

FAO-BRACELPA Side Event

The role of forest plantations – towards a sustainable future.

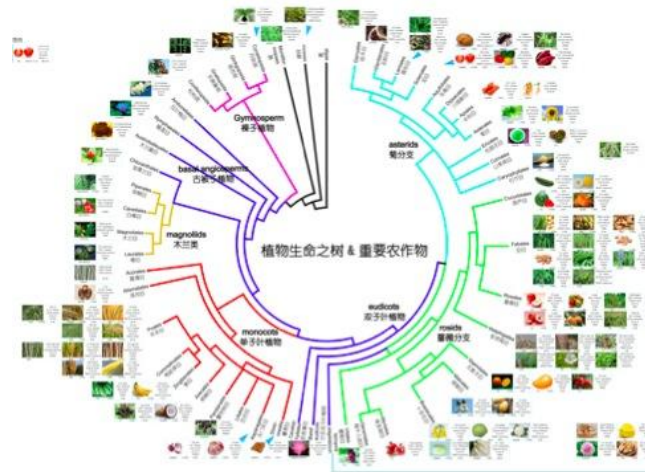
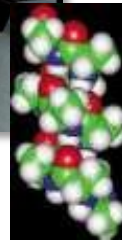
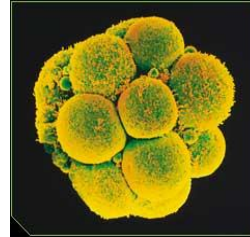
Responsible development and deployment of innovation – the example of GM trees.

Rome – 25th September 2012

Mike May VP Public Affairs, FuturaGene

The science-society divide

The application gap



Increasing the availability of food, feed and renewables, using the combined resources of modern biotechnology and conventional breeding to:

- Increase the yield of crops and livestock,
- Improve the nutritional value of crops and livestock,
- Reduce post-harvest losses,
- Increase integrated crop management,
- Ensure sustainable productivity increases on marginal lands,
- Improve afforestation and reforestation techniques,
- Increase efficiency of nitrogen fixation and mineral absorption.



Mutually reinforcing priorities:

1. Restore 150 million hectares of deforested and degraded lands by 2020.
2. Promote science, technology, innovation and traditional knowledge in order to face forests main challenge: how to turn them productive without destroying them.
3. Zero Net Deforestation by 2020, respecting the rights and knowledge of peoples living in and from the forests and responding to their sustainable development needs.

- Green growth implementation will be driven by novel partnerships that combine the convening power and outreach of inter- and non-governmental organisations with the innovative power of science and technology and the deployment skills of private sector business;
- Novel partnerships established would provide new thought leadership around key goals and technology platforms and how to implement them;
- Innovation, collaboration and governance will be the new pillars of sustainability.

Novel Implementation Partnerships



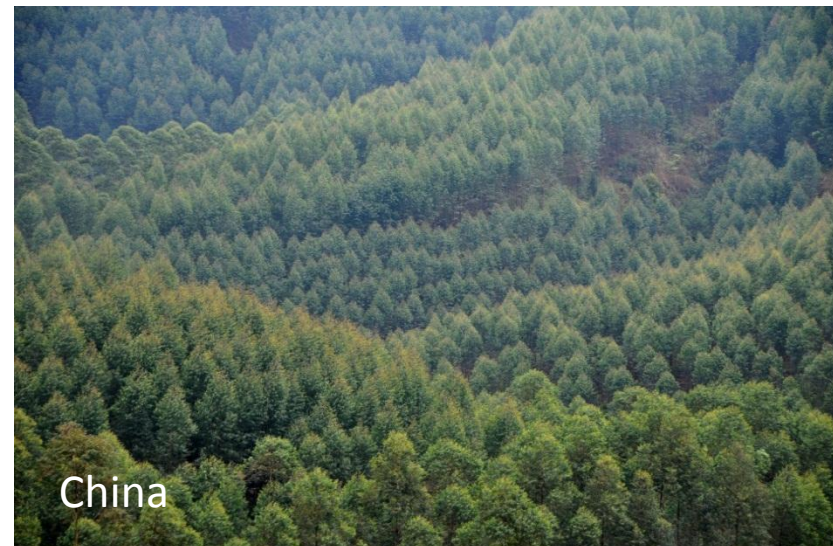
- Products produced in harmony with nature's cycles
- The new standards will be capacity to enhance primary productivity without moving us further towards the earth's carrying capacity



- These standards will be based on step changes in:
 - Life cycle performance,
 - Resource use efficiency,
 - Decoupling,
 - Resilience to environmental shocks and stresses
- Innovation in forest plantation productivity and diversification will drive new value chains for social, environmental and economic renewal

Renewable Planted Forests

Industrial crops on a massive scale





Eucalyptus – Sorghum

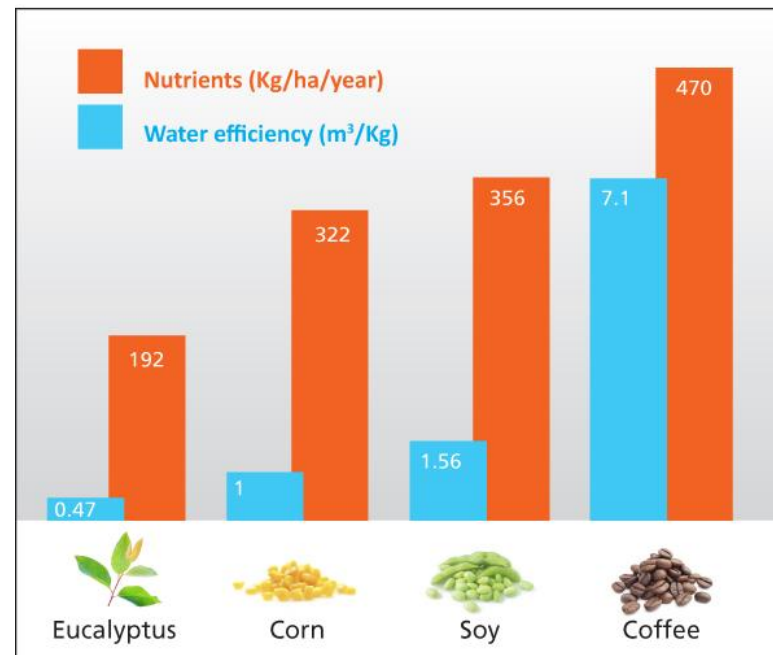
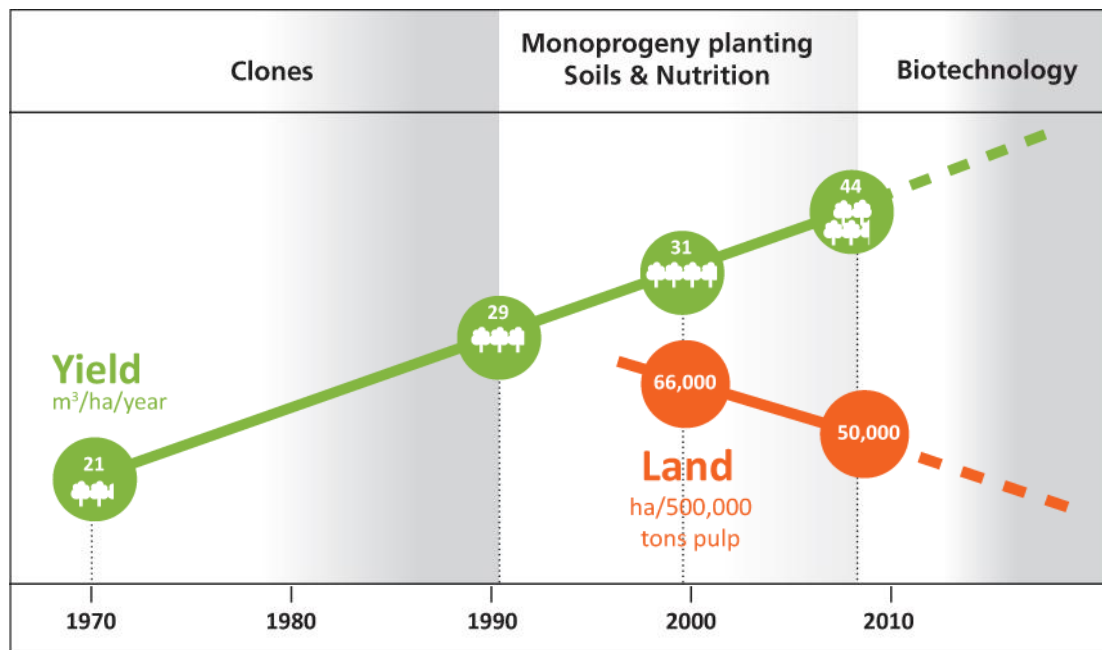
Eucalyptus – Livestock

Source: EMBRAPA



Planted forest innovation

Today's standards



Suzano Pulp & Paper, Bracelpa

Social innovation:

- Involvement of rural communities;
- Minimum impact on food-security (Land use)

Environmental innovation:

- Conservation of indigenous biodiversity at a level and design sufficient for sustainability;
- Reduced use of pesticides;
- Sustaining water resources;
- Maximum sequestration of carbon (on a life cycle basis)

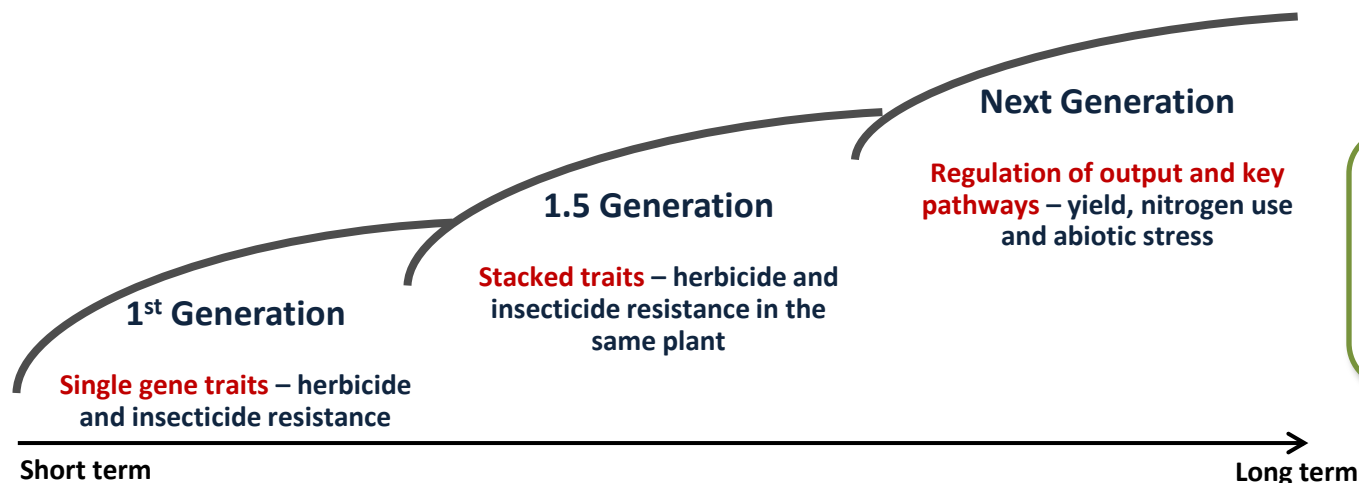
Economic Innovation

- Increased product yield per hectare;
- Diversification of use of harvested fibre (chemicals, plastics, energy etc);
- Increased replacement of non-sustainable products in the market place;
- Increased value extracted per tonne of harvested fibre.

Why biotechnology

Technology and Yield evolution

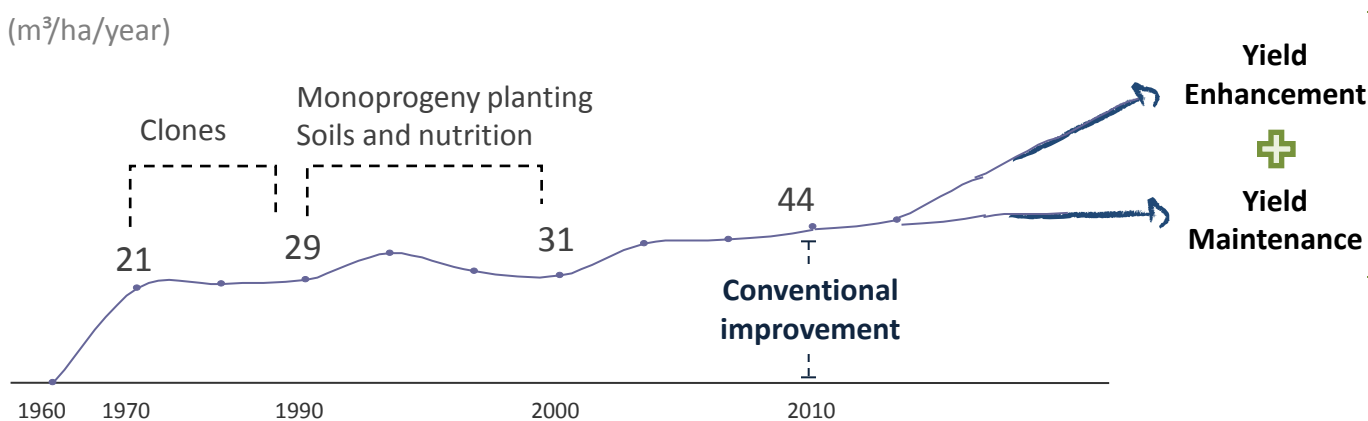
Biotechnology Evolution



Key to Success:
Regulation of food, feed and environmental safety

Forest Yield Evolution

(m³/ha/year)



BIOTECHNOLOGY

- More than 700 field trials since 1988;
- EU: 69 trials, 28 species, 32 traits;
- USA: 708 trials, 37 species, 36 traits;
- 4 commercial releases: papaya & plum (USA), and insect resistant and salt resistant poplar (China);
- High impact of public sector science
- Not only commercial targets, but environmental (eg phytoremediation), conservation (eg Dutch elm disease resistance and American Chestnut rescue)
- Proven technology for containing gene flow and gene stability
- Proven track record of biosafety and risk assessment

First Eucalyptus Field Trial in Brazil

First year growth



Transgenic line 1



Transgenic line 2



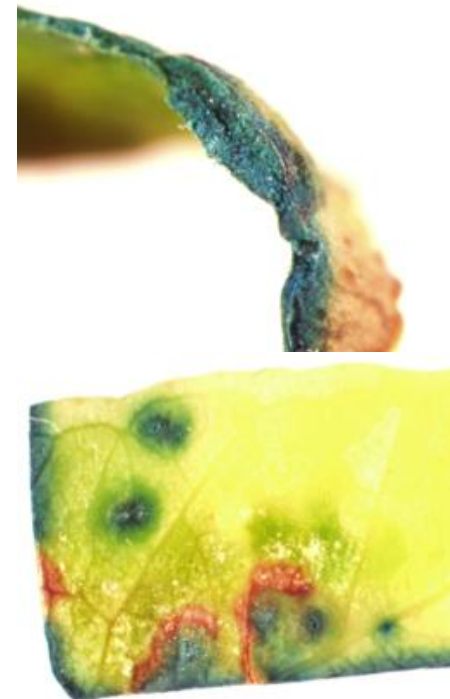
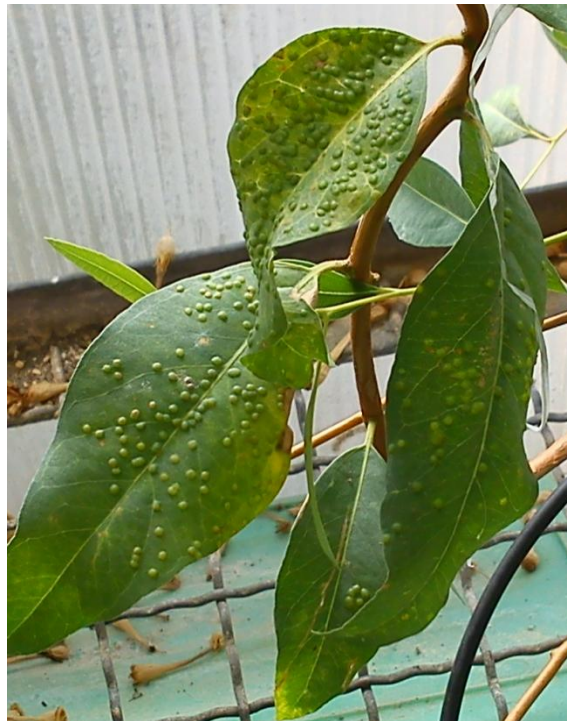
Wild Type

Pest and disease control is based on:

- Breeding.
- Field/ forest management.
- Chemicals.
- Biological control,
- GM technologies

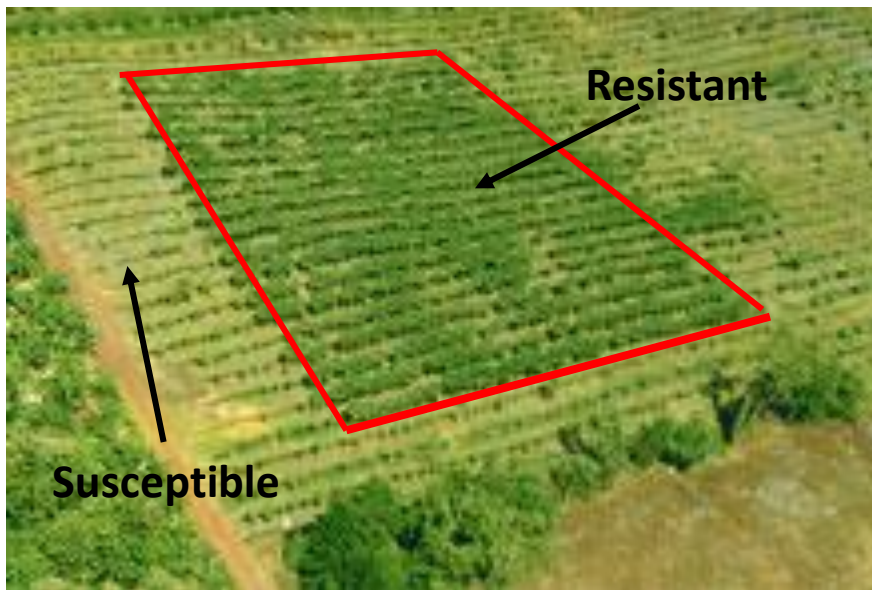
And is needed because of:

- Local problems
- Invasive species
- Climate induced changes in pest population dynamics



Commercial GM trees

- Insect-resistant poplar in China.
- Virus-resistant papaya in Hawaii.



Cultivation of Bt poplars in China

“Seeing once is better than studying a thousand times”

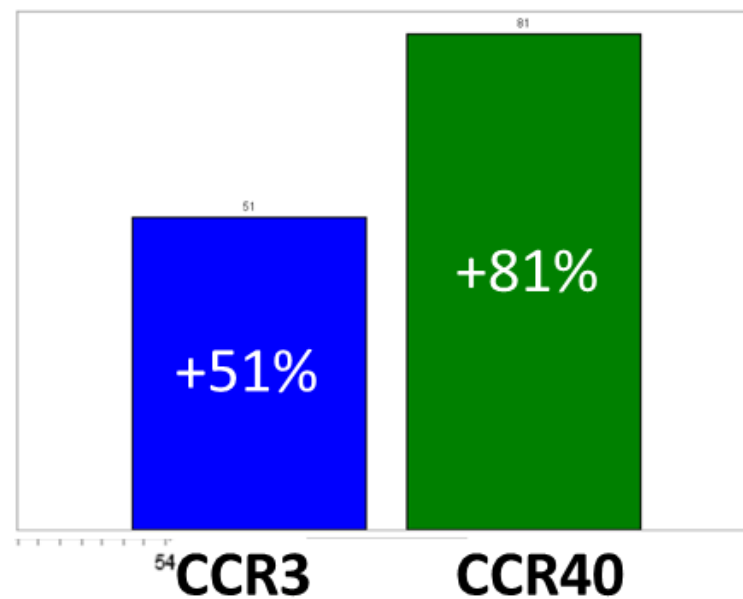


<http://www.gmo-safety.eu/science/woody-plants/316.seeing-once-studying-thousand-times.html>

May 2009



Bioethanol from GM low-lignin trees



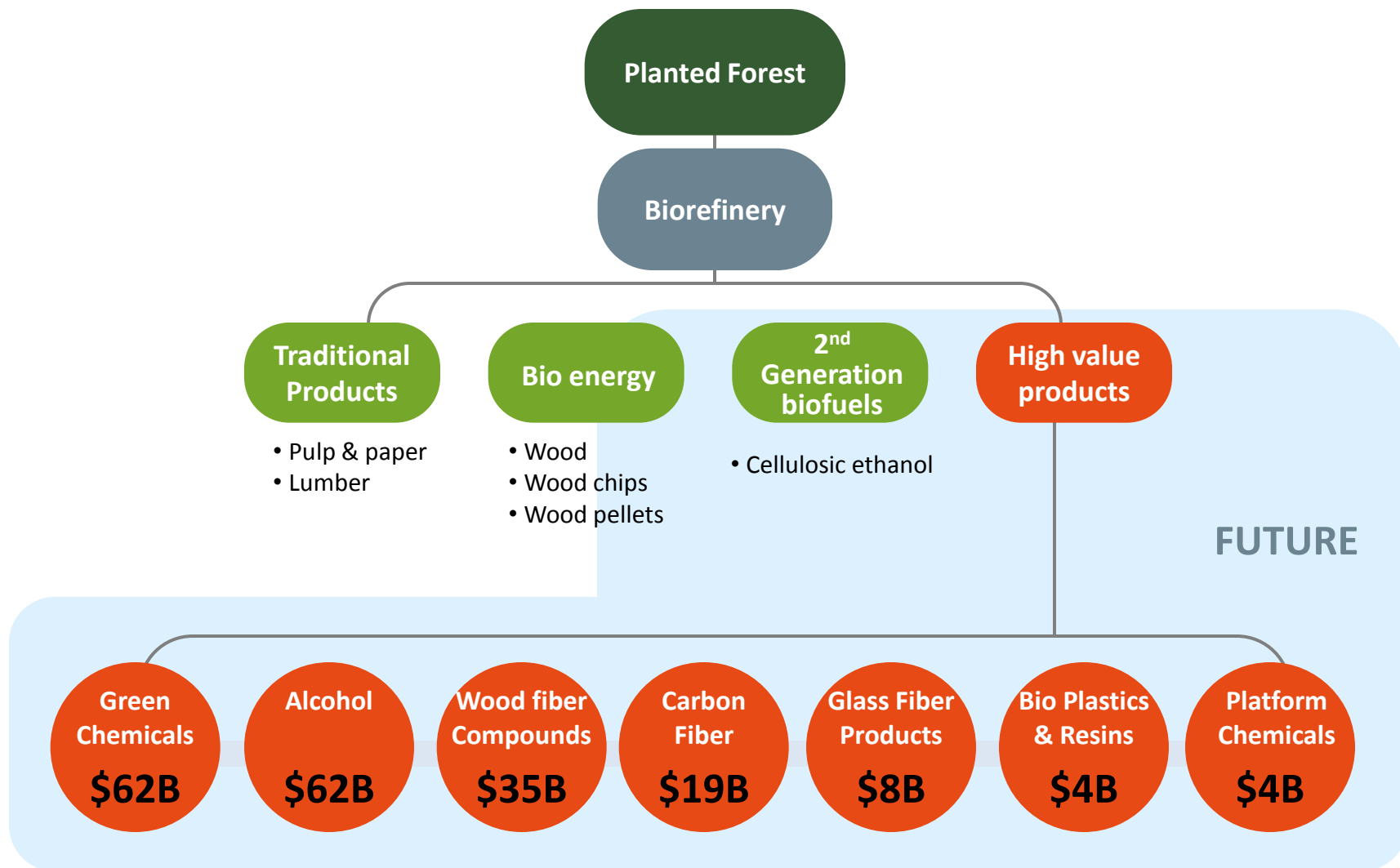
Soil restoration, rural development

Desert species in China 2012

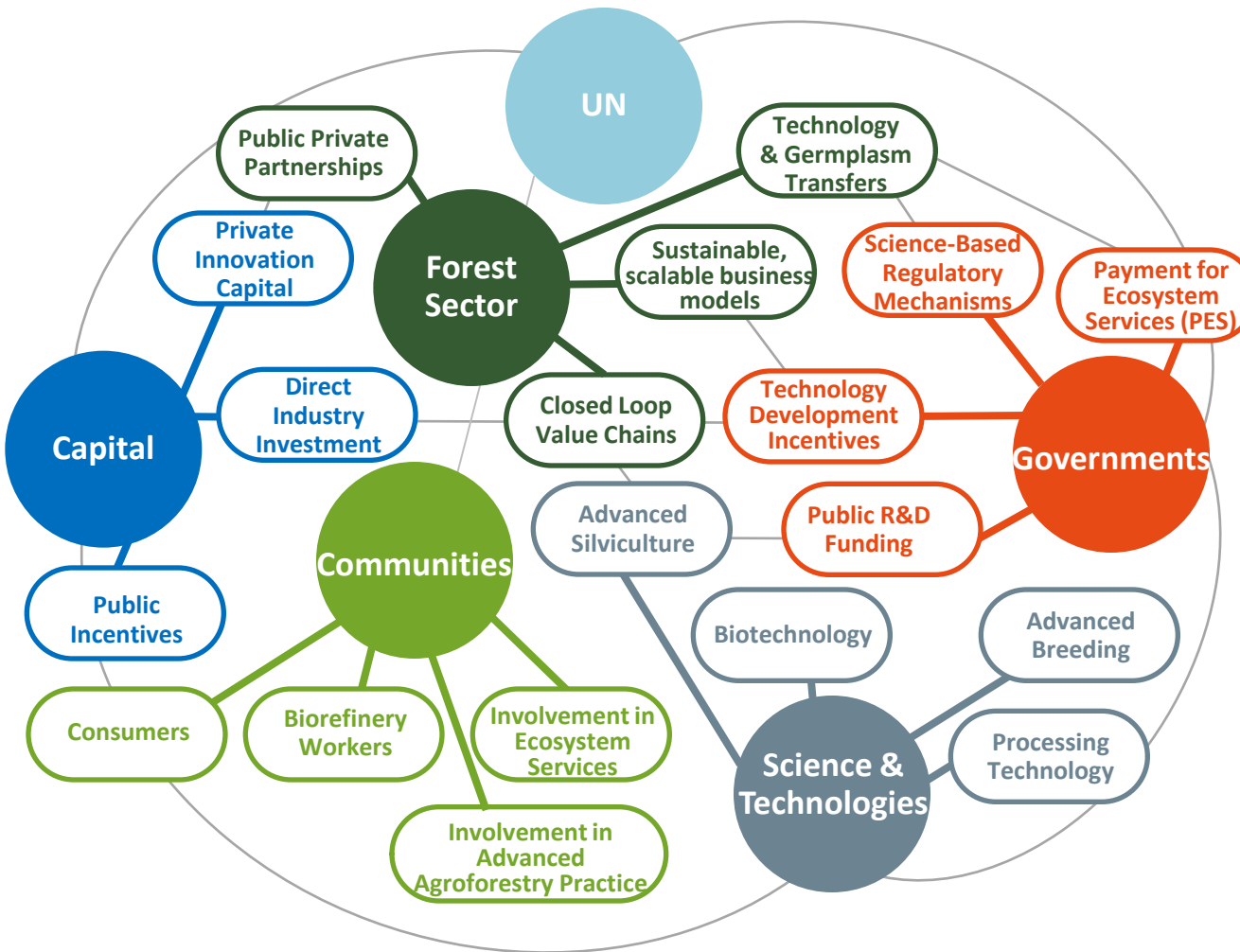


Source: FuturaGene & Gansu Desert Control Research Institute (GDC)

- Comprehensive and rigorous testing - is it adequate and is it transparent?
- Gene flow
- Gene stability – is it sustainable
- Co-existence with other forms of farming
- Human health issues
- Adverse effects on non-target species (in case of toxins)
- Has there been enough debate – we simply don't know enough
- Who owns the technology?
- Can it ever reach the poor farmers?



FUTURE



**Deforestation
halted**

Ecosystem restored

**Rural Development
realized**

**Sustainable,
technologically
advanced
plantation forests**

**Bioeconomy with
reduced fossil fuel
dependency**

1. Enable **knowledge Infrastructure** and promote science education;
2. **Invest** in global R&D systems and encourage financial systems that promote investment in SMEs;
3. Re-evaluate, standardise, rationalise and harmonise **regulatory regimes** in the light of scientific evidence and field experience;
4. Promote **technology transfer** and international collaboration for sharing, scale-up and replication of resources and best practice;
5. Promote the potential of technology to assist **small farmers** through capacity building, training and extension services linked through to appropriate public policy.

Sustainable forests

The new three pillars



Source : EMBRAPA