



**Legality of Traded Timber  
The Development Challenges  
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# **On the Economics of Legality Assurance: The Case of Costa Rica**

**“Understanding SH-DM and effects on Rule Compliance”**

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# **On the Economics of Legality Assurance**

## **Contents:**

1. In the search for an analytical view to the problem of legal compliance.
2. The Case of Costa Rica.
3. VERIFOR Conclusions and ongoing work.



## Some Existence Economic Questions

Why do we need a forestry law? or Why other competing agricultural products do not have such regulatory measures?

What is the public interest in a forest law?

What do we want to understand: only behavior (DM) for rule acceptance or the behavior (DM) behind rule making, or cause-effect between the two phenomena?



# Forest Law making and its compliance is not a simple economic problem!

What is the common good that the State wants to protect with the forest law (public good or the access to resources by powerful interest groups?)

Why...

- Not all illegal actions produce an environmental harm?
- Not all illegal actions have a legal option (no opportunity cost!)
- many legal forest activities produce an environmental damage (land use change)?



# Particular characteristics of Forests

Multi-functionality of forest in the provision of a bundle of good and services :

- Production forest: Private goods (timber/NTFP/tourism)
- Environmental forest: Public services (ecosystem functions)

1. ¿How much of those private and public Good and Services from the forests are required by society?
2. ¿What mechanisms are required by each type of good and service for their correct allocation?



Let´s build address our problem with a well known concept....

“People are observed to demand and to supply certain goods and services through market institutions. They are [also] observed to demand and to supply other goods and services through political institutions. The First are called private goods; the second are called public goods.”

(Buchanan ,1968. The Supply and Demand of Public Goods).

| <b>Economic view</b>                          | <b>Production Forest</b>   | <b>Environmental Forest</b>   |
|---|--|---|
| Type of Goods and Services provided by forest | Private (Divisible) goods<br><br>Timber, NTFP, Tourism, hunting rights | Public (Indivisible) goods<br><br>Environmental functions (CO2 fixing/storage, biodiversity, H2O cycle, etc.) |
| Institution                                   | Markets (Bilateral)  | Political (Multilateral)  |
| Social Dynamics                               | Consumer and Producers   | Power dynamics of interest groups   |
| Allocation mechanism                          | Price  | Vote  |

| <b>Economic view</b>      | <b>Production Forest</b>          | <b>Environmental Forest</b>     |
|---------------------------|-----------------------------------|---------------------------------|
| Constitutional governance | Private property rights           | Majority rule<br>(Simple/75-25) |
| Costs                     | Transaction costs                 | Agreement Costs                 |
| Utility capture           | Forestland owner and wood workers | Society as a whole              |

Public Choice's vision of the State

**Hypothesis:** Decisions in the political institutions (environmental services) affects the production of market goods (timber) and *viceversa*: “Mixed” forest land rent composed of market and non-market incomes and outcomes.

# ***Fiscal Arrangements in forest resource allocation in private forestland in CRI***

(CBA at policy level)

| <b>Society interest groups</b> | <b>Value</b> | <b>Tax</b> | <b>Forest Policy Agreements Reached at the forest law 7575 (1996)</b> | <b>Forest Net Value</b> |
|--------------------------------|--------------|------------|---|-------------------------|
| <u>Environmental</u>           | 4            | 3          | Agree to pay taxes for PES  | +1                      |
| <u>Industrial</u>              | 4            | 3          | Agree to pay forest taxes   | +1                      |
| <u>Forest Owner</u>            | 4            | 3          | Agree to implement SFM & invest                                       | +1                      |
|                                |              |            |   | <b>+3</b>               |

Adapted from Buchanan & Musgrave (1999)

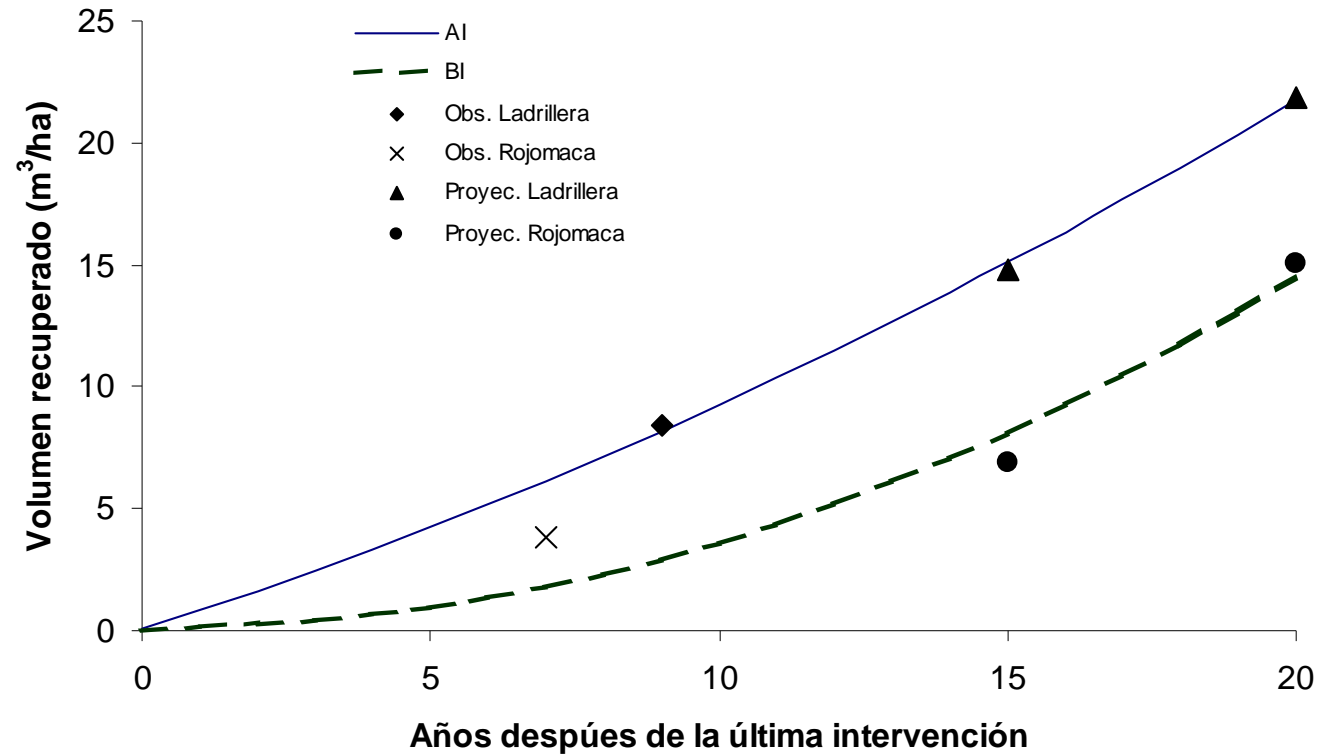
**Majority rule of at least  $\frac{3}{4}$  or consensus reaches an ideal situation for forest law compliance:** All interest groups actors must perceive benefits and share costs for obtaining the agreed amount and condition of production and environmental forest that will provide demanded goods and services by society.

# Effect of Forest Law compliance at the producer level for SFM in CRI (Micro- CBA)

| “Unregulated” SFM conditions   | Costs distribution                         |
|--|--|
| Society pays for the environmental services provided by society            | \$42/ha/yr (E)                             |
| No fallacy of value adding policy (allow for efficient intermediation)     | No dumping effect (I)                      |
| No cost for accessing legality   | Forest tax compensate control costs (I)    |
| All commercial trees can be harvested based on relative abundance criteria | >0.3 trees/ha (FO)                         |
| Cutting cycle defined considering forest cond                              | 10 years (FO)                              |
| Harvesting intensity considers forest growth                               | 75% of all commercial trees above MHD (FO) |
| Protection zones are defined based on hydrology criteria and technology    | 10% of forest area (FO)                    |



# Commercial volume recovery for two different harvesting scenarios. Sarapiquí, Costa Rica. 2005.

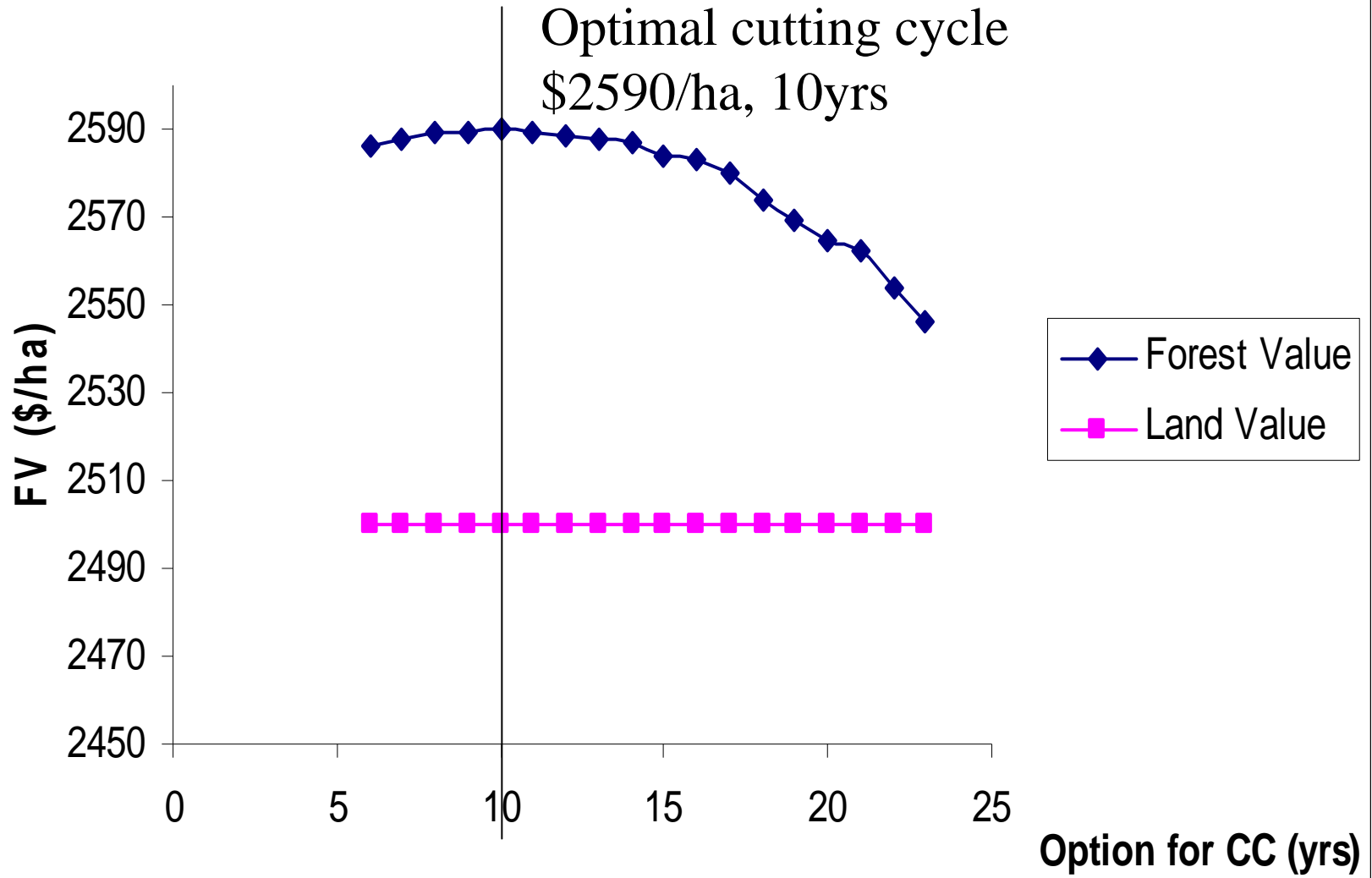


| Site (PPM) | Basal area / ha > MHD |             |                 |                  | No of trees / ha > MHD |           |            |                   |
|------------|-----------------------|-------------|-----------------|------------------|------------------------|-----------|------------|-------------------|
|            | Bef. H.               | Reduced (%) | Reduced (m²/ha) | Year to recovery | Bef. H.                | Reduced % | Red No./ha | Years to recovery |
| TIR2       | 3,71                  | 58,8        | 2,2             | 11               | 8                      | 62,5      | 5          | 6                 |

Meza, 2008.



## Forestland Value under SFM in Costa Rica



# Fiscal Arrangements For forest allocation in private land “The Reality”

**simple majority rule (51-49%)**

| <b>Society interest groups</b> | <b>Value</b> | <b>Tax</b> | <b>Forest Policy Movements agreed by power groups (1998-2004)</b> | <b>Forest Net Value</b> |
|--------------------------------|--------------|------------|---|-------------------------|
| Environmental                  | 4            | 0          | Eliminate PES/ set over-regulation                                | +4                      |
| Industrial                     | 4            | 0          | Contested payment of forest tax                                   | +4                      |
| Forest State Ad                | 4            | 0          | Transfer forest control-For Regent                                | +4                      |
| Forest owner                   | 2            | 15         | Assume all costs/ Perceive no benefit in long term                | -13<br>IL               |
|                                |              |            |   | +1                      |

Adapted from Buchanan & Musgrave (1999)



# **Sustainable forest Management require restrictions!**

1. Inefficient intermediation (high margins)
2. High cost for accessing legality
3. SFM over regulations:
  - Heavy planning for reduce harvesting impact
  - Ban of scarce and endangered species
  - 15 years minimum cutting cycle
  - 40% Remnant Commercial and Seed trees per species
  - Protected Areas (Riparian zones, water springs and steep slopes) (35% areas)

**“Too much work for four trees/ha”**

# Cost of accessing legal use of the forest resource

| Activities  | Cost of activity           | Cost per cubic meter roundwood | Natural forest                 | Trees outside na   |   |
|---|----------------------------|--------------------------------|--------------------------------|--|---|
|   |                            |                                | Management and Harvesting Plan | Forest Inventories with "Bosque 2000" and GPS verification | Forest Inventories without GPS verification |
| <b>Harvesting permit preparation</b>                                |                            |                                |                                |  |   |
| Natural forest Management plan                                      | \$2.9 /m <sup>3</sup> stpg | \$3.4                          | \$3.4                          |  |   |
| Forest Inventory  | \$1.4 /m <sup>3</sup> stpg | \$1.6                          |                                | \$1.6  | \$1.0                                       |
| Regency contract firm   | \$15.0 /unit               | \$0.2                          | \$0.2                          | \$0.2  | \$0.2                                       |
| Certificate of ownership  | \$10.0 /unit               | \$0.1                          | \$0.1                          | \$0.1  | \$0.1                                       |
| Intermediary empowerment  | \$10.0 /unit               | \$0.1                          | \$0.1                          | \$0.1  | \$0.1                                       |
| <b>Formalization of Harvesting Permit</b>                           |                            |                                |                                |  |   |
| Certificate of origin   | \$2.6 /m <sup>3</sup> stpg | \$2.6                          |                                |  |   |
| Transaction cost/day (M/D, expenses and travel)                     | \$43.0 /unit               | \$0.6                          | \$2.9                          | \$2.9  | \$2.9                                       |
| Bureucracy opportunity cost (50% annually)                          | \$119.0 /month             | \$1.6                          | \$6.1                          | \$3.0  | \$3.5                                       |
| Bribing fees for purchasing transport permits (with reusage effect) | \$159.8 /unit              | \$6.5                          |                                |  |   |
| <b>Timber Harvesting</b>  |                            |                                |                                |  |   |
| Forest Regency services   | \$1.0 /m <sup>3</sup> rw   | \$1.0                          | \$1.0                          | \$1.0  | \$1.0                                       |
| <b>Total</b>  |                            |                                | <b>\$13.9</b>                  | <b>\$9.0</b>   | <b>\$8.8</b>                                |



## Costs of Accessing legality in the CA Region

| País                              | Honduras<br>2006                                      | Nicaragua<br>2006  | Costa Rica<br>2005   |
|-----------------------------------|---|--|--|
| <b>Costo de un Plan de Manejo</b> | \$13.27/m <sup>3</sup><br>forest tax payment included | \$7-18/m <sup>3</sup> (50-499ha)<br>\$20-23/m <sup>3</sup> (>500ha)<br>Forest tax payment included | \$13.9/m <sup>3</sup><br>Do not include forest tax payment |
| <b>Period for approval</b>        | 3 to 6 months   | 6 to 19 months   | 6 to 18 months   |
| <b>Actors and Steps involved</b>  | 20 actors<br>53 procedures<br>71 steps                | +28 actors<br>+72 proceduers<br>+86 Steps<br>(Two separate administration for MP and POA)          | 11 actors<br>31 Procedures<br>34 Steps                     |

| <b>Description</b>  | <b>Conditions</b>              | <b>LEV<br/>\$/ha</b> | <b>Diff Value<br/>\$/ha (%)</b> |
|---|--------------------------------|----------------------|---------------------------------|
| <b>Initial Condition:</b> Unregulated SFM w/PES               | <b>Land Price \$2000-2500</b>  | 2,590                |                                 |
|   | <b>S1:PES removal (E)</b>      |                      | 1024(37%)                       |
| <b>Scenario No1:</b> Unregulated SFM - PES                    |                                | 1,566                |                                 |
|   | <b>S2: Intermediary (I)</b>    |                      | 473 (17%)                       |
| <b>Scenario No2:</b> S1 – Intermediary costs (IC)             |                                | 1,093                |                                 |
|   | <b>S3: Legal costs (B/E)</b>   |                      | 375 (13%)                       |
| <b>Scenario No3:</b> S2 - Legality costs (LC)                 |                                | 717                  |                                 |
|   | <b>S4: Ban Species (E)</b>     |                      | 323 (12%)                       |
| <b>Scenario No4:</b> S3 - Ban species                         |                                | 394                  |                                 |
|   | <b>S5: Cutting cycle (E)</b>   |                      | 187 (7%)                        |
| <b>Scenario No5:</b> S4 – CC restrictions (CC <sub>15</sub> ) |                                | 206                  |                                 |
|   | <b>S6: Harv. Intensity (E)</b> |                      | 145 (5%)                        |
| <b>Scenario No6:</b> S5 - Diminish Harv Int 60%               |                                | 61                   |                                 |
|   | <b>S7: PA (E)</b>              |                      | 262 (9%)                        |
| <b>Scenario No7:</b> S6 + increase PA <sub>40%</sub>          | <b>Subtotal overregulation</b> | <b>-201</b>          | <b>918 (33%)</b>                |
| <b>Total</b>  |                                |                      | <b>1,767</b>                    |



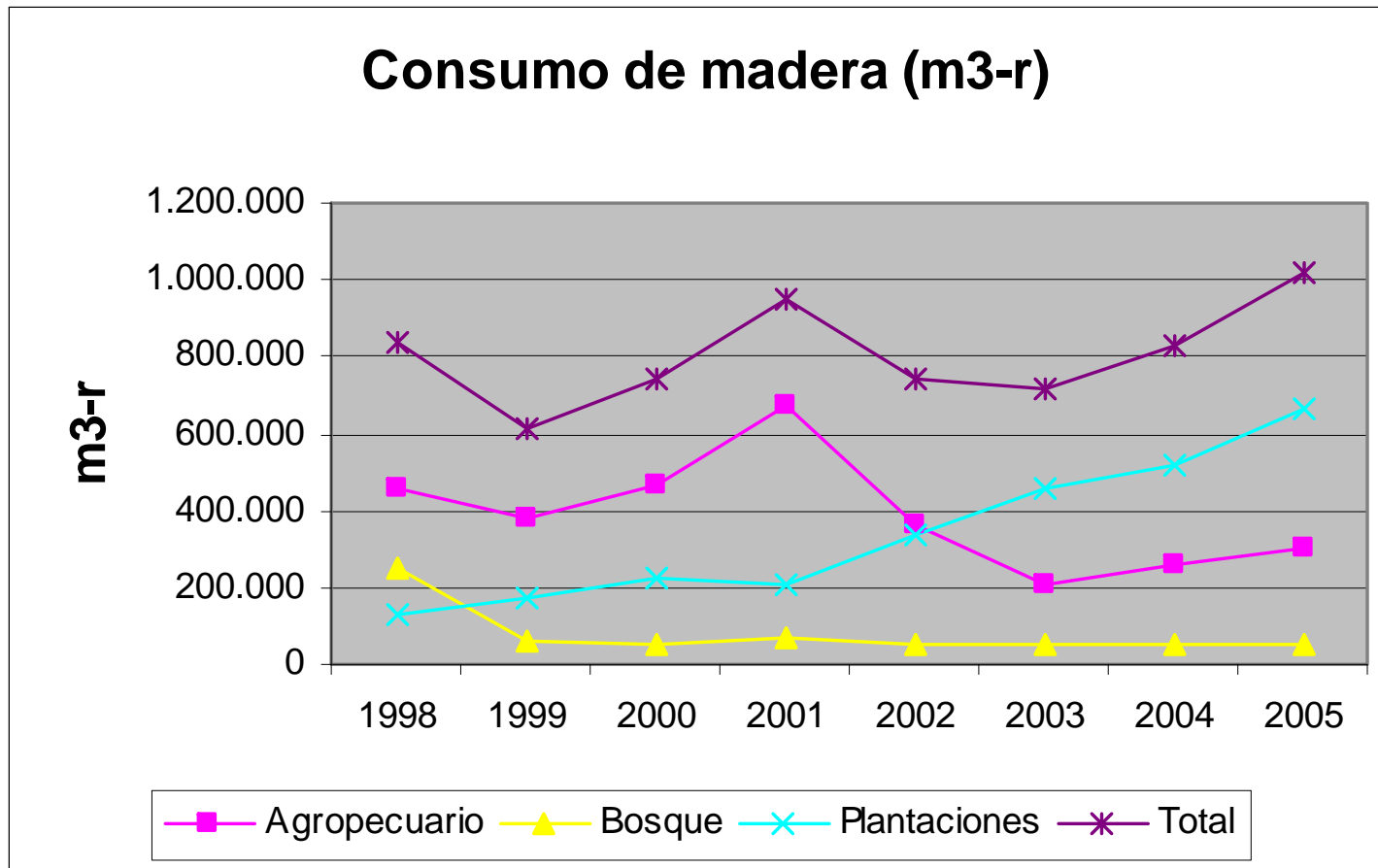
# SFM-Ban of Natural Forest in Costa Rica

- As the ban on SFM grew between 1998 and 2003, the process of illegal logging and deforestation increased to access easier more quantity and cheaper wood.

## Volume and percentage of wood coming from trees outside forest (TOF)

|             |                      |
|-------------|----------------------|
| <b>1998</b> | <b>458,538 (54%)</b> |
| <b>1999</b> | <b>379,437 (62%)</b> |
| <b>2000</b> | <b>467,543 (63%)</b> |
| <b>2001</b> | <b>673,426 (71%)</b> |
| <b>2002</b> | <b>358,771 (48%)</b> |
| <b>2003</b> | <b>205,401 (23%)</b> |
| <b>2004</b> | <b>259,279 (31%)</b> |

# Roundwood consumption in Costa Rica 1998-2005 (cubic meters roundwood)



# Further considerations

- It has not been considered the complexity of demand of land from agricultural sector which would also explain DEFORESTATION.
- Many of these problems have to be fixed at the CONSTITUTIONAL level (limitation to private property in respect to public goods, definition of majority rule, compensation principles).
- The AGREEMENT COST increase extremely with group size rise
- Select legitimate stakeholders for decision making will share equitably costs and benefits



# Conclusions

- As you have seen, the efficient solution to allocate environmental forest (public) goods depends on the institutional organizational arrangement.
- To find out the optimal allocation of private and public forest goods and services is really a study of the fiscal arrangements at the political sphere.
- **Every decision in the forestry political institution sphere of forestry affects the private (timber) production sphere and vice versa.**

