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Ana L Báez and Paul O'Loughlin

ILLUSTRATIONS BY:

THE INTERNATIONAL ECOTOURISM SOCIETY

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INTERNATIONAL ECOLODGE GUIDELINES

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The International Ecotourism Society (formerly The Ecotourism Society) is an international, non-profit membership organization founded in 1990 to make ecotourism a tool for conservation and sustainable development. The Society provides professionals with the information and educational materials they need to plan and manage ecotourism in destinations worldwide. TIES publishes a quarterly newsletter, books, information packages, guidelines and fact sheets; develops standards and monitoring programs for the ecotourism industry; performs research; and offers workshops, seminars, training programs and international forums on key topics within the field.

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FOREWORD

By William McDonough

Travelling often means visiting a place that is foreign and new. Imagine, instead, leaving home to find yourself in a dwelling where every element of your surroundings is imbued with the local; with the cultural, natural, material and energetic qualities of that new place, in a dwelling where your ecological "footprint" is gentle rather than harsh. In that case, you would have come home in a much larger sense to the planet itself. You would also have entered an ecolodge, one of this century's most delightful prospects.

The word "ecology" is rooted in understanding the "logic" of our home. It comes from the ancient Greek "oikos," which meant household, and "logos," which evolved into logic. Information about the nature of our earth home has exploded in the last few decades with galactic and nanoscale images, complex computer modeling, scientific research, and global communication. Even as these developments unfold, humans, like the early explorers, continue to explore the natural world and enjoy its diversity. We celebrate nature's abundance, and we have even begun to recognize its fragility. But we have only scratched the surface of honoring this larger home with our designs. The important questions for designers today at the local and global levels are, How can we become native to this place? How can we all become indigenous people?

This will not mean to go backward in time, but to move forward; to see the earth, and our place upon it, as gently and prosperously intertwined. It will also mean an encompassing approach across many disciplines. Right now, the human dimension of life on the planet is dramatic, it is dynamic, it is everywhere, and, with its current trajectory, it can be terrifying. The conventional global "development" process is clearly a strategy of tragedy — though an unintended one. Mindless design can be seen as a kind of intergenerational remote tyranny: the tyrannizing of future generations by our poor design choices today. In order to offer future generations of all species a strategy of hope, we must move to an intentional strategy of change. The concepts in this book offer a profoundly hopeful strategy, one that moves humans from a timeful mindlessness in our relationship to the earth, toward a timeless mindfulness that celebrates that relationship.

A famous statement of 20th century design was that of the modern architect Le Corbusier, who said "a house is a machine for living in." This has been translated in the last century to putting the same "machines for living" everywhere and powering them with petrochemicals.

As the technological world expands with asphalt hegemony, and architects engage in the construction of more steel, aluminum, and silica structures, those of us who lead must remember to ask the questions that get to the real heart of people and place. Do we want a legacy of sameness or diversity? Of elegant respect or brutish disregard? Of hope or despair? Of memory or forgetfulness? It is up to us. Whether we are architects, landscape planners, sociologists, market analysts, developers, or in any other profession, we are all the designers of our future world.

Like the Hannover Principles, which I wrote to guide EXPO 2000, the World's Fair, the guidelines in this book can be seen as an essay of clues: a humble transmission from well-meaning designers of this era to future generations, honoring our sacred responsibility to one another. As we consider having "designs" on the earth, and as we continue to design our place upon it, the concept of the ecolodge illuminates our path to the most important work ahead. To become indigenous again means engaging the best of human technology with local natural circumstance and culture in ways that honor all of these elements. Ecolodges are a leading strategy for such engagement. One can only hope all buildings will one day be designed like this.

INTRODUCTION

The ecotourism industry is at a crossroads in its development. In the last decade, it has generated much revenue for local and regional economies worldwide, provided new incentives for governments and local communities to preserve protected areas and species, and heightened over-all local awareness of the importance of conservation. Unfortunately however, it also has led to numerous problems, and placed undue pressures and threats on the natural resources that sustain it. From these often-costly lessons, we are learning that the benefits of ecotourism can only be sustained through well-planned and carefully implemented projects that place the long-term wellbeing of the natural resources and local communities as a top priority.

With the rapid growth of nature-based tourism within the last decade has come the development of numerous lodges in and around biologically rich, diverse areas. Such developments often have had detrimental ecological and social impacts. Given the continued demand for ecotourism destinations, the increase in numbers of lodging facilities seems inevitable, and for this reason, these guidelines have been written to allow for the creation of ecolodges. Our aim has been to provide a framework for the design, development and operations of future lodges such that they uphold the social and ecological integrity of their given environments, and thereby allow for sustained benefits from ecotourism without damaging or destroying the very natural resources on which they depend.

An ecolodge is an accommodation facility that satisfies at least five of the criteria listed below, three of which must embody the main principles of ecotourism; that of conservation of neighboring lands, benefits to local communities and interpretation to both local populations and guests:

1. Helps in the conservation of the surrounding flora and fauna.
2. Endeavors to work together with the local community.
3. Offers interpretive programs to educate both its employees and tourists about the surrounding natural and cultural environments.
4. Uses alternative, sustainable means of water acquisition and reduces water consumption.
5. Provides for careful handling and disposal of solid waste and sewage.
6. Meets its energy needs through passive design and renewable energy sources.
7. Uses traditional building technology and materials wherever possible and combines these with their modern counterparts for greater sustainability.
8. Has minimal impact on the natural surroundings during construction.
9. Fits into its specific physical and cultural contexts through careful attention to form, landscaping and color, as well as the use of vernacular architecture.
10. Contributes to sustainable local community development through education programs and research.

Mehta 1999

Efforts to create guidelines for the ecotourism profession and industry date back to the early 1990s. Ecolodge guidelines are particularly needed at this time, in order to ensure that ecolodges meet the highest possible international standards, not the cost-saving eco-efficiency approaches being promoted by the mass tourism industry. The demand for ecolodge guidelines has never been greater, as national governments,

NGOs, and development banks all set their sites on using ecotourism as a sustainable development tool.

Within the field of tourism, there is perhaps no more important and potentially achievable goal than setting sustainability standards for lodging. The International Ecotourism Society (TIES) recognized the importance of creating a whole new type of lodge — called "ecolodges" — and held two International Ecolodge Forums and Field Seminars in 1994 and 1995 at Maho Bay Camps in the U.S. Virgin Islands, and in Costa Rica. The second forum in Costa Rica held multi-sectoral stakeholder participatory work-sessions for the creation of international ecolodge guidelines. Representatives from 35 countries worldwide took part, local communities in two key locations in Costa Rica were included, and the results were summarized in Spanish in 1996.

This book is the culmination of six years of work. With the exception of the chapter on "Operations and Management," each of the chapters included in the guidelines has been contributed by collaborators who participated at the 1995 field seminar. The editors and collaborators represent five continents. TIES' intention has been to provide international guidelines that would be flexible and performance standard, and hence could be adapted to the local situation by the user. We hope that this book will be published in Spanish, French and Portuguese in the future, making it more readily accessible to a much larger audience.

Since the field seminar and workshops, the guidelines have been updated, and new ideas and concepts have also been included. We have covered age-old concepts and ways of design such as Feng Shui and Vastu Shaastra, as well as modern concepts such as "six senses" and permaculture, allowing for a universal approach. We have also included bibliographies and internet sites for readers who seek more detailed information on specific subjects covered in the various chapters.

These guidelines are designed for use by any group connected to ecolodges: developers, planners, architects, owners, managers, marketing directors, consultants, government representatives, NGOs, etc. We also encourage their use for other ecotourism facilities, such as visitor centers, wardens' houses, staff accommodation, and entrance gates. Most of the principles presented may also be applied to improving existing establishments, rendering them more ecologically friendly and sustainable.

We hope that these guidelines will be useful not only in the emerging field of ecolodge development, but also that their recommendations be applied in some measure to the traditional hospitality sector as a whole. Furthermore, we hope that these guidelines will provide a better definition and understanding of the ecolodge, and in doing so, assist tourism agencies in setting up criteria in determining whether or not a lodge is truly an ecolodge.

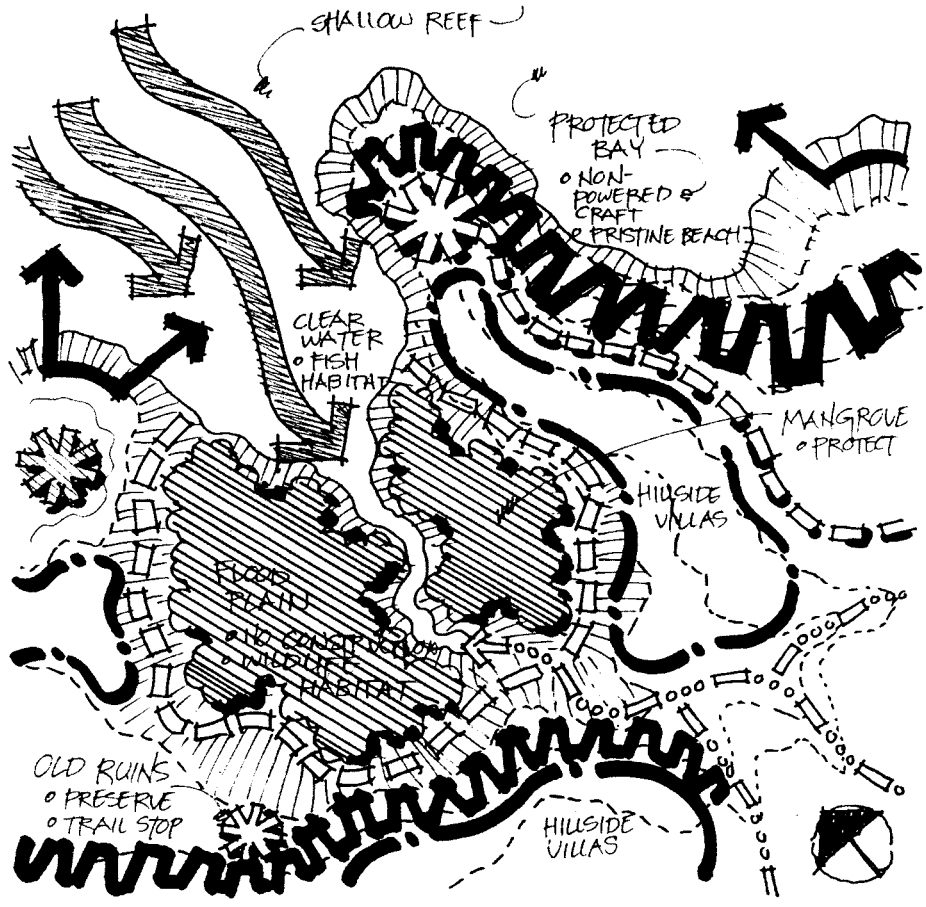
We realize that it may be prohibitively expensive and uneconomical to follow all the guidelines mentioned in this book. However, we do encourage that the reader use and implement as many of them as possible, making sure at the same time that there is return of investment. This book is intended to be a reference guide and therefore we do not expect readers to read all the chapters. In this regard, there are overlaps within certain chapters.

And finally, we hope that these guidelines will in some way encourage a conscientious approach to developing ecotourism facilities, and in doing so, contribute to the conservation of our global natural heritage.

Hitesh • *Ana* • *Paul*

"...in many ways the environmental crisis is a design crisis."

—Sim Van der Ryn



CHAPTER 1

SITE SELECTION, PLANNING AND DESIGN

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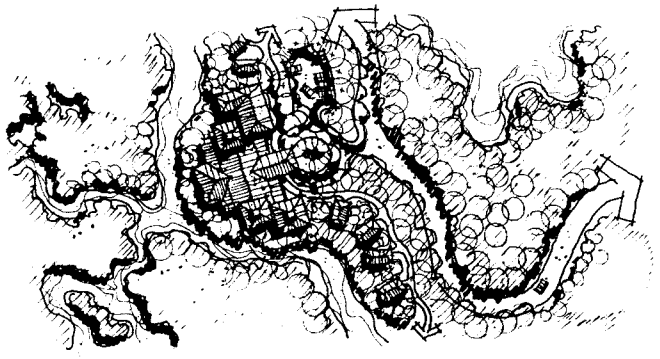
CHAPTER CONTENTS

1.0 SITE SELECTION, PLANNING AND DESIGN

1.1 INTRODUCTION

Careful, well-researched master site planning, and ecologically and socially conscious site design is crucial to creating harmony between tourism developments and environmental/cultural protection. Preserving the special characteristics of a place requires an in-depth understanding of the natural systems on the site, and the cultural responses to that environment's history, opportunities and constraints. We need a new way of thinking about site planning and design in order to change the way we build traditional tourism facilities. Opportunities exist to employ better ways of designing projects, using environmentally friendly materials, techniques and systems in a way that also incorporates traditional methods (possibly unique to the region) and practical local knowledge.



Sustainable site planning and design can lead to a closer harmony between ecolodges and their setting and can indeed help to lessen their environmental impact. Site planning and design for any ecolodge project must involve in an integral way land use, human circulation, existing structures (if any), facilities and utilities in the natural and human environment. Information and data on the project and site is best laid out clearly in accurate scale plans, showing location, layout, general size and shape, and orientation of the different elements of the project. Project development needs to be guided by a schedule, which is effectively a timetable showing the proposed sequence of activities for the project. Most often the schedule is written in the form of a grid, with tasks listed down the page and the time-span of the project evenly marked along the foot of the graph, allowing planners to clearly mark when activities and stages take place. Accompanying these documents will be a range of attachments and notes, among which will be standards and guidelines on minimizing the negative impacts of the project. Contract documents must clearly identify penalties for breaches of the impact standards you have set.

Therefore, the site planning and design for an ecolodge must first of all safeguard the sustainability and conservation of the area's natural assets and cultural heritage, and improve where possible on impacts that may already be present on the site. A fundamental goal for any "eco" oriented project is that the development of the site must leave the site better off after development than before. The scope for reforestation, water resource enhancements, soil enrichment and wildlife protection and restoration programs is often limited by funds and broadened by the availability of voluntary help. These factors should be taken into account during planning stages once the extent and capacity of voluntary work is established.

1.2 SITE EVALUATIONS AND SELECTION

The success of an ecolodge can pivot on the initial processes of site evaluation and selection. Careful evaluation, in some instances, may reveal that the site is not appropriate for development at all. Given the environmental impacts of increasing numbers of visitors to wilderness areas, it is prudent, although not always possible, to select ecotourism sites just outside a nature preserve. As such, a well-conducted site evaluation can assist developers in finding alternatives to developing in protected areas. The selected site should support the lodge within natural and biophysical resource limits while offering ecotourists the opportunity to experience and enjoy the natural environment. All considerations involved in selecting the most appropriate site for an ecolodge will be essential to following decisions dealing with design and construction.

It is important to mention that sites appropriate for ecolodge development often have little or no supporting infrastructure or public services.

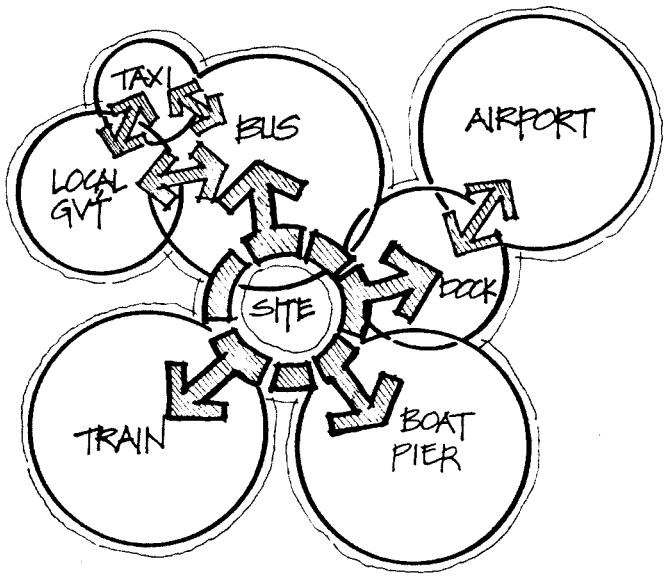
GENERAL GUIDELINES

1. Select a site whereby the ecolodge itself would not directly affect the focal (or flagship) ecotourism attractions of the area, or visually compete with these attractions. In other words, a balance must be struck between easy accessibility to outstanding natural areas and minimization of negative biophysical and cultural impacts (including visual impacts) of the environs.
2. Take account of the following infrastructure elements and public services as part of your site evaluation:
   a) Access to or provision for electricity, drinking water, sewage, telephone line, public lighting.

b) Transport options to the site: land motor vehicles (bus, taxi, rent-a-car, etc.); regular commercial, charter, or private flights; motor boats, cruise ships, yachts, ferries; railway (schedules of nearest railway station), etc. On site: walking paths and trails, bicycles, shuttle carts, solar/electric vehicles, etc.

c) Regional geography: site proximity to highways, roads, trails (tracks), airport, landing fields, railway, docks, electricity pylons, dams, mining or farming activities, dangerous ruins, etc.

d) Postal service, garbage collection and disposal, medical services, schools, commercial facilities, etc.



3. Carry out an initial feasibility "scoping" exercise for each site option before the particular site is selected. Scoping is the process by which positive and negative impacts are jotted down after physical inspection and brainstorming sessions with the local people, consultants, etc. This can be done using the well-documented Participatory Rural Appraisal (PRA) method. Scoping should include biophysical features (see Chapter 2 for more details) of the site (climate, land, vegetation, wildlife, etc.), as well as cultural features (archaeological sites, traditional villages, etc.).

4. Look for clues on the site and search for areas that have a spiritual quality — the sacredness of place. These areas should be protected and not built over. This factor is often overlooked during the site-selection process. As ecologically conscious planners and developers, we should protect the sanctity of a site, its spirit, and the people that inhabit in and around the site.

5. Develop a quick program for the different site options; i.e. market niche, site potential, sustainable use, profitability (economic sustainability). All this fits into determining what you need in a site and what the ecolodge should be like. The selected site must meet the needs of the program, have the resources to provide this day after day, tourist after tourist, and be done in a sustainable fashion.

1.2.1 Location and Accessibility

The location of the ecolodge is undoubtedly one of the most important criteria for selecting a site. The site should be the compelling reason for the existence of the lodge. The quality of the surrounding environment is crucial to the success of any ecolodge: the nearby natural and cultural attractions, the way ecotourism circuits are set up, operated and marketed, and also the way in which local populations are actively involved in the process.

GUIDELINES

1. When locating an ecolodge, consider the quality of the surrounding cultural and natural environment, site access, sewage disposal, energy sources, water supply, and impact on the neighboring ecosystem.

2. Consider travel distances as a critical siting criterion, as well as the natural and cultural features that can be visited and, perhaps, maintained economically from the site.

3. Consider proximity of the lodge to major transport modes in the region. However, the ecolodge should not be too close to airports or major transportation routes due to the excessive noise and pollution.

4. Choose the most adequate location for an ecolodge based upon a comparative analysis of alternative sites.

1.2.2 Local Communities and Cultural Resources

Just as one looks at the natural resources and how they might provide for programming, one should carefully research the local people and their culture. See Chapter 4 for more details on what kinds of research will be helpful. A good amount of time should be spent with the local people who may have lived on the site for centuries and have invaluable knowledge of the site and its surroundings. The designer should never underestimate the know-how of the local communities.

GUIDELINES

1. Complete a detailed study on local communities that are in the surrounding area during the site selection process.
2. One criterion when selecting the site should be the availability of labor in local communities to participate in the realization of the lodge from initial planning to construction and day-to-day management.
3. Other questions that need to be asked include:
   - Does the site have any sacred significance to the local communities?
   - What benefit will the local people receive from the development of the lodge?
   - Will the ecotourism nature of the development be compatible with adjacent land uses?
   - What cultural features (both past and present) are found at or near the site?
   - Does the local community have claim to the area despite legal ownership?
   - Does the local community accept the development of the ecolodge?
   - Will the ecolodge impact the community?
4. Developers and architects need to be frank and honest with the people about their plans and should in-fact elicit the local peoples' help in understanding and exploring the area. Meetings should be undertaken in a way that is sensitive to local customs and respectful of the rights of the local people.

1.2.3 Appropriate Technology and Availability of Environmentally Friendly Materials

If environmentally friendly local materials are not locally available, it may become uneconomical to import materials and thus, the site may not be appropriate for development. It is also important to note that in many cases, use of local materials may not be the best option as it may end up causing more damage to the environment than bringing the materials from elsewhere in the country. Using appropriate technology also usually means involving local community wisdom and labor. For a more detailed discussion of this subject, see section 3.6.

GUIDELINES

1. Conduct a survey of indigenous building practices, availability of environmentally friendly materials and their likely costs, which can be helpful at this stage. When embarking on an analysis of ecolodge construction, apply the "life-cycle" approach in architecture and building (also called "cradle-to-cradle" analysis); i.e. how much "embodied" energy does the building material create over its entire life? This should take into account the energy consumption of the different construction stages from the extraction of the raw material, transporting, refining, packaging and final delivery of the building product. This includes on-site erection, the energy required for cleaning and maintenance over its useful life, and the energy eventually used in its demolition, dismantling or relocation.
2. Analyze and confirm the practicality, cost and durability of old and contemporary building materials and practices of the region and the community.

1.2.4 Impacts of Development

This is a preliminary "brainstorming" component of the site selection process. Judgements of the various phases of development and protection of significant existing features must be thought out at the selection stage to assure that the site will not be degraded by the development of the ecolodge. The application of environmental impact assessment (EIA) practices in the development of every ecolodge is of the utmost importance. EIA provides a procedure for the full consideration of the environmental impacts of programs, activities and projects before any decision to proceed. It precludes "behind closed doors" decision-making in the public and private sectors.

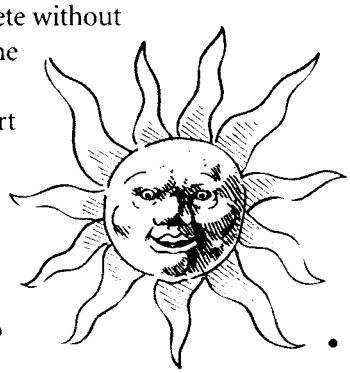
GUIDELINES

1. Study possible environmental and cultural impact for each site for both the construction and operation phases of the development of the ecolodge. See Chapter 2 for more information.
2. Consider both mid- and long-term scenarios for development impacts.

1.3 SITE INVENTORY AND PHYSICAL ANALYSIS

Once the optimal site has been selected, a more specific analysis must be carried out at that site. An ecolodge is not separable from the environment in which it is located, and for this reason an analysis of the natural and cultural characteristics of the site should take place before the design and building stages.

Any inventory or analysis would be incomplete without at least a rudimentary understanding of how the local population relates to the land spiritually, culturally and physically. This is a research effort that can guide many decisions that need to be made during the design phase. Throughout the process of site design, from concept to construction, the development of the ecolodge will benefit by a continued awareness of the specific cultural and physical environment into which it is being introduced.



The main purpose of a site inventory and analysis is to identify the natural and cultural resources available to the site. This should include a site boundary survey; hydrology and drainage patterns; wetlands and other water features; wildlife habitat, geology, vegetation, topography, soil types, climatic conditions, views, existing structures, local communities and culture, etc. For a more detailed discussion of this subject, see Chapter 2.

Tourism in most parts of the world is placing increasing demands on natural resources, so planners and landscape architects are turning to new and better alternative tools such as computers and design programs. These tools are proving very helpful in planning and developing ecotourism sites, particularly for analyzing the potential impacts of planned developments in ecologically sensitive areas. However, it is important to note that no information from aerial photos, surveyors or other databases presented on computers is a substitute for an extended site visit with local guides before the design process begins.

1.3.1 Analysis of Biophysical Features

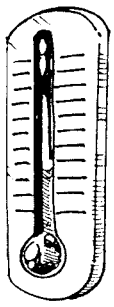
GUIDELINES

1. Contract appropriate professionals to analyze the site in regards to its major biophysical characteristics. Characteristics to be analyzed include the following: a) Climate: sunlight, temperature, precipitation and humidity, wind direction; b) Land: physiography, soils, geology, hydrology; c) Vegetation: native and exotic species, vegetation types, precise locations; d) Wildlife: native and introduced fauna, transient fauna, seasonal fluctuations.

   a) Climate — Carefully analyze and note the climatic factors of the site such as:

   i) Sunlight
   - Monthly sunrise and sundown hours through the year.
   - Angle of solar incidence through the year.
   - Solar intensity.
   - Landscape and vegetation obstacles to sunrays.
   - Local potential for generating solar energy.
   - Natural/vegetative shading for cooling purposes.
   - Cloudiness: dominating types of clouds, seasonal patterns of cloud cover, average number of clear and cloudy days per year.

   ii) Temperature



   - Monthly temperature variations: mean, maximum and minimum.
   - Temperature variations between day and night.
   - Frequency and mean duration of temperature extremes.
   - Human comfort ranges.
   - Location variations (north and south slopes aspects).

   iii) Precipitation and humidity
   - Monthly and yearly mean precipitation (measured in mm).
   - Identification of dry and rainy seasons.
   - Absolute and relative humidity.
   - Snow accumulations and disposition pattern (drifts, whiteouts).

iv) **Winds**

- Monthly mean and maximum wind velocities.
- Wind orientation patterns.
- Incidence and frequency of destructive winds.
- Potential for generating wind energy.

b) Land — Carry out a detailed analysis of the following land characteristics:

i) **Physiography**

- Topography — is the land basically horizontal, inclined, or with gentle or pronounced slopes?
- Dominant landscape forms, including the horizon — flat, mountainous, sloping, abrupt canyons and ravines, etc.
- Degree of erosion caused by diverse agents.
- Identification of most attractive landscape views from site, and natural screening of ecolodge to reduce visual impact.
- Potential for integrating landscape features with architectural design.

ii) **Soils**

- Dominant types of soil.
- Resistance and compaction of soil: fitness for different types of foundation and construction.
- Thickness of the different layers, degree of maturity, texture, strength, susceptibility to compaction, presence of organic materials, presence of alluvial soils, degree of permeability, fertility, rockiness, erosion, etc.
- What type of cultivation and crops could grow in this soil to attain a certain degree of food self-sufficiency?

iii) **Geology**

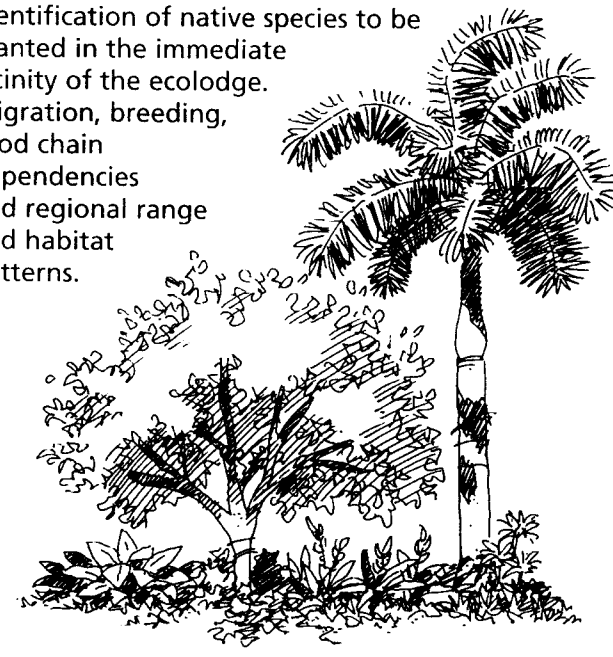
- Rock type and seismic characteristics of site.
- Presence or absence of geothermal or volcanic features.

iv) **Hydrology**

- Presence of rivers, streams, wadis, lakes, marshes, reservoirs, or oceans (or distance to these features).
- Subterranean waters.
- Degree of water pollution.
- Risk and frequency of floods.
- Depth of water table.
- Sources of potable water.
- Potential for making use of hydroactive energy systems.
- Soil recharge characteristics.

c) Vegetation

- Vegetation types and plant communities present.
- Native and introduced vegetation (exotic species).
- Endemic (peculiar to the area), characteristic and threatened flora species.
- Identification of focal (flagship) flora species (if any) from the ecotourism attraction viewpoint.
- Precise location of specific individual plants of particular interest or beauty.
- State of degradation or disturbance of native vegetation.
- Regeneration indicators.
- Tolerance or susceptibility to different types of disturbance, such as trampling, fire, etc.
- Protection status of native vegetation and plant communities.
- Possible measures for regenerating local native vegetation.
- Potential for integrating site plan and architectural design with surrounding native vegetation and plant communities.
- Identification of native species to be planted in the immediate vicinity of the ecolodge.
- Migration, breeding, food chain dependencies and regional range and habitat patterns.



d) Wildlife

- Species of native fauna (mammals, birds, insects, reptiles and amphibians, fish, invertebrates).
- Native and introduced fauna (exotic species).
- Resident, transient and seasonal species.
- Identification of focal species as regards their degree of ecotourism attraction (the most beautiful, singular or rare).
- Seasonal fluctuation of animal populations.
- Game species (if any).
- Status of local wildlife protection.
- Factors that have influenced decrease of local native wildlife.
- Possible measures to control exotic wildlife species.
- Impacts on planned program and design on wildlife communities, rare and endangered species.

1.3.2 Analysis of Cultural Features

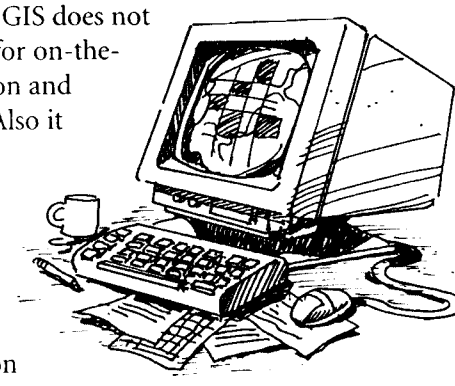
Apart from the biophysical features discussed in the preceding section, it is equally important to perform a more specific analysis of the local cultural elements (both of the past and the present — i.e. including archaeology) in the site and its vicinity. During the quick analysis of the cultural situation in the feasibility stage, you should have already developed at least a dialogue with people in developing agreements. This analysis will also provide important input for the subsequent design and construction stages.

GUIDELINES

1. Find noteworthy local cultural elements, both past and present:
   - Specific ethnic groups.
   - Traditional settlements.
   - Local traditions and folklore: language, architecture, clothing, handcrafts, dance, music, ceremonies, magic and religion.
   - Archaeological features.
   - Sacred grounds.
   - Potential for integrating design with cultural environment.
   - Ways of avoiding negative impacts on local culture.
2. Understand and respect the main cultural elements and traits of the region.
3. Research the population and distribution of groups and their distance from the proposed ecolodge.

1.3.3 CAD Generated Analysis: The Overlay GIS Method (Environmental Mapping Approach)

Geographic Information Systems (GIS), is a sophisticated computer-based way of generating and superimposing mapped data, and, in the right hands, can help manage tourism-related resources while improving the quality of recreational opportunities. Many environmental issues, including site planning and impact assessment, analysis of soil and vegetation interactions, mapping and modeling of atmosphere events, animal and population distributions, etc., can be effectively mapped using GIS. It is important to understand that GIS is only as good as the information that is fed into it. GIS does not replace the need for on-the-ground verification and further analysis. Also it can become expensive.



Computer manipulation permits greater flexibility and data manipulation and is increasingly being used for site analysis. Computer-aided design (CAD) programs are an enormous asset at any stage of the site planning and architectural design, so long as you do not have to recreate the program for each proposal.

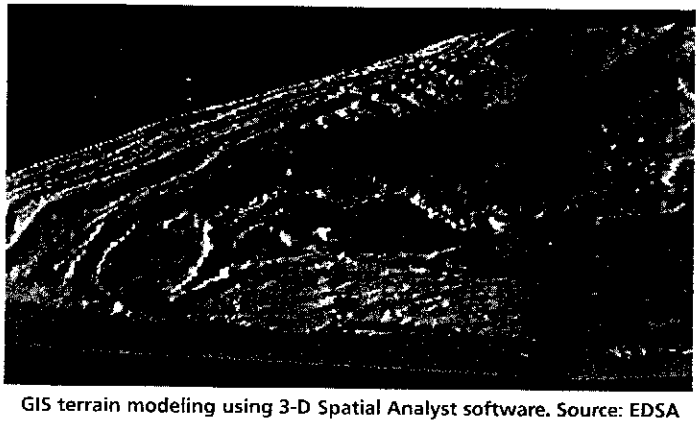
Faster, less-expensive, user-friendly computers have made GIS technology more accessible to wider audiences. With the use of these new data sources, GIS allows us to interpret the site in specific "layers" so that analysis and individual programs can be made for such diverse concerns as vermin control and monitoring of erosion impacts. GIS-based tourism resource and planning models can provide a common framework for the understanding of many aspects of ecotourism that affect the multitude of government agencies, private interest groups, and businesses that require an accurate and current information base.

GIS can bring together extremely diverse data, such as data on vegetation, geology, existing and proposed land uses, planned routes, etc. GIS makes it possible to analyze the site's capability and suitability in connection with proposed uses. It can perform view shed analyses; select optimum pedestrian and vehicular routes; identify the best locations for facilities and campsites; identify especially sensitive sites for complete preservation, and monitor data of various kinds of tourist activities. Provided with monitoring data of various kinds (field sampling, remote sensing, activity

reports), GIS can provide a continuing overview of the impact of tourists and travellers on the areas visited. GIS models of the visited environments can be created and the impacts of planned activities can be tested on these models, leading to more informed decisions.

It is also possible to use GIS to identify the locations of features in a particular area that are capable of supporting various tourism activities. This type of information is extremely important for supporting tourism's interests in integrated resource management.

The overlay method of site analysis is extremely sensitive to which components of the environment are selected for mapping. It is therefore essential that those mapped components represent the key issues among which site evaluation must be resolved. To do this, firsthand knowledge of the terrain must be acquired by a small team of competent observers from different backgrounds in relevant disciplines. For ecotourism sites it is advisable to have at least one person present from each of the geological, ecological and social sciences to assist the landscape architect and architect. Experts in economics, biology, agriculture, horticulture and wildlife behavior can be utilized if required.



GIS terrain modeling using 3-D Spatial Analyst software. Source: EDSA

GUIDELINES

1. Consider using the 3-D analyst, Spatial Analyst and Model Builder extensions to the GIS Arcview program to analyze the site. This is expensive technology to use in the short term but very economical in the long term, given a) an appropriate reason for its use in the first place, and b) depending on the quality of (repeatable) data and information.
2. Use knowledgeable consultants to provide the data required to initiate a GIS study and undertake sufficient training in GIS yourself to be able to run and build your own programs.

1.4 MASTER SITE PLANNING

New tourism destinations are benefiting from regional master planning whether they are initiated privately, by non-governmental organizations (NGO's) or by government. Of all the professions, landscape architects, planners and architects (with a strong ecological and environmental foundation) are among the best trained to design a sustainable development in nature-based areas. They bear a special responsibility for the design of facilities that are to be developed in pristine, ecologically rich areas. However, a considerable number of ecolodges are being designed and built without the services of a landscape architect. In some instances, even architects are ignored. This is rather unfortunate considering that planning is one of the most important aspects of a successful ecolodge. For ecolodges, it would be prudent to include a landscape architect specializing in ecologically sustainable development as an integral member of the design team. In many projects around the world, it is becoming quite common for landscape architects to be the prime consultants, providing the lead role in the design team.

All the elements of ecolodge site planning and design must have a purpose and have in mind the following:

- In the case of a protected area, the relationship of this area with other neighboring areas and the importance of the bioregion and wildlife corridors.
- Understanding of the overall site and its natural and cultural resources.
- Links between all physical facilities (including the ecolodge) and the natural and human environment.
- Links with any other facilities, transport points or infrastructure.
- Links with the general management goals of the surrounding or nearby protected area.

A new paradigm to master site planning is required: one that not only respects the ecosystems of the site and neighboring communities, but also strives to retain and in some cases enhance, the "sense of place" of the site. Therefore, a professional master site plan should cover zoning and the access to the site.

1.4.1 Zoning

Zoning is the process of applying different management objectives and regulations to different parts or zones of a specific area. Once the most appropriate location for the ecolodge has been defined within a relatively undisturbed natural area, a zoning system is required in order to evaluate and classify the surrounding area, according to its most suitable use.

The proposed site plan and zoning scheme for the ecolodge must comply with existing management plans and bylaws (i.e., in the case of legally protected areas).

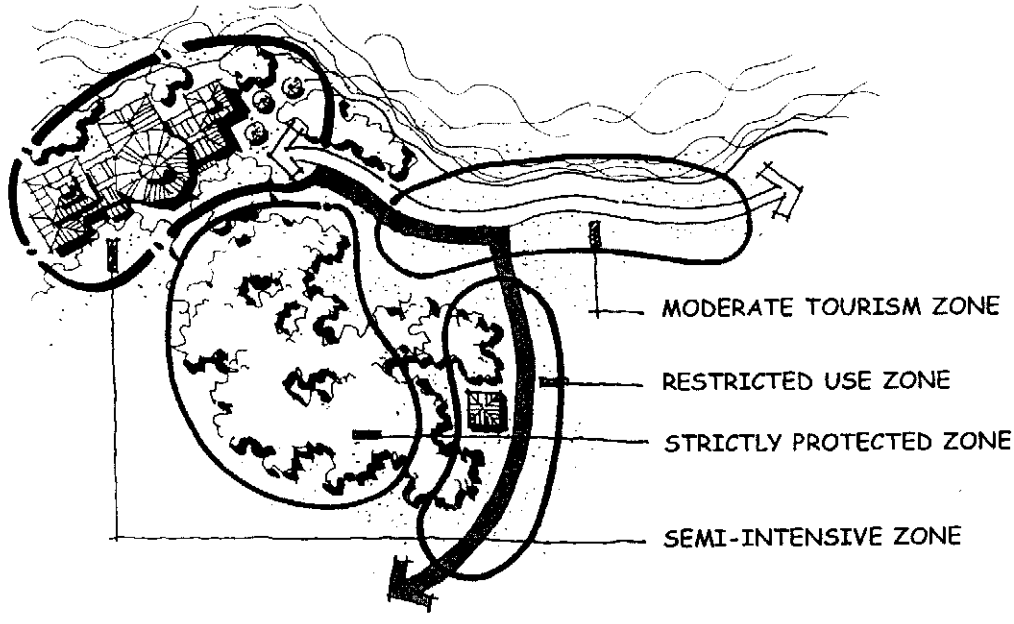
In essence, a zoning scheme shows the development suitability of the different portions of a site striving in every case to minimize impacts on the natural and cultural environment, as well as optimizing the ecotourist's experience. Zoning also indicates to us where facilities, activities or services should not be developed.

Among other things, the zoning strategy consists of concentrating visitor impacts and physical facilities in certain areas and dispersing or prohibiting them in other areas.

GUIDELINES

1. In order to carry out a proper zoning plan, you should consult with professionals and technicians of different areas and field expertise. Consultants may include landscape architects, architects, planners, engineers, ecologists, biologists, geographers, anthropologists, archaeologists and local authorities. Also very important is the consultation with the local people who generally have a better knowledge of the site. If at all possible, employ locally. As is the case with other expenses, fees for some of these professionals need to be considered right at the beginning.

2. Have each one of the proposed zones correspond to a specific management plan, always in accordance with habitat management planning objectives of the surrounding natural and cultural ecosystems. The following zoning scheme (especially for terrestrial ecosystems) is proposed:
   a) Strictly protected zone — In the strictly protected zone (sometimes called "sanctuary" or "absolute reserve" zones), prohibit the presence of all types of tourists and tourism infrastructure.
   b) Restricted tourism use zone — In the restricted tourism use zone (sometimes called "wilderness" zone), allow only access to a strictly limited number of tourists, usually on foot (or, in some cases, by rowboat), taking rigid measures for minimizing impacts (one way of doing this, is by having the tourists always accompanied by a guide). Include only trails (foot tracks) and never highways or roads.
   c) Moderate tourism use zone — In the moderate tourism use zone, encourage visitors to enjoy activities that will endeavor to enhance environmental education and ecological awareness, as well as a conservationist ethic. These zones may have limited low-impact tourist services (mainly of an interpretative nature). If roads are to be included, they must be strictly low-impact and low-speed. Tourists may move around this type of zone by foot, bicycle, horse, camel, rowboat, electric motorboat or low-impact land motor vehicle, but always on previously specified, controlled, and mutually exclusive paths.
   d) Semi-intensive tourism development zone — In the semi-intensive tourism development zone, which should always be an area of limited size, concentrate on the main tourism facilities, including the ecolodge itself and complementary services (such as an interpretative center, staff dwellings, highway or road access and parking space, etc.). Preferably, this zone should be located in peripheral areas where clearings exist or that



may already show a certain degree of environmental damage or deforestation. Never locate this zone in a primary vegetation area (including a mangrove or a marshland). In every case restoration and reforestation tasks should be carried out in this zone, based on endemic and native species.

e) It is important to mention that ecolodge development should never consider an intensive tourism development zone.

3. Use zoning to define allocation of areas for different uses and services based on the limits of acceptable change (described in Chapter 2) of the natural and cultural resources as well as other biophysical and climatic conditions. It must also support efforts to conserve the area's natural and human resources and also contribute to enhance the quality of the ecotourist's experience.

4. Consider allowing proposed land uses to increase if it has been determined that project areas and corresponding levels of intensity are found not to cause degradation or decrease the quality of the user's experience. The result is a project area that has a management plan that allows "development creep."

5. For each of the zones, plan for a specific density related to buildings and their primary uses. Examine relative merits of concentration versus dispersion, remembering that natural landscape values can normally be best conserved if the physical plan is carefully dispersed but also, inversely, knowing that by concentrating buildings and other structures (in the semi-intensive tourism development zone) you leave more available undisturbed natural zones. Again, the challenge is striking the right balance.

6. Remember that activities carried out in different zones are normally mutually exclusive (and often conflict), so that zoning decisions must be taken very carefully.

7. Design a flexible plan that allows a diverse range of clients to enjoy different experiences at different times of the time of the year.

1.4.2 Access to Site

Ecolodges often are located in remote and wild areas, and therefore few typical amenities and services found in towns are normally available. This includes access by paved highway, public transport, electric and telephone lines, piped potable water, public drainage and sewage, garbage collection and disposal, nearby school and medical services, shopping areas, etc.

For this reason, a different approach to planning is required, based on a high level of functional, energy and food self-sufficiency. Before designing and building your ecolodge, realistically and clearly identify the specific characteristics of isolation and difficulty of access to services and amenities to determine the level of self-sufficiency you wish or need to provide for the lodge to be sustainable and viable.

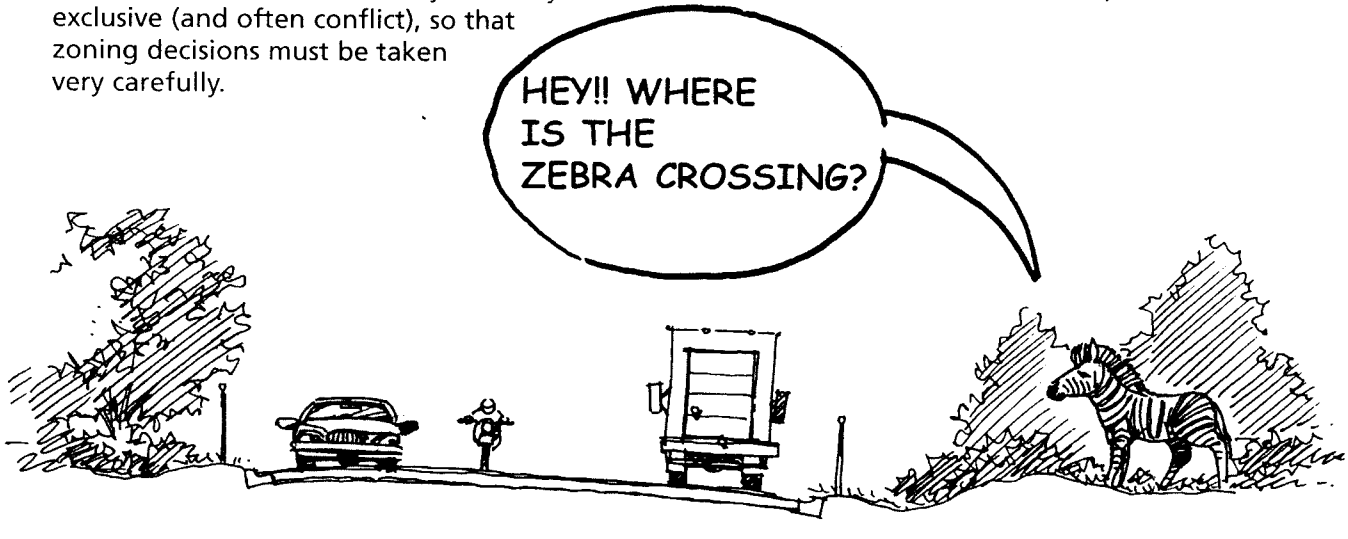
GUIDELINES

1. Negotiate appropriate public transport links with the local authority or bus operator.

2. Provide your own shuttle bus service to and from a nearby settlement with secure car parking. This will add immensely to an ecolodge's feeling of wilderness. It also gives you full control of vehicular movements around the lodge and eliminates the need for sacrificing land to visitor parking.

3. Design roads in a way that reduce speed.

4. Avoid building roads with a width of more than 5m/16ft within a protected area or ecotourism destination. Wider roads become veritable barriers for wildlife mobility and also mar the natural landscape.



5. Create the most appropriate access to your ecolodge, striking the right balance between ease of approach and impacts on the natural environment. Limit the number of entry points to your site (preferably only one) in order to facilitate surveillance control and management.

6. Remember that paved highways are usually an invitation for all kinds of human settlement and that they stimulate branching effects. If there is no existing paved highway access and the distance from the tourism distribution points is considerable, sometimes there is less impact in developing a landing field for light planes than to build a paved highway.

7. Keep in mind that construction of highways, roads and other motorways within a natural area or near to it will impact on the natural resources that one wishes to protect. Consequently, they should be strictly limited and justified only if no other viable solutions exist.

8. Impose rigid limits on the use of automobiles and other motor vehicles, according to a clear and strict zoning scheme. In any case, establish a low speed limit for any motor vehicle in the immediate vicinity of your ecolodge, and where appropriate, within the natural area.

9. Understand impacts of any roadways as barriers to small animals — particularly to breeding migrations, e.g. frogs and salamanders.

10. Whenever possible, use waterways (fluvial, ocean or lake), ensuring the use of boats with minimum negative impact. Avoid the use of internal combustion motors as much as possible within fragile areas such as mangroves or marshes. Consider the use of electric-powered boats. For short distances and wildlife-watching excursions it is best to use a stable rowboat. Particularly appropriate are catamarans, which make good, floating platforms if boards are laid across the two canoes. These waterways are often crucial to local fishermen and hence the local economy, so their use is a sensitive issue and needs to be negotiated.

11. Try to locate your project a fair distance from airports or main highways, in order to minimize in general the negative environmental impacts they cause and avoid, among other things, continuous contact with excessive noise and fumes. However, do note that being far away from airports and main highways carries with it the potential need to build more roads, so you will need to weigh the impacts on a case to case basis.

12. Other design considerations that you need to incorporate are: the provision of safe paths for pedestrians, cyclists, etc., the provision of multi-modal access corridors and the use of road surfaces that are local and non-petroleum based so as to increase recharge of water and reduce runoffs.

13. Include signboards in critical terrestrial areas (turtle nesting beaches, bird nesting or roosting colonies, dangerous marshes, and vulnerable sand dunes) to which the public would normally have ready access. They remind people of entry restrictions, inform tourists of behavior codes, carry educational information, and warn people of potential hazards. It may be necessary to fence off particularly sensitive habitats to discourage public entry.

14. Minimize impermeable surfaces when possible to reduce runoff and maximize groundwater recharge.

1.5 SITE DESIGN

Site design, as compared to master site planning, is specific to the property on which the ecolodge is to be developed. It deals with issues that are within the ecolodge site.

Ecolodge site design should enable the principles of adaptation, reduction, reuse, repair, recycling and energy conservation to be used. Successful site designs for ecolodges will derive their strength from the specifics of the site. In ecolodges, the overall context of the site is one of the main reasons for its existence and must be recognized as such by the designer. Site design should be based on an understanding of the relationship between the indigenous cultures and the land. Research into traditional site planning and land use and incorporation of their sustainable principles can help engender a site plan that is sensitive to the spirit of the place and the indigenous culture.

The main objective of the site design process is to balance human needs with the viability of natural systems. Working with what the land has to offer is the key to creating a built environment that exists in harmony with the natural one.

GENERAL GUIDELINES

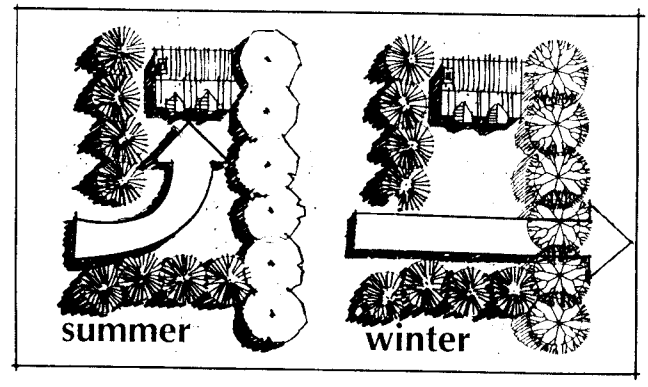
1. Take into account the area's biodiversity and any specific ecosystems and the site's relationships with any nearby farming or fishery resources, minimizing all environmental impacts. Following with the zoning strategy, sensitive areas should be strictly off-limits or have limited access. Concentrate development in less sensitive areas. Protect coastal dunes and the natural vegetation,

and avoid having negative impacts on nesting and spawning grounds. Strictly avoid the construction of large artificial "features" such as lagoons with direct discharge to the sea. Visitors wishing to swim may be perfectly happy with a mixed-use earth dam, or perhaps a moderately sized swimming pool. Note that swimming pools have significant impacts in terms of chemical storage, handling and the regular disposal of significant volumes of contaminated backwash water. Carelessly managed pool chemicals are toxic and highly explosive. For more information on pools, see section 1.5.6 later in this chapter.

2. Take great care in the design of the proposed ecolodge, and comply with the corresponding management plan of the respective protected area. Frequently the site selected for an ecolodge will be within or near a legally or officially protected area.
3. Avoid prominent marinas, embankments and jetties, which are counter to a natural image. Provide a simple jetty for small boats and canoes. Apply appropriate systems for controlling all sources of pollution from boats/ships. Strictly prohibit jet-skis and the like.
4. Phase your project so that its impact can be monitored, and modify subsequent phases based on the study results.
5. In hot localities, if you include an area for swimming, consider a natural or semi-natural area, like a lake, artificial lake, river, or the sea, but be sure there are no immoderate risks (noxious fauna, excessive sea waves or undertow, etc.) and avoid disturbance to aquatic fauna.
6. Become responsible for the best natural or manmade views from your site. Don't ruin other people's views to your site.
7. Preserve existing trees and other natural habitats, such as low shrubs, especially along edges of wetlands and forests.
8. Avoid blocking the views that adjacent owners have of marshes, lakes, etc.
9. Note any drainage ditches that need to have unimpeded flow.
10. Note any special restrictions such as habitat preservation areas or setbacks. Ensure that more than adequate buffer space is provided so that any intrusion is minimized and reinforced with appropriate signs.
11. The goal of ecolodge site design is to emphasize the natural characteristics of the site. Site design consists of the following main elements:
    - Physical structure siting
    - Road design
    - Nature trails
    - Fences and retaining walls
    - Grading and drainage

1.5.1 Physical Structure Siting

From the lessons learned through the site analysis process, a site plan should be designed whereby the buildings are in harmony with the landscape. Draw upon local precedents for determining the relationship between structure and environment. To achieve this, one of the primary techniques would be to protect sensitive habitats from development. The ecolodge should be planned around natural features rather than imposing typical resort design solutions. Buildings should not try to compete with the surrounding plant and landforms, which, after all, are the main attractions. In colder climates, wind directions are a major factor when siting ecolodge units.



GUIDELINES

1. Whenever possible, develop in previously disturbed sites. Redevelopment requires minimal disturbance of natural systems since the disturbed area may already be impacting the site. Suitable old or traditional buildings on the site should be converted into ecotourism facilities. Conversion of existing facilities is one of the lowest impact design techniques.

2. Consider the concept of cluster design. Consolidating functions or segment facilities can reduce footprints of individual structures. Having stacked guestrooms is better than being side by side. However, be careful not to build above the tree line. For example, if a visitor's lodge is sited on a ridge with a view over the valley below, the building will be visible from many angles and it will look glaringly conspicuous. But if it is sited below the ridgeline, on the slope, is single-storied and mimics the color of the landscape, it will be far less obtrusive.

3. In the spacing of buildings, allow for animal movement, plant growth and integration with the existing site. If possible, build on stilts to allow for animal movements.

4. The orientation of buildings is also very important. The building should be oriented to take advantage of shade and airflow for cooling in summer, and solar energy for heating and wind protection in winter.

5. If solar collectors or other photo-voltaic systems are proposed, orientation should allow maximum access to sunlight.

6. The landscape architect/architect should not carry out any design without a topographical map of the site that shows the location, girth and canopy diameter for every major tree on the site. Retention of existing grades around trees is critical to their survival. Through very simple cut-and-fill calculations the designer can minimize earthwork and clearing by aligning long buildings and parking lots with landscape contours or breaking them into smaller units on a series of terraces that can take up the excess slope.

7. Site buildings and other structures to avoid cutting trees and to minimize disruption of other natural features.

8. Locate pasture and corral areas for any horses, camels, and other grazing stock away from natural sources of potable water or watersheds.

9. Avoid sources of disagreeable sounds and smells near your ecolodge. In your project, utilize technologies that diminish gas emissions.

10. Site your ecolodge far from local communities and create buffer zones that will not permit human habitation.

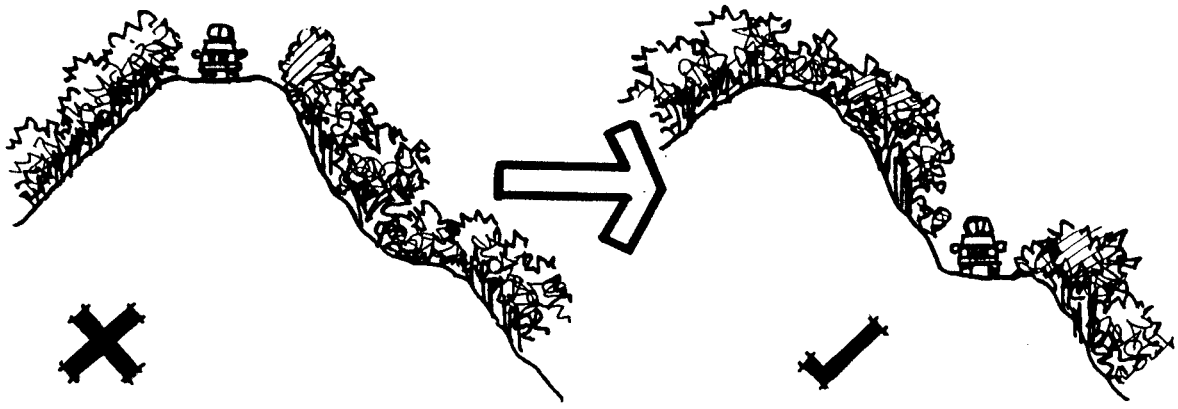
11. No coastal ecolodge should affect or modify the natural coastline in any way.

12. Avoid building on low areas. Aside from the danger of flooding, humidity will be higher and breezes less obvious.

1.5.2 Road Design

The main approach to the layout of the ecolodge should limit roads and vehicular traffic. All by themselves, roads can change the perception and function of the ecolodge. The creation of any road will alter the configuration of the landform and will lead to topsoil loss, erosion and increased run-off. Minimize the width and length of roads and use traffic-calming techniques, incorporating prominent bicycle routes and pedestrian path networks.

Road construction can have a devastating impact on the surrounding environment for literally hundreds of meters on either side. The opening of the environment can change microhabitat, including relative humidity, canopy and sun levels, hydro-period, and physical factors related to soils. The construction and type of cover (porous versus nonporous), the width and the methods used to reconstruct these areas of habitat change will have a great affect on the success of subsequent regeneration. The best solution is always to carefully remove and store the topsoil lost to any construction, for re-use adjacent to the finished development.



In parks such as Denali National Park, Alaska, and Grand Canyon National Park, Arizona, vehicular routes are being closed and reclaimed and shuttle systems have been introduced. Provision of transport hubs and public transport systems will be necessary to limit visitor impacts for many protected areas in the world and may be a wise option for a new ecolodge. This concept could be crucial to highly visited areas like Yosemite National Park, where visitor impacts have reached critical levels.

GUIDELINES

1. Although in some cases roads may be built in order to bring tourists into relatively close contact with wildlife, they should avoid sensitive areas such as breeding sites or hunting grounds. Roads in nature areas should avoid as much as possible any direct interaction with the wildlife and the flora. Therefore, they should not follow river courses for long stretches but have various viewpoints along the way and they should also not encircle waterholes. Both these approaches would help maintain wildlife behavior patterns.
2. Prior to construction of roads, inventory and move plants and topsoil that could be disturbed by construction activities. After road gradation has been completed, the plants and topsoil should be returned as closely as possible to their original sites.
3. Appropriately signpost all roads, endeavoring to stimulate appreciation of the natural and cultural environment, while providing interesting and pertinent information, and also encouraging suitable behavior. Avoid excessive signposts, which mars the natural landscape. Provide additional rules in brochures placed in visitors' rooms.
4. On hilly areas, avoid locating roads on ridgelines since this scars the landscape. They should be a minimum of 5-8m (16-26 ft) distance below the ridgeline.
5. Design roads using the topography to minimize visual impacts and create dynamic variation in views and orientation. Allow for wildlife movement patterns and habitat requirements, disturbing as little vegetation as possible.
6. Ensure that water runoff from the road does not create erosion channels. Consult an engineer if there is doubt about building gravel sinks or other drainage tools.
7. Clearly mark vehicle access and parking areas and limit it to those locations.
8. Draw up contracts with road builders and contractors that have conservation clauses with penalties for unnecessary impacts .The contract should specify the materials and methods to be used and include a timetable of construction. Additionally, give incentives for tree protection.
9. Locate your driveway to meander around trees and other natural features.
10. Limit the impervious cover of the ground to the minimum needed, especially around existing trees. Excessive areas for driveways should be avoided. A pervious surface, such as shell, turf, stone, brick or marl is recommended.

1.5.3 Nature Trails

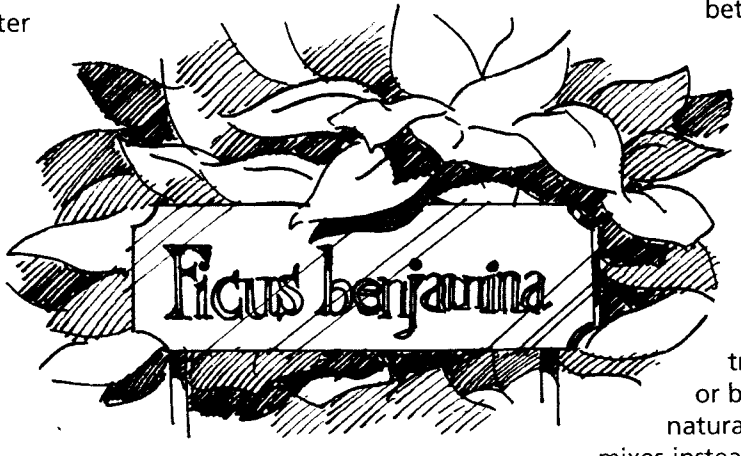
Since trails are meant to be interpretative, it is important that they be designed and planned hand in hand with the rest of the program plan and site design. The information obtained from the GIS overlay site analysis is vital and should be used to prepare an inventory of the various landscapes, and wildlife that exist in the nature trail area.

During the planning stages, biological experts need to evaluate and determine the places and types of infrastructure that is needed to protect the environment while providing efficient access. Planning requires a good understanding of environmental and species sensitivity and knowledge of trail design and limits of acceptable change.

Guided trails are those in which the local guide (along with the "tour leader" in some instances, especially for organized groups) leads the way. In this case, excessive signage could at times be a negative factor that can eliminate the more natural experience of visiting predominantly "unlabeled" trails and ecosystems. Further, "unsigned" nature trails provide greater job opportunities for the guide and local experts.

GUIDELINES

1. Take special care when planning trails through pristine areas. It is prudent to hire a naturalist to help place the trail system to minimize disruption of wildlife and habitat.
2. Capture the "sense of place" and design the nature trail to be in harmony with its surrounding. The visitor should not feel that there is intrusion taking place; otherwise the feeling of wildness or sacredness will be lost.
3. Place unobtrusive labels in those trees and bushes that are closest to your ecolodge so as to familiarize your visitors with the species that they will later be encountering in the nature trails.
4. Design a network of nature trails (footpaths) with suitable signage. Provide trails with an adequate spectrum of options for different fields of interest and physical strength of the tourist.
5. Include a sign with a map of your trail network in a conspicuous spot. Signposts should be clear yet sufficiently subtle so as not to ruin the feeling of being in naturally pristine environments.
6. Make sure that all trails respect wildlife movement patterns and habitat requirements, as well as location and growth and expansion patterns of the local flora.
7. Make the most of interpretative opportunities. Nature trails can be a valuable aid to ecological education, interpretation and awareness.
8. Preferably design your nature trails as closed circuits, so that walkers return to the starting point without having to retrace their steps. Give options for a short-cut return for tired visitors.
9. Always clearly indicate at the trail's starting point the distance to be covered and the degree of difficulty (level ground, gentle slopes, abrupt terrain, etc.), including a map of the trails and an explanation with photos or drawings of the local flora and fauna they may see. Along the trail indicate unobtrusively but clearly the covered and remaining distances (approximately every 200m or 650ft) and the time based on normal walking speed.
10. Provide erosion controls (caused by direct and indirect factors) for all trails. Deviate water flow away from trails before it attains too much speed and intensity and starts creating erosion problems. Control vegetation on the sides of the trail, periodically trimming it so as to avoid plants invading the path.
11. Always use low-impact and low profile techniques and materials. The surface of your trail should be resistant to continuous use, but avoiding as much as possible the use of concrete or asphalt and synthetic pavements. It is better to use natural permeable materials or solutions that allow water absorption by the ground and not surface flow; materials such as gravel, sand, wood shavings, small cross sections of tree trunks or branches, or boards, etc. Consider natural resin-based paving mixes instead of asphalt.



12. Minimize stream crossings by nature trails and roads.
13. In the case of crossing mangroves or wetlands, use elevated boardwalks with handrails. In abrupt terrain (especially steep ascent) use well-anchored staircases, with possible complementary use of cables and ropes for tourist safety.

14. Where appropriate, consider designing and building a limited number of observation towers and blinds (hides) for watching wildlife, especially alongside marshlands and mangroves and in the forests.
15. If you include horse trails, make them wide enough to accommodate two horses at a time. Free height to branches of roadside trees (if any) should be at least 3.5m (11ft). Bicycle paths should be a minimum width of 2m (7ft) with all-weather surface material such as compacted gravel.
16. Design horse (or camel) trails and bicycle paths so they are separated from each other and from foot trails, since their use is mutually exclusive and potentially conflicting.
17. Use foundation systems that minimize excavation and site disturbance.
18. Avoid use of conventional preservative-treated wood. Instead specify FSC-certified tropical hardwood or, if not available, use recycled plastic lumber products.
19. As for access roads, existing nature trails should be repaired and used. The impacts should be assessed, fragile features may be used for interpretation; other stretches may require slope stabilization, drainage or other erosion control measures.
20. If possible, make shorter trails with regularly spaced bench seating for elderly or handicapped visitors. A nature trail should be inviting and must have clear, well-marked entry and exit areas. These short trails should be wide and flat enough to walk along in comfort. Steep climbs and physical obstacles should be avoided, though in some areas it will not be possible to have flat trails.
21. Select location, alignment and grade considering aesthetic (scenic beauty, harmony with natural landscapes), technical (soil type, bedrock, excavation, slope and drainage) and if you so wish, metaphysical criteria (Vaastu Shastra, Feng Shui) (see Appendix at end of this chapter). Technical consultants should be approached to design the trail, which should be located in such a way that the area's features and scenery can be enjoyed without disturbance to the natural setting.
22. Design your signs to be fun and educational at the same time and make them able to withstand the weather and be clearly visible.
23. Clearly mark your nature trails in order to encourage visitors to stay on paths and not stray into sensitive areas.

1.5.4 Fences and Retaining Walls

Fences and retaining walls are an important element in many landscapes. However, in ecolodges both should be avoided as much as possible. Poorly designed fences can spoil a view and restrict wildlife movement, and retaining walls are sometimes a result of cutting into a natural landscape. In ecolodges, providing adequate housing for working within a confinable yard should be a basic requirement. Domestic animals pose serious threats to indigenous wildlife, particularly in pristine areas and restrictions must be imposed on introduced animals to avoid having fences around the ecolodge.

GUIDELINES

1. Avoid erecting fences as much as possible. Fences undoubtedly have a visual impact and should only be used for the protection of your guests. If this is the case, then plant a tree fence similar to those found in places like Central and South America.
2. Plant quick-growing species of hedge or shrubbery to screen undesirable views. Rainwater tanks, outbuildings, etc. may be decoratively painted or camouflaged before considering fencing.
3. If walls or fences are necessary, site them away from visitors and provide appropriate openings to permit wildlife movement wherever possible.
4. Design the fencing or retaining walls to relate to the architecture and not the property line, unless the fence has a pest control function, when you will want to maximize wildlife protection.

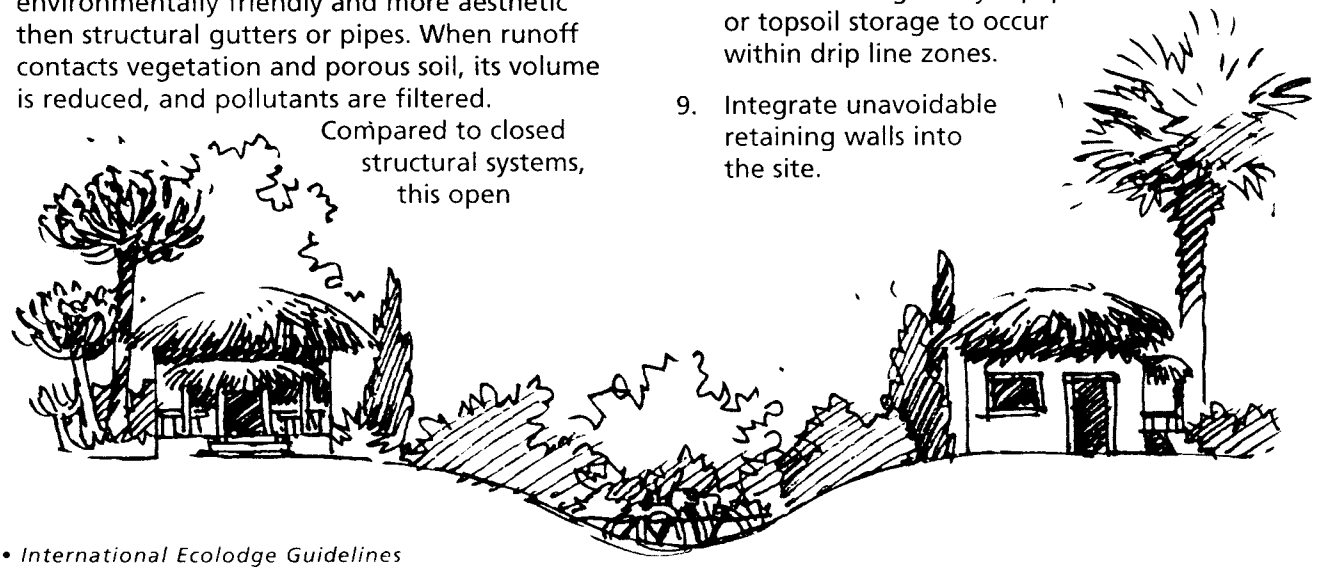
1.5.5 Grading and Drainage

Every ecolodge site is in a watershed, and everything the developers and tourists do on a site has an impact on the watershed's condition. Sediment from soil disturbance, oil leaks from cars, and fertilizers pollute streams; excessive runoff aggravates flooding and erosion; and deflection of rainwater from its natural paths dries out streams and wetlands. Clearing and earthmoving increase erosion by as much as 40,000 times the rate occurring in undisturbed sites. Siting construction and earthwork away from drainage courses preserves vegetated buffers and protects stream quality.

"No cut, no fill" is a worthy goal.

GUIDELINES

1. Use vegetated swales as a natural way of conveying concentrated runoff. This is more environmentally friendly and more aesthetic then structural gutters or pipes. When runoff contacts vegetation and porous soil, its volume is reduced, and pollutants are filtered. Compared to closed structural systems, this open drainage increases plant variety, reduces need for irrigation water, and reduces drainage velocity and erosion. In addition, it decreases downstream peak flow and runoff volume, increases infiltration, supports wildlife habitat, symbolizes interaction with nature, and needs less maintenance.
2. Carefully design the grading and excavation in an ecotourism site. Using the existing topography will save both construction and maintenance costs and conserve topsoil, as will minimize paved areas.
3. Make managing runoff an important facet in your ecolodge. If drainage controls are implemented at the beginning of site planning they can be integrated economically in the overall development. The concept should be to capture rainwater from roofs and filter runoff from impervious pavements with minimal disturbance to natural drainage patterns.
4. Use natural processes for beach restoration and safeguarding. On most resort beaches, this is done with heavy engineering equipment and traditional methods. Ecologically sensible strategies, such as planting native vegetation to trap and hold the sand, are usually much more effective in achieving long-term dune and shoreline stability.
5. Keep site grading to a minimum and avoid alteration of existing drainage systems or tree drip lines.
6. Avoid building in the wet season.
7. Have conservation clauses in building contracts that spell out conservation protection measures and penalties for non-compliance and the catching and eating of wildlife on site.
8. Avoid allowing heavy equipment or topsoil storage to occur within drip line zones.
9. Integrate unavoidable retaining walls into the site.



10. Do not directly channel runoff into water bodies or marshes, conservation areas or other impervious surfaces without adequate filtration.
11. Divert artificial runoff into existing natural swales.

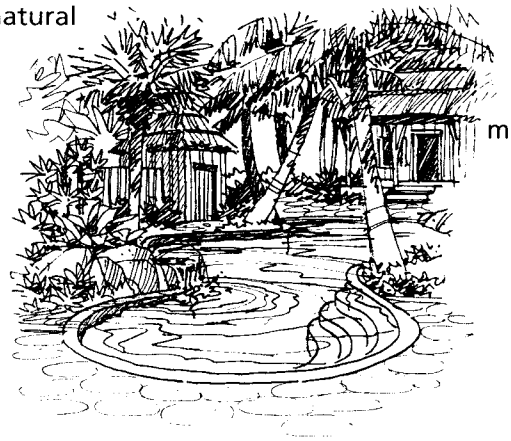
1.5.6 Swimming Pools

In our increasingly health conscious society, more and more "soft focus" ecolodges are recognizing that the provision of swimming pools and "health centers" give them a competitive edge, especially in warm areas. Many tourists, after a long and sweaty day in the field, like to enjoy a swim in the late afternoon or early evening. However, any swimming pool in an ecolodge must be carefully planned to reduce their additional burden on the environment. A lodge with existing natural swimming opportunities such as a lake or the sea should avoid having a swimming pool.

Swimming pools and spas can be voracious consumers of water and energy, require substantial chemical treatment to ensure that they meet hygiene standards, and create a substantial additional laundry demand. If it is felt that swimming pools are a necessity, especially in hot areas, we suggest that they be built with the following guidelines in mind.

GUIDELINES

1. **Design**
   a) Design swimming pools only in sites where water supply is sufficient to support them, perhaps where catchment or solar distillation is an option.
   b) Ensure that your water treatment and filtration is the most effective available to minimize water, chemical and energy consumption. Consider the various alternatives to chlorine and bromine for treating pool water, such as electrolytic chlorine generators, ozone generation and ionization systems.
   c) The size, shape, and siting of swimming pools and equipment enclosures must be carefully considered to achieve a feeling of compatibility with the surrounding natural elements and the architecture of the lodge.



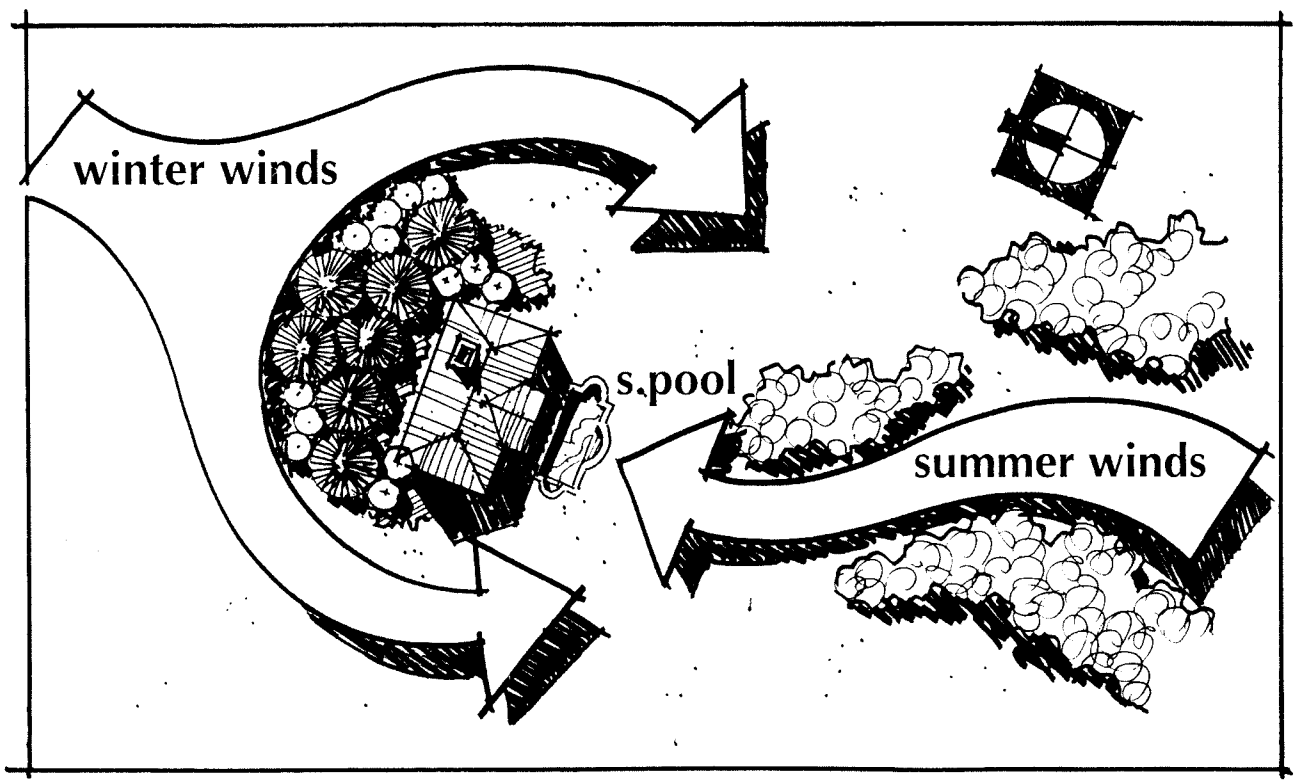
   d) Carefully site the pool's plant room as this can minimize routing and ducting of services and increase heat recovery potential. Ensure that sound from any audible equipment does not intrude on guest accommodation. Controls, dosing and filtration maintenance should have clear and simple instructions and the staff responsible must be properly trained in pool operation.
   e) Install safety barriers around pools to stop children and other small animals falling unobserved into the pool. Build in climb-outs and safety catches for animals that have fallen into a pool or drain.
   f) Securely cover a pool when it is not in use. Aside from the safety benefits, a cover that excludes light will effectively turn a pool into a tank — preventing algae growth, and reducing maintenance of the water to a bare minimum. Usually one slow-release chemical disinfectant will last a winter closure (but it would be wise to monitor your first off-season).
   g) Use filtered water from backwashing and draining the pool to irrigate gardens.
   h) Encourage bathers to use the toilet and (poolside) shower before using the pool, which will significantly lessen demands on filtration and treatment, and reduce backwashing. You can also buy urine-sensitive dyes for pools that turn the water around offenders an embarrassing red color.
   i) Consider shading some pool areas to reduce evaporation and chlorine loss and to allow guests to avoid ultraviolet light exposure.
   j) For swimming pool areas, use solar powered, in preference to high efficiency, lamps with time switches for remote area lighting, and sensors for areas that have periods of non-occupancy.
   k) Consider using solar energy heating and a solar-power assisted pump for the pool.
   l) In areas where water is a scarce commodity, consider the pros and cons of a reverse-osmosis plant to convert sea water for all your water needs; normally it is considered inappropriate for "environmentally sensitive" development, bearing in mind the significant impact this will have on marine biodiversity.
   m) Remember, excellent design and performance can inspire good management, will showcase environmentally-sustainability and win the enthusiasm of the staff.

2. **Swimming Pools for Cold Climates**
   a) Seriously consider using solar energy heating for your pool (see section 3.5.1).
   b) Install highly efficient thermal insulation as a priority.
   c) Consider the influence of solar radiation and daylight. Good quality glazing systems can offer increased daylight for minimal heat loss.
   d) Recirculate air and use run-around coils to recover heat wherever possible; e.g. venting sauna heat to the pool hall using waste heat from refrigeration and run-around coils on heater flues.
   e) Consider using condensing boilers, which are ideally suited to under-floor heating and swimming pools.
   f) A pool cover is essential whether you are indoors or outdoors. Fully automatic cover systems are a possibility, but only if the technology is readily available and not excessively expensive. Ensure it will cover your pool if it is an irregular shape. Use of pool covers reduces evaporation, enabling savings to be made in heating, and also has safety benefits.
   g) Consider the wind direction, so that entrances and ventilation points are sheltered.

3. **Operation**
   a) Manage the running hours of the pool circulation pump carefully. These can be dramatically reduced or eliminated at night.
   b) Pools need daily management and there should be a strict monitoring and maintenance program with a timetable covering the full year.
   c) In cold climates, check that heating, hot water, ventilation and lighting time switches are set correctly according to season.
   d) In cold climates, maintain air conditioning vents and heating outlets for operating efficiency.

1.5.7 Herbal Therapy / Meditation / Health Centers

Health centers are becoming very popular and have become important considerations for ecolodges. "Mind, Body and Spirit" packages are well sought after by urbanites. Also, baby boomers have come of age and in the fast pace of today's societies, tourists will always be looking for periods of relaxation on their vacations. Health centers provide recuperation from hiking, rafting, kayaking, etc., and they should be designed with a very natural look.



The ecolodge has an opportunity to draw upon local knowledge and human resources regarding wellness enhancement to offer a unique experience to tourists. Local methods of enhancing wellness may be sensitive to available resources and would promote cultural understanding.

GUIDELINES

1. Study the implications for energy use of these facilities closely before committing to them. Their hot water and ventilation requirements are significant. Ventilation is a key issue both for health and energy-efficiency reasons.
2. Study the possibility of using solar heated water for spas.
3. Restrooms and changing areas require substantial fresh air ventilation to provide adequate air quality, so heat recovery should be considered.
4. Fit spring-loaded pistol grips to hoses so that water can be cut off immediately when washing down is finished.
5. Use auto flush urinals; tap restrictors and showers on push timers. Push taps are ideal where taps can be left on.
6. Source environmentally friendly, biodegradable soaps, shampoos and toiletries and where possible provide them in dispensers.

1.6 PLANTING DESIGN

Planting design affects biodiversity. Landscapes planted with predominantly non-endemic species and/or monocultures and maintained with pesticides are damaged ecosystems. On the other hand, sustainable landscaping strives to maintain native habitat, and avoids fragmenting it or replacing it with less diverse vegetation. Ecolodge planting should echo the surrounding natural vegetation with respect to fire precautions.

GENERAL GUIDELINES

1. Use endemic and previously existing plant communities for the area's elevation, rainfall, topography and soil type. Include plants that are important to the regional culture and integrate them or their products into the daily experience of the visitor. "Ethnobotany" is a fascinating subject, and in many less developed countries, people have a very close connection to the plant world as it provides food and medicine and useful material.
2. Use limited pruning to open up views without altering the appearance of the natural landscape.
3. Lawns are a high-maintenance feature that require a lot of water and detract from the natural appearance of an ecolodge. Some lawn types are invasive to other native plant species; they also attract wildlife and make them nuisances, including hippos in Africa and deer and geese populations in the United States.
4. Make your successful landscape plan one that virtually eliminates time-consuming maintenance. Remember that planting lawns and certain flowering landscape plants may prove to be a never-ending maintenance headache.
5. Use salt-tolerant plants in areas close to the ocean. Salt from the ocean is transported in the air and deposited either on the vegetation or in the soil. Consult the plant list for suggestions on local salt-tolerant species in saline areas or those exposed to salt.

6. Use a natural landscape approach and concentrate your planting efforts adjacent to the lodge, especially near the entry. Groundcovers should begin this transition, which should progress to larger shrubs closer to the building walls.
7. Design a simple massing concept, as this is generally more successful than a complicated planting scheme. Remember that simplicity is the desired result.
8. Avoid using plants with forms and color from outside the area.
9. Consulting the local fire authority on planting design is a wise and potentially life-saving priority.

Landscape designs that emphasize native trees, vines, food for your guests. Remember that trees provide shade, climatic and erosion control.

on the canyon floodplains. Hopi people lived in the southwest United States, in what was known to them as the spiritual center of the continent.

Below is a selection of quotes from well-known native spiritual leaders. They give a poignant picture of how the natives viewed the land.

"The Great Spirit said not to take from the Earth — not to destroy living things." Thomas Banyacya, Hopi Indian

"The ground on which we stand is sacred ground. It is the dust and blood of our ancestors. A few more passing suns will see us here no more, and our dust and bones will mingle with these same prairies." Chief Plenty-Coups

"When we dug roots, we make little holes. When we built houses, we make little holes. We don't chop down trees. We only use dead wood." Old holy Wintu woman

"Loneliness is an aspect of the land. All things in the plain are isolated; there is no confusion of objects in the eye, but one hill or one tree or one man. To look upon that landscape in the early morning, with the sun at your back, is to lose the sense of proportion." Scott Momaday

"The earth and myself are of one mind. The measure of the land and the measure of our bodies are the same." Chief Joseph

"In our every deliberation, we must consider the impact of our decisions on the next seven generations." From the Great Law of Haudenosaunee (Six Nations Iroquois Confederacy)

The Pitjantjatjara — an indigenous Central Australian tribe — is just one of the many tribes of a network of a religiously secretive and fundamentally nomadic people, who share common beliefs despite having developed more than 700 languages over 40,000 years in their movements across the continent. This information has been provided by Diana James and Architect Paul Pholeros who worked with the people to develop a visitor center.

The design of housing and the spatial arrangement of houses to each other and the environment are vitally important to the spiritual health of a people who have had to adapt to settlement. If anangu maru (a tribal people) live too long inside houses and in large settlements that close them off from their environment, they lose heart. They need to see the country, feel the wind and the early morning sun on their skin. Then they can hear the land and know themselves.

The Pitjantjatjara people understand that energy lines criss-cross the earth; these are the Tjukurpa trails, the suggested "songlines" the Creation Ancestors made as they traversed the country.

The Tjukurpa — Dreaming/ Creation Law — established the inter-relatedness of all things. These ancestors were forebears of the animals and humans today, they created all the foods people eat, the plants, the rocks, the landforms, the water systems and the stars that guide travelers and mark the seasons in their movements.

Human beings are an integral part of this whole system. Where they live and how they position their dwellings is determined by the spiritual, ecological, topographical, hydrological and sociological aspects of this continuous living Tjukurpa (Dreaming). All people need to be part of a rich cultural life that gives meaning to all our actions and relates us to our living environment and the land.

Nganyinytja, a senior custodian of Pitjantjatjara Grandmother Law, speaks of her people's relationship to country: "Our spirit stands open. I live in the open, where I can see the hills and the bush. Living in the open, not enclosed, one's spirit is strong. A long time ago everything became related — the stars, the earth, the hills, the different animals, the different bush foods — everything."

Metaphysical Importance of Open Space — Being in and part of the open environment is essential for the wellbeing of the soul — listening to the wind, feeling the sun on skin, listening to the birds, observing the stars to tell the passage of time and the seasons, and participation in the extended communal family is vital to health.

It is important for the well being of the host community and its environment that visitors are cared for spiritually as well as physically, and develop a feeling of kinship with the places they visit.

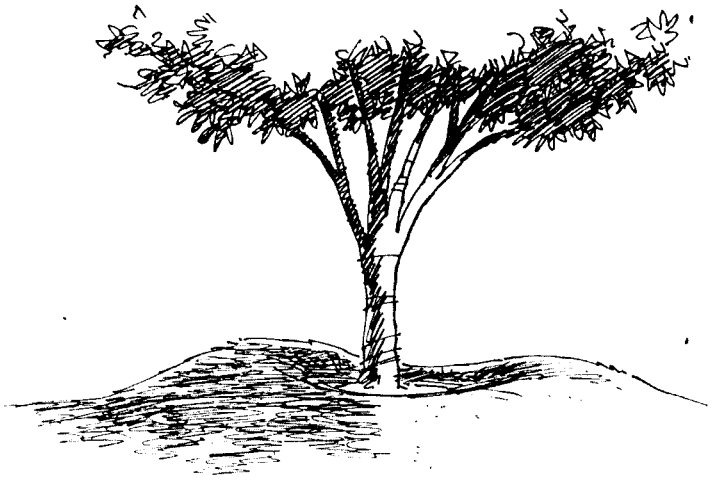
D) SENSE OF PLACE — SIX SENSES APPROACH

An interesting method of metaphysical site analysis is the six-senses approach, in which environments can be therapeutic in that light, color, scent, sound and water can all be used as therapies when incorporated into ecolodge design and decoration. Aromatherapy, color therapy, hydrotherapy, sound and light therapy can all bring their deep and personal healing qualities into the ecolodge.

Clare Cooper Marcus, Professor Emeritus at University of California - Berkeley advocates that in order to become "one" with the site, the designer should spend a couple of days and experience the site via each one of the six senses. The main objective of this method is for the designer to enter and experience the essence of the site, and how it is for the designer.

Before objective data collection begins, it is a good idea to allow time to experience the chosen site subjectively in person. Sit somewhere comfortable with a view. Take a few minutes to relax, breathe deeply — really "be" in the place. Try to let go of current anxieties,

3. When raising the grade around an existing tree, avoid "new" soil from coming in contact with the bark.



4. If invasive landscaping adjacent to trees is essential, cut outside of the drip line where possible and remove the same percentage of branches as roots lost.

5. Whenever possible, an on-site plant nursery for helping propagate, manage and sell endemic plant stocks will be a strong advantage, particularly if it incorporates the ecolodge's composting system.

1.6.3 Integrated Pest Management

Pest management would not be necessary in an ideal ecosystem. However, in the real world, you will have to protect the biodiversity and fitness of land in your care from a range of threats such as plagues of insects, the invasion of genetically modified pollens or a continual problem with feral domestic animals destroying habitat or preying on protected native species.

In disturbed and landscaped areas, especially in tourist areas, lawn and landscape maintenance can generate a high concentration of pesticides, nutrients and other pollutants. Integrated Pest Management (IPM) uses biological controls as a first defense These include parasitic insects that destroy pests, pheromone (sex-scent) traps, natural pesticides like pyrethrum and companion planting. If such non-toxic controls fail, carefully timed and targeted pesticides should be used. These controls need to be supervised by a knowledgeable biologist.

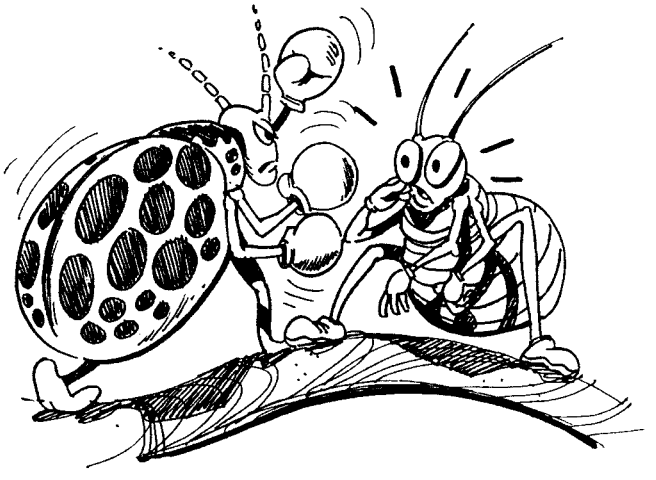
Lawns generally have no place in ecolodges unless they are part of an existing historic property.

GUIDELINES

1. Minimize and if possible, eliminate the use of high maintenance lawns. Turf grasses typically need more water, maintenance, and chemicals than other types of plants. Native or drought-tolerant turf species or beds planted with shrubs, groundcovers and perennials can replace exotic lawns. The use of introduced annual plants should also be avoided.

2. Two goals for all planned plantings are that invasive species should never be introduced, and plantings should need only the minimum of maintenance, particularly in terms of water and trimming, once they are established.

3. Understand the entire range of pests you are dealing with and the benefits of integrated pest management (IPM). A pest is part of a food chain, and simply eliminating one pest species at a time gives advantage to competitor, or lower-order pests.



"...AND IN THE GREEN CORNER..."

4. Write a pest management plan and make sure that the landscape contractor is capable and bound by an agreement to use proven IPM biological controls as first resort in destroying pests where that is appropriate.

5. Many pests originate from neighboring properties and a most effective part of your pest control management may be negotiations with nearby farmers, combined with specialist fencing, poisoning, shooting or trapping. Most often the effectiveness of pest management is a result of its budget.

6. Use alternatives to commercial pesticides such as mulching, alternative mowing and composting to maintain plant health. Organic mulch around

plantings conserves water and maintains favorable soil temperatures. Cleared or trimmed vegetation can be chipped economically for mulch or composted. Compost maintains soil fertility better than chemical fertilizers, and helps landscape plants resist pests and diseases without pesticides.

7. Consider fire management for invasive plant species control.

1.6.4 Landscape Lighting

Site lighting should be limited and controlled to avoid disruption to the nocturnal cycles of wildlife, and so light the minimum area for the minimum time at the lowest wattage. All-night illumination to areas with all-night use or extreme security concerns should be limited and simple timers or photocells can be used to turn lights on and off at seasonally appropriate times. For security lighting, motion-sensors can spotlight intruders without beaming constant glaring lights. Numerous solar-powered landscape lighting fixtures are also available on the market.

Low-voltage lighting may offer moderate benefits. 12 or 24-volt lighting is effective and increasingly popular for site lighting. Lower-voltage fixtures are safer and often less expensive to install than typical 240/120-volt options. The most important advantage is that they waste far less energy. Low-consumption fittings are still dearer than traditional fittings but are much cheaper over the long run and their purchase prices are improving all the time. Compact-fluorescent lighting is substantially cheaper and more energy conservative than incandescent lighting (including halogen and low-voltage).

If your ecolodge is located near sea turtle breeding areas, it is important to note that nearly all activity (egg laying and the return of hatchlings to the ocean) takes place under the cover of darkness and relies upon natural light environment, which is too often disrupted by the addition of artificial lighting. On beaches where artificial light is visible, the hatchlings' important journey to the sea is disrupted. Hatchling sea turtles move towards landscape lights, porch lights or interior lights visible through windows, and away from the relative sanctuary of the ocean. Quite literally, a single light left near a sea turtle nesting beach can misdirect and kill hundreds of hatchlings.

GUIDELINES

1. Forego exterior lighting entirely except in community areas and provide flashlights and portable lanterns, keeping in mind the fire risk.
2. Use the least artificial lighting outside the ecolodge, in order to avoid disturbance to wildlife.
3. Review outdoor lighting to assure that neighboring properties are protected from the view of bright light sources and plant screening shrubs to protect the lodge from off-site light pollution.
4. Eliminate all upward radiation of light through use of full cut-off luminaries. Avoid disturbance on the horizon so stars are clearly visible at night.
5. Make sure that any illumination necessary for evening activities is of low wattage, directed downward and only bright enough to be safe and effective.
6. Whenever possible, integrate necessary required lighting (on a photocell) into such features as steps, handrails, posts and curbs.
7. You can achieve pleasant effects through the use of landscape lighting, when it doesn't conflict with your ecological standards. Accent spotlight fixtures directed upwards into tree or native palm foliage can provide low intensity but often-dramatic illumination of pedestrian areas between buildings.
8. Use unobtrusive landscape lights.
9. Shield all landscape fixtures through plantings.
10. Design lighting that reflects the architectural character of the lodge. Creative uses for traditional fixtures may work well.
11. Consider essential driveway lighting attached to low bollards, directed downwards only and spaced along the edges. For a cheaper and more environmentally responsible solution, use posts with reflectors.
12. Keep beachfront lighting turned off during the sea turtle nesting and hatching season.

13. Reduce the number of lights near nesting beaches to the minimum necessary to accomplish lighting goals. Lighting used purely for decorative purposes should be kept off.

14. Reduce the light reaching the nesting beach by lowering, shielding, recessing and/or redirecting light sources. Any light source that is visible to an observer on the beach is likely to affect sea turtles.

15. Apply dark window tinting to windows visible from the beach and draw curtains after dark.

16. Replace existing light fixtures with those that emit light less detrimental to sea turtles. For instance, a pure yellow light such as that from a low-pressure sodium vapor source does not appear as attractive to turtles as some other lights. Yellow incandescent light bulbs also are preferred if they are kept at low wattage.

1.7 PERMACULTURE

Permaculture is a unique approach to site design that integrates landscapes, gardens, built structures, humans, flora and fauna into permanent systems. It is a design system that mimics the interconnectedness and diversity of animals and plants in natural ecosystems. It focuses on sustainable systems — those with no pollution or waste. To establish these sustainable systems, it uses ecology, biology and agriculture and combines it with engineering methods and architectural design. Once permaculture systems are well established they require a minimum of energy, materials, and labor to maintain. They also minimize pollution by recycling waste back into the system.

The main concept of permaculture is to turn waste into resources and problems into opportunities. It uses the natural cycles of plant and animal species to: heat and cool buildings using arbors and berms; restore groundwater; aerate the soil; control erosion; build soil fertility; incorporate small-scale food production; incorporate appropriate technology and recycling; and promote reforestation.

GUIDELINES

1. Observe the slope and orientation of the site to the sun. Orientation can be used to create differing conditions on each slope and for growing a diverse selection of plants.

2. In windy areas and hot climates, use trees as windbreaks and shelterbelts.

3. Use gravity on a slope to move materials and water. A slope defines a flow of energy and nutrients.

4. Encourage symbiotic relationships by putting elements together to benefit each other and so reducing unused outputs, which cuts down on pollution, e.g. water-loving plants such as mint species grown under eaves prevent erosion by catching excess water. Select only those species that are not invasive.

5. Incorporate elements with multiple relationships as this will help to stabilize the web of life. Planting trees helps to lower the water table where there is ground water salinity, especially in areas along the oceans, thus protecting surface vegetation from excess salt.

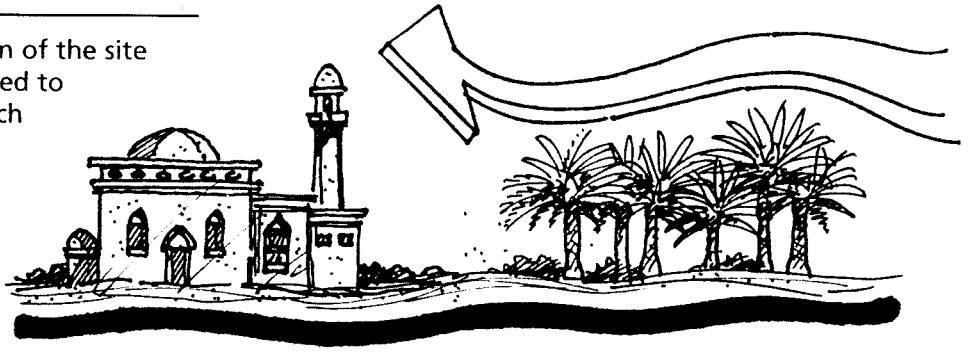
6. Replace expensive, toxic, non-renewable chemical fertilizers with biological resources that generate fertility on site. Encourage worms and microbes to multiply rapidly by using animal and green manure and by turning under crop residues.

7. Manage the flow of energy and nutrients; design swales that slow down the flow of water during rainstorms, preventing erosion; and give time for leaf-litter and seeds to penetrate the soil.

8. In restoring a disturbed landscape, speed up the process of natural succession by planting many complimentary native species at once, and letting them play out their natural evolution.

9. Increase the diversity of your system in fundamentally disturbed areas by introducing wetlands. This will increase the stability while minimizing pest problems and competition for nutrients.

10. Contour planting will help control soil erosion on open slopes.



11. Plant very comprehensively so that you have variety throughout the year, taking care to avoid exhausting the soil. Different trees and plants can fix nitrogen to nourish the soil, extract vital nutrients from deep in the sub-soil, repel insects, host beneficial predator insects, provide shade for tender seedlings, and serve as trellises for native climbing vine.
12. Maintain plant health by using clean and simple methods such as gravity, renewable energy, easily available natural materials, worms and micro-organisms, etc.
13. If possible, provide for an organic (chemical-free) kitchen garden and/or orchard near your ecolodge to grow sustainable crops of fruit trees, date palms, vegetable garden, cereals, etc. Other food growing techniques such as aquaculture, hydroponia and bee-keeping may best suit your circumstances.
14. A good alternative to domesticating precious wild space is contracting local farmers to grow organic produce for your ecolodge.

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APPENDIX: METAPHYSICAL SITE ANALYSIS AND DESIGN

By Hitesh Mehta

The majority of all the site analysis and planning techniques that are being practiced today are unfortunately objective, and so, somewhat one-dimensional. A subjective approach is needed in order to create a plan that is in total harmony with the existing landscape. A sense of place and the feeling of sacredness are missing from most existing tourism lodges. Ecolodge sites need to provide the ecotourist with a spiritual communion with nature and the feeling of being "one with nature." In the context of the ecosystem theory, holism is based on the concept that non-living components and living components function together as a whole according to well-defined biological laws. Everything is connected: humans, plants, animals and non-living objects.

Holistic philosophies are being widely practiced in many parts of the world. Of particular note are the Chinese philosophy of FENG SHUI and the Indian Vedic philosophy of VAASTU SHASTRA. Also, numerous indigenous tribes have a holistic philosophy, including the native Indians of the Americas and the aboriginal peoples of Australia. All these philosophies are ways of living, which depend on the interdependence of humans and nature. Recognizing these ways of life calls for a fundamental shift in the priorities of our culture from a civilization based on endless, unsustainable economic growth at the expense of nature, towards a sustainable world based on ecological principles and respect for both cultural and natural diversity.

These are complex topics and require much research to adequately understand the various indigenous thought processes and belief systems. In this book, we would like to make connections between interesting and often ignored philosophical standpoints and aspects of site analysis and design. Hopefully, in the next edition, we shall have guidelines for those who want more information on these topics. You are welcome to contact the author for additional information and feedback.

The Western reader may find some of these philosophies a little "foreign," un-scientific or esoteric. These introductions are meant for those who believe in ancient methods of site analysis and design and would want to adapt them to your ecolodges.

There are many ancient and traditional methods that have not been mentioned in this book such as Mayan, Aztec, Egyptian and other African cultures, which also contain many metaphysical references to the themes of planning and siting.

I will also be introducing a modern holistic approach to site analysis and design that I have found very useful in the ecolodges that I have worked with. It is the "Six-senses" approach as practiced by Professor Emeritus Clare Cooper Marcus.

The four holistic approaches to design that will be mentioned are: Feng Shui, Vaastu Shastra, Aboriginal methods, and the modern methods/six-senses approach.

A) FENG SHUI

The Chinese based the science and art of siting and orienting buildings upon the workings of earth forces, which are known as Feng Shui, literally "wind" and "water." Rooted deeply with ecology, geology, astronomy and hydrology, Feng Shui aims to harmonize nature with the built environment. Feng Shui offers an ancient method of site planning that adds to balance and harmony for those who live on the land and for the earth itself.

The Chinese believe that the earth is criss-crossed with energy lines that affect and are affected by virtually all geographical and topographical phenomena. This means that humans are affected by their environment, and we in turn modify our environment by what we do within it. Chinese believe that Chi (the Chinese word for energy) pervades every element in the cosmos and is the beginning of all life. Yin and yang are two kinds of Chi with opposite characteristics. Yin is characterized as female: negative and passive; while yang is characterized as male: positive and active. Only when yin and yang

meet and stay in balance can life begin. Their continually complementary interaction creates the ideally harmonious site.

Feng Shui is a form of "geomancy," or geographical divination that uses principles such as astrology as well as psychic and physical phenomenon to determine whether the siting and orientation of a building is auspicious or inauspicious. Buildings using the natural elements of the land and tap into its energy are healthy, auspicious places to live or work while places that are antagonistic to their energies are unhealthy and inauspicious.

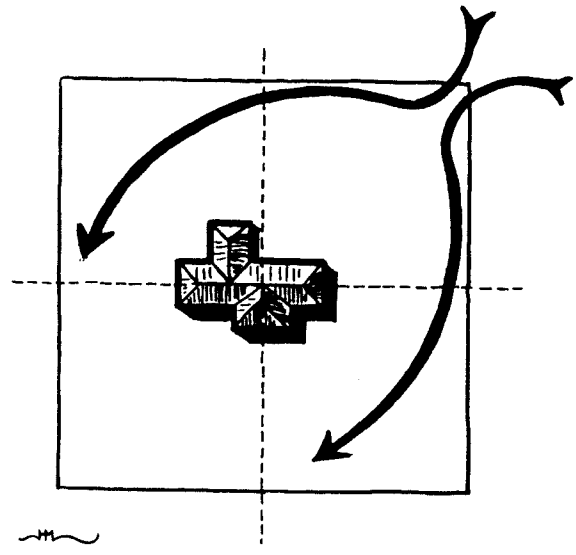
All natural shapes in the landscape have meaning to the Chinese and correspond to the ground qualities that they reflect. Feng Shui is a widely practiced concept for site planning in China, Korea and Japan. More recently, it has become the topic of interest, both professionally and personally for a growing number of developers, architects and landscape architects globally. They can use this knowledge in designing ecolodges to actually enhance aspects of visitor's lives.

It is crucial that you choose a Feng Shui expert who understands the principles and can make the correct adjustments for the various situations.

B) VAASTU SHASTRA

In India from time immemorial, eternal principles of Vaastu Shastra have been applied in the designing of villages, towns, and cities apart from temples, palaces, public buildings and residences. Vaastu is derived from the verb "Vaasa" meaning to "dwell" or "place of residence." The principles of Vaastu are pedagogical, geometrical, geophysical and botanical, and above all cosmological and celestial.

Vaastu Shastra states that every form creates a concentration or dispersal of cosmic and earth energies, which are harmful or beneficial to human beings. Therefore, Vaastu Shastra can bring about harmony between people, nature and buildings. Since a property represents a fixed form, it will radiate positive as well as negative energies depending upon its shape, properties, direction and location.



Vaastu Shastra recognizes with simple logic that all people live in an environment influenced by the five basic elements: Akash (Sky), Pruthvi (Earth), Pani (Water), Agni (Fire) and Vayoo (Wind) and followers of Vaastu Shastra will respect and be in harmony with these forces when building a lodge. These elements have an interactive influence on human beings whose physical constitution too is made of these same "parachutes." The external physical buildings, building materials, and nature in the form of the land, exert an influence or a natural force, which can be reoriented for the ultimate benefit of the individual.

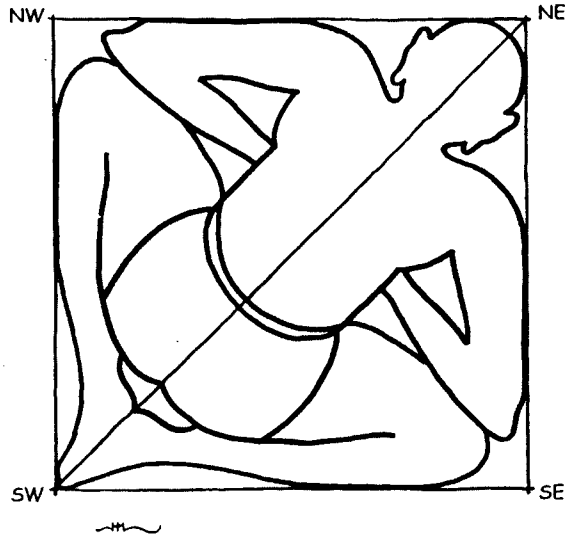
Like yoga, Ayurveda, acupressure and other holistic systems of India, Vaastu Shastra too can be beneficially used by all humanity. The human and nature are essentially interdependent parts of a sacred metabolic system, everything throbbing with life. In short, the fate of man is inextricably bound to the whims and cycles of heaven and earth.

Vaastu Shastra is essentially the art of correct setting where one can position himself in such a manner, so as to be able to absorb maximum benefits of the parachutes, as well as magnetic fields surrounding the earth, apart from the influence of plants, sun and stars. The scientific use of these elements ensures a perfectly balanced environment leading to enhanced health, wealth and prosperity.

In site planning (Vaastu Pada Vinyaasa) and design, the direction that the lodge and accommodation units face is essential to the well being of the occupants. There are several principles of orientation (Diknirnaya).

Just as in Feng Shui, it is important to opt for a Vaastu

master and an experienced landscape architect/architect who has a thorough knowledge of Vaastu Shastra.



Vaastu Purusna — the cosmic man who protects the dwelling place, and the spirit of the lodge.

C) INDIGENOUS ABORIGINAL METHODS

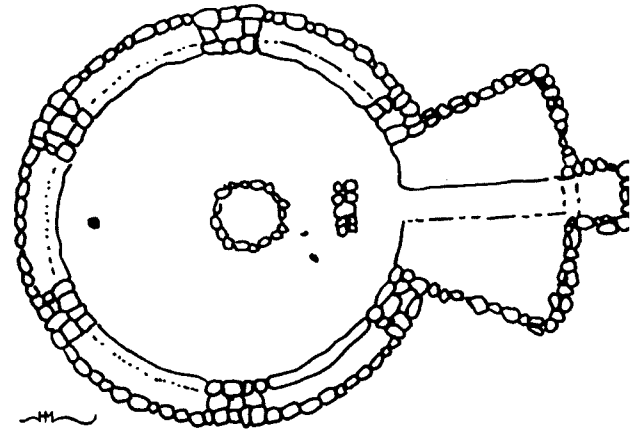
Indigenous aboriginal methods of design have shown a deep connection to the earth. Traditional cultures are the "librarians" of our "gene library" and each holds a stack of index cards carefully drawn up after thousands of years of patient trial and error. The deep respect for the environment is none more evident than in the American Indians of South and North America and the Aboriginal peoples of Australia. This is just one example of the various traditional holistic methods of design. I have taken examples of Native Americans and Australians as I feel that their respect for the earth is greater than I have seen anywhere.

This section will present some of their views and philosophies on the interconnectedness of humans and the earth.

Indigenous Native Americans have always been known to have a deep connection with the earth. Each tribe looked at the land in a different way but they all agree on one thing — that everything was connected; i.e. human, plants, sky, rivers and lakes.

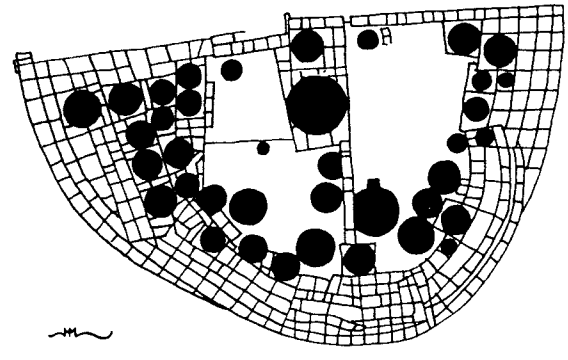
Everything that a Native American does is in circles. The flowering tree was the living center of the hoop, and the circle of the four quarters nourished it. The east gave peace and light, the south gave warmth, the west gave rain, and the north with its cold and mighty wind gave strength and endurance. Many native tribes camped in a circle and in the middle of the circle was a place called Hocoka, the center.

The Wintu of California lived on very densely wooded land where it was difficult even to find clear



land to erect houses; nevertheless, they would use only dead wood for fuel, out of respect for nature.

The ancient tribes of the southwest United States farmed the floodplains of the canyons and built pit houses and pueblos in alcoves in the cliff walls. These people were constrained by their environment, but not controlled by it. The Anasazi created some of the most remarkable villages anywhere in the New World. These villages are tucked away in isolated caves or rock shelters or suddenly arise from the middle of seemingly barren terrain. They create vivid images that remain with visitors for a lifetime. Settlements such as the promontory site, the bluff site, and the Connie site all lie on top of steep ridges or mesas. Some sites are also surrounded by what appear to be stone walls of considerable size.



Many Pueblo groups symbolize the place of emergence from the underworld, the sipofene or sipapo, by a small hole in the floor of their kivas. The sipapo, a small hole in the floor of both historic and prehistoric kivas, symbolizes the location where Pueblo people first emerged from the underworld to build villages in the upper world.

Chacoans captured the rain from intense summer thunderstorms that fell on the bedrock mesas of the canyon and cascaded into the arroyos below. They built small dams that diverted the water from the arroyos into canals and then into bordered gardens constructed

on the canyon floodplains. Hopi people lived in the southwest United States, in what was known to them as the spiritual center of the continent.

Below is a selection of quotes from well-known native spiritual leaders. They give a poignant picture of how the natives viewed the land.

"The Great Spirit said not to take from the Earth — not to destroy living things." Thomas Banyacya, Hopi Indian

"The ground on which we stand is sacred ground. It is the dust and blood of our ancestors. A few more passing suns will see us here no more, and our dust and bones will mingle with these same prairies." Chief Plenty-Coups

"When we dug roots, we make little holes. When we built houses, we make little holes. We don't chop down trees. We only use dead wood." Old holy Wintu woman

"Loneliness is an aspect of the land. All things in the plain are isolated; there is no confusion of objects in the eye, but one hill or one tree or one man. To look upon that landscape in the early morning, with the sun at your back, is to lose the sense of proportion." Scott Momaday

"The earth and myself are of one mind. The measure of the land and the measure of our bodies are the same." Chief Joseph

"In our every deliberation, we must consider the impact of our decisions on the next seven generations." From the Great Law of Haudenosaunee (Six Nations Iroquois Confederacy)

The Pitjantjatjara — an indigenous Central Australian tribe — is just one of the many tribes of a network of a religiously secretive and fundamentally nomadic people, who share common beliefs despite having developed more than 700 languages over 40,000 years in their movements across the continent. This information has been provided by Diana James and Architect Paul Pholeros who worked with the people to develop a visitor center.

The design of housing and the spatial arrangement of houses to each other and the environment are vitally important to the spiritual health of a people who have had to adapt to settlement. If anangu maru (a tribal people) live too long inside houses and in large settlements that close them off from their environment, they lose heart. They need to see the country, feel the wind and the early morning sun on their skin. Then they can hear the land and know themselves.

The Pitjantjatjara people understand that energy lines criss-cross the earth; these are the Tjukurpa trails, the suggested "songlines" the Creation Ancestors made as they traversed the country.

The Tjukurpa — Dreaming/ Creation Law — established the inter-relatedness of all things. These ancestors were forebears of the animals and humans today, they created all the foods people eat, the plants, the rocks, the landforms, the water systems and the stars that guide travelers and mark the seasons in their movements.

Human beings are an integral part of this whole system. Where they live and how they position their dwellings is determined by the spiritual, ecological, topographical, hydrological and sociological aspects of this continuous living Tjukurpa (Dreaming). All people need to be part of a rich cultural life that gives meaning to all our actions and relates us to our living environment and the land.

Nganyinytja, a senior custodian of Pitjantjatjara Grandmother Law, speaks of her people's relationship to country: "Our spirit stands open. I live in the open, where I can see the hills and the bush. Living in the open, not enclosed, one's spirit is strong. A long time ago everything became related — the stars, the earth, the hills, the different animals, the different bush foods — everything."

Metaphysical Importance of Open Space — Being in and part of the open environment is essential for the wellbeing of the soul — listening to the wind, feeling the sun on skin, listening to the birds, observing the stars to tell the passage of time and the seasons, and participation in the extended communal family is vital to health.

It is important for the well being of the host community and its environment that visitors are cared for spiritually as well as physically, and develop a feeling of kinship with the places they visit.

D) SENSE OF PLACE — SIX SENSES APPROACH

An interesting method of metaphysical site analysis is the six-senses approach, in which environments can be therapeutic in that light, color, scent, sound and water can all be used as therapies when incorporated into ecolodge design and decoration. Aromatherapy, color therapy, hydrotherapy, sound and light therapy can all bring their deep and personal healing qualities into the ecolodge.

Clare Cooper Marcus, Professor Emeritus at University of California - Berkeley advocates that in order to become "one" with the site, the designer should spend a couple of days and experience the site via each one of the six senses. The main objective of this method is for the designer to enter and experience the essence of the site, and how it is for the designer.

Before objective data collection begins, it is a good idea to allow time to experience the chosen site subjectively in person. Sit somewhere comfortable with a view. Take a few minutes to relax, breathe deeply — really "be" in the place. Try to let go of current anxieties,

concern about the next appointment, etc. Take half an hour to be in the here and now.

Take out a notebook and write down what you are sensing and feeling in this place at this moment. Try to spend at least five minutes focusing on each of the major senses.

Sight: What can you see? What attracts your visual attention? What kinds of vegetation, animals and people etc. do you see? What colors and textures are you aware of? What is the volume of the space like? Is your view enclosed, or can you see beyond this space? Who else can you see in this space? What kinds of people, what are they doing, and what seems to be their mood (relaxed, frantic, bored, busy)?

Feel: At the same time you write down what you see; also record your feelings about what you see. Do these sights make you happy or sad? Is the space relaxing, uncomfortable or dull? Does the presence of other people enrich or detract from the space for you? Do certain people or activities or groups attract your attention or make you feel uncomfortable?

Hearing: Try to spend some minutes with your eyes closed to allow yourself to focus on what you can hear. What kinds of sounds are there? What are their sources? Do they originate from inside or outside this space? Do these sounds lull or irritate you? Can you imagine how others are reacting to these sounds?

Touch: Feel this place. Touch it with your hands or other parts of your body. What textures or temperatures or qualities do you discover? Can you feel the movement of air, changes of temperature? How do these sensations make you feel (secure, comforted, repelled, bored)? Touching can enrich or confirm what we see and hear.

Smell and Taste: Close your eyes and sniff this place. What do you smell? Does this place smell fresh, stuffy, old, new, restful? Are there things to taste here? Is it appropriate to eat and drink here? Bring some food on one visit and try it out.

The questions suggested are intended to stimulate and help you sense the essence of a place, how it is for you and, perhaps, for others. Exactly how you record your experience is entirely up to you, but stream-of-consciousness writing, without pausing or censoring what is written down, is often the most revealing.

The most productive part of this technique is the final experience, when the designer tries to imagine that he/she is the place. The designer should ask some of the following questions and then write the answers in the notebook: "How does this place feel? Does this place feel happy or invaded to have people in it? Are there parts of this place that feel neglected or lonely? How do the plants, trees and the animals feel?" You may feel a little uncomfortable at first, but give it a try. You may be surprised at what you learn about the site by "becoming "it."

The designer should also spend time on the site developing a thorough understanding of the place and the harmonies into which the development must fit. The designer should look for the "sense of place" and for spiritual qualities that can often escape the ordered dimensions of the site.

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"In the wildness is the preservation of the world."

—Henry David Thoreau

CHAPTER 2

BIO-PHYSICAL IMPACT

Ray Ashton
Ashton, Ashton & Associates, Inc.

CHAPTER CONTENTS

2.0 BIO-PHYSICAL IMPACT

2.1 INTRODUCTION

The basic measures of the sustainability of an ecolodge are its impacts on the environment. These impacts begin with the construction phase and continue with day-to-day operations. The goal from an economic, social and moral standpoint is to plan, construct and operate a development in a sustainable manner. The ecolodge is selling biological and cultural diversity, and some of the most beautiful landscapes the world has to offer. If the ecolodge is designed, built and operated in a way that degrades the assets in your stewardship, its credibility, and that of the "ecologically sustainable hospitality industry," is damaged; the lodge loses it's selling point and any community support — , and ultimately fails. With this in mind, there are key elements that are presented here in the three critical periods of ecolodge development, planning and construction, and operation.

2.2 ENVIRONMENTAL ASSESSMENT PROGRAM (EAP)

The first stage for establishing a sustainable plan is careful evaluation of the proposed site and factors under consideration for development. Usually, an Environmental Assessment Program (EAP) is applied to this purpose. EAP is a crucial part of the planning process; it guides the pragmatic consideration of the proposal's environmental and cultural benefits and impacts. Without a robust EAP, a development may degrade its site and surroundings, destroying the very attraction that tourists come to enjoy. The EAP should ideally be completed before large sums of money are spent on developing a business plan.

Specialists — such as ecologists, biologists, economists, sociologists, anthropologists and others — with skills and relevant experience must be contracted to help complete the evaluation process. An EAP should be carried out for any ecolodge development, however small.

An EAP should examine the following potential impacts:

- Landscape
- Water, both surface and potable
- Soils
- Air
- Waste management
- Habitat and biodiversity (aquatic, marine, terrestrial)
- The site's history and regional context
- Economically important portions of the biodiversity
- Human communities

The study should carefully evaluate and determine acceptable levels of use and impact, and potential methods that should be used to mitigate for impacts. The experts should make clear recommendations on whether or not the site should be used at all if it is a sensitive and fragile site. Once these evaluations are made, a feasibility analysis should be established.

GENERAL GUIDELINES

1. Identify the appropriate specialists to carry out the EAP.
2. Evaluate environmental and cultural impacts and propose pragmatic remedial actions.
3. Identify alternative technologies that can be easily implemented.
4. Establish priorities in the best interests of the local human and wildlife communities.
5. Involve the local community as their participation is critical to the success of the EAP.
6. Prepare cost-effective mitigation strategies and include them in the agreed work schedule.
7. Incorporate the EAP into the tender and contract documentation and provide clear construction guidelines. The contractor should be held responsible and liable for any environmental impacts under his management. The contractor should have supervisors trained in, or at least conversant with, mitigation strategies and principles of ecologically sensitive construction techniques. Contractors should be encouraged to use local labor and craftsmen.
8. Retain consultants on an hourly basis for periodic audits during the construction process. This team should also be brought in to carry out an evaluation 6-12 months after the lodge has been opened for recommendations on its future management.
9. Establish a holistic monitoring program that quantifies impacts and benefits over time. High school students from a nearby school could easily do this work, and involving the local community helps raise awareness and stimulate people's support and interest in your work. Refer to Chapter 9 for more details on monitoring.

Environmental impacts can be classified into two categories: Abiotic (Non Living) — Soil, Water, Air and Sound — and Biotic (Living) — Flora and Fauna. It is important to understand that impact is NOT always negative. Also, impact is NOT always damage. This is a common misconception with many people.

Abiotic

Biotic

2.3 IMPACTS ON ABIOTIC SYSTEMS

The development and operation of tourism infrastructure and the presence of tourists have both direct and indirect impacts on soils, water and air. Direct impacts stem from use of resources like potable water and changing the lay of the land to establish roads, trails and building footprints. When resources like potable or fresh water habitats are limited on certain islands or desert or savannah communities, then the impacts can have serious effects on human and natural communities. Similarly, the use of diesel engine generators and vehicles in areas where air does not move or in extremely confined and delicate areas like caves can have devastating effects on the natural communities. It is extremely important during the planning and impact evaluation stage for ecolodge development to take these factors into account.

2.3.1 Soils

Healthy soils are an important factor of any ecosystem and all attempts should be made to preserve existing soils before and during construction of an ecotourism facility, and to stop any human-made erosion with an effect on the site.

GUIDELINES

1. **During the planning stages**
   a) Design the development along contours and avoid disturbance to existing topsoil. Emphasize the preservation of mature vegetated soils in lowland areas. These natural systems make the watershed work by allowing rainwater and runoff to infiltrate the soil. In lowland areas, groundwater discharges into surface drainage ways, streams and wetlands. Stable vegetation around drainage ways and streams filters incoming runoff, prevents channel erosion and creates habitat for aquatic ecosystems.
   b) Design the project empathetically to the original landscape with regard to cutting, excavations and landfill. Specify and make the fewest required earthworks strictly necessary for construction, avoiding the need for big machinery, and using hand tools whenever possible.
   c) Avoid important soil movements, especially during the phases of excavation and construction, since this creates erosion and soil sterilization.
   d) Avoid erosion caused by rupture and fragmentation of superficial soils that expose less fertile layers.

2. **During construction**
   a) Avoid compressing soil to the point of eliminating aeration that would thus kill existing micro-organisms necessary for plant and animal life. In delicate areas like deserts, where plant growth is very slow, a single vehicle trail can remain clearly visible many decades after it was made.
   b) Build stages or phases according to a schedule of work activities, taking season and climate into consideration. Disturb only what is necessary and do not interfere with the whole area at once.
   c) Silt fences (which hold sediment on-site during construction) should be installed before construction begins and should be maintained until construction is complete and after all slopes are vegetated.
   d) Water lines should be laid for minimal soil disruption; i.e. adjacent to or under roads and trails wherever possible.
   e) Access and movements of the following should be controlled:

i) **Vehicles**
- Set priorities and limit access for all vehicles, including heavy transport (which may damage plants and compact earth) during construction to and from the ecolodge.

ii) **People**
- Clearly separate and identify access for pedestrians and prohibit the concentration of people on specific sites.

iii) **Bicycles, horses and others**
- Clearly signpost different zones for their capacity according to season.

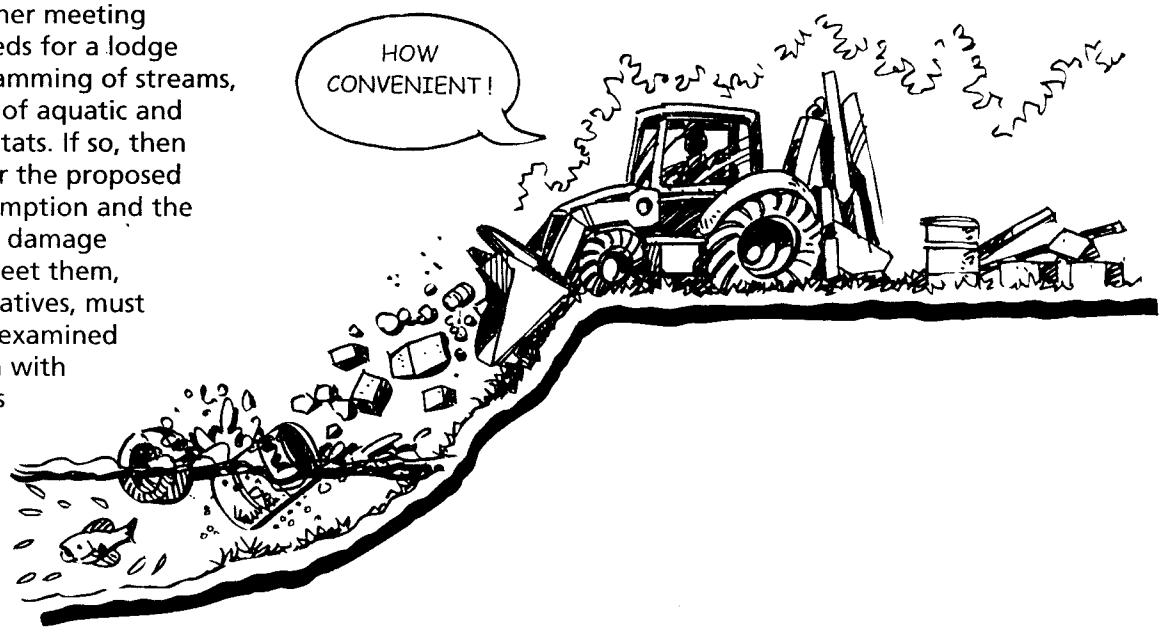
2.3.2 Potable Water

Clean drinking water is becoming increasingly precious, particularly where potable water use is at or beyond natural carrying capacity. Tourism facilities like hotels and lodges are notorious consumers of water, and laundries, gardens, kitchens and bathing facilities consume enormous amounts of water. With this in mind, the following guidelines should be taken into consideration:

GUIDELINES

1. **During the planning stages**
   a) Determine the area's ability to provide a consistent supply of potable water. If the projected use by the proposed ecolodge will reduce available water for human settlements or potentially have a negative impact on aquatic and terrestrial communities during dry or drought periods, then alternative water resources should be found or the location of the lodge should be reconsidered.
   b) Examine whether meeting freshwater needs for a lodge requires the damming of streams, or elimination of aquatic and terrestrial habitats. If so, then justification for the proposed levels of consumption and the environmental damage proposed to meet them, and any alternatives, must be stringently examined in consultation with interest groups before a site is confirmed.
   c) Similarly, ocean-side lodges that are considering desalination plants as alternative water sources need to carefully evaluate the significant environmental impacts of these plants.
   d) Avoid the use of potable water for any uses other than human consumption. Grey water should be used for toilets, irrigation, and other compatible uses.
   e) The size and systems of plunge pools, swimming pools, spas and other facilities that waste large volumes of water should be planned to take into consideration water availability and the impacts of various water disinfectant systems.

2. **During construction**
   a) Analyze the risks posed by construction materials and methods that could cause pollution or other harm to the destination's habitats. Suitable alternatives must be stipulated in the event that a ban on a particular product or system is recommended.
   b) Provide clear and enforceable guidelines for the storage, use, contamination and fire control for toxic and explosive fuels and products such as gasoline, oils, timber preservatives, acids, bleaches and others as part of management during the construction phase.
   c) Enforce a practical and comprehensive program for waste management, including recycling and composting, which must be in place from the outset of site activity. Disposal of construction waste in nearby waters must lead to the immediate removal and banning of offenders from the site, instant termination of contract, and a detailed report to enforcement authorities.



3. **Operational considerations**
   a) Conservation of water should be entrenched at all levels of operation, including laundry, kitchen, maintenance, grounds and cleaning activities.
   b) Water conservation should be basic to staff training, as is routine maintenance and emergency repairs for leaks, waste, corrosion contamination, etc.
   c) Locate all potential contaminants or polluting activities away from water sources.
   d) Prevent waste-water from flowing into rivers or any other natural hydrologic systems. Use appropriate methods for waste management, treatment and disposal (see Section 3.4.3).
   e) Never allow waste from your lodge to enter neighboring properties or waters. Compost appropriate kitchen and garden waste.
   f) Minimize the use of motor boats, with their physical and chemical impacts on water bodies. Use four-stroke engines in lieu of two-stroke engines, which cause additional air, water and noise pollution. Use electric motors where feasible.

2.3.3 Maintaining Water Quality

Ecolodges can cause a range of negative impacts on surrounding water bodies, often affecting local potable water supplies. Following are some guidelines to avoid negative impacts on water quality. Nutrient flows from on-site waste-water systems are one of the greatest polluters, as are two-stroke boat engines that pollute many lakes, rivers and oceans. These engines may inject a quarter of the fuel being put through the engine into the water. Added to this are leaking lubricants, fuel spills and other toxic substances that can find their way into the water and thus cause serious negative impacts.

GUIDELINES

1. **During the planning stages**
   a) Do not alter watercourses (rivers, creeks) including banks and shorelines.
   b) Do not build on flood plains.
   c) Plan for those areas where vehicle fuels, oils and other toxic substances are being used and stored, including contamination and spillage contingency facilities.

2. **During the operational stages**
   a) Establish the capacity and reliability of water sources to the lodge and ensure that demand never exceeds the resource's recharge rate. Your calculations must include a consumption "buffer zone" that accounts for factors such as fire management, seasonal fluctuations in water demand, drought and lodge expansion.
   b) Specify filtration that is able to return used water to the area's natural drainage and watercourses free of contaminants.
   c) Avoid making landfills or any other landscape alterations close to aquatic ecosystems. Remember the premise: minimal alteration.
   d) Avoid using pesticides and insecticides that could pollute waters and affect aquatic ecosystems.
   e) Consider the use of constructed wetlands for sewage. This is particularly effective in tropical and subtropical areas where a number of water plant species can be used to break down bacteria. You can both solve a possible pollution problem in a cheap way and even create a small wetland habitat that can attract wildlife near the ecolodge (see Section 3.4.3.5).
   f) Consider using electric or more contemporary four-stroke boat engines, which are quieter and less conducive to pollution. Boat operators should be trained and policies established to avoid emptying or spilling fuel, bilge-water, paint, grease and other toxic substances overboard. On-board toilets must discharge into sealed "pump out" tanks or portable containers.

2.3.4 Air Quality

Few lodges consider the effects they may have on air quality around the area or in general. Heating systems, power generation, vehicles and picnic areas may emit toxic substances into the air. As an environmentally sound facility, an ecolodge should consider its impact on air quality when planning and purchasing facilities and equipment.

Probably the greatest way to maintain air quality is to use solar power or natural gas if available. Using electric-powered vehicles greatly reduces noise pollution as well. Use of solar panels, solar water heating, and solar and wind power systems can greatly reduce the need for fossil fuel. If this technology is not practical, then getting power from the grid is less polluting than a diesel-powered generator.

Interior air quality is frequently a problem in many hotels and lodges. Uses of aerosol room deodorants, disinfectants and insect spray all add to serious interior air-quality problems. Aside from their needless artificiality, these pollutants carry environmentally unacceptable costs in terms of packaging and waste. Carpets, wood preservatives, paints, rugs, insulation and other materials also can contain harmful chemicals. Sound design, staff training and proper ventilation will help solve these problems.

GUIDELINES

1. Develop and follow a policy of minimal use of air-polluting machinery or power sources.
2. Do not use foggers or aerial application of insecticides.
3. Ensure that effluent from sewage or garbage disposal sites are conveniently designed and located so that no uncomfortable odors reach the ecolodge or areas accessible by visitors.
4. Control strong odors that could disturb local fauna or be a detriment to workers' and guests' health.

2.3.5 Sound

Imposed sound has two major impacts that should be considered: its impact on the ambience and visitor experience, particularly at an ecolodge; and environmental impact on valuable program resources. The common sources of human sound are power generation, vehicles, boats and other sounds coming from the ecolodge, like music. In any case, the quality of the experience can be seriously impaired by human-generated sounds. The design of the facility can help to eliminate mechanical sounds. Remember that these and other sounds, like music escaping the bar, or noise coming from one room to another can virtually destroy the experience that most ecotourists are seeking.

GUIDELINES

1. Take care to reduce sound impacts, particularly if boats or motorized vehicles are used to transport visitors for wildlife viewing or similar activities. Electric or human-powered transport should be considered for sites that are frequently visited. This will help reduce the incidence of wildlife moving away from noise sources, which effectively reduce habitat area and compound species competition. Monkeys, hoofed animals and many birds have been shown to move away from disturbing sounds and change resting and foraging areas to avoid it. This in turn could greatly reduce the biodiversity seen by visitors.
2. Avoid locating the ecolodge near a village or highway as noises from local communities and vehicles could affect visitor experiences.
3. Seriously question the use of recorded birdcalls that cause disturbance to nesting and territorial birds.
4. Emphasize the disturbance caused to wildlife and fellow visitors by noise pollution in visitor education tools. Provide clear guidance or rules and ensure that staff set a good example.

2.3.5.1 Generators

Most ecolodges are in remote areas and as such electricity generation most frequently requires the use of diesel generators, which are inevitably a source of noise pollution. The constant sound of a generator is a distraction that can destroy the entire ambience of the site. Photovoltaic solar power systems are now cost competitive with diesel generators in many areas and their use should be strongly encouraged.

GUIDELINES

1. Mitigate noise through proper planning of buffers, plant locations and muffling systems.
2. Reduce the need to run generators by using complimentary energy such as wind generators or solar panels for hot water. A decent bank of "deep-cycle" batteries will allow you to use stored power at night and other times of low demand.
3. Soundproof the generator room.

2.3.5.2 Visitor noise and privacy

Ecolodges are places where visitors should be allowed to fully enjoy silence and natural sounds. Guests, too, need to appreciate the value of life without the detritus of modern life such as amplified music, mobile phones and electronic games. Ecolodge hosts share a responsibility to provide an efficient ecolodge in a tranquil setting with guests, who must be given every opportunity to help maintain the peace.

GUIDELINES

1. Limit excess noise. Set an example for visitors and invite them to participate in the ecolodge's peaceful atmosphere through guidelines that help them and the lodge make the least possible noise, particularly from dusk to dawn. The aim should be to have no impacts on the surrounding natural patterns of life.
2. During construction, use the quietest machinery possible.
3. Specify building materials and insulation that minimize sounds between rooms. Soundproofing and privacy should be a high priority for the location of cabins, room design, and in all site and building layout.
4. Screen facilities such as swimming pools, bars, restaurants, meeting areas and staff quarters from wildlife locations and private guest quarters.
5. Plan to facilitate quiet activities such as night walks and astronomy courses.

2.3.5.3 Wildlife impacts

Infrastructure planning should take into account the impacts of intermittent noise on some species of wildlife. The long-term effects of persistent vehicular and guest noises can cause certain wildlife to move to other locations or behave in ways that make them less accessible to visitors, especially if the noise occurs at times when animals are more sensitive (resting periods, nesting, breeding, etc.).

GUIDELINES

1. Locate the ecolodge and roads at safe distances away from migratory routes, breeding and roosting sites, etc.
2. Establish a monitoring system to detect any possible changes in migratory routes, roosting sites, etc., that are in close contact with the lodge or its access roads.
3. Never use noise to flush birds or other wildlife from their habitat; i.e. from boats. In some areas noise is also used to flush bats from caves during the day.
4. Set standards for guests with regard to wildlife observation, photography (especially when using flash), and other related activities so as not to disrupt normal animal behavior. Use red filters on flashlights/torches in certain circumstances — e.g. looking for opossums or other night creatures in Australia, and turtles on Mediterranean beaches.

2.4 IMPACTS ON BIOTIC SYSTEMS

As a general rule, traditional lodges are built where the overall landscape or view is attractive. However, lodge developers and designers sometimes have eliminated the natural vegetation and communities in order to create an artificial landscape. Quite simply, whether the lodge specializes in wildlife viewing, birding or mountain climbing, the natural setting is frequently considered to be extremely important by most people who come to these facilities. The natural communities in and around the site are the most important commodities being sold by an ecolodge and those assets are frequently damaged or destroyed without any consultation with biologists, ecologists, wildlife behavior specialists, zoologists, etc., who are familiar with wild communities.

The two major impacts on biotic systems discussed now are impacts on flora and fauna.

2.4.1 Impacts on Flora

The ecolodge should be designed in a way that causes minimum alteration on the area's flora.

GUIDELINES

1. Above all, avoid cutting down trees in order to locate facilities. Plan, design and build with consideration for all natural plant communities of the site. The ecolodge should look like it grew there just like other plants. It should not destroy what is already there.
2. Avoid using areas of dense vegetation or primary forest. Try to build in areas previously altered, in areas of lesser vegetation, or in disturbed areas within dense vegetation.
3. Consider your ecolodge to be a continuation of a protected area, a forest or a coastal system (or any other environment) and avoid the barriers that could make it an island. Isolation limits the potential of biodiversity in your property and

nearby areas. The project should help expand the buffer zone and/or biological corridors nearby.

4. Keep all construction activities in previously cleared areas to minimize sometimes-irreversible impacts such as compaction. The idea is to plan the construction in order to use only necessary areas.

5. If the ecolodge is to be built in a place previously altered or damaged, then reforestation, restoration and natural regeneration should be considered as an integral part of the project.

6. Use endemic (exclusive to the area) species whenever possible, avoiding the introduction of exotic species (either on purpose or by accident). This said, however, the selection of certain native (i.e. "bio-regional") species in replanting or restoration of the ecolodge grounds or surroundings will help attract different kinds of wildlife such as butterflies, birds and mammals. Some flower- or fruit-producing trees and shrubs can be very successful and bring wildlife closer without the need to artificially feed them. Take into account average distances that wildlife can tolerate when planning the plantings. Use the skills of a wildlife specialist and a landscape architect on this.

7. Plan all trails with care to avoid vegetation "gaps," particularly those that subtly encourage visitors to cut corners. These "extra" trails are called "desire lines" and typically become compacted ruts with attendant erosion and re-vegetation problems.

8. Keep strict control over all species to be used in garden design, ornamentation and landscaping.

9. Avoid "single species" plantations set out in rows. Such monocultures always create negative impacts over natural vegetation and habitat, they destroy life cycles, and they promote deforestation.

10. Avoid all alterations produced by:
    a) Public Use Areas: Clearly signpost all camping areas, parking areas, trails, lookout points, etc., to avoid unnecessary impacts on the natural environment. Use clearly explained "zoning" in order to assist regeneration programs.
    b) Motors: Restrict the use of gasoline engines or any other combustion systems that produce pollutants or toxins that will be hazardous to the surrounding vegetation; instead, provide bicycles (possibly with little trailers) for staff and guests.
    c) Fires: Set out clear and strict rules for visitors and locals on appropriate fuel sources, seasonal fire risks, safety zones around individual fires and the effective dousing of fires.
    d) Collectors: Educate your team and visitors on the ecological consequences of collecting plants or any other natural items from the area (as above). Use clear signs indicating that collecting any material is prohibited, quoting relevant bylaws and penalties.

2.4.2 Impacts on Fauna

The ecolodge should be designed in a way that causes minimum alteration on the area's wildlife.

GUIDELINES

1. Avoid interfering with animal life both during construction and on-going operations.

2. Build as far as possible from all known sites of animal activity such as nesting areas, mating areas, resting areas, wildlife travel corridors, food and water sources, etc.

3. Instruct the visitor not to disturb the wildlife; e.g. no screaming, no high-volume radios, no engines, etc.

4. Use a "zoning system" and mark them on maps, along with all-important points to view wildlife.

5. Prohibit any kind of hunting activity inside the project property not directly related to pest control. It is not convenient to mix hunting activities with wildlife observation or photography since most wildlife will be extremely wary and difficult to see.

6. Exclude domestic species (with the exception of guide dogs for the blind or deaf) to the property, as they can seriously disrupt or kill local wildlife. Introduced species also bring with them a great risk of the spread of disease, and domestic animals that have successfully turned feral usually do so at great cost to existing native populations.

7. Enforce collection laws. The diversity, and, potentially, viability of habitat is affected by the indiscriminate collection of specimens, eggs, butterflies, shells, rocks, snails, or any other items that, after all, help make the destination unique. Habitat theft by staff can be curbed via their contracts, and warning signs can inform and

guide visitors. Allow collections only as part of officially sanctioned scientific research in line with the program and habitat management plan.

8. Do not permit visitors to alter by any form natural wildlife patterns for mating, nesting, eating, etc.; for example, taking flash pictures of nesting turtles, lights on the beach, camping in sensitive areas, use of lamps, etc.

9. Do not feed wildlife either on purpose or by accident (garbage cans). This alters their behavioral patterns, makes them dependent, and in some cases even aggressive toward humans.

10. Discourage any other contact or interaction with wildlife (petting, callings, etc.) by visitors.'

11. Do not permit the presence of captive animals "for show" in your ecolodge (native or exotic). This practice goes against all respect for the natural environment.

12. Avoid the introduction of diseases using adequate controls; e.g. from domestic animals.

13. Authorize only the reintroduction of native species, supervised by an ecologist or biologist with local knowledge.

14. Follow Reintroduction Specialist Group (IUCN) Guidelines for any restocking or relocation programs and make sure that they have been well flagged in the habitat management plan.

15. Do not permit any on-site wildlife rehabilitation or recovery programs.

16. Avoid destroying natural wildlife habitat. This could create a reduction in natural populations and encourage migration to other areas.

2.5 VISITOR MANAGEMENT

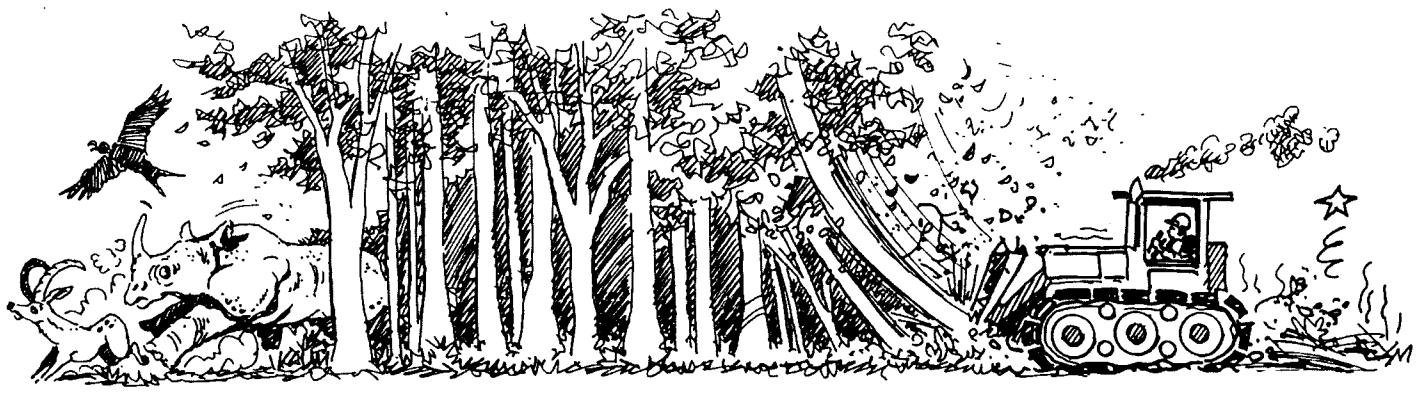
Ecolodge developers must understand that the methods they use to protect the assets for which they are responsible will be key to the lodge's success. The protection of natural and human resources is based on two key tasks. The first is establishing the number of people and frequency of use that any one resource can sustainably support. Second, a robust method of monitoring user impacts on those resources must be devised (and is discussed in Chapter 8).

Given the demands of the modern tourism market, it has become imperative to determine how many people can use an area without impacting habitat, changing wildlife behavior, or overusing natural resources. This approach has become widely successful in planning for the correct number of visitors, controlling erosion on walking trails, improving the quality of park services, and reducing wildlife disturbance.

There are three key points to consider:

- PHYSICAL / BIOLOGICAL: limits of the natural environment
- SOCIAL / PSYCHOLOGICAL: consistency with some quality of the recreation experience
- FACILITY / SERVICE / DESIGN: limits imposed by the facilities and services provided (e.g. the number of parking spaces or seats in an auditorium).

One of the main issues in determining how many people can be supported by a facility is that it ultimately depends on the value judgements of people; e.g. the proprietors and the visitors. The developer of the project should clearly understand the expectations of the target audience. Do they need pristine habitats? Great diversity? Unalloyed remoteness? Or, will they be equally pleased with less? Once this is determined, then a plan needs to be developed based on the combination of economics and the Program Plan, establishing the way people and the environment come together.



The idea of "killing the goose that laid the golden egg" is an important premise for ecolodge developers to take to heart. Ultimately, what makes an ecolodge different and successful from other hotels or lodging is based on their stewardship of the natural and cultural resources they provide for their clients. Most developers or their architects and builders forget this premise and frequently this all-important commodity is drastically reduced. Also, the proprietors of the lodges forget that they are the guardians of these resources, with responsibilities for establishing and maintaining the quality of the resources that provide these experiences. If they fail at this, they find themselves with declining or changing markets.

Anyone in the tourism industry knows that volume is an extremely important concept. The more beds you have in the lodge and the more people you can get into the commodity you are selling, the greater the "bottom line." However, this can seriously impact local natural resources. Developing an ecolodge, which is based on sustainable development principles, requires that the developer learn about the sensitivity of the habitat. This calls for experts who can go into a habitat to determine the amount of sewage that can be disposed of properly, the projected water intake and its impact on natural and human environments, and impacts of people going into the natural and human environments.

Building for an unsustainable volume is perhaps the fastest road to ruin an "ecological resource," and "cowboy" developers will see the costs of halting the destination's increasing degradation rise inversely with the decline of their capacity to pay for it. Creating a robust carrying capacity for a proposed development without disturbing the site requires experienced professionals and the time and resources to obtain reliable results.

What is required is the development of three management plans: The first is a Habitat Management Plan, which establishes the way in which the habitats are managed. Meanwhile, the Program Plan is developed. This plan tells you what programs (e.g. boardwalks, guides and activities) will be offered and how they should be provided to allow the numbers of visitors needed for economic viability and other management goals, which are set out in the Business Plan. Visitor Impact Management is developed from the synthesis of these plans. The measurement of the success of these plans is discussed in Chapter 9, Monitoring and Evaluation.

Any development causes change — some are temporary and some are permanent. Experts can determine this as well as what changes are acceptable or not. These are called Limits of Acceptable Change (LAC).

2.5.1 Key Points In Establishing Limits of Use

Establishing limits of use is an evaluation of the information gathered during the Environmental Assessment Program (EAP) and determining what is sustainable use and acceptable change for key resources. It is very important to understand some key points or assumptions before establishing the limits of acceptable change, to determine if the use of a resource is, in fact, within the limits established and that those limits are sustainable.

Creating a system of limited use requires an EAP on the site and a proposed Program Plan (see Chapter 8) for the use of the resource. Who, what, when and how is the resource being used?

Setting limits will not ensure sustainable use of a resource. It is simply the benchmark established by a group of professionals that has an in-depth understanding of what is necessary to maintain the resource in a sustainable fashion, and whom understand the activities, experiences and infrastructure required to sustain an economically viable ecotourism development. The larger or more complex a system or facility for which limits are being established, the greater the chance for error in detail. Setting limits on use, therefore, may be successfully determined on a trail but less likely for an entire national park.

It is important for the tourism industry (the users) to play a key role in establishing and monitoring their impacts and adjusting products to maintain sustainability. Without direct involvement, operators will not understand that they have a responsibility for protecting the very resources on which their economic well-being is based.

It is most important that the key stakeholders (investors, owners, etc.) develop flexible plans for the use of a resource before going through all the steps in establishing and monitoring visitor impacts.

GUIDELINES

1. Determine the visitor impact on ecosystems at the proposed site and in surrounding areas. The size and capacity of natural areas should be determined on the basis of limiting factors; i.e. the ecological vulnerability of the area,

water and energy availability, space, access and general site conditions, including visual compatibility. Propose tourism activities that benefit local communities and the environment.

2. Study the EAP, which will contain an inventory of resources that are present; e.g. flora, fauna, water resources, geology, etc. Using this inventory will allow better planning of various activities and zones for the area.

3. Remember that the main concern is not arriving at a magic figure of how many visitors should visit an area, but defining managerial tools for adequately handling the demands and effects of tourism on your destination.

4. Have a Program Plan (based on the Business and Marketing plans) that clearly defines who, when and for what reason the resource is going to be used.

5. Clearly define the resources to be used and the potential impact that the planned uses could have. Note: The resource should be defined in small units; e.g., a patch of rare plants, a bird rookery, one unit of an archaeological complex. By using knowledge of potential impacts (expertise is important here), determine what impacts are possible and what it will take to neutralize them.

6. Determine whether there is a need to have other similar resources to meet the program needs (numbers of participants and/or visits) to meet economic goals of the ecolodge (see Chapter 8). Develop alternative plans for determining the Limits of Acceptable Change, which is required to meet the "user" requirements (e.g. numbers at the time of year to meet economic goals).

7. Identify all the biodiversity that is appropriate for tourist "uses."

8. Underline the special attractions of the site and establish a habitat management plan.

9. Consider in both the Program and Habitat Management plans, the possibilities for other sustainable use of resources (e.g. fruit collection by local communities).

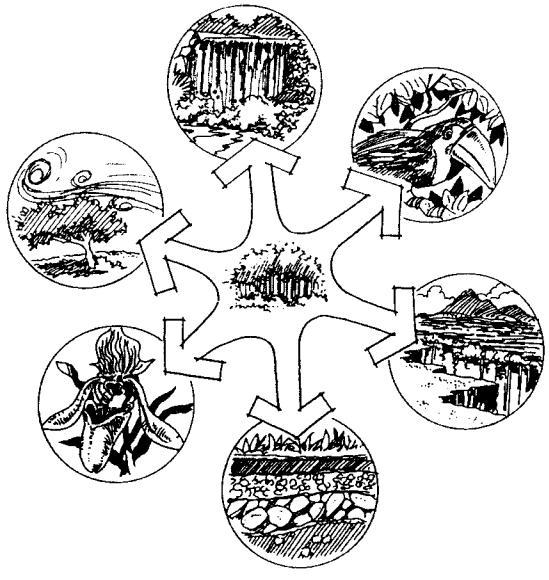
10. Understand and fully exploit the site's potential as a conduit for environmental education.

11. Plan and develop well-designed and clearly defined trails to prevent environmental impacts.

12. Restrict the number of trails in the property to those strictly necessary to show representative flora and fauna.

13. Publicize the maximum number of people allowed on trails to prevent disturbance.

14. Identify all local tourist products and attractions. Quantify the attractions of the project but also those close to the property that may be used in the programming. Those should be considered also in the planning process.



15. Define the type of materials convenient for building trails; consider also the difficulty of terrain, conditions of climate and season.
16. Make an inventory of all local materials that could be sustainably used for trails (see Chapters 1 and 3 for more details).
17. Analyze likely effects of tourism, particularly on trails, and establish a permanent monitoring system for your ecolodge and whether it uses public protected areas such as national parks, biological reserves, etc. (see Chapter 1 for more details).
18. Familiarize yourself with all management plans, and observe corresponding guidelines, especially those on visitor management; i.e. number of people allowed in the area, transport parameters, opening times, restricted activities, etc.
19. Work with protected-area staff and respect regulations of the protected area.
20. Cooperate with all plans launched by the protected area. Foster establishment of wildlife corridors and restoration of disturbed areas, making sure to use only seed stock endemic to the area.
21. Have your ecolodge function as an extension of the protected area if any, acting as a wildlife corridor that will help perpetuate your project's resources.
22. Promote creation of wildlife corridors and restoration projects, always with endemic plant species.
23. Use the system of "living fences" with local arboreal species. Where feasible, use native trees and shrubs to fence the property as well as internal "parceling."
24. Work with protected-area managers to coordinate efforts on resource use and conservation.
25. Join and participate actively with local organizations involved in conservation and protected areas.
26. Invest in a Habitat Management Plan of the site, which are essential for all ecolodges.

2.6 ESTABLISHING HABITAT AND SPECIES MANAGEMENT PLANS

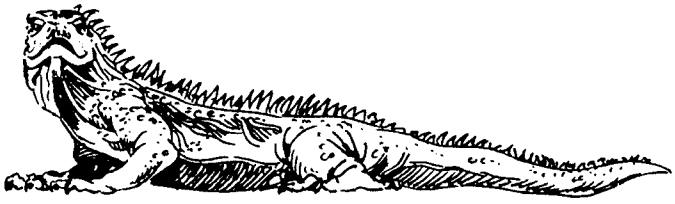
After the limits of use have been determined, the next step is to establish a Habitat and Species Management Plan (HSMP.) An HSMP helps the site manager sustain the habitat and species in line with current conservation thinking and helps ensure that resources are available for tourists in the distant future. The HSMP is based on establishing not only a sustainable use of the environment, but establishing a sustainable business and assuring sustainable long-term profitability.

The HSMP is established to ensure that habitats and species important to the area are sustained or enhanced in sometimes degraded circumstances. These plans are pivotal tools in establishing and maintaining a sustainable destination. The quantifiable costs of habitat management and monitoring should be incorporated into the business plan.

GUIDELINES

1. Ensure that the HSMP takes into account the site's management history, including its regional context. If it is a ranch and will continue to be a ranch, then it requires a plan that will incorporate ongoing enterprises as well. On protected areas, the goal is to work within the framework of proven management plans. However, in many cases, existing plans may fall short of enough data to demonstrate potential sustainable use and management. In this case, the tourism developer should work with the site manager to upgrade existing management plans.
2. Look at construction of infrastructure and how it can be maintained with least possible impact. Infrastructure types should be based on the volume and needs of each user type expected. Note: prior to any construction, a monitoring program should be in place and baseline data should have been collected at all monitoring points.
3. Collect the data of all habitats, natural and manmade, including:
   - Detailed maps of all habitats
   - Zoning scheme
   - Goals for management of each type and location
   - Management methods in detail including target dates; i.e. seasonal checklists or annual business review
   - Cost per acre
   - Contingency plans for emergency management (catastrophic events)
   - Responsive change in management and monitoring analysis
4. Beyond ensuring habitat and microhabitat requirements, it is important to establish a list of rare and endangered flora and fauna for each protected area, and also those species important to the tourism product. Also, management should include visitor program activities, research or specific programs revolving around species management. All management should have short- and long-term goals and a review period for analyzing progress, and setting goals, objectives and tasks for the following season.

5. Long term management plans must have fiscal plans that include staff, staff training, operations and equipment budgets, and of course a plan to coordinate management with program staff or site management staff.



2.7 ECOLODGE DESIGN AND CONSERVATION

Ecolodges should play a "proactive" role in conservation of nature and cultural traditions. Since ecolodges are to be used mainly by tourists, who are concerned with conservation matters, ecolodges should provide practical examples of harmonious interaction with nature. They should not only strive to minimize negative impacts but also to provide alternative, more sustainable ways of living. Visitors spending several days in a good ecolodge should be motivated to apply at home many of the environmentally friendly practices experienced on holiday. Also, ecolodges should serve as models for local communities wishing to improve their standard of living and their interaction with nature by applying simple, cost-efficient and ecologically wise solutions.

GUIDELINES

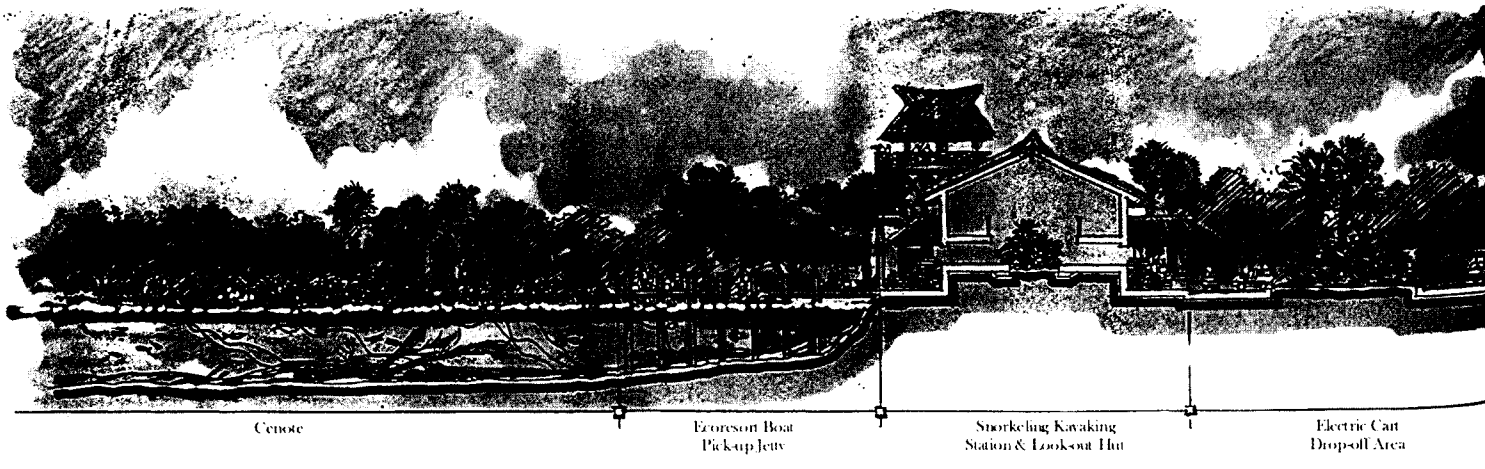
1. Keep in mind matters relative to control of harmful insects, reptiles and rodents. The right approach is to minimize opportunities for pest species to establish themselves and breed, which means treating still water against mosquitoes, for example. The next step is to minimize pest intrusion (ensuring the building structures and plumbing are cockroach-proof at the construction stage; using mosquito netting and flyscreens on doors and windows and bird screens for eaves and chimneys, for example), more than resorting to the extermination of noxious fauna.

2. Consider raising your buildings on stilts. This will help minimize the risk of flooding, allow the free movement of wildlife under buildings, separate the ecolodge from soil dampness and possible pests, and provide an insulating air chamber between the floor and the ground that allows for necessary ventilation and service access. Obviously, you will need mainly still air to help insulate buildings in cold climates, where, in places, some peoples have housed animals below the home living area to benefit from the warmth of their sheltered animals.

3. Strictly limit and control artificial lighting, so as to avoid disruption of nocturnal life cycles of plants and animals.

4. Do not leave or offer any food to local wildlife. Although it may attract local fauna (which may also prove attractive for certain tourists), on the medium and short term this leads to dependency and semi-domesticated behavior among wildlife, which must be avoided.

5. Whenever possible, operate a small farm for breeding certain wildlife species (rabbits, capybaras, crocodiles, etc.), so as to diminish hunting pressures on wild populations, and also to supply your ecolodge with fresh food. Even if no wildlife is available, a small farm with domestic animals may be a good idea. As mentioned earlier, chickens, pigs and other animals can recycle garbage and serve as a food source.



6. Require conservation clauses in your contract with the building contractor, establishing specific do's and don'ts to avoid ecological degradation and loss of habitat and species. Be sure your agreement specifies economic penalties in case of breach of contract. These areas should be fenced off and signed, noting that no construction material storage, vehicles or other activity be allowed to disturb these areas.

7. Provide ecological restoration and interpretative programs to help enhance the local ecology and educate guests as to the sensitivities of particular ecosystems. Establish a local eco-fund that guests can contribute to so that the restoration and vitality of the local ecosystem is a continuing mainstream element of eco-management, making sure that the money is visibly spent directly on the project contributed to.

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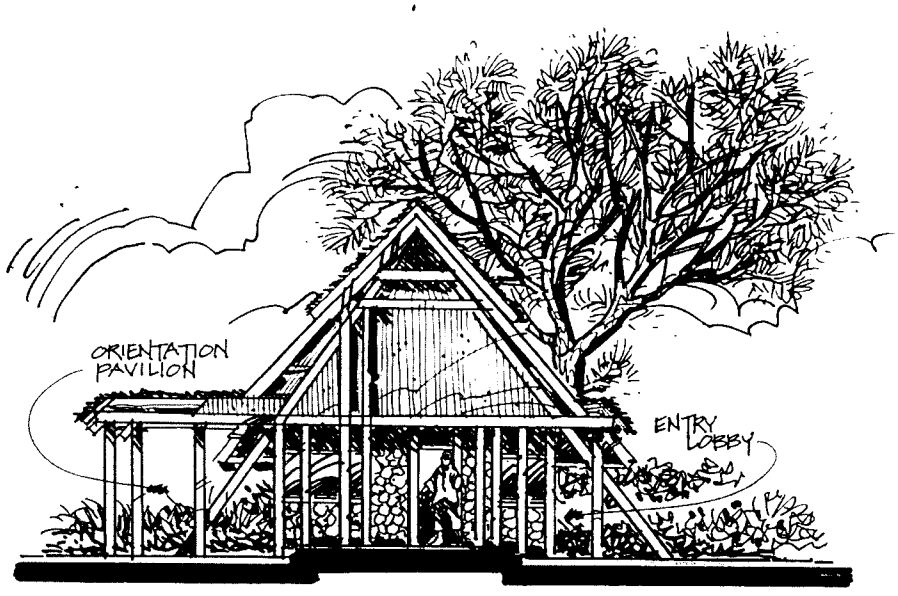
"All good architecture which does not express serenity fails in its spiritual vision."

—Luis Barragan



CHAPTER 3

ARCHITECTURAL DESIGN

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CHAPTER CONTENTS

3.0 ARCHITECTURAL DESIGN

3.1 INTRODUCTION

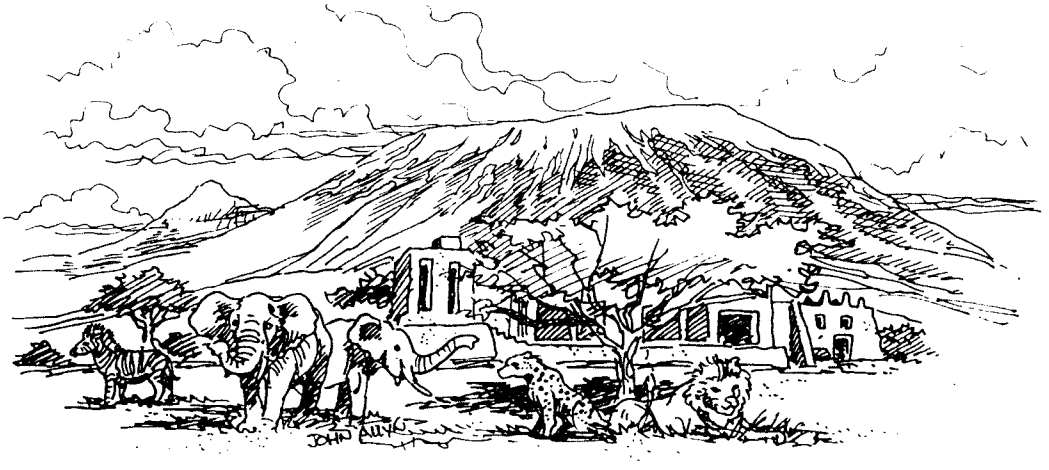
A fresh view of lodge architectural design is necessary if the hospitality industry is to be extended successfully into sensitive areas: ecolodge design is based on a blend of traditional technology and materials, along with modern concepts and appropriate technology. The considered inclusion of local people and the proper conservation of natural and cultural resources are crucial determining factors, particularly as typical ecolodges are sited in or around protected areas, and in most cases, are neighbor to traditional peoples.

Architectural design must be based on specific market analysis outlining target clientele for your ecolodge. It is indispensable to have a deep knowledge of the kinds of activities your tourists wish to carry out, their purchasing power and their expectations.

The authors of this chapter acknowledge the overlap between Chapters 1 and 3, as this book is intended as a guidelines reference work, and may be read separately by different persons. Also, there is a fine line between certain elements of site planning and architecture, and it would be impractical to eliminate all overlap.

GENERAL GUIDELINES

1. Maintain, restore and enhance the natural ecosystem: It is more important than achieving dramatic or impressive architectural expressions.
2. Define the easiest, fastest, most economical and least destructive way in which your ecolodge may be built, at the design stage. Make the most of all-available local natural resources and plan for long-term economic return.
3. Incorporate ease of maintenance, cleaning, repairing and operation of your ecolodge at the design stage.
4. Consider the possible incidence of natural catastrophes in your area: earthquakes, landslides, floods, cyclones and hurricanes, volcanic activity, etc., and comply with the corresponding requirements.
5. Try to include in the design of your ecotourism complex an interpretative center (also known as a visitor center). Even if it's a small, it should be aesthetic. Include a mock-up topographical model of your natural area, diagrams, good color photos of local wildlife and plants, mineral and vegetable samples, examples of handcrafts and man-nature interactions. Avoid using stuffed or caged specimens of local wildlife (they are generally frowned upon by ecotourists). In addition to the interpretative center, provide walks that incorporate living examples of what you are displaying in their natural setting.
6. Create an architectural style always consistent with an environmental philosophy and with the goals of ecotourism, avoiding design contradictions. Local traditional building forms and materials may provide clues to efficient and ecologically sensitive design.
7. Minimize negative environmental impacts by designing an ecolodge with rational and economic use of space.
8. Ecolodge architectural design should concentrate on the following key factors:
   a) Context and aesthetics
   b) Energy use and conservation
   c) Water conservation and management
   d) Waste management
   e) Building technology, materials, and construction
9. Ensure your ecolodge conveys a sense of place. Even within the building, guests should find a harmony with the natural environment. Terraces, elevated open walkways (skywalks), skylights, and verandas facing outwards can be used to achieve a communion with nature.



10. Design for the disabled; provide ramps for wheel chairs instead of steps, special-design toilet services, Braille language signs, etc. However, note that the rugged nature of some nature-based activities and sites may preclude access for many disabled persons. Be frank with your guests and potential guests: provide them with accurate information on program limitations.

3.2 CONTEXT AND AESTHETICS

Existing tourism lodges too often violate or intrude upon the environment with both physical and visual pollution. An ecolodge architectural design must demonstrate unique responses to the local environment, climate and culture. Therefore, the ecolodge's architectural form should not compete with the natural landscape and surrounding vegetation, but should be harmoniously integrated with the environment.

The ecolodge's presence should not disturb or intrude upon its natural setting. It is also important to consider any existing architectural forms in the region, whether they are synchronized with the landscape or not. These local building forms have evolved over hundreds of years and normally make the most efficient use of local materials, orientation and space and are a response to the relative climatic environments.

Two of the fundamental considerations in designing an ecolodge are the physical and cultural context; sensitivity to the local environment and culture are essential to a sustainable ecolodge design.

3.2.1 Physical Context

An ecolodge should be designed within the natural physical context of the area in which it is situated. It should be designed in keeping with its natural surroundings and should not violate or intrude upon the physical landscape as a foreign structure. The lodge should interact with the natural ecological/geological features, aiming to blend into them as much as possible. This, in turn, would render the design visually sustainable, as it would act as a timeless piece of architecture and an organic feature of the natural landscape.

The following principles should be given particular attention in addressing such issues as physical context:

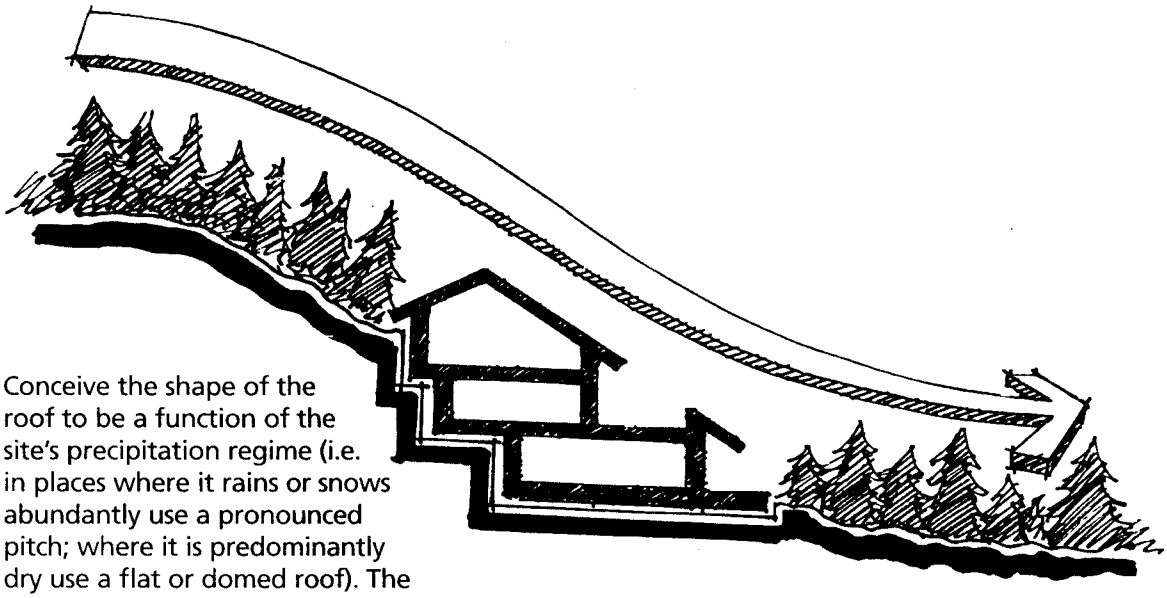
- Form
- Color
- Integration with the surrounding landscape

3.2.1.1 Form

Architects should draw on the beauty of the existing landscape as a vital theme for the ecolodge's form. The lodge should be planned and designed such that it follows the contours and forms of the natural landscape features, and therefore, enhances itself by such interplay.

GUIDELINES

1. Buildings and other structures should not dominate the landscape and/or surrounding vegetation, which constitute the main attraction, together with the local wildlife (and, this being the case, the local cultural environment). Try to have your ecolodge look as if it has sprouted like a plant or emerged from the landscape like a geological formation. Use clues from the local landscape for materials, building forms and siting of the buildings.



2. Conceive the shape of the roof to be a function of the site's precipitation regime (i.e. in places where it rains or snows abundantly use a pronounced pitch; where it is predominantly dry use a flat or domed roof). The degree of overhang or extension of the roof beyond the building line can provide shelter from sun or rain and protect the building from the elements.
3. Avoid building high structures, so that the architectural form does not stand out above the vegetation or surrounding rock formations. Besides aesthetic considerations, low structures also gain protection against intense weather conditions. However, some sites may be ideally adapted to tree house-type structures, which may reduce ground footprint.
4. Anticipate any possible future expansion of your ecolodge and plan carefully so as not to leave things to improvisation.

3.2.1.2 Color

The color and texture of exterior finishes are particularly important design elements for an ecolodge, and can enhance the feeling of harmony and unity between the final built form and the natural environment.

On the other hand, color can diminish the feeling of the physical context if used incorrectly. The wrong colors can sharply contrast the shades of color found in the natural landscape, and can create a feeling of intrusion upon that environment.

GUIDELINES

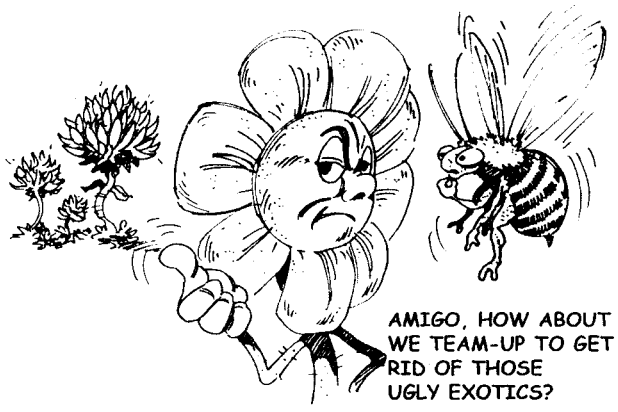
1. The colors used for the ecolodge should be drawn from shades found in the surrounding elements — leaves, barks, rocks, soil, etc., (commonly referred to as earth tones) — that should soften the presence of the built form within the environment.
2. Use colors that blend with their surroundings and be inspired by rocks, the sea, desert sand, plants and distant mountains. Remember that although white reflects solar radiation and may cause comfort inside the lodge, it may provoke annoying glare outside and may clash with the surroundings. Also, remember that black absorbs solar radiation.

3.2.1.3 Integration with the surrounding landscape

The built structure of the ecolodge can be made to blend in with and appear as an extension of the natural environment through carefully designed minimal landscape plantings. Refer to Section 1.6 for more detailed information on landscaping.

GUIDELINES

1. Integrate the lodge into the surrounding landscape through the planting of various indigenous trees and shrubs whenever and wherever possible. Landscaping should be guided by the patterns of the existing natural landscape as much as possible, and native vegetation (e.g. shrubs and trees) and rocks should be laid out in an informal, natural manner.
2. Build the lodge on stilts where feasible to allow existing vegetation to grow and to allow for natural drainage and ventilation. Obviously, this will not suit all lodges and sites.
3. Use plants that are native to the area (endemic) since they will be in greater harmony with the existing surroundings, require less maintenance, be well adapted to the local climate and soil conditions, and in some cases, attract native bird and butterfly species.



4. Avoid superfluous landscaping and the use of exotic plants. Preserving the existing landscape should be a priority.
5. Remember that landscape plantings can also assist in re-establishing diverse natural habitats that may have been lost or diminished within the larger natural site.
6. Your buildings should be placed sufficiently apart to allow for natural growth of plants and movement of wildlife.

3.2.2 Cultural Context

An ecolodge should demonstrate the same level of sensitivity to the cultural context as it does to the physical context. The design of the ecolodge should be congruous with the cultural environment in which it operates, incorporating cultural motifs and traditional styles of vernacular architecture wherever possible. The use of vernacular architectural principles in the design will allow the ecolodge to reflect the local cultural history, and be visually and culturally sustainable over time.

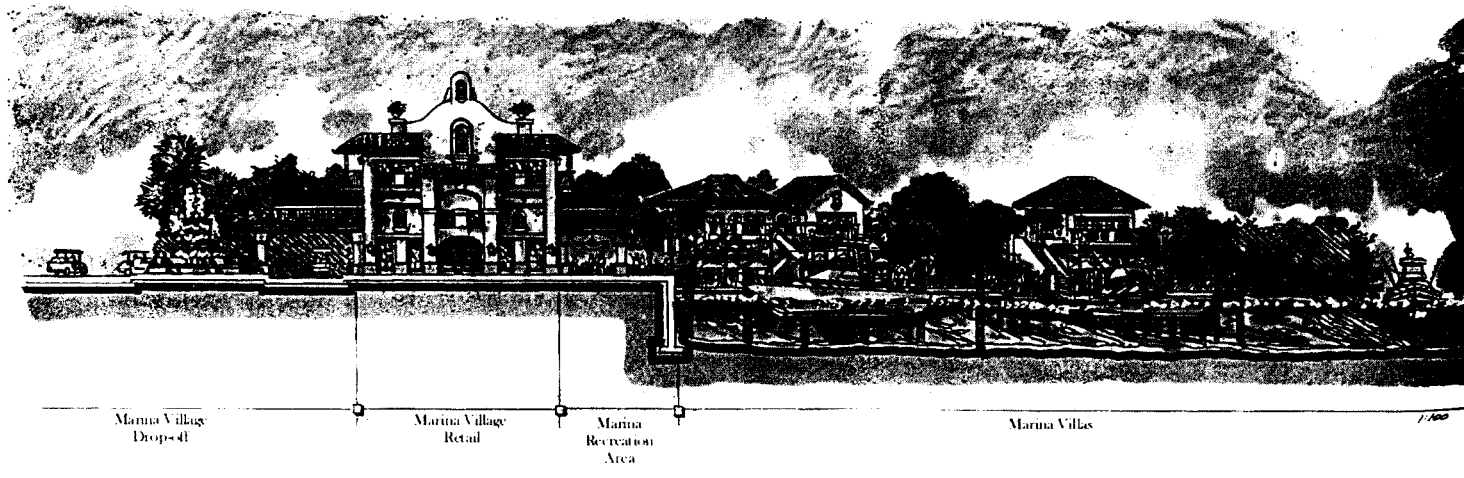
The use of an area's vernacular architecture helps assimilate buildings into the local cultural context, and here the ecolodge can serve two additional roles: First, it can help reduce any feelings of cultural intrusion that may be felt toward the lodge by local traditional peoples. Secondly, if it is done well, it can enhance the tourists' experience and appreciation of the local cultural forms and styles.

It does not suffice to merely copy the native forms however. The architect may be forced to incorporate modern appropriate technology so as to adapt the traditional forms to the present requirements of hygiene and lifestyle of the contemporary tourist — without making a parody of the original.

Traditional building forms can indeed lead us to a new synthesis of architectural expression by providing us with a new architecture that integrates the most modern technology with local materials and methods of construction. Architects and developers should therefore help demolish barriers between old and new, (while recognizing the potential folly of replacing worthy original features with faddish monuments to a powerful ego) and evolve a viable regional ecolodge "language" that draws upon timeless indigenous forms.

GUIDELINES

1. Consult with local elders or historians in your attempts to draw on themes and concepts from local culture and in examining and adopting various aspects of the vernacular architecture. Respect for religious/spiritual symbolism is very important, and the guidance of local people will be needed in order to avoid causing offense: you don't want to build your ecolodge on a local theme which turns out to be a traditional monument to the dead, for example.
2. Base your design on local building techniques and forms (if there are any) and use local cultural images as much as you can. Think about: the form of the built structure and traditional materials and technology used in their construction; spatial relationships



between and within structures; and cultural artifacts, which, with respect to their origins may be adopted for lodge decorations. Many native techniques are time-honored and are frequently the ones that bring out the best in relationships between people, architecture and its environment. But don't merely copy; employ local craftsmen to use traditional skills, and acknowledge their work. This helps bring a sense of local "ownership" to the project and apart from improving community relations, it gives you a chance to help them improve and modernize their work with the benefit of recent research and materials.

3. Construction, interior furnishing and decorating (which should be discreet) should always take advantage of local materials and hand labor (including native artists and artisans), if they exist. This is something that ecotourists will usually appreciate; however, be genuine and do not resort to cheap imitations.

4. Respect local traditions, including religious aspects, magical objects, ceremonial dates, etc. Create spaces in your ecolodge that can accommodate local dances, rituals, plays, etc.

3.3 WATER MANAGEMENT

Most futurists agree that water will become the most important resource in this century, even more than land. Because of the remote nature of most ecolodges, water is often a precious resource. Water is scarce in many parts of the world, and it is important that your ecolodge enhances the ecological and educational experience of your guests by demonstrating world-class water conservation and management.

Many lodges around the world experience problems with water supply. The lack of drinking and secondary water has been a major constraint for coastal lodges as well as those in semi-arid and arid regions. The architect should seek alternative, sustainable means of acquiring water for the ecolodge, as well as means of reducing consumption. Capturing and reusing any rainwater would be a prudent first step to take.

The architect should pay special attention to water management when planning an ecolodge, especially in regions with a history of drought. Extravagances such as swimming pools, spas and lawns in such areas not only may be inappropriate and unsustainable, but they may generate resentment and ill will among local people. At all times, however, the quality of water for consumption is of paramount importance, as is the intelligent re-use of "grey" secondary water. Lodges only use about 10% to 15% of processed water for drinking and cooling, and it is plainly extravagant to use it for flushing the toilet, bathing and showering, and watering the lodge gardens.

Sections 2.3.2 and 2.3.3 discuss mitigation measures when developing the ecolodge to avoid disturbance to surrounding water sources. This chapter deals with issues of reducing water use, reusing and recycling water, and with treating waste-water.

In every case, it is advisable to have a hydrologist look into the main water sources of your ecolodge site, considering the impacts of maximum use versus availability, and also the impacts on the natural environment and nearby communities. The hydrologist also should assess the minimum of water that must be present for natural systems to work during all seasons in order to avoid negative impacts. A careful analysis of water sources and any required dam building or groundwater extraction must be undertaken. Interference with natural watercourses may result in unacceptable environmental impacts, including the irreversible destruction of habitat and loss of species, feral species invasion, unexpected erosion problems, etc.

At least a basic knowledge of the hydrologic or water cycle is required to truly plan for the wise management of all available water resources. It is very important to monitor the effects of water uptake — the sustainability of your supply depends on it.

GENERAL GUIDELINES

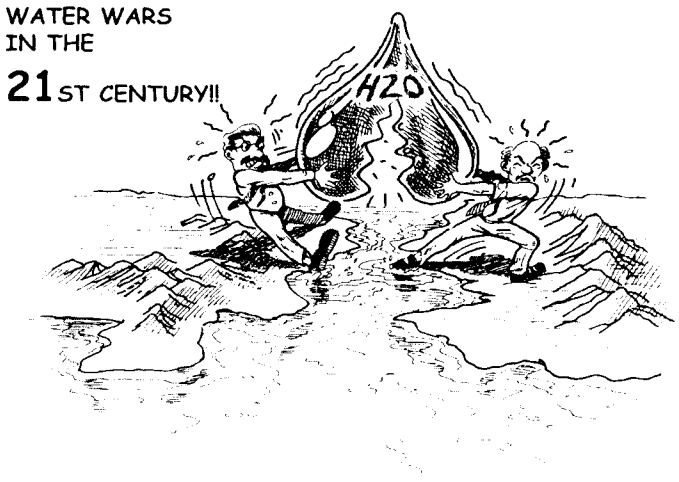
1. Employ a professional hydrologist to survey and draw up a monitoring program to predict and measure the impacts caused by water uptake: lowering the water-table can cause permanent damage, including the collapse of underground structures and the ingress of salt. Your hydrologist should provide a report on existing uses and capacity, water quality and content, and a monitoring timetable for measuring levels of salt and other contaminants and indicators. This program could prove crucial to your sustainability.

2. Carefully manage and monitor water resources, as well as waste handling and disposal, which can prevent the ecolodge from depleting or contaminating the natural resources surrounding it, and therefore enable it to sustain the very same flora and fauna that have attracted visitors to it.

3. When water isn't a problem, use it as an element of design in the interior spaces of your ecolodge, providing horizontal or vertical flow (small waterfalls, lily ponds with moss-covered stones and ferns, etc.) using solar-powered pumps. Apart from the pleasant aesthetic effect and sense of freshness,

the sound of running water produces a calming effect. In every case, try to recycle your water.

4. Investigate how the water supply system for your project may or may not affect the availability of water for neighboring communities.



There are four main ways to manage water:

- Water conservation
- Water harvesting
- Water re-use
- Water treatment

3.3.1 Water Conservation

Examples of modern, water-conserving devices include low water-use toilets, tap aerators, showerheads, and drip-irrigation systems that use filtered "grey" water from showers, kitchens and so on.

Designers should also shy away from unnecessary "luxuries," such as swimming pools or golf courses, that require large quantities of water (such facilities seriously contradict the ecolodge philosophy). This contradiction deepens in many arid and semi-arid regions, where water is a scarce commodity for the local inhabitants and at times, is even absent in sufficient quantity for their basic sustenance. If a swimming pool becomes a necessity for any reason in such circumstances — i.e. market demands — then it should be built and operated in a very environmentally-friendly way, it should look natural and it must have the community's blessing. (See Section 1.5.6 for specific design guidelines for swimming pools.)

GUIDELINES

1. Use low-flow showerhead sprayers, aerators, and restrictors; flow-control aerators for taps; water-conserving dual-flush toilets; "dry" composting toilets, waterless urinals, tap-aerators and night-timed drip-irrigation systems. Be aware that some of these technologies may require qualified and regular maintenance. Check that maintenance expertise and training would be available, should you decide to use them.
2. Avoid water leaks. Plan simple water systems with as few joints as possible and specify a pressure meter to help pick up water losses. Periodically check your plumbing and make sure that it is in good working condition.
3. Swimming pools are serious consumers of water and should be made as sustainable as possible in terms of treatment and filtration. Carefully investigate and recommend water treatment systems that offer the least impact for your water hardness and other circumstances. Non-chlorine methods for purifying water (Floatrons, ozone-bromine systems, copper/silver ions or salt) are available. Whenever possible and appropriate, use solar heating and solar-assisted circulation pumps.
4. Sand gravel filters do not require chemicals for their operation and can be used to filter domestic water for re-use in gardens, toilets, etc. Filtration and plumbing for water re-use must be planned.

3.3.2 Rainwater and Snow Harvesting

Rainwater or snow harvesting is one sustainable method of capturing water for the ecolodge. Rainwater can be a liability by causing soil erosion if concentrated run-off from hard surfaces is not well managed. However, rainwater can be an asset if it is collected from roofs, large cisterns or rain barrels for use in drinking water (after treatment) or secondary water-use purposes. Although not drinkable without treatment, it can be of adequate and in some cases superior quality for gardens, toilets, clothes and car washing, and possibly hot tubs and swimming pools.

Historically, the collection of rainwater from roofs has been common practice in many parts of the world, and is entirely suited to any ecolodge. Several innovations in cistern design have originated from traditional types of food storage spaces (e.g. granaries). Rainwater pollution may be a problem depending on the region where you live because of acid rain. Roofs with lead flashings or valleys also can affect the quality of water collected. Again, it is prudent to have a chemist analyze the rainwater collected before specifying the end uses for rainwater.

Please note the importance of groundwater recharge for wells, local streams and the effects on the local aquifer if rainwater is artificially drained away. Again, the advice of a hydrologist is essential before relying on groundwater sources.

Snow, being another form of precipitation, can also be harvested to provide an alternative supply of freshwater. Snow harvesting requires the construction of a pit, generally ranging in size from about 6 to 8 meters in diameter and about 10 meters in depth. The pit is heavily compacted and the collected snow is dumped into the pit to a depth of 2 to 3 meters. The compacted snow is covered with earth, which acts as an insulator, and a bamboo tube is placed about 50 cm above the base of the pit to serve as an outlet. As the snow melts around the bamboo pipe, water trickles along the bamboo and into a pot placed beneath the outlet. The water collected in the pot may be used for household drinking water and can supply water to up to 14 families.

GUIDELINES

1. Have all potential water sources analyzed by a hydrologist, if nearby. A competent local chemist is qualified and able to perform routine, inexpensive analysis of drinking (and swimming pool) water. Setting up a regular water analysis has the added benefit of providing some protection against speculative claims from mischievous clients.
2. Specify guttering, pipe-work and tanks to catch and use water efficiently, including any filtration necessary to ensure a clean drinking water supply.
3. Since fresh water supply is frequently a major problem in coastal areas, consider installing a desalination plant near your ecolodge. This option has a number of drawbacks, including the disposal of large quantities of "waste" salt that can substantially damage land and marine habitats. Additionally, desalination is very energy intensive, despite recent major technology improvements. If there is no alternative to desalination, however, don't go for sophisticated technology or large machines, since these produce too much concentrated high-salinity waste (normally at least 5 m^3 per day), which will have to be filtered (and disposed of) before being released into the sea. Avoid buying an oversized plant and look for the lowest kWh/1000gal. Purchase those plants that have a good service contract. If you choose seawater for desalination purposes, it should preferably be obtained from beach holes or other underground seawater. The siting of your source should not interfere with tourism activities such as snorkeling or diving. Brine water from desalination plants should not be infiltrated into the soil or discharged to the sea without sufficient treatment to avoid adverse effects of increased salinity or temperature on the biota or soil.
4. Deep beach wells are recommend in some locations. In other locations discharge to the sea can be accepted if pipes are not visible and the discharge occurs from vertical pipe extensions in water deeper than 15m. The difference between the effluent's salinity and ambient salinity should not exceed 10%. Also, temperature should be lowered to the ambient temperature before discharge.

3.3.3 Water Re-use

Wise use and conservation of water should be a byword in ecolodge design and operation. Water reuse should be standard in the industry and a very high priority for designers.

Wastewater from ecolodges, if treated properly, can be re-used for various purposes. The water from kitchens, sinks and showers can be collected in a tank, filtered and treated. This water can then be re-used for flushing toilets, watering gardens, etc. If biodegradable soaps and detergents are used in the showers and kitchens, then treatment is much easier.

GUIDELINES

1. Where there is fresh surface water (rivers, lakes, reservoirs, etc.) available for human use, test and treat it according to the application.
2. Grey water should only be used in sub-surface irrigation.
3. Do not discharge any untreated wastewater (grey or black) or other wastes (especially non-biodegradable) into the sea or other water bodies. This would ruin the resource base of any coastal ecotourism industry. Refer to Section 3.4.3. Under NO circumstances should treated grey water be used for washing dishes. Should you need to re-use water to this standard, you would require either high technology filters or low technology systems and constant quality monitoring.

3.3.3.1 Grey-water irrigation

There are four stages for grey-water reuse:

- Collection (all the points generating grey water, pipes and grades)
- Treatment (grease traps/arrestors, septic tanks, aerated treatment, etc.)
- Filtration (reed beds, sand filters, etc,)
- Storage (tanks, etc.)

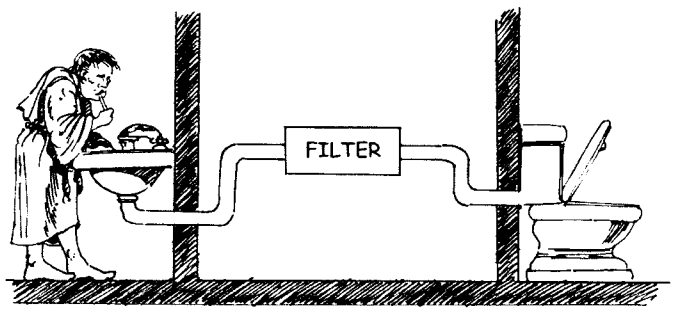
Waste-water from showers, bathroom sinks, and other wash sinks is known as grey water. Water from kitchen

sinks, dishwashers and washing machines — where the water is more heavily contaminated with food particles, grease and detergents — is known as black water. However, if you use arrestors and biodegradable detergents, the vast amounts of water from washing machines and kitchen sinks should be just fine for irrigation.

The wastewater from the above sources is then treated and filtered using sand, gravel, mechanical and biological filters. It is absolutely vital that no toxic or harmful substances are used in the water that goes into the system or it will be impossible to filter and reuse it. The filtered wastewater is then piped from storage for use in the garden or landscaped areas.

GUIDELINES

1. Reuse wastewater (both grey and black) as much as possible. Create systems in which water goes through several uses before being disposed, using it as irrigation or fertilizer for gardens, for flushing toilets, etc.



2. Avoid using potable water for irrigating.
3. Install separate lines and septic systems should you reuse both grey and black waters.
4. Specify and provide biodegradable soaps, shampoo, hair conditioner, etc. and post signs in baths urging guests to use them instead of other products they may have brought.

3.3.3.2 Flushing toilets

Since the widespread introduction of the flushing toilet in the 19th century, little has changed in its basic design. As is generally believed, flush toilets are NOT the largest indoor users of water. This is a key point as toilet waste is usually seen as the main waste problem whereas it is actually the grey-water that is more difficult in both volume (over 80%) and quality.

An ordinary toilet uses anywhere between 9 and 20 liters (2.5-5 gallons) for every flush. Obviously, this is excessive (in no case should more than 6 liters per flushing cycle be used) and several ways exist to save water consumption. In old-fashioned high-flow toilets, you can achieve a 30% saving in water consumption simply by taking up space in the toilet cistern. Cheap and effective ways to do this are putting a rock or any other solid, heavy object that will not move around or flake off particles like a brick will (in fact, a bottle filled with water is ideal). Use caution in selecting your object so that pieces don't come loose and jam the mechanism. Retrofit kits are available, including toilet dams to reduce tank flush volume.

GUIDELINES

1. Water-conserving flush toilets are widely manufactured and should now substitute for older, more water-consuming models. Characteristics that should be evaluated before purchasing a low-flow toilet include operational noise, solids evacuation, bowl cleaning, and water surface seal area (water standing in bowl after flush cycle; i.e. more water surface area requires less cleaning of skidmarks).
2. Double-flush units also save water by providing a partial flush for liquid waste and a complete flush (6 liters/1.5 gallons) for solid waste. Use waterless urinals wherever possible; besides enormous water savings (160,000-500,000 liters per year), they have lower maintenance costs.

3.4 WASTE MANAGEMENT

The management of waste is a critical conservation problem for protected areas, particularly given the impacts on wildlife and indigenous flora, which stand to suffer from the adverse effects of the irresponsible handling and disposal of waste, such as the introduction of problematic pest species. The design of an ecolodge should fully incorporate every aspect of waste management in order to avoid any harm to surrounding natural resources.

A basic premise of an ecolodge operation is minimizing waste generation, since this is one of the main causes of degradation of surrounding natural environment. This may be achieved by recycling, reusing, refusing, reducing and repairing.

One sustainable principle to keep in mind is that no nutrients should be released that are naturally found in the environment. It is very important to research waste treatment methods used elsewhere in the region: how far away are recycling facilities? Do they collect, and if so, what can they take? What options are available for sewage treatment? Many areas where ecolodges are built are places where aquatic or marine environments have adapted to and require low nutrient levels (mountain streams, springs, coral reefs, etc). The slightest extra flow of nutrients can cause problems such as blue-green algae.

The best attitude towards waste is to avoid it as much as possible, instead of finding ways of treating it.

Waste can be classified in various ways: liquid and solid, organic and inorganic, biodegradable and non-biodegradable, recyclable and non-recyclable. The types of waste addressed in this chapter are:

- Construction waste
- Solid waste
- Wastewater

3.4.1 Construction Waste

Construction sites generate a lot of waste and it is important that it be dealt with in an environmentally friendly way. In most cases, little thought is given to waste removal from "ecolodge" sites. A waste disposal schedule should be created by the contractor before beginning the project and approved by the architect. Effort should be made to reuse as much waste as possible.

GUIDELINES

1. Bring construction crews into the program. Providing initial training for workers that properly explains the project's aims, rules and reasoning, and encourage questions. Building mutual respect in this way will foster a "team" atmosphere where people have the tools and are motivated to excel in helping meet the project's aims. You may decide to introduce incentives, such as awards or cash prizes for tidiness, etc. Remember that people can be your strongest asset or worst liability.
2. Specify waste removal contracting as part of the construction stage.
3. Generate the minimum amount of waste possible and treat appropriately all your refuse, recycling and reusing as much as you can.
4. Reduce building waste and packaging at the source; i.e. do not take unnecessary materials to the site and return packaging regularly on trucks to leave the site empty.
5. Design for the most economical use of construction materials; e.g. order materials prepared to length off-site. Also, use full lengths of framing materials and full sheets of plywood rather than requiring cutting.
6. Specify the safe storage and disposal of hazardous waste (toxic materials, used car oil, unused thinners and turpentine, ammonia-based cleaners, etc.). Do not discard them in your site; ship them out to the nearest available waste collection center.
7. Building material waste should be sorted into organized piles by size and length and placed near the "new" materials. This makes it very easy to grab the "short" piece needed before using a new full size one; it also encourages good husbandry.
8. Form boards and panels should be specified that are not necessarily sized for the form but instead sized for reuse in the structure later, and specified as such.
9. Any construction equipment leaking fluids of any kind should not be allowed on site and should be stated in the specifications.
10. Specify or encourage car pooling by limiting parking on-site; provide secure parking for individual vehicles instead.

3.4.2 Solid Waste

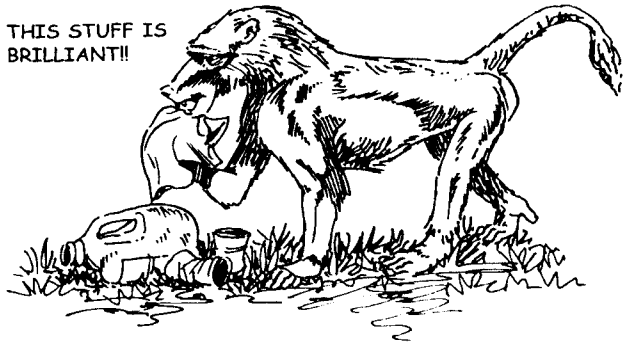
Every ecolodge basically has two basic sources of solid waste: management and guests. The following basic strategies may be applied:

- Use products that minimize waste and are not toxic.
- Reject all unnecessary packaging.
- Convert biodegradable waste to compost or submit the waste to digestive anaerobic systems. Many biodegradable wastes would be better suited to an aerobic system.
- Reuse materials in situ and collect materials suitable for recycling off site. If that is not possible, outdoor facilities may be used, provided that they are well sealed and contained.

GUIDELINES

1. In selecting a location for outdoor waste disposal, the architect should consider various issues. For example, the site should be inaccessible to wildlife and located far from water sources such as streams and rivers, especially as local people, flora and/or fauna use these sources. Attention should be paid to water table levels and groundwater flows, in order to eliminate the possibility of contamination by leachates. Also, prevailing wind direction must be considered when selecting the site, so as to avoid the smell being carried toward the lodge or neighbors.
2. Discard waste responsibly. Non-biodegradable wastes should be regularly sorted according to various categories (glass, plastics, etc.) and transported out of the protected area to the nearest dumping and processing facilities. Biodegradable waste can be turned into compost and used for landscape purposes around the lodge. Incinerator use should be avoided as they cause air pollution.

3. Given the frequent presence of large numbers of mammals, birds and other wildlife around lodges, all outdoor waste disposal sites and compost heaps should be secured from scavenging animals and birds.



4. Specify only durable, biodegradable or recyclable goods and materials for an ecolodge. A material is not converted into waste until it is thrown into the garbage can. If you can find ways of reusing a material, then it is not a waste but a resource. Remember that reusing is better than recycling. Allow for the lodge's complete flow of goods and materials in, and rubbish out via properly separated containers. Establish a specific recycling program in your ecolodge. From the beginning, instill a "recycling ethic" among your staff through good design of waste and recycling facilities and proper training. Ensure that your system — i.e. compost, metal, paper, glass and non-recyclable containers — is foolproof and easily accessible to guests. Design around the usual drawbacks of waste disposal — smell and pest insects in particular — so ensure bins are airtight; plan for a capacity to rinse out containers nearby.

5. Coordinate waste management systems with neighbors and the local community. It may be that you need to commit the ecolodge to take on initial responsibility for wider recycling management. If so, it is possible that you may use this to negotiate public services in return, such as inclusion for the ecolodge on bus routes.

6. At worst, if you must bury your inorganic garbage in sanitary landfills on site, seal the base of the landfill with clay or plastic, taking care to avoid creating a flooding problem either from or into watercourses. Alternate a one-meter layer of garbage with a 300 mm layer of clay or compressed mud, avoiding in all cases contaminating the water table.

7. Domestic animals such as chickens, ducks and pigs can be effective consumers of food wastes, and can later become healthy food themselves. This can be the ultimate recycling of food waste — converting it from one form to another.

3.4.2.1 Biodegradable materials

GUIDELINES

1. Emphasize the use of biodegradable and environmentally friendly materials in the construction and operation of your ecolodge, including aspects of cleaning, maintenance, acquisition of products, and kitchen design.

2. Whenever possible, use only natural paints, varnishes and finishes.

3. Use non-biodegradable materials only if local materials are exhausted. This will save the local ecosystems by not having to hack vegetation for walls, beams or thatching materials for building or maintenance, whether they are found within or outside the reserve.

4. Strictly limit the use of "virgin" plastics (not made from recycled material), especially as containers and packaging, unless it is returnable or reusable.

5. Specify only biodegradable soaps and detergents.

6. Advise your guests in advance against bringing materials that might result in non-biodegradable waste (including soaps, foodstuff and other products that use excessive synthetic wrapping).

3.4.2.2 Organic waste treatment

Composting and "biogas" (extracting natural gas from waste) are two popular examples of organic waste treatment. With new technology, it is becoming much easier to treat waste organically. Many ecolodges, however, prefer to use appropriate technology to build their own composters and biogas plants.

GUIDELINES

1. Consider using organic waste for producing compost (an excellent organic soil fertilizer) and biomass. You can build a compost processor using a discarded oil barrel, providing it with a double lower base (the higher of the two being a grill where you will place your organic waste). As the refuse decomposes, it is sieved through the grill and accumulated in the lower base of the barrel, from which it is periodically gathered as compost. A shaft made of sheet metal (at least 2 m long) should be provided at the top end of the

composting barrel, so as to eradicate bad odors. For better results (better solar absorption and speeding up of the biodegradation process), paint the barrel black.

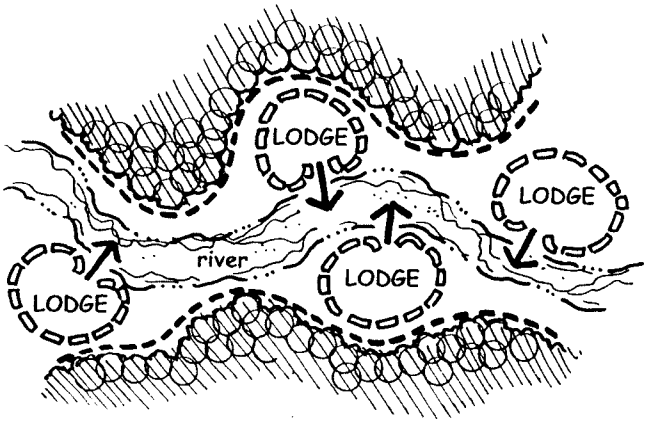
2. Consider using anaerobic digestion (wet fermentation process) for breaking down food, animal waste, human fecal matter, and for the total array of solid waste such as waste paper, green waste, and landscape (garden) waste. This converts the waste stream into three usable by-products:
   a) Biogas, an energy-rich gas stream, comparable to natural gas, that can be used to offset the cost of energy to the ecolodge.
   b) A high-quality solid organic fertilizer that may be useful in landscaping efforts or even crop production.
   c) A diluted liquid organic fertilizer that may be used in drip irrigation as an additive to any planting program, for feeding ornamentals, or in landscape plots for replenishing native species of plants.
3. Again, anaerobic processes are better suited for much of this waste, especially the food scrap, green and landscaping waste, and even human fecal waste in the proper composter.

3.4.3 Waste-Water Treatment

A wide variety of onsite wastewater treatment systems may be chosen for a given site. The primary criterion for selecting one design over another is protection of public health while preventing environmental degradation. Other important criteria are cost and ease of operating and maintaining the system. The fate and toxicity of any residuals resulting from the treatment and disposal system must be considered in the selection process.

On-site wastewater treatment systems include a variety of components and configurations, the most common being the septic tank/soil absorption system. Traditionally, subsurface soil absorption has been used almost exclusively for onsite disposal of wastewater because of its ability to meet public health and environmental criteria without the necessity of complex design or high cost. A properly designed, constructed and maintained subsurface absorption system performs reliably over a long period of time with little attention. This is because of the large natural capacity of many soils to assimilate wastewater pollutants.

Unfortunately, not all soils are suited for conventional subsurface soil absorption fields. If soil absorption cannot be used, wastewater also may be safely disposed into surface waters after appropriate filtration or evaporated into the atmosphere. However, more complex and costly systems may be required to reliably meet public health and environmental criteria where these disposal methods are used. Therefore the first step should be to analyze soil characteristics and composition of your site.



Most lodges have had difficulty when faced with the question of where and how to dispose of their wastewater. Some coastal lodges have released their waste into the ocean while a few have disposed of sewage in rivers. In such cases, marine, riparian and terrestrial wildlife — along with humans — all stand to be harmed by the water contamination. Sewage should be disposed and treated in a responsible fashion. The economical and relatively low-technology "solar aquatic" wastewater treatment ("a poop to flowers") system uses the sun's energy, combined with bacterial and animal/plant systems to break down waste and create marketable flowers and plants as a by-product. The resulting water is adequate for irrigation and other similar uses.

In this book it is not possible to discuss in detail all the different wastewater treatment and disposal methods under various site constraints. Many technical books deal specifically with wastewater treatment, but the reader is referred to the following sources: Salvato 1995, EPA 1990, Faruqui et al 1995, Rapaport 1996, Robertson & Sieber 1996, and Kruzic & White 1996.

Generally speaking, the following disposal methods are possible:

- Trenches
- Beds
- Pits
- Mounds
- Fill systems
- Sand-lined trenches or beds
- Artificially drained systems
- Evaporation infiltration lagoons
- Lined evaporation lagoons
- "Evapotranspiration" beds or trenches
- Lined trenches

With sufficient treatment and presence of receiving waters, surface water discharge is always a potential disposal option. You should install a sewage system that does not allow contamination to reach groundwater or other water sources, such as the ocean, river, lakes, etc., by ensuring that the system does not extend below the water table.

The six types of sewage treatment discussed here are:

- Pit latrines
- Septic tanks
- Dry toilets
- Anaerobic waste treatment
- Aerobic waste treatment
- Constructed wetlands

3.4.3.1 Pit latrines

This is the most rudimentary method for disposal of human waste matter (widely used around the world in less developed rural areas). It is not advisable as the permanent solution to the main body of your ecolodge, but may be justified during construction or at the very beginning of your operation, as well as in remote camping areas or in distant portions of nature trails.

In short, a pit latrine is a hole in the ground (covered by a cabin) in which human waste is dropped. When the hole is filled to about 1 m (3 ft.) from the surface, the cabin with the defecating platform must be moved somewhere else and the hole completely covered by soil. A new hole is dug near the previous one.

The use of conventional pit latrines should be extremely limited. None should be constructed in a floodplain. It is best to install Ventilated Improved Pit latrines (VIP), which is a modified version of the conventional pit latrine.

GUIDELINES

1. To avoid unpleasant smells and proliferation of flies that occur in traditional pit latrines, it is highly recommended to use improved ventilated latrines, preferably with the pit offset from the latrine. Put an external ventilating pipe (diameter of 6 or 8") coming out directly from the pit (fix a wire netting on the upper end of the vent to keep flies away). Paint the vent black so that the air inside will heat up, creating a rising current of air and avoiding bad smells. Ventilation is the key to successful operation. An older method is encouraging visitors to sprinkle a handful of lime into the pit before leaving.
2. In the case of sloping terrain, all pit latrines should be placed below the point where the local water source (well) is found, and at least 1.5 m above the water table, to avoid contamination. It is not convenient to use pit latrines in sandy soils that are too close to the water table.
3. As a method of sewage disposal, the architect can use the VIP in the ecolodge. A VIP is a modified version of the conventional pit latrine. It is built out of durable materials (walls are of brick or stone, and the floor is of a permanent finish of cement over concrete) and its pit is lined with a permanent brick or stone wall. Also, the VIP is ventilated through a pipe. The VIP is inexpensive in construction and like its conventional counterpart, is designed for use without water; this is an important factor given the frequent lack of water in large areas of many countries.
4. Point the vent flue toward the sun and fit a self-closing lid to the toilet to stop flies from entering.

3.4.3.2 Septic tanks

A septic tank is a closed chamber, usually made of concrete, in which microbes digest solid wastes, creating a liquid effluent that is absorbed into the ground through a leaching field, or series of perforated pipes. This substantially reduces the amount of leachate, which has to be absorbed by the soil below. Septic tanks can be purchased ready-made in some locations and may be field-constructed where they are not available.

It is important to understand that burying the septic tank does not remove the odors. It needs regular inspection, pump-out points and venting. They also do not accept waste that will not break down naturally.

GUIDELINES

1. Perform soil tests to determine the percolation rate of the ground, or the rate at which the leachate can be absorbed.
2. Design septic tanks and leach fields to accommodate the volume of waste flow. They can be designed to serve more than one unit to reduce their number and costs.
3. Locate leach fields where heavy rains won't saturate them and reduce their effectiveness. The leachate can also provide irrigation for plants, but beware of the tendency for fast growing roots to clog pipes.

3.4.3.3 Dry toilets

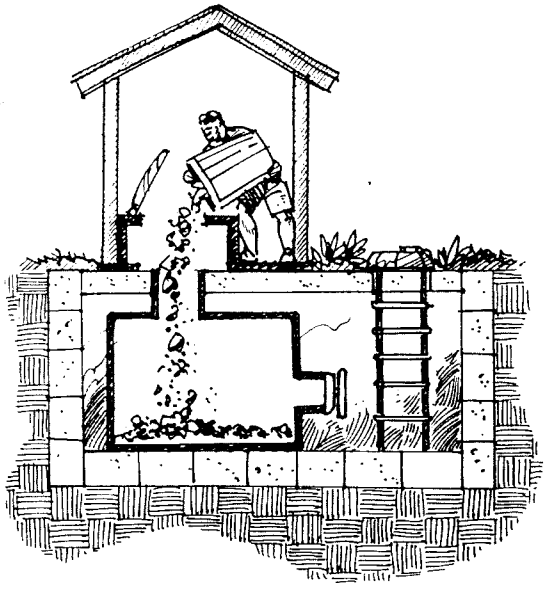
Dry toilets, also called composting toilets, offer one of the simplest and most economic ways to prevent pollution by converting excreta into fertilizer. A composting toilet is a large tank located directly below the toilet room. Wastes enter the tank through

a larger diameter chute connecting to the toilet, and decompose in an oxygen-rich environment. No water is used for the toilet, but a carbon-based bulking agent (such as wood shavings) is added to improve liquid drainage and aeration, and to provide fuel. A small fan draws air through the tank and up the vent pipe to ensure adequate oxygen for decomposition and odorless operation. Ducts, baffles and rotating tines also help the composting process, and about once a year compost can be taken from the tank for use in gardens.

However, it is important to mention that this type of toilet is not acceptable to some local authorities in certain countries, such as Australia and the U.S. Several commercial options of dry toilets are available in many countries around the world. An interesting variant, common in many developing countries, is the Double-Vault Composting (DVC) toilet. This batch composting arrangement allows decomposing excreta to be kept for a period of time in isolation from fresh materials (and pathogens), whereas in simple composting toilets, fresh excreta is continuously added to a single composting chamber. One of the most efficient composting toilets is the Clivus Multrum type, in which decomposing waste gradually moves across an incline from one end of the chamber to the other, where the humus (compost) is gathered.

GUIDELINES

1. Before using a dry toilet for the first time, partially fill the tank with vegetable waste including woodchips, grass and dry leaves, which will absorb liquids, provide carbon for decomposing and stop the contents from solidifying.



2. The bottom of the dry toilet tank should have a slope of some 30° to facilitate the sliding of waste and to conduct it to a lower chamber, from where composted material may be periodically removed.
3. Be sure to provide a mild temperature, moisture, fuel (vegetable material) and air for the toilet to function. Liquid may have to be added to the tank to keep the compost pile moist during periods of little use, or more solid matter added periodically to improve the compost texture.
4. Remember that composting or dry toilets have several advantages over other systems: no water is used and only a small amount of energy is needed for an exhaust fan; valuable nutrients can benefit soils; and proper maintenance requires little time. However, without proper maintenance, the tank can become clogged and unpleasant smells will arise.

3.4.3.4 Anaerobic septic treatment

Anaerobic waste treatment (bioseptic systems) is accomplished by micro-organisms living in the wastewater. Anaerobic microorganisms work in an environment where no free oxygen exists. A by-product of this method of breaking down waste is the smell; nevertheless, these unpleasant odors are the best indication that the anaerobic process is working well.

This technology is already offered commercially in many countries (both developed and less developed), using prefabricated bioseptic tanks (usually made out of concrete) containing an initial bacterial strain. The tank is buried to a minimum depth of 1.5 m/5 ft (to avoid unpleasant odors), to which the sewage pipe from the ecolodge toilet is connected. From the septic tank, a sloping exit pipe (minimum 3(slope) connects with an absorption pit (with brick walls forming a trellis), so that the treated water slowly seeps underground.

Only normal biological waste should enter this system: tampons and other materials that do not break down naturally — or, more seriously, kill micro-organisms, can impede or ruin the system. Toilet paper also affects the performance of septic systems and it pays to experiment with different brands, or disposing of paper separately.

Also, the impact of tourism seasons, with their alternative periods of light and intensive use, affect biological systems.

GUIDELINES

1. Consider having large, isolated treatment and disposal areas since slow treatment means longer holding periods (shallow depth tanks).

2. Dispose treated wastewater (effluent) in an underground system that passes effluent through carefully selected undisturbed soil profiles, as these soils must further filter and remove nutrients as the effluent returns to the water cycle.

3. Ensure that stored recycled effluent receives some aeration to facilitate odor-free recycled water in toilets. One variation of this type of treatment uses part of its treated effluent for toilet flushing.

4. Prior to committing time and resources, it is advisable to contact users of similar systems — talk with a designer, system operator, an owner, and possibly a regulatory agency inspector who has observed performance of anaerobic waste treatment systems in similar conditions to yours.

3.4.3.5 Aerobic septic treatment

Aerobic waste treatment is also accomplished with microorganisms, but in this system air is introduced through various systems into the treatment process to ensure plenty of free oxygen (which these types of bacteria need to thrive). Aerobic organisms work about 20 times faster than anaerobic organisms. Since the process is so much faster, much less holding time is required and less treatment area is needed.

Several options treat waste aerobically. The Center for Clean Development (CCD), a non-profit organization based in Eugene, Oregon (US), promotes the use of waterless toilets and other zero discharge technologies to international development organizations and domestic health agencies. Several different versions of the CCD toilet have been developed for use mainly in developing countries. The primary concern is to prevent pollution of groundwater and sensitive coastal environments. The basic design consists of two watertight chambers built above ground or partially buried. What distinguishes the CCD toilet from other composting toilets is that it is designed to promote aerobic conditions in the digestion chambers without the need for manual turning.

Another variation is a very economical thermophilic aerobic composting latrine, which uses typically local materials of the tropics like wood, bamboo and thatch. If built correctly, it is free of odor, flies and pathogen transmission. This option may be "pioneered" by the local people who can learn from working with the ecolodge. Construction materials include wood, posts, thatching material used for the compost bin, and the plastic bucket and wooden seat for the indoor component of the toilet.

GUIDELINES FOR CCD TOILET

1. Build two watertight concrete chambers side by side, with inside dimensions of each chamber approximately 1.5 meters by 1.2 meters and about 1.2 meters high.

2. A concrete slab covering the chambers serves as the floor of two separate toilet rooms, each with its own toilet seat pedestal molded in place (although the toilet would function no differently with squatting plates instead).

3. Make an inclining access hatch on each chamber facing the sun. Provide separate ventilation pipes for each chamber of at least 20 cm in diameter. Paint these and the digestion chambers matte black, and position the units so that they are exposed to as much direct sunlight as possible to boost evaporation and biological processes.

4. Excreta falls on a mat woven from coconut palm fronds resting on top of a nylon fishing net suspended inside the digestion chamber, separating the solids from the liquids and allowing air to penetrate the compost pile from all sides. Although the woven mat decomposes during the digestion process, the composting material has adequate time to bond together to keep from falling through the net.

5. The large diameter vent pipe draws air up through the pile from an air intake opening located below the net along the rear wall of the chamber. The airflow also helps to evaporate liquids that accumulate on the floor of the digestion chamber. Evaporation is further enhanced by wicks made from strips of polyester or rayon rags (from old clothing), which are hung from the net to draw up the liquid from below to increase the surface area exposed to the air stream.

6. For start-up, a few buckets full of organic material — such as finely shredded coconut husks that have been soaked in water — are placed on top of the mat, along with a scoop of garden soil to inoculate the chamber with anaerobic microorganisms.

7. Bulking agents such as coconut husks, small wood chips, leaves or vegetable food scraps are added periodically during use both to provide a source of carbon and to increase the porosity of the pile so air can penetrate all the way through. For this reason, fine particles of organic matter such as ashes or sawdust are not adequate.

GUIDELINES FOR THERMOPHILIC AEROBIC COMPOSTING LATRINE MADE OF LOCAL MATERIALS

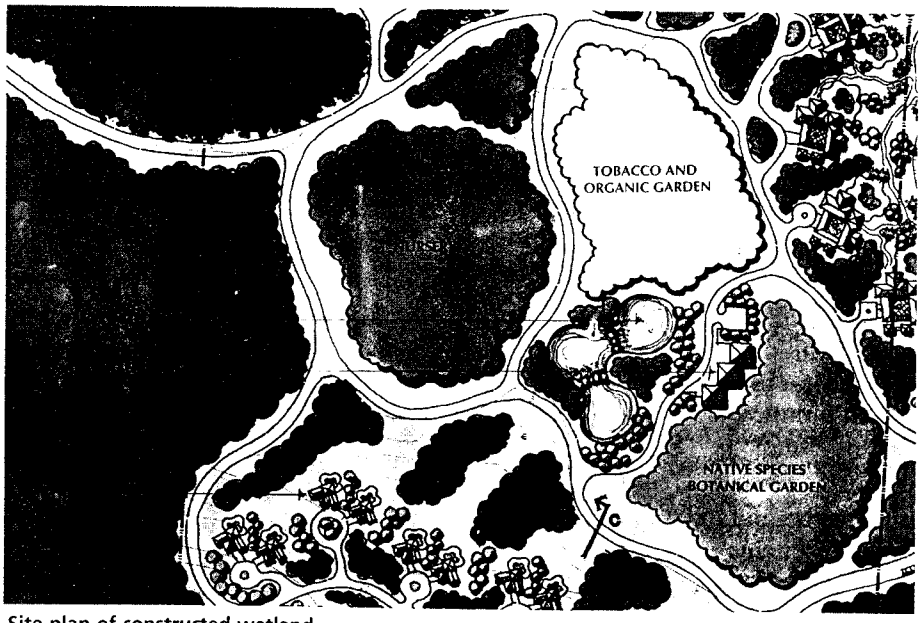
1. A very economical thermophilic aerobic composting latrine can be built that uses only typically local materials of the tropics like wood, bamboo and thatch. It is simple enough for villagers to build and maintain themselves.
2. Briefly, excrement is collected in a five-gallon plastic bucket (locally available in most rural communities of the developing world) and after each use, fresh excreta is covered with dry rice chaff, which eliminates odors and flies.
3. When the bucket is filled, usually in four to seven days, it is emptied into an above-ground, double-vaulted composting bin made of wood, with a thatched roof. Each vault measures 1.5 m x 1.5 m x 1.5 m, which, for an average family of six to eight should be useful for at least six months. The roof is necessary where there are seasonal extremes of sun and rain.
4. After emptying and rinsing the bucket into the compost bin, the fresh deposit is covered with dry leaves, grass or hay. Food scraps also may be added and covered. Only one vault is used at a time; when one vault fills, it is left to age and the other vault is used. When the second vault is full, the first is emptied of aged compost and is reused. Finished compost is applied as a soil conditioner.
5. The pile should not be turned or actively aerated. Aerobic conditions are maintained inside the pile by air trapped in the large, bulky cover materials.

3.4.3.6 Constructed wetlands

Natural wetlands (e.g. swamps, bogs, marshes, fens, sloughs, etc.) have been developed around the world to help provide water quality improvement, flood protection, shoreline erosion control, wastewater treatment, heat exchange and recreation opportunities — they also are pleasing to look at. Many freshwater, brackish and saltwater wetlands have inadvertently received polluted runoff and served as natural water treatment systems for centuries. The functional role of wetlands in improving water quality has been a compelling argument for preservation of natural wetlands and in recent years the construction of wetland systems for wastewater treatment.

Constructed wetland treatment systems have been designed and engineered to use natural processes involving wetland plants, soils and their associated microorganisms to treat wastewater. They are designed to take advantage of natural wetland processes, but do so within a more controlled environment. Some of these systems have been designed and operated with the sole purpose of treating wastewater, while others have been built with multiple-use objectives in mind, such as using treated wastewater effluent as a water source for building and restoring wetland habitat for wildlife and environmental enhancement.

Properly constructed wetland systems are able to provide an effective means of improving water quality without creating problems for wildlife. However, it must be underlined that in every case you will need the technical assistance of a hydrologist with ample experience in wetlands to carry out extremely complex biological and hydrological evaluations, before determining the volume of the operation. No toxic



Site plan of constructed wetland.

Source: E D S A

materials should go into the process. Also, necessary on-going monitoring needs to be programmed by the hydrologist.

Constructed wetland treatment systems generally fall into one of two general categories: subsurface flow systems and free-water surface systems. Subsurface flow systems are designed to create subsurface flow through a filter, keeping the water being treated below the surface, and helping to avoid the development of odors and other nuisance problems. Free-water surface systems, on the other hand, are designed to simulate natural wetlands, with water flowing over the soil surface at shallow depths. Both types of wetland treatment systems typically are constructed in basins or channels with a natural or constructed subsurface barrier to limit seepage.

Constructed wetland treatment systems have diverse applications and are found across the world. While they can be designed to accomplish a variety of treatment objectives, for the most part subsurface flow systems are designed and operated with a focus on water quality improvement only. On the other hand, free-water surface systems are frequently designed to maximize wetland habitat values and reuse opportunities, while providing water quality improvement.

The ecolodge architect should consider a constructed wetland system as a possible sewage treatment where wastewater can be cleaned and filtered through ponds planted with wetland species (e.g. sedges, bulrushes, etc.) that are able to remove pollutants. By using a Gravel Bed Hydroponic system and a subsequent series of ponds, one can successfully treat sewage water and at the same time create an aesthetically pleasing environment, surrounded mainly by indigenous plants.

Constructing wetlands involves turning nutrients into plant matter and can be profitable. Sidelines such as growing aquarium plants for sale, cultivating organic orchards, and using reeds and sedges from the wetlands in their traditional capacity as materials for building roofs or weaving floor mats and baskets are a few ideas.

The "living machine" is a wastewater purification system similar to the organic process found in nature's ponds and marshes. Living machines incorporate and accelerate natural processes used to purify water. With the help of sunlight and a managed environment, a diversity of organisms including bacteria, plants, snails and fish break down and digest organic pollutants. The treated water is then pumped to a holding tank for reuse in non-drinking situations. This purified water is clean enough for non-potable reuse applications such as irrigation and toilet flush water.

Depending on the climate, living machines can be housed in a protective greenhouse, under light shelter or in open air.

GUIDELINES

1. Investigate the feasibility of a constructed wetland system should sufficient funds and space on site permit. Keep in mind the various secondary purposes of a purpose-built wetland: for example, treated water can be used to breed freshwater fish or used for landscape irrigation; it also attracts wild birds and other wildlife, which in turn attracts ecotourists.
2. Consult an experienced wetlands expert from the final stages of deliberation should feasibility, impact and cost analysis be favorable to the idea.
3. Strict monitoring is required to ensure proper functioning of the wetland system.

3.5 ENERGY

Ecolodges may be powered in various ways. Ideally, you should maximize natural ventilation, heating and lighting. However, you may be able to consider alternative energy sources such as hydroelectricity, geothermal power, diesel-powered generators, natural gas, kerosene, trees grown for fuel and "organic diesel oil" (which comes from crops like oilseed rape), depending on your circumstances. Solar power is also used in a few instances, but so far is not exploited to its full potential in most lodges. The extra energy available through alternative generation is one of our most underused and invisible resources. Some are simple and cheap to put together, but all have particular constraints. Many of these problems have been widely discussed in scientific literature and will not be examined for the purposes of this chapter.

The various alternative and low-impact energies that will be discussed are:

- Solar
- Wind
- Natural Gas
- Geo-Thermal
- Generators
- Wood Combustion
- Hybrid Systems
- Low-Energy Lighting

3.5.1 Solar

3.5.1.1 Passive design

Passive and low-energy systems have a number of positive characteristics that have brought them to the attention of a world now acutely aware of energy scarcity and high energy prices, such as:

- Zero or minimal energy use. Passive systems rely basically on the natural mechanisms of conduction, convection, radiation and evaporation, and use little or no external energy.
- Simple and reliable operation. Passive systems are usually built as an integral part of the structure using familiar building materials such as bricks, wood, concrete and glass and so no special skills are needed to maintain or extend them.
- Low cost and multiple use. Perhaps the best examples are windows, which, when properly located, provide views, daylight, ventilation and passive solar gains at appropriate times.
- Good performance. Research has shown that well-designed passive systems perform well, both in terms of energy savings and thermal comfort.

Most passive and low-energy systems rely on designing the building to take advantage of a good climate and to provide protection from harsher conditions.

3.5.1.1.1 Hot climates

Over hundreds of years, traditional peoples have displayed excellent adaptation to the climate through the use of passive design. Varying microclimatic conditions have led to specific design responses. For example, in traditional courtyard houses of the Middle East, underground rooms and deep passages sometimes leading to a well, cistern or water canal draw cool, moist air into the rooms above. Scoops on the roof direct winds down to lower rooms. The air is cooler as it passes through the masonry shafts, and wet clay jars at the bottom moisten and cool it further. It is intelligent to study local traditional architecture to see what you can adapt to take advantage of sun and wind, and to reduce energy waste in lighting, heating and cooling.

The ecolodge's latitude is a factor in deciding the best orientation for buildings. Your position in relation to the equator is important because the sun shines from both the south and the north depending on the time of the year. From latitude 10 degrees north and south of the equator, changes in climate can become apparent. The following guidelines are for those areas that have a hot climate.

GUIDELINES

1. Traditional passive design should be used when drawing up an ecolodge, paying particular attention to the area's architecture where the lodge is planned.
2. Study the history of the area's climate and the suitability of materials you propose to use, taking into account the worst conditions you can expect. Ensure that your design takes advantage of the sun and elements — and protects against them. Ventilation, shade and insulation are key, as is cyclone protection in vulnerable tropical zones.
3. Many different passive design techniques are found in traditional architecture in relation to the sun. For example, long roof-overhangs protect and shade the walls, compact settlements increase shade, and natural floor finishes do not reflect the sun. Many indigenous peoples used thick insulating walls and roofs made of mud and grass to cool the hut during the day and heat it at night. Elongated floor plans are commonly used to minimize internal heat gain and maximize exposure for natural cross-ventilation.
4. Unlike temperate regions, the equatorial zone receives sunlight shines from the south for six months (late September to late March) and from the north for six months (late March to late September). In the Southern Hemisphere, a north-facing building can take advantage of natural light while using solar radiation to heat interior spaces during the colder months; of course, this is helped by thoughtfully positioned windows. To naturally cool the southern and western sides of the north-facing lodge during hotter months, the architect should design shading devices along useful traditional lines, incorporating balconies and covered porches. In the Northern Hemisphere the situation is exactly reversed. The wise use of plants and landscaping can provide additional shade and screening that protect the building from intense radiation of the equatorial sun.
5. In climates with high diurnal (day/night) temperature changes, use techniques such as the so-called Trombe wall, which consists of storing solar energy in a sun-facing wall made of heavy masonry such as brick, stone, block or earth, with a dark-colored surface facing the sun. As the sun's rays shine on the wall, generated heat is stored and circulated passively (especially during the evening and at night) through wall vents into the living areas. The wall can have window openings, with double or triple glazing fixed close in front and forming a cavity between the two surfaces, creating a greenhouse effect.
6. Use the courtyard concept as an efficient natural climate moderation in hot, arid climates. The inside rooms open onto galleries that give shade and access to rooms. Thick outside walls have few small windows and the roof can have a series of wind scoops to help air circulation.

7. Covering the roof partially or entirely with grass integrates the building with the surrounding ground and takes advantage of temperature-moderating effects of the earth.

8. Another solar wall technique is water-container walls, which use water drums or columns (painted black for better heat absorption) as heat stores instead of masonry. Vents should be incorporated toward interior space. Water is more efficient than masonry as a thermal store but is extremely heavy and needs regular maintenance to prevent or repair leaks and algae growth.

9. Remember that the sun can be a significant liability in hot climates, but is rarely a liability in cold climates.

10. Consider using radiant barriers in attics or ceilings and in exposed walls. These foil barriers reflect up to 96% of radiant energy and are one of the most cost-effective measures for preventing heat transfer into the building.

11. Remember that temperature is a liability in climates where it is consistently too hot or too cold. Areas that are very dry or at high elevation typically have the asset of large temperature swings from daytime heating to nighttime cooling, which can be flattened through heavy/massive construction to yield relatively constant indoor temperatures. In areas with cold winters, try to capture as much solar light (and its heat) as possible during this season, using large windows facing the sun's path.

12. When sun shading is difficult, use the next best alternative, which is to reflect as much light as possible by painting the roof and outside walls white; be sensitive to glare and impact on natural and cultural settings.

13. Use landscape elements to optimize natural ventilation and, consequently, to avoid unnecessary energy consumption. Evergreen trees (trees that do not shed their leaves or needles) and raised earth mounds (also called berms) can protect against undesirable prevailing winds.

14. Use the overhead canopy of deciduous trees to provide excellent filtration for the sun's warming rays in summer months. By preserving and supplementing the deciduous tree canopy, you can keep heat loss down in winter and keep heat intake at a minimum during hot summer months.

15. Limit the use of air conditioning to areas where rigid control of humidity and temperature are strictly necessary, such as in rooms where you might have computers or certain fragile research technical equipment. Design approach should generally use as much as possible cross-ventilation techniques for enhancing comfort. Ceiling fans are good alternatives to air conditioning in most areas, and can be used in conjunction with air conditioning to enhance air circulation and reduce the air conditioning load.

16. If absolutely necessary, thin your tree canopy rather than remove trees to allow sun and breezes to pass through while still maintaining its natural character.

17. When solar gain causes conditions too hot for comfort:
    a) Use overhangs to shade walls and openings.
    b) Use site features (and vegetation, if available) to provide shading to exposed side walls.
    c) Use shading devices such as louvers, covered porches and trellises with natural vines to block sun while allowing breezes and natural light.
    d) Orient broad building surfaces away from the hot late-day sun (only northern and southern exposures are easily shaded).
    e) Use light-colored wall and roofing materials to reflect solar radiation, but be sensitive to glare and impact on natural/cultural settings.
    f) Use shutters and screens in tropical and subtropical climates, avoiding glass and exposures to direct solar gain.

18. When climate is predominantly too hot for human comfort:
    a) Minimize solid enclosure and thermal mass.
    b) Maximize roof ventilation.
    c) Use elongated or segmented floor plans to minimize internal heat gain and maximize exposure for natural cross-ventilation.
    d) Separate rooms and functions with covered breezeways to maximize wall shading and induce ventilation.
    e) Isolate potential heat-generating spaces such as kitchens and laundries from living areas.
    f) Provide shaded outdoor living areas such as porches and decks.
    g) Capitalize on cool nighttime temperatures, breezes or ground temperatures (in some places it is common to build underground).

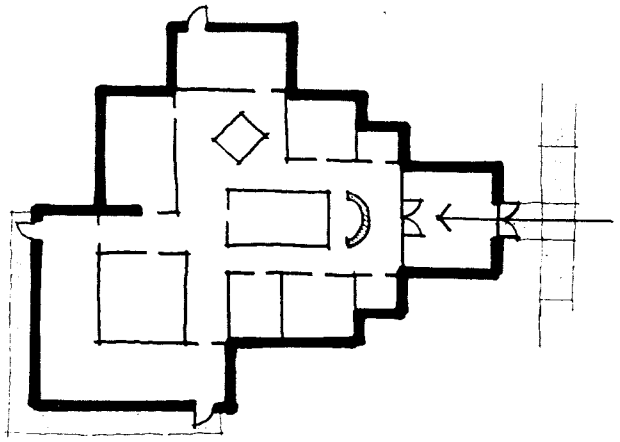
3.5.1.1.2 Cold climates — winter-time heating

The goal of all passive design heating systems is to capture the heat within buildings and release that heat during periods when the sun is not shining. Passive solar heating refers to the use of the sun's energy to

heating living spaces, without mechanical devices. For passive solar heating in winter, the ecolodge needs all the sun it can get. In this approach, the ecolodge buildings or some elements take advantage of the natural energy characteristics of materials and air created by exposure to the sun.

GUIDELINES

1. Orient the ecolodge to the south or slightly east of south. The buildings should be elongated on an east-west axis and the south face should receive sunlight between the hours of 9 a.m. and 3 p.m. (sun time) during the heating season. To take advantage of the heating provided from this orientation, the buildings should have south-facing windows and little or no north-facing windows. However, remember to follow the "thermal mass" common rule of thumb, which states that the south-facing windows should not exceed 7% of the total floor area unless the building has some means of heat storage.
2. Cavity-fill walls if appropriate, or apply internal and external insulation to solid walls.
3. Increase airtightness through caulking and weather-stripping. This keeps cold air out and prevents warm air from escaping.
4. Add additional insulation to roofs and walls during construction.
5. Put reflective foil on outside wall radiators.
6. Insulate hot- and cold-water tanks and lag pipes.
7. Add internal lobbies or enclosed porches to outside doors. Entrances bring in not only visitors and employees, but also cold air. One way to decrease cooling in winter is to protect entrances from cold air and winds.
8. Increase solar gain. Add solar windows, solar walls and sun-spaces. Fit solar panels to heat or preheat water.



9. Install double- or triple-glazed windows and use insulated night-window shutters.
10. Add shelter from hot summer sun and catch cool breezes by using shade trees and plantings, earthcover, roof and moon shades, verandas, thermal chimneys and wind scoops.
11. Increase shelter from cold prevailing winter winds by using plantings, earthcover and mounds.

3.5.1.1.3 Cold climates — summer-time cooling

Passive design techniques can help towards cooling ecolodge buildings during summer.

GUIDELINES

1. Plant large shade trees on the east and west sides of your ecolodge. This will supply needed cooling shade.
2. Design wing walls. These are vertical exterior walls placed perpendicular to adjoining windows to enhance ventilation through windows. These can be seasonally used, being covered with vegetation in the summer.
3. Install operable windows at opposite ends of the buildings to ensure air flow.
4. Design thermal chimneys to reinforce the effect of rising hot air to induce air movement for cooling purposes. These could be operable skylights or vents placed at the top of an open-peaked roof.

3.5.1.2 Active design

Active design implies the use of certain technological devices to enhance the use of solar energy in buildings. In the case of ecolodge design, it is wise to use only low-energy active designs (which require a minimum of sophisticated technology and external energy sources), such as flat-plate water heaters and photovoltaic systems.

The strong sun in many parts of the world allows for the use of low-energy active solar systems as an ecologically sustainable source of energy. Despite the comparatively higher start-up costs of such technology, the popularity of solar energy is increasing, and solar water heating systems are commonplace in countries such as Greece.

3.5.1.2.1 Solar water heaters and other applications

Solar water heaters are highly recommended, particularly in places with consistent sunlight. Solar technology is economical, easy to install, and virtually free

to run (solar pool heating can recoup its initial costs within two years). Solar systems are often boosted by gas or electric water heating, which is a sensible and economical compromise in areas with low sunlight hours.

In many countries (not only the industrialized ones), different high-efficiency models are being manufactured, and they may also be built in situ. They basically consist of flat-plate solar collectors (with a metallic frame, normally of aluminum) that contain a coil or loop (preferably made out of copper piping) painted black to absorb more solar energy, using a cover of tempered glass (to achieve a greenhouse effect). Solar cooking saves energy, does not heat up your kitchen and tastes better. There are many commercial versions to choose from and plans available for making your own. The successful use of "green" alternative solutions to everyday requirements will earn interested respect in the local community.

GUIDELINES

1. Mount solar collectors below your cold water storage. As cold water is fed into the collectors by gravity it is heated and returned to the upper tank and as hot water is less dense than cold, a circulation (the thermosyphon effect) develops that gradually heats all the water in the tank. By a pipe this solar heated water is stored in a thermotank (a tank covered by a thermal insulation material), from where it is distributed to the ecolodge's different water taps. Using a small water pump may increase efficiency.
2. Site and position your solar panels carefully to take advantage of the greatest amount of sunlight possible, throughout the day and across the seasons. In tropical regions, under normal conditions (about one and a half hours of good morning sunlight), solar panels will achieve a water temperature well above 40° C.
3. Consider using solar water heating and solar-assisted circulation for swimming pools.
4. Use solar energy for natural drying of a variety of foodstuffs and clothes.

3.5.1.2.2 Solar energy photovoltaic systems

A good option in isolated areas is the use of photovoltaic cells (based on the use of silicon) for converting solar energy into electric energy (12 volts DC). Some systems offer both options of 12 volts DC and any voltage and frequency (Hz); using the second alternative, the battery obviously drains down faster, however the DC-AC conversion device is called an inverter and usually operates in the 85-95% efficiency range. Photovoltaic (PV) cell technologies offer a number of choices: monocrystalline, polycrystalline, semicrystalline, various thin-film chemistries and amorphous silicon. All these technologies are now available commercially (fundamentally Japanese, German and U.S. producers) and all have different comparative advantages. In every case, electric storage is by lead-acid or no-maintenance gel cell batteries, similar to those used in golf carts.

PV systems are safer and more environmentally-friendly than kerosene lanterns and dry cell or automotive batteries that are widely used in developing countries for lighting and powering small appliances. PV systems reduce reliance on expensive imported fuels.

Although there are many variables, a typical ecolodge room could be powered by batteries of 300 amp hours at 12 volts, including a four-day reserve. Prices and operation costs vary somewhat but have generally been decreasing in recent years, rendering this a highly competitive alternative, especially in remote locations. Solar water pumping is particularly effective where water needs rise with hotter conditions.

GUIDELINES

1. Avoid locating photovoltaic systems on the shadow areas of buildings. Study the shadow pattern before placing solar panels.
2. Study the costs, benefits and drawbacks of different options for any PV technology you will use in your ecolodge. Remember that typical monocrystalline silicon cells have an efficiency of about 10-20%, but are more expensive than polycrystalline cells (which have a 4-5% efficiency). Amorphous cells are even cheaper but also less effective. Crystalline cell modules with 36 cells should be used instead of 32-cell "self-regulating" modules. In general, high-quality systems will out-perform cheaper ones, underlining a project's sustainability. Energy conservation is of paramount importance and paybacks are virtually instantaneous from savings in energy production and storage equipment.
3. To attain a higher efficiency in your PV system, use efficient fluorescent lights (CFL or tube lights) instead of incandescent lights (efficiency of the former is over 35 lumens per watt, while the latter is only 12 lumens per watt). Reflectors over your lights will help spread otherwise wasted light.
4. While "deep-cycle" (marine-type) traction batteries are preferable for use in PV systems, they are initially expensive and difficult to replace locally. For these reasons, automotive batteries are presently more commonly used. Nevertheless,

well-maintained traction batteries are the only serious option for a PV system of any substance; they can be bought with clear cases, which help staff monitor acid levels, and will outlast vehicle batteries (which are built with much thinner plates for starting engines) many times over. Finally, they can be dismantled and re-conditioned, so you won't be responsible for a growing stack of hard-to-dispose-of dead batteries.

3.5.2 Wind

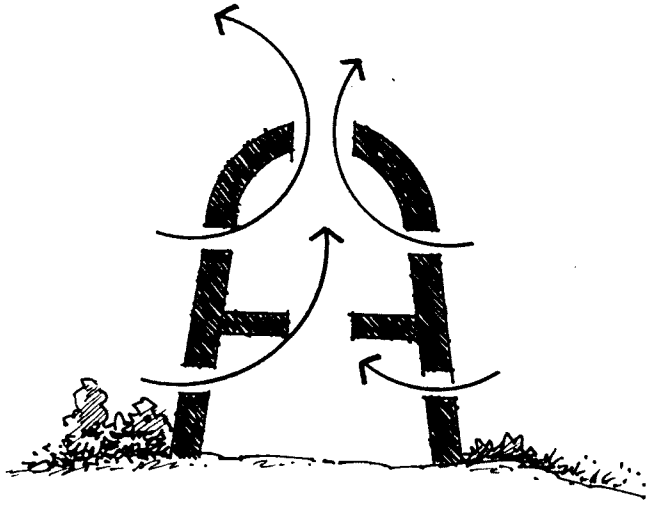
3.5.2.1 Passive design

The architect should take the prevailing wind direction into account when siting and orienting buildings, structures and outdoor areas such as courtyards, in order to create natural ventilation and cooling. Traditional architecture includes many examples, particularly in coastal regions, where cool breezes are channeled for ventilation through the use of internal courts and wind-catches. The following guidelines are for those areas that have a hot wet (tropics) or hot dry (desert) climate.

3.5.2.1.1 Hot climates

GUIDELINES

1. Consider seasonal climatic variations (solar angle, temperature, rains, trade winds, etc.) in the architectural design.
2. Your design should also consider natural wind conditions to create spaces that require a minimum of artificial ventilation.
3. In general, foster in your design cross-ventilation, which implies placing openings in opposite and parallel walls to allow a natural airflow from outside to cool and refresh inside. In this way you may be able to do without conventional air conditioning systems, which consume large amounts of electricity and, if freon-type refrigerants are used, also cause damage to the ozone layer. Of course, increasing air movement helps evaporation from the skin and makes occupants feel fresher and more active. Fortunately, many hot areas have prevailing winds that can cool the ecolodge by natural ventilation.



4. In a dry climate, air blowing into the ecolodge can be moistened by allowing it to pass over water in a pool, in earthenware containers and wide shallow bowls, or through damp cloth or vegetation. In cross-ventilation, from one side of a building to the other, cool air enters, preferably at low level, and expels warm air through windows or vents at high level. To enhance cross-ventilation, design floor plans with an elongated, rather than compact, layout. Building over water, misting towers and misters is also very effective in dry climates.
5. Natural air conditioning can be made from used oil drums simply by erecting a short intake ventilation stack (one drum high), some distance from the building. Air comes into the building via a tunnel (made of drums) deeper than 1 meter below the soil, which cools the air from the intake and draws it into the room.
6. In tropical and subtropical areas, minimize the use of glass windows, leaving openings (covered only by mosquito netting) that will enhance natural ventilation.
7. As already mentioned above, in general try to avoid the use of air conditioning and foster the use of cross-ventilation instead. If heat is excessive and becomes unbearable (even with cross-ventilation), try using ceiling fans, which have proven their effectiveness for almost a century in hot places. Evaporative coolers can work well in humidity lower than 30-40%. Table and floor fans are usually more effective than ceiling fans, and can be moved to where they are needed and are more efficient. In any case consider timers on fans so that they will not be left running in vacant rooms.
8. Use wind scoops (commonly used in some parts of the Middle East, northern Africa and coastal parts of eastern Africa, such as the malqaf or bacar, which catch cool breezes at roof level and channel them down a shaft to lower-level living areas). High pressure on the windward side and low pressure on the leeward side of the building ensure that cool air is sucked downward.

9. Develop different types of passive thermal chimneys (which use the "thermal-stack" effect to induce ventilation), working on the principle of convection (see point 5 above).
10. Install window lattices and screens, such as the Egyptian ornamental wooden-peg mashrabiya, to allow air to filter freely into rooms while additionally reducing the strong glare of direct sunlight. Also, create openings above doors, generous protected areas, terraces, pergolas, etc. Take advantage of exterior vegetation to channel breezes inside the building.
11. Use wind generators to pump water from wells.
12. Take a note of wind patterns when creating an energy-conscious landscape. Masses of evergreen trees, pines and/or hardwoods (where appropriate) can divert cool breezes that would have normally swept through your lot to confront your ecolodge. Landscape materials can also be used to direct breezes into spaces to enhance natural ventilation.

3.5.2.1.2 Cold climates

GUIDELINES

1. Draft-proof windows and doors and seal air leaks in unused fireplaces, floorboards, skirtings, ducts, electric switches and power outlets in outside walls.
2. Use pelmets at the top of window frames and fit heavy, lined curtains or insulating blinds and shutters to all windows. Double or triple glaze windows.
3. Insulate walls, floors and roof spaces.

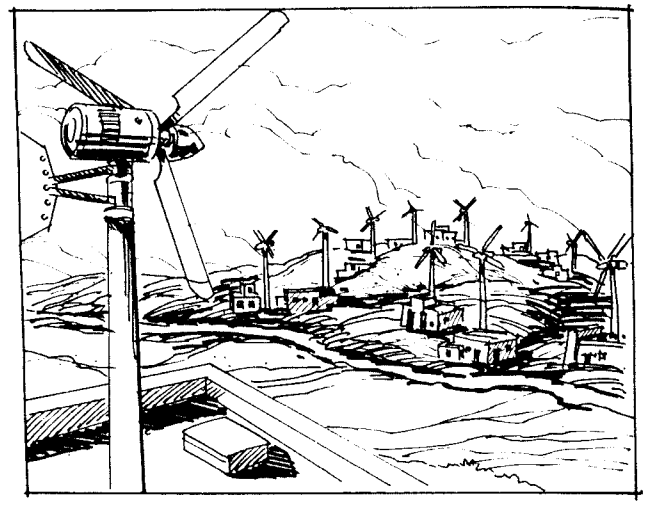
3.5.2.2 Active design

Another alternative for generating electricity in an ecolodge is the use of wind power. Wind generators may be used at sites exposed to high wind velocities. Wind power is almost twice as efficient as photovoltaic energy, and several brands of generators are readily available, but wind energy is still far less popular than solar at present. Nevertheless, rapid technological changes are taking place in wind power — indeed, the year 2001 was the fourth year in a row that wind power was the cheapest form of energy on the planet at utility scale and it will be wise to keep abreast of future developments.

People are so fascinated by the prospect of wind-power generation that they occasionally make the investment before they know for certain that their site will actually be cost-effective for wind power. An average minimum wind speed of 10 to 12 mph is a must; check with local airports, weather stations, and some government agencies to ensure you have a good site for wind generation.

GUIDELINES

1. Windmills should be used by ecolodges that are located along the coast, in deserts, mountain-tops and along lakes, where there is likely to be enough wind.



3.5.3 Natural Gas

By extracting the gas naturally produced by solid waste, biogas offers many sound benefits such as waste and wastewater processing, methane production for heating, cooking and refrigeration, and making compost for soil enhancement. A major portion of your energy needs for the ecolodge may be met through biogas, providing you have enough waste.

Simple biogas-producing devices generate energy from the gasses produced by decomposing organic matter, including crop residues or domestic wastes in an oxygen-deprived environment, such as garbage dumps. The resulting biogas — a mixture of methane, carbon dioxide, and trace amounts of other gases — can be used directly for fuelling gas refrigerators, stoves, absorption-chillers, and water heaters.

GUIDELINES

1. Use biogas to directly fuel gas refrigerators, stoves, absorption-chillers, and water heaters, which only need simple re-jetting (which amounts to changing a nut with a hole in it — a jet — for one with a larger hole). In many countries, equipment manufacturers will typically supply the right jets for biogas if you ask them.
2. Use gas-fired engine generators if you are sure you have enough gas reserves to support it.

Proven heavy-duty propane generators will be more reliable and quieter than the diesel-converted models of some US manufacturers. Be careful when buying used equipment, ensuring that the equipment is reputable and reliable, make sure that it is fully and warranted, that parts are readily available, and service is quickly available.

3. Extract biogas from landfills as this converts potentially explosive methane into energy, thus reducing the risk of it infiltrating the air and buildings near those sites.

4. Some conventional food crops that are high in starches and sugars can also be fermented to produce ethanol — a relatively, clear-burning, high-energy fuel. It may be feasible to negotiate with neighboring farmers to produce fuel crops such as oilseed rape.

5. Biogas might also be used in the production of ice at off-peak periods to sustain the marketability of local produce or the fishing industry.

3.5.4 Geothermal

Geothermal energy is heat from rocks and water deep in the earth that are continually heated by the decay of radioactive elements and the intrusion of molten rock known as magma. The stored heat can be extracted and used to warm buildings or generate electricity. Hot springs are the most popular of the many geothermal energy options. Yet, while the potential is enormous, only a very small fraction of geothermal energy can be recovered at costs that make it competitive in the energy market.

Hot springs around the world have provided heat for bathing and cooking for thousands of years. Two thousand years ago, the Romans and Japanese bathed in geothermally heated pools. In Iceland, people cooked with geothermal heat as early as the ninth century.

Unfortunately, some of the best potential sites for geothermal energy are areas of great natural beauty, such as America's Yellowstone National Park, or other environmentally sensitive areas. Several environmental groups have opposed plans to develop a major geothermal resource on the island of Hawaii near the Kilauea volcano, because they believe that the power stations would damage the rainforest found there. Biologists are finding many unique forms of life in geothermal areas and care should be taken to avoid biological impacts.

GUIDELINES

1. Contract expert geological and biological surveys to assess the impacts and capacity of your resource and to guide any exploitation of potential geothermal energy.

2. Wherever and whenever possible, use geothermal energy (geysers, thermal springs, underground steaming) to generate hot water for bathrooms and kitchens, for cooking, and to provide indoor space heating.

3. Use a geothermal heat pump to 'pump' heat from a low-temperature source (such as the ground) to a reservoir at a higher temperature (indoor air). For summer, simply reverse the flow to pump heat from indoors and re-injecting it back into the ground.

4. Geothermal fluids should be injected back into the reservoir or disposed of in lined evaporation ponds, avoiding the pollution of lakes, rivers and groundwater. Geothermal water can contain high levels of dissolved salts and significant amounts of toxic substances. Re-injection has the added advantage of maintaining the pressure within the geothermal reservoir, extending the life of the field.

3.5.5 Generators

With the advances in technology, some very energy-efficient and pollution-free generators are being developed, however, they have their drawbacks, of course. The most common objections to various natural-energy generators are their visual and environmental impacts. Remember, there is no such thing as "free" energy and use this technology only when it is absolutely necessary and appropriate: no-one will thank you for sacrificing habitat or wilderness for a row of ecolodge dishwashing machines. The two types of generators that will be discussed are hydro and diesel generators.

3.5.5.1 Tidal or current generators

Small-scale hydroplants are generally comprised of Pelton wheel generators (commercially available in many countries) that operate from high-head, running streams of water. They are reliable and cost-effective, and can be serviced by competent mechanics with hydraulic and electrical skills. Low-head generators are also available but generally at a higher cost. Storage batteries can be used to buffer peak electrical demands. It is important to note that the stream or river flow must be at least 13 km/h (8 mph) for the power generation to be effective.

There are also wave-action generators, which are comprised of hydraulic or pneumatic pumps that pressurize an accumulator to drive motor/generators. These systems can stand-alone or be disguised by incorporating them into docks and other shore emplacements. They work well wherever there is small wave action, such as in harbors and marinas, or in seashore facilities. Storage is designed into the system to meet electrical demands. They work best where demand is intermittent, such as for cycling pumps. There are also propeller type generators that can be placed in a flowing stream or tidal currents.

Micro-hydro generators are a viable renewable energy source. The micro turbines with a 5" runner can have their intake on the edge of the stream w/o dams and discharge superior oxygenated water back into the stream some way downstream. This power source is the cheapest form of energy available in most cases and can be as low as $0.05 kWh. An efficient system can produce up to 72 kWh/day per unit.

GUIDELINES

1. Consider this valuable resource when looking for property, it can be very cheap and reliable energy.
2. Hydroelectric also holds the highest potential for negative environmental impacts, very careful design, planning and installation must combine to prevent irreversible impacts.
3. Always return hydro tail water back to the source stream, and in such a way as to avoid erosion and stream silting.

3.5.5.2 Insulated diesel generators

The insulated diesel generators are fully enclosed and insulated for whisper quiet operation This is very crucial considering that most ecolodges are situated in pristine areas and noise pollution can affect animal behavior. These generators have a two-stage direct fuel injection which contributes to quiet operation by reducing engine knock. And it also reduces vibration and improves operating efficiency.

It should be noted that the three main objections to traditional diesel generators is the noise pollution, the use of fossil fuels and the disposal of the waste diesel.

GUIDELINES

1. Consider purchasing those generators that are insulated and produce less than 70 dB from a distance of 7m. Make certain your generator will power the loads you want — proper sizing is very important.
2. Hire an electrician to wire your diesel generator. There will not be a problem with grid (utility) interaction if you do. If a generator is turned on while connected to the utility, electricity can "backfeed" into utility lines, and create energized power lines. If the power is out in a given area, an energized (from the generator source) line can create major problems (like death) for utility line people servicing those lines. Also, repair persons generally ground a power line they're working on, and that may create a damaging situation for the running generator. If the utility lines "come back on", and the generator is not isolated from utility power, damage to the generator and your appliances is very likely to result.
3. Always make sure that your ecolodge circuits are disconnected from the utility prior to starting your generator. Before re-connecting to the utility, make certain your generator is off and all protective breakers are in place.
4. Hire a qualified service person to repair your generator, which will require regular servicing.
5. Locate your generator in a well-ventilated place, like outdoors or in a separate, ventilated shed.
6. Store fuels safely and in proper containers and locations. Re-use the waste diesel and do not dispose in neighboring lands.

3.5.6 Wood Combustion

In some areas, wood may be the principle source of fuel. Whatever the reasons for using wood, ecolodges need to use their fuel resources to the best possible advantage.

Although efforts are being made to halt deforestation and charcoal production, and to improve the efficiency of stoves, much remains to be done before the process of fuelling with wood and charcoal becomes sustainable. Within lodges, especially in Africa, staff workers often use wood for their cooking. It is also used for fireplaces within the lodge, and in many instances, is used to heat water for guest showers. Wood heat is an energy source commonly used in Northern Canada. Sophisticated, high efficiency wood stoves are being used for space heating.

Ecolodge operators should not only assist in reversing the contribution to deforestation caused by burning wood, but also subsidize its own energy needs by commissioning elsewhere, or growing on-site, an equivalent volume of wood to that burnt by the lodge. However you power the settlement, the use of low energy fittings remains a responsibility attached to promoting your operation as an ecolodge.

GUIDELINES

1. Plant fast-growing trees in plantations, farms, along roads, and on unused land in the vicinity of the protected area, for the ecolodge's own source of wood. It is important to choose the right species of tree; fast, straight, dense-growing; and able to burn economically.
2. Contact local businesses able to donate or sell waste wood such as old pallets, timber off-cuts or sawdust and waste paper able to be compressed into efficient "logs" for burning with a simple (commercially available) press.
3. Help conservation authorities in managing forests neighboring the protected areas, and use windbreaks and boundary "buffer zone" plantings, as potentially valuable sites for intensive wood cultivation. Boundaries with cereal crops or firebreaks often prove the best solution in terms of planting quick-growing "sacrificial" (i.e. can be back-burnt or bulldozed to halt the spread of fire) tree species with good access to sunlight.
4. In Northern climates, consider using pellet stoves, which use waste wood in an automatically regulated manner.

3.5.7 Hybrid Systems

The energy systems discussed above can be combined into hybrid systems, in which one technology supplements the other. For example, wind power can provide energy during times when stormy or rainy weather makes solar power ineffective.

Co-generation should also be considered. A typical example of co-generation is where electricity is produced on-site and excess steam or cooling water is used to provide hot water and central heating on the domestic side, and, via a heat exchanger, it can also be used for chilling and cooling through air-conditioning. The result is a closed recirculating system that is energy efficient.

3.5.8 Low-Energy Lighting

The illumination of buildings is responsible for a high proportion of electricity consumption in many countries around the world (around 20% in the US). Lighting is also one of the easiest areas to make the biggest impact on cutting energy consumption. Currently, new low-energy lighting options can cost-effectively save more than half of the energy used in buildings around the world. The standard incandescent bulb is the cheapest lamp to buy, but the most expensive to operate. An incandescent bulb uses 10% of electrical energy to create light, and 90% to generate heat. Ecolodges should be a showcase for saving on electricity consumption and you should rule out the use of high-energy consumption lighting equipment and hazardous materials early in the design stage.

The latest entry in the high-efficiency lighting arena is LED technology, which will dominate the lighting industry in the next few years. They shine in low-level lighting applications like path lighting. They produce virtually no heat, are the same color as moonlight and will not disturb wildlife, will maintain your night vision, have very low maintenance with a 100,000 hour life (20 years at 12 hrs/night) and at .07 watts each their efficiency is remarkable. 1 km of path lighting will use 200 LED lights and use only 14 watts of power! This low power consumption makes LED's ideal for powering with solar energy and a small, inexpensive PV system will provide path and security lighting regardless of the primary site power availability.

One of the most valuable assets a lodge has to offer its guests is the incredible night sky that is only available at a lodge that is removed from the light pollution of dense development. It is amazing how common it is to find the night sky bleached out by inappropriate outdoor lighting design of resorts.

GUIDELINES

1. Take the first step towards environmentally conscious lighting and carefully consider opportunities for natural lighting. Sunlight should be incorporated wherever possible to increase the quality of the indoor environment, provide a more natural ambience, and reduce lighting loads.
2. Specify, wherever possible compact fluorescent lamps (CFL's), solid-state electronic ballast, imaging specular reflectors, "smart" light bulbs with built-in controls, and LED's. CFL's have an efficiency of over 35 lumens per watt, vs. 12 lumens per watt for incandescent lights
3. Understand that interior paint colors and finish textures affect the quality of interior light; white finishes will reflect the maximum amount of light, while soft-textured surfaces will help to reduce glare.
4. Appropriate application is the most important aspect of energy efficient lighting systems. Typically, good lighting design will include ambient lighting for general background definition, task lighting for individual work, and accent lighting to feature certain areas or objects.
5. Strive to minimize outdoor architectural and landscape lighting, and never aim lights up at the sky. Use cut-off shields where necessary to protect nocturnal wildlife. Consider planning for a telescope, which can be the most popular feature at a resort with a great night sky.

3.6 SUSTAINABLE TECHNOLOGY AND MATERIALS SELECTION

The sustainability of an ecolodge can be determined, in part, by the choice of building technologies and materials used, and the level of care taken during the construction process. Unfortunately, many traditional lodge architects and builders have not regarded ecological factors as their concern.

A successful scenario for an ecolodge may involve a combination of traditional and modern building technologies and materials that have the least ecological impact, and are most efficient in use and maintenance-friendly over the long-term. Carefully planned and executed construction can be considered the cornerstone of successfully sustainable development.

We have already mentioned that ecolodges are often situated in remote, perhaps pristine areas, often with difficult access, particularly for heavy plant and equipment — and also, skilled construction workers are likely to be thin on the ground — and with labor, you get what you pay for. None of these considerations is unusual, however, it is vital that you take the most appropriate decisions related to construction materials and procedures based on what you know you can achieve within your limitations.

GENERAL GUIDELINES

1. Consider factors of climate (e.g. humidity, high temperatures and excessive sun radiation, among others) in order to schedule work stages and to choose the most suitable building materials.
2. If access by road or water implies covering long distances, consider the fact that transporting materials from far away implies high freight costs and fuel consumption, raising the environmental price of the development; so, look for light materials that are easily supplemented and repaired on site.
3. Keep it simple. Be aware of the teething and supply problems faced by pioneers of new systems and technologies: don't become a guinea-pig — remember that asbestos was a wonder material in its time. Remember, too, that building "systems" go out of fashion and maintenance easily degenerates into expensive running repairs in the absence of ready spare parts or expertise.
4. Whenever possible, use local building materials or process building components from local raw materials, but do not deplete rare natural resources.

3.6.1 Construction Activities

After selecting sustainable building technologies and materials, the architect should strive to ensure that the construction phase of the ecolodge development has minimal impact on the natural environment.

GUIDELINES

1. Identify the most suitable building method for the site and type of project to develop, considering environmental, economic, cultural and time factors.
2. To be sustainable, your ecolodge should preserve natural resources on the site and minimize disturbance of the area's flora and fauna during construction. This can be achieved in part through utilizing traditional building materials and construction methods that can be found locally, reducing transport and pollution, and are less likely to need heavy, noisy plants and equipment.

3. Sustainable construction aims to avoid: non-renewable resources and energy; air, soil, water and noise pollution; erosion of the site and roads; or destruction of vegetation by project vehicles and irresponsible storage of materials. Extra care should be taken on sites located within or bordering protected areas, or those adjacent to sensitive areas such as wildlife water holes.

4. Whenever possible, use renewable energy sources such as solar power when using modern tools. If the lodge is to be powered with renewable energy, install the energy system first and build with it and get the most out of your investment while protecting the environment during the construction phases. Building materials should also be pre-cut and prefabricated off-site, storage spaces should be carefully selected prior to construction, and any areas affected by construction should be restored and re-vegetated.

5. Write clear conservation clauses with corresponding penalty costs into contractor agreements. Establish specific do's and don'ts to avoid problems and loss of habitat and species. It is also recommended that ecolodge contract documents include formal guidance and a checklist for achieving sustainable construction. Also, a sustainable-construction booklet should be provided for contractors, and an appointed environmental officer should monitor construction activities. Keep in mind that this booklet must be able to potentially settle disagreements on breaches of your conservation standards: Keep it clear and unambiguous. Consider adding a "boiler plate" template of eco-specifications to this book. Incentives above contractual obligations could be given for tree and vegetation retention, etc., to provide additional insurance against environmental degradation.

6. To avoid risk of erosion and release of construction wastewater and mud that possibly contain fine sediments, apply a lining system of the construction site using appropriate filter materials.

7. Develop a detailed construction plan schedule (using the Critical Path Method (CPM) or similar technique) where you clearly specify each of the steps to be taken and when, the responsible parties in executing each job, the flow chart of activities, and the cash flow. Don't rely on improvisation and don't assume that contractors and subcontracting tradesmen will naturally be free on the dates you guess you need them — part of contracting is agreeing to the proposed work schedule.

8. Once the location of the lodge has been established, limits of construction should be determined. These areas should be fenced off and signed noting that no construction material storage, vehicles or other activity be allowed to disturb these areas.

9. Check that your building materials, tools, plant, equipment and crew are readily available before you start to build. Ensure secure storage and parking for the duration of construction phases. Remember that the greater the distance between construction activities and storage facilities, the slower the job done and the greater the costs of transport and, particularly, security.

10. Emphasize the importance of creating the least negative impact during construction. Your building site should be clean with minimal disturbance to the surrounding environment and it should discourage scavenging wildlife.

11. Try to strike the right balance between use of traditional and modern building methods, including modular-designed prefabricated components that are designed to be easy to assemble or place on site (be careful to establish the exact environmental impacts and costs of bringing larger, heavier, completed prefabricated units onsite). Take each case on its merits, as there are no fixed recipes to guide you.

12. Hand-excavate foundations whenever possible (avoiding heavy machinery to minimize environmental impact).

13. Avoid any runoff during construction as this can cause damage to adjacent properties. If it is likely that erosion or surface runoff may be a problem, then erosion control devices, such as temporary silt fences, will be required throughout construction.

3.6.2 Construction Techniques

3.6.2.1 Traditional construction technology

It took many centuries, indeed millennia, for humankind's shelter and settlement to evolve to intricately woven communities that respond entirely to climate, material resources, cultural and economic needs of society. In many cases, poor communications meant that people had to live in communities and cooperate in the use and management of common local resources.

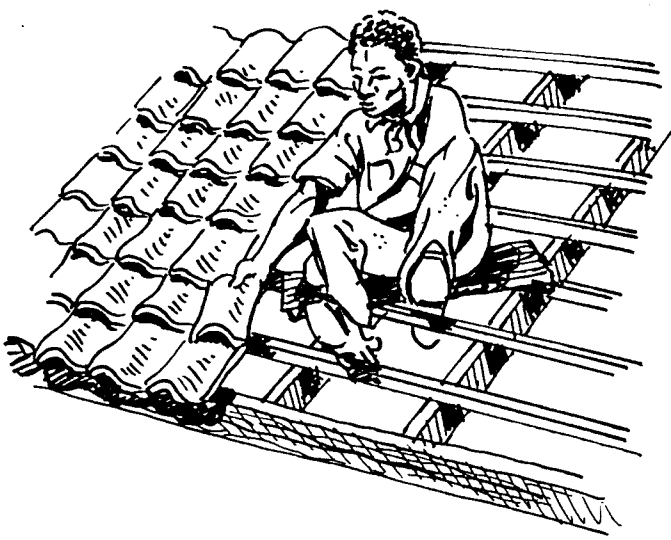
Traditional construction technologies now need to be rediscovered, re-evaluated and marketed at a wider scale, and used at an increased rate in designing ecolodges. However, take care not to mistake the trappings of ignorance and great poverty for sublime genius: be certain you understand the function of the devices you might use, and find out why they went out of use. An ecolodge is not a traditional hut, and today's tourist has different needs and ways of living to the area's natives and pioneers.

Once armed with the history of your options and your present parameters, you can adapt or improve on old ideas with great effect, rather than copying ancient mistakes. You also can bridge important gaps between your target client group's expectations, (including fire, plumbing and electrical standards) and beautiful forms from the past. Be careful that your use of modern materials is not obvious when reproducing original features; poor copies of respected forms can inspire derision or even cause insult.

GUIDELINES

1. Use traditional technologies as they have many benefits. For example, the production and use of traditional tools requires low energy and has minimal impact on natural resources. Construction techniques require the use of human-powered tools and are locally developed. Furthermore, these techniques necessitate the use of local skills, labor and knowledge; and in this way, contribute to the local economy. Also, the use of traditional construction tools and methods can render the ecolodge more authentic within its cultural context, and can fit closely into the fabric of the people's lives, allowing neighboring communities to identify with the lodge.

2. The architect should incorporate traditional building technology in the design and construction of the ecolodge wherever possible. Examples of traditional technology include dried clay bricks, reeds, grass, and other natural building materials using sun and wind, and use of hand-made, human-powered tools, such as sieves, shovels and trowels. A traditional construction method, found frequently in lodges along coastal areas, is the technique used for building thatch roofs: sun-dried palm fronds are carefully arranged by hand into two-feet square "tiles," after which they are overlapped and tied with locally grown sisal ropes to mangrove battens.



3.6.2.2 Modern construction technology

In the search for sustainable technology, however, architects should not discard modern knowledge. At times, modern building technology can be of significant ecological value to the ecolodge, through energy-efficient tools and methods of construction.

Any modern technology that you choose should preferably be regionally available and guarantee easy assembly on site, it must be understood by the people who are going to install and maintain it, and replacement parts must be quickly and cheaply available.

It is possible to combine traditional technologies with modern construction, but this must be done in a skillfu and creative way, avoiding contradictions and pastiches.

GUIDELINES

1. Do your research: ensure that any modern technology that you choose to apply in your ecolodge should be proven environmentally friendly, non-hazardous, energy-efficient, and should be respectful of local cultural conventions

2. Consider applying energy-efficient methods of construction such as hand-operated vibrators for sisal-cement roofing sheets, block-presses for making stabilized earth blocks, appropriate passive and active solar technology, and clean modern prefabrication systems for building.

3. Use modern construction technology that meet criteria such as low energy costs and minimum pollution associated with production, procurement and transportation, as well as contribution to the local economy.

3.6.3 Materials Selection

The architect should carefully consider the building materials used for the ecolodge, drawing on traditional materials wherever possible and combining these with modern materials whenever more suitable.

GUIDELINES

1. Analyze what proportion of biodegradable and non-biodegradable materials you will be using in your project.
2. Choose building materials that are energy efficient, use low energy in production, transport, and use, and, where possible are made locally.
3. Specifically apply the "life-cycle" approach to each stage of your building process. This is also referred to as the "cradle-to-cradle" analysis. Analyze how much "embodied" energy the building material takes over its entire life. This means taking into account the energy consumption of the different construction stages: from the extraction of raw materials through manufacture of major products and secondary materials, to transporting materials and products from source to project site; on-site installation, cleaning and maintenance over its useful life; and finally, the energy eventually used in its demolition, dismantling, relocation or disposal.
4. Analyze the availability of local sources for the material that you wish to use. When using this material, are you generating local hand labor and providing local economic benefits?
5. Use building materials that are abundant and renewable, and whose manufacture has low impact on the environment from where it has originated.
6. Consider using building materials that produce low waste and are capable of being reused and recycled, thereby saving the vast amounts of energy spent on processing raw materials. Using salvaged windows, doors, beams, slates, roof shingles, bricks, tiles and even furniture is an environmental option even cheaper than recycling materials.
7. Make a comparative analysis of the advantages of using local materials vs. materials brought from elsewhere, taking into account the following factors: economics, time, distance covered, environmental impact, and socio- economic benefits to the local community. Think in long-term socio-economic and environmental terms and not only on the short-term benefits to your business.
8. Consider if you can recycle or reuse the material at the end of its life cycle in a structure.
9. Find out whether you are generating by-products (especially toxic or noxious ones) during maintenance. Does the material require special finishes or treatments that may produce health or safety risks?
10. Only use those building materials that do not emit harmful vapors, particles, toxins or other pollutants into the environment either in manufacture or use.
11. Building materials should be produced via socially fair means, which include, as a minimum, equal opportunities, good working conditions and fair wages. Direct sales from cooperatives in the developing world to consumers in industrialized countries should be encouraged.
12. Work out the amounts of waste resulting from fabrication or installation and compare with alternative materials. Are you really taking the right choice of materials?

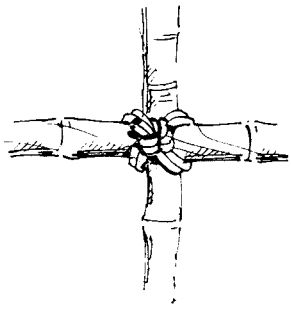
3.6.3.1 Traditional materials

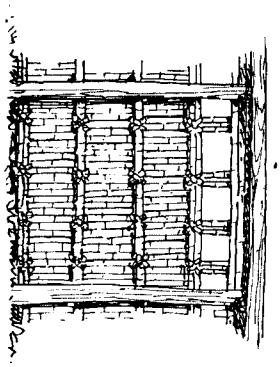
The architect should use traditional building materials for the ecolodge wherever possible. Some examples include: thatch and leaf used in roofs to cool the hut; coral stones (cut from the ground, not from the living reef) used to build foundations and walls; timber poles serving as structural members; locally produced timber used for doors and windows; and mud rammed to make walls and floors.

The use of traditional building materials has many advantages. For example, such materials are always derived from natural resources and do not contain any synthetic products, making them environmentally friendly. They have low energy costs and pollution associated with their production. Since they are locally procured, they require little energy for transport to the site. Furthermore, they make use of expert local labor in their production, and so contribute to the local economy. Also, they are well adapted for use in local climatic conditions, and in most cases, are less expensive than their modern counterparts.

GUIDELINES

1. Whenever possible, employ materials that are naturally found in your area (rock, stone, clay, wood, reed, bamboo, thatch palm, straw, etc.) and whose extraction is reasonably easy and low-impact. Only when some of these materials are scarce or correspond to threatened plant species should you opt for bringing materials from elsewhere.





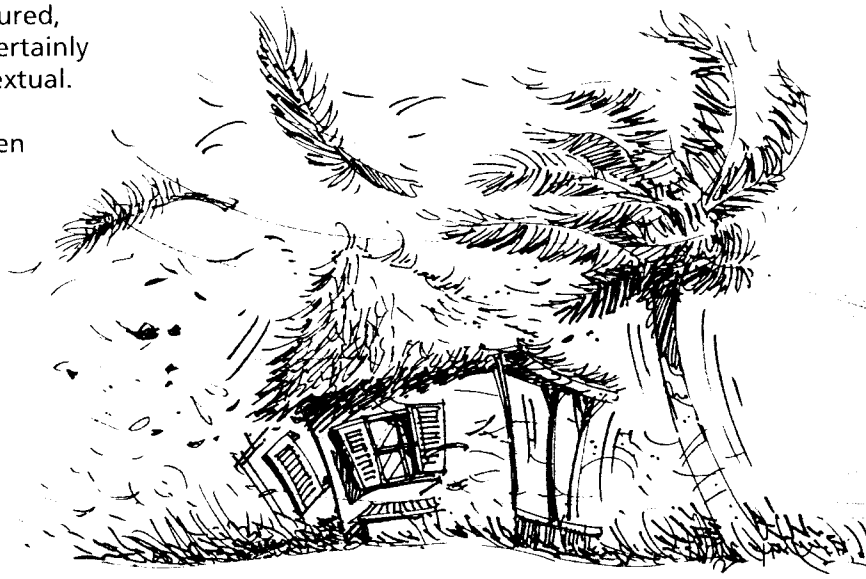
2. Carefully evaluate traditional building materials when addressing issues of availability, durability and cost-effectiveness. First, the architect should ensure that the materials used are renewable and abundant in supply. The materials should also be durable and not require frequent replacements; they should be able to withstand the forces of nature, particularly given the fact that the ecolodge will frequently be larger than the structures for which they were traditionally used. Also, the materials must be cost-effective. The architect should note that in some instances, traditional materials may be less expensive in the short-term, but more so in the long-term. For example, the popular thatch used in many tropical coastal roofs is locally procured, readily available, renewable, and certainly both physically and culturally contextual. However, the use of thatch is quite uneconomical in the long-term given its high replacement ratio. It also provides habitat for spiders and other insects; it can be a fire hazard and is not ideal for rainwater catchment. Put everything on the balance before taking a decision.

3. When choosing building materials for the ecolodge, the architect should also consider the environmental management of the source of the building materials. For example, irresponsible extraction of raw materials — such as limestone for cement — can lead to environmental degradation of quarries.

4. Building specifications should reflect the environmental and conservation concerns as related to timber products and other building materials. If you use wood, it is important to know its source. Use lumber and other products made from woods that have been deemed as sustainably produced by a reputable certification organization. Currently, little of this timber is available, but supplies are growing . To support sustainable forestry practices, wood certified by such organizations as the Scientific Certification System, Rainforest Alliance, Forest Stewardship Council, etc., should be used in construction. At least one salvaged wood product could be utilized to support the efforts of small-scale lumber companies that recycle forest products, which would otherwise be disposed of in landfills or burned in incinerators.

5. Look for traditional building materials salvaged from demolished buildings, railroads, etc. Salvaged wood, for example, have a distinct advantage; they are the highest-quality representatives of their species, having originated from old growth forests many years ago.

6. If applicable, take into account seismic considerations, as well as the effects of strong winds like cyclones and hurricanes when building your structure.



7. Whenever possible, use traditional building procedures (or at least, be based on them) and try to employ local expertise and labor in the construction process in order to generate regional socio-economic benefits.

8. If you need finishes or paint as a protective treatment on wood products, you should preferably use those that are based on organic substances and not synthetic chemical compounds, which are normally non-biodegradable and often toxic. Also consider the ability of your paint system to breathe; allowing timber to behave naturally helps keep it sound and can prevent rotting. These are some natural treatments and paints that are normally available:
   a) Borax wood impregnation treatment that protects wood against fungus and insects (instead of typical commercial treatments, which usually contain toxic arsenic or creosote). Pulverized borax salt particles lodge in the wood, preventing insect eggs from hatching. Wood also can be soaked in the ocean for several weeks, then dried for use; the salt provides an effective termite treatment for softer woods, which can absorb it.
   b) Wood-pitch impregnation made from resin-oil and beech-wood distillate; especially suitable for outdoors wood protection since it is water-resistant yet allows the wood to breathe.
   c) Wood sealant and primers made of natural resin oil (instead of using synthetic preparations based on polyurethane, which can be allergenic).
   d) Stains and pigments derived only from vegetable and mineral sources, dispersed in natural binders.
   e) Pure turpentine (this natural thinner and cleaner is distilled from a resinous oil derived from balsa wood). Care should also be taken with other "natural" solvents and distillates such as linseed oil and citrus based products.
   f) Pure beeswax for producing a soft sheen on all kinds of interior wood (also gives a pleasant indoor scent).

9. Whenever possible, use in construction those trees that have fallen due to natural causes (wind, river erosion, etc.).

10. Bear in mind that traditional materials are often combustible. Take the risk of fire very seriously and consult with fire experts on property protection, smoke detectors, fire extinguishers, fire doors, means of escape, fire prevention, staff training and drills, access for fire fighting units, and water and pressure availability.

3.6.3.2 Modern materials

In cases where traditional building materials fail to fulfill requirements of availability, durability, cost-effectiveness, performance and/or source, the architect should seek modern materials that do. However, modern materials should also meet other requirements such as low energy costs and pollution associated with production and procurement, as well as contributing to the local economy. In using modern materials, the architect should emphasize the use of environmentally friendly materials such as ceramic tiles made from crushed light bulbs and recycled clay; or decking from a composite of sawdust and bits of plastic that are long-lived, durable and easy to apply, repair and maintain. As with natural materials, they should be tested and tried over several generations. In most cases materials that improve building performance should have priority over a lower performing but more eco-friendly alternative. Energy performance should be goal one.

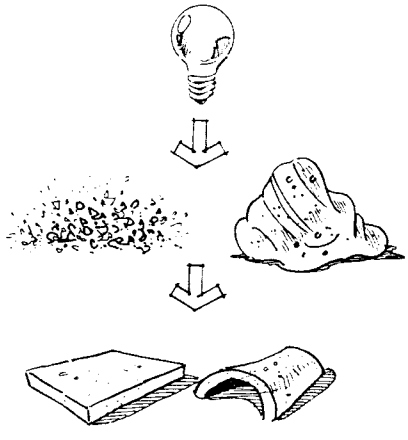
GUIDELINES

1. Incorporate modern building materials with good energy conservation values, such as high-rating insulation that retains heat in winter and keeps buildings cool in summer.

2. New materials used should be non-toxic, should easily blend in with traditional materials, and should resist climatic extremes, such as humidity and temperature (especially in tropical areas). Also, prefer light materials that are easy to transport and assemble on site. This usually calls for compromise, so decide your priorities.

3. Locate and use as many recycled materials as possible. Search out industry organizations that list suppliers of various materials.

4. Use environmentally friendly building materials, such as ceramic tiles made from crushed light bulbs and recycled clay, and decking from a composite of sawdust and bits of plastic.



3.7 ECOLODGE DESIGN IN COASTAL AREAS

Most of the general guidelines included in this chapter equally apply to ecolodges in coastal areas. Following are some specific guidelines that should be of particular interest for ecolodge design in coastal areas.

GENERAL GUIDELINES

1. Once a clear zoning scheme has been set up, define those activities that will take place in the sea, the coast, and inland around your lodge. Remember that if it is to be truly an "eco"-lodge, it has to attract and satisfy "eco" tourists who are primarily looking for natural assets, not artificial commodities.

2. Understand that marking boundaries of marine or coastal protected areas (and/or areas with high tourism value) may be unnecessary, except for beaches where sea turtles or sea birds nest. In tourist zones, however, strategically placed markers, signs or buoys can contribute to enforcement by encouraging visitors to follow trails (land and marine) and informing them of your zoning system while reinforcing it.

3. Moor buoys to mark snorkeling and diving sites and to prevent anchor damage on reef structures. Marking "marine protected" area boundaries with buoys may be expensive and difficult. In such cases, the site's boundary should be determined and its buffer zone or outermost boundary extended two or more kilometers seaward from some discernible feature (beach or reef crest) to control poaching. Navigation features (e.g. boat channels and dangerous reefs) should be marked with buoys to internationally recognized codes, consulting with the nearest coastguard or maritime authority to ensure that you meet your responsibilities under local maritime regulations.

4. Use sign boards above water as it is essential in critical terrestrial areas (turtle nesting beaches, bird nesting or roosting colonies, dangerous marshes, and vulnerable sand dunes) to which the public would normally have ready access. They remind people of entry restrictions, inform tourists of behavior codes, carry educational information, and warn people of potential hazards. It may be necessary to fence off particularly sensitive habitats to discourage public entry.

5. Obviously, no untreated wastewater (grey or black) or other wastes (especially non-biodegradable) should be discharged to the sea. This would ruin the resource base of any ecotourism industry on the coast.

6. Avoid execution of any work liable to affect the natural coastline or modify it, by protruding into the sea or retracting from it. Avoid landfilling in coastal area ecolodge development. Site the ecolodge a sufficient distance inland from the highest high-tidal shoreline. In the case of coral reef areas, it should also respect any existing reef protection line (RPL).

7. In every ecolodge, at least 50% of the coast should be left undeveloped in order to maintain predominantly natural focus of the project. This may be unavoidable, perhaps where you are restoring a degraded site, when you will be planting new endemic trees and shrubs according to a restoration plan.

8. Natural processes should be used for beach restoration and safeguarding. Often, traditional resort beaches use heavy engineering equipment to artificially groom and supplement their preferred beach setting. However, natural features such as native plants (planting vegetation to trap and hold the sand), are usually much more effective, and certainly cheaper, in achieving long-term shore stability, especially where dunes are concerned.

9. Your coastal ecolodge should take into account the landscape, seascape, biodiversity, and marine and coastal ecosystems, including fishery resources, minimizing all environmental impacts. Do not destroy coastal dunes and the natural vegetation and avoid having negative impacts on nesting and spawning grounds. Strictly avoid the construction of large artificial lagoons or swimming pools with direct discharge to the sea. If there is a strong, ecologically feasible rationale for installing an artificial alternative to the sea, a filtered seawater pool can be blended in with your accommodation by using natural colors such as beige to paint the pool floor and walls, and giving it a more natural shape.

10. To avoid the risk of erosion and the release of fine sediments and/or turbidity matters from your construction, apply a lining system of the construction area using appropriate filter materials. Alternatively, in coral reef areas, a properly designed turbidity-proof barrier should be built around such construction elements within the reef protection line (RPL).

11. Avoid complicated marinas, embankments and jetties, which are counter to a natural image and ecotourism activity. Provide a simple jetty for small vessels. Apply appropriate systems such as a pump-out facility for controlling all sources of pollution from boats/ships. Strictly prohibit jet-skis and the like.

12. Sewage systems using seawater should not be encouraged due to a series of treatment problems. Waste-water must not be discharged directly into the sea without proper treatment Infiltration of treated waste-water is only appropriate if geotechnical investigations show that aquifers will not be polluted. Microbiological inspection must be performed at intervals. Make sure that unfiltered wastewater is not shunted through the soil/underground directly to the littoral zone and coral reefs. Particular attention should be paid to the impact of nutrients. In desert areas, wastewater should be reused for irrigation after proper treatment and disinfection. Wastewater not used for irrigation and not filtrated at the producing lodge must be collected in tanks and transported for other uses, e.g. tree farms or to the desert for filtration/irrigation.

13. Consider water supply and management very seriously, as fresh water is a major problem in many coastal areas. Your options are to make water conservation a feature of your ecolodge experience by capturing and using rainwater; delivering or piping water from afar, or installing a desalination plant, which many would argue renders your development unsustainable in nature and therefore not an "eco" lodge. So think carefully. If you do want to explore desalination, don't look to sophisticated technology or large machines, since these produce too much concentrated high-salinity waste (normally at least $5m^3$ per day), which may not be dumped into the sea. Instead of a big machine, consider a smaller, simpler one.

14. The best source of seawater for desalination is from beach holes or other underground seawater sources (as far as possible from your lodge). This activity should not interfere with tourism activities such as snorkeling or diving. Brine water from desalination plants must not be filtrated into the soil or discharged to the sea without sufficient treatment in order to avoid adverse effects of increased salinity or temperature on the biota or soil.

15. In coral reef environments, deep beach wells are recommended in selected, previously identified locations. In other locations, discharge to the sea is commercially accepted if the pipes are not visible and the discharge takes place from vertical pipe extensions in water deeper than 15m. The difference between the effluent's salinity and the ambient salinity must not exceed 10%. Also, temperature must be lowered to the ambient temperature before discharge. It is the extent to which you can exceed these minimal stipulations that the sustainability of your water management, which is always a critical point with "eco" development, will be judged.

16. As the owner of a coastal lodge, it is important for you to keep a log or record book to indicate the impact of the establishment's activity on the environment, in accordance to local regulations. Take samples and make tests as deemed necessary to control your impacts and verify the implementation and progress of restoration and sustainable management practices.

17. Remember that you must be able to defend your proposal to impose any development that will have a significant impact on natural and beautiful ecosystems. Your responsibilities deepen with each square foot you move into pristine areas and may well last a lifetime, yet in comparison, your right to exploit the natural world lasts only as long as your impacts are positive. The genuine ecotourists you most need to impress have walked into sites like yours across the world, and perhaps erected nothing more than a tent. Their repeated patronage is your mark of success as a viable, ecologically sound business.

18. Strictly avoid any operation dealing with hotel' ships and big pleasure cruisers. These "floating hotels" normally cause enormous environmental impacts and put a competitive stress on the land-based tourist industry (including yours) and may lead to privatization demands on the marine and coastal waters.

19. If, on the other hand, you feel you need to compromise the ecological values of the area in order to accommodate the demanding entertainment needs of clients who have no natural interest in those values, pause to reconsider, and reconsider.

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"When the full power of the human imagination is backed by the weight of a living tradition, the resulting work of art is much greater than any that an artist can achieve when he willfully abandons his traditions."

—Hassan Fathy

CHAPTER 4

SOCIO-ECONOMIC AND CULTURAL IMPACT

Ana Báez
Turismo & Conservation Consultores S.A.

CHAPTER CONTENTS

4.0 SOCIO-ECONOMIC AND CULTURAL IMPACT

4.1 INTRODUCTION

The need for integration and participation of neighboring communities both in tourism projects and in the conservation of natural resources has been greatly emphasized over the past 10 years. In theory, an ecolodge project should create jobs and promote sustainable development of the area and community involved, from the environmental, cultural and economic point of view. In practice, this has proven to be no easy task. However, it is not impossible.

One of the main challenges is the race against time. Most communities lack experience in tourism and therefore need time to develop a mature response to today's "tourism culture," in much the same way as they developed that of agriculture, fishing, etc. While education and ongoing training aid the process, the ability to identify the existence of a true "attitude and aptitude" in the community — both of which are fundamental for the success of this type of activity — is of much greater importance.

In the majority of developing countries, tourism has been looked upon as a viable complement for solving the pressing needs of local communities, particularly rural and indigenous. Nevertheless, it should not be allowed to create unrealistic expectations or lead to a situation that could unleash bigger problems such as degradation through ill-advised exploitation of resources, or stimulating local rivalries, in the near future. Apart from involvement and participation of local communities in ecolodge development, we have to recognize that tourism will have negative impacts and we should attempt to minimize them.

Ecolodge projects designed with a medium and long-term perspective have had great success in achieving healthy and fruitful community participation. Those that have gone so far as to consider themselves just another member of the community and acted as such, are the ones that have had the best results.

This chapter is divided into four main categories:

- Cultural Factors
- Values and Traditions
- Community Participation
- Community as Developers

4.2 CULTURAL FACTORS

It is of fundamental importance to objectively research and document the various aspects of neighboring communities: their origins; how they are organized; their economic, political and social activities; the principal resources, traditions, beliefs; etc. In this way, you will have a better sense of the community environmental conditions and cultural characteristics to minimize negative impacts, to design and operate an ecolodge in balance with the surroundings, and to become more productive economically.

To minimize impacts on local culture and develop the chances for strong socio-economic relationships, it is important to invest in a participatory planning process. This strategy will bring opportunities to each of the "actors" to express their concerns, strengths and limitations even before the project is in place.

Knowing the economic situation of neighboring communities and their production structures is vital. It is a mistake to pretend that, in the short term, communities can transform traditional production systems and work experience to become service providers with international standards.

GENERAL GUIDELINES

1. Avoid competing with the community by involving residents as participants and beneficiaries and making them allies in the process and in projects to be developed. Local communities often compete for use of the same natural resources that have potential for tourism.
2. Avoid developing projects without first having discussed it with representative members of the community, because their expectations could be seriously affected by the project, and vice versa.
3. Avoid creating expectations, which make the already deteriorated economic conditions from which many of them suffer even more difficult.
4. Familiarize yourself with the political and institutional aspects of local communities and how they work in the area.
5. Familiarize yourself objectively with the socio-economic context of the community and clearly identify what your role should be. Do not abuse your position, economic or political.
6. Ask permission to develop the ecolodge project, respecting local procedures and authorities.
7. Take whatever time is necessary to establish a presence in the community: speak with its members, establish what its role will be and open an ongoing communication.
8. Learn from the community. The opportunity to learn and teach goes both ways — what you can receive from and give to the community and what the community can receive from and give to you.

9. Develop your project from the start with the community's active participation. Find out what community members think of your project and how they define it in their own terms.
10. Respect the community's structure and particular dynamics. Learn to understand that dynamic, their language and their concept of time.
11. Identify the most important crops and products (economic activities) that can serve and support the ecolodge, or those that could be promoted as future sources of development.
12. Promote the development of small business for subcontracting certain services, such as local transport, food products, arts and crafts, guiding, tours, etc.
13. Generate and/or support opportunities for economic development and improvements in the quality of life of the community, including those that aren't necessarily related to your project.
14. Facilitate opportunities for employment during all phases of the project's development and operation, and at all levels of responsibility. As much as possible, maintain a representative number of local employees at all levels of the organization.
15. Try to maintain an ongoing program to teach, educate and train local employees; or, in some cases, support organizations that promote the training of local people.
16. Avoid taking sides or strongly identifying yourself with one particular group before the community gets to know you and before you have achieved an objective understanding of the community.
17. Identify people who are interested in being trained for more specific jobs and greater responsibility.
18. Develop the administrative policies of the project and consider work stability, salary scales, incentives and relationships with other productive sectors, etc.
19. Promote the participation of local or national partners in the project.
20. Stimulate the development of joint venture projects between nationals and foreigners — preferably when there is pre-existing national legislation to encourage them.
21. Promote the participation of local or national partners in the creation of a plan in which the community and the employees have some type of participation (incentives) from benefits generated by the ecolodge.
22. Use "written agreements" for contracting services, responsibilities and relationships between the community and the ecolodge.
23. Make every effort, initially, to enter into agreements with organizations that represent the various interest groups of the community, and only later consider agreements with individuals.
24. Whenever possible conduct an economic feasibility study to measure the economic costs and benefits for the community resulting from the proposed ecolodge. Include aspects such as the impact to/of nature preservation, objectives in the area of influence, income and employment multipliers, etc. This study will help the community to understand your project's level of impact.

25. Write down a clear policy statement for the ecolodge, including the project's mission. Display it in a visible place for both employees and visitors.

26. Understand the undercurrents and realities of doing business in the area. Find out exactly how things really get done and make the right connections. Make certain that the most powerful people in the area are on your side, and do not discount corruption — understand it and ensure that you have the resources to deal with it. If bribery is customary, work out how much power various officials have, and how much you need them (i.e. for planning permission, electricity and water connections, road-building, etc.). Calculate the possible "extras" it will take for the project to succeed, and stay protected (i.e. from a plethora of "copy-cat" developments by the mayor's family next door to your ecolodge).

4.3 VALUES AND TRADITIONS

Cultural, economic and physical impact is always going to exist. It is feasible, however, to diminish the negative effects and strengthen the positive features of your proposal. One area of concern is the way in which visitors interpret and value unfamiliar cultures; another is how the locals perceive themselves. Acculturation and loss of values in the face of tourism occur more easily when there is low self-esteem within the community.

GENERAL GUIDELINES

1. Invest in a deep and objective analysis of the values and cultural traditions of the community. This will help you define both your project and your future relationship with the community.

2. Avoid making the mistake of abusing traditional symbols and activities, or allowing yourself to get carried away by romanticism or imagination.

3. Buy as much locally produced food as possible. In this way, the gathering will show support for the local economy and it will also help you establish the area's ability to support the finished ecolodge. Not only will this provide a good talking point with potential local suppliers, but it will give them a chance to meet future requirements.

4. Identify cultural impacts the project could produce and establish a monitoring plan. Consider both positive and negative impacts.

5. Establish a solid knowledge base about the values and traditions of neighboring communities and available natural resources.

6. Promote among local people an understanding of the intrinsic value of the site's resources and characteristics, and of their own cultural values and lifestyle, thus encouraging a sense of local pride.

7. Establish a discussion with the community about values and cultural symbols that they would like to share with visitors, and help determine the most convenient way to do it.

8. Avoid developing your own expectations about possible uses of resources or activities to enrich the visitor experience, without first establishing clearly with the community what is and is not possible to offer.

9. Be scrupulous and fair in your dealings with money and make sure you do not earn a reputation as a "soft touch." Be aware of the effect of paying wages that may cause friction in poor communities and the temptations your seemingly endless supplies of money brings about.

10. Avoid surprises, eliminate rumors and always be honest. Good communication is the best tool for establishing solid bases in your relationship with the community.

11. Use formal contracts or agreements that authorize you to use certain resources or symbols; use them, as well, for activities or services that the community is to provide you with, or vice versa.

12. Incorporate only those cultural symbols that authentically reflect local values (food, architecture, decoration, clothing, music, etc.) into your project, but do so only if and when the community has no objection.

13. Support activities and projects that foster appreciation and reaffirmation of the local culture (visitor information centers, development of research and distribution of information).

4.4 COMMUNITY PARTICIPATION

Many problems and difficulties can be avoided when community participation is considered right from the moment a project is proposed. It is an error to assume that community participation is limited to the job opportunities afforded by the ecolodge or to the benefits that the lodge might generate in the way of infrastructure and services.

It is fundamental to keep in mind that each community has its own concept of time, its own mental structure and usually a very respectable ancestral knowledge about the region, which could be of substantial benefit to the project.

GENERAL GUIDELINES

1. Establish relationships with neighboring communities and identify and work with various interest groups during all phases of the projects (planning, development, operation and monitoring); don't underestimate the value of orientation and aid both from community members and from qualified professionals during this stage.

2. Learn about the availability of primary resources for your use, such as drinking water and energy, and find out about waste management, respecting at all times the community's needs and rules for using these resources.

3. Consider the possibility of helping establish community recycling. After all, it will be very useful to your ecolodge.

4. Identify and respect local leaders; approaching and actively involving them often will result in their transmitting enthusiasm for the project to the whole community and achieve more organized community participation.

5. Identify an appropriate level of interaction with all representative sectors of the community (poor, rich, NGOs, politicians, etc.), establishing relationships and maintaining them throughout all stages of the project.

6. Consider yourself as one more member of the community. Stimulate and promote your role as a facilitator without fostering a paternalistic relationship.

7. Participate actively in current organizations and, if you want to create a new one, take into consideration the criteria of the community's various interest groups.

8. Stimulate communities to protect their natural resources. If the importance of conservation and its benefits are understood, community members will participate in and become proponents of the various projects.

9. Promote opportunities for locals to have access to your project by offering organized programs, special discounts and incentives.

10. Always remember that seeking community participation implies giving the community more opportunities for an effective participation in the development of activities and strengthening their own capacities. In this way, they become active members of society, rather than passive spectators, capable of making decisions and controlling activities that can affect their lives.

4.5 COMMUNITY EMPOWERMENT THROUGH ECOLODGE PLANNING AND DESIGN

Many projects fail simply because designers and developers failed to involve the proper local people and authorities at an earlier point in development. Many opportunities exist to constructively involve local people in the design and development of an ecolodge.

In many countries, corruption is a major issue, especially at local building approval councils. Involving respective council members at an earlier stage of the design process may be helpful at the approval stage.

GENERAL GUIDELINES

1. Consider organizing a two-day intensive design charrete consisting of architects, developer, local people and the authorities. Through this two-way participatory approach — as opposed to the traditional beneficiary one — local people feel part of the decision-making process and the resultant camaraderie may help to foster community pride in the ecotourism facility.
2. Understand the undercurrents and realities of doing your business. Find out exactly how things really get done in an unfamiliar target region and ensure that you maintain good relations with the area's decision makers. Do not discount corruption — understand it — but do NOT encourage it. If bribery is customary (for planning permission through electricity and water connections to road-building), find a non-corrupt way to get the approvals.

4.6 COMMUNITY AS DEVELOPERS

In some cases, indeed with increasing frequency, local communities are taking the initiative as developers and operators of ecotourism projects, particularly ecolodges. Various legal frameworks exist for community involvement in such projects, including cooperatives, non-governmental organizations or independent businesses, among others. Many of these community efforts have been supported and/or co-financed by international NGOs such as WWF, AWF, IUCN, TNC, GTZ and others. In any of these scenarios, the development process and operation of a community lodge should comply with guidelines mentioned in this book, to a degree that is in line with the project's scale.

Experience has shown that, while in theory all community members have the opportunity to become involved in development and operation of a project, usually only a few members actually take on the responsibility and face the project's challenges, until it reaches a certain level of maturity and fiscal stability. Evidence exists that this type of project requires a great deal of time (approximately five years) and concerted effort for community members to achieve a sufficient level of involvement and technical expertise for them to take it over completely.

GENERAL GUIDELINES

1. Remember that the guidelines from Sections 4.2, 4.3 and 4.4 also are valid for you whether you are a community organization or just one member of a community that wishes to develop its own project (or already has one), and that perhaps they will help you see your community from a broader perspective.
2. Identify your real capacity to take on all the activities this type of business involves, with professionalism and a sense of responsibility, and not merely with enthusiasm or because of a need for new sources of income.
3. Analyze your situation from a business perspective; be objective, critical and open to the opinions and input of other members of the community, yet know how to protect your business interests and profitability.
4. Officially establish the legal framework for your project, in order to comply with all the prerequisites for various legal transactions and commercial activities to be carried on by the business.
5. No matter how small the investment, don't stint on financial and administrative tools that will impose an efficient control on income and expenses. Get advice from professionals who can undertake pertinent studies and analyses.
6. The smaller the business, the more important it is to join forces with other members of the tourism sector, such as other ecolodges within the region, to form tourist routes and to market yourselves as a group with receptive tour operators, so that your product is part of the activities and services they are offering on the national and international market.
7. Leave space to give opportunities for other initiatives by community members that would complement your own product, thus enhancing overall service.
8. No matter what category your ecolodge falls under, you are competing on a global level. Therefore, it is vital to base your work on the criteria of quality; as you will find that the tourist always demands the best.
9. Any technical assistance, cooperation or financing that has been sought to support your project should be viewed as an investment that you will endeavor to repay. Paternalism benefits no one and, on the contrary, can cause disenchantment and failure once support is suspended.
10. Limited training of human resources is one of the commonest weaknesses in this type of project. Recognize your weaknesses and seek to strengthen them.
11. Participation in ecotourism projects should be understood and practiced as a complement to the community's traditional economic activities and not as a substitute.

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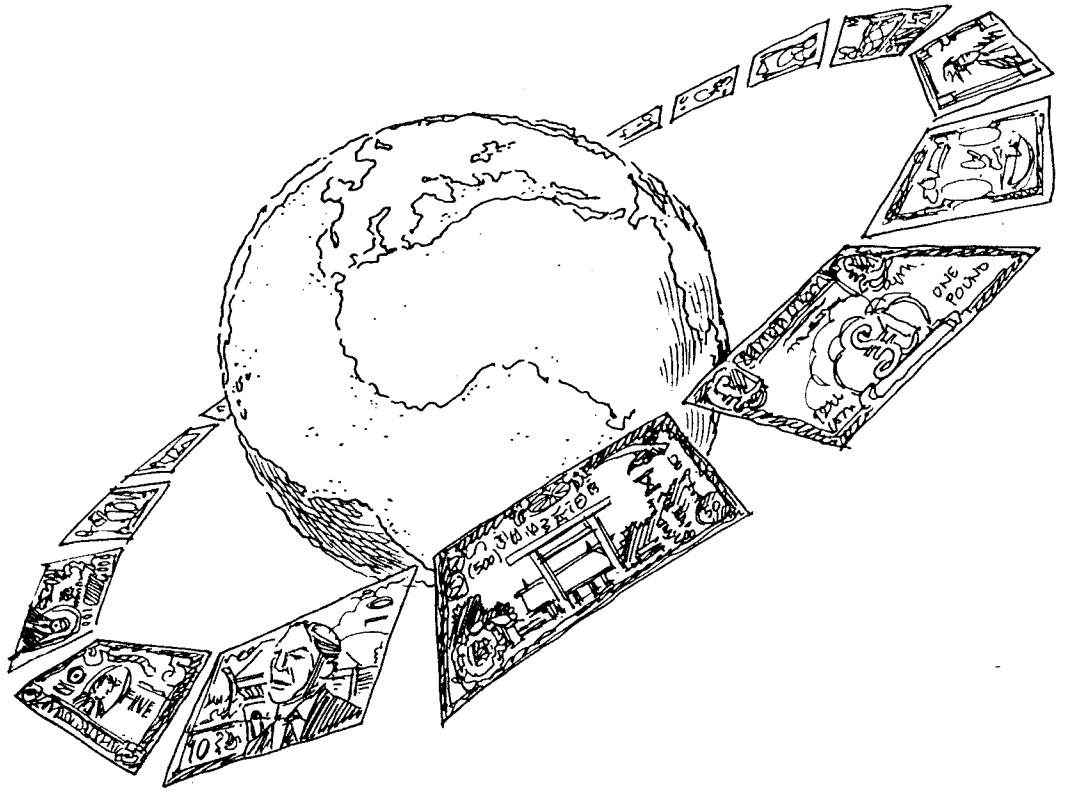
"For the first four years, no new enterprise produces profits. Even Mozart didn't start writing music until he was four."

—Peter F. Drucker



CHAPTER 5

LEGAL AND FINANCIAL CONSIDERATIONS

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CHAPTER CONTENTS

5.0 LEGAL AND FINANCIAL CONSIDERATIONS

5.1 INTRODUCTION

The sustainability of an ecolodge depends not only on its compatibility with the natural environment but also on its financial profitability and legal soundness. No venture will survive if it cannot generate an income that sufficiently covers all of its expenses.

Failure to create an appropriate legal foundation will put a venture at risk should government authorities, creditors or plaintiffs challenge it. In most financial and legal respects, ecolodges are little different from other businesses. However, to realize their full potential, ecolodges must also meet the demands and expectations of a variety of stakeholders beyond their immediate owners (e.g. the local community, others who depend on or care about the environment, the tourism industry, government, and the broader public). As a result, successful ecolodges are advised to make provisions to meet the needs of these stakeholders both in the day-to-day distribution of economic and financial benefits and in their formal legal charters.

This chapter covers legal and financial considerations for both pre-implementation and operation stages of ecolodge development. Unfortunately, the specific financial and legal requirements for setting up and operating an ecolodge differ substantially from country to country and depend on its size and stage of development. No "one-size-fits-all" detailed guidelines will be universally applicable. Accordingly, this chapter outlines a number of general principles, which can be applied in most cases, and provides as much in the way of specific guidelines as possible. However, more often than not, developers and managers of ecolodges will need to consult with local professionals for financial, accounting and legal advice. As a result, this chapter attempts to provide guidance as to the circumstances under which the developers or managers can reasonably expect to do financial and legal work for themselves and when they will probably want to turn to outside assistance.

The underlying premise of this chapter is that developers and managers of ecolodges, whether large or small, new or well-established, should become thoroughly familiar with the financial and legal underpinnings of their lodges. They should also frequently review and update financial plans and legal agreements to reflect changing conditions. At a minimum, no ecolodge should be launched without at least a clear understanding of the market and practical plan for financing and management (i.e. a "business plan"). In addition to guiding the developer from the idea stage to a viable project, the business plan is also essential for attracting finance, for determining the best legal structure, and for providing benchmarks to evaluate subsequent operations of the ecolodge. All ecolodges should be set up and operated in strict accordance with national and local laws governing tourism enterprises. Once operational, the venture's finances should be closely monitored on an ongoing basis. Finally, sight should never be lost of the ecolodge's broader responsibilities to its various stakeholders.

GENERAL GUIDELINES

1. Write a business plan. No ecolodge project should be started without at least an informal business plan or feasibility study.
2. Use your business plan to incorporate and formalize many of the other ecolodge guidelines presented throughout this book.
3. Establish a sound legal footing that reflects the lodge's individual circumstances.
4. Research and incorporate all national and local laws that pertain to setting up and running an ecolodge (both hospitality and excursions).
5. Develop a financing plan and financial management system that allows the ecolodge to adapt to unforeseen events.
6. Remember the needs and interests of other stakeholders as well.

5.2 BUSINESS PLAN

Both developers and investors usually need a business plan to take a vision from a "good idea" to a robust and viable project. In this chapter, the term "developer" refers both to individual entrepreneurs and corporate entities that conceive of the idea of the ecolodge and push it through to completion. The term "investor" refers both to individuals or groups that invest equity capital and to individuals or financial institutions that make loans to the project, even when the developer and investor is the same person (which often is the case for small ecolodges). Preparing an informal business plan is a useful way of thinking through all the related aspects

of a project. When the developer needs to attract outside investors, substantial advance homework will be required to anticipate questions. Furthermore, in many countries, it is standard business practice for investors to receive a formal business plan before they will even consider risking their funds in a new venture.

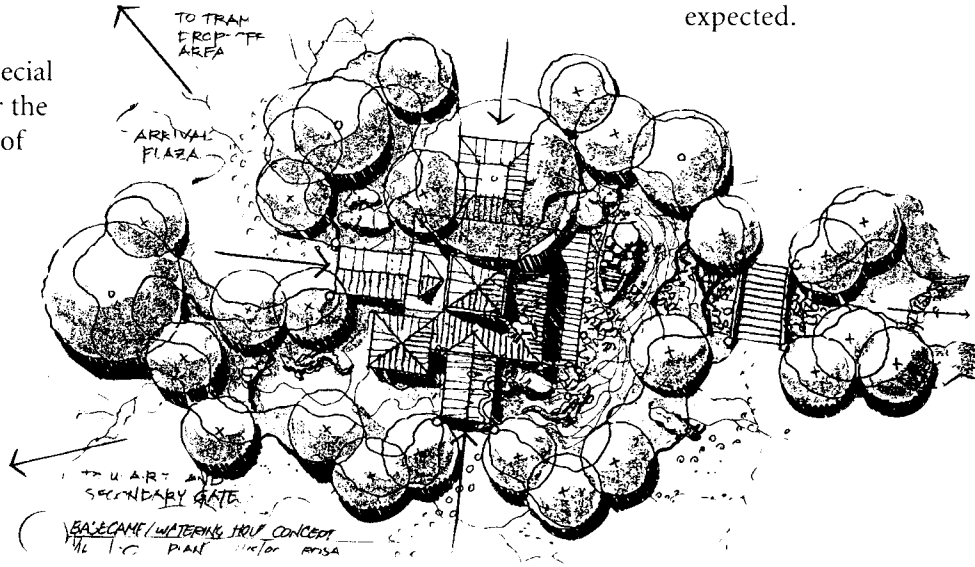
There is no prescribed format for a business plan, which is also often called a "feasibility study" (although the latter typically is often more generic and focuses primarily on the venture's financial prospects). All good business plans have sections that:

- Describe the products or services offered
- Analyze the market
- Summarize the proposed marketing strategy to be followed
- Describe the qualifications of the proposed management team
- Present timetables for key milestones and project completion
- Present detailed financial projections based on explicit assumptions
- Discuss the primary risks facing the venture

In addition, business plans for ecolodge projects should devote special attention to the physical setting for the project with an explicit discussion of the projected environmental impacts of the development and the likely costs of impact mitigation and management. Other considerations to be covered include the recreational and educational attractions of the site and its ability to sustain projected visitor loads. They should also address the interactions with local governments and NGOs, local community involvement, and contributions to conservation and sustainable development in the area. Beyond these very general requirements, however, there is great latitude in how the information should be organized and presented. (See Annex A for a sample template, which provides a good starting point for developing an ecolodge business plan).

Whether the business plan is being prepared only for the developer's internal use or whether it will be presented to outside investors, the goal is to critically evaluate and clarify all the major factors that will influence the success or failure of the ecolodge.

For individuals preparing plans for their own use, the critical requirement is to gather the relevant information and gain a clear understanding of the business opportunity and risks. Developers seeking outside investors will usually benefit by getting assistance from professionals who understand the questions that various types of investors are likely to ask and who can help present the kinds of analysis that will be expected.



5.2.1 Defining the Business Opportunity

Of utmost importance at the outset is a clear understanding and presentation of the products and services that will be offered based on the developer's goals and the site selected. Many questions need to be addressed. For example, what about the proposed site and surrounding area will be attractive to ecotourists? Based on the site attractions, what segments of the ecotourism market will the ecolodge primarily serve (e.g. student/researchers, more adventure-oriented travelers, wealthy tourists with an interest in high-end accommodation)? Given the target market, how will the proposed venture make a profit (e.g. from accommodation, adventure activities, nature interpretation)? Will the venture be able to attract the skilled management and staff necessary to provide the level of service required by the target market? The answers to these types of questions will determine the overall character and market positioning of the proposed ecolodge, which in turn will help determine the appropriate legal structure and financing options for it.

5.2.2 Evaluating the Market

Once a tentative strategy for the ecolodge has been established, the target market should be carefully evaluated to see whether in fact sufficient demand exists to support the project as envisioned. Whenever possible, collate statistics on tourist numbers and growth in the relevant market segments in past years. Find the average length of stay and expenditure of visitors, their willingness to travel, typical activities, and any other information that will help to determine market potential for the type of accommodation and activities planned. Data on prices charged and services offered by other ecolodges in the immediate area (if any) should be collected, as well as comparative data on similar lodges in other countries that will be competing for the same type of customers being targeted. All of this information should be summarized in terms of projections on the likely number of guests (usually presented in terms of projected occupancy rates) that the planned ecolodge could reasonably expect to attract given the room rates that will be charged and the amenities that will be offered.

5.2.3 Marketing and Promotion Plan

Even though the market analysis may indicate a substantial demand for facilities and excursions of the type being planned, a well-executed marketing and promotion plan will normally be required to capture that potential business. All too often, developers have a keen appreciation of the natural and cultural attractions of the sites that they have selected, but have not given sufficient thought to how they will convey this to potential guests. Potential investors will usually pay close attention to the proposed marketing plans and are very skeptical of a "build it and they will come" mentality. (See Chapter 7 for a fuller description of marketing and promotion strategies and guidelines).

5.2.4 Management Team

Even individual developers who do not need a written business plan are well advised to undertake a careful self-evaluation of their strengths and weaknesses as managers. If they lack the experience or temperament to do some or all of the tasks involved in building or operating the venture, they may want to consider turning to outside help. For developers seeking outside investors, it will be critical to document the experience and capabilities of the proposed management team. More than any other factor, the investor's decision to invest in a new venture is usually based on an assessment of the management capacity of the people who will be responsible for ensuring that their investment is being protected. A good business plan will systematically demonstrate why the proposed management team is likely to be successful.

5.2.5 Milestones and Timetables

Even having designed an excellent product for a market with good potential on paper, the entrepreneur will need to plan how to implement it and how long this will take. The important milestones, their interdependencies, and the time it takes to reach these milestones need to be considered in forming a project timetable. Making a project timetable will help to identify possible bottlenecks.

Important milestones include such items as site selection, legal permits, securing finance, final lodge design, earth works and the inauguration of the lodge. Some milestones are also interdependent; for example, you cannot start earth works without legal permits.

The time it takes to execute the tasks that allow you to reach your milestones will be based on the experience of the entrepreneur or area specialists. Ask your accountant or legal adviser to tell you how long it takes to get legal permits; architects and engineers can advise on construction schedules.

5.2.6 Financing Strategy

Section (5.3) outlines some key considerations in developing the ecolodge's financing strategy. It will be important to demonstrate that the financial projections are realistic based on the site's characteristics and business concept. The proposed financing mix (debt, equity, grants, in-kind support, etc.) should be justified in terms of the project's need for cash and its ability to protect the interests of the various types of investors being approached.

5.2.7 Identifying and Mitigating Risks

All investments have certain risks and the entrepreneur and investor need to know what they are. Risks exist at various levels, with some linked specifically to the project; e.g. possible loss from fire or severe weather, loss of key personnel, incompatible development of surrounding areas. Other risks may be area-wide (e.g. the airline serving nearest gateway is unreliable, public health risks), country-wide (exchange rate risks, impact of new legislation, image problems, etc.) or general (e.g. a world recession). Part of the reason for identifying and evaluating these risks is to provide "transparency" to investors so that they cannot later claim to have been misled. The risk assessment also provides a place to demonstrate what has been done to anticipate and mitigate these risks, either directly (e.g. building in redundancy, insurance policies) or indirectly by being more conservative in operating assumptions and financial projections.

GUIDELINES

1. Invest the time and money to prepare a thorough business plan since it will usually save money and headaches later on.
2. Devote substantial effort to understanding the potential market, thinking through the appropriate organizational structure, and preparing careful financial forecasts, even if someone else prepares the plan.
3. Even if only for their own use, individual entrepreneurs will benefit from writing down their plan.
4. Get professional help in preparing plans from experts who understand the special nature of the ecotourism industry and know the local situation, particularly if you are a developer who needs outside financing, but lack business planning experience.
5. Set up the business plan in a way that allows easy (but always truthful) modification to suit different (i.e. outside) investor priorities and concerns.
6. Base financial forecasts on market analysis, remembering that they should be consistent with the management capacity of the sponsors.
7. Perform "what if" analyses to compare the impact of different business and financing strategies on cash flow and profitability.
8. Identify primary risks to the project and present mitigation strategies to cover these risks.

5.3 FINANCING STRATEGIES AND OPTIONS

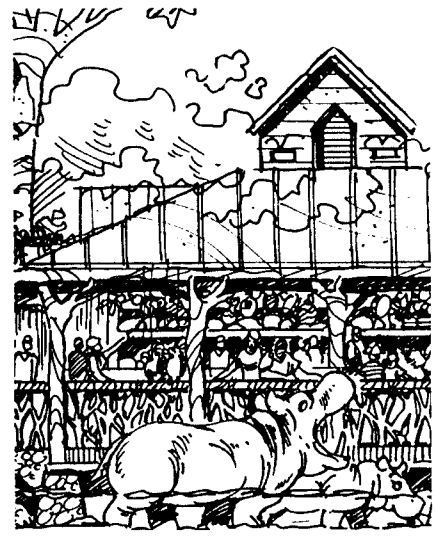
Financing for ecolodges can come from the developer's own funds, from third parties, or from a mix of the two. The source and nature of financing will critically influence long-term prospects for the venture and also can be a determining factor for selecting the particular legal structure of an ecolodge.

Even if the developer has sufficient funds to finance the ecolodge, it may be desirable to consider attracting third parties to spread the risks and/or to recruit strategic partners. Conversely, it is very difficult to attract outside investors if the developer has not financed part of the venture with his or her own funds. This is because most investors want the developer's own money to be "at risk" in order to make it more difficult for him or her to walk away from the project if it runs into difficulty.

Financing from third parties basically falls into four categories, which are outlined below:

- **Equity:** Individuals, strategic investors, venture capital firms, specialized funds
- **Debt:** Individuals, commercial and development banks
- **Grants:** Foundations, NGOs, government development programs
- **"In-kind":** Goods or services provided by various parties in lieu of cash

Equity investors will expect to receive an ownership position in the firm proportional to the size of their investment and usually will seek a high return on that investment. Ecotourism projects frequently do not generate the high rates of return that most equity investors are seeking (e.g. usually 20-30% or higher). This is one of the reasons why almost two-thirds of financing for nature lodges reportedly has come from the developer's own funds or from friends and family. Even if they can attract equity investors, developers also need to recognize that bringing outside equity into the project inevitably means some loss of control. If outside investors own more than half the company's stock, they will effectively control the company, not the developer. Even if the ecolodge developer relies on outside investors and cannot put any of his or her own cash into the venture, it is reasonable to expect to retain an ownership stake in the venture to compensate for the time and effort incurred. There is no hard and fast rule for the amount of this so-called "developer's equity" (which is payment for the "in-kind" services provided by the developer) that can be retained, since it depends completely on the circumstances.



Lenders, on the other hand, are primarily concerned with ensuring that they get their loan paid back with interest. As a result, they are mostly concerned with the project's ability to make the required debt-service payments, and collateral that stands behind their loan. Banks and other lenders usually pay close attention to debt service coverage ratios, which indicate the percent of profits that will be required to repay loan principal and interest. If the debt service coverage is high (i.e. projected profits are realistically much greater than the amount required to repay debt), then the project can run into unanticipated difficulties and still make its loan payments. Conversely, if the debt service coverage is low, the lenders are likely to face problems if the project runs into difficulty and they will be reluctant to make loan payments. In the final analysis, if the project runs into serious financial problems and has to declare bankruptcy, lenders want to make sure there is sufficient collateral in the form of hard assets to ensure that their loans can be repaid from the proceeds of the sale of these assets as the company is liquidated.

Donors who can provide grant funds will normally have an interest in a particular aspect of the project, rather than its overall profitability. For example, conservation groups may be willing to make grants to help ecolodges acquire property if they can be assured that the land will be put into some kind of protected status (e.g. conservation easements or private wildlife refuges). NGOs and government agencies often will make grants to cover extra costs for things like guide training or arts and crafts development in order to encourage job creation or cultural preservation. Grant funds can be an important supplement to conventional financing for ecolodges, but developers must make sure that their goals are compatible with those of the donors in order to avoid future conflicts.

"In-kind" contributions are often ignored in business planning exercises, because they are harder to identify and to quantify, but nonetheless can be quite important in reducing costs. The most important potential sources for in-kind contributions are usually "strategic partners" who will also benefit from the ecolodge's success. For example, transport companies that serve the area may be willing to donate services during construction in return for a share in the enterprise or long-term contracts. Local suppliers may be willing to provide discounted prices in return for long-term purchase agreements. Craftsmen may be willing to trade services in return for getting used building materials or equipment from the site. The range of opportunities is limited only by the developer's imagination, but is often not given sufficient attention during planning.

In addition to planning the initial financing structure, it is important to remember that the type of financing required may change significantly as a project matures. For example, it may be possible to locate grant funding to assist in preparing a business plan or for training during the start-up phase. Conversely, when a project is first getting started, it is usually difficult to attract much debt financing because of concerns about the project's unproved viability and therefore about the value of land or buildings being offered for collateral. Often at this stage, only friends, business acquaintances and family will be willing to make initial investments because they know the developer personally and have confidence in his or her capabilities. Outside investors usually will require substantial ownership participation for helping to fund start-up operations. Once the project has demonstrated its financial viability through several years of operations, it is much easier to raise equity on more favorable terms or to successfully approach commercial or development banks for loans to finance expansion or facility upgrades.

If the developer lacks the resources to finance the ecolodge with his or her own funds and no third-party sources are available, it may be possible to start with a smaller initial phase and to finance expansion out of cash flow. The Business of Ecolodges (Sanders & Halpenny 2001) found that only 18% of lodges surveyed were primarily built in one construction period. Another 22% were built primarily in two stages, while fully 59% were developed incrementally as cash flow permitted. The project should, however, start at a size sufficient to meet expectations of the target market and to ensure that it can cover fixed costs (such as land acquisition), which could otherwise be spread over more rooms if launched at a larger scale. Good business plans should take these project phase options into account in order to ensure that the project is designed for an optimal scale but is also of a size that developers can finance.

Carefully prepared business plans also should provide direction regarding the types and mix of financing required. However, before starting to look for funding, the developer should do the necessary homework and make a list of possible sources of the desired types of financing and try to find out as much as possible about them before making an approach: What kinds of projects do they finance? What size investments do they make? How tolerant of risk are they? What documentation will they require? What is

their decision process? Much of this information is now available on the Internet and makes it much more feasible to approach funding sources directly rather than relying on intermediaries.

The basic steps in raising funds following preparation of the business plan are:

- Make a short-list of preferred types of equity investors and lenders.
- Approach them with a summary of the business proposition.
- Have them sign a confidentiality agreement, send them the business plan, and if possible, make a personal presentation to them.
- The investors will review the plan (often called "due diligence"), which usually includes a site visit.
- If the size of the investment is large, an interested financier will often help to bring in other investors.
- Negotiate the specific terms of the investment, e.g. relative shareholdings or (environmentally conscionable!) modifications of by-laws to meet their concerns.
- Sign the contracts.

GENERAL GUIDELINES

1. Base the financing strategy on the findings of the business plan and design the financing mix (equity, debt, grants and "in-kind") to maintain as much control and flexibility as possible.
2. Financing is a matter of timing and phasing; think carefully about when the funding will be needed and what type of investor would be best suited for each stage of the project.
3. Research potential financing sources to find those that will offer the best terms and most closely share the project's vision.
4. Whenever possible, make personal presentations of the business plan to potential investors to help them fully understand all its aspects.
5. Ensure that sufficient funds are available to complete the project from the outset in order to avoid having to seek additional financing on "desperation terms" later.
6. Keep as much ownership control as possible and make sure that equity partners share the same vision for the ecolodge.
7. Limit debt to levels that can be comfortably serviced even in the face of unfavorable developments.
8. Be candid with potential investors about the potential risks associated with the project so that they will not later be surprised by risks that should have been disclosed to them, since they may take legal or other adverse action as a result.

5.4 ESTABLISHING THE LEGAL ENTITY

A wide variety of options are available for chartering ecolodges. Although the specifics vary considerably from country to country, the basic options for organizing a business are fairly similar. The selection of the specific form of legal organization for the ecolodge will depend on its size, the composition of its ownership, and the objectives of the developers and investors. The terminology and specifics vary considerably across countries and legal systems, but most countries have provisions for some form of:

Sole Proprietorships: Sole proprietorships provide a vehicle for a single individual to do business. They are appropriate only for small operations that the owner can finance from his or her own resources. They have the advantage of simplicity and avoid the problems of double taxation (see below), but they do not shield the owner from lawsuits and do not provide for continuity should the owner die or become incapacitated.

Partnerships: Partnerships are similar to sole proprietorships but have more than one owner and come in many variations. In most cases, the partners share the enterprise's expenses and profits. Profits are usually taxed directly as income to each partner and each partner usually has an unlimited liability for any debts or legal liabilities incurred by the partnership. Partnerships, depending on the specific arrangements, have most of the benefits and drawbacks of a sole proprietorship, but spread among multiple partners.

Privately and Publicly Held Corporations: Corporations are viewed in law as legal persons that can assume obligations and sue and be sued in their own name. Thus, owners of the company (the "shareholders") are protected from legal claims against the company and, therefore, at worst can only lose their investment in the company if it goes bankrupt. Ownership of privately held companies is usually limited to a relatively small number of shareholders (or "stockholders") and restrictions on the sale and purchase of shares in the company normally exist. Ownership shares in publicly held companies, in contrast, are traded on stock exchanges and can be freely bought and sold. Publicly traded companies are usually subject to strict oversight by national regulatory authorities (such as the Securities and Exchange Commission in the United States). It can be quite expensive to meet the incorporation and reporting requirements, so publicly traded companies are usually large. One of the significant disadvantages of the corporate form of ownership is "double taxation," whereby profits are taxed first at the corporate level and then again at the personal level when paid out in the form of dividends to owners.

Cooperatives, Non-Governmental Organizations (NGOs), and Non-Profit Entities: Most countries have legal structures to accommodate entities that are formed primarily to advance the social or other public policy objectives of their members. These organizations have members instead of shareholders and the purpose of the organization usually cannot be aimed at financial gain for its members. They are generally funded by loans and grants from people and organizations that believe in their objectives, since they usually have difficulty raising money from traditional financing sources. They are typically governed by boards of directors who act in the best interests of the organization. Most conservation entities are organized as NGOs or non-profits and many of them operate ecolodges as part of their mission. NGOs and non-profits typically benefit from tax-exemption or other tax benefits.

Developers usually have a clear preference from the outset as to what type of legal structure is best for the planned ecolodge. However, if there is any doubt, qualified lawyers and accountants should be consulted in order to understand all the ramifications of choosing one form of corporate structure over another. In any event, the planned form of corporate structure should be clearly laid out in the business plan so that presentations to potential investors can cover the specific offer being made. For example, will the ecolodge be a partnership or a corporation? How much equity investment or debt financing is being sought? What percentage of ownership will be offered for various levels of equity investment? Will investors be offered seats on the Board of Directors? What collateral will be available for lenders?

Although not always necessary, it is usually advisable to have finalized the paperwork for the legal founding of the ecolodge before approaching potential investors. But at whatever point the legal entity is formed, an experienced lawyer should be used to handle the incorporation or registration process. The money spent to ensure that the proper structure has been created and paperwork filed will avoid many serious problems at later stages. For smaller ventures or community-based ecolodges, it may be possible to get pro bono assistance from NGOs or government agencies, especially if the ecolodge is organized as a non-profit itself.

In setting up the legal entity, the lawyer is likely to consider a number of issues such as:

- **The Social Objective of the Ecolodge:** Will the venture be run as a family business, part of a larger business (such as one of several ecolodges or an adjunct to a tour operation), or will it be a community-run project? The appropriate legal structure for the lodge will depend critically on the answer to these questions.
- **Sources of Financing and Types of Investors:** Equity investors will want to make sure that their interests will be protected in the form of voting rights, management control (e.g. rights to name directors of the company), minimizing liabilities (personal and corporate), opportunities to sell their shares in the company, and opportunities to attract additional capital should that be necessary. Lenders will want to make sure that they have mortgages on real property and safeguards to ensure that they will have first call on assets should the ecolodge run into financial difficulty and have to be liquidated.
- **Provisions for Sharing Future Profits:** Some countries allow for special corporate structures (e.g. "S" Corporations in the United States) for smaller ventures to avoid double taxation of profits. Another issue is profit distributions to the local community and conservation organizations by the ecolodge. In some cases it is advisable to set up a separate legal entity to manage and disburse this money.
- **Tax and Accounting Costs:** Tax and accounting burdens can be simplified depending on the type of organization and its by-laws. Some forms of small business are allowed to keep their books and pay their taxes on a "cash" rather than an "accrual" basis (see below) which can substantially simplify book-keeping requirements. In Brazil, for example, small companies (based on revenues and social objective) can chose a "Simples" tax regime. In this system, the company pays an agreed tax rate on revenue, which replaces both federal and local taxes, usually implying both a lower tax rate and less administrative hassle, but some types of business are excluded.

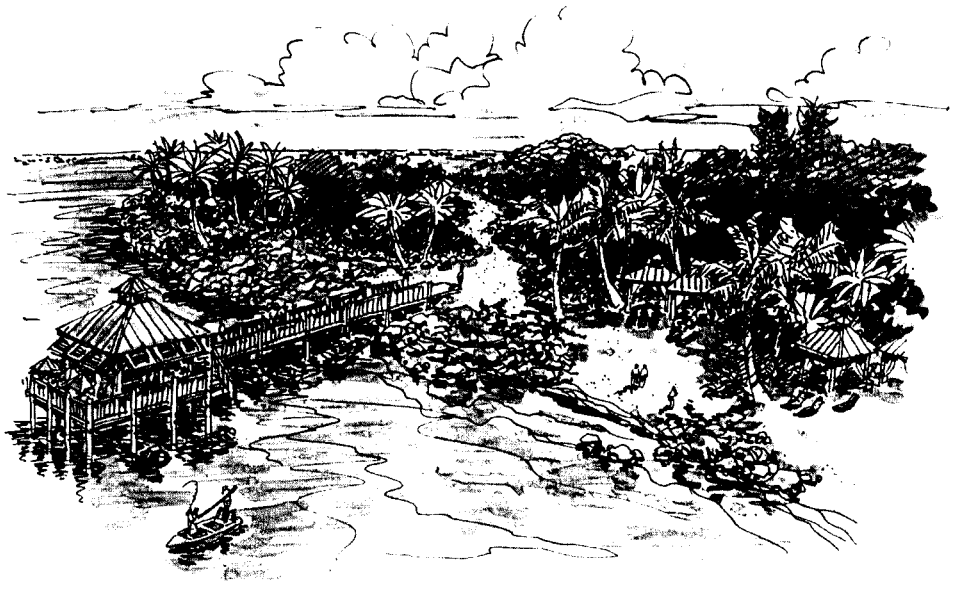
Because it is almost always complicated, the legal entity should be set up with the assistance of a lawyer and an accountant. They will stay abreast of changing requirements in the country and local jurisdictions within which the ecolodge will operate. They will provide guidance on essential steps like drawing up articles of incorporation (if relevant), the organization's by-laws, and registering the lodge with appropriate authorities. They also can ensure that proper record-keeping systems are developed to meet the requirements of relevant government authorities.

Especially for smaller developers who do not have much money for project preparation, many costs can be avoided by gathering all relevant information in advance. Free or low-cost assistance is often provided by business promotion organizations like: chambers of commerce, small enterprise assistance organizations, tourism promotion agencies, and local authorities. Much relevant information is now also available on the internet. The more work that can be done before calling in lawyers and accountants, the more money can be saved and the better the developer will understand the situation.

GENERAL GUIDELINES

1. Be clear from the outset about the ecolodge's economic and social objectives, how it is going to be financed, and how the profits are going to be shared, in order to set up the appropriate legal structure.

2. Evaluate the realistic options you have for alternative forms of legal structure to find the best in terms of their operation and financial consequences.
3. Pick a legal structure that will make potential investors comfortable that their interests will be protected, enhancing the prospects for raising outside capital.
4. Use experienced lawyers and accountants, but do not let them form more complicated structures than necessary for the size and operations of the planned ecolodge.
5. Pay close attention to the recommendations of lawyers and accountants and make sure that all issues and options are explained and fully understood prior to settling on final arrangements.
6. Remember that the form of legal organization can always be changed as the venture grows and requirements evolve.



5.5 ONGOING FINANCIAL MANAGEMENT

Once the ecolodge has been developed and begins operating, a sound accounting system will be important for two reasons:

- **"Financial accounting"** is a legal requirement for tax purposes, and shareholders will insist on accurate record-keeping to monitor their investments.
- **"Managerial accounting"** is essential for managers to track their performance against targets in order to improve planning and control of operations.

Every country has its own laws governing accounting standards;, however, the main effect is on tax-sensitive items like treatment of inventory, depreciation rates, and what items can be expensed in the year incurred versus depreciated over time. Regulations also will specify what records must be kept to verify the accounting process, how often they must be updated, and how long they must be retained to permit audits.

All income and expenditures of a company are registered in a General Ledger (journal) and then attributed to specific accounts, which are organized in relevant categories of cost, income, assets and liabilities. These accounts are called T-accounts, as each has a credit and debit side that must always balance. There is considerable latitude in terms of the amount of detail that is required, and appropriate, for different size ecolodges; but all should aspire to keeping records in a format that meets both financial and managerial accounting requirements.

The financial accounting system will typically provide for at least three basic reporting formats. (See Annex B for illustrative financial reporting formats that are typical for small hotels and motels and can be usefully applied to ecolodges as well). The three basic summary presentations of financial data are:

- **The Balance Sheet:** The balance sheet provides a summary of all assets (e.g. land and buildings, equipment, inventory, cash) and liabilities (e.g. payments due, loans outstanding, equity investments in the company). The purpose of the balance sheet is to provide a "snapshot" of the overall value of the company to its owners at any point in time (usually at the end of the year, and maybe every month or quarter). Total assets and total liabilities (including the value of shareholders equity) must always be equal, hence the term "balance" sheets.
- **The Income Statement:** The income statement shows the flow of revenues and expenditures over a period of time (usually monthly, quarterly and annually). Its purpose is to track how well the company has performed during that period of time. The income statement is based on "accrual principles" that record revenues when they are earned and when expenses are incurred, not when cash payments are actually made. Depreciation is usually the area where accrued expenses deviate the most from actual cash expenses. For example, cash is paid when a large item of equipment is purchased. The equipment, however, will be used to deliver services for many years. As a result, the income statement will spread this expense over the useful life of the equipment to show the real cost of providing the service in that particular year and to present a more accurate view of how well the business is doing.

- **The Cash Flow Statement:** The cash flow statement tracks the actual receipt and disbursement of funds, which may deviate substantially from revenues and expenditures recorded in the income statement. For example, a rapidly growing start-up company may show strong profits on the income statement, but have cash flow problems because it is investing heavily in new equipment. Similarly, guests can be late in paying their bills, or creditors may insist on advance payment for supplies and services because they are not yet confident of the company's prospects. Thus, a company can have high reported profits, but have negative cash flow, or vice versa.

Most countries provide detailed accounting standards that must be followed for tax purposes. Companies that plan to sell stock in public equity markets must usually follow stringent accounting practices, including the hiring of independent auditors. Regardless of size, however, all responsible ecolodges must set up their accounting systems according to the country's regulations, keep all necessary accounting books and paper records, and comply with all obligatory financial and operational reporting for tax, labor, environmental or other requirements.

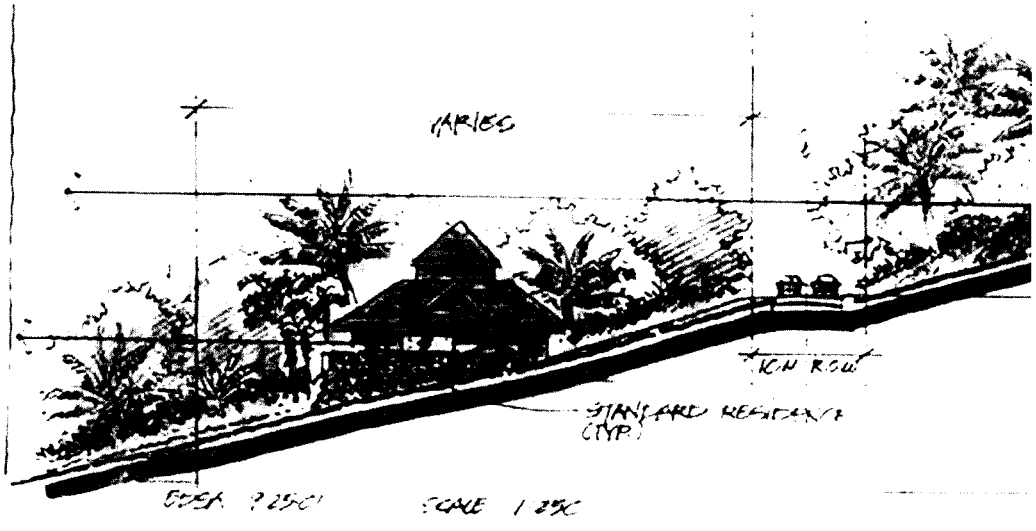
Because of their relatively small size, most ecolodges will use a combination of an internal bookkeeper and an outside accountant. It is important that these two work together to set up a good accounting system that will assist in running the business. A wide variety of software programs are now available to facilitate the creation and day-to-day entry of financial data. Outside accountants can provide useful guidance on software packages that are appropriate for country and facility size. In all cases, however, it will be important to keep systems simple, but to design them so that they can be easily expanded as the ecolodge grows.

The financial accounting system will provide the basic information to plan and implement capital budgeting decisions (i.e. when to expand the operation or make large equipment purchases, and how to finance these expenditures). It also will provide the basis for day-to-day cash management by tracking disbursements and accounts receivable (i.e. money that is owed to the ecolodge) and making sure that appropriate actions are being taken to collect on any outstanding bills.

The managerial accounting system can be much more flexible than the financial accounting system, but should always be based on the financial accounts for accuracy and consistency. The goal of the managerial accounts is to provide managers with information that they need to improve operations and profitability. Typically, the managerial accounting system will attempt to track performance in terms of:

- Cost and income categories that are relevant to ecolodge operation.
- The major variables that have an impact on financial performance.

For ecolodges, managers typically will be interested in the impact of changing occupancy rates on their revenues and expense. Revenues and expenses will usually be further allocated to the major operating departments such as "Rooms," "Food and Beverage," "Excursions," and any relevant "Other" categories. Thus the contribution of each of these departments to profitability can be evaluated both in terms of past performance and by "benchmarking" the ecolodge's performance against industry averages.



In order for the managerial accounting system to be effective, managers must:

- Plan and set budgets.
- Have an effective data entry and processing system.
- Regularly review actual performance against the budget plan.
- Take corrective action and adjust the plan when not meeting budget targets.

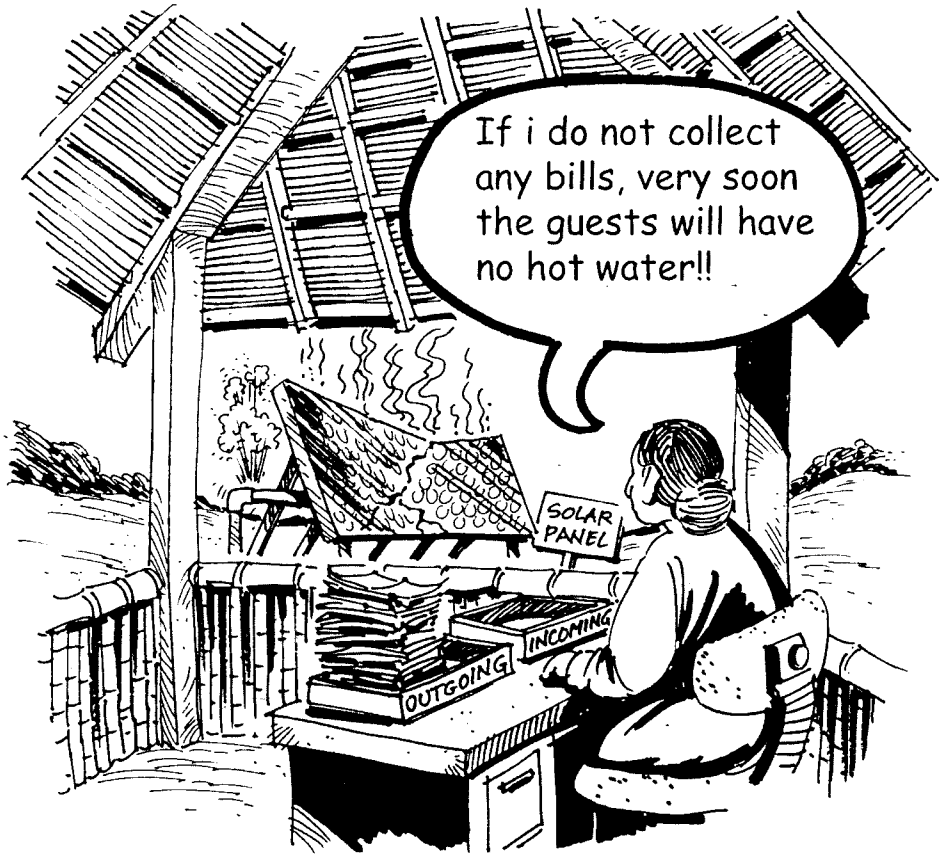
GENERAL GUIDELINES

1. Be familiar with basic financial and managerial accounting methods and terminology.
2. Find an outside accountant with experience in tourism and up-to-date with use of accounting software and legislation.
3. Select and train an internal bookkeeper to work closely with the outside accountant.
4. Set up both financial and managerial accounting systems with an outside accountant and internal bookkeeper.
5. Plan and set budgets, update and review them regularly.
6. Ensure that all employees are aware of the managerial accounting system and receive relevant feedback from it, which will help them understand how well the lodge is doing and how their work contributes.

5.6 RISK MANAGEMENT

Things almost always go wrong. The important thing is taking all sensible preventative measures and knowing what to do if plans don't work out. Ecotourism ventures face multiple risks:

Guest health and safety: Accidents involving guests pose direct risks to the venture's reputation because of adverse publicity and the potential for lawsuits if negligence can be proved on the operator's part. Moreover, serious accidents or deaths can have a devastating adverse impact on the morale of management and staff. Many ecotourism destinations also pose serious public health risks to guests (e.g. malaria, AIDS), which can exacerbate



any existing medical conditions that guests may have. In some areas, threats from guerrillas, bandits or just plain thievery can pose a serious risk for guests' personal safety.

Threats to physical facilities and equipment: Fire and severe weather can destroy buildings in minutes if they are not properly designed and maintained. Much less dramatic but usually more common is deterioration of buildings and equipment from slow-acting forces such as water damage or termites. Recreational equipment is subject to severe wear and tear and potential for loss through theft or carelessness.

Fraud and illegal activities: Employees can threaten the financial health of an operation through fraud, such as embezzlement, or by engaging in illegal activities that may generate adverse publicity or even legal enforcement by the authorities.

GENERAL GUIDELINES

1. Inform guests in advance of public health risks that exist in the area and take all reasonable steps to minimize the chances of exposure by guests and staff.
2. Carefully evaluate the risks posed by all excursions and outside activities and screen guests at the reservation stage for any health or physical limitations that would prevent participation in more strenuous or risky activities.
3. Maintain adequate liability insurance for the business (based on local liability standards).
4. Provide first aid and guest safety training to all relevant staff.
5. Design facilities to minimize risks from natural disasters.
6. Develop a preventive maintenance program for facilities and equipment.
7. Evaluate potential natural and man-made risks and prepare an emergency plan (communicated and drilled) in case something goes wrong, including a public relations response.
8. Stop excursions and even close down the lodge if you think risks are too high to guest health and safety or to equipment and facilities.
9. Set up appropriate financial and personnel policies and procedures to minimize risks of financial mismanagement or illegal staff activities.
10. Encourage any outbound operators with whom you work to maintain appropriate liability insurance for their clients.

5.7 GETTING FINANCIAL AND LEGAL HELP

Using consultants, accountants and lawyers can be expensive. They charge for their time and expertise, but developers and managers can reduce these costs by doing necessary homework and assembling basic information. Business support organizations usually will provide much background information for free or a small charge and many entities now support start-up NGOs or non-profit organizations.

In addition, students in business, accounting, hotel management and tourism programs often need study projects or internships and can be useful in gathering information and for solving particular problems. However, they usually need supervision and clear guidance as to what is needed from them. Increasingly, much of this information is available on the internet. The main sources for advice and information are:

- Owners of established ecolodges
- Local and international ecotourism organizations
- Business schools
- Hotel/tourism schools
- Small business assistance centers
- Other government agencies
- Chambers of commerce
- Local libraries
- Consulting and accounting firms

GENERAL GUIDELINES

1. Evaluate your own capabilities objectively and determine in advance where you can do the planning, accounting and para-legal work yourself and where you will need outside professional assistance.
2. Seek guidance from established ecolodge operators, who usually are the best sources of wisdom and often are willing to share their experiences, especially if you can offer something in return as a potential future colleague.
3. Explore other options for getting free or low-cost technical assistance from government agencies, non-profit groups and students.
4. Interview at least several candidates for any professional assistance you need: check their references and select the most qualified that will fit within your budget.
5. Do as much additional preparatory work as possible before hiring consultants, accountants and lawyers to reduce expenses by making effective use of their time.
6. Give consultants, accountants and lawyers clear terms of reference for what you want them to do for you. Make sure that they give you flexible plans that can evolve as your venture grows, but do not let them over-complicate things.

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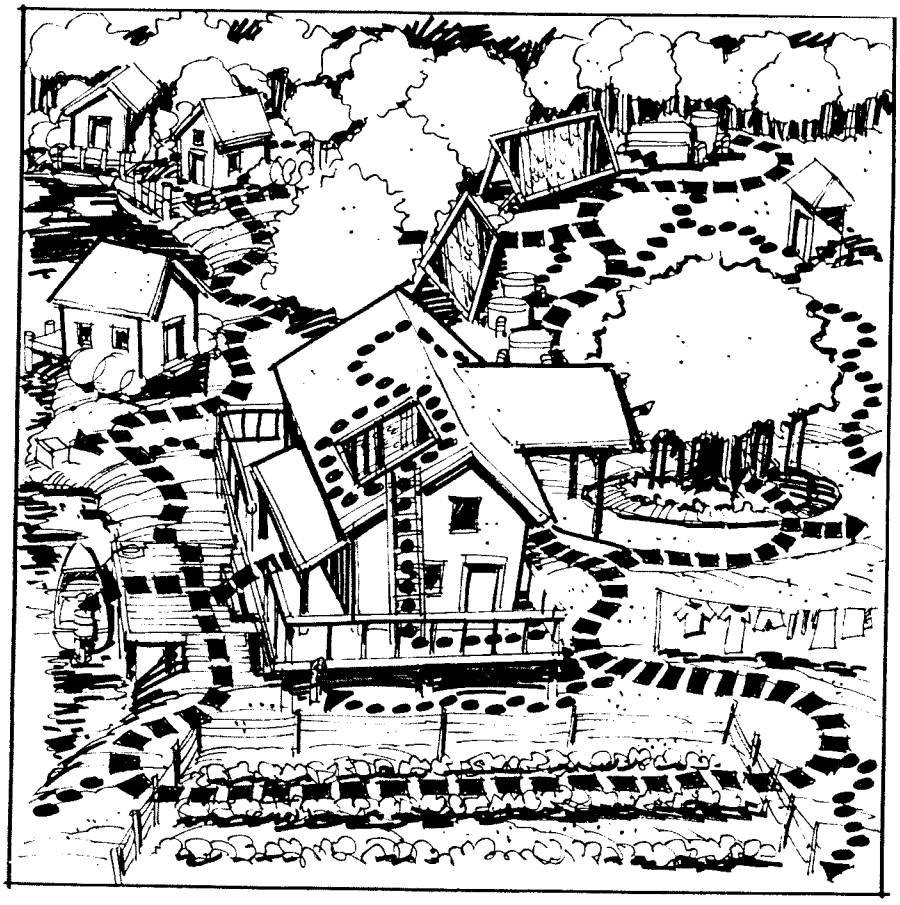
"All ecolodges should be operated on the same basic idea: creature comforts for all the creatures."

—Stanley Selengut



CHAPTER 6

OPERATION AND MANAGEMENT

Karen Lewis
Lapa Rios Ecolodge

CHAPTER CONTENTS

6.0 OPERATION AND MANAGEMENT

6.1 INTRODUCTION

Ecolodge owners and operators are in a unique position to demonstrate the significance and viability of ecotourism practices and concepts through their daily operations. By providing a role model, the owner/operator can ensure that the fundamentals of ecotourism are visible to inspire and educate local communities and officials, and garner accolades and support from guests.

If the ecolodge can successfully convey a commitment to ecotourism through its operations, staff and daily activities, it will benefit from valuable word-of-mouth marketing. Considering the importance of this form of marketing, it should not be underestimated. It is estimated that every satisfied guest tells up to seven friends and relatives of their positive experience, while every dissatisfied guest tells more than 20 people of a negative experience.

The local people are an indispensable resource for an ecolodge's management and operations. The long-term sustainability of the ecolodge and conservation project is substantially dependent on the local community's participation. Land preservation, along with ecotourism, is often done in areas of the world with very low levels of formal public education. Wilderness areas tend to be the least developed, most remote areas in any country; therefore, they are the last places to receive government investments in health, education, electricity, potable water, roads, etc. Education is one of the main mediums that will create successful ecotourism: sustainable development supporting local communities, tourism and land conservation. However, this level of education is unavailable, and therefore it falls to the ecotourism operator or owner to fill this gap.

Unregulated exploitation of wilderness areas is in competition with long-term, sustainable opportunities such as ecotourism. Without an opportunity for education, most locals lack the awareness of options for their futures. Through informal education and on-the-job training, the ecolodge owner provides the community the option of, and perhaps the tools for, sustainable development.

All actions of the ecolodge owner/operator should be in accordance with land conservation. The project's programs and infrastructure should be designed with sound environmental practices. Guests, staff and community members can learn together by participation within these guidelines. Additionally, it is in the ecolodge owner's interest to demonstrate and practice supportive policies for surrounding natural protected areas. Tree planting is a frequently practiced land conservation activity.

Central to sustainability is allegiance to land conservation principles, which have drawn tourists and provided industry to the community. It is through long-term education that the operator, local staff and tourists can embrace this allegiance.

Basic for any program offered to ecolodge guests is the combination of the available natural and cultural resources. Programs can be designed not only with the ecolodge project in mind, but also with consideration of the guests' capacity to participate in conservation projects closer to home. Where possible, the ecolodge can work with other responsible environmental community projects and natural protected areas. This extra step may create some financial gain for the ecolodge, better links with others locally providing environmental awareness, and an expanded experience for the guest.

6.2 MARKET RESEARCH, DIFFERENTIATION AND SEGMENTATION

By clearly identifying the market segments and differentiating the product to meet the needs and requirements of that market segment, the owner/operator can determine the services and products to offer at the ecolodge. Please see Chapter 7 for more details.

Ecotourists usually are curious people who want to learn more about the culture and natural area they are visiting. Your task at this stage is to establish which tourists are likely to be attracted to your development, what they want to do when they get there and how much they will be happy to pay. The more up-market your project, the more sophistication you need to offer, and the higher the capital investment required. Sometimes this is determined by the rarity and perceived value of the experience you are offering

Staff, support, and supply and maintenance costs vary with the range of services offered, but don't over-stretch or over-sell your product. The biggest single cause of client complaint arises from a mismatch between guest's expectations and the reality of a destination — and client access to law courts and the media has never been easier, nor more readily sought. Staff education and training need to live up to the lodge's marketed image, as do the cultural and natural resources you manage. Remember that bad news, however untrue or unjustified, travels faster and farther than good news.

GENERAL GUIDELINES

1. Identify your market segments and their needs and requirements by talking with as many potential clients as possible. Determine the educational level of guest that you want. A more-educated guest is often more widely traveled, and, as a group, these people often have the limitations of age and the higher expectations of the wealthier.
2. Talk with ecotourism travel companies. Find out what the market is "missing" that you could provide, or what "niche" you can fill. Become familiar with ecotourism, environment, hospitality, activity and tourism sites on the internet.
3. Use this market research to develop a range of experiences that will attract a high rate of return visits from your target client group. Your return rate, and the type of clients returning, are key performance benchmarks.
4. Visit other facilities in your country or elsewhere offering what you want to offer. Through conversation learn where their guests come from, what they offer their guests, what they don't or can't offer and why. Visiting events like the World Travel Market can be immensely helpful, as you can chat with hospitality and ecotourism colleagues from around the globe.
5. Be strictly accurate with your marketing. Do not underestimate the damage genuinely unhappy, mischievous or litigious clients can cause. Consider it instead a far wiser policy to tend to gently understate your product, and let happy guests apply the gloss.
6. Be prepared with answers and hands-on service for the continuous guest questions and needs. Although ecolodges are becoming more common travel destinations, guests are still out of their known environment and have greater personal needs.

6.3 MANAGEMENT AND EDUCATION OF THE STAFF

Most ecolodges are homey and small by design. Most likely they are owner-operated and offer personalized service. Operational costs will be greater than standard hotels because more staff are needed, no infrastructure exists and supplying daily needs is often more costly.

Depending on the clients, teaching international hotel standards to community members who have never left their locale takes patience and time. Training takes longer for people who have had little or no formal education. Often, the ecolodge owner will be the hands-on teacher, with multiple demands in various arenas. Our experience has shown that it may, take years of dedication to training before the owner is freed from hands-on, daily commitment. It is difficult to find experienced expertise from outside who can assist in training.

By providing on-the-job training to community members and local guides, a built-in incentive occurs for staff to continually improve in order to retain a competitive job near home. Given that these areas are usually characterized by their subsistence economies, the project is further complicated. By choice most community members will only train and work until they have enough money, at which time they leave. A practical solution is to create a larger group of trained people.

Seeing local people working among them helps match the guest's ideals of being in the wilderness, and being with and learning from community members. Mistakes often include having too many city and outside-educated people on staff who do not mix well with local staff, creating tension.

GENERAL GUIDELINES

1. Seek out inquisitive community members who will make better staff trainees than people with previous experience. Because guests in an ecotourism project will approach staff members at random, select local people who are not shy by nature.

2. Consider and allocate the following basic roles and responsibilities when finding staff (of course, each ecolodge is different):

   a) Communications-marketing
   b) Housekeeping
   c) Reservations
   d) Maintenance
   e) Accounting and bookkeeping
   f) Guide staff for tours
   g) Nature reserve guards and rangers
   h) Bar and restaurant staff
   i) Transportation
   j) Kitchen

3. English, the unofficial language of tourism, is often non-existent in rural communities and in many countries, therefore reservations and reception should require at least one capable bilingual person. Nature guides, restaurant staff and others communicating directly with guests also need enough relevant English.

4. Create teams for various departments where one member evolves into the leader who will eventually become helpful in staff selection, training and management.

5. Having established standards required in each respective department, create systems to ensure that levels of service are kept high. Such systems should include:

6. Organizational charts, lines of authority and responsibility that stress accountability and a strong reward system. Train to reach the goal in which only the leader reports to owner-management. Rural people are accustomed to dealing only with the owner. It takes a long time for staff to trust one another's authority.

7. Strong purchasing and ordering systems. Teach one trustworthy member of each team to be in charge of inventory controls and ordering, with the leader familiar with the routines.

8. Operational checklists and timetables for teams, with hourly and daily expectations. In addition, create a weekly routine, and a monthly and quarterly checklist. With a computer these checklists can begin very simply and be added to as skills are gained. Pictures, wall charts and sketches can assist teams with non-readers with descriptions of the tasks on the various checklists.

9. Consider local or national hotel organizations or bodies that provide specialist staff training for the hospitality industry. Ensure that this training does not contradict the aims and philosophy of your ecotourism project. Joining a national hotel association is a good way to get proper training assistance cheaply.

10. Make sure that outside suppliers have staff with good communication ability, or supply your own.

6.4 BROADER COMMUNITY DEVELOPMENT

Most people in rural communities have had poor or no educational opportunities. Land conservation and sustainable development are concepts from the educated world. With education and time, local residents can understand that their future might lie in conservation. It is imperative that the lodge owner/operator takes the time and effort to fill this gap. This can be achieved by:

GENERAL GUIDELINES

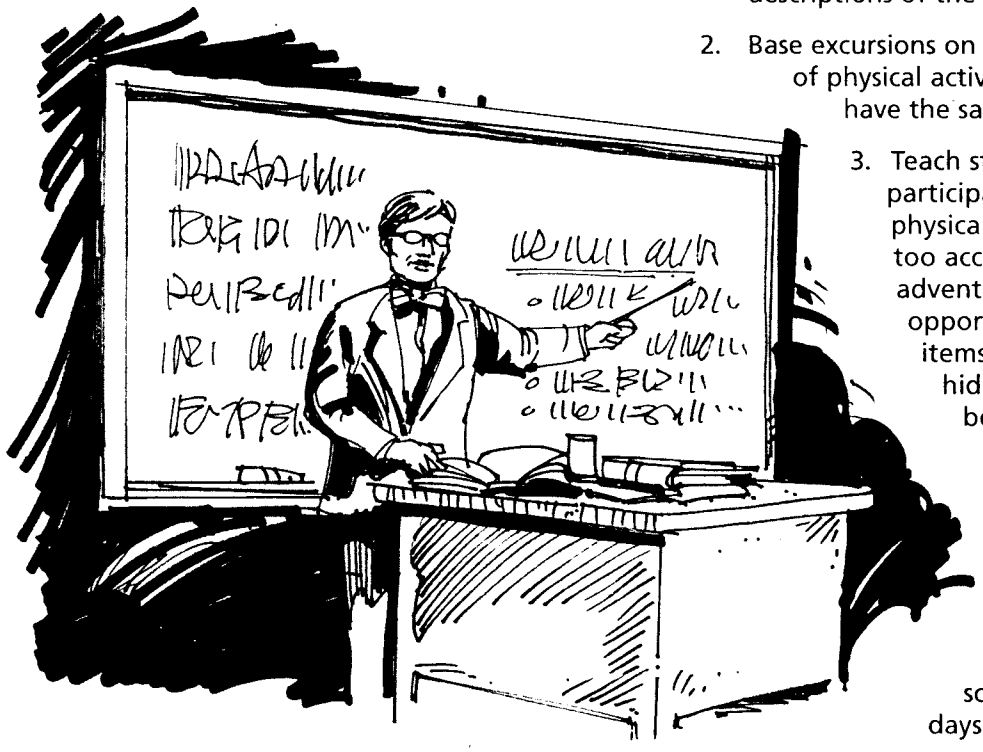
1. Encourage staff members to learn by providing newspapers, books, games, etc. If a teacher can be found, offer formal education and school supplies for staff members. If the ecolodge has electricity, provide lighting for staff.
2. Provide time off for parents to support their children's educational programs.
3. Have guests and visitors contribute to staff education and community developmental projects involving education.
4. Set up an after-hours program for English as a second language. Try to attract a college graduate trained in the program to participate for one year in exchange for room and board for a year's practical experience.
5. Consider the participation of professional naturalist guides that quite often accompany organized groups. They could assist in the training of local personnel regarding guiding and interpretation techniques. Moreover, this will reinforce the teamwork relationship between local and company guides.

6.5 GUESTS PROGRAM

A positive side to ecotourism are the ever-curious guests — they usually want many and varied opportunities to be with local residents in their environment. They expect to see, hear, smell, touch and sense everything as new. The larger the program combining culture with the natural area, the more satisfied the client, especially if the ecolodge has its own natural protected area. It is to the benefit of the ecolodge owner and community's acceptance of sustainability to promote the uniqueness of a cultural and natural area being protected.

GENERAL GUIDELINES

1. Include written material with reservations in order for guests to learn in advance about tour experiences, community involvement in which they can participate, etc. Provide site maps for everyone with detailed explanations upon check-in. In the communal areas of the ecolodge and in the guests quarters, provide written descriptions of the tours available.
2. Base excursions on different interests and levels of physical activity, as guests don't necessarily have the same interests or abilities.
3. Teach staff to encourage guests to participate, regardless of their age or physical abilities — many tourists are too accustomed to lectures about adventures instead of hands-on opportunities. For this reason, items such as telescopes, bird hides, a weather-station or beehive can act as interesting and educational ice-breakers. Set these items up during communal times to combine guests and guide staff with natural surroundings.
4. Provide a rotating schedule of tours over several days, taking into mind the guests' average stay; include opportunities for everyone every day.



5. Design the program around community members who are trained to communicate what they know about the area and its diverse uniqueness; local guides add more credibility to ecotourism than university-trained professionals from the city. Keep guest numbers low for each excursion (it is more difficult for guides speaking in a new language to manage more than six to eight people); offer a sign-up sheet to maintain maximums on tours; encourage guides to mingle with guests during communal hours.

6. Offer conveniences and equipment for guests, which they might not have brought with them: rubber boots, reef walkers, rain slickers, wind breakers, mittens, flashlights, walking sticks, water bottles, binoculars, a quality telescope, guide books for the local flora, fauna, geology, etc. These services can be offered for loan or for purchase (perhaps as branded souvenirs).

7. Support other projects or activities offering guests experiences to learn about the culture and other natural preserves in the area. Support and demonstrate those projects, encouraging local residents to use their environment in sound ways — vanilla farming from the existing rainforest on a local cattle farm; tree/plant nurseries of indigenous materials to be used in reforestation; butterfly farms, etc.

8. Offer a tour for guests to contribute their talents (and donations) to any community development projects supported by the ecolodge.

9. Promote a system for guests to contribute financially in the ongoing purchase and maintenance of the natural area protected by the ecolodge. There should be fail-safe opportunities for guests to contribute not only to ecolodge programs of conservation, but to community-based or regional programs too. Give them a range of choices and ensure that all donations are visibly spent on the projects being promoted. Keeping records of donations and expenditures, as well as photographs of progress, may be very useful for making reports that help promote the ecolodge.

10. Offer an experience for guests to help in hands-on work if the ecolodge is promoting land preservation and restoration. If the ecolodge has used renewable resources from the area, have guests help in the maintenance

of the areas where products are growing; offer other ways to prompt guests into thinking about how they can contribute to sustainability in their own communities.

11. Establish a program of special visits to the ecolodge (familiarization, or "fam" trips) for local government authorities and other influential institutions or individuals that could contribute either economic support or official endorsement/protection of the area and its conservation projects through ecotourism. This also could include other economic sectors that could potentially pose a problem or obstacle or present an opportunity for ecolodge development and continuity.

12. Contact universities, research institutions or perhaps neighboring conglomerates and make contacts and inquiries regarding opportunities for actual or sponsored scientific research on your site, and discuss the possibility of guest assistance with potential study directors.

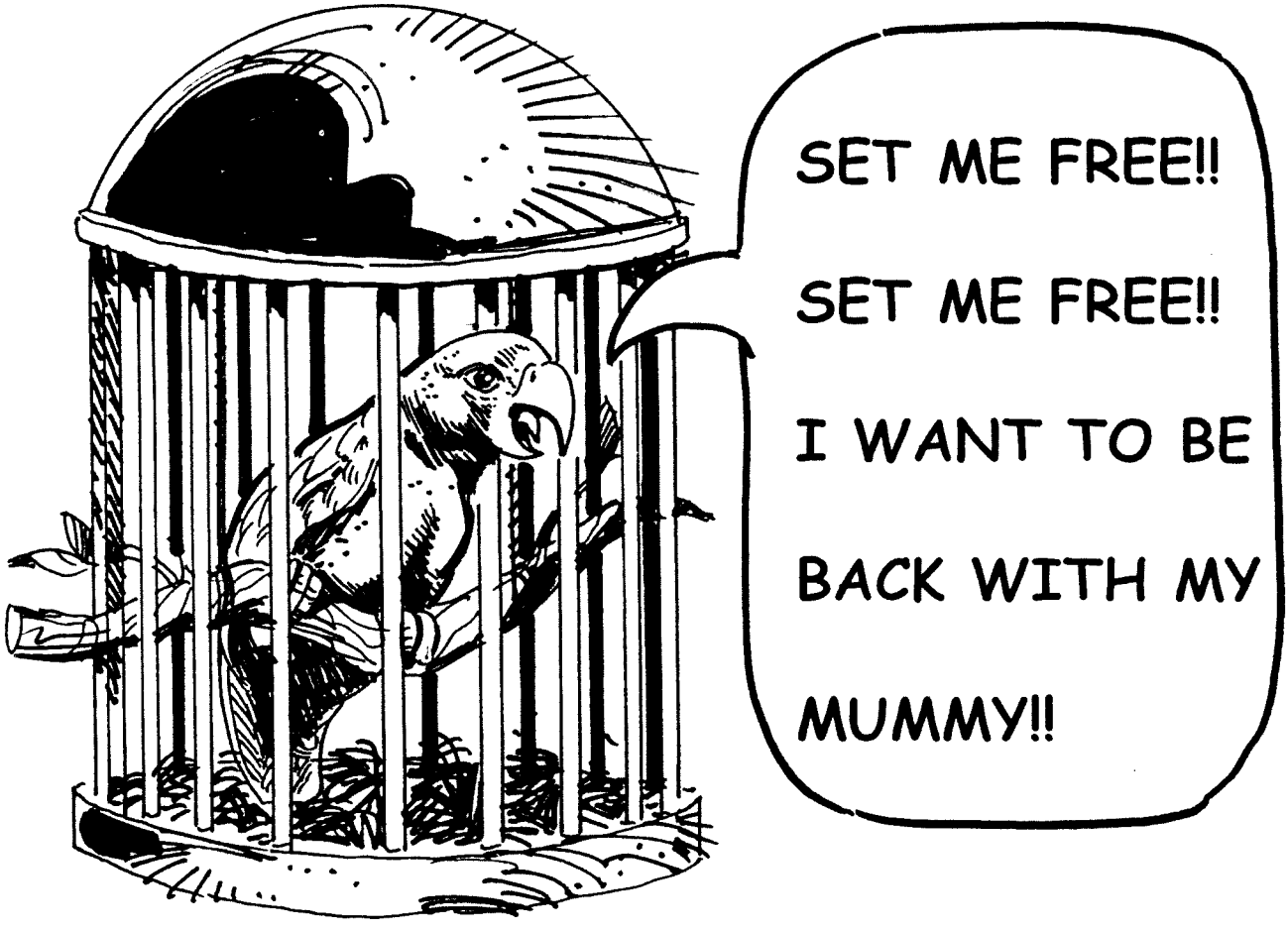
6.6 ENVIRONMENTAL PRACTICES AND PROGRAMS

By creating an environmental standard for the ecolodge, and publishing its intentions, staff and guests both are bound, by their presence, to participate. Regrettably, apathy and corruption toward the environment continues in many rural and wilderness locations. Conscience-raising and role modeling by an ecolodge dedicated to regional education is the beginning to land sustainability as a grass-roots economic choice.

On the positive side, most ecotourists are familiar with caring for their surroundings. Many EU countries and US states provide or require a measure of recycling and energy conservation. In some more advanced metropolitan areas, wind and photovoltaic energy are being made available to consumers. Their presence validates a true ecolodge's standards and demonstrates to the locals that other people care about the remote community and its surroundings.

GENERAL GUIDELINES

1. Keep neither caged birds nor animals; feed nothing from the wild; avoid permitting pet cats or dogs.



2. Demonstrate a "what's really needed" approach by refusing disposable containers in the project; offer no carryout restaurant or bar purchases to visitors.

3. Offer flashlights and rechargeable batteries to guests and dispose of spent batteries, and create an electrical system based on need, not want. Batteries should be reconditionable, or recycled wherever possible.

4. Avoid food waste by recommending that guests request smaller portions if serving menu style; create menus that use leftovers from the kitchen into soups, salads, etc. (not recommended for buffet-style service); teach portion controls to staff:

5. Insist on recycling everything: plate scraps to local farmers; compost all peelings; reuse paper; cart out plastics, bottles, paper or metal in empty vehicles going to cities with recycling centers, etc.

6. Demonstrate new ideas:
   a) Alternative energy sources such as solar-heated water and electricity, solar ovens, wind-generating electricity for water pumping, hydro power and solar pumps.
   b) More efficient means for food transportation (e.g. build an old-fashioned ice box or Coolgardie Safe*) and food storage techniques (e.g. super insulate a small space for cold fruit and vegetable storage and run a 110-watt, 5,000 BTU air conditioner).
   c) Use of biodegradable detergents, disposals of used oils, chemicals (paint, thinners, etc.).

7. Consider becoming the community standard-bearer in reporting illegal hunting, marine life gathering, trapping of animals and insects, reptile poaching or any kind of pollution of rivers, oceans, beaches, forests and deserts. The list of responsibilities you could take on is largely dependent on your circumstances: disregard by developers for building set backs, poor waste/water systems, erosion problems, noise pollution, non-licensed lumbering, collecting of any kind, trespassers, etc.

8. Be a model environmental steward — stooping to pick up litter (often rural communities rely on the rains or other natural methods to cleanse their environment); stop vehicles or boats when people toss trash out of them.

* A Coolgardie Safe is basically a cabinet with fly-screen sides covered in a cotton or linen cloth that sits in a tray of water. The water is drawn up to the top of the cloth and evaporates with the help of any breezes passing through the linen, cooling the food on the shelves inside. You can build this to any scale and it will work well as long as you keep the water supplied to the bottom of the cloth via a tray (or guttering).

REFERENCES

As ecolodge management is a relatively new field, very little known literature exists on the operations nd management of ecolodges aside from that written by Karen Fletcher. The best references are, in this case, the owners and managers of ecolodges. On the following page is a short list of contacts of well-known ecolodge owners/operators, who may able to provide some help with specific inquiries. Please be aware of different time zones and other courtesies when contacting people for advice.

1. Fletcher, Karen. (1997). Striving for Excellence: Communicating Environmental Quality in the Hotel Industry. London: International Hotels Environment Initiative (15-16 Cornwall Tce. Regent's Park, London NW1 4QP UK)

LIST OF ECOLODGE OWNERS/OPERATORS:

	Name	Ecolodge	E-mail
1.	Stanley Selengut	Maho Bay Camps	stansel@hamptons.com
2.	Jacques van Egeraat	Amazonat Jungle Lodge	amazonat@argo.com.br
3.	Paul Beaver	Tahuayo Lodge	paul.beaver@gte.net
4.	Daniel Koupermann	Kapawi Lodge	dkoupermann@canodros.com
5.	Monique Howells	Lamanai Outpost Lodge	lamanai@btl.net
6.	John Lewis	Lapa Rios	john@laparios.com
7.	Chandra de Silva	Ranweli Holiday Village	ranweli@sri.lanka.net
8.	David Kagan	Lodge at Pico Bonito	dmkagan@ix.netcom.com
9.	Albert C.K. Teo	Sukau Rainforest Lodge	albert@borneoecotours.com
10.	Randy Kapeshit	Cree Village Ecolodge	info@creevillage.com
11.	Max Gunther	Explorer's Inn	safaris@amauta.rcp.net.pe
12.	Raul Arias De Para	Canopy Tower	stay@canopytower.com
13.	Stephen Stroud	Hacienda Baru	sstroud@racsa.co.cr
14.	Shireen Aga	Hotel Mocking Bird Hill	mockbrd@cwjamaica.com
15.	Mick Fleming	The Lodge at Chaa Creek	reservations@chaacreek.com
16.	Michael L. Hartman	Tiamo Resorts	mail@tiamoresorts.com
17.	Babu Varghese	Tourindia Treehouse	tourindia@vsnl.com
18.	Karl Plunkett	Ecobeach	ecobeach@bigpond.com
19.	Sibylle Riedmiller	Chumbe Island Lodge	sibylle@kaributanga.com
20.	Pierre Knockhart	Centro Neo-Tropico	magistra@sol.racsa.co.cr
21.	Stefano Cheli	Tortilis Camp	safaris@chelipeacock.co.ke
22.	Amos Bien	Rara Avis	raraavis@racsa.co.cr
23.	Ron Clarke	Couran Cove Resort	enquiry@couran-cove.com.au
24.	Marcello Murzilli	Hotelito Desconocido	hotelito@pvnet.com.mx
25.	Caligo Ventures	Asa Wright Nature Center	asawright@caligo.com
26.	Kurt Holle	Posadas Amazonas	kholle@rainforest.com.pr
27.	Kaye Bishop	Kingfisher Bay Resort	kaye_bishop@kingfisherbay.com

"The real travel product lies in the human mind and heart — in the impressions, knowledge, understanding, appreciation, insight, friendships and memories the traveler acquires."

—S. Kameda

CHAPTER 7

MARKETING AND PROMOTION

Terry Pratt
Horizontes Nature Tours

CHAPTER CONTENTS

7.0 MARKETING AND PROMOTION

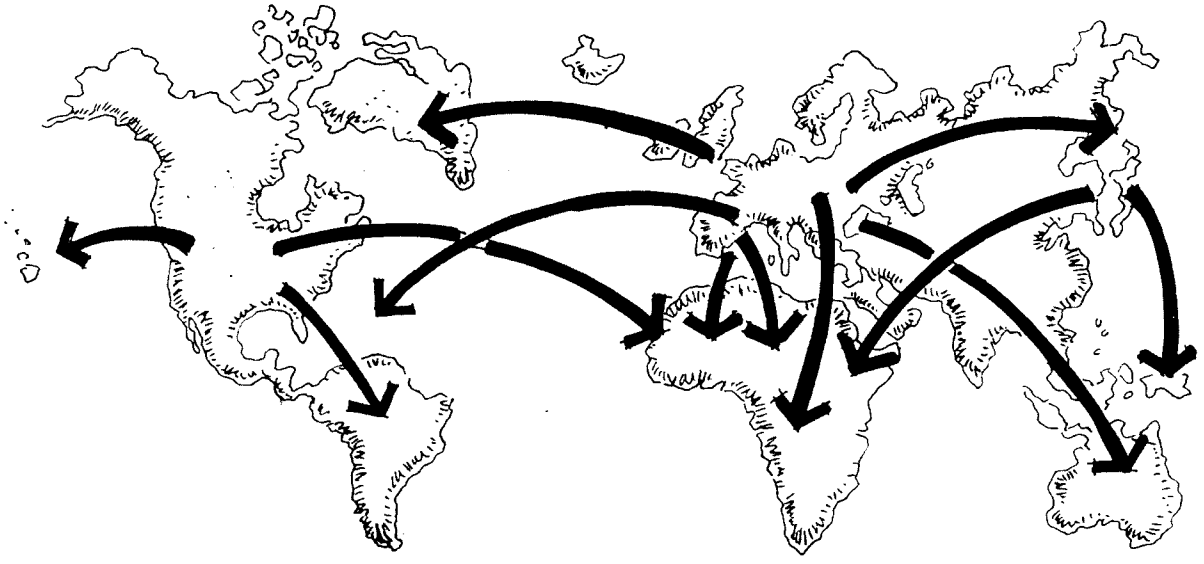
7.1 INTRODUCTION

Ecotourism draws from a definite and growing market, yet it continues to be a niche market within the global tourism context. Therefore, it is fundamental to familiarize yourself with the major outbound regions of the world such as USA, Germany, France, England, Holland, Spain, Italy and Japan, among others, and with the profile of your prospective clients.

Compared to conventional lodging, ecolodge marketing demands an ethical and honest presentation of the product and a greater degree of responsibility in the use and management of resources.

This chapter is divided into four main categories:

- Market Research and Product Analysis
- Preparation of Informative Materials
- Promotion Strategies
- Operation Marketing



Generally, the ecotourist is well-educated (a much higher percentage of post-graduate education than national averages), well-traveled (takes two or more trips per year), and has a higher family income than the national average. As a group, they are well-read on the destination, between 30 and 65 years of age, and interested in enriching, learning experiences.

In addition to the ecotourism niche market, a large market of "potential travelers" with a budding interest in nature-based and adventure tourism can potentially be converted into true ecotourists. This segment of the market is a more conventional travel audience, one that requires a more sophisticated level of promotion, both in terms of content and quality.

Ecolodges also provide a market for usually conventional, high-income tourists, who from time to time wish to experience ecotourism, sometimes as a two- or three-day extension of a traditional holiday. These travelers appreciate traditional (indigenous) styles, natural materials and other typical characteristics of ecolodges, but require a high level of comfort and some understated luxury. The size of this market segment also needs to be investigated, along with your ecolodge's capacity to cater for these people — will doing so unacceptably compromise the project's values?

7.2 MARKET RESEARCH AND PRODUCT ANALYSIS

The supply of tourism products has increased significantly, a fact which forces us to be increasingly demanding and careful of our own product, and to seek out the best counsel in that regard. To develop an effective marketing plan, it is extremely important to have a clear definition of your product and of your target market; this is achieved through product diagnosis and market research.

Once the product and services are defined, it is necessary to promote and operate them in a way that not only creates appropriate expectations on the part of your target market and the client you have profiled, but also fulfils those expectations. Due to the increasing popularity of ecotourism, some conventional operators offer "eco" packages, without having experience or adequate knowledge to operate them. Authentic ecotourism projects need to take the utmost care with the content and presentation of promotional materials, with direct contact with the client and intermediaries, and with the constant evaluation and updating of products and services, and to ensure delivery of what is being offered.

An excellent product analysis is one of the most important aspects of a good marketing plan. Ideally, it should be done before construction and be geared to the particular lodge's economic resources, setting, etc., and used as an aid in product planning. When conducting this in-depth analysis, it is important to cover all factors of potential interest to your target market(s).

In general terms, the newer and wilder the destination, and the fewer amenities, the more limited the market and the lower expectations of potential clients in regards to comfort. Hard core birders, for example, are often pioneer travelers to untried destinations. Most of them will sleep in very rustic conditions, eat very basic food and suffer poor weather and other discomforts in order to add new species to their list.

As a destination becomes popular and matures, it attracts clients from the much broader segment of the market mentioned earlier. These clients are defined as "soft" ecotourists and they tend to expect much greater comfort levels. Your product analysis will help greatly in determining what market share you can reasonably go after. Again, the more detailed it is, the better.

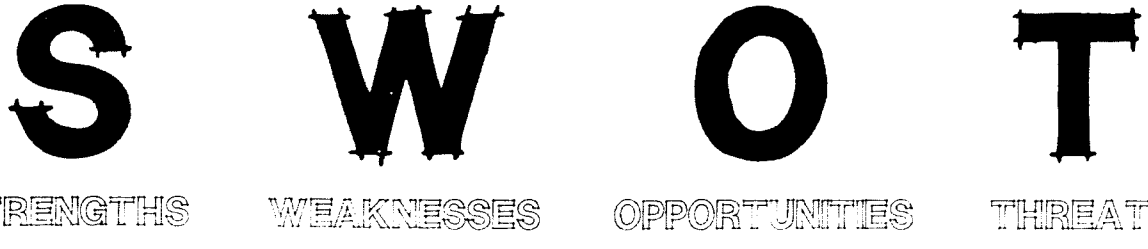
The analysis becomes the basis for developing a marketing and promotional plan that technically orients the future of your business for a significant period of time.

GENERAL GUIDELINES

1. Do an in-depth study of your target market(s). Obtain up-to-date statistics and consumer profiles from:
   a) The World Tourism Organization or the World Travel and Tourism Council for global statistics. Do note that these are country-based, rather than niche-based statistics, which makes them much less useful than other sources. Australia is great for niche records.
   b) Competing destinations' national figures, from personal contacts in those countries or from their respective tourist boards (the internet can be useful here).
   c) The overseas offices of the national tourist board, for local data.
   d) Similar lodges in your own destination and in other destinations.
   e) Experienced inbound tour operators.
2. Subscribe to travel and conservation magazines and newsletters from your target market; compile a database of magazines, writers and editors to whom you will send press releases (local and international).

EUREKA!! A NEW BIRDIE FOR THE BOOKS!!

3. Join organizations that are excellent resources for their members:
   a) The International Ecotourism Society
   b) The International Hotels Environment Initiative
   c) Local hotel association
   d) Local ecotourism association
   e) National tourism organizations.
   f) Local association of tourism professionals
   g) Local conservation organizations
   h) Internet companies who have access to a large online community, membership, travel writers, and experts (no need to join but to simply share information and content that can then be used in the web).
4. Identify the major outbound operators of nature-based, cultural and soft-adventure tourism from your target markets and find out who their local operators are:
   a) Prepare a questionnaire and interview those local inbound operators; also present them with the reasons your lodge should be included in their programs for wholesalers and in their offering for individual travelers. Be prepared with copies of all your promotional and informative materials, information on staff training, safety, emergency plans, insurance, etc.
   b) Offer to cooperate with the local operator's promotional efforts and budget by providing courtesy lodging for international writers, photographers and film crews, sales staff of outbound operators, travel agents, and local operator sales staff. Include internet companies that can offer free travel to their members and in turn promote your destination and lodge.
5. Set up meetings with your national tourist board:
   a) Do the same presentation you did for the local operator.
   b) Request a copy of the national marketing plan, if available.
   c) Request contact information for all trade shows in which the tourist boards will be participating.
   d) Ask to be on the mailing list for all training sessions in marketing that the tourist board offers.
6. Choose a few successful ecolodges from around the world and try to discover the most important elements of their marketing plan.
7. Research possibilities for cooperative marketing.
8. Meet with owners of lodges and other tourism-related businesses in your area and present them with your ideas (something concrete, not vague) for a joint marketing effort.
9. Establish marketing alliances with other ecolodges in other ecosystems in or outside the country, to develop joint marketing projects such as a slide or video presentation to show to guests (or at trade shows). That way, ecotourists could be sold on visiting other ecolodges. A commission could be established for those referrals/sales, making it a win-win relationship between ecolodges with similar high quality standards.
10. Visit the tourism and marketing school of your local university or community college. Ask permission to use their library to study the theory of marketing.
11. Offer to take on a marketing student for his/her practical work and assign that person to help with your marketing plan
12. Do a detailed analysis of your product on the basis of your market study, within the context of all factors covered in these guidelines. Typically, this will include the environmental and cultural impacts of construction and operation; natural attractions (native flora and fauna, geological formations, etc.), as well as historic and cultural values, appropriate architecture and landscaping and so on.
13. Conduct a joint analysis for the area using an exercise called a SWOT Analysis, in which you list, one at a time, the Strengths, Weaknesses, Opportunities and Threats of a situation. The first are internal factors of the business over which you have control and the last are external factors over which you have no control except as to how you react to them.



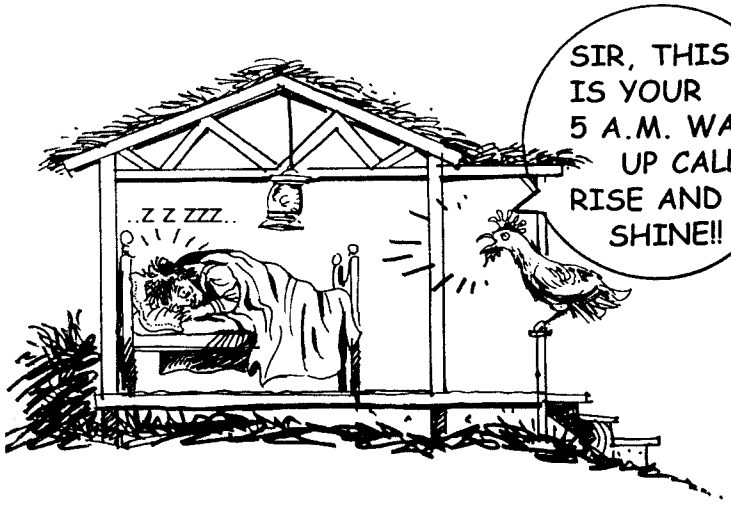
14. Offer those things, which are unique to your project — services, activities and attractions that are truly "memorable" and will remain in the hearts and souls of your clients, thus promoting conservation.

15. Include the following factors when conducting a detailed analysis. They are intended only as a basis from which to work. It is strongly recommended that lodge owners seek assistance in order to do the best analysis possible. This will aid not only in aligning your product with your target market but also in determining the price that can be set for the value offered.

    a) Physical Structure of Lodge
        i) Style of construction; what materials were used (woods, concrete, etc.)
        ii) Measures for minimizing environmental impact during construction (See Chapter 2)
        iii) Operational factors that minimize environmental impact (See Chapter 2)
        iv) Construction and operational factors that maximize guest comfort and safety, such as lighting in rooms, bathrooms, public areas and grounds, measures for extreme temperature conditions (cross ventilation, wall, floor or ceiling fans, a/c, heaters, fireplaces, storm shutters, etc.)
        v) Fire control (extinguishers, emergency plan, trained staff, etc.), flood control, earthquake emergency plan, etc.
        vi) Detailed description of public areas such as reception, indoor and outdoor sitting areas, verandas, meeting rooms, pathways (earth, concrete wooden, elevated, covered, open, etc.), stairs, elevators, restaurant, bar, pool, docks or piers, parking, shops, etc.
        vii) History — who built it, their commitment to the local environment, etc. (i.e. son inherited lodge from father who was a pioneer in the region)

    b) Rooms
        i) Number of rooms and distribution — ground floor, second floor, access, separate cabins, separate units with several (#) of rooms per unit, distances from each other, from main reception/dining area
        ii) Number and style of beds per room
        iii) Whether extra beds are available
        iv) Number and location of windows, type of window coverings, screening, glass, shades, curtains, etc.
        v) Type of bathroom facilities, including whether they are shared or private, size, construction material (concrete, wood, tile, etc.) amount of available surface space, mirrors, lighting, shower or tub, hot and/or cold water, flush toilets, waste disposal
        vi) Closets, table surface and other storage (including safety deposit box)
        vii) Location of light switches and fan controls
        viii) Degree of noise insulation between rooms to ensure restful sleep (important for all markets but particularly seniors, families, honeymooners)
        ix) Decorations: related to local culture (such as indigenous art), environmentally friendly (such as non-bleached cotton sheets, wicker lampshades from materials harvested sustainably from the rainforest), etc.
        x) Your policy to reuse towels to conserve energy and water
        xi) Are children/infants welcome?
        xii) Mosquito nets
        xiii) Modern conveniences — outline your balance with the traditional

    c) Services and Communication
        i) Staff with more than one language and good verbal communication/socialization skills. Also possibly interpretation or animation techniques/skills
        ii) Map and other information on local area. "Interactive" or "testimonial" maps are useful, which are sufficiently large and clear for ecotourists to record the places where they saw a particular plant or animal species or did something worth recording on their personal map.
        iii) Shop with basic necessities (personal care, first aid, etc.)
        iv) Laundry, security guards, safety deposit boxes, doctor on call
        v) Room service, picnic lunches, wake-up call



vi) Tour arrangements, transportation rental (car, boat, kayak, dugout canoe, camel or even yak!)

vii) Telephone, fax, computer (email, internet), television, video, slide projector, screen, etc.

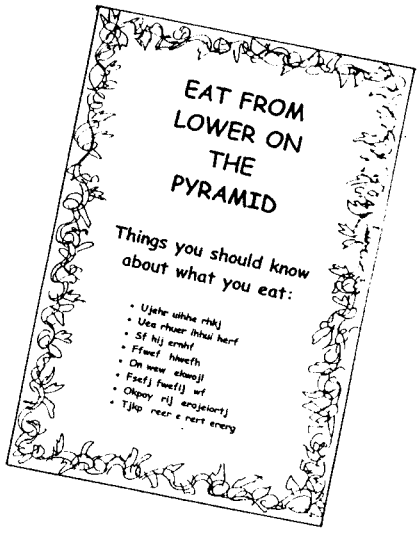
viii) Food — vegetarian, vegan, own-grown, seasonal or local produce?

d) Factors Pertinent to Target Markets

i) Natural History
- Library of books on natural history, local history and culture
- Slide or video presentation as orientation on the natural area
- Available information on local nature reserves and park, times of operation, costs, what services are available
- If the lodge has its own nature reserve — resident guide, self-guiding interpretative trail pamphlets, well-marked trails with map, list of common birds, animals, plants, etc.
- Orientation on safety in the natural area

ii) Seniors
- Menu (less salt, spice). Medical list of food cautions.
- Amount of exertion required to reach the lodge, use trails, get around the facility
- Listing of area services offered (such as doctors, pharmacies, gift shops, post office, etc.) and how to contact them or get to them
- Plan staff training for emergency medical situations or evacuation
- Grip bars, non-slip mats or stripping in showers or baths
- Bright lighting in common areas and in rooms

iii) Family Market:
- Activities for children, babysitting
- A crèche
- Children's medicines in lodge first aid kit
- Night lights, childproof sockets
- Railings with narrow uprights (so children can't squeeze through) in any area where a fall could happen
- Orientation of potential dangers in the natural area (plants, bugs and other non-edibles)
- Shallow children's area, if lodge has a pool
- Child-sized life jackets if lodge uses boats for access and / or tours
- Games
- Menu, portion size, special prices or free sleeping in room with parents

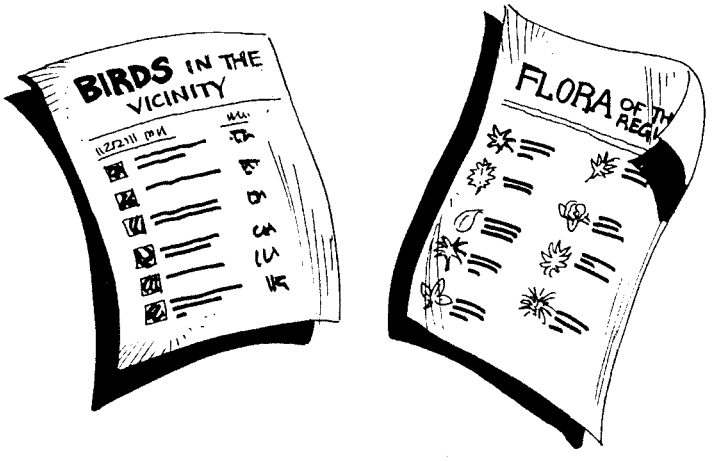


iv) Evaluation of Staff
- Locally hired
- Equal opportunity for women
- Level of training
- Employment conditions, salary, working conditions, benefits, incentives, etc.
- Opportunities for future development
- Baby sitting — can staff be trusted with taking care of clients' children?

v) Comparative Analysis
- Compare your lodge to others in the area or others in successful eco-destinations that are similar to your own (rainforest, desert, alpine, etc.)
- Propose staff exchange with other ecolodges as incentives.

vi) Analyze Uniqueness of Lodge
- Location — in the treetops of the rainforest, on the Arctic Circle, on stilts in a mangrove
- Architecture — igloo, yurt, tent camp, adobe hut, etc.
- Construction materials — all recycled, sustainably harvested, locally produced or grown (e.g. adobe blocks, bamboo, thatch)
- Decorations — paintings by local school children, traditional woven materials, etc.

vii) Analysis of Natural and Cultural Resources
- Do an inventory (using university biology, sociology, anthropology, etc., students in exchange for lodging and meals) — of the natural and cultural resources in the area of your lodge that are accessible to your guests (your own reserve, a nearby national park, the local village, etc.)



7.3 PREPARATION OF INFORMATIVE MATERIALS

In order to market your ecolodge, you will need to prepare promotional materials that persuade your target consumers to buy. Also prepare descriptive materials, pricing and policies that help intermediaries (travel agents, etc.) to sell your ecolodge; materials that inform guests about the services you offer; and others that help to interpret the natural and cultural values of your local environment.

These materials may be in printed form (brochure, information packages for tour operators, pre-departure information for consumers, press releases, etc.), audio-visual (a videocassette, for example) or electronic (website). Remember that some messages are inherent — for example, the use of recycled paper or non-toxic inks will testify to your eco-practices. However, don't be afraid to include a written testimonial — briefly in your promotional brochure, and in some depth in your guest room materials — explaining how you conform to these ecolodge guidelines.

The ecolodge should aim toward cross-platform transferable materials (TIF, JPG, GIF, PDF, RIF) that can be used for the web, radio-friendly TV messages, brochures, etc.

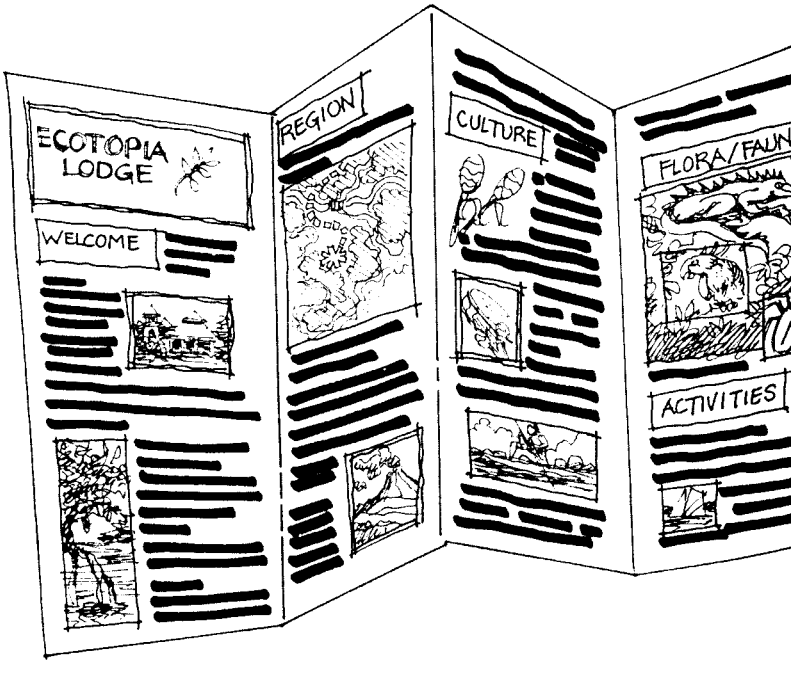
GENERAL GUIDELINES

1. Develop a logo and corporate image to be incorporated into business cards, letterhead, T-shirts, envelopes, fax paper, invoices, receipts, brochure, website, etc.

2. Use your market study and product analysis as a basis on which to prepare informative materials, in the language of your principal market — able to satisfy varying levels of interest. These materials should include (but are not necessarily limited to):

   a) Brochure

   Be sure to include photo of rooms, locals, public areas, natural attraction, basic information on setting, accessibility, facilities (how many rooms, private bath, etc.), services and activities, and contact information. This brochure can be 2-color if 4-color is too expensive. Profile the lodge, its development history, mission statement, and how it is environmentally and culturally responsible. Ideally, hire professionals to design and write it and another to help you plan local and international distribution. The written language (English, German, French, etc.) needs to be perfect to properly communicate with potential clients.



b) Website

Today's traveler is doing more and more research on the web. It is imperative to have a website that clearly and honestly depicts your lodge. The site should include the same information as your printed brochure, yet be presented in an easily "navigable" manner. Consult an expert who will help you design a website that includes, but is not limited to, the following characteristics:

i) Downloads and moves between screens very quickly
ii) Has a clear and easy-to-use navigation bar
iii) Is interactive enough to keep the visitor interested
iv) Includes a "Frequently Asked Questions" section
v) Includes your lodge's contact information on every screen, allowing potential clients to e-mail you with questions
vi) Has automatic e-mail response
vii) May include guest comments and testimonials from happy, past clients
viii) Has online reservation capabilities
ix) May have online payment capabilities (requires security)
x) Has links to websites with general information on the country
xi) May have links to websites of outbound operators whose programs include your lodge
xii) May have links to ecotourism organizations to which you belong

c) Price list

Rack rates (what you charge to the general public), commissions (what you pay to a travel agent, usually around 10%), and net rates (what you charge to tour operators, usually 25 to 35% less than the rack rate according to volume of rooms sold). Include off-season rates, student rates, group rates, policies on lodging and meals for guides and drivers, reservation, cancellation and payment policies. The price list should be on a separate sheet of paper, not in the brochure, so that any changes in rates does not mean having to print a new brochure or correct the existing one. Furthermore, when possible avoid posting the rates on the door of the room, as this can create conflicts with guests, travel agents, wholesalers, operators, etc., regarding the rate they gave their customers. Obviously, such a circumstance does not occur when the accommodations are part of a larger package arrangement.

d) A folder or attractive envelope for presenting all these materials (recycled paper).

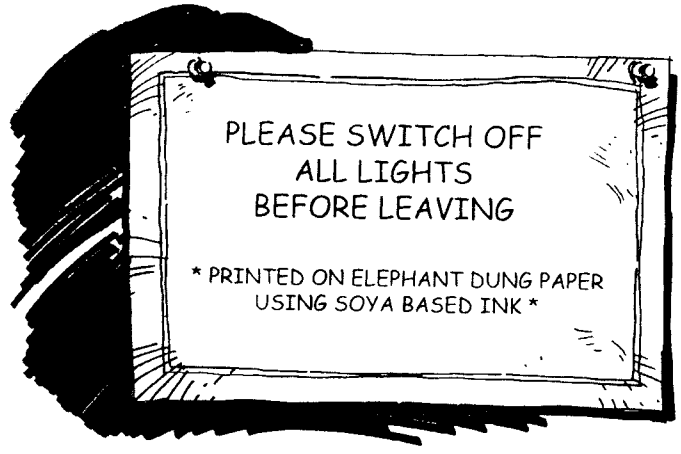
e) A video, CD-ROM or Power-Point presentation of your project should be considered at some point, when your budget permits.

f) Press releases for national and international media.

3. Develop materials for your guest rooms and make sure they are kept up to date. These materials should include but are not limited to:
   a) Information sheet on how guests can cooperate with the goals of being environmentally and culturally responsible.
   b) Information sheet on services and activities offered by the hotel, as well as rules and regulations.
   c) Guest comment sheet.
   d) For inside of room door: emergency information.

4. Be sure that all published information and photographs are technically and scientifically correct:
   a) Focus on content without detracting from the visual presentation.
   b) Ask an expert (naturalist guide, biology student, etc.) to review your materials for accuracy, before publishing.

5. Find ways to make your promotional materials more environmentally friendly:
   a) Keep in mind that publications can be sent by mail, fax, internet or personal distribution without significant cost increases.
   b) Use non-contaminating products and/or renewable resources wherever possible — for example, non-bleached 100% post consumer, recycled papers; alternate fiber paper products (banana, coffee, tobacco, kenaf, etc.); soy-based inks.



c) It could be a good idea to print in the brochure, in very visible type, the caption: "Help us help the environment — pass this on to a friend." In this way, it's not only a matter of recycling the paper used to print the brochure, but more importantly, passing the brochure on to other potentially interested friends on the part of the guest.

7.4 PROMOTION STRATEGIES

7.4.1 Positioning

Getting the message about your product to your target consumer often involves a long, and sometimes complicated, chain of communication: lodge owner to sales staff to local ground operators to international wholesalers to organizations with travel programs or travel agents and, ultimately to the consumer. Unless great care is taken in the development of the promotional materials mentioned in section 7.3, the message you want to deliver may not be the message your consumer will, in the end, receive.

The obvious risk here is that unclear or incorrect messages can result in unrealistic expectations of your product. Two possible scenarios can result. The consumer assumes that your product is below his comfort level or that it won't provide the ecotourism experience he is looking for and, therefore, does not choose your product. Or, the consumer chooses your product based on unrealistically high expectations of comfort and/or ecotourism experience and is, in the end, disappointed and won't recommend your product to others.

In short, the goal of all your materials is to create enough interest for the consumer to buy and have realistic enough expectations for him to be more than satisfied by his lodging and ecotourism experience. You need to be able to sell your trip.

7.4.2 Pricing

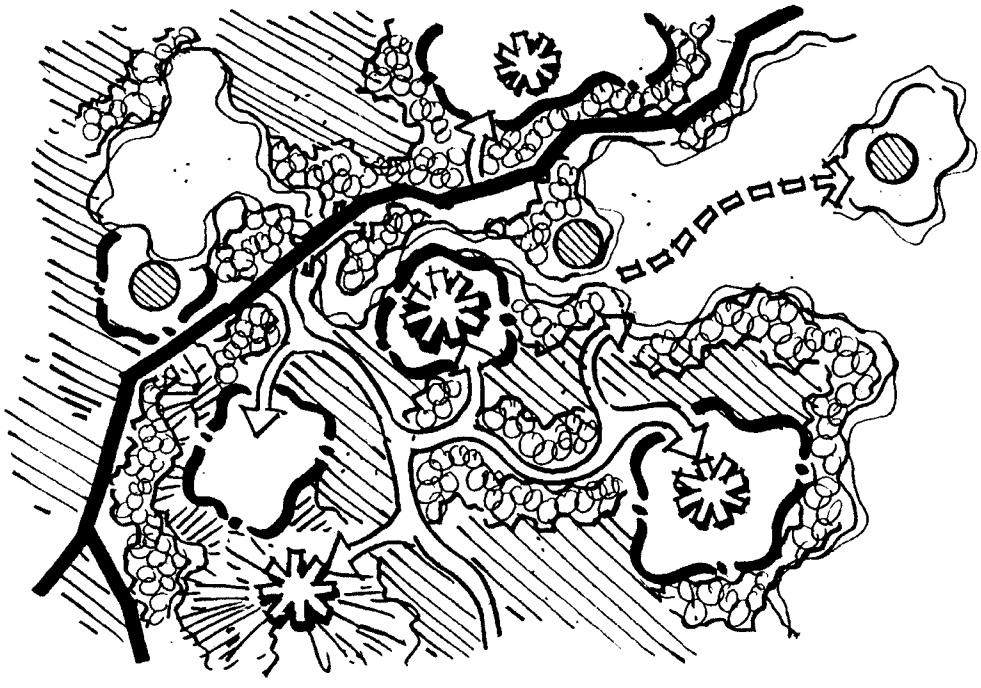
Studies show that environmentally responsible consumers are willing to pay more for environmentally responsible products, including lodging. Ask clients to leave a donation to protect the environment (leave a buck) but make sure the donation is not used to "clear their conscience," nor is it seen as a trick for extracting a tip. Nevertheless, value for price is always a consideration in any marketplace exchange. Your target consumer must perceive a value that matches the published price, if he/she is to buy. Thus, great care must be taken when establishing your rates.

Each link in the aforementioned chain of communication is in the business of helping to distribute your product and justly expects to receive monetary compensation for that service. Take time to learn about the terminology and pricing structures in the travel industry and make sure that your net rates, or your commissions on rack rates, are sufficient to compensate the whole chain of intermediaries, while maintaining a competitive price to the consumer.

GUIDELINES

1. Stimulate social and cultural responsibility within your market. Establish a code of practice.
2. Obtain permission from the community to promote and use their values, symbols and traditions.
3. Make information available to your clients on what is considered dignified and respectful behavior towards the neighboring communities; be strict with your clients and staff in maintaining these standards.
4. Direct your marketing energies to those segments of the market that are really interested in, or show the greatest potential for practicing, this type of tourism.
5. Clearly identify and target the various segments and interest groups within the ecotourism market (birdwatchers, adventure lovers, student groups, families, photographers, scientists, horticulturists, seniors, fisherman, scuba divers, etc.).
6. Do not underestimate the potential of the national market.
7. Market with honesty and be realistic:
   a) Based on your in-depth product analysis, present a realistic picture of your installations, amenities, services and facilities in order to avoid giving the wrong message to various client types (students, scientists, "soft" ecotourists, etc.).
   b) Keep an eye on quality control and personalized services that can distinguish your hotel (lodge, etc.).
   c) Charge fair prices that allow you to compete better in the market but are accessible to a greater number of people.
   d) Ensure that prices are in accordance with the level of comfort, service and added value that your property offers (for example, a private reserve for which maintenance implies an extra cost to the owner and an extra value and service for the client).
   e) Do not offer what you can't produce, including natural attractions such as animals that exist in the region but are not likely to be observed by the casual visitor.

8. Use the services of professionals or specialized publicity agencies that (ideally) practice the policies and principals that govern your project. Consider some of the following strategies.
   a) With the help of a specialist in database marketing (or, if funds are limited, a student in database marketing), develop a distribution list for your printed brochure, considering the following categories:
      i) Targeted consumers (database research/mining required)
      ii) Targeted travel agents, wholesalers and outbound tour operators
      iii) Inbound tour operators and travel agents in your own country
      iv) Targeted car rental companies and city hotels (with whom you have formed strategic alliances) in your county
      v) Trade and consumer travel shows (with the cooperation of a chosen inbound operator who will attend the show)
      vi) Offices of your tourist board around the world
      vii) Embassies of your government around the world
   b) Make sure that the consultant who designed your website also offers marketing services for your site such as:
      i) Placements with major ecotourism travel sites that offer free or very inexpensive links
      ii) Placements in major travel sites that offer free or very inexpensive links
      iii) Placements with other relevant sites that offer free or cheap links (such as the guidebook page of amazon.com)
      iv) Placements in search engine directories (including maintenance)
      v) Placements in websites that specialize in marketing small businesses
      vi) Strategic placements of banners for your site
   c) Hire a professional to design a print ad (2-color and 4-color) for the lodge. Run it as frequently as possible in nationally produced magazines and newspapers directed at tourists and with a good distribution (consistency is important — better a smaller ad many times than a large ad only once).
   d) If possible, run your ad in destination inserts in travel trade magazines such as Travel Agent or Recommend in the USA (these usually have special rates negotiated by the national tourist boards). Travel agents tend to keep these destination inserts, whereas regular copies of the magazines are discarded or recycled.
   e) Consider joint marketing, which is usually a very efficient and economical way to promote yourself even more vigorously.
   f) Market complete regional itineraries or entire areas.



9. Research your particular case and develop mechanisms for consolidating a joint marketing plan. This can incorporate the various services, attractions and activities of your area and/or the assistance of a national tour operator, of the government entity responsible for tourism marketing in your country or of those in charge of the protected area closest to your ecolodge.

10. Use written agreements that identify responsible parties, responsibilities, timing, costs and any other type of obligation.

11. Research various ways and means of getting free promotion, for example:
    a) Send out periodic press releases and check with the editor that your writing is up to their standards and is likely to appeal to their readership.
    b) The innovative ideas behind many ecolodges make them newsworthy in their own right, so you have a good chance of being published in various media, and in many cases, such exposure can be achieved with minimal cost.
    c) Invite the press to visit your project, carefully selecting those media that are of the most interest to you and that have the greatest potential for getting the message to your target market.
    d) Provide interesting, solid and up to date information and host the press members yourself.
    e) Find out how to get a feature on your project in a magazine. Often, articles appear in exchange for a free holiday for a specific journalist, although you will have no say in what is written or photographed. If you want (or, sadly, feel you need) to "positively influence" the outcome of an article, there are two main routes to negotiate before a journalist is sent. One is to pay to advertise your ecolodge in that magazine, or one of its sister publications (you will see this ploy time and again once you start looking for it). The other way is to pay directly for a promotional article using your photographs and even text. This is called an "advertorial," and frankly, they rarely work. The best option is to form a relationship with the magazine's editor, sell the feature to him or her over lunch, and then make sure that the journalist has a thoroughly enjoyable stay. If that fails, present your story as a coup for their opposition publishers, which is not a bad idea in any event.
    f) Offer special packages and discounts for organized groups that represent the market segment you are interested in (conservation NGOs, international agencies, educational institutions, etc.).

g) Make sure that all the guidebooks on your country receive and publish information on your lodge — and an invitation to visit the next time they are on a research trip.
h) Obtain a banner exchange for a free trip give-away to online companies.

12. Learn all you can about the chain of intermediaries that can exist between the consumer (your potential client) and the service provider (you). Consider the following as just some scenarios of client sources for your lodge and of potential intermediaries:
    a) No intermediary:
        i) Walk-in clients who have come to the country by air only and make reservation upon arrival (may have found your brochure at the airport) or simply show up at the hotel. The latter case is extremely unlikely in remote area.
        ii) Clients who book directly through the internet, in response to an advertisement or article in an international magazine, in response to your destination guidebook listing or most importantly, in response to a recommendation from one of your satisfied clients.
    b) One intermediary:
        i) Client books through an international travel agency who contacts you.
        ii) Client books through a local travel agency who contacts you.
        iii) Client belongs to a club or organization that has organized its own group tour and booked hotels directly.
    c) Two intermediaries:
        i) Client books a package tour through a travel agent that purchases from an international wholesaler who has either made block bookings with you or will book upon demand.
        ii) Client books a package tour through a travel agent who purchases from an in-country tour operator who has either made block bookings with you or will book upon demand.
    d) Three or more intermediaries:
        i) Client belongs to an organization that has a major travel program (such as a museum or zoo) and books their tour through the organization. The tour is organized and operated by an outbound tour operator who in turn uses the services of an in-country operator who makes all the reservations and actually operates the tour.

13. When establishing prices, remember that the intermediaries make a great effort to market both the country and your specific products; this implies a cost for them so it is important to consider commissions for intermediaries in your final price.

14. Seek the support of big operators and wholesalers who will always be more informed about new trends and better connected in the world, instead of investing your money to promote yourself with retail agents.

15. Choose intermediaries that are most compatible with your philosophy and service ethic.

16. Offer fam-trips (familiarization tours) to tour operators in the area, particularly those that specialize or are interested in this type of tourism.

7.5 OPERATION MARKETING

The final and perhaps most critical stage in your marketing strategy is to ensure that your ecolodge (the facility, the service and the natural history/cultural experience) more than lives up to your customers' expectations. To accomplish this goal it is extremely important to start and continue monitoring your operation (see Chapter 9) to ensure that these ecolodge guidelines are being met in all areas. It's equally important to provide ongoing staff training, motivation and incentives so that they share your ecolodge values and your goal of guest satisfaction. Finally, constantly solicit feedback from your guests and take appropriate follow-up action.

GENERAL GUIDELINES

1. Review your marketing plan periodically and use monitoring and evaluation systems.

2. Design an evaluation or suggestion form for your clients. Include a section for providing names and addresses of the friends of satisfied clients who might like to stay at your lodge. Add these names to your mailing list.

3. Act to rectify, as soon as possible, any problem that has come up or that a client has identified.

4. Follow up appropriately on any good suggestions a client offers.

5. Update your marketing plan and keep informed about new trends and techniques.

6. Remember that a satisfied client is the most efficient and effective form of marketing.

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"Through interpretation, understanding.
Through understanding, appreciation.
Through appreciation, conservation."

—Tilden

CHAPTER 8

EDUCATION: TRAINING AND INTERPRETATION

Pat Ashton
Ashton, Ashton & Associates, Inc.

CHAPTER CONTENTS

8.0 EDUCATION: TRAINING AND INTERPRETATION

8.1 INTRODUCTION

Education is indeed one of the cornerstones of all ecolodge operations and one of the identifying characteristics separating an ecolodge from traditional lodging. Frequently overlooked, however, is the need to educate the owners of and potential investors in ecolodge facilities. Business people involved in property purchase, investment for development or in the day-to-day business operations of ecolodges typically have a background in traditional tourism, with little or no knowledge regarding how to maintain an acceptable return on investment (ROI) while protecting natural and human environments. Nor do they grasp the importance of establishing and maintaining the integrity of their sustainable ecolodge operation and the role this will play in marketing and their ultimate bottom line. The surrounding communities, an integral part of all ecolodge development, should also be taught the significance of investments in ecolodge development, the intricacies of sustainability and the community impacts of ecolodge operations.

The education program should begin with the development of the business plan and continue through site identification and planning, construction, program development, staffing and operations. Understanding the reasons for developing sustainable concepts and linking these concepts to successful accomplishment of economic and long-term marketing goals creates a comprehensible framework for decision making by owners, investors and operations managers. Long-term success is the best encouragement for establishment of sustainable policies by ecolodge owners and investors. Staff education leads to visitor satisfaction and sustains the facility's long-term success. A well-educated operations and program staff recognizes the value of quality extensions and interpretation to the ecolodge's overall marketability. Educating the ecolodge guest ensures that expectations equal reality and "customer satisfaction" translates into economic success.

This Chapter discusses the education and training of:

- Visitors/Customers
- Interpretative Program Providers and Extension
- Operators
- Owners and Investors
- Communities
- Land Managers and Ecolodge Operators
- Ecolodge Operations Staff

8.2 EDUCATION OF VISITORS

An ecolodge exists because of the customers. Depending upon the location and type of ecolodge, these may include only overnight guests or the lodge may attract day visitors to use restaurants, special event services and various interpretative programs. Customers will be of all ages, diverse cultural backgrounds and will have various levels of understanding about ecotourism. Marketing strategies for ecolodges may target selected visitor profiles, but in fact the ecolodge must actually serve a broader cross-section of clientele. Some of these customers will be well educated on what makes an "eco" lodge different from any other lodging facility. Many customers, however, may have no idea why the ecolodge operations and habitat management are driven by sustainability principles. Visitor education on why sustainability of resources governs the ecolodge's operations and management is essential to customer satisfaction.

Customer satisfaction is directly related to the visitors' pre-conceived expectations. The actual "eco-experience" for a visitor to an ecolodge begins with the marketing materials that the potential visitor receives or sees prior to their visit. These materials create an image of the expected experience in the customer's mind, and whether correct or not, that visitor will judge their ecolodge experiences on the basis of these expectations. For this reason, appropriate education of the visitor is in the best interest of all ecolodge operations.

Marketing departments and reservation services are most often directly responsible for lack of information or misinformation leading to dissatisfaction among the ecolodge's clientele. Artistic license seems to be considered a "right" by many advertising agencies. This leads to brochures that picture beaches when the lodge is on the mountain with a view of the beach, or show animals looking in the window of the elegant visitor cabin when the nearest wildlife population is miles away. Calls to reservation services also frequently result in similar misinformation concerning services, location, activities or weather. In all areas, the ecolodge should provide accurate, thorough information and create an appealing but honest image of the ecolodge experience in the mind of the potential visitor. When the ecolodge exceeds customer expectations, the customer usually becomes the best marketing tool any lodge could have an exuberant "word of mouth" endorsement!

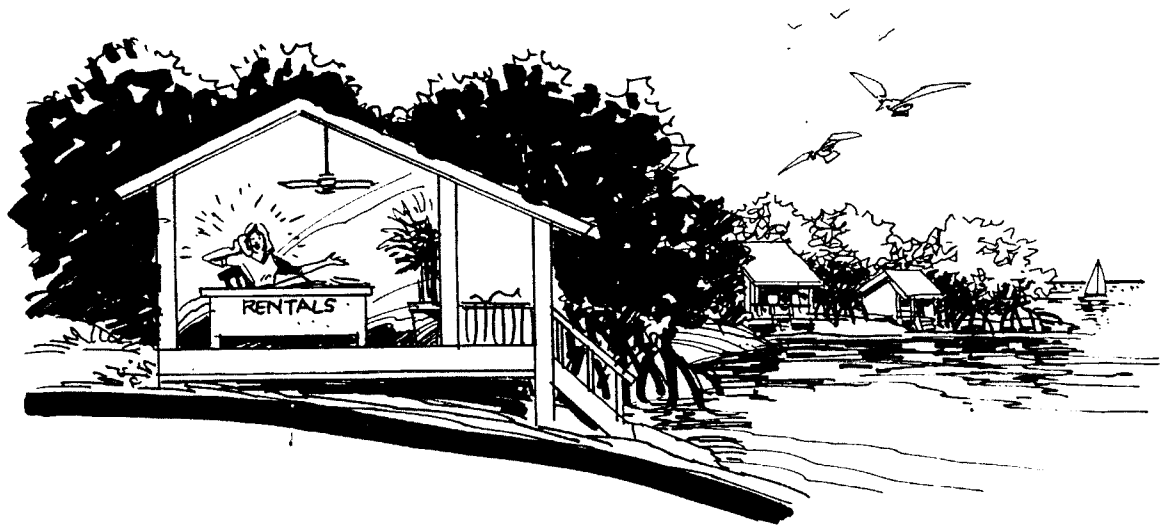
View the entire ecolodge as part of the educational experience — this includes the architectural and decorating themes, the uniforms or costumes worn by staff and the simple interpretative aspects of the infrastructure and landscaping.

8.2.1 Creating Ecolodge Visitor Satisfaction through Education

Following are guidelines for helping bring about a healthy learning environment for visitors.

GUIDELINES

1. Make sure that you have a firm grounding in ecology and ecotourism. It may be a good idea to undertake a course of study/seminar/workshop that keep you informed and up-to-date.
2. Hire only marketing companies and marketing personnel that have been trained in sustainability principles and that display values compatible with the ecolodge.
3. Ensure that photographs, graphic art and descriptions used by marketing are honestly (and positively!) representative. If possible, invite the photographer to advise on preparations for photographing the project. Address all aspects of the customer experience in graphic media that is current, yet avoid overly trendy formats or formats that are difficult for the visitor to interpret.
4. Familiarize your marketing people with interesting facts on the habitat, plant species, animal species, wildlife behaviors and sustainable operations.
5. Train front desk and reservation service staff on building customer satisfaction through provision of accurate information. Update this information daily/weekly/monthly and create a feedback loop so managers know that the information is accurate.
6. Help the media and others that may also be responsible for generating inaccurate images in the minds of customers, to get their facts straight.
7. Keep a list of most-asked questions and prepare a list of questions for which the staff usually doesn't know the answer, then make sure they learn the correct answers.
8. Keep all materials current and do not allow misinformation to go uncorrected on printed matter or on your web page. Use update boards in the lobby and access halls and keep them current!
9. Encourage the personal touch — have the general manager or desk manager on duty personally write a message each day on the lobby up-date board. Visitors to ecolodges enjoy personal tours of the operations, the sustainability modifications that make the ecolodge different from any other tourism facility — and they like meeting the staff and understanding the community's culture.
10. Provide visitors with current information or contacts of appropriate staff for interpretative questions about the local wildlife, culture, archaeology, ecolodge design and landscaping.



"...APART FROM A FANTASTIC BEACH, WE ARE LOCATED IN THE MIDST OF A DENSE FOREST OF COCONUT PALMS."

11. Only use well-trained knowledgeable spokespeople for your facility and train all staff in the correct way to interact and speak about the ecolodge and sustainability. Sometimes the first person a visitor encounters is the groundskeeper or security. These individuals must be trained about the ecolodge in order to give an accurate picture of the facility.

8.2.2 Educating Through Marketing Materials

If the ecolodge has established its market niche and identified its target audiences, then the marketing materials should be directed primarily to this group or groups. Appropriate materials can do an excellent job in attracting business for the ecolodge, including customer satisfaction, which drives repeat business. Repeat business is one key to a successful ecolodge operation. For more details on marketing materials, please see Chapter 7.

GUIDELINES

1. Insist on the accuracy of plant and animal names, and that correct species appear in images or graphics. Also check your current information on ecology, culture or archaeology in text and correct locations and details in photos, by having all copy and printed materials checked in the early stages as well as prior to printing by a qualified biologist, archaeologist or other appropriate specialist.
2. Identify any inaccuracies in illustrations or text concerning the ecolodge infrastructure or surrounding locations. Use old materials as a "history of the ecolodge" and website to keep your ecolodge current.
3. Check all marketing materials for the accuracy of the experiences suggested or illustrated. Be sure materials do not allude to something the ecolodge experience cannot or usually does not deliver.
4. Make sure the marketing materials are designed to inform the visitor about sustainability of operations and land management practices.

8.2.3 Creation of the Visitor Experience

Visitors will come to an ecolodge to live out the intangible expectations that have been created through the marketing materials. This visitor experience cannot be entirely controlled by the ecolodge; it is a creation formed by the melding of the visitors' past experiences with the images brought to life by the nature of the marketing materials and other sources like NGOs, television documentaries, other visitors, etc. Of this mix, only the quality and accuracy of the marketing materials are under the

"I'VE BEEN HERE TWO WEEKS ALREADY AND STILL HAVEN'T SEEN THE GORILLAS YOU MENTIONED IN YOUR BROCHURE."

control of the ecolodge manager.

The experiences at an ecolodge are its greatest assets and the nature of these experiences largely depend upon:

- how closely the ecolodge experience meets (or exceeds) client expectations
- the ecolodge's location or setting
- the atmosphere created within the structure and operation of the ecolodge
- the design of the infrastructure available for wildlife viewing and nature exploration
- the quality of on-site and surrounding natural habitats
- the training and personalities of guides and other service providers
- the quality of interpretative information provided by guides and through signage
- the type of equipment and learning materials available for use by visitors
- the timing of experiences and scheduling of events
- the mix of relationships visitors develop with staff and other guests
- the levels of privacy and protection from unwanted noises, activities and smells
- the intensity of all aspects of the experience

8.2.3.1 Visitor activities and training

Ecotourists are definitely seeking something different from a typical lodging in a natural environment. They may expect:

- More activities and opportunities to experience the natural or cultural environment.
- Less noise, less luxury and wastefulness.
- To share their experience with fewer people and to see or hear fewer cars, trains, or planes and less technology.
- Superior use of environmentally friendly technology like solar power, alternative energy and water use or bio-filtering of sewage.
- Not to hear jet-skis, snowmobiles or radios; nor a loud outdoor concert outside their window.
- More adventure and excitement in their outdoor activities and may expect opportunities to view the most rare species or to see the oldest ruins.
- More hand-on activities rather than observing from a distance.

8.2.3.2 Educating the Visitor in Sustainability

It will be easier to meet the needs of visitors whom have been acquainted with the unique features of the destination and how your ecolodge works. You can pass on information and help the visitor's learning experience in a number of ways. It is important that people quickly come to understand the principles behind the ecolodge and also know how to participate in meeting its sustainability targets.

GUIDELINES

1. Provide the best opportunities for the visitor to experience or discover certain plants, animals, archaeological ruins or cultural aspects of the area in a way that does not ultimately damage the sustainability of the facility or the region.
2. Avoid compromising any basic sustainability principles such as endangering plant or animal species or damaging archaeological or cultural materials, disrupting local cultures, or violating regional or cultural laws or principles.
3. Use innovative and varied interpretative methods to expose visitors to concepts related to the ecolodge's setting, biology and operations. These methods might include live music; hands-on crafts like weaving, carding and dyeing wool; or wildlife photography or videography.

" YESTERDAY... IT'S NOT HALF THE LODGE IT USED TO BE...."

4. Illustrate basic ecological principles, cultural attributes of the region, or unique features of the region in which the ecolodge is located. These basic activities may be as simple as signs and interpretative boards provided in appropriate locations, going on a self-guided tour using printed materials or a recorded tape, viewing video presentations provided at strategic locations, or may involve hands-on activities with local animal or plant species.

5. Include trip extensions to surrounding locations that will provide a variety of experiences for the ecolodge visitor, including visits to local homes, schools or historic sites; activities in parks or natural areas; and visits to governmental agencies, businesses, factories, farms and archaeological sites.

8.3 EDUCATION AND TRAINING OF INTERPRETIVE PROGRAM PROVIDERS AND EXTENSION OPERATORS

The most important staff members of any ecolodge are the interpretative program providers, and the most vital link outside of the ecolodge staff is with the extension operators. These individuals interact directly with the ecolodge visitors. If they fail in their task or perform poorly, then the ecolodge will fail in customer satisfaction and ultimately be unsuccessful.

An ecolodge should hire and pay well for excellent interpretative program providers. In addition, the successful ecolodge must establish a rapport with high-quality extension operators. A successful ecolodge also understands the importance of education and staff training in the sustainable principles on which the lodge operation is based.

8.3.1 Identification of Interpretative Staff and Operators

The interpretative program staff includes people such as tour guides, "greeters" and lobby personnel that interact with and provide information for the visitor; drivers and recreation activity instructors; craft or local culture demonstrators; musicians; storytellers and any other staff that interact with and influence the visitor. Extension operators may be in-house or may be outside contractors. These staff should be selected and educated with care.

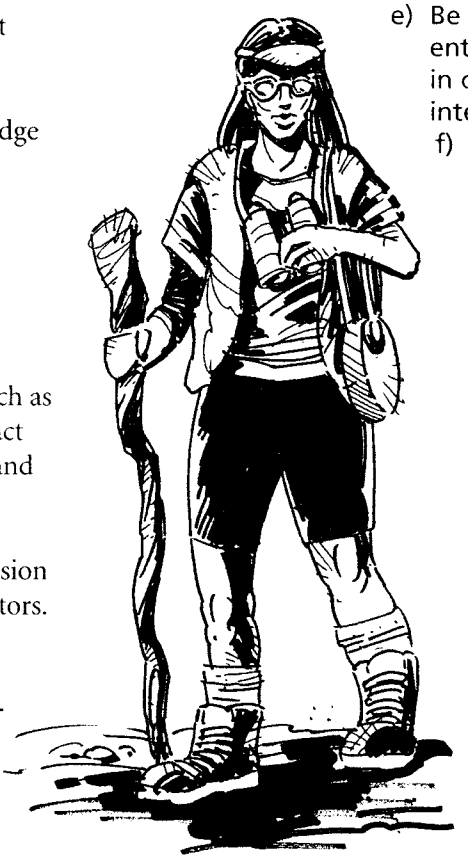
GUIDELINES

1. Educate managers and human resources staff on the level of quality and experience the ecolodge will require of its interpretative program staff. The ecolodge needs to establish an excellent training program and selection process for hiring and training locals possessing the appropriate skills, talents and capabilities. When possible, the ecolodge may provide pre-employment developmental schooling to assist promising candidates in achieving the level of performance required.

2. Staff chosen to select interpretative program staff should be educated in working in cross-cultural situations. Staff selection and training requirements and methods should take into account that visitors also will represent many cultures.

3. Create in advance an excellent model for all staff presenting interpretative programs and activities. Excellence is required in all aspects from choice of personal hygiene and appearance, to dress or costume, to ability to speak clearly and understandably, to the specific visitor group in that group's language.

4. An interpretative program staff member should:
   a) Have an excellent sense of timing.
   b) Know the subjects being interpreted at the ecolodge.
   c) Present a professional image to the visitor (good hygiene, demeanor, etc.).
   d) Know how to find out what they don't know, and have the desire to learn.
   e) Be engaging and entertaining as well as in control of the interpretative situation.
   f) Have an ability to communicate clearly and have a good memory.
   g) Be able to lead through actions and words.
   h) Attend to visitor safety as well as visitor interpretative needs.
   i) Have the ability to refuse to allow the visitor to do those activities that are forbidden, while keeping the visitor satisfied.



5. An extension operator must first meet all the requirements expected of any interpretative staff and then must also have excellent coordination and scheduling skills to organize and operate extension programs. Contracted operators should have experience and be able to provide references. An ecolodge will share responsibility in the visitor's mind with the extension operator for negative as well as positive experiences.

8.3.2 Training Interpretative Staff and Extension Operators

Training interpretative staff is the most essential aspect of creating a successful interpretative program for visitors. Training, like any other aspect of a business, requires clear objectives and a detailed plan to meet those objectives. The most common mistake made in training interpretative staff is to spend time and resources training staff on things that will not benefit the objectives of the ecolodge's interpretative program. There is no substitute for written guidelines and interpretation activity plans, followed by hands-on staff training where proper interactions are modeled through live example or training videos, and where staff members inevitably are held accountable for their level of learning and performance.

The techniques, tricks, and special methods of teaching can be taught to someone who possesses the ability to learn and teach. Engaging the audience and imparting information is also found in the dramatic arts; teaching and entertaining are close kin. Good interpretative programs must also be entertaining. The clients also will represent many cultures.

GUIDELINES

1. Provide opportunities for frequent training, devote resources to quality training, act on feedback from the staff, and demand performance from the staff.
2. Deliver quality service. In staff training performance there is no room for anything less than the highest quality if an ecolodge is to be successful. Remember that quality is in the eyes of the visitor — not the eyes of the local management, local community or various conservation agencies. Do constant reality checks on your ecolodge's measurement of quality performance.
3. Continually update the quality of interpretative materials being used and update the training program as well. Use sustainability principles in all aspects of interpretative programming and use new technology where appropriate. Shabby teaching or interpretative materials will reflect poorly on the entire ecolodge operation.

" I ...UH...WOULD LIKE TO TALK ABOUT...UM...OUR UNDERWATER ECO-TOUR...NOW UH... LET ME JUST CHECK MY BOOK A MINUTE..."

4. Use a variety of techniques for training and include teaching and entertainment techniques. Invite local community representatives, extension operators, students, interns or individuals that may want to train as future staff to join in some training sessions.
5. Involve experts and community representatives as well as interpretative staff in the creation of new programming and keep staff in the feedback loop. Also request visitor feedback and suggestions on what new programs they might like to experience.

8.4 EDUCATION AND TRAINING OF OWNERS AND INVESTORS

The growth in ecotourism has stimulated a flurry of activity on the part of potential investors. From industry newcomers to large multinational hotel chains, potential investors in the ecolodge concept jump on the bandwagon daily, each looking for a niche in this economic "Promised Land" of ecotourism. At each end of this spectrum, investors hold many misconceptions regarding the economics, the market and the nature of an ecolodge.

The financial world has not been quick to recognize the distinctions between a nature lodge and a true ecolodge, and it is those very distinctions that can eliminate financial funding for some ecolodge projects. Anything different that doesn't fit nicely into a niche could be a financial risk and thus is not a wise investment — so investment dollars for ecolodges that do not masquerade as simply "thematic travel lodgings," tend to disappear.

8.4.1 Creating Success through Education for Owners and Investors in Ecolodges

The long-term success of ecolodges is based on proper up-front financing and site selection based on the market segments being serviced. Environmentally and economically sound construction and operation, skilled and highly trained staff from management to guides, and a pervasive and visible environmental ethic in all aspects of the development and its operations are equally important.

Successful ecolodge owners need information and education on:

- Identifying the potential for successful ecolodge development on selected properties
- Determining the type of lodge and program best suited to selected properties
- Projecting the economic potential based on type of development chosen
- Using good ecologically sensitive, sustainable and successful management practices
- Creating a well-trained staff and an innovative program appropriate to ecolodge operations
- Understanding market strategies and target audiences for that ecolodge location

Successful investors in ecolodge developments need information and education on:

- Key factors in site selection for successful sustainable ecolodge development
- Major limiting factors — past, current and future — that may affect sustainability or economic success
- Selection of the most successful type of development and program for the resources available, including natural and human (i.e. staffing)
- Necessary operations and management plans, as well as staff training, required for continued long-term success of sustainable ecolodge operations

GUIDELINES

1. Learn. Owners of property that aspire to create an ecolodge should make educating themselves and any other staff involved in the project their first priority. This education should take the form of both personal acquisition of knowledge and the consultation of expert advisors who not only have knowledge but also personal experience.
2. Teach. Owners should also take the responsibility of fully briefing any potential partners or investors in an ecolodge project. Too often the project initiator is well-educated in principles that should guide ecolodge development, but investors entering the picture do not necessarily understand nor ascribe to these sustainability guidelines. An ecolodge built as the result of conflicting philosophies or from an uninformed point of view will have severe marketing and operating problems in the long run. Such a development may also fail due to lack of attention to resource sustainability.
3. Investigate. Investors attracted to potential ecolodge projects should take responsibility for educating themselves in the principles of sustainability and good ecolodge management.

4. Inform. All materials prepared for investors should include the basics of ecolodge development. Educational statements provided within the mathematical context of these documents can help those analyzing the ecolodge project's potential understand the melding of sustainability principles with the market potential of a lodge project.

8.4.2 Selecting and Using Advisors and Consultants

The research done for owners and investors is frequently based on information gathered by their staff, consultants, developers, landscape architects and other specialists. Just as a skilled birdwatcher or fisherman hires a guide to insure the best experience, it is important for the would-be investor or owner to do the same. All too frequently, investors either use the wrong experts or no experts to make decisions on ecolodge development. It is important to select the proper help, and it is important to understand that spending money for these services early can make the difference between success and failure.

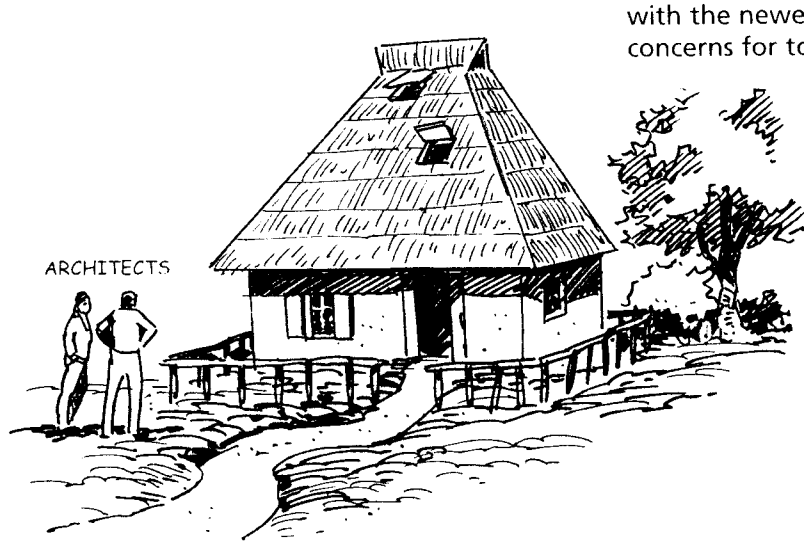
Therefore, it is important to gather data and to analyze all available information at key points in the process of owning, building or investing in an ecolodge.

The most frequent mistakes made by owners or investors when seeking information are:

- Selecting a consultant who is purely academic
- Choosing a consultant based on public relations and visibility without real evidence of successful experience and ability to accomplish needed tasks
- Using a consultant who has no first-hand knowledge of the tourism or lodging business
- Hiring a qualified consultant but getting the services of untrained or inexperienced staff
- Choosing to spend less than is needed on qualified consultants in the early planning stages and then having to spend more to correct early errors

GUIDELINES

1. Become familiar with literature regarding ecolodges, ecotourism or sustainable tourism development. Establish a working knowledge of current industry experts. Find out what they actually know about ecotourism and ecolodge development. Ask:
   a) What does their writing/projects reveal about their breadth of experience?
   b) Can you understand their logic and methods of communication?
   c) Are they philosophically compatible with your sustainability goals?
   d) Does their writing/projects reveal growth based on their successes and failures?
   e) Will they put the success of your ecolodge project first or their ego?
2. Hire landscape and building architects and engineers familiar with sustainable development. Traditional landscape and building architects often make fatal sustainability mistakes in the planning and building design. Frequently, hotel developers use their traditional hotel advisors to create an ecolodge — when they only know about traditional lodging. Small developers try to plan their own facilities without a basic understanding of what goes into sustainable development plans. Ask:
   a) Does the landscape architect know the native habitats of the lodge lands?
   b) Does the landscape architect recognize the value of endemic species for interpretative programming, long-term maintenance costs and enhancing native habitat?
   c) Does the landscape architect know which exotic species are invasive and should not be used in your area?
   d) Does the landscape architect recommend keeping native wildlife habitat and recognize its importance to your ecolodge program?
   e) If the first thing the architect suggests is to strip the land and start over, ask yourself why you should pay to "fix" native habitat that isn't broken?
   f) Does the building architect have experience with sustainable ecolodge facilities, including interpretative areas?
   g) Does the building architect allow for important sustainability principles — considering run-off, energy consumption, interpretation, wildlife viewing, and how staff and deliveries impact habitat and wildlife?
   h) Does the building architect have experience with the newest technologies and have concerns for toxins from materials used?



"THIS LODGE IS NOT QUITE MODERN ENOUGH. I SUGGEST WE TEAR IT DOWN AND START AGAIN."

3. Select consultants who are familiar with the biological resources of the area or similar areas and with the ecological interactions between those plants and animals and the physical environment. Also, they need to be familiar with the nature of the culture-based tourism business and how it relates to the natural environment and resource sustainability. Ask:
   a) What is the their specialty and years of experience?
   b) Will they go into the field or will they send a technician?
   c) Can they communicate with local peoples and operators?
   d) Do they recognize the required interactions between tourism and the natural and cultural resources?
   e) Have they created management plans for successful operations?
   f) Do they have an understanding of the tourism and lodge business?

4. Hire staff from local communities that have experience in the tourism and sustainable lodging industry as well as business "know how." Most local communities respond well to up-front information and education. Establishing proper business agreements, establishing working relationships and mitigating impacts with local communities from the very beginning is vital. Traditional developers are often closed-mouthed and seen as secretive. Ask:
   a) Have they worked with more than one community group before?
   b) Do they have experience in conflict resolution?
   c) Are they committed to honesty and open discussion?
   d) Do they have public relations experience and know how to work with media?
   e) Can they work with groups yet keep legal ramifications in mind?
   f) Are they knowledgeable in the business of tourism and ecolodges?
   g) Do they also have knowledge of current businesses in the local community that may be affected?
   h) Do they have a cultural appreciation for the area of development?
   i) Will they work for the project (your ecolodge) as well as for the community and its interests?

5. Hire the best staff, both for standard hospitality operations and for habitat and program management. Ask:
   a) Does the manager have ecolodge or wilderness tourism experience?
   b) Can the manager appreciate the needs of interpretation and "wildlife view" in addition to daily lodging operations and make compatible decisions?
   c) Will the manager address long-term marketability and not just immediate needs?
   d) Can the manager handle the interactions of staff and local community?

8.5 EDUCATION AND TRAINING OF COMMUNITIES

Successful ecolodge development depends upon a good mutual relationship with local businesses and with community leaders and organizations. Community education should begin before the area is even selected for ecolodge development. If the community sees the ecolodge as a partner, the relationship will be positive; if the community views the development as an invader, a potential source of "hand-outs," or as a parasite, then the lodge will have problems with long-term sustainability. The mistake most often made is to promise too much to the local community and then be unable to deliver.

" ARE YOU TELLING US THE TRUTH, THE WHOLE TRUTH, AND NOTHING BUT THE TRUTH?"

The staff working with the community should know how to work with different cultures and groups of people, and should have a clear picture of the project's business goals. They should understand and practice sustainability principles with all their community encounters. As in politics, one mistake of the philosophical principles will be noted and exposed for all to see. There are no real secrets in a community, even one of 25,000 people. Rumors are much more damaging than truth, so have a public relations campaign with accurate information ready to make public as soon as doing so will not put your project at a business disadvantage. The best ecolodge planning involves complete background research so that once you become visible in the field looking at various properties, your investors and basic concept are already well-formed and less subject to interference. This does not mean that there is not room for or need for community input. The community's participation and the sense of "ownership" and pride developed when a project fits in well with a community are vital to ecolodge success.

GENERAL GUIDELINES

1. Prior to actual release of any information on an ecolodge project, sponsor a series of workshops through a local chamber of commerce or community college on ecotourism and sustainable tourism development.
2. Listen to what is already going on in the community — they may already know more han you do about ecotourism and ecolodge potential. Check for recent or past conferences on ecotourism, publications and brochures, or presence of other companies or ecolodge investors that have been there before you. Start your investigations at the local library and schools.
3. Provide information for local schools, churches and community centers on ecotourism, sustainable habitat management, wildlife viewing, and other aspects of ecolodge development to serve as a positive support base for future ecolodge development.
4. Attend an already existing meeting or conference held in the community and take information on ecotourism and ecolodge development. Meet people and identify key leaders to work with.
5. Work with the local municipality and other business leaders to hold a regional planning conference on ecotourism and use speeches and workshops to promote the benefits of an ecolodge.
6. Hold a project workshop with local community leaders and inform them on sustainability, the ecolodge market and the business benefits and impacts of your proposed ecolodge project.
7. Provide communities with good, accurate, complete information and allow them to have input and to develop a sense of pride, ownership and participation in the future ecolodge project.

8.5.1 Education and Training of Community Leaders

Educating communities is not the same as working with them during the ecolodge project development. Education comes first, often even before the site selection is confirmed. Once the site is selected, the real work with the communities begins. During this process, the community leaders — real and apparent — must be brought to understand the value of conservation and environmental protection, ecotourism and your project.

GUIDELINES

1. The ecolodge owner or staff assigned to work with the local communities and community leaders should first learn about the community. Know the local, regional, state and national laws and regulations in the communities where the ecolodge will be developed. Pass this knowledge on to staff and make sure they conform to these local community regulations as well as to all other applicable laws. Show respect for local moral and cultural traditions as well.
2. Find the real community leaders — they are rarely politicians, but they usually do end up controlling the politicians who get elected. The real community leaders in some cultures will be older women, such as teachers. In many cultures these community leaders will be connected to local religious organizations, such as the primary churches or temples in the area. These real community leaders are often quiet listeners but when they speak, everyone else listens and the politicians often can be seen looking to them for quiet assent. Spend time and resources (lend them books) on converting these leaders on ecotourism, sustainability, and ecolodge development.
3. All too frequently politicians or community leaders see only the positive economic benefits to their communities and not the potential impacts ranging from cultural change to real economic loss (e.g. the effects of a ban on genetically modified crops and produce). Discuss impacts openly with the true leaders and listen carefully to what they say as well as to what they don't say. Once the real community leaders are identified, concentrate on

maintaining a meaningful relationship with these leaders and heed their advice on working with the community as a whole.

8.6 EDUCATION AND TRAINING OF LAND MANAGERS AND ECOLODGE OPERATORS

Ecolodges are directly dependent upon the quality and sustainability of the natural/cultural resources both on their own property and on surrounding lands; particularly those used in interpretative programming and travel extensions. These lands should be managed by knowledgeable land managers just as the ecolodge must be run by well-trained ecolodge operators. Selecting and training these important staff becomes one of the most crucial educational functions related to long-term ecolodge success.

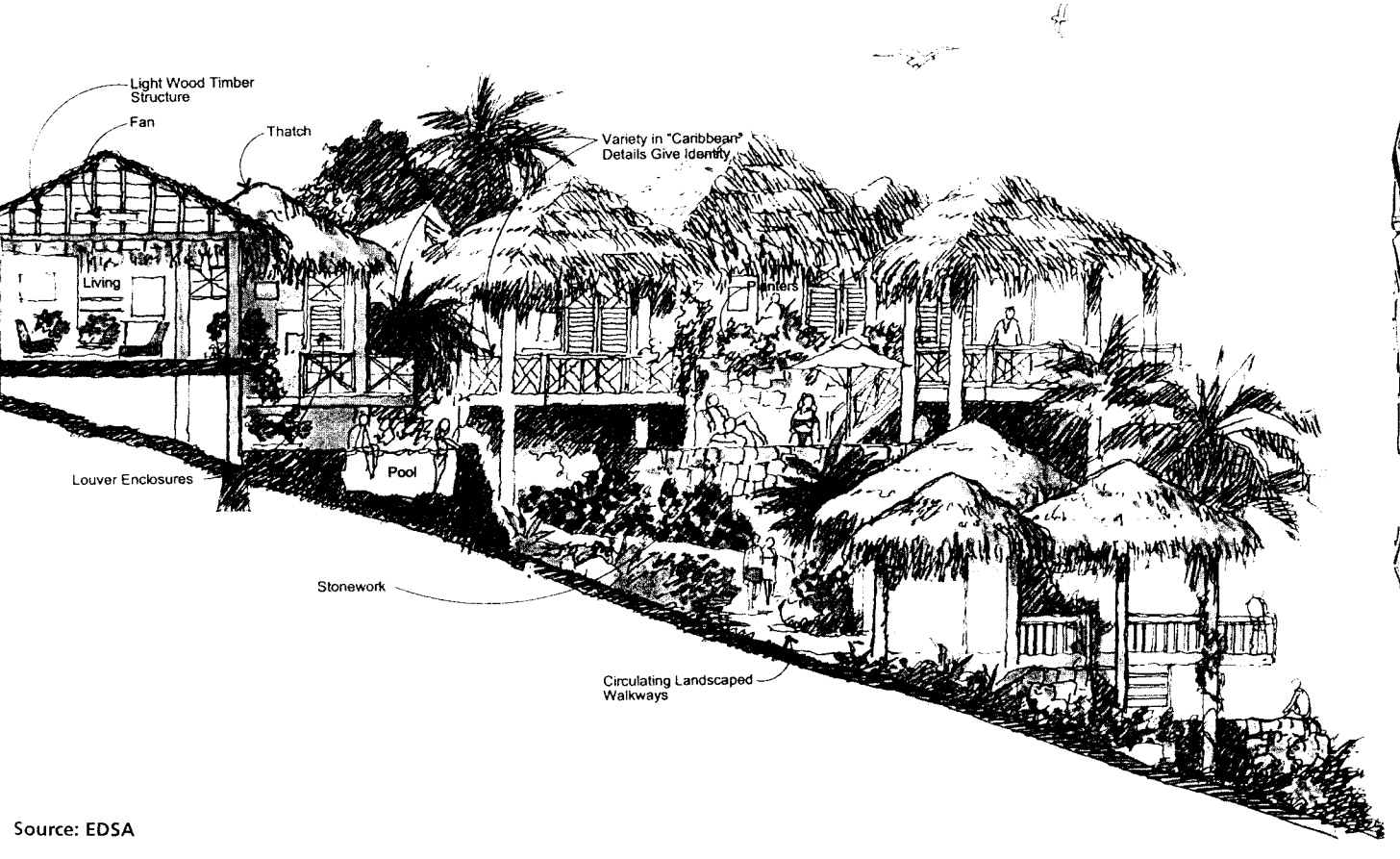
The best located, most thematically exciting and most sustainably designed ecolodge cannot succeed unless those responsible for long-term management and day-to-day operations are well-trained and dedicated to sustainable operations.

8.6.1 Education for Managers

If managers are dealing with visitors, whether those visitors are hikers, adventure seekers, archaeologists or bird watchers, they must become familiar with those visitors' needs to be able to protect the environment through proper infrastructure and staffing. This applies to all management personnel, and in particular to the land or habitat managers and the mangers most responsible for overall policies and staff adherence to those policies. Without a clear understanding of sustainable operations principles, these managers may often be uncooperative or actually work against the best practices of sustainability.

Operations Managers that need to be educated include:

- ecolodge operations general managers who make policy
- departmental managers — hospitality, sales and marketing, reservations, special events, food services, maintenance, security
- staff supervisors responsible for training
- managers responsible for enforcement of rules and regulations



Source: EDSA

Other employees that need education include Land and Habitat Managers of:

- the area ecolodges
- protected areas like preserves or parks
- private lands that are managed for nature-based tourism
- archaeological sites
- waterways and wetlands

All managers must become educated about tourism use of the resources they manage and its potential impacts. They also must know how to manage impacts and maintain the sustainability of their resource.

GUIDELINES

1. Ensure that all ecolodge operators — general managers, in particular — are well-trained on sustainability principles. No ecolodge should hire an operations manager or general manager that does not have training and experience in sustainable operations and ecotourism.
2. Write a Code of Practice for the ecolodge and require managers of all departments to agree and learn it. Because they will be trained in sustainability concepts as well as in management philosophy, managers will clearly understand that their ultimate responsibility is to manage all factors (including visitors) that impact the resources under their care.
3. Hold retreats and planning sessions for staff, specifically aimed at creating and (annually) reviewing the "management structure" that functions within sustainability guidelines. Ecolodge management staff must break out of the departmental "territoriality" box and work together to accomplish sustainability goals.
4. Provide training to managers on the green economic benefits of good habitat or land management, which in turn results in a resource usable for ecotourism and one that brings customers back to the ecolodge.

8.6.2 Educating Management Staff

Each ecolodge, depending upon its size, must allocate time and money to the systematic training of both management and their staff. Operations managers, general managers, departmental managers and land managers are pivotal in the ecolodge's successful sustainable operation. They make decisions crucial to running the lodge and to the protection and long-term operations of habitats used by lodge visitors. They often hire and supervise other staff and must enforce sustainable practices by those staff as well. These managers are frequently responsible for education and training of other staff.

GUIDELINES

1. Help your managers learn by providing access to well-written operations manuals and Habitat Management Plans. These written materials can provide systematic reinforcement and training on sustainability principles, which must form the basis for ecolodge operations.
2. Consider sending managers to conferences and training workshops and encourage them to attend meetings on sustainable habitat management. Ecolodge owners and operators will benefit from providing support and encouragement for education and training programs on sustainable habitat management for their land managers and those managers of surrounding properties or of areas used in extension programs. Make it part of their job description to attend appropriate conferences and workshops. National and international organizations like the Natural Areas Association, The International Ecotourism Society, National Parks and Conservation Association, and others provide training and networking opportunities.
3. Encourage and support managers with budget allocations for maintaining memberships in professional organizations that allow for networking and which provide new information on good sustainable practices for ecolodge operations through journals.
4. Organize an annual forum. Ecolodge managers should hold yearly retreats designed to update and reinforce sustainability concepts for all levels of management. Many times, managers may end up at odds with each other and with the original policies and philosophy of ecolodge owners or originators. Good communication is the key. Avoid punishing honesty and communications — encourage it for a healthy management staff.
5. Remember: Ecolodges that try to save money by not properly educating management staff will ultimately lose money due to the actions of those same poorly trained managers.

8.7 EDUCATION AND TRAINING OF ECOLODGE OPERATIONS STAFF

All ecolodge staff members should first and foremost be readily able to tell anyone what makes the ecolodge different from an "ordinary" lodge. Visitors will not come in contact with all operations staff, but members

of the community will. If staff do not understand and support the sustainability objectives of the ecolodge facility, then they will be the first to circumvent sustainability policies. A successful ecolodge cannot afford to ignore the education and training of these staff in the sustainable principles on which the lodge operation is based.

8.7.1 Identification of Operations Staff

All operations staff should be selected and trained with care, since they often determine the ecolodge's ultimate success or failure. These staff not only interact with outside service providers, suppliers, management and sometimes visitors; they also are a direct link to local communities.

GUIDELINES

1. Ensure that managers and human resources staff understand the level of quality and experience the ecolodge will require of its operations staff in accordance with very carefully designed job descriptions.
2. Train staff supervisors in conflict resolution and cross-cultural sensitivity to avoid potential staff conflicts.
3. Write an excellent operations handbook in advance of hiring staff and, if necessary, have it translated into local languages. These guidelines for all departments and operations staff should outline expectations and policies. Excellence is required in all aspects from choice of personal hygiene and appearance, to dress or costume, to ability to speak clearly and understandably to other staff as well as to visitors.

8.7.2 Training Operations Staff

Training operations staff is most often avoided, or it is assumed that staff can be hired who have been well-trained elsewhere. Do not assume that a staff member is correctly trained just because they have done that job for 20 years elsewhere — they may have done a bad job but no one required any better of them. Employees need to follow clearly written guidelines and be accountable for their level of performance and adherence to sustainability principles.

The ecolodge needs an excellent training program and selection process for hiring and training locals with appropriate skills, talents and capabilities for various operations involved in the ecolodge's day-to-day work. When possible, the ecolodge may provide pre-employment developmental schooling to assist promising candidates in achieving the level of performance required.

GUIDELINES

1. Train frequently, devote resources to quality training, invest the staff in the process, act on feedback from the staff, and demand performance.
2. Demand quality. If an ecolodge is to be successful, staff training performance must be of the highest quality. Do constant "reality checks" on your ecolodge's measurement of quality performance.
3. Update the quality of the training program. Apply sustainability principles in all aspects of training operations staff.
4. Use a variety of techniques for training, and seek methods that work best for the culture and past experience of various operations workers.
5. Involve experts and community representatives as well as representatives of operations staff in the creation of new training materials and experiences.
6. Reward quality performance and encourage staff to continually set new goals.

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"Biodiversity must be conserved as a matter of principle, as a matter of survival, and as a matter of economic benefit."

—UNEP / IUCN / WWF

CHAPTER 9

MONITORING AND EVALUATION

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CHAPTER CONTENTS

9.0 MONITORING AND EVALUATION

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9.0 MONITORING AND EVALUATION

9.1 INTRODUCTION

The basic concept of monitoring is to measure conditions over time, and to identify and predict change or impact (both positive and negative). Monitoring should become a fundamental part of ecolodges, because it will help the operators to understand the ecolodge's impacts on both natural and social surroundings. The final application of monitoring is to use it to make more informed decisions.

Monitoring encompasses many aspects, and all are of equal importance to the ultimate sustainability of an ecolodge. For example, monitoring can check on:

- Financial performance (checking income, expenses and profit against forecast figures).
- Human resource management (checking staff turnover, performance and satisfaction against those forecast in a business plan or human resource management manual).
- Marketing (checking how people heard of the ecolodge, how booking systems perform and customer's price sensitivity).
- Customers (occupancy levels, group size, length of stay, expectations, behavior and satisfaction).
- Environmental performance (consumption of energy and water, and generation of waste).
- Condition of the natural and social environment (surrounding habitat and health of the local host community).

The ideal way to monitor the true sustainability of an ecolodge is to monitor all aspects of the business using one framework, which would help to contrast the relative performance of environmental, social and economic goals. This chapter outlines a basic approach to setting up a monitoring framework that can be applied to any aspect of an ecolodge business. Given the environmental and social emphasis of this book, the authors have chosen to focus on monitoring the condition of the natural and social environment. Following this narrowing of focus, the authors will then expand to address the integration of monitoring into the ecolodge operation and product, as well as the integration of monitoring into staff awareness and training.

GENERAL GUIDELINES

1. Establish a set of goals for managing environmental performance and the condition of the environment (see Chapter 2).
2. Identify some baseline information and data to measure progress.
3. Identify objective performance standards for each indicator that relate to your goals.
4. Establish a monitoring system that is relatively easy to collect, store and analyze results.
5. Be prepared to change your practices (or close access to damaged areas) immediately or following annual review, if the data suggests that the current practices are unsustainable.

An ecolodge in a coastal environment. Source: EDSA

9.2 SETTING UP A MONITORING FRAMEWORK

9.2.1 Finding a Home for the Framework

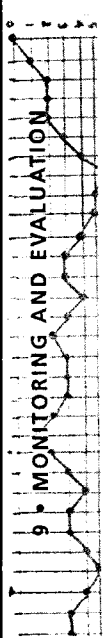
The first step in undertaking any kind of monitoring is to develop some sort of framework. A framework is most typically a table that sets out a logical way to present the relationship between the operations objectives, performance targets and monitoring techniques. Ecolodge operators typically create this framework within their business plan. In the business plan they write out business objectives and performance standards, such as the marketing and financial projections — this is the beginning of a monitoring framework. A monitoring framework that covers all aspects of the sustainability of an ecolodge should still be written into the business plan, because it is the principle document used to guide the operation.

The critical aspect of setting up a monitoring framework is to present each part of the framework in a logical way. Table 1 provides an example of a monitoring framework for an ecolodge. Basically, five steps are critical to developing a framework:

1. Establish a set of goals or objectives. These may already exist for some aspects of the business (such as financial performance), but may need other aspects added. An example of an objective for the condition of the social environment might be to "Empower the localcommunity to support the ecolodge through regular exchange of information, feedback and ideas."
2. Identify a set of indicators that reflect how well objectives are being met. An indicator should be easily measured and understood. An example of an indicator for environmental performance might be the ecolodge's annual energy consumption.
3. Decide the current state of the indicator (baseline standard), or if this is unknown, make a prediction. The baseline standard could be quantitative or qualitative, but usually is a measure over time. An example of a baseline standard for financial performance might be an annual profit of $200,000 per year.
4. Decide on the desired performance of each indicator (acceptable range) — this is almost always a prediction. The critical part of the acceptable

Table 1 Structure of a monitoring framework for an ecolodge (fictitious example)

Objectives	*Indicator(s)*	*Baseline standard*	*Acceptable range*	*Monitoring technique*
Financial performance	• Revenue • Expenses • Profit	• $1M / yr • $0.8M / yr • $200,000/yr	• $0.8M – $1.2M / yr • $0.6 – $1.2M / yr • $150,000-250,000 / yr	• Account keeping • Account keeping • Account keeping
Human resource management	• Staff turnover • Staff performance • Staff satisfaction	• 2 staff / yr • 2 extra duties / yr • 75% moderately to very satisfied	• 2-4 staff / yr • 2-5 extra duties / yr • 70-90% moderately to very satisfied	• Employment recording • Staff reviews
Marketing	• No internet bookings • Price sensitivity	• 200 in year one • Standard overnight rate of $150	• 500-750 / yr • Overnight rate of $125 – $150	• Internet bookings tally • Bookings system tally
Customers	• Occupancy levels • Length of stay • Satisfaction levels	• 60% average annual occupancy • 2.2 nights • 75% moderately to very satisfied	• 55% – 65% average annual occupancy • 2-3 nights • 70-90% moderately to very satisfied	• Bookings system tally • Bookings system tally • Questionnaire
Environmental performance	• Energy consumption • Water consumption • Waste generation	• 5MW / yr • 1.5ML / yr • 40 standard bin removals / yr	• 4.5-6.2 MW / yr • 1.4-1.7ML / yr • 38-44 standard bin removals / yr	• Consumption meters • Consumption meters • Consumption meters
Condition of the natural and social environment	• Flora and fauna diversity • Local water quality • Community involvement • Community satisfaction	• 5 sloth sightings / month • 0.003ppm E. coli • 6 monthly briefings / yr • 40% moderately to very satisfied	• 3-10 sloth sightings / month • 0.001-0.003 E. coli • 6-10 monthly briefings / yr • 40% – 60% moderately to very satisfied	• Wildlife spotting on tours • E. coli counting • Record of briefings • Question at briefings



range is the lower limit, because this is the "bottom line" of performance. While it may be desirable to make the upper limit infinite, it is worth putting in a limit so that there is a realistic expectation of performance. An example of an acceptable range for human resource management might be seeing between two to four staff leave and be replaced each year.

5. Decide on the monitoring technique. The monitoring technique is the way in which information will be collected. An example of a monitoring technique for checking the condition of the natural environment might be counts of sensitive wildlife while guides are taking tours.

GUIDELINES

1. Decide on the scale and period of time that the ecolodge is prepared to fund and run the monitoring program. Generally a monitoring program needs at least three to four years to provide trends and information that is reliable enough to make decisions.

2. Set up a budget to develop and run the monitoring techniques (monitoring program). The budget should recognize financial and human resource contributions.
3. Use a range of expertise to assist developing the framework. While much of the actual monitoring can be undertake by ecolodge staff, the framework may need specific expertise to ensure it is logical, manageable and reliable.
4. Ensure that the monitoring framework is coordinated with the operations environmental management plan and business plan. This process must begin before the lodge is planned and the site is selected.
5. Be prepared to change ecolodge practices as soon as the monitoring is activated, should it suggest that current practices are unsustainable.

9.3 INDICATORS AND TECHNIQUES FOR MONITORING THE NATURAL ENVIRONMENT

9.3.1 Need to Monitor the Natural Environment

All too often, even the most devoted ecolodge managers are faced with losing clientele after a few years because the biodiversity and quality of the natural environment has slowly been degraded by what appeared to be harmless activities. Eventually the characteristics of the natural environment that made the ecolodge successful no longer exist. Management is then faced with three alternatives:

1. Making a substantial investment in rehabilitation and associated activities.
2. Changing the marketing to attract tourists (in ever-larger volumes) that are less discerning and even more impacting.
3. Closing down the operation and losing part or all of the business.

Despite these onerous scenarios, the authors have found that less than 10% of ecolodges have formal methods of monitoring or evaluating environmental change. Ecolodges should not claim to be sustainable if:

- They have no way to measure what impacts they are actually having on their immediate natural environment.
- Negative impacts have been detected, yet no action is taken to make any changes.

Monitoring the condition or health of the natural environment is critical because it provides an indication of the nature of pressure creating the impacts in the first place. Evaluation of monitoring data needs to be able to determine whether the condition of the environment changed because of the ecolodge and its visitors, or some other influence.

9.3.2 Potential Indicators

Many indicators exist to monitor the condition of the natural environment. What is important is to monitor the ones that have the most relevance to the ecolodge's operation and the main activity of its customers. Some ecolodges may have government-set conditions and monitoring required of them as part of their operating permit or license.

Some indicators often considered by ecolodges to monitor the condition of the natural physical environment include:

- Water quality above and below ecolodge outfalls (e.g. from septic systems, swimming pools and fertilized gardens).
- Water quality below ground level (nutrients, Arsenic, E. coli, hardness, etc.) at potential sources of contamination such as septic tanks or if effluent is released offshore.
- Presence of contaminants such as oil and gasoline in aquatic habitats frequented by boats.
- Presence of hydroperiod in streams or ponds, or impacts on community water supplies.
- Signs of erosion.
- Presence of trampled or damaged vegetation.
- Sound levels from services and visitors (e.g. generators, vehicles and areas where visitors congregate).

Some indicators often considered by ecolodges to monitor the condition of flora and fauna include:

- Presence of exotic plants and animals (including domestic dogs and cats).
- Plant and animal biodiversity (terrestrial and aquatic) especially in use areas (such as along trails, roads, reefs, and places frequented by guests).
- Presence of species that are marketed and keenly viewed by customers, including changes in behavior that may cause them to be less accessible to visitors.

9.3.3 Monitoring Techniques

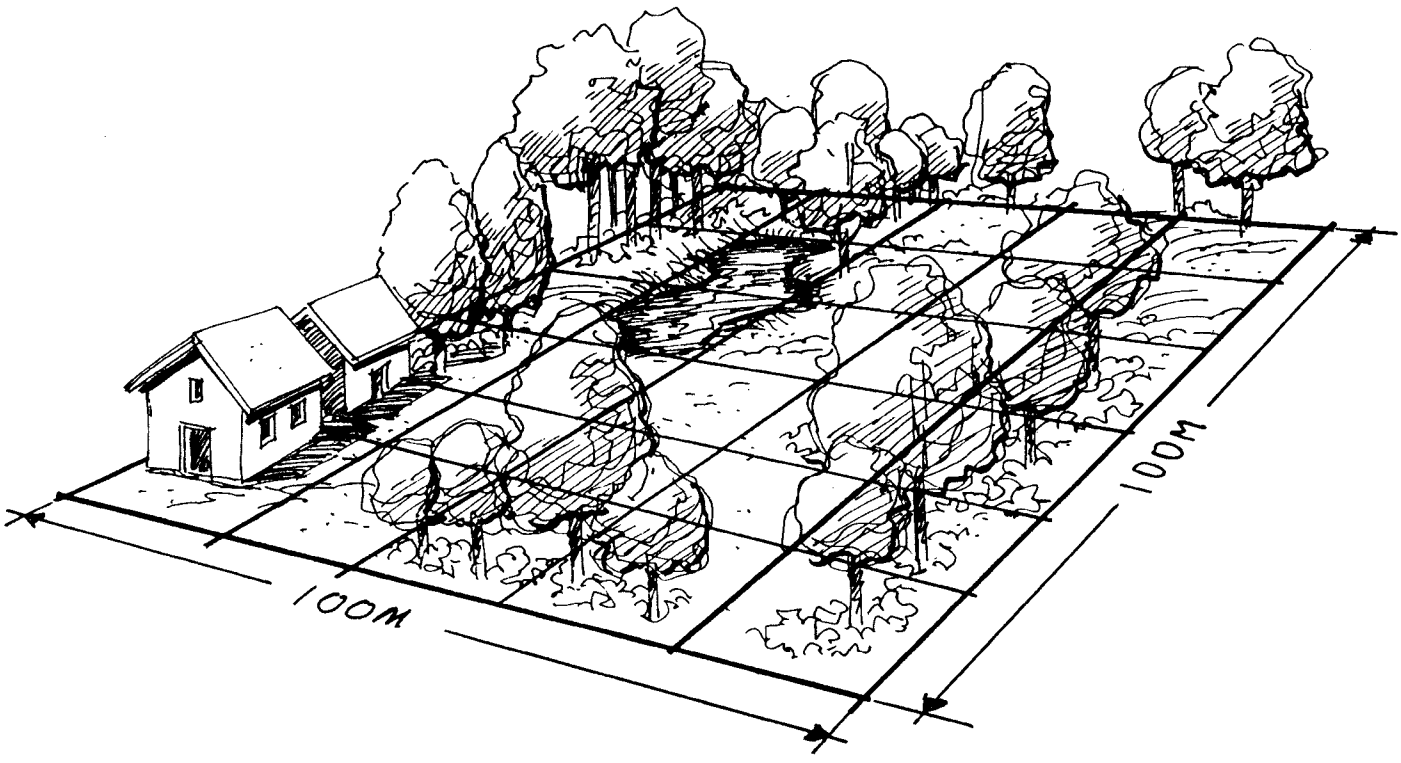
Monitoring the condition of the natural environment requires a medium- to long-term commitment because many environmental changes cannot be detected for a long time. Nonetheless, some of the most effective monitoring techniques are the simplest ones that can be integrated into other work practices. Three techniques that are briefly outlined below are:

- Routine observations.
- Photographic documentation.
- The use of plots or transects.

Routine observations can be undertaken by staff naturalists during tours. Data is collected in field notes or forms and then entered into data tables or into a computer. This approach can even use customers to assist, which can add to the interpretation experience. Many lodges now offer special Christmas Bird Counts and Amphibian Watch programs, which not only helps collect data but is an excellent marketing tool as well.

Photographic documentation of key sites, such as habitat area used by tours, are an accurate yet cost-effective monitoring technique. These photos need to be taken in precisely the same place and should be supplemented with notes about the conditions at the time, so it may be useful to set up discreet, permanent photo-points and mark them as such.

The use of plots or transects provides a more rigorous approach to habitat monitoring than observations, because the monitoring area is standardized. The length of a plot may be a few meters to several hundred and be two or three meters wide or many more (see sketch on the following page). The height may be just below the ground to the canopy level of the forest. The number of plots can vary greatly. The number of plots will depend on the size of the site, the number of natural communities involved, and the ability of staff to continue the monitoring effort. The key to this technique is comparing data from one year to the next and between plots that are in unaffected and potentially affected areas. One plot should be located where development and human impacts are likely, the other should be in similar habitat but well away from potential impacts. Comparing plots may provide information on change that is related to human use instead of overall conditions. Some changes may be seasonal or a reaction of the natural environment to drought, or increases in certain insects. In this case, the paired plots should show similar change. However, if the plots show dramatic differences, then the impacts may be due to human impacts.



Monitoring techniques should be standardized so that everyone is collecting the information in the same way, including new staff as old ones leave. If techniques are not kept consistent then results will not be able to be compared between plots and over time.

GUIDELINES

1. Put a staff member in charge of overseeing monitoring techniques, data input and evaluation.
2. Obtain professional assistance in piloting and establishing the monitoring, setting up data storage and reporting systems, and training staff on how to conduct routine monitoring techniques.
3. Choose techniques that reflect the complexity and reliability of information needed (observations for simple data, plots for complex data). Ideally, establish the monitoring techniques before changes are made to the environment where the ecolodge is to be located.
4. Pilot the monitoring technique to make sure it is simple, efficient and reliable.
5. Integrate as many monitoring techniques as possible into standard work practices, and make some monitoring techniques part of the guest experience.

9.4 INDICATORS AND TECHNIQUES FOR MONITORING THE SOCIAL ENVIRONMENT

9.4.1 Need to Monitor the Social Environment

For an ecolodge to operate sustainably it needs to respect and support the local social and cultural environment where it operates. If an ecolodge operates anywhere near a community, it will probably have both positive and negative social and cultural impacts associated with its development and ongoing operation. Positive impacts may include investment, employment and improved facilities and services; negative impacts may include loss of access to places and facilities, and loss of privacy and cultural identity. Therefore, monitoring needs to address social and cultural conditions that relate to the local environment. Generally, ecolodges undertake far less social monitoring than environmental monitoring. This is partly because the relationship between the performance of the business and social conditions is not as clearly dependent as it is with environmental conditions. The other reason is because monitoring social and cultural conditions requires expertise not typically found in an ecolodge operation.

9.4.2 Potential Indicators

Like the natural environment, many indicators can be used to monitor the condition of the social environment. Again, what is important is to monitor the ones that have the most relevance to the ecolodge's operation and the main activity of its customers. Ecolodges may have set conditions and monitoring required of them by local government, as part of their development consent.

Some indicators that could be used by ecolodges to monitor the condition of the social environment include:

- Opportunities for local input into ecotourism-related decision making.
- Community support for the scale and nature of the ecolodge.
- Availability and price of food.
- Local resident access to facilities (such as parking) and services (such as tradesmen).
- Ongoing visitation to local recreation areas by local residents.
- Sense of privacy among local residents.
- Rate and nature of crime among local residents and visitors.
- Opportunities for constructive dialogue between local residents and ecotourists.

Some indicators that could be used by ecolodges to monitor the condition of the cultural environment include:

- Loss of archaeological fabric from archaeological sites and museums.
- Damage, vandalism and graffiti present at archaeological sites visited by customers.
- Litter left by sites visited by customers.
- Continuation of cultural traditions.
- Clothing and accessories worn by local people.
- Clothing and accessories worn by ecotourists.

9.4.3 Monitoring Techniques

Like monitoring the condition of the natural environment, monitoring the condition of the social and cultural environment also requires a medium- to long-term commitment. Sometimes the greatest impacts are associated with the development phase, after which a community can become resilient to further, subtler impacts associated with visitor activity. Monitoring the condition of the social and cultural environment is far more complicated than monitoring the natural environment, because the subject (people) is more difficult to measure and understand. For example, people continually change their values and needs, and subsequently, what may be acceptable one day may not be the next. Further, people's behavior often is driven by many influences, so it is difficult to isolate how an ecolodge and its customers have influenced social and cultural conditions.

Therefore, there tends to be more social research than social monitoring, and this is typically known as Social Impact Assessment (the social equivalent to an Environmental Impact Assessment). Social Impact Assessments are mainly undertaken as part of a development consent process for large proposals (typically resorts), or large ecolodges near communities with minimal exposure to tourism activity.

Before an ecolodge can begin monitoring the condition of the social and cultural environment, it is obliged to gain the understanding, permission and trust of the host community. This can be a complex and political process. The following guidelines are offered to assist the building of community understanding, permission and trust.

GUIDELINES

1. Obtain the services of someone who has cross-cultural and negotiation experience (ideally with the particular culture involved).
2. Identify community leaders (not just the politicians), get to know them and try to work with them in their own style.
3. In the native language, provide written descriptions of what the project is and how it will work. Be sure to explain all of the ways that the project will affect the community. Position the community as a partner that can not only help minimize negative impacts but maximize positive impacts.
4. Meet with leaders again to answer questions and identify potential issues after people have had time to study and discuss the information.
5. Recognize and understand that the values, ethics and expectations of the local community may be very different to those of ecolodge management. Present the issues collected to the broader community, in their preferred manner of meeting and communicating. For some communities this will be via a town meeting of the whole community, in other communities it will be with special interest groups and in others again it will be on an individual basis.
6. Explore how community concerns can be taken into account during the development and operating phases, then re-present these options to the community for their response.

7. Be honest, clear and flexible to negotiate. As trust is developed and consolidated, further changes may be possible.
8. Keep jobs, hiring and agreements with people from the community separate from community-wide arrangements. Also, be sure that agreements with individuals are written down.
9. Guarantee that the voice representing the community is actually that of a majority of the community members.

9.4.4 Working with the Community

Preparing a written agreement or letter of understanding with the community is worth particular attention. The written agreement should contain:

- How both parties will maintain regular communication and information exchange.
- Ways that both parties can work together to solve problems or to make changes.
- The indicators and their benchmarks (which may go beyond the ecolodge operator's responsibilities).

Some small and isolated communities in developing countries might be scared or might not understand the significance of signing agreements, and might sign legally binding documents without realizing the ramifications of not carrying out the stipulated actions. Sometimes it is the educated representatives that sign, requiring a communication process with other members of the community to ensure everyone understands, despite different political affiliations, religious convictions, educational backgrounds and socio-economic status.

Once community understanding, permission and trust has been established (with or without a written agreement), it is possible to begin monitoring the condition of the social and cultural environment. Three monitoring techniques are briefly outlined below:

- Regular meetings with community representatives
- Questionnaires
- Observations and photography

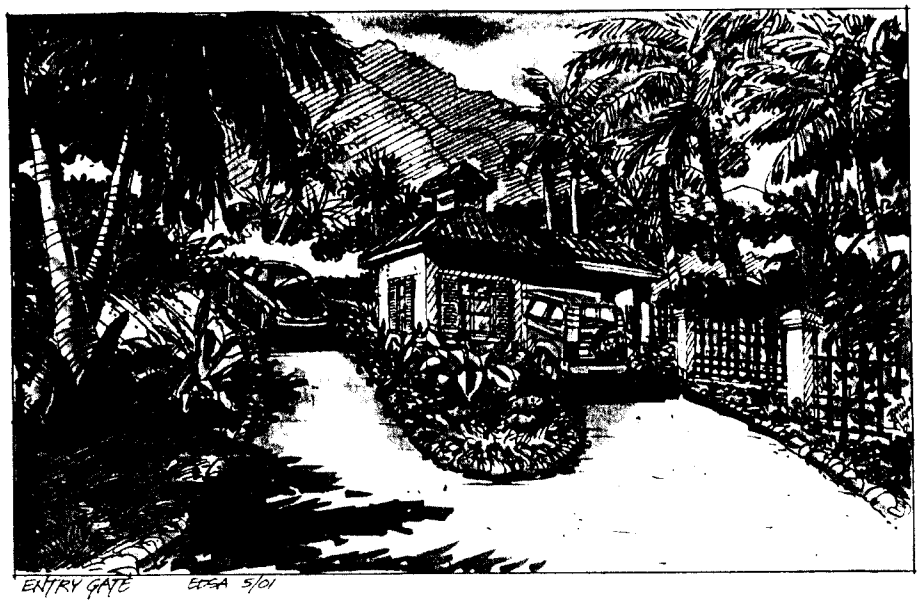
Regular meetings with community representatives are a critical way of exchanging information, gaining feedback, and monitoring opinions and issues. Information provided by the ecolodge operator is typically based around clearly explaining to the community the operating scale and style of the ecolodge at the onset, followed by the operating characteristics thereafter. The monitoring can be undertaken indirectly (through observations and recording of what is said) or directly (through questions specific to the indicator). An observer records community responses in a table that indicates what was said, as well as how many people and who said it. The language used in the meetings must be impartial and delivered in a way that is not threatening and is easily understood.

Questionnaires are an excellent way of sampling a large group of people, in a cost-effective way, on a continuing basis. The questionnaire can be posted out to homes or disseminated through a local newspaper on a regular basis (perhaps once per year). Great care must be taken to phrase questions in a way that communicates clearly and minimizes bias. It is essential to pilot test the questionnaire and refine it accordingly. The questionnaire should be prepared and analyzed using social research expertise.

Observations can be used in a similar way to that described in the monitoring of the natural environment. Observations have been used to monitor: visitor behavior near local people; resident behavior near visitors; and parking spaces available outside key shops and facilities. Photography has been used to monitor: attendance and behavior at cultural events and local recreation areas; vandalism and graffiti at cultural sites; and clothing worn by locals and ecotourists in townships. Observations need to be recorded in a way that allows easy tallying and comparison. This typically means recording in a table and entering the data into spreadsheets or databases.

GUIDELINES

1. Identify community representatives to oversee, and ideally, to undertake the social monitoring program (e.g. local government or a collection of resident or special interest groups).
2. Assist in training the representatives and help get them status for the work that they are undertaking. Once the benchmarks have been agreed to (in writing), lodge staff and community individuals should receive training on how to collect and store data. Both groups of data collectors should meet on scheduled times to exchange and go over data. Some data may be factual and other may be purely subjective. Both types are important.
3. Generate a simple reporting system that is accessible to the whole community (e.g. local meetings, local newspaper, fliers or a poster in the most visited shop window).
4. Create occasional meetings or workshops to evaluate the data and make decisions about how negative impacts can be further reduced.



9.5 INTEGRATING MONITORING INTO THE OPERATION AND PRODUCT

As mentioned at the beginning of this chapter, some types of monitoring (such as bookings, stock and financial performance) have become a fundamental part of daily ecolodge operations. Ecolodges should lead the way in not only monitoring all the elements of a sustainable operation (economic, environmental and socio-cultural), but they also should integrate all of this into their daily operation. Monitoring that becomes a part of daily operations becomes cost effective and thus viable to continue on an ongoing basis. In Australia, ecotourism operators must demonstrate how their environmental monitoring is integrated into their operation in order to become accredited under the National Ecotourism Accreditation Program (Ecotourism Association of Australia 2000).

Some types of ecolodge monitoring can actually be integrated into the ecotourism experience of guests, meaning that the monitoring adds value to the ecolodge product. Many ecotourists enjoy and actively seek out opportunities to be a part of monitoring because they like to:

- Use monitoring as a way of learning more about the place that they are visiting.
- Feel that their experience is valuable not just for themselves, but for the natural and social environment.
- Feel a part of the operation and like to take some responsibility for their time at the ecolodge.

Furthermore, guests who participate in monitoring become more aware of their potential impacts and more interested in practicing minimal impact behavior. Guests may even offer a fresh insight on changes that are not so easily observed by everyday staff.

Monitoring can be integrated into many aspects of an ecolodge operation. For example, some ecotourism operations design entire ecotours around monitoring wildlife, measuring vegetation plots and tracking erosion. Monitoring also can be integrated into ecolodge rooms by getting guests to complete surveys or have their room-based consumption of energy or water monitored by equipment. Some ecolodges even extend the monitoring for guests to take home with them so that they can make comparisons with their normal lives. Involving guests in monitoring is considered best practice ecotourism because it recognizes that becoming sustainable should require everyone to take responsibility for their actions and become involved in some way.

GENERAL GUIDELINES

1. Differentiate continual monitoring from seasonally based programs so that guests can select an opportunity that best suits them, and so that their expectations are realistic.
2. Train guides to explain the monitoring program to visitors and encourage guest involvement.
3. Create rewards for guests who take on and excel in the monitoring opportunities. This could include free promotional merchandise, free tours or discounts to other related products.
4. Market opportunities for guests to become actively involved in on-site monitoring as a point of differentiation to competitors. This is a way to let guests know that this is truly an ecolodge.

9.6 REPORTING AND DECISION MAKING

9.6.1 Recording Data That is Collected

One of the greatest flaws in monitoring programs is failing to collect and store data in a way that can be used to evaluate change over time. Recording data should not be complicated, but data should be stored and managed using set procedures and protocols. Simple data charts can be prepared by hand or, better yet, computerized. The simplest and most productive computer program is the spreadsheet, as this can do simple tallies, averages and more complex calculations using similar methods to those employed for basic financial management systems. Nonetheless, databases are more effective at storing qualitative information, such as descriptions of observations.

GUIDELINES

1. Identify an individual to have responsibility to regularly store information.
2. Select the data storage method to be used (if computer, which program and how the program should be used).
3. Train staff on how to enter data so that it is stored in a consistent manner.
4. Develop a recording system for the data that is simple enough for most staff to understand.
5. Back up data in computers with hard copy. Simple programs are now available that can be used to store data in computers; some programs will actually analyze data to demonstrate changes that are taking place.

9.6.2 Evaluating the Data and Making Decisions

Monitoring is worthless if the task stops with the collection of information. Data needs to be evaluated to:

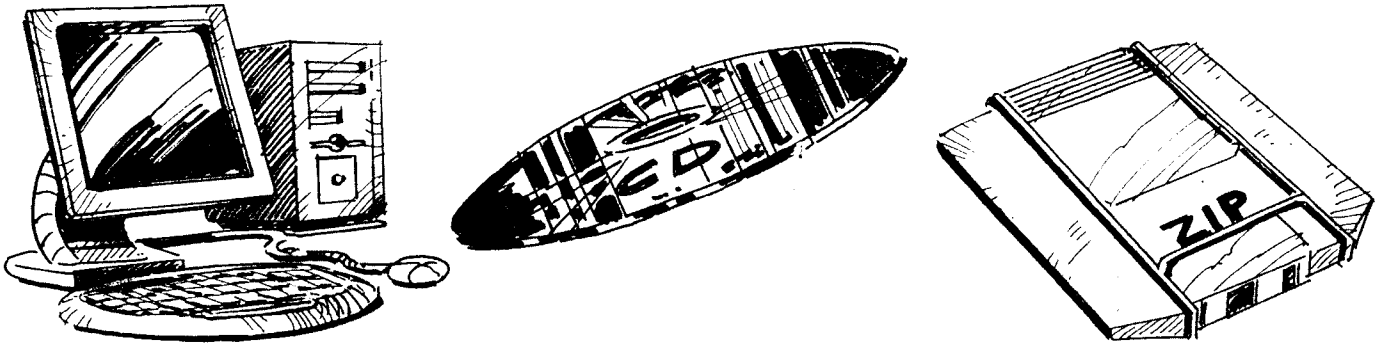
- Determine trends over time.
- Compare areas with and without visitor activity.
- Determine whether impacts are acceptable or unacceptable.
- Indicate or support decisions to change management practices.

The frequency of data evaluation depends on what is being collected. Some data (such as water quality) should be frequently evaluated so that management can respond before impacts become irreversible. Other data that reflects slower impact may only need to be evaluated each quarter or each season.

It is critical to inform and involve management in data evaluation, otherwise management cannot respond. This can be done by sharing reports, or through regular meetings or presentations. Meetings are preferred because they allow immediate questions, answers and debate to occur, which in turn will stimulate decision making. Meetings should record decisions made and follow up on the implementation of previous decisions. Ideally, key changes in management practices should be recorded as part of the monitoring process.

GUIDELINES

1. Regularly review data to evaluate changes and determine if and when adjustments should be made in resource or program management.
2. Meet regularly so that operations and management staff can learn about key findings and trends, and discuss implications.



3. Note any changes that may relate to the data, such as weather conditions, natural impacts and changes in operations, and include these observations in your reports.
4. When relevant, bring into meetings some local knowledge to help evaluate changes.
5. Do not make arbitrary decisions without being sure of the situation. Each decision should be based on sound data. It may be necessary to undertake specific research to qualify and confirm monitoring results.

9.7 STAFF AWARENESS AND TRAINING

9.7.1 Staff Awareness

All staff need some degree of awareness of the monitoring being undertaken and the results being generated, because they will want to know the rationale for decisions that come from the monitoring. Some staff members will be responsible for undertaking monitoring, and will be interested in how their contribution fits into the overall monitoring framework. Each staff member can observe visitor activity and indirectly monitor impact-related behavior in a simple and cost effective way. Each staff member has the potential to create positive and negative impacts, and if they are aware of these, they can enhance the positive impacts and reduce the negative ones. However, none of these opportunities can be realized if staff are unaware of the monitoring program and the results that it generates. This is why one individual on staff should be responsible for managing the monitoring program and raising staff awareness. Information sessions should explain how the monitoring will assist with other aspects of the operation, how it will be undertaken, and what is expected from each staff member.

GUIDELINES

1. Brief staff on the rationale and importance of monitoring.
2. Ask staff for feedback to further improve the monitoring program.
3. Integrate relevant environmental reporting into other forms of staff communication systems or briefing sessions.

9.7.2 Staff Training

Staff involved with the monitoring program should receive some kind of training to assist them in undertaking the monitoring in a cost-effective, reliable and sensitive manner. Training may cover specific monitoring techniques, reporting or decision making. Management should be independently trained in how they will be needed to assist in evaluating data and make decisions accordingly.

Before staff are identified to be involved in monitoring, management should determine whether external expertise is required and how it could best be used. Sometimes it is more effective to bring in the expertise to "train the trainer," allowing one staff member to take on coordinating responsibility for the monitoring and training of support staff to implement monitoring. Therefore, the skills required could be in setting up a monitoring program (identifying objectives, indicators, benchmarks, acceptable standards, monitoring techniques and reporting systems), or in undertaking specific monitoring techniques.

GUIDELINES

1. Select an individual with environmental and/or social planning expertise (depending on the emphasis of the monitoring) to manage the monitoring process.
2. Provide support to staff involved in the monitoring — don't just add it to staff with heavy existing workloads. The individual coordinating the monitoring should have the tasks acknowledged in their job description, and should have a budget and authority to co-opt staff to assist them.

3. Backup in-house expertise with consultants and trainers so that monitoring is never reliant on one individual.
4. Involve local residents and have them train monitoring staff in relevant characteristics of the local community.

9.8 CONCLUSION

Monitoring is a fundamental part of all ecotourism operations. This chapter has explained how existing monitoring of economic performance should be integrated with other aspects of sustainability — environmental and socio-cultural performance. The chapter has proposed the establishment of a monitoring framework to pool all monitoring together so as to see how different aspects of an ecolodge influence each other. An undercurrent of the chapter has been to start monitoring on a simple and cost-effective manner, then progressively expand to cover other aspects of the operation. In this way, monitoring can be recognized as a practical and manageable tool to assist in running a sustainable ecolodge.

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11. International Hotels Environment Initiative. (1998, October). Purchasing Guidelines Number 2: Environmentally - Preferable Flooring. London: Author

12. International Hotels Environment Initiative. (1999, April). Purchasing Guidelines Number 4: Fridges and minibars. London: Author.

13. International Hotels Environment Initiative. (1999, January). Purchasing Guidelines Number 3: Cleaning chemicals. London: Author.

14. International Hotel & Restaurant Association and United Nations Environment Programme Industry and Environment. (1995). Environmental good practice in hotels: Case studies from the international hotel & restaurant association environmental award. Author.

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16. Kenya Wildlife Service. Physical planning and environmental guidelines for facilities development in the protected areas. Author.

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ECOLODGE WEBSITES

There is only one informational ecolodge website and several that have web pages with basic information on Ecolodges. Most of the ecolodge websites are hosted either by Ecotour Operators or by Ecolodge Operators.

Ecomon: Hitesh Mehta
www.eco-mon.com
This is the one-stop shop ecolodge website. Everything you want to know about ecolodges but were afraid to ask — definitions, criteria, research papers, guidelines, presentations, top five ecolodges, etc. It's all here. Hosted by the 'ecomon' — Hitesh Mehta.

The International Ecotourism Society
www.ecotourism.org/ecolodge.html
TIES Member Ecolodge List. Just look through the worldwide listing of TIES Institutional Member Ecolodges. Those with websites are linked so you can explore specific homepages for further information.

The Nature Conservancy
www.tnc.org
TNC has produced an in-house ecolodge manual and there is some information in this website.

Conservation International
www.conservation.org
Conservation International was instrumental in the development of Chalalan Ecolodge in Bolivia and strongly advocates community participation at the planning stages.

Untamed Path
www.untamedpath.com/Ecotourism/what_is_ecotourism.html
Ecotourism has many meanings. Explore articles about ecotourism, ecotravel and ecolodges.

Kiskeya
www.kiskeya-alternative.org/publica/diversos/ecolodge-brasil.html
An evaluation of ecolodges in the Brazilian Amazon concerned with environmental issues and impacts caused by conventional tourism, people are opting for destinations and tourism products, which do not cause environmental problems.

Ecoclub
www.ecoclub.com
International ecotourism club for ecotourists and ecotourism providers. Free hosting, email and promotion for providers, discounts in lodges and ecoproducts for ecotourists.

PRODUCT WEBSITES

The editors would like to thank Alex Joseph (josepha@ucalgary.ca) from the University of Calgary for being part of the team that researched the internet for the information below. The following list is by no means exhaustive and should you have an ecoproduct that would benefit readers of this book, please send the details and website info to hmehta3@aol.com. Because of the ever-changing nature of the Internet, some of these websites may be outdated, for which we apologize.

SITE SELECTION, PLANNING AND DESIGN

Selection Criteria, Community Based Tourism, Ecotourism, Ecolodges
www.interconnection.org
Community based tourism project, websites donated by InterConnection

Sustainable Landscape Designs
www.sustainable-landscape.com
Sustainable Landscape Designs (SLD) creates ecological designs for residential and commercial clients.

Xeriscaping
www.cabq.gov/waterconservation/xeric.html

Integrated Pest Management, BC Parks and Environment
www.env.gov.bc.ca/epd/epdpa/eripm/

Paving without Asphalt or Concrete
www.buildinggreen.com/products/road_oyl.html

BIO-PHYSICAL IMPACTS

Wetlands foundation
www.humedales.org
Site provides information on mangrove project in Costa Rica.

Cairns On-line Environment guide – mangroves
http://cairns.aust.com/environ/mangroves.html
Detailed description of mangroves, with access to scientific studies.

Inside the mangrove jungle
www.flsun.com/wild_eco/mangrove.htm
Describes mangroves for a lay audience.

Mangrove replenishment initiative
http://mangrove.org
Good view of specific threats to mangroves. Includes good links.

Global temperature jumps off chart
www.worldwatch.org/alerts/981029.html

PRODUCT WEBSITES continued

Canada Emission Outlook
www.nrcan.gc.ca/es/ceo/outlook.pdf

Environment Canada 30-Year Climate Norms
www.mscsmc.ec.gc.ca/climate/climate_normals/index_e.cfm

6 Billion People
www.popexpo.net/eMain.html

ARCHITECTURAL DESIGN

DESIGN ELEMENTS

U.S. Department of Energy information on green buildings
www.sustainable.doe.gov

SkyCalc software for sizing skylights
www.energydesignresources.com/tools/skycalc.html

Whole Building Design Guide (US)
www.wbdg.org

Information and links on green building design
www.greenbuilding.ca

Advanced Buildings (Canadian, Commercial and Multiresidential)
www.advancedbuildings.org

Green Roofs
www.greenroofs.com
Greenroofs.com's purpose is academic, and is not subsidized by any company or institution. By sharing and exchanging information, the objective is to promote green roof interest and development through a dynamic and interactive "living" research document.

Roofscapes, Inc.
www.roofmeadow.com
Roofmeadow(r) vegetated roof covers are engineered systems that consist of three primary layers.

MATERIALS

Green building materials and background data
www.metrokc.gov/market/map/index.htm

Building Materials (India)
www.bmtpc.org

Alonobis
www.alonobis.com
Provides architects and green builders with a powerful online system that delivers green specifications and methods of procurement to fit the specific needs of your project.

U of T consideration of materials
www.cquest.utoronto.ca/env/env421h/openspaces/chap4.html#2

Christmas Star
www.christmas-star.org
Non-toxic pool technology. Contains ozone, hydrogen peroxide, zinc, magnets, enzymes and more.

Green building materials and products list
www.oikos.com

EBN what makes a building product green?
www.buildinggreen.com/features/gp/green_products.html

Embodied energy article
http://hem.dis.anl.gov/eehem/95/950109.html

Biodegradability
www.ecomall.com/greenshopping/organicsol.htm

Biodegradable packaging
www.cdpoly.com/allies/allies_packaging.asp

Wood certification
www.buildinggreen.com/features/cert/certification.html

Certified Wood Products Council
www.certifiedwood.org

Forest Stewardship Council
www.web.net/~fscca/

Smart Wood
www.smartwood.org/product-finder/product-finder.html#plywood
Certified Wood Product Company Listing.

Natural Resources Defense Council
www.nrdc.org/land/forests/gb/gbinx.asp

Home Depot and GBRF
www.fanweb.org/actionvan/homedepot.html

Sierra Club petitions Home Depot
www.sierraclub.ca/bc/News/Media_Releases/HomeDepot.html

List of reclaimed wood suppliers
www.buildinggreen.com/products/recycled_wood.html

Treated wood
www.buildinggreen.com/features/tw/treated_wood.html

Comparing against wood (Wood Council)
www.cwc.ca/english/publications/technical_bulletins/technical_bulletin_4.html

CanFibre greenMDF
www.canfibre.com

Steel vs. Wood studs
www.buildinggreen.com/features/svw/steel_vs_wood.html

Steel Alliance
www.thenewsteel.org

Cement and Concrete: Environmental Considerations
www.buildinggreen.com/features/cem/cementconc.html

Solenium Carpet tile by Interface, Inc.
www.solenium.com

Nature's Carpet by Colin Campbell (Vancouver)
www.colcam.com

Buyer's guide to carpet
muextension.missouri.edu/xplor/regpubs/ncr463.htm

Air gap
www.thewindowman.co.uk/air-gap.htm

Cellulose Insulation Manufacturers Association (CIMA)
www.cellulose.org

Recycle Steel
www.recycle-steel.org/construction/main.html

PRC – 1998
www.prc.org/guide/prodindx.htm
Recycled Products Guide.

The Plastic Lumber Company, Inc.
www.plasticlumber.com
Recycled plastic products: picnic tables, park benches, and site amenities

Recycling plastics
www.newton.dep.anl.gov/askasci/env98.htm

Disposal of fluorescent tubes (EPA)
http://es.epa.gov/techinfo/facts/lamps-fs.html

Case Studies of recycled ceiling tile in use and other ceiling products
http://dnr.metrokc.gov/market/map/Product%20profile/ceilingtile.htm

SierraPine Limited
www.sierrapine.com
Manufacturer of 100%recycled and reclaimed medium-density fiberboard. Products that have no added formaldehyde.

Earthship
www.slip.net/~ckent/earthship/
Homes built from recycled tires, cans, etc. Definitely a different style of environmental house — puts new meaning to recycling and re-using.

Sustainable Construction
www.mha-net.org/docs/sustain.htm#embodied

Strawbale construction
http://solstice.crest.org/efficiency/straw_insulation/index.html

Rammed earth construction
www.greenbuilder.com/sourcebook/EarthGuidelines.html#Rammed

Rammed Earth – The Australian Connection
www.hahaha.com.au/rammed.earth/
Although quite an old process, Rammed Earth is making something of a comeback as an ecologically sound building practice. The results are beautiful, solid and earth-friendly, although labor-intensive.

Adobe
www.epsea.org/adobe.html

Cast Earth
www.castearth.com
A structural material made with earth and calcined gypsum can replace wood or steel framing in residential and light commercial buildings, reversing escalating costs while yielding energy and environmental benefits.

Earthship Biotecture
www.earthship.org
Independent Housing for the Planet.

Explanation of Insulation, R-Value, Thermal Resistance, etc.
www.buildinggreen.com/features/tm/thermal.html

Steel vs Wood Residential Construction
http://ascweb.org/jce/97vol1/no4/97VOL144BATEMAN.HTM

Wood vs. Steel (Wood point of view)
www.lumber.com/articles/art_04.asp

Cost comparison: strawbale vs. wood vs. cellulose
http://solstice.crest.org/efficiency/strawbale-list-archive/9612/msg00589.html

WATER

Learning to be water-wise and energy efficient — An education program
www.getwise.org/splash.html
Targets a younger audience but contains some interesting facts and tips for people of all ages, including a section describing the water cycle.

American Water and Energy Savers, Inc.
www.americanwater.com/49ways.htm
A commercial site that sells water-saving products.

Waterwiser: The energy efficiency Clearinghouse
www.waterwiser.org
Contains a good list of links.

Environment Canada: water conservation/efficiency
www.ec.gc.ca/water/en/manage/effic/e_weff.htm

Water conservation
www.its-canada.com/reed/eehc/ds12.htm

Greywater: A recyclable Solution
www.waterstore.com
Advocates greywater use, including a general description and diagram of a greywater system.

PRODUCT WEBSITES continued

Greywater explained
www.greywater.com

Rainwater Harvesting
www.southface.org/home/sfpubs/articles/rainwater.htm

Rainwater harvesting: a new water source
http://twri.tamu.edu/twripubs/WtrSavrs/v3n2/article-1.html

Home Use of Graywater Rainwater Conserves Water — and May Save Money
ag.arizona.edu/AZWATER/arroyo/071rain.html

Rainwater Collection by Green Builder
http://greenbuilder.com/sourcebook/Rainwater.html

Rainwater harvesting: a new water source by Jan Gerston
http://twri.tamu.edu/twripubs/WtrSavrs/v3n2/article-1.html

Water Storage Solutions
www.waterstoragesolutions.com
Water tanks for rainwater collection.

Environment Canada water conservation/efficiency
www.ec.gc.ca/water/en/manage/effic/e_weff.htm

Example of water drain heat exchanger
www.caddet-ee.org/newsdesk/nw497_05.htm

Washer & Dryer listing on YHP
www.yourhomeplanet.com/Products/Consumer/Appliances/Washer_Dryer/

Staber 2000 washer/dryer
www.staber.com/bin/Images/POP%20image.jpg

Discussion on horizontal washer/dryer combos
www.nahbrc.org/toolbase/pandt/tech/abstracts/appab7.html

Hot water
www.heimer.com/information/hot_water.html#Temperature

The septic information site
www.inspect-ny.com/septbook.htm

Water, energy, and agriculture
www.npg.org/forums/tightening_conflict.htm

Soybio-Drip
www.soybio-drip.com
An earth friendly biodegradable non-petroleum based oil for Vertical Shaft Water Pumps.

Residential Enviro Design
www.reddawn.com

Conservation/Water-Related Links
www.waterwiser.org/template2.cfm?page1=reuselinks&page2=links_menu

ENERGY

The real price of oil
www.worldwatch.org/alerts/000928.html

The madness of nuclear energy
www.theecologist.org/Nov99.html

Nuclear nears peak
www.worldwatch.org/alerts/990304.html

James & James – Renewable energy suppliers and services
www.jxj.com/dir/wdress
Site maintains searchable database of renewable energy suppliers and services in many different countries worldwide.

Energy Harvester
www.energyharvester.com
Dealer and installer of renewable energy technology. Provides living energy systems.

Real Goods Renewables / Gaiam
www.realgoods.com
Energy efficient appliances including washing machines and dryers, sun ovens, off-grid refrigeration and composting toilets.

U.S. Department of Energy information site
www.eren.doe.gov/

Union of Concerned Scientists
www.uscusa.org

eValuator software for finding life cycle costs of design decisions
www.energydesignresources.com/tools/evaluator.html

Ecodesign BC Links page
www.ecodesign.bc.ca/links.htm

Sustainable energy in Canada
www.newenergy.org

Facts about Green Power, Enviro Canada
www.mb.ec.gc.ca/info/publications/ce00s01.en.html

Page 4 of Energy Demand report
www.nrcan.gc.cales/ceo/alta-96b.pdf

Hydro Quebec, James Bay project
www.hydro.qc.ca/visit/virtual_visit/dam.html

3 Gorges Dam
www.rose-hulman.edu/Class/ce/HTML/curriculum/undergraduate/CE361/tgd/tgd.html

SOLAR

Passive solar design using Walden diagrams and software
www.srv.net/opt/sunchrt.html

ACR Solar International
www.solarroofs.com
Solar water heating systems. High-performance, advanced design.

Big Frog Mountain Corporation
www.Bigfrogmountain.com
Solar electric equipment, windmills, micro to medium hydro systems, energy efficient appliances.

Sunnyside Solar, Inc.
www.sunnysidesolar.com
Full-service photovoltaic company that specializes in small, medium- and large-sized photovolataic systems for both remote and non-remote locations.

Solar Architecture — Passive Cooling
http://mhathwar.tripod.com/thesis/solar/solar_architecture.htm

OM Solar
www.omsolar.com
The OM Solar system is based on a fundamental objective: to create homes and buildings that respond flexibly to exterior environmental conditions so as to optimize the use of available solar energy and other climatic patterns for indoor heating and cooling, ventilation, dehumidification and hot water supply.

The Solar Cooking Archive
http://solarcooking.org

Solar energy international
www.solarenergy.org

Online solar calculations
http://susdesign.com/sunangle/

Building integrated photovoltaic
www.eren.doe.gov/solarbuildings/integrated.html

Mr. Solar
www.mrsolar.com

Maine solar house
http://solstice.crest.org/renewables/wlord/index.html

The hazards of solar energy
www.lhup.edu/~dsimanek/solar.htm

Solar Cooker Field Test South Africa
www.solarcookers.co.za
Our vision is to supply African countries with low-cost mass-produced solar stoves or components of high quality produced in South Africa, with other words to offer solar stoves as a commercial product to everybody.

Solstice
http://solstice.crest.org

Sustainable energy in Canada
www.newenergy.org

Solar Energy Society of Canada
www.solarenergysociety.ca

Solar Energy International
www.solarenergy.org

WIND

Build your own wind turbine from reclaimed parts
www.windmill.on.ca/prod01.htm

Home wind energy mailing list
mailto:awea-wind-home-subscribe@egroups.com

Wind power sets growth record
www.worldwatch.org/alerts/981229.html

Wind Energy Maps (U.S.)
http://rredc.nrel.gov/wind/pubs/atlas/

Canadian Wind Energy Association
www.canwea.ca

HYDRO

Tidal energy
www.bluenergy.com

Mini hydro FAQ
www.jademountain.com/faq/faqhydro.html

Geothermal:
Geothermal Energy Society
www.geotherm.org

US DOE geothermal
www.eren.doe.gov/geothermal/

FUEL CELLS

Source for innovative fuel cell energy systems
www.fuelcellstore.com

Micro fuel cells
www.wirednews.com/news/technology/0,1282,36013,00.html

Fuel Cells
www.fuelcells.org

Ballard Power Systems
www.ballard.com

PRODUCT WEBSITES continued

GE Microgen Home Fuel Cells available 2001
www.gemicrogen.com

Vision of a Hydrogen Future
www.unh.edu/ipssr/Balaton/Bulletins/spr99page11.html

BIOMASS

American Bioenergy Association
www.biomass.org

BIODIESEL

Biodiesel
http://journeytoforever.org/biodiesel_link.html
Biodiesel is much cleaner than fossil-fuel diesel. It can be used in any diesel engine with no need for modifications — in fact diesel engines run better and last longer with biodiesel. And it can easily be made from a common waste product — used cooking oil.

GreaseCar.com
www.greasecar.com

Information and Links on Bio Diesel
www.kelseyville.com/biodsl/

Journey to Forever
http://journeytoforever.org

VeggieVan
www.veggievan.com

Wiener Stadtwerke
www.energia.at

OTHER

Heat pumps
www.pnl.gov/fta/2_ground.htm

Direct current motor
http://home.a-city.de/walter.fendt/physengl/electricmotor.htm

DAYLIGHTING

Daylighting Collaborative Website
www.daylighting.org

Tips for daylighting
http://eande.lbl.gov/btp/pub/designguide/

Daylighting Products and Case Studies compiled by Lightsearch
www.lightsearch.com/search/applications/daylighting.html

INDOOR ENVIRONMENTAL QUALITY

Indoor Air Quality
www.its-canada.com/reed/iaq/overview.htm

IAQ Health Canada
www.hc-sc.gc.ca/ehp/ehd/bch/air_quality/indoor_air.htm

EPA IAQ Clearinghouse
www.epa.gov/iaq/iaqinfo.html

Multiple Chemical Sensitivity Primer
www.geocities.com/HotSprings/Spa/4415/index.html

WASTE

World of composting toilets
www.compostingtoilet.org

Clivus Multrum – Waterless composting toilets
www.earthlink.comau/clivus/index.html

EPA solid waste management/environmental education
www.epa.gov/osw

Composting and resource directory
www.cals.cornell.edu/dept/compost

OPERATIONS

COMPOSTING

NRDC – Composting overview
www.igc.apc.org/nrdc/bkgrd/gacompov.html

Worm Forum
www.wormdigest.org/forum/index.cgi
This is a place for worm enthusiasts to share information and ask questions.

Bioagro
www.gratisweb.com/bioagro/compost.htm
We are growers of redworms and producers of composts fullcompostsand vermicomposts.

City Farmer Article on Composting
www.cityfarmer.org/wormcomp61.html

Community Composting Network
www.othas.org.uk/ccn/index.html
Providing advice and support to existing and would-be community composting projects across the UK.

Composting Bin Plans and Details
www.speakeasy.org/~tilth/download/download.html
Portable Wood and Wire Compost Bin. Tilth Worm Composting Bin. Wood and Wire Stationary 3-Bin Composting System. Homemade Food Waste Composter.

Composting Forum
http://forums.gardenweb.com/forums/soil/
This forum is for the discussion of all aspects of soil — including topics like creating a healthy balanced soil methods of composting and using mulches effectively.

Is vermicompost better than compost?
www.soilfoodweb.com/biocyclevermicomposting.html

RECYCLING

NRDC-Recycling overview
www.igc.apc.org/nrdc/bkgrd/garecyc.html

Recycling
www.stopwaste.org

CLEANING PRODUCTS

1ST Environsafety, Inc.
www.1stenvironsafety.com
Replaces hazardous petrochemical products with new, cheaper, nontoxic colloidal cleaners. Fume-free, water-soluble degreasers.

Earth Friendly Products
www.ecos.com
Full line of 100% naturally based, nontoxic, biodegradable household cleaning products. No animal products/testing, no phosphates, chlorine, petroleum products, ammonia or harsh chemicals. Recyclable packaging.

Rochester Midland Corporation
www.rochestermidland.com
Complete range of high-performance, environmentally preferable cleaning products. All are non-toxic, phosphate-free, noncorrosive, noncombustible and nonreactive. Contains neither suspected carcinogens nor ozone depleting compounds. Formulated with a preference to using rapidly renewable resources.

GREEN DESIGN AND BUILDING WEBSITES

Ecosustainable Hub – Ecology Environment Sustainability
www.ecosustainable.com.au
One-stop connection to resources and tools on ecology, environment and sustainability. Facilitating cooperation, networking and ethical developments.

Denver Service Center
www.nps.gov/dsc/dsgncnstr/susdb
Green products/environmental performances database

Sustainable buildings sourcebook
www.greenbuilder.com/sourcebook/contents.html
Waste, energy, water, materials

Green Home
www.greenhome.com
Find green alternatives to the products you use every day. Everything you need for a healthy home environment!

Cargill
www.cdpoly.com/natureworks.asp
Plastic products made from corn and other renewable resources.

Recyclops
www.recyclops.com

Green Building Products
www.earthdream.com/mall/building.shtml

EcoNexus — The Green Procurement Directory
www.econexus.net
An on-line database of green products, green services and green companies developed by the Centre for Indigenous Environmental Resources.

Environment Design. & Construction Magazine
www.edcmag.com/buyersguide.htm

Sustainable Community Building
www.sustainable.com

Sustainable Development
www.environliteracy.org/

Ecological Footprint Information
www.eclei.org

Sustainability Indicators
www.subjectmatters.com

Envirosource
www.envirosource.com

Green Design Network
www.greendesign.net

GreenSpec
www.greenspec.com

Environmental Building News
www.buildinggreen.com

OIKOS: green building products, news
www.oikos.com

USGBC LEED 2.0 Rating System (pdf)
www.usgbc.org

Natural Capitalism
www.natcap.org

Union of Concerned Scientists on Global Warming, Ozone Hole
www.ucsusa.org

PRODUCT WEBSITES continued

International Institute of Sustainable Development
http://iisd1.iisd.ca

VIDEO FILES

Greenworks TV online
www.greenworks.tv

ONLINE TOOLS

Receive a bi-weekly summary of green building stories by subscribing from this website
http://listserv.energy.wsu.edu/guest/RemoteListSummary/GreenClips

Green Building Discussion Group via email
http://oikos.com/resources/maillist.html

For you hardcore email fanatics, daily green building discussion threads
www.biggreen.org

Online Sun Position, Window Heat Gain, Overhang Design Calculator
http://susdesign.com

NEWSGROUPS

www.liszt.com/news/

alt.architecture

alt.architecture.alternate

alt.architecture.int-design

alt.planning.urban

sci.environment

nz.soc.green sci.environment

nz.soc.green

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Hitesh is one of the leading figures in the field of planning and design of ecolodges, has written several papers on the subject and speaks regularly at conferences around the world. Hitesh also specializes in facilitating participatory ecodesign workshops. His website (www.eco-mon.com) on ecolodges is the only one of its kind on the internet. Hitesh is one of the founding members of the Ecotourism Society of Kenya (ESOK) and sits on the Board of Directors for The International Ecotourism Society (TIES) and advisory boards of the Brazilian Environmental Society (BIOSFERA), the Conservation International Ecotourism Award, and Florida Ecotourism and Education Committee. He is also an Adjunct Professor at Florida International University and teaches a class on "Sustainable Tourism."

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Ana is recognized as a professional leader in the ecotourism industry and has extensive experience as a consultant, spokesperson and professor in several countries, including Brazil, Ecuador, Kenya, Indonesia and Spain. She served as Director of the Masters Degree Program on Ecotourism, ULACIT and for several years was Deputy Director of the Costa Rican National Museum. Ana has published various articles on tourism, conservation and sustainable development that can be found in magazines and books specialized on these topics. "Guidelines for the best practice of ecotourism in protected areas" is among the most well-known of her publications. Ana has a degree in Biology and holds a MSc. in Museum Studies from the University of Leicester, UK. In 1994, she received the "National Ecology" award, presented by the National Association of Tourism Professionals of Costa Rica.

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PAUL O'LOUGHLIN is the Managing Director of Philona & Associates, Environmental Management Troubleshooting. He has been an environmental management consultant to the construction and tourism industries on three continents since 1993, when his world-pioneering postgraduate work led more than 200 universities across the globe into environmentally responsible management. An Australian now based in the UK, Paul has worked on a wide range of ecotourism projects in Europe, from environmental impact assessment to planning and design through to construction management and marketing.

Paul has a consistently innovative and lateral approach combined with practical on-site expertise thanks to his time as a fully qualified tradesman prior to his academic career and a period as Head of Research & Development for a major political organization in London. He continues to write, edit and solve environmental planning and development problems for private companies, government bodies and NGOs, focusing on water, energy and waste management in emerging economies.

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While living in Montana, John developed a love of wildlife and a keen interest in the environment and its preservation. His enthusiasm for the outdoors has inspired him to camp in the Bob Marshall Wilderness, Montana; hike the trails of Yosemite, California; canoe down the Suwannee River, Florida; and climb Nevis Peak on the island of Nevis.

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PATRICIA S. ASHTON is President of Ashton, Ashton & Associates, Inc. A native Floridian, Patricia is a field biologist, botanist, educator and author, as well as an ecotourism expert with more than 27 years experience in international travel development, teaching, designing museum and zoo education programs, exhibit development, park planning and operations, staff training, curriculum design, and endangered species habitat management. Patricia leads teams of experts in completing projects such as designing museums and parks, creating successful ecolodges, designing nature trails, and evaluating the education and marketing feasibility of various properties for development. Her specialties include interpretation of ecological principles, marketing and sustainable business program design, wilderness survival and tour guide training, and sustainable technology implementation. Patricia has worked with private industry, conservation organizations and governments in more than 20 countries.

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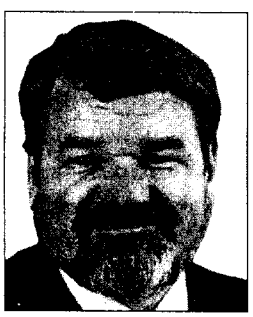

RAY E. ASHTON JR. is Executive Director of Ashton, Ashton & Associates, Inc. Ray is an ecologist who, after 17 years as a museum curator and researcher, began working in the late 1970s to develop nature- and culture-based tourism programs around the world. Ray worked as a tour developer and operator in 27 countries for 12 years. His years of experience led to his working as a consultant to governments, conservation organizations and the tourism industry. He has written legislation for three countries, established national tourism plans for nine others and has worked in 42 countries on protected area development and ecolodge development. Ray has published a large number of articles, book chapters and with his wife Patricia has completed a second book.

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HECTOR CEBALLOS-LASCURAIN is a Mexican environmental architect and ecotourism expert. He is Director General of the Program of International Consultancy on Ecotourism, Special Advisor on Ecotourism to IUCN (The World Conservation Union) and Advisor to the World Tourism Organization. He is credited with coining the term "ecotourism" and its preliminary definition in 1983. His modified version of this definition has been officially adopted by IUCN in 1996. Hector has performed research and provided consultation in 70 countries worldwide on all aspects of ecotourism planning and development, including the architectural design of ecolodges and other environmentally friendly facilities. He has authored or co-authored more than 100 books, reports and articles, and has recently coordinated an international study on linking biodiversity conservation with tourism planning for UNEP/UNDP/GEF/BPSP, with the participation of 12 selected countries.

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COLLABORATORS continued

ARIANE JANÉR is a Dutch field biologist with a degree in business administration who has been living in Brazil since 1988. She has worked as a business development consultant for mostly ecotourism and sustainable development projects in many parts of Brazil since 1996. She ran her own ecotourism company for several years and is one of the founding directors of EcoBrasil, the Brazilian Ecotourism Association. Ariane also builds on her experience in finance and marketing from a previous career at Royal Dutch Shell, as a freelance consumer market researcher for Euromonitor, and as financial analyst for Baxter Straub.

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KAREN LEWIS has a degree in Music Education and Geography from the University of Minnesota and taught music for several years in Minnesota. From 1968 to 1970, she and her husband John Lewis were Peace Corps Volunteers in Kenya, East Africa, where they were secondary school educators in rural schools. In 1990, Karen and John took their avocation of bird watching to a contributory level and purchased more than 1,000 acres of tropical rain forest in the isolated Osa Peninsula of southwest Costa Rica. To maintain and conserve this reserve they developed the ecolodge Lapa Rios. Together with their local community they offer an environmental and cultural experience for a limited number of guests. Karen believes ecotourism can use education as a tool to promote land conservation; as a vehicle to create greater self-worth for and to preserve a community; and as a means to attract curious guests, teaching them about wilderness areas while they sustain a community and its natural environment. In 2002, Karen and John Lewis dedicated a land conservation easement that will protect the Lapa Rios Reserve in perpetuity.

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SIMON MCARTHUR is renowned for strategically bridging the gap between heritage management, visitor management and tourism activity. He has seven years industry experience in planning and delivering tourism developments in highly sensitive, high profile areas throughout the world, including Central and South America, China and the Pacific Islands. He also has six years experience as the prime tourism and visitor management specialist for Parks Victoria, the Tasmanian Department of Parks Wildlife and Heritage, and Forestry Tasmania, where he received numerous awards for innovative planning and sensitively designed developments. Simon is also a renowned author in his field, with 150 papers on managing tourism in sensitive areas and three books on heritage tourism and visitor management. Simon's key areas of expertise are in the policy, planning, product development, and management of special interest tourism in sensitive natural and cultural areas.

Simon is internationally recognized for his work in establishing and implementing tourism impact monitoring and management systems. He has a PhD in impact monitoring, which is the first to contrast the effectiveness of all known models and the first to specifically address how best to implement impact management models. He is the designer of the most recent model yet produced - the Tourism Optimisation Management Model. The TOMM has been implemented at several sites in Australia, Canada and United States, and been nominated for a Tourism for Tomorrow Environment Award. Simon has developed and assisted to implement over 15 models across the world. Simon has developed many relationships within the nature-based tourism industry, has served on Ecotourism Association of Australia's committee for five years, and on Tourism Council Australia's Environment Committee for two years.

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OSWALDO MUNOZ holds a degree in agronomy from Universidad Central del Ecuador. An instructor in guiding techniques, freelance writer and consultant in sustainable tourism development policies, his 32 years of experience "in the field" have been shared at international workshops in Costa Rica, Cuba, Venezuela, Paraguay, Brazil, and Panama, among others. In 1973, he participated in the construction of one of the first sustainable ecolodge concepts in the Ecuadorian Amazon, and six years later founded Nuevo Mundo Travel & Tours, an inbound tour operator. From December 1990 to July 1998 he headed the Ecuadorian Ecotourism Association (EEA), establishing a close collaborative link to The International Ecotourism Society (TIES), where he served a five-year term on its Board of Directors. "Green Evaluations for Nature Tour Operators," a pilot program launched in 1995, was one of the major programs he directed in Ecuador for TIES. In addition, he is co-owner and assistant manager of 4-star Hotel Sebastian in Quito, and director of the Equatorial Solar Museum. One of his prime concerns is assisting students in ecotourism and related studies.

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TERRY PRATT worked in nature tourism since 1980, for the first seven years as owner/operator of Top Flight Nature Tours based in Ontario, Canada. Costa Rica was one of her company's main destinations. Then, in 1987, at a time when increasing numbers of travelers were discovering Costa Rica's natural attractions, Terry adopted it as her home. After working for one year at Cosmos Tours, helping to establish and develop their incoming department, she moved on to become a private consultant for marketing nature-based tourism. With her in-depth knowledge of Costa Rica's nature "product," her understanding of the existing and potential markets, and her writing skills, Terry quickly built a broad client base that included hotels, lodges, tour operators, publicity agencies and the Costa Rican Tourist Board. In 1993, she went into partnership with Ana Baez to establish Turismo & Conservacion Consultores, S.A. (T&CC). Ana and Terry were local coordinators for The Ecotourism Society's Second International Forum & Field Seminar on Eco-Lodging held in Costa Rica in 1995. After 10 successful years as a consultant, Terry chose to work exclusively with one of her long-term clients and in 1997 accepted a position as Marketing Director for Horizontes Nature Tours, considered by many to be Costa Rica's leading ecotourism operator.

Terry unfortunately died in a plane accident in mid-2000. Through her contributions in this book, her work lives on.

ED SANDERS is a private business consultant and also serves as Special Projects Director at the Center for Sustainable Tourism at the University of Colorado at Boulder. He co-founded Eco Tourism International, a consulting firm that specializes in ecotourism project development and sustainable development planning. Ed co-authored The Business of Ecolodges: A Survey of Ecolodge Economics and Finance published by The International Ecotourism Society, and recently prepared a survey of the U.S. ecotourism market for the World Tourism Organization. Ed has prepared market surveys, feasibility studies, business plans, financing proposals, and regional development plans for private developers and local and national government planners in the United States and throughout the world.

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E D S A (Edward D. Stone Jr. and Associates)

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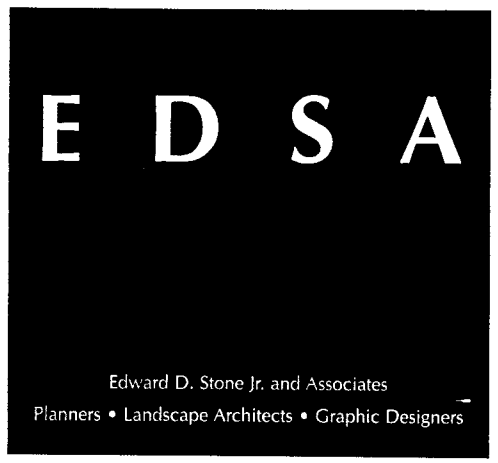

E D S A's experience with ecotourism projects is extensive. Some examples are: Futuro Model Rainforest Ecolodge, Amazonas, Brazil; Sustainable Development Master Plan of Mayaguana Island, Bahamas; Red Sea Ecolodge Guidelines, Egypt; Tourism Diversification Programme, Kenya; Vagamon Hill Retreat, India; Punta Mangle Ecoresort, Dominican Republic; Northwest Point Ecotourism Plan, Turks and Caicos; Kissimmee River Save Our Rivers, Florida; and El Portal Tropical and Visitor Center, Puerto Rico. The firm's works have been recognized with more than 150 awards for their design excellence and environmental sensitivity and, more importantly, for their viability and success as environments, which are enjoyed by those who use them.

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OTHERS

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Since 1992, Nomadic Expeditions has specialized in travel to Mongolia, promoting cultural, educational and environmental awareness and understanding. In 2002, Nomadic Expeditions opened the Gobi Lodge, built in accordance with the canons of Mongolian Buddhist architecture without using a single nail. This beautiful ger camp, built with the participation of the local community, serves as a convenient base for travelers to explore the wilds of the Gobi Desert. The main buildings were constructed by local workers and artisans to complement the natural surroundings and to utilize renewable energy sources (solar and wind power). The Gobi Lodge is an integral part of Nomadic Expeditions' ongoing commitment to ecotourism and sustainable development.

For more information visit: www.NomadicExpeditions.com

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The Nature Conservancy's mission is to preserve plants, animals and natural communities that represent the diversity of life on earth by protecting the lands and waters they need to survive. Internationally, the non-profit organization works with like-minded local conservation partners and communities to bring sustainable protection to natural areas. The Ecotourism Program provides technical assistance to our international partners to better harness the potential of ecotourism as a conservation tool that contributes to the long-term protection of biodiversity and the natural resources upon which it is based. The Nature Conservancy's International Trips Program offers ecotours that educate travelers about the organization's work with local partners and communities in Latin America, the Caribbean, Canada and Asia/Pacific, and supports their conservation efforts.

For more information visit: www.tnc.org

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Developer and Operator of the first ecolodge, Maho Bay Camps

Executive Board Member, The International Ecotourism Society

"Ecolodges are a leading strategy for the 21st century. One can only hope all buildings will one day be designed like these. Please use this book!!"

- WILLIAM MCDONOUGH

Time magazine Hero of the Planet, 1999

Author of "The Hannover Principles" and Renowned Sustainable Design Architect

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