

# SOURCES FOR THIS GUIDE

## ALTHOUGH THE TERM “ADAPTIVE MANAGEMENT”

has only been around for the past couple of decades, the basic concepts inherent in this term have been expressed for centuries in various schools of human thought.

Adaptive management approaches have been developed in many different contexts. In the first part of this section, we introduce a few of the approaches that we read about.



Specific fields that we consulted include:

- Science and Philosophy — “The Scientific Method”
- Social Sciences — “Social Learning”
- Business Management — “The Learning Organization”
- Professional Practice — “Reflection-in-Action”
- Ecosystem Management — “Adaptive Management”

Elements of adaptive management have also been adopted by many conservation and natural resource management projects. In the second part of this section, we describe the projects in the three countries that we visited:

- Zambia — The ADMAD, KANTIPO, and SLAMU Projects
- Canada — The British Columbia Forest Service’s Adaptive Management Initiative
- Papua New Guinea — The Research and Conservation Foundation’s Crater Mountain Project

Each of these sources contributed to the framework for effective adaptive management presented in this guide.

## Literature We Reviewed

### The Scientific Method

The most basic concepts behind all adaptive management approaches can be found in the traditions of science and philosophy. In the Western tradition, these advances are embodied in the development of the formal scientific method. The scientific method has its roots in the work of the ancient Greek philosophers such as Democritus, Socrates, Plato, and Aristotle who developed the first formal elements of logic and reason. This work was then further refined through the work of subsequent philosophers like Aquinas, Descartes, Hume, and Kant, and scientists like Galileo, Newton, Pasteur, Darwin, and Einstein. To represent the “scientific method,” we use some of the ideas outlined by Robert Pirsig in his book *Zen and the Art of Motorcycle Maintenance*. We also briefly touch on a few concepts advocated by Thomas Kuhn in his book *The Structure of Scientific Revolutions* and the idea of “post-normal” science represented by the works of Silvio Funtowicz and Jerome Ravetz.<sup>3</sup>

#### Conditions That Warrant Using the Scientific Method

According to Pirsig, at its most basic sensory level, the universe is “unintelligible, just a kaleidoscopic jumble of colors and patterns and noises and smells and pain and tastes without meaning.”<sup>4</sup> Pirsig is interested in how humans have used the scientific method to organize our collective understanding of these pure sensory data into a pyramid of knowledge about the universe. Pirsig describes the formal scientific method in comparison to informal ways of acquiring knowledge as “a huge bulldozer — slow, tedious, lumbering, laborious, but invincible...it takes twice as long, five times as long, maybe a dozen times as long as informal techniques, but you know in the end you’re going to *get* it.”<sup>5</sup> This formal process is needed because in scientific work “otherwise the problems get so complex that you get lost in them and confused and forget what you know and what you don’t know and have to give up.”<sup>6</sup>

#### A Brief Description of the Scientific Method

Pirsig describes how at its core, the scientific method involves weaving together two kinds of logic. *Inductive inference* involves starting with observations of the natural world and then arriving at general conclusions based on these observations. Induction is thus reasoning from particular experience to general truths. *Deductive inference* involves starting with general knowledge and predicting specific results. Deduction is thus reasoning from general truths to particular experience. The scientific method involves combining long strings of mixed inductive and deductive inferences.<sup>7</sup>

To be truly effective, the use of inductive and deductive reasoning has to be done very systematically so that as you add to the pyramid of knowledge, you avoid making any errors on lower levels that could cause the entire structure to come crashing down. The formal scientific method involves eight steps: 1) State the problem that you would like to change, 2) Develop a hypothesis as to the cause of the problem, 3) Design an experiment to test the hypothesis, 4) Predict what you think will happen when you undertake the experiment, 5) Implement the experiment following the protocol that you outlined, 6) Describe the results of the experiment focusing only on

what you have observed and not make any unwarranted inferences, 7) Analyze and draw conclusions from the results of the experiment without concluding more than you have proved, and 8) Publish the results of your experiment so that other people can learn from your findings and will not have to “reinvent the wheel.”<sup>8</sup>

Kuhn looks at the larger scale of how science operates in general. He defines the collection of knowledge and models in any given field as a *paradigm*. Kuhn argues that the development of paradigms is not a gradual process, but occurs in a series of waves in which the greatest advances take place during crisis periods when existing theory and the normal modes of scientific inquiry break down. Funtowicz and Ravetz extend this concept, arguing that when dealing with large complex problems like environmental issues, the traditional scientific method cannot be used successfully in the face of high stakes, a high degree of uncertainty, and conflicting values held by different stakeholders. Instead, they advocate using science in a way in which it is “no longer imagined as delivering truth” and instead, decision-making becomes a mutual learning process among different stakeholders.<sup>9</sup>

#### Social Learning

Practitioners in a number of different fields began to take the scientific method and apply it to problems that they were facing, seeking to turn knowledge into action. One of the earliest of these efforts was in the social sciences where practitioners were concerned with the question of how groups make decisions. This work began to become known as social learning. Social learning can in part be traced from John Dewey’s philosophy of pragmatism — a theory of getting things done.<sup>10</sup> For Dewey, learning comes from the interplay between practice and planning and then back to practice:

*The plans which are formed...as guides of reconstructive action, are not dogmas. They are hypotheses to be worked out in practice, and to be rejected, corrected, and expanded as they fail or succeed in giving our present experience the guidance it requires.*<sup>11</sup>

Dewey’s influence was seen in the work of a wide range of people ranging from the planner Lewis Mumford, the economist Edgar J. Dunn, and even Mao Tse-tung whose essay “On Practice” echoes the same thoughts: “Practice, knowledge, again practice, and again knowledge. This form repeats itself in endless cycles, and with each cycle, the content of practice and knowledge rises to a higher level.”<sup>12</sup> To represent this work, we look at the field of “social learning” as described by Chris Argyris and Donald Schön in their book *Organizational Learning: A Theory of Action Perspective*.

## Conditions That Warrant Social Learning

Argyris and Schön base their work in the need to help organizations function better. According to Argyris and Schön, an organization is a collection of people whose members devise rules for making decisions in the name of the collectivity.<sup>13</sup> The problem is to try to get the organization to capture knowledge generated so that it does not repeat mistakes. As Argyris and Schön put it:

*Organizational learning is not the same thing as individual learning, even when the individuals who learn are members of the organization. There are too many cases in which organizations know less than their members. There are even cases in which the organization cannot seem to learn what every member knows.*<sup>14</sup>

## A Brief Description of Social Learning

Every organization has what Argyris and Schön call a “theory-of-action” that guides what activities the organization chooses to pursue. Unfortunately, an organization’s stated theory may often differ from its actual “theory-in-use.” As a result, as Argyris and Schön state:

*Organizational learning occurs when members of the organization act as learning agents for the organization, responding to changes in the internal and external environments of the organization by detecting and correcting errors in organizational theory-in-use, and embedding the results of their inquiry in private images and shared maps of organization...In both cases, organizational learning consists of restructuring organizational theories of action.*<sup>15</sup>

Although these ideas are developed in the context of specific organizations, Argyris and Schön made it clear that the same principles apply to society as a whole.

## The Learning Organization

Different schools of thought for managing businesses and organizations have probably been around for as long as there have been businesses — it’s not that hard to imagine merchants in ancient Babylon or China talking to one another in their stalls about the latest strategy for maximizing profit flow and avoiding taxes. In the past few decades, however, a number of schools of thought on business and organizational management have developed that have begun to converge on similar ideas. Examples of these different schools include strategic planning,<sup>16</sup> management by objectives/results,<sup>17</sup> total quality management,<sup>18</sup> and structured flexibility.<sup>19</sup> To represent this approach, we focused on the concept of the “learning organization” that is presented in Peter Senge’s book *The Fifth Discipline: The Art & Practice of the Learning Organization*.

## Conditions That Warrant Learning Organizations

For Senge, the key condition is that managers are working with systems. A system is a series of interconnected factors that affect one another. Because managers are working with systems, they cannot merely focus on part of the system, but instead need to use systems thinking. As Senge writes: “Systems thinking is a discipline for seeing wholes. It is a framework for seeing interrelationships rather than things, for seeing patterns of change rather than static snapshots.”<sup>20</sup> For Senge, “Today, this systems thinking is important because we are being

overwhelmed by complexity. Perhaps for the first time in history, humankind has the capacity to create far more information than we can absorb...and to accelerate change far faster than anyone’s ability to keep pace.”<sup>21</sup> Furthermore, this complexity is not in the sheer numbers of variables in the system — the *detail complexity* of the system — but also in the ways in which these variables interact with one another — the *dynamic complexity* of the system.<sup>22</sup> The complexity of these systems means that those corporations that can deal with it best will be the most likely to survive.

## A Brief Description of Learning Organizations

Senge’s approach to developing a learning organization involves mastering five different disciplines. For Senge, the key discipline is *systems thinking*. One of the main tenets of systems thinking is that all systems have an inherent structure that can dictate outcomes and behaviors. In most systems, these factors are not linearly related, but instead linked in webs or loops with different factors interacting with each other in different ways. As a result, many well-intentioned efforts to solve problems by focusing on only part of the system can have unintended results. At the same time, however, small, well-focused actions can sometimes produce significant, enduring improvements, if they’re in the right place. Senge refers to this principle as “leverage.” Senge’s other disciplines include developing *mental models* of the system in question, building *shared visions* of the future that you seek to create, enhancing *team learning*, and promoting *personal mastery* that involves a commitment to lifelong learning.<sup>23</sup>

## Reflection-in-Action

Another offshoot of the social learning and organizational development work is related to the work done by professionals — practitioners of fields like medicine, law, architecture, and planning. These professions have a scientific underpinning of *technical rationality* that can be traced back to the work of the French philosopher August Comte in the early 1800s. The expansion of technical rationality into all fields continued throughout the 19th and 20th centuries, peaking in World War II with the development of the field of operations research, which used scientific approaches to track submarines and build nuclear weapons. These successes led to a growing sense that all problems could be dealt with through the rigorous application of the scientific method. In the 1960s, however, as researchers began to apply technical rationality with little or no success to social and political problems, doubts began to creep in about the validity of the approach. A growing movement developed to look at how to best help professionals deal with the difficult problems that they are facing. To represent this movement, we use the ideas outlined by Donald Schön in his book *The Reflective Practitioner*, which describes the process he terms “reflection-in-action.”

## Conditions That Warrant Reflection-in-Action

Schön starts by looking at the types of problems that professionals work with. He finds that the hallmark of these problems is that they are complex, uncertain, unstable, unique, and laden with value conflicts. Whereas traditional academics deal with relatively tidy and clean problems that can be solved through rigorous

application of technical knowledge, practitioners are faced by these messy problems that are more relevant to the real world, but that resist traditional technical based approaches. As Schön states:

*In the varied topography of professional practice, there is a high, hard ground where practitioners can make effective use of research-based theory and technique, and there is a swampy lowland where situations are confusing “messes” incapable of technical solution. The difficulty is that the problems of the high ground, however great their technical interest, are often relatively unimportant to clients or to the large society, while in the swamp are the problems of greatest human concern. Shall the practitioner stay on the high, hard ground where he can practice rigorously, as he understands rigor, but where he is constrained to deal with problems of relatively little social importance? Or shall he descend to the swamp where he can engage the most important and challenging problems if he is willing to forsake technical rigor?...There are those who choose the swampy lowlands. They deliberately involve themselves in messy, but crucially important problems and, when asked to describe their methods of inquiry, they speak of experience, trial and error, intuition, and muddling through.<sup>24</sup>*

### A Brief Description of Reflection-in-Action

Reflection-in-Action is a process that begins by “setting the problem” and “framing the context” in which the problem will be dealt with.<sup>25</sup> Next, the practitioner sets up experiments that test his or her understanding of the situation. These experiments take place in the context of everyday practice. As Schön writes, the practitioner “becomes a researcher in the practice context...he does not keep means and ends separate, but...implementation is built into inquiry. Thus reflection-in-action can proceed, even in situations of uncertainty, or uniqueness.”<sup>26</sup> Schön pointed out that the practitioner’s experimentation is different from that of the traditional scientist:

*The practice context is different from the research context in several important ways, all of which have to do with the relationship between changing things and understanding them. The practitioner has an interest in transforming the situation from what it is to something he likes better. He also has an interest in understanding the situation, but it is in the service of his interest in change.<sup>27</sup>*

## Adaptive Management of Ecosystems and Natural Resources

In North America, the first few hundred years after Columbus landed saw little or no management of natural resources, especially at ecosystem levels.<sup>28</sup> The basic principle behind the “frontier mentality” was to harvest what you could as fast as technically and economically possible and then, when the returns began to diminish, move on to new locations. In the late 1800s, however, the obvious shortsightedness of this approach started to become apparent with the close of the frontier. A number of visionary thinkers such as John Muir, Gifford Pinchot and Theodore Roosevelt began to realize that it would become important to manage these resources. This realization led to the development of federal, state, and local government agencies and non-government organizations, all of which were concerned with managing natural resources. During much of the following century, the natural resource management that these agencies and organizations promoted was primarily reactive and focused on discrete elements of the overall system. Under this “command and control” approach, a manager was trained to focus on a specific target variable.

In the early 1970s, policy makers and resource managers became dissatisfied with the traditional procedures and principles of resource management and sought some realistic alternatives. In response, a group of scientists led by C.S. Holling and Carl Walters began to argue for a new approach to these problems that might address some of these concerns. These ideas were developed in the context of resources drawn from large ecosystems like salmon along the Northwest Coast of North America, timber in the Canadian forests, and fresh water in the Florida Everglades. The approach was first termed “adaptive environmental assessment and management” and was then later shortened to “adaptive management.” To represent this work, we use the ideas outlined by Kai Lee in his book *Compass and Gyroscope: Integrating Science and Politics for the Environment* and C.S. Holling in his introduction to the book *Barriers and Bridges to the Renewal of Ecosystems and Institutions*.

### Conditions That Warrant an Adaptive Management Approach

Holling and his co-workers outline a number of conditions of ecosystems that warrant taking an adaptive management approach as opposed to the traditional command and control approach: 1) ecosystems are complex, but everything is not strongly connected to everything else, 2) ecosystems are non-uniform over space and time, 3) the unexpected can be expected, and 4) eliminating change does not lead to environmental quality.<sup>29</sup> In addition to these conditions about the nature of ecosystems, there are also conditions about the limited ability of a researcher or manager to understand the ecosystem that favor an adaptive management approach. As Lee states: 1) data are sparse because it is difficult to observe the state of the ecological system and the human economy interacting with it, 2) theory is limited and does not permit deductive logic to extrapolate very far from experience, and 3) surprise is unexceptional so that predictions are often wrong, expectations unfulfilled, and warnings hollow.<sup>30</sup>

### A Brief Description of Adaptive Management of Ecosystems

An adaptive management approach deals with the uncertainty inherent in managing natural ecosystems by treating policies as experiments. As Lee puts it:

*Adaptive management is an approach to natural resource policy that embodies a simple imperative: policies are experiments; learn from them...Adaptive management takes uncertainty seriously, treating human interventions in natural ecosystems as experimental probes. Its practitioners take special care with information. First, they are explicit about what they expect, so that they can design methods and apparatus to make measurements. Second, they collect and analyze information so that expectations can be compared with actuality. Finally, they transform comparison into learning — they correct errors, improve their imperfect understanding, and change action and plans. Linking science and human purpose, adaptive management serves as a compass for us to use in searching for a sustainable future.<sup>31</sup>*

## Projects We Visited

### Community-Based Wildlife Management in Zambia

During our field visit to Zambia we focused primarily on the Administration Management Design (ADMADE) project. We interviewed Gilson Kaweche, then Director of National Parks and Wildlife Service at its headquarters in Lusaka. While at ADMADE's headquarters of operations at the Nyamaluma Training Institute in Lupande, we interviewed Dale Lewis, Technical Advisor, and many of the staff who manage ADMADE (For more information on ADMADE, go to [www.ADMADE.org](http://www.ADMADE.org)).

During our visit to Zambia, we also spoke to representatives of the Kafue Anti-Poaching (KANTIPO) project based in Kafue National Park, and the South Luangwa Area Management Unit (SLAMU) project based outside of the South Luangwa National Park. We interviewed Stephan Forster, General Manager of KANTIPO, and Brian Child, Technical Advisor to SLAMU Project Manager.

#### Conditions That Warrant an Adaptive Management Approach

Zambia is a country rich in wildlife. But in recent times, wildlife numbers have declined precipitously as rural populations have grown, hunting has intensified, and encroachment into national parks has increased. Because of a lack of financing and infrastructure, the Government of Zambia has been hard-pressed to control the internal and external threats to its wildlife. In response to these threats, the Government of Zambia has developed a decentralized approach to natural resource management in which control over wildlife in designated



Game Management Areas is given primarily to local communities. In this way, subsistence hunting is monitored, poaching by outside forces is tightly controlled, and many of the benefits of commercial safari hunting flow directly to the communities.

Growing out of a workshop that occurred in Lupande in 1983, the Zambian National Parks and Wildlife Service established the ADMADE program. ADMADE is Zambia's official community-based natural resource management initiative and is responsible for working in 36 Game Management Areas throughout the country. ADMADE works with communities through Community Resource Boards, which are elected by community members. Working with the Government and private sector investors — such as tour and commercial safari operators — the Community Resource Boards are empowered to make most of the natural resource management decisions in their local area.

ADMADE works to find ways in which communities can manage their wildlife resources sustainably. Many of the projects supported by ADMADE are designed to promote community development as a way of offsetting threats to biodiversity. The major source of revenue for many ADMADE communities is commercial safari hunting — safari clients often pay as much as \$1300 to \$1500 per day for the privilege of hunting in the Game Management Areas of Zambia.

At the Nyamaluma Training Institute, ADMADE trains village scouts, unit leaders, bookkeepers, enumerators, and data analysts. It also conducts seminars and workshops for village chiefs, the Community Resource Board members, and other community leaders. It also monitors all aspects of ADMADE operations including results of scouting patrols, training, community development, and commercial safaris.

KANTIPO, the second organization we visited, is managed by a board of directors and steered by an association of stakeholders including tour and safari operators, lodge owners, National Parks and Wildlife Service, and local communities. KANTIPO primarily supports the activities of anti-poaching units in Kafue and also works with local communities to find incentives to counteract hunting activities.

SLAMU, the third group we visited, works in the Luangwa area, controlling the South Luangwa National Park and the Upper and Lower Lupande Game Management Areas. Like ADMADE, SLAMU is a community-based natural resource management project.

#### Elements of Adaptive Management in These Projects

According to Dale Lewis, “ADMADE is a continually evolving program that actively applies the principles of adaptive management to identify, test, and refine methodologies that support community-based natural resource management.”<sup>32</sup> ADMADE monitors wildlife throughout the project area primarily through village scouts. These scouts accompany safari operators to collect hunting data and ensure that they follow the rules. Data collected through these efforts are used to ensure that proper fees are paid to the Government of Zambia and local communities. They are also used to continually adjust hunting quotas. The scouts also conduct regular patrols and collect data on poaching, illegal fish camps, and encroachment into the national parks. ADMADE has been

careful to understand the local conditions that drive overhunting in the GMAs. It has invested considerably in data collection and analysis, and according to Dale Lewis, “From such analysis, additional questions can be asked as to how best adapt ADMADE to these variables in achieving biodiversity conservation, supporting community development needs, and promoting private sector profits.”<sup>33</sup>

The other two projects we visited also demonstrate characteristics of adaptive management approaches. KANTIPO utilizes a very systematic approach to determining threats, identifying strategic issues to address, developing objectives, planning activities, and monitoring results. The foundation of all of this work is a project “cause-effect” model in which project managers analyze the core problems affecting the Kafue National Park. The SLAMU project staff have made considerable investments in problem analysis, goal setting, and data collection and analysis.

## Natural Resources Management in British Columbia, Canada

Of the three projects we visited for this study, the British Columbia (BC) Forest Service initiative is the one that is most explicitly doing adaptive management. We first learned about the BC Forest Service’s adaptive management work while on the Internet looking for information on adaptive management. Staff of the BC Forest Service have been prolific in developing tools to make the previously highly technical and somewhat academic concepts of adaptive management much more accessible to practitioners in the field (For more information, go to [www.for.gov.bc.ca/hfp/amhome/amhome.htm](http://www.for.gov.bc.ca/hfp/amhome/amhome.htm)). One result of their efforts is *An Introductory Guide to Adaptive Management for Project Leaders and Participants* (available at [www.for.gov.bc.ca/hfp/amhome/introgd/toc.htm](http://www.for.gov.bc.ca/hfp/amhome/introgd/toc.htm)). Their guide provides an introduction to the concept of adaptive management as it is being implemented by the BC Forest Service, and is an excellent resource for project managers anywhere in the world. During our visit to BC, we spoke with Brian Nyberg and Brenda Taylor in the Victoria offices. We also visited the Kispiox Forest District headquarters in Hazelton where we spoke with Norm Bilodeau, Doug Steventon, Dave Maloney, and other staff.

### Conditions That Warrant an Adaptive Management Approach

The BC Forest Service of the Ministry of Forests is responsible for managing the timber, range and recreation resources of British Columbia’s unreserved public (Crown) forest land, which covers two-thirds of the province (about 59 million hectares).<sup>34</sup> About one-quarter of this land is managed for commercial timber harvesting, while the other three-quarters are managed for non-commercial timber values, including recreation and cultural heritage. Each year, about one per cent of provincial forest land designated for timber production is harvested.

Within the BC Forest Service, the Forest Practices Branch is responsible for managing the preparation, update, assessment, and refinement of all aspects of provincial forestry policy and standards. Branch staff members provide expert advice and technical support to a broad array of clients, particularly operations field staff. They also assess the effectiveness of forest planning and forest practices standards and propose legislation, policies and procedures to help achieve the ministry’s goals and objectives.



### Elements of Adaptive Management in This Initiative

One of the key initiatives of the Forest Practices Branch is adaptive management. This initiative includes several components, including the production of educational materials, training programs, advice and support for various project teams, and development of a set demonstration projects where adaptive management is being applied to local issues. In particular, managers in the BC Forest Service use adaptive management as a way of efficiently managing BC’s timber resources. According to the BC Web site:

*Forest ecosystems are complex and dynamic. As a result, our understanding of ecosystems and our ability to predict how they will respond to management actions is limited. Together with changing social values, these knowledge gaps lead to uncertainty over how best to manage British Columbia’s forests. Despite these uncertainties, forest managers must make decisions and implement plans. Adaptive management is a way for forest managers to proceed responsibly in the face of such uncertainty.*<sup>35</sup>

One of the most important features of the BC Forest Service’s work is that it focuses on local resource managers as the agents of adaptive management. While it acknowledges that scientists are needed to carry out specific research that may be required to answer specific questions, the BC Forest Service seeks to help project managers use sound scientific and management principles to improve decision making. Examples of specific questions that the project managers have considered include: What are the effects of different types of logging road crossings on a stream’s ability to provide fish habitat? Or what are the effects of different levels of timber harvesting on the breeding success of key bird species?

## Community-Based Natural Resources Management in Papua New Guinea

The focus of our visit to Papua New Guinea (PNG) was the Research and Conservation Foundation (RCF) based in Goroka in Eastern Highlands Province. We have been working with RCF for the last few years through their involvement in the Biodiversity Conservation Network (For more information, go to [www.BCNet.org](http://www.BCNet.org)). We interviewed John Ericho, RCF's General Manager, and Robert Bino, Manager of the Crater Mountain Project.

### Conditions That Warrant an Adaptive Management Approach

Papua New Guinea is reknown for its spectacular biodiversity. From the interior highlands to the coastal plains and coral reefs, PNG is home to birds of paradise, tree kangaroos, and marine invertebrates. Papua New Guinea is also blessed with an extraordinary cultural diversity. Most human populations in the highland live in relative isolation and population pressure on natural resources is relatively low.



RCF grew out of efforts to conserve the Crater Mountain Wildlife Management Area, which covers over 2,600 square kilometers. The site spans a wide range of elevations (150-2,100 meters). Primary forest blankets the lower elevations, while alpine scrub and grasslands occur higher up. Crater Mountain is home to over two hundred bird species, of which 49 are endemic to the region, and 84 mammal species, of which 15 are endemic. Crater Mountain is also home to under a thousand people who are divided into 21 traditional clans across two distinct linguistic groups. Although the area currently has a low population density, a number of threats loom including industrial logging, mining, and oil drilling. These threats are compelling because the companies that would like to access the natural resources of the Wildlife Management Area are offering the local residents who own these resources, relatively large amounts of money compared to their current incomes.

To address the threats to biodiversity, the Crater Mountain project team was formed by RCF working with the Wildlife Conservation Society. The team works in partnership with numerous national and international NGOs, the government of Papua New Guinea, and the local landowners. The project has established several locally owned and operated research and ecotourism and handicraft production enterprises. The tourism enterprises provide lodging and guide services for visiting scientists and for tourists interested in experiencing the natural and cultural wonders of the Crater Mountain area. The project has been working to develop a management plan that provides for both biodiversity conservation and enterprise sustainability.

RCF also executes community development initiatives as incentives for conservation for the local people of the Crater Mountain Wildlife Management Area. Though these initiatives are not directly linked to conservation, significant community development initiatives are being identified and implemented according to the wishes and aspirations of the landholders. RCF envisions that helping the landowners to meet their needs will assist in establishing concrete landholder commitment to RCF's conservation work. As part of this strategy, the RCF Conservation Education Program is designed to raise public awareness in the Crater Mountain Area as a way to develop the knowledge and capacity of local landowners so that they can independently manage the Crater Mountain project in the future.

### Elements of Adaptive Management in This Initiative

RCF is a relatively young conservation organization that has evolved considerably since its inception. In 1994, RCF began taking a much more systematic and strategic approach to project planning and management as part of the Biodiversity Conservation Network. Project staff developed a conceptual model of their project and detailed management and monitoring plans so that they could learn about the effects of their interventions. Since that time, RCF has been implementing these plans and has collected a good deal of data about various elements of the project. RCF has on a number of occasions formally revisited and revised their model and plans and is constantly working to develop their organizational learning capabilities.