



Pioneering the Future

Alone in the Woods

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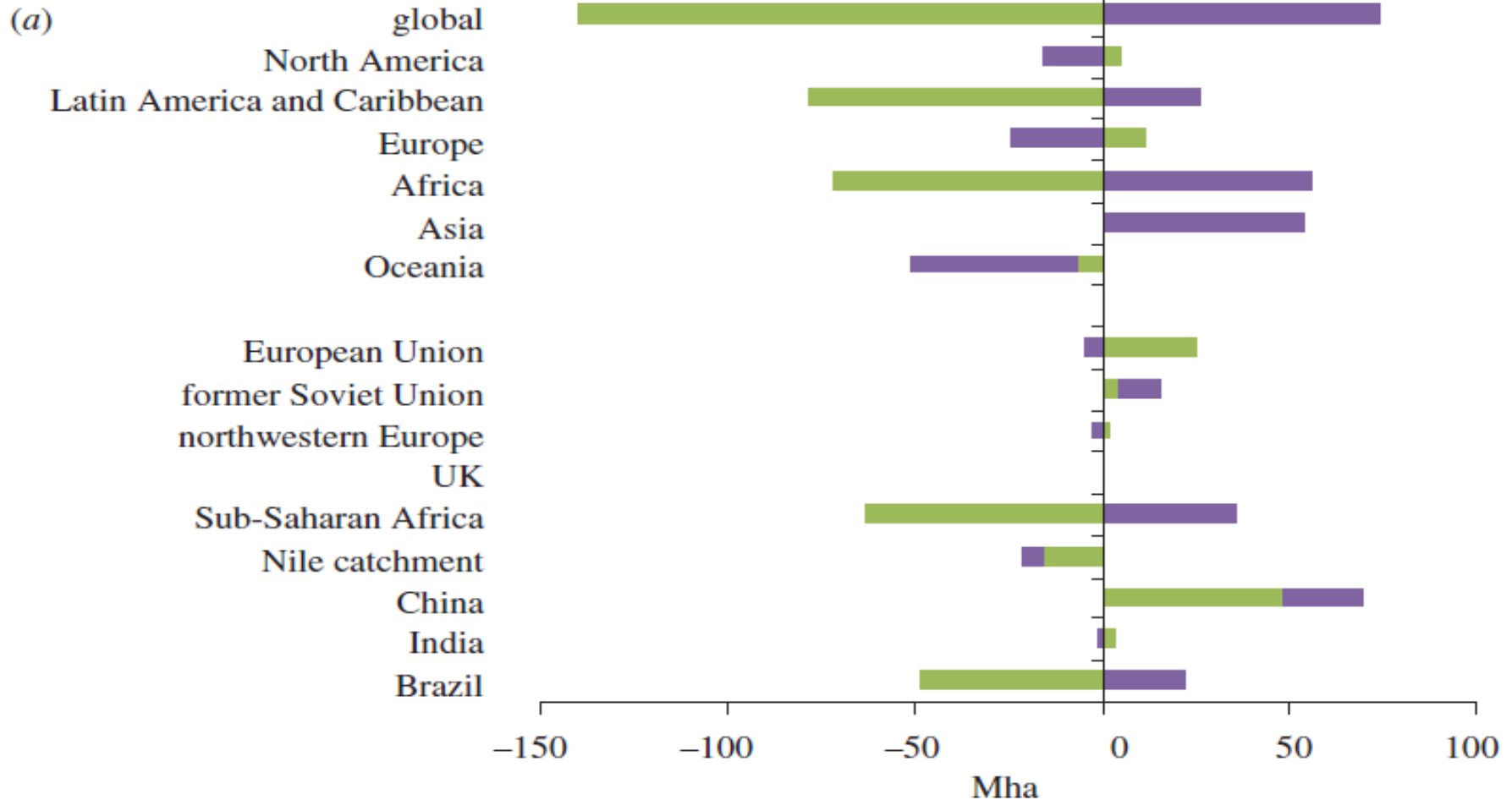
Drivers of Demand

- 🌿 Demographic changes
 - World's population projected to increase; 30% in 25 years
- 🌿 Continued economic growth
 - Global GDP increase; doubled in 25 years
- 🌿 Regional shifts
 - Developed vs. developing economies; balance swing
- 🌿 Environmental policies and regulations
 - Forests exclusion
- 🌿 Energy policies
 - The use of biomass, inc. wood, is increasingly encouraged

from 2005 projection to 2030

FAO, 2009

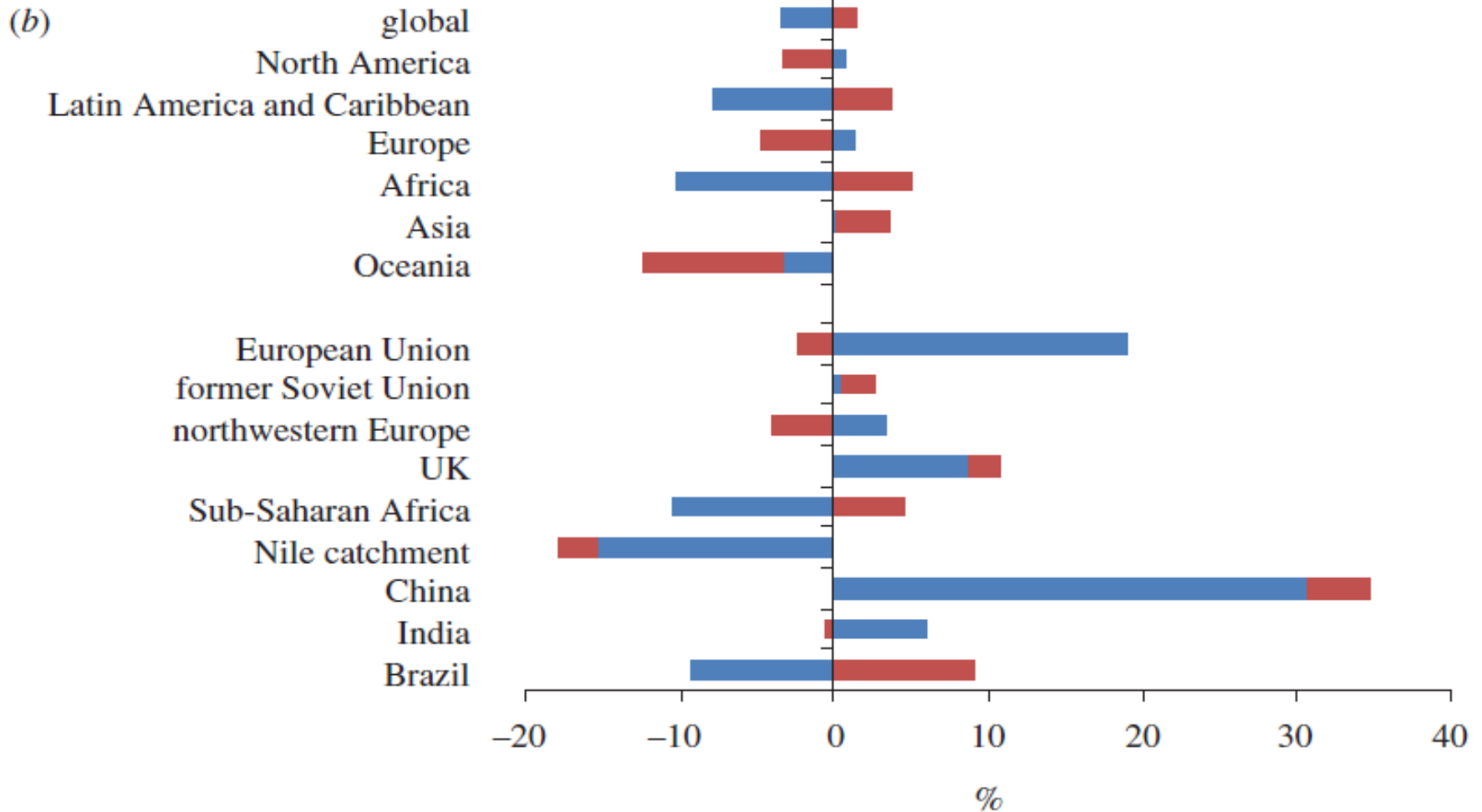
Competition for Land - A Time of Change [Mha]



Green - forest and wood; Purple - agricultural land

Smith et al., 2010

Competition for Land - A Time of Change [%]

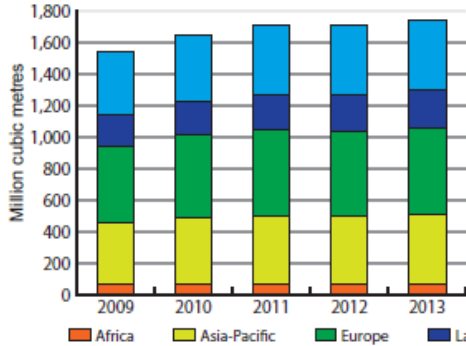


Blue - forest and wood; Red - agricultural land

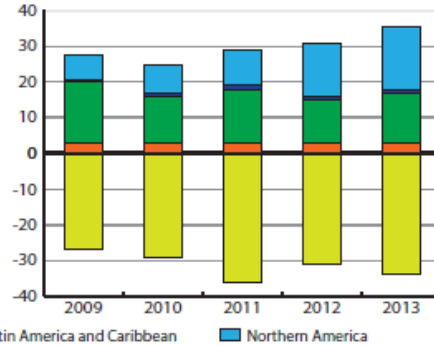
Smith et al., 2010

Production & Trade

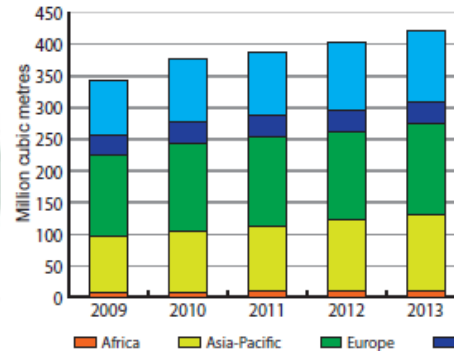
Industrial roundwood production



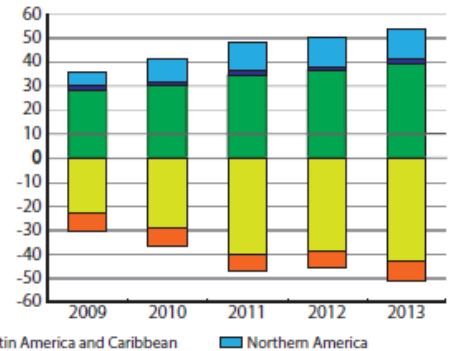
Industrial roundwood net trade



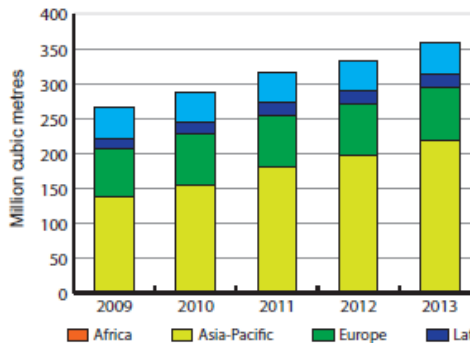
Sawnwood production



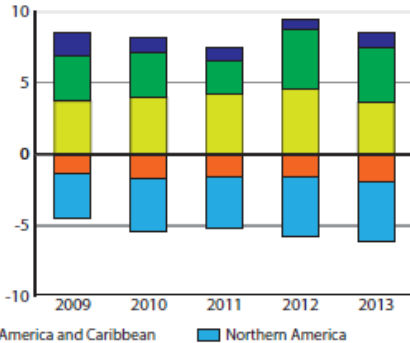
Sawnwood net trade



Wood-based panel production



Wood-based panel net trade



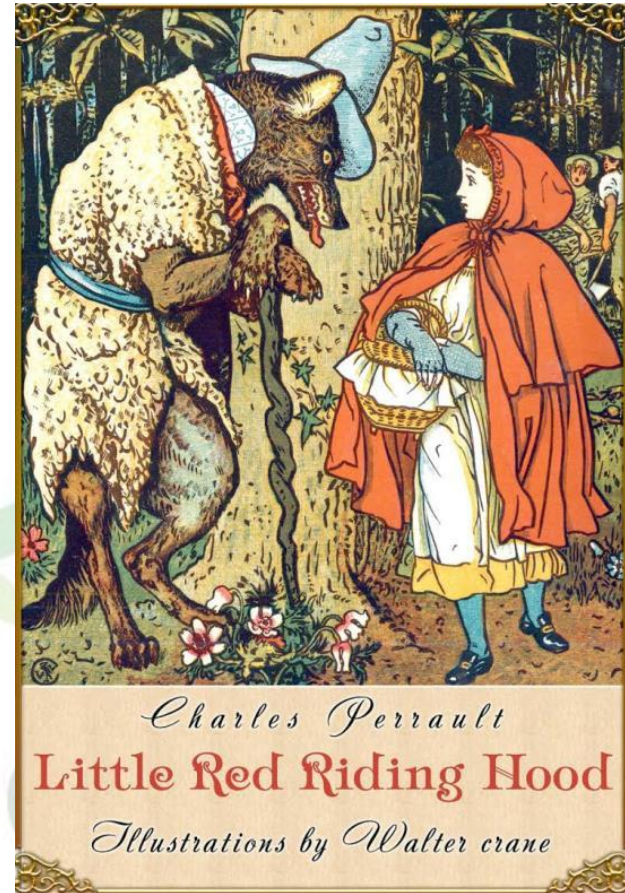
Who's in the play?

Actors:

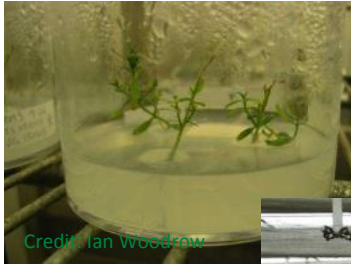
- A seedling
- The soil
- Climate Change
 - “The big bad wolf”

Screenplay:

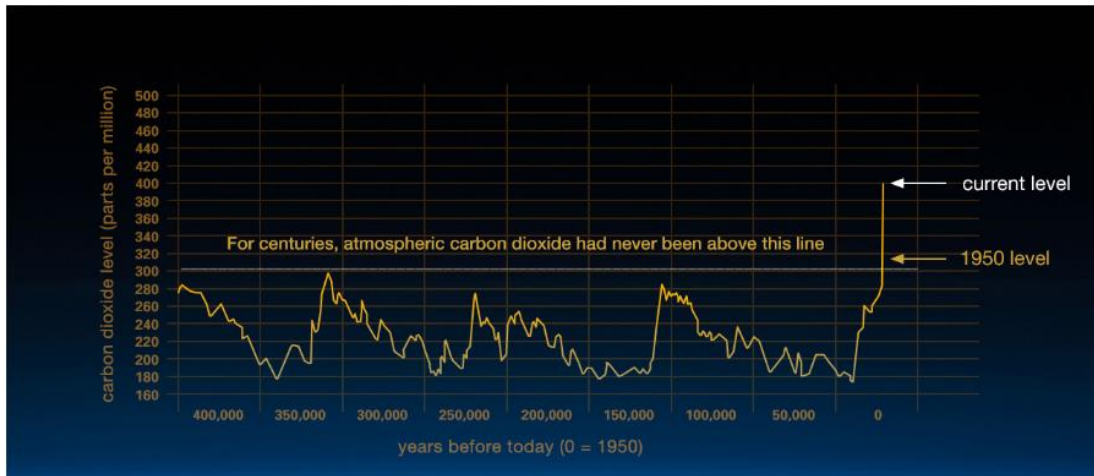
- “Alone”, Exposed
- High expectations
 - Survival
 - Life cycle
 - Deliveries



The Plant & Soil



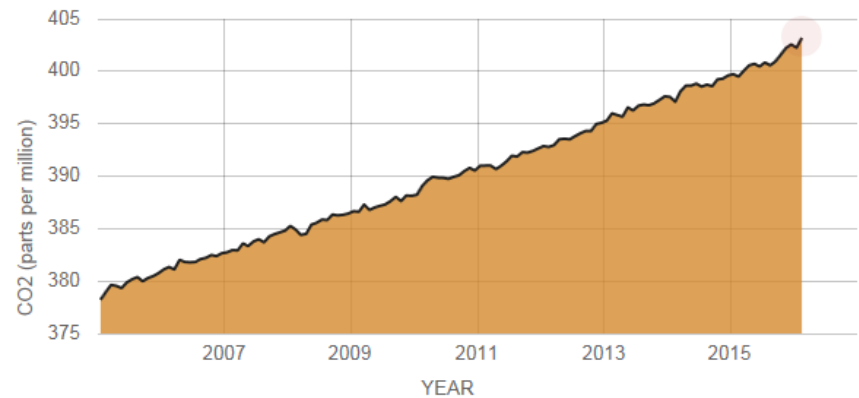
The "Good" - Carbon Dioxide



This graph, based on the comparison of atmospheric samples contained in ice cores and more recent direct measurements, provides evidence that atmospheric CO₂ levels have risen sharply since the Industrial Revolution. (Credit: Vostok ice core data/U.R. Petit et al.; NOAA Mauna Loa CO₂ record.)

DIRECT MEASUREMENTS: 2005-PRESENT

Data source: Monthly measurements (average seasonal cycle removed). Credit: [NOAA](#)

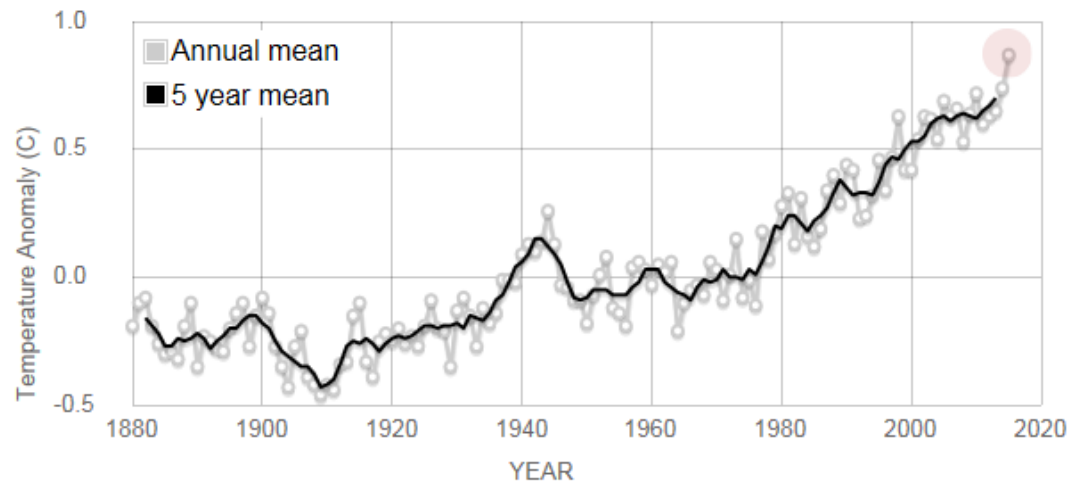


The Bad? – Temperature

- 🌿 Underestimated – friend or foe?
- 🌿 Fluctuating – disruptive
- 🌿 Season length
- 🌿 Uneven!

GLOBAL LAND-OCEAN TEMPERATURE INDEX

Data source: NASA's Goddard Institute for Space Studies (GISS).
Credit: NASA/GISS

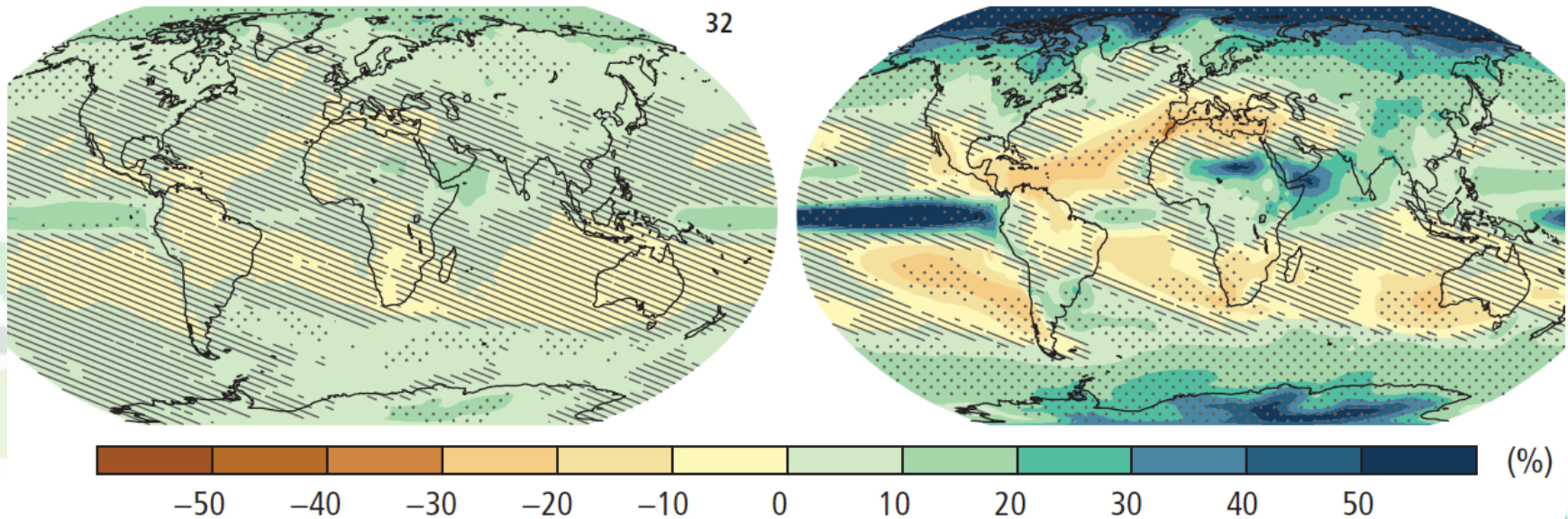


The Ugly! – Precipitation

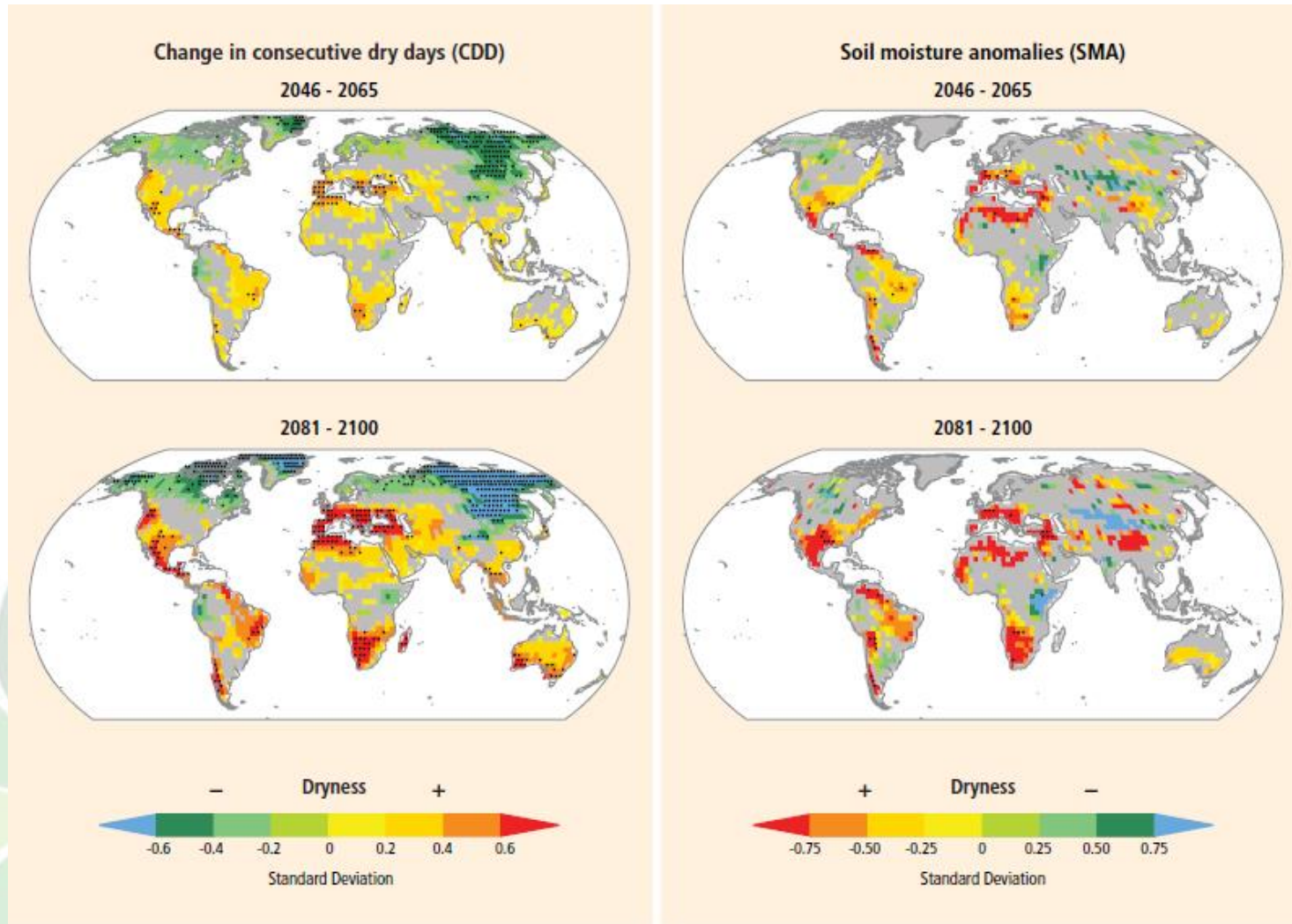
Two main issues:

- Shift - Food production areas, Natural forests
- Instability – prediction, extremes

Change in average precipitation (1986–2005 to 2081–2100)



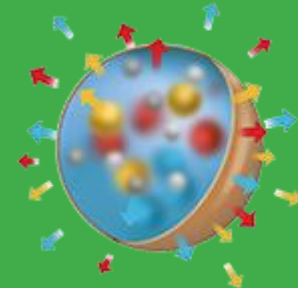
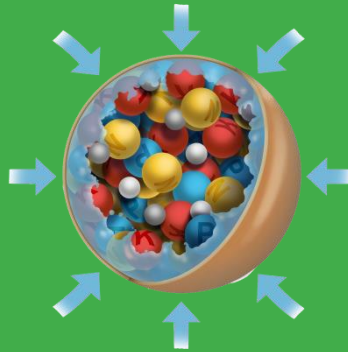
Indicators of Dryness (future terms)



Forests; On the Move

- ✿ **Polar-ward shift** by 500 km or more for boreal zones
- ✿ Forest expansion and **replacement** of up to 50% of current tundra area
- ✿ Lagged migration may lead to **massive loss of natural forests...** and a correspondent **large carbon pulse**
- ✿ Some... migration rates can be much **more rapid**
- ✿ For **timber** production, which relies on **managed** forests with **migration facilitated by human actions**, this negative effect of lagged migration might be of lesser importance than for natural forests

What Can We Do?



How Can We Help?



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The Need

Hand in Hand

- Supply adapted to demand
 - Daily fluctuations
 - Seasonal requirements

Day by Day

- Environmentally Protected
 - Rain events
 - Over irrigation



The Offer

Matched Nutritional Compositions

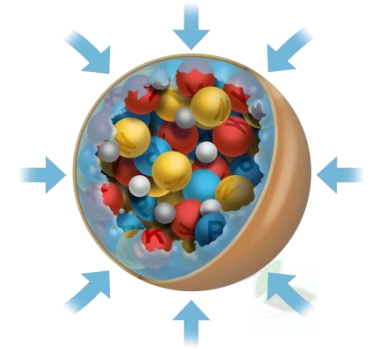
- Coated and Uncoated
 - Potassium Nitrate; Urea; MAP, MgS; Boron!
 - Various N-P-K +/-Mg +/- ME

Adapted Longevities (wide range)

- From 2 M as starter and up to 16 M for complete establishment and sustained support @ 21 °C

The Art of Blending

- Based on soil texture and “water regime”
- Define your needs, Compose your own



The Benefits

- ✦ Sustained Growth
 - Best match
- ✦ Nutrient Use Efficiency
 - Reduced rates
- ✦ Environmental Impact
 - Leaching, Emissions, Fixation
- ✦ Single Application
 - Nursery; @ planting
- ✦ Cost Effective
 - Coated / Uncoated Mix



Take-Away Message

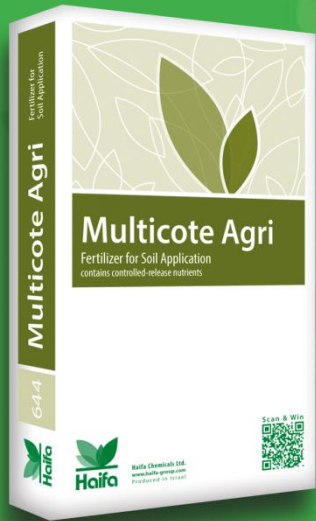
- ✦ The need for wood is increasing (and won't stop)
- ✦ Climate change will cause “involuntary migration”
- ✦ The managed forests / plantations will expand
- ✦ Weather instability will increase exposure to risk
- ✦ Investments require deliveries
 - There is no such thing as free lunch...

Haifa's Forest Concept:

- ✦ Hand in Hand nutrition; Day by Day protection
 - Increased Nutrient Use Efficiency
 - Reduced Environmental Impact
- ✦ Making sure your investment, pays off!



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Thank You

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