Attribution and measurement of short versus longer term impacts.*

Knowing how much emphasis to place on the measurement of outputs, outcomes and short term versus long term impacts is another concern when designing M&E plans. Behn (2003) states that M&E should be applied to the full range. Others (Sida, 2005; International Development Research Center [IDRC], 2001) caution that M&E should be focused on shorter term behavioral changes (e.g. outcomes and short term impacts). The IDRC emphasizes that long term impacts are less feasible to measure than short term impacts: Long term impacts (e.g. improved standard of living) are further removed from the direct influence of program activities and are likely influenced by other organizations working in the area. This makes the attribution of long term impact to a specific organization or program difficult.

*Appropriate levels of participation in M&E.*

Broad-based stakeholder participation is important to the implementation of RBM based monitoring and evaluation programs (CIDA, 2009; IMFN, 2004; UNDP, 2002) and

adaptive management (Margoluis & Salafsky, 1998). Participation helps with the development of stakeholder interest, understanding, commitment, a sense of ownership toward the results (Margoluis & Salafsky; UNDP), and stimulating exchange of ideas about preferred outcomes (Sayer et al. 2007). Program impacts should be designed in a manner that builds stakeholder consensus, and it is necessary to support the development of adequate technical capacity among participants (IMFN).

Accountability focused M&E processes like certification of sustainable forest management practices or reporting to project donors often require independent third party participation in an auditing role. When the purpose of M&E is organizational learning and continual improvement, however, it may not be necessary to involve outside parties in the process (Salafsky & Margoluis, 2003). In these cases it makes more sense to conduct M&E with internal resources to maximize the learning process.

While participation in M&E is clearly important, Sida (2005) caution that the time and resources needed to develop a logic model using a participatory process are substantial. This can be a problem for development NGOs. Sayer et al. (2007) recommend combining stakeholder participation with expert judgment when developing indicators. They note that it is not always feasible to include all interested parties directly in an M&E program. McShane and Wells (2004) point out that the question of what is the most appropriate or desirable amount of participation from stakeholders is unresolved.

*Lack of purposeful learning and feedback loops.*

Monitoring and evaluation functions which are intended to result in learning and improvement are sometimes not well applied. Moynihan (2005) says that performance management is sometimes treated merely as a reporting mechanism with no intention

toward genuine learning or change. Organizations that limit change to “doing the same thing better” (Moynihan p. 204) versus being open to meaningful change do not benefit from the learning that is possible when basic assumptions, strategies, goals and relevance are periodically revisited. Such a deeper openness to change is referred to by Moynihan as *double-loop learning*. Organizational cultures that punish mistakes tend to discourage learning and the effectiveness of M&E (Meffe et al., 2002). As well, significant learning opportunities can be missed when M&E fails to pick up on unexpected results (Behn, 2003).

Critically important is the presence of a feedback loop that links the findings from monitoring back to decision making processes. This way, learnings can be incorporated into the next management cycle (Margoluis & Salafsky, 1998). In the context of decision making for forest biodiversity, Failing and Gregory (2003 p. 131) recommend that each indicator be “linked to an hypothesis about how it is expected to be affected by a policy and how it, in turn affects an endpoint that people care about.”

Even if learning does occur the new knowledge may not be used to facilitate change and improvement. Moynihan (2005) suggests the need for learning forums where program successes, failures and basic assumptions can be considered in a non-confrontational manner. Stem et al. (2005) recommend there be clarity with respect to the actions required and persons responsible for transforming learnings into improvement. The Conservation Measures Partnership (CMP, 2004) recommends analyzing the information obtained from M&E on an ongoing basis to understand what is happening and why project interventions are working or not. Swiss (2005) warns that improvement will not occur unless the appropriate people have the capacity to act on lessons learned.

*The one dimensional and rigid nature of the logical framework approach.*

There are some inherent disadvantages to the logical framework approach that can result in challenges to effective project planning, monitoring and evaluation. Sida (2005) found almost unanimous complaint amongst development NGOs that the “linear logic” and “one dimensional” aspect of the LFA does not reflect the complex reality of on-site development project implementation:

It is a mechanistic idea of cause and effect as if we can turn the key in the engine of development and the wheels start turning. Unfortunately (for the logical framework approach at least) we are not working with such a self-contained systems and there are so many factors involved which lie beyond the scope of the planned initiative that will change the way things work (p. 12).

A related shortfall is that due to the focus on monitoring only indicators that are linked to anticipated outcomes and impacts the LFA may fail to recognize unexpected and possibly negative project impacts (Sida, 2005). The IMFN (2004) and CIDA (2009) recommend the development of *risk management* strategies that may help to address these types of uncertainty. While these measures might help it is still difficult to account for factors that were not considered in the first place. Here we encounter additional limitations of the LFA: Once in place it can be difficult to make mid-course changes from the detailed pathways set out in the logic model (Sida, 2005). This rigidity limits the possibility of making adjustments to strategy in response to new information or unexpected outcomes.

*Other Approaches to Effectiveness Measurement M&E*

There are other approaches to effectiveness measurement, some of which try to avoid the pit falls of RBM and the logical framework approach. Sida (2005) would like to see a new focus that maintains the strengths of the LFA while avoiding its tendency to hold programs to actions that may have become inappropriate since original project assumptions were developed. In this scenario, program outputs would be flexible and able to change in response to the results of M&E, while keeping the end goal in mind.

Canada's International Development Research Center (IDRC, 2001) describes an effectiveness evaluation approach known as *Outcome Mapping*. Outcome Mapping focuses on the measurement of shorter term behavioral related outcomes. This is in large part to avoid the difficulties mentioned previously with the measurement and attribution of long-term impacts. Outcome Mapping is premised on the concept that while long-term impacts are critically important and reflect ultimate program objectives, the effective management of shorter term changes will eventually lead to their achievement.

Clear Horizon (2005) describes an approach called the Most Significant Change (MSC). MSC is a participatory M&E process based on the collection of stories of significant change from project participants at the field level. The technique is intended to facilitate meaningful contribution to the M&E process from rural participants and designed to be effective in diverse, multi-stakeholder rural development programs. Proponents of MSC feel that its avoidance of indicators helps to reduce M&E program complexity compared to RBM. Among the strengths of MSC is its ability to identify unexpected changes, foster ownership of M&E results, and develop a holistic picture of the situation being managed.

Sayer et al. (2007) suggest that there are limited instances of M&E frameworks that successfully take an integrated approach to measuring program outcomes in the socio-ecological and political contexts of a landscape scale (such integrated landscape scales would be similar to the model forest context). They present an approach to selecting indicators based on each of five *asset-based livelihood* categories, five kinds of *capital assets* (social, financial, physical, human and natural) and an additional *conservation* category. The approach uses participatory techniques including *rich pictures*, *historical trends analysis* and *participatory modeling* to facilitate stakeholder dialogue and agreement around desired outcomes and indicators. They conclude it is possible to design integrated and landscape level indicator frameworks that are effective and simple.

Plummer & Armitage (2007) propose a somewhat similar framework that is designed for evaluating the outcomes of adaptive co-management. It is based on the recognition of the continually changing and unpredictable nature of socio-ecological systems. They present a framework of *ecological parameters*, *livelihoods parameters* (economic and social factors) and *process parameters* (stakeholders, interests, connections across multiple scales). From this process indicators are developed to evaluate outcomes that contribute to resilience and socio-ecological sustainability.

#### *Principles for Effective Application of M&E*

Despite the many difficulties discussed above experts remain convinced of the value that M&E brings to the continual improvement of conservation and sustainable development projects (Salzer & Salafsky, 2006). With respect to the LFA, Sida (2005) notes that, despite its problems it is seen by most development NGOs as the “best of a

bunch of bad options” (p. 1). To increase the probability of M&E success it is important to be aware of the key principles for effective application and the potential stumbling blocks to avoid. I summarize the recommended principles for effective application of RBM and adaptive management oriented M&E in Table 1.

Table 1.

*Key Principles for Effective Results-based and Adaptive Management M&E*

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Principle	Description
Simple Design	Minimize indicators and effort required for data collection.
Clear Objectives	Fundamental program objectives (end points/impacts) are clear.
Systems Approach	Understand system dynamics, cause & effect, key assumptions.
Effective Indicators	Simple, precise, understandable, relevant, measurable, reliable, realistic to collect, linked to objectives vs. means.
Internally Consistent	Indicators are linked tightly to objectives.
Integrated	M&E integrated within operations, responsibilities are defined.
Feedback Loop	M&E results linked to learning forums, decision making processes.
Genuine Learning	Challenge basic assumptions and strategies. Indicators linked to key management questions. Mistakes are opportunities to learn.
Flexibility	Able to change course based on the results of monitoring.
Participatory	Involve stakeholders, build capacity for diverse involvement.
Base line	Establish a baseline where data is available.

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## Methods

I selected a *case study approach* for my research due to its strengths in addressing complex and real life contexts (Yin, 2003). The case study approach is used frequently in practice oriented fields such as urban planning, public policy, and management science (Yin). These are environments which reflect the multi-stakeholder context of model forests. While case studies have faced criticisms in the past as lacking the rigor and objectivity of more traditional scientific methods, the case study approach is becoming increasingly accepted. Yin emphasizes that with careful design and implementation, case studies produce valid, valuable results.

The research process reflects a *participatory action research* approach (Berg, 2007). It responds to a real organizational need, involved model forest participants with the design of the research, used information from model forest participants, and modified initial results and recommendations based on this information. My direct involvement as a temporary staff member supporting the model forest M&E process from July to December, 2008 is also reflective of a participatory action approach. The results of the research will be shared: An abbreviated version of the thesis will be translated to Spanish and made available to AMMF stakeholders and other model forests in the network.

To address the research objectives in a comprehensive manner I collected qualitative data about the design and implementation of the M&E process and the relevance of specific features of adaptive management. I collected the data from a variety of sources, using four methods. This *triangulation approach* (Berg, 2007), allowed for the cross checking of data and results from the different methods in order to confirm the

validity of the findings. The methods used, as detailed below, were: an internal document review, a log of personal observations, semi-structured interviews, and group creation of conceptual diagrams. All four methods contributed information concerning the monitoring and evaluation program. The first and fourth methods provided data concerning adaptive management.

#### *Internal Document Review*

The document review took place during the months of July and August, 2008, prior to the other steps in the research process. First I examined the *2005-2008 AMMF Strategic Plan* (AMMF, 2005) and the annual operations plan for 2008 (*Plan Operacional Anual*, 2008) to gain a perspective on the model forest background, strategic objectives and operations. Next I assessed the design of AMMF's monitoring and evaluation framework (*Marco de Monitoreo y Evaluación*, AMMF, 2005). I also compared the indicators and targets against effectiveness principles identified in the literature review. I then looked at project and staff reports, meeting minutes and other documents for evidence of ongoing monitoring and evaluation activities.

With respect to adaptive management I reviewed the IMFN website, the *Impact Monitoring and Evaluation Handbook for Model Forests* (IMFN 2004), the *Framework for Model Forest Strategic Plan Development* (IMFN, 2008), a one page document entitled *Principles and Attributes of Model Forests* (IMFN, 2008) and the *AMMF 2005-2008 Strategic Plan*. I looked to see if adaptive management is specifically mentioned in these documents. I also looked to see if the objectives and strategies outlined within the documents align with or could benefit from the potential contributions offered by adaptive management.

I recorded the results of the document review in structured notes. The notes were used to initiate ideas about the strengths and weaknesses of the M&E program design and implementation. Ideas and tentative hypothesis generated in the document review were incorporated into the questions asked during the semi-structured interviews, and /or specific questions to model forest staff and partners, test their validity and obtain additional perspectives.

### *Personal Observations and Log*

During my involvement with the strategic planning process, including participation in staff meetings, community workshops and trips to the field I made personal observations related to the research. From time to time I asked questions of model forest staff and partners to help verify my understanding of the M&E program, to obtain experienced opinion related to the research questions, and to assist me with language or culturally sensitive interpretations. The discussions and observations were recorded in a research log. This information was brought into the analysis when useful in corroborating or amending findings from the other data sources.

### *Semi-structured Interviews*

I interviewed fifteen people in fourteen semi-structured interviews during November and December, 2008. The interviews took place in Spanish. I selected the participants based on a stakeholder analysis (Appendix A) and consultation with the AMMF staff anthropologist. Interview candidates were selected to provide a good representation of the people involved with or affected by the model forest. Seven interviews were conducted with members of the model forest board of directors (BOD).

Two of the BOD members were from local government agencies. The other five BOD members were from a national environmental NGO, a local municipality, a local university, a community of rural colonial descent, and a community of rural indigenous descent. I also interviewed four members of the model forest staff, and four community members who had been direct beneficiaries of model forest projects.

Notes were taken during the course of the interviews. With the permission of interviewees the discussions were taped using a digital recorder. There was one exception where, due to some nervousness on the part of a rural interviewee, I felt it would not be appropriate to request a recording. In this case only notes were taken. Early during the design of the research process the AMMF anthropologist, Ms. María Inés Bustos, and I felt that it would be necessary for a model forest staff member to accompany me on the interviews (see Interview and Workshop Guidelines in Appendix B). This was to provide a familiar contact and assist with any communication difficulties. When the time came to do the interviews, however, this was no longer felt necessary. I had previously met most of the interviewees and I was able to communicate with them adequately in Spanish. In cases where I did not already know an interviewee Ms. María Inés Bustos came with me to present the invitation and make introductions. In one case I was accompanied by an AMMF agricultural extension worker to an interview in a remote rural area.

The interview questions were directed toward enquiry around stakeholder awareness of and understanding of the current monitoring and evaluation program, effectiveness of the program in supporting AMMF's program objectives, and recommendations for improvement. Due to the varied education and literacy levels within the region of the model forest it was necessary to design two sets of interview questions.

One set was designed to be meaningful and relevant to professionals working for local agencies and institutions (Appendix C). A similar but simpler set of questions was designed for rural participants, some of whom had been direct beneficiaries of model forest projects (Appendix C). Both sets of questions were developed with the help of Ms. María Inés Bustos and Dr. Glenn Brown.

The interview recordings were transcribed to 42 single spaced pages of typewritten notes. Due to an intermittently poor recording quality I was not able to transcribe 100% of the recorded data. In the cases (about 15% of the time) where full transcription was not possible I was usually able to supplement the recorded data with the hand written notes I had taken during the interviews. These two sources together provide confidence that the significance points made during the interviews have been captured accurately. In the few cases where doubt existed about the meaning of a statement the data was not incorporated into my analysis. In cases where interviewees elected to remain anonymous I avoided presenting information within the analysis that could lead to their identification.

Content from the interviews was analyzed by means of coding each idea presented and later grouping the emergent themes into similar categories (Berg, 2007). These results occupy 33 single spaced, typewritten pages (17 pages of coding and 16 pages sorted according to theme). The key findings from the interviews are presented in the form of a discussion of the prevalent patterns, how the interview results relate to the research questions, and how they relate to the results from the other methods.

*Group Development of Conceptual Models*

Discussions with the AMMF General Manager early during my time on site led to a decision to explore a potential application of adaptive management in the model forest. We decided to conduct a trial of a group process developed by the Resilience Alliance. The process is referred to as *Assessing and Managing Resilience in Social-ecological Systems* (Resilience Alliance, 2007). The assessment of resilience involves the creation of several conceptual models of key factors in a given social-ecological system. During the process we explored historically relevant forces affecting the local forests and community, and the key relationships, influences and ecological thresholds affecting two specific ecosystems.

The model building exercise seemed appropriate due to its systems-based approach to understanding complex social-ecological factors, a context similar to that of the model forest region. Such understanding is a prerequisite of adaptive management (BSP, 2001; Schreiber et al., 2004) and can help with the development of M&E indicators (Failing & Gregory, 2003; Margoluis et al., 2009). As well, the Resilience Alliance process is participatory in nature, making it an appropriate tool to reflect model forest values. Due to the limited time available our purpose for undertaking the Resilience Alliance process was not in taking it exhaustively through to completion, but to explore the results and potential applications in the model forest context.

Results and Discussion: The Monitoring and Evaluation Program

*Document Review Results and Discussion*

*The 2005-2008 AMMF strategic plan.*

The 2005-2008 *Araucaria del Alto Malleco Model Forest Strategic Plan* (AMMF, 2005) is a 58 page document. It describes the model forest territory, its peoples, challenges and assets. It also describes the long term vision and priorities for the model forest region as defined by participants at a series of AMMF planning workshops held in 2004. The wide range of local actors that were involved with the strategic planning process includes local communities of indigenous and colonial descent, government agencies, environmental and social sector NGOs.

The AMMF organizational structure contains nine full time staff members. These positions include administrative support, agricultural and forestry extension workers, an intercultural advisor, an anthropologist and general manager. The general manager reports to a 22 member board of directors, the members of which represent the local actors mentioned above. Funding for the model forest comes from the national forests ministry, project specific awards and international sources. The proposed budget for 2005 was US\$570,000.00.

In response to concerns voiced by community stakeholders the 2005-2008 strategic plan attempts to address a broad and diverse range of regional issues. Strategic areas include the themes of participatory governance, regional planning, local economic development and sustainable use of forest and agricultural resources (Table 2). Given the finite resources available to the model forest the program appears ambitious. On the other hand it clearly recognizes the importance of addressing interconnected social, ecological

and economic factors as an approach to achieving local sustainability and community well being. Several successful AMMF projects undertaken prior to 2005 are described in the plan. For its efforts prior to 2005 AMMF was selected from among 400 other Chilean organizations for a national environment and citizenship innovation award.

Table 2.

*Priority Areas within the 2005-2008 AMMF Strategic Plan*

Priority	Description
One	Community Participation and Citizenship
Two	Regional Organization and Development
Three	Local Economic Development
Four	Natural Resource Management and Conservation
Five	Improved Organizational Effectiveness

Each of the five priority areas in the strategic plan is accompanied with specific goals, objectives and actions. These are the basis for the logical framework approach described in the literature review. Each action in the strategic plan is the foundation from which the subsequent outputs, outcomes and impacts are summarized in the logic model. I review the strategic plan priorities and goals below. The M&E program and plan are reviewed in subsequent sections.

I assessed the goals and corresponding objectives for each of the five priority areas, comparing them with the criteria of clarity (Margoluis et al., 2009; Schreiber et al., 2004) and measurability (Failing and Gregory, 2003). The priority one goal: “strengthen democracy and community participation in the sustainable management of natural

resources” appears to be clear, although somewhat broad and possibly a challenge to measure. The corresponding objective of building the capacity of leaders and strengthening grassroots organizations is more precise.

The intent behind the priority two goal: “improve coordination between agencies to increase the effectiveness of development initiatives” seems only moderately clear. The nature of the development initiatives is not defined could imply a range of different focuses. It is not very apparent how the corresponding objectives to increase and organize information and strengthen local culture and identity relate specifically to the achievement of the goal.

The priority area three goal: “contribute to the development of a diverse, sustainable, and innovative economy which improves the standard of living for local residents” seems clear and likely more easily measured. The corresponding objectives of improved marketing, improvements to tourism, farming activities and the support of small business development also appear clear and correspond well to the goal.

The priority area four goal: “contribute to sustainable natural resource management, increasing the social, environmental and economic value of natural resources” is understandable and clearly addresses important topics for the model forest region. Similar to the examples above, however, it is quite a broad topic. Specific social, environmental and economic values have not been defined. The corresponding objectives of increased environmental awareness, restoration of degraded and eroded ecosystems and preserving native forests through sustainable management help to clarify the intent of the goal, but I believe there is an opportunity to be more specific. How, for example, is sustainable forest management defined?

There may be an opportunity then to improve the clarity and precision of priority area four, and some of the other priorities discussed above. I did not review the goals and objective for priority area five due to space limitations and its focus toward internal organizational objectives verses the external, community oriented objectives of the other four areas.

*General design of the monitoring and evaluation program.*

The Araucaria del Alto Malleco Model Forest's plan for monitoring and evaluating program impacts is contained in a document entitled *Marco de Monitoreo y Evaluación* (AMMF, 2005). The plan was designed according to guidance provided by the *Impact Monitoring and Evaluation Handbook for Model Forests* (IMFN, 2004). The Marco de Monitoreo y Evaluación (M&E Framework) is 35 pages long. It describes a project improvement cycle similar to the example discussed in the literature review. Templates are provided for a series of monthly and bi-annual reports, the data from which is intended to assist with the measurement of M&E indicators.

Specific staff positions are delegated to implementing various tasks within the M&E program. These tasks include distribution of the M&E plan to stakeholders, the training of staff and committee members for the implementation of M&E, and the incorporation of M&E within annual work plans, programs and projects. A requirement for annual evaluation retreats is also described.

The M&E Framework contains a logic model similar to that described in the literature review. In the logic model 72 outputs, outcomes and impacts (Figure 6) are designated to correspond to the five priority areas in the strategic plan. These consist of 27 outputs, 15 outcomes, 14 short term impacts, 9 medium term impacts and 7 long term

impacts. In turn, 77 indicators were assigned to measure each of the outcomes and impacts identified. Indicators were not assigned to program outputs.

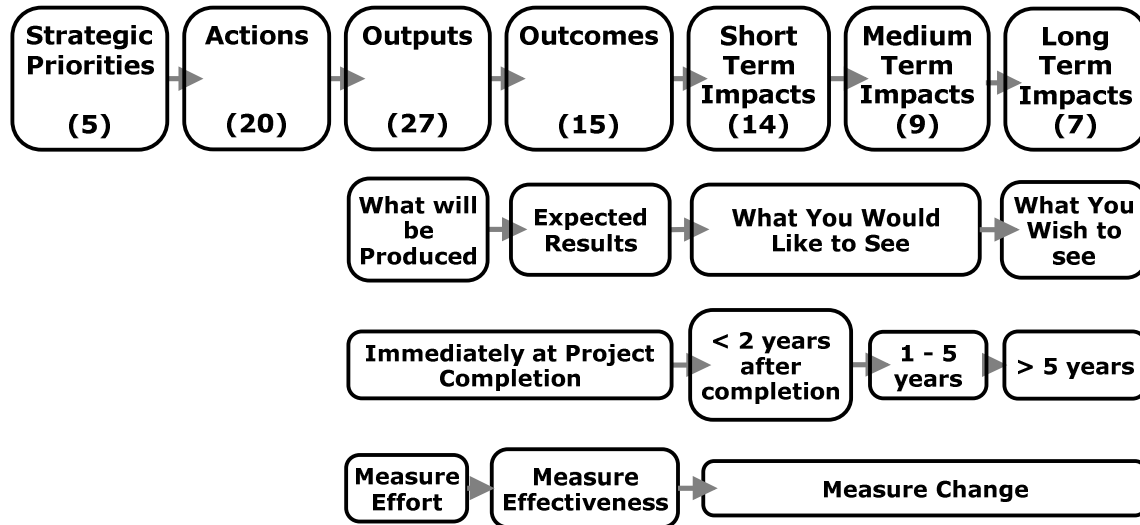


Figure 6: Design of the AMMF Logic Model based on IMFN Guidebook Criteria

Note. Adapted from, *Impact Monitoring and Evaluation Handbook for Model Forests* (p. 30), IMFN, 2004.

Note. Numbers in parentheses depict quantity in the 2005-2008 plan (i.e. there are 5 strategic priorities and 19 actions. Rows 2, 3, and 4 indicate the what, when and how (respectively) that correspond to each step of the results chain.

This number of indicators seems high compared to Sayer et al.'s (2007) recommended format of 25 to 40. To understand how 77 indicators emerged from the five strategic areas I traced their emergence through the logic model. The 45 assigned outcomes and impacts amount to an average of nine outcomes/impacts for each strategic area. In turn there is an average of 1.7 indicators assigned to each outcome and impact. It is premature to speculate at this point if the quantity of outputs, outcomes and impacts assigned to each priority area is high, or whether the number of indicators assigned to each outcome and impact is high. It is clear, however, that AMMF's use of the logic model process generated a substantial number of indicators, even with no indicators

assigned to program outputs. The generation of a high number of indicators from the logic model is predicted by Sida (2005).

In accordance with recommendations in the *Impact Monitoring and Evaluation Handbook for Model Forests* (IMFN, 2004) the AMMF monitoring and evaluation framework assigns an additional 28 *evaluation indicators*. These indicators are designed to assess model forest relevance, success, cost effectiveness and sustainability at the end of each strategic plan operating cycle. This addition brings the total number indicators to 105. If AMMF had decided to include additional indicators for risk as recommended in the guidebook (and by CIDA, 2009), the total number would be higher.

As a comparison to the quantity of indicators generated in other locations I reviewed the M&E plans from two model forests in Canada. I selected the plans randomly from a group of M&E plans made available to me from the International Model Forest Network. The Eastern Ontario Model Forest (Eastern Ontario Forest Group, 2003) follows the same format outlined in the M&E handbook for model forests. For five priority areas and seven activity areas the Ontario model forest assigned 52 monitoring indicators. An additional 35 evaluation indicators were assigned, making for a total of 87.

The Western Newfoundland Model Forest (Western Newfoundland Model Forest Inc., 2007) has three priority areas in the strategic plan and three major activity areas. Using the logic model process they generated 43 output, outcome and impact indicators and 18 evaluation indicators for a total of 61.

Both of the model forest examples discussed and Sayer et al.'s recommended quantity of indicators suggest that the amount of indicators in the AMMF M&E Framework is relatively high. This finding also suggests that it might be possible to

reduce the current number of indicators in the current framework and still be effective. Given the concerns mentioned in the literature review about the problems inherent with complex M&E programs that have high numbers of indicators, this is likely an area worthy of further consideration.

*Analysis of the monitoring and evaluation plan logic model.*

I analyzed the reasoning of the cause and effect sequences (results chains) in the logic model, beginning with outputs and progressing through to outcomes and impacts. For illustration purposes and space considerations I limit my discussion to results chain sequences from three of the five strategic priorities. Strategic priority five was omitted due to its internal focus on improvement to model forest organizational factors. Strategic priorities two, three and four were selected due to their direct focus on the economic, regional planning and natural resource management elements of sustainable development.

The first example (Figure 7) corresponds to Strategic Priority Two: Regional Organization and Development. Here it appears reasonable that the project outputs: a “regional diagnosis” (assessment of needs), “GIS database” and “workshops” (with partners and communities) would lead to the outcome of improved information. A regional development plan, however, seems ambitious as an immediate outcome and might be better placed further along in the results chain after the outcome of improved information has already been realized.

The short term impact: “greater awareness of local problems, natural resources, and local capacities” seems an appropriate result of the outputs and outcomes, although it overlaps somewhat with the outcome of improved information. It could perhaps have been included under outcomes, and followed up further along the chain with the

development plan and improved regional structure/organization. The medium term impact: “improved focus and investment of resources in local development” appears appropriate and well placed in the logic model.

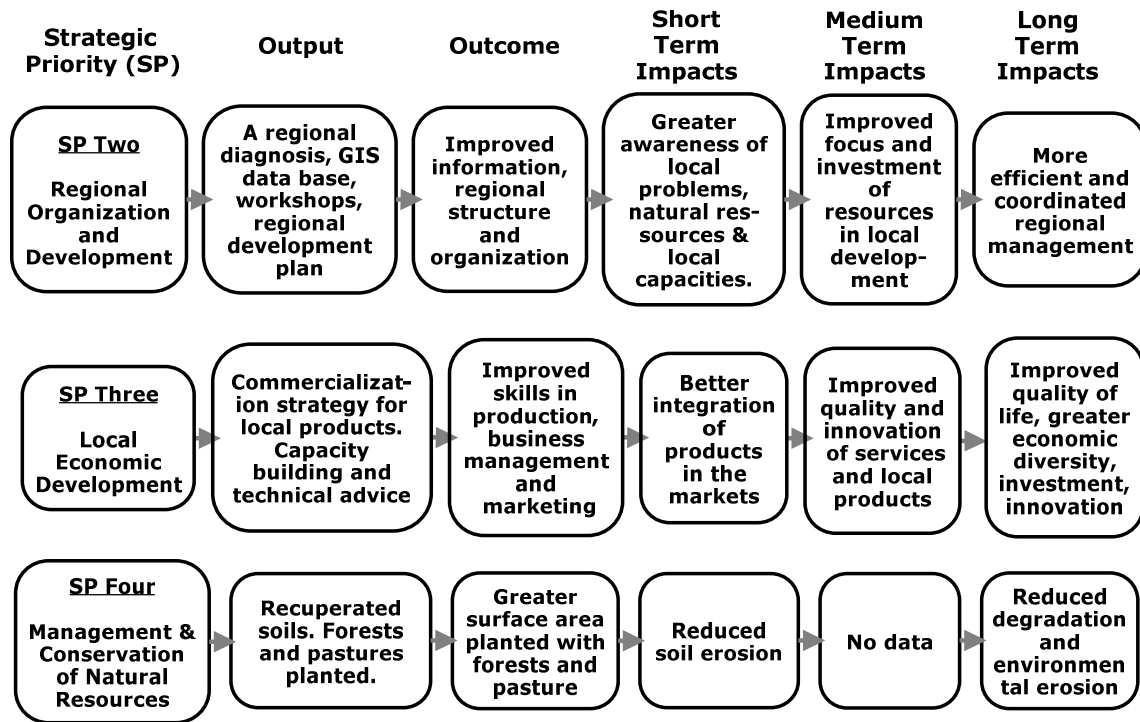


Figure 7. Examples of Three AAMF Logic Model Sequences

Note. Translated and adapted from, *Marco de Monitoreo y Evaluación* (p. 9), AMMF, 2005. In some cases examples are condensed due to space limitations.

The long-term impact for strategic area two is a “more efficient and coordinated regional management.” While this is clearly a worthwhile objective I am not convinced that it would meet the criteria that Failing and Gregory (2003) describe for endpoints. That is, is a more efficient and coordinated regional management the ultimate objective or is it really a means for achieving something more fundamental, such as improved use of local assets (mentioned in the strategic plan), reduced conflict, or improved standard of

living. If this is the case then a more efficient and coordinated regional management would be best placed earlier in the results chain.

The second results chain example is derived from Strategic Area Three: Local Economic Development. The rationale of cause and effect here appears sensible. The project outputs: a “commercialization strategy for local products, capacity building and technical advice” might reasonably lead to the outcomes of “improved skills in production, business management and marketing.” The short-term impact: “better integration of products in the markets” leads logically to the long-term impact of “improved quality of life, greater economic diversity, investment, innovation.” The medium term impact: “improved quality and innovation of services and local products” could perhaps be switched with the short term impact to improve the flow of cause and effect.

The third results chain example is from Strategic Area Four (Management and Conservation of Natural Resources). Here there are some opportunities similar to those from the first example to improve the flow of cause and effect. The output of recuperated soils appears to have been placed too early in the results chain. Assuming that recuperated soils are intended to be the result of planting new forests and pastures (there is no other action within the results chain that could lead to this) it would make more sense if this result was placed further out along the results chain to become an outcome or impact of planting activities. In turn, the current outcome of greater surface area planted with forests and pasture would be more appropriately located earlier in the chain as an output, or eliminated all together as it is basically the same as forests and pastures planted.

The logic within this third results chain example is that reforesting and seeding pasture (and perhaps the associated capacity building activities although this is not clear) will lead to reduced erosion and degradation in the model forest region as a whole. In terms of cause and effect (or hypothesis of change) there seems to be an inherent but unexpressed assumption. That is, that the planting and seeding programs will be successful, that their success will in turn lead to reduced erosion on individual project sites, and that this will have a tangible effect on erosion in the region. However rather than monitoring the success of these projects at reducing erosion the logic model and associated indicators make a leap to the assessment of erosion at the regional level. There may be an opportunity here to collect some data which is more relevant to factors that are under the control of AMMF managers (project scale factors) before moving to regional impacts.

Again in the third results chain example, the intent of the long-term impact of “reduced degradation and environmental erosion” is not very clear, measureable or understandable. This could create difficulties for effective monitoring and evaluation (Failing & Gregory, 2003; Margoluis et al., 2009; Schreiber et al., 2004). In addition, and similar to the case for example one, a more fundamental endpoint objective may be appropriate here such as the ability to sustain agricultural and forest production for future generations.

From this set of examples it appears that where priority areas and goals in the strategic plan are relatively clear (i.e. priority area three) the corresponding outcomes and impacts in the logic model are also clear. When goals in the strategic plan are less clear (i.e. priority areas two and four) it seems more difficult to write logic model steps which

are sensible and understandable. I continue to explore this idea in the context of indicators and targets below.

*Analysis of indicators and targets.*

I assessed the indicators and targets in the M&E Framework by comparing them to the effectiveness principles summarized from the literature review in Table 1 (precise, understandable, relevant, measurable, reliable, realistic to collect, linked to objectives verses means). My intent for this stage (similar to the logic model discussion above) is not to discuss of all the 105 indicators in the plan. Although I reviewed all of the outcome and impact indicators in the plan, the discussion is focused toward example indicators that correspond to the outcomes and impacts for strategic areas two, three and four. This is consistent with the strategy used for the logic model discussion above. I did not review the evaluation indicators. AMMF did not have sufficient resources to measure any of these indicators during the 2008 M&E process.

Just over 50% of the indicators illustrated in Table 3 are relatively precise and understandable. In these same cases the indicators and their corresponding targets appear to align well with the other effectiveness principles. For example, the outcome and short term impact indicators (indicators ‘c’ and ‘e’) for strategic area three are “quantity of business starts by men and women supported by the model forest” and “number of purchase and sales agreements established with local producers.” These indicators are simple and clear. Indicators ‘d’, ‘f’ and ‘g’ also seem precise and easy to understand. Interestingly, these same indicators also appear measureable and the data realistic to collect from readily available project data and opinion surveys. The corresponding targets are precise, with quantifying descriptors that match.

Table 3.

## Example Indicators from the AMMF M&amp;E Framework Document

Strategic Priority	Outcome or Impact	Indicator	Target
Two (short-term impact)	Greater awareness of problems and local resources.	a) Level of understanding of problems in the region.	1 workshop/year related to regional issues. Managed info is shared with local organizations.
Two (med-term Impact)	Improved focus and investment of resources in local development.	b) Level in which AMMF & local actors assume and/ or manage the regional focalization of decision making for investment.	Investments in the region are more focused toward identified priorities.
Three (outcome)	Improved skills, production tech- niques, business management and marketing.	c) Quantity of marketing and business starts supported by AMMF. d) Quantity & quality of products and innovations supported by AMMF.	AMMF has supported a minimum of 100 business starts. AMMF has supported the commercialization of at 10 local products.
Three (short- term impact)	Better integration of local products in networks and markets.	e) Number of purchase and sales agreements with local producers.	AMMF has facilitated purchase/sales agreements with at least 10 local producers.

Table 3 continued.

Strategic Priority	Outcome or Impact	Indicator	Target
Three (long-term impact)	Better quality of life for inhabitants.	f) Level of well being according to the per- ception of local people.	In 2015 most of the population perceive an increase in their level of well being.
Four (outcome)	Greater area planted with trees.	g) Number of hectares forested.	AMMF has planted 300 hectares of forest.
Four (short-term impact)	Reduced soil erosion.	h) Number of actions related to soil improve- ment. Level of soil productivity.	Soil recuperation works realized and 440 hectares of pasture seeded.
Four (long-term impact)	Less degradation and environmental erosion.	i) Level of degradation and environmental eros- relative to start of plan.	In 2015 an increase to all actions conducive to reduced environmental degradation can be observed and quantified.

Note. Translated and adapted from, *Marco de Monitoreo y Evaluación* (p. 10-21), AMMF, 2005. In some cases examples are condensed due to space limitations.

Other indicators in Table 3, particularly ‘b’ and ‘i’ are not so precise or easy to understand. These same indicators and targets do not align well with the other effectiveness principles. For example, “level of degradation and environmental erosion

relative to start of plan,” appears to be a broad topic and difficult to measure verses something more specific such as rate of soil loss or the condition of a species of concern. Perhaps partially as a result, the corresponding target: “in 2015 an increase to all actions conducive to reduced environmental degradation can be observed and quantified” is imprecise, indirect and does not appear very effective as a proxy.

The clarity of the rest of the indicators in the M&E Framework is greater than what I found for the examples in Table 3. Slightly fewer than 80% of the total indicators (excluding evaluation indicators) appear clear and understandable. Medium and long-term impact indicators are more problematic with regard to clarity than outcome and short-term indicators.

Almost all of the indicators in Table 3 appear relevant to their corresponding outcome or impact. An exception might be indicator ‘b’, which corresponds to the medium term impact for strategic priority two. It is not clear how the “level in which AMMF and local actors assume and/or manage the regional focalization of decision making for investment” would lead to improved focus and investment. Perhaps no one else is currently fulfilling this role or it is assumed that AMMF and other local actors could do it better. Even if considered as a proxy indicator there would still be a gap in the reasoning of cause and effect that stems back to the logic model.

Several of the other indicators seem to be proxies as well, specifically ‘c’, ‘d’, ‘e’ and ‘h’. While direct indicators are preferable the literature review indicates that this is not always possible. It is acceptable to have proxy indicators when necessary. The only indicator I would question is ‘h,’ the “number of actions related to soil improvement.” While this indicator might be acceptable as distant proxy for reduced soil erosion it

would be more suitably located earlier in the cause and effect chain as a measure for the output (Figure 7): “forests and pastures planted.”

Outcome indicator ‘g’ in Table 3 (number of hectares forested) would be more suitable as a measure of program outputs due to its production oriented nature. For the M&E Framework as a whole, eight percent of the indicators reflect this same issue. Interestingly, just over 30% of the targets for outcome and impact indicators in the M&E Framework would also be more suitably assigned to program outputs. The prevalence of this occurrence could be a result of the decision not to assign any indicators to program outputs. Outputs are generally easier to measure, with more data readily available, and if longer term changes prove more difficult to assess, output oriented criteria become a more viable option.

As predicted in the literature review (Sida, 2005) there appears to have been some additional difficulties with the effective design of targets. For example the target for indicator ‘b:’ investments in the region are more focused towards identified priorities, does not specify a quantifiable level of impact being sought. Even as a qualitative indicator it is difficult to understand how the data for this target might be collected. As well, there is no baseline data from which to judge progress.

I reviewed the rest of the targets in the M&E Framework, looking for a potential trend in this area. It does not appear to be a concern for outcome indicators and targets. Just over 50% of the impact targets, however, do not specify a quantifiable level. As well, baseline data is generally absent.

Similar to the logic model examples discussed above it appears that the effectiveness of indicators and targets may be linked to some degree to the clarity of the

priority areas and goals in the strategic plan. For example the more problematic indicators and targets (e.g. 'a', 'b' and 'i') correspond to priority areas two and four, both of which are rather broadly defined topics and somewhat difficult to understand. On the other hand, the more effective indicators ('c', 'd', 'e', and 'f') correspond closely to the more clear and understandable priority area three.

As would be expected with a results-based M&E program the medium and long-term impacts in the M&E Framework are broad in scale, extending beyond project specific boundaries to the AMMF region and society as a whole (e.g. living standards). Predictions in the literature review that long-term impacts are difficult to measure appear to be true here. Proxy indicators and the use of perception based surveys are frequently the only options available to measure them, and attribution of impact is difficult. In addition, the distant nature of the linkage between these impacts and model forest programs makes them less relevant to AMMF decision making processes.

*Periodic reports and surveys as evidence of M&E implementation.*

Following my review of the Strategic Plan and M&E Framework I looked to the documented evidence of ongoing monitoring that took place during 2005-2008. Several monitoring related reports are accessible in the office filing system. Monthly staff reports detail progress and challenges with respect to ongoing and completed projects. Minutes from the quarterly board of directors meetings detail periodic discussions about program issues and directions. Project reports provide data related to implementation costs, successes and challenges. Annual reports provide a summary of the previous year's activities and costs, and provide a general written summary of program results.

In general the monitoring-related reports had been filled out consistently (with the exception of annual reports which had not been completed since 2005). The information in the reports appears useful to assessing the success of projects in a general way. The data, though, is not well linked to the M&E Framework indicators. That is, the data collected does not correspond to or help with the measurement of indicators. Nor is it clear how the data would be used to provide feedback to decision making processes, such as input to annual work plans.

From June to December of 2006 AAMF undertook a mid-term progress evaluation. Data for the evaluation exercise was collected from model forest documents, interviews with stakeholders, an evaluation day with staff and the board of directors, and workshops that were held in the community. The evaluation asked probing questions about the continued relevancy of model forest actions, how activities had corresponded to community expectations and how resources could be focused more effectively.

It is apparent that substantial time and resources went into the evaluation, yet I found it difficult to extract the central results and conclusions. The results were summarized in roughly 15 pages of written dialogue at the end of the evaluation report, *Desarrollo y Resultados del Proceso de Evaluación de la Ejecución del Plan Anual de BMAAM en el Territorio* (personal communication, AMMF, August 15, 2008). A concise or readily understandable summary of the main findings was not presented in the document. In addition, while the evaluation questions were well structured to correspond to the five priority areas in the strategic plan they are not linked to the indicators in the M&E Framework.

The significant effort spent on the monitoring related reports and the mid-term progress evaluation clearly demonstrates a commitment to continual improvement and the processes undoubtedly produced value for the model forest. As suggested in the literature review (Conservation Measures Partnership, 2004; Sayer et al. 2007), more value may have been derived from the process by linking these efforts more closely to the M&E Framework, and ensuring that the results were presented in a concise structure that could be channeled into a feedback process for continual improvement (Margoluis & Salafsky, 1998). These concerns with implementation appear to be a challenge to the effectiveness of the M&E program.

#### *Personal Observations Results and Discussion*

##### *Early observations on site.*

As described in the research methods I kept a daily log of my personal observations. These observations include relevant discussions that took place between model forest staff, stakeholders and myself during the course of my six months on site as a temporary staff member. The results are described here.

During the month of July, 2008 I accompanied model forest staff to a routine interview with a recipient of funding for a tourism project. A predetermined interview format was used to invite feedback from the funding recipient about project success, challenges, and ideas for improvement. The exercise appeared very worthwhile for collecting data for M&E and for providing an opportunity for a project beneficiary to participate in the continual improvement process.

I did not find evidence that the data collected during the interview was used to help with the measurement of indicators. Similarly, while I presume that the data collected will be helpful for organizational learning I did not see a process in place to ensure that the data will be purposefully considered in future decision making. These observations support indications from the document review that while monitoring-related reporting activities and evaluations occur on a regular basis they had not been well integrated into the M&E Framework itself.

The process of measuring indicators and evaluating results of the 2005-2008 Strategic Plan began in September, 2008. It was apparent that up to that point in time data had not been collected specific to measuring the indicators in the M&E Framework. The reason for this was not clear, however it was apparent that while responsibilities had been assigned to various staff positions for implementing the M&E program (see document review), these were not followed up on during the 2005-2008 period.

The forestry department of a nearby university, La Universidad de la Frontera (UFRO), was invited to participate in the M&E process. A collaborative working relationship formed between AMMF staff and UFRO faculty members over the subsequent four months. From my observations and based on opinions from model forest staff, faculty members from La Universidad de la Frontera, and model forest stakeholders, the relationship with UFRO proved extremely valuable to the M&E process. UFRO's time, expertise, and outside perspectives were well received and the M&E process gained additional credibility from the involvement of a respected outside entity. The university benefited from the opportunity to be involved with a project in the local community that was related to their interests and expertise. These observations

concur with the literature (Schreiber et al., 2004; Walters, 1986; Lee, 1999; and Cote & Kneeshaw, 2001) that collaboration with stakeholders (UFRO is also represented on the model forest BOD) is helpful to M&E success.

*Documents, surveys and workshops as tools for data collection.*

The monitoring-related reports discussed in the document review were used as a source of information for the assessment of indicators. During this process a new procedure resulted which will likely help produce a more regular and integrated monitoring program in the future. A spreadsheet was designed with the help of two recent forestry graduates from UFRO. Indicator related data (numbers of training workshops conducted, hectares planted etc.) was compiled on the spreadsheet. AMMF's intention is that the spreadsheet will be used for ongoing data compilation during the next strategic planning period. This new procedure appears to have the potential to improve the effectiveness of the M&E program by more closely linking ongoing management processes to indicator data requirements.

Opinion surveys (Appendix D) were designed with the help of UFRO to assist with the collection of data for qualitative indicators. The surveys were well received at rural community workshops where they were administered. When given the opportunity to provide feedback about the survey process itself, however, there was very limited response. The workshop participants appeared to have a limited understanding of the M&E process.

Opinion surveys were also administered at a board of directors meeting. Members of the board of directors were more vocal in their reaction to the survey. One person (based on an experience not related to the model forest) wanted to ensure that the survey

was genuinely oriented to learning and improvement and not a mere public relations exercise. Another board member was concerned that he did not have sufficient information to respond adequately to several of the questions. Another comment pertained to a perceived difficulty with measuring broader, long term model forest impacts due to the various other actors and influences in the region.

Board member concern about a lack of adequate information to answer some of the survey questions might be related to the very general wording of some questions designed to address broadly based long-term impact indicators. For example, topic number 11 on the survey, “biodiversity and local culture are more valued more than before,” topic 12, “habitants of the territory are more concerned for the care of the forests,” topic 14, “living standards in the territory have increased,” and topic 15, “environmental degradation and soil erosion in the territory have diminished,” appear difficult to address in the time limited nature of a survey other than through very cursory responses. It is not surprising that at least one respondent felt uncomfortable about their ability to provide a reliable perspective.

This type of qualitative approach to addressing indicators is not unfounded (IMFN, 2004; Stem et al., 2005; UNDP, 2002). However without the ability to use at least some direct indicators (Sit & Taylor, 1998; CMP, 2004; UNDP) and quantitative indicators (IMFN; UNDP) to support the results it seems difficult to produce reliable data for model forest management and decision making. This challenge is supported by concerns in the literature review about the difficulty with measuring long-term impacts and attributing them to specific project implementers (IDRC, 2001).

*Semi-Structured Interviews Results and Discussion*

*How the monitoring and evaluation program is perceived.*

Interviews with model forest staff and representative model forest stakeholders took place in November and December, 2008. As described in the research methods, two sets of interview questions (Appendix C) were developed to address the interests and literacy levels of rural participants and institutional professionals. Due to the limited stakeholder and community participation with the development of the M&E program I was not able to ask questions about the detailed structure and functioning of the M&E program itself. Instead, questions were directed toward current levels of understanding and individual perceptions of the program. I brought a copy of the M&E framework with me to the interviews and when participants expressed interest we briefly reviewed the elements of the plan together.

The interview results suggest that professionals from the local forests ministry, a municipality, an environmental NGO, UFRO, and the model forest staff (from here on collectively referred to as institutional respondents) have a good general familiarity with the concepts and objectives of M&E. Rural farmers were less familiar with the ‘academic’ concept of M&E but expressed clear and interesting ideas about how M&E might look in the real world context. Only two AMMF staff members and the UFRO faculty that had been directly involved with the M&E process were familiar with the details of how it functions.

When asked if the model forest’s M&E program is beneficial and makes a difference to model forest operations there was unanimous consensus in the affirmative among both rural and institutional respondents. This result does not appear consistent

with the limited familiarity that respondents seemed to have with the M&E program. It could be the result of respondents not wanting to sound negative about the program. The tone, however, in response to a number of related questions and throughout the interviews in general was very positive toward the M&E program. I believe that the people who were not intimately familiar with the M&E Framework itself responded from a viewpoint that M&E serves a worthwhile function, and that AMMF's application of it is genuine and open to constructive feedback, as discussed below.

Respondents provided various examples related to how they viewed the model forest M&E program as a valuable tool. I grouped these into categories based on similarity of ideas. Categories with three or more comments each (in order of highest to lowest number of comments received) include: the M&E program helps the model forest to learn and improve; it helps with transparency and building confidence of outside entities towards the model forest; it helps model forest beneficiaries; it helps to focus and prioritize; and it helps the model forest to become more effective. One UFRO faculty member described their perception of AMMF's commitment to M&E as "genuine," stating "I don't see that the model forest is doing the (M&E) process just to meet requirements," and, "I believe that AMMF has the intention to improve, improve its management, and improve impacts in the area."

*Perceptions about the M&E program's design and implementation.*

Several themes emerged with regard to perceptions about the design and implementation of the M&E program. The strongest category, with unanimous consent from the five rural model forest participants interviewed is that the model forest is viewed as being receptive to feedback from the community. The majority of comments in this

category were from people who had benefited directly from a model forest project (i.e. they received funding, training or technical assistance to implement a project or a more sustainable practice). One project beneficiary illustrated his view by describing how the model forest agreed to modify a project midstream based on feedback designed to improve the final results. Another rural respondent indicated, however, that while ideas are well received (i.e. politely received) the resources are not always there to act on them. That is, the suggested changes may not take place. I did not ask institutional respondents directly about model forest receptivity to feedback as they are not the intended beneficiaries of model forest projects. I received no comments from them during the course of the interviews, though, that would contradict the positive view voiced by project beneficiaries.

The next strongest theme to emerge is related to methods for collecting community feedback. Six comments from five institutional respondents indicate that the surveys, community workshops, team meetings and field visits were useful for collecting feedback from the community.

Next, four institutional respondents felt that the M&E Framework is impractical. One perceived the number of indicators to be high. Another described the M&E framework as “notably rigorous and complete” but not very practical. Further comments pertained to a need for more attention to ensuring that indicators and targets are effective. One person noted, for example, that there are no practical means for measuring some of the indicators, that some indicators are imprecise or too broad, and that sometimes goals did not align well with indicators. These ideas align with the document review findings

related to the complexity of the M&E plan and difficulties with the design of indicators and targets.

One institutional respondent felt that the M&E framework had likely adhered too closely to a predetermined format or template. The result of this, they believed, was a plan that was not adequate to the local reality and too demanding for the resources available. Similarly, another person had the impression that the M&E framework was not designed by the same people who were later responsible for its execution. The respondent felt that this resulted in a lack of commitment to implementing the monitoring plan.

I asked interviewees for their perspectives on what kinds of model forest program impacts are most difficult to measure. While some respondents noted environmental and economic impacts as most difficult, the majority of responses (seven) indicated that qualitative changes to people's perception, attitudes and behaviour present the greatest monitoring and evaluation challenge. UFRO professor Zoia Neira Ceballos commented on the difficulties with measuring changes to attitude and conduct: "If you hold an environmental workshop, how are you going to monitor if the attitude to destroy (the environment) changed to an attitude to protect, or conserve, or value."

Three comments from two institutional respondents identified attribution of impacts as an issue. Both respondents commented that there are other organizations working to improve conditions in the model forest area. They were concerned that even though community members may indicate that a local condition has improved it is difficult to determine that this impact is a result of model forest interventions. These comments support suggestions from the document review, personal observations and the literature about the difficulty with measurement and attribution of long-term impacts.

Three institutional respondents were concerned about what they felt was a common perception that M&E is a negative, fault finding approach (two specified that this is a perception particularly evident in Chile). They felt that this perception is an obstacle to the acceptance of M&E programs. One person noted, for example, that the view of M&E as something intended for auditing and control verses learning and continual improvement can result in people hiding errors, which makes M&E difficult. One respondent stated that there is a common perception that M&E is a process that does not result in change: “we just finish up doing the same thing anyway.” When this attitude prevails it is easier to just to say “everything is fine” rather than go through the effort of M&E.

There were no interview questions specific to the resources required to implement the monitoring and evaluation program. Two institutional respondents, however, including General Manager Washington Alvarado cited a lack of resources as a serious obstacle to implementation of M&E. Mr. Alvarado felt that the M&E program “wasn’t all it should have been.” When I spoke with Mr. Alvarado we were nearing the conclusion of the 2008 M&E process. He was optimistic that the model forest is now “more prepared than before” to do M&E, and that a more continuous approach to monitoring will be easier and more cost effective in the future.

Other ideas emerged from the interview data that I have not included in the results. These are cases where there were less than three related comments from respondents, and similar ideas did not surface in the document review, observations, or literature review. In most of these cases the ideas did not seem relevant to the research topic.

*Respondent recommendations related to the M&E program.*

During the course of the interviews a variety of suggestions were made with respect to optimizing the effectiveness of the model forest's monitoring and evaluation program. The majority of comments were related to better integration of M&E into model forest operations, assigning resources more specifically towards M&E, consistency of application, and ensuring that M&E results are shared with as broad a group as possible. Respondents also suggested the need for local design and ownership of the M&E program, maintaining the collaborative arrangement with UFRO, and the need to build capacity for M&E implementation.

When asked about who should be participating in the M&E program most respondents suggested that a broad range of participation is best, including AMMF staff, board of directors members and local government organizations working with the model forest. One suggestion for including project beneficiaries (recipients of funding or technical expertise) in the M&E process was the installation of an opinion box at the model forest office. Another suggestion was to invite landowners to be present during the monitoring of tree plantations on their property so that they could learn more about and be a part of the monitoring process. Project beneficiaries themselves indicated interest in participating with monitoring activities. One respondent qualified, however, that he would require some form of remuneration for his time.

At the conclusion of each interview I asked respondents what advice they would give to other model forests that may be thinking about implementing an M&E program. Comments here reflected the recommendations discussed above, including the need for a home-grown, realistic and practical M&E framework, the need to ensure that adequate

resources and capacity are available, starting off slow, and the necessity for building capacity to implement M&E. One individual emphasized that the will and commitment to implement M&E must be in place. Another noted that each model forest should evaluate its own reality when deciding if an M&E program is needed and appropriate.

*Synthesis of the M&E Inquiry Results*

To help with determining the importance of the themes that have emerged in the M&E related data I have summarized their occurrence in each of the three data sources (document review, personal observations and semi-structured interviews) in Table 4. Next to each theme I have indicated the sources in which it is supported. As well, I have indicated whether the theme is consistent with findings from the literature review. Then I discuss the major patterns.

Some of the themes that have emerged about how the M&E program is designed and implemented appear in only one of the data sources, while others are corroborated in two or sometimes all three of the data sources. Greater corroboration of ideas between sources usually suggests greater validity and reliability of the ideas. Some ideas, however, even though they may appear only in one source are still likely to be sound and relevant, and due to their nature they may not be locatable in the other sources. Stakeholder perceptions about the M&E program, for example, would not necessarily come up in the document review.

*Strong commitment to M&E and community feedback, program is well perceived.*

All three data sources support the suggestion that AMMF's commitment towards M&E is substantial. This idea is further supported by interview-based evidence of

AMMF's receptivity to feedback from stakeholders and openness to change. Together these factors suggest there is a good foundation for a successful monitoring and evaluation program at AMMF.

Table 4

## Frequency of Theme Occurrence in Data Sources

Theme	Doc. Review	Pers. Observ.	Inter- views	Lit. Review <sup>a</sup>
Strong AMMF Commitment to M&E	√	√	√	
AMMF M&E Program Well Perceived		√	√	
Good AMMF Receptivity to Feedback		√	√	
M&E Framework is Comprehensive	√	√	√	
M&E Framework is Overly Complex	√	√	√	√
Clarity of Objectives is Important	√			√
Concerns with Flow of Cause & Effect	√			
Indicators & Targets Need Improvements	√	√	√	√
Baseline Data is Needed	√			√
Long-term Impacts Diff. to Assess & Attribute	√	√	√	√
Limited Integration of M&E into Operations	√	√	√	√
Functioning Feedback Loops Not Evident	√	√	√	√
Behavioral Impacts Hard to Assess			√	
The Concept of M&E is Perceived Negatively			√	

<sup>a</sup> Indicates that the theme is found in the literature review.

*The M&E Framework is comprehensive but overly complex.*

The document and interview-based data strongly suggest that the M&E Framework, while comprehensive, is probably too complex a program to implement with the limited resources available. This finding is supported by my personal observations of the difficulties with implementing the M&E process from September to December 2008 and the extensive demands it placed on AMMF staff members and funds. The extra set of evaluation indicators add additional complexity to the M&E program and were beyond the resources of AMMF to assess.

The complex nature of the AMMF M&E Framework is not surprising for two reasons. First, the multi-faceted nature of the strategic plan leads to a complex set of impacts to monitor. Second, as noted in the literature review, the logical framework approach has a propensity to generate complicated M&E frameworks.

*Improvements needed to results chain logic, indicators, targets and baseline.*

Document review evidence suggests that significant effort and reasoning went into the development of the logic model. The results chains could be improved, however, in some cases. Sometimes the order of cause and effect is reversed, and in other instances there is overlap or gaps in the logic, and missing assumptions. Often the outcomes and impacts jump to broad, regional scales without first considering local scale results that are more closely linked to project specific implications.

More than half of the indicators and targets in the M&E Framework align well with the effectiveness principles identified in the literature review. The document review and interview evidence concur, however, that there are significant difficulties with

indicators being broad and imprecise, difficult to measure, occasionally of limited relevance, and having targets that do not correspond appropriately. The suggestion that AMMF indicators are frequently problematic to measure is also supported by data from the personal observations. Document review findings that a high proportion of indicators are proxies, have targets that do not specify desired levels impact or lack baseline data also supports this idea. These types of findings are consistent with predictions in the literature review.

The document review results suggest a possible link between the effectiveness of indicators and targets and the clarity of objectives in the strategic plan. Where priorities and goals in the strategic plan are worded imprecisely, the clarity and usefulness of corresponding outcomes, impacts, indicators and targets are problematic, and the effectiveness of the M&E program may be reduced. These concerns are also supported in the literature.

*Long-term impacts are difficult to assess and attribute.*

The documents, personal observations, interview-based evidence and literature agree that long-term impacts are often difficult to measure and attribute. This might explain why despite that no indicators were specifically assigned to project outputs, a significant number of the indicators and targets assigned to outcomes and impacts are in fact output oriented. The greater measurability of program outputs likely made these output focused indicators the only feasible option.

Given the limited resources available for M&E in model forests it may be worthwhile to consider if the assessment of such a wide range of outputs, outcomes and impacts is the best way to address results-based M&E. The current RBM process puts

model forest managers in the position of implementing at least three of the five M&E purposes identified in the literature: accountability focused M&E through the monitoring of program outputs; effectiveness measurement M&E through the measurement of outcomes and short to medium-term impacts; and status assessment M&E through the tracking of long-term regional conditions. In the current RBM process all of these approaches must be applied within the same program at the same time.

It might make sense to focus resources on a narrower set of M&E purposes, to simplify the M&E program and improve its effectiveness. Consider how a focus on shorter term results could work in the case of soil erosion. Rather than attempting to assess erosion at a regional scale where the relevance to model forest effectiveness is minimal, evaluating the success of project specific impacts would be much more feasible and provide useful feedback to managers.

Similarly, instead of attempting (with potentially dubious results) to measure changes to regional living standards, why not directly assess changes to the conditions of farmers and adjacent areas as a result of specific project interventions? These aspects better reflect the objectives outlined by the IMFN (2004) for results-best M&E in model forests: manage impacts, improve management processes, demonstrate effectiveness and enhance accountability. The status assessment aspects of broader regional conditions clearly remain important but could perhaps be more effectively addressed by combining resources with other institutions to implement local level indicator processes, as has been successfully accomplished by several Canadian model forests.

*Non-functional feedback loops, limited integration of M&E.*

Evidence in the document review and personal observations (limited feedback loops and linking of reports to indicator data needs) as well as the interviews (limited stakeholder familiarity with the M&E program) suggests that the AMMF M&E program is not well integrated within model forest operations. The view of one interview respondent that close adherence to a pre-designed M&E template contributed to a disconnect between the M&E plan and local realities might be an interesting partial explanation for the lack of integration. This conclusion is not substantiated, though in the other data sources. Another partial explanation supported by the personal observations and interview based evidence might simply be the limited resources and capacity available to integrate the M&E plan into daily operations during the 2005-2008 period.

*Behavioral impacts are hard to assess.*

A concern that changes in perception, attitude, and behavior are among the most challenging impacts to measure surfaced strongly in the interviews. It is not supported or contradicted in the other data sources. Such a challenge, though, raises questions central to the purpose of the M&E program.

*The concept of M&E in general is perceived negatively.*

A theme that emerged in the interviews is the idea that negative perceptions toward M&E reduce its effectiveness. While it is apparent from the comments that these viewpoints can occur locally I did not find evidence in my personal observations or in the

generally positive tone of the interviews that such views are prevalent amongst the stakeholders of the model forest. I did receive several interview-based comments that M&E is best conducted by an external entity to ensure objectivity. This is not supported in the literature, which suggests that internally conducted M&E is most effective for learning and continual improvement focused M&E. One interview respondent alluded to the possibility for M&E to create internal tensions in the organization if people feel they are being personally evaluated. This is perhaps something to be considered in the design and implementation of the M&E program.

## Results and Discussion: Adaptive Management

### *Document Review Results and Discussion*

I reviewed the *Impact Monitoring and Evaluation Handbook for Model Forests* (IMFN 2004), the IMFN website, the *Framework for Model Forest Strategic Plan Development* (IMFN, 2008), the *AMMF 2005-2008 Strategic Plan* (AMMF, 2005) and a one page document entitled *Principles and Attributes of Model Forests* (IMFN, 2008) to look for indications that adaptive management is currently used as an approach in model forests. I did not find adaptive management specifically mentioned in these documents. I did find areas where adaptive management might strengthen model forest planning processes and program effectiveness. These are discussed below.

The one page IMFN document entitled *Principles and Attributes of Model Forests* (IMFN, 2007) provides general guidance for model forests. Innovation and experimentation are noted as key priorities model forest programs. It is suggested, for example, that model forests should “promote innovative mechanisms for pursuing the sustainable management of natural resources” and “facilitate and promote research and the implementation of new and innovative ideas, processes, approaches and techniques.” These principles appear to align well with adaptive management’s focus on innovation and purposeful experimentation at operational scales.

The *Framework for Model Forest Strategic Plan Development* (IMFN, 2008) supports model forests with the implementation of effective planning processes. It suggests the use of situational analysis tools to help with determining model forest vision and strategic directions. These include *Environmental Scan* (which emphasizes

stakeholders, landscape issues and external factors), *Force Field Analysis* (the assessment of forces that can help or hinder change), *PEST Analysis* (assessment of political, economic, social and technical environments), and *SWOT Analysis* (an analysis of strengths, weaknesses, opportunities and threats). These analysis tools appear to have merit for improving the understanding of factors that influence model forest operating environments. There may be an opportunity, however, to further explore and illuminate key social, ecological and economic influences using adaptive management's conceptual modeling approach. This possibility is explored below.

#### *Small Working Group Results and Discussion*

The Araucarias del Alto Malleco Model Forest applied situational analysis techniques to arrive at the five priority areas outlined in the 2005-2008 strategic plan. A series of workshops was used to collect community and stakeholder opinion about challenges facing the model forest region, and understand local vision for the future. A SWOT analysis, small group meetings and community mapping exercises were also employed. In August of 2008 I discussed with AMMF general manager Washington Alvarado the idea of trying an additional analysis tool, adaptive management's conceptual modeling approach, to explore how a deeper systems understanding might help with the planning and evaluation of model forest interventions. Our discussion led to a decision to conduct an exploratory trial.

In October of 2008 I facilitated a five hour workshop with six AMMF staff members and two UFRO forestry graduates. The workshop format was based on the Resilience Alliance's workbook, *Assessing and Managing Resilience in Social-ecological Systems* (Resilience Alliance, 2007). The process uses group discussion and the

development of simple conceptual models to help with identifying important social, economic and ecological features that influence a natural system being managed. The process also involves identifying which phase of the *adaptive cycle*, seen to be composed of the sequential phases of growth, conservation, release, and reorganization (Resilience Alliance, 2007) the model forest region is presently in.

Our objectives for holding the workshop were threefold. First, we wanted to try out a conceptual modeling tool to see if it could be useful as part of an adaptive management approach in the model forest. Second, we wanted to begin generating a systems-based understanding of the model forest region. It was hoped that this new source of ideas and concepts would complement the other sources of data used for the strategic planning process and reveal important indicators that should be monitored. Third, while we were not concerned about taking the process through to 100% completion, we wanted the results to be a resource for future community dialogue about sustainability in the region and potential management interventions. We adapted the resilience assessment exercise to fit within the strategic planning process that was currently underway for the development the 2009 – 2012 AMMF strategic plan.

The workshop began with participants discussing and documenting the social, economic and ecological attributes that define the model forest area as a functioning system. This step is referred to as *bounding the system* (Resilience Alliance, 2007). Key relationships and factors that influence local environmental, social and economic well being were discussed and summarized on a series of tables. Examples of factors considered include existing natural resources and environmental services, policies and land rights, local agreements and disagreements, sources of power, and sources of

innovation in the region. Larger scale influences like the global economy and climate change were also discussed and summarized. Examples of the tables can be found in Appendix E.

Next the group constructed a *historical timeline* (Resilience Alliance, 2007) representing key *disturbances* that have influenced the model forest region from the year 1900 to the year 2008 (Figure 8). Broader scale events including a national political transformation from democracy to dictatorship and back to democracy were added to the upper timeline. The participants defined three *eras* that have occurred in the region during the past 100 years: an era of Colonization from 1900 to the early 1930s; an era of Industrialization and Exploitation from the early 1930s to the late 1980s; and an era of Globalization and Democracy from the late 1980s to the present day.

The exercise helped the group to see vulnerabilities that had resulted in the crossing of *thresholds* that generally exist between *alternate states* (Resilience Alliance, 2007). For example, a strong dependence on the local forest industry led to a pronounced and enduring change from a prosperous economic state to a very depressed economic state when the wood supply ran out. On the timeline this signifies the end of the Industrialization Era, the economic consequences of which still harshly affect the model forest region today. These insights might help form a basis from which to consider indicators that monitor resilience to future such disturbances.

The timing and frequency of biophysical and social disturbances are also depicted in the timeline. Three volcanic eruptions and two earthquakes have occurred since the 1950s. Climate change appears midway through the current era. Land revolts, land rights reforms and the institution of new regulations regarding the use of forests have also

resulted in profound changes for local residents. We did not pursue the development of indicators for the insights that materialized from this exercise; however the process itself accomplished groundwork for this that can be returned to at a later date.

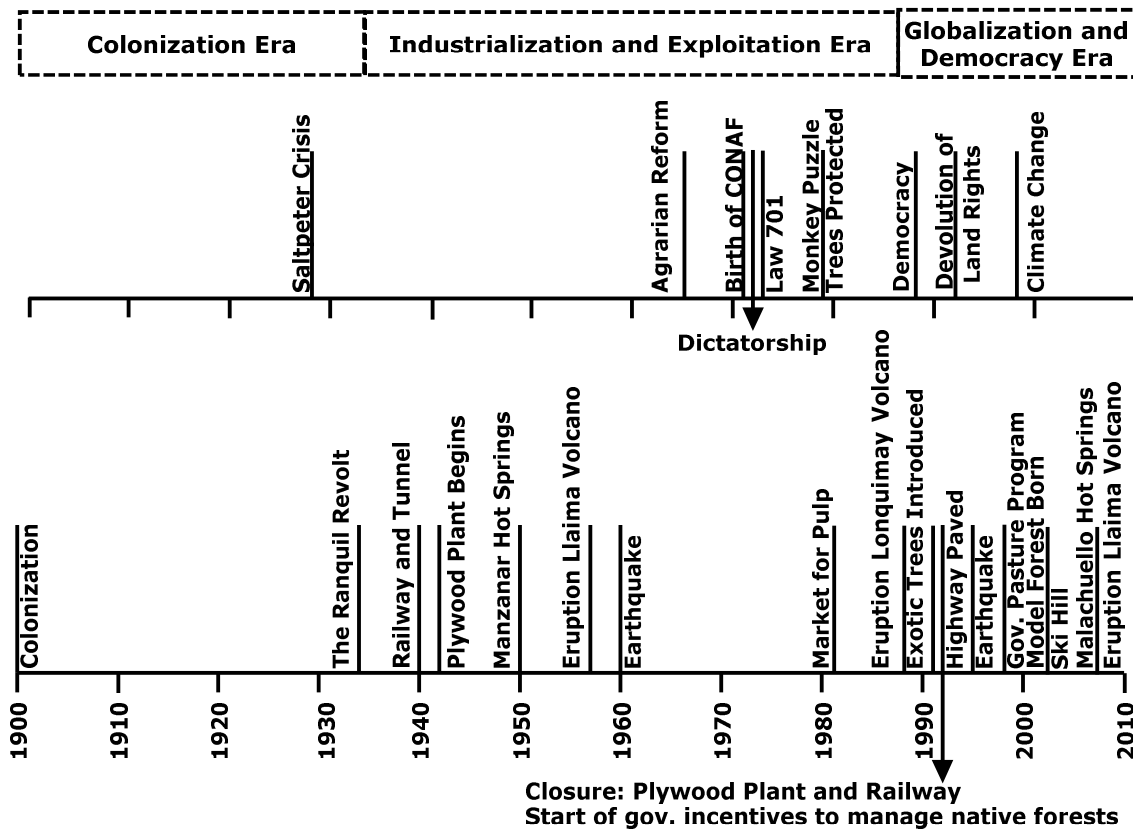


Figure 8. Historical Timeline Created by Workshop Participants

Note. The format for the timeline is adapted from *Assessing and Managing Resilience in Social-ecological Systems: A Practitioners Workbook*, (p. 23), by the Resilience Alliance, 2007.

Participants at the workshop developed conceptual models of how human caused and natural disturbances influence the state of two local ecosystems: forest and high elevation grassland. The forested ecosystem in Figure 9 can change from forest to grassland conditions due to fire or agricultural-based disturbances. Agricultural abandonment or restoration activities can return the grassland to a regenerating forest.

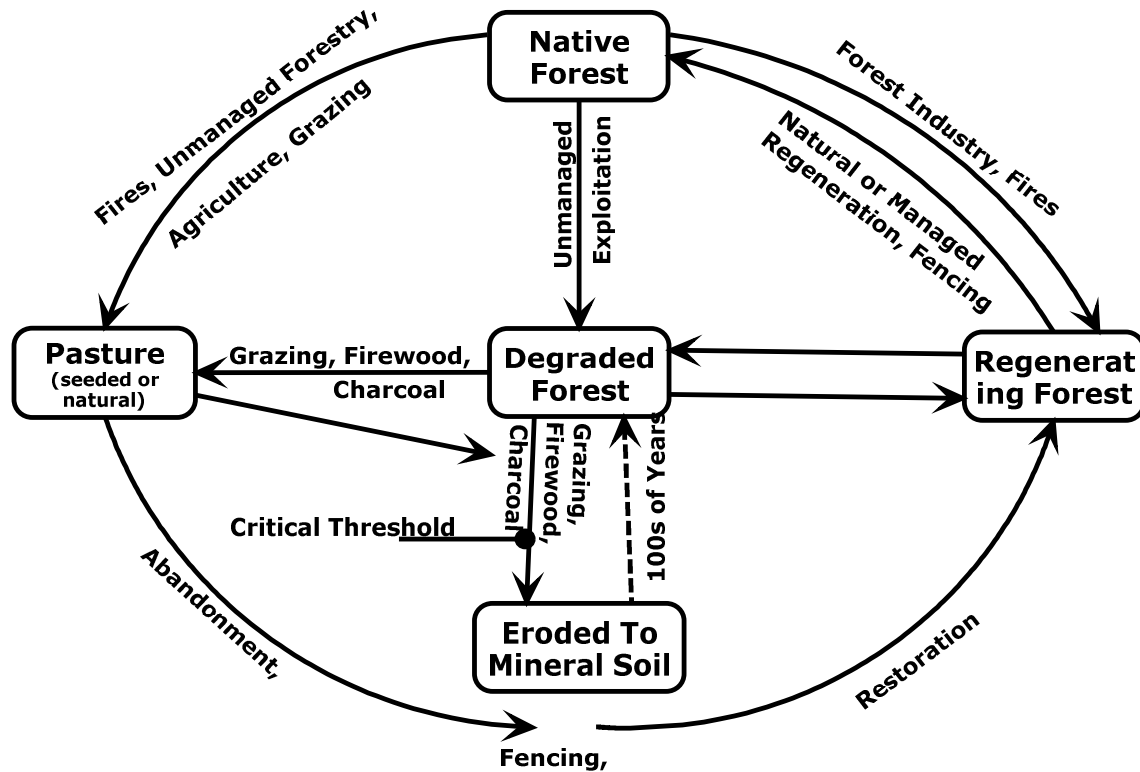


Figure 9. Forest Ecosystem Conceptual Model Created by Workshop Participants

Note. The format for the model is adapted from *Assessing and Managing Resilience in Social-ecological Systems: A Practitioners Workbook*, (p. 38), by the Resilience Alliance, 2007.

Workshop participants identified that overgrazing and charcoal production can drive a forest ecosystem to a degraded state characterized by eroded terrain that is devoid of vegetation and soil organic layers. During this process of change the ecosystem can pass a critical threshold beyond which it settles into a new stable state and can no longer return to its previous condition. Somewhere between the condition of *Degraded Forest* and the condition of *Eroded to Mineral Soil* is a critical threshold. That is, Eroded to Mineral Soil is an alternate stable state and once reached it may not be possible to return. Understanding the existence of this threshold and the circumstances that might lead to reaching it can help with identifying appropriate interventions and indicators.

To conclude the workshop, participants considered the location of local forest and grassland ecosystems within the adaptive cycle (Figure 10). The group decided that local forest ecosystems are currently in a phase of *reorganization* that has followed a period of extensive ecosystem depletion due to unregulated timber extraction (the release phase). Grasslands are felt to be in a growth and recovery phase due to the recent rehabilitation efforts of the agriculture ministry.

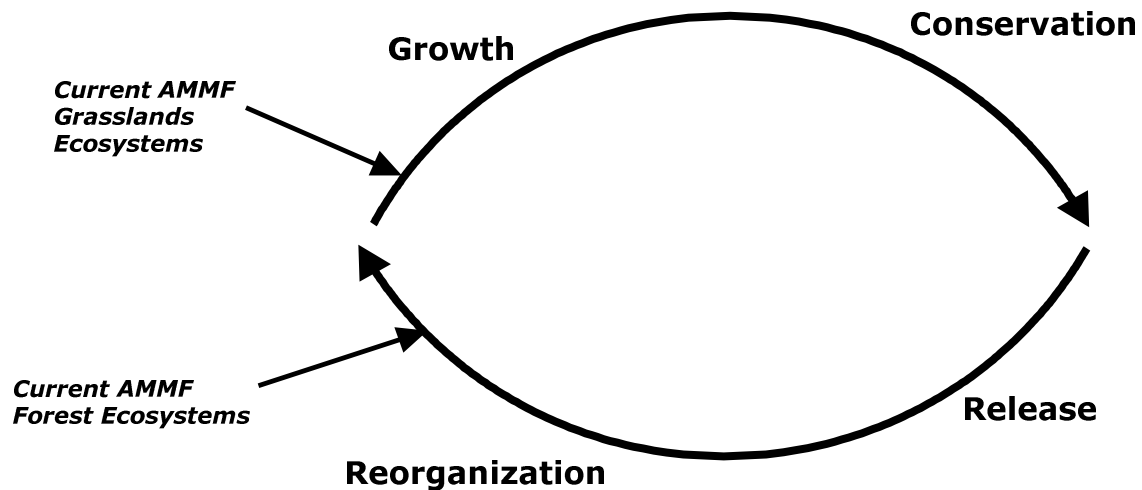


Figure 10. Adaptive Cycle Analysis for Forests and Grasslands.

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Note. Adapted from *Assessing and Managing Resilience in Social-ecological Systems: A Practitioners Workbook*, (p. 50), by the Resilience Alliance, 2007.

Management implications emerge from the adaptive cycle analysis. For systems located in the reorganization phase the Resilience Alliance (2007) recommends that retaining ecological, social and economic capital through the transformation process should be a priority. This could be translated to a need to maintain soil productivity (e.g. protect soils from erosion) and natural seed sources during the process of forest

reestablishment following heavy disturbance. In addition it might imply the need to diversify sources of economic activity as local forests undergo the long recovery process.

For systems in the growth phase the Resilience Alliance suggests that flexibility and ecosystem diversity should not be sacrificed for the sake of increased efficiency. This recommendation could have implications, for example, to how much artificial pasture is seeded versus how much natural grassland is maintained. For both reorganization and growth phases the Resilience Alliance recommends that innovation and learning be fostered. Further analysis and discussion are possible from the adaptive cycle exercise.

After the workshop I asked participants for their perspectives about the usefulness of the exercises and their ability to connect with the concepts presented. The perceptions were positive, although it appears the workshop lasted longer than what would have been ideal, and too much time was spent on definitions of concepts. I asked four model forest staff (selected based on availability) to rate the usefulness of each exercise on a scale of one to five. The timeline and conceptual models came out highest with an average rating of 4.5 out of 5. The adaptive cycle was next at 4 out of 5, and the tables came last at 2.75 out of 5.

### *Synthesis of the Adaptive Management Inquiry Results*

Significant similarities exist between AMMFs results-based M&E program and adaptive management. Particular among these is the iterative project cycle designed to facilitate continual improvement. Both approaches depend on the monitoring of key indicators to provide information to a feedback process.

There appear to be two potential areas, however, where adaptive management can offer important contributions beyond those of the current tools available to AMMF and

other model forests. First is adaptive management's experimentation approach and purposeful focus toward innovation and the testing of new practices and policies. This focus is not currently incorporated within the management tools available to model forest managers, yet it closely reflects the key principles and attributes of model forests worldwide.

Second, it is likely that adaptive management's emphasis on systems-based understanding can complement the current RBM and situational analysis tools available for strategic planning. Given the complexity of the challenges faced by communities in the AMMF region it should be reasonable to suggest that a good understanding of key social, ecological and environmental factors would be helpful for planning interventions and M&E programs.

Our brief trial of a systems-focused tool produced results that agree with these suggestions. The results of the Resilience Assessment workshop have been used in the new strategic plan for the Araucarias del Alto Malleco Model Forest (AMMF, 2009). According to the strategic plan (as translated from Spanish) the resilience assessment exercise has facilitated "a start in advancing to view the model forest territory from a holistic, integral perspective, and considering interventions based not solely on immediate demands but also based on the implications of the functioning of the region as a whole" (p. 33). It concludes by conveying a hope that the resilience assessment tools "will be useful in the broader context, and will be a source of discussion and generation of ideas for the future" (p. 33).

### Major Conclusions and Recommendations

The results of the research and literature review lead to a number of central conclusions and recommendations. Each conclusion and recommendation relates directly to one or both of the two research questions: How can monitoring and evaluation be most effectively applied to support AMMF and other model forests with promoting economic, ecological and social sustainability at regional levels, and; what is the potential value of adaptive management for helping AMMF and other model forests achieve their goals for the sustainable management of forests and other natural resources? The conclusions and recommendations are presented here.

*Conclusion A: AAMF's commitment to M&E is genuine and well regarded.*

AMMF is strongly committed to monitoring and evaluating program impacts, and to continual improvement. Stakeholders have a high regard for the model forest's receptivity to feedback from the community and willingness to make changes when needed. AMMF should be commended for the efforts put into the monitoring and evaluation program, particularly considering the relatively small size of the organization and the limited amount of resources allocated it.

*Recommendation: Maintain existing commitment, dedicate specific resources.*

The existing level of commitment to monitoring and evaluating program results, seeking community feedback and adjusting programs based on the findings should be maintained. Ensuring that specific people and resources are dedicated to fulfilling the various aspects of the M&E program would help to increase the consistency and

continuity of ongoing monitoring efforts. New and innovative ways of involving stakeholders with M&E, including rural project participants, should be considered as the program evolves. The currently positive, improvement oriented M&E focus should be maintained to minimize the possibility of negative perceptions emerging.

*Conclusion B: The M&E Framework is comprehensive but overly complex.*

The AMMF monitoring and evaluation program comprehensively addresses the actions outlined in the 2005-2008 strategic plan. The program is too ambitious, however, with an overwhelming number of indicators. This is largely a result of the multi-faceted nature of the strategic plan coupled with an inherent propensity for the RBM logic model to generate complexity.

*Recommendation: Simplify the M&E program.*

The total number of indicators should be reduced. One option to help achieve this is prioritizing and limiting the number of indicators based on their degree of alignment with the effectiveness principles identified in the literature review (also see Conclusion C, below). A second opportunity is limiting indicators to those that are most closely linked to and able to influence management decisions. The value of separate evaluation indicators versus a simpler format should be considered. Simplifying the logic model by reducing the quantity of outputs, outcomes and impacts is also worth considering. In the future the potential for alternative and emerging effectiveness measurement M&E approaches to simplify the present RBM model should be explored.

*Conclusion C: The M&E program would benefit from improvements to the logic model flow of cause and effect, the design of indicators and targets, and baseline data.*

Significant effort and reasoning went into the development of the M&E logic model, indicators and targets. In some cases though the logic model flow of cause and effect is not rational or there are overlaps, gaps, or missing assumptions. The usefulness of some indicators and targets is limited due to a range of difficulties that are predicted in the literature as common problems. It appears that there may be a link between the effectiveness of AMMF outcomes, impacts, indicators and targets, and the clarity of the goals in the strategic plan. The lack of baseline data from which to compare results limits the ability to effectively evaluate progress.

*Recommendation: Incorporate M&E effectiveness guidelines at the design stage.*

Use of the effectiveness principles identified in the literature review would help improve the utility of the AMMF monitoring and evaluation program. Indicators should be simple, precise, understandable, relevant, measurable, reliable, realistic to collect and linked to objectives. Fundamental objectives including those in the strategic plan should be clear and precise. Where baseline data is available it should be incorporated within indicators and targets. Where baseline data is not available it should be established over time using the future M&E program results.

*Conclusion D: The M&E program is not well integrated into AMMF operations.*

The M&E program is not well understood by model forest staff and stakeholders and is not well integrated within programs and operational routines. Feedback loops for continual improvement are not clear and do not appear to be functioning effectively.

*Recommendation: Adapt and integrate M&E to fit the AMMF context.*

The monitoring and evaluation program should be adapted to meet the specific needs of the model forest and align with the resources available. As much as possible, data needs for monitoring should be coupled with existing management routines or other readily available sources. The newly established data base initiative should be continued and linked directly to M&E data requirements. The results from M&E should be more explicitly linked to periodic reflection and decision making process to ensure that lessons learned are regularly translated into continual improvement. AMMF staff and stakeholders should be more aware of and involved in the M&E process. It would be helpful to maintain the existing M&E focused relationship with La Universidad de la Frontera or a similar institution. However for continual improvement purposes it is not necessary to have external third party involvement. It is more important that M&E be conducted on a regular basis with the resources available.

*Conclusion E: long-term indicators are problematic for results-based M&E.*

Due to their broad, regional implications the measurement of long-term impacts is difficult, and the ability to attribute these impacts back to specific model forest interventions is limited. Their measurement more closely reflects a regional status assessment approach to M&E and the results have limited relevance to model forest operations, decision making processes and continual improvement. The inclusion of these impacts significantly adds to the complexity of AMMF's results-based M&E program and the resources required to implement it. This detracts from the effectiveness of the learning and continual improvement aspects of the program.

*Recommendation: narrow the focus of the results-based M&E program.*

Consider narrowing the focus of AMMF's results-based M&E program toward the assessment of shorter term impacts that are more measurable and within the influence of model forest programs. Consider collaborating with other local organizations to measure longer term, regional changes using a separate, status assessment approach based on local level criteria and indicators. In the future it may be worthwhile to explore how alternative effectiveness measurement M&E approaches such as Outcome Mapping might help to resolve the difficulties with measuring long-term impacts in model forests.

*Conclusion F: Adaptive management aligns well with basic model forest principles and can support AMMF with achieving local sustainability goals.*

Adaptive management's focus on facilitating innovation and the testing of new practices and policies aligns well with the purpose of model forests, yet it is an approach not currently found in the existing repertoire of model forest tools. In addition, adaptive management's systems-based approach to understanding key ecological, social and economic influences can complement the current RBM and situational analysis tools available for strategic planning. The development of simple conceptual models can promote discussion about community vulnerabilities to future change, strategies to develop resilience, and help with the development of appropriate indicators.

*Recommendation:*

Continue to explore how the strengths of adaptive management might be used to complement the existing planning tools available to AMMF and other model forests.

Continue the process of dialogue that emerged during the resilience workshop at AMMF and consider the implications that result for future indicators within the M&E program.

*Concluding Statement.*

By committing to a results-based monitoring and evaluation program the Araucarias del Alto Malleco Model Forest is breaking new ground for model forests in Latin America. There are few examples to follow. Neither is there significant support for strengthening the capacity of model forests to implement M&E. Even so, the AMMF monitoring and evaluation framework is commendable for its comprehensiveness in addressing the actions detailed in the 2005-2008 strategic plan. Equally commendable is AMMFs dedication to seeking and responding to community feedback, to learning, and to continual improvement.

As with any first effort at a complex management process there exist valuable opportunities to improve the implementation of AMMF's monitoring and evaluation program. Many of these opportunities are consistent with the experiences of other organizations in the conservation sector. Two of the key challenges are exacerbated not by AMMF's manner of implementing the M&E framework but by the nature of the framework itself: a propensity to generate excessive complexity, and the difficulty with assessing long-term impacts and linking them in a relevant way to management implications. If M&E for effectiveness measurement is cumbersome to implement or lacks relevance to model forest decision makers then it is not meeting the purpose to which it was intended.

It is worthwhile then to benefit from existing knowledge about the effective application of M&E and to explore potential changes that might lead to its improved

utility in the model forest context. In this sense the noteworthy potential of adaptive management to augment existing model forest management tools is also worthy of further exploration. The continued evolution in the use of all of these tools will be valuable to helping AMMF and other model forests in their pursuit of facilitating the sustainable use of forests for the benefit of communities in Chile and around the globe.

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## Appendix A

### Stakeholder Analysis

The following groups were identified as stakeholders, a representative cross section of which need to be included in the semi-structured interviews. Araucarias del Alto Malleco Model Forest staff positions: General Manager, Projects and Community Development, Anthropologist, Intercultural Liaison Advisor, Forestry Coordinator, Economic Development, Administrative and Events Coordinator.

Alto Malleco Model Forest Board of Directors: 10 representatives from the communities of Lonquimay and Curacautín of whom 7 are indigenous community representatives and 3 are non-indigenous rural community representatives; the mayor of the municipality of Lonquimay; the mayor of the municipality of Curacautín; the regional governor; the Secretariat of the Regional Ministry of Agriculture; Regional Director of the National Forests Ministry; Regional Director of the National Institute for Agricultural and Rural development; Assistant southern Director - National Corporation for Indigenous Development; Regional Director of the Social Investment and Solidarity Fund; The Corporation for the Defense of Flora and Fauna (NGO); The Evangelical Development Service; The United Nations Development Program in Chile; Director of the Temuco Archbishop's Social Action Department; The University of the Frontier; Private sector farming and forestry representatives.

Local community participants in model forest projects and beneficiaries of specific projects.

## Appendix B

### Interview and Workshop Guidelines

The following guidelines for workshops and semi structured interviews were developed with Alto Malleco Model Forest Anthropologist Ms. María Ines Bustos. Education and literacy levels vary within the model forest area. Some of the recommendations are based on the need to communicate in a manner that will be comfortable for the full range of participants.

Interview questions will be developed with the assistance of AMMF staff in order to benefit from their extensive experience with the local communities.

Interview questions may be structured differently for directors of local institutions or model forest staff then for project participants from rural areas.

The model forest has noted that during workshops, rural and / or less educated participants are hesitant to participate in larger groups or with the presence of institutional professionals. In these situations smaller groups may more appropriate for soliciting feedback in a workshop / working group setting.

A model forest staff person should accompany me to interviews and workshops in order to provide a familiar contact, boost confidence and credibility in the research process, and where needed, assist with any difficulties in language and communication.

Appendix C

Semi-Structured Interview Questions

*Questions to AMMF Staff and other Institutional Professionals*

What is your understanding of monitoring and evaluation (M&E)?

What do you understand the purpose of the M&E program to be?

How does the M&E program work? What happens in the M&E program?

What do you think is working best?

What are the most difficult aspects of M&E?

What are the most difficult aspects of monitoring results?

What are the values you see in having an M&E program?

Does the M&E program make a difference to anything? Does it influence anything? Who does it help?)

How is M&E helping the model forest to learn and improve programs?

What happens after the M&E information is obtained? What do you think should happen after the information is obtained?

What program / project impacts are important for the MF to be monitoring and evaluating?

What kinds of environmental changes or threats exist in the region that could be relevant to monitor? Why?

What changes do you think could help the effectiveness of the program?

Who else could be participating in M&E and in what manner, to make the program more effective?

What would you say to other model forests considering an M&E program?

*Questions to Rural Board of Director Members and Project Participants*

What is your understanding of M&E?

What do you understand the purpose of the M&E program to be?

How well has the Model Forest staff understood your perspectives?

Project participant: If you have participated in a MF program or project, how does the model forest know / measure the effectiveness or success of the project? How do they incorporate your suggestions?

Project Participant: How do you measure / know if the project was a success for you?

Participant: What sorts of things make a program more successful or less successful?

What things are more important to evaluate with respect to the impacts a project has generated?

What kinds of environmental changes or threats exist in the region that should be monitored? Why?

Do you see change / responsiveness to the needs of the community?

How was the survey useful or not useful in helping you convey your perspectives?

How would you like to participate in monitoring and evaluation?

Appendix D

Opinion Survey Delivered to the Board of Directors

The purpose of the following questions is to collect information about the how the Model Forest has met the objectives declared it its Strategic Plan. Please mark your answer with an X in the column that corresponds with your level of agreement with each statement (consider the 2005 – 2008 period).

One = In Total Disagreement; Two = In Disagreement, Three = Minimally Acceptable

Four = In Agreement; Five = Totally in Agreement

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Statement	One	Two	Three	Four	Five
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The initiatives undertaken by AMMF are pertinent  
to local priorities.

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The activities realized by AMMF are coherent with  
the strategic priorities

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Investments in the region have been focused on  
the priorities defined as strategies

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Inhabitants of the region participate and are  
more familiar with the model forest

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Local organizations have incorporated  
environmental themes in their work

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Development agents in the region have  
incorporated environmental themes in their agenda

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Local organizations are more involved in  
realities of the region

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Statement	One	Two	Three	Four	Five
The proposal for a participation strategy has slowly grown.					
Communities have increased sustainable practices					
Local organizations have increased their leadership and independence					
Local biodiversity and culture is more valued than before					
Inhabitants of the region are more concerned about the care of the forests					
The community has more participation in local decision making					
The well being of inhabitants in the region has improved					
Environmental degradation and soil erosion in the regions has diminished					

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Observations and Comments:

## Appendix E

## Example Tables from the Resilience Assessment: Step One

Table E.1

## Central Issues That Need to be Faced in the Region

Issue	Valued Attribute	Geographic Limit
Participation and citizenship	Self esteem and local advocates	Model Forest and adjacent regions
Biodiversity	Biological stability	adjacent regions
Sustainable forest management	Conservations & development	“
Environment	Quality of life, good practices	“
Local economic development	Quality of life	“

Table E.2

## AMMF Systems Components

Component	Elements
Institutions	Forests, Agriculture and Livestock Ministries, Municipalities, Ministry of Public Works, National Environment Commission
Social	Neighborhood and APR committees, religion and education
Ecological	Forests, grasslands, glacier, water courses, water bodies, volcanoes, flora and fauna
Economic	State subsidies, grazing and agriculture, fish farming and bee keeping, Tourism and non-timber forest products, business and services

Table E.3

## Conflicts and Agreements

Conflicts	Agreements
Regional conflicts	The ley corta
State subsidies	State subsidies
Water	Water
Socio-cultural (e.g. religion)	
Use and management of soils	

Table E.4

## Key Leadership Roles

Organizational	Individual
Neighborhood committees	Neighborhood committee leaders
Municipalities	Mayor and councilors
Indigenous communities	Lonkos (traditional medicine men)
NGOs	Rural teachers
	Model forest leaders
Churches	Parish Priests
Employers	
The police	