

# Socio-economic and ecological impacts of NIS: insights from agroecology



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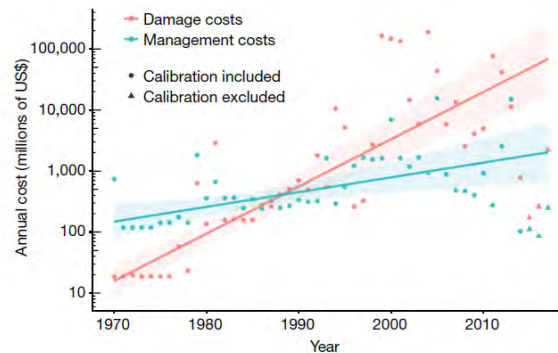
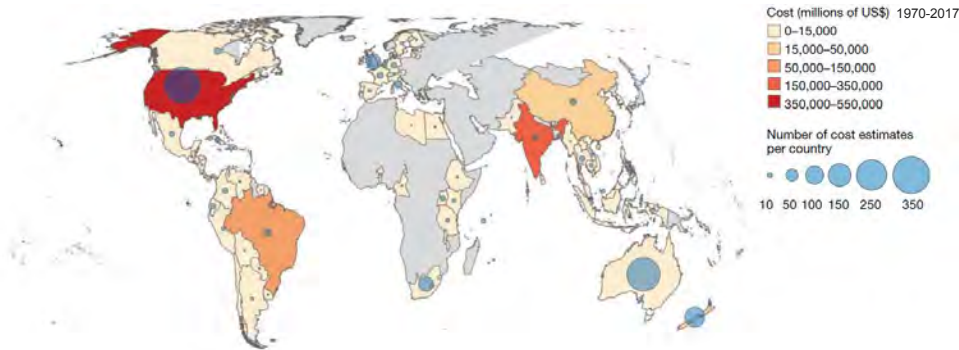
# Socio-economic and ecosystem impacts of NIS

NIS can have **profound negative effects** on:

- Biodiversity
- Ecosystem functioning and services
- Human health and welfare
- Losses of goods, services and production capacity

Estimation of annual mean cost of invasion could reach US\$162 billion in 2017.

Although these costs remain strongly **underestimated**



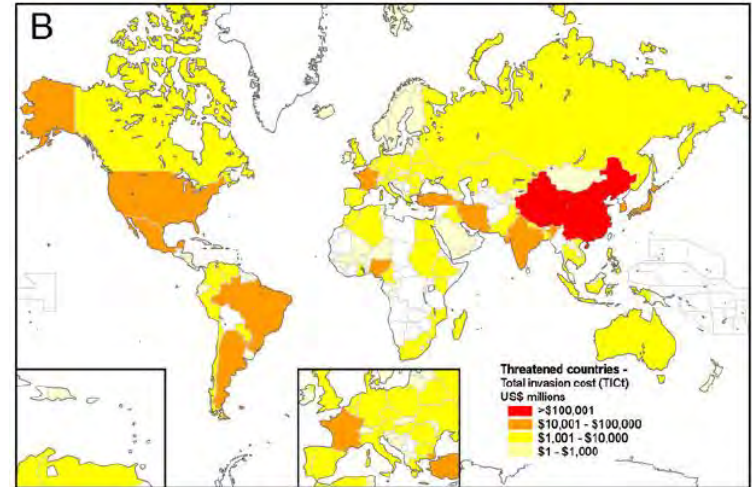
## NIS as a global threat to agriculture

Specifically in agriculture, **NIS** are a major cause of **crop loss** and can adversely affect food security

Countries that showed the highest potential costs are also those with large agricultural production

Highly depend on:

- Types of crops grown in a country
- Level of trade with other countries
- The particular NIS present in the trading countries



# NIS negatively affects agroecosystem services

**Biodiversity** for food and agriculture is indispensable to **food security, sustainable development** and the supply of many vital **ecosystem services**.

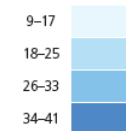
NIS are regarded as a **major threat to biodiversity**

NIS negatively affects **agroecosystem services**

Reported effects of pests, diseases and invasive alien species on the provision of regulating and supporting ecosystem services, by production system

Production systems (PS)	Effects of pests, diseases and invasive alien species on ecosystem services								
	Pollination	Pest and disease regulation	Water purification and waste treatment	Natural-hazard regulation	Nutrient cycling	Soil formation and protection	Water cycling	Habitat provisioning	Production of oxygen/gas regulation
Livestock grassland-based systems	-	-	-	-	-	+/-	+/-	-	+/-
Livestock landless systems	+/-	-	-	-	-	+/-	-	-	-
Naturally regenerated forests	-	-	-	-	-	-	-	-	-
Planted forests	-	-	-	-	-	-	-	-	-
Self-recruiting capture fisheries	-	-	-	-	-	0	-	-	-
Culture-based fisheries	-	-	-	-	-	-	+/-	-	-
Fed aquaculture	-	-	-	-	-	+/-	-	-	-
Non-fed aquaculture	-	-	-	-	-	-	-	-	-
Irrigated crop systems (rice)	-	-	-	-	-	-	-	-	-
Irrigated crop systems (other)	-	-	-	-	-	0	+/-	-	-
Rainfed crop systems	-	-	-	-	-	-	-	-	-
Mixed systems	-	-	-	-	0	0	0	-	0

Proportion of countries reporting the PS that report any effect of the driver (%)



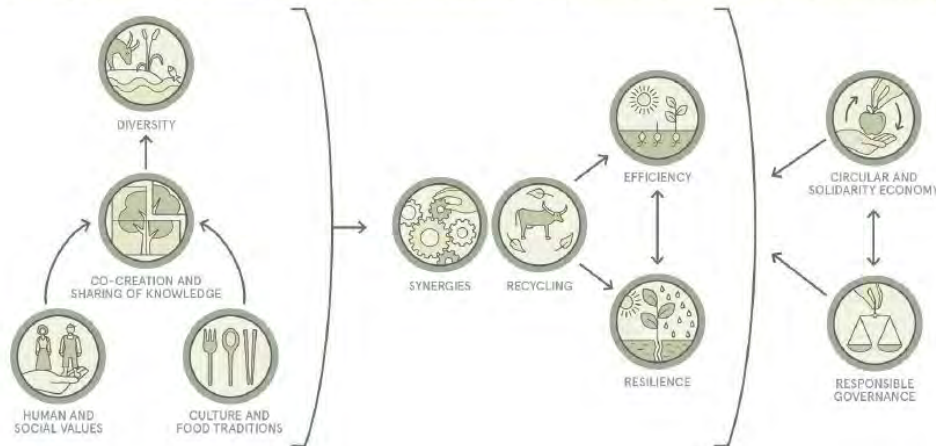
# Agroecology principles

Modern agricultural systems appear to be very vulnerable to climate change and NIS

FAO has approved the 10 Elements of Agroecology for agrifood and food systems transformation

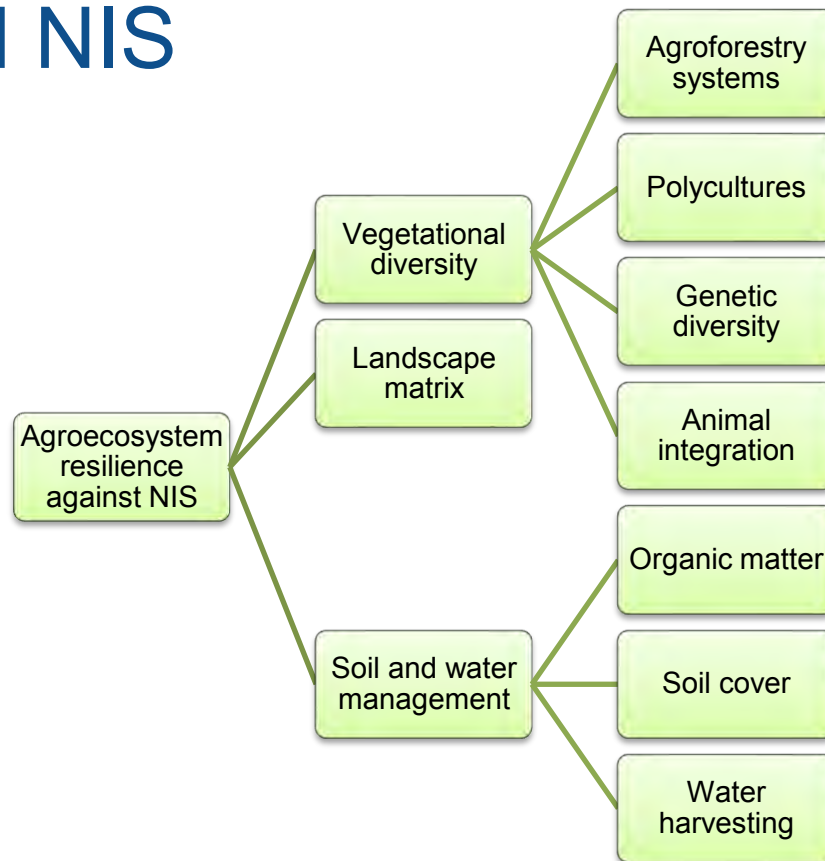
**Biodiversity** as a promising entry point to design more resilient and sustainable food and agriculture systems

## AGROECOLOGICAL TRANSITION TOWARDS SUSTAINABLE AGRICULTURE AND FOOD SYSTEMS



# Agroecology and NIS

Agroecological practices to **enhance biodiversity** and **improve ecosystem services** and **protection** against invasive pests and pathogens





# Agroecology and NIS

Agroecological practices to enhance biodiversity and improve ecosystem services and protection against invasive pests and pathogens

## Diversified ecosystems



# Agroecology and NIS

Agroecological practices to enhance biodiversity and improve ecosystem services and protection against invasive pests and pathogens

## Organic matter management





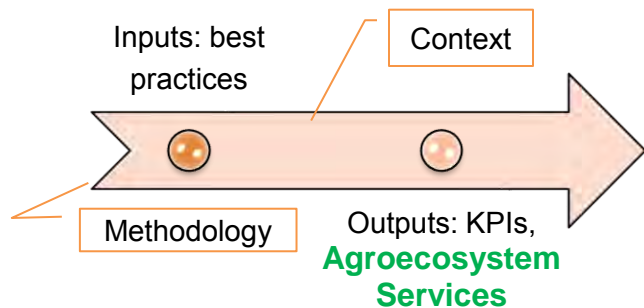
# Agroecology and NIS

Agroecological approaches for *Phytophthora cinnamomi* and *Xylella fastidiosa*, two aggressive invasive species that are affecting the agroecosystems in the Mediterranean Basin





# Agroecology Tesseract VRE



This **approach** will allow to:

- verify good practices
- replicate practices
- scale up from RIs to LLs
- understand the past
- assess future scenarios
- help decision-making processes
- keep citizens informed and involved



# Take-home messages



*\*Take  
home message*

1. Importance of socio-economic and ecological costs of NIS worldwide, and especially on agriculture
2. Application of agroecology principles and strategies can help to NIS control and management, and increase food security
3. Agroecology Tesseract VRE for accessing and modelling agroecological-related information



# Thanks!

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