



# Biodiversity

prof. dr. Rony Swennen

Department of Biosystems  
Faculty of Bioscience Engineering

# Three hierarchical levels:

- between ecosystems
- between species
- within species

# Three hierarchical levels: between ecosystems



Rainforest



Cerrado



Mangrove

# Three hierarchical levels: between species



Soybean



Orange



Sugar cane



Coffee

# Three hierarchical levels: between species



Cashew nut



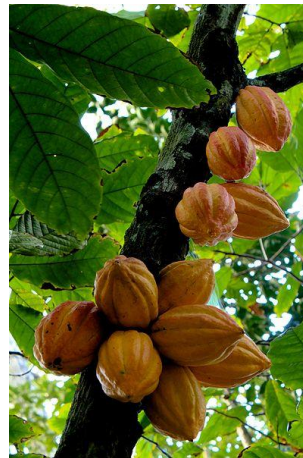
Passion fruit



Guava



Brazil nut



Cacao



Rubber

# Three hierarchical levels: between species

*Caesalpinia echinata*



wood also yields a **red dye** called **brazilin**

# Three hierarchical levels: within species



# Ecosystem services

- *provisioning services*: such as food, water, timber, and fibre;
- *regulating services that affect* climate, floods, disease, wastes, and water quality;
- *cultural services* that provide recreational, aesthetic, and spiritual benefits; and
- *supporting services* such as soil formation, photosynthesis, and nutrient cycling



# Crop wild relatives and monetary value

## Wild banana



## UN award in 2010

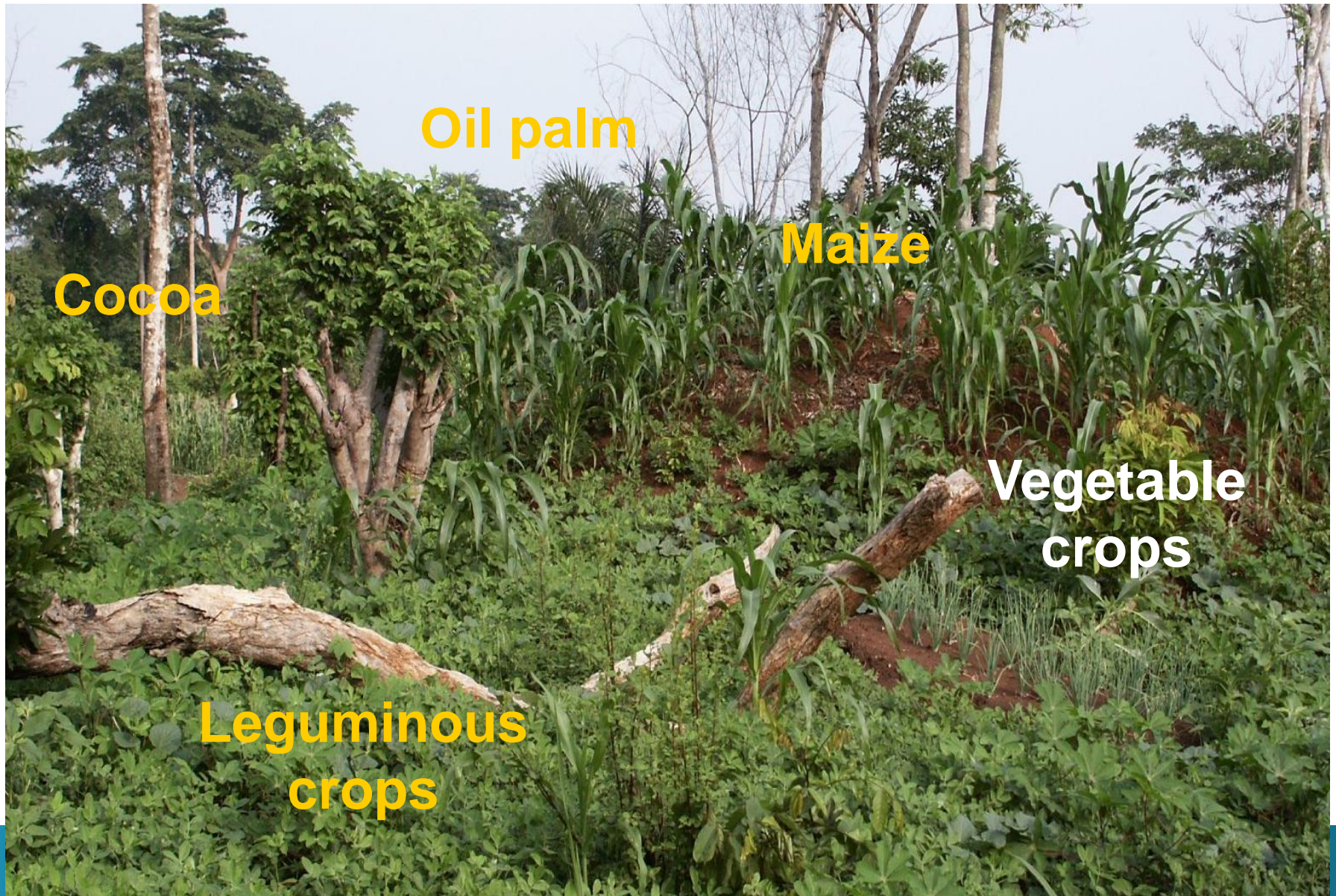


# Better3Fruit: KU Leuven spin off



animal pollination for seed set:  
35% of the production volume of all world crops

# Agro-biodiversity and stability



**Oil palm**

**Maize**

**Cocoa**

**Vegetable  
crops**

**Leguminous  
crops**

# Biodiversity loss

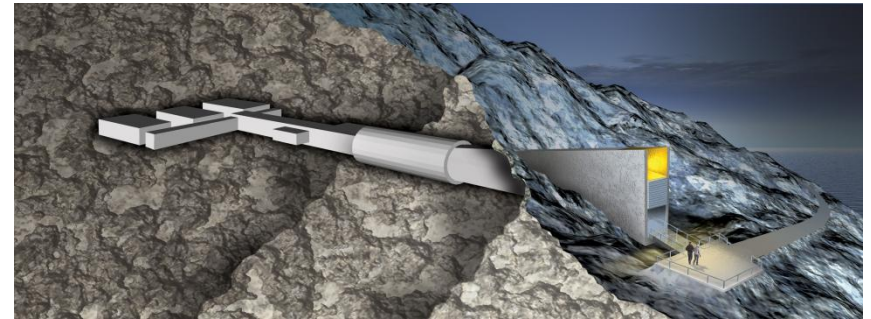
The rate at which species become extinct is currently circa 500 times higher than the 'normal' species extinction rates

- 1) the loss and fragmentation of habitats
- 2) the invasion of exotic species
- 3) pollution
- 4) overexploitation by hunting and fishing
- 5) climate change



Monocultures are necessary  
to produce high quantities  
but for continuous high performance  
breeding is needed  
and means access to biodiversity

# Svalbard Global Seed Vault



750,000 seed samples at  $-18^{\circ}\text{C}$



International

Musa Transit

Centre (ITC):

Global banana collection



**Bioversity**  
International

# N0 2 global collection?

**KU Leuven: global centre of excellence in plant cryopreservation**





# *Convention on Biological Diversity (CBD)*

*agreed at the UN Conference on Environment and  
Development in Rio De Janeiro*

3 main objectives:

- 1) the conservation of biological diversity;
- 2) the sustainable use of the components of biological diversity and
- 3) the fair and equitable sharing of the benefits arising out of the utilization of genetic resources.

# Biodiversity is under-used

- 11 million species currently living on earth, with only 2 million of this number actually documented
- Plants:
  - 310,000 species existing
  - Just 100 species are being used intensively
  - Need to use more and new species

# Guaraná-da-amazônia

## Guaraná Antártica

second best-selling soft drink brand in Brazil



## Some guaraná-flavoured soft drinks



# Brazilian Cerrado - Hotspots



# Biodiversity in Cerrado



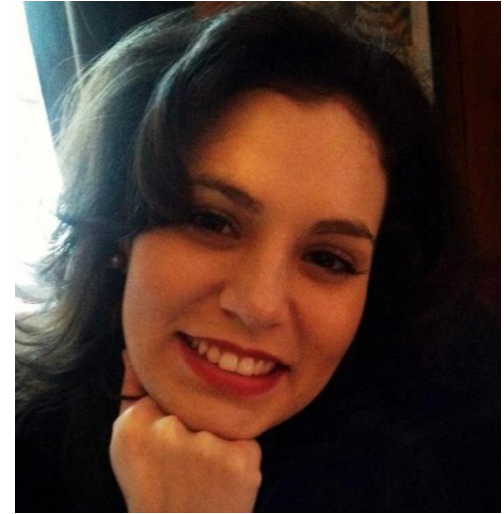
Suzana Garcia



Rodrigo Therezan



Nádia Campos



Gabirola – *Campomanesia xanthocarpa*



Passion Fruit  
*Passiflora gilbertii*



Araticum Mirim  
*Annona emarginata*

# Memorandum of understanding



## Universidade Federal de Lavras





# Biodiversity: Basic commodity or luxury Item?

Metaforum paper N0 2, 2010