Policy issues of seed transfer for forest management under climate change: \textit{where do tropical countries stand?}

Juan F. Fernandez-M.

CNRS

IUFRO-Ecofor International Symposium
27-29 May 2010, Paris
Talk Outline

• Introduction
  - Climate change and forest adaptation
  - General Policies regarding seed transfer

• Geographic distribution of studies provenance/seed zones that address climate change

• Conclusions
Introduction

• It is widely accepted that forest conversion and burning is the second cause of CO$_2$ increment in the atmosphere.

• Hence, *conserving* forests, *reforestation* and *afforestation* has been proposed as key mitigation measures to cope with human induced climate change.

• Evidently, we start forests with seeds.

• However, *how* we *trade* seeds, *what* we *plant* and *what* we *study* is highly different between tropical and temperate countries.
Introduction (cont.)

- Forests need to be seen as something more valuable than carbon sinks.

- The added value of biodiversity and ecosystem services will highly depend on which species are planted.

- What are then the role of policies, research priorities and practices in these issues?
Climate change & Forest adaptation recommendations

Use of multiple provenances of the same species to ensure local diversity allows either plastic or raw material for evolution.

Introduction of new species that historically have occurred in the region during historical warm periods: neo-native forests.

Introduction of alien/modified species that have proved resistant to climate extremes.

Assisted Migration Options

Measures require seed transfers at different scales!
Policy and regulations for seed commerce

- Convention on biological diversity
- Organization for Economic Co-operation and Development: OECD
- Regional regulations: EU 105/1999
- National regulations

*Restriction/Protection Tool!*

Contribution on biological diversity
How to know what to plant?

• Provenance tests
• More than 100 year of experiments
• Arguably the best tool to understand plant responses

Ecological gradient
How to know what to plant?

- Provenance tests in a changing climate
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Most planted species in the world

FIGURE 3.9
Twenty-five most common tree genera reported

1 Among the ten most common species reported by 88 countries.
Number of Provenance studies of the most planted species in the World\textsuperscript{1}

\begin{figure}
\centering
\includegraphics[width=\textwidth]{provenance_graph.png}
\caption{Provenance studies of the most planted species in the World.}
\end{figure}

\textsuperscript{1} ISI web of science searched in May 2010
Studies explicitly addressing Provenance Tests and Climate change

Only Five studies from tropical regions…
Provenance Studies addressing Climate Change in Tropical plants

Figure 3.11: Number of native forest tree species

- Quercus rugosa
- Pinus hartwegii
- Pinus oocarpa
- Pinus patula
- Pinus tucumanni
- Prosopis africana
- Prosopis chilensis
- Prosopis pallida
- Nothofagus pamilu
Provenance Studies addressing Climate Change in Tropical plants & Deforestation

Net change in forest area by country, 2005–2010 (ha/year)

Quercus rugosa
Pinus hartwegii
Pinus oocarpa

Pinus patula
Pinus tucumanni

Prosopis africana

Nothofagus pamilu

Prosopis chilensis
Prosopis pallida

Net loss
- More than 500,000
- 250,000–500,000
- 50,000–250,000

Small change (gain or loss)
- Less than 50,000

Net gain
- 50,000–250,000
- 250,000–500,000
- More than 500,000
What else has been studied in the tropics?

Why plantations are not using other species?
Low Diversity Spiral

Few species used historically

Studies concentrated on Few species

Low budget for tropical species studies

Low tropical diversity plantations

Markets used to few species
Study Case: Chinchina, Central Colombia, South America

- Began in 2001, inscribed this in April 2010 in REDD
- Protection of 15000 Ha of natural forest
- Plantation of 15000 Ha of production forest
- To enhance ecological services
- Create 1500 jobs (direct and indirect)
- Species chosen:
  - *Pinus patula* 50% (Mexico)
  - *Alnus jourulensis* (Native, but water thirsty…)
  - *Cordia alliodora* (Native, but on edge of distribution)
- FAO estimates that Colombia has at least 5000 native tree species
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• Looking at forests only as carbon sinks can have a pernicious effect on biodiversity as a whole because many newly planted forests are done with well known commercial species that are often exotics.

• The relatively few barriers for trading of commercial seeds perpetuates the use of a reduced number of species.

• Moreover, large differences in the state of research between developed and developing countries can hinder the implementation of biodiversity rich forest
Thank you for your attention.