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INNOVATION, BIOTECHNOLOGY AND WAY FORWARD

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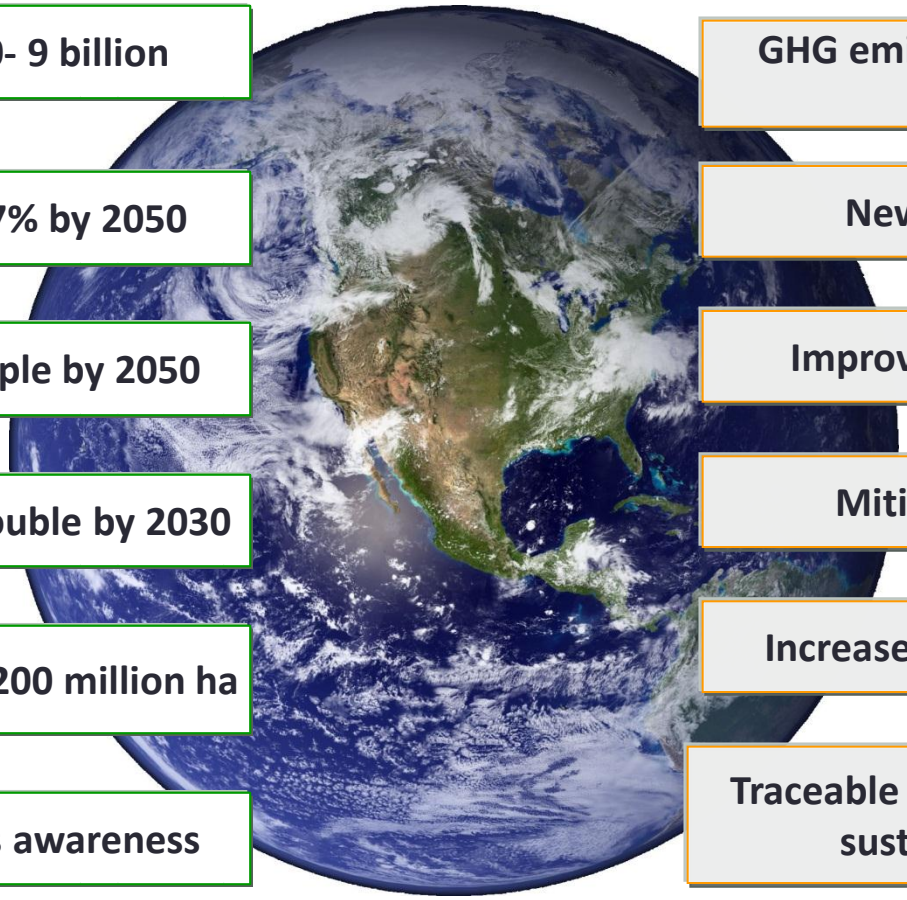
Global scenario...

- Population by 2050- 9 billion
- Cereal demand: + 67% by 2050
- Food demand will triple by 2050
- Energy demand will double by 2030
- Land deficit by 2050 – 200 million ha
- Increased consumers awareness



- GHG emission decrease 50-80% by 2050
- New business models
- Improve resource efficiency
- Mitigate habitat losses
- Increase production and yields
- Traceable value chains that meet sustainability criteria

TECHNOLOGY AND INNOVATION

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Innovation...

" *Innovation is* the development of new customer value through solutions that meet new needs, unarticulated needs, or old customer and market needs in new ways. This is accomplished through different or **more effective products, processes, services**, **technologies**, or **ideas** that are readily available to markets, governments and societies"

" *Innovation is not a unique event, it is a* ***process****!"*

Science must lead the way - Towards more sustainable practices
BIOTECHNOLOGY

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Much has been done, and engaging on the GM Trees discussion is timely...

Significant Research

160 million hectares of GM agricultural crops

29 countries; 16,7 million farmers (90% resource-poor farmers)

Most adopted technology in agriculture within the past 10 years

Over 800 GM Tree field trials

"What is possible to do?"

"What is appropriate to do"

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Forest biotechnology...
Genetic improvement vs. GMOs

GENETIC IMPROVEMENT	GM TREES
Conventional breeding (clones)	Genes of interests of other species (same gender). Breeding would not happen conventionally
Methods are slow and valuable traits (resistance to stress) difficult to implement	Direct and rapid approach and allows for the development of traist that would happen conventionally
Current reality	Thought reality

Being strongly considered and evaluated by forums and organizations such as FAO, WBCSD, FSC, PEFC

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Already a reality....

United States

Brazil, Argentina and South Africa

Among the biotech mega-countries growing 50,000 hectares, or more, of biotech crops

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Already a reality....

India

China

Canada

Paraguay and Bolivia

Australia

Among the biotech mega-countries growing 50,000 hectares, or more, of biotech crops

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Benefits of biotechnology...

- Little published on GM Trees– not on a commercial scale
- Only 4 commercial approvals (2 in the US and 2 in China)
- Information on GM crops:

Environmental	Socioeconomic
Provide better environment by reducing use os pesticides	Contributing to food, feed and fiber security and self-suficiency
Reduce carbon emissions/ saving on fossil fuels	Value of US$ 78 billion in 10 years
Conserve biodiversity by reducing pressure over native ecosystems	Increase production and yields
Reduce use of water	Alleviate poverty by helping small farmers

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Opposition...

- Ideology (against monoculture/ intensively managed forests)
- No current scientific studies proving hindering aspects of GMOs

CONTRARY ARGUMENTS

1. More complex systems than agriculture crops;
2. Produce recognized goods and services simultaneously;
3. Confer upon them a diversity of social, cultural and symbolic value;
4. Longer life cycle than crops (longer to have scientific evidence)

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Challenges to GMOs...

- *The most applied and safest technology developed*
- *RISKS are a given*
  - ✓ *Risks of using it vs. risks of **not** using it*
  - ✓ *Risk assessment and scientifically supported processes*
- *Maintain an open dialogue*
  - ✓ *Using science to attain social acceptance and legitimacy*
- *Production models that can incorporate small holders*

THANK YOU!

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