

# **Conservation of Biodiversity**

Permanent Ecological Network Structures  
and  
Ecological Corridors  
with  
The Sicirec Formula



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## 1. Introduction

The natural forests of the world still vanish at an alarming rate. What is left after human intervention are dispersed and isolated patches of forest and bare land. This imposes a serious threat upon the world's biodiversity. Valuable wildlife and plant species are left on small isles after which extinction is only a matter of time. With the extinction of many species mankind loses the greatest treasure that mother earth has to offer.



Rainforests are among the most biodiverse ecosystems on earth

### 1.1 What is biodiversity?

In the simplest of terms biological diversity is the variety of life and its processes; it includes the variety of living organisms, the genetic differences among them, and the communities and ecosystems in which they occur.

(Keystone Center, "Final Consensus Report of the Keystone Policy Dialogue on Biological Diversity on Federal Lands," 1991)

### 1.2 Why is biodiversity so important?

The natural environment is the source of all life. Environmental processes provide a wealth of services to the living world — providing us with air to breathe, water to drink and food to eat, as well as materials to use in our daily lives and as natural beauty to enjoy.

Complex ecosystems with a wide variety of plants and animals tend to be more stable. A highly diverse ecosystem is a sign of a healthy system. Since the whole of the living world relies on the natural environment, and especially we ourselves, it is in our best interest and the interest of future generations to conserve biodiversity and our resources.

([www.eco-online.qld.edu.au](http://www.eco-online.qld.edu.au))

## 2. The Sicirec context

Sicirec realises and supports sustainable and ecological reforestation projects that earn a good financial return and at the same time, by means of conservation and restoration of ecological networks, maintain or restore biodiversity. More specifically, in all Sicirec's projects the emphasis is on the establishment of permanency for all restored and protected ecological areas. In that way the realised ecological networks are made irreversible and permanent. Profitable forestry is thus combined with lasting repair and protection of biodiversity.

### 2.1 Sicirec's philosophy

Sicirec's philosophy is simple: anywhere where land is used in whatever way, ecological repair and production methods based on ecological principles, can very well be combined with profitability. It is a common misunderstanding that ecology and profitability are always incompatible. Combining the two is a matter of know-how, that is still missing most of the time. Sicirec helps to spread this know-how.

Combining the two aspects of ecological repair and profitability is of the utmost importance since:

- If nature conservation is not supported by economic and social sustainability, it will not be sustainable in the long run. The active protection of a nature reserve cannot earn the qualification sustainable as long as there is any chance that in the future the protection of the reserve can no longer be guaranteed.
- Only preservation is not enough. A healthy environment also depends on sound ecological networks. By restoring these networks a coherent ecosystem will be established that is worth preserving.

Each project making use of Sicirec's investment and subsidy-scheme for planting trees, is obliged to have a minimum of 20% of the area in question contributing to an ecological network. The areas are selected in such a way that they as much as possible connect the project area with surrounding nature reserves.

In case it is not possible to establish connections with surrounding nature reserves, establishing stepping stones of natural pockets is a proper intermediary goal and in such cases the ecological stepping stone effects should be optimized.

In all Sicirec's projects the ecological areas created will be given a permanent status by means of ecological leases (servidumbres ecológicas) or by means of any other comparable structure.

### 2.2 How?

Combining ecology and profitability is realised by proper land use planning and long term safeguarding of sound ecological networks and corridors. Within the production areas the goal is maximization of profits, whereas in the natural core areas and in the corridors the goal is for one hundred percent the preservation of nature and the maximization of ecological values.

## 2.3 Importance of ecological corridors

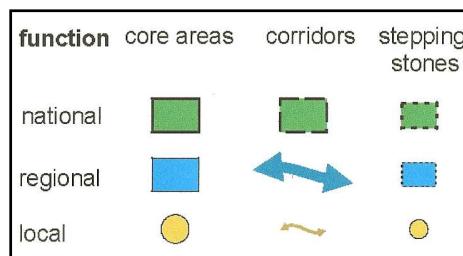
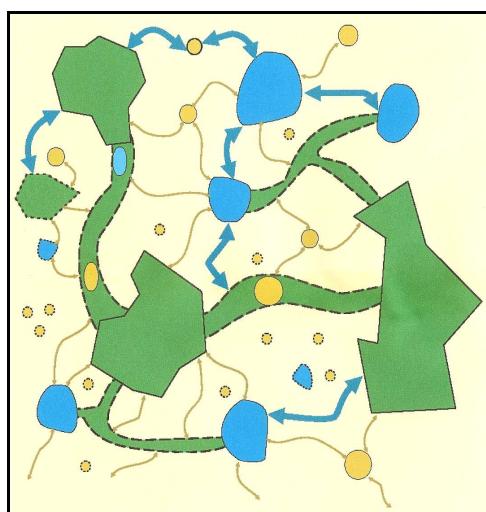
Ecological corridors, as crucial elements of ecological networks, have the vital role of facilitating the movement and migration of animal and plant species between core and adjacent areas. As such, ecological corridors are essential for the long term survival of biological diversity.

The fragmentation of nature, or what is left of it, is in fact one of the major causes of species going extinct. If unable to migrate, due to natural fluctuations in numbers, animals and plants sooner or later go extinct locally with no option to repopulate the area again in a later stage. This tendency can effectively be prevented by preserving and repairing ecological corridors between the remnants of nature that are still ours.

The changing climate is one more reason why sound ecological networks and ecological corridors are imperative to maintain biodiversity. Due to the changing climate, appropriate habitats for animal and plant species are shifting, forcing species to either migrate or to go extinct locally. Therefore the quality of the ecological networks and ecological corridors determines to a large extent the climate durability of habitats.

Since an ecological network provides a home to many different animal and plant species it helps in diminishing the chances of plagues en pests to form in the adjacent production areas. As a result, less effort has to be put in combating plagues and pests, thus saving time and money.

## 2.4 Main elements of an ecological network



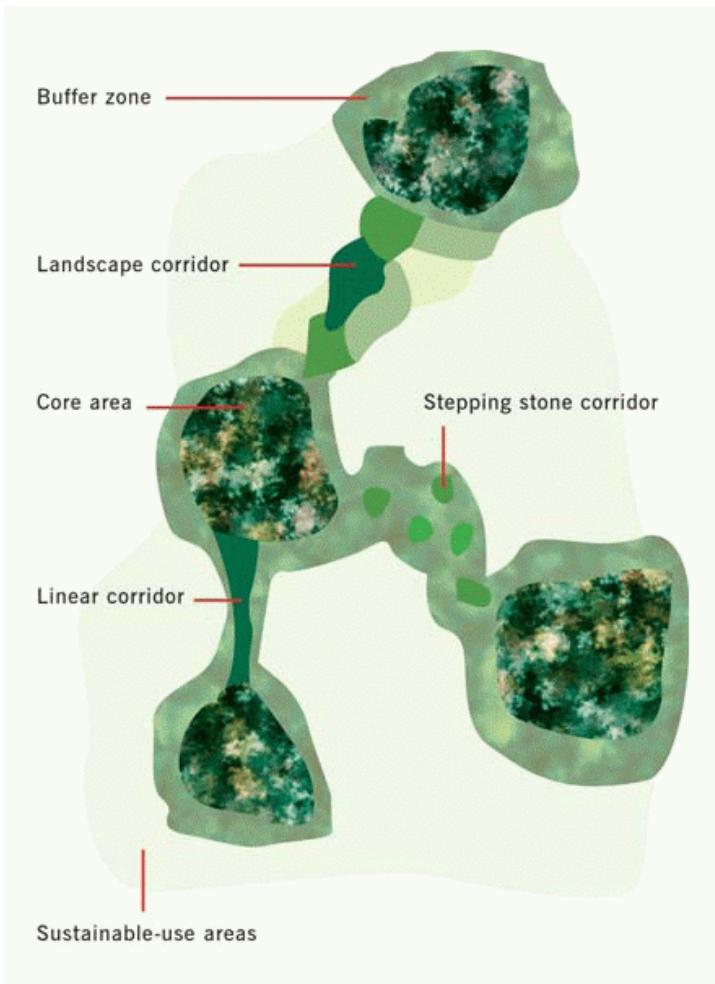
Ecological network

(source: [www.bfn.de](http://www.bfn.de); presentation of dr. Karin Ullrich)

### 2.4.1 Core areas:

These are areas where the primary function is biodiversity conservation. They should be legally protected under national or regional legislation. These areas preferably

should provide a substantial representation of key natural or semi-natural ecosystems and contain viable populations of important or threatened species.



Source: countdown2010.net

#### **2.4.2 Corridors:**

These are areas of suitable habitat and limited width that provide functional linkages between core areas. For example, they may stimulate or allow species migration between areas. Corridors can be continuous strips of land or 'stepping stones' that are patches of suitable habitat.

#### **2.4.3 Stepping stones:**

These are patches of natural areas that are interlinked due to the fact that the distance between them is limited and small enough for animal and plant species to be able to migrate from one to another, thus facilitating the possibility to move between different core areas.

#### **2.4.4 Buffer zones:**

Protected areas should not be considered as islands that are safe from negative external effects. Buffer zones allow a smoother transition between core areas and

surrounding land use. The size and utilisation of buffer zones depends heavily on the particular needs of the specific ecosystem and its local population.

#### **2.4.5 Sustainable use areas:**

These are remaining areas that can be subject to more intensive land use. But they should still contribute to the successful provision of ecosystem goods and services.

### **3. How it works in practice**

The Sicirec formula can be applied on different levels of scale. The larger the scale, the more attractive are the resulting ecological network structures. Also, realizing ecological network structures on the smallest scale are more difficult to realize, since they involve the cooperation of more parties and individuals. However, if the Sicirec formula can be realized on that smaller level, it can be applied on any scale. Below we will give an example of the smallest possible scale, with participation by smallholders in Bolivia.

On the basis of satellite images potential areas for reforestation and remaining patches of primary forest are identified.

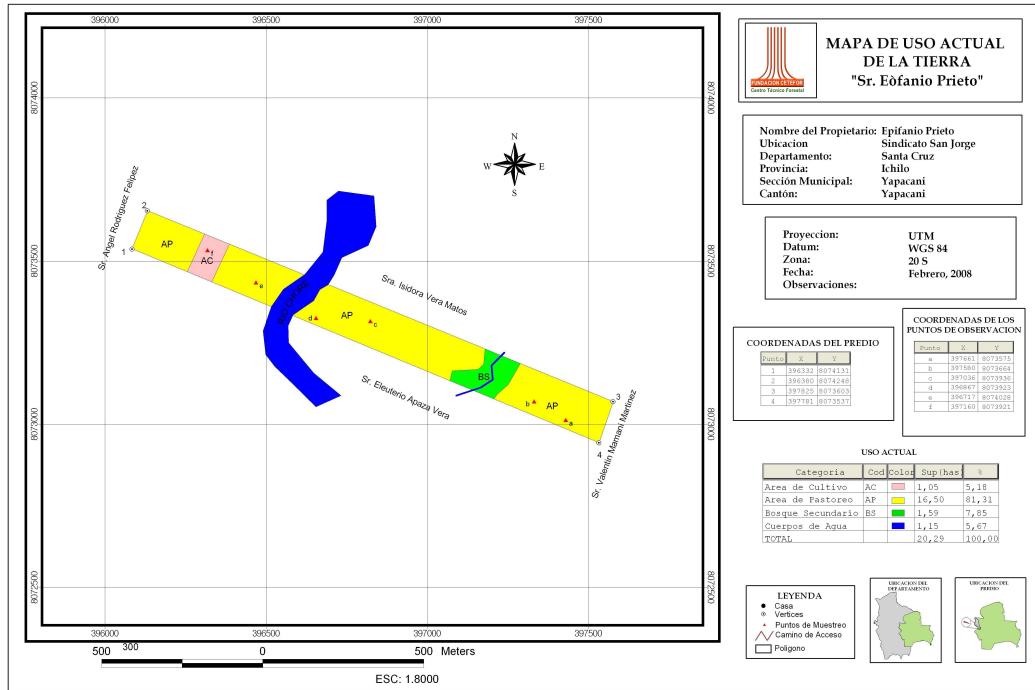
The whole property of the smallholder is mapped with GPS. The boundaries of the terrain are defined and by means of a length transect all land use changes are recorded.



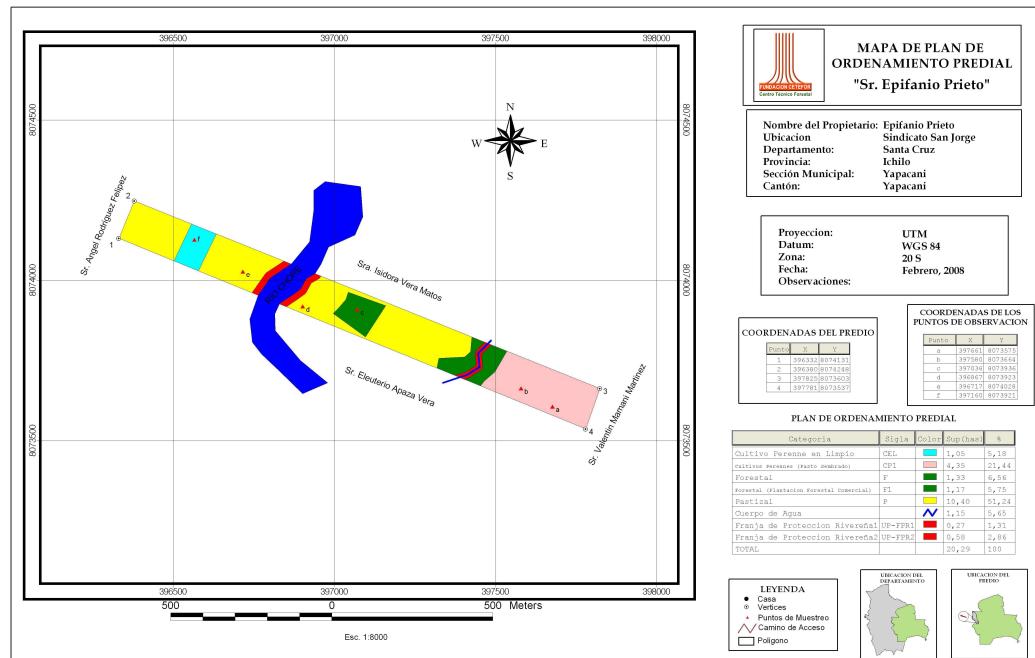
Field survey with GPS and earth-drill

A technical employee discusses with the smallholder his future plans for his property. Together they determine what measures can be taken to prevent water and wind erosion and which part of the terrain qualifies for permanent nature conservation.

All data are collected on paper and subsequently digitalized. From these data two reports are produced, the so called POP (Plan de Ordenamiento Predial) or Land use Plan and the integral management plan. The POP covers all technical aspects of the land use plan and the integral management plan in addition mainly covers all social aspects of the land use plan. At the moment these plans are already available as field forms.



Actual land use map



The same parcel with future land use, with protected areas in red and forests in green

After the POP has been discussed with the smallholder, it is submitted for approval to the "Superintendencia Agraria" (SA). In Bolivia this is the regulatory institution for the sustainable use of land. The SA verifies all legal aspects like land ownership, legal status of the owner and the technical aspects, especially as to capacity and productivity of the soil.

In the POP also the areas that will be permanently protected are determined. The POP implies a legal and permanent status of the proposed type of land use, including a legal status for areas defined as conservation areas. The supervision and control by the SA guarantees a governmental level of involvement.

Future changes of the POP, by law need the approval of the AA Cetefor-Sicirec.

#### **4. Costs and Financing**

Preservation of primary and secondary forest remnants and the establishment of ecological corridors and thus a sound ecological network, can in principle be realised at very low costs. It basically just involves the organization and protection of no exploitation, rather than any type of, more costly, cultivation measures.



Multi-functional river bed vegetation; a perfect corridor