



Typology of fish farms using ponds in the French Lorraine region

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Introduction

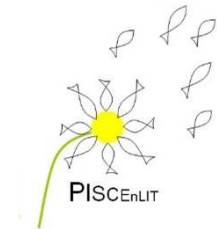


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Call Systerra « *Ecosystems, territories, living resources and agricultures* »

PISCEnLIT : Ecological intensification of fish farming (2010-2013) =
an interdisciplinary program

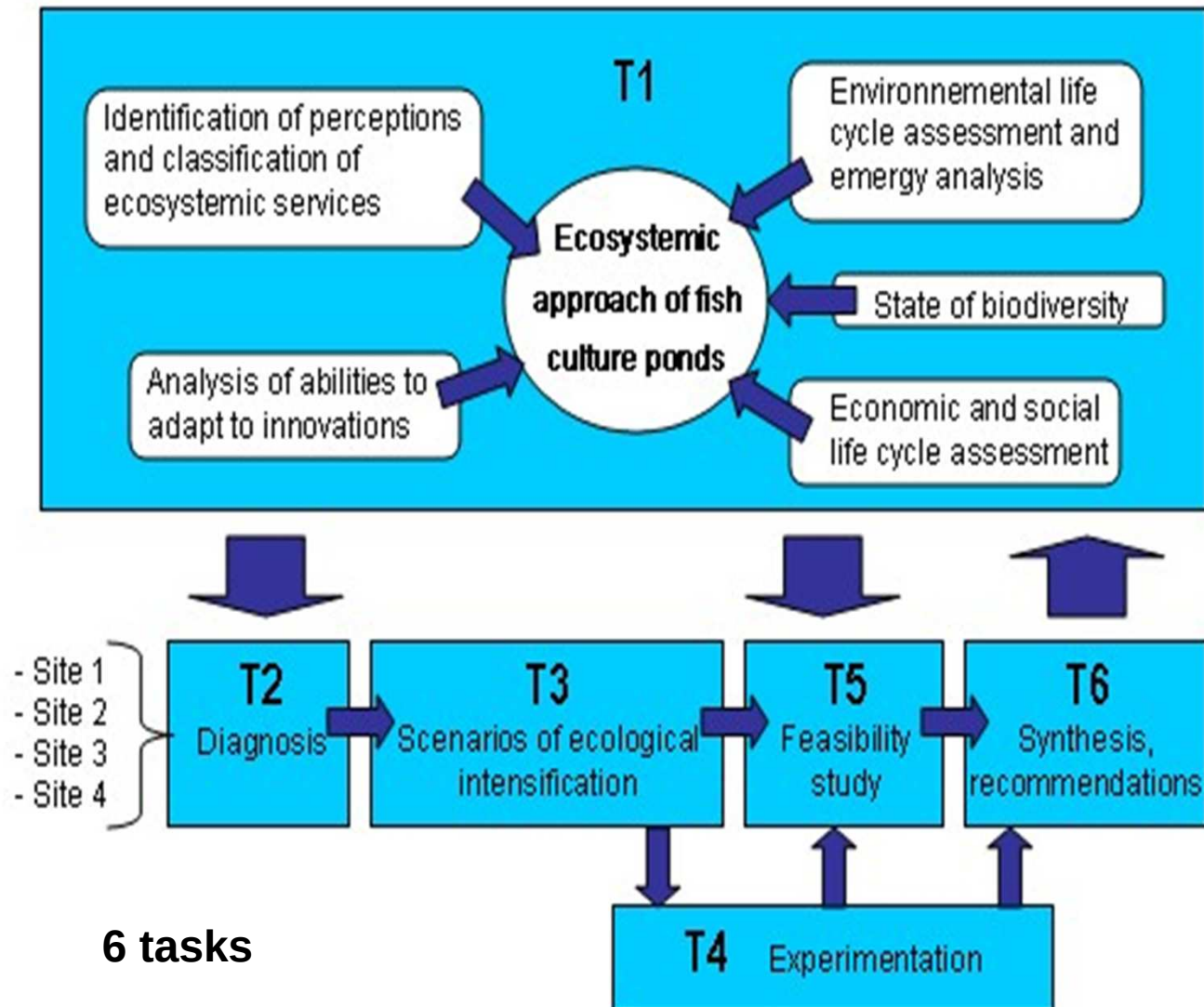


=> systemic approach of freshwater fish culture systems (mainly ponds) including technical, social, biological, environmental, economical and organizational expertises

Main objectives are :

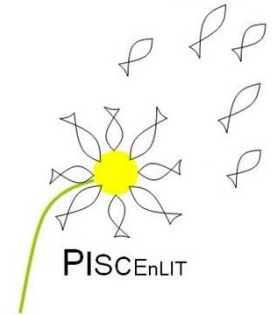
- Analyses of fish culture systems by an ecosystemic approach of fish culture ponds
- Proposition and assessment of scenarios of ecological intensification, including a valuation of ecosystemic services

Main tasks of the PISCEnLIT Program:

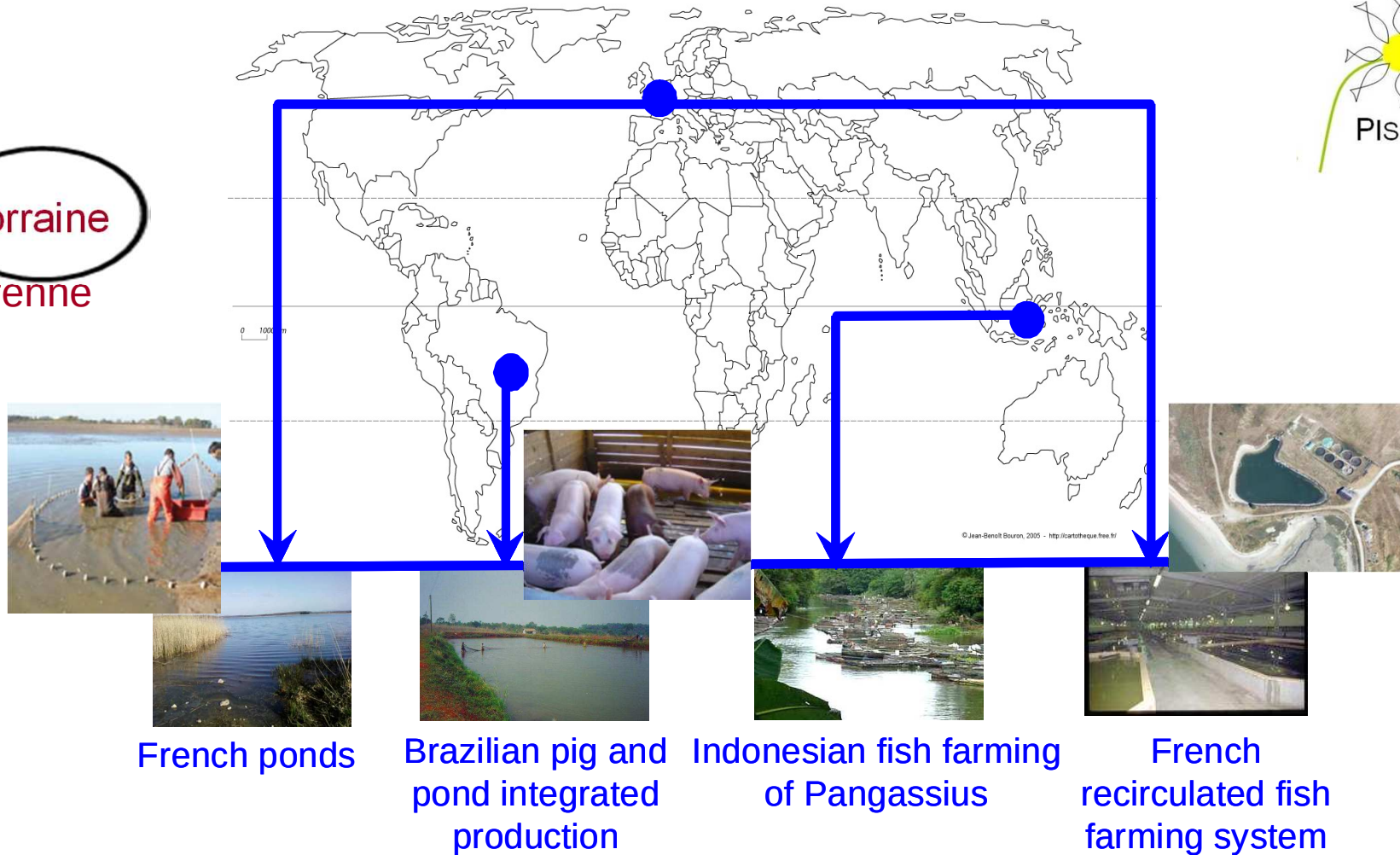


Comparative study

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

Agricultural intensification gradient



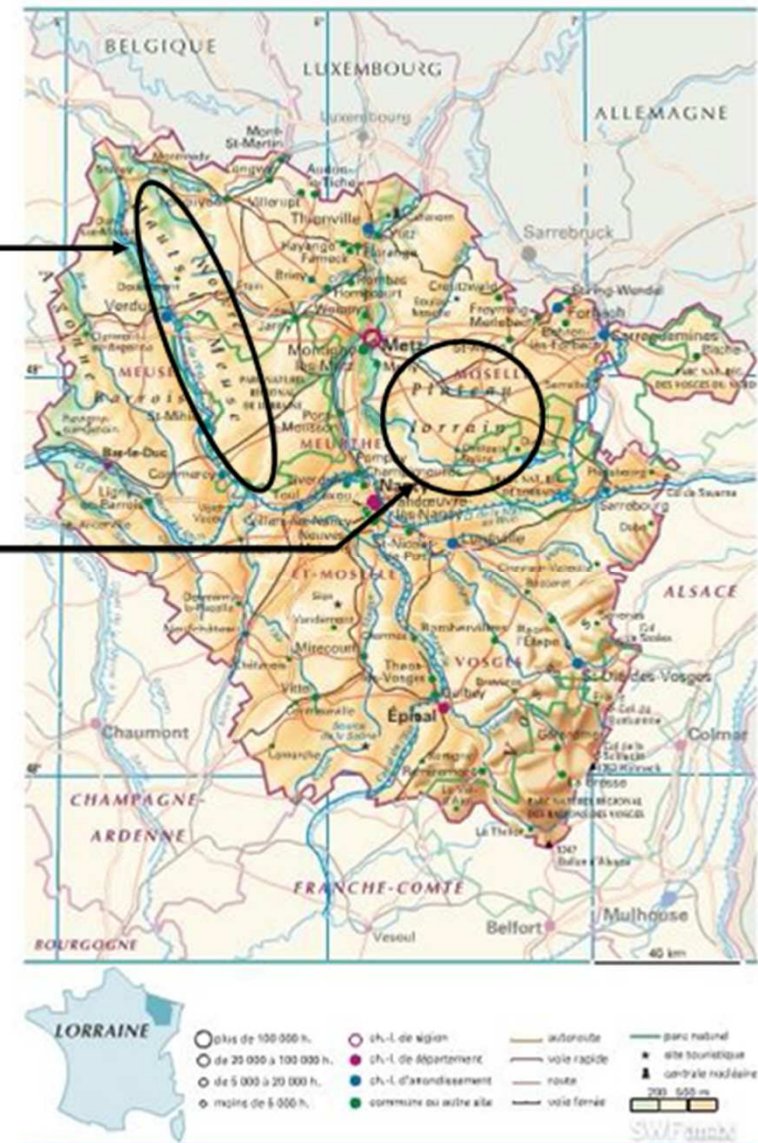
Lorraine Region

- 2nd French Region for fish pond polyculture
 - **7000 ha** available for fish culture
 - Only dam ponds (often large surfaces)
 - Production = 800-900 mt (150 kg/ha)
 - 90% for the restocking market
 - High interest for local authorities
- => « **Pond agreement** »



The Woèvre

The Saulnois



Socio-economic context

A context more and more difficult:

- Decline of the restocking market
- Increasing environmental pressure (piscivorous birds, rules for water pond management, climate changes ...)
- Low price of fish
-



Specific objectives of the present study:

- Global characterization of fish farms using pond system (systemic approach)
- Typology of fish farms => clusters (all farms are **VERY** different)
- Perception of ecosystemic services related to fish farm ponds by fish farmers

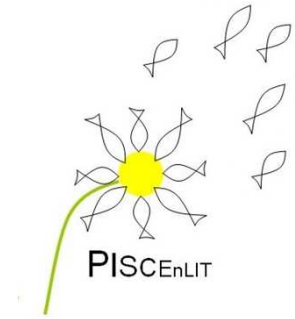


Material and methods





- **25 Fish farmers** (59%)
- May – July 2010
- **Farmers** = Producers of cyprinids (polyculture), salmonids, crayfish, ornamental fish
- **Pond use** = fish production or angling



2 hours / farmer

Method = a survey with many questionnaires

Data analysis:

- **Principal Component Analysis (PCA)**
- **Hierarchical Clustering Analysis (HCA)**

153 Questions (11 parts) :

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



Ecosystemic services

Millenium Ecosystem Assessment (2005)

Chevassus-au-Louis *et al* (2009)

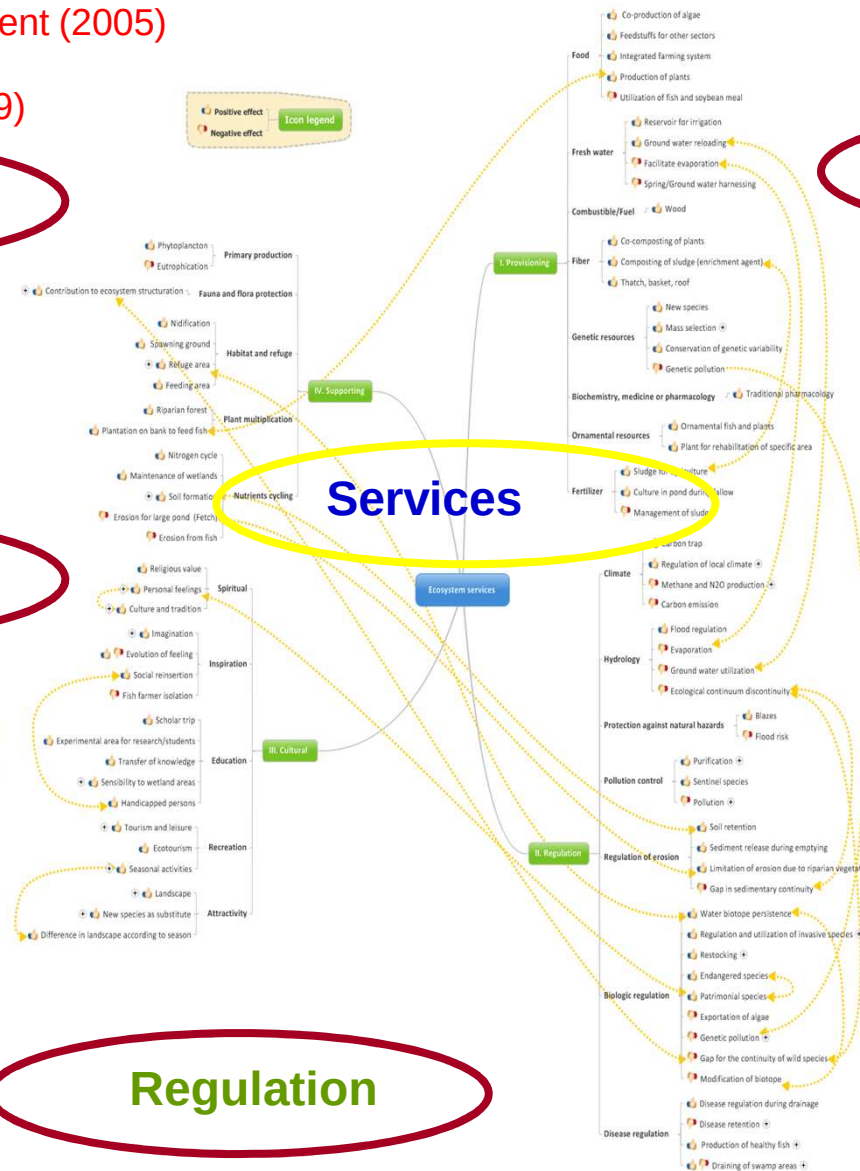
Supporting

Production

Culture

Services

Regulation



⇒ 28 ecosystemic services identified for ponds

=> selection and hierarchization of 10 among them



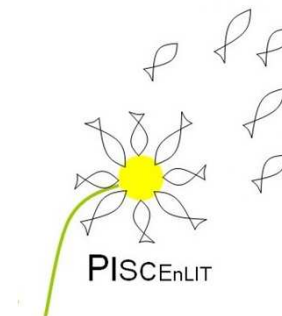
Results





General results:

- **51 years**
- 76% native from Lorraine
- 36% = first job
- 70% of individual firms
- **Education level** : 40% = bachelor, 36% = master / PhD
- 68% open to public (for 82% = a way for the firm perennality)
- Surface = 112 ha
- Production = 31 mt

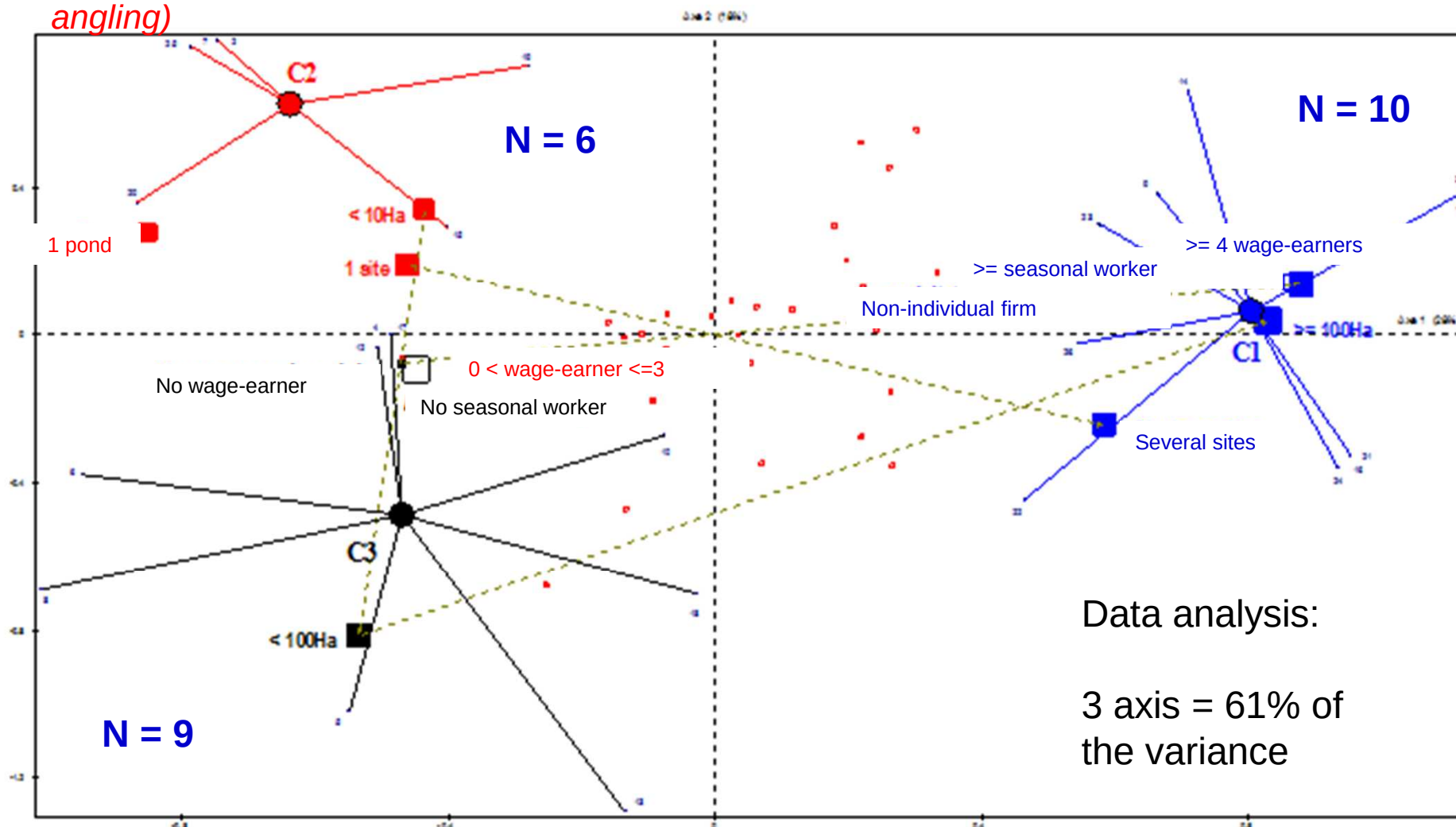


Data analysis (PCA + HCA) => 3 clusters according to the more influencing variables

Farm typology

Recreational trout fisheries (pond for angling)

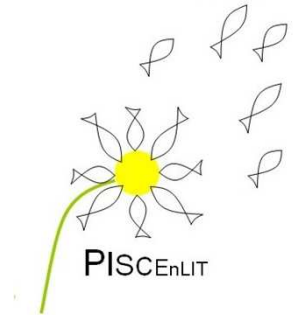
Polyculture pond farmers



Mixed group (trout farms, crayfish farms, polyculture pond farms = pond owners)

Identification of ecosystemic services / fish farmers (n = 21)

=> 4 Classes



CI 1 (n = 7)

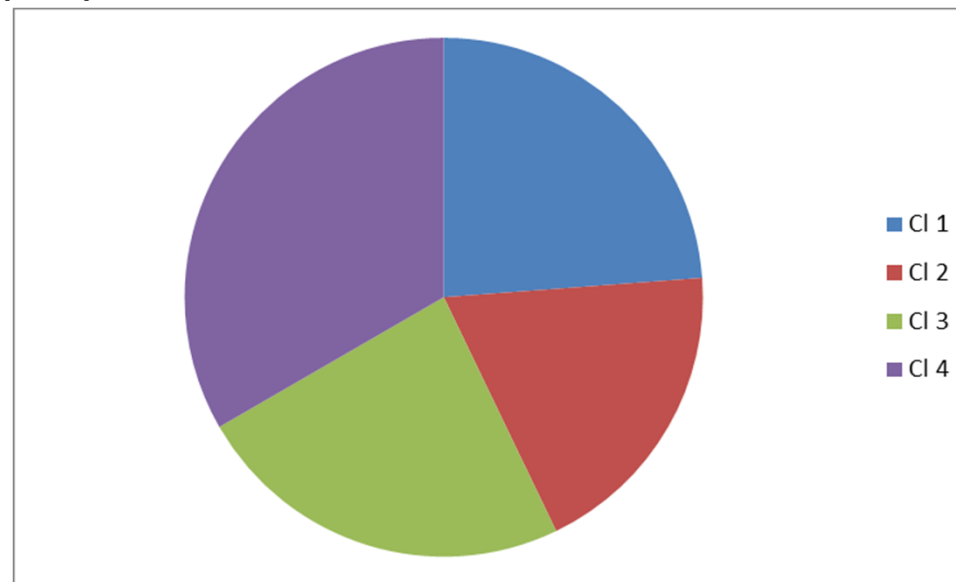
Supporting (biodiversity, wetlands) and production (fish) services

CI 2 (n = 5)

Production services (fish)

Data analysis:

3 axis = 94% of the variance



CI 3 (n = 5)

Regulation services (water flow management)

CI 4 (n = 4)

Culture services (fishing, landscape, education)

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

Conclusions:

- Whereas a strong diversity of farms exists in Lorraine, the typology permits to identify **3 distinct clusters**.
- The **important parameters** for the typology analysis are:
 - pond number and surface
 - number of sites
 - number of wage-earners and seasonal workers
 - legal status
- The **ecosystemic services linked to culture pond** are :
 - Production services (fish)
 - Supporting services (biodiversity, wetlands)
 - Regulation services (water flow mangement) ⇔ dam ponds
 - Culture services (fishing, landscape, education)



Perspectives:

- **Further actions** will be focused on the classe C1 (**polyculture pond farmers**) : larger surface of ponds, higher potential for aquaculture, major stakes for the local and national administration.
- **Including the perception of other populations** (stakeholders, end-users, local inhabitants) / ecosystemic services, researches will be conducted on the part of culture ponds on **water flow management at the watershed level**.
 - **Quantitative aspects** (water retention ...)
 - **Qualitative aspects** (impact on water quality : contaminants ...)

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

Thank you for your attention