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The role of bamboo in environmental management

By

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The views expressed are those of the author and do not necessarily reflect the views of UNCTAD.



The role of bamboo in environmental management - carbon sequestration, protecting biodiversity and eco systems, restoration of degraded lands

Multi-year Expert Meeting on Commodities and Development
10 – 12 October 2022, Room XVII, Palais des Nations, Geneva



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- I. The global restoration movement
- II. The potential for bamboo restoration
- III. The global restoration Initiative and bamboo

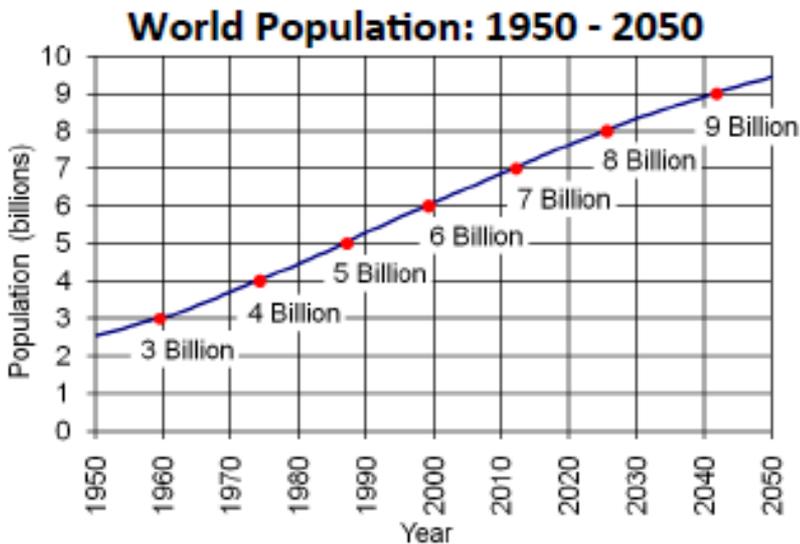


- ❑ Increasing pressures on land,
- ❑ Decreasing utilization of land,
- ❑ The poor are disproportionately affected.



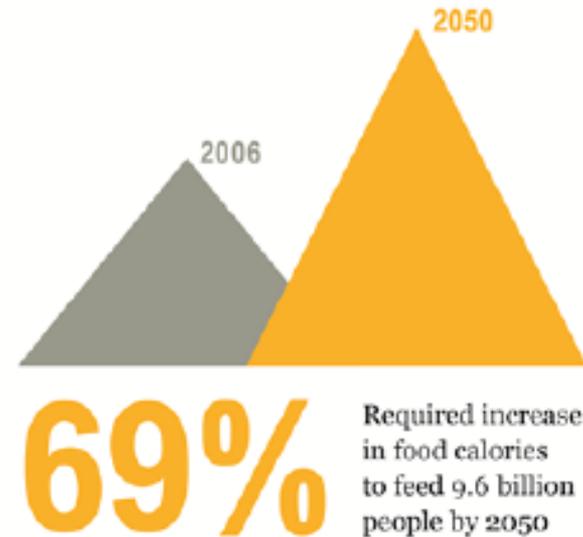
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Population increase to 9.6B by 2050



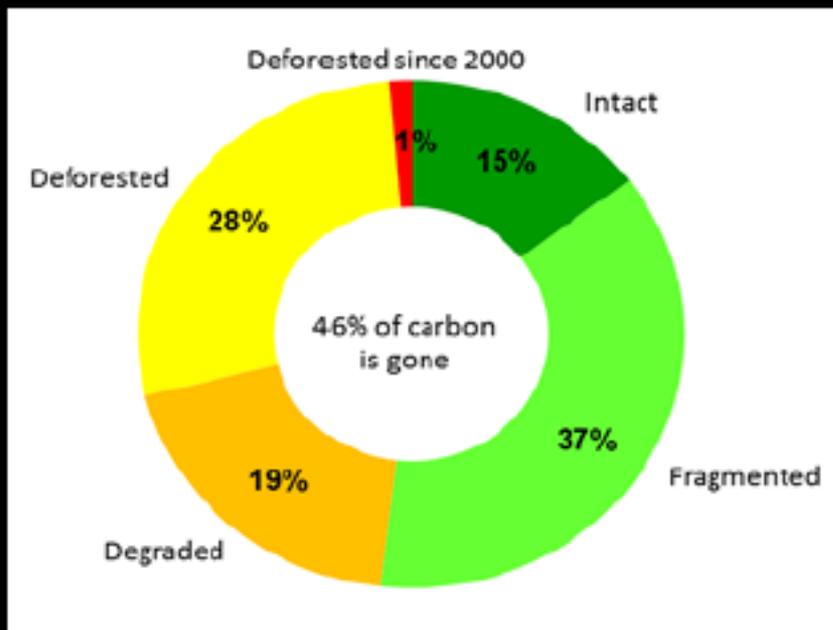
Source: U.S. Census Bureau, International Data Base, June 2011 Update.

Expected consumption increase to 69%

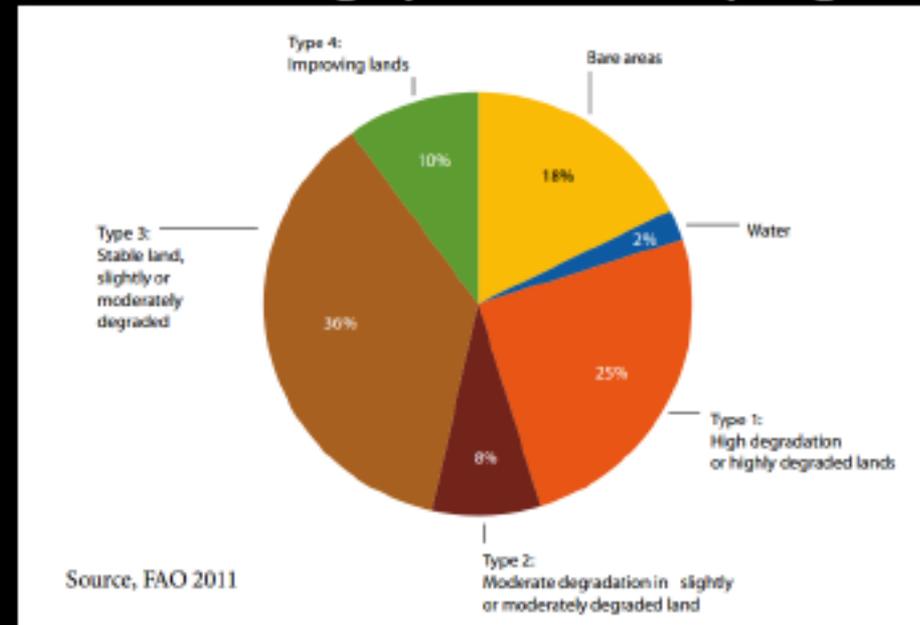


- ❑ Increasing pressures on land,
- ❑ **Decreasing utilisation of land,**
- ❑ The poor are disproportionately affected.

47% of forests degraded or deforested

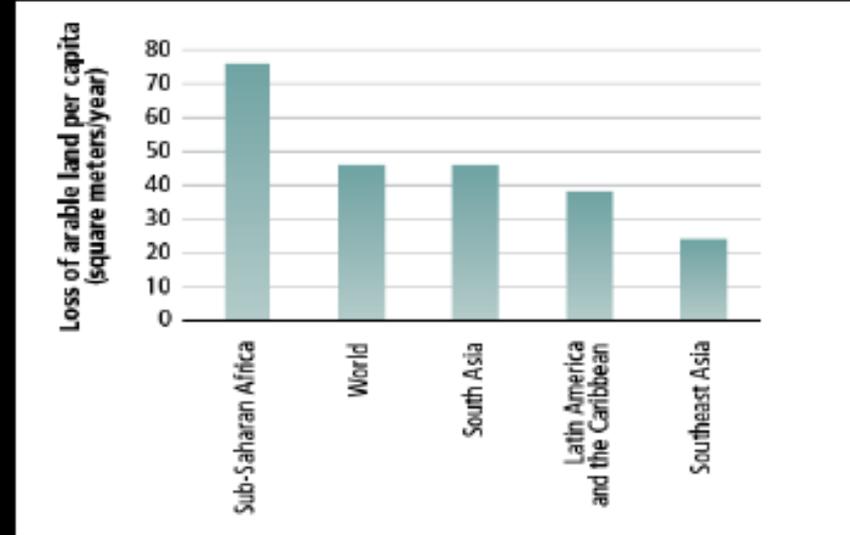
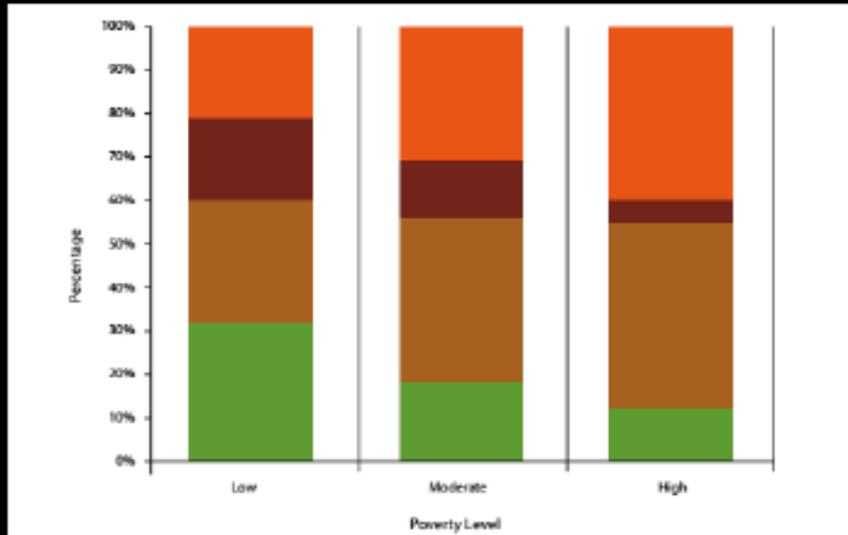


1/3 of land is highly or moderately degraded



- ❑ Increasing pressures on land,
- ❑ Decreasing utilisation of land,
- ❑ **The poor are disproportionately affected.**

The poor face more severe degradation (FAO) 46m² of arable land lost /capita / year (IFPRI)



A World of Opportunity for Forest and Landscape Restoration

2 bn ha with opportunities for restoration



FOREST AND LANDSCAPE RESTORATION OPPORTUNITIES

-  Wide-scale restoration
-  Mosaic restoration
-  Remote restoration

OTHER AREAS

-  Agricultural lands
-  Recent tropical deforestation
-  Urban areas
-  Forest without restoration needs



AMBITIOUS TARGETS EXIST

The Bonn Challenge

150m

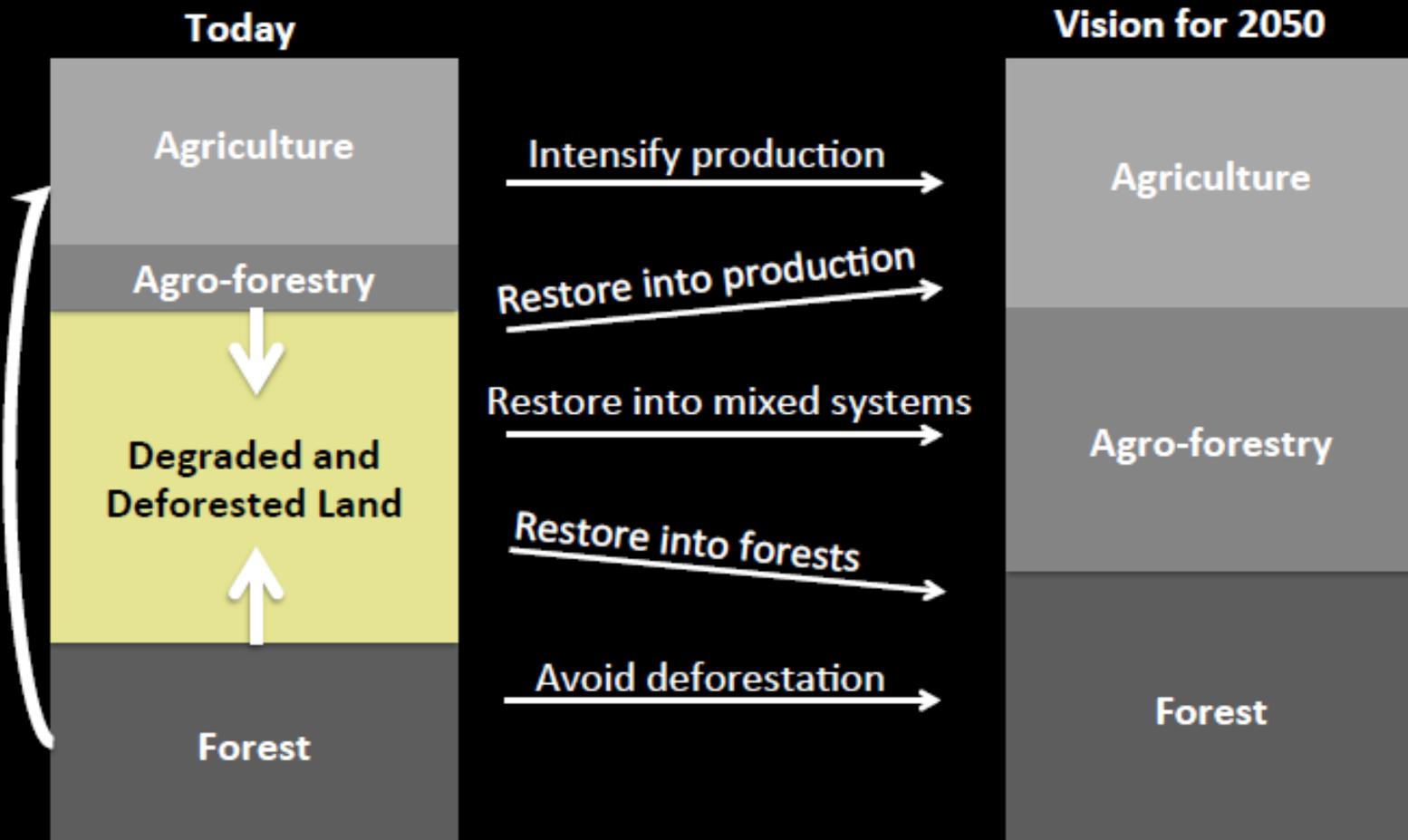
hectares under
restoration by 2020

New York Declaration

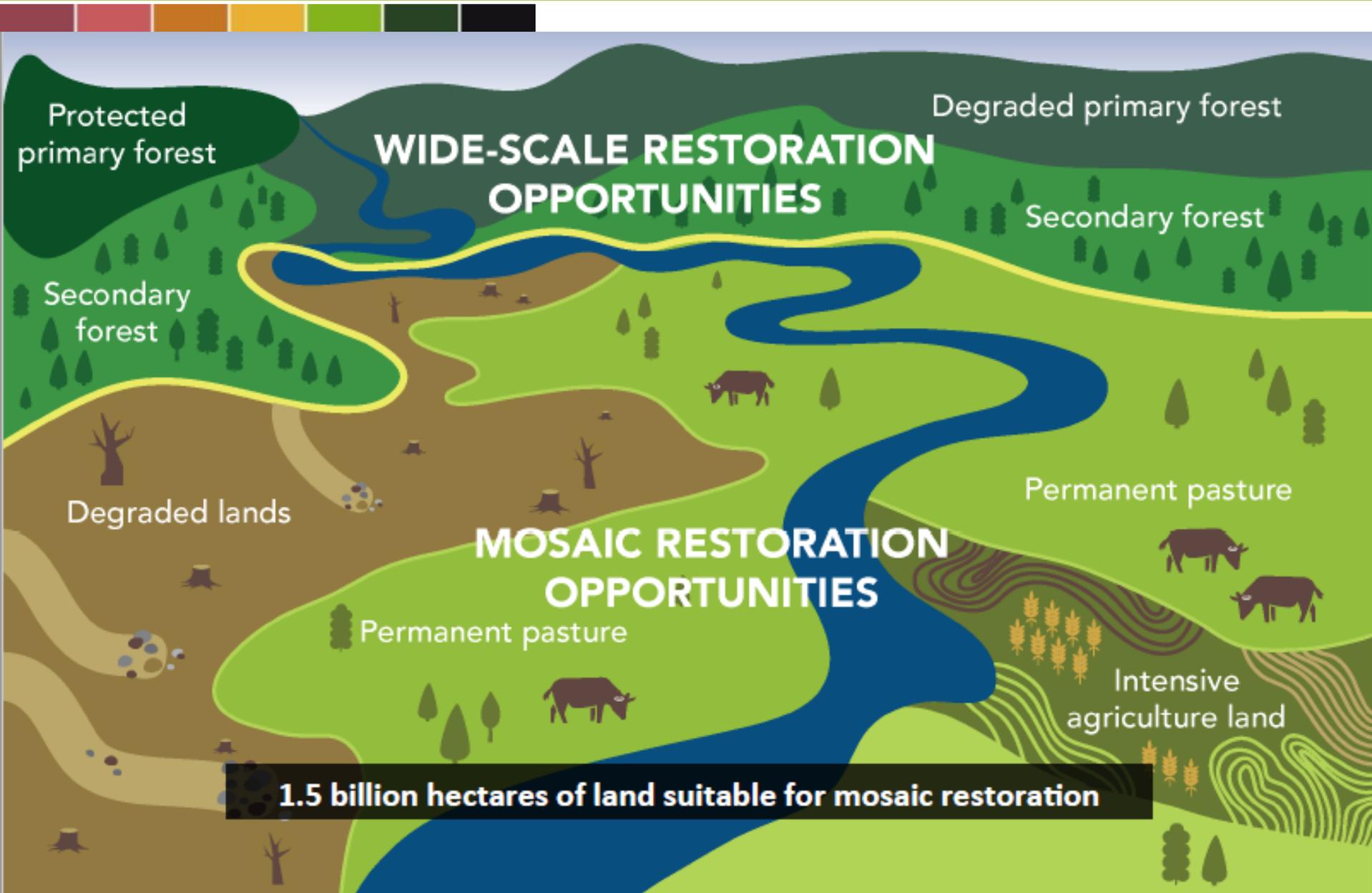
350m

hectares under
restoration by 2030

Global Restoration Initiative : Restore Productivity And Function



The Landscape Restoration Approach



South Korea, 1960

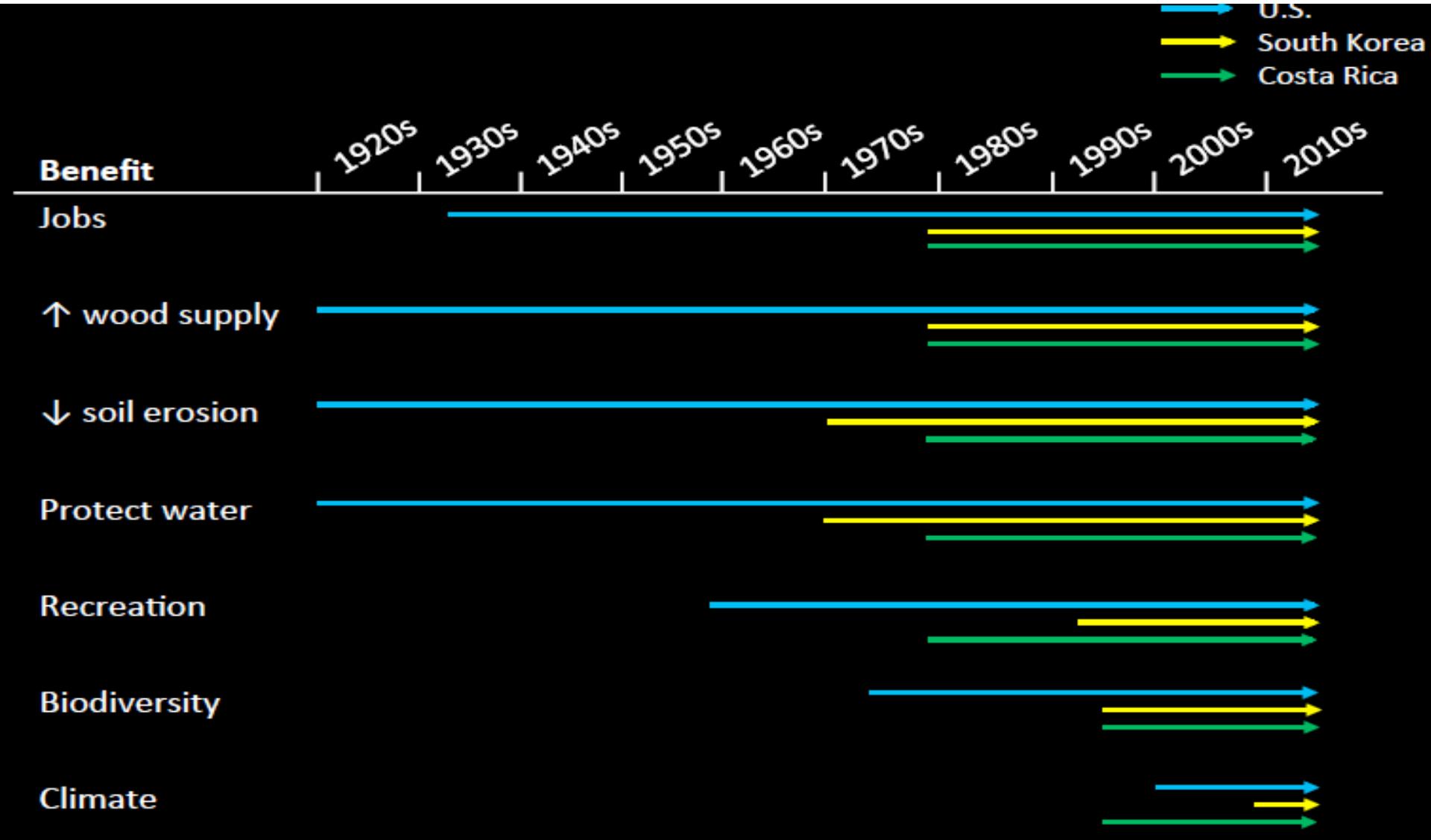


South Korea, 2000



- Forest cover from 35% to 64%
- Forest density increased 14x, population 2x, economy 25x

Desired benefits have evolved?





- ❑ In the 21st Century, we need to reassess the plants we use and how we use them,
- ❑ Plantations currently provide less than 50 percent of the world's demand for round-wood (WWF2015);
- ❑ One of the Fastest growing plant in the world,
- ❑ 1662 bamboo species identified in the world, bamboo's substitutability provides a key way of dealing with contemporary natural resource deficits.

(Canavan et al, 2017)



- ❑ **Rapid maturity** e.g. <7 years for fiber, annually thereafter high productivity, quick returns,
- ❑ **Marginal degraded land utilization** - can grow on low fertility soils, sloping land e.g. will not compete with food,
- ❑ **Reduced inputs** e.g. Less chemical, fertilizer, water input than other fiber sources, no re-planting required continuous yields.



- ❑ **Soil regeneration:** Rhizomes bind soil, protect against erosion, landslides, rhizomes protects top layer of soil (clumping bamboos do not spread extensively),
- ❑ **Ecological benefits:** permanent canopy creates thick layer litter to fertilize soil,
- ❑ **Water benefits: e.g.** 'Greening Red Earth' water table rose from 40 – 33.7m – transformation within 6 years – evergreen water inception and moisture retention,
- ❑ **Livelihood development** – Selective harvesting requires continual labor e.g. 'Greening Red Earth' witnessed 70% of migrant labor force return to bamboo agroforestry labour.





Carbon sequestration

INBAR Model	Moso plantation	Fir plantation
Mean annual carbon sequestration	5.10 tonnes C/ha	2.97 tonnes C/ha
Total carbon stock after 60 years	305.8 tonnes C/ha	178 tonnes C/ha
CO ₂ equivalent after 60 years	1101 tonnes /ha	640 tonnes/ha



**2 – 25 tons/Ha for
monopodial bamboo.
2 – 40 tons/Ha for
tropical bamboo.**

Quelles sont les opportunités ?



Bambou pour la restauration au Cameroun?

- ❑ The TRI project envisage the restoration of 600 000 hectares of degraded landscape in Cameroon,,
- ❑ Intra-Africa programme envisaged 10 000 hectares,





- ❑ In India, bamboo has been planted on severely degraded land – the result of an intensive brick-making industry,
- ❑ In 20 years, the water table had risen by 10 meters (m) and agricultural crops and tree species had been incorporated into a landscape of bamboo,
- ❑ Due to its success, the project has expanded to cover 100,000 ha of degraded land in 600 villages, benefiting more than one million people economically and socially..

- ❑ In Colombia, planting *guadua* bamboo in degraded soil improved soil quality, decreasing soil compaction by more than half.
- ❑ This more porous soil, with a lower bulk density, quickly restored several crucial ecological functions, including water regulation and nutrient recycling.
- ❑ In Nepal, a similar planting has helped reduce soil erosion and flood damage.

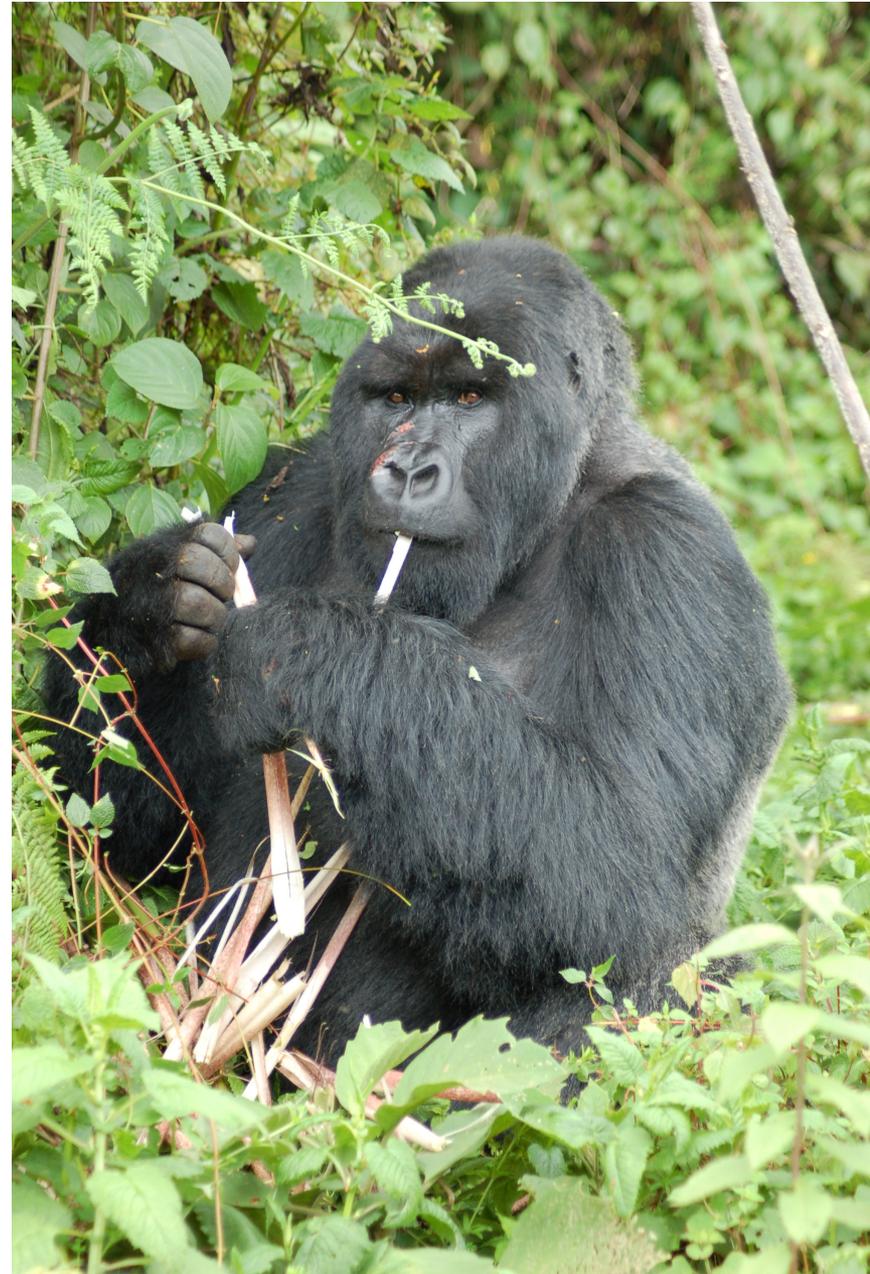
- ❑ A study conducted in China, in the Chishui region, proved that planting bamboo on degraded land improves soil quality and water regulation,
- ❑ A comparison of soil conditions between a bamboo plantation and a sweet potato farm found that the bamboo plantations had 25% water runoff,
- ❑ Bamboo planting also helped to reduce average soil erosion by 80%, and established bamboo plantation significantly reduced soil erosion by up to 27 t soil/ha/yr.

- ❑ In Ghana, since the 1970s, the North Bandai Hills Forest Reserve in the Ashanti Region has been destroyed due to logging, cutting and burning of wood for charcoal, and the activities of herders migrant nomads who bush fires to regenerate new grass to feed their livestock,,
- ❑ To reduce deforestation, Ecoplanet B has established a 2,818 ha commercial bamboo plantation in the northern hill forest of Bandai to reverse deforestation and provide a long-term sustainable source of bamboo fiber for the production of toilet paper. , packaging materials and textiles..

- ❑ Bamboo replaced trees that had been destroyed by bushfires or cut down to burn charcoal,,
- ❑ The bamboo developed shoots and foliage that filled the space between the remaining stands of trees, turning all the ground cover into forest,
- ❑ The growth of wildlife and other plant species in the forest is gradually restored,
- ❑ Birds and bush animals that previously lived in the forest are returning to the forest reserve.



- ❑ Globally, there is growing pressure on land due to food, fuel and fiber needs
- ❑ Bamboo can be one of a range of options to rapidly regenerate degraded land, reduce soil erosion and provide livelihood benefits,
- ❑ Restoration objectives need to be clarified, opportunities mapped and management plans identified to ensure sustainability.







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