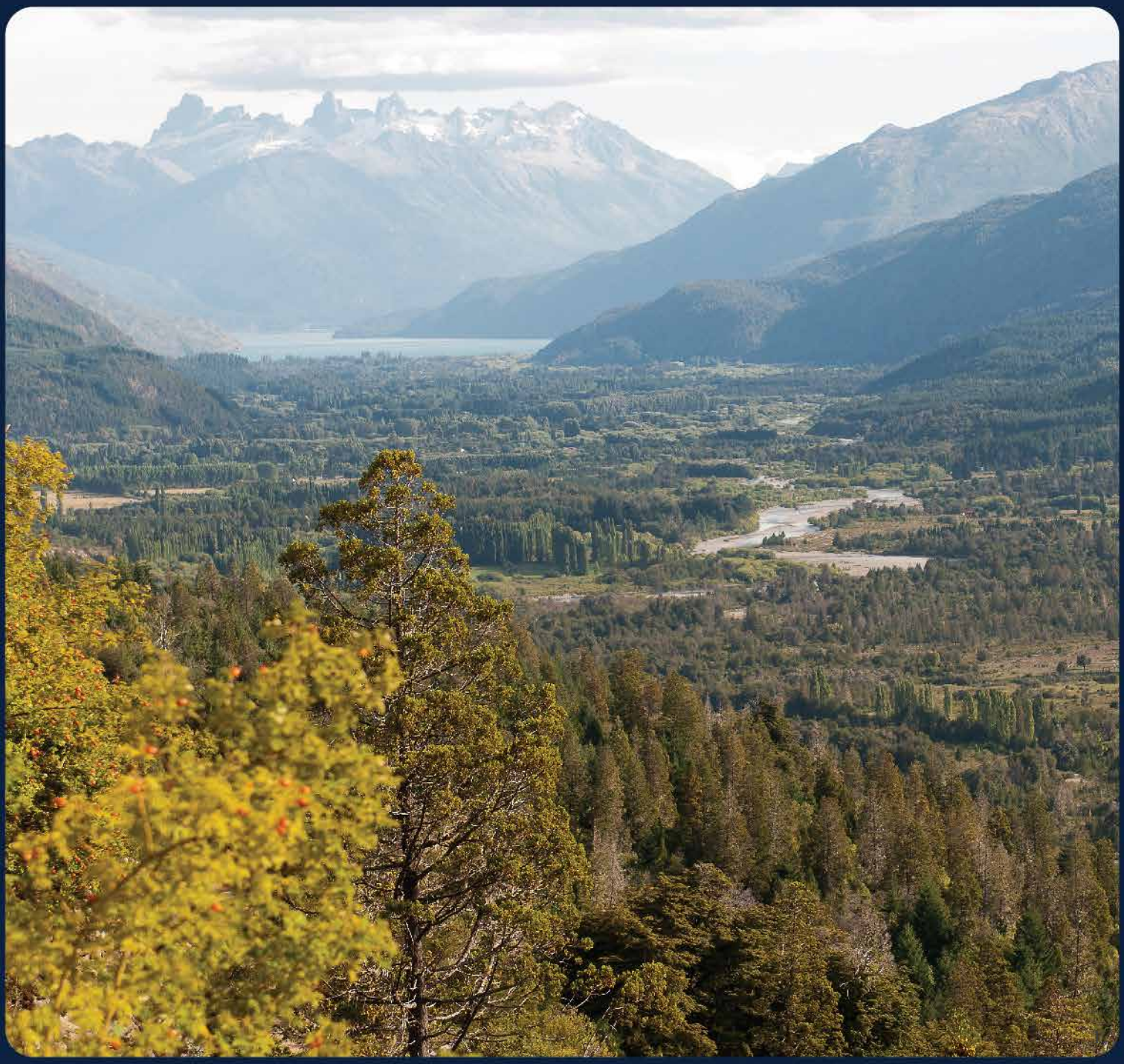
Second Argentine Report for the Montreal Process

National Report based on criteria and indicators of the Montreal Process



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Aereal view of Paraná river, province of Misiones. Author Pablo Oliveri, courtesy of UCAR-MAGyP.

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Cover photo: The Azul river running through El Bolsón valley to Puelo Lake, Río Negro.
Author Pablo Oliveri, courtesy of UCAR-MAGyP.

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Unit List

%	Percentage
g	Gram
Gg	Gigagram
h	Hour
ha	Hectare
km^2	Square kilometer
l	Liter
m^3	Cubic meter
t	Tonne
m s.n.m.	Meters above sea level
ºC	Degree Celsius

Acronyms

ANP: Protected Natural Areas
APN: National Parks Administration
CEProVe: Experimental Center of Vegetative Propagation
CIEF: Center for Forestry Research and Experiences
CIEFAP: Andean-Patagonian Center for Forest Extension and Research
CIRN: Research Center of Natural Resources
CITES: Convention on International Trade in Endengered Species of Wild Fauna and Flora
CITEMA: Center for Research and Technology of the Wood Industry and Associated Industries
COFEMA: Federal Environmental Council
CONADIBIO: National Advisory Commission for the Conservation and Sustainable Use of Biodiversity
CONICET: National Scientific and Technical Research Council
DB: Forests Direction
DPF: Forestry Production Direction
EEA: Experimental Agricultural Station
FAO: Food and Agriculture Organization of the United Nations
FONCyT: Fund for Scientific and Technological Research
FRA: Global Forest Resources Assessment
GEF: Global Environment Facility
GHG: Greenhouse Gas
GIS: Geographic Information System
IADIZA: Argentine Dryland Research Institute
IBRD: International Bank for Reconstruction and Development
IFONA: National Forestry Institute
ILO: International Labor Organization
INASE: National Seed Institute
INDEC: National Institute of Statistics and Censuses
INTA: National Institute of Agricultural Technology
INTI: National Institute of Industrial Technology
IPCC: Intergovernmental Panel on Climate Change
IRB: Biological Resources Institute
IUCN: International Union for Conservation of Nature
LACFC: Latin America and the Caribbean Forestry Commission
MAGyP: Ministry of Agriculture, Livestock and Fisheries
MAB: Man and the Biosphere Programme
MERCOSUR: Southern Common Market
NWFP: non-wood forest products
NGOs: Non-Governmental Organizations
OTBN: Native Forest's Territorial Planning
PIARFON: Applied Research Projects for Native Forest Resources
PNEF: National Forest Statistics Program
PNPBN: National Native Forest Protection Program
PROMEF: Program for Domestication and Improvement of Species for High Value Application
RAJB: Argentine Network of Botanical Gardens
RAMSAR: Convention on Wetlands
RBG: Network of Germplasm Banks
SAyDS: Secretariat of Environment and Sustainable Development
SENASA: National Service of Agrifood Health and Quality
SIFAP: Federal Protected Areas System
UCAR: Unit for Rural Change
UNESCO: United Nations Educational, Scientific and Cultural Organization
UMSEF: Management Unit of Forest Assessment System
UNLP: La Plata National University

In the context of this report, the term forest refers to both native and plantation forests. Moreover, the terms plantation forests and cultivated forests are used as synonyms.

Introduction

The Azul river running through El Bolsón valley to Puelo Lake, Río Negro. Author Pablo Oliveri, courtesy of UCAR-MAGyP.

Argentine Republic

Overview

The Argentine Republic is on the southern end of the American continent, and its mainland covers 2,791,810 km^2. The mainland of the country spans 3,700 km, between 22º and 55º south of the Equator. That large span of land includes a wide spectrum of climates, ranging from the subtropical areas of the north to the cold areas of the south, though much of the country is temperate. It has borders to the north with Bolivia, to the northeast with Paraguay, to the east with Brazil, Uruguay and the Atlantic Ocean, and to the west with Chile. It has a long maritime coastline, from the River Plate to Tierra del Fuego.

The Argentine territory comprises 23 provinces and the Autonomous City of Buenos Aires, the country's capital.

As per the National Constitution, Argentina has a representative, republican and federal government. The country's 23 provinces and the Autonomous City of Buenos Aires have their own Constitutions and Institutions, based on the global framework provided by the National Constitution.

Forestry Institutions

Forest-related powers at the national level were concentrated in the National Forest Administration, the enforcement agency created in 1948 through Law No. 13273 for the Protection of Forest Resources. In 1973, after Law No. 20531 was passed, said agency became the National Forest Institute (IFONA), which was then dissolved through Decree No. 2284 of 1991. Its powers as regards native forests were transferred to the Forests Direction (DB) of the Secretariat of Environment and Sustainable Development (SAyDS); while plantation forests are managed by the Forestry Production Direction (DPF) of the Ministry of Agriculture, Livestock and Fisheries (MAGyP).

Also under the aegis of the MAGyP, the National Institute of Agricultural Technology (INTA) is a self-governing agency focused on developing research and technological innovation activities in value chains, regions, and territories, aimed at improving the country's competitiveness and sustainable rural development. The management of Protected Areas is carried out by the National Parks Administration (APN), a de-centralized agency under the aegis of the National Tourism Secretariat (STN).

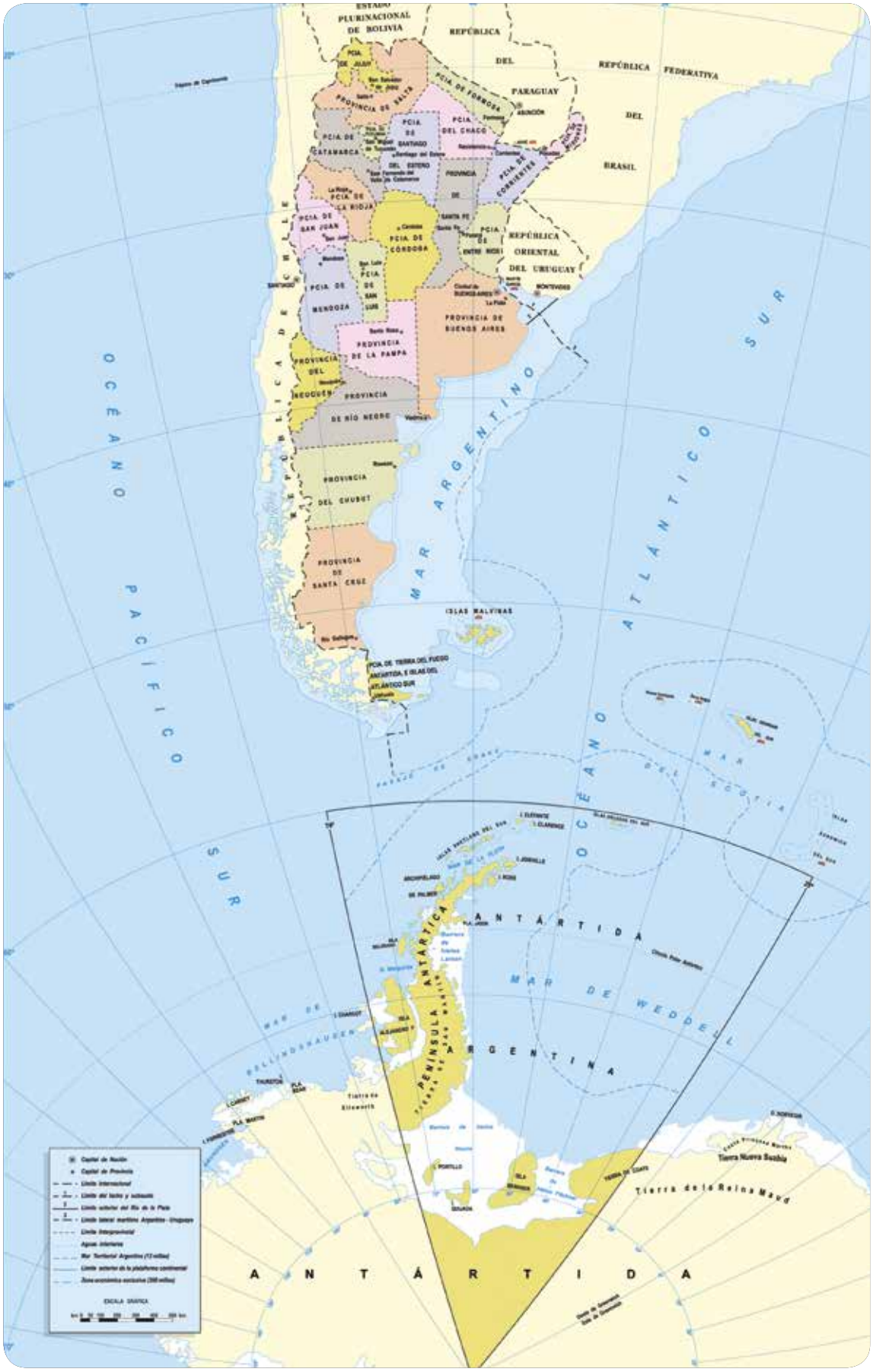
The research system in Argentina is complex in nature. There are several coexisting entities, such as the National Scientific and Technical Research Council (CONICET), which mainly funds basic science; self-governing institutions devoted to the development of technologies and, to a lesser degree, to the creation of knowledge (such as the aforementioned INTA, and the National Industrial Technology Institute, INTI), more than twenty National Universities, of which at least six offer courses directly linked to the forestry industry (Comahue National University, Patagonia National University, La Plata National University (UNLP), Formosa National University, Misiones National University, and Santiago del Estero National University), and various institutes specialized in the subject (such as the Andean-Patagonian Center for Forest Extension and Research, CIEFAP, and the Center for Forestry Research and Experiences, CIEF) or with an indirect effect on the area, through the development of regional technological models which deal with the topic of native forests. The Center for Research and Technology of the Wood Industry and Associated Industries (CITEMA), a part of the INTI, is in charge of applied research for wood transformation.

Besides the aforementioned institutions, other Universities, with no direct link to the subject, include research groups dealing with forest sciences and associated topics. In general, these operate within schools of agricultural engineering or natural resource management, as in the case of the North-Eastern National University, the Tucumán National University, the Córdoba National University, and the Buenos Aires University.

Parque Chaqueño region. Author Forest Direction, SAyDS.

Bi-continental map of the Argentine Republic

Figure 1



Source: National Geographic Institute

Argentine Ecoregions

Ecoregions are geographically defined territories in which certain geomorphological or climactic conditions, relatively uniform or recurring, dominate, characterized by a vegetal structure of natural and semi-natural communities sharing a considerable group of dominant species, and general ecological dynamics and conditions, the interactions of which are essential for its long-term persistence (APN, 1998).

The following are the forest ecoregions defined for the country:

Monte de sierras y bolsones (Hill and valley bush)

An arid region, with a broad diversity in terms of geology, geomorphology and elevation. It is associated to the mountains and hills of the west of the country, which go from Jujuy to the north of Mendoza. Along its western edge, this ecoregion shows steep slopes which, at certain heights, connect it to the *Puna* to the north and the Andes to the south. The base of those slopes present tectonic intermountain valleys, the most important of which are the Quebrada de Humahuaca, the Quebrada del Toro, Valles Calchaquíes and the high valleys of the De los Patos River, and the Jáchal and Bermejo rivers (Desaguadero river system).

The region has a dry subtropical weather in the north, as the humidity from the Atlantic air mass enters the region and sets on the eastern side of the hills (*Yungas o Selva Tucumano Boliviana* ecoregion). The region as a whole receives little rainfall, averaging anually between 80 and 200 mm. The soil is arid, primarily sandy, poor in organic content and saline, with frequent rock outcroppings and stoniness.

The region's plant structure is that of a tall brush-steppe (between 1 and 3 meters tall), very sparse at places, dominated by *Larrea divaricata* and *Neosparton ephedroides*, and, to a lesser degree, trees like *Cercidium praecox* and others, which form the typical community known as "*jarillal*". These species tend to favor the well-drained soils of intermountain valleys (Subregion of *Jarillares de Bolsones y Valles*), while the bushes grow shorter and sparser towards the hillsides and mountainsides, with dominance of columnar cacti (*cardón*), which can grow to be 4 or 5 m tall (Subregion of *Cardonales de Laderas*). The bottom of the valleys shows ecological conditions with high salt concentration, due to the strong level of water evaporation: saltpans, where halophyte communities develop. Along their edges, there are trees like *algarrobo* (*Prosopis* sp.), which, thanks to the supply of subterranean water, which compensates for the local aridity in the region, form gallery forests on the fluvial terraces of the region's waterways.

As regards fauna, there are several subterranean rodents, such as *vizcacha* (*Lagostomus maximus*), *tuco-tuco* (*Ctenomys* sp.), *cuis* (*Microcavia australis*) and field mice; other mammals, such as opossums (*Didelphis* sp.), *quirquincho* (*Tolypeutes mataco*), Geoffroy's cats (*Felis geoffroyi*), pumas *(Puma concolor*), guanacos (*Lama guanicoe*), foxes (*Pseudalopex* sp.), hog-nosed skunks (*Conepatus humboldtii*), and lesser grisons (*Galictis cuja*); as regards birds: condors (*Vultur griphus*), Andean gulls (*Larus serranus*), *carpintero de los cardones* (*Melanerpes cactorum*) and several Chaco-based species. The most prominent reptiles are the *lagarto overo* (*Tupinambis teguixin*), tortoises (*Chelonidis donosobarrosi*), lizards (*Liolaemus* sp.), and snakes.

Yungas or Selva Tucumano Boliviana (Yungas or Tucumano Bolivian Forest)

The *Yungas*, also known as the *Selva Tucumano Boliviana*, appears in several mountain areas linked to the Andes. The prevalence of this ecoregion throughout South America means it appears from Venezuela to the Argentine north-west. In Argentina, it appears intermittently in the provinces of Salta, Jujuy, Tucumán and Catamarca, generally on sub-Andean hills. The ecoregion's climate is warm and humid/subhumid. Temperature and moisture conditions vary based on altitude, latitude, position on the relief and hillside exposure. These hills create an orographic barrier that condenses the humid currents from the South Atlantic anticyclone. This phenomenon makes it possible for a dense forest cover to

exist. The Yungas appear between 400 and 3000 m.a.s.l, and their annual rainfall is 900-1000 mm, reaching 1300 mm in specific areas. Rainfall is concentrated in the summer, and lasts five or six months. During the colder season, both condensation and the abstraction of water from the mists that are so typical of these "cloud forests" partly offset the lack of rainfall.

The broad spectrum in terms of altitude creates major climactic differences, and, hence, different plant formations. The following vegetation strata appear as altitude increases: a) Piedmont Jungle, hot and humid, dominated by tree species such as *tipa blanca* (*Tipuana tipu*), *cebil* (*Anadenanthera colubrina*), *pacará* (*Enterolobium contortisiliquum*), *tarco* or *jacarandá* (*Jacaranda mimosifolia*), *lapacho rosado* (*Handroanthus impetiginosus*), and *viscote* (*Acacia visco*); b) Montane Jungle, temperate-warm and humid, dominated by laurel (*Cinamomunn porphiria*), *horco-molle* (*Blepharocalyx salicifolia*), cedars (*Cedrela* sp.) and *nogal criollo* (*Juglans australis*) c) Montane Forest, temperate (with frequent winter frosts) and humid, dominated by alders (*Alnus acuminata*), *pino del cerro* (*Podocarpus parlatorei*) and *nogal criollo* (*Juglans australis)*, and d) Montane Grasslands, temperate-cold and subhumid, alternating with patches of Montane Forest and shrubs, and creating purely herbaceous communities at higher altitudes. Local fauna shares species with the *Selva Paranaense* ecoregion and the Chaco plains, with the most important being jaguars (*Panthera onca*), pumas (*Puma concolor*), Geoffroy's cats (*Oncifelis geoffroyi*) and tapirs (*Tapirus terrestris*). As regards birds, over 60 species could be considered typical in the region, such as *paloma nuca blanca* (*Columba* sp.), glaucous macaws (*Anodorhyncus glaucus*), Tucumán amazons (*Amazona tucumana*) and violet-capped woodnymphs (*Thalaurania glaucopis*).

Chaco Seco (Dry Chaco)

This ecoregion is a vast plain, with a gentle northwest-southeast slope, and covering the western half of the provinces of Formosa and Chaco, the east of Salta, almost the whole of Santiago del Estero, the north of Santa Fe and Córdoba, and zones in Catamarca, La Rioja and San Luis. The plain is interrupted by occasional hills, mainly in the south. Just as the Chaco plain taken as a whole, the Chaco Seco ecoregion is the result of the sediments deposited in the great Chaco-Pampean rift valley. Besides major loessial wind contributions, there are important alluvial and fluvial processes, linked to the large influx of material from the Andean mountains. This is where the basins of the rivers Bermejo, Pilcomayo, Juramento and Dulce, which flow across the region, start and are organized. The region has a continental, warm subtropical weather, with zones that record the highest absolute temperatures in the whole continent. The mean annual temperature, from north to south, ranges from 23 ºC to about 18 ºC. Rainfall oscillates between 500 and 700 mm per year, is clearly concentrated in the summer, and shows a clear reduction as one moves towards the limit with the *Monte* ecoregion, to the southwest. In some areas, such as the so-called "Agricultural Strip" in Chaco and the "Chaco Gateway" in Salta, rainfall reaches 800 mm. Based on climactic and geomorphologic variations, the following subregions can be identified: (a) *Chaco de Derrames Fluviales*; (b) *Chaco Semiárido*; (c) *Chaco Árido*; (d) *Chaco Subhúmedo*; and (e) *Chaco Serrano*.

The vegetation is dominated by xeric forests, the trees of which become shorter and scragglier as one moves towards the *Chaco Árido* subregion, in the region's southwest. There is also an abundance, in specific zones and subregions, of montane forests, savannahs and grasslands. The highest areas, in a flat relief context, have xeric forests of *quebracho colorado santiagueño* (*Schinopsis quebracho colorado*) and *quebracho blanco* (*Aspidosperma quebracho blanco*), and also *mistol* (*Zizyphus mistol*) and *itín* (*Prosopis kuntzei*). In some lowlands, salinity and drainage constraints affect floristic composition, giving rise to communities of *palo santo* (*Bulnesia sarmientoi*), *algarrobo* (*Prosopis* sp.) and *chañar* (*Geoffroea decorticans*). Forests alternate with grasslands (*pampas*) of *aibe* (*Stipa* sp.), associated to ancient clogged riverbeds.

The area known as *Chaco Serrano* ranges from north to south, over the Subandean and Pampean Hills. It covers the low hillsides of hills and ravines, creating an extensive ecotone with the *Yungas* and *Monte* ecoregions, and reaching heights of about 1800 m.a.s.l. The area is dominated by xeric forests comprising *horco-quebracho* (*Schinopsis haenkeana*), *visco* (*Acacia visco*), *churqui* (*Prosopis ferox*), and *molle* (*Schinus poligamus*).

As regards *Chaco Seco* fauna, the most representative animals are toothless mammals: *mulitas* (*Dasypus septemcinctus*) and *tatúes*, such as the *pichiciego chaqueño* (*Calyptophractus retusus*), *mataco bola* (*Tolypeutes mataco*), *tatú carreta* (*Priodontes maximus*) and giant anteaters (*Myrmecophaga tridáctila*). There are also large mammals, such as jaguars (*Panthera onca*) and pumas (*Puma concolor*), and herbivores, like *chancho quimilero* (*Parachoerus wagneri*), peccaries (*Tayassu tajacu*), and brocket deers (*Mazama gouazoubira*). In terms of birds, the area is dominated by *chuñas* (*Cariama cristata*), martineta tinamous (*Eudromia elegans*), *charatas* (*Ortalis canicolis*) and greater rheas (*Rhea americana*), among others.

Chaco Húmedo (Humid Chaco)

This ecoregion shows a gentle west-east slope, dominated by depressed environments. It covers the eastern half of the provinces of Formosa and Chaco, the northwestern end of Corrientes and the North of Santa Fe. It has a warm subtropical climate. The annual mean temperature decreases towards the south, ranging from 23 ºC at the border with Paraguay, to about 18 ºC in the center of Santa Fe. Annual rainfall in the eastern part amounts to 1300 mm, and decreases towards the west, down to 750 mm. The same east-west trend can be seen in terms of rainfall concentration in summer months. Vegetation is more diverse than that of *Chaco Seco*. The high forests of the hills are mainly composed of *quebracho colorado chaqueño* (*Schinopsis balansae*), *quebracho blanco* (*Aspidosperma quebracho blanco*), *guayaibí* (*Patagonula americana*), *urunday* (*Astronium balansae*), *lapacho* (*Handroanthus heptaphyllus*), *guayacán* (*Caesalpinia paraguariensis*) and *viraró* (*Ruprechtia laxiflora*). The lowest areas show

low forests, both dense and sparse, bordering estuaries and ravines, comprised mainly of *algarrobos* (*Prosopis* sp.), *tatané* (*Pithecellobium scalare*), *guaraniná* (*Bumelia obtusifolia*), *churqui* (*Prosopis ferox*), *espinillo* (*Acacia caven*) and *tala* (*Celtis tala*); grasslands, in which *espartillo* (*Elionurus muticus*) is the dominant species, together with several herbaceous species and often trees from low-forest species, which form savannahs.

Fauna is very diverse, thanks to the heterogeneous habitat. There are large mammals, such as *aguará guazú* (*Chrysocyon brachyurus*), *carayá* (*Alouatta caraya*), sourthern night monkeys or *mirikiná* (*Aotus azarae*), peccaries (*Tayassu* sp.), giant anteaters (*Myrmecophaga tridáctila*), *carpincho* (*Hydrochaeris hydrochaeris*), brocket deers (*Mazama gouazoubira*), pumas (*Puma concolor*), and marsh deers (*Blastocerus dichotomus*). The most prominent birds are the greater rheas (*Rhea americana*) and dusky-legged guans (*Penelope obscura*).

Selva Paranaense o Selva Misionera (Atlantic Forest)

This region represents the humid subtropical jungle covering the basins of the Paraná and Uruguay rivers, in southern Brazil, eastern Paraguay, and the northeastern end of Argentina. In the latter, the ecoregion covers almost all of the territory of the province of Misiones, its limits represented by three mighty rivers: River Uru-

guay, River Paraná, and its tributary, River Iguazú. The weather is warm and humid, with rainfall going from 1600 mm near the border with the province of Corrientes to 2000 mm in the northeast, and evenly distributed throughout the year.

Mean annual temperatures hover about 20 ºC. The region's typical red soil is due to the transformation of the basaltic material under a warm and humid climate.

Vegetation presents a dense tree cover, comprising four or five vertical strata, the topmost of which can reach heights of 30-40 m. The ecoregion as a whole includes 2000 vascular plants, and the Argentine sector in particular ranks first among all ecoregions in the country in terms of biodiversity. The most prominent trees are *lapacho negro* (*Handroanthus heptaphyllus*), laurel (*Nectandra saligna*), *guatambú blanco* (*Balfourodendron riedelianum*), *palo rosa* (*Aspidosperma polyneuron*), *cedro misionero* (*Cedrela fissilis*), *peteribí* (*Cordia trichotoma*) and *yerba mate* (*Ilex paraguariensis*).

The following mammals stand out in terms of diversity: marsupials *(*Order *Metatheria);* carnivores, such as tayras or *irará* (*Eira barbara*)*;* Neotropical otters (*Lontra longicaudis*)*;* and five felids: jaguars (*Panthera onca*), pumas (*Puma concolor*), ocelots (*Felis pardalis*), oncillas (*Leopardus tigrinus*) and margays (*Felis wiedii*). Moreover, 550 bird species have been found in the province of Misiones alone: more than 50% of the total bird fauna of Argentina. There is a prominent presence of forest eagles, such as harpy eagles (*Harpia harpijha*) and the black-and-white hawk-eagle (*Spizastur melanoleucus*), among others.

Delta e Islas del Paraná (Delta and Paraná Islands)

This ecoregion spans the alluvial plains of the middle and lower sections of the River Paraná and the River Paraguay, its tributary, which cross the Chaco-Pampean plain, along a great geological fault. In its southernmost area, it also includes the Paraná delta and the River Plate's riverbed, which cover an ancient marine estuary.

As a whole, the region's landscape comprises low and floodable islands, separated by lateral tributaries and the main riverbeds of the major rivers, and vast riverside lowlands. As the strong action of the rivers is the main shaping factor in the ecoregion, it could be identified as an "azonal" ecoregion, as its features do not stem from major continental factors, such as climate and geology, of the zones it spans. The rivers act by depositing the sediments they drag from the plateaus and mountains from which they flow.

Both the islands of the fluvial terraces and those of the delta create vast "buckets", regularly flooded towards their center, and with elevated edges. These, called *albardones*, are only reached by extraordinary floods, so islanders choose them for dwelling. The water's very action creates connection channels which, crossing the *albardón*, make it possible for the island to be flooded or drained based on water level.

The ecoregion's vegetation creates forests and shrubs, in all cases along narrow riverbank strips on the *albardones*; scrublands and grasslands towards the center of islands without open bodies of water; hydrophilic and aquatic communities along channels and rivers and in the lagoons within the islands. Forests are mainly comprised of *sauce criollo* (*Salix humboldtiana*), *aliso del río* (*Tessaria integrifolia*) and *seibo* (*Erythrina crista-galli*).

Fauna is particularly rich relative, for instance, to that of the pampas, due to the aforementioned biogeograph-

Argentine Ecoregion Map Figure 2

Source: National Parks Administration.

ical aspects, the variety of environments, and the prevalence of natural refuge. The most prominent species are *lagarto overo* (*Tupinambis teguixines*) and broad-snouted caiman (*Caiman latirostris*). There is a dominance of aquatic birds, with a great variety of ducks, herons, coots and related species. Tree-covered environments support a population of dusky-legged guans (*Penelope obscura*), and numerous bird communities. Among mammals, there are still large populations of *coipo* (*Myocastor coypus*), *carpincho* (*Hydrochoerus capíbara*), marsh deers (*Blastocerus dichotomu*), and Neotropical otters (*Lontra longicaudis*).

Espinal
(Thorny deciduous shrubland forest)

The *Espinal* is part of the Chaco-Pampean plain, and it borders the *Pampa* ecoregion to the north, west, and south, covering the south of Corrientes, the northern half of Entre Ríos, a strip in the center of Santa Fe and Córdoba, the center and the south of San Luis, the eastern half of La Pampa and the south of Buenos Aires. The landscape is dominated by flat to gently-rolling plains, with low forests, savannahs and grasslands, mostly devoted to agriculture nowadays.

Due to the region's extension, climate is extremely varied: warm and humid to the north, and dry and temperate, with clear water deficits, towards the west and the south.

The *Espinal* can be divided in three subregions: Ñandubay, in the humid provinces of Entre Ríos and Corrientes; Algarrobos, in the subhumid central zone, the transition between the Pampa and Chaco regions; and, finally, Caldén, a semiarid sector, a transition between the *Pampa* and *Monte* ecoregions.

Typical plant formations are low forests of xeric, woody species, both dense and sparse, with a single stratum; and savannahs, interrupted by pure grasslands. Very few taxa are endemic to the *Espinal*. The *caldén* (*Prosopis caldenia*) is one of the few examples of a species restricted to this ecoregion. The northeast of the region is dominated by forests of *ñandubay* (*Prosopis ñandubay*), *algarrobo* (*Prosopis alba, Prosopis nigra*), *molle* (*Schinus poligamus*) and *espinillo* (*Acacia caven*). The most prevalent species towards the center of the area are *Prosopis alba* and *Prosopis nigra*, together with *chañar* (*Geoffroea decorticans*) and *tala* (*Celtis tala*). The west and the south are dominated by almost-pure forests of *caldén* (*Prosopis caldenia*). As regards herbaceous species, most are those from the *Pampa* ecoregion, with a dominance of graminaceous plants typical of temperate grassland and, to some degree, in the *Chaco* ecoregion.

Describing the *Espinal* fauna is not easy. The usual species throughout its span include carnivores, such as pumas (*Puma concolor*), Pampas foxes (*Pseudalopex gymnocercus*), hog-nosed skunks (*Conepatus humboldtii*) and tayras (*Eira barbara, Galictis cuja*).

Pampa

The *Pampa* ecoregion —also known as the Pampa Plain or Pampa Prairie— covers the province of Buenos Aires (except its southern end), the northeast of La Pampa and the south of Córdoba, Santa Fe and Entre Ríos. The *Pampa* ecoregion is the result of the wind's filling the great graben that reaches the *Chaco* region.

The gentle relief is interrupted towards the south, by the Tandil and Ventana hills, reaching about 500 and 1000 m.a.s.l., respectively. Climate is temperate and humid/subhumid, with warm summers. Rainfall, even throughout the year, goes from about 600 mm in the southwest to 1100 mm in the northeast. Annual mean temperature goes from 15 ºC in the south to about 18 ºC in the north. Temperate grasslands are the region's typical structure, dominated by a community known as the *flechillar*, where graminaceous genre such as *Stipa*, *Piptochaetium*, *Bromus*, *Aristida*, *Briza*, *Setaria*, *Melica*, *Poa*, *Paspalum* and *Eragrostis* stand out.

As regards fauna, the region stands out for its great herbivores, almost gone nowadays: Pampas deer (*Ozotoceros bezoarticus*) and guanacos (*Lamaguanicoe*); carnivores, such as pumas (*Puma concolor*), Geoffroy's cats (*Felis geoffroyi*), Pampas foxes (*Pseudalopex gymnocercus*), hog-nosed skunks (*Conepatus humboldtii*), tayras (*Eira barbara, Galictis cuja*); other mammals, such as

vizcacha (*Lagostomus maximus*) and *cuis* (*Microcavia australis*), *coipo* (*Myocastor coipo*), armadillos (*Chaetophractus villosus*) and opossums (*Didelphis albiventris*); and birds, such as greater rheas (*Rhea americana*) and *chajá* (*Chauna cavaría*).

Monte de llanuras y mesetas (Plain and plateau bush)

This ecoregion covers the province of Mendoza, to the east of the Andes, Neuquén, La Pampa, and reaches the Atlantic shores of Río Negro and the northeast of Chubut. Together with the *Monte de sierras y bolsones* ecoregion, they are the most arid in the country. However, the former differs from the latter in that in it, steep landscapes tend to disappear, leaving their place to plains and vast staggered plateaus.

The region is temperate-arid, and the little rainfall it receives (usually, about 100 mm, and 200 mm on occasion) is evenly distributed throughout the year in the north. The south of the region, there is a greater prevalence of Mediterranean-like whether, typical of Patagonia, characterized by winter rains.

Soils are mainly aridisols, as befits the arid climate. Salinity and stoniness are frequent.

Vegetation is poorer in terms of communities and species than that of the *Monte de sierras y bolsones* ecoregion: there are no *caldén* forests, and no bush steppe on the hillsides; there are no *algarrobo* communities south of the center of Mendoza; there is less diversity in some botanical families, such as the Cactaceae and the Zygophyllaceae. The *jarillal* (*Larrea divaricata*) dominates both in plateaus and the slopes of fluvial terraces and low plains.

Local fauna is rich in cave-dwelling mammals, and the region generally shares most species with the northern

Bush (Monte) and the Patagonian Steppe (Estepa Patagónica). Typical animals include *mara* (*Dolichotis patagonum*), *cuis chico* (*Microcavia australis*), culpeos (*Pseudalopex culpaeus*), pumas (*Puma concolor*), guanacos (*Lama guanicoe*), lesser rheas (*Rhea pennata*), *canastero patagónico* (*Asthenes patagonica*) and *monjita castaña* (*Neoxolmis rubetra*).

Bosques Patagónicos o Andino Patagónicos (Patagonian or Andean-Patagonian forests)

The *Bosque Patagónico* ecoregion, also known as Sub-Antarctic or Andean-Patagonian forest, covers a narrow strip along the Andean massif, from the north of Neuquén to Tierra del Fuego and Isla de los Estados. It has a mountainous landscape, with steep and sheer reliefs, snowy peaks, glacial valleys, volcano-created landforms (in the north of the region), several waterways and lakes that drain into the Atlantic and the Pacific through different rivers. Maximum altitudes reach 3000-3700 m.a.s.l. in Neuquén and decrease towards the south, reaching 800-1400 m.a.s.l. in Tierra del Fuego. The climate is temperate-cold and humid, with winter snow and rain, frost almost throughout the year, and strong western winds. Three subregions can be identified within the ecoregion: *Bosques Septentrionales* (Northern Forests), *Bosques Meridionales* (Southern Forests) and *Insulares y Alto andina* (insular and high-altitude Andean region).

In terms of vegetation, the region is dominated by humid, temperate, semi-deciduous (a combination of deciduous species and species with persistent foliage) forests, with different species at different altitudes, degrees of hillside exposition, and latitude. Forests are mostly tall (30 m), dense, and interrupted by shrublands and low forests. North of the center of Neuquén, the continuous forest cover gives way to sparse forests with denser "islands", dominated by *pehuén* or *araucaria* (*Araucaria araucana*) trees.

The *Bosques Septentrionales* ecoregion show a richer variety of species in the areas linked to the Valdivian forest region, located in border areas such as Puerto Blest (Nahuel Huapi National Park), where annual rainfall can reach 4000 mm, dominated by species including *coihue* (*Nothofagus dombeyi*), *alerce* (*Fitzroya cupressoides*), *mañiú* (*Podocarpus nubigena*), *mañiú hembra* (*Saxegothea conspicua*), *ulmo* (*Eucryphia cordifolia*), *avellano* (*Gevuina avellana*), *lingue* (*Persea lingue*) and many vines, epiphytes and parasitic species. Towards the east, average rainfall decreases dramatically, and the forests becomes poorer in terms of genera and

species: the dominant genus is *Nothofagus*, with species such as *ñire* (*N. antartica*), *lenga* (*N. pumilio*), *raulí* (*N. nervosa*), *roble pellín* (*N. obliqua*), *ciprés de la cordillera* (*Austrocedrus chilensis*), *notro* (*Embothrium coccineum*) and *radal* (*Lomatia hirsuta*).

The *Bosques Meridionales* subregion has little presence in Santa Cruz, but is very dominant in Tierra del Fuego, where it covers the south of the province. These forests are less diverse in terms of species, and the following stand out: *guindo* (*Nothofagus betuloides*), *lenga*, *ñire* and *canelo* (*Drimys winteri)*. In Tierra del Fuego, these forest alternate with peatlands, flooded areas covered by moss of the *Sphagnum* genus.

As regards fauna, the main species in the ecoregion are pumas (*Puma concolor*); two endemic deer: *pudú* (*Pudu pudu*, the smallest deer in the world) and *huemul* (*Hippocamelus bisulcus*); a small marsupial known as *monito del monte* (*Dromiciops australis*); kodkods (*Oncifelis guigna*); and *huillín* (*Lontra provocax*).

Forest of *Nothofagus* sp., Yuco Alto, Lácar Department, Neuquén. Author Pablo Oliveri, courtesy of UCAR-MAGyP.

Argentina's status relative to the Montreal Process

Argentina is a member country of the Montreal Process (MP) since 1995, and is an active participant of both the Working Group's and the Technical Advisory Committee's meetings. Moreover, it hosted the 13th meeting of the Working Group in Bariloche, in 2001, and the 18th meeting of the Working Group in Buenos Aires, in November, 2007. It also hosted the 7th meeting of the Technical Advisory Committee in Iguazú, in 2004. In May, 2002, Argentina submitted its first Report for the Montreal Process. It also organized the ad hoc meeting of the Working Group in 2009, against the background of the World Forestry Congress.

Argentina, as per Resolution No. 326/2002 of the SAyDS, implements the *Montreal Process Criteria and Indicators National Program* under the SAyDS. Moreover, as per Resolution No. 633 /2011 of the MAGyP, it created the Technical Working Group for Sustainable Forest Management, coordinate by the DPF.

The Montreal Process Criteria and Indicators (C&I) are an essential tool for public and private institutions. Sustainable forest management is currently defined across economic, environmental, social and cultural dimensions, based on the forestry principles agreed upon on the United Nations Conference on the Environment and Development (UNCED), held in Rio de Janeiro, Brazil, in 1992, and ratified after twenty years in the same city, during the Rio+20 Conference.

> *The criteria define the essential elements or principles used to establish the sustainability of forest management, paying due attention to the productive, protective and social functions of forests and forest ecosystems. Each criterion is defined based on indicators, which are measured and monitored regularly in order to establish the effects of forest management over time.*

The preparation and application of C&I will make it possible to unify the concept of sustainable forest management and to crystallize it as an operational instrument which could be applied when managing forests. Decision-makers could use the national-level C&I to orient policies, regulations and laws supportive of sustainable forest management.

Austrocedrus chilensis "ciprés de la cordillera".
Author Pablo Oliveri, courtesy of UCAR-MAGyP.

To that effect, national institutions in charge of sustainable administration and production and of conservation of forest resources have created teams for selection and monitoring of relevant C&I at the national level. The set of trends relative to identified indicators could show the forestry sector's level of sustainability, as well as progress or deterioration in that regard. It is desirable for the trends of all criteria to show a positive evolution over time. When indicators reveal that sustainability is not moving in the right direction, government can adjust its policies to achieve the desired goals.

Information on the situation and trends at the national level, and the predictions based on that information, can help rationalize the processes for policy formulation and decision making. The goal is to promote more ade-

quate native and plantation forest management practices over time, and to bring about the development of an ever more productive level of forest assets, able to satisfy the country's social, economic, and environmental needs, now and in the future.

In this sense, the C&I to be developed at the national level to prepare the Second National Report on the MP (2015) were established. The Baseline or starting point for the comparison of changes recorded in forests is the First National Report on the Montreal Process (2002). It is necessary to ensure compatibility and comparability, and to constantly provide feedback on the applicability of the C&I. Thus, the C&I represent a dynamic procedure used to measure, assess, supervise and prove the advances achieved as regards the country's forest sustainability in a given period of time.

In order to assess the forest state-of-affairs, this Report establishes a weighting mechanism for the selected indicators. To that end, the baseline scenario chosen was that of the First Argentine Report on the Montreal Process (2002). Bearing in mind that indicators can change over time based on conditions, priorities and management goals, two aspects to consider were established: Indicator Evolution and Information Quality.

Information quality refers to the availability, regularity and reliability of the data. It is assessed to be **high** if information is regular and very reliable, and **low** if there is little or no information, or if it is irregular or very unreliable. Information quality is deemed to be **average** when it is relatively reliable and available with variable regularity.

It is necessary to clarify that, for the analysis of the indicators presented in this report, the period 2002-2012 was generally considered for periodical quantitative data. The choice was made according to the availability of data managed by SAyDS and MAGyP when preparing the report. An exception was made with Forest Fires and International Trade of Forest Products, whose series were extended to the year 2013.
For other indicators or studies without a periodical base, information for more recent years was provided.

The assessment of Indicator Evolution is focused on the interventions carried out in forest lands which must be supplemented in space and time in order to ensure a successful evolution at the national level. When the data of an indicator over time are compared, it is possible to see **a positive evolution** if the indicator's trend helps to improve forest management relative to the situation reported in the First Report. Otherwise, the indicator's evolution is deemed **negative** or, **neutral,** if no changes are recorded. A question mark means the data available are not enough for a comparison.

Indicator assessment	
Information Quality	
Low	L
Average	A
High	H
Indicator Evolution	
Neutral	→
Positive	↑
Negative	↓
Insufficient data	?

References:

F. Castañeda. Criterios e indicadores de la ordenación forestal sostenible: procesos internacionales, situación actual y perspectivas in Unasylva - Nº. 203.

Criterion 1
Conservation of biological diversity

Pampas deer (*Ozotoceros bezoarticus)* in Aguaracuá Reserve, province of Corrientes. Author Pablo Oliveri, courtesy of UCAR-MAGyP.

Forest of *Nothofagus* sp. and *Austrocedrus chilensis* "ciprés de la cordillera". Author Pablo Oliveri, courtesy of UCAR-MAGyP.

Criterion 1:
Conservation of biological diversity

Forests, and particularly native forests, support a substantial proportion of the planet's biological diversity and terrestrial species. Biological diversity enables an ecosystem to respond to external influences, to recover after disturbance, and to maintain essential ecological processes.

Human activities and natural processes can impact adversely on biological diversity by altering and fragmenting habitats, introducing invasive species, or reducing the population or ranges of species. Conserving the diversity of organisms and their habitats supports forest ecosystems and their ability to function, reproduce, and remain productive.

Indicator Assessment	
Information Quality	
Low	L
Average	A
High	H
Indicator Evolution	
Neutral	→
Positive	↑
Negative	↓
Insufficient data	?

Indicator	Information Quality	Indicator Evolution
1.1. Ecosystem diversity		
1.1.a. Area and percent of forest by forest ecosystem type, successional stage, age class, and forest ownership or tenure.	H	↓
1.1.b. Area and percent of forest in protected areas by forest ecosystem type, and by age class or successional stage.	H	↑
1.3. Genetic diversity		
1.3.a. Number and geographic distribution of forest associated species at risk of losing genetic variation and locally adapted genotypes.	A	?
1.3.c. Status of on site and off site efforts focused on conservation of genetic diversity.	H	?

1.1. Ecosystem diversity

Maintenance of the variety and quality of forest ecosystems is necessary for the conservation of species. Without sufficient habitat size, adequate connectivity, necessary structural diversity and appropriate protection and management measures, species may decline and become vulnerable to extinction.

These indicators provide information on the area and extent of ecosystem types, forest area under formal protection and the effects of fragmentation.

Aereal view of forestry areas and agroforestry systems in the province of Misiones. Author Pablo Oliveri, courtesy of UCAR-MAGyP.

1.3. Genetic Diversity

Genetic diversity, or the variation of genes within populations and species, is the ultimate source of Biological Diversity at all levels and is important for the functioning of healthy forest ecosystems. Threats to gene pools come from climate change, catastrophic events, and human activities and pressures.

Loss of genetic variation reduces the ability of species to adapt to environmental change and for society to maximize the potential benefits available from forest species, for example for medicines and other bio-resources. High levels of genetic diversity within populations are usually a measure of their greater potential for survival. The loss of genetic variation within species also makes forest ecosystems less resilient to change.

1.1.a. Area and percent of forest by forest ecosystem type, successional stage, age class, and forest ownership or tenure.

Rationale: This indicator provides information on the area and extent of forest ecosystem types, including successional stage, age class and the nature of tenure or ownership. The sustainability and stability of forest ecosystems may depend on their size and diversity. If these are not maintained, forests may become vulnerable to habitat degradation and loss. Tenures or ownership types may have a variety of management regimes associated with them - each with a different impact on biological diversity.

Information Quality: H **Indicator Evolution:** ↓

To identify native forests, this report uses the classification proposed by the Food and Agriculture Organization (FAO) through the Global Forest Resources Assessment (FRA) (FAO, 2001), adapted to the Argentine context. Forests are defined as Forest Lands (FL) presenting a tree cover with at least a 20% of native species reaching a height of 7 m. They may comprise closed forest formations, where trees of different size and the undergrowth cover most of the land, or open forest formations.

As regards forest ecosystem types, this report uses the classification of Ecological Zones or Ecozones proposed by FAO to the FRA (FAO, 2012) and the forest regions defined in the First National Inventory of Native Forests of Argentina (Figure 3). In Argentina, there are very few native conifer forests, and the area they cover is less than 1% of the total FL area. This is why the Ecozone clasificacion was adopted, and Table 1 shows the different forest ecosystem types associated to forest regions in Argentina and matches them to the classification proposed by FAO (FAO, 2012).

Selva Misionera region in the province of Misiones. Author Pablo Oliveri, courtesy of UCAR-MAGyP.

Argentine Forest Regions

Figure 3

Confeccionado:

Unidad de Manejo del Sistema de Evaluación Forestal (UMSEF)
Dirección de Bosques de la Nación.
Secretaría de Ambiente y Desarrollo Sustentable de la Nación.
Jefatura de Gabinete de Ministros.

Edición Mayo de 2015.

Fuente:
- SIG 250. Instituto Geográfico Nacional de la República Argentina.
- Unidad de Manejo del Sistema de Evaluación Forestal (UMSEF). Dirección de Bosques de la Nación. SAyDS.

Argentine forest regions and their correspondence with the Ecozone classification proposed by FAO

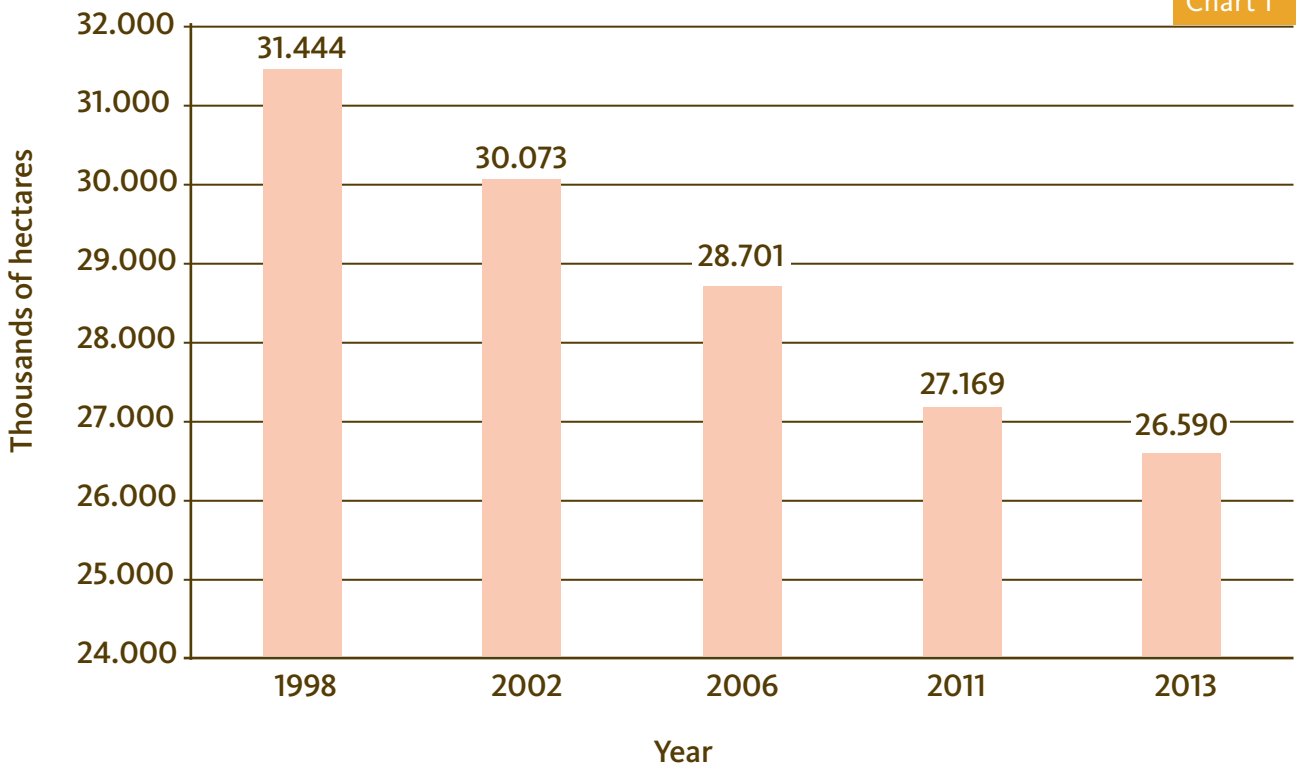
Table 1

Forest region	Description	Ecologic zone or Ecozone (FAO, 2012)
Selva Misionera (Selva Paranaense)	Multi-strata formation, 20 to 30 m tall, with three tree strata, a bambuseae and shrub stratum, a herbaceous stratum and a muscinal stratum. Presence of vines and epiphytes. Dominance of genera *Balfourodendron, Nectandra, Aspidosperma* and *Cedrela*.	Tropical rainforest, Subtropical humid forest
Selva Tucumano-Boliviana (Yungas)	Mountain and piedmont forests, 20 to 30 m tall, with two tree strata, one shrub stratum, one herbaceous stratum, and a muscinal stratum. Presence of vines and epiphytes. Dominance of genera *Tipuana, Phyllostylon, Enterolobium, Anadenanthera, Cedrela, Blepharocalyx, Podocarpus* and *Alnus*.	Tropical moist forest, Tropical mountain forest
Parque Chaqueño	The most extensive native forest region in Argentina. It shows xeric, semi-deciduous forests to the west, dominated by the species *Schinopsis lorentzii, Aspidosperma quebracho-blanco, Bulnesia sarmientoi* and several species of the *Prosopis* genus. To the east, forests become denser, with greater biodiversity, with the following major species: *Schinopsis balansae, Aspidosperma quebracho-blanco, Astronium balansae, Ziziphus mistol, Phyllostylom rhamnoides, Cordia americana, Handroanthus heptaphyllus, Pterogyne nitens, Prosopis* sp.,among others. The montane area is dominated by xeric forests, mainly composed on *Schinopsis haenkeana*. These areas alternate with grasslands, scrublands, palm tree fields and shrublands.	Tropical moist forest, Tropical dry forest
Espinal	Xeric deciduous forests, rarely growing taller than 10 m, alternating with palm tree fields, grass savannahs, grass steppes, and shrub steppes. Dominated by genera *Prosopis, Acacia* and *Geoffroea*.	Subtropical steppe
Bosque Andino-Patagónico	Primarily deciduous forests, with conifer communities. The most common genera are *Nothofagus, Austrocedrus* and *Araucaria*.	Temperate mountain forest
Monte	Xeric arbustive steppes, with isolated thickets. Main genera: *Larrea* and *Prosopis*.	Subtropical steppe

Source: Secretariat of Environment and Sustainable Development. Undersecretariat of Planning and Environmental Policy. Forest Direction. Forest Assessment System Management Unit.

Forest Land Area in Argentina. 1998 – 2013

Chart 1

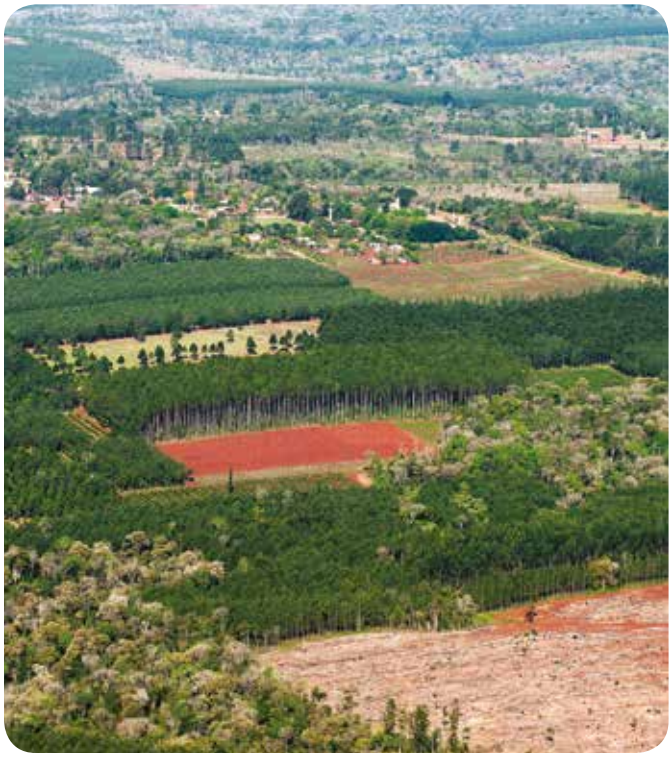


Source: Secretariat of Environment and Sustainable Development. Undersecretariat of Planning and Environmental Policy. Forest Direction. Forest Assessment System Management Unit, based on information taken from the First National Inventory of Native Forests of Argentina (1998) and subsequent updates (2002 to 2013).

The earliest available data on actual native forest area in Argentina are taken from the 1937 National Agricultural Census, which shows a native forest area of 37,535,308 hectares in that year. Through the First National Inventory of Native Forest (Native Forests and Protected Areas Project, IBRD loan 4085-AR, 1998-2005), the DB of the SAyDS gained access for the first time to national-, regional- and provincial-level data on the area of native forests, which, through subsequent updates, offer a view of their evolution over time (Chart 1).

Chart 2 shows the percentage of forest lands in 1998-2013, based on the total continental area of Argentina, which decreased about 2% in the last 15 years.

The loss of FL is a process that frequently appears in waves, associated to contexts conducive to agricultural expansion, either due to the price of agricultural commodities, to technological developments, or to the socio-political situation. Since the 1990s, Argentina is recording a deforestation trend, boosted by the investment in infrastructure, technological developments (genetically modified crops and no-till farming) and the international context (globalization), which are likely to have triggered one of the most profound processes of transformation of native forests in the history of the country (Charts 1 and 2).



Aereal view of forestry areas and agroforestry systems in the province of Misiones. Author Pablo Oliveri, courtesy of UCAR-MAGyP.

Percentage of area covered by forest lands in Argentina. 1998-2013

Chart 2

Source: Secretariat of Environment and Sustainable Development. Undersecretariat of Planning and Environmental Policy. Forest Direction. Forest Assessment System Management Unit, based on information taken from the First National Inventory of Native Forests of Argentina (1998) and subsequent updates (2002 to 2013).

Responding to this important process of land-use change prevalent in the last two decades, mainly due to the progression of the agricultural frontier, on November 28, 2007, National Law No. 26.331 (Minimum Budgets for the Environmental Protection of Native Forests), which defines the minimum environmental protection budgets used for the enrichment, restoration, conservation, exploitation and sustainable management of native forests and the environmental services they provide. Moreover, the law established a promotion regime and criteria for the allocation of funds in exchange for the services provided by the native forests, and requested all jurisdictions to carry out their Native Forest Territorial Survey (OTBN) on all forests in their territory. This led to a slowdown in the process of native forest loss in the last three years (Table 2).

Rate of loss of forest lands in Argentina, by period (%)

Table 2

Forest land rate of loss			
1998-2002	2002-2006	2006-2011	2011-2013
1,11	1,17	1,10	1,08

Source: Secretariat of Environment and Sustainable Development. Undersecretariat of Planning and Environmental Policy. Forest Direction. Forest Assessment System Management Unit, based on information taken from the First National Inventory of Native Forests of Argentina (1998) and subsequent updates (2002 to 2013).

Table and Chart 3 shows forest land area by forest region between 2002 and 2013. In this context, the progression of the agricultural frontier accounts for most of the reduction of native forests, and is particularly important in the *Selva Misionera*, *Selva Tucumano Boliviana* and *Parque Chaqueño* regions (Table and Chart 3). In the *Selva Misionera* region, native forests are giving way to industrial crops, such as tea, yerba mate, tobacco, and to afforestation with exotic species (pine and eucalyptus).Migratory agriculture is particularly relevant as a land use pattern in this region, giving rise to a great concentration of secondary native forests, locally known as *capueras*. The *Selva Tucumano Boliviana* region is the most affected by agricultural replacement, with sugarcane, citrus, tobacco and soybean (in the last few years) crops, especially at the Piedmont Forest altitude. In the *Parque Chaqueño* region, agricultural activity is mainly related to the production of soybean.

Forest land area, by forest region. 2002-2013

Table 3

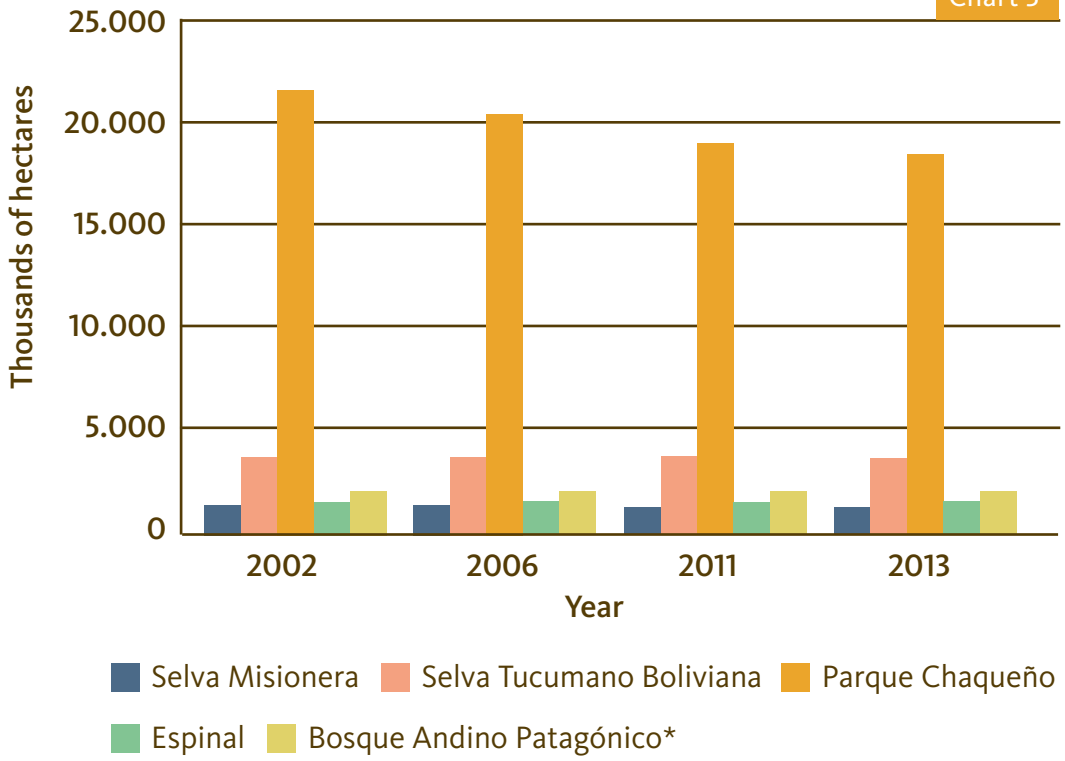
Forest region	Forest land area (thousands of hectares)			
	2002	2006	2011	2013
Total	30.073	28.701	27.169	26.590
Espinal	1.402	1.373	1.346	1.340
Parque Chaqueño	21.836	20.615	19.188	18.632
Selva Tucumano Boliviana	3.716	3.654	3.610	3.598
Selva Misionera	1.224	1.164	1.130	1.125
Bosque Andino Patagónico*	1.895	1.895	1.895	1.895

*This region has no variation during the period because it is not being monitored. The data for the region are those of the First National Inventory of Native Forests (1998).

Source: Secretariat of Environment and Sustainable Development. Undersecretariat of Planning and Environmental Policy. Forest Direction. Forest Assessment System Management Unit, based on information taken from the First National Inventory of Native Forests of Argentina (1998) and subsequent updates (2002 to 2013).

Forest land area by forest region. 2002-2013

Chart 3



*Bosque Andino Patagónico region has no variation during the period because it is not being monitored. The data for the region are those of the First National Inventory of Native Forests (1998).

Source: Secretariat of Environment and Sustainable Development. Undersecretariat of Planning and Environmental Policy. Forest Direction. Forest Assessment System Management Unit

Other wooded land area in Argentina. 1998-2013

Table 4

National categories	Area (thousands of hectares)				
	1998	2002	2006	2011	2013
Other wooded lands	64.975	63.291	65.179	64.867	64.745

Source: Secretariat of Environment and Sustainable Development. Undersecretariat of Planning and Environmental Policy. Forest Direction. Forest Assessment System Management Unit, based on information taken from the First National Inventory of Native Forests of Argentina (1998) and subsequent updates (2002 to 2013).

It is very important to bear in mind that the definition of native forests used in Law No. 26331 includes, besides the Forest Lands (FL) category, based on the FAO definition, other classes, such as low-height tree forests, palm tree fields and gallery forests, included in the Other Wooded Lands (OWL) category, also defined by FAO for the FRA (FAO, 2001). For that reason, there are differences between the area data presented under this criterion and the data reported in indicator 7.1.a, stemming from the different criteria used to identify forests and the different sources used to prepare the information.

The areas included in the OWL category cover lands with native species canopy cover of 5%-20 %, with trees reaching a height of 7 m; or lands with a canopy cover of over 20%, with trees shorter than 7 m; or lands with at least 20% of shrub cover, with shrubs with a minimum height of 0,5 m. This includes native gallery forests, shrublands, cane fields, and palm tree fields. When analyzing the evolution of OWL area between 1998 and 2013, it is possible to see that it remains relatively constant (Table 4), accounting for 23% of the total continental area of Argentina throughout the period under analysis.

Selva Tucumano Boliviana or *Yungas* region, province of Tucumán. Author Daniela García.

1.1.b. Area and percent of forest in protected areas by forest ecosystem type, and by age class or successional stage.

Rationale: This indicator provides information on the area and extent of forest by ecosystem type, age class or successional stage protected to safeguard biological diversity and representative examples of forest ecosystem types. This indicator will also help identify forest types of conservation value that are in need of protection. The level of formal protection given to forests is a reflection of the importance society places on their conservation.

Information Quality: H **Indicator Evolution:** ↑

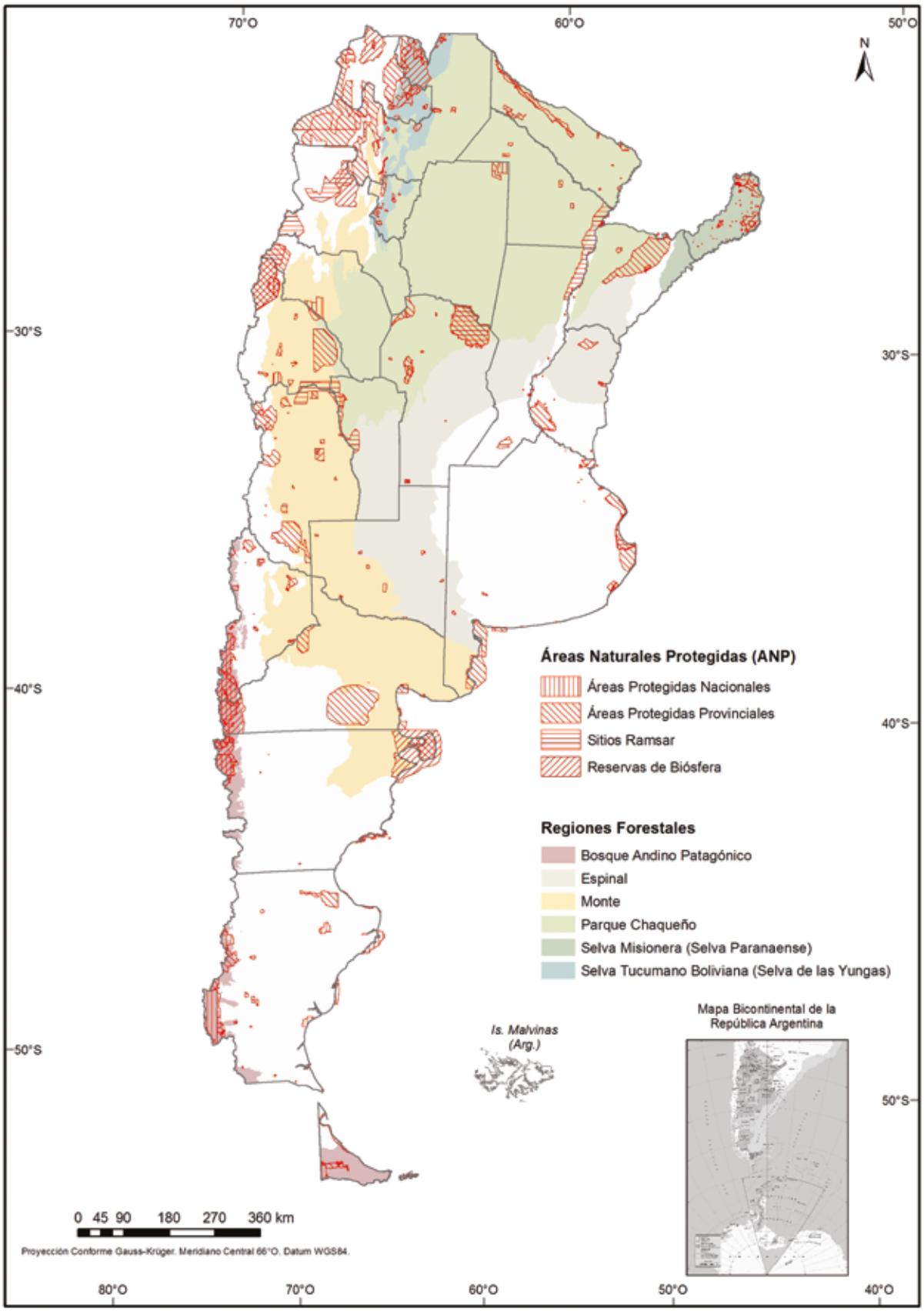
The country's territory spans an area of 279 181 000 hectares (National Geographic Institute, 2013), of which approximately 30 800 000 are Protected Natural Areas (ANP) with different conservation categories, totaling 11.03% of areas under protection. Figure 4 shows the ANPs distribution.

The International Union for Conservation of Nature (IUCN), in its document Guidelines for Applying Protected Area Management Categories, defines a protected area as "a clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values" (Dudley, 2008). The document further adds that they are "set aside to maintain functioning natural ecosystems, to act as refuges for species and to maintain ecological processes that cannot survive in most intensely managed landscapes and seascapes", and that "they act as benchmarks against which we understand human interactions with the natural world". Based on its functions and management objectives, a protected area can be designated as a National Park, a Natural Reserve or Provincial Reserve, among other classifications.

Forest with high proportion of *Nothofagus obliqua* "roble pellín" in Yuco Alto, Lanín National Park, province of Neuquén.
Author Pablo Oliveri, courtesy of UCAR-MAGyP.

Ditribution of Protected Natural Areas and Forest Regions in Argentina 2015

Figure 4



Source: Secretariat of Environment and Sustainable Development. Forest Direction. Federal Protected Areas System (SIFAP). Map preparation: Forest Assessment System Management Unit.

Moreover, Biosphere Reserves represent another conservation concept. Biosphere Reserves are "areas of terrestrial and coastal/marine ecosystems, or a combination thereof, which are internationally recognized within the framework of UNESCO's Programme on Man and the Biosphere (MAB)" (UNESCO, 2010). They are used for the harmonic promotion of the integration of populations and nature, aimed at creating sustainable development through participatory dialogue, knowledge exchange, poverty reduction, improvement of well-being, respect for cultural values, and society's adaptability to change. Biosphere Reserves are included into the World Network by decision of the MAB's International Co-ordinating Council (Article IV of the relevant statutes), based on presented proposals.

Ramsar Sites are another concept related to the protection of natural areas. The Argentine Republic's territory includes wetlands of international importance, recognized as Ramsar Sites by the Ramsar Convention[1]. These areas are wetlands, defined as zones which remain flooded or at least with a water-saturated soil for significant periods of time. While the definition encompasses a broad spectrum of ecosystems, all wetlands share a defining feature: water is fundamental for their structure and ecological functions. The inclusion of wetlands in the List of Wetlands of International Importance of the Ramsar Convention represents international recognition, as well as a commitment to the promotion of their conservation and rational use. For wetlands to be classified as Ramsar Sites, they have to meet certain strict criteria, such as being a representative, rare or unique example of a type of wetland, or a particularly important wetland for maintaining biological diversity (SAyDS, 2012).

Protected Natural Areas and Native Forests

Only a part of the total ANP in the country presents forest cover. Figure 4 shows the ANP distributed in the country's forest regions.

As mentioned in the case of Indicator 1.1.a, in order to identify native forests, this work uses the classification proposed by FAO for the 2000 FRA (FAO, 2001), adapted to the Argentine context. It is important to bear in mind that the definition of native forest used in Law No. 26331 (Minimum Budgets for the Environmental Protection of Native Forests) includes, in addition to the Forest Lands category, other classes such as low-height tree forests,

Los Glaciares National Park, province of Santa Cruz.
Author Daniela García.

Native Forest Surface in Protected Natural Areas. 2013

Table 5

	Forest lands			Other wooded lands		
Forest region	ANP area (ha)	Total area in region (ha)	Protected area (%)	ANP area (ha)	Total area in region (ha)	Protected area (%)
Total	3.291.102	27.470.617	12	1.145.099	20.272.359	6
Bosque Andino Patagónico	1.283.291	2.803.918	46	442.012	1.213.368	36
Espinal	111.136	1.312.013	8	59.019	4.909.732	1
Parque Chaqueño	410.221	18.631.108	2	575.359	13.666.204	4
Selva Misionera	377.753	1.125.361	34	28.515	182.203	16
Selva Tucumano Boliviana	1.108.701	3.598.219	31	40.194	300.852	13

Source: Secretariat of Environment and Sustainable Development. Undersecretariat of Planning and Environmental Policy. Forest Direction. Forest Assessment System Management Unit, based on information from the Federal Protected Areas System.

1Ramsar Convention: a treaty negotiated through the 1960s between countries and non-governmental organizations concerned about the increasing loss and degradation of wetland habitat for migratory waterbirds. It was adopted in the Iranian city of Ramsar in 1971, and came into force in 1975. Its mission is "the conservation and wise use of all wetlands through local and national actions and international cooperation, as a contribution towards achieving sustainable development throughout the world". Taken from www.ramsar.org.

palm tree fields and gallery forests, included in the Other Wooded Lands (OWL) category, also defined by FAO for the 2000 FRA (FAO, 2001).

In order to report the native forest area under protection (Table 5), the relevant area was computed in the *Bosque Andino Patagónico*, *Espinal* [2], *Parque Chaqueño*, *Selva Misionera* and *Selva Tucumano Boliviana* regions, as of 2013. (The *Monte* and *Delta e Islas del Paraná* forest regions were not included, because there are no up-to-date surveys). The estimations were made based on the surveys of ANPs provided by the SIFAP, surveys of native forests prepared by the Patagonian-Andean Forest Regional Node[3], based on the Andean-Patagonian Center for Forest Extension and Research (CIEFAP), and by UMSEF. Cartographical bases used are those of the Geographic Information System 250 of National Geographic Institute.

Native Forest Protected Areas by conservation category and forest region. 2013

Table 6

Conservation Category	Forest Region	Forest lands			Other wooded lands		
		ANP area (ha)	Total area in region (ha)	Protected area (%)	ANP area (ha)	Total area in region (ha)	Protected area (%)
National Protected Areas	Bosque Andino Patagónico	820.831	2.803.918	29,27	258.821	1.213.368	21,33
	Espinal	-	1.312.013	-	8.120	4.909.732	0,17
	Parque Chaqueño	134.535	18.631.106	0,72	70.759	13.666.204	0,52
	Selva Misionera	43.353	1.125.361	3,85	12.629	182.203	6,93
	Selva Tucumana Boliviana	195.297	3.598.219	5,43	1.296	300.852	0,43
Provincial Protected Areas	Bosque Andino Patagónico	227.831	2.803.918	8,13	79.937	1.213.368	6,59
	Espinal	95.319	1.312.013	7,27	26.643	4.909.732	0,54
	Parque Chaqueño	283.594	18.631.106	1,52	355.019	13.666.204	2,60
	Selva Misionera	166.679	1.125.361	14,81	15.482	182.203	8,50
	Selva Tucumana Boliviana	162.632	3.598.219	4,52	14.204	300.852	4,72
Biosphere Reserves	Bosque Andino Patagónico	1.007.612	2.803.918	35,94	384.140	1.213.368	31,66
	Espinal	-	1.312.013	-	-	4.909.732	-
	Parque Chaqueño	68.785	18.631.106	0,37	12.044	13.666.204	0,09
	Selva Misionera	200.345	1.125.361	17,80	483	182.203	0,27
	Selva Tucumana Boliviana	931.262	3.598.219	25,88	26.928	300.852	8,95
Ramsar Sites	Bosque Andino Patagónico	2.957	2.803.918	0,11	1.999	1.213.368	0,16
	Espinal	23.922	1.312.013	1,82	37.319	4.909.732	0,76
	Parque Chaqueño	79.500	18.631.106	0,43	270.894	13.666.204	1,98
	Selva Misionera	-	1.125.361	-	-	182.203	-
	Selva Tucumana Boliviana	-	3.598.219	-	-	300.852	-

Source: Secretariat of Environment and Sustainable Development. Undersecretariat of Planning and Environmental Policy. Forest Direction. Forest Assessment System Management Unit, based on information from the Federal Protected Areas System.

2 As regards the *Espinal* region, the computation included the areas of the provinces of Córdoba (partial), Corrientes, Entre Ríos, La Pampa and San Luis (Buenos Aires is excluded, as the relevant survey is being updated).
3 Regional Node: a work team comprising technical and administrative staff, with the mission of establishing a support interface between the SAyDS – DB, through the UMSEF, and the provinces. The National Network of Regional Nodes comprises the *Parque Chaqueño* Node, the *Monte* and *Espinal* Node, the *Bosque Andino Patagónico* Node, the *Selva Misionera* Node and the *Selva Tucumano Boliviana* Node.

Of the total ANP in the country (which, as was discussed before, comprise approximately 30 800 000 hectares), only 10 280 000 hectares coincide with forest regions, of which 3 291 000 hectares belong to Forest Lands, 1 145 000 hectares belong to Other Wooded Lands, and the rest is classified as Other Land[4]. Table 5 shows the area of native forest under protection in each forest region.

Table 6 shows the native forest area under protection divided by forest region and by the conservation categories included in this report: National ANP, Provincial ANP, Biosphere Reserves and Ramsar Sites. Besides, it shows the percentage of protected native forests relative to the total area of native forest per forest region. It is worth mentioning that the various ANP categories can overlap, so each category's wooded area is reported independently. Those categories should not be added to compute the total protected native forest area at the country level, due to the aforementioned overlap.

Charts 4, 5, 6 and 7 compare the percentages of protected FL and OWL relative to the total forest area in each conservation category, divided by forest region. In National ANP, FL protection is concentrated at the *Bosque Andino Patagónico* region (29.27%).This trend is mainly the result of the criterion (focused on the beauty of the landscape) that dominated the first decades of the 20th century, when the first National Parks were created. The *Bosque Andino Patagónico* region, in the first few years after the creation of the National Parks Administration (1934), had a protected area of 2 000 000 hectares.

In the case of Provincial ANP, the distribution is more homogeneous, thanks in part to the efforts from the provinces that started to create them under their jurisdiction starting in the 1960s.

Cyanocorax chrysops "urraca común", Iguazú National Park, Misiones. Author Daniela García

The greatest concentration appears in the *Selva Misionera* region, whose area is the smallest relative to the other forest regions.

The Biosphere Reserve program started in the 1980s, aimed at harmonizing use and protection of high-conservation-value environments. In Argentina, they are primarily located in the *Bosque Andino Patagónico* and *Selva Tucumano Boliviana*. The largest reserves in those regions are the Andino Norpatagónica Biosphere Reserve and the Yungas Biosphere Reserve, respectively.

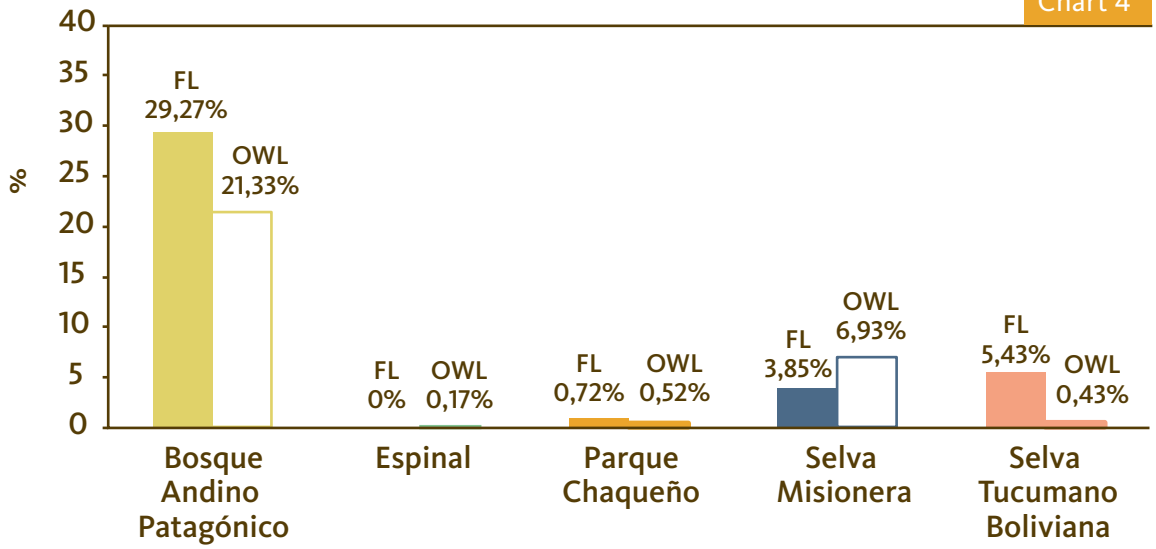
As Ramsar Sites aimed at preserving wetlands, this conservation category does not include large areas of native forest, as reflected by the low protection percentage relative to each region's total native forest area (Chart 7). Moreover, Ramsar Sites were introduced in Argentina only recently: the first sites were created in 1992.

Hydrochaeris hydrochaeris "carpincho". Author Pablo Oliveri, courtesy of UCAR-MAGyP.

4 Other land: any land not classified as forest land or other wooded land. (Terms and definitions. FRA, 2015).

Percentage of Forest Lands (FL) and Other Wooded Lands (OWL), by forest region, in National Protected Areas. 2013

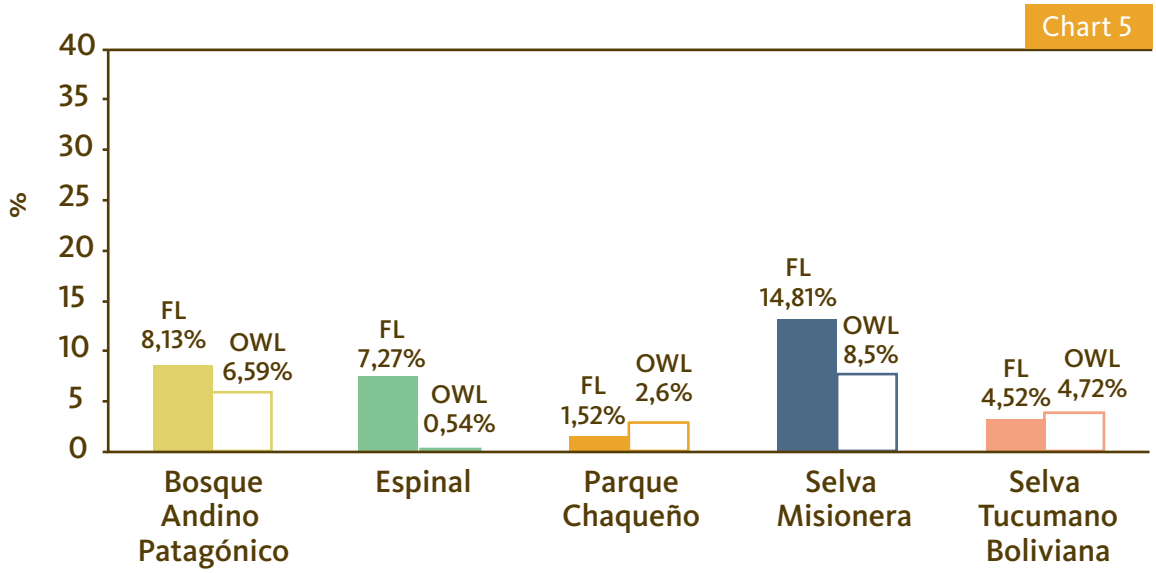
Chart 4



Source: Secretariat of Environment and Sustainable Development. Undersecretariat of Planning and Environmental Policy. Forest Direction. Forest Assessment System Management Unit, based on information from the Federal Protected Areas System.

Percentage of Forest Lands (FL) and Other Wooded Lands (OWL), by forest region, in Provincial Protected Areas. 2013

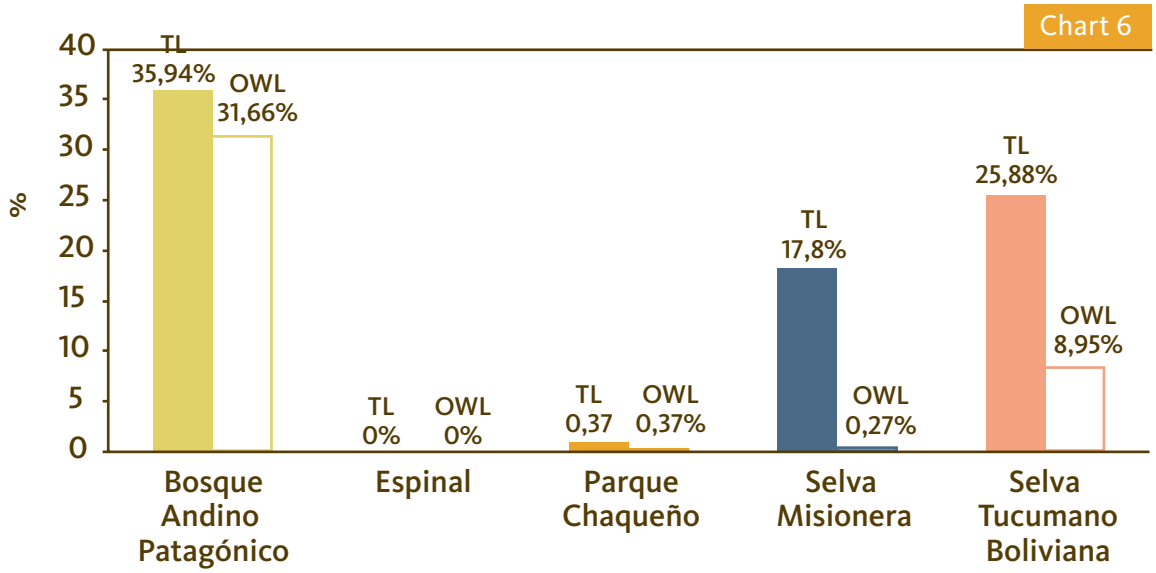
Chart 5



Source: Secretariat of Environment and Sustainable Development. Undersecretariat of Planning and Environmental Policy. Forest Direction. Forest Assessment System Management Unit, based on information from the Federal Protected Areas System.

Percentage of Forest Lands (FL) and Other Wooded Lands (OWL), by forest region, in Biosphere Reserves. 2013

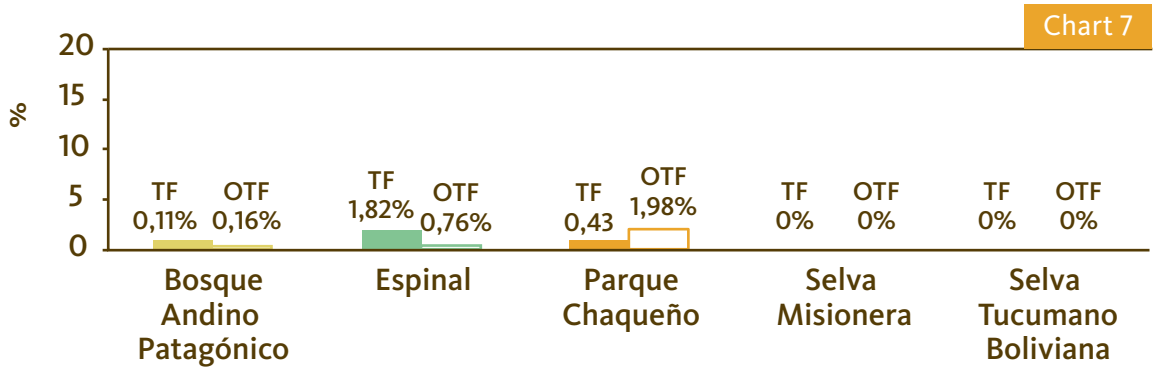
Chart 6



Source: Secretariat of Environment and Sustainable Development. Undersecretariat of Planning and Environmental Policy. Forest Direction. Forest Assessment System Management Unit, based on information from the Federal Protected Areas System.

Percentage of Forest Lands (FL) and Other Wooded Lands (OWL), by forest region, in Ramsar Sites. 2013

Chart 7



Source: Secretariat of Environment and Sustainable Development. Undersecretariat of Planning and Environmental Policy. Forest Direction. Forest Assessment System Management Unit, based on information from the Federal Protected Areas System.

References:

Dudley, N. (Ed). 2008. Guidelines for Applying Protected Area Management Categories. Gland, Switzerland: International Union for Conservation of Nature.

Food and Agriculture Organization of the United Nations (FAO). 2001. Global Forest Resources Assessment 2000. Main report. FAO Forestry Paper 140. Roma, Italia: FAO.

Secretariat of Environment and Sustainable Development. 2012. Humedales de la República Argentina. Water Resources Working Group. Available at: **http://www.ambiente.gob.ar/default.asp?IdArticulo=12215**.
Query date: 01/12/14

United Nations, Educational, Scientific, and Cultural Organization (UNESCO). 2010. Man and the Biosphere Programme-Biosphere Reserves: Definition (in Spanish). Available at: **http://www.unesco.org.uy/mab/es/areas-de-trabajo/ciencias-naturales/mab/programa-mab/reservas-de-biosfera.html**. Query date: 01/12/14

1.3.a. Number and geographic distribution of forest associated species at risk of losing genetic variation and locally adapted genotypes.

Rationale: This indicator provides information on the number and distribution of forest-associated species at risk of losing genetic variation across their population. This erosion in genetic variation makes species less able to adapt to environmental change and more vulnerable to extinction. Some local populations with unique gene pools may also risk being swamped by larger populations introduced intentionally, by accident, or by natural processes.

Information Quality: A **Indicator Evolution: ?**

Argentina's great variety of species and ecosystems implies a high diversity in terms of variation inheritable within and between populations of organisms, that is, high genetic diversity. The number of endemic species alone (18% of flora; 12% of mammals, 23% of reptiles; and 24% of amphibians are endemic species) proves the country has a unique asset and an unparalleled genetic heritage.

Additionally, many species are found in regions classified as important "*centers of plant diversity*"[5] (Groombridge, 1992; Heywood and Davis, 1997) or the center of origin of useful species such as *algarrobos* (*Prosopis* sp.) and the *araucaria* or *pehuén* (*Araucaria araucana*).

Based on the Red List of the IUCN (IUCN, 2007) the number of threatened species in Argentina amounts to 194, of which 42 are plants and 152 are animals. Among the latter, there are 29 mammal species, 49 bird species, 5 reptile species, 29 amphibian species and 40 other species, with the greatest abundance and diversity in the *Selva Tucumano Boliviana* and the *Selva Misionera* regions.

Of the threatened tree species (Table 7), one is "Critically Endangered", seven are "Endangered", and 21 are "Vulnerable". The intensity of forestry exploitation, land-use changes and the implantation of exotic species have lead to fragmentation and degradation processes in forest masses, and, thus, to a loss in genetic diversity. Some of the species most vulnerable to extinction are species which are highly valued for their timber attributes, which means they have been exposed to a continuous over-exploitation process. In the *Selva Misionera* or *Selva Paranaense* region, *Aspidosperma polyneuron* and *Balfourodendron riedelianum* are "endangered", while *Araucaria angustifolia* is "Critically Endangered", due to the drastic reduction of the area of their natural forests. In the *Selva Tucumano Boliviana* region, *cedro coya* (*Cedrela lilloi*) and *cedro orán* (*Cedrela balansae*), native species with a high economic value, show a systematic decrease in the last few decades in terms of timber stocks and in terms of quality of the input offered to the forestry sector, currently revealing high-risk conditions (Zelener *et al*., 2001).

This list also includes *sauce criollo (Salix humboldtiana)*, the most widely-used (and, consequently, the most endangered) riparian forest species, appreciated for its

Cedrela fissilis "cedro misionero". Author Daniela García.

5 The geographical area in which a species developed its distinctive features.

Threatened tree species based on IUCN classification

Table 7

Genus	Species	Regional distribution
Critically endangered		
Araucaria	*angustifolia*	Selva Misionera
Endangered		
Fitzroya	*cupressoides*	Bosque Andino Patagónico
Amburana	*cearensis*	Selva Tucumano Boliviana or Yungas
Aspidosperma	*polyneuron*	Selva Misionera
Cedrela	*fissilis*	Selva Tucumano Boliviana/Misionera
Cedrela	*lilloi*	Selva Tucumano Boliviana or Yungas
Balfourodendron	*riedelianum*	Selva Misionera
Cochlospermum	*tetraporum*	Selva Tucumano Boliviana or Yungas
Vulnerable		
Araucaria	*araucana*	Bosque Andino Patagónico
Austrocedrus	*chilensis*	Bosque Andino Patagónico
Pilgerodendron	*uviferum*	Bosque Andino Patagónico
Acacia	*albicorticata*	Selva Tucumano Boliviana or Yungas
Acacia	*etilis*	Selva Tucumano Boliviana or Yungas
Prumnopitys	*andina*	Bosque Andino Patagónico
Albizia	*edwallii*	Selva Misionera
Caesalpinia	*paraguariensis*	Selva Tucumano Boliviana or Yungas
Chloroleucon	*chacoense*	Selva Tucumano Boliviana or Yungas
Sapium	*saltense*	Selva Tucumano Boliviana or Yungas
Myrcianthes	*callicoma*	Selva Tucumano Boliviana or Yungas
Siphoneugenia	*occidentalis*	Selva Tucumano Boliviana or Yungas
Loxopterygium	*grisebachii*	Selva Tucumano Boliviana or Yungas
Coursetia	*brachyrachis*	Selva Tucumano Boliviana or Yungas
Coursetia	*hypoleuca*	Selva Tucumano Boliviana or Yungas
Tabebuia	*lapacho*	Selva Misionera
Inga	*saltensis*	Selva Tucumano Boliviana or Yungas
Prosopis	*abbreviata*	Monte de sierras y bolsones
Schinopsis	*haenkeana*	Selva Tucumano Boliviana or Yungas
Cedrela	*odorata*	Selva Tucumano Boliviana or Yungas
Jacaranda	*mimosifolia*	Selva Tucumano Boliviana or Yungas

Source: International Union for Conservation of Nature (2007). Red List of Threatened Species. Available in www.iucnredlist.org/amazing-species

lumber (good density, straight fibers, reddish hue, caloric capacity, etc.) (Gallo L., personal communication).

Of all the countries in the region, Argentina has the greatest number of studies on the genetic diversity of its main native forest species (Gallo, L., personal communication). In the last 20 years or so, several research efforts have been carried out aimed at providing knowledge positive for adequate strategies for conservation and for the use of native forest resources.

As regards the native Patagonian species of the *Nothofagus* and *Austrocedrus* genera, the application of various molecular markers, such as SSRs (Simple Sequence Repeats), cpDNA (chloroplast DNA), or isozymes, have made it possible to describe the genetic diversity of natural populations as well as the processes and evolutionary forces that give shape to it, to identify the centers with the greatest genetic diversity, and to define relevant genetic areas. This information is currently used in programs for the conservation, management and domestication of said species.

As regards the species in the *Cedrela* genus, the application of various markers, such as AFLPs (Amplified Fragment Length Polymorphisms), ITS (Internal Transcribed Spacers) of ribosomal genes, and SSRs, made it possible to: (a) accurately define the limits of populations; (b) describe the geographical distribution patterns of the genetic variability; (c) quantify the incidence of different levels of anthropic disturbance (forest exploitation, legal protection, and population accessibility) on diversity; (d) assess the effects of fragmentation on gene flow; (e) identify the priority conservation populations; and (f) describe the genetic materials to be used in genetic improvement programs.

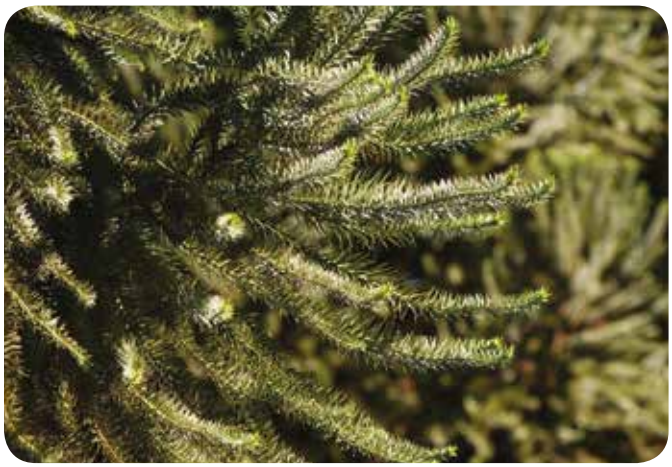
In the case of *Araucaria angustifolia*, the application of AFLPs and SSRs made it possible to study genetic diversity in plantations and natural populations of areas both protected and not protected in the Argentine northwest, to the effect of assessing the status of conservation of forest resources and prioritize populations for their preservation.

In the case of *Prosopis*, studies on variability were carried out through biochemical and molecular markers under programs for genetic improvement and the conservation of forest species which are highly valuable for the Chaco region. Said studies have helped describe the distribution of genetic variation and define sources of seeds appropriate for afforestation with timber-related purposes, and potentially for ecosystem recovery in areas degraded by agriculture. Moreover, molecular markers developed in the genus are currently being used for evolutionary studies of the complex comprising theses species, particularly relevant for their dynamic conservation (Marcucci *et al*., 2013).

Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)

The CITES is an international agreement, to which countries adhere on a voluntary basis, which includes Argentina (Law No. 22344), aimed at ensuring that international trade in wild animals and plants does not represent a threat to their survival, thus becoming a tool for the protection of genetic diversity. As a result of this agreement, all import, export, re-export and introduction from the sea of species covered by the Convention has to be authorized through a licensing system.

Araucaria angustifolia "pino paraná". Author Pablo Oliveri, courtesy of UCAR-MAGyP.



Detail of *Araucaria angustifolia* "pino paraná". Author Pablo Oliveri, courtesy of UCAR-MAGyP.

Threatened species are classified in three groups, known as Appendices, numbered I-III in a decreasing order, based on the level of restrictions they imply:

Appendix I includes all species threatened with extinction. Trade in specimens of these species is permitted only in exceptional circumstances.

Appendix II, which is the relevant appendix in this case, includes species not necessarily threatened with extinction, but which could be threatened if their trade is not strictly controlled. International trade of specimens of Appendix II species can be authorized through an export permit or a re-export certificate. Permits and certificates can be granted only if the relevant authorities consider certain conditions have been met, in particular, that trade will not be a threat to the species' survival in the wild.

Appendix III includes species which are protected in at least one country, which has asked other CITES Parties for assistance in controlling the trade.

In Argentina there are four Appendix I species:
1) *Pino del cerro* (*Podocarpus parlatorei*)
2) *Pehuén* (*Araucaria araucana*)
3) *Ciprés de las Guaytecas* (*Pilgerodendron uviferum*)
4) *Alerce* (*Fitzroya cupressoides*)

There is only one Appendix II species:
1) *Palo santo* (*Bulnesia sarmientoi*)

Currently, our country has no Appendix III tree species.

Source:

Ministry of Agriculture, Livestock, and Fisheries Agriculture Undersecretariat. Forestry Production Direction. Forest Genetic Resources Area, based on reviewed information.

Secretariat of Environment and Sustainable Development. Undersecretariat for Planning and Environmental Policy. Forest Direction. Convention on International Trade in Endengered Species of Wild Fauna and Flora Scientific Area.

References:

International Union for Conservation of Nature (2007). Red List of Threatened Species. Available at **http://www.iucnredlist.org/amazing-species**

Zelener, N., Soldati, M. C., Inza, M. V., Aguirre, R. R., Salek, D., Araujo, A., Van Zonneveld, M.,Fornes, L. (2001). Distribución geográfica de la diversidad genética molecular de dos especies de Cedrela *(C. lilloi* y *C. balansae*) sujetas a severos procesos de degradación en la Selva Tucumano Boliviana. Available at **http://www.mapforgen.org/mapforgen/web/uploads/proyectos/7/Cedrela%20spp.pdf**

Zelener N., Torales S., Fassola H., Pahr N., Fernandez R., Fornes L. and Aguirre N. (2011). Diversidad genética de Pino Paraná: análisis de AFLPs en poblaciones naturales y una Reserva Forestal de la Selva Misionera, Argentina. Available at **http://inta.gob.ar/documentos/diversidad-genetica-de-pino-parana-analisis-de-aflps-en-poblaciones-naturales-y-una-reserva-forestal-de-la-selva-misionera-argentina/**

Marcucci S., Torales S., El Mujtar V., Acuña C., Soliani C., Zelener N., Schmid P., Pomponio F., Marchelli P., Inza V., Sola G., Soldati C., Villalba P., Arana V., Bozzi J., García M., Azpilicueta M.M., Martínez M.C., Rivas G., López Lauestein D., Cosacov A., Vega C., López J.,Fornés L., Verga A., Marcó M., Gallo L.(2013). Desarrollo y aplicación de herramientas de Genética Molecular para resolver problemas complejos de la Genética Forestal. Fourth Argentine and Latin American Forest Congress. Iguazú, September 23-27, 2013.

Secretariat of Environment and Sustainable Development. Fourth National Report for the Conference of the Parties to the Convention on Biological Diversity, 2010.

1.3.c. Status of on site and off site efforts focused on conservation of genetic diversity.

Rationale: This indicator provides information that describes on site (or in situ) and off site (or ex situ) efforts to conserve genetic diversity within species. Some species have suffered from a loss of genetic variability due to population decline and a reduction in their former range and distribution. Continued loss of genetic variability will threaten the viability of these species and may accelerate a decline that may lead ultimately to extinction.

Information Quality: H **Indicator Evolution: ?**

Argentina has seen a significant evolution in terms of policies for the conservation and sustainable use of biodiversity. There was a shift in the paradigm in the last decade: the issue is now approach from an eco-systemic standpoint, in which biodiversity conservation, through sustainable use, complements the country's economic growth and inclusive development.

The conservation of forest species in Argentina is carried out on site, in protected areas or managed natural forests, and off site in germplasm banks, arboreta and botanical gardens.

The different species stored in germplasm banks are mostly located in the Experimental Agricultural Stations (EEA) of the INTA, which are in general where the improvement programs for the crops they hold are carried out, and whose geographical location coincides with production zones. There collections comprise seeds or field in vivo collections for the case of species with agamic reproduction or which are difficult to reproduce sexually.

Germplasm Banks Network (RBG)

Forest species active banks:

- Yuto Experimental Tropical Crop Station, Jujuy: *cedro* (*Cedrela* sp.) and other in vivo field collections.

- Sánez Peña Agricultural Experimental Station, Chaco: seeds of native forest species.

In vitro cultivation of *Eucalyptus* sp., province of Entre Ríos. Author Pablo Oliveri, courtesy of UCAR-MAGyP.

Base Bank of the Biological Resources Institute (IRB), Natural Resource Research Center (CIRN), Castelar, province of Buenos Aires.

The Base Bank has duplicates of the RBG active collections, as well as collections held in custody for firms and institutions, both national and foreign. Total duplicates number 36 556 entries, excluding materials held in custody.

Other institutions have organized banks or collections which generally interact with the RBG, such as:

- National *Prosopis* Germplasm Bank, Córdoba National University: conservation of *algarrobo* seeds.

• Center of Vegetative Propagation (CEPROVE), Bank of forest species germplasm of Buenos Aires, UNLP: seeds of *Eucalyptus viminalis, Eucalyptus globulus* var. *Globulus*, *Eucalyptus globulus* var. *maidenii*, *Eucalyptus dunnii*, *Araucaria angustifolia*, *Araucaria araucana*, *Nothofagus pumilio*, *Nothofagus procera*, *Nothofagus antartica*, *Nothofagus betuloides*, *Pinus canariensis*, *Pinus elliottii*, *Podocarpus parlatorei*, *Melia azedarach*, *Schinus molle*, *Tilia cordata*, *Scutia buxifolia*, *Acacia caven*, *Celtis tala*, *Erithryna crista-galli*, *Parkinsonia aculeata* and *Jodina rhombifolia*.

• Argentine Dryland Research Institute (IADIZA): seeds of bush *algarrobos* (*Prosopis chilensis* and *P. flexuosa*).

• Germplasm Bank of Native Species - BGEN - INEAH - National University of Salta: 187 accessions which represent 36 native species of the northwest region of Argentina.

• Regional Seed Bank of the School of Forestry Sciences, National University of Misiones: seeds of native forest species.

Arboreta and Botanical Gardens

Botanical Gardens hold the greatest off-site collections of plant species, and work as centers for education, conservation and research. Within the Argentine Botanical Garden Network (RAJB), 12 are devoted to conservation activities. The RAJB was created in November, 1996. Until then, the few botanical gardens in existence worked hard and with little or no communication between them.

Micropropagation in germplasm banks, province of Misiones.
Author Pablo Oliveri, courtesy of UCAR-MAGyP.

Nowadays, the Network comprises about 41 botanical gardens, mainly distributed in the north and center of the country, with a few in Patagonia. There are four types. Most operate within universities, several are municipal, two are private and two belong to scientific research centers. (Chart 8).

National Biological Diversity Strategy

The SAyDS, in cooperation with the INTA, the APN, and the Commission of Argentine Institutions of the International Union for Conservation of Nature (IUCN), coordinated the National Strategy Preparation Process and advanced with the identification of the elements needed to design a national action plan and the relevant sectoral plans. Through a consultative and participatory process, involving both the sectoral and the regional spheres, it produced the National Biodiversity Strategy. Said document was accepted through Resolution No. 91/2003 (SAyDS 2003).

A new National Biodiversity Strategy is being prepared, based on the goals proposed by the Convention on Biological Diversity and the 2010 Aichi Targets[6]. This task is the responsibility of the National Advisory Commission for the Conservation and Sustainable Use of Biodiversity (CONADIBIO), which has been carrying out workshops with the various stakeholders (public bodies: SAyDS, MAGyP, INTA; and NGOs) in which priorities are established and global agreements signed are locally reinterpreted.

The National Biodiversity Strategy to be presented at the end of the year will be the instrument used to articulate public policies in the area.

The following are some key actions and policies aimed at conserving biodiversity in the forestry sector:

The National Flora Management Program, created through Resolution No. 460/99, is aimed at carrying out coordinated actions for the comprehensive management of flora resources at the national level. Its goal is to provide an assessment of the current state of knowledge of national plants, through the definition of at-risk groups and the listing of endemism centers, in order to establish the bases for a National Flora Law. Some of the actions

6 The Aichi Biodiversity Targets are a set of 20 targets grouped around five Strategic Goals, which should be achieved by 2020. They are part of the Strategic Plan for Biodiversity 2011-2020, approved in 2010 at the tenth meeting of the Conference of the Parties to the Convention on Biological Diversity.Taken from "UICN - Integrar las Metas de Biodiversidad de Aichi en losObjetivos de Desarrollo Sostenible" (in Spanish).

National Arboreta and Botanical Gardens

Table 8

Arboretum/ Botanical Garden	City	Province
Northeastern region		
High-Altitude Botanical Garden	Tilcara	Jujuy
Agricultural Engineering and Zootechnics School's Arboretum. Tucumán National University	San Miguel de Tucumán	Tucumán
Miguel Lillo Foundation Botanical Garden	San Miguel de Tucumán	Tucumán
Chaco region		
Natural Resources School's Arboretum	Ciudad de Formosa	Formosa
Guaycolec Arboretum, Lucas Tortorelli Botanical Park	Ciudad de Formosa	Formosa
Augusto G. Schulz Museum House and Garden	Colonia Benítez	Chaco
Forest Sciences School's Botanical Garden	Ciudad de Santiago del Estero	Santiago del Estero
Mesopotamia (Misiones, Corrientes, Entre Ríos) region		
Selva Misionera Botanical Garden	Eldorado	Misiones
City of Posadas' Botanical Garden	Ciudad de Posadas	Misiones
City of Corrientes' Botanical Garden	Ciudad de Corrientes	Corrientes
Ca-á-Porá Botanical Garden	Concordia	Entre Ríos
Oro Verde Botanical Garden	Paraná	Entre Ríos
Cuyo region		
Chacras de Coria Botanical Garden	Chacras de Coria	Mendoza
San Luis National University's Botanical Garden	San Luis de la Punta	San Luis
School of Agricultural Engineering's Botanical Garden	Villa Mercedes	San Luis
Pampean region		
Córdoba Botanical Garden	Ciudad de Córdoba	Córdoba
Córdoba Catholic University's Gaspar Xuárez S.J. Botanical Garden	Ciudad de Córdoba	Córdoba
Dr. Miguel J. Culaciati Botanical Garden	Huerta Grande	Córdoba
El Espinal Indigenous Forest	Río Cuarto	Córdoba
Agricultural Engineering and Veterinary Science School's Botanical Garden	Esperanza	Santa Fe
San Carlos Centro Municipal Botanical Garden	San Carlos Centro	Santa Fe
Lorenzo Parodi Botanical Garden	Ciudad de Santa Fe	Santa Fe
Juan Williamson Botanical Garden	Santa Rosa	La Pampa
América Biological Garden	América	Buenos Aires

Centro de la Provincia de Buenos Aires National University's Botanical Garden	Azul	Buenos Aires
Del Sur National University Botanical Garden	Bahía Blanca	Buenos Aires
Bahía Blanca Botanical Garden	Bahía Blanca	Buenos Aires
Arturo E. Ragonese Botanical Garden	Castelar	Buenos Aires
Carlos Thays Botanical Garden	Ciudad de Buenos Aires	Buenos Aires
Lucien Hauman Botanical Garden	Ciudad de Buenos Aires	Buenos Aires
Native Species Didactical Garden	Ciudad de Buenos Aires	Buenos Aires
Japanese Garden	Ciudad de Buenos Aires	Buenos Aires
Ezeiza Botanical Garden	Ezeiza	Buenos Aires
"Carlos Spegazzini" Botanical Garden and Arboretum	La Plata	Buenos Aires
Santa Catalina Agrobotanical Garden	Llavallol	Buenos Aires
Pillahuincó Botanical Garden	Tornquist	Buenos Aires
Patagonia region		
Cascada Escondida Botanical Garden	El Bolsón	Río Negro
Arid Patagonia Garden	Comodoro Rivadavia	Chubut
Non-Andean Patagonia Botanical Garden	Puerto Madryn	Chubut

Source: Ministry of Agriculture, Livestock and Fisheries. Agriculture Undersecretariat. Forestry Production Direction. Forest Genetic Resources Area

carried out under the program are the Register of plant nurseries propagating or cultivating native species and/or species from the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), the compilation of systematic, bio-geographical, and provincial lists, by risk group and usefulness, and the definition of Protected Areas based on plants.

In 2010, the CITES, after a request from Argentina, included *palo santo* (*Bulnesia sarmientoi*) in the flora and fauna list in Appendix II. CITES establishes that species in Appendix II must be used sustainably.

The DB of the SAyDS was designated as CITES Scientific Authority, in charge of ensuring that the use of *palo santo* (*Bulnesia sarmientoi*) for the export market does not endanger the species' survival, through the signature of non-harmful extraction resolutions.

Under the priority goal of promoting sustainable multiple use of biodiversity, the National Program of Management and Use of Wild Species involves preparing and agreeing on national policies for the conservation and sustainable use of species and for the improvement of ecosystems through the use of wild species, in order to prevent replacement by intensive production systems. It is based on the implementation of projects to manage wild species prone to be useful, coordinating administrative and commercial management and the relevant biological studies. Moreover, it benefits the local communities that use these resources traditionally.

In the context of the eco-systemic approach, focused on landscapes, used by Argentina to develop conservation and sustainable use policies, several projects and programs are being supported, aimed at promoting territorial planning processes with an eco-regional approach.

The Comprehensive Strategic Plan for the Conservation and Sustainable Development of the Paraná Delta Region (PIECAS-DP) stands out among those projects. Its main function is to articulate and coordinate efforts by environmental agencies from the provinces of Buenos Aires, Entre Ríos, and Santa Fe, as well as those from the SAyDS, in order to promote the implementation of a Comprehensive Strategic Plan for the conservation and sustainable use of the Paraná River Delta as a tool for the territory's environmental management.

Conservation efforts are carried both by public and private agencies. Table 9 presents the list of efforts of public and private bodies that produced projects for the on site conservation of various species.

Prosopis alba "algarrobo" plantations. Author Natalia Acosta.

On site conservation: areas, species and/or groups of plants, institutions involved, and causes for the loss of genetic variability

Table 9

Influence Area	Institution	Protected species	Causes for genetic erosion
Province Buenos Aires	CEPROVE (UNLP)[7]	Talares, leguminosas species	Expansion of agricultural frontier Urbanization
Bosque Patagónico	APN: exotic species in the Isla Victoria Greenhouse NHNP[8]	*Metasequoia glyptostroboides* *Larix leptolensis* *Sequoiadendron giganteum*	Pests
Bosque Patagónico	APN	*Podocarpus nubigena* *Cissus striata* ssp. *striata* *Gevuina avellana* *Eucryphia cordifolia* *Aextoxican punctatum*	Habitat alteration
Selva Paranaense	APN	*Euterpe edulis* *Aspidosperma polyneurum*	Deforestation
Bosque Patagónico	APN	*Fitzroya cupressoides* *Griselinia ruscifolia*	Alteration of habitat due to dam construction
Espinal, Chaco Seco	Gaspar Xuárez Botanical Garden (UNCba)[9]	Native forests in the centre of the country	Deforestation for agricultural and rural developments

Source: Ministry of Agriculture, Livestock and Fisheries. Informe sobre el Estado de los Recursos Fitogenéticos para la Agricultura y la Alimentación. October. 2007.

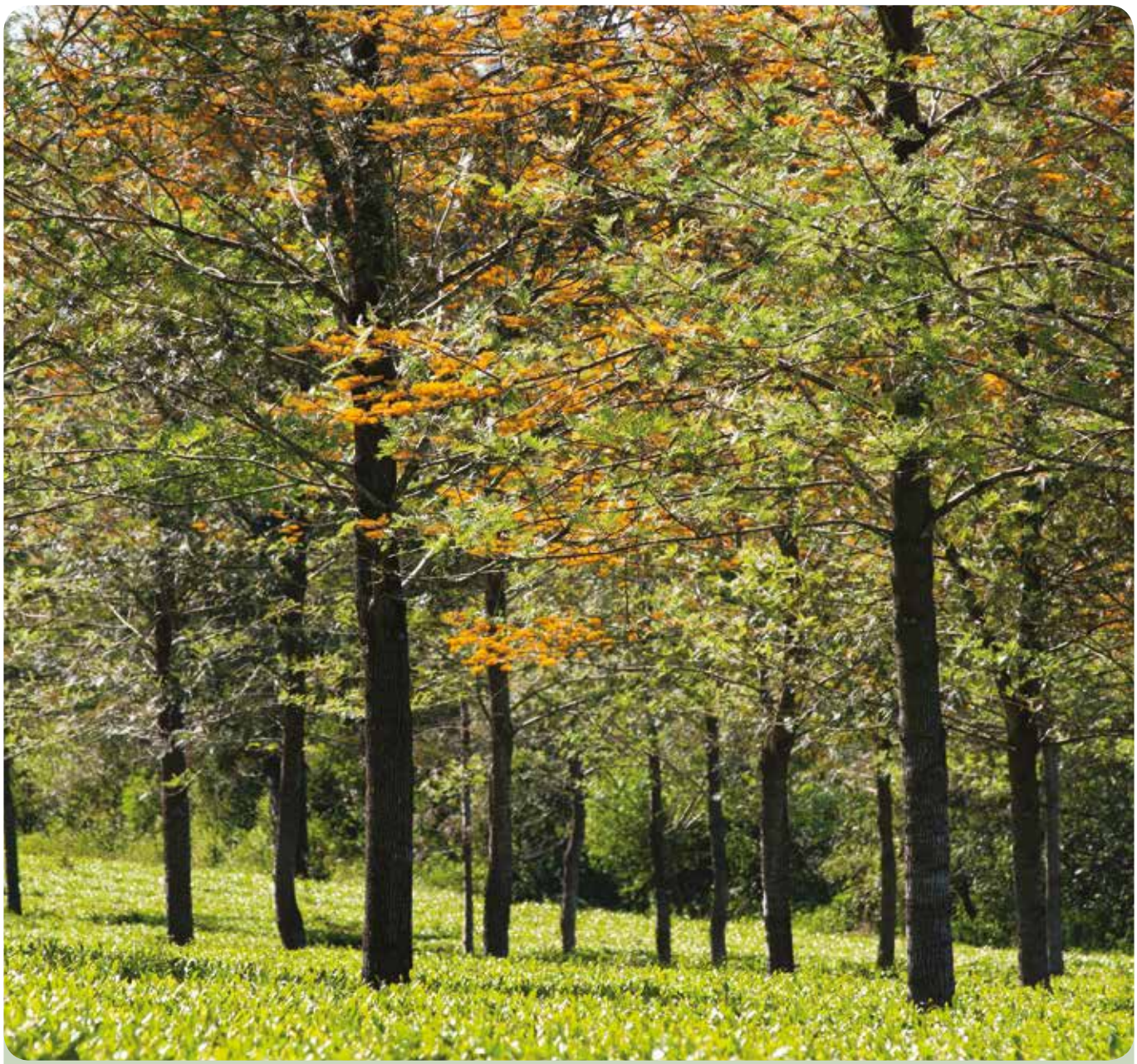
Source:

Ministry of Agriculture, Livestock and Fisheries. Agriculture Undersecretariat. Forestry Production Direction. Forest Genetic Resources Area and Environmental Area, based on information received from the Informe Nacional sobre el Estado de los Recursos Fitogenéticos para la Agricultura y la Alimentación (Abril, 2008), the Fourth National Report for the Conference of the Parties to the Convention on Biological Diversity (August, 2010), and the Argentine Botanical Garden Network (RAJB, 2012).

7 Center of Vegetative Propagation of the La Plata National University. 8 Nahuel Huapi National Park. 9 Córdoba National University

Criterion 2
Maintenance of productive capacity of Forest Ecosystems

Populus sp. "álamo" plantations with oat pastures, 4th Island Section, District of Campana, province of Buenos Aires. Author Pablo Oliveri, courtesy of UCAR-MAGyP.



Agroforestry system: *Grevillea robusta* and tea, Campo Ramón, province of Misiones. Author Pablo Oliveri, courtesy of UCAR-MAGyP.

Criterion 2:

Maintenance of productive capacity of Forest Ecosystems

Many communities depend on forests directly or indirectly for a wide range of forest based goods and services. The sustainable provision of these services is clearly linked to the productive capacity of the forest. If this capacity is exceeded there is the risk of ecosystem decline and collapse.

For forests to be sustainable it is necessary to understand the levels at which goods and services may be extracted or used without undermining the functioning of forest ecosystems and processes. The nature of goods and services provided by forests change over time due to social and economic trends, and technological developments. Change in the productive capacity of forests may be a signal of unsound forest management practices or other agents that are affecting forest ecosystems in some way.

Indicator	Information Quality	Indicator Evolution
2.c. Area, percent, and growing stock of plantations of native and exotic species.	H	↑
2.e. Annual harvest of non-wood forest products.	H	?

Trithrinax campestris "caranday", used for handmade products. Author Cristina Résico.

Indicator assessment	
Information Quality	
Low	L
Average	A
High	H
Indicator evolution	
Neutral	→
Positive	↑
Negative	↓
Insufficient data	?

Aereal view of forest plantations in the province of Misiones. Author Pablo Oliveri, courtesy of UCAR-MAGyP.

Solanum betaceum "chilto", alimentary use. Author Yaiza Reid.

2.c. Area, percent, and growing stock of plantations of native and exotic species.

Rationale: This indicator provides information on the nature and extent of plantation forests. Changes in the area of plantation reflect society's present and future needs or the impact of competing land uses on forest cover. The use of both native and exotic plantation species may enhance the range and quantity of goods and services available.

Information Quality: H **Indicator Evolution:** ↑

Argentina now has 1 128 411 hectares of plantation forests, mainly dominated by rapid-growth exotic species (table 11). Sixty five percent of the plantations correspond to conifer species, mainly *Pinus elliottii* and *Pinus taeda* and, to a lesser extent, other species such as *Araucaria angustifolia, Pinus ponderosa* and *Pseudotsuga menziesii*.

About 22% of forest plantations correspond to eucalyptus trees, with *Eucalyptus grandis* as the most planted; followed by *Eucalyptus camaldulensis, Eucalyptus tereticornis, Eucalyptus viminalis* and *Eucalyptus globulus*.

Meanwhile, *Salix* and *Populus* species account for about 9% of the planted forest, with different clones of *Populus deltoides* and *Populus* x *canadensis* as the most representative cultivars among planted poplars. As regards willows, *Salix babilonica* x *Salix alba* and *Salix matsudana* x *Salix alba* stand out.

The remaining 4% is made up of broadleaved species such as *Grevillea* sp., *Paulownia* sp., *Melia* sp., *Robinia* sp., *Prosopis* sp. and *Toona* sp.

The Mesopotamia region currently has the greatest concentration of plantation forests, dominated by conifers (Figure 6). In the province of Buenos Aires, we find eucalyptus, pines and poplars in rain-fed cultivation, and poplars and willows in the Paraná Delta region (Figure 7). In the region covering the west of the provinces of Neuquén, Río Negro and Chubut (known as Patagonia Andina region), pines are the most commonly-chosen species (Figure 8). In the region of the provinces of Salta, Jujuy and Tucumán (known as NOA or region of the Noroeste Argentino), pines and eucalyptus are found (Figure 9), while

Seed orchard of *Pinus taeda*, Puerto Esperanza, province of Misiones. Author Pablo Oliveri, courtesy of UCAR-MAGyP.

the province of Mendoza (Cuyo region) and the provinces of Río Negro and Neuquén (region of Valle de Río Negro) present the most extensive irrigated poplar plantations aimed at protection and production. Finally, the region comprising the provinces of Formosa, Chaco and Santiago del Estero (known as Chaqueña region) is the greatest area with native species' plantations of the *Prosopis* genus.

Due to the high annual growth of the plantations, few years are needed to reach a good yield. The years needed and the yields, even though they depend mainly on the species and genera, the ecological characteristics at the site, and the destination of the plantation, are presented in Table 10.

Yields and rotations of the main planted species in Argentina

Table 10

Species	Rotation (years)	Yield (m^3/ha/year)
Eucalyptus grandis	08-15	35-50
Araucaria angustifolia	25-30	15-18
Pinus elliottii	18-20	20
Pinus taeda	16-20	20-40
Pinus ponderosa	35-45	14-25
Prosopis alba	20-25	-
Paulownia sp.	10-15	18-22
Melia azedarach	12-15	-
Salix sp.	10-12	20
Populus sp.	10-12	23

Source: Ministry of Agriculture, Livestock, and Fisheries (MAGyP). Undersecretariat of Agriculture. Forestry Production Direction (DPF). Promotion Area.

Eucalyptus sp. plantation with practices of pruning and thinning, Concordia, province of Entre Ríos. Author Pablo Oliveri, courtesy of UCAR-MAGyP.

Forest plantations area (hectares) estimated by species and provinces

Table 11

Province / Region	Species				Totales
	Coniferous	Eucalyptus	Salix-Populus	Others	
Misiones	306.592	10.557	-	35.243	352.392 (1)
Corrientes	263.268	108.985	-	1.016	373.269 (1)
Entre Ríos	20.174	106.281	26.967	577	154.000 (2)(3)
Buenos Aires (Delta)	27	29	57.539	78	57.673 (1)
Mendoza	-	-	7.900	-	7.900 (4)
San Juan	-	-	457	-	457 (5)
San Luis	46	-	75	29	150 (5)
Neuquén	60.721	-	1.522	727	62.970 (2)
Río Negro	5.235	-	1.145	248	6.628 (6)(7)
Chubut	30.585	-	105	837	31.527 (8)
Santa Cruz	-	-	14	-	14 (5)
Jujuy	2.556	11.000	-	141	13.697 (1)
Salta	788	2.963	4	883	4.638 (9)
Tucumán	2.804	541	112	213	3.670 (9)
Catamarca	290	-	-	-	290 (9)
Córdoba	34.165	1.013	-	2.363	37.541 (6)
La Pampa	-	-	600	424	1.024 (6)(7)
Santa Fe	7	13.619	1.253	157	15.036 (10)
Formosa	-	-	-	1.353	1.353 (11)
Chaco	2	15	15	894	925 (11)
Santiago del Estero	-	-	185	3.072	3.257 (11)
TOTALES	727.260	255.003	97.893	48.255	1.128.411*

1 Plantation Forest Map (MPF), 2009/ 2 MPF, 2014/ 3 The delta/ 4 Cartography IDR- DPF: 2012-2013 being reviewed / 5 MAGyP – DPF – Promotion area. Surface area approved in the context of Law No. 25080 (only for plantation activities)/ 6 National Plantation Inventory (INP), 1998/ 7 MAGyP – DPF – Forestry Extension Area/ 8 MPF, 2013/ 9 MPF, 2010/ 10 MPF, 2011/ 11 MAGyP – DPF – Promotion area. Surface area approved in the context of Law No. 25080 (plantation and native forest improvement activities).

*These data are updated constantly, so they are preliminary.

Source: Ministry of Agriculture, Livestock, and Fisheries. Agriculture Undersecretariat. Forestry Production Direction. Geographic Information System (GIS) and Forest Inventory Area, based on information provided by the provinces.

Distribution of plantation forests in Argentina

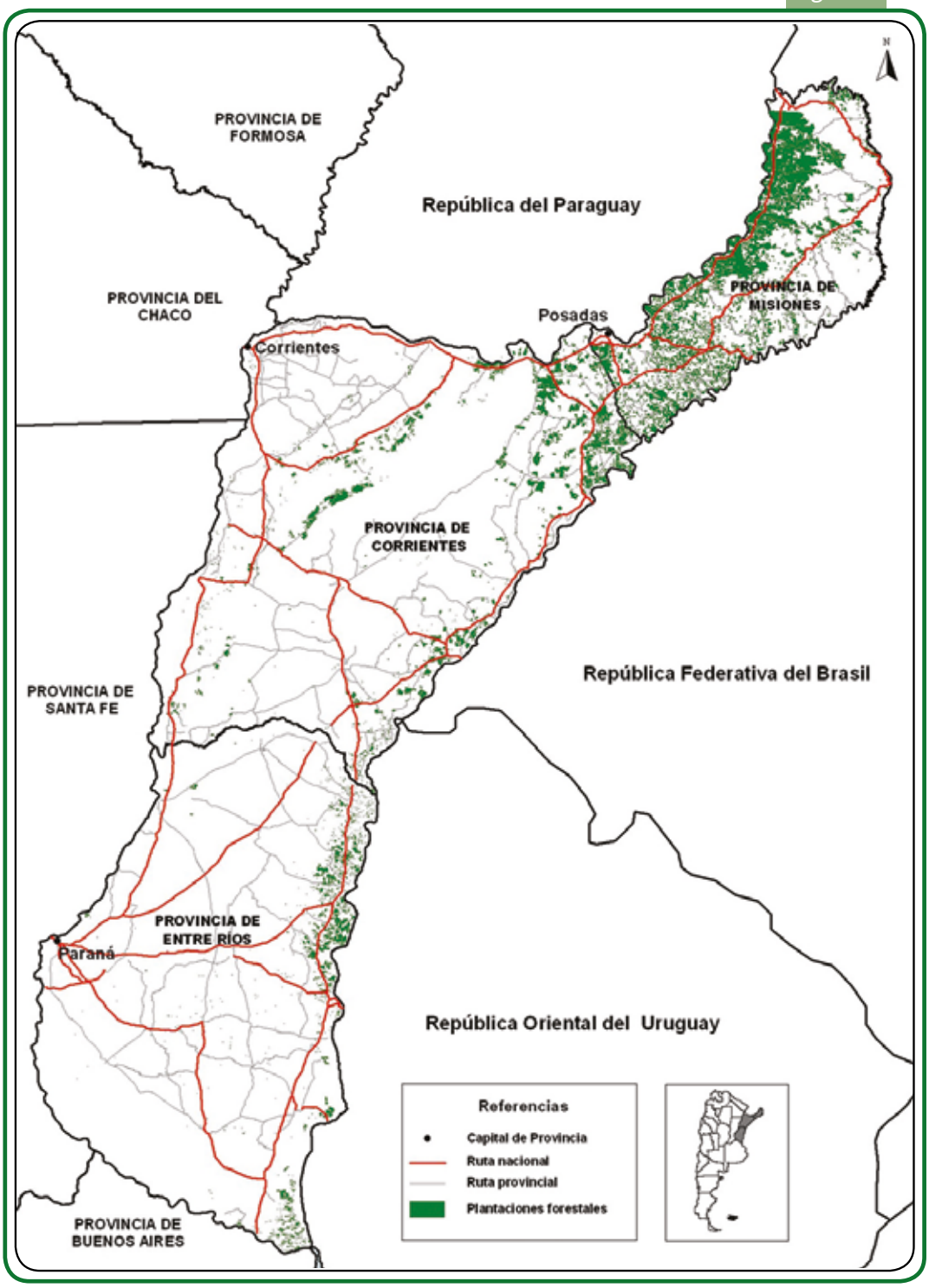
Figure 5

Source: First National Inventory of Plantation Forests of Argentina (1998-2000) and Argentine Plantation Forest Map (2009-2013). GIS and Forest Inventory Area. Forestry Production Direction. National Direction of Agricultural and Forestry Production.

Silvopastoral system in *Populus* sp. "álamo" plantations with natural field, 3rd Island Section, District of San Fernando, province of Buenos Aires. Author Pablo Oliveri, courtesy of UCAR-MAGyP.

Plantation Forest Map, 2008-2009
Provinces of Misiones, Corrientes, and Entre Ríos

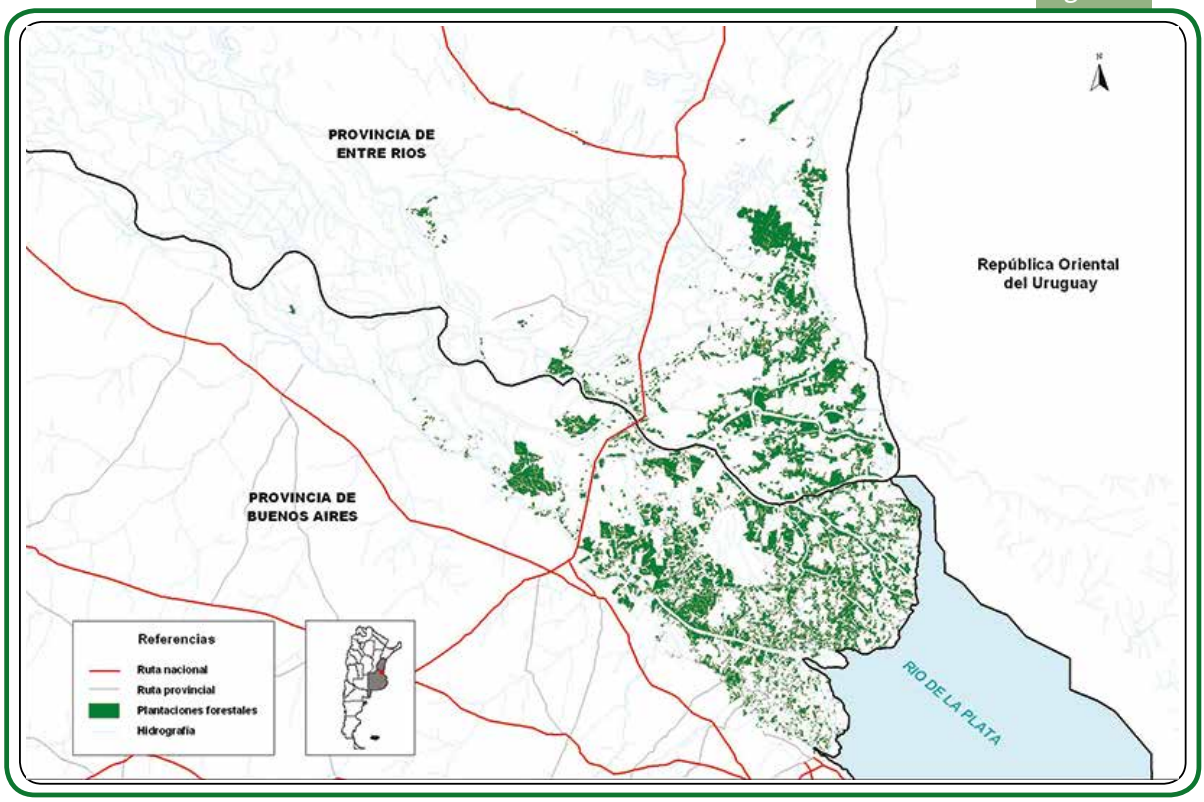
Figure 6



Source: GIS and Forest Inventory Area. Forestry Production Direction. Ministry of Agriculture, Livestock, and Fisheries. Planimetric information from the National Geography Institute (IGN) GIS250 .

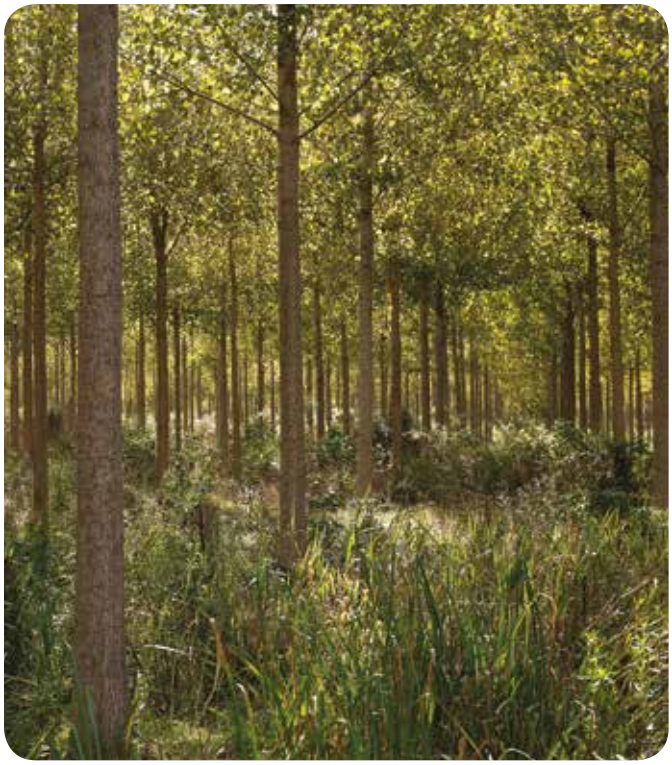
Plantation Forest Map, 2008-2009
Buenos Aires and Entre Ríos delta

Figure 7



Source: GIS and Forest Inventory Area. Forestry Production Direction. Ministry of Agriculture, Livestock, and Fisheries. Planimetric information from the National Geographic Institute (IGN) GIS250.

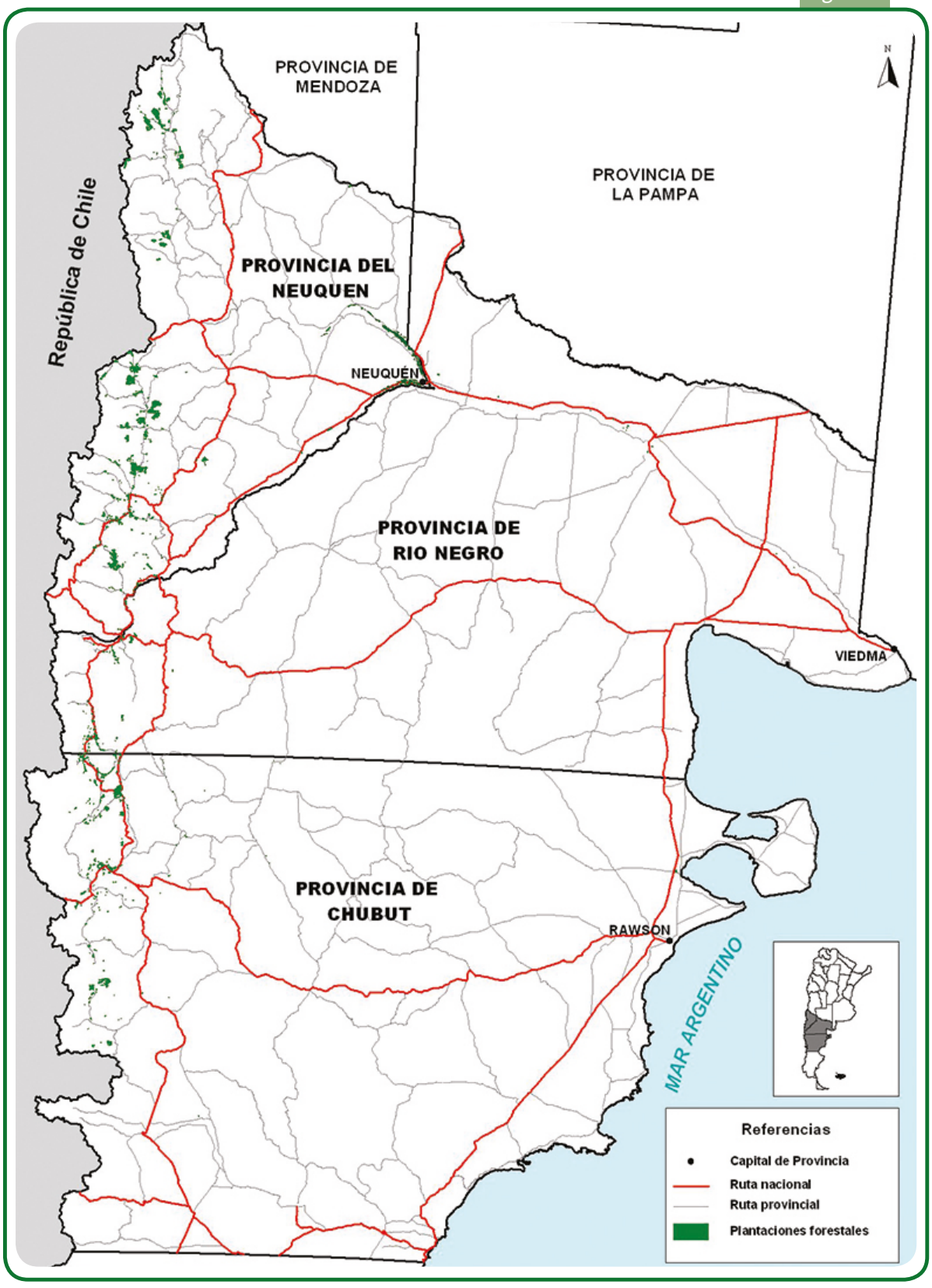
Logs loading and transport equipment. Tractor with hydraulic boom and trailer in the unloading area next to Carabelas river, province of Buenos Aires. Author Pablo Oliveri, courtesy of UCAR-MAGyP.



7 year old *Populus* sp. "álamo" plantation of 6m x 6m with two prunings, 4th Island Section, District of Campana, province of Buenos Aires. Author Pablo Oliveri, courtesy of UCAR-MAGyP.

Plantation Forest Map, 2008-2009
Provinces of Neuquén, Chubut and Río Negro

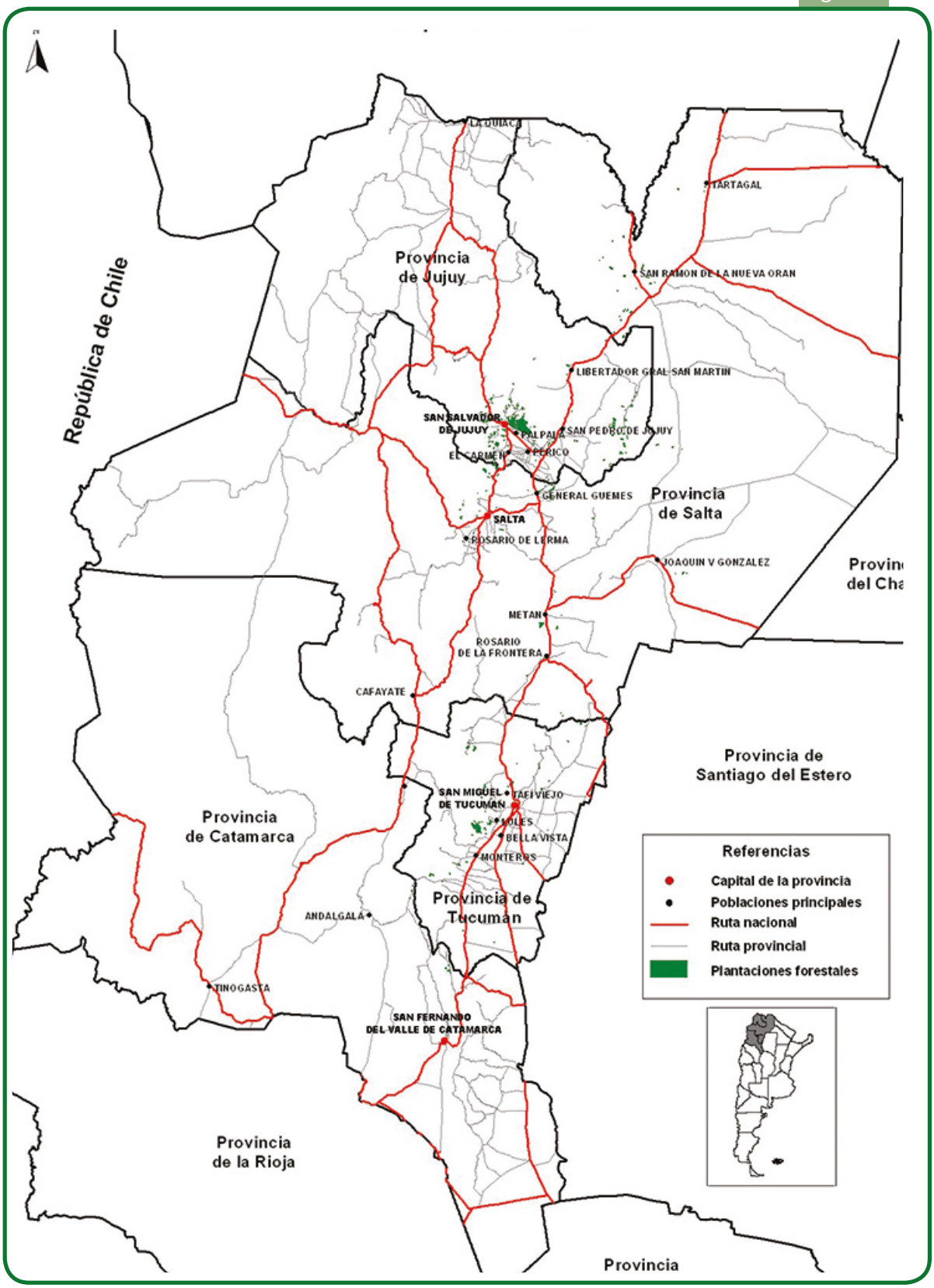
Figure 8



Source: GIS and Forest Inventory Area. Forestry Production Direction. Ministry of Agriculture, Livestock, and Fisheries. Planimetric information from the National Geographic Institute (IGN) GIS250.

Plantation Forest Map, 2008-2009
Provinces of Jujuy, Salta, Tucumán and Catamarca

Figure 9



Source: GIS and Forest Inventory Area. Forestry Production Direction. Ministry of Agriculture, Livestock, and Fisheries. Planimetric information from the National Geographic Institute (IGN) GIS250.

The national government encourages the installation of forest plantations through non-refundable economic contributions and tax benefits, under Law No. 25080 (Investments for Plantation Forests), extended and modified by Law No. 26432, whose national application authority is the Secretariat of Agriculture, Livestock and Fisheries (SAGyP) of the MAGyP. Moreover, the government promotes the establishment of new forest-industrial projects and the ramping up of existing projects, through tax benefits and fees for sustainable management, as long as there is a commitment to increase wood supply through the creation of new plantations.

The national policy of forest incentives aims at stimulating the industry by giving a non-refundable economic support equal to 80% of the costs of the plantation. It also includes the possibility of receiving support for pruning, thinning, managing regrowth for 70% of its estimated cost, as well as fiscal benefits. In the same context, there is financial aid for the activity of native forest enrichment. Between the passing of Law No. 25080 and 2012, 23 134 forestry projects have been supported, both through plantation activities and through forestry actions, such as pruning, thinning, and regrowth management.

It is estimated that this promotion policy lead to the creation of 1.13 million hectares of plantation forests (GIS-DPF). 80% of the plantations reached by the policy are in the provinces of Misiones, Corrientes, and Entre Ríos, while the remaining 20% is spread throughout other regions.

To the current indicator's purposes, we resort to records stemming from our own work and from other areas of the DPF. In all cases, sources are identified, for revision and improvement purposes.

We now show the results of all investments promoted by the current Law. According to the classification, large producers are those who request annual support for between 500 ha and 100 ha, medium producers request support for between 100 ha and 10 ha, and small producers are those who request support for 10 ha or less. Pruning, thinning and regrowth management activities without plantation are included in the silvicultural tasks column.

Approved projects per year

Table 12

Year	Approved projects				
	Plantation			ST	Total
	BP	MP	SP		
2000	120	928	4.063	138	5.249
2001	72	391	3.202	149	3.814
2002	37	130	189	69	425
2003	76	271	1.007	134	1.488
2004	72	502	1.796	354	2.724
2005	60	448	1.097	193	1.798
2006	85	420	715	225	1.445
2007	102	515	760	247	1.624
2008	88	466	747	336	1.637
2009	54	378	751	404	1.587
2010*	21	113	284	477	895
2011*	3	16	55	281	355
2012*	1	2	3	87	93
Total	791	4.580	14.669	3.094	23.134

Big producers (BP) request support for between 500 ha and 100 ha per year; medium producers (MP) request support for between 100 ha and 10 ha per year, and small producers (SP) request support for 10 ha or less per year. Pruning, thinning and regrowth management activities without plantation are included in the silvicultural tasks (ST) column.

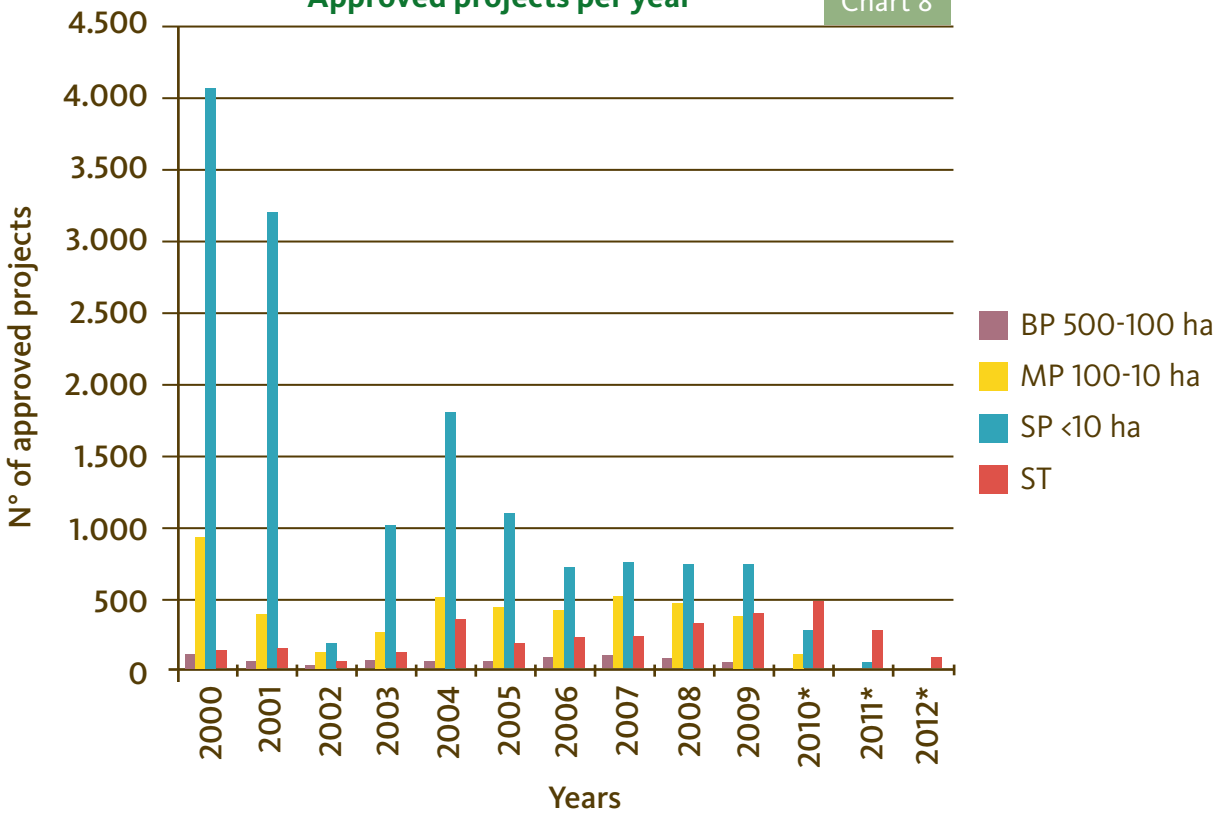
* See explanation on page 68.

Source: Ministry of Agriculture, Livestock, and Fisheries. Undersecretariat of Agriculture. Forestry Production Direction. Promotion Area.

Pinus taeda seedling, placed in a cell for its rooting. Author Pablo Oliveri, courtesy of UCAR-MAGyP.

Approved projects per year

Chart 8



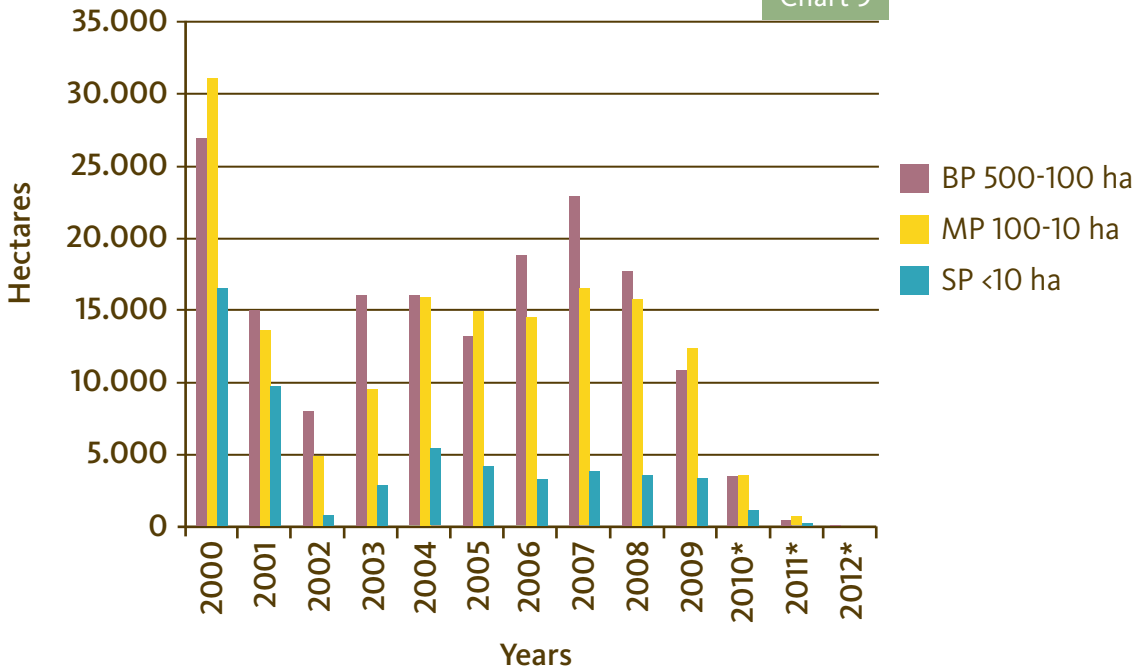
BP: big producers, MP: medium producers, SP: small producers, ST: silvicultural tasks

Source: Ministry of Agriculture, Livestock, and Fisheries. Undersecretariat of Agriculture. Forestry Production Direction. Promotion Area.

* See explanation on page 68.

Area by size of benefited producers per year (hectares)

Chart 9



BP: big producers, MP: medium producers, SP: small producers

Source: Ministry of Agriculture, Livestock, and Fisheries. Undersecretariat of Agriculture. Forestry Production Direction. Promotion Area.

* See explanation on page 68.

Areas by size of benefited producers, per year

Table 13

Year	Area by producer size (hectares)			
	BP	MP	SP	Total
2000	26.920	31.082	16.612	74.614
2001	15.119	13.649	9.863	38.631
2002	8.066	4.904	920	13.890
2003	16.093	9.571	2.923	28.586
2004	16.081	15.977	5.451	37.508
2005	13.207	15.041	4.342	32.590
2006	18.772	14.544	3.323	36.639
2007	22.906	16.469	3.938	43.313
2008	17.820	15.827	3.663	37.310
2009	10.907	12.491	3.464	26.863
2010*	3.566	3.677	1.262	8.505
2011*	484	814	251	1.549
2012*	218	102	14	334
TOTAL	170.159	154.147	50.027	380.334

Big producers (BP) request support for between 500 ha and 100 ha per year; medium producers (MP) request support for between 100 ha and 10 ha per year, and small producers (SP) request support for 10 ha or less per year.

Source: Ministry of Agriculture, Livestock, and Fisheries. Undersecretariat of Agriculture. Forestry Production Direction. Promotion Area.

It is important to highlight that 73% of the total approved plantation projects belongs to small producers.

This marks a clear contrast to the data expressed in terms of the surface area benefitted by the policies, where the highest percentages belong to big and medium size producers, with 44% and 40% respectively; while the total surface occupied by small producers is only 14%.

Areas enriched outside the scope of the Law or by programs prior to the Law have not been taken into account.

As regards forest management, it is possible to define relative plantation densities. There is no comprehensive and continuous density registry available, so the data refer to a few years (Table14).

* It should be noted that data in this table has been taken from payment resolutions, so the areas corresponding to plans still in the process of being assessed have not been taken into account. There is a difference between the planting year and the payment date, so it is estimated that the data from the area achieved annually stabilizes during the next four years, due to several situations arising during the realization of the enterprise and its corresponding benefit paperwork. So, it can be said the area planted up to 2009 will not show great variations.

Area in hectares divided by the plantation densities used, per year

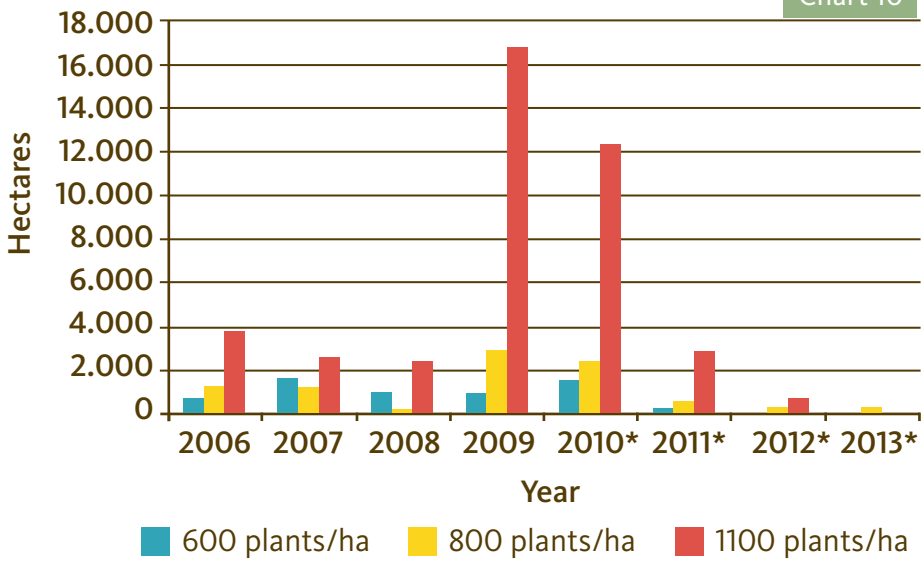
Table 14

Year	600 plants/ha	800 plants/ha	1100 plants/ha
2006	715,55	1.268,95	3.775,78
2007	1.650,62	1220,2	2.579,15
2008	946,18	165,73	2.431,35
2009	922,91	2.936,39	16.749,54
2010*	1.520,88	2.415,01	12.281,59
2011*	183,69	517,58	2.860,93
2012*	2,78	273,27	720,5
2013*	-	278,5	10,5
TOTAL	59.42,61	9.075,63	41.409,34

Source: Ministry of Agriculture, Livestock, and Fisheries. Undersecretariat of Agriculture. Forestry Production Direction. Promotion Area.
* See explanation on page 68.

Area in hectares divided by the plantation densities used, per year

Chart 10



Source: Ministry of Agriculture, Livestock, and Fisheries. Undersecretariat of Agriculture. Forestry Production Direction. Promotion Area.

* See explanation on page 68.

Native forest enrichment aims to increase the number of specimens of wanted species, through planting and/or seeding of native species among the existing vegetation; as well as to increase the forest economic value, through planting of native species of high commercial value.

With the purpose of restoring degraded forests, this activity can receive benefits from Law No. 25080 and Law No. 26 331 on Minimum Budgets for Environmental Protection of Native Forests as supplements, when aimed at productive purposes.

Native Forest Enrichment with *Peltophorum dubium* "caña fístula", Misiones. Author Daniela García.

Area of approved native forest enrichment projects (hectares)

Table 15

Year	EN	BP	MP	SP	Total
2000	2.462	-	971	455	3.888
2001	148	-	132	19	299
2002	-	1	34	2	37
2003	59	-	-	9	68
2004	415	-	36	59	510
2005	177	-	133	72	382
2006	485	-	108	32	625
2007	567	-	14	111	692
2008	802	19	32	1	854
2009	1.679	30	-	26	1.735
2010*	592	99	-	20	711
2011*	53	-	-	-	53
TOTAL	7.439	149	1.460	806	9.854

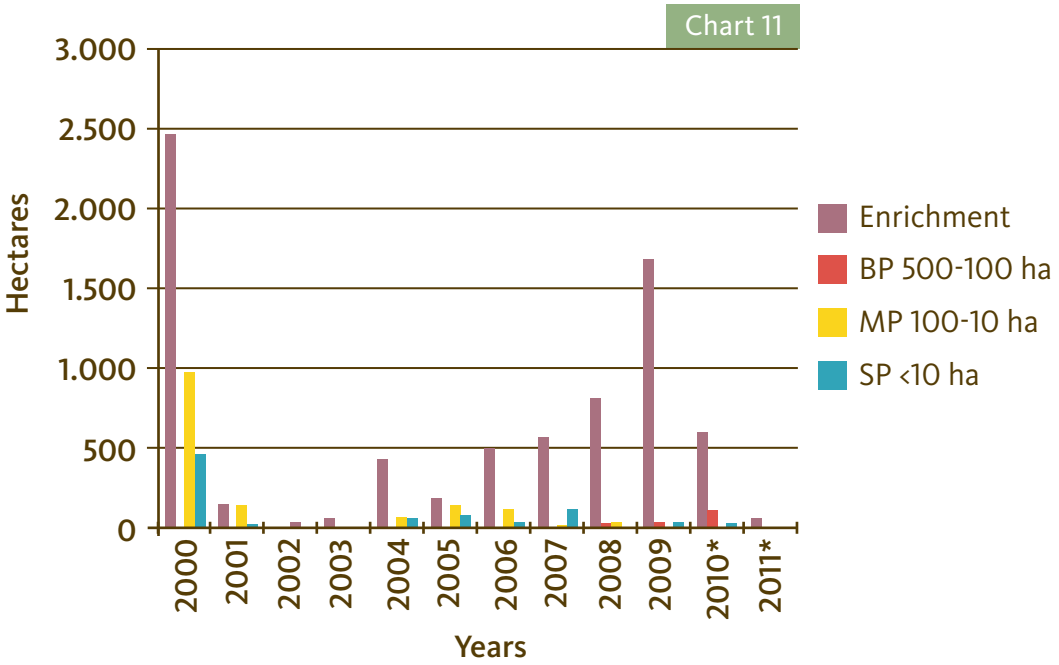
EN = Enrichment. Big producers (BP) request support for between 500 ha and 100 ha per year; medium producers (MP) request support for between 100 ha and 10 ha per year, and small producers (SP) request support for 10 ha or less per year.

Source: Ministry of Agriculture, Livestock, and Fisheries. Undersecretariat of Agriculture. Forestry Production Direction. Promotion Area.

* See explanation on page 68.

Area of approved native forest enrichment projects (hectares)

Chart 11



BP: big producers, MP: medium producers, SP: small producers

Source: Ministry of Agriculture, Livestock, and Fisheries. Undersecretariat of Agriculture. Forestry Production Direction. Promotion Area.

* See explanation on page 68.

Native Forest Enrichment with *Cedrela balansae* "cedro orán", province of Jujuy. Author Daniela García

2.e. Annual harvest of non-wood forest products.

Rationale: This indicator reports on the sustainability of the harvest of non-wood forest products. The wellbeing of indigenous and other communities dependent on non-wood forest products may be closely allied to the forest's ability to maintain its productive capacity over time.

Information Quality: H **Indicator Evolution: ?**

The concept of non-wood forest products (NWFP) is used to refer to goods with a biological origin (unlike firewood, timber and charcoal), and services provided by forests, other forest areas, and trees located outside the forests.

These products include a huge variety of trees, bushes, herbs, mosses, lichens, ferns and fungi used for food, as incense, for crafts, for pharmaceutical/medicinal purposes, etc. Different products can be extracted from the various species, such as essential oils, waxes, rubbers, resins, etc.

Forest services include those related to tourism, CO_2 capture, soil and basin protection, etc.

Information on NWFP (including native and plantation species) was provided by the Provincial Forest Services, the National Parks Administration, private companies, associations, foundations and NGOs, through specific forms.

In 2004, a program was launched to improve statistics on these products with the Provincial Forest Services, broadening the form with new products and the annual average price. This provides us with the price-quantity ratio, which the relevant authorities will use, in the future and including other economic and environmental variables, to make economic assessment of NWFP and measure their degree of representativeness.

Starting in 2005, private sector sources were incorporated, including associations, foundations and NGOs.

Branch with fruits of *Prosopis chilensis* "algarrobo chileno". Author Daniela García.

Non-wood forest products

Figure 10

Source: Secretariat of Environment and Sustainable Development. Undersecretariat of Planning and Environmental Policy. Forest Direction. National Non-Wood Forest Products Program.

Non-Wood Forest Products by use and year

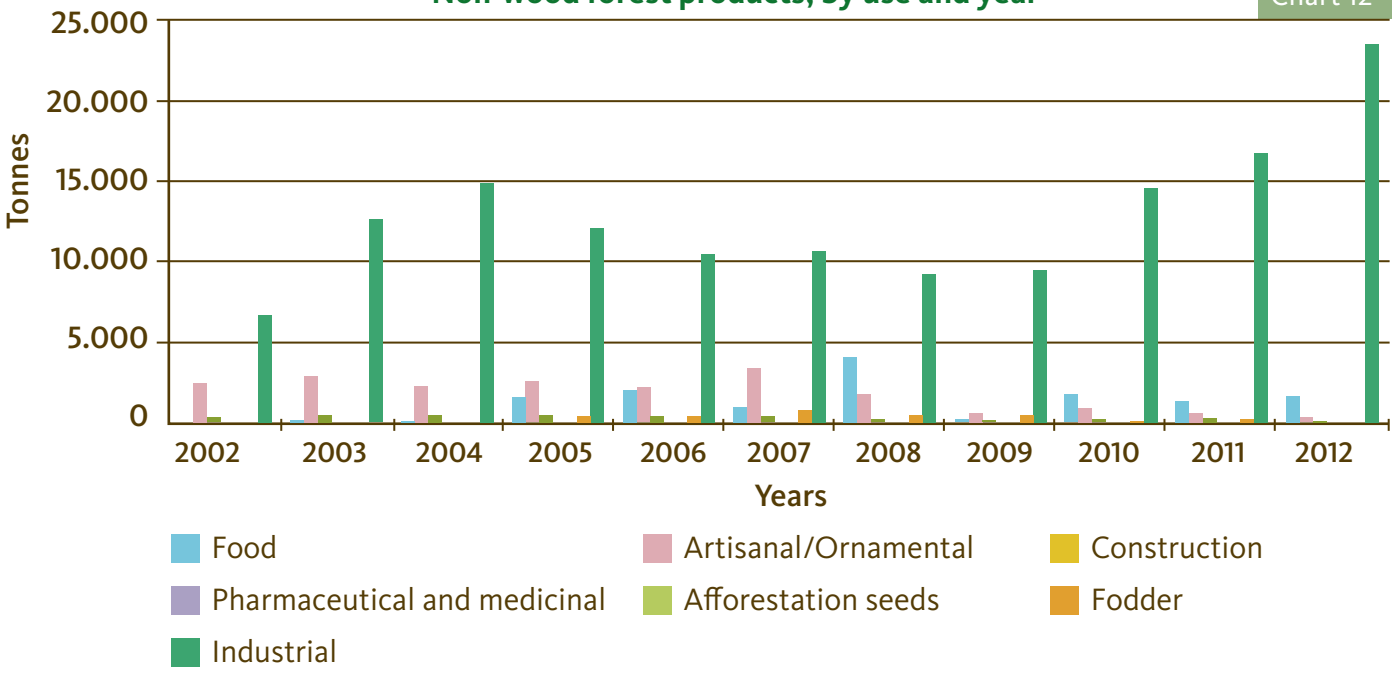
Table 16

Use	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
	Tonnes										
Total	9.132,25	16.089,04	17.692,43	17.137,66	15.521,32	16.051,70	15.802,76	11.005,34	17.462,63	19.149,57	25.517,03
Food	29,00	205,16	114,97	1.640,40	2.047,00	925,88	4.117,95	264,55	1.724,97	1.300,29	1.702,62
Artisanal/ ornamental	2.340,73	2.826,90	2.270,84	2.541,00	2.233,10	3.395,41	1.729,74	554,99	893,77	584,34	294,23
Construction	162,46	486,90	439,40	410,00	384,00	302,35	224,79	155,34	197,71	299,20	49,65
Pharmaceutical and medicinal	0,05	0,08	0,22	-	-	-	0,03	0,02	0,03	1,70	-
Afforestation seeds	-	-	-	0,26	0,22	0,05	0,25	0,25	4,65	4,05	1,52
Fodder				450,00	450,00	450,00	523,00	536,20	109,50	230,00	10,00
Industrial	6.600,00	12.570,00	14.867,00	12.096,00	10.392,00	10.630,00	9.207,00	9.494,00	14.532,00	16.730,00	23.459,00

Source: Secretariat of Environment and Sustainable Development. Undersecretariat of Planning and Environmental Policy.Forest Direction. National Forest Statistics Program, based on information provided by Provincial Forest Services, National Parks Administration, foundations, associations, NGOS, and private forestry companies.

Non-wood forest products, by use and year

Chart 12



Source: Secretariat of Environment and Sustainable Development. Undersecretariat of Planning and Environmental Policy. Forest Direction. National Forest Statistics Program, based on information provided by Provincial Forest Services, National Parks Administration, foundations, associations, NGOS, and private forestry companies.

- The analysis of the series on volume shows an increase in production and the capture of NWFP data, reaching a peak in 2012, with 25 517 tonnes.
- The greatest share is that of Industrial use, through the Miera product (78%), followed by Artisanal/Ornamental use, with 11%.
- Percentage change between both ends of the period is positive and around 180%.
- The period's average amounts to 16 415 tonnes of NWFP.

References:

Secretariat of Environment and Sustainable Development. Undersecretariat for Planning and Environmental Policy. Forest Direction. National Forest Statistics Program. "Anuario de Estadística Forestal de especies nativas". 2002-2012. http://www.ambiente.gov.ar/?idarticulo=2136

Secretariat of Environment and Sustainable Development. Undersecretariat for Planning and Environmental Policy. Forest Direction. National Forest Statistics Program "Series Estadísticas Forestales". 2002-2012. http://www.ambiente.gov.ar/?idarticulo=305

Criterion 3
Maintenance of Forest Ecosystem Health and Vitality

Forest fire risk sign in the province of Corrientes. Author Pablo Oliveri, courtesy of UCAR-MAGyP.

Hillside with specimens of *Austrocedrus chilensis* "ciprés de la cordillera" standing after the fire that took place in Catedral Hill in 1999, San Carlos de Bariloche, province of Río Negro. Author Pablo Oliveri, courtesy of UCAR-MAGyP.

Criterion 3:

Maintenance of forest ecosystem health and vitality

The maintenance of forest health and vitality is dependent upon the ability of the ecosystem's functions and processes to recover from or adapt to disturbances. While many disturbance and stress events are natural components of forest ecosystems, some may overwhelm ecosystem functions, fundamentally altering their patterns and processes and reducing ecological function.

Decline in forest ecosystem health and vitality may have significant economic and ecological consequences for society including a loss of forest benefits and the degradation of environmental quality.

Information gained on the impacts of biotic and abiotic processes and agents may inform management strategies to minimize and mitigate risk. The maintenance of forest ecosystem health and vitality is the foundation of sustainable forest management.

Indicator	Information Quality	Indicator Evolution
3.a. Area and percent of forest affected by biotic processes and agents (e.g. disease, insects, invasive species) beyond reference conditions.	L	→
3.b. Area and percent of forest affected by abiotic agents (e.g. fire, storm, land clearance) beyond reference conditions.	H	↑

Practice of prescribed burning. Author Nilda Irigoin.

Indicator Assessment	
Information Quality	
Low	L
Average	A
High	H
Indicator Evolution	
Neutral	→
Positive	↑
Negative	↓
Insufficient data	?

Forest fire´s control line. Author Nilda Irigoin.

Poplar rust. Author Natalia Acosta.

3.a. Area and percent of forest affected by biotic processes and agents (e.g. disease, insects, invasive species) beyond reference conditions.

Rationale: This indicator identifies the impact that biotic processes and agents have on forests. Where change due to these agents and processes occurs beyond a critical threshold, forest ecosystem health and vitality may be significantly altered and a forest's ability to recover could be reduced or lost. Monitoring and measuring the effects of these processes provides information helpful in the formulation of management strategies to mitigate risk.

Information Quality: L **Indicator Evolution** 

Institutional framework governing forest health

At the national level, the entity in charge of ensuring and certifying the health and the quality of forestry production is the National Service of Agrifood Health and Quality (SENASA), a de-centralized body of the Ministry of Agriculture, Livestock and Fisheries (MAGyP). Under SENASA's Plant Health Direction, the Forest Health Program was created in 2012, whose main goal is to reduce the economical damage produced by the pests affecting Argentine forest assests. To that effect, the Program's activities are organized around five components:

1- Diagnosis and planning of forest pest control: in charge of the ongoing survey of biological aspects, behavior, regional distribution, management options, and damage assessment in relation to the pests affecting plantation and native forests.

2- Monitoring and control: divided in five subcomponents, based on the host-pest combination: pine trees with *Sirex noctilio* and *Pissodes* sp., eucalyptus with *Thaumastocoris peregrinus* and *Leptocybe invasa*, and *Salix-Populus* with *Megaplatypus mutatus* and *Tremex* sp.

3- Biological controls: aimed at providing the specific biological controls for the pests identified in the program.

4- Evaluation of wood packaging material and of Wood Packaging Material Treatment and/or Assembly Centers (CATEM): the goal is to minimize the risk of pests' spreading from and to other countries, by means of evaluating all CATEM and controlling wood packaging material at the points through which it enters or leaves the country (International Standards for Phytosanitary Measures, or ISPM, No. 15).

5- Information processing and analysis: this refers to the information provided by the monitoring and control of forest pests activities, domestic wood movements, and the evaluation of wood packaging materials and treatment centers.

In turn, the MAGyP's Forestry Production Direction (DPF) includes a specific area (i.e., the Forest Health Area) whose main goals are related to the design and sharing of information and the inter-institutional coordination aimed at transferring, sharing and updating knowledge on forest pests, pursuant to the significant investment carried out by the government through Law No. 25080 (Investments for Plantation Forests), extended and modified by Law No. 26432. Thus, the health of plantation forests becomes a highly-relevant aspect of the forestry production chain. In this sense, Argentina has taken part in 2008-2014 in a regional project, supported by the Food and Agriculture Organization of the United Nations (FAO), called *Red de Países del Cono Sur sobre Especies Exóticas Invasoras a Ecosistemas Forestales* (Network of Southern Cone Countries for Invasive Exotic Species

in Forest Ecosystems), together with Brazil, Chile, Paraguay, and Uruguay (Southern Cone countries) and Bolivia, which is aimed at creating a network for the dynamic and integrated management of forest pests —bearing in mind that member countries share the same crops and that pests do not respect borders—, in order to have data to use as benchmarks for decision-making.

While the Forest Health Program, in line with the forestry activity development and promotion strategies applied by the MAGyP's DPF, has made it possible for the country to meet certain sanitary standards as regards pests affecting plantation forests, the information currently available at the national level is not enough to report on the area and percentage of forests affected by biotic processes and agents beyond reference conditions. In this sense, we report under this indicator the main biotic agents affecting forests and the damage they produce.

Biotic agents affecting forests

Forests are affected by biotic agents that include invertebrates, vertebrates, pathogens, and weeds. There are currently no methodologies implemented to assess damage at the national level, which would make it possible to identify the percentage of plantation and native forests affected by biotic processes and agents. Having said that, there are official bodies and programs working on sanitary issues particular to plantation forests. As regards problems occurring in native forests, some cases are known, based on research produced mainly by academic circles.

A- Invertebrates: harmful insects

Insects are one of the most serious issues affecting forest systems in the country. Most of the insect species affecting plantation forests in particular are alien to the region, coming instead from the same region from which the forest species cultivated in the country come from. Having no natural enemies from their home regions, they have found a niche and managed to establish themselves and become pests for these plantations. Table 17 shows the most important examples and the year in which they entered the country.

Pinus

The insects affecting the *Pinus* genus, the woodwasp, *Sirex noctilio* Fabricius 1793 (*Hymenoptera: Siricidae*), is the main pest in areas with commercial plantations: Patagonia, center, northeast and northwest of the country. It entered the country in the mid-1980's, leading to major commercial damages, associated to wood destruction and death of affected specimens. A secondary pest, which usually appears after attacks by *S. noctilio* or in conditions of tree stress, is the weevil known as *gorgojo de la corteza del pino*, *Pissodes castaneus* De Geer 1775 (*Coleoptera: Curculionidae*). It came from Europe and

Main harmful insects affecting plantation forests Table 17

Hosts	Harmful insects										
	Sirex noctilio	*Pissodes castaneus*	*Gonipterus scutellatus, G. gibberus*	*Glycaspis brimblecombei*	*Thaumastocoris peregrinus*	*Leptocybe invasa*	*Megaplatypus mutatus*	*Nematus oligospilus*	*Tremex fuscicornis*	*Hypsipyla grandella*	Ants
	Year of entry										
Pinus	1985	1998									native
Eucalyptus			1925	2005	2005	2010					
Salix y Populus							native	1980	2011		
***Cedrela* sp.**										native	

Source: Ministry of Agriculture, Livestock and Fisheries. Undersecretariat of Agriculture. Forestry Production Direction. Forest Health Area.

Pupal chamber and damage caused by *Pissodes castaneus* (Misiones 2012). Author Natalia Acosta.

Pine specimen with dieback caused by combined attacks from *Sirex noctilio* and *Pissodes castaneus* (Bariloche 2013). Author Natalia Acosta.

North Africa in 1998, and though it was first reported in the province of Jujuy, it nows affect all regions in which pine trees are cultivated. They damage the bark —creating galleries underneath— and may cause the death of young specimens or greenhouse seedlings, and even adult plants, in case of successive attacks.

Eucalyptus

The first insects reported as pests for the *Eucalyptus* sp. genus were the "eucalyptus weevils" *Gonipterus scutellatus* Gyllenhal 1833 (= *G. platensis*) and *G. gibberus* Boisduval 1835 (*Coleoptera: Curculionidae: Entiminae*). These are phyllophagous insects, originally from Oceania, introduced in Argentina circa 1925. After approximately five years, thanks to the support provided by the South African Entomology Department, where they were used for biological control, the first specimens of the egg parasitoid *Anaphes nitens* Girault 1928 (*Hymenoptera: Mymaridae*) for both weevil species were imported. In spite of the effort invested to control this pests, it remains an issue in some areas with eucalyptus plantations.

In 2005, two new insects specific to the *Eucalyptus* genus were identified. The first is the "redgum lerp psyllid", *Glycaspis brimblecombei* Moore 1964 (*Hemiptera: Psyllidae*), which, while present in all eucalyptus species, is particularly prevalent in red eucalyptus like *E. camaldulensis* and *E. tereticornis* and their interspecific hybrids. The nymphs of these species can secrete honeydew to form a "shield" for protection, and that is the phase in which they are harmful, with the potential to even cause death of branches and young trees in case of successive attacks. The insect entered the country together with its natural parasitoid, *Psyllaephagus bliteus* Riek (*Hymenoptera: Encyrtidae*).

Gall caused by *Leptocybe invasa* (La Plata, Buenos Aires 2013). Author Natalia Acosta.

Thaumastocoris peregrinus nymphs and adult specimens. Author Natalia Acosta.

Another insect found in several eucalyptus species is the "bronze bug", *Thaumastocoris peregrinus* Carpintero & Dellape 2006 (*Hemiptera: Thaumastocoridae*), which shows a high level of tolerance to extreme abiotic variables. If the bug population density reaches high levels, it can cause a reduction in the photosynthesis rate of the leaves, which could lead to partial or total defoliation, which can be reversed by new budding in some cases. As this proved a major issue, 2011 saw the creation at the regional level of the "*Plan Regional de Vigilancia y Control Biológico de la Chinche de los eucaliptos Thaumastocoris peregrinus* Carpintero & Dellapé (*Hemiptera: Thaumastocoridae*)" (Regional Surveillance and Biological Control of *Thaumastocoris peregrinus* Carpintero & Dellapé (*Hemiptera: Thaumastocoridae*) Plan), by the COSAVE (Plant Health Committee). This document reflects the decision to "reduce the negative impact of *T. peregrinus* in commercial production areas, and urban and rural wooded areas, of *Eucalyptus* spp., in the member countries of the COSAVE[10], through biological control with *Cleruchoides noackae* Lin & Huber (*Hymenoptera: Mymaridae*)". In the context of this framework, attempts have been made to introduce *C. noackae*, an egg parasitoid, from Uruguay, which succeeded for the first time in 2013. It is currently quarentined, in order to comply with all regulations of existing standards at the national and international levels as regards environmental biosafety, before its release into the field.

Specimens of "blue gum chalcids", *Leptocybe invasa* Fisher & LaSalle 2004 (*Hymenoptera: Eulophidae: Tetrastichinae*), were identified in 2010. These are considered by the FAO to be the main pest affecting young eucalyptus trees and seedlings. These species of small chalcid wasp hails from Australia can cause galls in young stems, petioles and veins. Massive cases of galls can cause the death of the specimen, which creates severe economic losses for nurseries and commercial stands. The species is currently present in all areas with eucalyptus plantations. As it was recently introduced, information about its biology and behavior in the country is but incipient.

Populus and Salix (Salicaceae).

One of the first plagues identified in poplars and willows was a polyphagous insect, native to South America, known as *Megaplatypus mutatus* Chapuis 1865 (= *Platypus sulcatus*), or *taladrillo grande de los forestales* (*Coleoptera: Platypodidae*). This ambrosia beetle lives symbiotically with a basidiomycota fungus, *Raffaelea santoroi*, and attacks vigorous trees, over 15 cm in diameter, in order to dig a system of galleries in the shaft's normal plane. It has been identified as the cause of damage in poplars, willows and other forestry and fruit-bearing species in Argentina.

Another pest spotted for the first time in Patagonia in 1980 is the "willow sawfly", *Nematus oligospilus* Förster 1854 (*Hymenoptera: Symphyta: Tenthredinidae: Nematinae*), native to the Northern hemisphere, whose defolliating larvae feed on several willow species and clones. From the south of the country, it spread into other provinces, and was spotted in the Paraná River Delta after six years. It can lead to defoliation of up to 90% in plantations, as it was reported for Patagonia, stimying tree growth and even causing death in case of successive attacks.

More recently, in 2011, the Tremex wasp, *Tremex fuscicornis* Fabricius 1787 (*Hymenoptera: Siricidae*), native to Europe and Asia, was identified in Buenos Aires. While the literature on the subject refers to several forest and woody species as potential hosts, so far, they have only been found in salicaceous (*Salix* sp. and *Populus* sp.) species in plantations and urban wooded areas.

Central cylinder of peeling with *Megaplatypus mutatus* galleries (Neuquén 2011). Author Natalia Acosta.

10 The Plant Health Committee (COSAVE) is a Regional Phytosanitary Protection Organization (ORPF), created under the International Plant Protection Convention (IPPC). See www.cosave.org.

Cedrela

The insect known as *barrenador de los brotes de las Meliáceas* (shoot borer), ***Hypsipyla grandella* Zeller** (*Lepidóptera: Pyralidae*), is the main pest affecting *Cedrela* sp. (*Meliaceae*) plantations in the northeast and northwest of Argentina. The larvae damage young trees' shoot of main shafts by means of boring into the pith, which leads to loss of apical dominance, and, thus, to a reduction in the shaft's economic value. Various research projects are currently devoted to the search for alternative options to control this moth.

Hypsipyla grandella damage in a young specimen of *Cedrela* sp. (San Antonio, Misiones 2011). Author Natalia Acosta.

All forest species

The most important genera of leaf-cutting ants in Argentina in terms of agronomical-forestal relevance are ***Acromyrmex*** and ***Atta***, which affect plantation forests throughout the country. Their management and control is indispensable to ensure an economically-feasible production —particularly in plants of less than three years—, as it can lead to growth delays, reductions in timber yield, and even the death of seedlings. The main control method used is the administration of granulated baits. In 2013, the European Union banned the use of fipronil and other active ingredients, which forces forestry producers who wish to export to resort to other alternatives for ant control. In this sense, several projects, financed by government agencies, are devoted to research alternatives including, among others, the use of entomopathogenic fungi (e.g., *Beauveria bassiana*) and parasitoid insects (e.g., flies of the *Phoridae* family) against the ant community.

Anthills (Misiones 2012). Author Natalia Acosta.

B- Vertebrates.

Rodents

The European hare, *Lepus europaeus* (*Lagomorpha: Leporidae*), currently found throughout the country, and the European rabbit, *Oryctolagus cuniculus* (*Lagomorpha: Leporidae*), restricted to the south, are one of the main issues affecting plantation forests in Argentina. The damage they cause in young trees affects their apical buds, while in the case of older trees, damage is related to browsing of leaves and the use of tree bark to wear their teeth away. Plantations suffer the greatest damage in the first 2-3 years after implantation or before the plant reaches a height of 50-60 cm and the animals can no longer reach the buds. In order to prevent this, several protections are used, such as gaiter-like devices and electrical mesh, or lower-cost home-made solutions (plastic bottles, Tetra Brik packaging, hermetic plastic bags or silo bags, etc.).

As regards damage percentages in Patagonia, Bonino (2009)[11] mentions through Gader that some studies carried out on hares in plantation forests in the Huiliches and Lacar Departments (province of Neuquén), found up to 68% damage in apical buds during the first year after implantation. Moreover, in surveys and studies carried out in 43 plantations from the Andean zones of the provinces of Río Negro and Neuquén, found that 83% of said plantations experienced hare-related damage in the first year after implantation, and that damage percentages moved between 28% and 73% of the plants, with the ponderosa pine (*Pinus ponderosa*) as the most affected species, followed by the Oregon pine (*Pseudotsuga menziesii*) and murrayana pine (*Pinus contorta*). The most frequent type of damage was cutting of the apical bud (88% of cases), followed by cutting of the apical bud and consumption of needles (12% of cases).

11 Bonino, N. 2009. Liebres y conejos como plagas de plantaciones forestales. Cuadernillo n° 7. En: Serie Técnica Manejo Integrado de Plagas Forestales. Editores: Villacide, J. & Corley,J. Cambio Rural - Laboratorio de Ecología de Insectos., ISSN 1851-4103

PET covers against the attacks of hares and rabbits.
Author Daniela García.

Domestic Animals

Some domestic animals which affect forests through browsing and plant-breaking are caprine and bovine cattle.

Austrocedrus chilensis, some of them afected by the "mal del Ciprés" desease (Parque Nacional Los Alerces, Esquel 2013). Author Natalia Acosta.

C- Pathogens: diseases

Native forests

In 1948, it was reported that the native conifer of the Andean-Patagonian forests, *Austrocedrus chilensis* (D. Donm) Florin et Boutelje, or *ciprés de la cordillera* (*Cupressaceae*), was suffering from a disease known since then as the "disease of the *ciprés de la cordillera*". In 2007, researchers from the San Juan Bosco National University of Patagonia and from CIEFAP- CONICET identified ***Phytophthora austrocedrae***, a root pathogen, as the agent causing the disease. This is the main sanitary disturbance affecting cypress forests, causing the death of trees in more or less extensive stands, and the progressive decay of structures. In the last few years, the pathogen's action has grown in terms of range and relevance, affecting the possibility of managing forestry activities based on this species. The disease manifests as a premature defoliation of the canopy, coupled with decay of root systems, which ends in dieback. This forest species' importance lies not only on its ecological function, but also on the quality of its wood and its aesthetic contribution to the landscape.

Cultivated forests

Table 18 shows the most prevalent diseases for the most cultivated genera in the country.

D- Weeds

Weeds are important competitors of forest plantations. Some of the most prevalent woody weeds are *Rubus ulmifolius*, or zarzamora, *Rosa rubiginosa*, or eglantine, and *Ligustrum sinense*, or Chinese privet.

Rosa rubiginosa "rosa mosqueta". Author Daniela García

Main diseases affecting the *Pinus*, *Eucalyptus*, *Salix* and *Populus* genera

Table 18

Host	Disease	Pathogen	Comments
Pinus	Sphaeropsis blight – Pine pitch canker	*Diplodia pinea* (=*Sphaeropsis sapinea*)	In sprouts, needles, cones and branches. It creates a blue tint in wood. It can appear in nurseries and stressed specimens. Secondary pathogen.
	Cyclaneusma needle cast	*Cyclaneusma minus*	In needles
	Nursery diseases	*Fusarium* spp.	In seedlings. It produces damping, root necrosis.
	Nursery diseases	*Phytophthora* spp.	In seedlings. It produces damping, root necrosis.
Eucalyptus	Eucalyptus rust	*Puccinia psidii*	In sprouts, leaves, minor stems.
	Viruela del eucalipto ("eucalyptus smallpox")	*Kirramyces epicoccoides* (= *Phaeoseptoria eucaliptii* =*Septoria pulcherrima*)	In leaves. It causes defoliation. Secondary pathogen.
	Canker	*Teratosphaeria gauchensis* (= *Kirramyces gauchensis*)	Infections appear in stems, green branches, and shafts.
	Nursery diseases	*Cylindrocladium scoparium*	Associated to damping. It produces root necrosis, and cankers at the base of the stem.
	Leave spots	*Teratosphaeria suttonii*	In leaves
Populus* and *Salix	Canker	*Septoria musiva*	In branches, trunks and leaves. It affects *Populus*
	Poplar and willow rust	*Melampsora* spp.	In leaves. It affects *Populus* and *Salix*.
	Root rot	*Phytophthora* sp.	In roots. It affects *Populus*.
	Anthracnose	*Marssonina* sp.	In leaves. It affects *Populus* and *Salix*.
	Cankers and bark blackening	*Cytospora chrysosperma*	In leaves and trunks. It affects *Populus* and *Salix*. In stored stakes and in nurseries.
	Cankers and bark blackening	*Phomopsis* sp.	In leaves and trunks. It affects *Populus* and *Salix*. In stored stakes and in nurseries.
	Bark necrosis	*Discosporium populeum* (= *Dothichiza populea*)	In branches and trunks. It affects *Populus* and *Salix*.
	Cercosporiosis or Willow leaf spot	*Cercospora salicina*	In leaves. It affects *Salix*.

Source: Ministry of Agriculture, Livestock and Fisheries. Undersecretariat of Agriculture. Forestry Production Direction. Forest Health Area.

"Viruela del eucalipto", *Phaeoseptoria eucaliptii*, in nursery plants. (La Plata 2008). Author Natalia Acosta.

Cirrhus from the fungus *Cytospora chrysosperma* on poplar (Tunuyán, Mendoza 2014). Author Natalia Acosta.

Poplar canker due to *Septoria musiva* (Tunuyán, Mendoza 2014). Author Natalia Acosta.

Case Study

Inter-institutional collaboration to manage a pest with relevance for forestry, *Sirex noctilio*.

The Forest Health Program of the SENASA's Plant Health Direction (DNPV), through the "Sirex woodwasp control project", has taken steps to maintain the population levels of Sirex woodwasps, or *Sirex noctilio* (*Hymenoptera: Siricidae*). This pest represents the main sanitary issue, as it attacks the Pinaceae, and mainly the *Pinus* genus, which accounts for the largest cultivated area in the country, leading to serious economic damage, a problem exacerbated by the fact that the insect has a wide distribution, from the north of the country —Mesopotamia and Northwest regions— to Patagonia.

Moreover, the Integrated Pest Management project of the National Institute of Agricultural Technology (INTA) has made it possible to collaborate with SENASA, the DPF and various universities to develop biological control tools resorting to natural enemies and forestry management, in order to reduce insect populations to endemic levels or levels below the threshold of economic damage.

The Forest Health Program, as a part of the Bi-National Contingency Plan agreed with Chile, provides for the multiplication of *Sirex* biological controls and has the goal of removing the insect from plantations in the provinces of Neuquén, Río Negro, and Chubut, in order to keep it from spreading to other regions of Argentina and Chile. Currently, the program includes other pine-producing regions, such as Córdoba, Corrientes, Misiones, and Buenos Aires. Starting in 2001, the Program uses biological control tools based on the release of live organisms. Pine trees are inoculated with the *Beddingia siricidicola nematode*, and eggs of the parasitoid wasp *Megarhyssa nortoni* (*Hymenoptera: Ichneumonidae*) are released into the environment, which, coupled with the action of *Ibalia leucospoides* (*Hymenoptera: Ibaliidae*) —a parasitoid which entered the country with *S. noctilio*—, help reduce pest population density, and the damage it causes.

Sirex woodwasp, *Sirex noctilio*. Courtesy of INTA.

Sirex noctilio exit orifices (Bariloche 2013). Author Natalia Acosta.

Some *Sirex noctilio*-related deaths in a pine plantation (Bariloche 2013). Author Daniela García.

Source:

Ministry of Agriculture, Livestock and Fisheries Undersecretariat of Agriculture. Forestry Production Direction. Forest Health Area, based on information from SENASA.

References:

COSAVE. 2011. Plan Regional de Vigilancia y Control Biológico de la chinche de los eucaliptos *Thaumastocoris peregrinus* Carpintero & Dellapé (*Hemiptera: Thaumastocoridae*) del COSAVE. Available at http://www.cosave.org/pagina/planes-regionales.

Ministry of Agriculture, Livestock and Fisheries. Forestry Production Direction. Forest Health Area. Website: http://area-sanidad-forestal-dpf.blogspot.com.ar

Murace, M. and Aprea, A. 2011. Enfermedades foliares fúngicas en Gimnospermas. Publication for professors. Forest Protection Course, School of Agricultural and Forest Sciences, La Plata National University

Ramos, S. 2014. Enfermedades en *Eucalyptus*. Evaluación sanitaria de las plantaciones de eucalipto en el NEA. Summary Book. Second Argentine Congress on Forest Health, September 24-26, 2014, Montecarlo - Misiones.

National Service of Agrifood Health and Quality (SENASA). Plant Health Direction. Forest Health Program. Website: www.senasa.gov.ar/contenido.php?to=n&in=661&io=2635

3.b. Area and percent of forest affected by abiotic agents (e.g. fire, storm, land clearance) beyond reference conditions.

Rationale: This indicator identifies the impact that abiotic agents, both natural and human induced, have on forests. Where change occurs due to these agents and processes beyond a critical threshold, forest ecosystem health and vitality may be significantly altered and a forest's ability to recover from disturbance could be reduced or lost. Monitoring and measuring the extent of forest affected by physical agents provides information to guide the formulation of management strategies to mitigate risk.

Information Quality: H **Indicator Evolution:** ↑

Fire Management Federal Service (SFMF)

The SFMF is part of the Secretariat of Environment and Sustainable Development (SAyDS).

The Law No. 26815 that created the Fire Management Federal Service was approved on November 28th, 2012. This Law provides all the elements that will make it possible to improve institutional quality in terms of forest and rural fire prevention and management, with relevant consequences in related technical and operational aspects.

The Law of Fire Management will make it possible to complete a process of analysis, discussion, and valuable feedback that took place in the last few years among institutions, organizations, and experts, and led to the creation of the Fire Management Federal Service, with an environmental and organic view, which will contribute to improve the quality of life of the towns and people affected by recurrent fires in forests and fields.

The Federal Service thus created, whose goals are the establishment of mechanisms to effectively manage fires and protect the environment, and the protection of populations as a whole and of people involved in fighting fires, comprises the organizations in charge of managing fires in the provinces and in National Parks, coordinated by the Secretariat of Environment and sustainable development, through the Fire Management National Plan.

This system will be adequately consolidated, supported, and financed, turning fire management into a government priority.

Some of the actions punishable by the law include lighting fires within forests and grasslands in violation of the relevant regulations, not observing the obligation of reporting to the nearest authority should fire be spotted, hindering the actions of firefighting personnel.

Articles 2, 5 and 6 in Law No. 26815 of Minimum Budgets for Fire Management, (available at *http://www.ambiente.gov.ar/default.asp?IdArticulo=11168)*, specify the application authorities, while article 8 identifies its articulations.

Forest fire in Cholila, Chubut (Febrero 2015). Courtesy of Sistema Federal de Manejo del Fuego (Fire management Federal Service).

Article 2

Application scope. The current law applies to all prevention, pre-suppression, and firefighting activities related to forest and rural fires which affect live or dead plants, in native or plantation forests, in protected natural areas, agricultural areas, prairies, grasslands, shrublands or wetlands, and areas in which buildings coexist with vegetation outside the strictly urban or structural environments. Moreover, it covers planned fires, which are allowed to burn in previously defined environmental conditions, and the achievement of the management goals of a territorial unit.

Article 5

National Application Authority. The National Application Authority for the current Law is the Secretariat of Environment and Sustainable Development or whichever body may replace it.

Article 6

Competent Authorities. Each jurisdiction will define a Competent Authority for this Law. In the case of the protected areas provided in Law No. 22351 (National Parks), the National Parks Administration is the Competent Authority.

Article 8

Articulation. The National Application Authority will articulate, under the Federal Environmental Council (COFEMA), the implementation of prevention policies, the support to be provided to fire management strategies, early alert systems and quick and effective firefighting, in order to maintain ecosystems and its relevant processes through a comprehensive management.

Statistics

Forest Fire Statistics are prepared and disseminated in the context of the National Forest Statistics Program of the Forest Direction (DB) of the SAyDS, since 1993.

The information is requested by jurisdiction and department every month. The basic data from which information is gathered and processed are:

- Number of recorded fires
- Area affected, by type of vegetation (native forest, plantation forest, grasslands, and shrublands)
- Main causes (negligence, intentional, natural, and unknown)

There is an Access database, which offers the option of browsing data by type of forest, department, month, time period, province or department range, causes, etc., between the years 1993 and 2014.

The network of bodies which report fires is varied. In some cases, information is provided by Provincial Forest Services, and in others, by Civil Defense Organizations, and Provincial Fire and Police Departments. In 2000, the Autonomous City of Buenos Aires joined the network of jurisdictions providing information, through the Costanera Sur Ecological Reserve.

Data are disaggregated into the following categories:

- Phytogeographical regions
- Regional data, from the Federal Fire Management Service
- Jurisdiction
- Department
- Month

Users can group the data by topic, season, month, quarter, etc., based on information available in the SAyDS' website, in journals *(http://www.ambiente.gov.ar/?idarticulo=13180)* or in the database available at *http://www.ambiente.gob.ar/?aplicacion=consultaIncendios&tipo=causas_por_departamento*.

Control line opening practice. Author Nilda irigoin.

Bodies reporting on forest fires, by jurisdiction and institution Table 19

Jurisdiction	Institution
Buenos Aires	Civil Defense General Direction
Catamarca	Government Secretariat of Environment and Sustainable Development
Ciudad Autónoma de Buenos Aires	Costanera Sur Ecological Reserve
Córdoba	Secretariat of Environment
Corrientes	Civil Defense – Forest Resources Direction
Chaco	Civil Defense Provincial Direction
Chubut	General Forests and Parks Direction
Entre Ríos	Secretariat of Environment – Provincial Fire Management Plan
Formosa	Natural Resources and Management Direction
Jujuy	Provincial Sustainable Development Direction
La Pampa	Ministry of Government – Civil Defense
La Rioja	Civil Defense – Provincial Emergency System
Mendoza	Renewable Natural Resources Direction
Misiones	General Native Forest Direction
Neuquén	Provincial Fire Management Direction
Parques Nacionales	Forest Fire Fighting Coordination
Río Negro	Forest Fire Prevention and Firefighting Service (SPLIF) Bariloche and El Bolsón Viedma Fire Department
Salta	Civil Defense Undersecretariat
San Juan	San Juan Fire and Police Departments
San Luis	San Luis Solidario Program
Santa Cruz	Provincial Agricultural Council / Santa Cruz Brigade
Santa Fe*	Santa Fe's D-TRES Police Operations Department
Santiago del Estero	General Natural Resources Direction
Tierra del Fuego	Natural Resources Undersecretariat – Forest Direction
Tucumán	Wild Fauna, Flora and Soil Direction

* We appreciate the collaboration of Fundación Hábitat, which provided data on the "El Pozo" Ecological Reserve, in the province of Santa Fe.

Definitions of terms used to prepare the indicator:

Types of vegetation

Forest: a group of plants, dominated by trees or other woody species, with a coverage of at least 20% of the area.
Native forest: a forest evolved from already-present organisms (dominance of native species), with a coverage of at least 20% of the area, and with a tree height at maturity of 4 meters or more.
Plantation forest: a forest plantation created by implanting trees or stakes.
Grasslands: grass covered areas, in which herbs are the main source of fuel for the fire, regardless of their height.
Shrublands: an area with plants which are different from herbs on account of their persistent and woody stems, and from forests on account of their low height (up to four meters) and their tendency to branch at the base.

Definition of forest fire

Forest fire: any fire which spreads without control in forest lands, affecting vegetation which was not intended to burn.

Causes

Negligence: fire caused due to carelessness. E.g., a poorly-extinguished campfire.

Intentional: fire caused to receive a benefit. E.g., forests burnt to develop grasslands.

Natural: fire caused by draughts, high temperature, electric storms.

Unknown: fire whose cause is impossible to ascertain.

Number of fires, by main cause

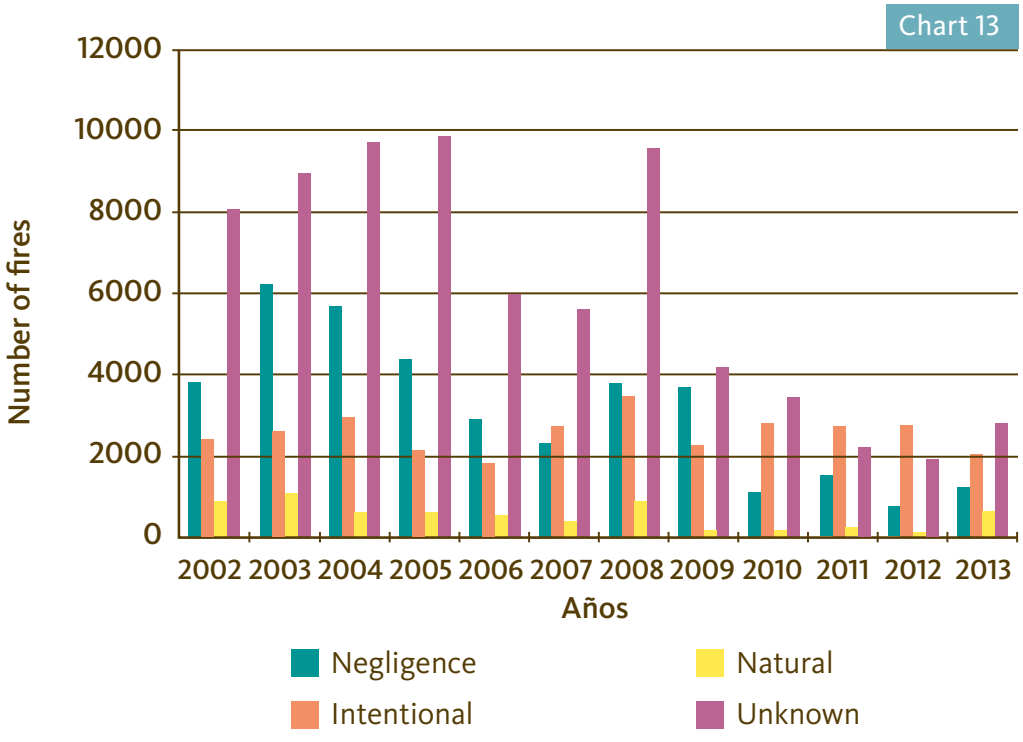
Table 20

Year	Total	Main causes of forest fires			
		Negligence	Intentional	Natural	Unknown
2002	15182	3816	2414	878	8074
2003	18832	6233	2597	1055	8947
2004	19001	5693	2941	634	9733
2005	17010	4369	2127	642	9872
2006	11243	2874	1809	534	6026
2007	11053	2326	2705	395	5627
2008	17738	3790	3453	899	9596
2009	10340	3690	2258	190	4202
2010	7526	1098	2813	172	3443
2011	6750	1510	2739	258	2243
2012	5607	754	2782	131	1940
2013	6705	1221	2019	672	2793

Source: Secretariat of Environment and Sustainable Development. Undersecretariat of Planning and Environmental Policy. Forest Direction. National Forest Statistics Program, based on information provided by Provincial Forest Services, the National Parks Administration, Civil Defense, Fire Department, Provincial Police Department, and Fundación Hábitat.

Number of forest fires, by main causes

Chart 13



Source: Secretariat of Environment and Sustainable Development. Undersecretariat of Planning and Environmental Policy. Forest Direction. National Forest Statistics Program, based on information provided by Provincial Forest Services, the National Parks Administration, Civil Defense, Fire Department, Provincial Police Department, and Fundación Hábitat.

Fire-affected areas, by type of vegetation

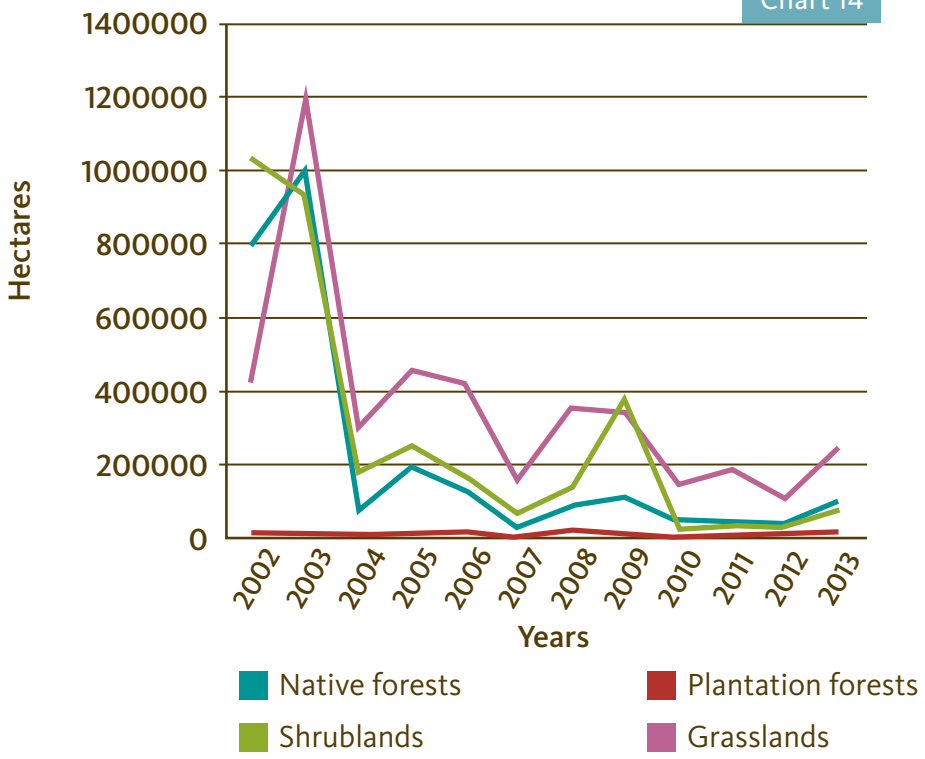
Table 21

Year	Total	Area (ha)			
		Native forest	Plantation forest	Shrublands	Grasslands
2002	2260709.35	790396.74	16473.65	1030798.20	423040.76
2003	3152856.81	1004812.85	15319.31	933693.07	1199031.57
2004	565909.41	78636.93	13841.07	178219.70	295211.71
2005	929678.17	199411.61	18408.99	252740.85	459116.73
2006	746828.82	130866.57	20015.26	169907.71	426039.28
2007	257989.17	30470.26	4428.00	69419.71	153671.20
2008	607572.21	89485.14	20323.86	142706.19	355057.01
2009	844227.79	109968.27	15977.59	378246.21	340035.72
2010	222719.58	49946.99	3404.79	26669.01	142698.78
2011	283227.78	53783.44	4022.90	35561.03	189860.41
2012	197081.69	45766.56	14738.21	31487.54	105089.39
2013	441763.43	102865.49	16222.90	77663.88	245011.16

Source: Secretariat of Environment and Sustainable Development. Undersecretariat of Planning and Environmental Policy. Forest Direction. National Forest Statistics Program, based on information provided by Provincial Forest Services, the National Parks Administration, Civil Defense, Fire Department, Provincial Police Department, and Fundación Hábitat.

Fire-affected areas, by type of vegetation

Chart 14



Source: Secretariat of Environment and Sustainable Development. Undersecretariat of Planning and Environmental Policy. Forest Direction. National Forest Statistics Program, based on information provided by Provincial Forest Services, the National Parks Administration, Civil Defense, Fire Department, Provincial Police Department, and Fundación Hábitat.

Results:

- In the period 2002-2013 the area affected by fires was about 11 million hectares.
- Of that total, 41% are grasslands, 32% are shrublands, 26% are native forests, and only 1% are plantation forests.
- Native forests reached their maximum area in 2003, with over a million hectares, and their minimum area in 2007, with 258 000 hectares.
- Fires in fields or rural fires (affecting both shrublands and grasslands) amounted to 73% of the area affected, while forest fires (both native and plantation forests) amounted to 27%.
- As regards the main causes identified for the fires recorded in the period, 25% of fires were due to negligence, 21% were intentional, 4% had natural causes, and the remaining 49% refers to unknown causes.
- Analyzing the maximum values for the series at hand, in 2003 there were 6233 fires caused by negligence; in 2008 there were 3453 intentional fires, and 1055 were due to natural causes.

Fire control equipment. Author Nilda Irigoin.

References:

Source: Secretariat of Environment and Sustainable Development. Undersecretariat of Planning and Environmental Policy. Forest Direction. National Forest Statistics Program. "Estadística de Incendios Forestales". 2002-2012. **http://www.ambiente.gov.ar/?idarticulo=13180**

Secretariat of Environment and Sustainable Development. Undersecretariat of Planning and Environmental Policy. Forest Direction. National Forest Statistics Program. "Series Estadísticas Forestales". 2002-2012. **http://www.ambiente.gov.ar/?idarticulo=305**

Secretariat of Environment and Sustainable Development. Secretary Unit. Fire Management Federal Service. **http://www.ambiente.gov.ar/?idseccion=27**

Area and percentage of plantation forests affected by forest fires

The Fire Area of the MAGyP's DPF is in charge of overseeing plantation forests affected by fires. Based on that information, the sub-indicator "Area and percentage of plantation forests affected by fires" was developed.

The causes of fires in Argentine plantation forests are almost exclusively anthropogenic. For that reason, the actions of the MAGyP, as the body in charge of implementing plantation-forest-related actions, are aimed at creating awareness among and providing training to producers as regards the use of measures to prevent fires within plantations.

Bearing in mind that most plantation forests are the property of private companies or producers, they are the main parties responsible for prevention. In this sense, the MAGyP's function aims at training producers in the implementation of appropriate silvicultural tasks and coaching them in the early detection and control of points of origin of fire.

Definition of point of origin

Point of origin of fire: initial fire which affects a small area, close to the ignition point. (Spanish version taken from *Glosario de Términos relacionados con el Manejo de Fuego del Plan de Manejo del Fuego*, SAyDS).

The detection of forest fires is the set of resources and procedures which make it possible to locate the point of origin as soon as possible, in order to convey that information to the unit in charge of controlling the fire.

The MAGyP's DPF, in charge of applying Law No. 25080 (Promotion of Investment in Plantation Forests), extended and modified by Law No. 26432, has defined some prevention standards for the design of plantations, and firefighting-specific equipment which producers should secure within the context of forest plans, in order to access the benefits of the aforementioned Law.

The DPF is also in charge of executing Resolution No. 700/99, which encourages the creation of producer consortiums aimed at preventing and controlling forest fires, which are non-profit organizations which enable their members to organize and coordinate their efforts in order to achieve a more efficient use of the available resources and ensure that plantation forests complete their productive cycle.

The MAGyP, through the Fire Area of the DPF, prepares an annual statistical series on fires in plantation forests from the whole country. The information is broken down by the dates in which the fires began, georeferencing of those fires in the provinces which provide the information, area (in hectares) by province and department, type of species in affected plantation forests, and the fires' causes. The weather's effect on the outbreak of fires is also analyzed.

As these statistics are specific to plantation forests, data provided by provincial jurisdictions are detailed and verified on a fire-by-fire basis.

The information thus obtained makes it possible to orient training and awareness campaigns to the areas most affected by forest fires in the country.

The information on plantation forests affected by fires is taken from the databases the provinces develop annually through the institutions listed in Table 22.

The National Meteorology Service is another source of information.

Every province has a specific body in charge of fire prevention and control at their jurisdiction. The members of the brigades that fight the fires provide data on the place and the time of the fire, the area affected (in hectares), the type of fuel affected, and in some cases the types of causes responsible for the fire.

The following statistics are partial, and refer to the provinces which account for 90% of the country's plantation forests, since it was not possible to gather information specific to the remaining provincial jurisdictions.

Each year, approximately 0.5%-1% of the total area of plantation forests in Argentina is affected by fire.

In Patagonian provinces, as the prevalence of fires is seasonal (from October to April), statistical information is analyzed by fire season and not by calendar year.

A comparative analysis of the 2011-2012 and 2012-2013 fire seasons in the Andean-Patagonian region (Chubut, Río Negro and Neuquén) shows that fires were related to water deficits and high temperatures, factors conducive to outbreaks.

The area of plantation forests affected by fires in 2011-2012 was the highest among the seasons considered in the series (Table 23).

Bodies reporting on forest fires, by jurisdiction and institution

Table 22

Jurisdiction	Institution
Corrientes	Fire Management Consortium of the province of Corrientes. Forest Protection Department of the Natural Resources Department of the province of Corrientes.
Chubut	Provincial Fire Management Service of the province of Chubut.
Entre Ríos	Fire Management Plan of the Secretariat of Environment of the province of Entre Ríos.
Jujuy	Provincial Fire Management Plan of the province of Jujuy.
Mendoza	Provincial Fire Management Plan of the province of Mendoza.
Misiones	Fire Management Coordination Group of the Ministry of Ecology and Natural Resources of the province of Misiones.
Neuquén	Forest Protection Direction of the province of Neuquén.
Río Negro	Provincial Forest Fire Control Service of the province of Río Negro.

In Mesopotamia (provinces of Misiones, Corrientes and Entre Ríos) a high number of hectares were affected in 2012, mainly due to weather-related factors, as the months between January and September were marked by high temperatures, strong winds and extreme draughts, mainly in the south of Misiones and the north and the center of Corrientes. Both temperatures and rainfall were excessive in 2013 throughout the region, a fact which led to a significant reduction in burnt areas: 24.6% relative to the previous year.

In the province of Jujuy, in 2012, while draughts and high temperatures did not increase the number of fires, they did lead to fires of a greater magnitude. In 2013, the draught intensified, and the effect of human negligence doubled the burnt area of the previous year (Table 24). The analysis at the country-level, without including the Andean-Patagonian region, shows that, in 2012, 71% of the area affected was in the province of Corrientes and 14% was in the province of Jujuy; while, in 2013, 73% of the plantation forests of the province of Jujuy were affected, and 18%, in the case of Corrientes.

In the Andean-Patagonian region, in the 2011-2012 and 2012-2013 seasons, the provinces of Chubut and Neuquén accounted for almost 100% of the fires.

Plantation forests' area affected by fires in the Andean-Patagonian region, by number of fires, provinces, and seasons

Table 23

Provinces	2011-2012		2012-2013		2013-2014	
	Area (ha)	Number of fires	Area (ha)	Number of fires	Area (ha)	Number of fires
Total	902.53	164	43.82	155	12.46	167
Chubut	270.98	39	21.51	19	-	-
Neuquén	630	35	15.43	35	-	-
Río Negro	1.55	90	6.88	101	12.46	167

Source: Ministry of Agriculture, Livestock and Fisheries. Undersecretariat of Agriculture. Forestry Production Direction. Forest Fire Area.

Plantation forests' area affected by fires in the remaining surveyed provinces, by number of fires and year

Table 24

Provinces	2012		2013	
	Area (ha)	Number of fires	Area (ha)	Number of fires
Total	5446.22	55	3104.11	41
Corrientes	3877.36	36	963.25	7
Entre Ríos	361	-	144.55	-
Jujuy	753.86	18	1898.51	27
Mendoza	9	1	50.3	7
Misiones	445	-	47.5	-

Source: Ministry of Agriculture, Livestock and Fisheries. Undersecretariat of Agriculture. Forestry Production Direction. Forest Fire Area.

January, February, August and September were the months with the greatest area burnt for the whole country in the years and fire seasons analyzed. As regards identified points of origin of fires, they concentrate in the months of December, January, February, March and October.

Pine and eucalyptus were the most affected species. Causes remain unknown for a significant percentage of fires. In the cases in which the causes were in fact identified, intentional fires and fires due to negligence dominate (Figures 11 and 12).

Map of points of origin of plantation forest fires in 2012

Figure 11

Source: Ministry of Agriculture, Livestock and Fisheries. Undersecretariat of Agriculture. Forestry Production Direction. Forest Fire Area and GIS and Forest Inventory Area.

Tower for monitoring and prevention of forest fires. Author Pablo Oliveri, courtesy of UCAR-MAGyP.

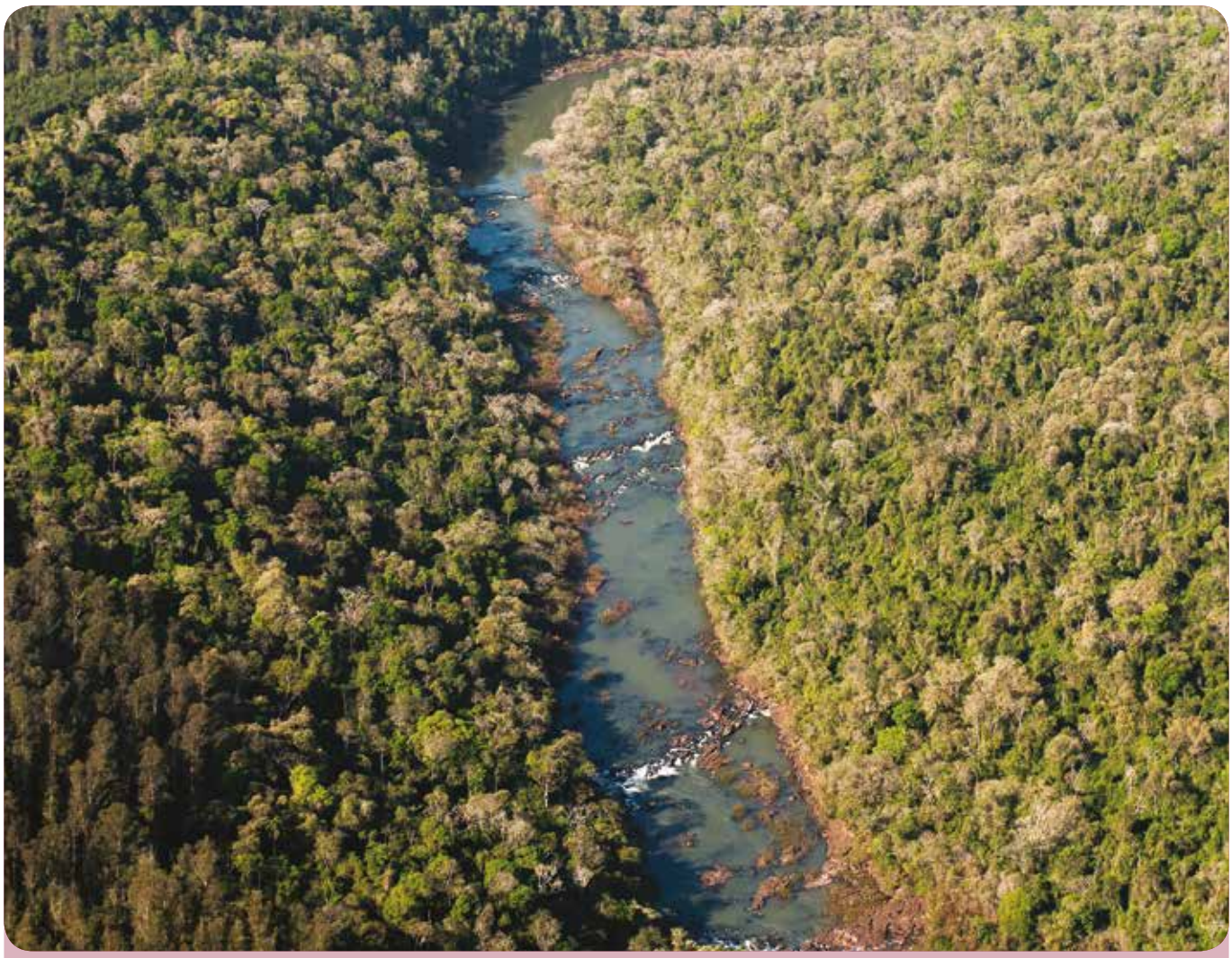
Map of points of origin of plantation forest fires in 2013

Figure 12

Source: Ministry of Agriculture, Livestock and Fisheries. Undersecretariat of Agriculture. Forestry Production Direction. Forest Fire Area and GIS and Forest Inventory Area.

Criterion 4
Conservation and maintenance of soil and water resources

Panoramic view of Urugua-í dam, Iguazú Department, Misiones. Author Pablo Oliveri, courtesy of UCAR-MAGyP.



Aerial view of the forest and the Urugua-í stream, province of Misiones. Author Pablo Oliveri, courtesy of UCAR-MAGyP.

Criterion 4:

Conservation and maintenance of soil and water resources

Soil and water underpin forest ecosystem productivity and functions. Forest ecosystems play an important role in the regulation of surface and groundwater flow and, together with associated aquatic ecosystems and clean water, they are essential to the quality of human life.

The interaction of soil, water and topography influence the character and health of streams and rivers flowing through and from forests. Monitoring change in the chemical, physical, and biological characteristics of soil, water and aquatic systems provides valuable information to support sustainable forest management.

Forest management activities can significantly alter forest soils, water quality and associated aquatic habitats. Inappropriate management may result in soil compaction, the loss of the soil A horizon, loss of riparian buffering capacity, increased sediment loads in streams, degradation and destruction of aquatic habitats and altered flow regimes. Change in water flow can also create an increased risk of flooding or the complete desiccation of streams. Both have harmful implications for human safety, property, and economies.

Soil and water resources may be protected through the allocation of land for that purpose or through appropriate management regimes and best management practices.

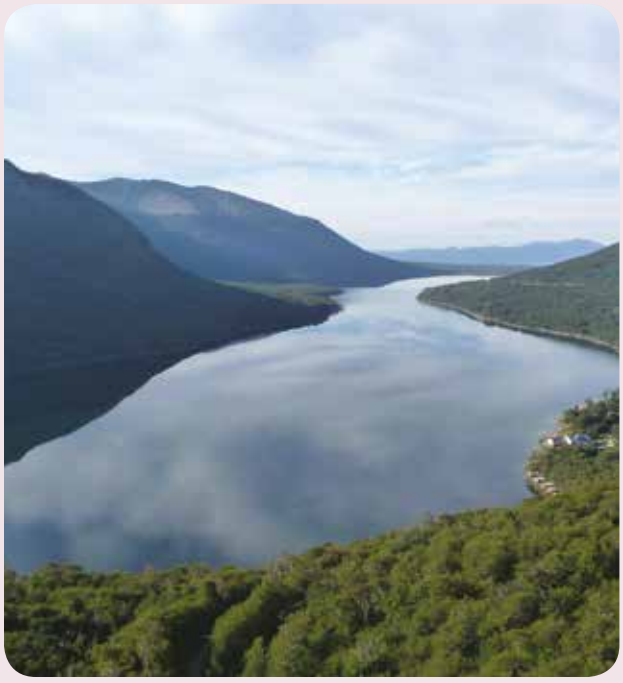
Indicator	Information Quality	Indicator Evolution
4.1. Protective Function		
4.1.a. Area and percent of forest whose designation or land management focus is the protection of soil or water resources.	-	?

4.1 Protective Function

Healthy and productive forests depend on the maintenance of the soil and water resource. Forests also regulate these resources by moderating the flow of water, controlling erosion and preventing catastrophic events such as flooding, avalanches and mudslides.

Indicator Assessment	
Information Quality	
Low	L
Average	A
High	H
Indicator Evolution	
Neutral	→
Positive	↑
Negative	↓
Insufficient data	?

Soil profile under a *Pinus ponderosa* plantation, province of Río Negro. Author Pablo Oliveri, courtesy of UCAR-MAGyP.



Fagnano Lake, Tierra del Fuego. Author Fernanda Alcobé.

4.1.a. Area and percent of forest whose designation or land management focus is the protection of soil or water resources.

Rationale: The area and percent of forest designated or managed primarily for the protection and regulation of soil and water reflects the importance of these resources to society, including the trade-offs made between other uses.

information Quality: - **Indicator Evolution: ?**

The Forest Direction of the SAyDS has no access to the information required to report on Indicator 4.1.a at the moment. Based on the information presented by the provinces in the context of the Native Forests´ Territorial Planning (OTBN) defined by Law No. 26331, in the cases where the provinces considered protection services for soil and water resources when categorizing, the information is not spatially identified nor homogeneous among the different provinces.

Should the Forest Direction deem the production of this information to be a medium-term priority, the following proposal is put forward:

Some activity could be carried out to provide a first approximation of the information required. This would imply an agreement by the various areas of the Forest Direction —in consultation with other relevant SAyDS areas—, on important areas for the protection of soil and water resources (e.g., minimal distances for the establishment of buffer areas surrounding rivers and bodies of water for water conservation; to define a level of slope capable of ensuring soil protection) and the creation of a digital coverage which could be cross-referenced with the OTBN so as to get a more accurate estimation of the Native Forest Area in Category I (very-high-conservation-value sectors) protecting soil and water resources (*See Indicator 7.1.a*).

Azul river, El Bolsón, province of Río Negro. Author Pablo Oliveri, courtesy of UCAR-MAGyP.

Criterion 5
Maintenance of forest contribution to global carbon cycles

Aerial view of Paraná river, province of Misiones. Author Pablo Oliveri, courtesy of UCAR-MAGyP.

Forest of *Austrocedrus chilensis* "ciprés de la cordillera" and *Nothofagus dombeyi* "coihue", province of Río Negro. Author Pablo Oliveri, courtesy of UCAR - MAGyP.

Criterion 5:

Maintenance of forest contribution to global carbon cycles

Forests are renewable and one of the largest terrestrial reservoirs of biomass and soil carbon. They have an important role in global carbon cycles as sinks and sources of carbon. Carbon stocks in forests include above ground biomass, below ground biomass, dead and decaying organic matter and soil carbon. Carbon is also stored in wood products.

The biosphere has a significant influence on the chemical composition of the atmosphere. Vegetation draws CO2 from the atmosphere, through photosynthesis and returns it through respiration and the decay of organic matter. The interchange between the biosphere and atmosphere is large; approximately a seventh of total atmospheric CO2 passes into vegetation each year.

Global climate change could have significant impacts on the structure, distribution, productivity, and health of temperate and boreal forests as well as impacts on forest carbon stocks and fluxes, and the prevalence of forest fires, disease and insect outbreaks, and storm damages.

Forest management practices also affect the carbon cycle and fluxes. Deforestation has a negative impact, but management activities that maintain and enhance the carbon stored in forests and forest products over the medium to long term can make a positive contribution to mitigating atmospheric carbon dioxide levels. In addition, biomass from forests can be used as a substitute for fossil fuels thereby reducing greenhouse gas emissions.

Change in the global carbon cycle and associated climate change will have major impacts on human well-being, especially rural communities and indigenous peoples dependent directly on the natural environment.

Indicator	Information Quality	Indicator Evolution
5.a. Total forest ecosystem carbon pools and fluxes.	H	?
5.b. Total forest product carbon pools and fluxes.	A	?

Chips. Author Pablo Oliveri, courtesy of UCAR-MAGyP.

Indicator Assessment	
Information Quality	
Low	L
Average	A
High	H
Indicator Evolution	
Neutral	→
Positive	↑
Negative	↓
Insufficient data	?

Paper reels. Author Fernanda Alcobé.

Pile of firewood. Author Pablo Oliveri, courtesy of UCAR-MAGyP.

5.a. Total forest ecosystem carbon pools and fluxes.

Rationale: This indicator provides information about the total amount of carbon stored in forest ecosystems. It also describes changes, fluxes or flows in carbon between forests and the atmosphere. A better understanding of these processes will aid the development of appropriate responses to the effects of climate change.

Information Quality: H **Indicator Evolution: ?**

Our country has submitted two Climate Change National Communications and prepared four National Inventory Reports on Greenhouse Gases, for the years 1990, 1994, 1997 and 2000, pursuant to the obligations assumed upon ratification of the United Nations Framework Convention on Climate Change.

As of the preparation of this report, the Secretariat of the Environment and Sustainable Development (SAyDS) is working on the third Climate Change National Communication, under which the GHG Inventory Report for the years 2010 and 2012 is being developed, including a review of previous inventories (1990/1994/1997/2000).

The Third National Communication will include in the historical emissions series data recomputed based on the latest available information, such as the Native and Plantation Forest Inventories, as well as the information provided by Argentina to the Global Forest Resources Assessment (FRA), and new data available from information management tools more modern than those used for previous inventories.

As regards biomass-related factors being used when computing GHG emissions under the Third National Communication, a change should be highlighted in the quantification of biomass used in previously-published inventories (default values) and in the new inventory (biome-based local information). The latter are the same values submitted to the FRA (Table 25). The final results of the GHG Inventory are expected to be available in the second half of 2015. The updated information could be included in the next country report to the MP. More information available at *www.ambiente.gov.ar/?idseccion=29*.

Nothofagus pumilio "lenga" forest, Tierra del Fuego.
Author Fernanda Alcobé.

Biomass, by type of forest, for the National GHG Inventories

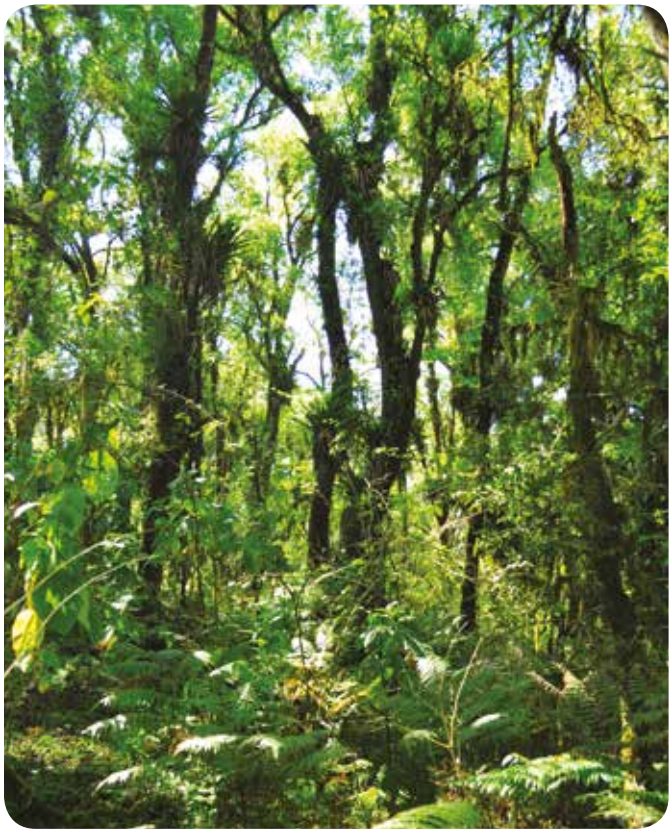
Table 25

2000 Inventory		2010-2012 Inventory	
Forest Type Inventario 2000	Biomass (t MS/ha)	Forest Type Inventario 2010-2012	Biomass (t MS/ha)
Selva Misionera	171.0	Selva Misionera	259.3
Chaco Oriental	28.5	Parque Chaqueño	129.0
Chaco Occidental	15.0	Parque Chaqueño	129.0
Selva Tucumano Boliviana o Yungas	80.0	Selva Tucumano Boliviana o Yungas	205.7
Espinal	35.8	Espinal	110.5
Monte	No incluido	Monte	37.2

DM: Dry matter
Source: Secretariat of Environment and Sustainable Development. Undersecretariat of Promotion of Sustainable Development. Climate Change Direction. Project "Tercera Comunicación Nacional sobre Cambio Climático de la República Argentina a la Convención Marco de las Naciones Unidas sobre Cambio Climático" - GEF TF No. 098640.

Coal production furnaces, province of Santa Fé.
Author Laura Pinciroli. Forest Direction, SAyDS.

Storage of dried wood. Author Pablo Oliveri, courtesy of UCAR-MAGyP.



Selva Tucumano Boliviana region, province of Tucumán.
Author Daniela García.

References:

Inventario de Gases de Efecto Invernadero 2000. 2ª Comunicación Nacional del Gobierno de la República Argentina a las Partes de la Convención Marco de las Naciones Unidas sobre Cambio Climático (2004-2005). Secretariat of Environment and Sustainable Development.

5.b. Total forest product carbon pools and fluxes.

Rationale: This indicator provides information on the role that forest products play in storing, cycling and releasing carbon. Forest products delay the release of carbon into the atmosphere and are more sustainable than products with manufacturing processes that have significant carbon footprints.

Information Quality: A **Indicator Evolution: ?**

The methodology used to report on this indicator is the one proposed by the 2006 Intergovernmental Panel on Climate Change (IPCC) Guidelines for National Greenhouse Gas Inventories as regards Harvested Wood Products (HWP). HWP include all wooden materials (bark included) taken from the harvest sites.

Bearing in mind the decision tree defined in the guideline, the tier 1 method was chosen, and it was decided to apply the worksheet Model developed by the IPCC for HWP. There are several approaches used to estimate annual variations in HWP carbon content. The four different approaches proposed in the IPCC Guidelines differ in how they allocate the HWP contribution between wood producing and consuming countries, and what processes (atmospheric fluxes or stock changes) they focus on. They therefore give different results for the overall annual emissions or removals of CO_2 a given country would report on a given year.

The following is a brief descriptions of the methods used to develop this indicator:

Stock-change approach: it estimates changes in HWP stocks in the country in which the HWP are used, called consuming country. Changes in forest stocks are reported in the country in which they are produced, referred to as the producing country. This approach includes HWP imports and excludes exports.

Atmospheric flow approach: it estimates fluxes of carbon to/from the atmosphere within national boundaries. It includes the gross removals of carbon from the atmosphere due to biomass growth and the carbon release to the atmosphere of HWP that are consumed in the country. The carbon release to the atmosphere from HWP includes carbon release from imports.

Production approach: it estimates changes in carbon stocks in the forest pool of the reporting country and products made from wood harvested in the country. It includes products to be exported. This approach inventories carbon in wood products from domestically harvested wood, and does not provide a complete inventory of wood carbon in national stocks.

Simple decay approach: this approach estimates and reports the net emissions or removals of carbon from/to the atmosphere, when, but not where, they occur, if wood products are traded. Removals of carbon from the atmosphere due to forest growth, and emissions resulting from oxidation of HWP are reported by the producing country.

The chosen Model's variables (production, imports and exports of wood and paper products) were taken from the Food and Agriculture Organization of the United Nations's (FAO) database (FAOSTAT Web site). The wood products considered were roundwood, sawnwood, wood-based panels, veneer, plywood, charcoal, residues, pulp and paper. Table 26 and Charts 15 and 16 show the results obtained applying the IPCC's worksheet Model to the 1990-2013 period, for all four approaches mentioned.

HWP Contribution to the carbon cycle, for applied approaches in Gg of CO_2 per year

Table 26

Year	Approach					
	Stock change	Atmospheric flow	Production	Simple decay		
				Harvest	Release	Total contribution
1990	225	-1080	-1024	-21006	19981	-1024
1991	-30	-793	-1008	-21371	20363	-1008
1992	-1929	-2129	-2165	-24046	21882	-2165
1993	-1313	-794	-1235	-21216	19981	-1235
1994	-1320	-1696	-1682	-22124	20442	-1682
1995	-1408	-3177	-2397	-23787	21390	-2397
1996	-1986	-3174	-3015	-23602	20588	-3015
1997	-1582	-1969	-2002	-23643	21641	-2002
1998	-1859	-1834	-2086	-25266	23180	-2086
1999	-1981	-1594	-2313	-20239	17926	-2313
2000	-1578	-1202	-1952	-21978	20026	-1952
2001	-995	-701	-1619	-19595	17976	-1619
2002	-81	-959	-2019	-23707	21687	-2019
2003	-907	-1973	-2902	-26731	23829	-2902
2004	-1650	-2042	-2985	-30808	27823	-2985
2005	-2024	-2757	-3612	-29439	25827	-3612
2006	-2257	-2923	-3686	-28802	25117	-3686
2007	-1691	-1655	-2423	-28045	25622	-2423
2008	-840	-716	-1718	-26938	25220	-1718
2009	-1935	-2405	-3137	-28930	25793	-3137
2010	-2097	-2215	-2943	-30820	2.877	-2943
2011	-2223	-1853	-2786	-30028	27242	-2786
2012	-2230	-1724	-2795	-30010	27215	-2795
2013	-2200	-1662	-2768	-30010	27242	-2768

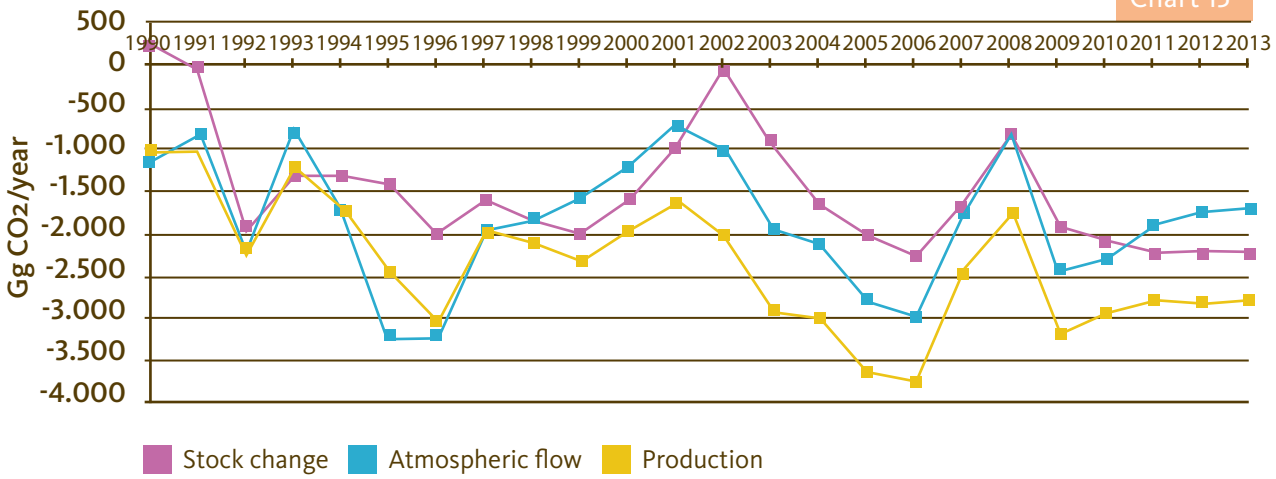
Source: Ministry of Agriculture, Livestock and Fisheries. Undersecretariat of Agriculture. Forestry Production Direction. Environmental Area.

Pinus taeda roundwood, Misiones. Author Pablo Oliveri, courtesy of UCAR-MAGyP.

Paper reels. Author Fernanda Alcobé.

HWP contribution to the carbon cycle for the stock change, atmospheric flow and production methods

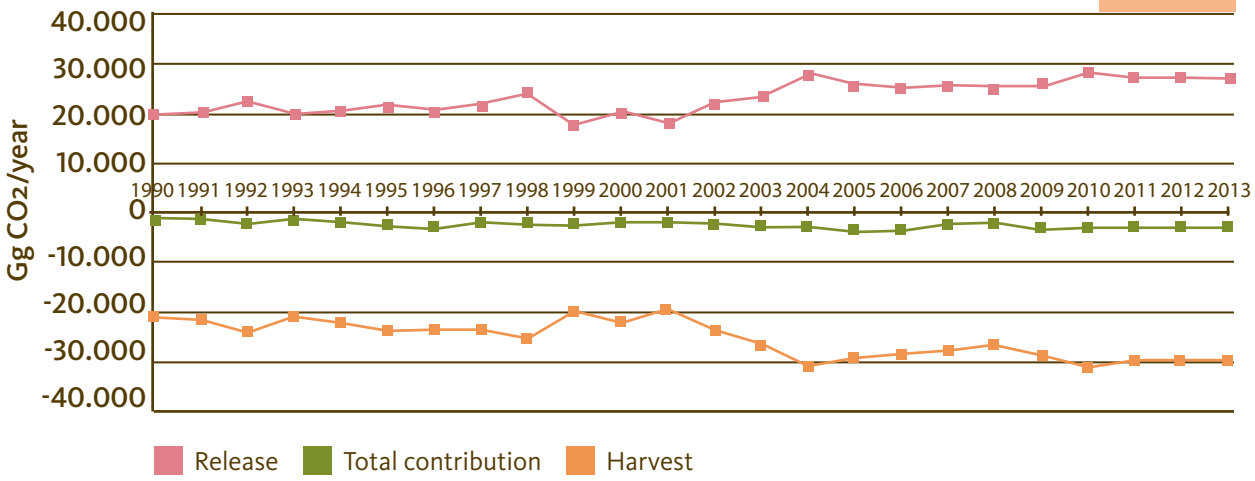
Chart 15



Source: Ministry of Agriculture, Livestock and Fisheries. Undersecretariat of Agriculture. Forestry Production Direction. Environmental Area.

HWP contribution to the carbon cycle according to the simple decay approach

Chart 16



Source: Ministry of Agriculture, Livestock and Fisheries. Undersecretariat of Agriculture. Forestry Production Direction. Environmental Area.

Populus sp. "álamo" sawn timber stocked for their transfer to carpentry. Author Pablo Oliveri, courtesy of UCAR-MAGyP.

References

IPCC, 2006 IPCC Guidelines for National Greenhouse Gas Inventories (Pingoud K., Skog K.E., Martino D.L., Tonosaki M., Xiaoquan Z. and Ford-Robertson J.). Volume 4 – Agriculture, Forestry and Other Land Use: Chapter 12 Harvested Wood Products and HWP Worksheet MS Excel. **http://www.ipcc-nggip.iges.or.jp/public/2006gl**

FAO (2013): Food and Agriculture Organization of the United Nations. Statistical Databases. FAOSTAT Forestry. **http://faostat.fao.org.**

Criterion 6

Maintenance and enhancement of long-term multiple socio-economic benefits to meet the needs of societies

Eucalyptus grandis roundwood slicing. Author Pablo Oliveri, courtesy of UCAR-MAGyP.

Pruning activity in a *Pinus taeda* plantation. Author Pablo Oliveri, courtesy of UCAR-MAGyP.

Criterion 6:

Maintenance and enhancement of long-term multiple socio-economic benefits to meet the needs of societies

Forests provide a wide variety of social, cultural and economic goods, services and other benefits that contribute to meeting the needs of society. Many people and communities, including indigenous peoples, are dependent on forests for their livelihood and well-being. Information on the production and consumption of forest products, investment and employment in the forest sector, forest-based recreation and tourism, and other social and cultural forest values illustrate the many benefits forests provide.

Indicator Assessment	
Information Quality	
Low	L
Average	A
High	H
Indicator Evolution	
Neutral	→
Positive	↑
Negative	↓
Insufficient data	?

Indicator	Information Quality	Indicator Evolution
6.1. Production and consumption		
6.1.a. Value and volume of wood and wood products production, including primary and secondary processing.	H	↑
6.1.b. Value of non-wood forest products produced or collected.	H	?
6.1.d. Total and per capita consumption of wood and wood products in round wood equivalents.	H	↑
6.1.f. Value and volume in round wood equivalents of exports and imports of wood products.	H	?
6.1.h. Exports as a share of wood and wood products production and imports as a share of wood and wood products consumption.	H	?
6.2. Investment in the forest sector		
6.2.b. Annual investment and expenditure in forest-related research, extension and development, and education.	A	→
6.3. Employment and community needs		
6.3.a. Employment in the forest sector.	L	↑

Nothofagus nervosa "raulí" trial. "Gral. San Martín-INTA" forest field, Las Golondrinas, Cushamen department, Chubut. Author Pablo Oliveri, courtesy of UCAR-MAGyP.

Eucalyptus sp. roundwood. Author Pablo Oliveri, courtesy of UCAR-MAGyP.

6.1 Production and consumption

These indicators provide information on the contribution of wood and non-wood products and environmental services to national economies. The value, volume and revenues associated with domestic production and consumption of forest products and services, including through international trade, demonstrates the type and magnitude of the contribution of forests to domestic economies. They also provide information about market conditions relevant to forest management and the forest sector.

Eucalyptus sp. roundwood. Author Pablo Oliveri, courtesy of UCAR-MAGyP.

6.2 Investment in the forest sector

These indicators provide information on long-term and annual expenditures to enhance forest management, forest-based enterprises, and the knowledge and skills of people who are engaged in the forest sector. Maintaining and enhancing the long-term multiple socio-economic benefits derived from forests depends in part on investment in the forest sector, including both long-term capital investments and annual operating expenditures.

Eucalyptus grandis. Plant division for its multiplication and its posterior placement in a cell for its rooting. Autor Pablo Oliveri, courtesy of UCAR-MAGyP.

6.3 Employment and community needs

Forest-based and forest-related employment is a useful measure of the social and economic importance of forests at the national and local level. Wage and income rates and injury rates are indicators of employment quality. Communities whose economies are concentrated in forest industries, or who rely on forests for subsistence purposes, may be vulnerable to the short or long-term effects of economic or policy changes in the forest sector. These indicators provide information on levels and quality of forest employment, community resilience to change, use of forests for subsistence purposes, and the distribution of revenues from forests.

Classification of *Eucalyptus grandis* plants. Author Pablo Oliveri, courtesy of UCAR-MAGyP.

6.1.a. Value and volume of wood and wood products production, including primary and secondary processing.

Rationale: This indicator provides information on the value and volume of wood and wood products at various stages of processing. The value and volume of wood and wood products reflects one aspect of the importance of forests and the wood processing sector to domestic economies.

Information Quality: H **Indicator Evolution:** ↑

The loading of a truck with sawn timber, CRAFI sawnmill, Entre Ríos. Author Pablo Oliveri, courtesy of UCAR-MAGyP.

Production

Data on the production of wood and wood products are provided by Provincial Forest Services and the National Parks Administration (APN). The tools used to obtain these statistical data are the Forestry Permits[12], extended by the aforementioned agencies. In some jurisdictions, not all timber extractions are recorded, so the original data are revised based on the values from the industries of sliced wood, plywood, tannin, fibreboard and particle board, paper, pulp, and impregnated boards. This revision is carried out through the Annual Census of the Timber and Paper Industry.

Pile of native species´ roundwood. Author Daniela García.

12 Forestry permits, or Transport permits, are documents which vouch for the legal nature of wood products cargoes.

Roundwood extraction at the country level (m^3)

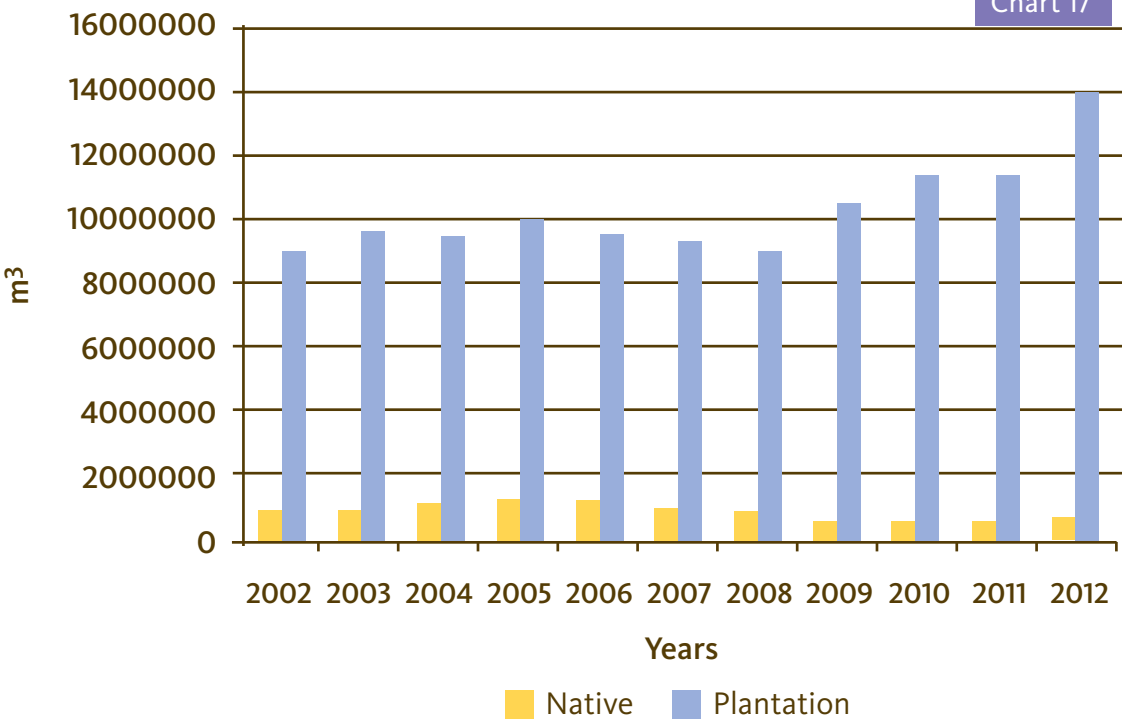
Table 27

Year	Total	Native	Plantation
2002	9864965	897825	8967140
2003	10601509	967056	9634453
2004	10529833	1101189	9428644
2005	11143032	1253734	9889289
2006	10736604	1213180	9523424
2007	10306534	998802	9307732
2008	9836500	904371	8932129
2009	11141639	667086	10474553
2010	12035770	681416	11354354
2011	12010778	671349	11339429
2012	14604896	701784	13903112

Source: Ministry of Agriculture, Livestock and Fisheries. Undersecretariat of Agriculture. Forestry Production Direction. Economics and Information Area, and the Secretariat of the Environment and Sustainable Development. Undersecretariat of Planning and Environmental Policy. Forest Direction. National Forest Statistics Program, based on information provided by provincial Forest Services and National Parks Administration.

Roundwood extraction at the country level

Chart 17



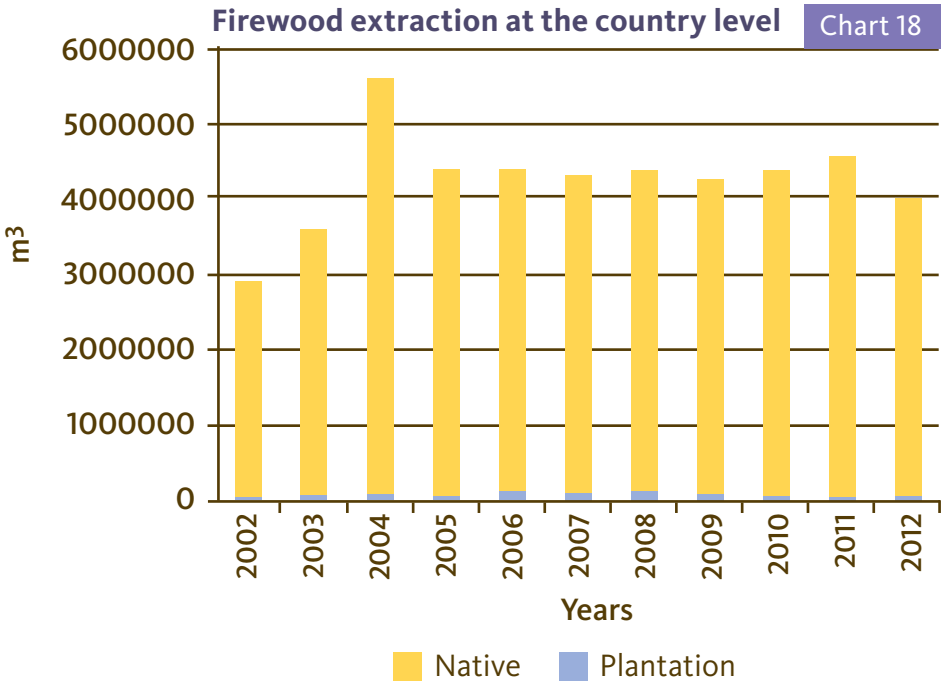
Source: Ministry of Agriculture, Livestock and Fisheries. Undersecretariat of Agriculture. Forestry Production Direction. Economics and Information Area, and the Secretariat of the Environment and Sustainable Development. Undersecretariat of Planning and Environmental Policy. Forest Direction. National Forest Statistics Program, based on information provided by provincial Forest Services and National Parks Administration.

Firewood extraction at the country level (m^3) Table 28

Year	Total	Plantation	Native
2002	2798112	45027	2753085
2003	3589467	70767	3518700
2004	5594013	82380	5511633
2005	4380125	62984	4317141
2006	4383078	121261	4261817
2007	4293650	93765	4199885
2008	4362429	115100	4247329
2009	4267153	88200	4178953
2010	4374522	75670	4298852
2011	4547140	56536	4490604
2012	3992571	74898	3917673

Source: Ministry of Agriculture, Livestock and Fisheries. Undersecretariat of Agriculture. Forestry Production Direction. Economics and Information Area, and the Secretariat of the Environment and Sustainable Development. Undersecretariat of Planning and Environmental Policy. Forest Direction. National Forest Statistics Program, based on information provided by provincial Forest Services and National Parks Administration.

Firewood extraction at the country level Chart 18



Source: Ministry of Agriculture, Livestock and Fisheries. Undersecretariat of Agriculture. Forestry Production Direction. Economics and Information Area, and the Secretariat of the Environment and Sustainable Development. Undersecretariat of Planning and Environmental Policy. Forest Direction. National Forest Statistics Program, based on information provided by provincial Forest Services and National Parks Administration.

Pole extraction at the country level (m³)

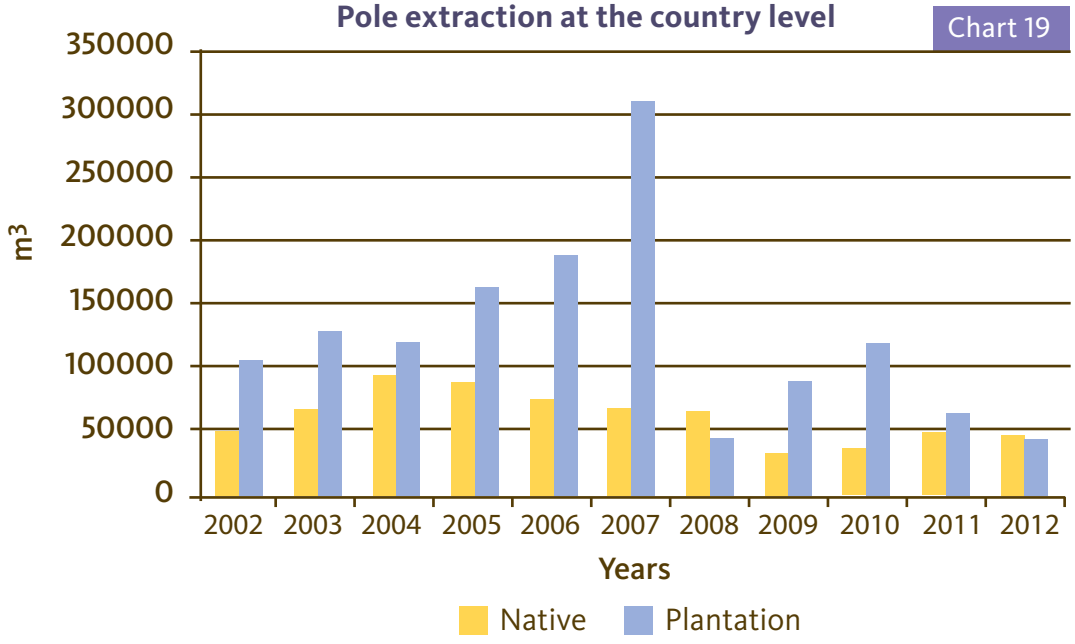
Table 29

Year	Total	Native	Plantation
2002	154334	48971	105363
2003	196984	67632	129352
2004	212901	93621	119280
2005	252835	88285	164550
2006	265542	76156	189386
2007	378980	67651	311329
2008	109731	64614	45117
2009	122137	32273	89864
2010	154188	34732	119456
2011	111278	48043	63235
2012	89861	47029	42832

Source: Ministry of Agriculture, Livestock and Fisheries. Undersecretariat of Agriculture. Forestry Production Direction. Economics and Information Area, and the Secretariat of the Environment and Sustainable Development. Undersecretariat of Planning and Environmental Policy. Forest Direction. National Forest Statistics Program, based on information provided by provincial Forest Services and National Parks Administration.

Pole extraction at the country level

Chart 19



Source: Ministry of Agriculture, Livestock and Fisheries. Undersecretariat of Agriculture. Forestry Production Direction. Economics and Information Area, and the Secretariat of the Environment and Sustainable Development. Undersecretariat of Planning and Environmental Policy. Forest Direction. National Forest Statistics Program, based on information provided by provincial Forest Services and National Parks Administration.

Other products extraction at the country level (m³)

Table 30

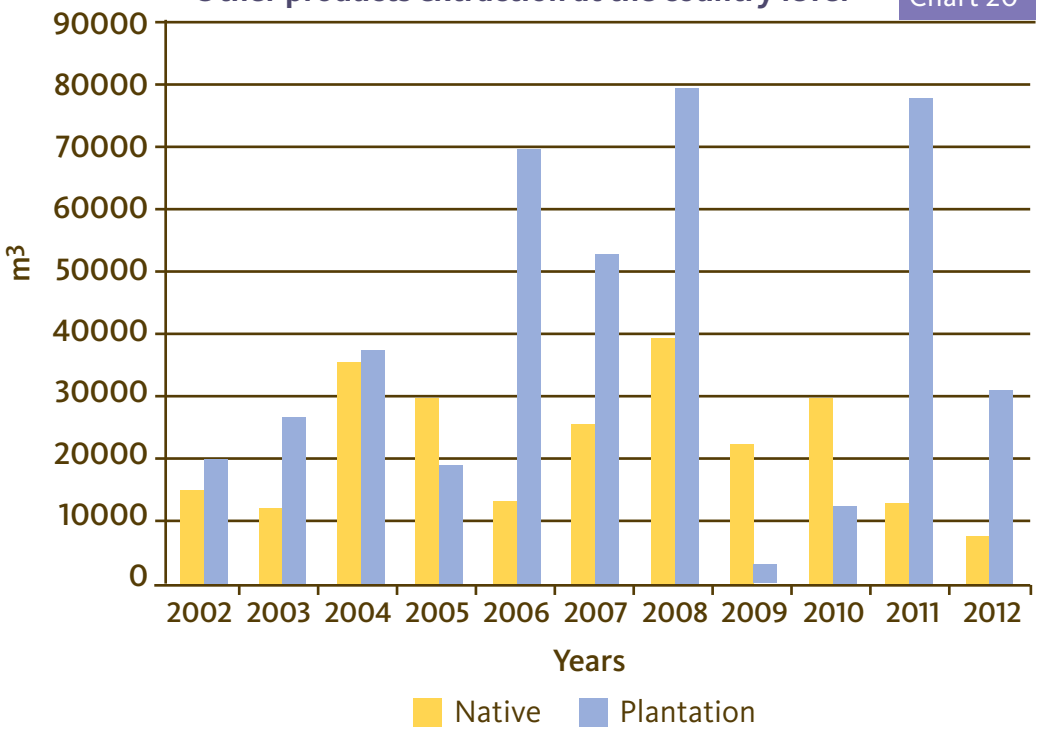
Year	Total	Native	Plantation
2002	35042	15066	19976
2003	39048	12177	26871
2004	73241	35723	37518
2005	49212	30018	19194
2006	82958	12996	69962
2007	78346	25279	53067
2008	119139	39658	79481
2009	25946	22593	3353
2010	42169	29586	12583
2011	91252	13258	77994
2012	38899	7634	31265

"Other products" include various types of poles, stakes, and struts, known as *estacones, rodrigones, trocillos, puntales, varas, varillas, varillones* and *varejones.*

Source: Ministry of Agriculture, Livestock and Fisheries. Undersecretariat of Agriculture. Forestry Production Direction. Economics and Information Area, and the Secretariat of the Environment and Sustainable Development. Undersecretariat of Planning and Environmental Policy. Forest Direction. National Forest Statistics Program, based on information provided by provincial Forest Services and National Parks Administration.

Other products extraction at the country level

Chart 20



Source: Ministry of Agriculture, Livestock and Fisheries. Undersecretariat of Agriculture. Forestry Production Direction. Economics and Information Area, and the Secretariat of the Environment and Sustainable Development. Undersecretariat of Planning and Environmental Policy. Forest Direction. National Forest Statistics Program, based on information provided by provincial Forest Services and National Parks Administration.

If the behavior of different products in 2002-2012 is analyzed, the following can be seen:

• **Roundwood:** 92% of production is accounted for by plantation species. The highest produced total (native plus plantation) was that of 2012. Native species average about 914 345 m^3 in the series, while plantation species average 10 250 388 m^3.

• **Firewood:** 98% of the total production of firewood is accounted for by native species. 2004 saw the largest produced volume: 5 594 013 m^3. In the period, native species average 44 154 152 m^3, and plantation species account for 80 599 m^3.

• **Poles:** 67% of all poles produced come from plantation species; the highest recorded production was in 2007: 378 980 m^3. Native species average 60 819 m^3 and plantation species average 125 433 m^3.

• **Other products:** 64% of these come from plantation species, with the greatest volume in the series in 2008. Native and plantation species average 22 181 m^3 and 39 206 m^3, respectively, during the period.

Value

The National Forest Statistics Program (PNEF) has developed a native species price series for primary products since 2002 and for processed products since 2004, broken down by product and species at provincial level. Using the p x q valuation matrix (price times extracted quantity), it is possible to estimate the value of the production of each product since the aforementioned years.

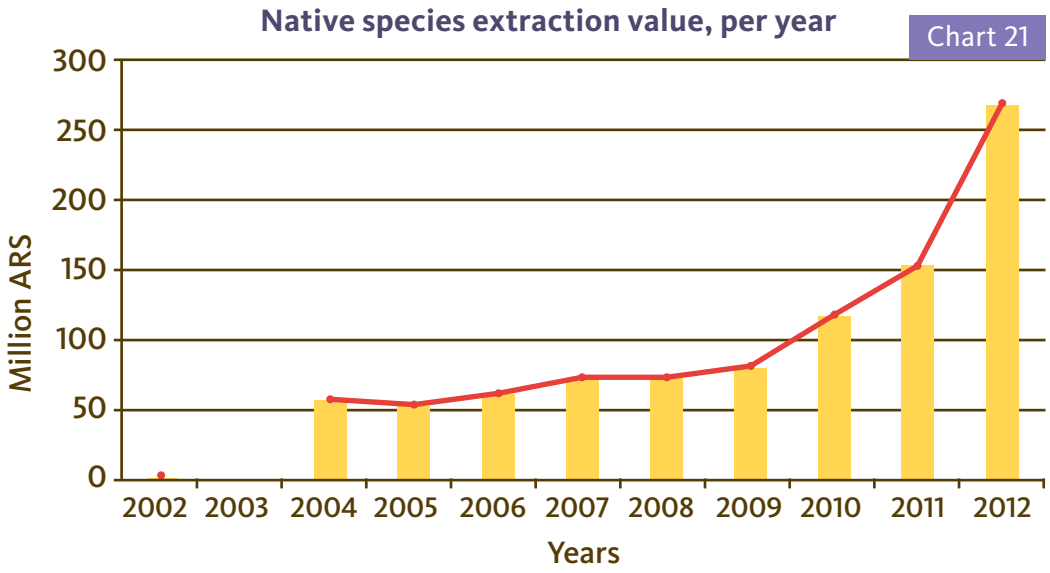
Methodology: in order to value roundwood products, each jurisdiction's production volume was weighted based on the average annual "at-industry" price, while in the case of firewood, the "at-woodland-site" price was used. The price of charcoal is that of charcoal sold in bulk at the charcoal vendor.

Native species extraction value, per year — Table 31

2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Million ARS										
0.7	*	56.4	52.2	61.9	72.6	72.8	80.9	117.9	153.1	268.8

* The value for 2003 is not computed due to lack of price data.

Source: Secretariat of Environment and Sustainable Development. Undersecretariat of Planning and Environmental Policy. Forest Direction. National Forest Statistics Program, based on information provided by provincial Forest Services, Concordia Institute of Agricultural Technology Experimental Station.



Source: Secretariat of Environment and Sustainable Development. Undersecretariat of Planning and Environmental Policy. Forest Direction. National Forest Statistics Program, based on information provided by provincial Forest Services, Concordia Institute of Agricultural Technology Experimental Station.

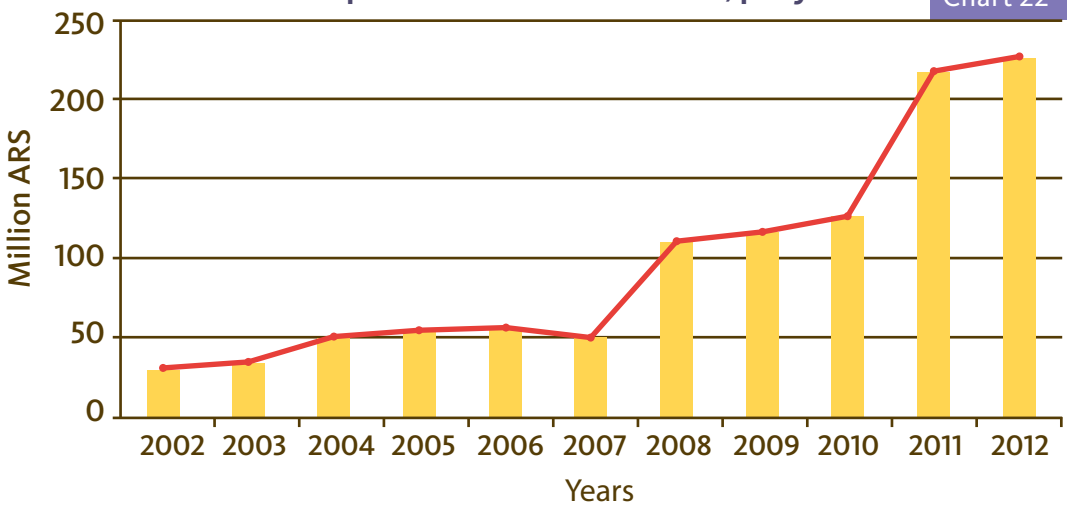
The following tables show the achieved coverage, per year and product for the production. Table 31 and Chart 21 show that the native species extraction average price saw a 50% increase relative to the previous year. Additionally, Table 32 and Chart 22 series show that native species firewood extraction average price saw a 27% increase relative to the previous year.

Value of native species firewood extraction, per year Table 32

2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Million ARS										
30.6	33.9	50.1	55.6	55.9	49.8	110.7	116.4	126.2	217.6	226.2

Source: Secretariat of Environment and Sustainable Development. Undersecretariat of Planning and Environmental Policy. Forest Direction. National Forest Statistics Program, based on information provided by provincial Forest Services, Concordia Institute of Agricultural Technology Experimental Station.

Value of native species firewood extraction, per year Chart 22

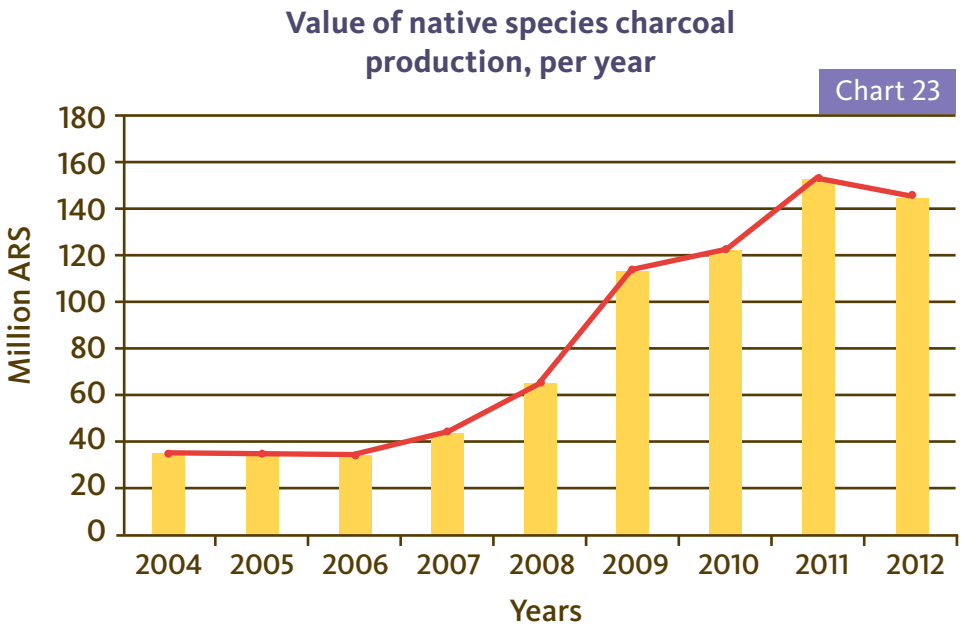


Source: Secretariat of Environment and Sustainable Development. Undersecretariat of Planning and Environmental Policy. Forest Direction. National Forest Statistics Program, based on information provided by provincial Forest Services, Concordia Institute of Agricultural Technology Experimental Station.

Value of native species charcoal production, per year Table 33

2004	2005	2006	2007	2008	2009	2010	2011	2012
Million ARS								
34.8	33.5	34.2	44.0	65.3	113.3	122.1	152.4	145.2

Source: Secretariat of Environment and Sustainable Development. Undersecretariat of Planning and Environmental Policy. Forest Direction. National Forest Statistics Program, based on information provided by provincial Forest Services, Concordia Institute of Agricultural Technology Experimental Station.



Source: Secretariat of Environment and Sustainable Development. Undersecretariat of Planning and Environmental Policy. Forest Direction. National Forest Statistics Program, based on information provided by provincial Forest Services, Concordia Institute of Agricultural Technology Experimental Station.

Table 33 shows a decrease in the charcoal production value for the last entry in the series (2012), due to a reduction in charcoal production.

Notwithstanding that, unit prices continue to show an upward trend. The series shows that the 2012 average price saw a 4% increase relative to the previous year.

Industry

The National Forest Statistics Program of the Forestry Direction is in charge of the Annual Census of the Timber Industry, which covers companies producing sliced wood, plywood, and tannin; while the Economics and Information Area of the Forestry Production Direction carries out an Annual Census of the Timber and Paper Industry, covering fibreboard and particle board, pulp, and paper production. Data on the aforementioned industries include both native and plantation species.

In the case of the sawmill industry, no surveys are carried out, and the roundwood used are computed as the difference between roundwood declared in each jurisdiction and the raw materials used in the industries of fibreboards, particle boards, sliced wood, plywood, tannin, and pulp and paper.

The series considered is annual, and starts in 2002 and ends in 2012. Production is the starting point to compute apparent consumption and per capita consumption.

Coal furnace. Author Natalia Acosta.

Prosopis sp. "algarrobo" sawnwood. Author Natalia Acosta.

Industrial production

Table 34

Year	Fibre board	Particle board	Sliced wood	Plywood	Sawnwood	Pulp	Paper	Tannin
	(thousand m3)	(thousand m3)	(thousand m3)	(thousand m3)	(thousand m3)	(thousand t)	(thousand t)	(thousand t)
2002	298	318	2	60	1658	827	1072	55
2003	578	455	2	77	1816	782	1212	50
2004	627	536	1	84	1288	937	1344	62
2005	631	602	1	86	1740	937	1769	61
2006	656	584	2	91	1610	926	1544	70
2007	620	555	1	85	1516	941	1423	75
2008	797	564	1	82	955	860	1708	67
2009	606	512	1	66	2151	715	1438	44
2010	647	568	1	69	2159	711	1206	69
2011	642	552	1	70	2151	637	1215	60
2012	617	506	1	68	3339	755	1186	66

Source: Ministry of Agriculture, Livestock and Fisheries. Undersecretariat of Agriculture. Forestry Production Direction. Economics and Information Area and Secretariat of Environment and Sustainable Development. Undersecretariat of Planning and Environmental Policy. Forest Direction. National Forest Statistics Program, based on information provided by private companies of the Forestry Industry.

In the analysis of the behavior of Forestry Industries in the period at hand (2002-2012), it is possible to infer that:

• Average production in thousands of m^3 for fibreboard was 611; for particle board, 523; for sliced wood, 1; for Plywood, 76; and for sawnwood, 1853.

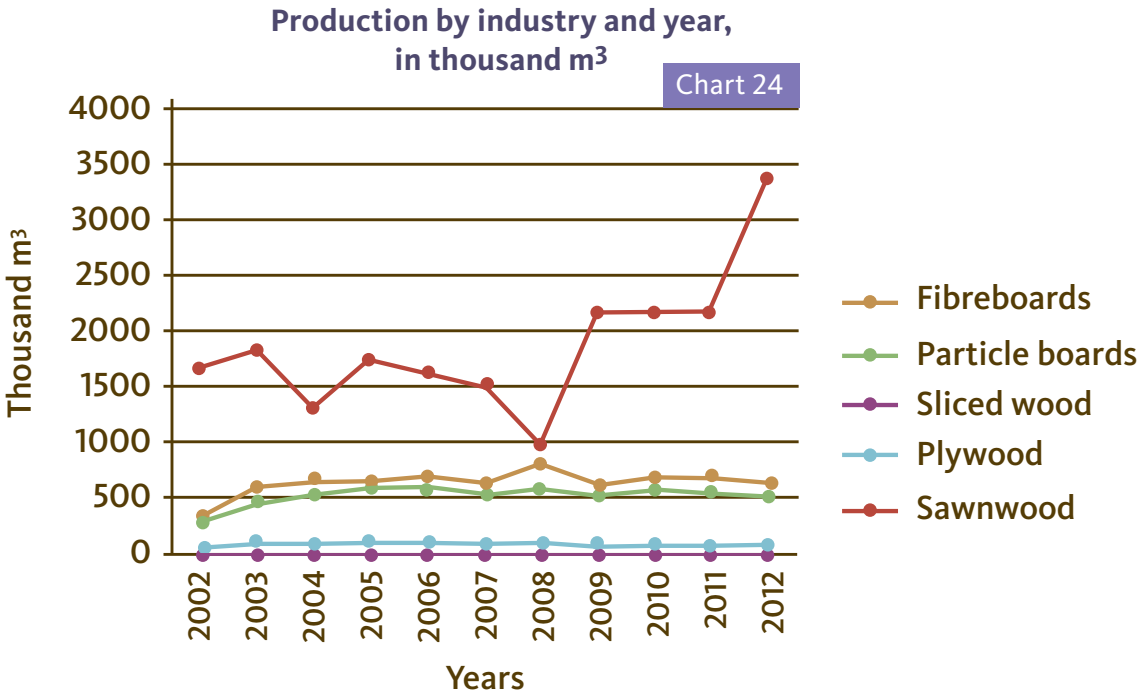
• Average production in thousands of tonnes for pulp was 821; for paper, 1374, and for tannin, 62.

• The greatest recorded production values in the various industries was as follows: fibreboard, 2008; particle board, 2005; sliced wood in 2002, 2003 and 2006; sawnwood, 2012; pulp, 2007; paper, 2005; and tannin, 2007.

• The analyses above show that, with the exception of the sliced wood and pulp productions, which saw negative evolutions during the period (-50% and -9%, respectively), the other industries recorded positive changes, particularly in the case of fibreboard and sawnwood, which saw 107% and 101% increases.

Eucalyptus sp. sawmill, Entre Ríos. Author Pablo Oliveri, courtesy of UCAR-MAGyP.

Sawdust. Author Pablo Oliveri, courtesy of UCAR-MAGyP.



Source: Ministry of Agriculture, Livestock and Fisheries. Undersecretariat of Agriculture. Forestry Production Direction. Economics and Information Area and Secretariat of Environment and Sustainable Development. Undersecretariat of Planning and Environmental Policy. Forest Direction. National Forest Statistics Program, based on information provided by private companies of the Forestry Industry.

Source: Ministry of Agriculture, Livestock and Fisheries. Undersecretariat of Agriculture. Forestry Production Direction. Economics and Information Area and Secretariat of Environment and Sustainable Development. Undersecretariat of Planning and Environmental Policy. Forest Direction. National Forest Statistics Program, based on information provided by private companies of the Forestry Industry.

6.1.b. Value of non-wood forest products produced or collected.

Rationale: This indicator provides information on the value of non-wood forest products. The collection, processing and use of non-wood forest products are important dimensions of the economic value of forests. In some countries, non-wood forest products are vital to the livelihoods and lifestyles of indigenous and other rural communities.

Information Quality: H **Indicator Evolution: ?**

Value

The value series for the non-wood forest products (NWFP) covers 2011-2012, as that is the earliest date on which data for these products are available.

The total marketed production in both years was about 315 million ARS, while the 2012 increase was of 62%.

The *Miera* industrial product represents 89% and 98% in 2011 and 2012, respectively, relative to the total NWFP production.

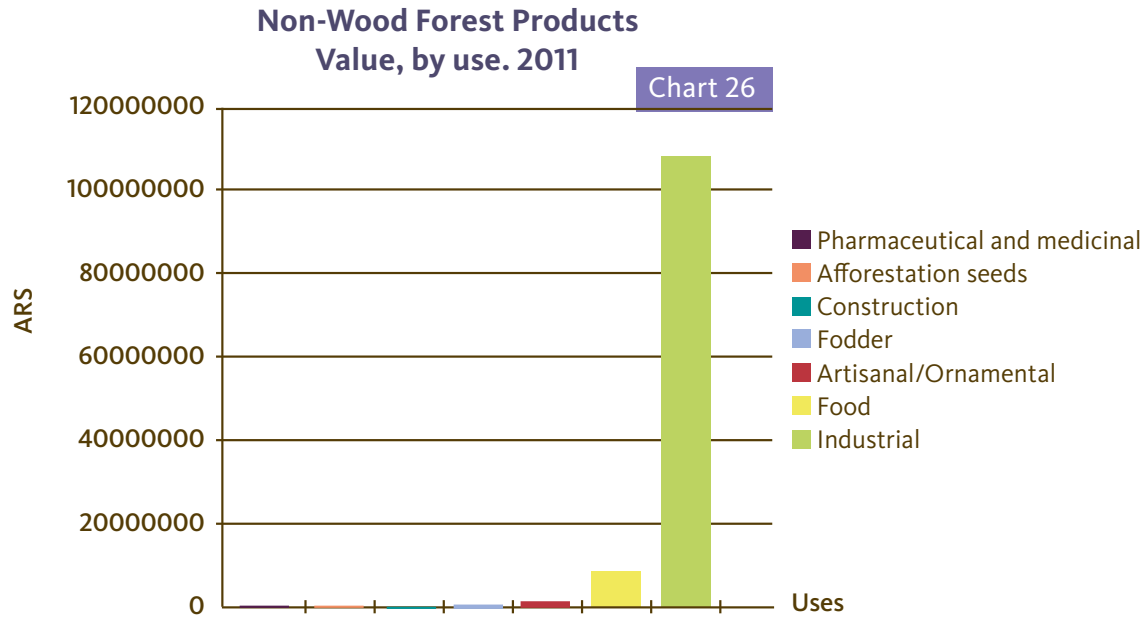
In order to value NWFP, production is weighted by product and jurisdiction, and based on the body providing the data. In 2012, middle-men account for 25.64%, producers account for 1.55%, harvesters/gatherers account for 0.81%, and exporters account for 0.52%, while 71.48% of the data was not broken down by source of information.

Non-Wood Forest Products, by use

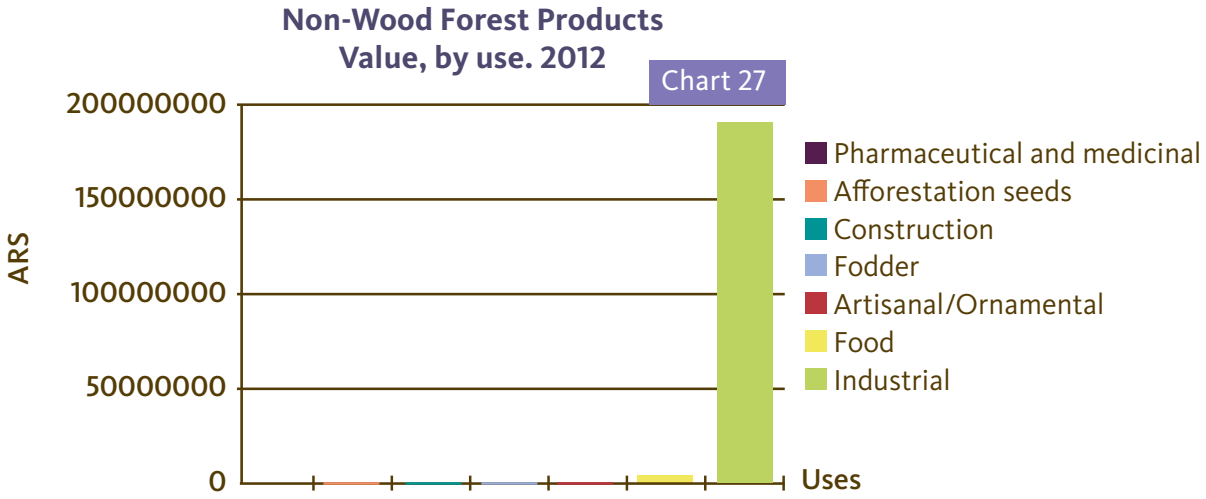
Table 35

Use	2011	2012
	ARS	
Total	120275251	194805715
Food	11601052	3202495
Artisanal/Ornamental	883540	451990
Construction	91146	20470
Pharmaceutical and medicinal	11008	-
Afforestation seeds	50935	3400
Fodder	415000	-
Industrial	107222570	191127360

Source: Secretariat of Environment and Sustainable Development. Undersecretariat of Planning and Environmental Policy. Forest Direction. National Forest Statistics Program, based on information provided by provincial Forest Services, National Parks Administration, Foundations, Associations, NGOs and private companies of the Forestry Industry.



Source: Secretariat of Environment and Sustainable Development. Undersecretariat of Planning and Environmental Policy. Forest Direction. National Forest Statistics Program, based on information provided by provincial Forest Services, National Parks Administration, Foundations, Associations, NGOs and private companies of the Forestry Industry.



Source: Secretariat of Environment and Sustainable Development. Undersecretariat of Planning and Environmental Policy. Forest Direction. National Forest Statistics Program, based on information provided by provincial Forest Services, National Parks Administration, Foundations, Associations, NGOs and private companies of the Forestry Industry.

References:

Secretariat of Environment and Sustainable Development. Undersecretariat of Planning and Environmental Policy. Forest Direction. National Forest Statistics Program. "Anuario de Estadística Forestal de especies nativas". 2002-2012. **http://www.ambiente.gov.ar/?idarticulo=2136**

Secretariat of Environment and Sustainable Development. Undersecretariat of Planning and Environmental Policy. Forest Direction. National Forest Statistics Program. "Series Estadísticas Forestales". 2002-2012. **http://www.ambiente.gov.ar/?idarticulo=305**

6.1.d. Total and per capita consumption of wood and wood products in round wood equivalents.

Rationale: This indicator provides information on consumption, including consumption per capita, of wood and wood products. The quantity of wood and wood products consumed illustrates one aspect of society's dependence on forests as a source of raw materials.

Information Quality: H **Indicator Evolution:** ↑

The identified segments comprising roundwood products were: sawnwood, fibreboard, particle board, plywood, tannin, pulp and paper.

In the case of the fibreboard, particle board, pulp and paper industries, data was provided by the DPF of the MAGyP. In the case of the sliced wood, plywood and tannin, information was provided by the DB of the SAyDS. However, as the sawmill industry carries out no annual series, the relevant data was computed as the difference between produced roundwood and the roundwood raw materials used by surveyed industries.

The series considered is annual and starts in 2002 and ends in 2012. Production is the starting point for computing apparent consumption [13] and per capita consumption (m^3).

Apparent consumption by industry Table 36

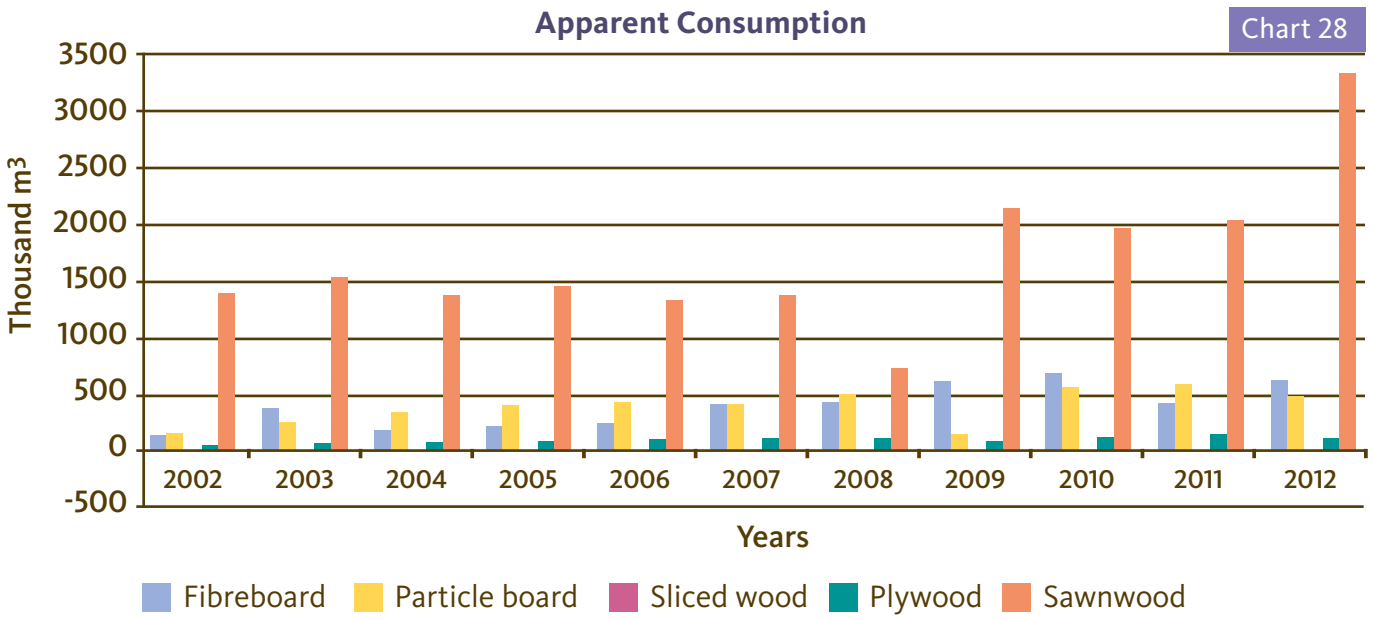
Year	Fibre board	Particle board	Sliced wood	Plywood	Sawnwood	Pulp	Paper	Tannin
	(thousand m3)	(thousand m3)	(thousand m3)	(thousand m3)	(thousand m3)	(thousand t)	(thousand t)	(thousand t)
2002	132	152	* 0	47	1395	457	1231	14
2003	378	255	** 0	70	1539	633	1518	9
2004	182	336	4	76	1372	851	1752	18
2005	212	402	-11	91	1461	847	2239	15
2006	240	435	5	103	1343	836	2006	17
2007	413	406	4	118	1380	915	2069	23
2008	432	494	4	117	736	817	2373	30
2009	609	147	2	85	2151	622	1345	9
2010	682	571	2	119	1983	641	1104	19
2011	423	587	1	142	2044	641	1172	14
2012	617	499	1	118	3346	598	1143	26

* In 2002, the figure is significant to the first decimal, with a value of 0.16 thousand m^3.

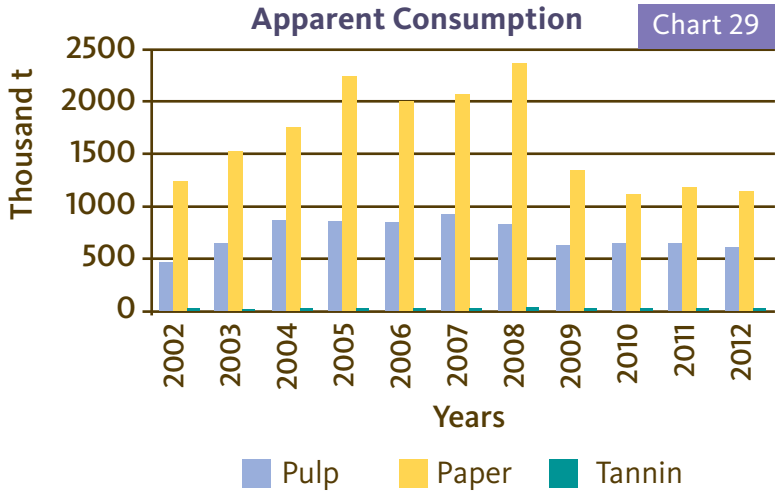
** In 2003, the figure is significant to the first decimal, with a value of 0.25 thousand m^3

Source: Ministry of Agriculture, Livestock and Fisheries. Undersecretariat of Agriculture. Forestry Production Direction. Economics and Information Area and Secretariat of Environment and Sustainable Development. Undersecretariat of Planning and Environmental Policy. Forest Direction. National Forest Statistics Program, based on information provided by private companies of the Forestry Industry.

13 Apparent consumption = Production + Imports - Exports



Source: Ministry of Agriculture, Livestock and Fisheries. Undersecretariat of Agriculture. Forestry Production Direction. Economics and Information Area and Secretariat of Environment and Sustainable Development. Undersecretariat of Planning and Environmental Policy. Forest Direction. National Forest Statistics Program, based on information provided by private companies of the Forestry Industry.



Source: Ministry of Agriculture, Livestock and Fisheries. Undersecretariat of Agriculture. Forestry Production Direction. Economics and Information Area and Secretariat of Environment and Sustainable Development. Undersecretariat of Planning and Environmental Policy. Forest Direction. National Forest Statistics Program, based on information provided by private companies of the Forestry Industry.

The series at hand (2002-2012) shows the following annual apparent consumption averages for industrial production:

- Fibreboard: 393 thousand m³
- Particle board: 390 thousand m³
- Sliced wood: 1 thousand m³
- Plywood: 99 thousand m³
- Sawnwood: 1705 thousand m³
- Pulp: 714 thousand t
- Paper: 1632 thousand t
- Tannin: 18 thousand t

In the period under analysis, apparent consumption underwent the following changes:

- Plywood increased by 151%
- Sliced wood increased by 525%
- Sawnwood increased by 140%
- Fibreboard increased by 367 %
- Particle board increased by 367 %
- Pulp increased by 31 %
- Paper decreased by 7 %
- Tannin increased by 86 %

The following were the highest apparent consumption values for the series at hand:

- Fibreboard: 682 thousand m³ in 2010
- Particle board: 587 thousand m³ in 2011
- Plywood: 142 thousand m³ in 2011
- Sawnwood: 3.346 thousand m³ in 2012
- Sliced wood: 5 thousand m³ in 2006
- Pulp: 915 thousand t in 2007
- Paper: 2373 thousand t in 2008
- Tannin: 30 thousand t in 2008

As regards sliced wood, the lowest recorded value was -11 thousand m³ in 2005. This negative figure for apparent consumption was due to the fact that the exported value was greater than the produced value, possible thanks to the availability of surplus stock from previous years.

Per capita consumption by industry Table 37

Year	Fibre board	Particle board	Sliced wood	Plywood	Sawnwood	Pulp	Paper	Tannin
	thousand m³/ thousand inhabitants)	thousand m³/ thousand inhabitants)	thousand m³/ thousand inhabitants)	thousand m³/ thousand inhabitants)	thousand m³/ thousand inhabitants)	thousand t/ thousand inhabitants)	thousand t/ thousand inhabitants)	thousand t/ thousand inhabitants)
2002	3	4	*	1	37	12	32	*
2003	10	7	*	2	41	17	40	*
2004	5	9	*	2	35	22	45	*
2005	6	10	*	2	38	22	58	*
2006	6	11	*	3	35	22	54	*
2007	10	10	*	3	35	23	52	*
2008	11	12	*	3	19	21	60	*
2009	15	4	*	2	54	16	34	*
2010	17	14	*	3	49	16	28	*
2011	11	15	*	4	51	16	29	*
2012	15	12	*	3	81	15	28	*

* Per capita consumption for the production for sliced wood and tannin is significant to the sixth decimal place.

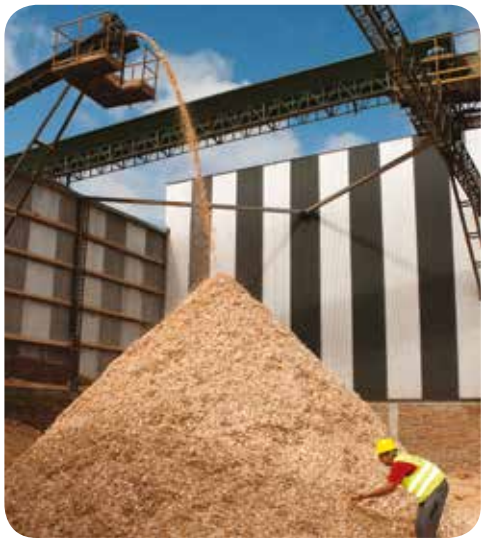
Source: Ministry of Agriculture, Livestock and Fisheries. Undersecretariat of Agriculture. Forestry Production Direction. Economics and Information Area and Secretariat of Environment and Sustainable Development. Undersecretariat of Planning and Environmental Policy. Forest Direction. National Forest Statistics Program, based on information provided by private companies of the Forestry Industry.

The following is the average per capita consumption for the various products in the series under analysis:

- Fibreboard: 10 thousand m³/ thousand inhabitants
- Particle board: 10 thousand m³/ thousand inhabitants
- Plywood: 3 thousand m³/ thousand inhabitants
- Sawnwood: 43 thousand m³/ thousand inhabitants

• Pulp: 18 thousand t/ thousand inhabitants
• Paper: 42 thousand t/ thousand inhabitants

Sawn timber stockpile. Author Pablo Oliveri, courtesy of UCAR-MAGyP.

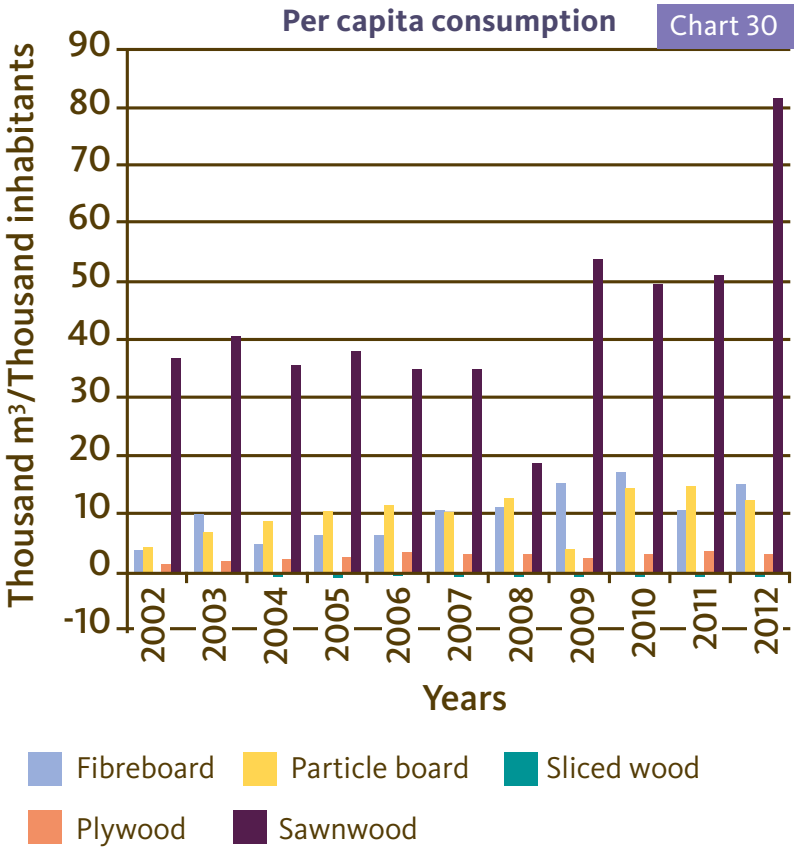


Conveyor transporting chips to the storage area Author Pablo Oliveri, courtesy of UCAR-MAGyP.

For this series, the following are the years with the highest per capita consumption values of the different products:

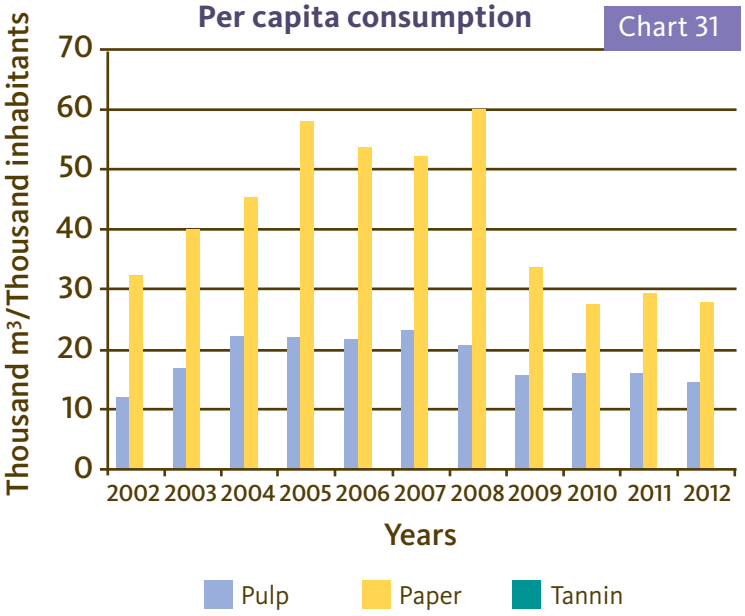
• Fibreboard: 17 thousand m³/ thousand inhabitants in 2010
• Particle board: 15 thousand m³/ thousand inhabitants in 2011
• Plywood: 4 thousand m³/ thousand inhabitants in 2011
• Sawnwood: 81 thousand m³/ thousand inhabitants in 2012
• Pulp: 23 thousand t/ thousand inhabitants in2007
• Paper: 60 thousand t/ thousand inhabitants in 2008

Per capita consumption Chart 30



Source: Ministry of Agriculture, Livestock and Fisheries. Undersecretariat of Agriculture. Forestry Production Direction. Economics and Information Area and Secretariat of Environment and Sustainable Development. Undersecretariat of Planning and Environmental Policy. Forest Direction. National Forest Statistics Program, based on information provided by private companies of the Forestry Industry.

Per capita consumption Chart 31



Source: Ministry of Agriculture, Livestock and Fisheries. Undersecretariat of Agriculture. Forestry Production Direction. Economics and Information Area and Secretariat of Environment and Sustainable Development. Undersecretariat of Planning and Environmental Policy. Forest Direction. National Forest Statistics Program, based on information provided by private companies of the Forestry Industry.

6.1.f. Value and volume in round wood equivalents of exports and imports of wood products.

Rationale: This indicator provides information about the value and volume of a country's exports and imports in wood products and their contribution to the domestic economy. International trade in wood products may be a significant factor in the management, commercial use and economic value of forests.

Information Quality: H **Indicator Evolution: ?**

International trade

Data on international trade are provided by the National Institute of Statistics and Census (INDEC), through the National External Sector Statistics Directorate, based on customs documentation about merchandise export and import operations, known as boarding permission and import clearance, respectively.

Sawmill. Author Pablo Oliveri, courtesy of UCAR-MAGyP.

Wood product exports and imports Table 38

Year	Exports		Imports	
	Tonnes	USD	Tonnes	USD
2002	1100553	491597740	546426	425206693
2003	1406440	612252416	826556	607180115
2004	1542269	783390203	1086429	829742080
2005	1499491	784549589	1175144	977426771
2006	1503715	918552130	1222265	1098185458
2007	1423975	958202108	1429282	1315638133
2008	1256624	965894383	1374544	1495503390
2009	1262789	846961483	1090413	1122603842
2010	1281536	1014829055	1347396	1533149494
2011	1093831	1034530124	1433185	1838654815
2012	828346	738782252	1252316	1598448479
2013	795694	720722613	1178008	1529257811

Source: Secretariat of Environment and Sustainable Development. Undersecretariat of Planning and Environmental Policy. Forest Direction. National Forest Statistics Program, based on information provided by INDEC.

Source: Secretariat of Environment and Sustainable Development. Undersecretariat of Planning and Environmental Policy. Forest Direction. National Forest Statistics Program, based on information provided by INDEC.

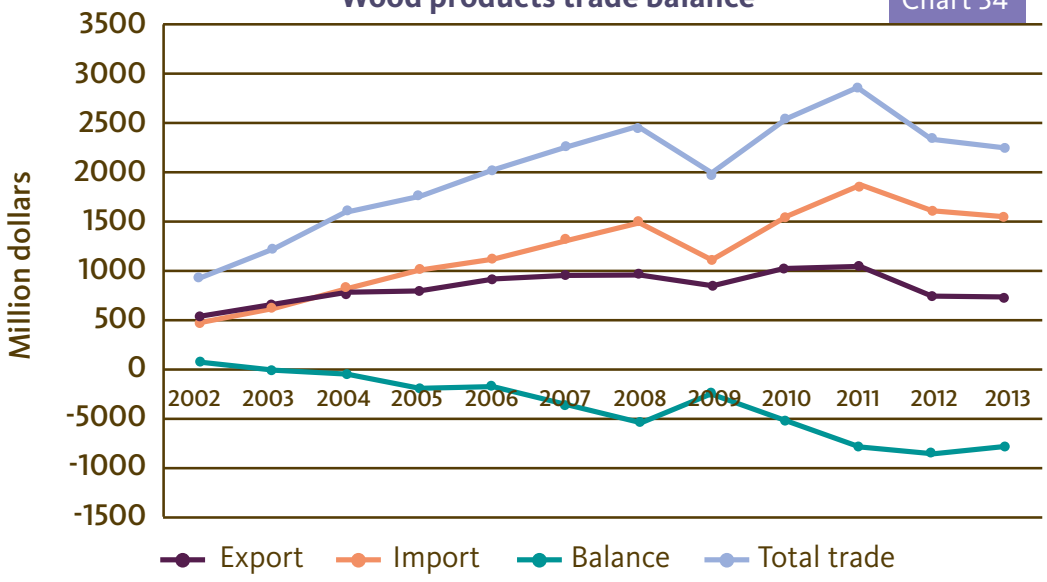
Source: Secretariat of Environment and Sustainable Development. Undersecretariat of Planning and Environmental Policy. Forest Direction. National Forest Statistics Program, based on information provided by INDEC.

Wood products trade balance (in million dollars) Table 39

Concept /year	Export	Import	Balance	Total trade
2002	491.6	425.2	66.4	916.8
2003	612.3	607.2	5.1	1219.4
2004	783.4	829.7	-46.4	1613.1
2005	784.5	977.4	-192.9	1762.0
2006	918.6	1098.2	-179.6	2016.7
2007	958.2	1315.6	-357.4	2273.8
2008	965.9	1495.5	-529.6	2461.4
2009	847.0	1122.6	-275.6	1969.6
2010	1014.8	1533.1	-518.3	2548.0
2011	1034.5	1838.7	-804.1	2873.2
2012	738.8	1598.4	-859.7	2337.2
2013	720.8	1529.3	-808.5	2250.0

Source: Secretariat of Environment and Sustainable Development. Undersecretariat of Planning and Environmental Policy. Forest Direction. National Forest Statistics Program, based on information provided by INDEC.

Wood products trade balance Chart 34



Source: Secretariat of Environment and Sustainable Development. Undersecretariat of Planning and Environmental Policy. Forest Direction. National Forest Statistics Program, based on information provided by INDEC.

The analysis of the available tables shows that:

• In the series at hand, 2011 was the year with the highest wood product imports in terms of value (1839 million USD) and volume (1 433 185 tonnes), while exports for the same year show the highest value in terms of USD (1034 million USD), but in terms of physical units, the highest value was recorded in 2004 (1 542 269 tonnes).

• Throughout the period, exports in terms of value increased by 47%, imports increased by 260%, trade total increased by 145%, while the balanced decreased by 1317%.

• The series shows that the first year with a negative balance was 2004, after the currency board regime was abandoned in 2002, with no positive balances recorded since.

References:

Secretariat of Environment and Sustainable Development. Undersecretariat of Planning and Environmental Policy. Forest Direction. National Forest Statistics Program. "Comercio Exterior de Productos Forestales". 2002-2012. **http://www.ambiente.gov.ar/?idarticulo=304**

Secretariat of Environment and Sustainable Development. Undersecretariat of Planning and Environmental Policy. Forest Direction. National Forest Statistics Program. "Series Estadísticas Forestales". 2002-2012. **http://www.ambiente.gov.ar/?idarticulo=305**

Forestry crane lifting *Eucalyptus* sp. roundwood. Author Pablo Oliveri, courtesy of UCAR-MAGyP.

6.1.h. Exports as a share of wood and wood products production and imports as a share of wood and wood products consumption.

Rationale: This indicator provides information on the relative importance of international trade in wood and wood products to domestic production and consumption. Wood and wood product exports can be a significant source of revenue for domestic economies. Imports may supplement or substitute for production from domestic forest sources.

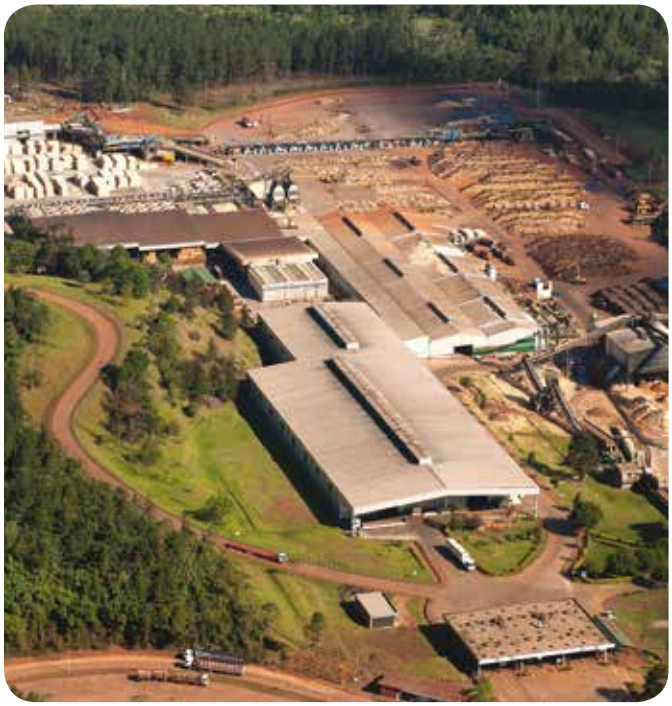
Information Quality: H **Indicator Evolution: ?**

Figures analyzed under this indicator were provided by the Forestry Production Direction of the Ministry of Agriculture, Livestock and Fisheries and the Forest Direction of the Secretariat of Environment and Sustainable Development. The methodology used was an annual survey of the wood sector industries, aimed at studying data to gather the necessary information to learn about its evolution and to prepare statistics.

Transport of *Pinus* sp. logs, Corrientes. Author Pablo Oliveri, courtesy of UCAR-MAGyP.

Industrial production/Wood product exports

Table 40 shows the evolution of the production and exports of the main forestry products, which makes it possible to infer that Fibreboard production reached 298 thousand m^3 in 2002, of which 89% was exported. In the following years, production grew steadily until 2008, the year with the highest production in 2002-2012 period (797 thousand m^3). As regards exports, they reached 50%. During that decade, we can see a 107% change in production, with an exported share of just 56%.



Sawmill, Misiones. Author Pablo Oliveri, courtesy of UCAR-MAGyP.

Industrial production/Wood product exports (thousand m³)

Table 40

Years	Fibreboard			Particle board			Sliced wood			Plywood boards			Sawnwood		
	Prod.	Exp.	%	Prod.	Exp.	%	Prod.	Exp.	%	Prod.	Exp.	%	Prod.	Exp.	%
2002	298	264	89	318	170	53	2	4	200	60	14	23	1658	295	18
2003	578	450	78	455	209	46	2	6	300	77	15	19	1816	365	20
2004	627	457	73	536	211	39	1	3	300	84	16	19	1288	41	3
2005	631	431	68	602	197	33	1	19	1900	86	12	14	1740	405	23
2006	656	430	66	584	178	30	2	3	150	91	15	16	1610	380	24
2007	620	229	37	555	86	15	1	2	200	85	11	13	1516	237	16
2008	797	396	50	564	103	18	1	2	200	82	7	9	955	301	32
2009	606	304	50	512	135	26	1	2	200	66	5	8	2151	211	10
2010	647	330	51	568	119	21	1	3	300	69	4	6	2159	220	10
2011	642	305	48	552	99	18	1	4	400	70	1	1	2151	152	7
2012	617	210	34	506	40	8	1	2	200	68	2	3	3339	27	1

Source: Ministry of Agriculture, Livestock and Fisheries. Undersecretariat of Agriculture. Forestry Production Direction. Economics and Information Area and SAyDS. Undersecretariat of Planning and Environmental Policy. Forest Direction. National Forest Statistics Program, based on information from the Annual Census of the Timber and Paper Industry, in the case of production, and from INDEC, in the case of exports.

Industrial production/Pulp, paper and tannin exports (thousand t)

Table 41

Years	Pulp			Paper			Tannin		
	Prod.	Exp.	%	Prod.	Exp.	%	Prod.	Exp.	%
2002	827	258	31	1072	188	18	55	44	80
2003	782	255	33	1212	225	19	50	44	88
2004	937	134	14	1344	287	21	62	48	77
2005	937	223	24	1769	304	17	61	50	82
2006	926	212	23	1544	336	22	70	57	81
2007	941	195	21	1423	270	19	75	60	80
2008	860	179	21	1708	256	15	67	50	75
2009	715	250	35	1438	257	18	44	37	84
2010	711	229	32	1206	261	22	69	54	78
2011	637	164	26	1215	183	15	60	49	82
2012	755	204	27	1186	238	20	66	46	70

Source: Ministry of Agriculture, Livestock and Fisheries. Undersecretariat of Agriculture. Forestry Production Direction. Economics and Information Area and SAyDS. Undersecretariat of Planning and Environmental Policy. Forest Direction. National Forest Statistics Program, based on information from the Annual Census of the Timber and Paper Industry, in the case of production, and from INDEC, in the case of exports.

As regards particle board, the highest recorded value was produced in 2005 (602 thousand m^3), of which 197 thousand m^3 were exported to other markets (33% of production). In the ten years under analysis, production grew 60%: 318 thousand m^3 were produced in 2002, and 506 thousand m^3 in 2012.

It is worth mentioning that between 2002 and 2012, sliced wood production was very small, moving between 2 and 1 thousand m^3. Exports of this product comprised mainly stocks accumulated in previous years.

As regards plywood boards, they had an erratic behavior in 2002-2012 in terms of production: they moved between 60 thousand m^3 and 91 thousand m^3. 2006 was the year with the highest production (91 thousand m^3), with exports of 15 thousand m^3. One aspect worthy of mention is that of production shipped abroad, which decreased relative to the total produced. In the years following 2002, they went from 15 thousand m^3 to 1 thousand m^3 in 2011.

Sawnwood production grew steadily during the aforementioned decade. In 2002, it amounted to 1658 thousand m^3, and to 3339 thousand m^3 in 2012: a 101% increase. Just as in the case of plywood, exports contracted significantly, going from 295 thousand m^3 to 27 thousand m^3 between 2002 and 2012.

Pulp and paper production maintained an upward trend. Pulp production hovered about 827 thousand and 941 thousand t, while export indices were of over 20%. Paper had a similar behavior: production peaked in 2005, with 1769 thousand t, with exports of about 20%. Tannin yield was 55 thousand t in 2002 and 75 thousand t in 2007: a 36% increase. Starting in 2008, this growth rate slowed, reaching 66 thousand t in 2012. Exports in the period were about 70% and 80% in 2002 – 2012.

Furniture factory, Misiones. Author Pablo Oliveri, courtesy of UCAR-MAGyP.

Fibreboard production plant, Misiones. Author Pablo Oliveri, courtesy of UCAR-MAGyP.

Industrial production/Wood product imports

The behavior of imports will be analyzed regarding production of the main wood products between 2002 and 2012. Table 42 shows that fibreboard imports recorded a significant increase, going from 4 thousand m^3 in 2002 to 43 thousand m^3 in 2012. This represents a 975% increase, while the share of imports over production went from 1% to 7%.

This upward trend in imports was also seen in the case of particle board. In 2002, they amounted to 4 thousand m^3, and in 2007 they reached the highest value in the 2002-2012 period, with 40 thousand m^3 and a 900% increase. Afterwards, particle board imports move down and reach a steady rate, between 31 thousand m^3 and 33 thousand m^3. Percentages also remained between 1% and 7% in the period under analysis.

The sliced wood industry recorded a decrease in 2002-2012, while the plywood board industry grew. The share of imports over production grew steadily, totaling up to 700% in 2005 in the case of sliced wood and to 104% in 2011 for plywood.

Industrial production/Wood product imports (thousand m³)

Table 42

Years	Fibreboard			Particle board			Sliced wood			Plywood boards			Sawnwood		
	Prod.	Imp.	%	Prod.	Imp.	%	Prod.	Imp.	%	Prod.	Imp.	%	Prod.	Imp.	%
2002	298	4	1	318	4	1	2	2	100	60	1	2	1658	22	1
2003	578	7	1	455	9	2	2	4	200	77	8	10	1816	88	5
2004	627	12	2	536	11	2	1	6	600	84	8	10	1288	125	10
2005	631	14	2	602	12	2	1	7	700	86	17	20	1740	126	7
2006	656	14	2	584	29	5	2	6	300	91	27	30	1610	113	7
2007	620	22	4	555	40	7	1	5	500	85	44	52	1516	101	7
2008	797	33	4	564	31	5	1	5	500	82	42	51	955	82	9
2009	606	23	4	512	23	4	1	3	300	66	25	38	2151	50	2
2010	647	37	6	568	27	5	1	4	400	69	54	78	2159	44	2
2011	642	41	6	552	30	5	1	4	400	70	73	104	2151	45	2
2012	617	43	7	506	33	7	1	3	300	68	51	75	3339	34	1

Source: Ministry of Agriculture, Livestock and Fisheries. Undersecretariat of Agriculture. Forestry Production Direction. Economics and Information Area and Secretariat of Environment and Sustainable Development. Undersecretariat of Planning and Environmental Policy. Forest Direction. National Forest Statistics Program, based on information from the Annual Census of the Timber and Paper Industry, in the case of production, and from INDEC, in the case of imports.

Industrial production/Pulp, paper and tannin imports (thousand t)

Table 43

Years	Pulp			Paper			Tannin		
	Prod.	Imp.	%	Prod.	Imp.	%	Prod.	Imp.	%
2002	827	112	14	1072	347	32	55	3	5
2003	782	106	14	1212	531	44	50	3	6
2004	937	141	15	1344	695	52	62	4	6
2005	937	137	15	1769	774	44	61	4	7
2006	926	122	13	1544	798	52	70	4	6
2007	941	168	18	1423	916	64	75	8	11
2008	860	136	16	1708	921	54	67	13	19
2009	715	157	22	1438	773	54	44	2	5
2010	711	159	22	1206	948	79	69	4	6
2011	637	168	26	1215	1003	83	60	3	5
2012	755	165	22	1186	873	74	66	6	9

Source: Ministry of Agriculture, Livestock and Fisheries. Undersecretariat of Agriculture. Forestry Production Direction. Economics and Information Area and Secretariat of Environment and Sustainable Development. Undersecretariat of Planning and Environmental Policy. Forest Direction. National Forest Statistics Program, based on information from the Annual Census of the Timber and Paper Industry, in the case of production, and from INDEC, in the case of imports.

Inversely, sawnwood was the product with the lowest volume of imports relative to production in ten years. This translated into a very small share of imports over produced volumes, which remained between 1% and 10%.

Lastly, in the case of pulp and paper, we can say that for the former, the share of imports over production grew from 14% in 2002 to 22% in 2012, with the greatest share recorded in 2011 (26%). Paper's behavior was similar: it increased from 32% in 2002 to 83% in 2011, with a slight decline in 2012, to 74%. As regards tannin, imports were negligible relative to those of other industries, reaching its highest values in 2007 and 2008, with 11% and 19%, respectively.

Apparent consumption/Wood product imports

Tables 44 and 45 show the evolution of imports relative to apparent consumption of the main wood industrial products.

Apparent consumption/Wood product imports (thousand m³)

Table 44

Years	Fibreboard			Particle board			Sliced wood			Plywood boards			Sawnwood		
	Cons.	Imp.	%	Cons.	Imp.	%	Cons.	Imp.	%	Cons.	Imp.	%	Cons.	Imp.	%
2002	132	4	3	152	4	3	* 0	2	0	47	1	2	1395	22	2
2003	378	7	2	255	9	4	** 0	4	0	70	8	11	1539	88	6
2004	182	12	7	336	11	3	4	6	150	76	8	11	1372	125	9
2005	212	14	7	402	12	3	-11	7	-64	91	17	19	1461	126	9
2006	240	14	6	435	29	7	5	6	120	103	27	26	1343	113	8
2007	413	22	5	406	40	10	4	5	125	118	44	37	1380	101	7
2008	432	33	8	494	31	6	4	5	125	117	42	36	736	82	11
2009	609	23	4	147	23	16	2	3	150	85	25	29	2151	50	2
2010	682	37	5	571	27	5	2	4	200	119	54	45	1983	44	2
2011	423	41	10	587	30	5	1	4	400	142	73	51	2044	45	2
2012	617	43	7	499	33	7	1	3	300	118	51	43	3346	34	1

* In 2002, the figure is significant to the first decimal, with 0.16 thousand m³

** In 2003, the figure is significant to the first decimal, with 0.25 thousand m³

Source: Ministry of Agriculture, Livestock and Fisheries. Undersecretariat of Agriculture. Forestry Production Direction. Economics and Information Area and Secretariat of Environment and Sustainable Development. Undersecretariat of Planning and Environmental Policy. Forest Direction. National Forest Statistics Program, based on information from the Annual Census of the Timber and Paper Industry, in the case of production, and from INDEC, in the case of imports.

Landscape with *Eucalyptus* sp. Author Pablo Oliveri, courtesy of UCAR-MAGyP.

Apparent consumption/Pulp, paper and tannin imports (thousand t)

Table 45

Years	Pulp			Paper			Tannin		
	Cons.	Imp.	%	Cons.	Imp.	%	Cons.	Imp.	%
2002	457	112	25	1231	347	28	14	3	21
2003	633	106	17	1518	531	35	9	3	33
2004	851	141	17	1752	695	40	18	4	22
2005	847	137	16	2239	774	35	15	4	27
2006	836	122	15	2006	798	40	17	4	24
2007	915	168	18	2069	916	44	23	8	35
2008	817	136	17	2373	921	39	30	13	43
2009	622	157	25	1345	773	57	9	2	22
2010	641	159	25	1104	948	86	19	4	21
2011	641	168	26	1172	1003	86	14	3	21
2012	598	165	28	1143	873	76	26	6	23

Source: Ministry of Agriculture, Livestock and Fisheries. Undersecretariat of Agriculture. Forestry Production Direction. Economics and Information Area and Secretariat of Environment and Sustainable Development. Undersecretariat of Planning and Environmental Policy. Forest Direction. National Forest Statistics Program, based on information from the Annual Census of the Timber and Paper Industry, in the case of production, and from INDEC, in the case of imports.

Based on this information, it possible to highlight that fibreboard imports in 2002-2012 recorded a steady increase (with the exception of 2009, when they fell slightly). The greatest share of imports over apparent consumption, both for fibreboard and for plywood boards, was that of 2011.

In the case of particle board, the share of imports over apparent consumption was erratic, with a peak in 2009, due to a marked decrease in consumption.

Import shares over apparent consumption for sliced wood go over 100% because imports were higher than apparent consumption in the period under analysis. The lowest apparent consumption value for this product was -11 thousand m^3 in 2005. That year's negative apparent consumption was due to the availability of surplus stock from previous years, which make it possible to export more than it is produced.

Paper apparent consumption in the period fell by 7%. Imports for this product fluctuated, but with an upward overall trend; so the share of imports in apparent consumption increased markedly in 2002-2012.

Eucalyptus sp. sawmill, Entre Ríos. Author Pablo Oliveri, courtesy of UCAR-MAGyP.

6.2.b. Annual investment and expenditure in forest-related research, extension and development, and education.

Rationale: This indicator provides information on annual investment and expenditure in forest-related research, extension and development, and education. Research underpins scientific understanding, including the ability to practice improved forest management and to develop and apply new technologies. Education, including extension activities, increases public awareness of the multiple benefits provided by forests.

Information Quality: A **Indicator Evolution:** 

Pinus ponderosa clonal bank. INTA Bariloche, Río Negro. Author Pablo Oliveri, courtesy of UCAR-MAGyP.

Nursery, Corrientes. Author Daniela García.

National capabilities as regards forestry production stem from the identification and quantification by research groups working on the subject, centers or institutions whose lines of research are applied to forest sciences and the undergraduate and postgraduate training courses which make up the available education options at the national level.

Forest research in the country stems from the need to manage forest resources. Over time, different administrative agencies were created, and underwent changes, adapting their goals and functions based on national and regional policies. In 1943, the National Forest Direction was created: the first official institutional acknowledgement of forest resources as an important part of the national economy. In 1948, the National Forest Administration (ANB) was created through Law No. 13273, as the agency in charge of its enforcement. Both institutions encouraged research of all forests in the country, with the goal of surveying fiscal forests, their sustainable use, and supply for the markets. To that effect, they connected both national universities and the successive management agencies [the "National Forest Service" (1968), the "Forest National Service" (1969) and the "National Forest Institute" (IFONA) (1973 – National Law No. 20531)]. The IFONA led forest research up to its dissolution in 1991. Since then, forest research has been taken up by national institutions such as the INTA, the Secretariat of Natural Resources and Human Environment (1991 – National Decree - Law No. 2419), which was then re-created as the SAyDS; the National Council of Scientific and Technical Research (CONICET), the National Parks Administration , and national universities, as well as provincial and regional research centers and institutions (such as Forest Research Center, the Neuquén Forest Corporation or the Andean-Patagonian Center for Forest Extension and Research).

Selva Misionera region in the province of Misiones. Author Pablo Oliveri, courtesy of UCAR-MAGyP.

Among the public-sector-led efforts, special mention should be made of the Applied Research of Native Forest Resources (PIARFON), created by the SAyDS; the Applied Research Projects (PIA), focused on developing knowledge and technology applied to sustainable quality wood production, other associated productions, and the environmental services from plantation forests, supported by the MAGyP; the Native and Introduced Species Domestication and Improvement for High-Value Uses Program (PROMEF), implemented by the INTA through a Letter of Agreement with the Undersecretariat of Agriculture, Livestock and Fisheries, aimed at creating improved genetic material of native and introduced species, so as to increase and diversify the supply of quality wood, improving the profitability and the sustainability of the forest chain in the whole country, preserving genetic resources; Forest Health Projects (SaFos), which aim at launching studies to secure short-term scientifically-sound and environmentally-sustainable solutions for current and potential sanitary issues, and, also, to consolidate the capabilities of human resources specialized in the area; and the experimental Silvopastoral Modules, which include experimental and demonstration elements which make it possible to assess them from productive, economic, social and environmental standpoints, and which are in turn a tool to disseminate results.

Forest Targeted Scientific and Technological Research Projects (PICTO), 2006. These projects were developed thanks to the financial contribution of the National Agency of Scientific and Technical Promotion, through the FONCYT, the Secretariat of the Environment and Sustainable Development, the INTA, national universities of Comahue, San Juan Bosco, and Patagonia Austral, and the five Patagonian provinces represented in the CIEFAP board, which amounted to 4 200 000 ARS. Said contribution was used to elaborate on topics significant to Patagonian provinces and/or the region. Some issues discussed were the assessment, monitoring, conservation and sustainable use of native forests; the development of guidelines for post-fire management and restoration; the quantification and mitigation of damages and impacts caused by forest fires; the substitution and invasion by exotic species; the current level of productivity; and wild fungi management techniques, among others.

Forest research projects have peculiar features, mainly related on the time needed to arrive at useful results. However, they are linked to a large variety of economic activities: industry, energy, agriculture, pasturing, and soil and water conservation; and they also affect broader development aspects, such as employment, resource allocation and environmental values.

The following are forest development projects being carried out:

1. Natural Resource Sustainable Management Project. The project has three components: the first one applies to Native Forests, which brings it under the aegis of the SAyDS; the second applies to Sustainable Plantation Forests, implemented by the MAGyP; and the third is linked to Protected Areas, which are the responsibility of the National Parks Administration. The first component "Native Forests and their Biodiversity" has the overall objective of a participatory formulation of an Investment Project for the protection and sustainable management of native forests and their biodiversity, to be implemented by the Argentine government. This objective was accompanied by priority focal field experiences, taking action predominantly in the *Parque Chaqueño* region and institutional strengthening of provincial governments, to support the implementation of Law No. 26331 on "Minimum Budgets for Environmental Protection of Native Forests" and its supplementary regulations. "The Sustainable Plantation Forests" the second component of the project has the general goal of contributing to the sustainable development of the Argentine forest sector, by means of improving the capabilities of national and provincial institutions and NGO with direct responsibilities over plantation forests, through activities of research, outreach and information, training, dissemination and support to efficiency in forest management in Argentina. This represents a World Bank credit amounting to 60 million USD, of which approximately 27 million are executed by the MAGyP, 30 million are executed by the APN, and the rest is executed by the SAyDS.

2. Biodiversity Conservation in Forest Productive Landscapes Project. This project, executed by the MAGyP, attempts to encourage the inclusion of biodiversity management in the management of plantation forests in specific areas within regionally- and globally-important ecosystems in Argentina. This is a 7 million USD grant from the *Global Environment Facility* (GEF).

3. Forest Sustainability and Competitiveness Program. The project is implemented by the MAGyP at the country-level, focusing on regions with significant current or potential forest development: *Norte Grande* (provinces of Corrientes, Misiones, Chaco, Formosa, Santiago del Estero, Salta, Jujuy and Tucumán); *Valles irrigados* (mainly provinces of Río Negro, Neuquén, Chubut, Mendoza and San Juan); *Región Pampeana* (provinces of Córdoba, Entre Ríos, Buenos Aires and La Pampa). The general goal is to contribute to sustainable management and competitiveness in forest plantations, increasing the quality of products, both in terms of primary production and also of first transformations, diversifying the productive base, and improving access to productive chains and markets for micro, small and medium forestry and forestry/industrial enterprises. This program represents a 60 million USD loan from the Inter-American Development Bank, with a counterparty contribution of almost 15 million USD, provided by the national government.

Eucalyptus sp. plantation in the province of Entre Ríos. Author Pablo Oliveri, courtesy of UCAR-MAGyP.

4. Sustainable Forest Management in the Great American Chaco Cross-Border Ecosystem project. This program comprises 8 provinces of the Argentinean Chaco region, Bolivia and Paraguay. It is aimed at reverting trends in soil and forest degradation in the Great American Chaco through sustainable management in a productive environment. It manages 4 Pilot sites for Good Practices of Sustainable Management in affected areas in the provinces of Chaco, Formosa, Santiago del Estero and Córdoba. Through the project, a proposal for a political and regulatory framework was developed, with input from the Chaco provinces.

5. Under the National Native Forest Protection Program (UNDP ARG 12/013), created by Law No. 26331, the Secretariat of Environment and Sustainable Development (SAyDS), together with the National Scientific and Technological Promotion Agency, agreed to allocate $7 500 000 to finance scientific and technological research projects with a maximum length of three years, aimed at contributing to knowledge to improve native forest management, protection, sustainable harvesting and the transformation of the goods and services provided by the forests.

In this sense, 3 thematic axes were defined, comprising Axis 1, which implies all economic and social aspects of the use, transformation and trading of resources provided by native forests; Axis 2, which covers all issues related to territorial planning and management of native forests; and Axis 3, dealing with research lines focused on the monitoring of native forest resources. Of the total 61 projects submitted, 16 are in Axis 1; 36 in Axis 2; and 9 in Axis 3.

Currently, these projects are in the evaluation and relevance assessment stage, and the projects to be financed are expected to be known by the second half of this year.

All research relevant to develop plantation forests takes place mainly at INTA, through the National Forest Program. Priority areas financed with this institution's resources include genetics and improvement, sustainable forest management, forest economics, and native forest management.

In Argentina, five state universities offer undergraduate forest-related courses: the School of Agricultural and Forest Sciences of the La Plata National University, the School of Forest Sciences of the Misiones National University, the School of Renewable Natural Resources of the Formosa National University, the School of Forest Sciences of the Santiago del Estero National University, and the Department of Forestry Engineering of the School of Engineering, at the Esquel Campus of the San Juan Bosco National University of Patagonia. Also, the

National University of Comahue offers a Forestry Technician degree at the San Martín de los Andes campus. However, forest-related contents are also covered in the curricula of other courses, such as Agricultural Engineering, Natural Resources, Environmental Sciences, etc.

Other forest research projects are carried out at research centers focused solely on forests, such as the Andean-Patagonian Center for Forest Extension and Research (CIEFAP) and the experimental Center of Vegetative Propagation (CEPROVE - UNLP).

Source:

Ministry of Agriculture, Livestock and Fisheries. Undersecretariat of Agriculture. Forestry Production Direction. Environmental Area, based on information provided by INTA, Union for Rural Change (UCAR) and universities.

Atlas de los Bosques Nativos Argentinos 2003, Native Forest and Protected Areas Project, IBRD 4085-AR, Forest Direction, Secretariat of Environment and Sustainable Development.

Secretariat of Environment and Sustainable Development Undersecretariat of Planning and Environmental Policy. Forest Direction. National Native Forest Protection Program. Project UNDP ARG 12/013- SAyDS.

Case Study

Research and Development in Patagonia

One of the main institutions dealing with forest-related research, development, and innovation in Patagonia is the Andean-Patagonian Center for Forest Extension and Research (CIEFAP). The following is a summary of the most relevant scientific-technical contributions and planning, management and transfer actions carried out by this agency in each stage of the productive cycle and the conservation of forests and lands suitable for forestry.

Seeds and nurseries

The Seed Analysis Laboratory authorized by the Instituto Nacional de Semillas (National Seed Institute, INASE), jointly owned by the CIEFAP and the Universidad Nacional de la Patagonia San Juan Bosco (San Juan Bosco National University of Patagonia, UNPSJB), provides quality-control services for seeds of forest and agricultural species to producers and institutions. In the case of *Pinus ponderosa*, the most popular plantation species in the region with *Pseudotsuga menziesii*, a protocol was developed to optimize the germination of seeds. Research was also carried out on the agent causing the destruction of *Austrocedrus chilensis*.

In the case of nurseries, a classification was made of the seedlings best suited to each plantation site, and the use of different substrata for the production of forest seedlings was assessed, besides other avenues of research. Moreover, technical support was provided to solve the issues stemming from the productive medium. The mycorrhiza associations present in *Pinus ponderosa* and *Pseudotsuga menziesii* were identified, in order to suggest low-cost inoculation strategies,

Native species seedling production in trays. Author Daniela García.

Estudio de caso

propose the species best-suited to this effect and adjust techniques to implement inoculation in nurseries with fertigation.

Native forests and plantations

Native and plantation forests were studied as regards different issues and at different scales. At the regional level, the state of forests was assessed through the use of inventories, and, in order to optimize the surveys of forests and forest lands, studies were carried out with different state-of-the-art satellite platforms, aimed at identifying applications with an adequate cost-benefit ratio. Under an effort from the Secretariat of Environment and Sustainable Development, a Regional Node was created within CIEFAP to monitor native forests in Patagonia.

As regards planning for the use of native forests, they were classified based on their current use, productive potential, and conservation and restoration needs. Native forest management systems were developed based on sustainability criteria and indicators; ecological and silvicultural surveys were carried out for the management of *Nothofagus pumilio* and *Austrocedrus chilensis* forests; and the post-fire restoration techniques and environmental impacts were assessed.

As regards afforestation with exotic species, the productive potential of forest-worthy zones was assessed, and various soil-preparation methods, tools and seedling types were tried. Moreover, tools were developed which can be applied to the dasometric quantification, as well as growth and productivity studies, pruning schemes and thinning tests. Plantation experiments were also made for the diversification of forests with other valuable species.

Financial assessments were carried out as regards the management systems suggested for *Pinus ponderosa* and *Pseudotsuga menziesii*, as well as studies of the value chain of wood extracted from plantations to be used in construction, and also market price studies.

Related to forest health, the agents responsible for rotting in *Nothofagus pumilio* and other native species were studied, and a characterization was made of the foliar diseases relevant to native forests. The first regional-level health prospecting was carried out for pine plantations, which identified the most prominent pests and diseases in the region. Moreover, the potential of wild fungi was analyzed, in order to increase their productivity and contribute to their industrial production.

Wood technology

Studies were carried out on the different raw materials processed in the region's industries, in order to learn about their properties. The possibilities to use native species were defined, taking into account not only their physical and mechanical properties, but also the industrial structure in the processing sector. From the point of view of the supply of raw materials, wood extracted from plantations is growing in relevance, so its properties and relation with forest management were assessed, in order to predict, to a certain degree, the technological properties of materials to be harvested in the future. In order to make effective contributions to the sector's growth, effort has been devoted to the development of construction systems which optimize the application of wood and the quality of homes built with these materials.

Nothofagus sp. and *Austrocedrus chilensis* forests. Author Pablo Oliveri, courtesy of UCAR-MAGyP.

Case Study

Individual companies and corporate groups received technical assistance, and training interventions were facilitated at different levels.

Territorial planning

The strong pressures affecting forest areas make it necessary to address territorial planning studies, aimed at promoting the sustainable management of resources, minimizing conflicts related to that management.

Applications were developed to efficiently monitor the state and the evolution of plants facing extreme events, such as intense snow, draughts and forest fires.

Forest extension

This comprises various communication strategies, which include an electronic newsletter, a periodical magazine, a radio show and a website; besides the design, in coordination with other institutions, of different dissemination products, such as articles, brochures, and books. The CIEFAP also sponsors training projects for different actors in the sector, and organizes associated management and organization processes.

Support to the strengthening of forest policies

The various studies developed in the CIEFAP have made it possible to assist Provincial and National Forest Administrations, contributing to decision-making on legislation, planning and implementation of sector policies. For instance:

a- Review of the First Regional Inventory of the *Bosque Andino Patagónico Region*, in 2005.

It is currently working to update it, with a scale of approximately 1:50,000, in coordination with provincial jurisdictions and the SAyDS.

b- Native Forest Territorial Planning

Under the Law of Minimum Budgets for the Environmental Protection of Native Forests (Law No. 26331), the CIEFAP made contributions towards its promulgation and facilitated the identification of the consensus-building around the zoning criteria established by the Law, in order to harmonize them at the regional level.

c- Patagonia Regional Forest Plan

In April, 2008, the Forest Direction (DB) of the SAyDS, selected Patagonia as the pilot region to begin the development process of the Patagonia Regional Forest Plan, tasking the CIEFAP with coordinating the process at the regional level.

This led to the development of a regional vision, characterized by the goal of creating the conditions for the increase in the area of forest subjected to a sustainable forest management, a decrease in the deforestation rate, a reduction in the degradation of forests due to grazing and fires, and an increase in the area covered by forests thanks to afforestation, enrichment and natural repopulation.

Source:

Andean-Patagonian Center for Forest Extension and Research (CIEFAP).

6.3.a. Employment in the forest sector.

Rationale: This indicator provides information on the level of direct and indirect employment in the forest sector. Employment is a widely understood measure of economic, social and community wellbeing.

Information Quality: L **Indicator Evolution:** ↑

Eucalyptus grandis classified by size. Author Pablo Olivieri, courtesy of UCAR-MAGyP.

Native and plantation forests have great potential for making contributions to socioeconomic development at the national level.

This indicator reports the number of people working in the forestry industry as of 2013, based on the following division:

• Wage labor registered in the Argentine Integrated Pension System (SIPA), which includes workers registered in the forest industry in Forestry, Forest products extraction, and Forest Services.
Source: Ministry of Labor, Employment and Social Security (Employment and Business Dynamics Observatory. Undersecretariat of Technical Programming and Labor Studies).

• Staff working in forested areas of National Parks and administrative staff.
Source: Human Resources and Training Direction. National Parks Administration.

• Staff involved in fighting forest fires (both native and plantation forests) and rural fires (grasslands and shrublands).
Source: Secretariat of Environment and Sustainable Development. Undersecretariat of Planning and Environmental Policy. National Fire Management Plan (PNMF).

• Staff in forest industries.
Source: Secretariat of Environment and Sustainable Development (National Forest Statistics Program (PNEF) and Ministry of Agriculture, Livestock and Fisheries Economics and Information Area).

Staff employed in the forest industry, by category. 2013

Table 46

	Number of employees	Percentage
Total	31014	100
Registered in SIPA	10883	35
APN	1779	6
PNMF	5702	18
Industries	12650	41

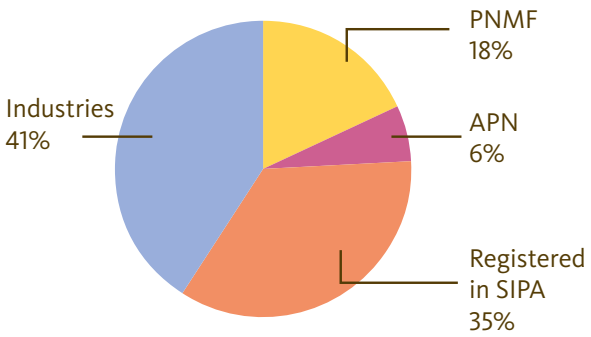
Employment data presented here do not include people receiving a wage or salary in cash or in kind, but not registered in the SIPA.

The Income and Jobs Generation Matrix, prepared by the National Accounts Direction of the INDEC, makes it possible to access that information by means of cross-referencing population censuses, industry censuses, agricultural censuses and external sources. At the time of publication of this report, the information was not available.

In Chart 36, the 2013 percentage share of employment for the forest industries can be seen, with a total of 12 650 people at the country level. It should be noted that this value does not include employees in the sawmill industry because there are no up-to-date information.

Percentage of employees in the forest industry, by category

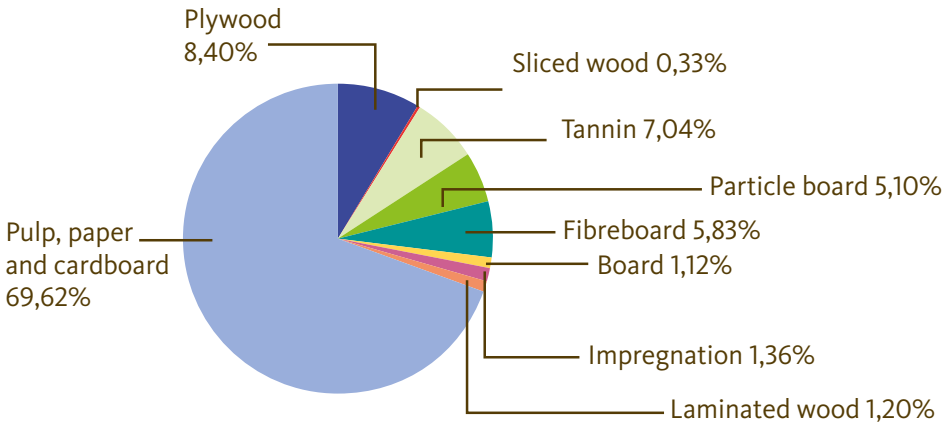
Chart 35



Source: PNEF, based on information provided by the Ministry of Labor, APN, PNMF, and industries.

Staff employed by industry. 2013

Chart 36



Source: Secretariat of Environment and Sustainable Development. Undersecretariat of Planning and Environmental Policy. Forest Direction. National Forest Statistics Program and Ministry of Agriculture, Livestock and Fisheries. Undersecretariat of Agriculture. Forestry Production Direction Economics and Information Area, based on information from the Annual Census of the Timber and Paper Industry.

References:

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Secretariat of Environment and Sustainable Development. Undersecretariat of Planning and Environmental Policy. Forest Direction. National Forest Statistics Program Anuario de EstadísticaForestalespeciesnativas. 2013 **http://www.ambiente.gov.ar/?idarticulo=12847**

Ministry of Agriculture, Livestock Production and Fishing. Undersecretariat of Agriculture. Forestry Production Direction. Economics and Information Area. Forest Industries. 2013 **http://www.minagri.gob.ar/new/0-0/forestacion/_archivos/_econo/industrias2013.pdf**

Criterion 7

Legal, institutional and economic framework for forest conservation and sustainable management

Selva Misionera region. Author Daniela García.

Parque Chaqueño region, Formosa. Author María José del Bó. Forest Direction, SAyDS.

Criterion 7:

Legal, institutional and economic framework for forest conservation and sustainable management.

Criterion Seven relates to the overall economic, legal, institutional, and policy environment of a country. This Criterion provides a context for the consideration of Criteria One to Six. Legislation, institutional capacity and economic arrangements, with associated policy measures at both national and sub-national levels, create an enabling environment for the sustainable management of forests. Reporting against these indicators contributes to raising public and political awareness of issues affecting forests and builds support for their sustainable management.

Indicator Assessment	
Information Quality	
Low	L
Average	A
High	H
Indicador Evolution	
Neutral	→
Positive	↑
Negative	↓
Insufficient Data	?

Indicator	Information Quality	Indicator Evolution
7.1.a. Legislation and polices supporting the sustainable management of forests.	H	
7.5.c. Monitoring, assessment and reporting on progress towards sustainable management of forests.	H	↑

7.1.a. Legislation and polices supporting the sustainable management of forests.

Rationale: This indicator provides information on legislation and policies, including regulations and programmes, which govern and guide forest management, operations and use. Legislation and policies designed to conserve and improve forest functions and values are prerequisite to achieving the sustainable management of forests.

Information Quality: H **Indicator Evolution:**

Selva Tucumano Boliviana or *Yungas* region. Author Alejandro Paez, Forest Direction, SAyDS.

Legal and institutional framework

The Argentine Republic has adopted a republican, representative and federal system of government (cf. National Constitution, article 1). Under that organization, provinces are autonomous entities, pre-existing relative to the Nation, and enjoying all the powers they have not expressly delegated to said nation. Moreover, they control all natural resources found in their territory (cf. National Constitution, article 124).

It should be pointed out that Administrative Law works at the local level, i.e., provinces retain for themselves the power to create their own local institutions and regulate them (cf. National Constitution, article 122). This is important because the regulation of licenses, permits and concessions is, based on the above, exclusively local. Likewise, at the provincial level, there are municipalities with a certain degree of autonomy —broadly speaking—, which carry out a certain level of policing activities concurrently with the province (cf. National Constitution, article 125).

National environmental regulatory framework

The 1994 reform of the National Constitution provided the National Government with the attribution of passing regulations to establish minimum budgets for environmental protection, without altering local jurisdictions (cf. National Constitution, article 41).

Thus, minimum budget laws determine the basic guidelines for environmental management which can be applied throughout the national territory, and represent the legal foundations on which a government policy is built as regards protection of the environment and sustainable development, defining priority areas for public management and the tools needed to achieve the goals set forth in that environmental policy.

Article 41 of the National Constitution refers to sustainable development and environmental damage. It creates a special system, which forbids financial compensation for environmental damages, and forces the legal entities or individuals responsible for those damages to take responsibility for restoration. "In-kind" restoration is the rule, and only exceptionally, in cases in which it is not possible, must the company or the individual pay a financial compensation.

Moreover, articles 121 and 124 establish that provinces are the domain holders of all natural resources existing in their territories, and, thus, have the power to exercise all rights related to that domain, including those related to use. In this way, provinces retain all powers not delegated by the National Constitution to the Central Government, and the powers they have expressly reserved for themselves (article 121).

Since the constitutional reform, laws on minimum budgets were passed in relation with different issues, such as industrial and utilities waste, urban solid waste, management and disposal of polychlorinated biphenyl (PCB) pollutants, public environmental information, water, glaciers, among others. The following are directly relevant to native forests.

In 2002, Law No. 25675 (General Environmental Law) was passed. It considers the minimum budgets needed to achieve a sustainable and adequate management of the environment, the preservation and protection of biological diversity, and the implementation of sustainable development. This is the first time in which a comprehensive concept is put forward: "The environment is the protected legal asset". Against this background, the provinces are entitled to regulate aspects foreseen in the national regulatory framework, and even improve on or outperform them, but never to violate them.

Law No. 25675 defines the principles of environmental policy at the national level, and also the minimum budgets and environmental damage. Moreover, it establishes precautionary measures for urgent cases and includes a special civil liability regime. It lists the tools of environmental policy and management, such as territorial planning, environmental education, environmental information, citizen participation and the Environmental Impact Assessments of the projects, as the best instrument to prevent or minimize what environmental damage they may cause.

The law regulates these instruments at a general level, establishing the institutional "framework" for all regulations, at the sector and general local levels. Thus, it defines the minimum requirements for the sectoral, provincial or municipal regime.

Moreover, it creates an inter-jurisdictional coordination system for the implementation of environmental policies at the national and regional level (article 1, section j), implemented through the Federal Environmental Council (COFEMA)[14], whose goal is the articulation of these policies between the central government, the provinces' governments, and the governments of the Autonomous City of Buenos Aires towards sustainable development. Particularly, in this context, the various jurisdictions have managed to build a consensus around the implementation of Law No. 26331.

Law No. 25831, passed in 2003, establishes a Regime of Free Access to Public Environmental Information, and defines the minimum environmental protection budgets needed to ensure the right to access environmental information held by the government, at the national, provincial and municipal levels, and also in the Autonomous City of Buenos Aires, and their relevant self-governed bodies and utilities companies of public, private or mixed ownership. It defines the parties bound by the law and the relevant procedures, including the procedure to follow if access to information is denied.

Law No. 26331 (on Native Forest Environmental Protection), passed in 2007, defines the minimum environmental protection budgets for the enrichment, restoration, conservation, harvest and sustainable management of native forests and of the environmental services they provide to society, that is, the tangible and intangible benefits created by native forest ecosystems, needed for the coexistence and survival of the natural and biological system as a whole.

14 The COFEMA was created in 1990 as legal entity under civil law in charge of coordinating the preparation of environmental policy between the provinces. It comprises 24 provincial agencies and one of its goals is the formulation of a comprehensive environmental policy, both for prevention and for correction, based on relevant diagnostics, and considering local, provincial, regional, national, and international scales. More information available at www.cofema.gob.ar

Nothofagus antarctica "ñire" forest, Neuquén. Author Pablo Oliveri, courtesy of UCAR-MAGyP.

National forest regulatory framework

Argentina has signed environmental treaties with Brazil, Bolivia, and Chile. In particular, it is necessary to mention that the Additional Specific Protocol for Forest-Related Cooperation between Argentina and Chile is currently in effect.

At the multilateral level, the country has ratified, among others, the Conventions on Biological Diversity, Climate Change, and Fight against Desertification, as well as the Convention on Wetlands of International Importance, especially as Waterfowl Habitat (Ramsar), and the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) (Table 47).

Moreover, Argentina is part of the FAO's Latin American and Caribbean Forestry Commission (LACFC), which it currently presides, and takes part in the meetings of the United Nations Forum on Forests (UNFF).

Argentina is a member of the Intergovernmental Panel on Climate Change (IPCC), and has a Climate Change Direction, created in 2003 under the Secretariat of Environment and Sustainable Development (SAyDS).

While the political framework as regards forest resources includes the Montreal Process' criteria and indicators, there are difficulties to obtain the data needed for a regular assessment of changes. Nevertheless, an improvement has been achieved in terms of information related to topics such as forest fires, which are important agents of forest ecosystems' degradation, coupled with the expansion of the agricultural frontier.

Tables 47, 48 and 49 show the main existing forest-related regulations, both at the provincial and the national level. In order to analyze the laws, regulations were classified in nine categories, as follows:

Preservation of the environment: this includes all regulations related to general aspects of the conservation of the environment, those which regulate the preparation of Environmental Impact Assessments, those referring to incentive programs for agencies in charge of protecting the environment, and those which ensure access to environmental information.
Conservation of natural resources: this considers all regulations aimed at the conservation of a specific natural resource, such as protected natural areas (for instance, reservations, parks, etc.), soil, water resources, fauna, flora, among others.
Plantation forests: this refers to those regulations whose main axes are the management and the development of plantation forests.
Native forests: this refers to all regulations aimed at the preservation, use and sustainable management of native forests.

Fire management: this includes all regulations aimed at preventing, controlling, using and managing fires in forest areas.

Health: this considers all regulations aimed at preserving plant health, both through the adequate use of agrochemicals and biocides, and through pest control.

Forests: this includes regulations affecting aspects linked to plantation forests and native forests as a whole.

Hygiene and safety: this includes all regulations linked to workplace safety and health.

Indigenous peoples: this includes all regulations related to indigenous peoples and tribal peoples.

National laws ratifying international treaties

Table 47

Sector	Law	Description
Conservation of natural resources	Law No. 21836	Convention concerning the Protection of the World Cultural and Natural Heritage.
Conservation of natural resources	Law No. 22344	Convention on Wetlands of International Importance. Vienna Convention for the Protection of the Ozone Layer.
Conservation of natural resources	Law No. 23918	Convention on the Conservation of Migratory Species of Wild Animals, adopted in Germany on June 13th, 1979.
Conservation of natural resources	Law No. 23919	Convention on Wetlands of International Importance.
Conservation of natural resources	Law No. 24375	United Nations' Convention on Biological Diversity.
Conservation of natural resources	Law No. 24701	ILO Convention 169, Concerning Indigenous and Tribal Peoples in Independent Countries.
Hygiene and security	Law No. 25739	Safety and Health in Agriculture Convention.
Preservation of the environment	Law No. 23724	Vienna Convention for the Protection of the Ozone Layer.
Preservation of the environment	Law No. 23778	Montreal Protocol on Substances that Deplete the Ozone Layer.
Preservation of the environment	Law No. 24295	United Nation Framework Convention of Climate Change.
Preservation of the environment	Law No. 25438	Kyoto Protocol.
Preservation of the environment	Law No. 25841	MERCOSUR Framework Agreement on the Environment.
Indigenous people	Law No. 24071	ILO Convention 169, Concerning Indigenous and Tribal Peoples in Independent Countries.
Health	Law No. 23922	The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal.
Health	Law No. 24425	Marrakech agreement, which establishes the WTO and its annexes, which include the Agreement on Sanitary and Phytosanitary Measures, the Agreement on Technical Barriers to Trade, and the Agreement on Trade-Related Intellectual Property Rights.
Health	Law No. 25278	Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade.
Health	Law No. 26011	Stockholm Convention on Persistent Organic Pollutants.

Source: Ministry of Agriculture, Livestock and Fisheries. Undersecretariat of Agriculture. Forestry Production Direction. Environmental Area.

National laws directly or indirectly related to forests

Table 48

Sector	Law	Description
Plantation forests	Law No. 13273	Defense of forest wealth.
Native forests	Law No. 24688	Andean-Patagonian Forests.
Native forests	Law No. 26331	Minimum budgets for native forest conservation.
Conservation of natural resources	Law No. 22351	Of national parks and reserves, and natural monuments.
Conservation of natural resources	Law No. 22421	Conservation of fauna.
Conservation of natural resources	Law No. 22428	Promotion of soil conservation.
Conservation of natural resources	Law No. 24702	The establishment of various species as natural monuments.
Conservation of natural resources	Law No. 25688	Regime of water environmental management.
Hygiene and security	Law No.19587 and regulatory decree 351/79.	Workplace hygiene and safety law: it establishes staff protection measures.
Fire management	Law No. 26815	Fire Management
Plantation forests	Law No. 24857	Afforestation. Fiscal Stability.
Plantation forests	Law No. 25080	Investments for plantation forests.
Plantation forests	Law No. 25509	Real right of forest area.
Plantation forests	Law No. 26432	Amendment and extension of Law No. 25080.
Preservation of the environment	Law No. 25675	General environmental law.
Preservation of the environment	Law No. 25831 (Official Gazette: 07/01/04)	Regime of free access to public environmental information.
Health	Decreto-Law No. 6704/63	Sanitary Defense.
Health	Law No. 24051	Of hazardous waste.
Health	Law No. 25612	Of comprehensive management of industrial and service activities' waste. It replaces Law No. 24051, but, pending ratification, Law No. 24051 and their regulatory decrees remain in effect.

Source: Ministry of Agriculture, Livestock and Fisheries. Undersecretariat of Agriculture. Forestry Production Direction. Environmental Area.

Nothofagus oblicua "roble pellín" plantation under the protection of *Pinus radiata* "pino insigne". Author Pablo Oliveri, courtesy of UCAR-MAGyP.

The information presented in Table 49 is an analysis of provincial laws related to the sustainable use of the environment as regards forestry activities. This analysis was based on a legal compilation of the digital digests, available on the Internet, of each province. Said compilation considers only regulation with the status of laws, and is available at the following link *http://area-ambiental-dpf.blogspot.com.ar/p/ordenamiento-ambiental.html*. It should be mentioned, as the digests are regularly updated, and some are even under construction, that the information presented was compiled up to February 24th, 2015.

Provincial laws related directly or indirectly to forests Table 49

Provinces	Plantation forests	Native forests	Preservation of the environment	Conservation of natural resources	Fire manage ment	Health	Forests
Buenos Aires	4	-	2	2	-	2	2
Catamarca	1	1	-	-	-	1	1
Chaco	2	2	1	1	-	1	5
Chubut	2	1	1	1	1	2	4
Córdoba	1	2	3	3	2	2	1
Corrientes	3	3	5	5	2	2	2
Entre Ríos	2	1	1	1	2	-	1
Formosa	2	1	2	2		2	2
Jujuy	3	3	1	1	1	-	1
La Pampa	1	5	2	2	4	2	2
La Rioja	1	1	1	1	1	-	1
Mendoza	2	1	1	1	2	1	1
Misiones	3	3	-	-	1	2	2
Neuquén	4	-	3	3	-	1	3
Río Negro	5	2	3	3	1	2	5
Salta	2	1	1	1	-	-	1
San Juan	3	1	4	4	1	3	-
San Luis	1	1	2	2	1	2	1
Santa Cruz	2	3	1	1	-	-	1
Santa Fe	1	2	1	1	-	-	2
Santiago del Estero	1	1	1	1	-	-	1
Tierra del Fuego	-	1	1	1	-	-	1
Tucumán	1	1	2	2	-	-	-

Source: Ministry of Agriculture, Livestock and Fisheries . Undersecretariat of Agriculture. Forestry Production Direction. Environmental Area.

Smallholder, Comandante Andresito, Misiones. Author Fernanda Alcobé.

Silvopastoral system with *Pinus taeda.* Author Pablo Oliveri, courtesy of UCAR-MAGyP.

Notwithstanding the above, the historical progress in terms of addressing the problems of native forest ecosystems was provided by Law No. 26331 of Minimum Budgets for the Environmental Protection of Native Forests, passed through Decree No. 91/2009.

Law No. 26331 of Minimum Budgets for the Environmental Protection of Native Forests

Law No. 26331 of Minimum Budgets for the Environmental Protection of Native Forests was passed in December, 2007. It establishes the minimum environmental protection budgets for the enrichment, restoration, conservation, harvest and sustainable management of native forests and the environmental services they provide to society. The National Application Authority is the SAyDS, while the Local Application Authorities are the agencies the provinces choose in each jurisdiction.

This law establishes the need to carry out the territorial planning of native forests through a participatory process, withholds authorization for clearing wooded areas until said planning is completed, turns environmental impact assessments and public hearings into a compulsory requisite for authorizing the clearing of wooded areas, and creates the National Native Forest Protection Program. Additionally, it establishes that all interventions in native forests must be subject to a conservation or sustainable management plan. As regards projects of native forest transformation, it is necessary for a land use change plan and the relevant environmental impact assessments to be approved.

Moreover, it creates a promotion regime and criteria for the distribution of the National Fund for the Enrichment and Conservation of Native Forests (FNECBN), for the environmental services they provide, the most important of which are water regulation, biodiversity conservation, soil and water quality conservation, greenhouse gas sequestration, the contribution to landscape diversification and beauty, and the defense of cultural identity.

The protection system created by the aforementioned law is somewhat complex, due to the nature of the area it regulates, the novel nature of the instruments used at the local level, and the institutional articulation needed between the relevant authorities. The key management instrument considered in the law is each jurisdiction's obligation to complete and approve (by law) the planning for all native forests in its territory, classifying forests based on their conservation value. Once completed, the plan has to be presented before the National Application Authority, in order for the jurisdiction to access the system's benefit. Lack of compliance with this obligation makes it impossible for the jurisdiction to grant permits relative to native forests.

The law of minimum budgets is now the most important tool to promote a forestry policy on native forests in the country.

Its passing launched a change process, with countless challenges, such as the weakness of the agencies in charge of implementing it, which reveal the urgent need of carrying out institutional strengthening efforts.

In this sense, it is necessary to develop the capabilities of the Forest Direction (DB) of the Undersecretariat of Planning and Environmental Policy, as the agency in charge of executing the Native Forest Protection Program (Chapter 4, Law No. 26331), and also of the provincial

application authorities, and the inter-institution coordination mechanisms, so as to achieve an adequate level of articulation with all sectors involved in the management and conservation of Argentine native forests.

Local application authorities have received specific funds from the general government to strengthen the relevant areas, and Law No. 26331 establishes the provision of funds for the activities it is responsible for, as per the mechanism established in Article 35.

National Fund for the Enrichment and Conservation of Native Forests

The National Budget allocates funds to the implementation of Law No. 26331 for 2010, 2011, 2012, 2013, 2014 and 2015.

The budget funds allocated annually to the minimum budgets law are used to provide financial assistance for the Native Forest's Territorial Planning (OTBN) (Article 6), to the FNECBN (Articles 30 and 35), to the National Native Forest Protection Program (PNPBN) (Article 36), and to pay for plans under the Experimental Native Forest Management and Conservation Program (SAyDS' Resolution No. 256/09).

National Budget funds allocated to native forests

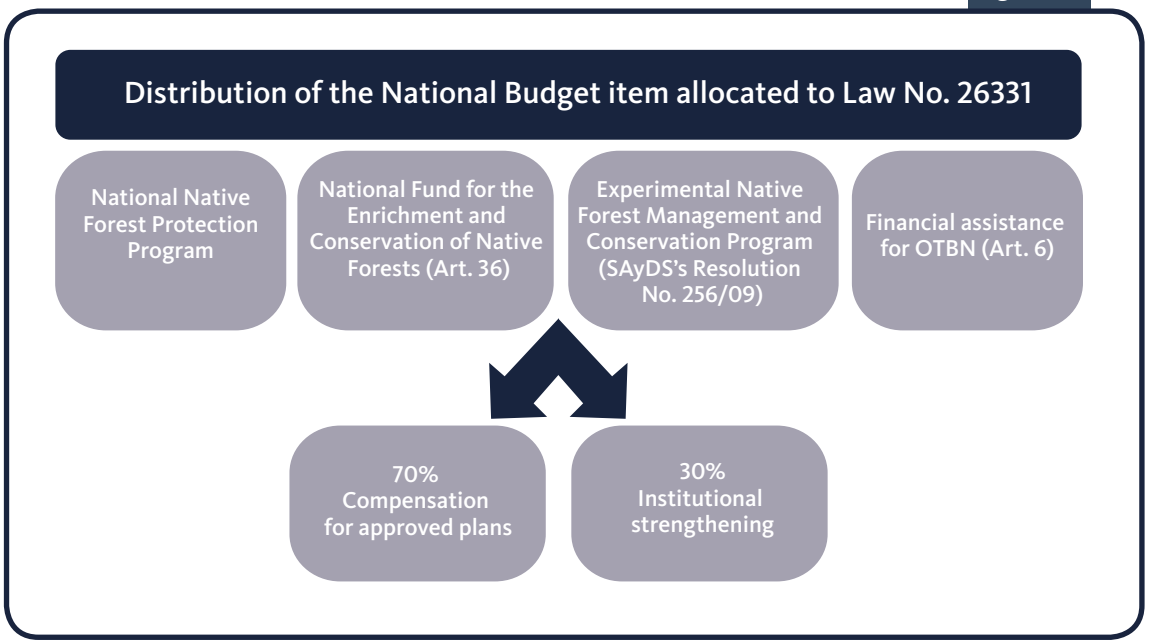
Table 50

Year	Budget funds allocated to Law No. 26331 (in ARS)
2010	300000000
2011	300000000
2012	300085190
2013	253000000
2014	247043707
2015	246450000

Source: Secretariat of Environment and Sustainable Development. Undersecretariat of Planning and Environmental Policy. Forest Direction.

Distribution of the National Budget funds allocated to Law No. 26331

Figure 13



The FNECBN's is distributed annually among those provinces whose OTBN has been approved by provincial law and ratified by the National Application Authority. For the annual distribution among provinces, the COFEMA has established a distribution methodology based on the native forest area in each jurisdiction, the relation between the aforementioned area and the province's total area, and the conservation categories established as per Article 32 of National Law No. 26331. The application of this distribution methodology for the FNECBN in the successive procedures implemented since 2010 in each jurisdiction with a ratified territorial plan is formalized year after year through a COFEMA Resolution.

National Budget items allocated to the National Fund for the Enrichment and Conservation of Native Forests

Table 51

Year	Funds allocated to the FNECBN (in ARS)	COFEMA Resolution No.
2010	94563095	199/2010
2011	230000000	211/2011
2012	245467244	229/2012*
2013	218735000	243/2013
2014	222000000	277/2014

* COFEMA Resolution No. 229/2012 does not include the funds allocation table for the amounts allocated to the FNECBN to the provinces as the other resolutions. Instead, it commands the SAyDS to distribute them.

Source: Secretariat of Environment and Sustainable Development. Undersecretariat of Planning and Environmental Policy. Forest Direction. Native Forest's Territorial Planning (OTBN) Area, based on the OTBN prepared by the provinces.

Table 51 shows the funds allocated to the FNECBN, unlike Table 50, which also includes the amounts allocated to financial assistance for the preparation of the OTBN, to the National Native Forest Protection Program, and to the payment of plans under the Experimental Native Forest Management and Conservation Program. In 2010, part of the budgetary funds was reallocated by the Office of the Chief of the Cabinet of Ministers to other purposes, so the administrative process of distribution and transfer to the provinces could not be completed.

National Native Forest Protection Program

On October 10th, 2012, the Project Document / Review A of Project ARG/12/013 "Support for the Implementation of the National Native Forest Protection Program" was signed between the Undersecretariat of Planning and Environmental Policy of the Secretariat of Environment and Sustainable Development of the Office of the Chief of the Cabinet of Ministers, the Secretariat for International Coordination and Cooperation of the Ministry of Foreign Affairs, International Trade, and Worship, and the United Nations' Development Programme.

The project's overall goal is to contribute to native forest conservation and sustainable management, by means of strengthening Law No. 26331's National Application Authority and the implementation of the National Native Forest Protection Program created by the law.

In order to meet the project's overall goal, and as a part of the strategy, activities were structured around four products: (1) Mechanisms of articulation, developed and in operation, between actors related to the implementation of Law No. 26331; (2) Knowledge management efforts, designed and implemented; (3) Developed monitoring and control mechanisms for the implementation of Law No. 26331; (4) Strengthened National Application Authority for Law No. 26331, and defined and agreed-upon institutional design, in order for it to meet the missions and functions stemming from the law.

Provincial environmental regulatory framework

As was mentioned before, the provinces supplement the minimum budgets laws, reserving the management of local administrative law, so they pass specific regulations as regards these resources and retain policing powers.

Now, Article 6 of Law No. 26331 requires each jurisdiction to prepare a Native Forest Territorial Planning (OTBN) for all native forests in its territory, through a participatory process and based on environmental sustainability criteria mentioned in the relevant annexes. This is the framework under which native forest interventions are carried out and to which lower-level regulations should be adjusted.

Based on the observed sustainability criteria, the following conservation categories are established:

Category I

Very-high conservation value sectors, which should not be transformed nor subjected to forestry uses. Activities which do not alter conservation attributes are permitted.

Category II

Sectors with medium conservation value, which should not be cleared. They can be subjected to sustainable use, tourism, gathering and scientific research.

Category III

Low conservation value sectors, which can be subjected to total or partial transformation.

As a requirement to access the benefits of the National Fund for the Enrichment and Conservation of Native Forests, jurisdictions must have an OTBN approved by provincial law (article 32 of Law No. 26331).

As of now, 22 provinces have completed their OTBN and secured approval by provincial law. These are the provinces which have approved their OTBN, and the relevant administrative act:

- Catamarca: Provincial Law No. 5311 (09/09/2010)
- Chaco: Provincial Law No. 6409 (24/09/2009)
- Chubut: Provincial Law No. XVII-92 (17/06/2010)
- Córdoba: Provincial Law No. 9814 (05/08/2010)
- Corrientes: Provincial Law No. 5974 (26/05/2010)
- Entre Ríos: Provincial Law No. 10284 (28/03/2014)
- Formosa: Provincial Law No.1552 (09/06/2010)
- Jujuy: Provincial Law No. 5676 (14/04/2011)
- La Pampa: Provincial Law No. 2624 (16/06/2011)
- La Rioja: Provincial Law No. 9188 (partial veto) (26/06/2012)
- Mendoza: Provincial Law No. 8195 (14/07/2010)
- Misiones: Provincial Law No. XVI – No. 105 (02/09/2010)
- Neuquén: Provincial Law No. 2780 (09/11/2011)
- Río Negro: Provincial Law No. 4552 (08/07/2010)
- Salta: Provincial Law No. 7543 (16/12/2008)
- San Juan: Provincial Law No. 8174 (11/11/2010)
- San Luis: Provincial Law No. IX-0697-2009 (16/12/2009)
- Santa Cruz: Provincial Law No. 3142 (17/08/2010)
- Santa Fe: Provincial Law No. 13372 (11/12/2013)
- Santiago del Estero: Provincial Law No. 6942 (17/03/2009)
- Tierra del Fuego: Provincial Law No. 869/12 (25/04/2012)
- Tucumán: Provincial Law No. 8304 (24/06/2010)

Table 52 and Chart 37 show the data on total native forest area and area by conservation category taken from each jurisdiction's OTBN. These data refer to the jurisdictions which approved their OTBN by provincial law, with the exception of the provinces of Entre Ríos, whose OTBN is being assessed by the Forest Direction, and La Rioja, whose OTBN is yet to be submitted to the SAyDS.

"Chiflón" *Syrigma sibilatrix*. *Parque Chaqueño*. Author María José del Bó, Forest Direction, SAyDS.

Selva Misionera region, Campo Ramón, Misiones. Author Daniela García.

Native Forest area submitted by the Local Application Authority, by conservation category

Table 52

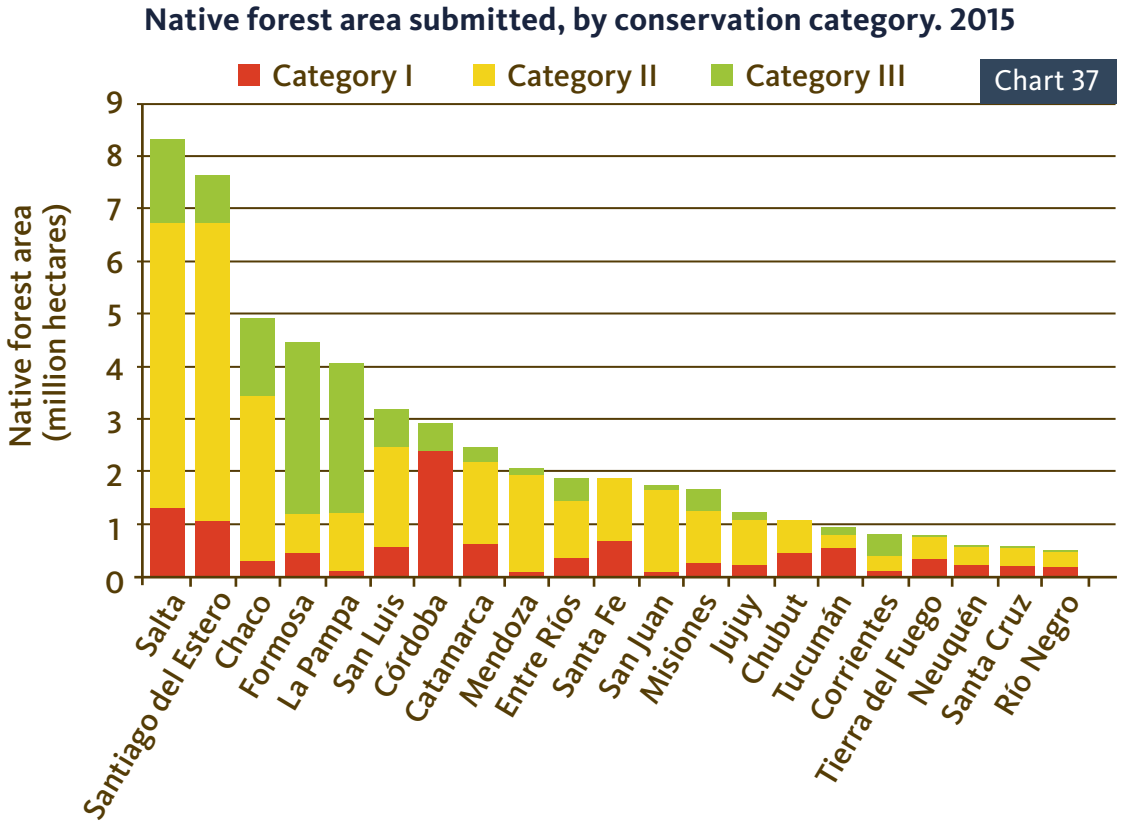
P rovince	Total (ha)	By conservation category					
		Red (I)		Yellow (II)		Green (III)	
		ha	%	ha	%	ha	%
Total	51232298	9716255	19	30713961	60	10802082	21
Catamarca	2433682	587123	24	1543593	63	302.966	12
Chaco	4920000	288038	6	3100387	63	1531575	31
Chubut	1052171	419351	40	613324	58	19496	2
Córdoba	2923985	2393791	82	530194	18	-	-
Corrientes	770319	63840	8	292251	38	414228	54
Formosa	4387269	409872	9	719772	16	3257625	74
Jujuy	1208943	213152	18	832334	69	163457	14
La Pampa	3996107	38518	1	3029760	76	927829	23
Mendoza	2034188	82613	4	1800595	89	150980	7
Misiones	1638147	223468	14	967192	59	447487	27
Neuquén	543917	192686	35	347672	64	3559	1
Río Negro	478900	181900	38	252700	53	44300	9
Salta	8280162	1294778	16	5393018	65	1592366	19
San Juan	1745401	71557	4	1603171	92	70673	4
San Luis	3152630	526962	17	1887363	60	738305	23
Santa Fe	1853791	663520	36	1190271	64	-	-
Santa Cruz	523818	180569	34	343249	66	-	-
Santiago del Estero	7644449	1046172	14	5645.784	74	952493	12
Tierra del Fuego	733907	311707	42	401918	55	20282	3
Tucumán	910512	526638	58	219413	24	164461	18

Source: Secretariat of Environment and Sustainable Development. Undersecretariat of Planning and Environmental Policy. Forest Direction. Native Forest Territorial Planning Area, based on the Native Forest Territorial Planning prepared by the provinces.

Parque Chaqueño region. Courtesy of Forest Direction, SAyDS.

Selva Tucumano Boliviana or *Yungas* region. Courtesy of Forest Direction, UMSEF, SAyDS.

Parque Chaqueño region, Formosa. Author María José del Bó. Forest Direction, SAyDS.

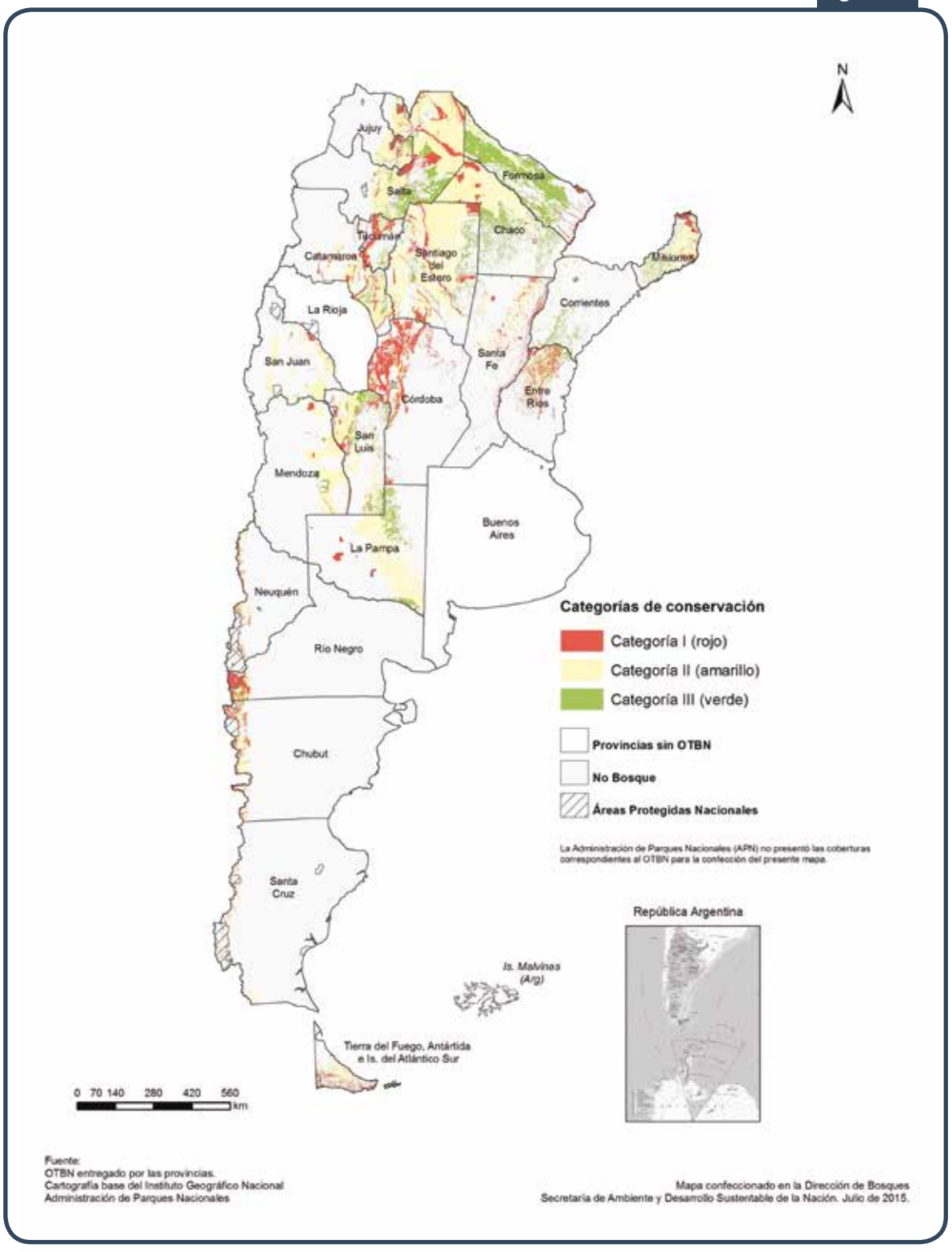


Source: Secretariat of Environment and Sustainable Development. Undersecretariat of Planning and Environmental Policy. Forest Direction. Native Forest Territorial Planning Area and Communication and Control Area.

The following map shows the regional distribution of the aforementioned categories:

Native Forest's Territorial Planning of Argentina. 2014

Figure 14



All native forest interventions must be part of a plan, as per articles 16 and 17 of Law No. 26331 and article 9 of Regulatory Decree No. 91/09.

Conservation categories impose certain restrictions to the use of native forests, limiting or prohibiting some activities. The different types of plans establish the activities to carry out in the various conservation categories mentioned above.

70% of the FNECBN allocated to the provinces is distributed among the "pooled beneficiaries" of lands covered by native forests and legal entities or individuals which the province guarantees have legal land tenure of the relevant lands and are able to implement plans under Law No. 26331, and who submit Conservation Plans (CP), Sustainable Management Plans (MP) or Formulation Projects (FP, which comprise financing for the preparation of both types of plans), authorized by the Local Application Authority. Soil Use Change Plans are not financed under this Fund.

Local Application Authorities are responsible for approving or rejecting plans submitted to them, after organizing a call for the presentation of the aforementioned plans.

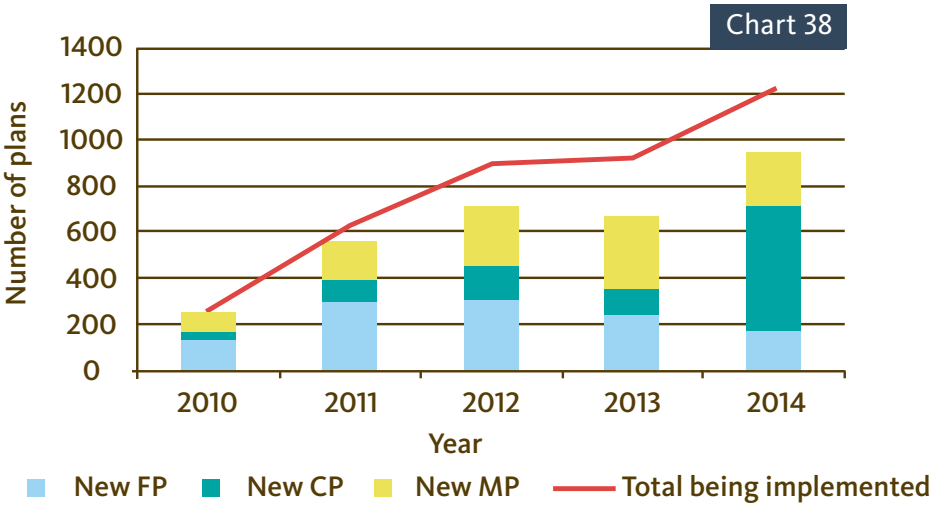
It should be mentioned that some native forest interventions fall outside the FNECBN, either because they are not among the priorities established by the Local Application Authorities or because they are managed by areas other than those directly linked to funds distribution. However, the contents and requirements of all interventions, regardless of their status as regards the FNECBN, fall under Law No. 26331, and so must meet the minimum budgets thereby considered.

The remaining 30% is used for institutional strengthening, for monitoring native forests in each jurisdiction, and for the implementation of technical and financial assistance programs for small producers, indigenous communities and/or farmer communities.

Chart 38 shows the number of plans financed by year under the law in the 2010-2014 period. Bars represent the number of new plans (approved and executed) for each year, and the line represents the number of existing plans in the same period. This includes all new plans and plans submitted in previous years, through the successive Annual Operating Plans.

Number of Management Plans (MP), Conservation Plans (CP), and Formulation Projects (FP) per year for the 2010-2014 period

Chart 38



Source: Secretariat of Environment and Sustainable Development. Undersecretariat of Planning and Environmental Policy. Forest Direction. Native Forest Territorial Planning Area and Communication and Control Area.

National plantation forest regulatory framework

Law No. 25080 of Promotion of Investment in Plantation Forests, managed by the Ministry of Agriculture, Livestock and Fisheries' (MAGyP) Forestry Production Direction (DPF), promotes forestry activity since 1999, supporting forestry investments so as to increase timber supply through the implementation of new afforestations and encourage the installation of new forestry-industrial projects and the scaling-up of existing projects through financial and fiscal benefits. This law was modified in 2008 by Law No. 26432, which extended for a period of ten years, and amended Article 4. As per said article's provisions, within the context of this law, plantation forests are those "…created through planting native and/or exotic wood-producing species, ecologically-adapted to the site, for mainly commercial or industrial purposes, in lands which, for their natural conditions, locations and adequacy can be subjected to afforestation or reforestation as per the Native Forest's Territorial Plan, ratified by provincial law pursuant to Law No. 26331 of Minimum Budgets for the Environmental Protection of Native Forests", and the projects submitted in this context must meet the requirements included in Law No. 26331.

Law No. 25080 is a "provincial endorsement" law, that is, it applies only in provinces which expressly endorse its regime, through the passing of a provincial law, which must expressly invite municipalities to pass the relevant endorsement regulations through their legislative bodies.

The national policy of promotion of afforestation aims at boosting the industry by means of providing non-refundable financial support covering 80% of plantation costs and improvement of degraded native forests. It also includes the possibility of providing financial support for pruning, thinning, and regrowth management, equivalent to a refund of 70% of the estimated costs. These values are defined for each region through the Cost Resolution in effect in the year in which the project was requested. Fiscal benefits, in turn, comprise tax rebates, exemptions,

Pinus taeda plantation. Author Pablo Oliveri, courtesy of UCAR-MAGyP.

Eucalyptus grandis seedlings. Author Pablo Oliveri, courtesy of UCAR-MAGyP.

and deferrals. Moreover, endeavors covered by the regime have the possibility of requesting the benefit of fiscal stability for periods ranging from 30 to 50 years.

Plantation forests are promoted by using the best seeds and seedlings available, in cooperation with the National Seed Institute (INASE), and forestry practices of pruning, thinning, regrowth management and native forest improvement are used to encourage an adequate use of those seeds and seedlings. In this sense, based on Resolution No. 102/10, projects carried out with forestry reproductive species labeled as "Selected" or higher (as per the minimum requirements approved by the INASE's Resolution No. 207/09), receive a 10% increase in non-refundable financial support.

Table 53 shows the amounts financed through forestry projects since the date in which the law went into effect.

Amounts approved by years as per Law No. 25080

Table 53

Year	Approved amount (ARS)
2000	949869
2001	519519
2002	0
2003	23398261.13
2004	11028711.63
2005	24215469.61
2006	26683213.42
2007	42713701.45
2008	48668022.70
2009	83090998.63
2010	84572284.20
2011	81161981.65
2012	149795080.16
2013	99999934.84
2014	122335597.05
TOTAL	799132644.85

Source: Ministry of Agriculture, Livestock, and Fisheries. Undersecretariat of Agriculture. Forestry Production Direction.

Pinus taeda plantation, Corrientes. Author Pablo Oliveri, courtesy of UCAR-MAGyP.

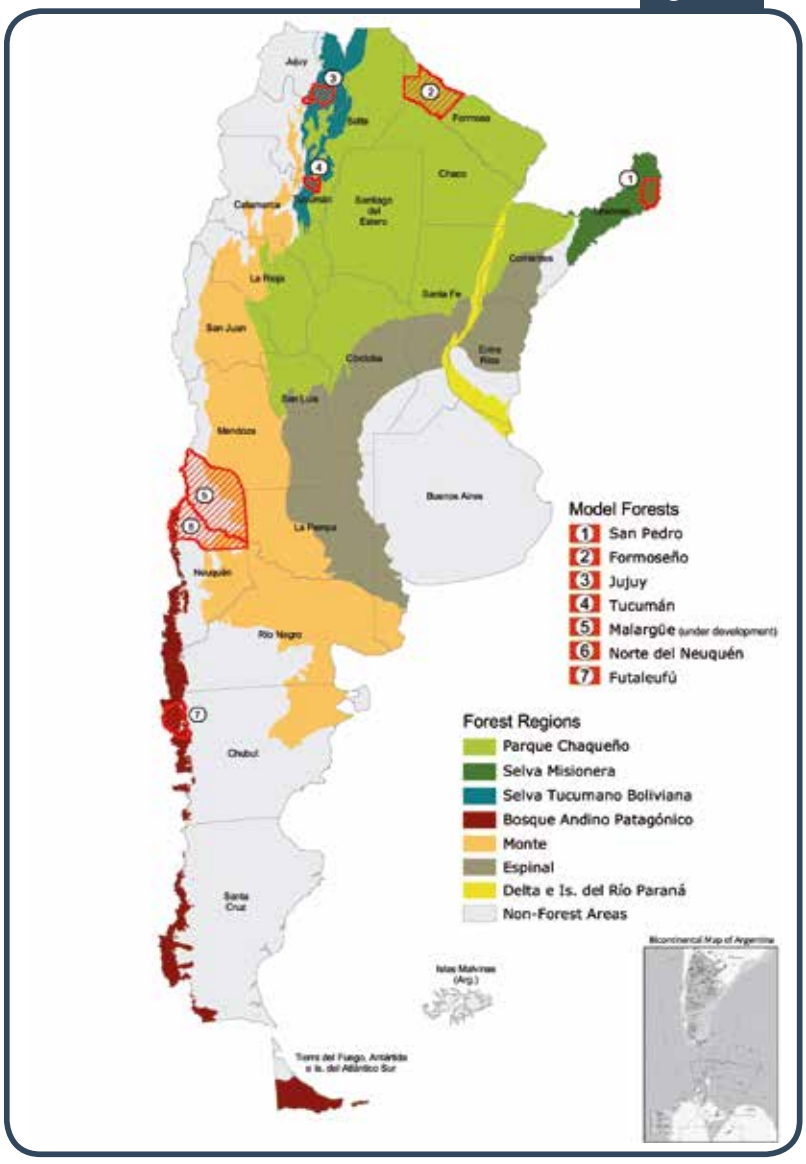
Case Study

Participatory development of local criteria and indicators: the case of the National Network of Model Forests in Argentina

The National Network of Model Forests' Initiative on Criteria and Indicators (C&I) for Sustainable Forest Management is a landscape-scale application of the Montreal Process and the framework of Principles and Attributes of the International Model Forest Network. Through the involvement of a broad spectrum of key actors from the territories, 31 indicators were constructed at the local level, organized into 6 criteria.

Argentine Model Forests (Figure 15) are defined as "associations of wills, which, in agreement, plan and manage sustainable development models for forest ecosystems, with the main goal of improving the quality of life of marginalized or poor communities". The National Network of Model Forests (RNBM) considers C&I to be a key tool to successfully implement this management system, in which different actors, with different interests, build a shared vision on needs in terms of use and conservation of natural resources. The monitoring of indicators provides relevant information, readily understandable by the community, about the impact of planning and management decisions.

Argentine Model Forests Figura 15



Source: National Model Forest Program. Forest Direction. Secretariat of Environment and Sustainable Development. Cartography: Forest Assessment System Management Unit. Forest Direction. Secretariat of Environment and Sustainable Development. (2015).

Case Study

Against this background, the local C&I Initiative of the RNBM aims at:

• Building, through a participatory process, a common C&I framework of sustainable forest management for the implementation of a monitoring and evaluation system of the Model Forests of the National Network, under the principles and attributes of the International Model Forest Network, the Montreal Process, and advances achieved at the national level.

• Strengthening local capabilities for active participation in the process of development and implementation of Sustainable Forest Management C&I for Argentine model forests.

• Contribute to knowledge management as regards C&I a the local, national and international levels, and also to the orientation of policies aimed at improving the management of forest resources.

The construction process started to take shape in the Global Model Forest Forum, held at the Tropical Agricultural Research and Higher Education Center (CATIE) in 2005. With the support of the Canadian Forest Service and the Canadian Model Forest Network, participatory workshops were organized at the level of the RNBM, coupled with local workshops at each Model Forest [15]. The key aspect at the center of this experience is the creation of spaces to enable participation by a broad range of local actors.

The "National Network of Model Forests' Initiative on Criteria and Indicators (C&I) for Sustainable Forest Management", established in 2010, is the result of this collective construction. This tool comprises 6 criteria and 31 indicators, based on the experience and knowledge of the members of each Model Network (Table 54). The process' results were shared with the Ibero-American Model Forest Network.

Model Forest of the province of Tucumán. Author Mónica Gabay.

Model Forest of the province of Formosa. Author Noel Carlos Paton.

15 More information at www.ambiente.gob.ar/default.asp?IdArticulo=9116.

Case Study

Criteria and Indicators of Sustainable Forest Management for Model Forests

Table 54

Criterion	RNBM Indicators	Match with Montreal Process' Indicators (grey: indicators measured by Argentina)
1. Conservation of biological diversity	1.1. Area by type of vegetation	1.1.a Area and percent of forest by forest ecosystem type, successional stage, age class, and forest ownership or tenure
	1.2. Area of protected areas in IUCN categories	1.1.b Area and percent of forest in protected areas by forest ecosystem type, and by age class or successional stage
	1.3. Effectiveness in management of protected natural areas	1.2.c Status of on site and off site efforts focused on conservation of species diversity
2. Maintenance of status and productive capacity of forest ecosystems	2.1. Area of forests used to produce wood and/or non-wood forest products	2.a Area and percent of forest land and net area of forest land available for wood production
	2.2. Area of forests affected by destructive processes or agents	3.a Area and percent of forests affected by biotic processes and agents (e.g., disease, insects, invasive alien species) beyond reference conditions 3.b Area and percent of forest affected by abiotic agents (e.g., fire, storm, land clearance) beyond reference conditions
	2.3. Area of forests used to produce wood and/or non-wood forest products under responsible forest management regimes	No match
	2.4. Area by type of vegetation, classified by main use	2.c Area, percent, and growing stock of plantations of native and exotic species
3. Conservation and maintenance of soil and water resources	3.1. Area of forests designated primarily for soil- and water-protection purposes over total area designated primarily for soil- and water-protection purposes	4.1.a Area and percent of forest whose designation or land management focus is the protection of soil or water resources

Case Study

	3.2. Existence of landscape-scale planning which takes into account the use and conservation of soil and water resources, based on the drainage basin approach	4.2.a Proportion of forest management activities that meet best management practices or other relevant legislation to protect soil resources 4.3.a Proportion of forest management activities that meet best management practices, or other relevant legislation, to protect water related resources
	3.3. Area of land with significant erosion issues	4.2.b Area and percent of forest land with significant soil degradation
	3.4. Area under land-use change which could lead to changes in surface runoff	
4. Multiple benefits for society	4.1. Amount of primary wood forest products extracted, by type and species	2.d Annual harvest of wood products by volume and as a percentage of net growth or sustained yield 6.1.a Value and volume of wood and wood products production, including primary and secondary processing.
	4.2. Number of direct beneficiaries by type of project developed by Model Forests	6.3.c Resilience of forest- dependent communities 6.3.d Area and percent of forests used for subsistence purposes 6.3.e Distribution of revenues derived from forest management
	4.3. Percentage ratio of areas based on land tenure regime	7.3. Clarity and security of land and resource tenure and property rights
	4.4. Identification, maintenance and respect of traditional cultural practices and sites	6.5.a Area and percent of forests managed primarily to protect the range of cultural, social, and spiritual needs and values
	4.5. Number of direct jobs in the forest sector	6.3.a Employment in the forest sector
	4.6. Percentage of primary forest production locally industrialized	6.1.a Value and volume of wood and wood products production, including primary and secondary processing

Case Study

	4.7. Area of forests used for recreation and tourism	6.4.a Area and percent of forests available and/or managed for public recreation and tourism
	4.8. Existence and implementation of education and awareness-raising campaigns for the community on key aspects of sustainability of natural resources	6.2.b Annual investment and expenditure in forest-related research, extension and development, and education 6.5.b The importance of forests to people
	4.9. Gross Geographic Product (GGP) of the Model Forest area, by sector	6.1.a, 6.1.b, 6.1.c, 6.1.f, 6.1.g, 6.1.h
5. Legal, institutional and economic framework for forest conservation and sustainable management	5.1. Existence of laws and regulations promoting sustainable forest management, and their effectiveness	7.1.a Legislation and policies supporting the sustainable management of forests 7.3.b Enforcement of laws related to forests
	5.2. Detailed Model Forest annual budget	7.2.a Taxation and other economic strategies that affect sustainable management of forests 7.4.a Programmes, services and other resources supporting the sustainable management of forests
	5.3. Annual executed government budget, broken down by jurisdiction, for activities related to sustainable forest management in Model Forests	
	5.4. Management capabilities of the forest-related provincial authorities	7.1.b Cross sectoral policy and programme coordination
	5.5. Number and type of producers' organizations	7.5.b Public participation and conflict resolution in forest-related decision making
6. Governance and networking	6.1. Degree of participation in the development of the Model Forest strategic plan a. Approval of the strategic plan by board members, and percentage of participants over total board members b. Validation of the strategic plan by Model Forest's partners, detailing	7.5.a Partnerships to promote the sustainable management of forests 7.5.b Public participation and conflict resolution in forest-related decision making

Case Study

the participation methodology and the percentage of participants over total members	
6.2. Relation between the objectives of the Model Forest's strategic plan and plans and/or programs from other jurisdictions (e.g., national, provincial and local government; National, Ibero-American and International Model Forest Networks; international agreements)	7.5.a Partnerships to promote the sustainable management of forests 7.5.b Public participation and conflict resolution in forest-related decision making 7.5.c Monitoring, assessment, and reporting on progress towards sustainable management of forests
6.3. Type and degree of consistency of implementation and monitoring mechanisms of the Model Forest's strategic plan (e.g., annual plans describing the contributions and responsibilities of stakeholders in specific activities, as well as monitoring and evaluation systems)	
6.4. Type, number and frequency of communication and dissemination activities by the Model Forest	No match
6.5. Type and number of cooperation actions among Model Forests	7.5.a Partnerships to promote the sustainable management of forests
6.6. Model Forest's composition, by type of partner: a. percentage of members by sector (public, private, civil society and academic spaces) over total organizations dealing with issues related to the concept of Model Forests with a presence in the Model Forest's territory b. degree to which the Model Forest's composition in terms of members' sector is reflected in the board's composition	7.5.a Partnerships to promote the sustainable management of forests 7.5.b Public participation and conflict resolution in forest-related decision making

Source: Forest Direction - National Model Forest Program (2010), National Network of Model Forests' Initiative on Criteria and Indicators for Sustainable Forest Management.

The RNBM is currently working to prepare a report with 2013-2014 measurements. Figures 39 and 40 show examples of the indicators' measurement. These results will make it possible to adjust the indicators' profiles and advance towards the estimation of some reference values and goals which are yet to be achieved.

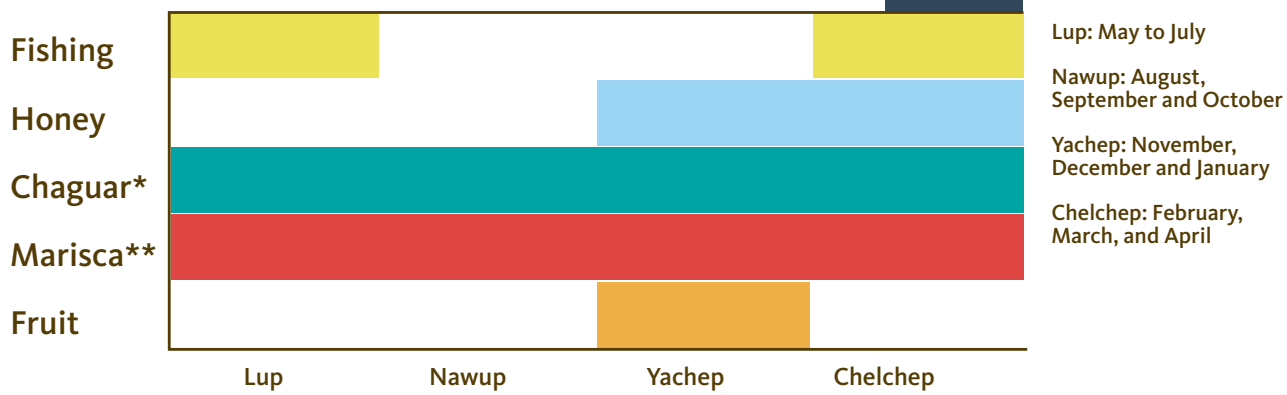
Case Study

Measurement of Indicator 4.4 on traditional cultural practices and sites

Indicator 4.4. Identification, maintenance and respect of traditional cultural practices and sites The Wichi people, from the west of the province of Formosa, is a hunter-gatherer culture, with cycles based on their own calendar, which can be applied throughout their territory:

Activities based on the Wichi calendar

Chart 39

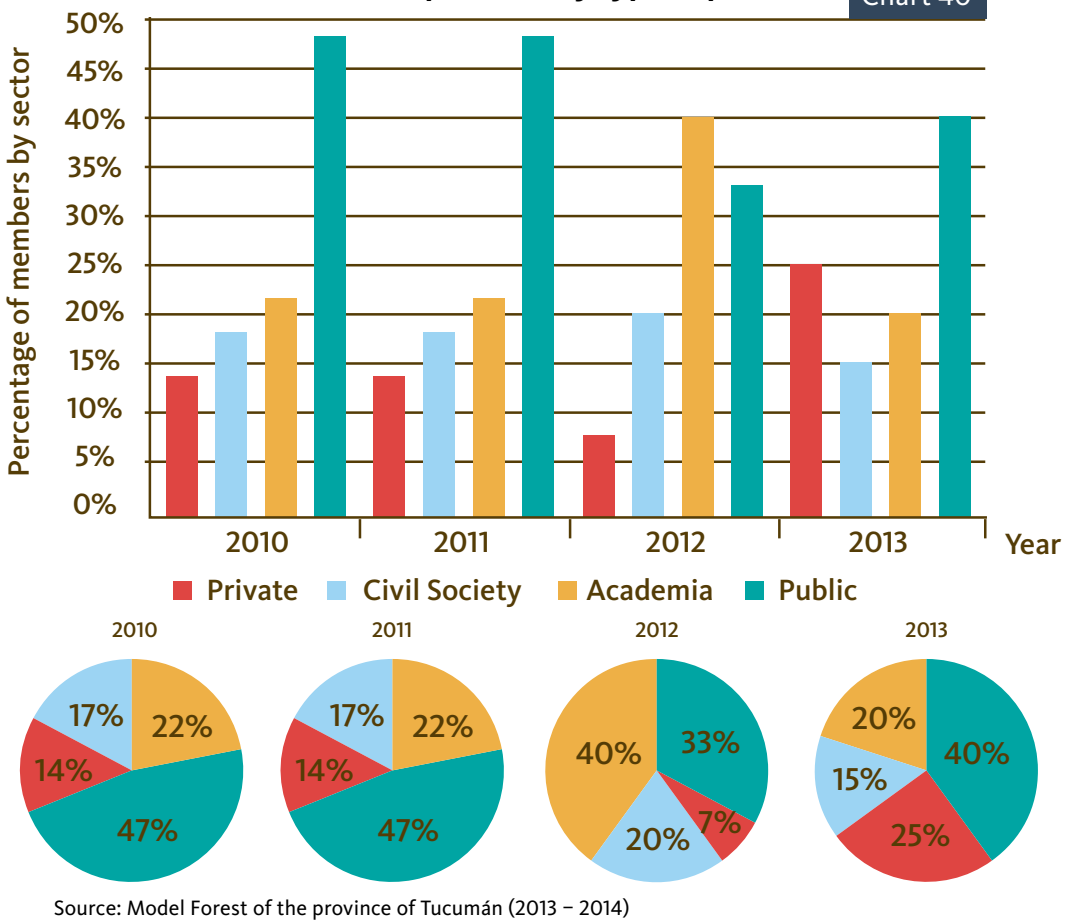


*Chaguar: Quechua term that describes a group of bromeliads native to the Chaco that provide fiber for textiles.
**Marisca: refers to a traditional mode of hunting and gathering various animal or plant species
Source: Model forest of the province of Formosa (2013 – 2014).

Measurement of Indicator 6.6 on Model Forest integration

Model Forest's composition, by type of partner

Chart 40



Source: Model Forest of the province of Tucumán (2013 – 2014)

7.5.c. Monitoring, assessment and reporting on progress towards sustainable management of forests.

Rationale: This indicator provides information on the capacity to monitor, assess and report on forests. An open and transparent monitoring and reporting system that provides up-to-date and reliable forest-related information is essential for informed decision making, in generating public and political awareness of issues affecting forests, and in the development of policies to underpin the sustainable management of forests.

Information Quality: H **Indicator Evolution:** ↑

Inventory of forest plantations in the province of Mendoza. Author Natalia Acosta.

The MAGyP's DPF manages the implementation of Law No. 25080 of Investments for Plantation Forests (extended and amended by Law No. 26432) and the analysis of the various issues surrounding forestry production at the national level.

In this sense, the DPF has three areas in charge of monitoring plantation forests in the country, whose functions are detailed below.

Promotion Area

The Promotion Area is in charge of the analysis and technical management of forestry projects under Law No. 25080. The tasks and practices involved in primary production in relation to the aforementioned forestry promotion law can be tracked based on the information systems the law creates, which have registries of producers, professionals and projects. These are a basic prerequisite to the reception of government benefits.

The forestry law's project analysis and management task is completed with an inspection of plantations, aimed at monitoring and verifying them, but also at keeping technicians in direct and permanent contact with the sector and with the various technological alternatives under implementation.

Both the technical assessment of forestry plans and the contribution to the preparation of forestry-specific regulations for the law's enforcement are carried out based on bibliographical reviews and consultations with professionals specialized in the various issues, and also on consultations with regional technicians from the different provinces. The technicians at the National Agricultural Technology Institute (INTA) and their field work represent the main source of information. There is also link to different education institutions, aimed at learning about their work and their views.

The experience acquired over the stages of this process led to the preparation and permanent amendment of the

regulations of the law, which over the years has modified its approach and the specificity of the treatment and analysis of the various projects, following the evolution of implemented technologies and the changes that took place in the forestry sector's goals.

Geographic Information System and Forest Inventory Area

In the mid-1990's, the Geographic Information System (GIS) and Forest Inventory Area was created under the Forestry Production Direction (DPF), with the main goal of monitoring plantation forests throughout the national territory, using a growing number of remote-sensing tools and techniques and GIS, the use of which grew exponentially in those years.

The gradual adoption of these new technological tools made it possible for the DPF to effectively manage the operations of Law No. 25080 of Investments for Plantation Forests, the product of which was a large geographical database, a GIS which currently includes all areas which have received benefits under the aforementioned law. The GIS and Forest Inventory Area, through Framework Convention No. 50/96, signed by the National Space Activities Commission, (CONAE), and the former Secretariat of Agriculture, Livestock, Fisheries and Food, (MAGYP), created between 1998 and 2001 a bank with approximately 1200 Landsat 5 TM and Landsat 7 ETM satellite images, covering the areas with plantation forests in Argentina.

Images were processed and georeferenced with the accuracy needed to analyze forest plans submitted in order to receive the benefits of Law No. 25080 and the various activities carried out in the area.

Currently, the DPF has access to images captured by the French SPOT satellite, which increase the analysis capabilities thanks to the spatial and spectral resolution they provide.

Moreover, field surveys, which are a major source of information, supplement the data gathered through the aforementioned remote sensors. An information storage system was implemented in a spatial database. This technological leap is conducive to integrity, traceability, data mining, and mainly an efficient management of information. As regards forest inventories, the GIS Area, based on its experience and knowledge, was in charge of receiving and auditing the information generated through the First National Inventory of Plantation Forests (INPF)

Populus sp. "álamo" plantations with oat pastures, 4th Island Section, District of Campana, province of Buenos Aires. Author Pablo Oliveri, courtesy of UCAR-MAGyP.

and of creating a database. Plantation forest inventories are currently being prepared in the provinces of Mendoza and Entre Ríos, which will be followed by other forestry-relevant provinces.

In line with the dynamics of the technology applied to geomatics, new spatial information analysis protocols related to forest monitoring systems are being implemented, which enable a quick update of forest cartography and the preparation of the defined analysis and their corresponding reports.

Economics and Information Area

The compilation and analysis of information related to forest products, industrial forestry activities and forest fires, as regards plantation forests, take place within the DPF, through the Economics and Information Area.

The area's operational objectives are the production of information which can be then used to plan the development of forestry activities, and for that information to be relevant to the achievement of system sustainability, both from an economic and a social perspective.
This is achieved by means of:

• Defining unified methodologies for the compilation, processing and analysis of forest information, which includes the establishment of homogeneous standards, definitions and classifications, aimed at ensuring the compatibility of information at the national, provincial and international level.

• Searching for, processing and disseminating basic statistical and economic data, as regards plantation forests

in the primary or timber sectors, in the productive or industrial sector, and in the tertiary sector related to foreign trade and the services linked to the comprehensive use of the plantation forests.

• Disseminating specific publications, articles, statistics, and economic indicators.

• Being part of the National Statistical System, through the National Statistical System.

Activities of the Economics, and Information Area:

Forest planting costs:
Forest planting costs are prepared and annually updated, by species and province, based on the established densities. Moreover, base price information for inputs, wages and machinery is processed to update the costs.

Prices:
The national price series for seeds, seedlings and reproductive material, roundwood, chips, sawnwood, tongue-and-groove boards, and boards are updated.

A quarterly newsletter is prepared with international prices for construction wood, fencing, pulp and forestry lands; forestry services prices, by species, in the main regions in the country; prices of forestry machinery.

Forestry Sector Publication:
As regards basic provincial information and other sources, an annual Forestry Sector publication is prepared, with data on the extraction of forest products at the provincial level, by species and type of product, and also on the national apparent consumption of roundwood.

Forestry Industries Publication:
The Forestry Industries publication is prepared based on annual survey of 150 industries with specific forms. This publication includes information on the number of industries, installed capacity, personnel, raw material use, and production for all industries related to the forestry sector: pulp and paper, boards, laminated wood, impregnation, and resin extraction.

Foreign Trade Publication:
All information on Argentine trade in forest products, taken from the National Institute of Statistics and Censuses (INDEC) is processed to prepare the Foreign Trade publication about forest products imports and exports. It contains information classified by tariff nomenclature, countries, economic blocs, and customs office of entry and exit. These publications are available at: www.minagri.gob.ar/new/0-0/forestacion/index.php?seccion=comercio_exterior

FAO (Food and Agriculture Organization of the United Nations) – Yearbook:
The Argentine Forestry Sector Statistics are prepared for the FAO's Yearbook of Forest Products. The documentation requested by the FAO on sector production and marketing is submitted annually and is included in the international statistical yearbook of forest products.

FRA (Global Forest Resources Assessment) - FAO:
The questionnaires on plantation forests for the preparation of national information tables under the FRA are completed. The professional who works as a correspondent before the FAO for the FRA works in this area.

INDEC (National Institute of Statistics and Census):
Forest sector statistics on plantation forests are prepared for the INDEC, and are included in the Argentina Yearbook prepared by that body.

Montreal Process:
Area staff is part of the national working group of the Montreal Process. Data on plantation forests are provided to build different indicators, which are then used to prepare the national report.

Forest fires:
The specific function of the Ministry of Agriculture, Livestock and Fisheries (MAGyP) in this area is aimed at creating awareness among producers and training them, in order for them to implement preventive silvicultural actions in plantations and to organize themselves for early detection and control of fires at their point of origin.

The current legal framework is Law No. 25080 of Investments for Plantation Forests, extended by Law No. 26432, Regulatory Decree No. 133 and Resolution No. 700/99, which encourages the creation of consortiums of forestry producers aimed at preventing and fighting forest fires.

Annual statistics on fires in plantation forests are prepared at the national level. That information is broken down by province, department, number of sources of fire, area, affected species, and causes. In provinces with georeferenced data, the GIS area of the DPF prepares maps with the location of identified sources of fires.

Moreover, this indicator covers the various activities carried out at the Forest Direction of the Secretariat of Environment and Sustainable Development to ensure the criterion's implementation:

Eucalyptus grandis seedling. Author Pablo Oliveri, courtesy of UCAR-MAGyP.

Forest Assessment System Management Unit

The Forest Assessment System Management Unit (UMSEF) is a working group within the Forest Direction (DB) of the Secretariat of Environment and Sustainable Development (SAyDS), created in 2001, pursuant to one of the goals of the First National Inventory of Native Forests (Native Forest Project – IBRD Loan 4085-AR), namely, to strengthen the institution's operational capacity. The UMSEF comprises a Technical Coordinator and three technical modules: the Remote-Sensing and Geographic Information System Module, the Geographic Information System Cartography Module, and the Biometrics and Forest Inventory Module, the main goals of which are to generate, analyze, store and disseminate reliable data and information as regards native forests in Argentina, so as to keep an up-to-date database on native forest resources. In this sense, the UMSEF monitors native forests in order to identify, quantify, and follow up over time natural and/or anthropogenic processes which modify the structure and/or extension of natural forest ecosystems, using mainly remote sensing techniques, and a Geographic Information System. Between 1998 and 2006, native forest area was monitored every four years, but since the Law of Minimum Budgets for the Environmental Protection of Native Forests, passed in November, 2007, monitoring is done annually. Based on this work, reports are prepared using the results obtained, including thematic cartography at the relevant provincial and regional level, which are published at the SAyDS's website (www.ambiente.gob.ar/umsef). In the last few years, the forest regions under analysis are *Parque Chaqueño, Selva Tucumano Boliviana, Selva Misionera* and *Espinal*, as they have the greatest impact in terms of native forest area change in the last 20 years. In turn, the UN-REDD[16] Programme requires the regular publication of this information in a GIS WEB portal, aimed at making this information more accessible and transparent.

The basic information needed to monitor native forest area in the Argentine Republic is taken from the cartography of the First National Inventory of Native Forests (PINBN). The PINBN was performed between 1998 and 2006, under the Native Forests and Protected Areas Project (IBRD 4085-AR), by an Argentine-Canadian Consortium, and covered the six forest regions of Argentina: *Monte, Espinal, Parque Chaqueño, Selva Misionera, Selva Tucumano Boliviana* and *Bosque Andino Patagónico*. With the exception of the *Monte* region, which was only monitored in terms of area, the remaining regions, besides the area monitoring, included a dasometric data field sampling. Results are presented in regional reports and annexes with the data from the inventory (www.ambiente.gob.ar/?idarticulo=316). The operational manuals detailing the methodology used to prepare the inventory are also published.

Currently, due to the fact that Law No. 26331 is in effect, coupled with the dynamic nature of the use and substitution of native forests, which requires administrations, both national and provincial, to take urgent measures to protect and adequately manage their resources, it is necessary to secure up-to-date and systematic information

16 The UN-REDD Programme is the United Nations collaborative initiative on reducing emissions from deforestation and forest Degradation in developing countries. The Programme was launched in 2008 and builds on the convening role and technical expertise of the Food and Agriculture Organization of the United Nations (FAO), the United Nations Development Programme (UNDP) and the United Nations Environment Programme (UNEP).

on those resources, which implies having a set of forest inventories repeated at regular intervals. For that reason, the SAyDS, through the DB, the UMSEF, and using the support provided by the Regional Nodes, has among its projects the preparation of a Second National Inventory of Native Forests, which would provide the foundations for a future National Inventory Program. Based on the experience and the knowledge acquired during the PINBN, some modifications are being proposed to the original design. The new inventory's basic design includes a 10 km x 10 km orthogonal grid, in which each intersection point covering a forest area to be included in the inventory is surveyed. In order to make field work easier, the proposal is to de-centralize said activities in regional nodes or administrative units, which are to be sampled periodically, every five years, in order to record dasometric variables (species, diameter, height, sanitary status, regeneration, etc.). Moreover, there is a proposal to include other environmental variables in the basic design, such as fauna, non-wood forest products, and environmental services, among others. All results will be presented in regional reports, besides the preparation of the database for the information from sampling units, and new thematic cartography created, and published online.

National Forest Statistics Program

The National Forest Statistics Program (PNEF) is in charge of preparing forest statistics, and develops a Forest Statistics Information System, which includes the production of statistics which are reliable, adequate and timely for sustainable development.

The participation of PNEF´s working group takes place in the context of implementation and analysis of the guidelines of Law No. 26331 of Minimum Budgets for the Environmental Protection of Native Forests, and its Regulatory Decree (No. 91) covers the following aspects:

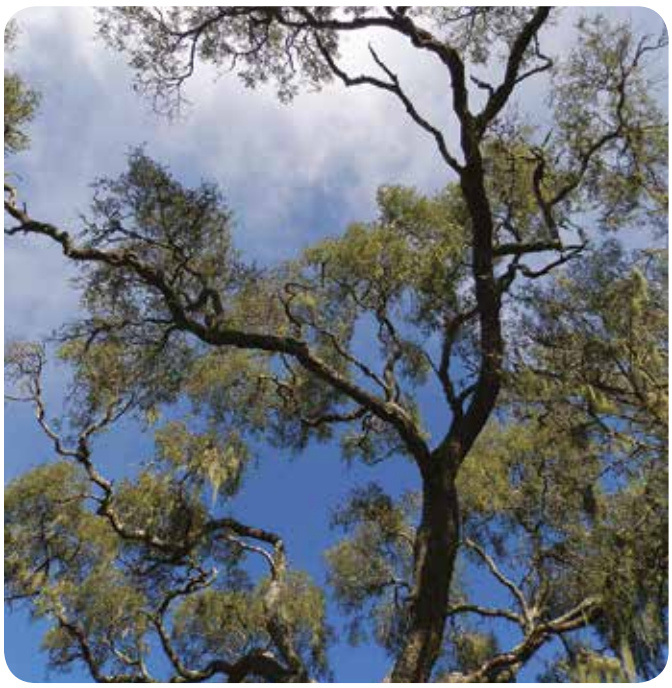
Article 12

• To promote sustainable forest management for categories II and III through the establishment of Sustainable Forest Management Criteria and Indicators, adjusted to each environment and jurisdiction.

• To promote the cooperation and information harmonization between equivalent institutions from different jurisdictions, and with the Application Authority.

Article 35

• To develop and maintain a monitoring network and information systems for native forests.



Aspidosperma quebracho-blanco. Copo National Park. Santiago del Estero. Author Natalia Acosta.

The PNEF prepares annual publications on an ongoing basis, which make it possible to provide basic information to achieve a better knowledge of forests, in order to contribute to their sustainability in the future. (www.ambiente.gov.ar/?idseccion=42).

• Forest Statistics Yearbook: This publication aims at providing information to increase knowledge of native forests and their production, and also to contribute to decision-making in the future, in order to achieve a more sustainable forest management.

• Forest Statistics Series: This publication provides historical information on the main forestry indicators: primary forest products, charcoal and wooden sleepers, forest industries, non-wood forest products, international trade, and forest fires.

• Forest Fire Statistics: This publication provides information on the number of forest fires, classified by cause (negligence, intentional, natural, and unknown), area affected by type of vegetation (native and plantation forests, grasslands, and shrublands).

• Forest Regions: Primary Production: This provides regional forest information, aimed at increasing knowledge on our country's forests and forest regions. This is a tool used to define national policies related to the forest sector, and it is also useful to manage and make decisions needed to advance towards sustainable forest development.

• Forest Products International Trade: This publication analyzes the behavior of the Argentine trade balance in the last few years, the evolution of forest exports, and the share of the forestry sector in total exports. It also includes the behavior of exporting industries.

• The PNEF has been the national counterparty to the FAO project's implementation.

• Strengthening of the national capabilities of Southern Cone countries for the monitoring, assessment, and reporting on the progress achieved in terms of sustainable forest management through the development, use, and implementation of criteria and indicators – TCP/RLA/3203.

• The PNEF has contributed to the implementation of the Forest Administration, Control and Verification System (SACVefor).

Forest Administration, Control and Verification System

Project IBRD 7520-AR piloted in some provinces of *Parque Chaqueño* ecoregion the project known as Forest Administration, Control and Verification System (SACVefor), with the goal of carrying out, efficiently and effectively, the tasks of managing, controlling and verifying the use and trade of forest products, from the approval and control of activities in woodland areas, to the processing, transport and final destination of the products, ensuring traceability and an increase in the processes' transparency.

The SACVefor covers the whole supply chain. It will be computer-based and will also afford the possibility of reconciling volumes in different points in the chain.

Besides, the system will contribute to the fight against deforestation and degradation of native forests, together with the commitment to the promotion of sustainable forest management in Argentine native forests.

Integrated Forest Information System

Within the framework of systematizing available forest information and that information needed for adequate planning and decision-making, it has been attempted, on different instances, to implement an Integrated Forest Information System, in which all relevant variables are linked to each other and work harmoniously, as is necessary for the preparation of these systems.

In a historical analysis, first carried out by the National Forestry Institute (IFONA), through a World Bank

Model Forest of the province of Formosa. Author Mónica Gabay.

Project related to the Forest Information System, and then through the Secretariat of Agriculture, Livestock and Fisheries' development of the Integrated Agricultural Information System (SIIA), an attempt was made to systematize the forest sector as a component of the agricultural system.

Lastly, the "Native Forests and Biodiversity" Project (IBRD 7520-AR), within the "Native Forest Assets Information and Monitoring" component, implemented a Subcomponent called "Integrated Forest Information System".

Project UNDP ARG/12/13 ("Support to the implementation of the Native Forest Protection Program"), finally, implemented the aforementioned system, which will prove useful for officials and users in general, as it will provide timely access to the elements needed to develop and design public policies.

Another type of indicator about progress towards native forest sustainable management refers to the implementation of Law No. 26331, which creates the PNPBN under the DB of the SAyDS (see indicator 7.1.a for more information).

Annexes

Eucalyptus sp. plantations. Author Pablo Oliveri, courtesy of UCAR-MAGyP.

Annex 1

Supplementary regulations to Law No. 26331 of Minimum Budgets for the Environmental Protection of Native Forests

The following resolutions have been passed under the SAyDS and the COFEMA, conducive to the effective and adequate implementation of Law No. 26331:

• **SAyDS Resolution No. 256/2009,** which creates the Experimental Native Forest Management and Conservation Program.

• **SAyDS Resolution No. 450/2009,** which modifies Resolution No. 256/2009, which creates the Experimental Native Forest Management and Conservation Program.

• **SAyDS Resolution No. 514/2009,** which enables the National Registry of Offenders created by Law No. 26331.

• **SAyDS Resolution No. 944/2011,** which allocates funds from the National Fund for the Enrichment and Conservation of Native Forests from the 2011 budget to finance plans approved under SAyDS Resolution No. 256/09.

• **SAyDS Resolution No. 1279/2012,** which allocates funds from the National Fund for the Enrichment and Conservation of Native Forests from the 2012 budget to finance plans approved under SAyDS Resolution No. 256/09.

• **SAyDS Resolution No. 393/2013,** which authorizes documents to be presented by the provinces as regards exports of palo santo (*Bulnesia sarmientoi*).

• **SAyDS Resolution No. 585/2014,** which establishes that only non-harmful extraction authorizations for exports of *Bulnesia sarmientoi* and all related products are to be issued, based on sustainable management plans, as long as the requesting parties meet the requirements of SAyDS Resolution No. 393/2013.

• **SAyDS Resolution No. 826/2014,** which establishes the requirements for the presentation of management and conservation plans for native forests, for the reception of funds, and for accountability thereof. It replaces, since its approval, Resolution No. 282/2012 of the Office of the Chief of the Cabinet of Ministers.

• **Resolution No. 282/2012,** of the Office of the Chief of the Cabinet of Ministers, which establishes the accountability system for projects developed under SAyDS Resolution No. 256/09, and also for management and conservation plans financed under Law No. 26331.

• **COFEMA Resolution No. 189/2010,** which requires the National Application Authority to set aside resources from the National Fund for the Enrichment and Conservation of Native Forests from the 2010 budget, for financing plans duly approved under Resolution No. 256/09.

• **COFEMA Resolution No. 199/2010,** Distribution of the National Fund for the Enrichment and Conservation of Native Forests for 2010.

• **COFEMA Resolution No. 200/2010,** which requires the National Congress to carry out the actions needed for the 2011 National Budget to include the total amount of the funds mentioned in Law No. 26331, under the National Fund for the Enrichment and Conservation of Native Forests.

• **COFEMA Resolution No. 203/2010,** which provides for the new allocation of funds from the National Fund for the Enrichment and Conservation of Native Forests for 2010.

• **COFEMA Resolution No. 211/2011,** Distribution of the National Fund for the Enrichment and Conservation of Native Forests for 2011.

• **COFEMA Resolution No. 213/2011,** which creates a working group, comprising the National Application Au-

thority, and all Local Application Authorities, under the Federal Environmental Council (COFEMA), so as to prepare a proposal for the implementation and the ratification of National Fund for the Conservation of Native Forests of Article 36 of Law No. 26331.

• **COFEMA Resolution No. 218/2011,** which extends the deadline for the presentation of Native Forest Management and Conservation Plans.

• **COFEMA Resolution No. 219/2011,** which creates an ad-hoc commission, under the COFEMA, aimed at preparing a proposal to include unauthorized felling, cutting and/or clearing of native forests as criminal acts in the Criminal Code.

• **COFEMA Resolution No. 223/2011,** which declares "Manual de Bosques Nativos: un aporte a la Conservación desde la Educación Ambiental. Provincia de Mendoza" (Native Forest Handbook: a Contribution to Conservation from Environmental Education. Province of Mendoza) to be of federal environmental interest.

• **COFEMA Resolution No. 224/2011,** which ratifies the amounts allocated before.

• **COFEMA Resolution No. 225/2011,** which requires the National Congress to carry out all actions needed for the 2012 National Budget Law to include the total amount mentioned in Law No. 26331 of Minimum Budgets.

• **COFEMA Resolution No. 229/2012,** which approves the Guidelines for General Procedures, Law No. 26.331.

• **COFEMA Resolution No. 230/2012,** which approves the document prepared in the Native forest workshop for provincial technicians and authorities.

• **COFEMA Resolution No. 231/2012,** which requires the Permanent Advisory Commission on Legislative Affairs to analyze regulatory projects for the ratification of the National Fund for the Conservation of Native Forests.

• **COFEMA Resolution No. 236/2012,** which approves the document "Pautas metodológicas para las actualizaciones de los Ordenamientos Territoriales de los Bosques Nativos" (Methodological standards for the update of the Native Forest's Territorial Planning).

• **COFEMA Resolution No. 243/2013,** Distribution of the 2013 National Fund for the Enrichment and Conservation of Native Forests.

• **COFEMA Resolution No. 244/2013,** which provides for the reservation of the 2013 funds for the provinces of Corrientes and Córdoba specified in the tables presented before the Assembly, which are funds provided under Law No. 26331.

• **COFEMA Resolution No. 255/2013,** which suggests the SAyDS to establish new deadlines for presentation, and a final calendar for pending accountability-related presentations.

• **COFEMA Resolution No. 258/2013,** Formal presentation before the budget commissions in the Senate and the National Chamber of Deputies about the urgent need to take the necessary measures to progressively increase the budgetary resources allocated annually to the Program of Minimum Budgets for the Environmental Protection of Native Forests, starting with the 2014 budget.

• **COFEMA Resolution No. 262/2013,** which provides an extension for the reservation of funds for the province of Corrientes.

• **COFEMA Resolution No. 264/2013,** which states the need of criminalizing behaviors that lead to the destruction or damages of native forests protected under Law No. 26331 of Minimum Environmental Budgets.

• **COFEMA Resolution No. 277/2014,** implements the Fund's distribution and general procedures and minimum contents of the sustainable management and conservation plans.

Annex 2

Provincial Laws which ratify national Laws No. 25080 and No. 26432

• **Buenos Aires:** Provincial Law No. 12443, endorsement of National Law No. 25080.
Provincial Law No. 14227, endorsement of National Law No. 26432.

• **Catamarca:** Provincial Law No. 4977, endorsement of National Law No. 25080.

• **Chaco:** Provincial Law No. 4604, endorsement of National Law No. 25080.
Provincial Law No. 6314, endorsement of National Law No. 26432.

• **Chubut:** Provincial Law XVII-No. 61 (formerly, Law No. 4580), endorsement of National Law No. 25080.
Provincial Law XVII-No. 91, endorsement of National Law No. 26432.

• **Córdoba:** Provincial Law No. 8855, endorsement of National Law No. 25080.

• **Corrientes:** Provincial Law No. 5340, endorsement of National Law No. 25080.
Provincial Law No. 5890, endorsement of National Law No. 26432.

• **Entre Ríos:** Provincial Law No. 9243, endorsement of National Law No. 25080.
Provincial Law No. 9953, endorsement of National Law No. 26432.

• **Formosa:** Provincial Law No. 1301, endorsement of National Law No. 25080.

• **Jujuy:** Provincial Law No. 5146, endorsement of National Law No. 25080.
Provincial Law No. 5790, endorsement of National Law No.26432.

• **La Pampa:** Provincial Law No. 1883, endorsement of National Law No. 25080.
Provincial Law No. 2517, endorsement of National Law No. 26432.

• **La Rioja:** Provincial Law No. 6751, endorsement of National Law No. 25080.
Provincial Law No. 8702, endorsement of National Law No. 26432.

• **Mendoza:** Provincial Law No. 6745, endorsement of National Law No. 25080.
Provincial Law No. 8432, endorsement of National Law No. 26432.

• **Misiones:** Ley Provincial VIII-37 (Law No. 3585), endorsement of National Law No. 25080.
Ley Provincial VIII-60 (Law No. 4521), endorsement of National Law No. 26432, Investment for Plantation Forests.

• **Neuquén:** Provincial Law No. 2288, endorsement of National Law No. 25080.
Provincial Law No. 2694, endorsement of National Law No. 26432.

• **Río Negro:** Provincial Law No. 3314, endorsement of National Law No. 25080.
Provincial Law No. 4476, endorsement of National Law No. 26432.

• **Salta:** Provincial Law No. 7025, endorsement of National Law No. 25080.
Provincial Law No. 7660, endorsement of National Law No. 26432.

• **San Juan:** Provincial Law No. 6965, endorsement of National Law No. 25080.
Provincial Law No. 8230, endorsement of National Law No. 26432.

• **San Luis:** Provincial Law VIII-0249, endorsement of National Law No. 25080.

• **Santa Cruz:** Provincial Law No.2531, endorsement of National Law No. 25080.

• **Santa Fe:** Provincial Law No. 11768, endorsement of National Law No. 25080.
Provincial Law No. 13320, endorsement of National Law No. 26432.

• **Santiago del Estero:** Provincial Law No. 6466, endorsement of National Law No. 25080.
Provincial Law No. 7016, endorsement of National Law No. 26432.

• **Tucumán:** Provincial Law No. 7021, endorsement of National Law No. 25080.

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