



IV Ibero-American and Caribbean Conference on Ecological Restoration

Making decisions to revert environmental degradation

SIACRE 2015 Conclusions

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Edited by

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Conference attendees



Speaker (JL Fontana)

Post-plenary workshop discussion



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1. Forewords

We had the invaluable opportunity to host in our University the IV Iberoamerican and Caribbean Congress on Ecological Restoration (ER) organized by SIACRE. Experts from Latin America, the Caribbean region, and the rest of the world privileged us comprehensively discussing realities, priorities, strategies, and innovations of ER in SIACRE countries in the understanding that these are not subjects of merely scientific interest but they concern governance and public policies in the social responsibility towards our communities. We kindly acknowledge SIACRE, SER, SOBRADE, REDCRE, REA, the local Organizing Committee, and every participant for chosen us and let us to be the forum for a landmark meeting enlarging our frontiers and deeply impacting on the commitments in ecological restoration developed through our Department of Ecology and Environmental Sciences (DECA) over the last 15 years.

Alfredo Vitullo, Director (CEBBAD¹, Maimonides University)

It is a pleasure to me to communicate the success of SIACRE2015. I'd like to convey the international participation and the bonds established between SIACRE and national ER societies from Latin America and Caribbean (including SOBRADE) during the conference in Argentina, last April. I'd like to highlight the strength SIACRE has shown during the congress. The Society has become a strong partner of SER international in terms of its policy to include new associates around the world, particularly in our region. Demands on ER became clear during SIACRE2015. SIACRE, along with national ER societies, will continue advocating for the need of ER in Latin America and Caribbean. I hope we will count on the help from SER, especially taking into account that next SER-SIACRE conference will be held in our region.

Mauricio Balensiefer, Chair (SOBRADE, Brazil)

On behalf of the Society for Ecological Restoration, I want to congratulate SIACRE on the success of its conference. The conference provided SER with a greater understanding of restoration activities in Latin America and the Caribbean, as well as key challenges. SER especially appreciated the opportunity to network with leading experts in ecological restoration from these regions. Relationships built at the conference will assist SER in its work to promote global initiatives to successfully repair degraded ecosystems.

Cara Nelson, Chair (Society for Ecological Restoration)

I feel very honoured to represent Latin America and the Caribbean at SER Board of Directors. SIACRE countries have shown an increasing world's importance in ecological restoration. In many countries we have seen growing efforts from governments, societies, NGOs and the private sector to commit pledges and initiatives for large-scale restoration and decreasing the deforestation and land degradation rates. SIACRE has taken over a leading role in this process, as can be well exemplified by SIACRE2015 Congress outcomes. Because social constraints have been very important factors in SIACRE countries, we have learnt and can teach the world how to overcome those social and economic barriers for ecological restoration, in search for increasing human well-being. SER2017 in Brazil will be an excellent opportunity to strengthen this role and bring together all Latin America and Caribbean restorationists, as it will be held jointly by SER, SIACRE and REBRE/SOBRE.

Vera Engel, Latin America/Caribbean representative (SER-International)

It was a great pleasure to participate in SIACRE15 as Managing Editor of Restoration Ecology. It was the perfect venue to help demystify the peer review process to young researchers and to establish collaborations to effectively support SIACRE authors to publish in RE and other international journals. There were high-level presentations and discussions on all aspects of

restoration, and it was emphasized the importance of enhancing technological development, active participation on the policy debate and social engagement in restoration projects.

Valter Amaral, Managing Editor (Restoration Ecology)

The conference took a novel approach to facilitating discussion around five major topics by allocating time after each plenary for a breakout session to continue the debate. The closing plenary then presented a synthesis of these discussions and some of the conclusions reached, and sought to situate these regionally important topics and themes within a broader global context ... In addition to a full slate of presentations and productive discussion, SIACRE 2015 provided a singular opportunity to strengthen relationships and forge new bonds among numerous national and international restoration networks ... The atmosphere was truly dynamic and will hopefully lead to productive collaborations well into the future.

From SER-News June 2015 (by Levi Wickwire)

¹ Center for Biomedicine, Biotechnological, Diagnosis, and Environmental Studies

2. Realities and perspectives of ER in SIACRE countries (Symposium)

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- SIACRE must consolidate academic, conceptual, administrative, communication and management levels for the next 10 years.
- SIACRE must contribute to the training of technicians and encourage and support the creation and strengthening of ER-related legislation.
- SIACRE should create tools and guidelines for ER, and contribute to the creation of strategies for the communication of practices already carried out.
- To strengthen the bond SIACRE-SER Europe, improving mechanisms of communication and collaboration in order to develop synergy between the different countries.
- SIACRE must involve both government authorities and the private sector in order to carry out an integral analysis of the land and socio-ecological relationships, planning the activities of private companies together with academic players, communities and governmental bodies.
- SIACRE must contribute to the promotion and diffusion of ER and facilitate exchanges between the different sectors involved, by organising events such as courses, conferences and workshops.
- ER represents an opportunity for businesses and job creation in Latin America, which governmental bodies should support with the opening of investment channels, training programmes and regulatory and monitoring systems.
- SIACRE emphasises the importance of creating national networks, with sub-national nodes distributed throughout the different regions of the country, strengthened by the cooperation of international networks.
- SIACRE highlights the importance of carrying out a study of priority areas at a national level, so as to make possible the proposal of national restoration plans.
- SIACRE must consider and promote the legal requirements of compensation, voluntary forest

certification, international agreements and greater environmental awareness.

- SIACRE must become ER's networking platform in Latin America, coordinating with other global initiatives like the Global Partnership on Forest and Landscape Restoration (GPFLR).
- The development of an ER regulatory framework for all SIACRE member states is a priority, in order to channel all the action and efforts of the member countries in such a way as to guarantee both community and environmental rights.

3. Principles: needs of updating and Latin American realities (Plenary).

Zuleta G^{1*}, E Ceccon², M Balensiefer³, S Tajani¹, C Murcia⁴

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- Speakers and colleagues participating in the plenary debates agreed that the central paradigm of the discipline do not require an update, it is comprehensive enough.
- The “*Primer*”, published in 2004 by the science and policy working group of the Society for Ecological Restoration (SER), established the principles of the discipline. During SIACRE2015 and recent related conferences in Latin America, there was a large consensus that the “*Primer*” was our milestone and the basic conceptual framework is solid.
- Restoration definitions, reference ecosystems, distinction between the practice and the science, and major attributes of a restored environment, are undeniable and worthy achievements.
- Almost 90% of the SIACRE2015 survey respondents referred to the “*Primer*” at least once over the last five years; 65% of them during 2014-2015. Additionally, 57% considered that it was or it is an essential guideline for their projects, but 30% did not.
- At a global scale, the “*Primer*” concepts have also influenced international initiatives such as the Convention for Biological Diversity (decision XI/16), Aichi goals and the 20x20 Bonn Challenge, and the principles for ecosystem management and restoration proposed by IUCN.
- The new global scenario, with regional challenges and developments and with a novel institutional context (e.g. the creation of SIACRE in 2013), are changing the “status quo”.
- Therefore, 11 years later, it seems that the ecological restoration (ER) principles need a review and updating process according to different realities all over the world.
- In Latin America, restoration actions are notably dependent on the social context which is heterogeneous, both among and within countries. Ecological degradation affects more intensively, and negatively local communities with near-subsistence economy, such as native groups and small-holder farmers. In contrast, international market-economy groups (e.g. large-scale agro-industry, ranching or mining) generate different environmental damages and require different restoration solutions.
- Ancestral knowledge of land uses and land protection are needed to be “restored” along with the classic biological restoration. In other words, ER in Latin America and the Caribbean necessitates a strong “social construction” component. ER is not merely to recover biodiversity, ecosystem resilience or nutrient availability.
- Although the “*Primer*” considers the connection between ecological processes and cultural practices, effective procedures are not developed to reflect such social realities of most SIACRE countries, neither the political links. An 89% of the survey respondents agreed that the principles should include local people needs.
- Moreover, 51% of the participants considered that the “*Primer*” do not reflect the socio-environmental issues of Latin America. To be fair, the document was not prepared to fulfill needs of each world region.

- In most SIACRE countries, ER should be considered as a trans-discipline.
- In Brazil, the ER principles should promote or reflect country's realities like the application of cost-effective techniques, feasible measures for the agriculture sector, new legal enforcements for rural land tenure, and innovative approaches of environmental governance at both local and large scales.
- In Argentina, ER principles are formally being analyzed since 2014. During SIACRE2015, most attendees of the plenary agreed with the results. The survey figures also showed that the "Primer" should include a planning section detailing measures to prevent degradation (74% in accordance, 3% in disagreement).
- 83% of the respondents supported the proposal to include major ultimate driving factors of degradation such as consumption rates of the (global) human population.
- Going back to basic, classic principles, 66% did not agree that the "novel ecosystem" concept replaces the "reference ecosystem" one. Besides, 71% agreed to consider two types of reference ecosystems: the historical-evolutionary (ecological standard) and the pre-disturbance one (legal standard).
- Many ecological concepts are non-linear, context-dependent. All social concepts are non-linear, context-dependent. Therefore, the "Primer" should reflect them.
- In summary, our proposal is to update and adjust the SER document, not necessarily to elaborate a separate body of "Latin" or SIACRE principles (e.g. a "Latin-Primer").

4. Social perspectives of restoration in Latin America (Symposium)

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- Several of Latin-American initiatives show that, in some countries, ecological restoration can be an important tool to increase rural communities' empowerment over their natural resources.
- Mexico and Colombia have various participatory productive restoration projects with indigenous and impoverished rural communities, showing favorable results involving changes in both ecological and social aspects.
- In Colombia, the legislation has different instruments to regulate and direct the ecological restoration. The legislation has been strengthened in recent years with new legal instruments that collect the mandate of the Constitution of Colombia and Law 99 of 1993. In this country, there is also a national plan for ecological restoration, which can be considered a model for other Latin American countries but has not yet been regulated.
- In Argentina, in arid and semiarid areas of Neuquén province, they are using an approach known as "Ecological Restoration Based on Environmental Education" with adults. The programme started in 2008. It was possible to conclude that it is necessary to include theoretical and methodological frameworks of environmental adult education for the generation of praxis communities in ecological restoration.
- In Brazil, experiences show that ecological restoration can be a tool for social reintegration.
- In Panama, an experience -which includes leadership training-, restores degraded pastures with the introduction of trees. The enterprise showed that it is possible to open new prospects for sustainability in livestock systems.
- These initiatives show that some Latin American countries undergo new possibilities and visions in ecological restoration, when interpreting the contexts and social and cultural needs.
- These initiatives can be a very effective instrument for changes in the relation between society

and nature.

- Ecological restoration knowledge in Latin America is still an open question.

5. Environmental governance and public policies (Plenary)

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- National and local governments in Latin America show weaknesses in the enforcement and regulation of ecological restoration projects, negatively affecting their potential success.
- The governmental entities order the territory and make public policy decisions despite their profound ignorance of regional conditions and under the absence of trained actors within the territories.
- Knowledge networks, research groups, companies, national and local governments, and civil societies are and will be key actors in the construction, implementation and monitoring of public policy elements, administration, management and conservation of the territory.
- It is essential to involve multiple actors to lay the basis for good governance.
- Research groups, universities, NGOs and research institutes, which are present in the territories, through agreements of interinstitutional collaboration, are the drivers of ecological restoration projects, and have made possible the implementation of experiences on ecological restoration in Latin America.
- It is considered essential to build and strengthen academic environments to exchange and analyze ecological restoration experiences.
- It is necessary to promote knowledge about ecological restoration in grassroots movements and initiatives of civil society organized, as a legitimate mechanism to influence public policy.
- There are significant challenges and opportunities for the construction of a normative basis that allows addressing ecological restoration processes in Ibero-America and the Caribbean.
- The response to environmental degradation processes must be emitted at a wide scale/magnitude.

6. Social responsibility and governance for ER (Symposium)

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- Ecological restoration, as well as its governance, is still very young and underdeveloped in SIACRE countries.
- In general, the success of restoration attempts in Latin America and the Caribbean is limited, and far from compensating the accelerated fragmentation of key habitats and the destruction of biodiversity and essential environmental services.
- Governance—understood as the participatory processes and collective actions that integrate local communities, economic sectors, civil society organizations (CSO), academic institutions, and government agencies—is diverse among Latin America countries, and also within different countries.
- In Latin America, the national legal frameworks and public policies that explicitly embrace or support restoration actions are scarce and disperse.

- Latin America countries share a common history of natural resources abuse and destruction during the last five centuries; however, the current historic conjuncture offers opportunities for a positive change.
- The basic paradigms and crucial principles underlying restoration differ broadly among Latin America countries, ranging from innovative constitutional rights being granted to nature, e.g. Ecuador and Bolivia, to traditional exploitation approaches in most of the countries.
- In Latin America, the participation and number of CSOs devoted to environmental conservation is steadily growing. However, their focus on practical and large scale restoration is very rare; this also happens within the academy.
- An important social responsibility related to restoration practitioners (e.g., CSO members and restoration researchers) is the requirement of an *ad hoc* “restoration guild” work ethic, with emphasis on the congruence between everyday lifestyles and restoration practices.
- There are some outstanding restoration projects thriving at the landscape scale in spite of the lack of legally binding frameworks promoting restoration. Such successful cases demonstrate that the current scenarios are not a universal impediment to move forward and achieve significant results.
- Specific examples of successful projects with participatory governance are: The one million ha large mammals restoration project at Parque Iberá in Northwestern Argentina, integrating public and private lands (Proyecto Iberá); the Alto Paraná forest restoration project at the border of Argentina, Brazil and Paraguay, aiming to restore 2.6 million ha (Vida Silvestre Argentina – WWF); the restoration of 60,000 ha of insular ecosystems in Mexico (37 islands)—hosting six to eight times the biodiversity of the continental territories—conducted by a national CSO (Conservación de Islas or GECl), and backed by federal government agencies, and national and international funders; and the forest restoration linking local knowledge of maya-lacandón indigenous communities with science in Selva Lacandona, Southeast Mexico. The anatomy of these successful participatory governance experiences should give light to other large scale projects.
- If the “Bonn Challenge” and the CBD Aichi Target 15 are assumed by the SIACRE’s countries at a programmatic level, then participatory governance becomes a key input to achieve these ambitious goals.
- The general observations we advance on this important matter could become working hypothesis for further analysis using formal methodologies.

7. Degradation causes: rectify the economic model, is enough? (Plenary)

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- Given the widely different professional experiences of the speakers (economy, forestry, geography, agronomy) and the public (ecology, biology), it was surprising to see so much convergence about whether a change in the economic model is sufficient to change the causes of degradation.
- All presentations mentioned the focal issue that the very environmental problems Ecological Restorations are struggling to solve, should be better avoided by changes in culture and life styles, leading to the conclusion (and to the cliché) that profound changes are needed.
- It was pinpointed that ecological restoration actions will never be able to neutralize present levels of consumption of a small (but growing) portion of the world population and as such, cannot be considered as a solution to the environmental degradation problem.

- Easier said than done, plenary speakers suggested some ways to overcome the above mentioned trade-off between ER and degradation.
- A tentative approach is to use the engaging power of restoration projects. One important outcome of restoration projects, aside from improving soil, biota or air, is to make people realize the connection between their life style and environmental degradation.
- Restoring is an effective way to make people realize the huge amounts of time and resources needed to fix degradations, aside from frequently questionable results.
- Restoration processes must be participatory since conception. People who feel excluded from the decision process are most likely to end up opposing it, even if “inclusiveness” is a frequent cause of projects delays. Issues such as food security and other aspects of life quality amplify the positive outcomes of restoration projects, and should always be in the restoration agenda.
- All speakers independently mentioned that the above said issues will only be accomplished if proper actions and policies are developed and agreed upon; once again, that is easier said than done.

8. Scientific priorities in Latin America (Plenary)

Bonfil C^{1*}, P Meli², AE Rovere³, C Nelson⁴, M Castañeda-Sánchez⁵, M González-Espinosa⁶

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- Most natural ecosystems in Latin America are fragmented and, as a consequence, vegetation patches prevail in the landscapes. Alongside, the area covered by secondary forests has also substantially increased. The current challenge for restoration is to be able to restore these landscapes, increasing their conservation value and resilience.
- More attention to economic factors will allow us to show the economic feasibility of different approaches for ecosystem restoration, as well as to consider goals and resources for decision making.
- In order to restore, it is important to consider ecosystem resilience, current land use and the landscape matrix. There are important differences in the cost/efficiency ratio of passive versus active restoration that should be analyzed in each case.
- One of the priorities for SIACRE countries is to make progress on the analysis of the degree of degradation of different ecosystems and regions in each country in order to generate national restoration plans. Such priorities should be identified at the regional level, i.e., they have to be designed in a bottom-up scheme.
- As a scientific-technical entity, SIACRE should have a leading role in the establishment of regional priorities, in order to strengthen the relationship among members of the scientific community and various social actors, to develop training programs, and to make available for all stakeholders the relevant information for decision making.
- In relation to public policies, SIACRE should promote that the governments of the region, as well as various public and private entities: (a) make important investments in restoration and, (b) develop policies and procedures that are informed by recent advances in restoration science and practice, including appropriate goals in an era of rapid environmental change.

9. Technological priorities in SIACRE countries (Plenary)

Cortina¹ J, A Aguirre-Muñoz², M Aguilar-Garavito³, V Amaral⁴, J Bannister⁵, N Ciano⁶, J Codignotto⁷, S Kaderian⁸, A Maranta⁹, RR Rodrigues¹⁰, JA Rubio¹¹, S Saavedra¹²

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- Technology has contributed significantly to the advancement of ER. Similarly, the practice of ecological restoration has promoted technological development. Mechanisms to promote this virtuous circle should be promoted.
- There is a wide range of technologies appropriate to different stages of ER. In this context, we must develop and integrate technologies that are related to social participation, decision making, and knowledge exchange and dissemination.
- We must develop and integrate monitoring and evaluation techniques, including the use of social, economic and ecological indicators. Diagnostic techniques are essential to prioritize ER actions, including the identification of non-recoverable areas, and establish the basis for prescribing good ER practices.
- Likewise, given the diversity of ER techniques it is necessary to promote transdisciplinarity in ER projects and training. Low diversity (biological, conceptual, technological, training, high vs. low tech, active vs. passive...) and simplification have been responsible for significant failures in ER programs. This is especially important when considering landscape restoration.
- Basic research is crucial to developing good restoration practices. We should promote the connection between the two areas.
- The effectiveness of ER technology depends on other factors, in addition to technological sophistication and cost.
- The state of degradation is positively related to the technological effort and restoration costs, although there are exceptions. This is a good reason to intervene and do it strategically, incorporating ER costs in identifying priorities (cost-benefit relationships).
- Traditional and ecological knowledge are great sources of information to develop best practices.
- We must develop science which is relevant at a management scale and establish efficient mechanisms for the mutual information and knowledge exchange among stakeholders. Most of them are both producers and users of technological knowledge. For the advancement of science at this scale we must develop pilot projects. These represent excellent settings for validating research results at a management level. Information exchange should contribute to identify research priorities in a rigorous way that is consistent with ER objectives.
- In this regard, the practice of ER offers unique opportunities to validate scientific results and modify management practices according to these results, thus developing adaptive management.
- It is a priority to establish mechanisms for mutual information and knowledge transfer. There is a wide range of mechanisms to achieve this goal, including demonstration projects. National and international agreements should be promoted to establish a network of accessible and well documented reference sites. This network could be combined with a parallel network of permanent observation points to enable regular comparisons of restored areas and reference systems.
- The development and implementation of restoration techniques has put enormous emphasis on the re-creation of reference ecosystems. We must begin to consider 'reference paths', i.e., optimizing the provision of ecosystem services and biodiversity throughout the entire

ecosystem integration process, especially in ecosystems whose recovery may be slow. This includes considering both one-step restoration options vs. consecutive interventions.

- Equally harmful to the advancement of ER technology are ultra-conservative attitudes (the precautionary principle taken to the extreme), and ultra-liberal attitudes, which may jeopardize the ecosystem integrity, even beyond the borders of the intervention. The legal framework should consider this balance.
- The development of new technology provides business opportunities. Inter-American cooperation funds, national funding sources and the private sector, etc. should take on this challenge. Opening specific investment lines to solve technological problems and the development of new restoration technologies should be a priority.
- We must develop objective ways to quantify the efficiency of restoration technologies. We propose the development of a utility index, related to a given ecological, socio-ecological and cultural context. This index could be used to provide integrated quantitative ratings and certify a certain technique in a given context. This information should be freely available, so that to allow the incorporation of additional information, comments from users and other valuation techniques ("likes", "stars" ...). SIACRE and SER should drive this process.

10. Strategies and innovations to strengthen ER proficiency (Symposium)

Bloomfield GS^{1*}, Z Calle², S Santamaría³, PHS Brancalion⁴, G González⁵, M Campos⁶, SRR Pinto⁷, C Estrada⁸

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- The initiatives presented in this symposium by speakers from ELTI, CIPAV, Pacto Mata Atlântica, CEPAN, ECOLOGIC, AJAASSPIB and TNC Brazil, exemplify not only the importance of capacity-building, but also the strategies and lessons learned in the process of strengthening the capacity for ecological restoration in Latin America. This section highlights those lessons and key messages with the hope of helping diverse members of SIACRE to be able to incorporate and increase their capacity-building efforts within their restoration activities.
- All of the organizations agreed that training and capacity building is key tool to help ranchers, framers, practitioners and other implementers of restoration initiatives to optimize the success of ecological restoration activities. Specifically for SIACRE the presenters recommend the following principles:
 - Capacity-building should be based on a combination of the latest science, research results, and practical land management experiences with the goal of enhancing the technical and institutional capacity of implementers to carry out successful restoration initiatives.
 - In addition to technical training, capacity-building for restoration should include economic and business factors in a way that teaches the potential income generation and other benefits of restoration activities.
 - Training courses must be designed to maximize the possibility for participants to apply what they learned in their professions, organizations and aid in their land-management decisions.
 - Capacity-building does not end with a training course; a combination of courses and follow-up support makes it possible to create a domino effect where participants can go on to advocate for change within their organizations, develop national and sub-national legislation and carry out their own restoration projects.
 - Similar to on-site training, the use of online courses, technology and virtual tools can offer

valuable support to capacity-building efforts, however, they need to be designed with a strong basis in the needs of intended audiences.

- The speakers stressed the importance of developing and conducting all capacity-building activities in an open, participatory way that is rooted in local needs and for which the strategies and materials presented can be adapted for specific audiences. They recommend that:
- Capacity-building should be aimed at the empowerment of communities and the strengthening of local partners to help them implement more sustainable land-use practices that contribute to reducing environmental impacts and maintain ecosystems and ecosystem services upon which communities depend.
- Conducting capacity-building for conservation, ecological restoration and sustainable production requires the crossing of many borders: between disciplines, between background levels, between capacity and knowledge generation, between ideologies, cultures and world views.
- Approaching the training audiences with humility and empathy can be very important empowering local leaders and encouraging community groups to adapt the principles of ecological restoration to their local contexts.
- Overall, SIACRE members can strengthen their own potential for capacity-building by facilitating interactions, exchanging of experiences, and conducting joint projects with partners (such as those presented in this document) to expand their training programs and to use new teaching tools in these capacity-building efforts.

11. Urban areas: conservation and restoration criteria (Workshop)

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- It is important for all the diverse authorities involved in each particular urban area to come to a consensus on strategies, so as to agree on objectives and join forces in ecological restoration.
- The participation of local people in environmental work and in trying to improve the quality of life in the neighbourhood is possible through cooperation between the local population and the research team.
- The planning of green spaces should accompany the growth of urban areas.
- It should be understood that the political commitment necessary for the rehabilitation of urban areas is long term, transcending changes in governmental authorities, and that this kind of work requires previous studies and advice from specialists.
- The rehabilitation of urban areas should be implemented as State policy.
- Formal and potential reserves should be mapped out so that decision makers can take this into account when planning.
- The landscape is part of our cultural identity; we should really speak of culture-landscape-environment.
- The regional scale of the landscape should be considered in site restoration, in such a way that the recovered patches constitute biodiversity corridors in the urban-rural gradient.
- An interdisciplinary approach is recommended in urban conservation and/or restoration work.
- It is necessary for society and all decision makers to be aware of the importance of biodiversity conservation and of the integration of urban landscapes into the natural environment.

- A need for community activities is suggested for the restoration of degraded urban environments, as a way of promoting public participation and environmental education.
- The restoration of urban areas directly affects inhabitants' quality of life.
- The incorporation of a socio-environmental dimension in rehabilitation would be beneficial, so as to take the needs of the local population into consideration.
- Multiple criteria, such as those mentioned in this work, should be taken into account in the development of ecological restoration projects. This would generate the added value of elements such as scenery, identity, participation and social perception; i.e., projects should be contemplated from a landscape planning perspective, an approach not always covered but which is essential in order to win the support of all parties concerned.

12. Invasive species and restoration in Latin America (III Symposium)

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- There has been little progress in SIACRE countries restoring areas degraded by invasive species related to the steady increase in the amount of invaded lands and the raise in the number and abundance of introduced invasive species.
- Different teams in SIACRE counties made progresses developing new tools to identify and prioritize the control of invasive and potentially invasive species on natural and restored ecosystems as well as on potential sources and access roads.
- There has been a clear advancement in the region creating new protocols which evaluate invasion risks, editing field guides which facilitate species identification and editing technical guidelines for impact assessments as well as for control and management of conflictive species.
- Ecological restoration in degraded lands vulnerable to invasions not only depends on eradication and control practices and on the restoration approach but also on monitoring schemes and further adaptive management.
- One of the recognized ways to better control invasion is to identify dispersion vectors (i.e., vehicles) and prevent their access to restored sites. This implies the participation and awareness of visitors and local residents.
- In order to better control invasive species it is overriding to know their ecology. Researches in Colombia have made significant advances studying the ecology of *Ulex europaeus*. Researchers have identified its soil seed bank as one of the main invasion drivers; they consider that measures to deplete common gorse seed bank should be incorporated in restoration plans.
- In order to take control actions, it is recommended to identify main sources of invasion taking into account diverse criteria such as plant phenological stages, level of land degradation, distance to restored sites, etc.
- Invasive species which are weed crops represent a serious threat when restoring abandoned old fields as their seeds usually form permanent soil banks. It is recommended to promote seedling emergence through cultural practices (i.e. soil tillage) in order to control invasive species before native ones are seeded.
- It is recommended to prioritize the control of invasive species able to monopolize and outcompete native ones such as those invasive plant species which reproduce through stolons and rhizomes and can easily develop monoculture stands.
- In Argentina, natural and restored ecosystems are threatened by introduced beavers in Tierra

del Fuego, European hares in Patagonia and Pampas and golden mussel in the Parana River, the second largest watershed in Latin America.

- In Argentina, natural and restored grassland and savannas are threatened by spontaneous afforestation by exotic trees (*Ligustrum sinense*, *L. lucidum*, *Fraxinus americana*, *F. excelsior*, *Morus nigra*, *Gleditsia triacanthos*, *Melia azederach* and *Acer negundo*).

13. ER of natural protected areas: paradigms & new challenges (Symposium)

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- The cases presented in this symposium explore different approaches and analyze the various levels of success, including challenges, problems and lessons to be learned in dealing with restoration in protected areas.
- Papers primarily introduced perspectives focused on intervention in plant communities and their structure (bottom-up type), with only one paper working with the recomposition of megafauna populations and the recovery of trophic cascades from primary consumers (top-down type).
- The potential reintroduction of large vertebrates in Argentina and Latin America — and the challenges it poses — was discussed, together with habitat availability and all approaches related to this undertaking, such as available scientific expertise, collaborative planning, interpersonal and institutional networking, public communication and adaptive management.
- Previous experiences in national parks were relevant both educationally and as examples of best management practices for protected areas and their surroundings, as it became clear that there exists a need for criteria systematization, expansion of monitoring activities and evaluation of costs for strengthening and expanding this kind of interventions.
- A key element was the creation of interdisciplinary work groups with members from different institutions whose commitment, continuity, sense of belonging and fluid interaction contributed to the dissemination of the scientific work and practical experiences.
- The area's history of use is of utmost importance; disturbances and their frequency should be examined, as well as suitable management strategies for each type of problem.
- Attention must be drawn to the poor availability of native plant material (seeds, seedlings), including specific genetic origins and in sufficient amount as needed for restoration.
- The incorporation of lessons and information generated by projects is deemed vital for enhancing and expanding intervention wherever it is necessary, with full knowledge of costs and operational requirements.
- Relevant authorities — or those with jurisdiction over protected areas — should be informed in detail about projects, their results and the difficulties faced.
- Settling criteria for avoided damage or impact minimization (present or future) is necessary; it should be covered in planning stages and included as restoration costs in the construction budget.
- It remains to be studied how to replicate results from small-scale ecological restorations in large-scale interventions.
- Further training, environmental education and increase people awareness is crucial to

recognize degradation problems in a wide sense; and incorporate community in restoration activities and projects.

- It is of utmost importance that restoration should not be perceived as an activity opposed to the presence and maintenance of population in protected areas.
- It is fundamental to achieve project continuity and incorporate them into the existing normal activities in the relevant areas, including local actors.
- Increasing people's awareness about environmental restoration can collaborate in improving the quality of life of populations in protected areas.

14. Spatial analysis: its significance for restoration (Symposium)

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- Spatial analysis provides a more holistic view of baseline conditions in a specific area and allows making decisions at different scales.
- Spatial analysis inputs are a source for spatial planning at the regional level for the implementation of specific actions of restoration, rehabilitation, reclamation or conservation of ecosystem services.
- The use of spatial analysis for planning restoration strategies in SIACRE countries will enable more efficient and effective results that facilitate monitoring.
- These inputs help to make better decisions to improve landscape connectivity as well as matrix permeability and to reduce the habitat isolation with the aim to increase landscape resilience for further disturbances.
- The most commonly used spatial analysis methods are rooted on the assessment of landscape composition as well as configuration. They are based on tools such as GIS, remote sensing and the analysis of resistance grids coming from multi-criteria analysis.
- The integration between different approaches and scales in space becomes a new challenge to develop in the years ahead in SIACRE countries, especially for the restoration commitments that are taking place in the world.

15. Succession and regeneration in ER (Oral Session)

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- Every research presented in this symposium provides different ideas about the importance of ecosystem dynamics knowledge for ecological restoration in SIACRE countries.
- The ecological trajectory can be detected through careful studies on reference ecosystems. This knowledge is essential to elaborate predictive models that show ecosystem restoration possibilities and their likely successional stages.
- It is essential to generate knowledge about the reference ecosystems as floristic, successional

and environmental topics are key components. This will allow tailoring restoration practices to successional stages.

- The practical application of the successional stages, beginning with pioneer species, accelerating the process through seeding and seedling transplant, will contribute to the ecosystem recovery as close as the natural references as possible.
- The natural regeneration of ecosystems with minimal human intervention is possible under certain conditions. In peatlands, some useful strategies are to block the entry of domestic animals and to improve the partial management of abiotic factors (e.g. water supply).
- The elaboration of forestry expansion predictive models by natural regeneration is an essential tool to define areas with natural regeneration potential. It also contributes to reduce operational costs.
- State and transition model outcomes show the most vulnerable successional stages, in which it would be necessary intervention to avoid backsliding towards undesired stages.
- The control of exotic pastures that help other exotic species to encroach is possible if native species are implanted at high density. These plants allow regeneration of high native mountain meadows through competitive interactions with exotic pastures facilitating interaction with local species.
- The traditional use of fire-adapted species grant the regeneration of different grasslands communities (*pastizales* and *pajonales*) in where fire was a natural disturbance agent. This means that in such communities plants adapted to interact with fire and grazing have a higher active regeneration than the ungrazed ones.

16. Restoration in agroforestry systems (II Symposium)

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- Areas to be restored must be prioritized taking into account not only social issues but also biodiversity. A multi-purpose restoration approach is preferable over focusing on a single restoration goal (e.g., increased carbon sequestration).
- It is essential that farmers get involved in the restoration process to ensure the persistence and success of projects in the long term. Furthermore, while preserving and restoring degraded areas in their farmlands, farmers could provide the restoration of critical ecosystem services such as carbon sequestration or the improvement of hydrologic conditions.
- In our region, indices to assess the sustainability of agroforestry systems and the success of restoration are needed.
- It is important to take into account that changes in land use that may often appear linked to the activity of farmers are actually driven by large companies who buy land after it has been deforested. Understanding this phenomenon is important in order to reduce degradation problems and understanding and control its drivers.
- Landscapes with intensive production activities have less biodiversity than agroforestry systems. Intensive production generates degradation and loss of ecosystem function which must then be restored to maintain productivity in the long term.
- It is fundamental to prevent further degradation and develop management alternatives compatible with the maintenance of biodiversity and ecosystem functions that can be applied by small farmers.

17. How can we include more threatened trees in ER projects? (Symposium)

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- Upscaling restoration of threatened tree species requires a number of technical, social and economic factors to be addressed. Firstly, before restoration is carried out, it is necessary to identify the driving forces of population decline and then precede and/or accompany the restoration of threatened species with ongoing management of these drivers.
- Restoration strategies for threatened species should be based on an understanding of their ecological traits (e.g. phenology, reproductive biology, successional group, growth rates etc) and population attributes.
- Understanding these traits and attributes informs (a) where and when seed collection should take place; (b) how to store them during years of low production and (c) where, in which forest type and at which densities trees should be planted.
- Priority sites and species for restoration should be identified as a basis for guiding future interventions at a national level within the SIACRE member countries. To achieve restoration of threatened species at multiple scales within the SIACRE member countries, it's necessary to incorporate threatened tree species into larger landscape-level projects, through a combination of active and passive restoration.
- The effectiveness of landscape level restoration for threatened species can be increased through the use of satellite imagery and by undertaking cluster planting in priority areas in Latin America.
- There is a need to increase investment in research on the propagation requirements for threatened species. Supporting development of in vitro cultivation for trees is also a promising methodology – providing care it taken to use maintain genetic variability of source material.
- Suppliers of propagation material should be assisted to source and grow a larger quantity of threatened species. This should involve training and learning exchange between institutions within the SIACRE member countries.
- Ultimately, nurseries will only increase their supply of seedlings of threatened trees if this is met by an increase in demand. There is a need to engage with major planters in the restoration community to encourage use of threatened species within habitat restoration projects. This can be fomented by national laws that increment subsidies if the idea is to plant threatened tree species.
- National laws and/or subsidies may be key to encourage the production of threatened tree seedlings. In addition, when possible, the conservation and restoration of threatened tree species should be included in the forest or environmental legislation in SIACRE member countries.
- Partnerships between conservation groups and corporations should be established to ensure threatened tree restoration is carried out to support their biodiversity commitments. Engagements should be explored with groups in the extractive, forestry and productive sectors.
- Strong engagement of people living close or within the restoration areas of threatened species should be fostered. This can be particularly effective for species with clear existing values, but is nonetheless vital for the many lesser known species found throughout the region.

18. Restoration genetics: bridging the gap research-management (Symposium)

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- When planning the production of plants for afforestation programs and ecological restoration it should be considered the origin of the genetic material of plant species.
- The definition of Operational Genetic Management Units (OGMU) such as Provenance Regions (PR) and Genetic Zones (GZ) minimizes the risk of maladaptation of the planting material and genetic contamination of the surrounding forests of the same species.
- Using OGMU demand traceability of the genetic material in seeds and seedlings, from seed collection to planting.
- The agencies of law enforcement to promote afforestation, enrichment and restoration of degraded forest ecosystems, should regulate the use of GZ and PR as a condition for access to the benefits thereof.
- Basic genetic information can provide support in forest land use, contributing to the prioritization of areas to conserve, or use of genetic resources through the registration of basic propagating materials, including Seed Production Areas.
- Strategies of restoration and/or preservation should consider and provide projections of the impact of global climate change. Niche modeling and the current genetic information can be combined to predict the future distribution of a species and its priority areas for conservation.
- Assisted migration should be considered as a possible strategy for the persistence of species threatened by global climate change. This strategy deserves further discussion and contextualization for each particular case.

19. ER in mining and oil/gas fields of Latin America (Oral Session)

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- In Latin America, the fundamental principles to control erosion in mining open pit operations are based on engineering designs like sediment ponds, culverts and design slopes. However, due to the different and sometimes extreme environmental and weather conditions, the use and management of vegetation should be included as an effective action to control runoff during the construction and operation of mine.
- It is recommended the use of native vegetation to cover the disturbed areas and to promote biodiversity conservation. Native species could be established by hand broadcast seeding or using mechanical techniques as drill seeding or hydroseeding.
- For example, in the arid steppes of Patagonia (Argentina), *Grindelia chiloensis* and *Senecio filaginoides* are pioneers species used to increase plant diversity during the early successional stages, whereas *Lathyrus pubescens* is an appropriate accompanying species which also contributes to increase the nitrogen availability in the system.
- *Prosopis denudans*, a legume shrub which fixes air nitrogen into the soil and whose seeds require prior chemical or mechanical scarification; it is another useful species native from Patagonia which can be used to rehabilitate areas affected by oil exploitation, as long as soils

containing less than 1 % of hydrocarbons.

- In Peru, the establishment of stands of *Lupinus* species combined with grass seeds (*Festuca* spp., *Dactylis* spp.) using hydroseeding in the revegetation of disturbed areas by mining operations has obtained good results.
- In Panama, the use of hydroseeding in the revegetation is a common practice in mining activities; most seeded species are grasses. Hydroseeding provides coverage of large, rather unreachable areas in a short time.
- Additionally, it is advisable to preserve natural organic soil (top soil) to be added to restore disturbed areas instead of using cost-effective techniques to soil formation. E.g. in mining operations in Peru there are regulations in order to recover and stockpile topsoil.
- In our region, there are not specific regulations to establish procedures and plans in order to implement ecological restoration measures in mining and oil and gas operations during the critical operational stages (exploration, construction, operations).

20. Remediation and ER post-remediation in contaminated sites (Workshop)

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- Remediation of contaminated land should be taken as a suite of practical approaches that consider all the environmental effects when implementing a restoration program. All the available technology options should be included in order to reduce environmental footprints.
- Risk assessments to human health or the environment caused by the presence of contaminants is the way to determinate target specific cleanup levels for the site and focus the use of resources on carrying out the remedial actions.
- The most important factors in making decisions about the selection of remediation technologies are: cost, future land use, processing time, reliability, and jurisdictional regulations.
- The use of indigenous microorganisms and composting technique are recommended for bioremediation of soils contaminated with explosives. This is an environmentally friendly and low-cost technology.
- The use of phosphate solubilizing bacteria is applicable for the bioremediation of agricultural soils contaminated with pesticides.
- Phytoremediation technologies are emerging as viable alternatives to remediate sites contaminated with organic compounds or metals, but there are few phytoremediation projects applied to ecological restoration in the region.
- In SIACRE countries, numerous projects of scientific and technological research on remediation are being carried out; however, there is little implementation of such research on a field scale.
- SIACRE, as a technical-scientific organization, should play an important role in establishing regional priorities, if it is aimed at strengthening relations between the scientific community and the different actors involved in the remediation of contaminated sites.
- It is recommended to promote and disseminate the latest advances in research on restoration -including appropriate remediation goals- to regulators in each country, as well as to public and private organizations in charge of developing policies and procedures.

21. Soil restoration and rehabilitation (Oral Session)

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- Soil conservation practices serve to stop soil erosion and to restore main soil functions. These practices allow conserving soil moisture by reducing overland flow and improving infiltration. A better soil water balance fosters macro and micro fauna with a positive effect on soil fertility.
- Soil restoration and rehabilitation practices should go over a series of preventive and corrective measures for optimal results and continue soil improvement.
- It is recommended for Latin American countries to encourage the active participation of local residents to strengthen the capacity for planning, to follow up with monitoring and to provide an updated feedback to practitioners.
- It is recommended to check the origin and quality of organic amendments because the presence of seeds from invasive species in compost and manure is a concern in restored lands where the natural soil seed bank has been depleted. In these heavily perturbed sites, deep changes in light availability and soil fertility with respect to reference systems make it difficult to establish native vegetation so undesirable species have better chances to outcompete native species.
- Soil rehabilitation by applying organic matter amendments promotes biological activity, accelerating the weathering and soil formation from exposed substrates (rocks, pyroclastic) situated at lands disturbed by road construction, mining, erosion, volcanic eruptions, etc.
- In arid and semi-arid ecosystems, the natural recovery of perturbed or eroded soil is very slow; in order to obtain a quick, effective rehabilitation, state-of-the-art green technologies should be incorporated in soil rehabilitation projects. These innovations include geocostales, branch beds and packs, soil erosion blankets, bioplastic geotextiles, gabions and stones barriers, infiltration trenches, as well as the application of organic matter (compost, manure).
- It is necessary to establish a system of training and outreach at the local level on the diverse concepts and objectives of ecological restoration to attain an effective capacity-building in SIACRE countries.
- In difficult to revegetate arid and semi-arid ecosystems, strategies favoring the early establishment of thriving vegetation will enable more effective soil conservation.
- The use of Bio-Organic Fertilizers to recover degraded soils can not only improve soil quality and increase biodiversity of soil fauna but also reduce the use of chemical fertilizers.
- The use of organic matter from crop pruning and pig manure with subsequent inoculation of earthworms can generate an excellent biofertilizer for plantings.
- In semi-arid ecosystems, soil mulching with hay or crop residues helps to conserve water by reducing direct soil evaporation. Additionally, mulching reduces soil supraoptimal temperatures thus facilitating early seedling emergence and establishment.
- Soil mulching in semi-arid environments should be done at relatively low rates to avoid inhibition of xerophytes or early colonizers which prefer bare ground for recruitment and growth.

22. Priority areas for ER (APREs) in Argentina (III Symposium)

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- 87% of Argentina's terrestrial and coastal lands (245 out of 281 Mha) are currently degraded, mainly by cattle raising (65%) and agriculture (17%). Forestry, mining, industry, urbanization, and other human activities uses affect less than 5% of the country.
- Degradation intensities and restoration solutions differ among ecoregions and land uses.
- Restoration-related governance in Argentina is heterogeneous; there is a gap of solid, integrated restoration laws. The main driver of regulatory frameworks and decision making is the individual (personal) initiative.
- Under this context, a National Ecological Restoration Plan (NERP) is needed. In 2012, a NERP initiative was started and promoted by academic, technological, NGO, private companies, and public sectors.
- This nation-wide restoration initiative is based on four principles/tools: inter-institutional commitments, networking, determination of high priority restoration sites/zones (APREs), and establishment of technical/management approaches to revert degradation trends.
- SIACRE2015 allowed discussing advances towards a NERP, analyzing particularly three ecoregions (Campos & Malezales, Iberá Wetlands, and Yungas). Priority areas for ecological restoration were proposed for some ecoregion.
- In Mesopotamia, Northeastern Argentina, restoration actions are more needed in grasslands, whereas forests and wetlands showed mixed rehabilitation needs. In all cases, a passive approach (e.g. reduction in land use intensity) is a more appropriate option than active restoration, except local cases.
- In Yungas (subtropical Andean forests), Northwestern Argentina, restoration priorities include premontane forest, riparian forests categorized as conservation areas in provincial land-use plans, connectivity areas within Yungas and with other ecoregions, and cultural and educational sites of special interest.
- Ecological restoration is becoming a rapidly increasing discipline in Argentina. In the last decade, many independent researchers have embraced the discipline, with direct and indirect investigations tackling restoration questions.
- However, much information is still needed regarding basic ecological aspects, including seeding and plantation techniques, plant-soil-clime interactions, species performance, and secondary succession.
- In the same way, economic quantifications and trade-offs are still lacking in order to inform multicriteria analyses and to advance restoration (e.g. active vs. passive) decisions.
- In general, environmental degradation occurs at several orders of magnitude greater than restoration initiatives and efforts. Consideration of spatial extent and grain size is fundamental in order to determine the feasibility of restoration priorities, and to match interest and urgency with resources and impact.
- Our next challenges are mostly from the social and political dimensions: negotiate a NERP initiative with environmental and agricultural (cattle and forestry included) authorities, propose mechanisms to restore 20% of disturbed landscapes by 2050, develop strategies to implement effective enforcement, and increase participation and commitments from the society.

23. Ecological restoration in temperate-cold environments (Oral Session)

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- In southern South America, temperate-cold environments experience strong environmental gradients, in relation to moisture, temperature and soil fertility. These temperate-cold environments face numerous environmental problems.
- In general, restoration projects have been developed in a scientific context and at an experimental scale, focused mainly in the social assessment of environmental issues, without prior identification of the ecological elements necessary to restore ecosystem functions and, in many cases, without a clear definition of reference ecosystems.
- Most studies in restoration of temperate-cold environments are carried out by research institutes and universities while the contribution of private sectors and government organizations is scarce.
- Furthermore, much effort has been allocated into re-establishing native vegetation but little progress has been made in relation to other ecological components, such as recovery of animal populations, soil properties, etc.
- In fact, the reintroduction of plants, when the only considered attribute is growth habit (trees in the case of forests, shrubs in woodlands and grasses in pastures) does not guarantee neither the recovery of system functionality nor of biotic interactions.
- An approach based on an a priori identification of morphologic and functional attributes, associated with functional groups or species, gives useful information about the ecophysiological characteristics of species, their ecological performance and its ability to perform in restored ecosystems.
- Project planning for environmental quality recovery, based on the knowledge of both functional traits and functional groups would increase the efficiency of restoration activities, by enlightening the detection of "bottlenecks" and by providing one or more key species with the ability to regain functionality and ecosystem services.
- Nevertheless, species selection in the region is mainly based on seeds and nursery seedlings availability or for its subjective conservation value (e. g. late successional species), but not necessarily for their ecological suitability for restoration.
- In conclusion, we suggest that further research in restoration ecology for terrestrial ecosystems of temperate-cold environments in our region should focus on: i) potential of native species as pioneers, ii) physiological traits related to positive interactions and ecosystem functionality iii) alternatives to current ways of production, with the potential to provide useful materials for the agriculture, industry, medicine or other uses and iv) low-cost strategies to enhance the recolonization of disturbed areas.

24. Wetland ecological restoration: the Parana River Delta case (Workshop)

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- It's recommended to maintain the hydrological regime of the different areas of the Parana River Delta, avoiding the use of dikes and embankments and the clogging of natural waterways and drains, especially in large scale. This is essential for maintaining the ecological integrity of its wetlands.
- The conservation and restoration of the Parana River Delta environment and plant species through the development of basic research on native forest relict patches and secondary forests will contribute to the recovery of the native plant and animal species diversity.
- Applied investigations on the management of secondary forests should be encouraged, raising awareness among the different social actors in the Parana Delta islands about the importance of their conservation as a measure of coast protection, conservation of endangered species such as the dusky-legged guan and recovery of native tree species.
- Discuss with the authorities of the Buenos Aires province about the importance of including secondary forests into the "Law on minimum budget for native forests environmental protection".
- The environmental education programs represent a capacitation proposal for institutions and island inhabitants that will help to create conscience of wetland conservation.
- The development of new innovative and sustainable forest production strategies can lead to the conservation of wetlands' functions and values, as well as to create new jobs, for example, setting up native tree nurseries.
- The transformation of marshes into forestations results in an increase in carbon emissions to the atmosphere that far exceeds its storage by wood accrual in plantations.
- In the last 10 years the intense cattle raising, the real state mega-developments and regasification ports, among others, are producing an irreversible damage that, in case of not ceasing, will provoke the permanent loss of Parana Delta wetlands functions and values.
- We recommend the implementation of preventive management measures to control major fires like those that occurred in 2008 in the region of the Paraná River Delta.
- While the 54.4% of the region is under the Protected Area (PA) status (3 national PA; 11 Provincial PA; 12 municipal PA; 8 private or mixed), it's important to stand out that less than 1% of the PA count with an acceptable degree of regulation "(PIECAS, 2011)".
- Based on the previous item, it becomes necessary to take urgent measures to ensure that national, provincial and municipal governments comply with the law, ensuring the correct management of the PA.
- We propose to continue the integration of PA to different International Socio-Environmental Protection Systems, in addition to the two existing ones: the Reserva Natural Estricta Otamendi under the Ramsar Convention and the Reserva de Biosfera Delta del Paraná under the Worldwide Network of Biosphere Reserves, of the Man and Biosphere Program – MaB – UNESCO.
- It's needed to propose a new PARADIGM of ENVIRONMENTAL SUSTENTABILITY in the Lower Parana Delta, proposing the urgent necessity of Ecological Conservation and Restoration of wetland environments.

25. Sociologists of science observe research on Ecological Restoration

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- Thanks to a participant observation conducted by sociologist of science from STS center during the IV Ibero-American & Caribbean Congress on Ecological Restoration (April 12 to 16, 2015), we have formulated 4 series of crucial questions, aiming to suggest a sociological analysis on the coproduction of public problems and research agendas understood as interdependent processes and not as isolated operations. The following issues arose from the 3-days socio-anthropological observation work:
- During the Congress converged a heterogeneous group, formed by academic scholars, practitioners, foundations, NGOs and policy and policy makers. This led us to ask about the disciplinary feature of the Ecological Restoration (ER) field: is it about a disciplinary or interdisciplinary field, or rather a trans-epistemic arena?
- Regarding to the priorities defining this field, between the production of scientific knowledge and its application, several issues emerge, related to the research agenda in the ER field: i) between scientific research and practical application of ecological theory in restoration projects; ii) for some practitioners, there is a trouble translating the experiences into scientific papers, both because of the required specific format, and also due to the difficulty finding a shared standard to codify experiences into a common language shared by several actors .
- There is a large consensus on the fact that the application –and therefore- the social utility of knowledge produced is a priority, but it is necessary to approach: i) The way in which scientific knowledge is used as a resource for the solving of public problems related to environmental issues; ii) Who are the ‘users’ of knowledge produced in the ER field: is it only about governments o other institutions must be included, such as NGOs and firms? Y, finally, how to regulate the participation of these institutions in public projects?
- Regarding the center-periphery issue, several questions emerge around the local and global dynamics that play a crucial role in the production and use of knowledge generated by ER. It is also crucial to approach the use of large databases generally managed by central countries. We note tensions between the orientation of research towards solving local problems and the participation in international scientific networks/consortia.
- In terms of the enlarging the field, we have to note the need to incorporate knowledge by social sciences, which should contribute to build a more comprehensive and complex perspective on the environmental issues.

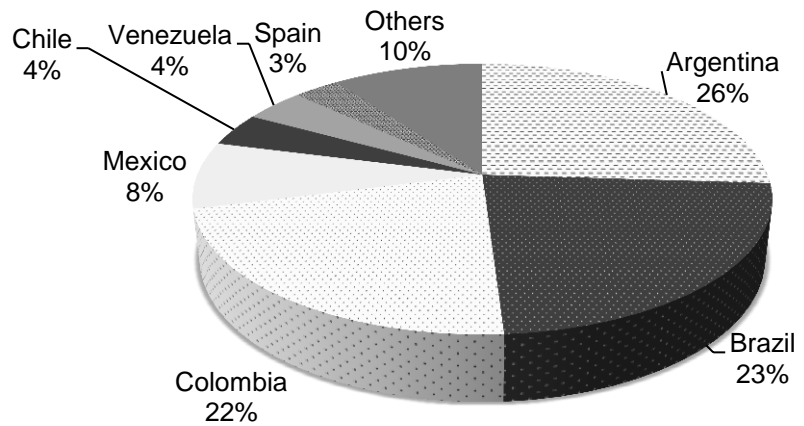
26. Conference statistics

SIACRE2015 received 405 abstracts representing 21 countries. Argentina, Brazil, and Colombia accounted for 71%. Figures go up to 90% including Mexico, Chile, Venezuela, and Spain. Abstracts from the academia were the vast majority (57%) but all social groups involved in Ecological Restoration were represented during the conference: NGOs, government agencies, private companies, and research and technological centers.

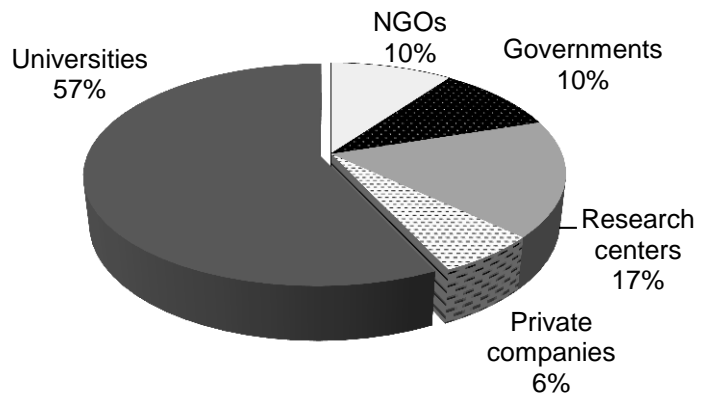
Abstracts by country

Country	Abstracts
Argentina	107
Brazil	93
Colombia	87
Mexico	34
Chile	16
Venezuela	15
Spain	11
Ecuador	7
Cuba	5
Peru	5
United States	5
Guatemala	4
Paraguay	3
Uruguay	3
Canada	2
Costa Rica	2
Panama	2
France	1
Honduras	1
Portugal	1
United Kingdom	1

Most represented countries



Social groups



Useful information

For more information about SIACRE 2015, visit the conference website:

www.siacre2015.com.ar/

To view the SIACRE 2015 Book of Abstracts (in Spanish/Portuguese), visit:

www.siacre2015.com.ar/libro-resumenes.pdf

Other related links

Iberoamerican and the Caribbean Society of Ecological Restoration:

<http://siacre.org/>

Argentina-Ecological Restoration Network: <http://www.redecologicaargentina.com/>

Brazilian Society to Recover Degraded Areas: <http://www.sobrade.com.br/>

Colombian Network of Ecological Restoration: <http://redcre.com/>

Mexican Network for Environmental Restoration:

<http://www1.inecol.edu.mx/repara/>

Society for Ecological Restoration: <http://www.ser.org/>

SER-Europe: <http://chapter.ser.org/europe/>

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