

Protecting Mountain Biodiversity

IPROMO (Italy)

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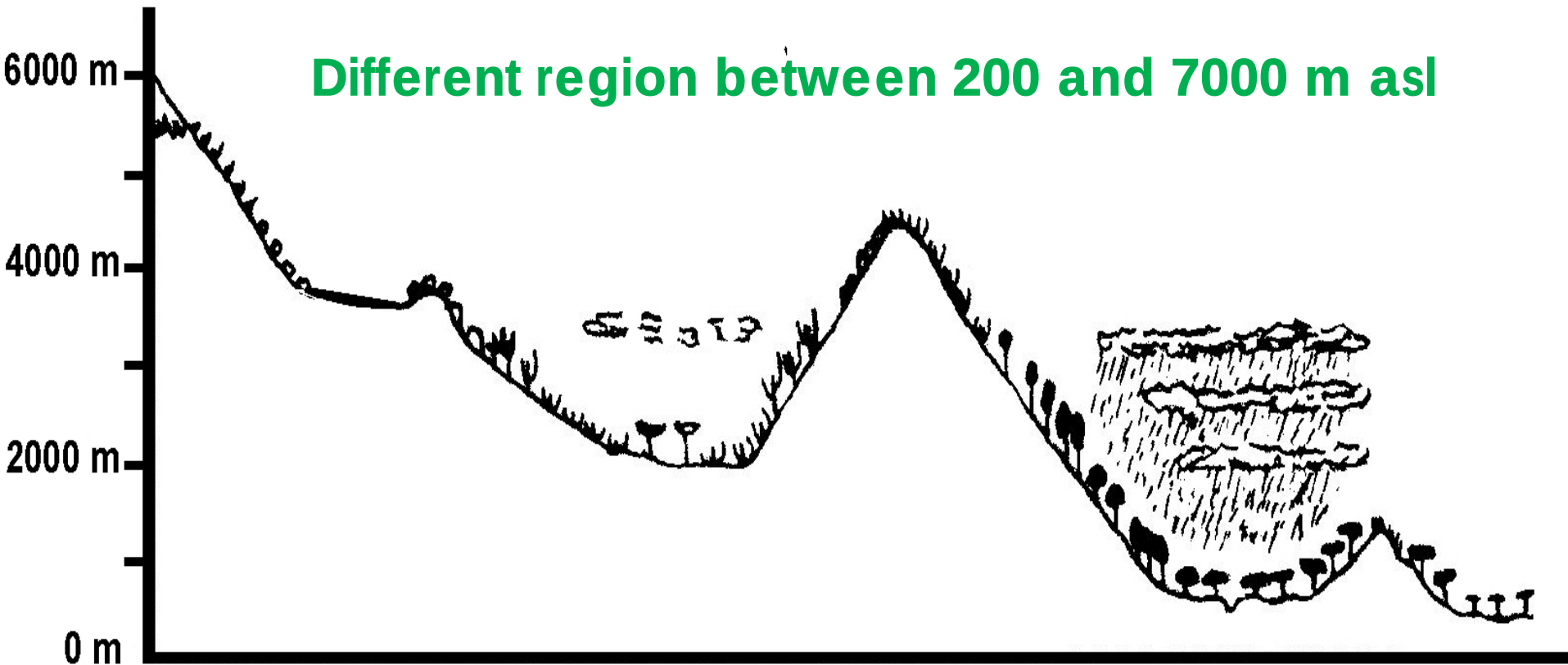
Argentinean Northwest (21° - 32° S)



Tucumán

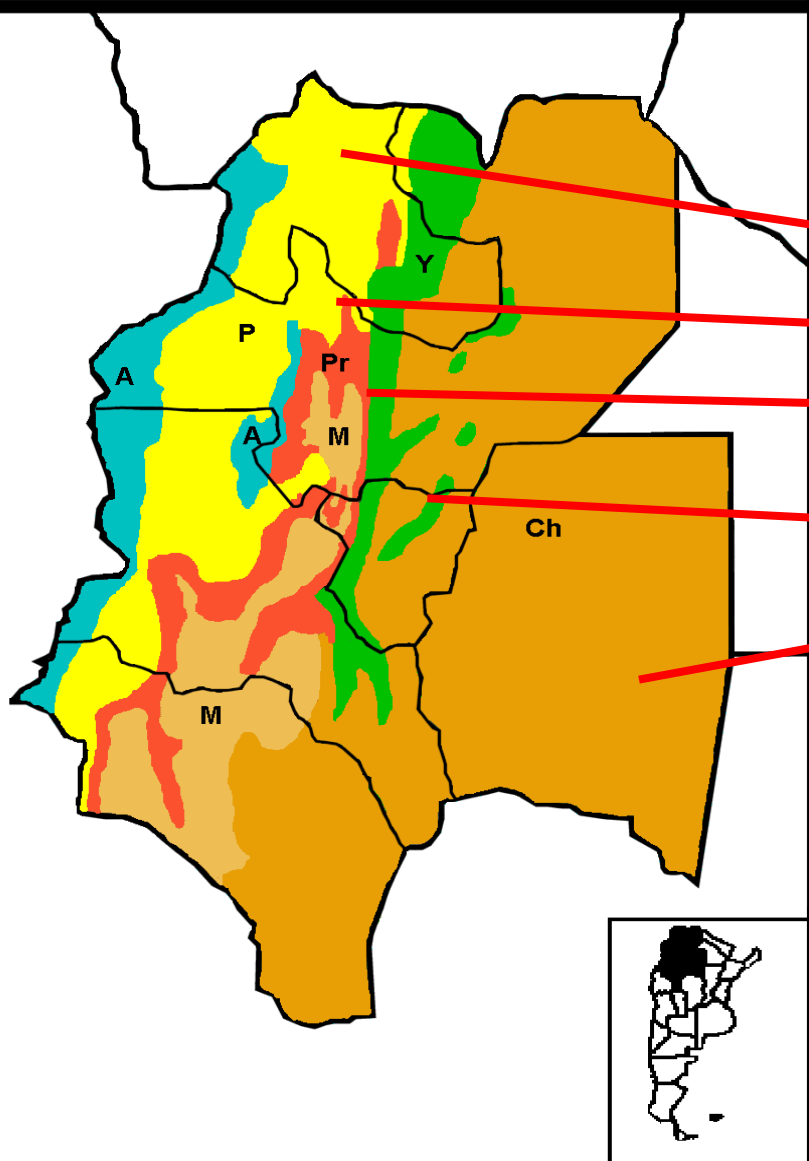


Altitudinal levels and vegetation in the Argentinean Northwest Region



"Chaco" vegetation (> 200 m asl)	Cloud forest (1,500 – 3,000 m asl)
"Selva basal" (400 – 700 m asl)	Prepuna, Puna (> 3,000 m asl)
Mountain forest (700 – 1,500 m asl)	High andean vegetation (> 4,200)

Biogeographical Regions



High Andean region

Puna

Prepuna

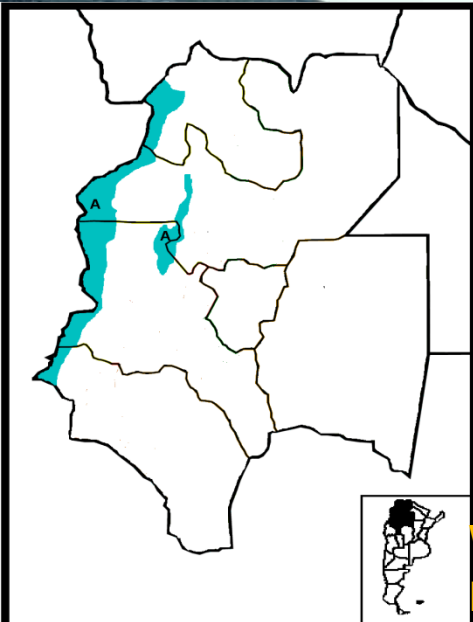
Monte

Yungas (Rain Forest)

Chaco

From High Andean mountain (near 7,000 m asl)

Ojos del Salado volcano (border with Chile)



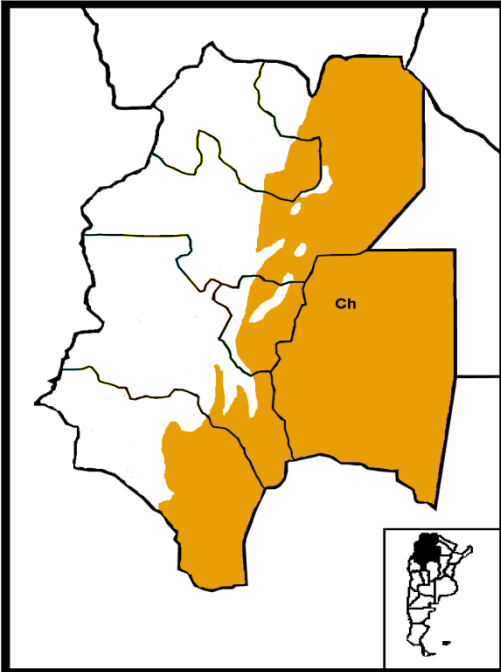
“...What is essential is invisible to the eyes...”

We found *Lactobacillus* at near 4,000 m asl
Lactobacillus is important for milk and cheese industries

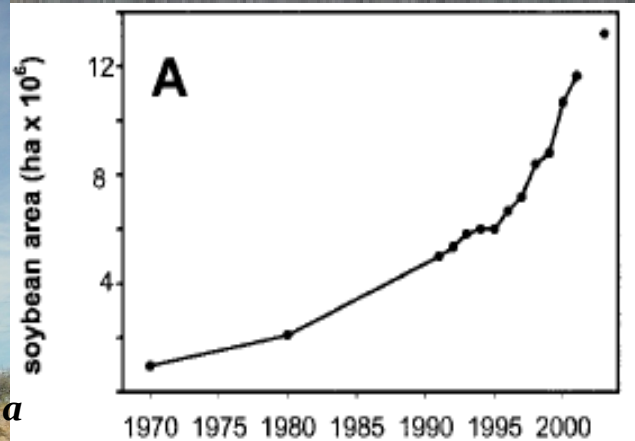


“Chaco” vegetation (near 200 m asl)

This region actually is under a strong deforestation for soya crops



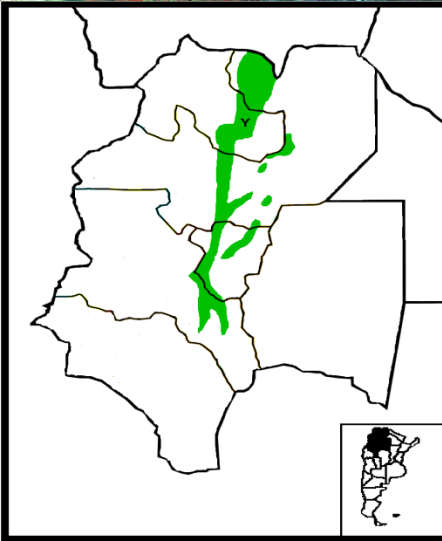
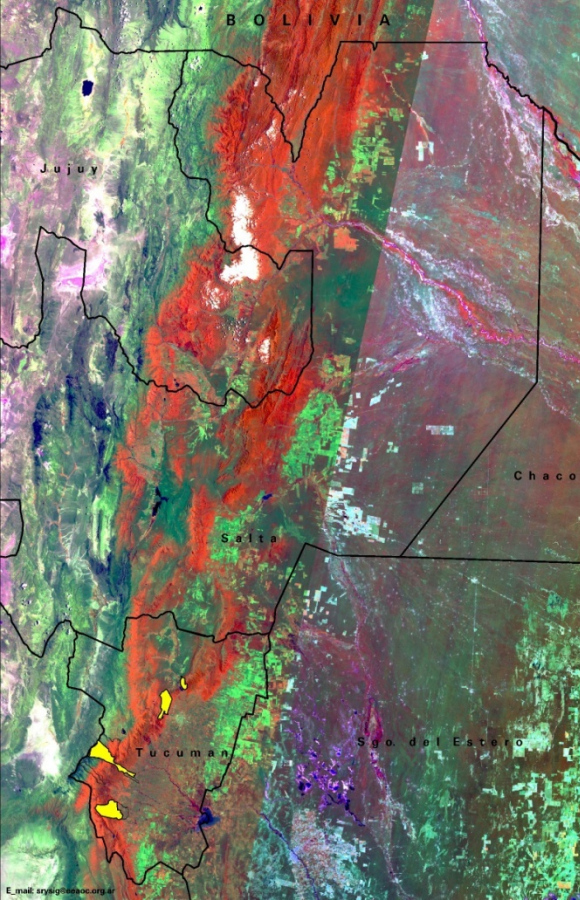
Quebracho blanco (*Aspidosperma*)



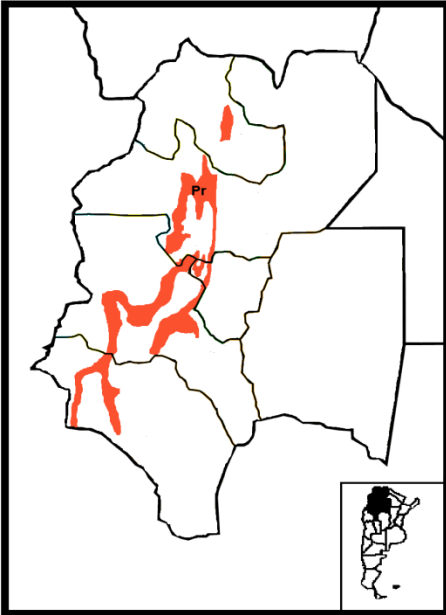
Quebracho colorado (*Schinopsis*)

Argentinean Yungas

In low mountain slopes (between 600 to 3,000 m asl). Warm climate with high precipitation in summer (near 2,000 mm/year). Cloud forest with a lot of trees and animal species

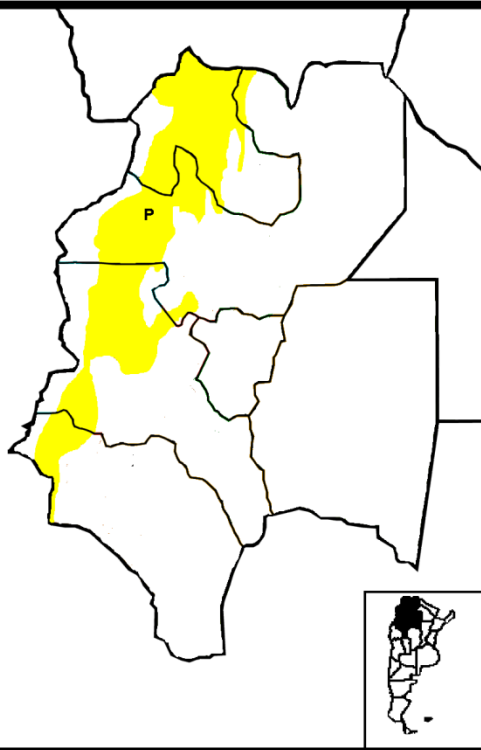


Prepuna Region Between 2,000 and 3,300 asl



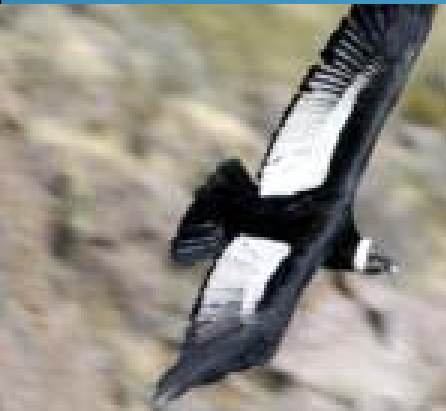
Presence of shrub vegetation and columnar cacti and bromeliaceae

Puna Region (Provincia de la Puna)



It is a high plateau, between 3,300 and 4,300 m asl. Shrub vegetation.

In the Argentinian Puna many lagoons with several species of birds like flamingo exist (*Phoenicoparrus* y *Phoenicopterus*). Mining activities in expansion.



Northwest Richness and problems

In this altitudinal and latitudinal gradients we have:

- Different biogeographic regions
- Biodiversity richness
- Landscapes richness
- Hidrological richness (specially in Tucumán) (one of the environmental services no yet evaluated)
- Solid water reservoir (permanent ice)
- Minerals in general
- Indigenous heritage
- **BUT WE HAVE TOO SOME PROBLEMS related to deforestation, mining activities, climatic change (excess and lack of precipitation); a good package of law but inefficient controls; a lot of protected areas but without a budgets and personal, among others**

Some projects

- We are working on:
- Herbarium update (near 3,000,000 samples)
- A good collection of insects, reptils, mammals and others
- Survey of vegetation, fauna and environment problems for protected area.
- Rescue of native crops (eg. Inca Crops or “quinoa”, some important forest like *Prosopis* (“algarrobo”), *Amaranthus* and andean potato.
- Reuse of industrial effluent, like vinasse, to forest recovery.
- Ecophysiological studies at green house and field (specially mountain species)
- Some physiological studies in andean mammals (like *Lama* sp and others)
- Census and studies of birds and their migrations
- UVB studies (morphological and physiological aspects) on plants
- Effect of atmospheric contaminants on photosynthetic assimilation along an altitudinal gradients
- Fountain water protection (throught a regional park between two provinces)

Aconquija Park Project to protect the water fountain and high mountain biodiversity



Cumbres Calchaquies
(near 4,600 m asl)

In the west of Tucumán there are two blocks of mountains (Cumbres Calchaquies and Aconquija) where all the rivers irrigating the valley area are born.

Cumbres del Aconquija
(near 5,550 m asl)



The water originating in Tucumán, irrigates not only Tucumán but also other states like Santiago del Estero, a portion of Catamarca and the northern area of Córdoba (Mar Chiquita).

Mar Chiquita is an international protected area (Ramsar)

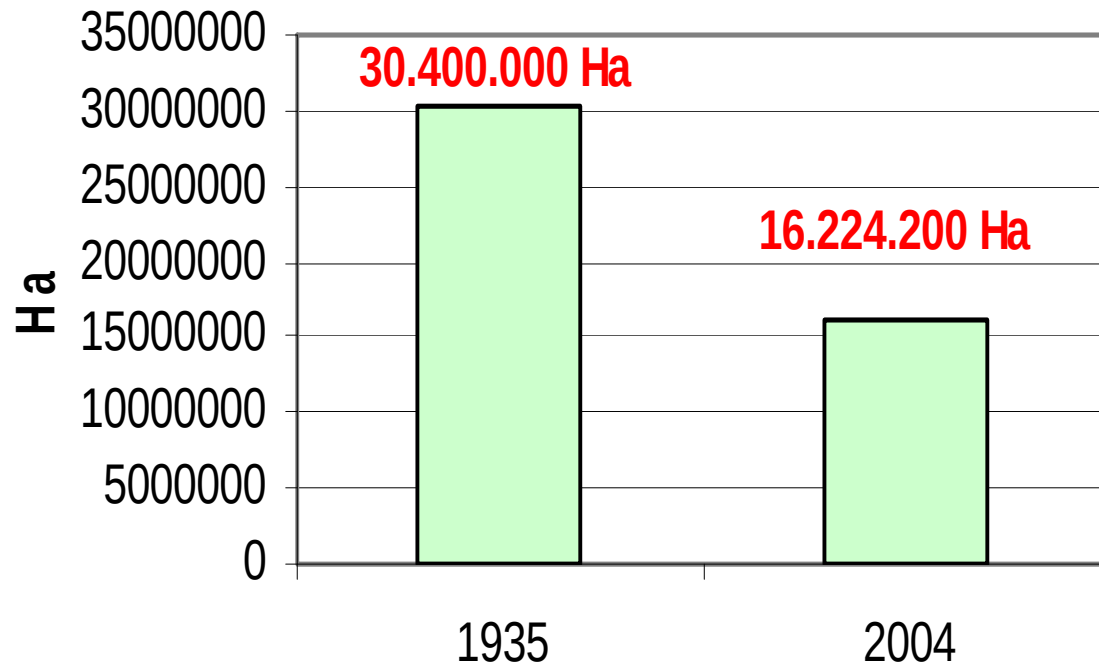
This water system is called “Salí – Dulce Basin” and covers a surface of 60,000 km²

Tucumán generates most of the water utilized by the northwest region

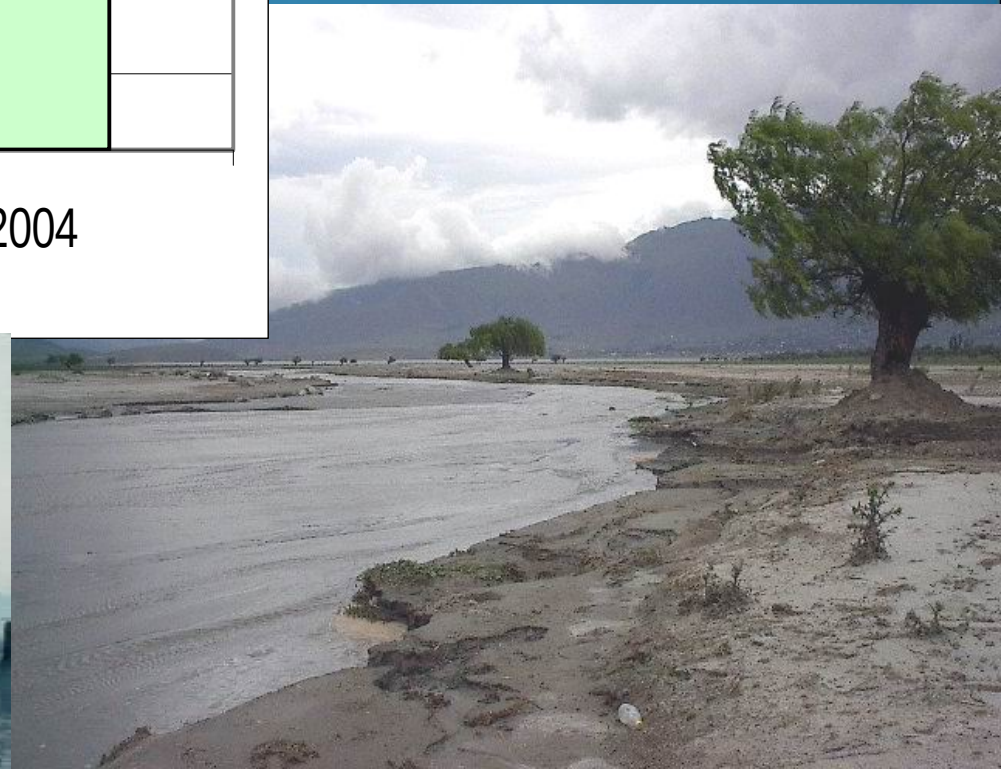
Productive activities in the Argentinean Northwest

- Agriculture (from poor farmers to big producers)
- Livestock
- Industrial activities
- Forest activities
- Tourism and hotel management
- Mining activities (in general non metalliferous with an exception of M. Alumbrera in Catamarca)
- Ecoturism (incipient)

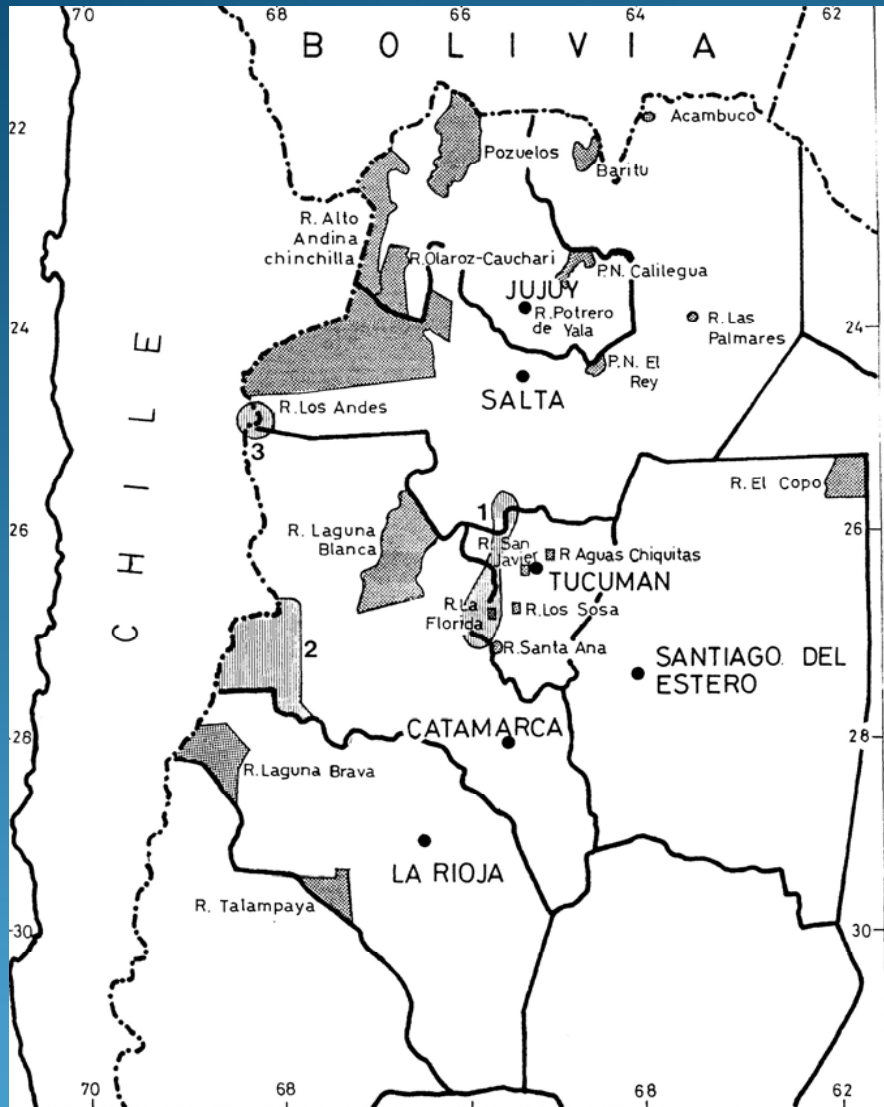
Northwest region deforestation (1935 – 2004)



Deforestation of 14,000,000 Ha in 70 years

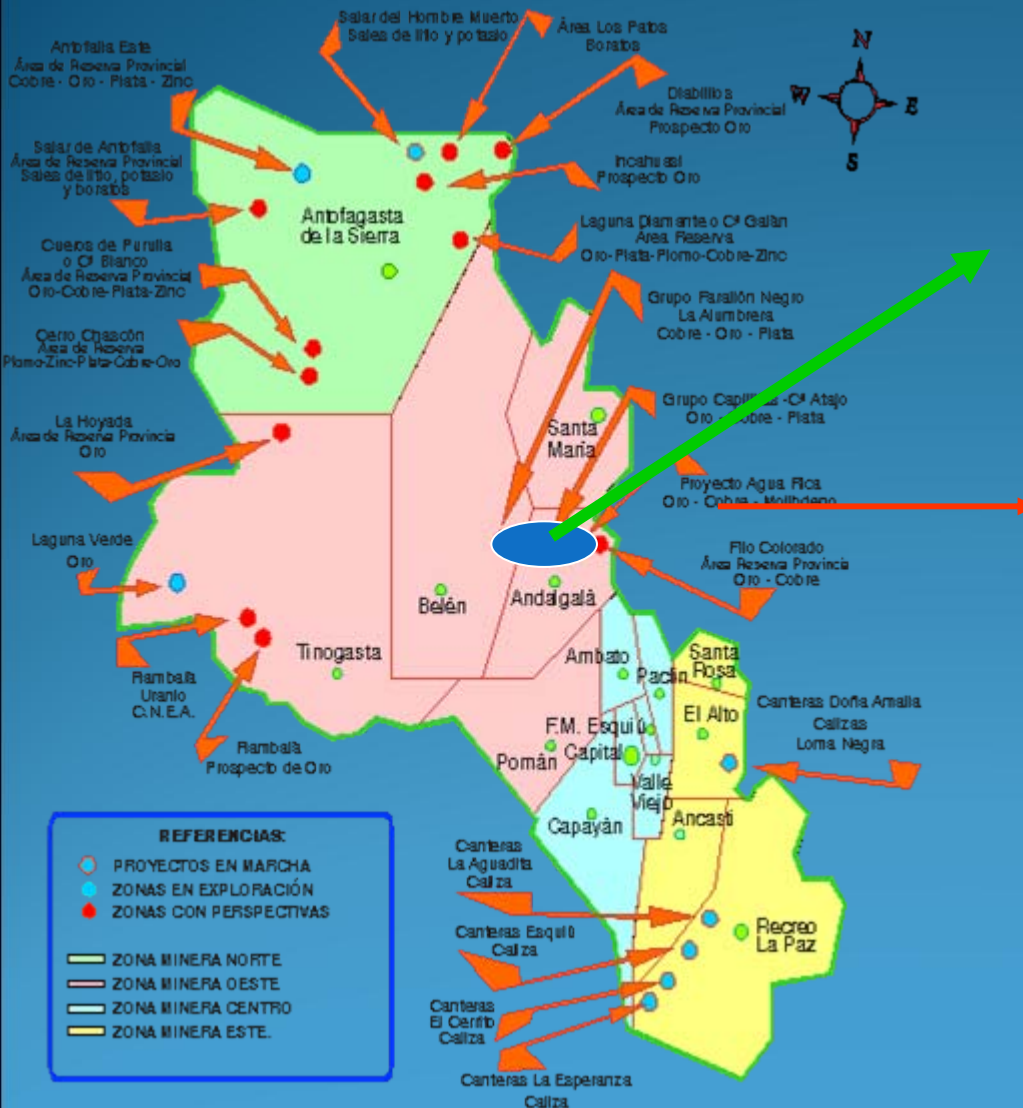


Protected areas



Only 10 % (mean) of the Argentinean Northwest are protected as parks or reserve.

Metaliferous and non metaliferous mining activities e.g. Catamarca)



Minera Alumbreira (Cu, Au)
Agua Rica
Filo Colorado

Tucumán – Catamarca
border
(Aconquija mountain)

Proyecto: Parque Aconquija



Referencias

- Parque Aconquija
- Pque. Nac. Los Andes
- Hidrografía
- Ríos
- Diques

- Cotas sobre el nivel del mar
- 1000 msnm
- 3000 msnm
- Rutas y caminos
- Pavimentado
- Consolidado

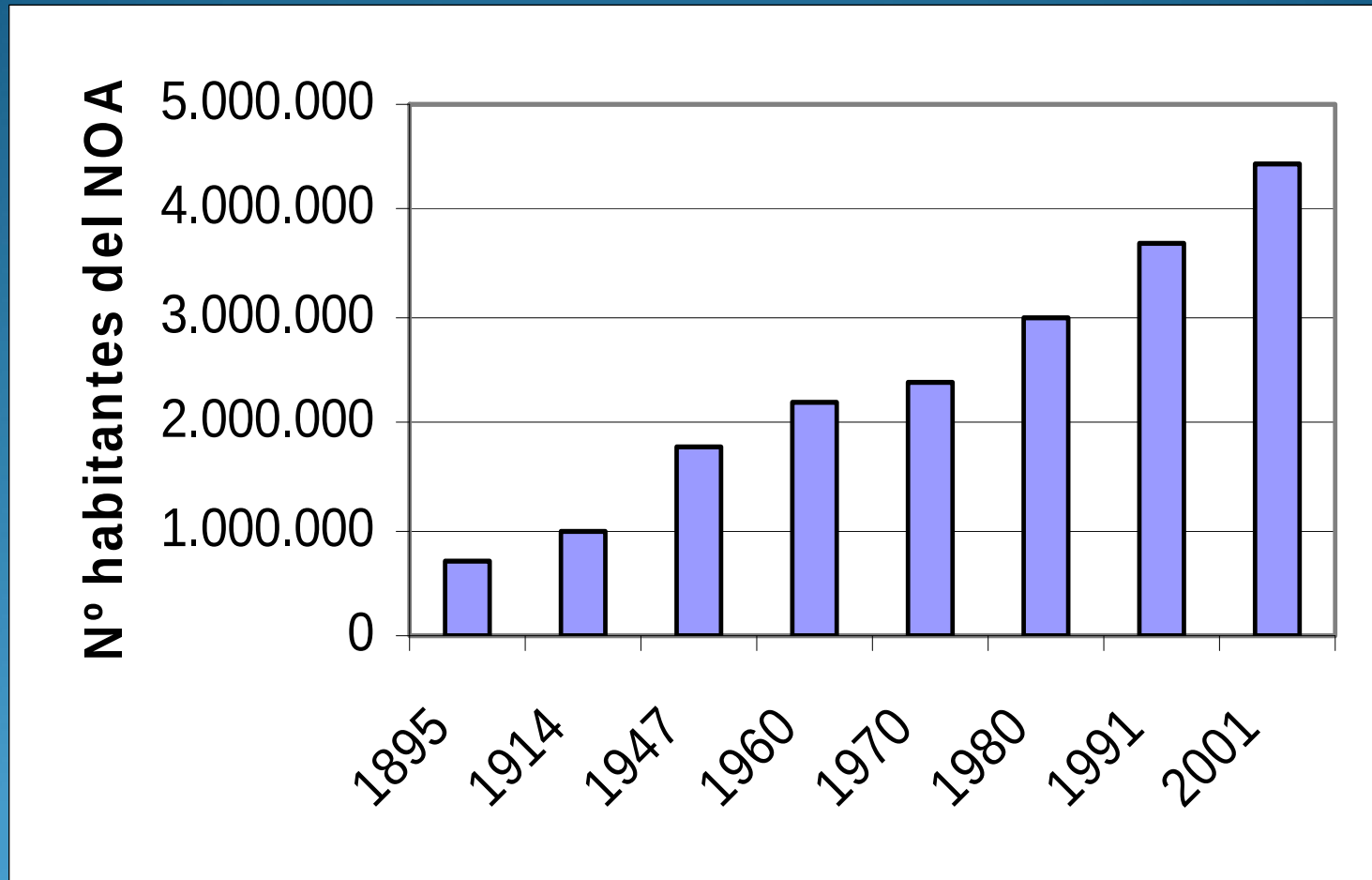
- Limites políticos
- Provincial
- Departamental
- Municipalidades

10 0 10 20 30 40 50
Kilómetros

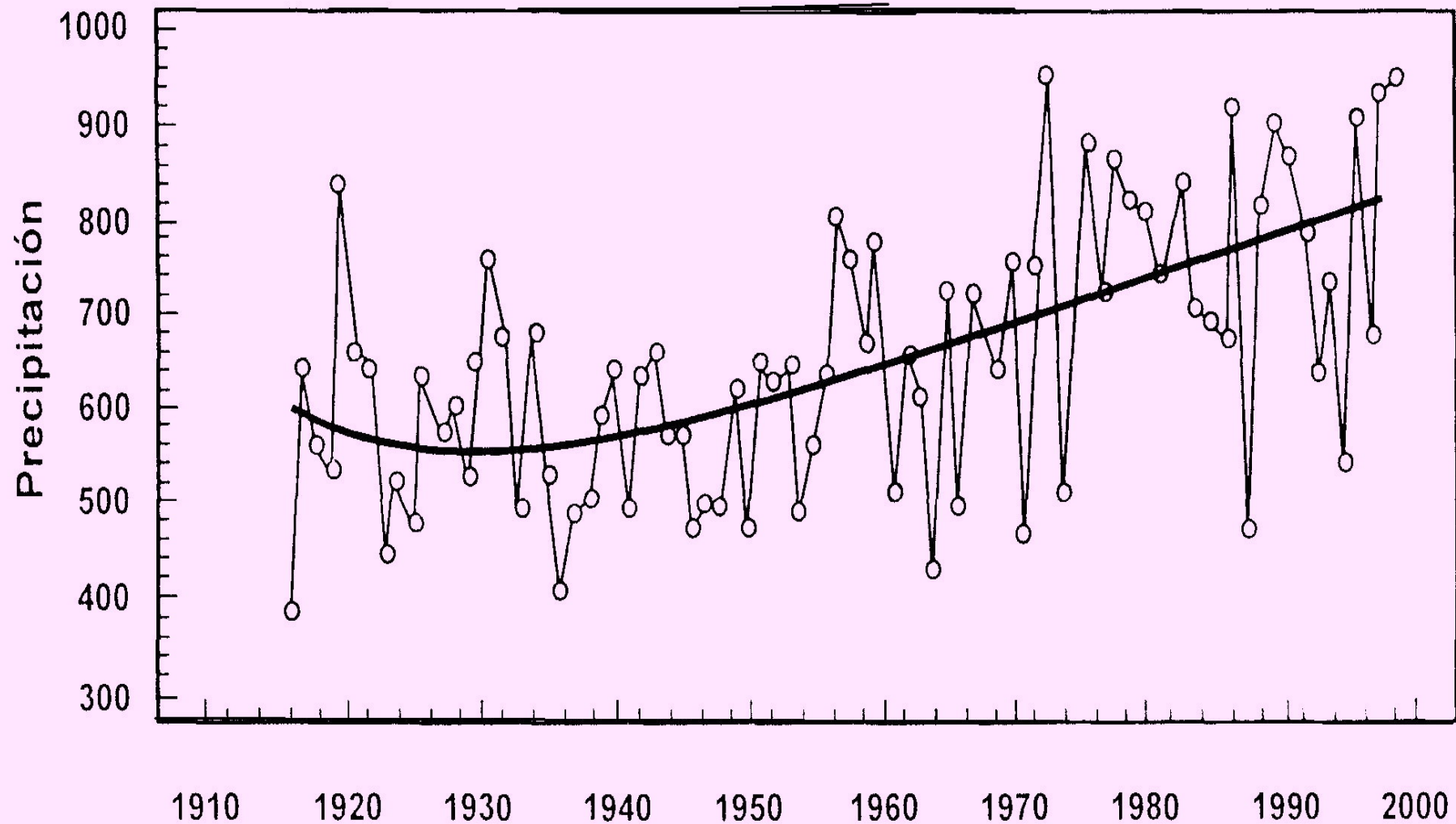
Fuentes: Fundación Miguel Lillo, Hojas I.G.M. a E 1:250000, y datos propios

Elaboración: Lic. Federico J. Sosa
Dirección de Medio Ambiente
Provincia de Tucumán

Population growth (Argentinian Northwest)



Water consumption: 300 – 400 Lt/person/day



	Origin	Seed weight (1000 seeds)	Grain colour	Grain size (diameter $\pm$ SD)
Amilda	Bolivia (Patacamaya)	2.96	White	2.0 (0.3)
Chucapaca	Bolivia (Patacamaya)	2.55	White	2.0 (0.3)
CICA	Argentina (Salta)	1.73	Yellow	2.0 (0.2)
Kamiri	Bolivia (Patacamaya)	3.55	White	2.0 (0.4)
Kancolla	Bolivia (Patacamaya)	1.70	White	1.7 (0.1)
Ratuqui	Bolivia (Patacamaya)	3.16	White	2.0 (0.3)
Robura	Bolivia (Patacamaya)	2.13	White	2.0 (0.1)
Sajama	Bolivia (Patacamaya)	1.81	White	2.0 (0.2)
Samaranti	Bolivia (Patacamaya)	1.61	White	1.9 (0.1)
Sayaña	Bolivia (Patacamaya)	3.08	Yellow cream	1.8 (0.1)



NL-6, Kiuna Roja, Real

