

OPINION ARTICLE

# Establishing the ecological restoration network in Argentina: from Rio1992 to SIACRE2015

Gustavo Zuleta<sup>1,2</sup>, Adriana E. Rovere<sup>3</sup>, Daniel Pérez<sup>4</sup>, Paula I. Campanello<sup>5</sup>, Bárbara Guida Johnson<sup>6</sup>, Celina Escartín<sup>6</sup>, Antonio Dalmaso<sup>7</sup>, Daniel Renison<sup>8</sup>, Nicolás Ciano<sup>9</sup>, James Aronson<sup>10,11</sup>

The development of the science and practice of restoration ecology in Argentina can be divided into three periods. The first was 1992–2004, characterized by isolated restoration efforts, mostly in arid and dry ecosystems, and engaging specific people in the academic, agro-technological, and private sectors as partially required by national regulations, but also inspired by the 1992 Earth Summit, the 1994 Amendments of the Constitutional Law, and environmental guidelines from investment entities. The second period of 2005–2010 showed significantly greater involvement in international networking and conference contributions. The current period from 2011-present has witnessed rapid advances and national integration. The country's network *Red de Restauración Ecológica de Argentina* (REA) was founded in 2012, with seven subnational nodes. In 2014, the 2nd REA symposium was held to determine priority areas for restoration and to generate a National Plan. Public agencies, NGOs and volunteer groups are now actively engaged stakeholders. In 2013 Argentina became a founder member of SIACRE (*Sociedad Ibero-Americana y del Caribe para la Restauración Ecológica*) and is organizing SIACRE's 4th international conference (April 2015; Buenos Aires). Restoration ecology in Argentina is ascendant because of long-term efforts related to strengthening democracy, people initiatives, and strong support from SIACRE, SER (*Society for Ecological Restoration*), SER-Europe, and the national networks of Colombia, Brazil, Mexico, and Chile. Moreover, Argentina is now the first country to have updated its Civil Code by integrating the environment as a "legal good," which reinforces the citizens' rights to demand the implementation of degradation prevention and/or ecosystem restoration measures.

**Key words:** Citizen' rights, Civil Code, environmental governance, networking drivers, restoration priorities, SIACRE-SER implications, subnational nodes

## Implications for Practice

- Ecological restoration is a rapidly expanding and important field in Argentina, e.g. the *Red de Restauración Ecológica de Argentina* (REA) was founded in 2012 and organized in seven subnational nodes.
- In April 2014, the 2nd REA symposium was held to determine priority areas for ecosystem restoration and to generate a national plan.
- In April 2015, the 4th SIACRE International Conference will be held in Buenos Aires.
- Ecological restoration has developed based on increased democratic participation, citizen initiatives, and international cooperation.
- Argentina is now the first country to have updated its Civil Code so as to integrate the environment as a "legal good," which reinforces the citizens' rights to demand the implementation of degradation prevention and/or ecosystem restoration measures.

## International Context: Priorities, Networking, and Commitments

Ecosystem restoration is becoming a global priority at different levels of decision-making to achieve political and technical objectives (Aronson & Alexander 2013). Also, in the last

10 years, the science and practice of the discipline have significantly progressed, generating knowledge, creating and

Author contributions: GZ, AER, DP, PIC, BGI, CE, AD, DR, NC, JA conceived, wrote, and edited the manuscript.

<sup>1</sup>Sociedad Ibero-americana y del Caribe de Restauración Ecológica (SIACRE), Departamento de Ecología y Ciencias Ambientales (DECA), CEBBAD, Universidad Maimónides, Hidalgo 775 (1405), Ciudad Autónoma de Buenos Aires, Argentina

<sup>2</sup>Address correspondence to G. Zuleta, email zuleta.gustavo@maimonides.edu

<sup>3</sup>SIACRE, Consejo Nacional de Investigaciones Científicas y Técnicas de Argentina (CONICET) – Departamento de Ecología, Universidad Nacional del Comahue (UNCO), Quintral 1250 (8400), Bariloche, Argentina

<sup>4</sup>Red de Restauración Ecológica de Argentina (REA), Laboratorio de Rehabilitación y Restauración de Ecosistemas Áridos y Semiáridos (LARREA), UNCO, Buenos Aires 1400 (8300), Neuquén, Argentina

<sup>5</sup>Instituto de Biología Subtropical, CONICET – Universidad Nacional de Misiones, Bertoni 85 (3370), Puerto Iguazú, Argentina

<sup>6</sup>DECA, CEBBAD, Universidad Maimónides, Hidalgo 775 (1405), Ciudad Autónoma de Buenos Aires, Argentina

<sup>7</sup>Grupo de Geobotánica y Fitogeografía, Instituto Argentino de Investigaciones de Zonas Áridas (IADIZA), CONICET, Avenue Ruiz Leal s/n Parque General San Martín (5500), Mendoza, Argentina

<sup>8</sup>Instituto de Investigaciones Biológicas y Tecnológicas, Centro de Ecología y Recursos Naturales Renovables, CONICET – Universidad Nacional de Córdoba, Avenue Vélez Sarsfield 1611 (5016), Córdoba, Argentina

<sup>9</sup>Centro Regional Patagonia Sur, Instituto Nacional de Tecnología Agropecuaria (INTA), 25 de Mayo 330 1° (9100), Trelew, Argentina

<sup>10</sup>Center for Conservation and Sustainable Development, Missouri Botanical Garden, PO Box 299, St. Louis, MO 63166-0299, U.S.A.

<sup>11</sup>Centre d'Écologie Fonctionnelle et Évolutive (UMR 5175, CEFE – campus CNRS), 1919, Route de Mende, 34293, Montpellier, France

© 2015 Society for Ecological Restoration  
doi: 10.1111/rec.12198

applying tools, designing procedures and promoting networks worldwide. In 2011, for the first time, the International Conference of SER (Society for Ecological Restoration) was held in Latin America (Mérida, México). The region also showed remarkable institutional, legal and professional progress since 2004 (Armesto et al. 2007; Aguilar et al. 2015; Echeverría et al. 2015), including the formal establishment of SIACRE (*Sociedad Ibero-Americana y del Caribe para la Restauración Ecológica*) in 2013. Brazil, Colombia, and México are leading the movement with the cooperation of Cuba, Chile, Ecuador, and Venezuela, among other countries. In this broad context, our goal is to review the development of the discipline in Argentina and its contribution to national and international restoration needs.

The early legal step was done in June 1992, when the country signed and ratified the United Nations Convention on Biological Diversity (UN-CBD), launched at the Earth Summit in Rio de Janeiro, Brazil. In December 2012, Argentina endorsed the Hyderabad Call of the UN-CBD committing to restore 15% of all degraded ecosystems on Earth by 2020 (the Bonn Challenge). Moreover, the national government has pledged to support the No Net Loss campaign of the UN Convention to Combat Desertification (UNCCD), which proposes restoration of degraded ecosystems. Argentina is also a member of the International Platform on Biodiversity and Ecosystem Services and has engaged to develop restoration policies. In December 2014, Argentina endorsed, along with seven other Latin American countries, the Initiative 20 × 20 to restore 20 million hectares of forests by 2020.

### National Context: Legal and Socioeconomic Drivers, Public, and Private Initiatives

The first regulations related to ecosystem restoration in Argentina started during the 1990s, influenced by three factors: (1) privatization of public companies, (2) increased opening of the economy to foreign corporations, and (3) environmental guidelines from investment entities, e.g. The World Bank. In 1992, the national government (Secretary of Energy [SE]) passed the first regulations to recover pre-disturbance (“natural”) conditions in all abandoned oil/gas fields, but did not require technical specifications or implementation protocols (Resolution SE 105; all national laws are available in Mecom (2014)). Recently, the Neuquén provincial government made a substantial positive change by releasing Regulation 226 that details the requirements on *how* to restore degraded soils and vegetation (e.g. number of native plants per hectare, reference ecosystem guidelines; Boletín Oficial Provincia del Neuquén [2011]). This is the most specific legal tool in Argentina for on-site implementation of restoration, and is comparable to similar legislation that has been promulgated in the Brazilian state of São Paulo (Aronson et al. 2011). The mining industry is devoting similar efforts to monitoring and ecosystem recovery under the “Mining Law” 24.585/1995.

The “*Ley de Bosques Nativos*” (Native Forests Law) 26.331, which was approved by the National Congress in 2007, obliges provincial governments to create and update native forests

inventories and land planning maps based on three categories: red—rigorous conservation use; yellow—recovery, sustainable use without deforestation; and green—feasible for deforestation if allowed by an environmental impact assessment. This is the most relevant legal tool associated with the protection and restoration of forest-type ecosystems at the landscape-ecoregional scale. Since 2000, the forest industry is implementing both enforced and voluntary environmental actions under the National Law 25.080 (Ministry of Agriculture) and, more recently, under the “*Ley de Bosques Nativos*.” In this initiative, the forest industry was encouraged by technical advisors (Faggi et al. 2014) and international certification (e.g. the Forest Stewardship Council). One consequence is that foresters now are more likely to restore degraded headwaters and riparian habitats when water availability is a potential constraint for production, or to reduce land use intensity to recover natural grasslands.

In connection to democracy, which was successfully “restored” 31 years ago (December 1983), restoration-related rights are included in founding laws of modern Argentina. The National Constitution was amended in 1994 and, for the first time in history, an environmental right was established for all Argentine citizens: “*the right to a healthy, equilibrated environment,*” including that “... *any environmental damage ... must obligatorily ... be repaired.*” In 2002, the National Environment General Law 25.675 defines and broadens the concept of environmental damage to include “... *any negative alteration ... to public goods or values*” (Article 22). This law incorporates the principle of degradation prevention and the concept of “*environmental restoration,*” and also regulates how damages must be “*repaired or recomposed,*” particularly when it affects the public interest. Related to the Law 25.675, in November 2014, the Supreme Court of Justice approved the amendments of the Civil Code integrating the environment as a “legal good” and a collective right, reinforcing the legal framework of the country. These changes will come into effect by August 1st, 2015. Argentina is now the first country that has updated a Civil Code with environmental rights which may be unprecedented in its scope and legal implications in the world; while other countries do compel proper closure of mining sites or clean up of oil spills, this empowers Argentine citizens to use the law to demand the implementation of measures to prevent degradation and/or to restore ecosystems.

### Combining Bottom-Up, Isolated Initiatives With Top-Down, Integrated Collaborations

The development of the science of restoration ecology and the practice of ecological restoration in Argentina can be divided into three periods. The first started in early 1990s when the academic and agro-technological sectors developed initial on-site implementations and research experiments. Most restoration efforts were isolated and not necessarily in compliance with the legal initiatives described in the previous section; different sectors were not fully integrated. In general, projects were more common in the arid and dry ecoregions, which account for 69%

**Table 1.** Ecosystem degradation by major land use types in Argentina. Land use/land cover categories adapted from APN (2007) and INTA (2009); data validated using 2014 satellite imagery. *Ecosystem types*: Grasslands are found in five ecoregions (Pampas—prairie, Patagonia—steppe, “Campos y Malezales”—savanna, lowland Monte—shrublands, and highland Monte—mixed shrublands). Forests occur in six ecoregions (dry Chaco, wet Chaco, Yungas, Atlantic, Espinal, and Andean Patagonia); Wetlands occur in Iberá and Delta; and Highlands occur in Puna and High Andes (Fig. 1). *Natural areas*: Includes protected areas, bare soil, glaciers and permafrost, wetlands. *Mining*: Includes oil and gas drilling. *Legal RE*: Degree of legal enforcement: regulations that impose or strongly recommend ecological restoration (ER), in a broad sense, of degraded lands (e.g. soil, vegetation).

Ecosystem Types	Natural Areas (Mha)	Human-Modified (Degraded) Areas (Mha)						Total Degraded Areas (Mha)	Total (Mha)	Degraded Areas (%)	Natural Areas (%)
		Livestock Ranching	Agriculture	Forestry	Mixed Areas	Urban Areas	Mining				
Grasslands	11.9	114.5	23.2	0.8	0.1	0.4	0.5	139.6	151.5	92.1	7.9
Forests	11.2	55.3	25.1	0.6	8.7	0.2	0.0	89.9	101.1	88.9	11.1
Wetlands	4.6	2.4	<0.1	<0.1	0.0	<0.1	0.0	2.8	7.4	37.8	62.2
Highlands	9.4	12.0	<0.1	<0.1	0.0	0.0	0.0	12.1	21.5	56.3	43.7
Total	37.1	184.3	48.4	1.6	8.8	0.6	0.5	244.6	281.4	86.8	13.2
Total (%)	13.2	65.4	17.2	0.6	3.1	0.2	0.2				
Legal RE	High <sup>a</sup>	None	None	Moderate <sup>b</sup>	None	None	High <sup>c</sup>				

<sup>a</sup>National Law on Protected Natural Areas (22.351; resolution 016/94); Glaciers National Law (26.639) (MEcom 2014).

<sup>b</sup>Native Forest National Law (26.331) and Forestry Investment National Law (25.080) (MEcom 2014).

<sup>c</sup>Mining (24.585), Mining Investments (25.429) and Hydrocarbons (26.197) National Laws; resolution SE105; Provincial Laws and regulations (i.e. San Juan province’s mining procedures code; 1.875 and 2.267 Neuquén Laws, Neuquén regulation 226; 2.925 Santa Cruz Law) (MEcom 2014).

of the country’s land (Table 1; Fig. 1). In these ecosystems, restoration was needed because of low resilience and a long history of human modification, such as overgrazing in Patagonian steppes and extensive selected logging in the Chaco forests since 1900–1920, and inexistence of sustainable management, restoration or rehabilitation. The severely degraded conditions related to soil erosion and vegetation changes still remained or were accentuated 50–100 years later (Morello 1956; Brown et al. 2005). In Central Argentina dry mountain forests lost almost 20% of soil cover during 400 years of livestock rearing (Cingolani et al. 2013) and restoration efforts only started in the mid 1990s (see next section; Table 2; Fig. 2C).

In 2003–2005 begun the second period began, when Argentina started participating in the creation and improvement of international networks, including REDLAN (*Red Latino Americana de Restauración Ecológica*) in 2005, RIACRE (*Red Ibero-Americana y del Caribe para la Restauración Ecológica*) in 2007, and SIACRE in 2013, which brought together REDLAN and RIACRE. The country was better represented at international networks, e.g. senior scientists and practitioners began attending most SER conferences (United States, Canada, Spain, Australia, and México) and also SER-Europe (SERE) 2012, Eco-Summit 2012, and the Veolia-UNCCD World Conference 2014.

In October 2011 (third period), the first national event took place through the *Taller Regional de Rehabilitación y Restauración de la Diagonal Árida de Argentina* (shortened as “*Diagonal Árida*”), held in Neuquén, Northern Patagonia. Almost 180 people from all sectors and invited colleagues from Chile and Spain attended this historic workshop. Representatives from NGOs, government agencies, private companies, universities, and technical institutions discussed the topics more relevant for Argentina: public policies, overgrazing, desertification, soil erosion, biodiversity loss, social participation, native people’s rights, and biological invasions. Conclusions, future actions and expectations, practitioner experiences, and original and

theoretical research applied to restoration were published in a 41-chapter book (Pérez et al. 2013).

### Argentina’s Restoration Network and Subnational Nodes

In September 2012, the *Red de Restauración Ecológica de Argentina* (REA) was formally founded at the 1st National Symposium on Ecological Restoration. This milestone event was celebrated during the 25th Meeting of the Argentine Society of Ecology held in Luján, Buenos Aires province. Twelve speakers summarized the state of degradation and current restoration activities in major ecoregions (Table 1). Conceptual frameworks and future directions were also discussed, with the collaboration of a Representative-at-Large of RIACRE and REDCRE (*Red Colombiana de Restauración Ecológica*). The principles of restoration ecology (SER 2004) were debated to reflect environmental and socioeconomic realities of Latin America. Finally, national integration was achieved.

Adopting REDCRE’s network approach (Aguilar et al. 2015), REA was organized in seven subnational nodes (Table 2; Fig. 1). The Northern Patagonia node is currently in charge of REA coordination and has published several books on restoration of arid shrublands (Fig. 2A). The Southern Patagonia node has two branches: one focuses on terrestrial and marine restoration and conservation; while the other branch covers humid mountain forests and lowland prairies (Cipriotti et al. 2014; Molares & Rovere 2014; Fig. 2B). The third subnational node, *Cuyo*, includes extensive arid territories, where post-mining rehabilitation is a major issue (Fig. 2D). The Central Argentina node leads a long-term restoration project in seasonally dry forests (Renison et al. 2011) (Fig. 2C). The fifth node, Northwestern Argentina, encompasses the highest environmental gradient of the country from arid, high-altitude grasslands to subtropical cloud forests. The Mesopotamia node deals with the conservation and restoration of subtropical Atlantic forests,



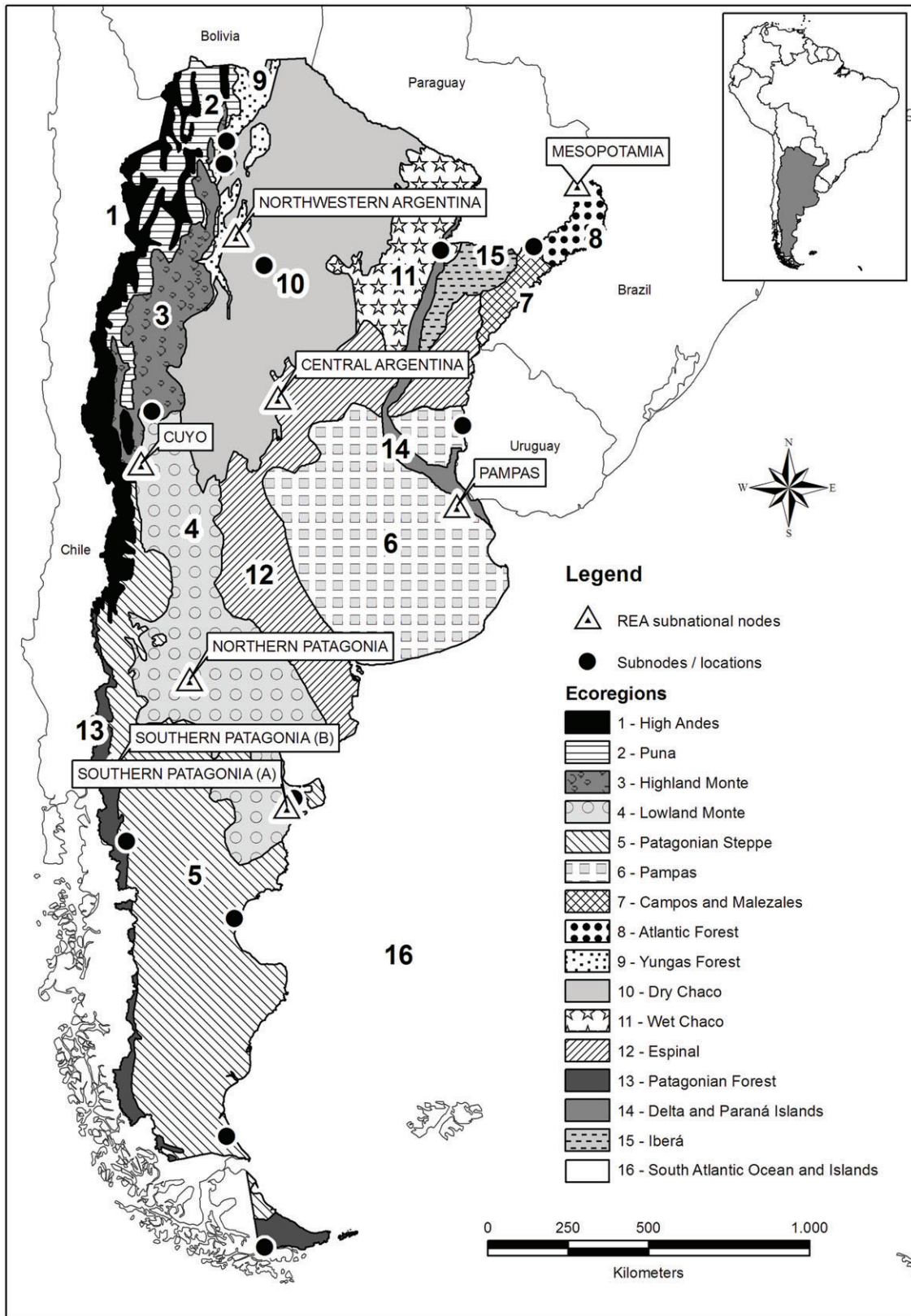


Figure 1. Map of ecoregions of Argentina and distribution of REA's subnational nodes and subnodes.

**Table 2.** Characteristics of the seven subnational nodes of Argentina's network for ecological restoration (REA). Underlined location and institution indicates node/subnode coordination.

ID	Node or Subnode	Locations	Institutions and Sectors Involved	Ecoregions (see map in Fig. 1)	Degradation Drivers	Major Achievements and Projects
1	Northern Patagonia	<u>Neuquén</u>	<u>Univ. del Comahue</u> , oil/gas companies, Provincial government	Lowland Monte Patagonian Steppe	Overgrazing, oil/gas exploitation. Local scale: dams, irrigation farming, forestry.	REA coordination, 1st " <u>Diagonal Árida</u> " workshop organization (2011), three published books on restoration of arid environments, regional network of community nurseries of native plants, advising public policies (guidelines), long-term monitoring of reference ecosystem, scientific experiments (low-tech), collaborative projects with Chile and Venezuela. First restoration efforts by late 1990s.
2A	Southern Patagonia A	<u>Trelew</u> , <u>Puerto Madryn</u> , <u>Comodoro Rivadavia</u> , <u>Río Gallegos</u>	<u>INTA</u> , <u>Univ. de la Patagonia</u> , <u>CENPAT</u> , oil/gas companies	Patagonian Steppe South Atlantic Ocean and Islands	Overgrazing, oil/gas exploitation, fishing.	3rd " <u>Diagonal Árida</u> " workshop organization (October 2015), extensive practice of restoration, theoretical studies (state and transition models), monitoring network of ecological and land use indicators (MARAS) in 330 plots, recovery of coastal and marine threatened species. First restoration efforts by early 1990s.
2B	Southern Patagonia B	<u>Bariloche</u> , <u>Esquel</u> , <u>Ushuaia</u>	<u>Univ. del Comahue</u> , <u>CIEFAP</u> , <u>CADIC</u>	Andes-Patagonian Forest (includes wet lowland prairies in Tierra del Fuego island)	Overgrazing, forestry, exotic species invasions. Local scale: fire, tourism, urbanization.	International networking, collaborative projects with Chile, first national database of restoration projects, graduate courses, control, and removal of exotic species. First restoration efforts by early 2000s.
3	Cuyo	<u>Mendoza</u> , <u>San Juan</u>	<u>IADIZA</u> , <u>Univ. de San Juan</u> , mining companies	Lowland Monte Highland Monte High Andes	Oil/gas exploitation, mining, overgrazing. Local scale: irrigated agriculture (vineyards).	2nd " <u>Diagonal Árida</u> " workshop organization (2013), intensive practice of restoration (high-tech), coordination of the national observatory system of land degradation in 17 sites across Argentina. First restoration efforts by early 2000s.

Table 2. Continued

ID	Node or Subnode	Locations	Institutions and Sectors Involved	Ecoregions (see map in Fig. 1)	Degradation Drivers	Major Achievements and Projects
4	Central Argentina	Córdoba, Santiago del Estero	Univ. de Córdoba, NGOs (Ecosistemas Argentinos), INTA	Dry Chaco Espinal	Logging, deforestation, overgrazing, intensive agriculture, hunting. Local scale: exotic species invasions.	Volunteering and extensive networks of practitioners, regional workshops, international publications, long-term project since 1997, silvo-pastoral management experiences, reforestation with native tree species, grad and undergraduate courses. First restoration efforts by mid 1990s.
5	Northwestern Argentina	Tucumán, Jujuy, Salta	Univ. de Tucumán, Univ. de Jujuy, Univ. de Salta, NGOs (ProYungas)	Puna High Andes Yungas Forest Highland Monte Dry Chaco	Logging, deforestation, overgrazing, agriculture, hunting. Local scale: oil/gas exploitation, mining, forestry.	Volunteering, reforestation projects with native tree species, land planning and APREs identification, regional workshops, advising public policies ( <i>Ley de Bosques</i> ), monitoring network of ecological indicators in 50 permanent plots (in Yungas). First restoration efforts by early 2000s.
6	Mesopotamia	Puerto Iguazú, Posadas, Corrientes, Colón	IBS, Univ. de Misiones, Univ. del Nordeste, forestry companies	Atlantic Forest Campos & Malezales Iberá (wetlands) Delta and Paraná Islands	Overgrazing, forestry, agriculture, hunting. Local scale: dams, fishing, exotic species invasions.	Two international symposia and one graduate course on forest restoration in commercial plantations, control, and removal of exotic species, wildlife re-introduction, participatory monitoring network in 63 sites (Campos & Malezales), land planning (APREs; see text). First restoration efforts by early 2000s.
7	Pampas	Buenos Aires, Luján	Univ. Maimónides, Univ. de Buenos Aires, NGOs (Azara, Hábitat, & Desarrollo)	Pampas Espinal Delta and Paraná Islands	Agriculture, livestock ranching. Local scale: urbanization, industry, waste disposal, transportation.	1st and 2nd Symposium on Restoration in Argentina (2012; 2014), organization of IV SIACRE Conference (April 2015), international networking, governance and NERP project (see text), Master degree (major in restoration ecology) since 2003. First restoration efforts by mid 1990s.

CENPAT-CONICET, Centro Nacional Patagónico – Consejo Nacional de Investigaciones Científicas y Tecnológicas; CIEFAP, Centro de Investigación y Extensión Forestal Andino Patagónico; CADIC-CONICET, Centro Austral de Investigaciones Científicas; IADIZA-CONICET, Instituto Argentino de Investigaciones de Zonas Áridas; IBS-CONICET, Instituto de Biología Subtropical; INTA, Instituto Nacional de Tecnología Agropecuaria.



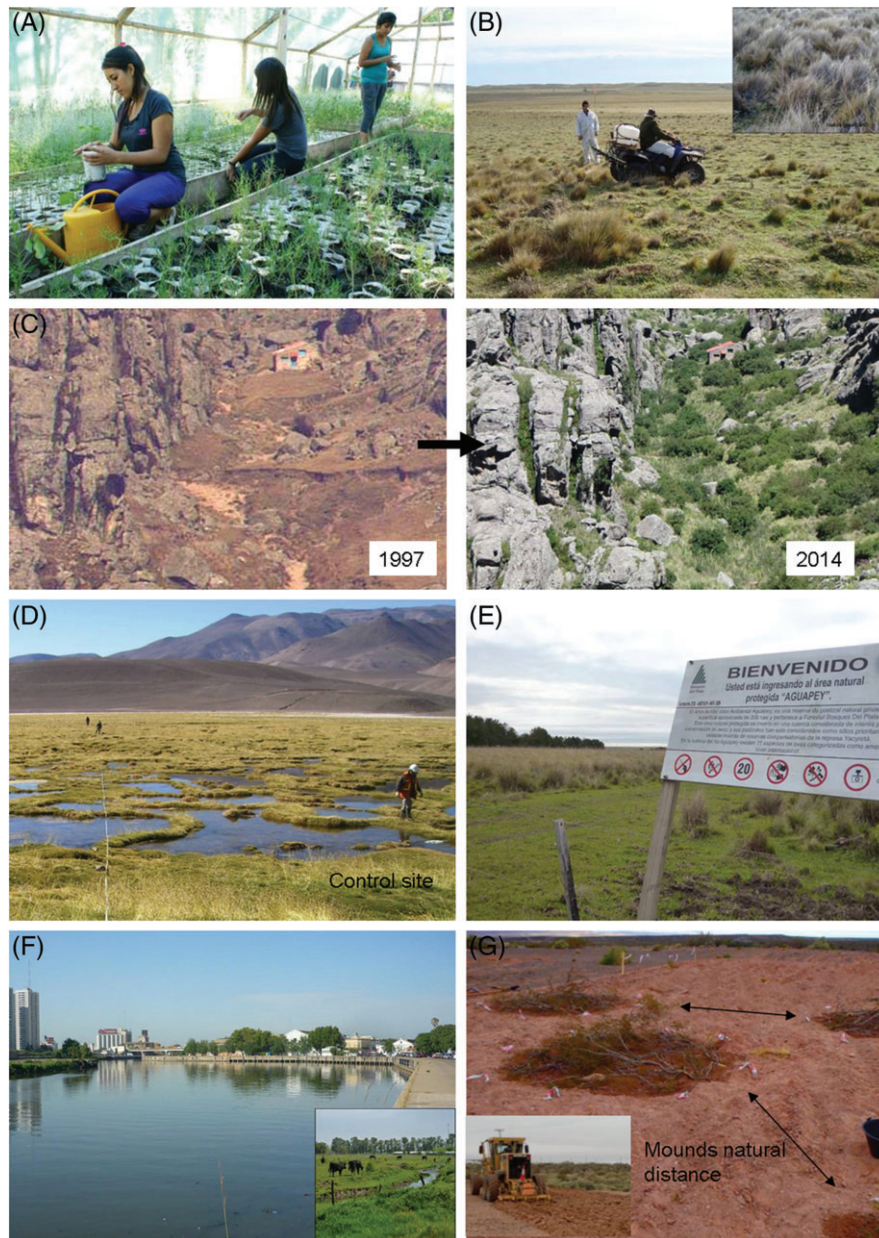


Figure 2. Selected ecological restoration field efforts in Argentina. (A) Community plant nursery in Neuquén, *Northern Patagonia* node; (B) exotic species (*Hieracium pilosella*) removal with herbicide treatments in Tierra del Fuego steppe, *Southern Patagonia* node; (C) before-after comparisons (1997–2014) of restored *Polylepis australis* trees in high-mountains of Córdoba, *Central* node; (D) natural meadows monitoring for future restoration practices in copper-gold mines of High Andes, *Cuyo* node; (E) monitoring of wet-savanna recovery and reference ecosystem in silvo-pastoral systems, *Mesopotamia* node; (F) restoration planning of riparian grasslands severely degraded by rural–urban land uses, *Pampas* node; (G) restoration experiments (scarification-branching-organic matter technique) in shrublands of North Patagonia.

savannas (Fig. 2E), and large-scale wetlands. The seventh node, Pampas, comprises the most degraded ecoregions of Argentina (Table 1), and conducts restoration projects in urban–rural gradients (Guida Johnson 2015; Fig. 2F), Patagonia (Fig. 2G) and Mesopotamia (Arias 2013). This node is responsible for launching the national symposia series as well as the upcoming 4th SIACRE international conference, on 12–16 April 2015 (<http://www.siacre2015.com.ar>).

### Current and Future Implementations: Priority Areas and SIACRE-SER Perspectives

Despite the great improvements described above, Argentina lacks a National Ecological Restoration Plan (NERP), as adopted in Colombia and Ecuador and which is an essential tool for decision-making. In April 2014, the 2nd REA symposium was held with the objective to generate a NERP draft, determining priority areas for ecological restoration

(APREs). Table 1 reflects part of this ongoing nation-wide initiative. We note that the urgency for ecosystem restoration is reflected by the fact that 87% of continental and coastal lands (281 Mha) are considered to be degraded to varying levels: from relatively low impacts on wetlands (38% under significant human use) to almost complete destruction (99%) of temperate grasslands (here referred to as Pampas), due to its massive replacement by industrial agriculture and to intensive livestock grazing. Cultivated lands increased from 23 Mha in 1996 to 32 Mha in 2014. Of these lands, 56% are now occupied by agro-industrial soybean fields (MAGyP 2014), and approximately 70 of 100 Mha of native forests have been eliminated, particularly during the past 100 years (SAyDS 2008). It should be considered beyond doubt that Restoration is a high priority in Argentina.

Given this context, and to prepare the SIACRE 2015 conference and foster international cooperation, six colleagues from Brazil, Chile, Colombia, México, and United States–France, representing SIACRE, SER, REDCRE, SOBRADE (*Sociedade Brasileira de Recuperação de Áreas Degradadas*), REPARA (*Red Mexicana para la Restauración Ambiental*), and RECRE (*Red Chilena de Restauración Ecológica*), respectively were invited to attend the 2nd REA symposium. All of them made great contributions to improve our ideas, approaches, methods, and perspectives, specifically the NERP draft and the APREs project (This event also served as the catalyst for this publication, assisted by the managing editor and editor in chief of Restoration Ecology.)

In summary, after two decades, restoration ecology in Argentina is now a rapidly developing discipline thanks to 31 years of democracy, citizens' initiatives, and strong support from international and national societies (a key factor). The REA has now the potential to contribute to the global restoration movement, e.g. by helping to increase the internationalization of SER or the inter-society relationships such as SER-SIACRE, SER-SERE and, hopefully, with societies from Africa and Asia to be created in a near future. Importantly, there is a well-supported integration of efforts within Latin America—perhaps the fastest growing geopolitical region in terms of legal, scientific, government, private sector, and citizen efforts for restoration ecology. Please join us!

## Acknowledgments

The authors thank the numerous Argentinian researchers, practitioners, authorities, students, and volunteers who work on ecosystem restoration, to all REA members, and to all international societies, networks, and colleagues that support our projects and help advance the discipline in Argentina. This article arose from the 2nd International Symposium on Ecosystem Restoration of Argentina, and was made possible thanks to the financial support from Universidad Maimónides, Agencia Nacional de Promoción Científica y Tecnológica (grant PICT-2009-0125 to GZ at Universidad Nacional de Lomas de Zamora), Ministry of Agriculture (grant PIA 12064 to GZ), Universidad del Comahue (grant U007 to DP and AER). International support came from “Instituto Humboldt” (Ministry of

Environment, Colombia) and “Universidad Autónoma de México” that kindly supported traveling expenses of REDCRE and REPARA representatives. In particular, we thank P Ares and C Falguera of DECA for their assistance in organizing the Symposium. D Schell and A Aguilar Zurita helped us with the land use data and GIS analyses. We gratefully thank P Brancalion, V Amaral, S Murphy, and three anonymous reviewers for their valuable comments on previous versions of this manuscript.

## LITERATURE CITED

- Aguilar M, Sierra J, Ramirez W, Vargas O, Calle Z, Vargas W, Murcia C, Aronson J, Barrera Cataño JI (2015) Towards a post-conflict Colombia. Restoring to the future. *Restoration Ecology* 23:4–6
- APN (Administración de Parques Nacionales) (2007) Las áreas protegidas de la Argentina. Herramienta superior para la conservación de nuestro patrimonio natural y cultural. Buenos Aires. [http://campus.fca.uncu.edu.ar:8010/pluginfile.php/21075/mod\\_resource/content/0/APN\\_2007\\_3460922.pdf](http://campus.fca.uncu.edu.ar:8010/pluginfile.php/21075/mod_resource/content/0/APN_2007_3460922.pdf) (accessed 15 Dec 2014)
- Arias M (2013) Indicadores florísticos aplicables a conservación y manejo ambiental en sistemas silvopastoriles de la ecoregión Campos y Malezales: revisión crítica. Tesis de Maestría. Universidad Maimónides, Buenos Aires, Argentina
- Armesto JJ, Bautista S, Val ED, Ferguson B, García X, Gaxiola A, et al. (2007) Towards an ecological restoration network: reversing land degradation in Latin America. *Frontiers in Ecology and the Environment* 5: w1–w4
- Aronson J, Alexander S (2013) Ecosystem restoration is now a global priority: time to roll up our sleeves. *Restoration Ecology* 21:293–296
- Aronson J, Brancalion PHS, Durigan G, Rodrigues RR, Engel VL, Tabarelli M, et al. (2011) What role should government regulation play in ecological restoration: Ongoing debate in São Paulo State, Brazil. *Restoration Ecology* 19:690–695
- Boletín Oficial Provincia del Neuquén N° 3250 (2011) <http://boficial.neuquen.gov.ar/pdf/bo11061703250.pdf> (accessed 30 Dec 2014)
- Brown A, Martínez Ortiz U, Arcebi M, Corcuera J (2005) La Situación Ambiental Argentina 2005. Fundación Vida Silvestre Argentina, Buenos Aires, Argentina
- Cingolani AM, Vaieretti MV, Giorgis MA, La Torre N, Whitworth-Hulse JI, Renison D (2013) Can livestock and fires convert the sub-tropical mountain rangelands of central Argentina into a rocky desert? *Rangeland Journal* 35:285–297
- Cipriotti PA, Collantes MB, Escartín C, Cabeza S, Rauber RB, Braun K (2014) Experiencias de largo plazo para el manejo de una hierba invasora de pastizales: el caso de *Hieracium pilosella* L. en la Estepa Fueguina. *Ecología Austral* 24:135–144
- Echeverría C, Smith-Ramírez C, Aronson J, Barrera Cataño JI (2015) Good news from Latin America. National and an international restoration networks are moving ahead. *Restoration Ecology* 23:1–3
- Faggi AM, Zuleta GA, Homberg M (2014) Motivations for implementing voluntary environmental actions in Argentine forest companies. *Land Use Policy* 41:541–549
- Guida Johnson B (2015) Rehabilitación de ambientes degradados en la cuenca Matanza-Riachuelo: enfoque a múltiples escalas. Tesis de Doctorado. Universidad Nacional de General Sarmiento, Buenos Aires, Argentina
- INTA (Instituto Nacional de Tecnología Agropecuaria) (2009) Monitoreo de la cobertura y uso del suelo a partir de sensores remotos. Proyecto específico PNECO 1643, Buenos Aires
- MAGyP (Ministerio de Agricultura Ganadería y Pesca) (2014) Sistema Integrado de Información Agropecuaria. <http://www.sii.gov.ar/> (accessed 20 Dec 2014)



- MEcom (Ministerio de Economía y Finanzas Públicas) (2014) Centro de Información y Documentación. <http://infoleg.mecon.gov.ar/infolegInternet/mostrarBusquedaNormas.do> (accessed 30 Dec 2014)
- Molares S, Rovere AE (2014) Restoration of an area of the Andean Northern Patagonian Biosphere Reserve: a proposal based on ecological and ethnobotanical parameters. *Agrociencia* 48:751–763
- Morello J (1956) Estudios botánicos en las regiones áridas de la Argentina. *Revista Agronómica Noroeste Argentino* 2:79–152
- Pérez DR, Rovere AE, Rodríguez Araujo ME (2013) Restauración ecológica de la diagonal árida de la Argentina. Vázquez Mazzini Editores, Buenos Aires, Argentina
- Renison D, Hensen I, Suárez R (2011) Landscape structural complexity of high-mountain *Polylepis australis* forests: a new aspect of restoration goals. *Restoration Ecology* 19:390–398
- SAyDS (Secretaría de Ambiente y Desarrollo Sustentable) (2008) El avance de la frontera agropecuaria y sus consecuencias. [http://www.ambiente.gov.ar/archivos/web/File/032808\\_avance\\_soja.pdf](http://www.ambiente.gov.ar/archivos/web/File/032808_avance_soja.pdf) (accessed 30 Dec 2014)
- SER (Society for Ecological Restoration) (2004) The SER International Primer on ecological restoration. <http://www.ser.org/docs/default-document-library/english.pdf> (accessed 15 Dec 2014)

Coordinating Editor: Valter Amaral

Received: 6 January, 2015; First decision: 20 January, 2015; Revised: 2 February, 2015; Accepted: 6 February, 2015; First published online: 9 March, 2015