

IN SILICO MODEL TO PREDICT COMPATIBILITY IN FISH POLY CULTURE

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Context

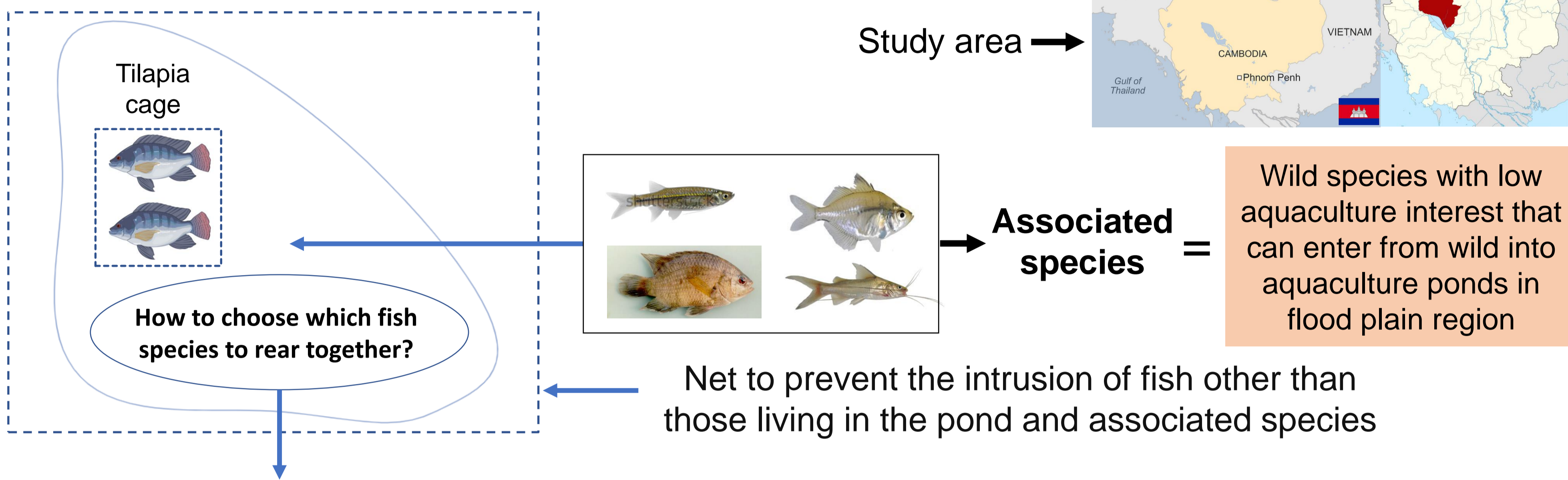
- Polyculture can help to improve the sustainability of aquaculture but to be effective, species need to be compatible^{1,2}
- In Cambodia, rearing species in ponds are not controlled and so not big in term of production
 - We need to develop controlled polyculture with compatible species to increase fish production and sustainability in this region

Polyculture: Rearing of two or more fish species at the same time¹

Fish compatibility: able to live in the same system without detrimental interaction and with a minimized competition¹

Objective

Rearing system in Cambodia: Cage in pond



Objective: Determine the most compatible 2-4 species combination to put into ponds with associated species and tilapia cages?

Method

Conditions:

- Live in Cambodia
- Used in aquaculture in Asia
- Available to perform experiment

STEP 1
BUILD A FISH SPECIES LIST

STEP 2
REMOVE COMBINATIONS WITH PREDATION



STEP 3
CLASSIFY THE FISH COMBINATIONS

Ranking the combinations according to:

- 1 Economic interest
- 2 Fish Compatibility Index (CI) and other considerations

1 Price

Between 0 and 1
0: no profit 1: most profitable

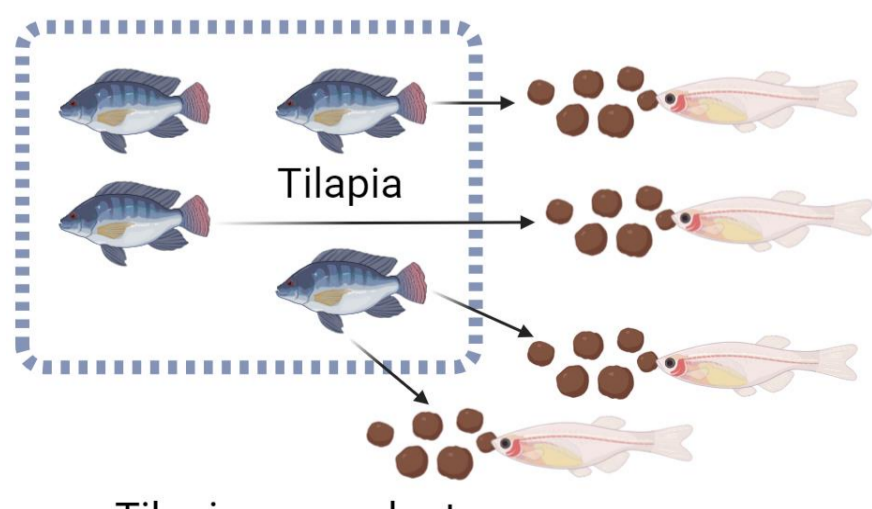
2 Compatibility Index

Between 0 and 1 (1: most compatible)

Minimizing trophic competition

Maximizing predation of associated species

Using of tilapia co-products (=detritus)



Associated species

Results

Selection of 15 species

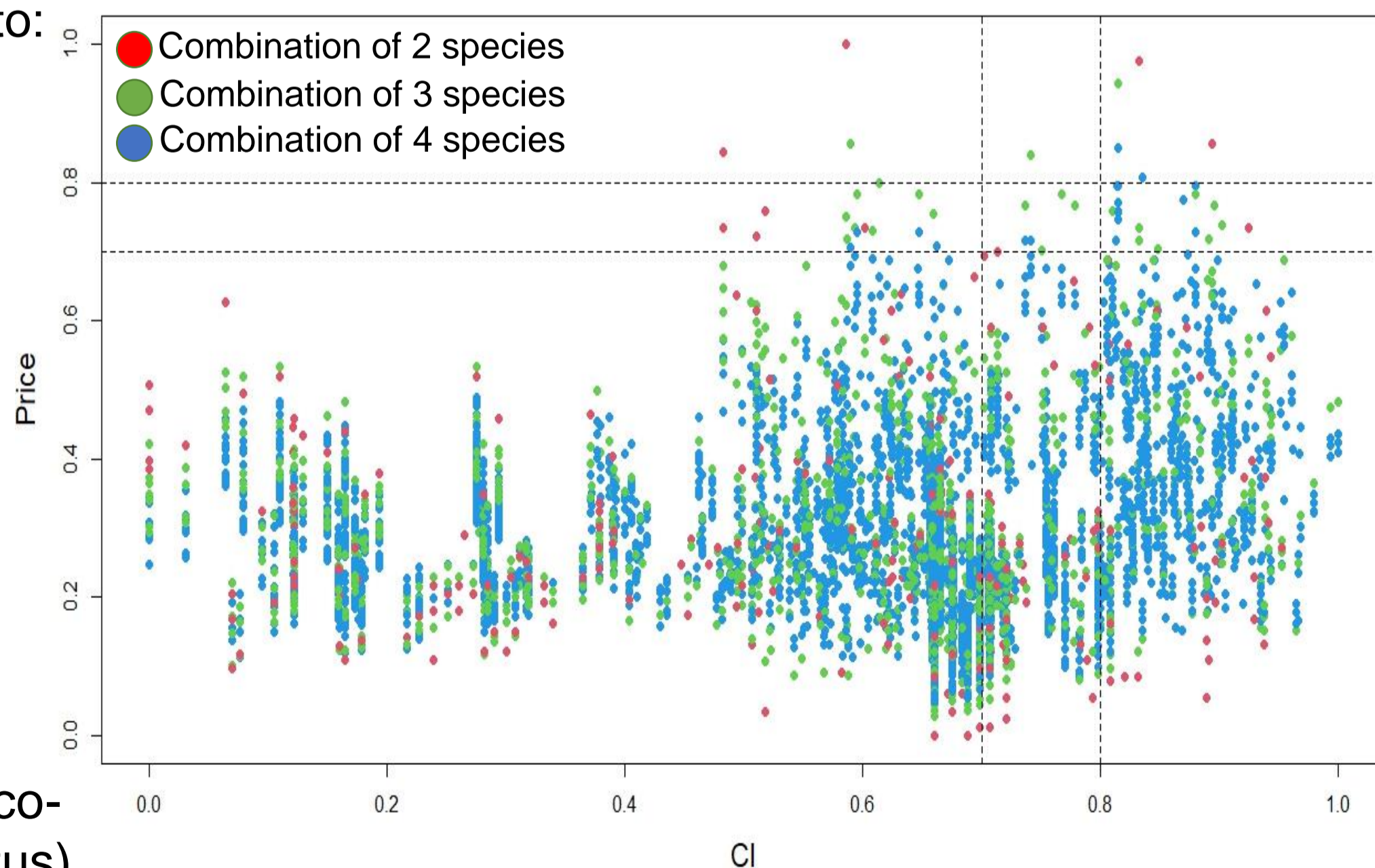
1925 possible combinations of 2 to 4 species

Impossible to test empirically all of the combinations

In silico model

- 48% of combinations

926 possible combinations of 2 to 4 species



Perspective: Model validation in Cambodia with a selection of combinations