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BIOSPHERE RESERVES AND UNESCO CHAIRS: PARTNERSHIPS FOR SUSTAINABLE DEVELOPMENT

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Belém, Dezembro de 2013

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BIOSPHERE RESERVES AND UNESCO CHAIRS: PARTNERSHIPS FOR SUSTAINABLE DEVELOPMENT[1]

Luis E. Aragón[2], Miguel Clüsener-Godt[3]

Abstract:

This case study presents the UNESCO Chairs-Biosphere Reserves Model as an important tool to achieve sustainable development. Biosphere Reserves are sites established by countries and recognized by UNESCO where new and optimal practices to manage nature and human activities are tested and demonstrated. UNESCO Chairs are defined as think tanks and bridge builders, aimed at successfully linking the different scientific disciplines to promote the knowledge base for policy formulation in the field of sustainable development. Some UNESCO Chairs are designed to give scientific support to the implementation of actions of Biosphere Reserves. The Model functions basically in three ways: 1) a UNESCO Chair adopts an specific Biosphere Reserve as a laboratory for research, application, and management assistance; 2) a UNESCO Chair serves as an instrument to catalyze joint efforts of different Biosphere Reserves of specific areas; 3) a UNESCO Chair serves as a "think tank" to consolidate concepts related to specific Biosphere Reserves. The UNESCO Chairs-Biosphere Reserves partnership is a fortunate and innovative association through which the academic world is bridged to actions implemented in Biosphere Reserves, transferring scientific knowledge to society. The case presented here exemplifies the application of the Model through the Project "Sustainable Rural Development and Biodiversity Conservation in the Biosphere Reserves of the Amazon" of the UNESCO Chair in South-South Cooperation for Sustainable Development of the Federal University of Para, Brazil.

KEY WORDS: South-South Cooperation. UNESCO Chairs. Sustainable Development. Amazon. Biosphere Reserves.

[1] Paper based on the presentations by the authors in the *Solutions Forum: Energy and climate change: Focus on biodiversity, forestry and land degradation*, during the *United Nations Global South-South Development, Expo 2012*. Vienna, Austria, 19-23 November, 2012.

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RESERVAS DA BIOSFERA E CÁTEDRAS UNESCO: PARCERIAS PARA O DESENVOLVIMENTO SUSTENTÁVEL

Resumo:

Este estudo de caso apresenta o Modelo Cátedras Unesco-Reservas da Biosfera como uma importante ferramenta para alcançar o desenvolvimento sustentável. Reservas da Biosfera são locais estabelecidos pelos países e reconhecidas pela UNESCO, onde novas e ótimas práticas para gerir a natureza e as atividades humanas são testadas e demonstradas. Cátedras UNESCO são definidas como grupos de reflexão e construtores de pontes, visando a articulação com sucesso das diferentes disciplinas científicas para promover a base de conhecimento para a formulação de políticas no campo do desenvolvimento sustentável. Algumas Cátedras UNESCO são projetadas para dar suporte científico para a implementação de ações de Reservas da Biosfera . O Modelo funciona basicamente de três maneiras : 1) a Cátedra UNESCO adota uma Reserva da Biosfera específica como um laboratório para pesquisa, aplicação e assistência de gestão; 2) a Cátedra UNESCO funciona como um instrumento para catalisar os esforços conjuntos de diferentes Reservas da Biosfera de áreas específicas; e 3) a Cátedra UNESCO funciona como um "tanque de idéias" para consolidar conceitos relacionados à Reservas da Biosfera específicas. A parceria Reservas da Biosfera e Cátedras UNESCO é uma oportuna e inovadora associação através da qual o mundo acadêmico estabelece uma ponte com ações implementadas em Reservas da Biosfera, transfeindo assim conhecimento científico para a sociedade. O caso apresentado exemplifica a aplicação do Modelo por meio do Projeto "Desenvolvimento Sustentável do Meio Rural e Conservação da Biodiversidade nas Reservas da Biosfera da Amazônia" da Cátedra UNESCO de Cooperação Sul-Sul para o Desenvolvimento Sustentável da Universidade Federal do Pará, Brasil.

Palavras-Chave: Cooperação Sul-Sul. Cátedras UNESCO. Desenvolvimento Sustentável. Amazônia. Reservas da Biosfera.

CONTEXT

In 1974, the United Nations established a special unit within the United Nations Development Programme (UNDP) to promote, coordinate and support South-South and triangular cooperation globally and within the United Nations system. Considering that countries of the South (or developing countries) generate knowledge and initiatives applied to their own reality, South-South cooperation would enable them to strengthen linkages and partnerships for their own benefit and development. The UNDP special unit is today the UN Office for South-South Cooperation (UNOSSC), with headquarters in New York, which coordinates, promotes and supports the programmes and initiatives[4].

One of the programmes of UNOSSC is the realization of the Annual Global South-South Development EXPO (GSSD), which began in 2008. The GSSD Expo objective is to identify and promote initiatives

> to help the Global South to achieve sustainable and equitable development through the sharing and transfer of Southern-grown development solutions. The GSSD Expo is designed to showcase successful evidence-based solutions created by developing countries to address development challenges. It enables developing countries and their development partners – including donor agencies, agencies of the United Nations system, and private-sector and civil society organizations – to collaborate and showcase solutions that are rooted in the historical, political, economic, social and geographic conditions specific to the originating countries. It provides a powerful platform for Southern development actors to celebrate successes, share knowledge and lessons learned, explore new avenues for collaboration and initiate new collaborative efforts towards achieving the objectives set forth in the Millennium Development Goals (MDG s) and other internationally agreed development goals. In addition, the GSSD Expo facilitates the forging of innovative and inclusive partnerships for South-South cooperation, including triangular and public-private partnerships (UNOSSC, 2013, p. 17).

According to UNOSSC Director, Yiping Zhou,

> The GSSD Expo is not intended to be a conference about problems or presentations of abstract scenarios and recommendations for solving them. Rather, the Expo is designed solely to bring together developing countries and their development partners, including donors, organizations of the United Nations system, and the private-sector and civil society organizations, to methodically and regularly share their evidence-based development solutions. Each development solution showcased will highlight the following 8 attributes: (1) Southern priority/demand driven; (2) Southern ownership; (3) Southern leadership; (4) broad-based partnership; (5) innovation; (6) efficiency; (7) sustainability; and (8) scalability (UNSOOSC, 2013, p. 73).

[4] For further information of the UN Office for South-South Cooperation see http://ssc.undp.org/content/ssc.html. Accessed in 30/12/2013.

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The fifth edition of GSSD, the EXPO 2012, took place in Vienna, Austria, 19-23 November, 2012, with the general theme *Investing in Energy and Climate Change: Inclusive Partnerships for Sustainable Development.* More than 600 delegates from 150 countries participated of the event to exchange and scale-up innovative solutions coming from the South related to energy insecurity and climate change challenges. EXPO 2012 was hosted by the UN Industrial Development Organization (UNIDO), and organized in conjunction with more than 20 U.N. agencies and partners. The solutions and exhibits presented provided a platform to spotlight, showcase and promote best practices that have been developed by developing countries themselves or with the support of the donor community and UN system (UNOSSC, 2013).

One of the six main solutions forums[5] of EXPO 2012, was Forum 3:.*Energy and climate change : Focus on biodiversity, forestry and land degradation.* The purpose of this forum was to provide knowledge on new technology, capacity and models (i.e. transfers of know-how, technology, and partnerships) which can positively influence profound changes in peoples' lives in the face of climate change. Five solutions were presented: 1) *Sustainable rural development and biodiversity conservation in the biosphere reserves of the Amazon, promoted by the UNESCO Chair in South-South Cooperation for Sustainable Development of the Federal University of Para, Brazil,* 2) *Protecting biodiversity through regional cooperation and alternative livelihoods: solutions promoted by China-ASEAN Environmental Cooperation Center (CAEC),* 3) *Biodiversity informatics and valuing non-timber forest products for biodiversity and sustainable forest management: National Institute of Biodiversity INBio's solutions, Costa Rica,* 4) *South Africa's grasslands programme and innovative partnership for landscape conservation: Solutions from South African National Biodiversity Institute (SANBI),* 5) *A portfolio of conservation priorities for the hydrocarbon sector in Colombia, promoted by the Alexander von Humboldt Biological Research Institute (Colombia).*

Each one of the six main forums was preceded by a key-note speech, or a short note consolidating the main issues treated in each case. The first author of this paper was invited to be the key-note speaker of Forum 3. His key-note follows:

Dealing with climate change involves knowledge, innovation, commitment, and above all cooperation. Knowledge able to understand the natural climatic processes and the anthropogenic impacts; innovation of new forms of controlling such impacts; commitment with the sustainability of life on earth; and cooperation of those concerned with the future of humankind. The question is what to do now and how South-South cooperation could contribute in finding solutions to biodiversity

[5] The six main solution forums were: 1) *Energy, climate change and industrial development*; 2) *Energy, climate change and decent work*; 3) *Energy and climate change: Focus on biodiversity, forestry and land degradation*; 4) *Energy, climate change and food security*; 5) *Energy, climate change and health, youth and women*; 6) *Energy, climate change and energy access*. Besides the main forums, EXPO12 agenda included also mini-forums, round tables, showcasing of solutions, and other activities.

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conservation, forestry and Land degradation in the context of energy and climate change. Within that context, four main issues emerge:

First: How biodiversity, forest and land are linked to climate change and energy and why this is relevant to the South? It is widely recognized that countries of the South are rich in biodiversity but poor in scientific and technological development able to explore such biodiversity sustainably; that countries of the North are the main responsible for accelerating climate change; and that countries of the South posses the major alternative sources of energy: sun, wind, biomass, water. The sustainable use of resources abundant in the South will therefore, contribute to control climatic change through the conservation of biodiversity and forests. For example, the annual deforestation in the Amazon rain forest represents the emission of about 200 million tons per year of CO_2; if deforestation was completely controlled, and avoided deforestation compensated, it would prevent that amount of CO_2 of being emitted to the atmosphere, giving, in turn, significant economic value for keeping the forest standing, conserving biodiversity.

Second: How could South-South cooperation scale up innovative solutions dispersed far apart in different corners of the world? International cooperation has become a strategic instrument for developing countries, allowing unity in diversity, which implies respect to the identity, culture and values of each partner, at the same time looking for complementarities for mutual strength. In that sense South-South cooperation is an important mechanism for development and peace. Through commonalities in history and geography, or through ways of facing similar development challenges, the countries of the South have important lessons to share concerning the issues treated in this forum. Just two examples: (1) The Amazonian Cooperation Treaty Organization (OTCA), which is integrated by Bolivia, Brazil, Colombia, Ecuador, Guyana, Peru, Suriname, and Venezuela, is formulating its own agenda to control deforestation, conserve biodiversity and improve the quality of life in the region following the principles of sustainable development; (2) Amazonian Biosphere Reserves in Bolivia, Brazil, Colombia, Ecuador, Peru, and Venezuela have established a network to implement actions of sustainable development that enhance biodiversity conservation. As a result of this work, a memorandum of cooperation was signed by the Federal University of Pará (Brazil), the University of Kinshasa (Democratic Republic of Congo) and the MAB Programme of Indonesia to strengthen South-South Cooperation and implement joint initiatives related to the management of the three major humid tropical areas of the world: Amazonia, the Congo basin, and South-east Asia; some of those initiatives are underway.

Third: South-South cooperation as an effective mechanism in transferring knowledge and overcoming barriers: International cooperation from the North to render significant fruits in the South should find fertile soil. To get that, scientific capacity in the South should be reinforced or be built. Networking speeds up transfer of technology, maximizes financial and technical resources, and

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facilitates exchange of professors, mobility of students and joint research projects. In this sense, the Program Large Scale Biosphere-Atmosphere of the Amazon (LBA) is a well known initiative in Brazil. This program, which is supervised by The Ministry of Science and Technology, is integrated by scholars from different disciplines of Brazil, other Amazonian countries, and other countries, interested in discovering and explaining how climate and land use change affect the biological, chemical, and physical functioning of the Amazon region and what are the implications of those changes on world climate. More than 240 scientific institutions participate of the Program, of which more than 100 are Brazilians; more than 1,600 scientists and students have participated of the program, developing more than 120 projects financed by national and international agencies. The results of this program have demonstrated the critical role of the Amazon region in the regulation of climate in the world and the devastating consequences of deforestation.

Fourth: South-South cooperation as a facilitator for knowledge sharing, exchange and innovation: Associations create conditions and scenarios for endogenous development and consolidation of regional integration through international research teams, exchange of students and professors, international events, publications, and missions. Other initiatives involve courses in consortium, and distance and virtual education. Limitations faced by individual institutions are, therefore, overcome through cooperation and joint efforts, sharing of installations, cultural interactions, geographic and historical learning and cultivation of friendship and culture of peace. At the long run is through this cultural integration that political and economical integration will be reached. In Latin America there exist at least thirteen university networks operating today. These networks are creating common academic spaces on the basis of scientific, technological, educational, cultural, and political cooperation.

As a final thought, it could be concluded that enhancing South-South cooperation will enable developing countries to strengthen self-reliance, which will ultimately allow them to foster authentic national and regional bases for sustainable development and to contribute more effectively in finding solutions to biodiversity conservation, forestry and land degradation in today context of energy and climate change.

A synthesis of the conclusions and lessons learned of Forum 3, were included in the Final Report of EXPO12, as follows (UNOSSC, 2013, p. 34-35):

1. Forum 3 presented development solutions on biodiversity, forestry and land degradation in the midst of climate change and increasing demand for energy, especially in restoring r rehabilitating degraded habitats and ecosystem services, promoting the conservation and sustainable use of natural resources, preserving and enhancing the ecosystem services that buffer communities from extreme events, and ensuring that the use of renewable natural resources is sustainable.
2. In the midst of major demographic changes such as climate change and increased demand for energy to restore or rehabilitate degraded habitats and ecosystems,

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there is the need to protect biodiversity and ecosystem services across all regions by shifting towards more sustainable consumption and production patterns.

3. A broad range of stakeholders such as local community members, private and public-sector entities and the government must be involved in the design, implementation and management of the conservation activities and programmes. This approach facilitates strong leadership and easier identification and formulation of local solutions.
4. Benchmark surveys are an important and necessary tool for gathering essential information to assist the implementation of rural development projects in a South-South cooperation context.
5. The interaction and engagement of local communities as managers for biodiversity, forests and land are vital for aligning environmental protection and local economic development and livelihoods.
6. Universities working within the framework of UN guidelines, such as the UNESCO Chairs, are an effective way to involve a wide range of stakeholders and disseminate knowledge owing to their convening and networking capacity.
7. South-South cooperation in the field of environment is entering a new and scaled-up stage that is characterized by structured, large regional platforms, such as China-ASEAN environmental cooperation.
8. Activities that are detrimental to the environment often lack risk mitigation and management plans. It is important to include stakeholders from outside formal government institutional frameworks to enable improved governance.
9. Reliable and long-term sources of funding, sound operational mechanisms and partnerships involving key stakeholders are critical to the sustainability of conservation initiatives. It is important to complement electronic communications (such as e-mail) at each stage of a project with face-to-face communication to build trust and facilitate a better understanding of the nature and complexity of the range of issues being addressed.
10. Project objectives and expectations should be set after careful collection and analysis of baseline information; strength, weakness, opportunity and threat (SWOT) analysis; and identification of gaps.

This paper consolidates the presentation of solution 1 of Forum 3, following the objectives, format and guidelines of the GSSD EXPO 2012[6].

THE PROBLEM

Initiatives of protected areas in developing countries tend to focus on the values of landscapes in ecological terms. Frequently, such concepts do neither originate from the affected local population, nor do they necessarily coincide with their often pressing livelihood needs. The attempt to bridge the potential or existing conflicts between conservation and development aspirations led to the rise of schemes intending to reconcile the demand for preserving specific ecosystems with the need to sustain local livelihoods. Biosphere Reserves are specific settings integrating management strategies with the

[6] For further information concerning activities, programme, participants and results of Expo 12, see the final report of the event (UNOSSC, 2013).

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participation of different stakeholders including the local people, the private sector, the government, NGOs, and the scientific community, focusing on the implementation of sustainable development.

Biosphere Reserves are defined by UNESCO as,

> sites established by countries and recognized under UNESCO's Man and the Biosphere (MAB) Programme to promote sustainable development based on local community efforts and sound science. As places that seek to reconcile conservation of biological and cultural diversity and economic and social development through partnerships between people and nature, they are ideal to test and demonstrate innovative approaches to sustainable development from local to international scales. Biosphere Reserves are thus globally considered as: (1) sites of excellence where new and optimal practices to manage nature and human activities are tested and demonstrated; (2) tools to help countries implement the results of the World Summit on Sustainable Development and, in particular, the Convention on Biological Diversity and its Ecosystem Approach; (3) learning sites for the UN Decade on Education for Sustainable Development.[7]

The Biosphere Reserves Programme of UNESCO began in 1976, and today integrates the World Network of Biosphere Reserves (WNBR), with 610 reserves in 117 countries, including 12 transboundary sites**.**

UNESCO Chairs is another programme of UNESCO created in 1992. UNESCO Chairs are defined as

> 'think tanks' and 'bridge builders' between the academic world, civil society, local communities, research and policy-making, strengthening North-South, South-South and North-South-South cooperation, creating poles of excellence and innovation at the regional or sub-regional level and reinforcing the dynamism of networks and partnerships.[8]

There are today 762 UNESCO Chairs and 69 Unitwin Networks involving 850 institutions in 134 countries.

Around concrete environment and development issues, the UNESCO Chairs are aimed at successfully linking the different scientific disciplines to promote the knowledge base for policy formulation in the field of sustainable development. The Chairs are located in universities, research institutions or other relevant institutions of public or private character. The articulation between research, intensive training courses for policy makers and specialists, and documentation and information activities addressed to different clienteles are major concerns. UNESCO Chairs are designed according to local ecological, economic and socio-cultural conditions and should promote action-oriented research and specific priorities for decision-making concerning sustainable

[7] www.unesco.org. Accessed in 19/02/2013.
[8] www.unesco.org. Accessed in 19/02/2013.

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development, be it a question of educational strategies or scientific research, technological development strategies or negotiation processes concerning the environment, or information and communication strategies related to these issues. In developing countries, specific attention is given to social identification of the objectives of scientific and technical development crucial for sustainability. Special characteristics of the UNESCO Chairs are the outreach components of their programmes. Community servicing and assuming the function of a platform for fruitful dialogue between different societal stakeholder groups, are priority tasks taken up by these Chairs. The Chairs promote a pluridisciplinary vision, which is fundamental for removing obstacles on the way of knowledge progress.

Those two programmes (Biosphere Reserves and UNESCO Chairs) have joint efforts generating synergies in innovative ways of implementing solutions for sustainable development.

THE UNESCO CHAIRS-BIOSPHERE RESERVES MODEL

Of the 762 UNESCO Chairs, some are designed to give scientific support to the implementation of actions of Biosphere Reserves. The model functions basically in three ways: 1) a UNESCO Chair adopts an specific Biosphere Reserve as a laboratory for research, application, and management assistance; 2) a UNESCO Chair serves as an instrument to catalyze joint efforts of different Biosphere Reserves of specific areas; 3) a UNESCO Chair serves as a "think tank" to consolidate concepts related to specific Biosphere Reserves. Those three schemes are not exclusive and combinations can occur.

UNESCO Chairs-Biosphere Reserves partnership is a fortunate and innovative association through which the academic world is bridged to actions implemented in Biosphere Reserves, transferring scientific knowledge to society. This scheme allows, among other things, to (1) identify priority areas for research according to specific needs of Biosphere Reserves; (2) bring together different actors from the academic world and managers and other stakeholders of the Biosphere Reserves; (3) produce scientific knowledge to reinforce the concept of Biosphere Reserves; (4) facilitate the promotion of endogenous development practices; (5) replicate good practices and disseminate knowledge related to the functions and mission of Biosphere Reserves.

Some examples:

The UNESCO Chair on Sustainable Development and Environmental Education of the University of the Basque Country (Spain). This Chair was created in 2004 with the main objective of promoting applied research, teaching and special studies on issues of sustainable development and

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environmental education from an interdisciplinary perspective. The activities promoted by the Chair are aimed at understanding and solving the problems related to sustainable development in the Basque Country and in particular in the Urdaibai Biosphere Reserve which is used as the place for tests and demonstrating experiences (ONAINDIA, 2011).

The UNESCO Chair Biosphere Reserves and Urban Environment of the National Institute of Ecology (Mexico)[9]. The purpose of this new Chair created in 2013 is to contribute to the welfare of populations living in cities and in rural environments, providing them with appropriate surroundings, in recognition of the fact that collective effort in planning the use of natural and cultural capital is the best way to achieve sustainable development based on diversity. The Chair proposed the Biosphere Reserve model as a tool to plan the physical and biological environment of the city and its environment with the participation of public citizens. This challenge is vital for Latin America, where much of the biological and cultural diversity is threatened by massive urban growth and unregulated use of the soil. This Chair promotes development through the joint effort of the natural and social sciences to address one of the biggest challenges of our civilization - the integration of biodiversity into everyday life as a basis for fair and sustainable social, economic and environmental models of development.

The UNESCO Chair on Biosphere Reserves and Mixed and Natural World Heritage Sites of the University for International Cooperation (Costa Rica). The main objective of this Chair created in 2009 is to promote the Biosphere Reserves and the natural and mixed heritage sites of Latin America and the Caribbean through the generation of capacities, research and communication (MÜLLER, 2011).

The UNESCO Chair in South-South Cooperation for Sustainable Development of the Federal University of Para (Brazil). This Chair was created in 2006 with the purpose of developing scientific knowledge and improving the South-South Cooperation for sustainable development through the implementation of a large system of activities and partnerships related to higher education, research, and documentation and in particular to major themes, as the population and the environment in the Amazon region and the Biosphere Reserves Programme ARAGÓN, 2011). This Chair coordinates the Project "Sustainable Rural Development and Biodiversity Conservation in the Biosphere Reserves of the Amazon", which is presented bellow.

[9] www.unesco.org. Accessed in 19/02/2013.

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APPLICATION OF THE UNESCO CHAIRS-BIOSPHERE RESERVES MODEL: THE CASE OF THE PROJECT SUSTAINABLE RURAL DEVELOPMENT AND BIODIVERSITY CONSERVATION IN THE BIOSPHERE RESERVES OF THE AMAZON

The term Amazon or *Amazonia* means different things according to the criteria used and the purpose of the definition. It is best understood as an immense area containing several regions within the so called Greater Amazon Region, which includes the areas covered by the Amazon River basin and also the tropical rainforest. Eight countries and a French Department share the region: Bolivia, Brazil, Colombia, Ecuador, Guyana, Peru, Suriname, Venezuela and French Guyana.

Although there is no consensus regarding the extent of the region, it is estimated to cover approximately 8 million square kilometers. Approximately 35 million people are estimated to be living in the Amazon Region, including about 1 million Amerindians. More than 60 percent of the population lives in urban areas with two cities already over-passing one million people (Belem and Manaus).

The Amazon Region is one of the largest, most diverse, complex and rich natural domains of the planet. The area of the entire Amazon corresponds to $1/20^{th}$ of the surface of the earth, $2/5^{th}$ of South America and $3/5^{th}$ of Brazil and contains 53 percent of the tropical forests remaining in the world, about 15 percent of the fresh water of the world and less than 0.5 percent of the 7 billion people living on earth.

Huge abundance of fresh water, thick humid tropical rainforest, and biological and cultural diversity are common features of this enormous region; and its functioning is intimately related and dependent of each one of those factors. The Amazon River is the longest in the world, with 6,671 kilometers, and its discharge of water in the Atlantic Ocean is estimated in some 220,000 cubic meters per second. The discharge of water of the Amazon corresponds to four times the one of the Congo and ten times of the Mississippi, and as the river approaches the Ocean, the sediments accumulated are estimated in 1 billion tons per year, which the river discharges into the Ocean, and are dispersed along the coast up to the Orinoco delta (Venezuela).

Because of the enormous quantity of natural resources stocked in the region, and the important role in the regulation of climate of the world, the Amazon has become an important issue in the world's highest scientific and political forums, such as those related to the regulation of the market of key natural resources, including water and biodiversity; and to the control of global warming.

Within that context, the new paradigm where conservation and development are conceived as interdependent processes puts Biosphere Reserves in a privilege position for the implementation of

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conservation and development projects in areas of paramount importance in the world such as the Amazon.

Of the 610 Biosphere Reserves existing in the world, 12 are located in the Amazon or include parts of the region, in six countries, totalizing an area close to 46 million hectares (Table 1, Figure 1).

Table 1: Area of the Biosphere Reserves of the Amazon.

Country	Biosphere Reserve	Year of creation	Area in hectares
Bolivia	Pilon-Lajas	1977	400,000
	Beni	1986	135,000
	Apolobamba	1977	483,744
Peru	Manu	1977	1,909,800
	Oxapampa-Ashaninka-Yanesa	2010	94,814
Ecuador	Yasuni	1989	1,600,000
	Sumaco	2000	931,930
	Podocarpus El Cóndor	2007	1,140,080
Colombia	Tuparro	1979	918,000
Venezuela	Alto Orinoco Casiquiare	1993	8,700,000
	Delta del Orinoco	2009	8,778,500
Brazil	Amazonia Central	2001	20,859,978
TOTAL			45,951,846

Source: UNESCO/MAB. *Red Mundial de Reservas de Biosfera 2010: Sitios para el Desarrollo*. *Sostenible.* Paris: UNESCO, 2011.

Figure 1: Biosphere Reserves of the Amazon Region.

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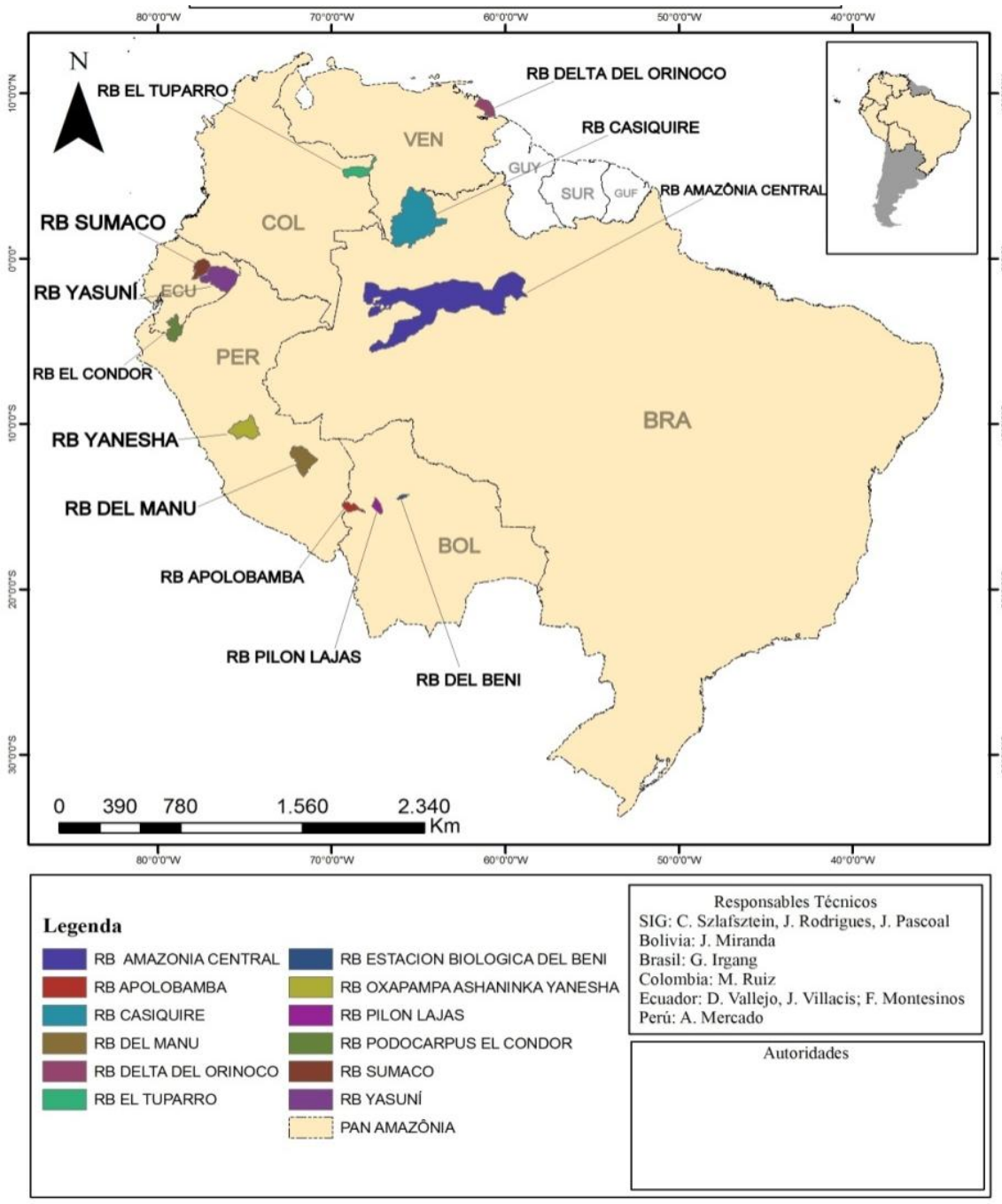

Source: Cátedra UNESCO de Cooperação Sul-Sul para o Desenvolvimento Sustentável. *Sistema de informação geográfica para Reservas da Biosfera da Amazônia*. Belém, 2013. CD. Szlafsztein, Claudio Fabián; Pascoal, João Paulo Araujo; Rodrigues, Jose Edilson. *Sistema de Información Geográfica para las Reservas de Biosfera en la Amazonia.* Power point presentation at the VI International Workshop of Biosphere Reserves of the Amazon. Leticia (Colombia), 27-28 November, 2012.

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Since creation in 2006, the UNESCO Chair in South-South Cooperation for Sustainable Development of the Federal University of Para (Belem, Brazil) implements activities with the Biosphere Reserves of the Amazon.

This Chair emerged from the experience of that University in the South-South Cooperation Programme on Environmentally Sound Socio-Economic Development in the Humid Tropics, a joint initiative of UNESCO/MAB, the United Nations University (UNU) and the Third World Academy of Sciences (TWAS). This programme that began in 1992 as a follow-up of the World Conference on Environment and Development held in Rio de Janeiro (1992) is coordinated through the MAB Programme at the Division of Ecological and Earth Science in Paris.

The Programme operates on two basic directions: on the one hand, helping to identify ways of strengthening local institutions undertaking research, training and management in relation to the sustainable use of renewable resources and on the other, by recommending possible actions. Furthermore, the programme has taken steps to improve the exchange of information and research results, particularly with respect to the preservation and sustainable use of biodiversity. It has also worked to disseminate knowledge of comparative research through publications and network data-bases, and to increase the exchange of scientists and experts.

Systematic work of the UNESCO Chair in South-South Cooperation for Sustainable Development and Biosphere Reserves of the Amazon began with a series of seminars with the objective of generating synergies among the Reserves leading to sustainable development. Six seminars have been organized in Georgetown, Guyana (2006), Belem, Brazil (2007, 2010), Cusco, Peru (2009), Rurrenabaque, Bolivia (2011), and Leticia, Colombia (2012).

During the 4th seminar, in Belem (2010), was approved the Project *Sustainable Rural Development and Biodiversity Conservation in the Biosphere Reserves of the Amazon*. Within the scope and mission of the UNESCO Chair in South-South Cooperation for Sustainable Development and the Madrid Action Plan of Biosphere Reserves this project focuses on the population of Biosphere Reserves in the Amazon, in order to identify ways to improve their quality of life and the conservation of biodiversity through actions to strengthen their capacity to carry out rural development activities that add value to their products conserving biodiversity. Participate of the project all the 12 Biosphere Reserves of the Amazon as mentioned in Table 1.

The project is coordinated by the UNESCO Chair in South-South Cooperation for Sustainable Development, placed at the Center for Advanced Amazonian Studies of the Federal University of Para, Belem, Brazil. The project is carried out in three phases: Phase I: Development of a database containing socio-environmental information of each of the Biosphere Reserves participating of the Project (completed); Phase II: Elaboration of pilot projects on rural development and biodiversity

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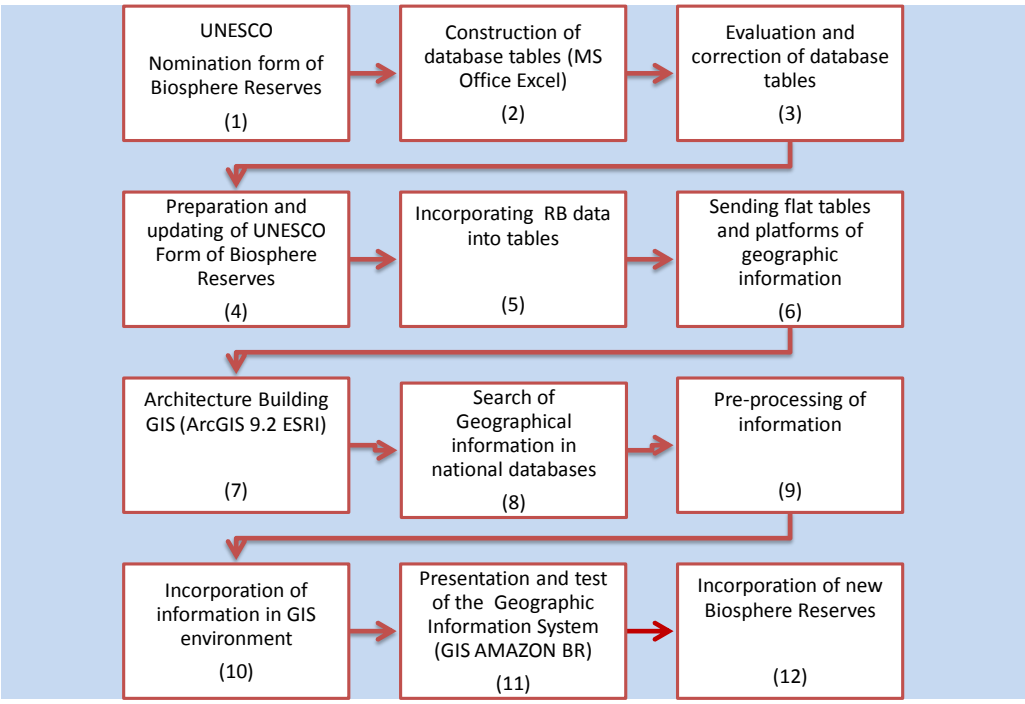
conservation in each of Biosphere Reserves participating of the project (completed); Phase III: Implementation of the pilot projects formulated in Phase II (began implementation).

Chart 1 illustrates the steps followed in Phase I. The objective of this Phase was to elaborate a Geographic Information System incorporating all 12 Biosphere Reserves participating of the project.

Chart 1: Steps followed in phase I of the Project Sustainable Rural Development and Biodiversity Conservation in the Biosphere Reserves of the Amazon.



Source: Based on Szlafsztein, Claudio Fabián; Pascoal, João Paulo Araujo; Rodrigues, Jose Edilson. *Sistema de Información Geográfica para las Reservas de Biosfera en la Amazonia.* Power point presentation at the VI International Workshop of Biosphere Reserves of the Amazon. Leticia (Colombia), 27-28 November, 2012.

Steps 1 to 3 were preparatory to the collection of data of each Biosphere Reserve. A group of researchers of the Center of Advanced Amazonian Studies (NAEA) and other units of the Federal University of Para, under the coordination of the UNESCO Chair in South-South Cooperation for Sustainable Development analyzed the information required in the UNESCO Nomination Form of Biosphere Reserves (step 1). On the basis of the information required a database was designed using the Excel tool (step 2). Those tables were revised by the managers of each Biosphere Reserves, incorporating new information not included in the UNESCO Form (step 3). After step 3 the group of researchers elaborated Term of References for the collection of information in each Biosphere

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Reserves by consultants selected by the group of researchers on the basis of CV among professional that applied for the consultancies in each Biosphere Reserve. The Terms of Reference required that the consultants up-dated the information of the UNESCO Nomination Form, adding further information, and collect GIS information and cartography (step 4). Once the information of the UNESCO form was completed, such information was transferred to the Excel tables (step 5). Those tables plus the SIG information of each Biosphere Reserve was sent to the Coordination of the Project (The UNESCO Chair) (step 6). Here, a group of researchers coordinated by a specialist on GIS, prepared the architecture of the GIS system incorporating the information of all 12 Biosphere Reserves (step 7). This group incorporated further information collected from national databases to complete the system (step 8). Then the GIS system was completed (steps 9 and 10). Finally, the Geographic Information System was tested and presented during the VI International Workshop of Biosphere Reserves of the Amazon, held in Leticia in November 2012 (step 11). The system is open to incorporate Biosphere Reserves created in the future (step 12).

Some examples resulting from the use of the system are in figures 1, 2, 3, and 4.

Figure 2: Localization of the Biosphere Reserves of the Amazon and roads network, river system.

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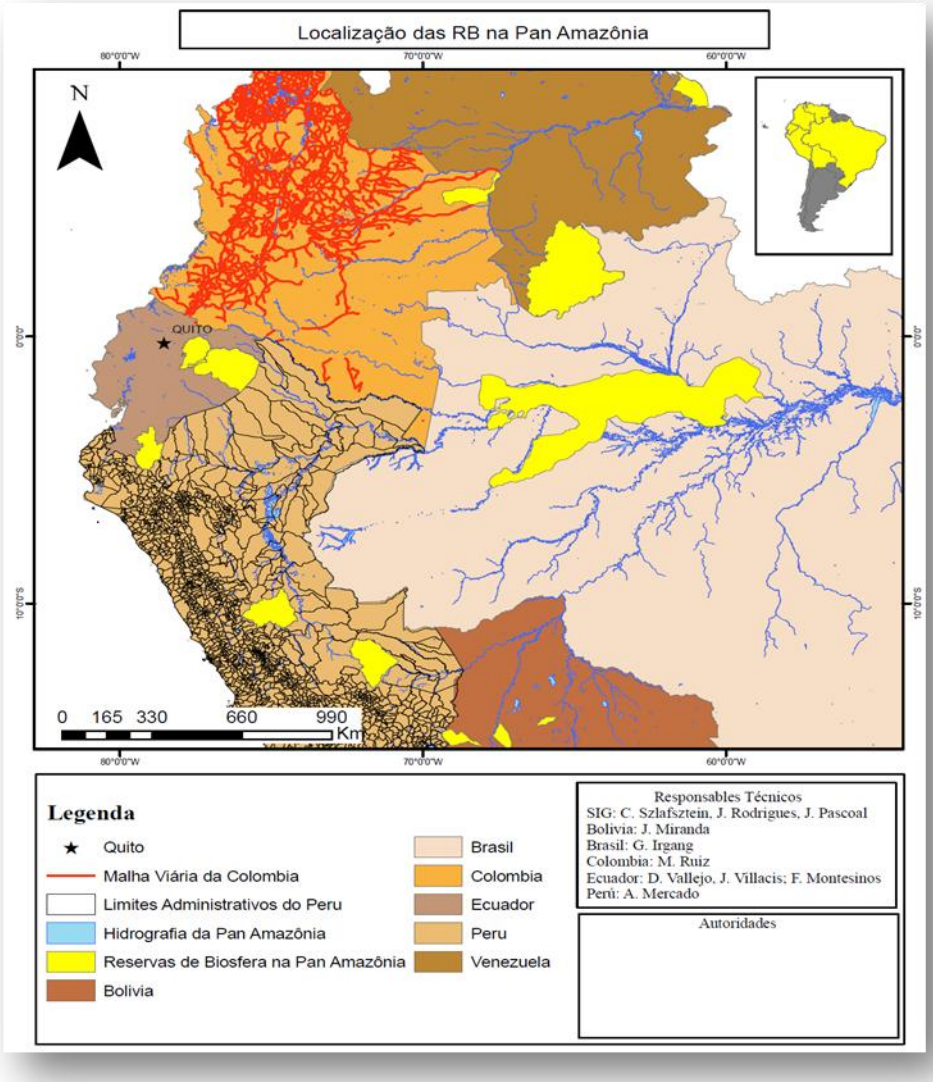

Source: Cátedra UNESCO de Cooperação Sul-Sul para o Desenvolvimento Sustentável. *Sistema de informação geográfica para Reservas da Biosfera da Amazônia*. Belém, 2013. CD. Szlafsztein, Claudio Fabián; Pascoal, João Paulo Araujo; Rodrigues, Jose Edilson. *Sistema de Información Geográfica para las Reservas de Biosfera en la Amazonia.* Power point presentation at the VI International Workshop of Biosphere Reserves of the Amazon. Leticia (Colombia), 27-28 November, 2012.

Figure 3: Land Tenure in the Biosphere Reserves of Tuparro (Colombia) and Amazonia Central (Brazil).

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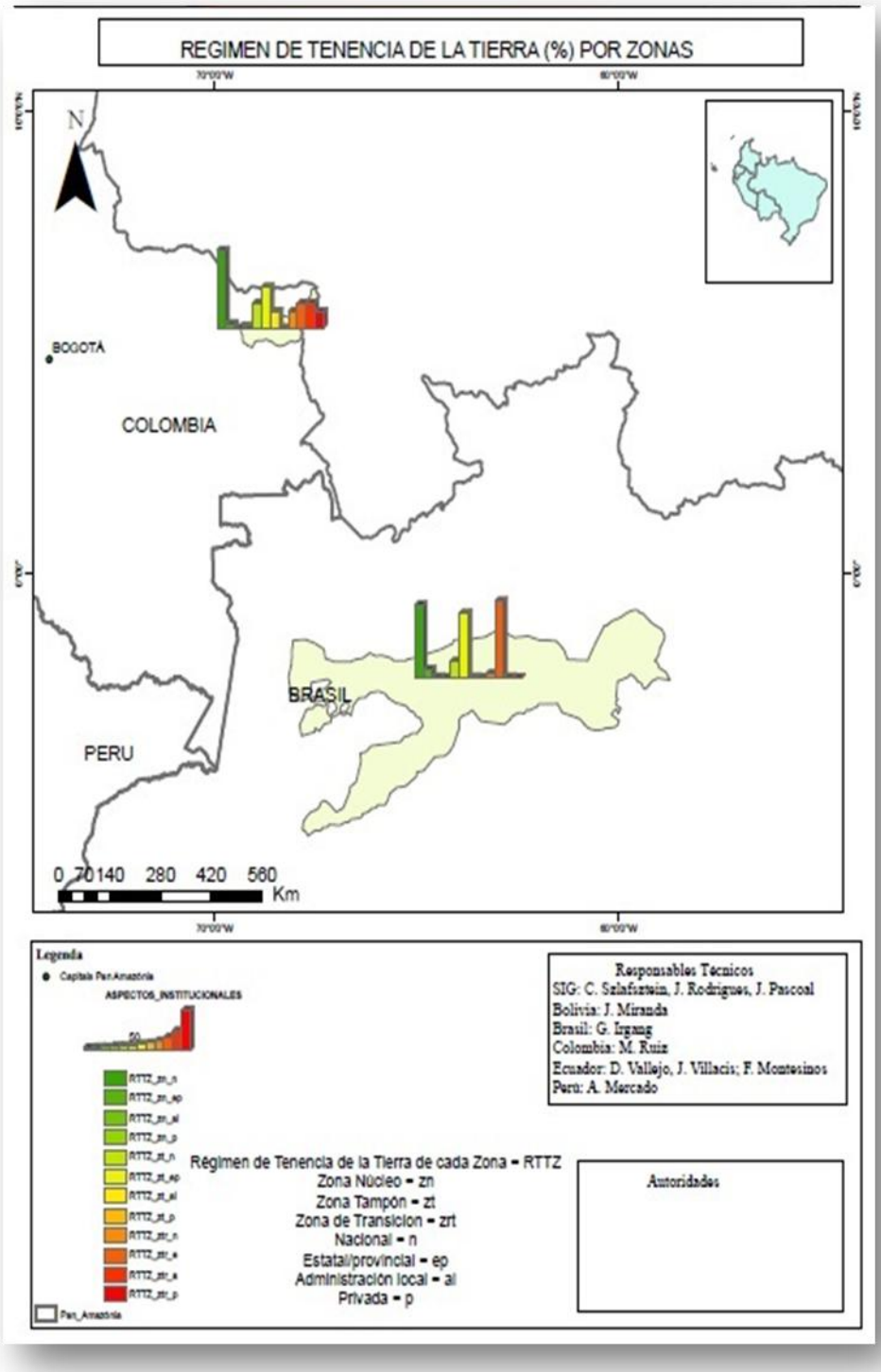

Source: Cátedra UNESCO de Cooperação Sul-Sul para o Desenvolvimento Sustentável. *Sistema de informação geográfica para Reservas da Biosfera da Amazônia*. Belém, 2013. CD. Szlafsztein, Claudio Fabián; Pascoal, João Paulo Araujo; Rodrigues, Jose Edilson. *Sistema de Información Geográfica para las Reservas de Biosfera en la Amazonia.* Power point presentation at the VI International Workshop of Biosphere Reserves of the Amazon. Leticia (Colombia), 27-28 November, 2012.

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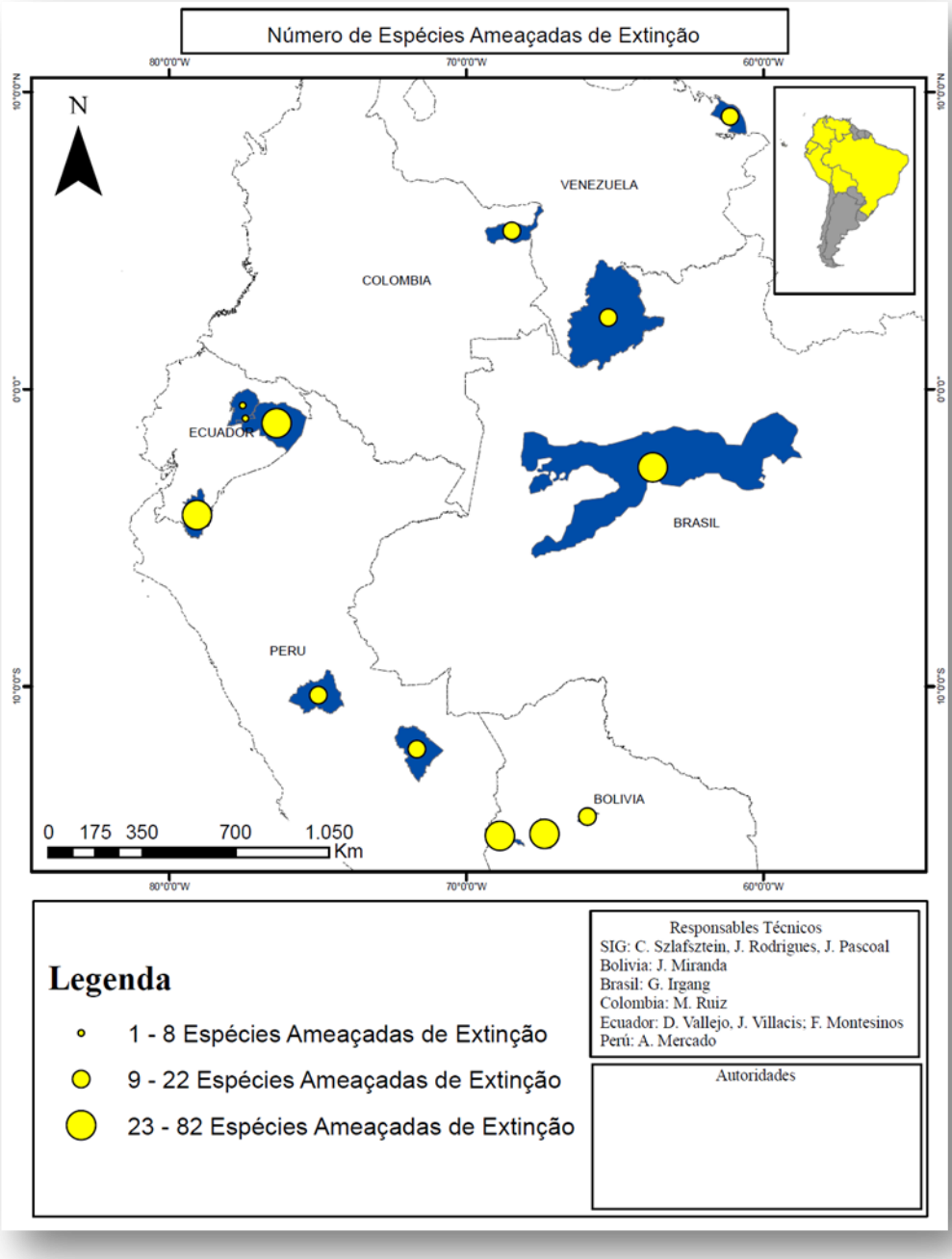
Figure 4: Number of species threatened with extinction in the Biosphere Reserves of the Amazon



Source: Cátedra UNESCO de Cooperação Sul-Sul para o Desenvolvimento Sustentável. *Sistema de informação geográfica para Reservas da Biosfera da Amazônia*. Belém, 2013. CD. Szlafsztein, Claudio Fabián; Pascoal, João Paulo Araujo; Rodrigues, Jose Edilson. *Sistema de Información Geográfica para las Reservas de Biosfera en la Amazonia.* Power point presentation at the VI International Workshop of Biosphere Reserves of the Amazon. Leticia (Colombia), 27-28 November, 2012.

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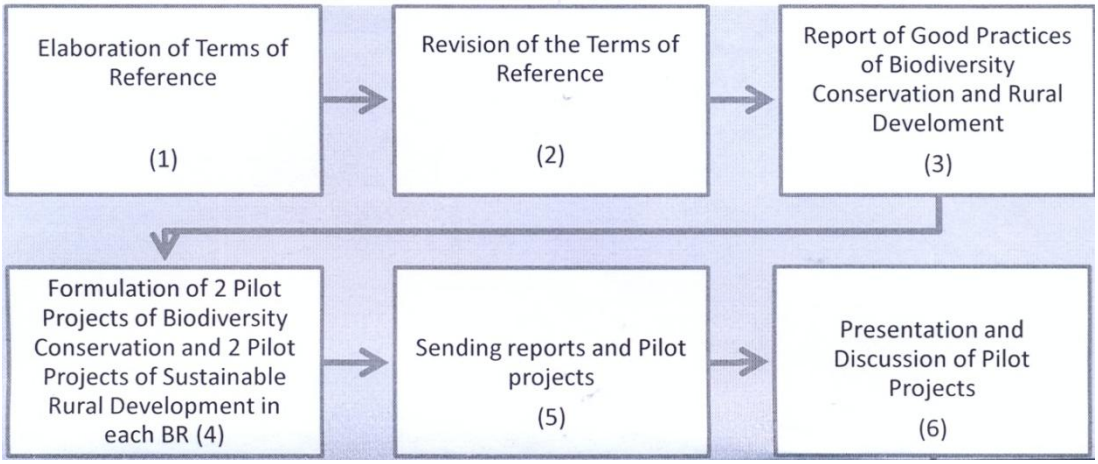
Chart 2 illustrates the steps followed in Phase II of the project. The objective of this Phase was to elaborate pilot projects of biodiversity conservation and sustainable rural development to be implemented in each Biosphere Reserve participating of the project.

Chart 2: Steps followed in phase II of the Project Sustainable Rural Development and Biodiversity Conservation in the Biosphere Reserves of the Amazon.



Source: Based on Szlafsztein, Claudio Fabián; Pascoal, João Paulo Araujo; Rodrigues, Jose Edilson. *Sistema de Información Geográfica para las Reservas de Biosfera en la Amazonia*. Power point presentation at the VI International Workshop of Biosphere Reserves of the Amazon. Leticia (Colombia), 27-28 November, 2012.

A group of researchers of NAEA and other academic units of the Federal University of Para elaborated Terms of Reference (step 1). Those Terms of References were revised by the managers of the Biosphere Reserves (step 2). After having the final version of the Terms of Reference for the elaboration of Reports of Good Practices of Biodiversity Conservation and Rural Development (step 3), as well as the formulation of two pilot projects of biodiversity conservation and two pilot projects of Sustainable development (step 4) in each of the 12 Biosphere Reserves participating of the project, consultants were selected by the group of researchers on the basis of CV among professional that applied for the consultancies in each Biosphere Reserve. All reports and pilot projects were sent to the coordination of the project (UNESCO Chair in South-South Cooperation for Sustainable Development) (step 5). Finally the Pilot Projects were presented and discussed during the VI International Workshop of Biosphere Reserves of the Amazon, held in Leticia in November 2012 (step 6).

Phases I and II of the project are finished and Phase III began implementation. So far, the main results of the Project are: (1) A Data base SIG, composed of updated and systematized information of the 12 Biosphere Reserves participating of the project, including location, population, physical and biological features, function of conservation, development and logistic support, institutional aspects

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and special designations. To use the system is indicated the program GIS Quantum GIS version 1.6 "Capiapo", software of public domain under a free license, and extremely user friendly. It has good performance in the production of files through its connections to the database, and allows easy access to databases of images in JPEG and PNG formats via the WMS server; (2) 12 reports of good practices on biodiversity conservation in the Biosphere Reserves participating of the project; (3) 12 reports of good practices on sustainable rural development in the Biosphere Reserves participating of the project; (4) 24 demonstration pilot projects on biodiversity conservation in the Biosphere Reserves participating of the project; (5) 24 demonstration pilot projects on sustainable rural development in the Biosphere Reserves participating of the project.

REPLICATION OF THE UNESCO CHAIRS-BIOSPHERE RESERVES MODEL

The UNESCO Chairs-Biosphere Reserves Model began with the creation of the UNESCO Chair on Sustainable Development and Environmental Education of the University of the Basque Country (Spain) in 2004, and its association with the Urdaibai Biosphere Reserve.

This model was presented at 3rd World Congress of Biosphere Reserves in 2008 in Madrid (Spain). As a result, the MAB Programme recommended the model to be divulgated and replicated as an important tool to implement Biosphere Reserves, and the Madrid Action Plan of Biosphere Reserves that resulted from the 3rd World Congress, recognized the important role that UNESCO Chairs can play to reach the goals ambitioned by the plan.

Following that Congress, within the context of the "World Conference on Education for Sustainable Development – Entering into the Second half of the United Nations Decade", held in Bonn in 2009, a workshop organized by the MAB/UNESCO Programme discussed the topic "The UNESCO Biosphere Reserves as sites of learning to integrate issues of local and global sustainable development." During this workshop the UNESCO Chairs-Biosphere Reserves Model was presented giving concrete examples of the work carried out by the Chair on Sustainable Development and Environmental Education of the University of the Basque country (Spain) in the Urdaibai Biosphere Reserve, the Chair in South-South Cooperation for Sustainable Development of the Federal University of Para (Brazil), in the Biosphere Reserves of the Amazon, and the Chair on Biosphere Reserves and Mixed and Natural World Heritage Sites of the University for International Cooperation (Costa Rica), in the Biosphere Reserves of Mesoamerica. The Bonn Declaration on the Decade of Education for Sustainable Development that resulted from that Word Conference recognized the partnership between UNESCO Chairs and MAB as an important asset for sustainable development.

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To know the UNESCO Chairs-Biosphere Reserves Model in situ, the Chair on Sustainable Development and Environmental Education of the University of the Basque Country following the World Conference of Bonn, organized a workshop in the Biosphere Reserve of Urdaibai (2009) inviting the responsible for the Chairs working with this model in Brazil and Costa Rica. The purposes of the workshop were to: (1) improve the analysis and systematization of the UNESCO Chairs-Biosphere Reserves Model; (2) present the result of the activities developed in the three Chairs, in Spain, Brazil, and Costa Rica, and identify ways of working together; (3) identify possibilities of replicating the model with other Chairs/Biosphere Reserves in Spain, or other parts of the world; (4) create a road map to strengthen the model.

With that trajectory the UNESCO Chairs-Biosphere Reserve Model is becoming better known around the world. In Russia, for example, the UNESCO Chair "Ecologically safe development of the large region – the Volga basin" of the Nixhny Novgorod State University of Architecture and Civil Engineering (NNGASU), created in 1997, is developing forms of working with the eight Biosphere Reserves located in the Volga Basin (KOPOSOV, 2009). The responsible for the UNESCO Chair in South-South Cooperation for Sustainable Development was invited to present and discuss the experience with the Biosphere Reserves of the Amazon.

In addition, with the support of the UNESCO Chair in South-South Cooperation for Sustainable Development, a memorandum of cooperation was signed in 2009 by the Federal University of Para (Brazil), the University of Kinshasa (Republic Democratic of Congo) and the Indonesian MAB Programme to joint efforts to strengthen links between the Biosphere Reserves of the three major humid tropical areas of the world. This Chair is also collaborating for the creation of the Biosphere Reserve of Marajo Island in the Amazonian coast, replicating the model used by the UNESCO Chair on Sustainable Development and Environmental Education of the University of the Basque Country (Spain) in the Urdaibai Biosphere Reserve.

Finally, the UNESCO Chair "Biosphere Reserves and Urban Environment" of the National Institute of Ecology in Mexico, recently created, is another example of replication of the model.

INSTITUTIONAL AND FINANCIAL ARRANGEMENTS OF THE UNESCO CHAIR IN SOUTH-SOUTH COOPERATION FOR SUSTAINABLE DEVELOPMENT

The UNESCO Chair in South-South Cooperation for Sustainable Development is linked to the Division of Ecological and Earth Sciences of UNESCO in Paris and is hosted at the Federal University of Para, in Belem, Brazil. An agreement signed by the General Secretary of UNESCO and the Rector

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of the University defines the mission, programme of activities and responsibilities of the two institutions. The agreement is revised every four years and can be renewed or cancelled depending of the performance of the Chair. The Chair holder is appointed by the Rector of the University after hearing UNESCO.

The Federal University of Para is a public institution created in 1957 and is maintained by the federal government. Today that University is one of the largest federal universities of the country in terms of students. Almost 38 thousand undergraduate and graduate students are registered in the campus of Belém and nine more campi in the interior of the state of Para, covering practically all scientific fields at the undergraduate level. The University offers 51 masters and 26 doctoral programmes.

Within the University the Chair is placed at the Center for Advanced Amazonian Studies (NAEA). This Center initiated activities in 1973, and is considered today one of the most important academic units of the university. NAEA is a research institute offering master and doctoral interdisciplinary programs related to the development of the humid tropics and especially of the Amazon. The academic staff of the Center is integrated by 25 professors/researchers of different nationalities and scientific fields. Along history the Center has formed more close to 400 masters and more than 140 doctors.

The Chair receives financial support from the University, UNESCO, the National Council of Scientific and Technological Development of Brazil (CNPq), and other national and international agencies. Phases I and II of the Project "Sustainable Rural Development and Biodiversity Conservation in the Biosphere Reserves of the Amazon", received financial support principally from the MAB/UNESCO Programme, the Spanish Agency of International Cooperation (AECI) and the Organism of National Parks of the Ministry of Environment of Spain, and counted with technical and administrative support of the UNESCO Office in Montevideo.

LESSONS LEARNED

What can be learned from the UNESCO Chairs-Biosphere Reserves Model presented here that can be useful for future actions? Among other things, we learned that:

1. Biosphere Reserves are unique sites for implementation of actions of sustainable development where conservation and development are considered interdependent dimensions of the same

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process: there will not be development without conservation or conservation without development.

2. UNESCO Chairs can provide training and research relevant to the Biosphere Reserves mission. The double function of the UNESCO Chairs as think tanks and as creators of bridges between academia and civil society and local communities, as well as between research and the adoption of policy decisions, provides to Biosphere Reserves important support to implement their activities.
3. Application of the UNESCO Chairs-Biosphere Model by the UNESCO Chair on

   on Sustainable Development and Environmental Education of the University of the Basque country (Spain) in the Urdaibai Biosphere Reserve, the Chair in South-South Cooperation for Sustainable Development of the Federal University of Para (Brazil), in the Biosphere Reserves of the Amazon, and the Chair on Biosphere Reserves and Mixed and Natural World Heritage Sites of the University for International Cooperation, has shown important synergies between those two programmes of UNESCO.
4. The project "Sustainable Rural Development and Biodiversity Conservation in the Biosphere Reserves of the Amazon" is a concrete application of the UNESCO Chairs-Biosphere Reserves Model. This project allowed the different actors and stakeholder of the Amazon Biosphere Reserves establish linkages of cooperation and joint work, generate up-date information about those Biosphere Reserves, and produce a series of projects in six countries of the region which will improve the quality of life of the population of those reserves.

CONCLUSIONS

This case study presented the UNESCO Chairs-Biosphere Reserves Model as an important tool for sustainable development. Among its advantages, this model (1) facilitates the creation of links between scientific research and management; (2) the UNESCO Chair offers through the university or research institute where the Chair is hosted a complete range of disciplines from social and technical disciplines to natural sciences necessary for research on the concept of sustainable development and interdisciplinary approaches for its application; (3) stimulates researchers to work together in multidisciplinary groups, building capacity to implement the actions of biosphere reserves; (4) research is focused on the needs of managers and other stakeholder responsible for the biosphere reserves.

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