Socio-economic impact classification of alien taxa (SEICAT)

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How to compare socio-economic impacts?

How much does it cost?

Agricultural pests

spotted wing drosophila

Easy to calculate:
- Yield losses
- Management costs

Not so easy to calculate:
- Switch to other crops
- Changes of consumer preference
- Consequences of reduced income for farmers

Agricultural pests in developing countries

water hyacinth

Monetary losses mean different things in different parts of the world

Health impacts
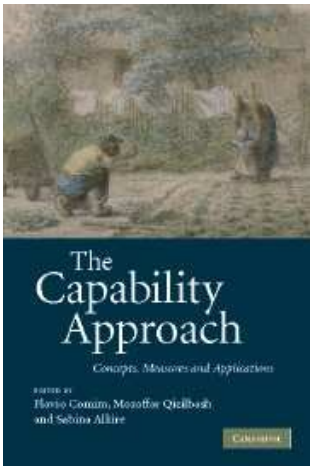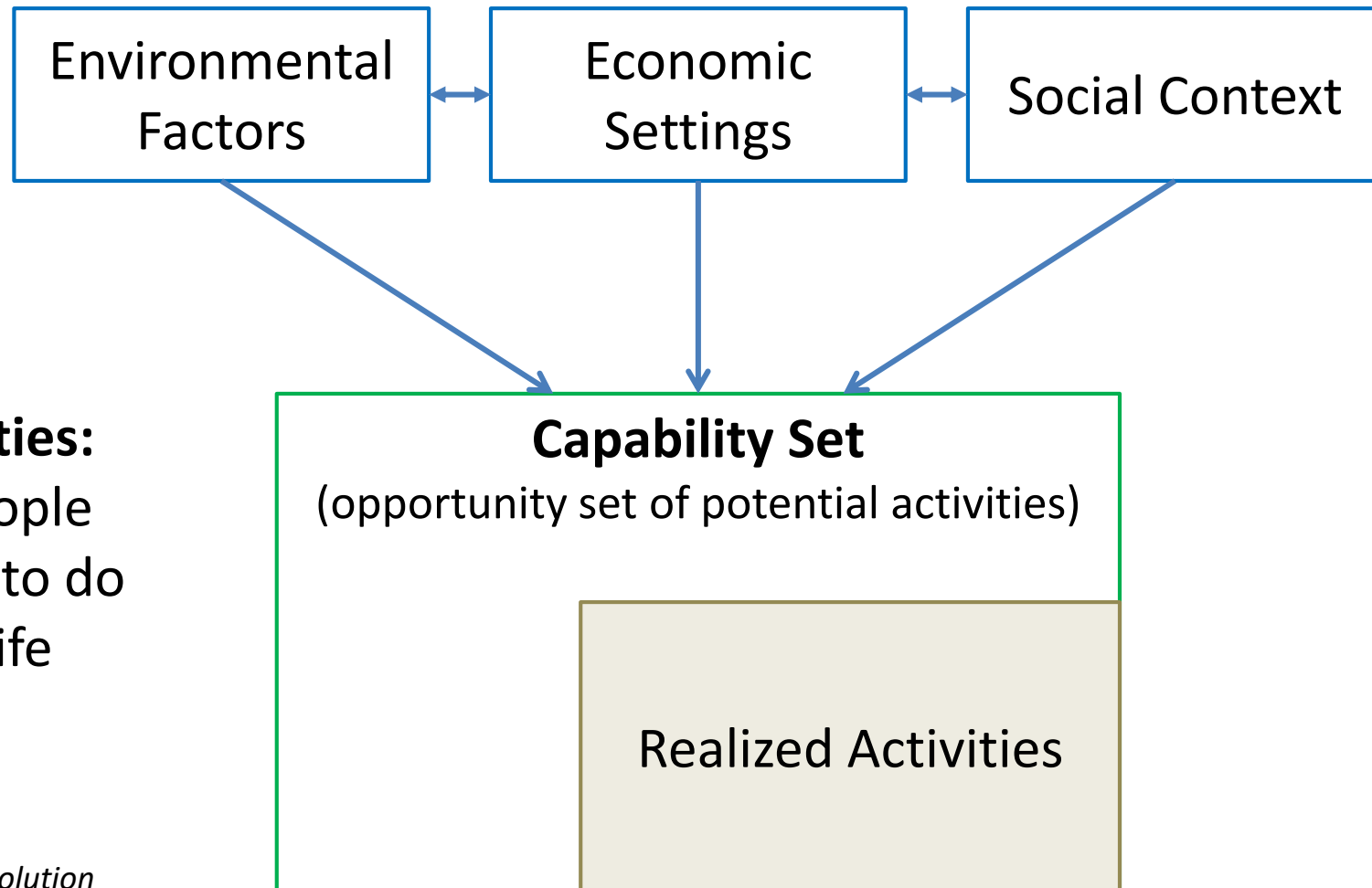

ragweed

It's more than just the treatment costs
- reduction or avoidance of activities
- not feeling well

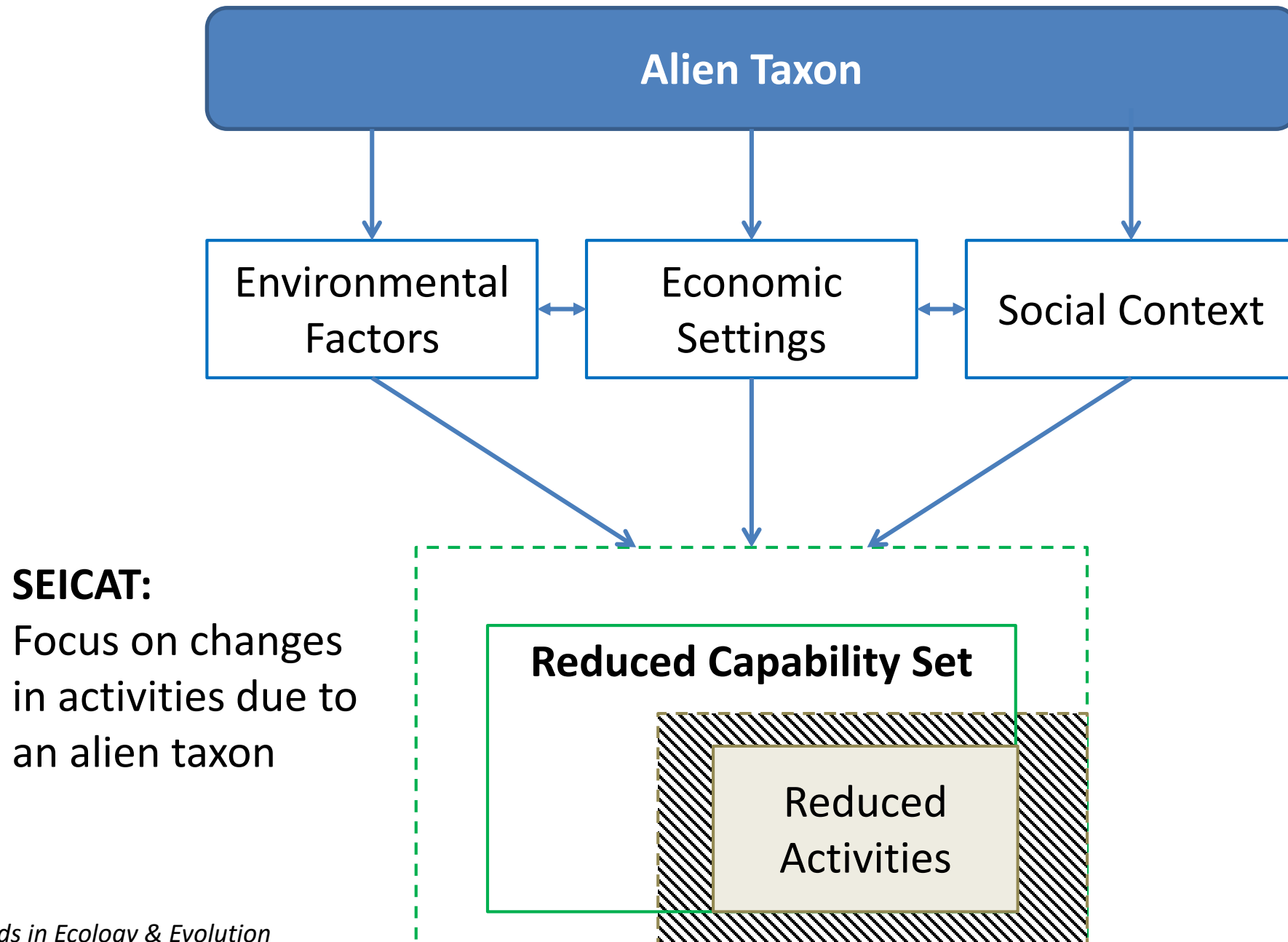Money appears to be a useful measure to compare impacts, **but it's not!**

Reframing the question:

How are peoples' lives affected by alien species?

Human well-being is related to peoples' "capabilities"

Environmental Factors ↔ Economic Settings ↔ Social Context

Capabilities: what people are able to do in their life

Capability Set
(opportunity set of potential activities)

Realized Activities

Bacher et al. 2018 *Methods in Ecology & Evolution*

Bacher et al. 2018 *Methods in Ecology & Evolution*

Classifying levels of impact

Minimal Concern (MC)	Minor (MN)	Moderate (MO)	Major (MR)	Massive (MV)
normal activities	reduced activities, more difficult to carry out activities	some people stop participating in activities, some continue	local loss of an activity; reversible	local loss of an activity; irreversible

Minimal Concern (MC)

normal activities

Minor (MN)

reduced activities,
more difficult to
carry out activities

Moderate (MO)

some people
stop participating
in activities,
some continue

Major (MR)

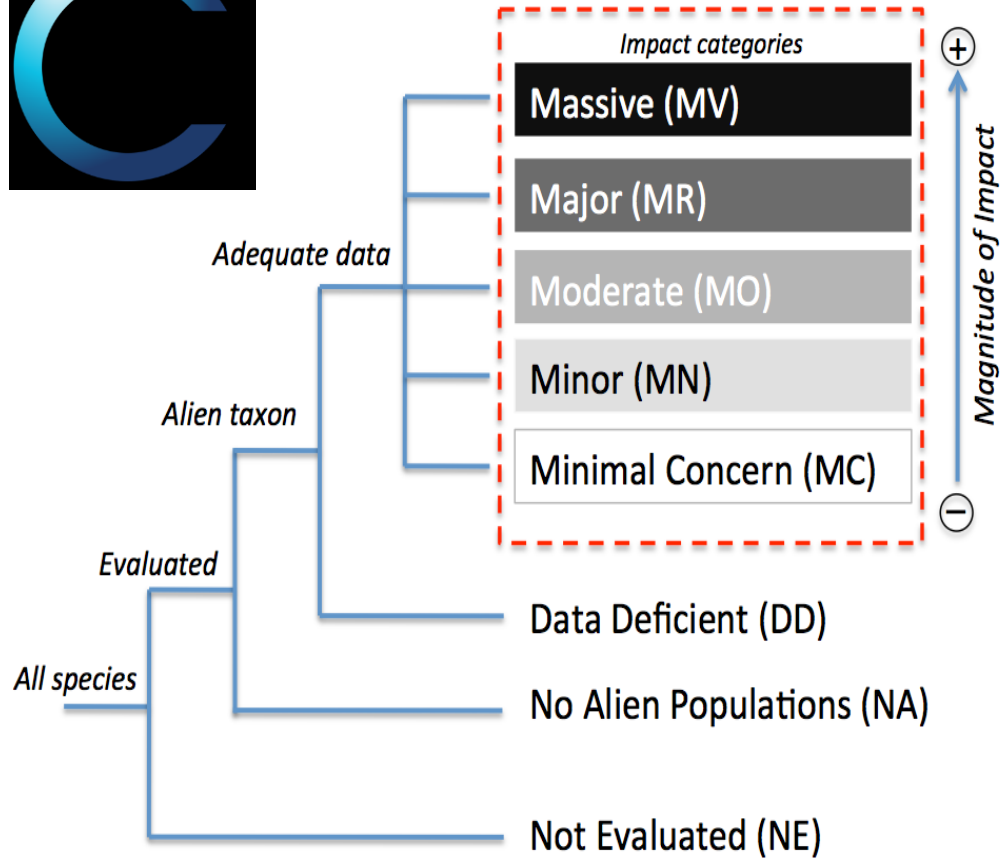local loss of an activity; reversible

Massive (MV)

irreversible

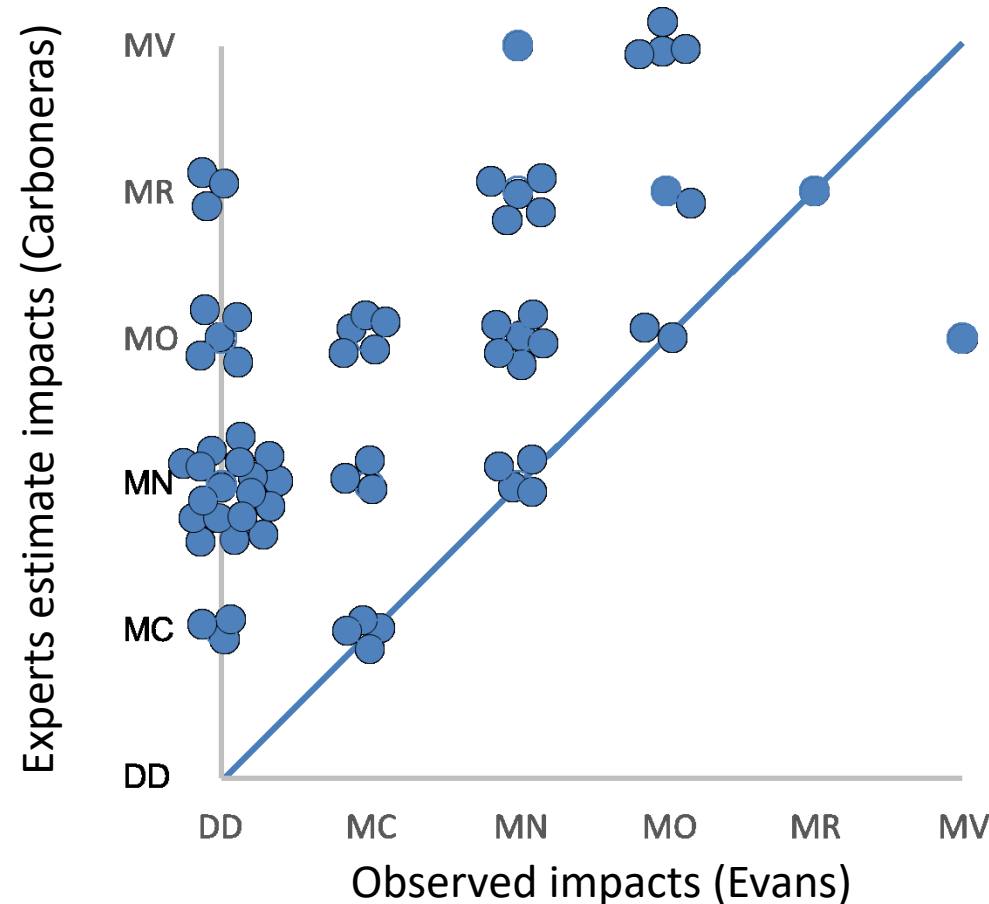local loss of an activity; irreversible

EICAT / SEICAT

- Allows comparisons among taxa, impacts, regions
- Works with low data input
- Aligns with existing international frameworks (RedList)
- Can be used for prioritization, identification of species with high impact, prediction of impacts

Expert opinion: a word of caution

Carboneras C. et al. (2018) A prioritized list of alien species to assist effective implementation of the EU regulation. *J Appl Ecol* **55**, 539-547.
Evans T. et al. (2017) Application of the Environmental Impact Classification for Alien Taxa (EICAT) to a global assessment of alien bird impacts. *Diversity and Distributions* **22**, 919-931.

Applications (so far)

EICAT

- Birds (Evans et al. 2016)
- Amphibians (Kumschick et al. 2017)
- Marine fish (Galanidi et al. 2018)
- Ungulates (unpubl.)
- Aquatic weeds (unpubl.)
- Freshwater fish (unpubl.)
- Molluscs (Kesner & Kumschick 2018)

SEICAT

- Amphibians (Bacher et al. 2018)
- Marine fish (Galanidi et al. 2018)

- Aquatic weeds (unpubl.)

Maximum Impact:
Marine fish alien to the Mediterranean

Marika Galanidi

	EICAT	Confidence	SEICAT	Confidence	Focal Area
Plotosus lineatus	MO	low	MN	medium	Eastern Mediterranean
Pterois miles/volitans	MR	medium	MN	medium	Western Atlantic
Lagocephalus sceleratus	DD		MO	medium	Eastern Mediterranean
Fistularia commersonii	DD		MN	low	Eastern Mediterranean
Siganus spp.	MR	high	MN	medium	Eastern Mediterranean
Saurida lessepsianus	MO	low	MN	low	Eastern Mediterranean

Galanidi et al. 2018 *Medit. Mar. Sci.*

Prioritization using SEICAT