



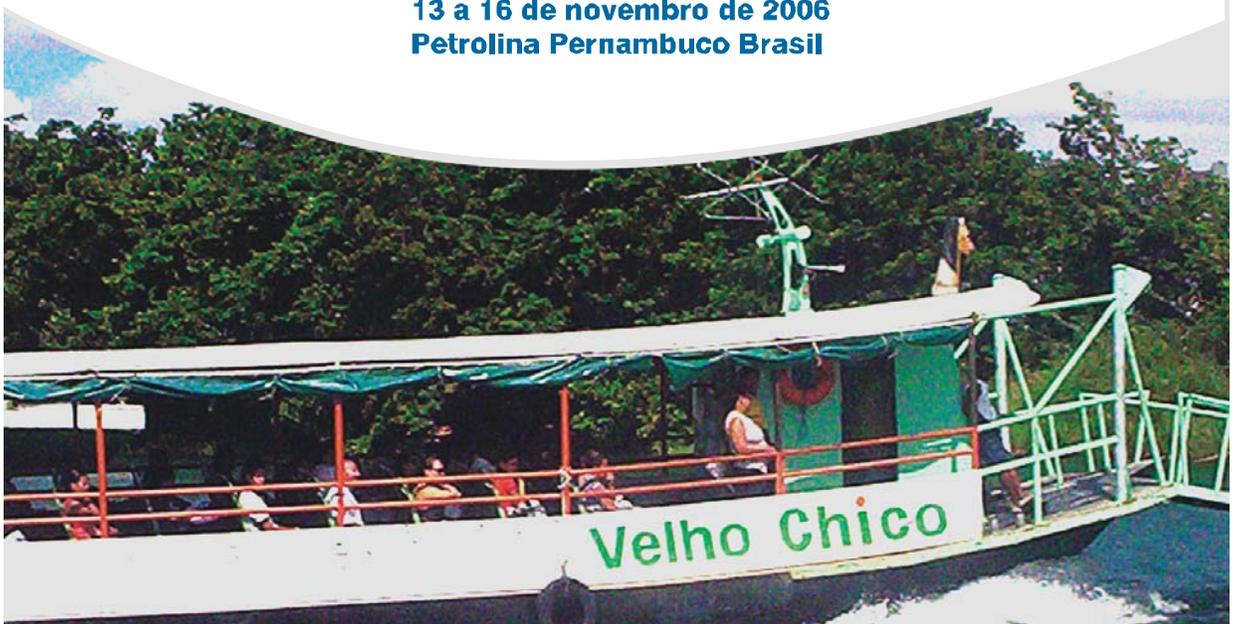
**First International Seminar on Biosphere  
Reserves of Arid, Semi - Arid Regions**



**I SEMINÁRIO INTERNACIONAL DE  
RESERVAS DA BIOSFERA  
DE REGIÕES ÁRIDAS E SEMI-ÁRIDAS**

**Petrolina, November 13-16, 2006**

**13 a 16 de novembro de 2006  
Petrolina Pernambuco Brasil**





INSTITUTO AMIGOS DA RESERVA DA BIOSFERA DA  
CAATINGA  
Friends of the Caatinga Biosphere Institute



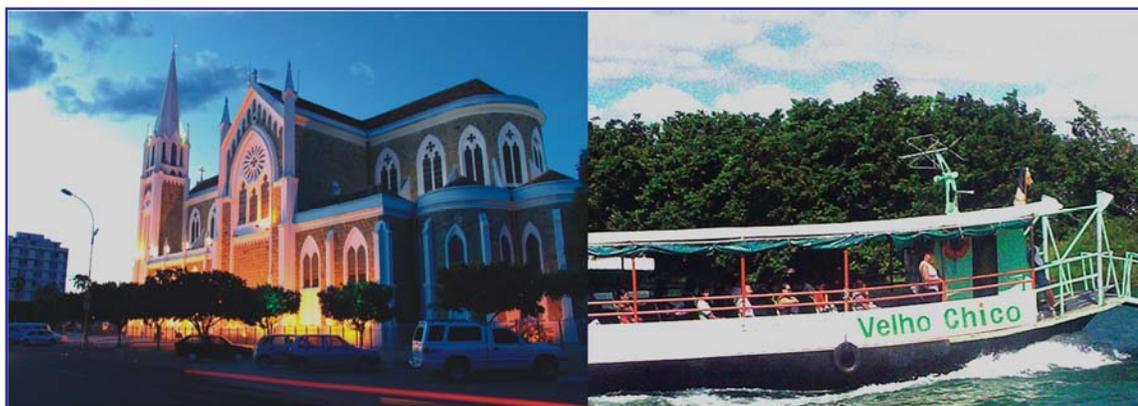
**PEREZ-GUERRERO TRUST FUND FOR ECONOMIC AND TECHNICAL  
COOPERATION AMONG DEVELOPING COUNTRIES, MEMBERS OF THE GROUP  
OF 77  
GOVERNMENT OF BRAZIL**

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## **I Seminário Internacional de Reserva da Biosfera em regiões Áridas e Semi-Áridas**

**First International Seminar on Biosphere Reserves of Arid, Semi-Arid Regions**

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**Petrolina, November 13-16, 2006**



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CAATINGA  
Friends of the Caatinga Biosphere Institute



This technical report regards the project approved by the Perez-Guerrero Trust Fund for Economic and Technical Cooperation among Developing Countries, Members of the Group of the 77 that sponsored the "1<sup>st</sup> INTERNATIONAL SEMINAR ON BIOSPHERE RESERVES OF ARID, SEMI-ARID REGIONS", held in Petrolina, from 13 through 16 of November 2006. It outlines debates and breakthroughs that were accomplished through the Seminar, as well as proposals issued for the biodiversity sustainability and preservation of the aforementioned reserves.



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## PRESENTATION

Currently, the subject of semi-arid eco-systems stands for a growing global magnitude, incorporating one of UNESCO-led sponsored programmes “The Man and the Biosphere” (MaB). The Seville Seminar, in 1995, was held as a prime benchmark of a political action thereat, by establishing the Arid, Semi-Arid Biosphere Reserves, wherein the foremost challenge stands for the establishment of a sustainable relation between water and the eco-systems.

Further steps have been taken, since then. The United Nations (UN) declared 2006 as the International Year of Deserts and Desertification and, namely, at the Tunis Conference held in June, the scientific approach to semi-arid eco-systems became a prime guideline on the perspective of appointing research subjects and proposals toward Environmental Education.

As part of that acknowledgment, the **1<sup>st</sup> International Seminar on Biosphere Reserves of Arid, Semi-Arid Regions** was then designed and held, based upon the presentation of the Morocco Biosphere Reserve at a meeting held in Sao Paulo. Given the resemblance of problems and the likelihood of sharing experiences on the answers found in semi-arid regions, the initiative featured a broaden arrangement and the idea of a meeting has been planned, encompassing similar experiences that took place among some countries. The disclosure and assessment of the management type followed in Brazil within the scope of practice exchanges tried among other regions turned out to be a key strategy to strengthen the inclusion of arid, semi-arid areas, among Biosphere Reserves, as important systems to be regarded upon the definition of public policies.

Now therefore, by appointing one of the seven Biosphere Reserves of the Brazilian Network<sup>1</sup>, the Caatinga Biosphere Reserve, led by its Council and by the Pernambuco Secretary of Science, Technology and Environment launched the 1<sup>st</sup> International Seminar on Biosphere Reserves of Arid, Semi-Arid Regions. The EMBRAPA (Brazilian Agency of Agricultural Research) support has been fundamental as well, as this entity establishes today as a sound institution on a national, international scales, by developing specific lines

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<sup>1</sup> The Brazilian Network of Biosphere Reserves encompasses seven reserves, as follows: Caatinga’s, Amazonia Central’s, Atlantic Forest’s, Cerrado’s, Cinturao Verde de Sao Paulo’s, Pantanal’s and Serra do Espinhaco’s.



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of research for semi-arid region, plus the biodiversity conservation and the enhancement of the biological reserve.

Ultimately, this proposal complies with recommendations, whereupon governments shall decide how the world network will run in their own territories, aiming to perform their duties, as UNESCO has not established any sanctions whatsoever. There is a statutory benchmark for Biosphere Reserves and an amendment expected at every ten years of operation, although each country may withdraw the net incorporation application for any Biosphere Reserve that fails to comply with criteria and, likewise, it may create opportunities for its ratification.



## **OPENING CEREMONY**

**November 13**

### **Paper presented by Claudia Karez - UNESCO**

Subject: Importance of Biosphere Reserves of Arid, Semi-Arid Climate

The Seminar Opening has been emphasised with a lecture presented by Dr. Claudia Karez who focused on the MAB Programme and the weight of Arid, Semi-Arid Biosphere Reserves within the scope of the programme thereof. The background presented on the MAB emphasised the concept framework that brings together both conservation and development. In addition, she has backed the programme institutional workability, by particularly emphasising the role played by national committees and their scopes of operation; the work network and communication, besides the exchange of information currently available. Possibilities that open wide for the expansion of the said network have also been pointed out as issues to be stressed.

Afterward, she lectured on the Biosphere Reserves of Arid, Semi-Arid Climates with the support of current indicators and trends noticed on the occupation features, their weight within the scope of global network for the Biosphere Reserves plus the conservation priorities already endorsed by UNESCO. For instances, data available for Latin America and Caribbean have shown that a quarter of lands stand for arid, semi-arid eco-systems and a significant part of these lands (83%) is quite degraded indeed, pursuant to paper "Evaluación del Estado de Conservación de las Ecoregiones Terrestres de América Latina y el Caribe" (*Assessment of the Conservation State of Terrestrial Ecoregions of Latin America and Caribbean*).

However, the UNESCO representative has specifically pointed out that answer options for these biosphere reserves lie more in the own acquaintance with arid and semi-arid eco-systems whose fragility and vulnerability to climate changes and human activities should be recognised.



Main issues addressed as proposals were, as follows:

- Establishment of incentives so that the overall subject of Biosphere Reserves become noticed as a tool for the sustainable development.
- Approach of the 1995-Seville Strategy proposals, aiming that biosphere reserves should meet three core purposes, as follows: To incorporate the roles of biodiversity conservation & sustainable development, further to the local, national programmes; that they become experimentation sites: Interdisciplinary research and environmental monitoring, based upon knowledge and the engagement of local communities, by identifying the specific subjects or problems (institutional, economical, social, cultural and environmental framework).
- Strengthening of the MAB National Committees aiming the exchange of knowledge and experiences plus information disclosure and the launch of new biosphere reserves and inter-border biosphere reserves. Attention should be paid to funds allocation and assignment of personnel, besides the definition of straightforward, tangible goals for the performance of the said committees, plus the establishment of an agenda and goal-setting schedule.
- Reference to the UNESCO-sponsored Conference “Future of Arid Zones” along with several entities, held in Tunis in June 2006, whereupon prime subjects for research have been proposed, namely the protection of natural, cultural diversity, the integrated management of water, prospects for the eco-systems sustainable use, programs and benefits for local communities plus the assessment of eco-system services. It is therefore proposed that an information network be set up among regional actors that are connected with the international network, without ruling out private sector and non-governmental organizations.

Finally, it was stated that bringing together the current knowledge on the conservation of Arid, Semi-Arid Biosphere Reserves features a “new behaviour” largely matching conservation priorities that comprise interests and are carried out by national governments and by development agencies.



## **FIRST PANEL**

Presiding Officer: Luiz Mauro Gomes Ferreira - MMA

Sequence of Lectures:

- **Bosque Fray Jorge Biosphere Reserve – Chile**  
**Lecturer: Juan Francisco Muñoz Schaeffer**

## **CHILE**

### **FRAY JORGE**

#### **General Description**

The Fray Jorge Biosphere Reserve comprises the Fray Jorge, Talinay and Punta del Viento National Parks, situated in the IV Region, Limari Province and north of Santiago. It extends along the range of mountains forming the Cordillera de la Costa that extends between Elqui River in the north to the Aconcagua in the south and includes coastal plains and mountainous hinterland. It is situated between formations of scrub and semi-desert coastal steppes on the one side, and tree and shrub formations of the Cordillera de la Costa on the other. The most important feature of this Biosphere Reserve is the presence of the most northerly forest in Chile. The Fray Jorge forests are green 'oases' surrounded by semi-arid lands. They have some features in common with the hygrophilous forests in the south. The Biosphere Reserve shelters almost all the Mediterranean species typical of Chile. Among the great variety of birds are partridge (*Nothoprocta perdicaria*), meadowlark (*Sturnella loyca*), goldfinch (*Diuca diuca*), and mockingbird (*Mimus thenca*). There are relatively few mammal species, the most noteworthy being the fox (*Dusicyon culpaeus*). The core area of the Biosphere Reserve has remained in its natural state. There is no evidence of farming, intensive stock raising or exploitation of the forest even though there has been some introduction of livestock in the transition area. However, in Las Chinchillas there has been excessive grazing, felling of trees and coal mining. Over 752 people (1999) live in the buffer zone, mainly engaged in agriculture and livestock. A development plan for tourism has been made for camping and picnic areas, education centre and tourist information. Priority has been given to research projects relating to management programmes.



### Major ecosystem type

Evergreen sclerophyllous forests, woodlands or scrub; mixed mountain and highland systems

### Major habitats & land cover types

Semi-desert coastal steppe (matorral) occasionally associated with woodlands with "lilén" (*Azara celastrina*), "molle" (*Schinus latifolius*), "litre" (*Lithraea caustica*), "guayacan" (*Porlieria chilensis*) etc.; semi-desert coastal steppes (matorral) with "alcaparra" (*Senna cummingii*), "palo de yegua" (*Fuchsia lycioides*) and *Echinopsis coquimbana*; river ecosystems with *Baccharis* sp., *Salix* sp., *Potamogeton pectinatus*, *Myriophyllum aquaticum* etc.; agro ecosystems with potatoes, paprika and beans; grazing areas.

LOCATION	ALTITUDE (metres above sea level)	YEAR DESIGNATED
30°38'S; 71°35'W	-3 to + 6,323	1977

### Area (hectares)

Total	Core area(s)	Buffer zone(s)
73,545	9,845	63,700

### Administrative authorities

Parque Nacional Fray Jorge Corporación Nacional Forestal, Region IV, CONAF IV

### *Reserch and monitoring*

#### Brief description

Climate

Vegetation

Small mammals

Influence of fog on the dynamics of the Fray Jorge forest



Reintroduction of species that previously existed in the region, such as the guanaco (*Lama guanicoe*) and the chinchilla (*Chinchilla lanigera*)

### ***Specific variables***

#### **Abiotic**

Climate.

#### **Biodiversity**

Ecosystem functioning/Ecosystem structure, forest systems, mammals, reintroduction, vegetation studies/plant cover, wildlife.

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### ***Related links***

[CONAF](#)

[Terrestrial Ecosystem Monitoring Site](#)



- **Comitê Directivo Del MaB – Paraguai**  
**Lecturer: Lucio Andrés Spinzi Mendonza**

## Paraguay

### EL CHACO

#### General Description

This Biosphere Reserve covers a large area in the northern part of the boreal El Chaco system in Paraguay, with ecologically diverse dry forest ecosystems, which are under great pressure to be converted into grazing lands. The Biosphere Reserve covers a series of ecosystems ranging from forest areas, matorral, savannahs and lacustrine and riparian ecosystems, both of permanent and temporary character. It contains representative ecosystems for the conservation of the regional Gran Chaco system in terms of protected habitat types, varied transition types between ecosystems, and a gradient from semi-arid to humid systems and temporary flooded areas. El Chaco Biosphere Reserve could become an essential part of a potential large-scale transboundary biosphere reserve of the Gran Chaco region with other countries Argentina and Bolivia.

The area of El Chaco is biophysically the most diverse of the Gran Chaco system. It combines a high biodiversity with well-conserved ecosystems and habitats of great importance that are indispensable for the establishment of biological corridors with the neighbouring countries. The Biosphere Reserve hosts a high floristic diversity with almost 5,000 different species, of which 486 are wild relatives of cultivated species. The fauna is influenced by the Amazonian and Inner Atlantic Forests, but still includes a high degree of endemism, especially in mammals but also in reptiles, birds, insects and arthropods. Numerous threatened species find refuge in El Chaco such as the guanaco (*Lama guanicoe*), jaguar (*Panthera onca*), tapir (*Tapirus terrestris*), and the giant armadillo (*Priodontes maximus*).

The Biosphere Reserve has six core areas, all protected areas: the Río Negro National Park, Cerro Cabrera - Timane Nature Reserve, Médanos del Chaco National Park, Cerro Chovoreca Natural Monument, Defensores del Chaco National Park, and Teniente Agripino Enciso National Park. The buffer zone and transition area are made up of private land, military territories; land managed by the Instituto de Bienestar Rural, and territories



of indigenous communities.

El Chaco has important cultural values and includes parts of the traditional territories of three ethnic groups: the Ayoreo, Guarani-Ñandeva and Ishir. The indigenous communities have had a low impact on the environment (small periodic burning, subsistence agriculture) and sustain practices of hunting and harvesting, combined with the culture of summer orchards. The Biosphere Reserve designation helps to protect local indigenous communities' homeland and cultural identity. The population of El Chaco, which totals some 54.700 people, also includes Creole and Mennonitas groups. The creation of the Biosphere Reserve constitutes a first effort to promote the management of the use of natural resources in the north of the Paraguayan El Chaco. The management plan of the Biosphere Reserve is in preparation.

### Major ecosystem type

Dry or deciduous tropical forests

### Major habitats & land cover types

Dry forests on old alluvial plains; Forests on poorly drained grounds; Forests on sandy grounds; Transitional forests; Savannahs on sandy grounds; dry forests of the old alluvial plains; Riverine forests; Neotropical aquatic vegetation

LOCATION	ALTITUDE (metres above sea level)	YEAR DESIGNATED
20°03'09"S; 66°09'08"W	+78 to +900	2005

### Area (hectares)

Total	Core area(s)	Buffer zone(s)	Transition area(s) when given
7,492,250	1,624,795	894,298	4,973,157



## **Administrative authorities**

Secretaría del Ambiente

## ***Reserch and monitoring***

### **Brief description**

The core areas are established to protect biodiversity and the range of different natural processes that currently are protected within the boundaries of the legally established Áreas Silvestres Protegidas in the Biosphere Reserve. The buffer zones are established to constitute corridors of biodiversity, with emphasis on the flagship species for conservation, especially the jaguar (*Panthera onca*). The buffer zones constitute a barrier to protect the core areas from the development activities in the transition area. The transition area is established to promote the sustainable use and management of natural resources in harmony with indigenous cultures and needs.

Project on the environmental system of El Chaco - inventorying, evaluation and recommendations for the protection of natural areas; Development of the knowledge base related to the biophysical resources and natural processes of El Chaco, relevant for the management of the territory; Projects for the protection of the "Ayoreo-Totobiegosode", including the recovery, legalization and return of the land to these native people; Project to safeguard the area of "Amotocodie", that is of great importance for native communities; Initiative for the protection of wild areas of Paraguay and the strategy and action plan for biodiversity on the socioeconomic conditions and alternatives in the area; Prospecting and explorations in the search for hydrocarbons; Climatic monitoring; Project of ecorregional evaluation of the great American Chaco with social, economic, political, legal, and cultural components, related to the conservation of the biodiversity in El Chaco.

## ***Specific variables...***

### **Abiotic**

Abiotic factors, air quality, air temperature, climate, drought, erosion, geology, geomorphology, global change, groundwater, habitat, hydrology, meteorology, modelling, monitoring/methodologies, nutrients, siltation/sedimentation, soil, topography.



## **Biodiversity**

Afforestation/Reforestation, alien/invasive/exotic/introduced species, amphibians, arid/semi-arid, autoecology/synecology, biodiversity, biogeography, biology, birds, breeding/reproduction, community studies/communities, conservation, degraded areas, desertification, dune systems, ecology, ecosystem assessment, ecosystem functioning/ecosystem structure, ecotone, endemic species, ethology, evapotranspiration, evolutionary studies/palaeoecology/evolution, fauna, fires/fire ecology, fishes, flora, forest systems, freshwater/inland water, genetic resources, indicators, invertebrates/insects/spiders, lagoon systems, mammals, migrating populations/migration, modelling, monitoring/methodologies, natural medicinal products, natural resources, perturbations/resilience/vulnerability, pests/diseases, phenology, phytosociology/succession, plants, population genetics/population dynamics, productivity, rare/endangered/threatened species, reptiles, restoration/rehabilitation/redevelopment, species inventorying/inventory, sub-tropical and temperate rainforest/sub-tropical forest, taxonomy, tropical dry forest, tropical grassland and savanna systems, vegetation studies/plant cover, wetlands, wildlife.

## **Socio-economic**

Agriculture/Production systems, agroforestry, anthropological studies/anthropology, archaeology/paleontology, bioprospecting, capacity building, control and monitoring of illegal activities, cottage industry/artisanal industry, cultural aspects, demography, economic studies, economically important species, energy production systems/alternative energy, firewood cutting/harvesting, fishery/fisheries, forestry, human health, human migration/population exodus, hunting, indicators, indicators of sustainability, indigenous people, livelihood measures, livestock and related impacts/overgrazing, local participation, mining, modelling, monitoring methodologies, natural hazards, non-timber forest products/ntfp, pastoralism/pastoralists/grazing, people-nature relations/man/nature, poverty, quality economies, recreation, resource use, role of women/gender, sacred sites, small business initiatives, social/socio-economic aspects, stakeholders' interests, tourism, traditional practices/ethnology/traditional knowledge, transport.



## **Integrated monitoring**

Biogeochemistry, carrying capacity/sustainability, conflict, ecosystem approach, education and public awareness, environmental change, geographic information system/gis, impact and risk studies/environmental impact, indicators, infrastructure, institutional and legal aspects, integrated studies/interdisciplinaty, interdisciplinary studies, land tenure, land use/land cover, landscape inventorying/monitoring, management issues, mapping, modelling, monitoring/methodologies, planning and zoning measures/zonation, policy issues, remote sensing, rural systems, sustainable development/sustainable use, transboundary/transfrontiers, watershed studies/monitoring.

## **Contact...**

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## **Related links...**

[Ramsar Wetland: Río Negro](#)

## **DEBATES**

Mr. Luiz Mauro Ferreira, the Presiding Officer, stressed the existing distinctions between the two reserves. In Chile, the geographical situation is isolated and in Paraguay, system is being pushed by uses of different natures, without providing any room for researches or specific studies that may enable solutions, aiming the sustainable livelihood of the population and other species in the system.

A question has been raised on the successful mechanisms that enabled the establishment of those Reserves and as far as their legal base is concerned. In Chile, the management plan is still being regulated. Nonetheless, the search for community access has been the major breakthrough achieved in the said reserve. There is an undergoing activity of rallying communities to incorporate them into the Biosphere Reserve, run by advisory councils and the enhancement of the public-private enterprise relationship. Explanatory, didactic visits are used to the sites and one can notice the commitment of different players aiming the environmental education as part of the basic education. The principle of



bringing conservation concepts to several school subjects is employed. Moreover, there is a successful support of the relevant authorities.

In Paraguay, situation looks harder, as it depends on a change of behaviour on the use of land, a picture that doesn't look like to have a short-term outcome. Nevertheless, at El Chaco Biosphere Reserve, the establishment of the Managing Committee of the dunes has been successfully achieved, from a local-based group that is represented by community members at the buffer area and the core area. In the wild Paraguay area, the expropriation of to-be protected areas has been possible and, in those areas, Managing Committees were established, thus launching an acquaintance work within the population. As far as funding is concerned, terms have been limited and the availability of skilled personnel is fairly reduced. The option of being connected with the Secretary of Environment is being handled currently, by maintaining managers from their own region.

## **SECOND PANEL**

**November 14**

Presiding Officer: Iedo Bezerra de Sá

Sequence of Lectures:

- **Instituto Argentino de Investigaciones de las Zonas Áridas - Argentina**

**Lecturer: Silvia Claver**

## **Argentina**

### **NACUÑÁN**

#### **General Description**

Ñacuñán is located in the Province of Mendoza in the plains (540 metres above ground) at the foot of the Andes. The area consists of open *Prosopis flexuosa* (algarroba) woodland, accompanied by a shrubby steppe of *jarrea* spp and an herbaceous layer of grasses. Mammals as the grey fox (*Dusicyon griseus*), 'puma' (*Felis concolor*), birds such as rhea (*Rhea americana*), 'martineta' (*Eudromia elegans*) and reptiles such as tortoise (*Geochelone chilensis*) are found in the reserve. The forests of *Prosopis flexuosa* survived timber exploitation in the up to 1930s. However, timber and hunting still constitute the main threats that the Biosphere Reserve is facing today. A site of particular historic interest is 'La Carbonera' which contains relicts of *Propopis* wood transformation into



charcoal and some pottery and metal utensils, left by the human settlements. More than 80 inhabitants live in the Ñacuñan village in the transition area (1999). Activities such as education and public information, training courses, workshops and research activities have been carried out in the Biosphere Reserve. Management practices are oriented towards conservation, research and environmental education. Recent work in the Ñacuñan Biosphere Reserve concern the impact of seed-eating birds on soil-seed reserves in the Monte desert.

### Major ecosystem type

Warm deserts and semi-deserts

### Major habitats & land cover types

LOCATION	ALTITUDE (metres above sea level)	YEAR DESIGNATED
34°02'S; 67°54'W	+540 (average)	1986

### Area (hectares)

Total	Core area(s)	Buffer zone(s)	Transition area(s) when given
12,271	3,255	2,298	6,718

### Administrative authorities

Instituto Argentino de Investigaciones de las Zonas Aridas (IADIZA)

### *Reserch and monitoring*

#### Brief description

Climate monitoring

Biodiversity and perturbations

Vegetation inventory, resulting in two maps from 1970 and 1999

Plant-animal interactions

Bird ecology



Habitat selection of micro-mammals  
Structure and dynamics of *Prosopis flexuosa* forest  
Ecology of desert communities  
Insect biodiversity  
Sustainable development in an arid zone community  
Mapping of the different zones of the biosphere reserve

### ***Specific variables...***

#### **Abiotic**

Climate, habitat, monitoring/methodologies.

#### **Biodiversity**

Arid/semi-arid, biodiversity, birds, community studies/communities, ecology, fauna, forest systems, invertebrates/insects/spiders, mammals, perturbations/resilience/vulnerability, plants, population genetics/population dynamics, vegetation studies/plant cover.

#### **Integrated monitoring**

Mapping, planning and zoning measures/zonation, sustainable development/sustainable use.

### ***Contact***

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### ***Related links***

[MABFlora/MABFauna](#)

[MAB Young Scientists Award 1998](#)

[Terrestrial Ecosystem Monitoring Site](#)

- **Reserva de la Biosfera Del Nor Oeste Peruano - Peru**

**Lecturer: Oscar A. Garcia Tello**

**Peru**

**NOROESTE**

**General Description**

The Noroeste Biosphere Reserve is located on the northern coast of Peru in the Tumbes and Piura departments. The area covers part of the Ecuadorian dry forest in the tropical Pacific forest with high biodiversity in flora and fauna. The reserve also includes the 'Cerros de Amotape' National Park, the 'Coto de Caza El Angolo' and the national forest of Tumbes. Its relief is very varied, and it is covered by formations of matorral, very dry forest, dry and tropical sub mountain forest, with (*Prosopis juliflora*), (*Bombax sp.*), (*Tillandsia sp.*), and mangroves of Tumbes. It also contains endangered fauna species as *Crocodylus acutus*, iguanas (*Iguana iguana*), and birds as the *Vultur gryphus*, *Sarcoramphus papa*, and *Burhinus superciliaris*, and mammals as *Odocoileus virginianus*, *Tayassu tajacu*, and *Felis concolor*. Over 480 inhabitants live in the biosphere reserve, engaged in agriculture, livestock and tourism mainly in the buffer zones, which generates the principal income and benefits to local communities. In 1997, some 1,200 tourists visited the area. However, very little income is generated through natural tourism (guiding, handicrafts, hotel and restaurant). Some of the principal problems in the area are extensive livestock, timbering and illegal hunting. The main goal of the biosphere reserve is to protect ecosystems, important endangered forest fauna, and flora species. Environmental education efforts have been supported as well as conservation and research on natural resources.



### Major ecosystem type

Tropical dry or deciduous forests

### Major habitats & land cover types

Mountainous tropical forest with *Prosopis* sp., *Cordia lutea*, *Acacia macracantha*, *Caesalpinia paipai* etc.; tropical very dry forest including species such as *Tillandsia usneoides*, *Ceiba* sp., *Bombax discolor*, *Bursera graveolens* etc.; pre-mountainous tropical forest characterized by *Tabebuia chrysantha*, *T. billbergii*, *Ceiba* sp. etc.; tropical dry forest dominated by *Triplaris peruviana* and *Ochroma* sp.; agro ecosystems; pasture land

LOCATION	ALTITUDE (metres above sea level)	YEAR DESIGNATED
03°24' to 04°53'S; 80°09' to 81°19'W	+60 to +1,640	1977

### Area (hectares)

Total	Core area(s)	Buffer zone(s)	Transition area(s) when given
231,402	91,300	140,102	-

### Administrative authorities

Instituto Nacional de Recursos Naturales (INRENA)

### *Reserch and monitoring*

#### Brief description

Monitoring of water resources

Evaluation of archaeological and tourist potential

Work with the community from buffer zone (environment education)

Projects on management of natural resources

Monitoring of flora and fauna



### ***Specific variables***

#### **Biodiversity**

Fauna, flora, methodologies, natural resources.

#### **Socio-economic**

Archaeology/Palaeontology, capacity building, local participation, tourism.

#### **Integrated monitoring**

Education and public awareness, management issues.

### ***Contact***

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## DEBATES

One of the questions raised concerned the meaning of demography. Argentina regions seem to be located in low-density areas, unlike the Brazilian Northeast region that stands for one of the areas of highest density of semi-arid systems.

Another issue raised stands for the importance of the Biosphere Reserve management decentralization, alike what happens in Brazil that has approved by now the National Plan

of Protected Areas, having a joint Council that shall start working henceforth. As for Peru, despite of stress given in decentralization process, political, institutional frameworks are different, thus exhibiting variances among regional demands and the national zoning supplementary law. The biggest challenge would be the standards, information systematization among all delegations on municipal, regional levels.

The interest on the community inclusion strategies within the Conservation Units work has been recurrent. It was mentioned that in Peru a community participation-oriented project is being launched, including meetings to approve priority projects. However, the area for the application of advance facilities still falls within the State's powers. The path through the NGO includes increased demands for international funding. Different levels of support are

available: Public funds of international cooperation, alternate funds like those arising out of tourism and some specific federal fund.

It has been stressed that civil society in Brazil, even taking into consideration all restraints thereto, enjoys proposal mechanisms for prioritizing public funds disbursement. Established over ten years ago, the National Fund of the Environment stands for a mechanism whereupon municipalities, states and NGOs may apply for by submitting their projects. Several environment-oriented state funds are also available at a state level (19 are currently under way). There are international funds available as well, wherein the applicants' scope is restricted to NGOs but where public entities may join in as partners. Such actions trail the trend of a broaden decentralization process.



• **Caatinga Biosphere Reserve National Council / Caatinga Biosphere Reserve –  
Brasil**

**Lectureres: Alexandrina Sobreira de Moura e Roberto Gilson Campos**

**CAATINGA**

Caatinga stands for a Brazilian exclusively biome, located in semi-arid region and occupying an approximate area of 1,037,517.80 sq km that encompasses nine states in Brazil Northeast (Piaui, Maranhao, Ceara, Rio Grande Do Norte, Paraiba, Pernambuco, Alagoas, Sergipe and Bahia), besides the Northern region of Minas Gerais state. The said region stands for 60% of the Brazilian Northeast area and 13% of Brazil's and is inhabited by 56% of the Northeast population, including the North of Minas Gerais and 16% of the Brazilian population.

Main figures

Location:	03°00' to 16°00'S; 35°30' to 44°00'W
Area (hectares)	
Total:	19,899,000
Core area:	1,000,342
Buffer area:	13,545,000
Transition area:	5,353,658
Altitude (metres above sea level):	From 40 to 1,100
Year designated:	2001
Administrative authorities:	IBAMA – Brazilian Agency of Environment - Brasilia / DF National Council of the Caatinga Biosphere Reserve, Recife/PE

Of all lands covered by caatinga, 50% have a sedimentary source, affluent in ground waters. Rivers are mostly irregulars and the volume water is typically restricted, being insufficient for irrigation purposes. Mean altitude of the region goes from 0 metres to 600 metres. Mean temperature ranges from 24 degrees to 28 degrees Celsius. Average precipitation rate goes from 250 mm to 1,000 mm and the water shortage is high throughout the year.



Caatinga lands feature a xerothermic index equivalent to *cerrado* (biome) (100-50), although from a different resource, within the Brazilian Shield's Northeast core from the

Pre-Cambrian era, thus leading to richer soils (Andrade-Lima, 1981) and with 50% sedimentary source, affluent in ground waters. Rivers are mostly irregular and the volume of water is typically restricted, being insufficient for irrigation purposes. Mean altitude of the region goes from 0 metres to 600 metres and temperatures range from 24 degrees to 28 degrees Celsius. Average precipitation rate goes from 250 mm to 1,000 mm and the water shortage is high throughout the year.

*Caatinga* stands for a region presenting various landscapes and plant types due to geomorphological, climate and topographic changes (Andrade-Lima, 1981), thus affecting its plant species distribution, wealth and diversity (Silva, 2002). As far as the height and density of this eco-system's plant community is concerned, they mostly relate to precipitation (Gomes, 1979), but also with the soil physical, chemical characteristics

(Santos et al., 1992), whereof its eco-system is defined by its climate (Andrade & Lins, 2001). Its vegetation chiefly comprises small-sized woody, herbaceous species, typically provided with spines and they are typically of deciduous type, thus losing its leaves at the beginning of the dry season, in addition to cactaceae and bromeliaceae. Approximately 380 species are endemic out of the 932 species that are estimated to have been classified for this region. *Catingueiras* (*Caesalpinia pyramidalis*), *Jurema* (*Mimosa spp.*) and quinques (*Croton spp.*) are the most predominant plants at the majority of the surveying jobs carried out in caatinga area.

The list of species existing in Caatinga is partial, due to the lack of adequate studies in the region. Pursuant to Tabarelli et al. (2000), over 40% of this eco-system has not been sampled yet, nearly 80% of all surveyed areas have been sub-sampled, while protected areas, like reserves and conservation units, are less than 2% of the entire eco-system.

Quantitative, qualitative assays on the caatinga flora and vegetation showed 180 endemic species out of 596 arboreal and shrubby species that were classified. This number of species is likely to become higher, if herbaceous species are to be considered. Most frequent arboreal and shrubby families are *Caesalpinaceae*, *Mimosaceae*, *Euphorbiaceae*, *Fabaceae* and *Cactaceae*, having the Senna, Mimosa and Pithecellobium genera the largest number of species. *Catingueira* (*Caesalpinia pyramidalis*), *Juremas*



(*Mimosa* spp.) and quinces (*Croton* spp.) are the most predominant plants at the majority of the surveying jobs carried out in caatinga area.

Figures above show that references on the literature about the Caatinga, namely: a poor eco-system sheltering few endemic species and, therefore, featuring low priority for protection is erroneous and is misconstrued over its visual aspect due to the adaptation style to drought. This falsehood has been decreasing, as new studies are being conducted in the region and new endemic species of plants and animals are constantly described (Andrade-Lima 1982, Rodal 1992, Sampaio 1995, Garda 1996, Silva & Oren 1997). To illustrate this, a study on the collection effort of samples for a given group of amphibians identified the Caatinga as one of the regions least recognized in the entire South America, with extensive areas lacking any single information (Heyer 1988).

It should be stressed the vertebrate fauna comprising 148 species of classified mammals, 10 of which are endemic while further 10 are endangered species. One can also find 15

endemic species of birds and 20 endangered species out of 348 species of birds. As far as reptiles and amphibians are concerned, 15% of species are endemic out of 154 classified species. There are 185 classified types of fishes as well, where 57.3% stand for endemic species.

Caatinga exhibits a background of and old anthropic action that goes back to the colonial period, with the progress toward the main land pursuant to search for gold and precious stones, based on the *sesmarias* (land donation by the King) regime and the *capitania*

*hereditaria* (Royal provinces given to noblemen) system (Andrade-Lima, 1981; Arruda, 2001). Most of its native vegetation, approximately 60% and 70% has been already modified. Activities like burns for soil preparation, replacement of native vegetation with pasture and deforestation are regarded as foremost aggressions and cause for changes that took place (Andrade-Lima, 1981; Tabarelli et al., 2000; Arruda, 2001). Local inhabitants, who are reckoned as Brazil's largest concentration of poor population chiefly, carry out such activities. Recent data estimate that over the last fifteen (15) years approximately 40,000 square km (4,000,000 ha) of caatinga have been devastated, due to human interference in the region. It is further estimated that 653,000 ha are devastated, every year. Therefore, its priorities, besides the protection of the rich regional biodiversity stand for the fight against desertification, the promotion of sustainable activities



(apiculture, tourism, handicraft, and so on), besides the study and disclosure of data related to those important eco-systems.

The lecture emphasised the Biosphere reserve modernism and stressed historical facets, as follows: 1999, when the 3<sup>rd</sup> Conference of the Parties on Desertification that brought about the challenge of handling the Biosphere Reserves on a state level, the State Plan to Fight Desertification and Livelihood with Drought; the establishment of the Biosphere Reserve National Network, as to the establishment of the Caatinga Biosphere Reserve.

A noteworthy distinction has been drawn between Brazil and the raised experiences: The Biosphere Reserve of Caatinga is located within a territory (13% of the Brazilian territory and 60% of Northeast) that lodges the Caatinga Biome (approximately matching the semi-arid region boundaries). The Caatinga Biosphere Reserve does not constitute itself as a continuous land nor is it restricted to a single state and may occur in broken up territories. The Caatinga Biosphere Reserve National Council has been set up for its management (30 members – 50% governmental) that is working on a local, global levels and that is

furnished with a capillarity that is implemented with the State Committees (joint committee, wherein its structure may vary from one state to the other, Ceara and Pernambuco with 14 members; Bahia, Sergipe and Piaui, with approximately 14 members; and Alagoas and Rio Grande Do Norte where Managing Committees are still being formed). The committees comprise NGOs representatives, rural workers and researchers, as participants. There is currently an attempt to reassess the Caatinga Biosphere Reserve and each state is drafting an Action Plan.

In view of the gap of comprehensive studies on its biodiversity, a biological, social, economical and physical analysis has been draft on the Biome that may be examined at “Scenarios for Caatinga Biome” journal. A Data Bank on the Caatinga Biome has been assembled, along with INPE’s technical staff.

The experience in the Caatinga Biosphere Reserve has been framed through three axes, as follows:

- The Global UN Agenda 21;
- Biome Conservation;
- Fight against Desertification and Livelihood with Drought



Main strategies employed were, as follows:

- Women empowerment;
- Sanitation unit;
- Support to production units;
- Digital inclusion (computer resources availability to low-income classes and social strata).

The following obstacles to the Caatinga Biosphere Reserve have been identified, as follows:

- High population density and its critical social shortage;
- Economical growth and low competitiveness;
- Small areas, not devastated yet;
- Inadequate technology and reduced installed capacity for researches;
- Setbacks for the Management type launch;
- Major levels of degradation of the area;
- Reduced awareness of communities on the value assigned to the Biosphere Reserve vs. value assessed to Amazon, Atlantic Forest and further Biosphere Reserves.

Proposals:

- Appreciation of Biosphere Reserves capacities: The significant economical dimension; the presence of a mesh of cities; the knowledge already bolstered on local production arrangements plus the survival strategies that were adopted.
- Development project for the country that includes biome diversities;
- State improvement with the boost of society
- Care given to negligence, otherwise risking the growth of regional, inter-regional disparities;
- Search for alternative energy sources, aiming the reduction of the environment management for wood extraction
- Community incentive and awareness-raising campaigns, as sustainable strategy for any and all actions.



## THIRD PANEL

**November 14**

Presiding Officer: Lúcia Kiill - Embrapa

Sequence of Lectures:

- **MaB Maroc National Committee/Biosphere Reserve of Argania - Marrocos Expositor:  
Mustafá Lamrani Alaouki**

### Morocco

#### ARGANERAIE

##### General Description

Located in the southwest of Morocco, this biosphere reserve covers a vast inter-mountain plain of more than 2,560,000 hectares, bordered by the High Atlas and Anti-Atlas Mountains and open to the Atlantic in the west. The core area comprises the Souss-Massa National Park. Of main conservation interest is the endemic Argan tree (*Argania spinosa*). As a relict of the tertiary era, this forest species is extremely well adapted to drought and other environmentally difficult conditions. It is currently under the threat from excessive human exploitation. The Argan tree is not only the focus for conservation, but also for research and socio-economic development. Research topics to improve the knowledge on this tree species are its usage, and its physical and socio-economic environment. Traditional uses of the Argan tree are for example forestry, pastoralism, food, medicine and cosmetics. Growing along the border of Sahara, it also functions as a buffer against desertification. The majority of the population in the biosphere reserve is of

Berber origin, but Arab people are also living in the area, which supports approximately 2,374,000 inhabitants, including the town of Agadir (~899,000 inhabitants, 1994).

##### Major ecosystem type

Warm deserts and semi-deserts / evergreen sclerophyllous forests

##### Major habitats & land cover types



Semi-steppe Mediterranean ecosystem with Argan trees (*Argania spinosa*); forested and semi-forested Mediterranean ecosystem with the "Thuya de Berbérie"; semi-steppe or semi-forested ecosystems with red Juniper; agricultural land; urban zones

LOCATION	ALTITUDE (metres above sea level)	YEAR DESIGNATED
29°15' to 31°20'N; 8°10' to 10°25'W	0 to +2,000	1998

#### Area (hectares)

Total	Core area(s)	Buffer zone(s)	Transition area(s) when given
2,568,780	110,000	953,870	1,504,910

#### Administrative authorities

Direction Régionale des Eaux et Forêts du Sud-Ouest (Ministry of Water and Forests)

#### *Reserch and monitoring*

#### Brief description

Research on the Argan tree (*Argania spinosa*); its uses and physical and socio-economic environment

#### *Specific variables...*

#### Biodiversity

Plants.

#### Socio-economic

Resource use, social/socio-economic aspects.

#### *Contact*

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- **Comisión Nacional de las Áreas Protegidas – Mexico**

**Lecturer: Fuensanta Rodríguez Zahar**

An overall description on the 155 natural areas protected (9.5% of the national territory) in Mexico has been presented. Thirty-four of these areas are within UNESCO's programmes while twelve are located in arid zones. Fast degradation caused by various aspects, as follows: Natural extraction; chemical pollution; shrimp farms; wind-powered farm. There are several monitoring actions and fight against the chemical pollution from the shrimp lagoons, thus achieving a reduction on the contamination levels.

- **Metztlán CONANP Biosphere Reserve - Mexico**

**Lecturer: Salvador Montes Quintero**

Barranca de Metztlán Biosphere Reserve

Barranca de Metztlán Biosphere Reserve has been officially launched initially on November 27, 2000 and, later, on August 1, 2003, comprising an area of 96,042-94-70,18 hectares and is located in the Mid-East part of Hidalgo state, between coordinates 98° 23' 00" and 98° 57' 08" West longitude and 20° 14' 15" and 20° 45' 26" of North latitude. It encompasses part of the municipalities of Acatlán, Atotonilco el Grande, Eloxochitlán, Huasca De Ocampo, Metepec, Metztlán, San Agustín Metzquitlán and Zacualtipán De Angeles.

Main road network stands for federal highways 105 & 132 Pachuca-Huejutla and Mexico-Tuxpan, where the first one crosses Venados River, while the latter gets a deviation to Acatlan in Tulancingo, giving access to the southern part of the Reserve through various treks leading to rural area-located communities. Vegetation types are, as follows: Quercus



woods (3,191,27 hectares), Juniperus woods (1,795,02 hectares), Pino-encino woods (2,161,60 hectares), tropical deciduous woods (1.219.61 hectares), Mountain base woods

(45,215,26 hectares), Mountain base woods-Weather-based agriculture (1,440,64 hectares), xerophilous woods (20,493,70 hectares), xerophilous woods-seasonal agriculture (465,93 hectares), Pasture land (1,352,43 hectares) and riparian woods (1,186,58 hectares). Vascular flora comprises 465 species, 270 genders and 83 families. Pursuant to NOM-059-SEMARNAT-2001 classification, there are nine threatened species, 6 species under special protection, 2 endangered species and one species regarded as extinguished in the wild.

As far as the wild fauna is concerned, amphibians are represented with 6 species, 5 genders and 5 families; reptiles with 23 species, 17 genders and 6 families; birds with 188 species, 120 genders and 37 families; and finally, mammals with 42 species, 33 genders and 14 families. Pursuant to NOM-059- SEMARNAT-2001 classification, there are nine endangered species and eight species under special protection.

Within the protected natural area, 135 populations and settlement can be found: 78 from Metztitlán, 10 from Eloxochitlán, 13 from San Agustín Metzquititlán, 10 from Huasca De Ocampo, 11 from Atotonilco El Grande, 13 from Acatlán, 3 from Zacualtipán De Angeles and 3 from Metepec. The overall population within the Reserve's area was in 2000, according to INEGI, 32,215 inhabitants, comprising 15,151 males and 17,064 females, standing for, in that order, 47% and 53% of the entire population. The overall population split by age groups is described, as follows: The 5-year group population is above 28,739, standing for 89.2%, whilst 10.80% stand for the 0-4 year group. Within the Reserve's area, the real estate's type of property is of social and private types. Main uses of soil are, as follows: farming (16,115,08 hectares), livestock and forestry (78,522,04 hectares). The use and occupation of soil at the influence area focus on farming, livestock, forestry and urban.

Within the scope of utilities and as far as education is concerned, the area includes 64 federal schools, 104 state schools and 2 private schools at nursery school level; 31 federal schools, 219 state schools and 3 private schools at elementary school level; and 70 state schools and 1 private school at high school level. As far as health care is concerned, it includes 23 IMSS medical units, 4 ISSSTE health care services and 21 from SSA. Over 90% of homes are owned and the average occupation is five individuals per dwelling. The problem encompasses several issues, as follows: Changes to the use of



soil, lack of adequate studies on the existing natural resources integrating the entire area, excess of pasture, water erosion and soil compactation, soil fragmentation, fragility of eco-systems, illegal extraction and capture of fauna, flora species, lack of natural regeneration of plant species, lack of environmental education, soil, water contamination, areas strongly degraded, illegal hunting, inadequate fisheries, introduction of exotic species, irregular urbanization activities, migration of population and cultures (trans-culturalization).

Entities working in that area are, as follows: Natural Protected Areas Commission, Hidalgo State Independent University, Mexico National Independent University, Chapingo Independent University, Post-graduation College, National Polytechnic Institute, Independent Metropolitan University, UM Program for Development, Children and Infants, A. C. e Vida e Raíces, A. C. Twenty-two assays focus on the knowledge and management of natural resources, among which, the following should be emphasised: *“Estudo monográfico das cactáceas do Estado de Hidalgo”, “Viagens à Barranca de Tolantongo”, “Estudo Florístico da Barranca de Tolantongo”, “As Cactáceas do Estado de Hidalgo”, “Estudo Técnico Justificativo”, “Programa de Manejo”, “Propagação in-vitro de cactáceas ameaçadas de extinção na Reserva da Biosfera “Barranca de Metztitlán””, “Diagnóstico regional fitossanitário nos cultivos hortícola e comunidades naturais de Metztitlán, Anfíbios e répteis do México”:*

*“Inventários naturais, topotipos e espécies endêmicas”, “Proposta de turismo alternativo no ex\_acampamento “El Tajo” no Município de Eloxochitlán, Hidalgo”, “Proposta de turismo alternativo para a Lagoa de Metztitlán”, “Inventário das helmintíases em peixes e o seu risco potencial zoonótico nas comunidades indígenas da Reserva da Biosfera “Barranca de Metztitlán””, among others.*

Location:	Year Designated
20° 14' 15" and 20° 45' 26"N; 98° 23' 00" and 98° 57' 08"W	2003

There has been a lecture on the Hidalgo's Metztitlan Reserve about communal practices and farming cooperatives for specific plants – cactaceae, oriented to national, international markets. Collective actions and cooperatives comprise representative meetings that discuss prices and market advantages and drive that experience.



The principle stands for habitats protection and not only species or areas. By protecting habitats, species are protected. More restrictive rules and standards are therefore proposed, preventing the entry of alien species.

Environmental messengers were proposed as well, by constituting environmental tutors to bring about the knowledge, with the aid of children-oriented seminars and empowerment modules that shall accrue the support ensemble to the project. Tourist, educational visits are also added to incentives, as a way of socializing awareness on conservation, as well.

A meeting with researchers and academic people has been convened and it is held every year in the region covering farming management practices within arid areas.

- **Metztitlan CONANP Biosphere Reserve - Mexico**

**Lecturer: Benito Bermudez Almada**

### **Mexico**

#### **EL VIZCAINO**

##### **General Description**

El Vizcaino is located in the central part of the Baja California peninsula in the Sebastian Volcano region, between the Gulf of California and the Pacific Ocean. Vizcaino includes a great abundance and variety of species of wild fauna and flora, including numerous endemics to the Mesoamerican region and species that are in danger of extinction elsewhere. Protection of the site is justified due to the exceptional value of the desert, mountain and coastal/marine ecosystems, which link the Pacific Ocean to the Gulf of California. The reserve is also of importance for its fossil beds and numerous marine birds, including some under threat of extinction. Grey whale (*Eschrichtius robustus*) frequents the bay. There are more than 400 prehistoric sites of importance on the peninsula, as well as petroglyphs, wall paintings and ancient ruined structures. The region of the desert of Vizcaino is one of the most isolated zones in Baja California, although most of the land in the reserve is under some form of human use. However, 35,000 people (2000) live in the reserve, of which 52% in rural communities (including seasonal fishing camps). Principal economic activities include intensive agriculture, fishing, extensive livestock grazing, mining and tourism. The reserve possesses what are reputed to be some of the largest manufactured saltpans in the world in the neighbourhood of Guerrero Negro. 30,000 tourists visited Laguna San Ignacio in 1989 to view grey whale.



The main goal is to conserve the integrity, and the natural and cultural values of the World Heritage sites located inside the reserve.

Major ecosystem type

Desert and semi-desert; coastal lagoons; coastal / marine ecosystems

Major habitats & land cover types

Scrubland including succulent species; desert scrub; low shrubs of arid land; halophyllous vegetation; coastal dunes; marine and coastal ecosystems; mangrove; riparian vegetation; agriculture

LOCATION	ALTITUDE (metres above sea level)	YEAR DESIGNATED
26°22' to 28°00'N; 112°14' to 115°15'W	-100 to +1,920	1993

Area (hectares)

Total	Core area(s)	Buffer zone(s)	Transition area(s) when given
2,546,790	363,439	2,183,351	-

Administrative authorities

Comisión Nacional de Areas Naturales Protegidas (CONANP); Secretaría de Medio Ambiente, Recursos Naturales y Pesca (SEMARNAP) Camino al Ajusco 200, 3er piso, Jardines en la Montaña, Tlalpan, C.P. 14210, México, D.F. Tel: (615) 157 01 77; (615) 157 01 77 Fax: (615) 157 17 77 E-mail: vizcaino@conanp.gob.mx; elvizcaino@intecnet.com.mx

### ***Reserch and monitoring***

Brief description



Pronghorn and bighorn sheep census  
Pronghorn semicaptivity management  
Bighorn sheep management

Sustainable fisheries  
Monitoring studies of Osprey population

*Specific variables...*

Biodiversity  
Birds, methodologies, population genetics/population dynamics, wildlife.

Socio-economic  
Fishery/Fisheries.

Integrated monitoring  
Management issues, sustainable development/sustainable use.

**Contact**

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Web site

[www.conanp.gob.mx](http://www.conanp.gob.mx)

World Heritage Site:

Whale Sanctuary of El Vizcaino and Rock Paintings of the Sierra de San Francisco

Terrestrial Ecosystem Monitoring Site

[www.ine.gob.mx/ucanp](http://www.ine.gob.mx/ucanp)

- **Mapimi CONANP Biosphere Reserve - Mexico**

**Lecturer: Cristino Villarreal Wislar**

**Mexico**

**MAPIMÍ**

**General Description**

Mapimí is located in the Durango State in northern Mexico between the Neotropical and nearctic bio geographical region, in the 'Bolson de Mapimí' 1,150 meters above the sea level. It contains three core areas in the 'Sierra de la Campana', the 'laguna de las Palomas', a salted lagoon, and a desert habitat called 'Dunas de la Soledad'. It comprises fragile warm desert and semi-desert ecosystems (particularly Chihuahuan desert), and the rich, highly adapted but vulnerable plants, mainly xerophytic matorral, and animal species as the puma (*Puma concolor*), venado bura (*Odocoileus hemionus*), the grullas (*Grus canadensis*) and the 'zorrita del desierto' '*Vulpes macrotis*' along with scrubs and desert grasslands. 72,600 inhabitants (1997) live in the reserve, mainly engaged in extensive livestock, salt exploitation and in agriculture. Local population (ranchers and farmers) are involved in conservation and management efforts. The Institute of Ecology has supported the improved management of extensive cattle ranching with the introduction of Spanish breeds. Research activities with UNESCO/MAB and UNEP are engaged in local development activities, improved cattle ranching, agriculture, crafts and tourism. The main goals of the Biosphere Reserve are to conserve desert ecosystems and protect mammals and other endangered species optimising conditions for an economic sustainable reconstitution of degraded areas.

**Major ecosystem type**

Warm deserts and semi-deserts



### Major habitats & land cover types

Scrubs and desert grassland; shrub communities; halophylus vegetation

LOCATION	ALTITUDE (metres above sea level)	YEAR DESIGNATED
26°29' to 26°52'N; 103°31' to 103°58'W	+1,100 to +1,800	1977

**Area (hectares) Total:** 20,000

### Administrative authorities

Comisión Nacional de Áreas Naturales Protegidas (CONANP); Secretaría de Medio Ambiente y Recursos Naturales (SEMARNAT) Camino al Ajusco 200, 3er piso, Jardines en la Montaña, Tlalpan, C.P. 14210, México, D.F. Tel: (618) 825 84 75 Fax: (618) 811 20 03 E-mail: rmapini@prodigy.net.mx Instituto de Ecología, A.C. This is a Federal Natural Protected Area. By an agreement, this Biosphere Reserve was transferred to the Institute of Ecology for its management.

### *Reserch and monitoring*

#### **Brief description**

Plant ecology studies on: *Prosopis glandulosa*, *Atriplex* spp., *Pleuraphis mutica*, *Flourenzia cernua* and *Opuntia* spp.

Animal ecology studies on: *Odocoileus hemionus*, *Gopherus flavomarginatus*, *Uma* spp., *Tayassu tajacu*, *Lepus californicus*, *Canis latrans*, *Bubo virginianus* and *Tyto alba*

Effects of grazing on desert plant communities by cattle, rodents, lagomorphs and insects

Soils and hydrology

Rehabilitation of degraded rangelands

#### *Specific variables*

#### **Abiotic**

Hydrology, soil.



INSTITUTO AMIGOS DA RESERVA DA BIOSFERA DA  
CAATINGA  
Friends of the Caatinga Biosphere Institute



### **Biodiversity**

Arid/Semi-arid, degraded areas, ecology, fauna, invertebrates/insects/spiders, plants, restoration/rehabilitation/redevelopment, tropical grassland and savannah systems.

### **Socio-economic**

Livestock and related impacts/Overgrazing.

### **Contact**

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## **Lecture on the Caatinga Information Virtual Network / MMA - Brazil**

**Lecturer: Luiz Mauro Ferreira**

SDS/MMA pursuant to Economical, Ecological Zoning Programme, a joint-venture with Caatinga Biosphere Reserve' National Council and OEMAs has been implementing the Caatinga Information Virtual Network, allowing:

- The amalgamation of environment managing bodies;
- The strengthening of the National Information System on the Environment (SINIMA);
- The boost of the information broad availability, plus the SISNAMA reinforcement.

The virtual network territory encompasses, as it regards to the Caatinga Biosphere as reference, the entire Northeaster area of Brazil plus the state of Minas Gerais, by incorporating information based on a web service network that provides perspectives on a national, regional and local scales, from various sources of data and scales, employing a low-cost technology.

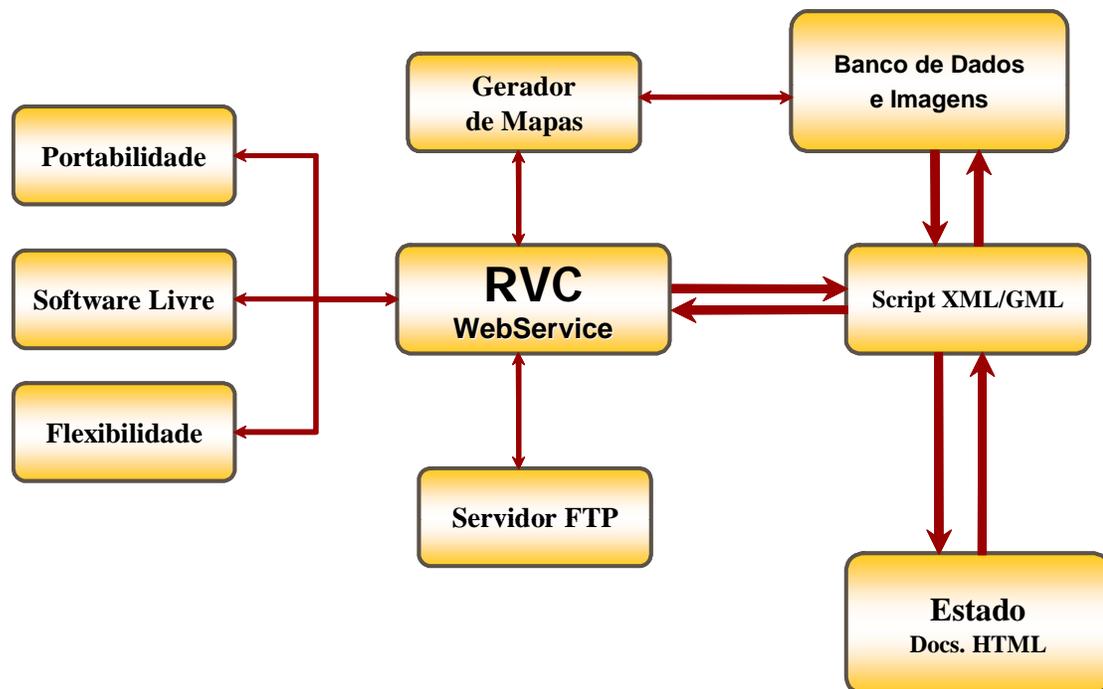
As an entity, the Network incorporates joint entities, namely ANA; Ministério dos Transportes (Ministry of Transportation), Serviço Geológico do Brasil (Brazil Geological Service), IPEA, MRE, EMBRAPA, Ministério de Minas e Energia (Ministry of Mining and Energy), Ministério da Ciência e Tecnologia (Ministry of Science and Technology), INPE, Ministério da Saúde (Ministry of Health), IBAMA, Ministério da Integração Nacional (National Integration Ministry), IBGE, among others.

Its short-term goals are, as follows:

- The incorporation of all available information on Caatinga at the three government upper levels;
- To match and disclose such information;
- To make information widely available, aiming to accomplish the process social control;
- To ease the draft of plans, programmes and governmental actions on a regional level;
- To improve instruments and mechanisms for planning, management and conflict resolution;

- To reinforce the Ecological, Economical Zoning Programme.

The methodology that was employed is depicted in the next chart, as follows:



The FAO-developed free software and used in the Virtual Network is Geonetwork that is applied to the geographical data recording. At Geonetwork, maps, digital data and satellite pictures available at the MMA data Server and joint institutions may become accessible. With this programme, the access and integrated use of data and space information are likely to be improved, as well as the support to decision-making process, the endorsement of sustainable development-oriented multi-disciplinarily and the awareness expansion of geographical information advantages.

## CONCLUSION OF DEBATES

Debating issues arising out of the Seminar

Based on the experiences undertaken, some issues are likely to be identified and they may lead through the debate on the Biosphere Reserve institutional maintenance.



- Favourable conditions to the sustainability of Biosphere Reserve conservating actions in Semi-arid, arid regions:

- The experience's development level. Seen primarily as essential issues regarding the managing type improvement, it arises then as a factor that is likely to be minimized and even overcome with the institutional framework, management dynamics underpinning. Practical examples may be obtained from Biosphere Reserves that were established more recently and exhibit already their own breakthroughs, thanks to the management type elected and to the making of an institutional workability on behalf of the Biosphere Reserves. The institutional learning features a specific pace, nevertheless there is already a knowledge build up that may be exchanged and tried.

- The space given to data systematization, to studies and to researches. As it seems, all experiences that have gave precedence to this issue feature higher possibilities of establishing its own sustainability, as they provide a legacy than can be easily displayed as explanatory and adequate to any management or upon any fund raising. - Brazil, Morocco and Mexico (see the three conservation programmes). Priority given to knowledge, monitoring and researches. Assembly of an infrastructure that houses or lodges activities thereof and, above all, the search for inventive alternative technologies (to be created yet or others existing but not tried yet in the region; or else tried in local rehearsals – underground dams, masonry wells, in Brazil's Northeast).

- A commitment association among the attached institutions further to an updated regulatory benchmark. The competent institutions pursuant to environment-led governmental powers should be connected. Maintenance of inter-regional committees is important to reduce setbacks, while endorsing an educational attribute – surveillance, punishment for inadequate uses and, in a different path, encouragement to good practices of conservation. Similarly to Mexico, crime punishment are to be two folded within Biosphere Reserves; as such, training regarding issues on the property and farming use among fiscal agents and inspectors are encouraged.

- Network of entities that get closer to communities– participating processes. Reinforcement of councils and committees.

- Cooperation and experience exchange. Alike Mexico's example, during the debated experiences, where the "*know to protect*" motto is stressed, by conducting in a first



moment environmental-oriented educational programmes as well the gathering of experts and researchers that feature abilities and skills to develop their own knowledge on the management and on the negative impacts of the lack of actions or positive impacts achieved with the performance of actions.

- Boost of environmental education among specific addressees, like children and women, just like further addressees.
- Sustainable funding conditions based upon local funds. Foreign contributions (contingent and provisional) feature an incentive role.

#### Adverse conditions

- The institutional complexity imposed onto a Biosphere Reserve that goes beyond the territorial boundaries of municipalities, states or nations, or when government actions match a federation pattern that establishes stiff links of addiction between central, local governments.
- The incidence of pressures setting up conflicts of interests on the use of the area
- Population density stands for a discrete factor for challenges, as it shapes distinct profiles for survival strategies of the dweller population
- Degradation levels of the physical environment and likelihood of regeneration (degradation due to various items, namely: Natural extraction, chemical pollution, among others) that shall define both the nature and scale of interventions and investment,
- The Biosphere Reserve location in arid, semi-arid regions, as related to further Biosphere Reserves and to intermediate areas and buffer areas.

#### Strategies that are to be increased and enhanced

- Research, Monitoring activities: On the physical environment; ecology and natural resources; dynamics and use.
- Environmental Education and Empowering activities:
- Institutional affairs linked with international, national levels, with municipalities and communities (multi-sector councils), still in embryonic stage.
- Popular Participation – challenges to the communal management and strengthening of participative processes.



Main challenge: How to launch a management type, so to ensure the MaB's sustainability?

Some issues are important to the subsequent debates, namely:

- The role played by networks: Launch and maintenance
- In a global sphere: How to sustain the network among countries and regions featuring common problems and solutions that are worthy of being shared?
- To emphasize the creation proposal of Biosphere Reserve Networks in arid, semi-arid regions.
- The strengthening of National Systems of Management: Committees, various institutional arrangements. Is there any need of establishing further channels?
- Fund raising increase
- Boost of the Biosphere Reserve concept, regardless of the Conserved Area concept.

**November 15**

### **Workshop: Establishment of an International Network of Biosphere Reserves of Semi-arid Regions**

There has been a debate of the draft of the Memorandum of Petrolina that was conducted, according to the agenda that follows:

1. Experience of existing networks – alike the IBEROMAB and the Arabic Network<sup>2</sup>
2. Network's functions and assignments
3. Management system
4. Fund raising
5. Network launch public deed
6. Forwards: Document remittance to UNESCO and each country's authorities
7. Next meeting

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<sup>2</sup>IBEROMAB gathers the MAB's National Committees of 21 countries in the region with over 120 biosphere reserves



## **MEMORANDUM OF PETROLINA**

The representatives of the Biosphere Reserves of Arid, Semi-arid Regions located in Argentina, Brazil, Chile, Morocco, Mexico, Paraguay and Peru, gathered in Petrolina (State of Pernambuco, Brazil) at the 1<sup>st</sup> INTERNATIONAL SEMINAR OF BIOSPHERE RESERVES OF ARID, SEMI-ARID REGIONS, from November 14 through 16, 2006, submit their suggestions that were brought upon the evaluation arising out of the experience exchange and debates.

Having proposals convened at the 1995 Seville Strategy and Seville+5 as benchmark, specifically related to issues described hereinbelow:

- The permanent enhancement of knowledge about reality with the support of social sciences;
- The establishment of management types based on the link among the various players, within the political, administrative scope and further networks;
- The inclusion of communities aiming to prevent and manage conflicts arising out of the area occupation, in participative processes.

WHEREAS the UNESCO Programme repercussion having the United Nations Agreement for Fight Against Desertification as focusing point;

WHEREAS the prospect of creating subject-based networks to provide for a better performance of the World, regional and sub-regional networks of Biosphere Reserves within its three key roles, as follows: Conservation, development and logistic support;

WHEREAS the weather similarities among biosphere reserves in different parts of the world and, more specifically, between arid, semi-arid regions;

WHEREAS the major association degree between poverty and arid, semi-arid zones;

WHEREAS common problems related to fight against desertification and against poverty and;

WHEREAS the effectiveness and benefit of coping with the problems thereof with the trade of experiences, accrued learning and cooperation among the network members,



NOW THEREFORE IT IS HEREBY AGREED to submit UNESCO a proposal supporting the establishment of an International Network Biosphere Reserves of Arid, Semi-arid Zones.

Furthermore, the following guidelines for launching this Network have been regarded as important, as follows:

- To ease the countries' assimilation and cooperation with arid, semi-arid regions;
- To endorse, to disclose and to apply the MaB Programme concepts within arid, semi-arid regions;
- To strengthen the connection between MaB National Committees with Biosphere Reserves;
- To define common indicators for monitoring, evaluation processes;
- To set up exchange mechanisms of knowledge and experiences aiming to solve common challenges;
- To endorse empowering programmes and environmental education programmes;
- To identify funding sources to meet the Network's goals.

Proposals:

- That UNESCO sponsors the Network creation within MaB's scope;
- That local, regional, sub-national and national managements contribute toward the establishment of the proposed Network
- The MaB's National Committees support this Biosphere Reserve streamline;
- That each country may provide for a focusing point to ensure the connection between MaB's National Committee and the Biosphere Reserves.

Made in Petrolina, this November 15, 2006.

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Caatinga Biosphere Reserve National Council - Brazil

Roberto Gilson da Costa Campos  
Caatinga Biosphere Reserve National Council - Brazil



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## **SOCIAL, CULTURAL PROGRAMME**

### 1. Opening Cocktail / Performance of local music

Date: 12/11/ 2006: 20/22h

Location: Hotel Petrolina Palace Pool Area

Welcome reception to the participants by the Chairwoman of the Caatinga Biosphere Reserve National Council, Mrs. Alexandrina Sobreira De Moura. In addition to the international guests, representatives of the following entities also attended the ceremony, as follows: UNESCO, Conselho Nacional da Reserva da Biosfera da Mata Atlântica (Atlantic Forest Biosphere Reserve's National Council), CODEVASF, EMBRAPA, Ministério do Meio Ambiente (Ministry of Environment), Universidade do São Francisco – UNIVASF, INCRA, Prefeitura de Petrolina (Petrolina Municipality), SECTMA and CHESF.



### 2. Regional Dinner / Cultural Exhibition: *Forró Pé de Serra Manoel Paixão*

Date: 13/11/2006: 20/22h

Location: Bododromo

Performance of Brazilian North-eastern music for international guests with a traditional group and songs, like “*forró-pé-de-serra*”, *sanfona*, *zabumba* and triangles.

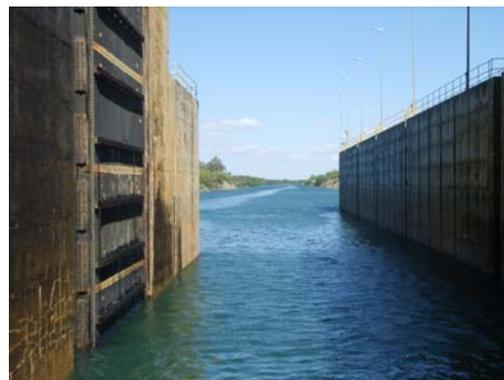


3. Visit to Sobradinho Dam and boat riding through Sao Francisco River to the city of Petrolina.

Date: 14/11/2006

Location: Petrolina - Sobradinho – Petrolina

Technical visit to Sao Francisco River from Sobradinho to Petrolina, crossing the dike. Guests were able to watch an assortment of facets of the river, its banks, islets, as well as the riparian vegetation and degraded areas. There was a pause at Rodeadouro Island to contemplate the tourist potential, wherein participants could visit a famous river beach in the entire intermediate part of Sao Francisco River.





#### 4. Regional Dinner Live Music (Brazilian Popular, Regional Folk music – house band)

Date: 14/11/ 2006: 20h30/22h

Location: Restaurante Barretu's

Regional dinner served with traditional foods and Northeastern music





## 5. Dinner at Armazem Café restaurant

Date: 15/11/2006; 20:00h

Location: Restaurant at Bahia state's Juazeiro serving regional, international menus



## 6. Technical visit to the Semi-Arid Tropic Research Centre - EMBRAPA/CPATSA

A worthy activity that took place during the event was the visit to CPATSA, regarded as one of world's foremost research centres oriented to semi-arid issues. All international guests, besides representatives of public, private entities that attended the seminar also made this visit. The entity research's chairperson initially lectured at the auditorium, by encompassing the issues described below:

- EMBRAPA and national centres organization
- Characteristics of Brazilian semi-arid tropic: Diversities, advantages, disadvantages, irrigation, and so on.
- EMBRAPA semi-arid mission statement, technical staff and ongoing trial works.
- Research lines, research subject-oriented areas.

After the lecture, a field visit was made where by-products of *umbuzeiro* (*imbu* - *Spondias tuberosa*) have been observed, as well as the spined, spineless species of *mandacaru* (*Cereus jamacaru*) for animal nutrition, the imbu farming for the production of pickles as foodstuff, the integrated farming of Atriplex and fish, with the employment of the

desalinator's by-product, besides ground dams, local water entrapment, rural cisterns and native fruits.



## 7. Technical visit to the Sao Francisco Valley's winegrowing & wine-production region

Among the area's companies, a visit to VINICOLA RIO SOL, located at Lagoa Grande, nearly 70 km from Petrolina.

The technical circuit started with the farming area of the various wine grape varieties for wine production that, unlike any other part in the world, can harvest two crops per year. Afterward, the visit to the entire wine production process stages, from the grape reception



to the ripening state in stainless steel silos and the bottling stage. Finally, the wine tasting has ended the visit to the wine grower.





On the way back to Petrolina, a visit to Petrolina Handicraft Centre allowed participants to appreciate and buy several products from local artisans



## SPONSORS

The bid of celebrating 2006 as the International Year Against Desertification, by gathering in Brazil 11 experts at the I International Seminar of Arid, Semi-arid Regions has been cheerfully welcomed by official, free enterprise sponsors. By means of the Perez Guerreiro Fund, the Agência Brasileira de Cooperação (Brazilian Agency of Cooperation), attached to Ministério das Relações Exteriores - MRE (Ministry of Foreign Affairs) secured the majority of the available funds for this event, by ensuring the proposal's development and further entry of Ministério do Meio Ambiente (Ministry of Environment) and Ministério da Agricultura, Pecuária e Abastecimento – MAPA (Ministry of Agriculture, Livestock and Supplies).

Besides the Ministries, the Seminar also included key sponsors from the United Nations Development Programme -UNDP; Banco do Nordeste do Brasil – BNB (Brazil Northeast's Bank); Empresa Brasileira de Pesquisa Agropecuária – Embrapa (Brazilian Agency of Farming, Livestock Research); Agência Nacional De Águas – ANA (Water National Agency); Companhia Hidro Elétrica do São Francisco – Chesf (Sao Francisco's Hydro-electric Utilities Company) and Projeto de Conservação e Uso Sustentável da Caatinga - GEF Caatinga (Conservation and Sustainable use of Caatinga Project). In addition, worthy of mention are the support of the following entities: UNESCO, Associação Brasileira de Entidades Estaduais de Meio Ambiente – Abema (Brazilian Association of State Entities for Environment), Universidade Federal Rural de Pernambuco – UFRPE (Federal Rural University of Pernambuco) and the Petrolina Municipality wherein the event was held. Within the private sector, we had the support of VINIBRASIL, a wine grower located in the municipality of Lagoa Grande, in the Northeastern semi-arid, producing Rio Sol wines exported to Europe and to the US, a joint venture with Dao Sul Portuguese wine producer and Expand Store exporter.

### Direction

Conselho Nacional da Reserva da Biosfera da Caatinga – (Caatinga Biosphere Reserve National Council)

Instituto Amigos da Reserva da Biosfera da Caatinga – (Friends of Caatinga Biosphere Reserve Institute)

Secretaria de Estado da Ciência, Tecnologia e Ambiente de Pernambuco - SECTMA (Department of Science, Technology and Environment of Pernambuco)



## UNESCO

Perez-Guerrero Trust Fund for Economic and Technical Cooperation Among Developing countries, Members of the Group of 77

United Nations Development Programme - UNDP

Ministério do Meio Ambiente – MMA (Ministry of the Environment)

Ministério da Agricultura, Pecuária e Abastecimento – MAPA (Ministry of Agriculture, Livestock and Supplies )

Agencia Brasileira de Cooperação – ABC (Brazilian Agency of Cooperation) / Ministério das Relações Exteriores - MRE (Ministry of Foreign Affairs)

Companhia Hidro Eletrica do São Francisco – CHESF (Sao Francisco's Hydro-electric Utilities Company)

Banco Nordeste Do Brazil – BNB (Bank of Brazilian Northeaster)

Agência Nacional das Águas – ANA (Water National Agency)

Empresa Brasileira de Pesquisa Agropecuaria – EMBRAPA (Brazilian Agency of Farming, Livestock Research)

Projeto de Conservação e Uso Sustentável da Caatinga - GEF Caatinga (Caatinga Conservation and Sustainable Use Project)

Governo do Estado de Pernambuco - State Government of Pernambuco

## Support

Prefeitura de Petrolina - Municipality of Petrolina

Vinícola Rio Sol



Realização



PEREZ-GUERRERO TRUST FUND



Patrocínio

Ministério do Meio Ambiente

Ministério da Agricultura, Pecuária e Abastecimento



Apoio





INSTITUTO AMIGOS DA RESERVA DA BIOSFERA DA CAATINGA  
Friends of the Caatinga Biosphere Institute



#### Patrocínio



#### Apoio

