

# Risks and Uncertainties

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## *What are the most likely effects of climate change on forest ecosystems?*

Assumed

- 50 year time horizon

Take as given

- Increase in CO<sub>2</sub> and other GHGs
- Increase in temperature
- Changing patterns of precipitation

All these will have direct and indirect impacts

## Disturbance factors

- Biotic - Pests, diseases, invasives
- Physical – fires, drought, floods, storms(?)
- Melting permafrost

## Forest(ry) impacts

- Species composition
- Commercial species
- Competitiveness N/S
- Tropics/boreal

## Human impacts

- Population pressures
- Governance, ownerships,
- Forest laws, land management
- Anthropogenic fires
- Level of development

Deforestation – cause not effect of climate change

*Which risks are the most important and how likely are they?*

Depends – on where you are and the extent of climate change

Deforestation - happening and significant

- Forest fires
- Melting permafrost

Both have amplifying effects

- Drought, pests and diseases
- Increased stress on trees – inter-related

Magnitude depends on climate change effects

# What do we need to know?

*What do we know and what more do we need to know?*

- Magnitude and impact of the drivers of CC
- Baseline for measuring change
- Limiting factors for growth
  - CO<sub>2</sub> fertilisation
  - Nutrients
  - Water balance
  - Others?
- Interacting effects
- Soil processes

# What do we need to know?

- Scaling up from experiments
- Evaluate models
- Translating models to relate to the real world

# How to respond?

*How should we respond to the perceived major risks?*

- Continue research
- Incentives to prevent deforestation
- Effective alternatives
- Alleviate poverty

# How to respond?

- Apply existing knowledge of SFM
- Better “tech transfer”
- Locally appropriate systems
- Adaptive education
- Ensure decision makers understand the links between forests and climate change

## *How good are our monitoring systems to inform management decisions?*

- Identify and concentrate on “hot spots”
- Monitor GHG fluxes
- Use of remote sensing – military partnerships?
- Integrated networks of sensors
- Influence and improve the interface between scientists, policy makers and on the ground delivery
- “What decisions will this information help us make?”

## *How resilient or flexible are forest ecosystems to changing environmental conditions?*

- Need to understand the whole system
- Soil micro-organisms may adapt quicker
- Tree species
  - Some fragile with limited genetic base or climatic tolerance
  - Others more variable
- Barriers to natural migration N/S or E/W
- Speed of evolution c.f. evolution or migration
- Local nativeness

## *What is the likelihood of a catastrophic event?*

- Climate change science uncertainties
- Catastrophic effects on forests – Amazon
- Tipping points
- Capacity to respond or recover may depend on resources

- Terminate
- Transfer
- Tolerate
- Treat

How bad are we prepared to let things get before intervening?

Do we take a precautionary approach?

## Mosi-oa-Tunya



