Payment for Forests Watershed Environmental Services in Mexico

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PSAH Program's Objective

- Stop the deforestation that threatens those forests critical for watershed-related environmental services in Mexico

by

- paying land owners to preserve forest land and avoid its transformation for other uses, such as: agriculture and cattle raising.

Also

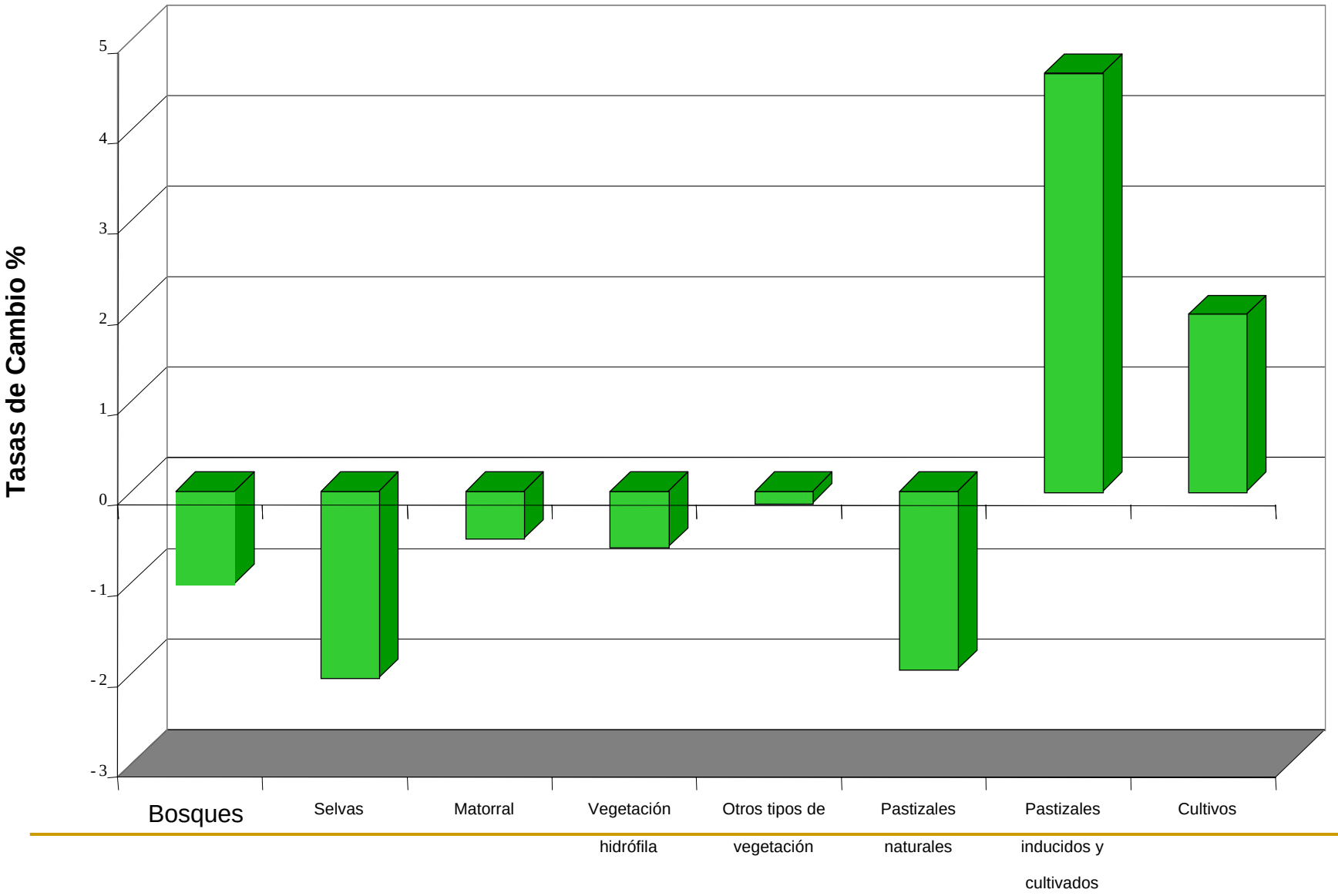
- it is expected to set the stage for the development of local PES programs.

Initiative

- Forests & Water, main issues of new government's environmental platform.
- INE's analysis: deforestation driven by opportunity costs, untargeted forests at risk, potential link.
- Strong political leader at Forestry Agency (CONAFOR), economist heading SEMARNAT.
- Program design using research by WB, UCBerkeley, UIA, and CIDE.

Tasas de Cambio de Uso del Suelo en México

1993 - 2000



Many believe there is a link.

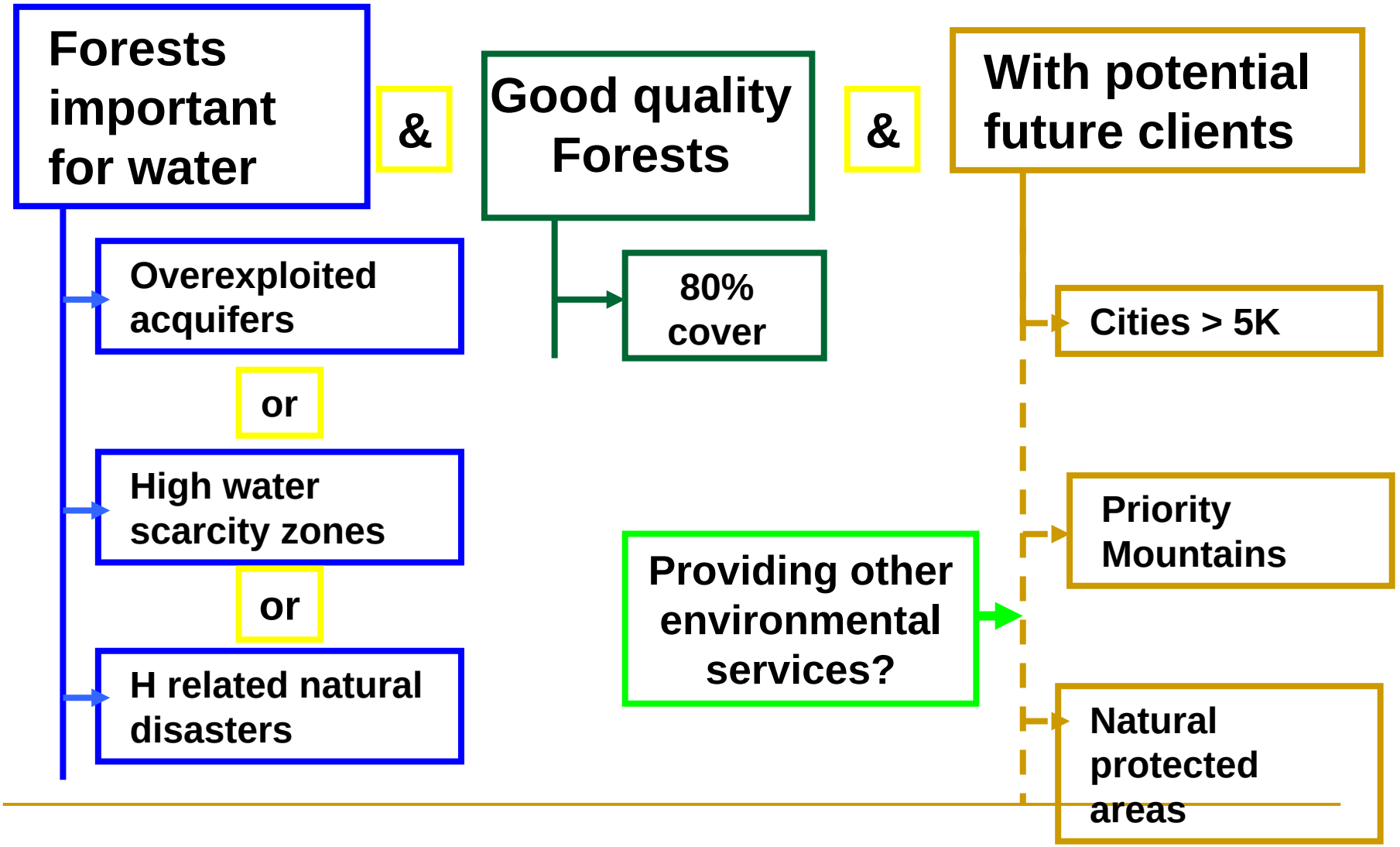
Who pays?

- Government acts as intermediary, collecting fees from water users, paying forest owners.

- Instrument: Federal Fees Law (Ley Federal de Derechos LFD): water fees.
  - Earmarked $18 million USD per year.
  - Discussion % or lump sum.

- All federal water users pay, except municipalities.
  - Conflict with previous implicit SHCP earmarking

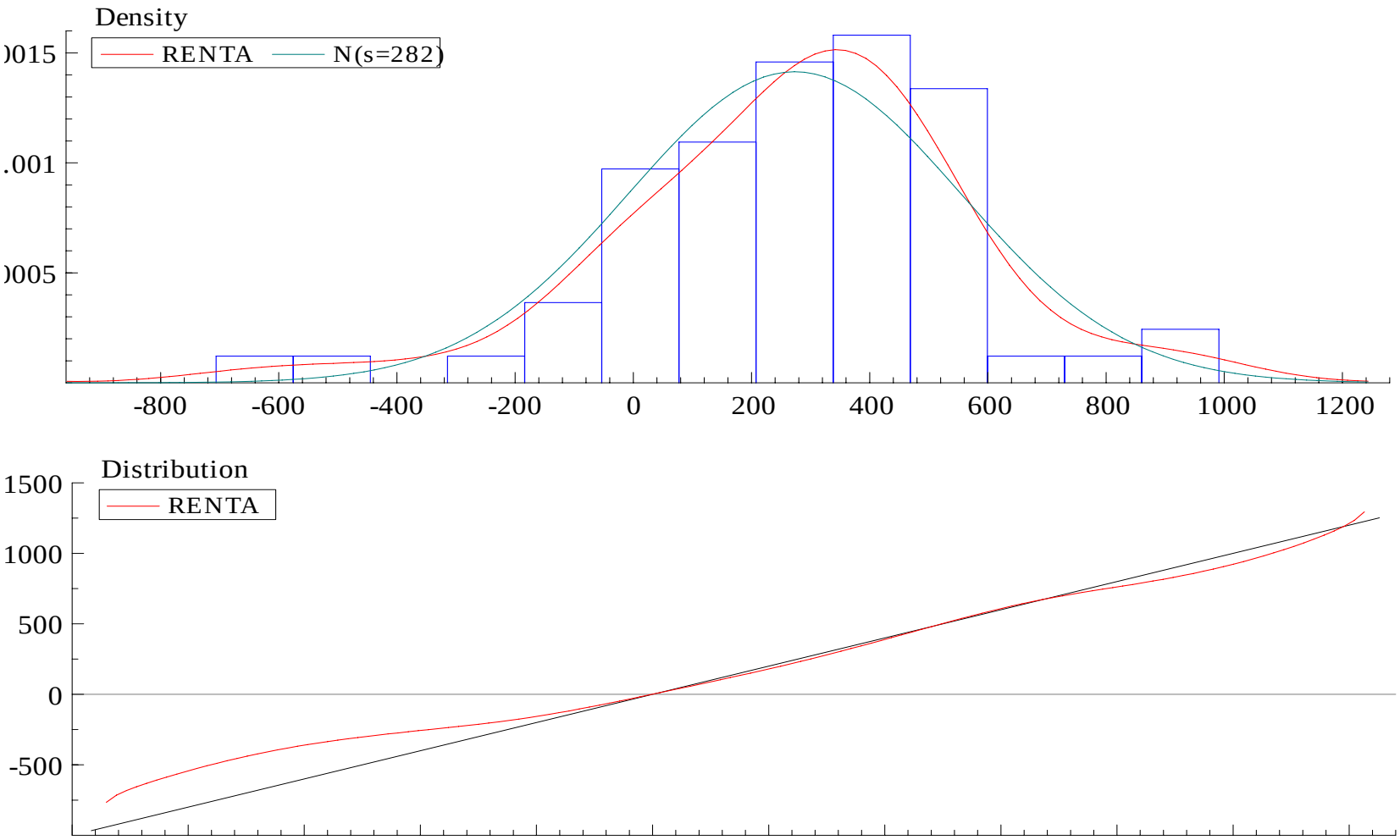
Rules of Operation for PSAH (2003-2004)



Implementation issues

- Main objective: watershed and aquifer protection
- Secondary (implicit) objectives:
  - attend unfunded mountain program,
  - Natural Protected Areas lobby for compensations,
  - regional political balance.
- Images provide proof of conservation, precede payment and renewal
- Selection of applications has gaps.

Corn production as an opportunity cost



Basado en: “Estimación del Costo de oportunidad de la tierra forestal”
Luis Jaramillo INE 0201

Pagos PSAH

Literature* suggests an ordering of forests according to their hydorlogical service:

1. **CLOUDFORESTS**
2. **DRY TROPICAL FORESTS**
3. **OTHERS**

*** J.Carrillo (2003), I. García-Coll (2002), Brunzeel (2002)**

**** Uncertainty? Apply precautionary principle**

- **Intense lobbying from orgs.**
- **PSAH pays each year for 5 years:**
  - $400 per hectare to cloudforests
  - $300 por hectárea to the rest.

PSAH complementing an array of policies

Commercial forests	PRODEFOR, PROCYMAF, Cadenas Productivas
Plantations	PRODEPLAN
Degraded Forests	PRONARE
Well preserved, non-commercial forests important for watershed	PSAH

Implementing challenges

- Time
- Images
- Georeferences

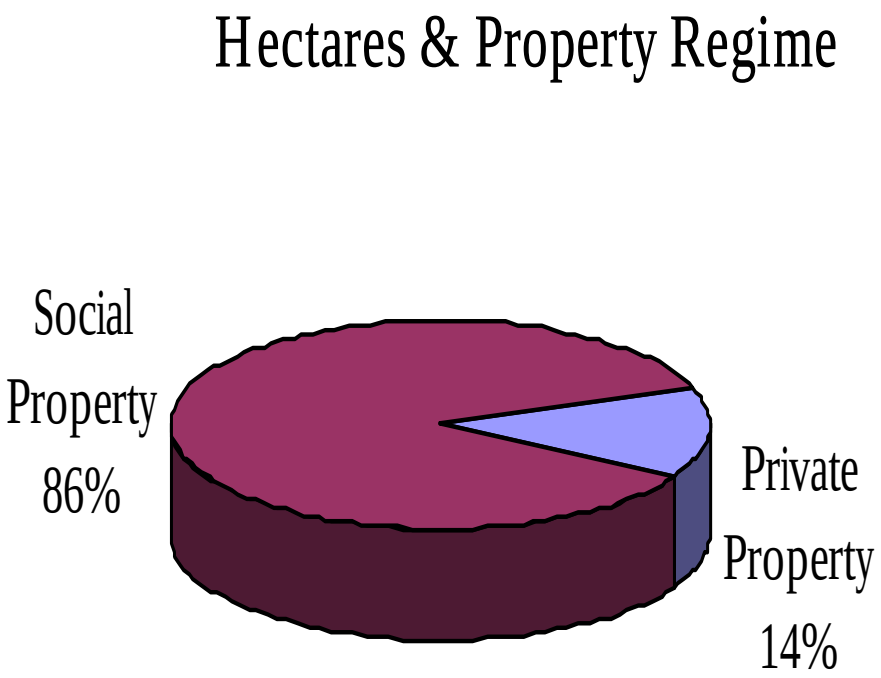
Additionality

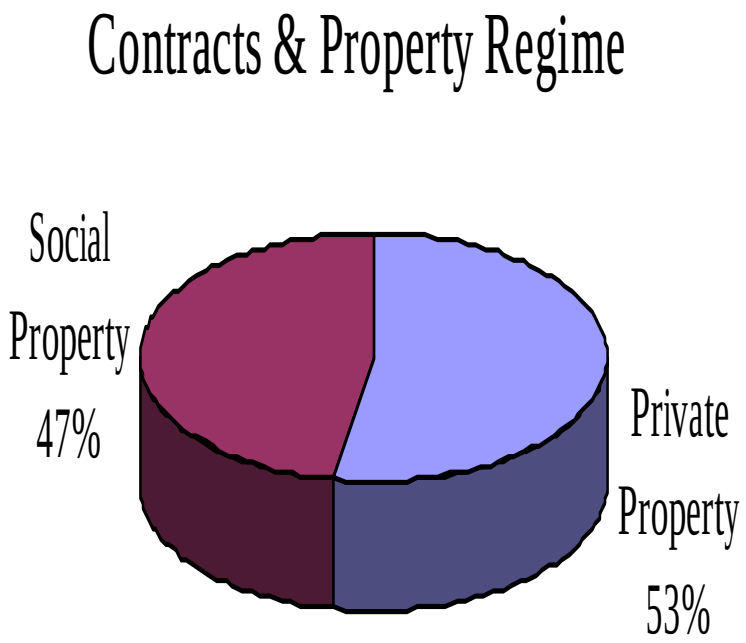
- Baseline cover (a model of deforestation)
- Excluding (almost!) commercial forestry
- Hydro benefits over time
- Use of transfers

Implementation Problems

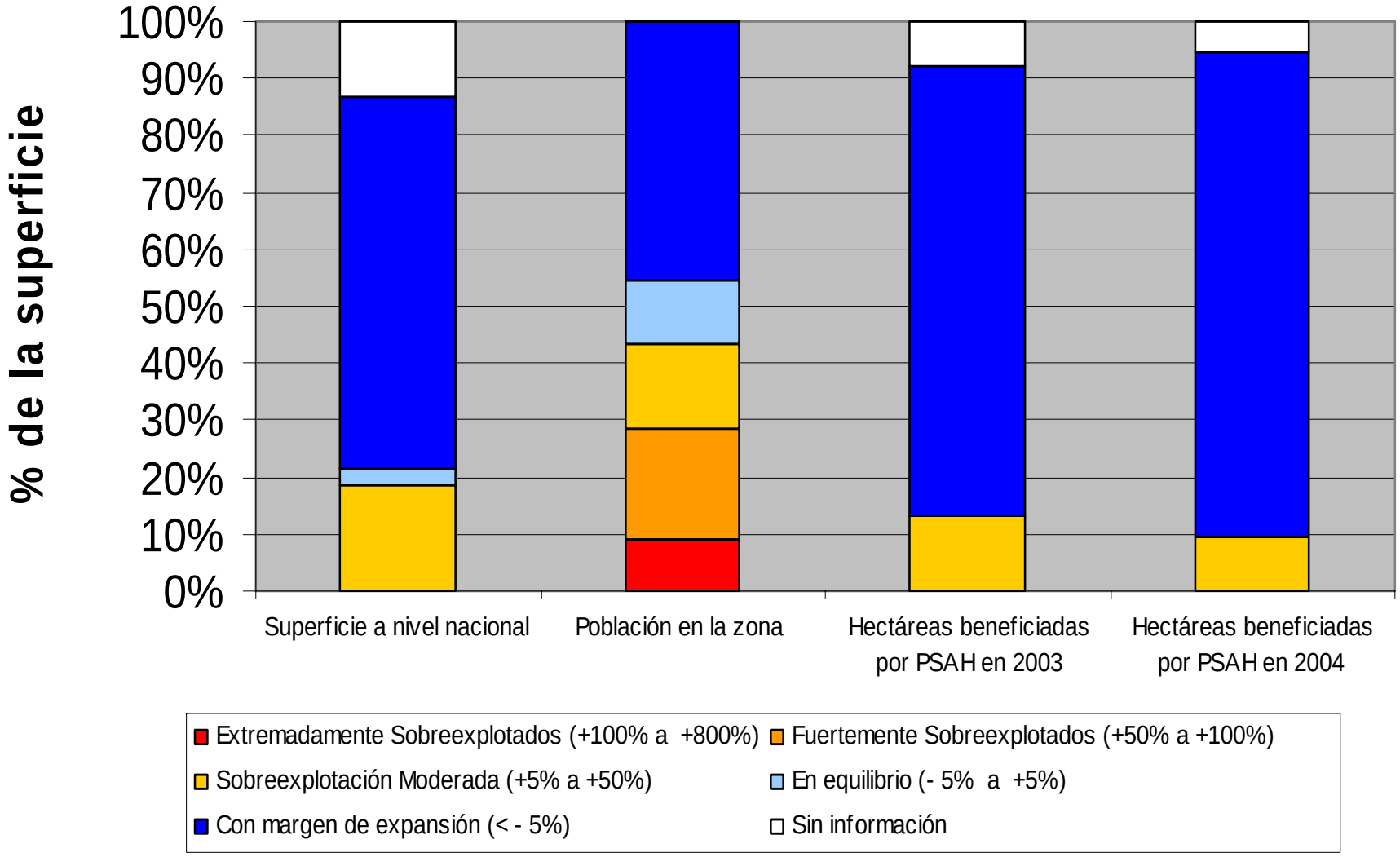
1. (Un) expected success: three times as many applications than funds. (Excess demand)
2. 2003: short promotion and evaluation time. Unclear criteria.
3. 2004: Ad-hoc regional political balance, some use of grading system with surrealist algorithms.
4. Satellite images, georeferenced properties and evaluation still a bottleneck.

Hectares and Contracts according to type of property

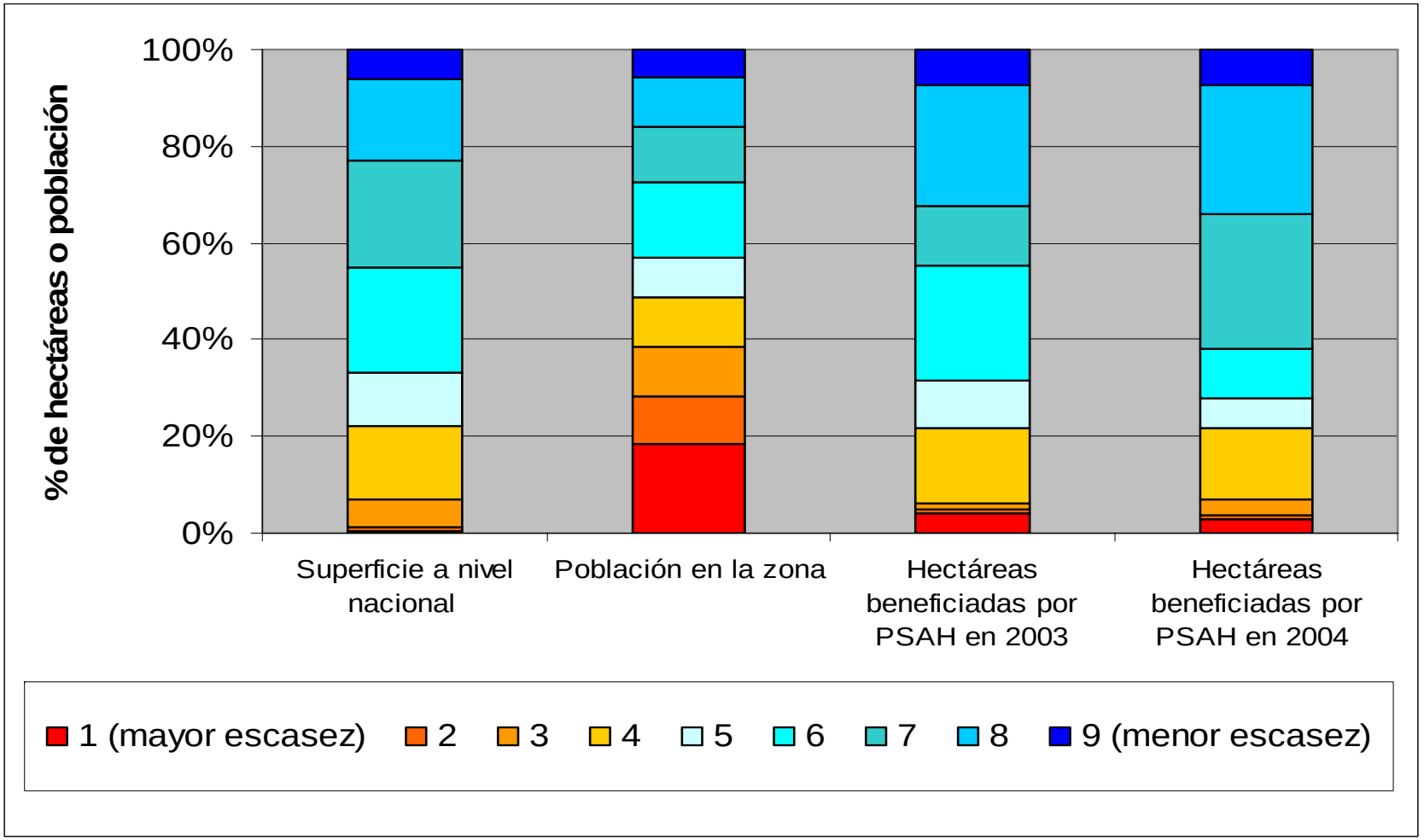




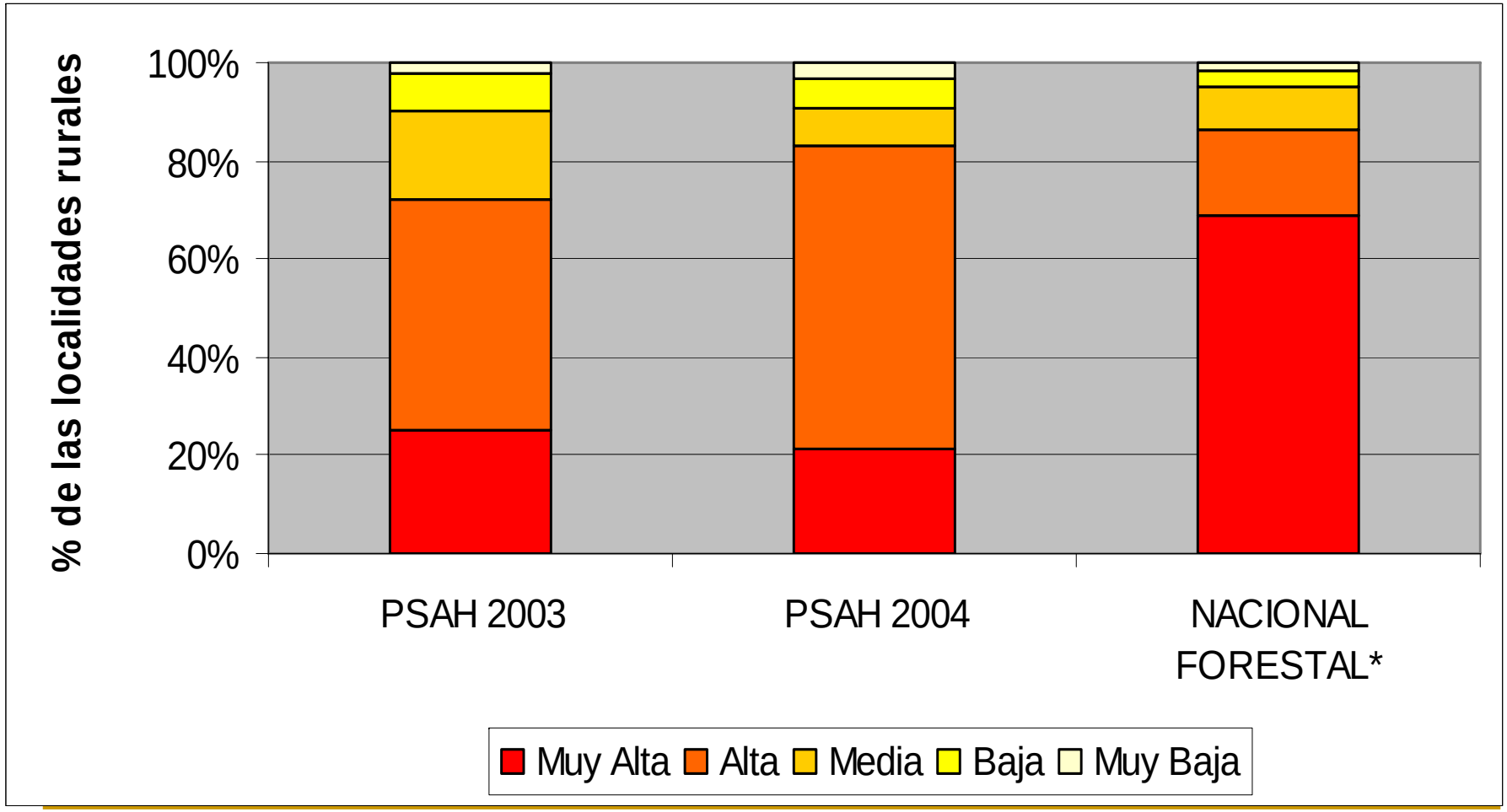
Targeting: Acquifers



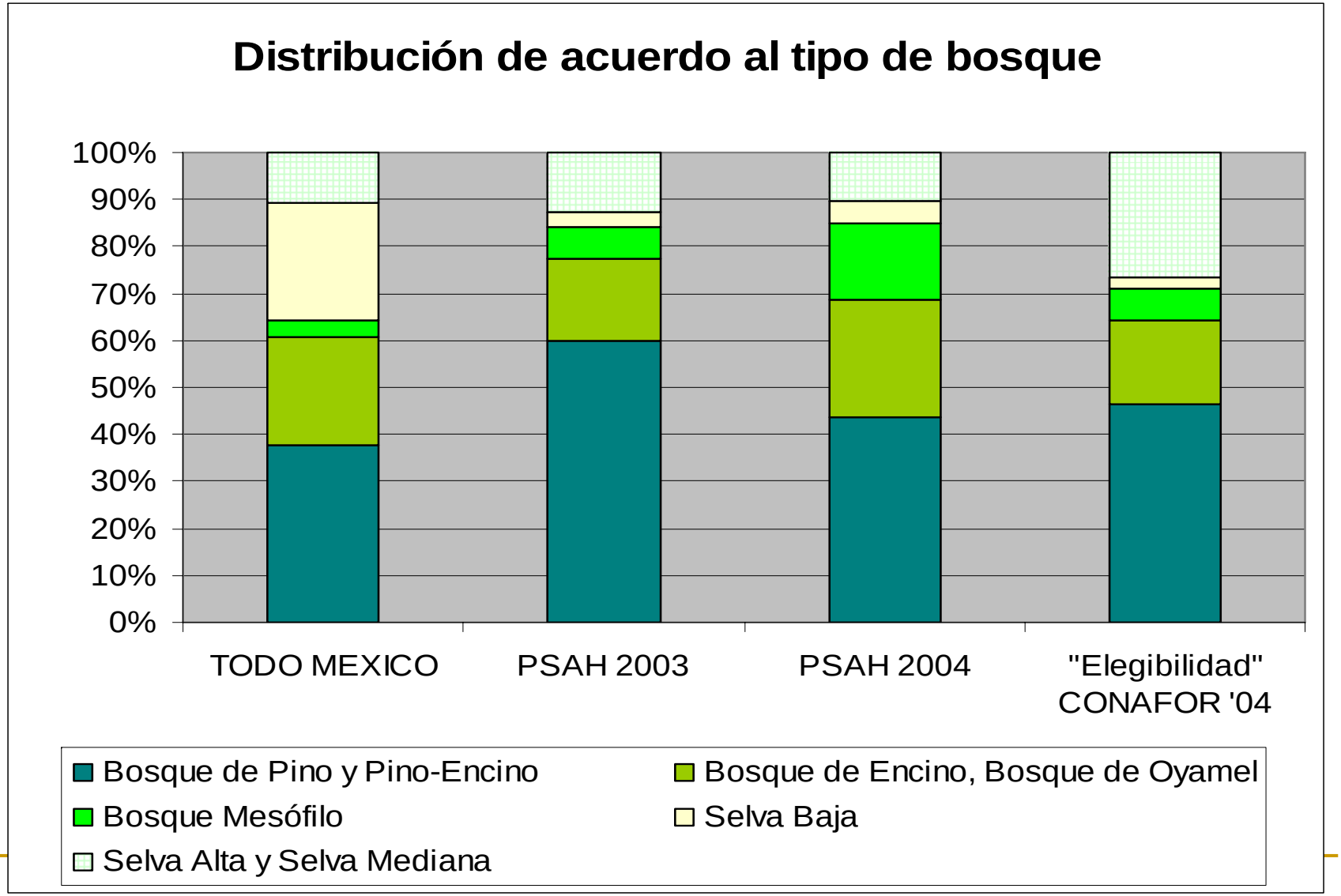
Targeting: Water scarcity

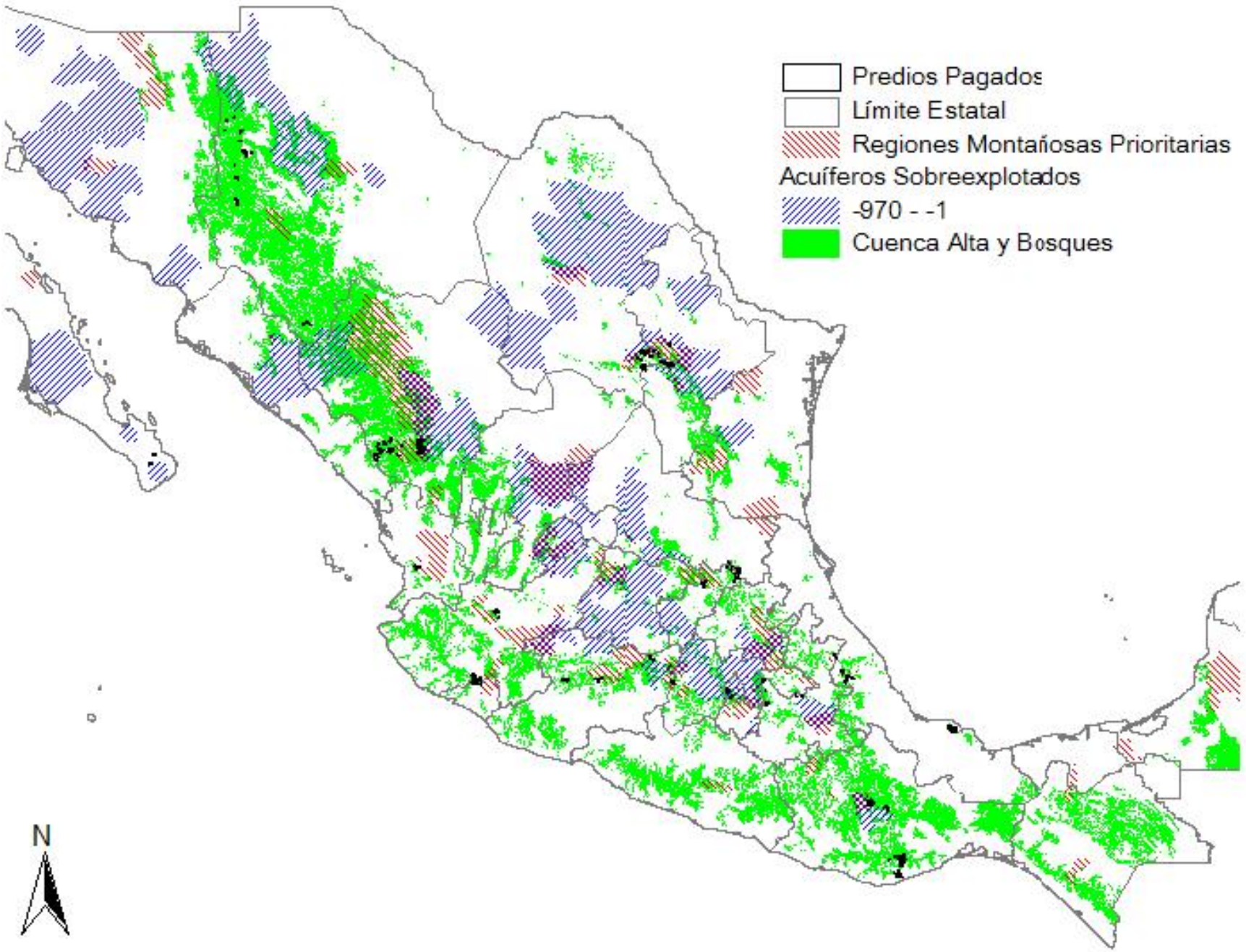


Targeting: poverty and marginalization



Targeting: Type of forests




Predios Pagados
Límite Estatal
Regiones Montañosas Prioritarias
Acuíferos Sobreexplotados
-970 - -1
Cuenca Alta y Bosques
N

Leakage?

- Leakage? No tests yet, but large areas were incorporated
- Future?
  - The scheme as a transition to sustainable forestry
  - The emergence of local PSAH projects

Patterns of deforestation

- Pixel grid (20x20) 1993/1994 compared to 2000.
- Conserved forests could be
  - Still there
  - Degraded
  - Deforested

“All models are wrong, but some are useful.”

(George Box, citado por Kennedy 1992: 73; citado por Kaimowitz y Angelsen: 1998; y aquí).

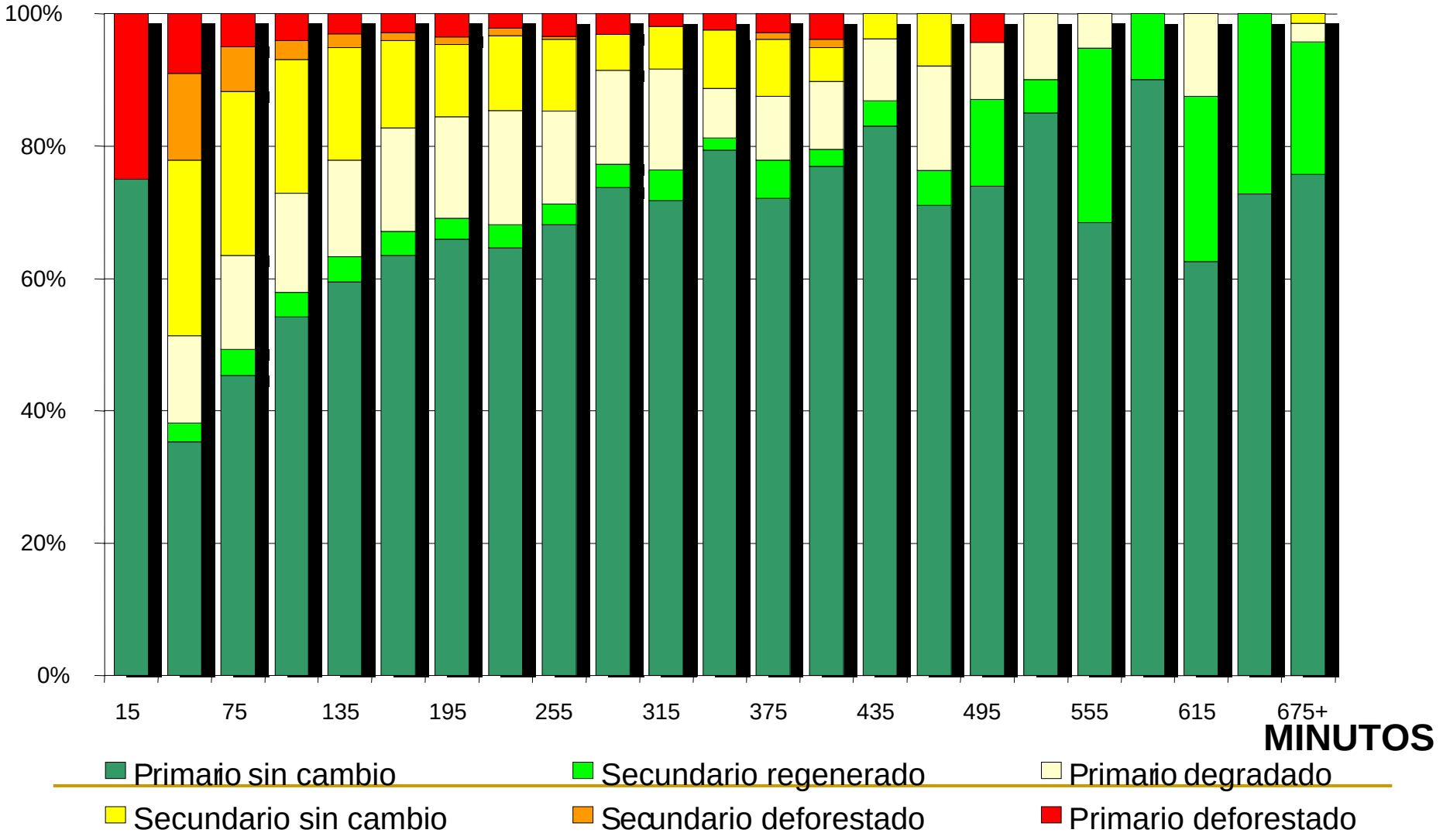
Patrones de deforestación

Patrones de deforestación

- Variables:
  - Slope
  - Altitude
  - Distance to population centers
  - Potential agricultural yields (maíz)
  - Poverty, marginality
  - Natural protected areas
- Combining opportunity costs, liquidity constraints and regulation

Gráfica 1.

Cambios de uso de suelo y distancia al poblado más cercano.



*Unbalanced sample

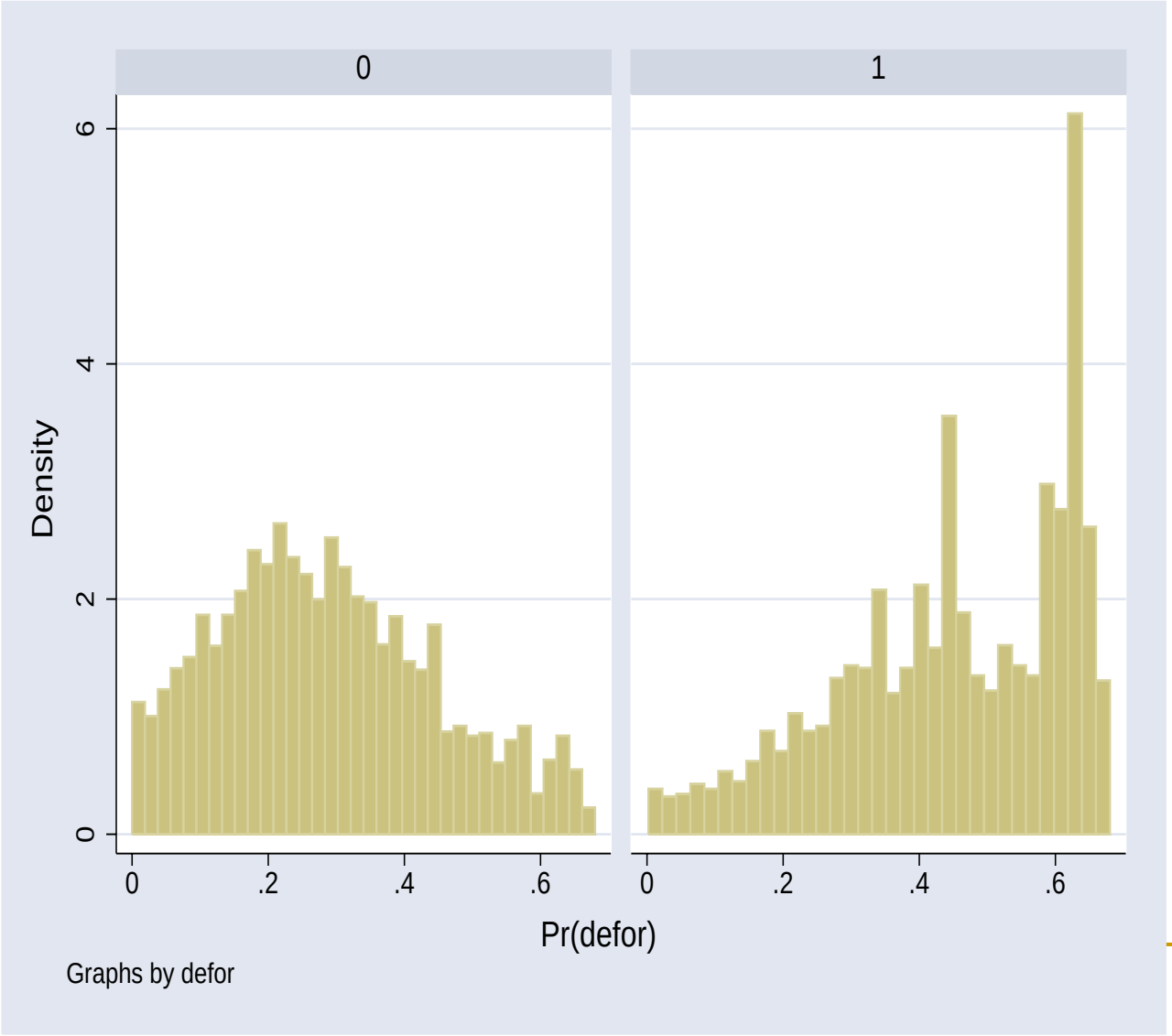
Econometric analysis

(primary forests)

Variable	Probit Deforestación/degradación vs no cambio	Probit ordenada Deforestación, degradación, no cambio
Pendiente (%)	**-0.005745 ****	**-0.003574 ****
Altitud (msn)	**.0000415**	**-.00000356**
Distancia poblado (min)	**-0.0035625 ****	**-0.002861 ****
Distancia Cd. (min)	**-0.0018948 ****	**-0.001137 ****
Rendimiento maíz (txHa)	**-0.0126468**	**0.0690093 ****
Índice Marginación 95	**0.0787564 ****	**0.0647605 ****
Dentro de ANP	**-0.618584 ****	**-0.628249 ****
Pino/encino vs conífera	**0.2120812 ****	**0.8128571 ****
Selva alta vs coníferas	**0.4517746 ****	**0.814395 ****
Selva baja vs coníferas	**0.2789231 ****	**0.6340389 ****

* Significativo a niveles mayores a 90%; ** Significativo a niveles mayores a 99%,

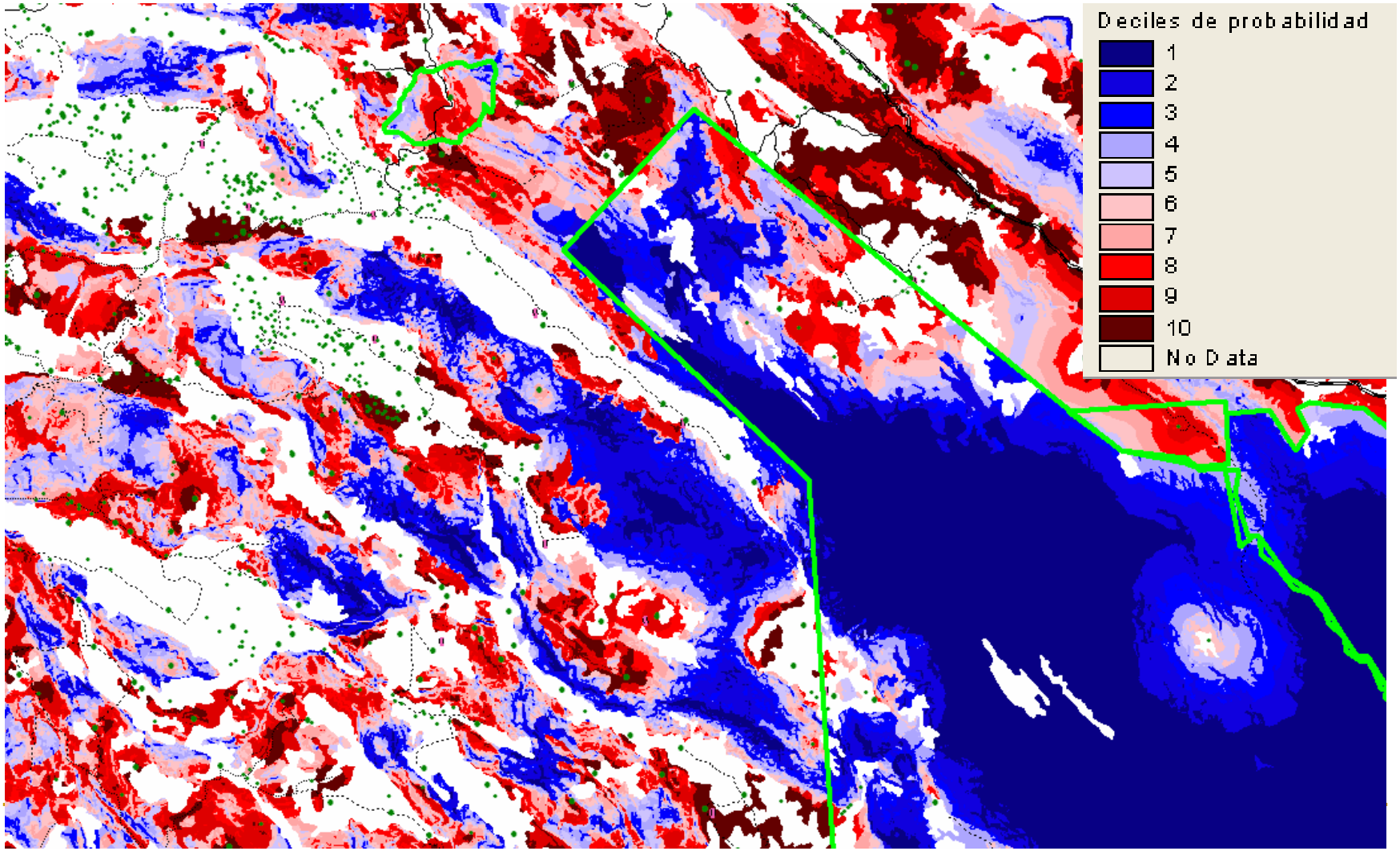
Predictive power



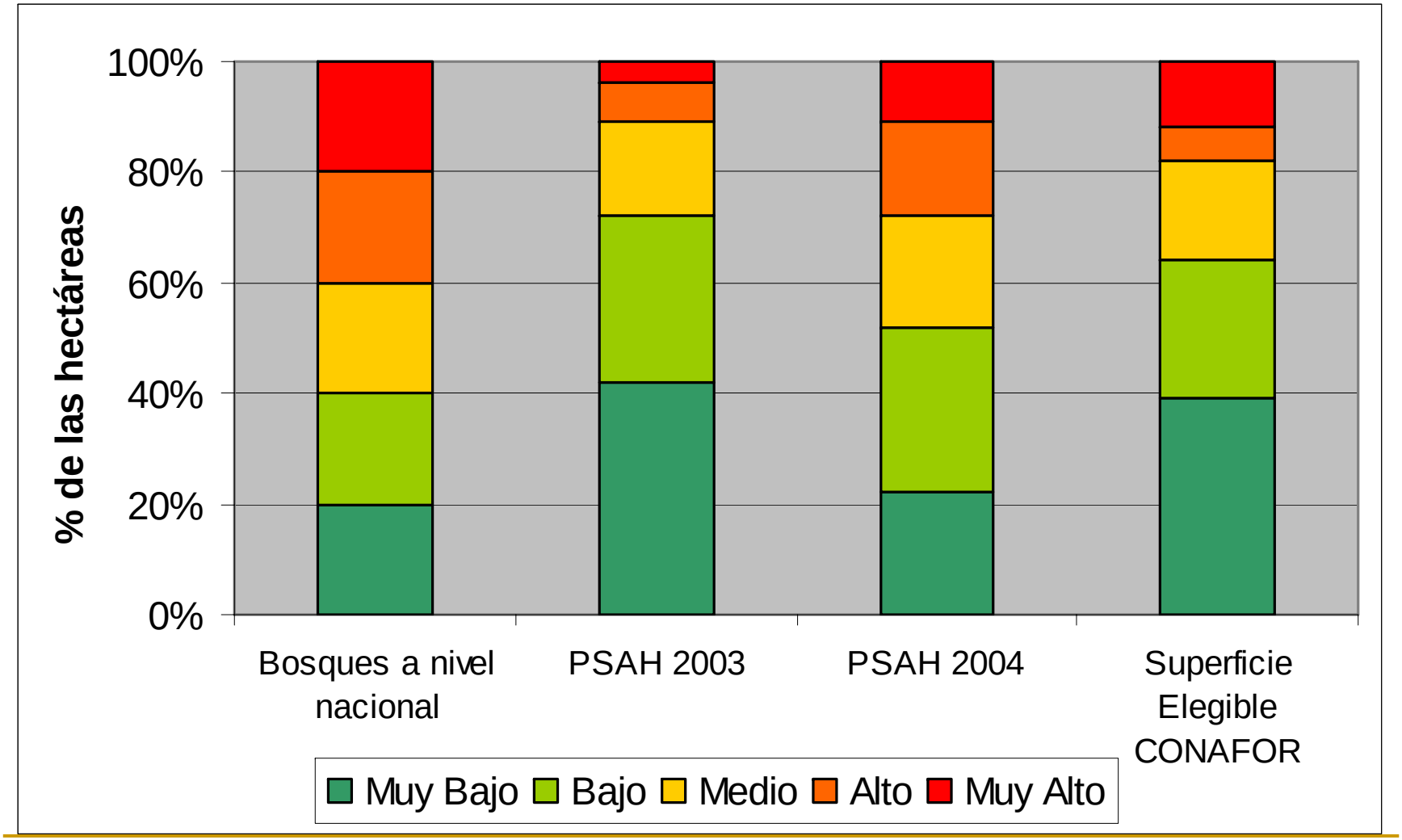
70% deforested pixels correctly classified

68% conserved pixels correctlz classified

Example: Chiapas



Targeting: Deforestation risk



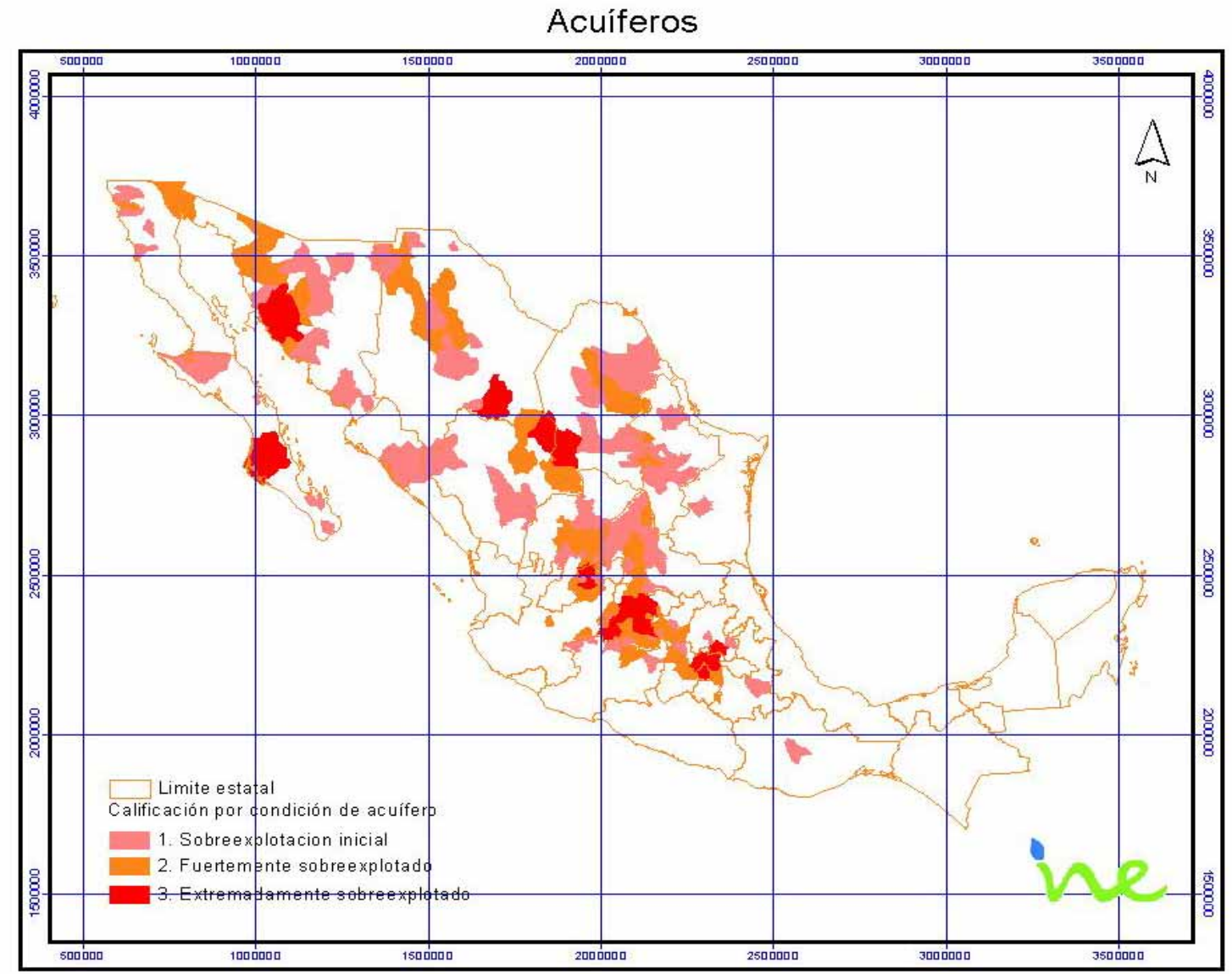
Next Steps I: PSAH

- Introduce deforestation risk as one of the criteria to select plots. Expected even more excess demand. Create multicriteria grading system for selection process.
- Continue scientific work on the linkages between forests and water, and communicate results to water users in the watershed for continuing political support.
- Evaluate the program. (Implementation and results)
- Foresters lobby and some NGOs want to convert it to micromanagement.

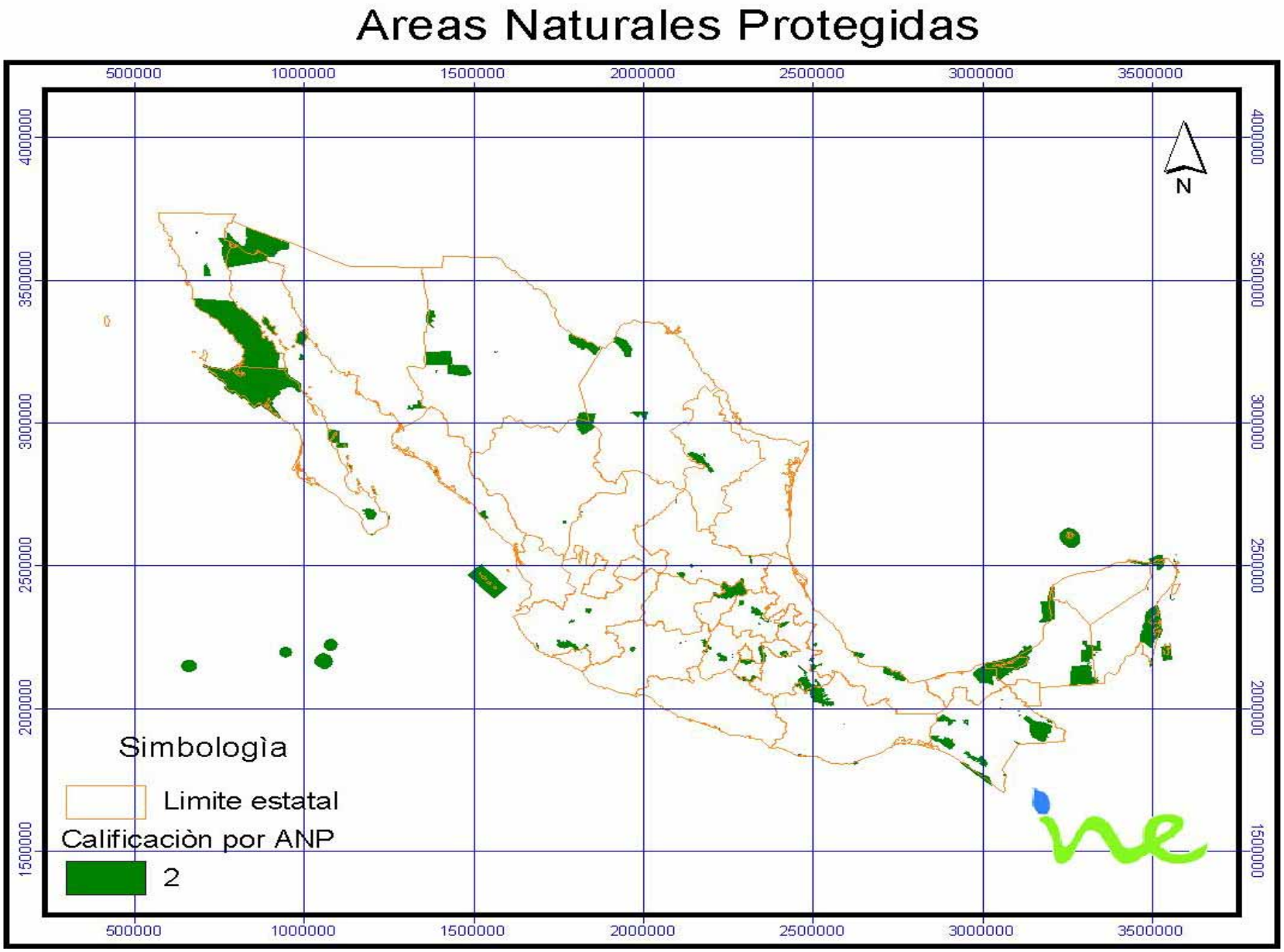
Proposed grading system:

- Overexplotied aquifers (3,2,1,0 points)
- Priority Mountains (2,0)
- Natural Protected Areas (2,0)
- High water scarcity municipalities (2,1,0)
- High risk of floods (3,2,1,0)
- Deforestation Risk (5,4,3,2,1,0)
- Indigenous communities (2,1,0)
- Watershed „protection plan“ (10,0)

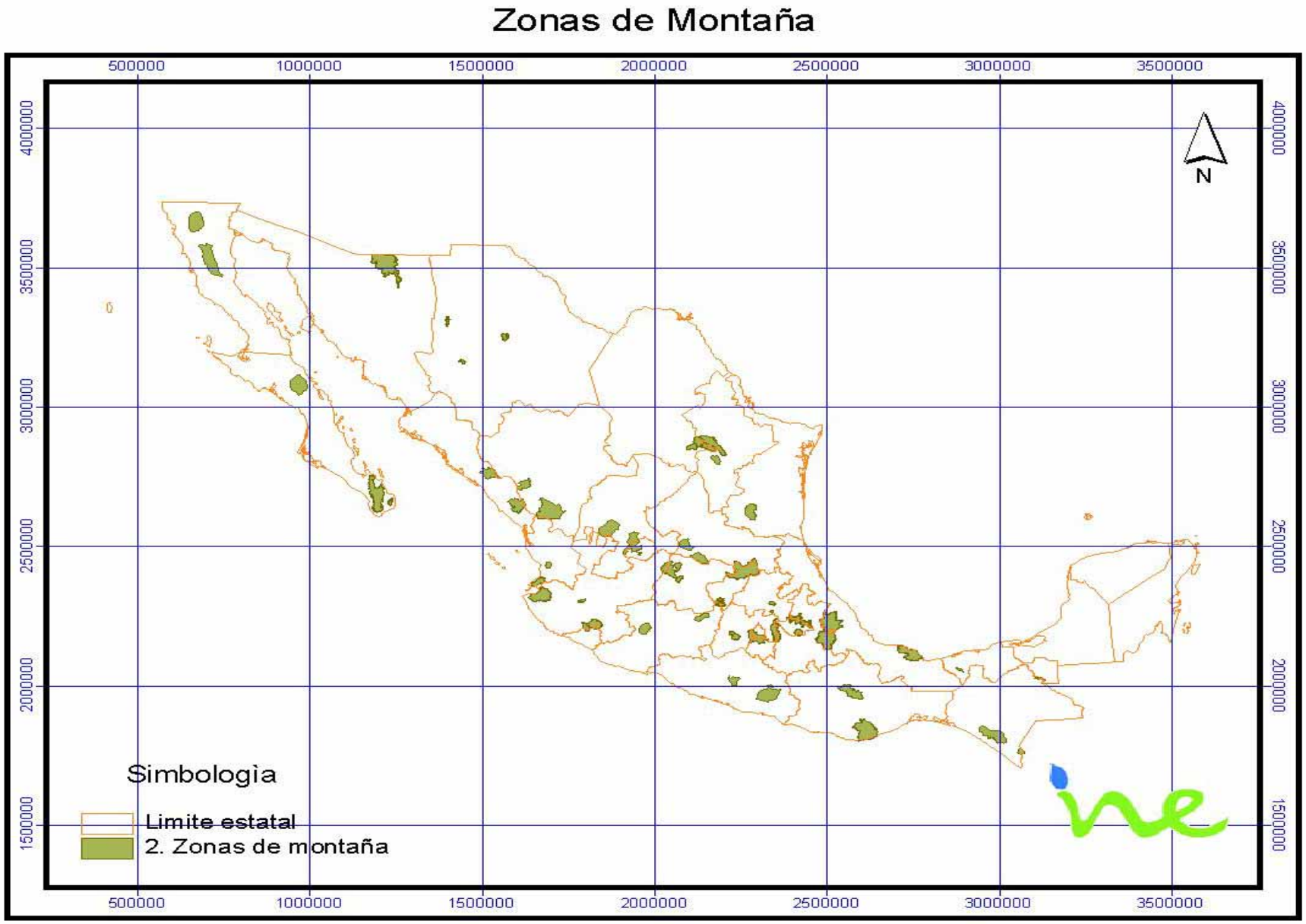
Over-exploited aquifers



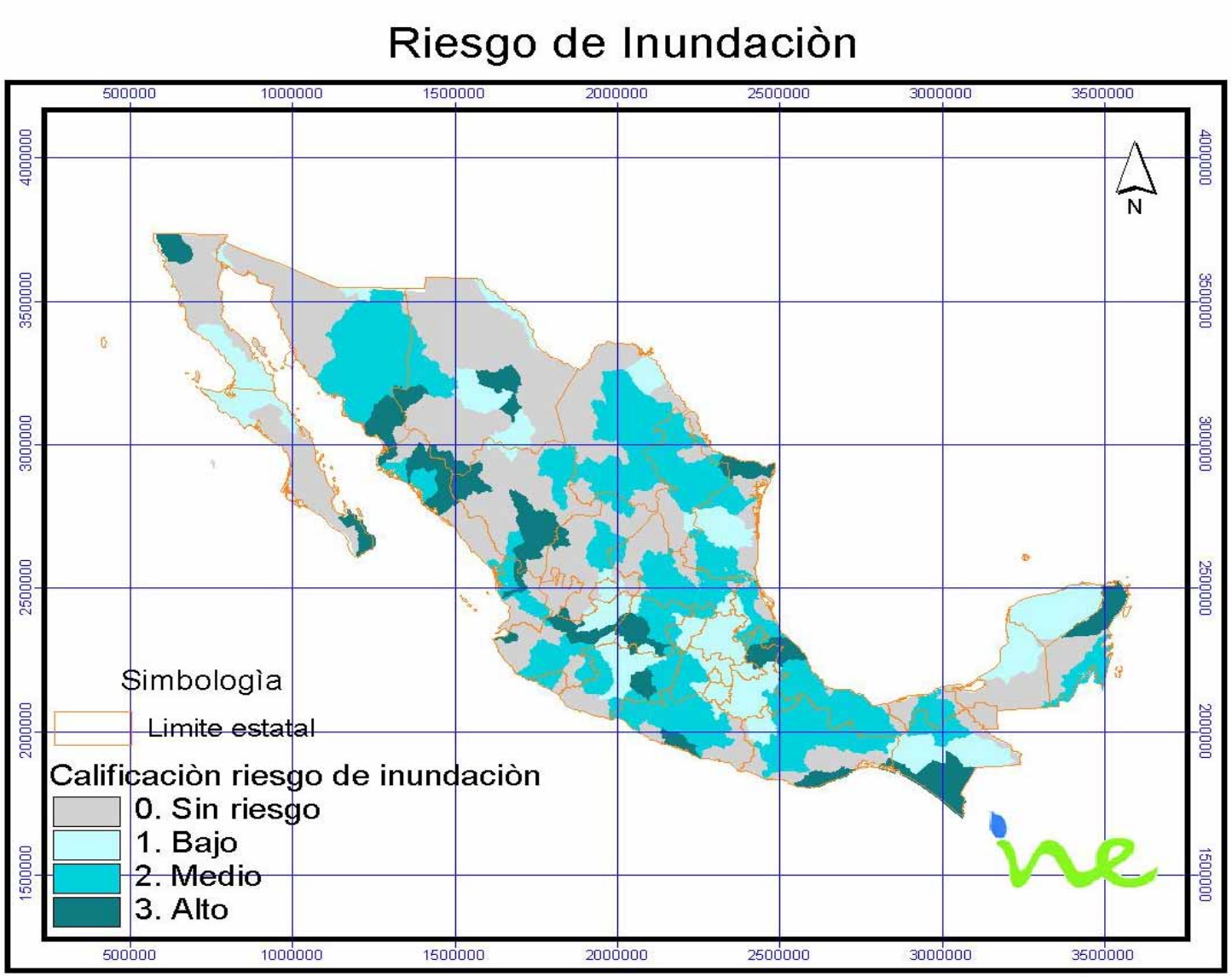
Natural Protected Areas



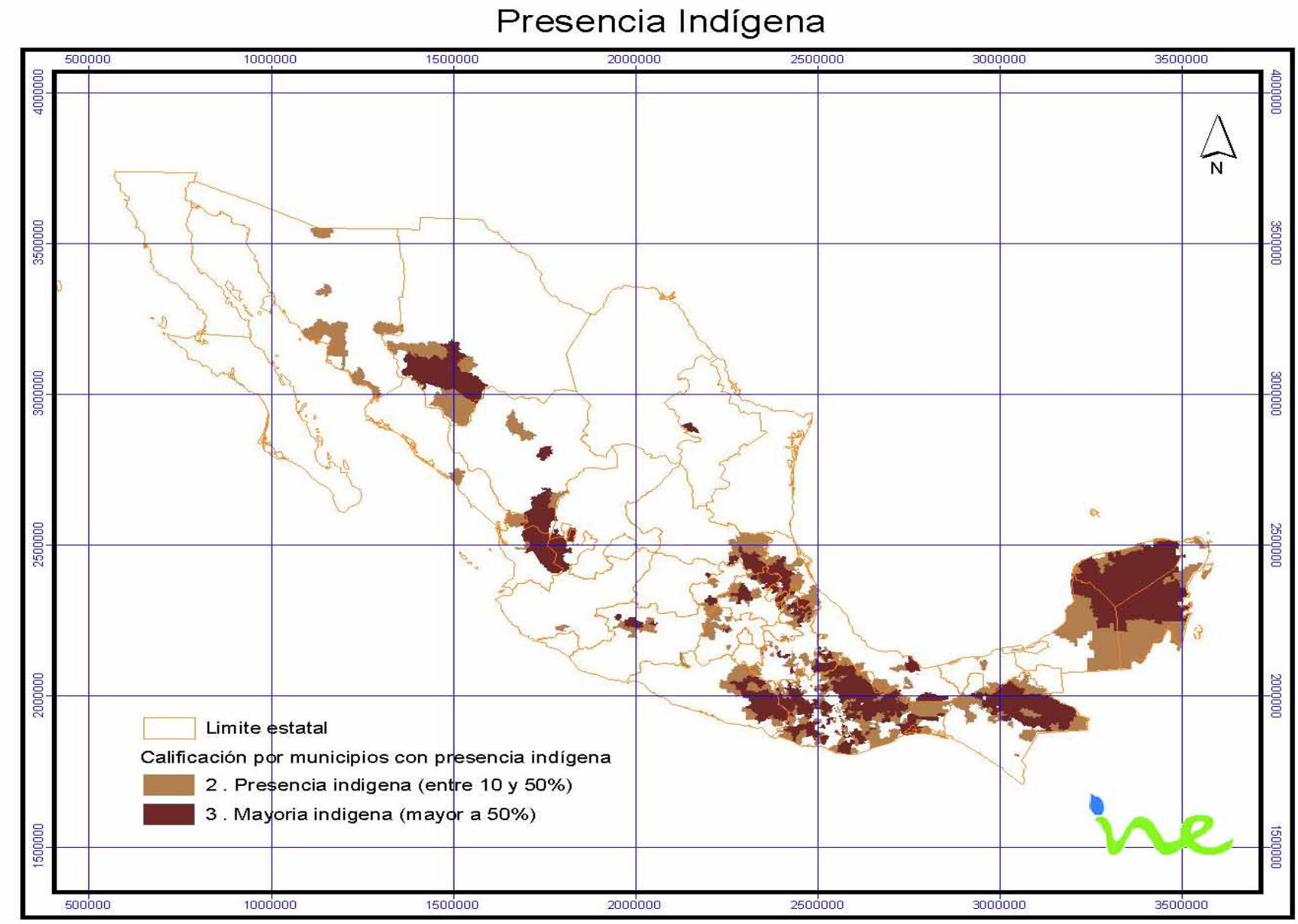
„Priority“ Mountains



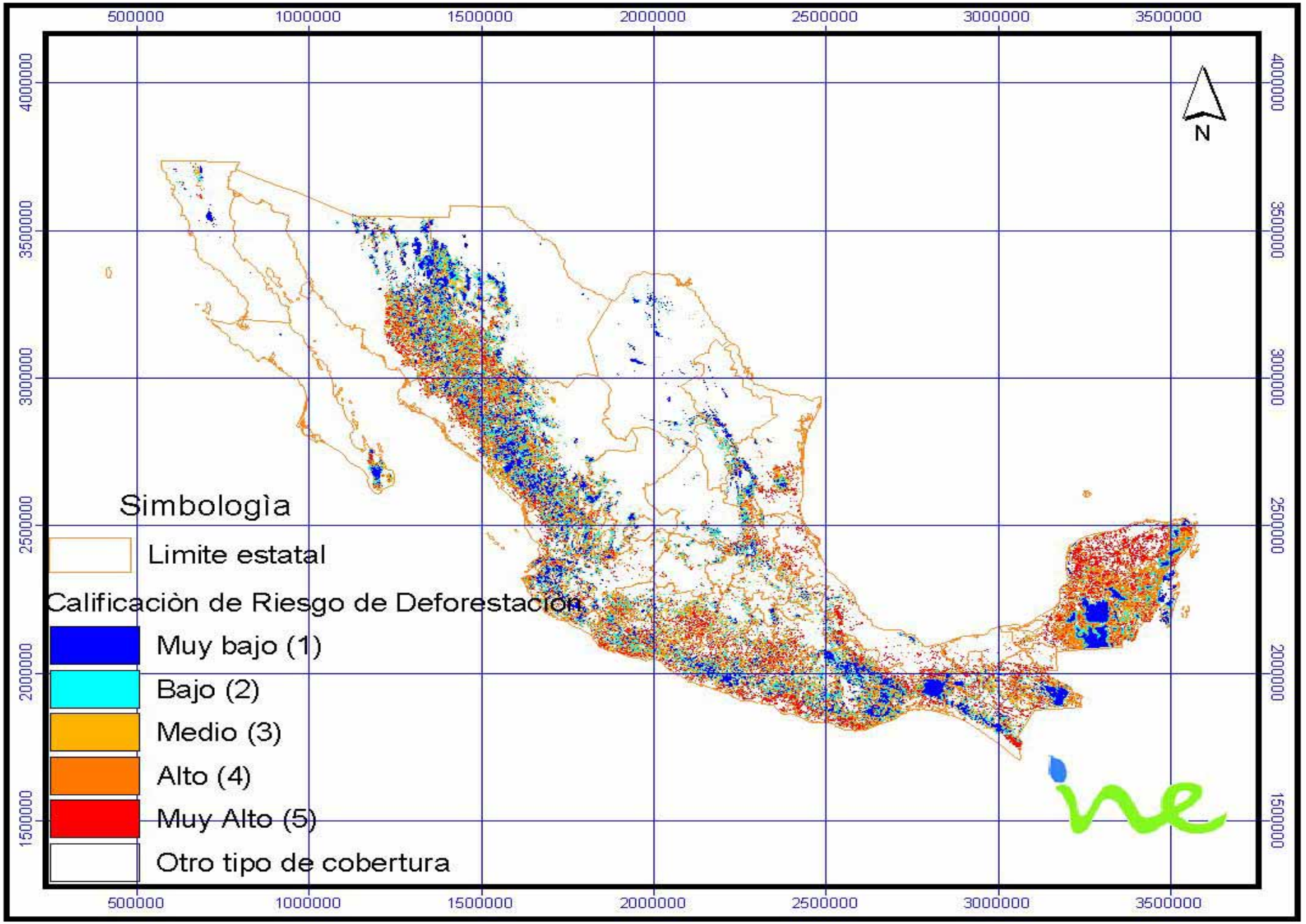
Watersheds with high risks of flooding



Indigenous municipalities



Riesgo de Deforestaciòn



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Next Steps II:
A program for other environmental services

- Agricultural and Forestry lobby pushed for this new program.
- Basic approach: fund project design and implementation
- Political economy: Producers and technical advisors interests.

Characteristics

- Selection with a grading system considering location and community characteristics.
- Amount of subsidy depends on size of plot, and for carbon on community characteristics

Risks

- No buyer assured, not necessary to comply with intnl standards. (risk)
- No pre-assesment of profitability; experience of past failure