



Analysis of the ecosystem services associated to fish ponds in the French Lorraine region

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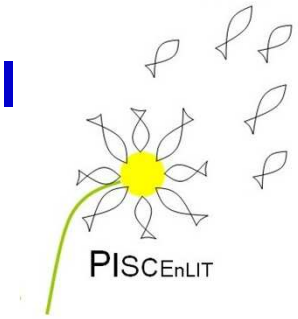
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« *Ecosystems, territories, living resources and agricultures* »



PISCEnLIT : Ecological intensification of fish farming (2010-2013)

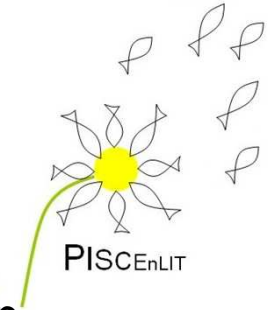
= an interdisciplinary program => systemic approach of pond polyculture including technical, social, biological, environmental, economical and organizational expertises



+ 2 foreign partners : Brasil + Indonesia

10 partners :

Overall context of the study :



- **Food safety = major stake** in the world / increase of the world population
(=> How feed all people?)

- Aquatic products : Fisheries decline => Dvpt of aquaculture

- Need to promote **sustainable breeding systems**



- **Pond polyculture** = main breeding system in the field of aquaculture

- Pond polyculture could contribute to the development of a sustainable aquaculture in the future (concept of **ecological intensification**?)

However, that requires an integration of the ecosystemic services related to this agrosystems.

What are the ecosystemic services related to fish ponds?

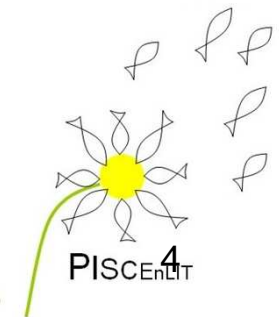
Preliminary identification of ecosystemic services from fish farming ponds

Supporting

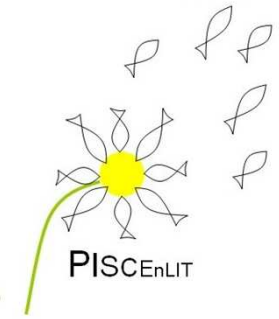
Production

Culture

Services



Millenium Ecosystem Assessment (2005), Chevassus-au-Louis *et al* (2009)

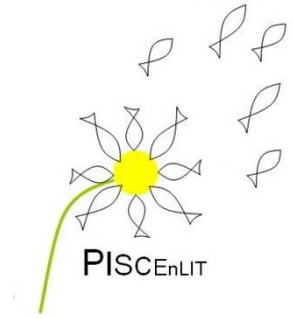


Study 2010-2011 : Identification and hierarchization of ecosystemic services related to fish ponds

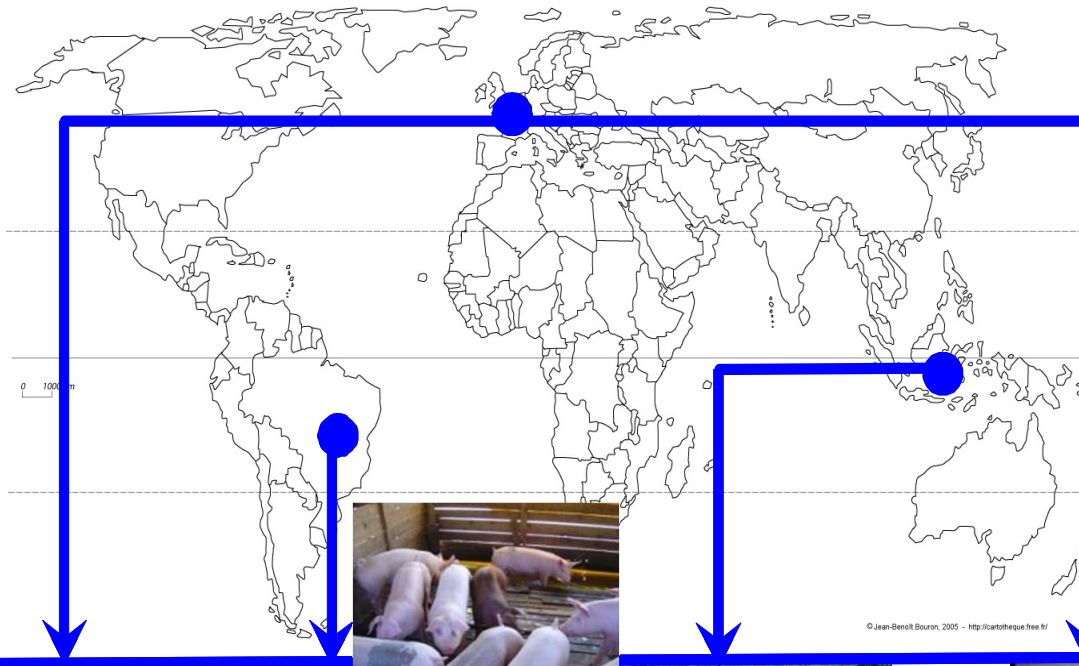


Comparative study

Sites



Lorraine
Brenne



French ponds

Brazilian pig and pond integrated production

Indonesian fish farming of Pangassius

French recirculated fish farming system

Site 1

Site 2

Site 3

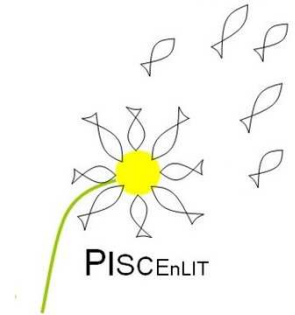
Site 4





Case of Lorraine Region

- 2nd French Region for fish pond polyculture
- **7000 ha** available for fish culture
- Only dam ponds
- High interest for local authorities => « **Pond agreement** »



Method = 4 surveys with questionnaires

- **S1 : Fish farmers** (n =25, 59%), May – July 2010, 2 hours / person)



153 Questions (11 parties) :

B – Characterization of activity

C – Opening to public

D – Ecosystemic services

E – Social network

F – Territories and institutions

G – Labour and social

H – Products and bussiness

I – Constraints and conflicts

J – Economical management

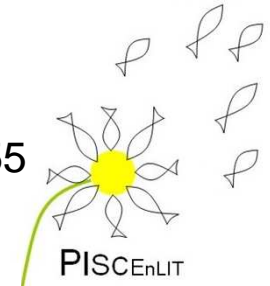
K – Identification of fish farmer

L – Biodiversity



Case of Lorraine Region

- **S2 : Stakeholders and pond owners, but not operating** (n = 32, Oct.-Nov. 2010, 1 hour / person, 55 questions)
 - Administrations (agriculture, environment) / national and local governments
 - Associations or institutes for environment protection
 - Organisations or firms related to aquaculture ...



- **S3 : Pond users** (n = 114, 20th Nov. 2011, 10 min./person, 17 questions)
 - « Fish feast at the Lindre Domain, 13 000 visitors over a week-end)

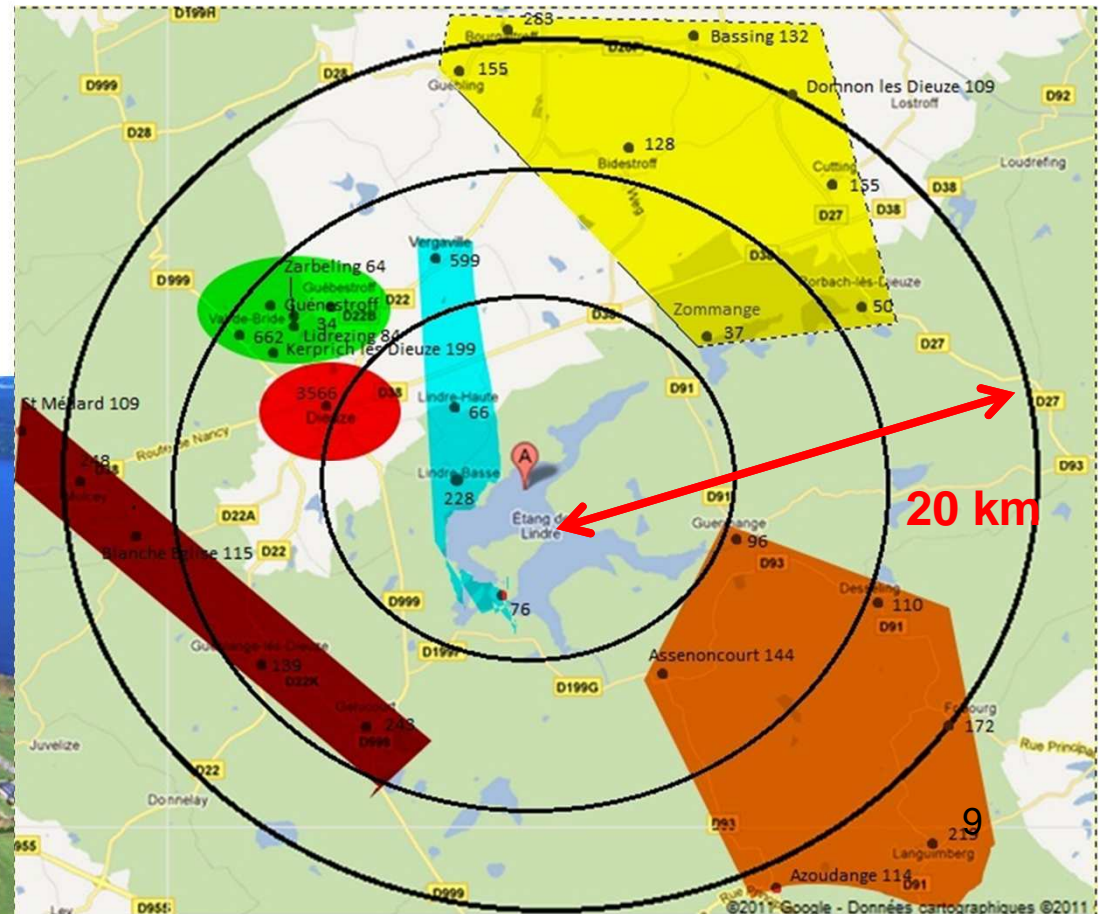




- **S4 : Local population** (n = 497, 6% of the population, 28 villages, dec. 2011, 10 min./ person, 20 questions)

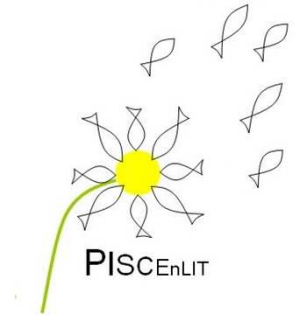


792 ha



Results: Survey S1 / fish farmers (n = 21)

=> 4 Classes



CI 1 (n = 7)

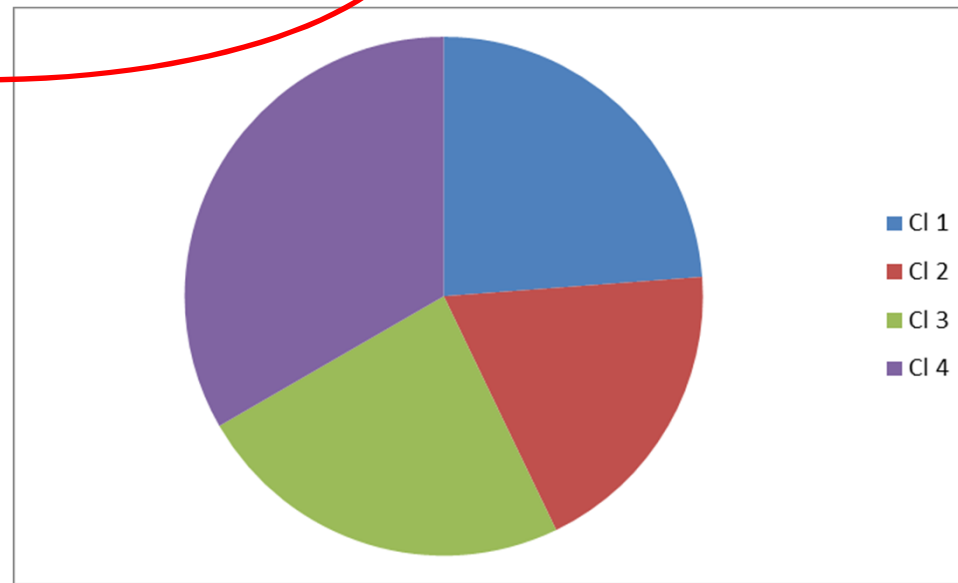
Supporting and production services

CI 2 (n = 5)

Production services

Data analysis:

3 axis = 94% of the variance



CI 4 (n = 5)

Regulation services

CI 3 (n = 4)

Cultural services

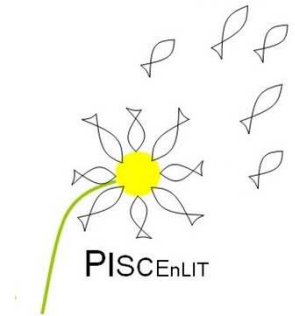
Mean age :

51 years

Production (57%) > Supporting (33%) > Regulation (24%) > Culture (19%) 10

Results: Survey S2 / stakeholders (n = 32)

=> 3 classes

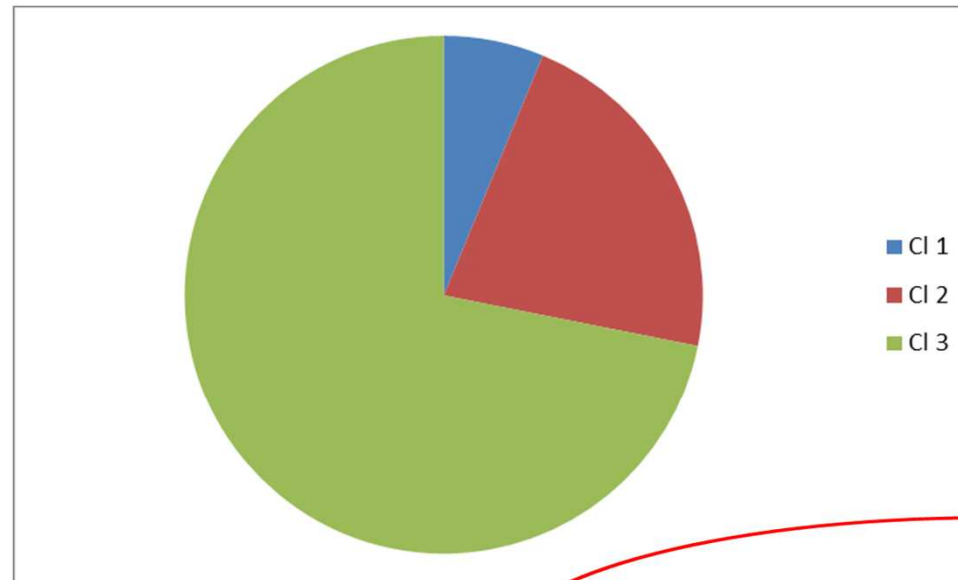


CI 1 (n = 2)
Cultural services

CI 2 (n = 7)
Production and regulation services

Data analysis:

3 axis = 97% of the variance

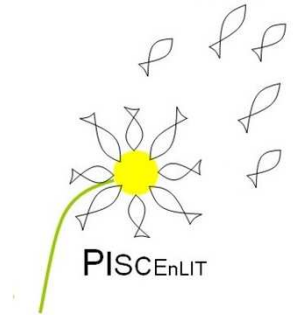


CI 3 (n = 23)
Supporting services

Supporting (72%) > Production and Regulation (22%) > Culture (6%)

Results: Survey S3 / pond users (n = 114)

=> 4 Classes

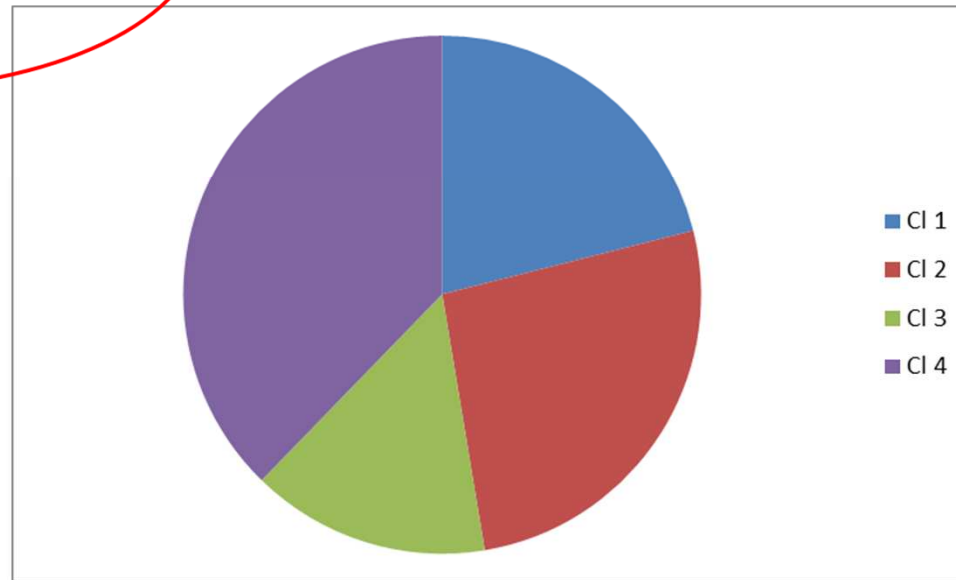


CI 1 (n = 43)
Supporting services

CI 2 (n = 24)
Production services

Data analysis:

3 axis = 90% of the variance



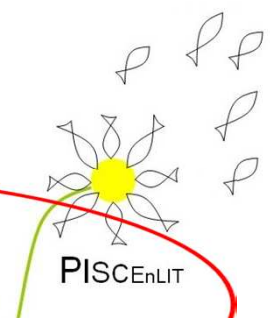
CI 4 (n = 17)
Regulation services

CI 3 (n = 30)
Cultural services

Supporting (38%) > Culture (26%), Production (21%) > Regulation (15%)

Results: Survey S4 / local population (n = 497)

=> 4 Classes

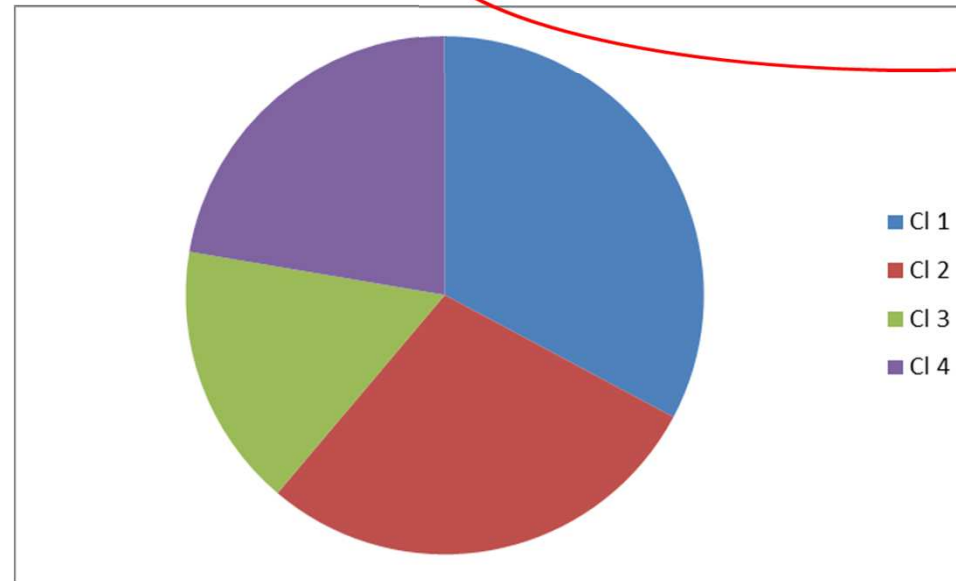


CI 1 (n = 111)
Supporting services

CI 2 (n = 163)
Production services

Data analysis:

3 axis = 90% of the variance



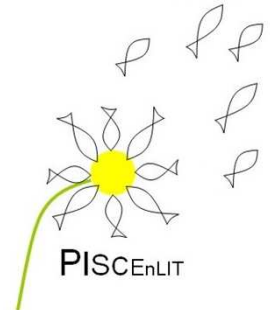
75% are native from the region

CI 4 (n = 82)
Regulation services

CI 3 (n = 141)
Cultural services

Production (33%) > Culture (28%), Supporting (22%) > Regulation (17%)

Associated comments down by local population:



Positive comments:

Presence of ponds = entertainment (35%), aesthetic (25%), biodiversity (25%) and tranquillity (19%)

No advantage = 20%



Carex bohemica

Negative comments:

Presence of ponds = insects (18%) and climate (16%)

No disadvantage = 53%



Conclusions:

- A **diversity in the perception of the ecosystemic services** associated to fish ponds is noted.
- However, the **main ecosystemic services** identified by different classes are mainly **the same**, independently to type of person:
 - 1 – **Supporting services:** conservation of biodiversity (*all*) and **wetlands** (*fish farmers, stakeholders*), **refuge and reproduction areas** / birds, aquatic animals and vegetables (*pond users*)
 - 2 – **Regulation services:** water flow management (*all*) en relation to **water storage and swelling** (*stakeholders*) or **pollutants retention** (*local population*)
 - 3 – **Production services:** fish production (*all*), **water for irrigation** (*except for stakeholders*)
 - 4 – **Cultural services:** fishing (*all*), **landscape and education** (*fish farmers, stakeholders*)

Pond as patrimony value is never cited as cultural service!

Perspectives:

- **Development of scenario of ecological intensification for fish ponds** including a protection or valorization of ecosystemic services and adapted to Lorraine territory.
- **Comparison of results obtained in different geographical and socio-economical contexts.**

- **Identification of new items for further researches:**

How to quantify the value of a fish pond in terms of biodiversity? Evaluation of impact of cultural practices?

What is the real role of a fish pond in the water flow management at a watershed scale?

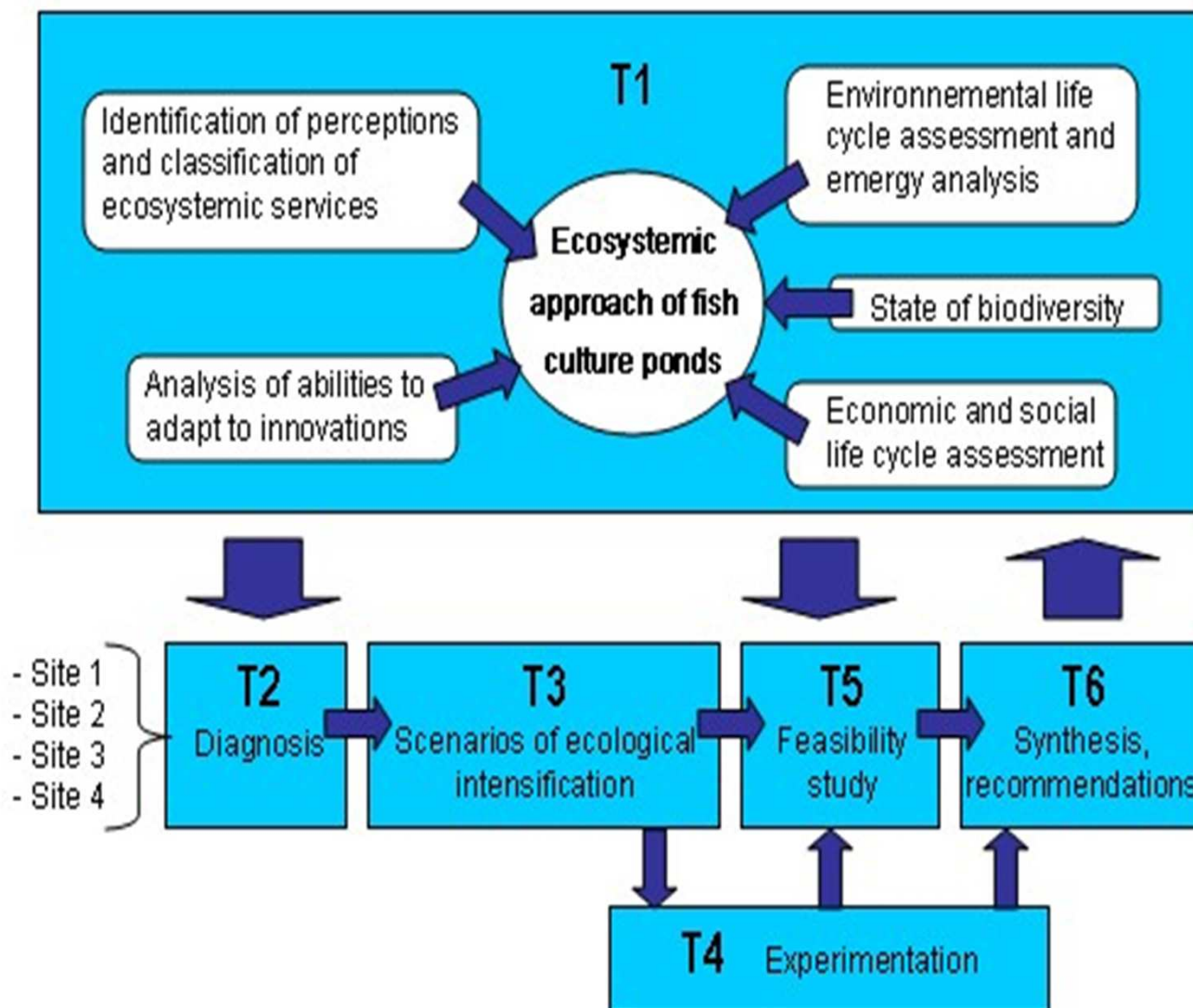
What is the economical value of such ecosystemic services?

...

A scenic landscape featuring a calm pond in the foreground, reflecting the sky and surrounding greenery. In the middle ground, a white house with a brown roof is nestled among lush green trees and a field. The background shows a dense forest under a blue sky with scattered white clouds. The overall scene is peaceful and idyllic.

Thank you for your attention

Objectives of the PISCEnLIT Program: 6 tasks



Definitions :

- Ecological intensification

Development of aquaculture production by ecological levers without forcing the ecosystem (no fertilization) and taking into account all ecosystemic services

- Ecosystemic services

All services given to populations by ecosystems (not only fish production)

