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# Environmental assessment of trout production in France: influence of practices and production goals

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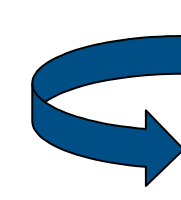
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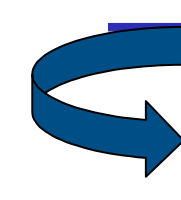
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## Context

- an increasing demand for aquatic products and rainbow trouts,
- a production decreasing, about -2 % per year for the last decade in France,
- a necessity: developing sustainable trout production systems in a protected environment.



## Material and methods: an LCA associated to statistical methods

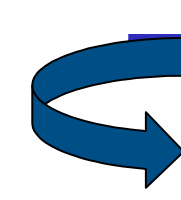
a survey in 20 fish farming divided in two groups according to the commercial size of fish production is conducted:  
Pan-size trout farms (11 farms) – large-size trout farms (9 farms)

### An attributional LCA method

- CML 2 (2001) method,
- eutrophication, acidification, climate change, net primary production use, land occupation, water dependence, total cumulative energy demand + on farm working time recorded.
- functional unit: 1kg of trout at farm gate

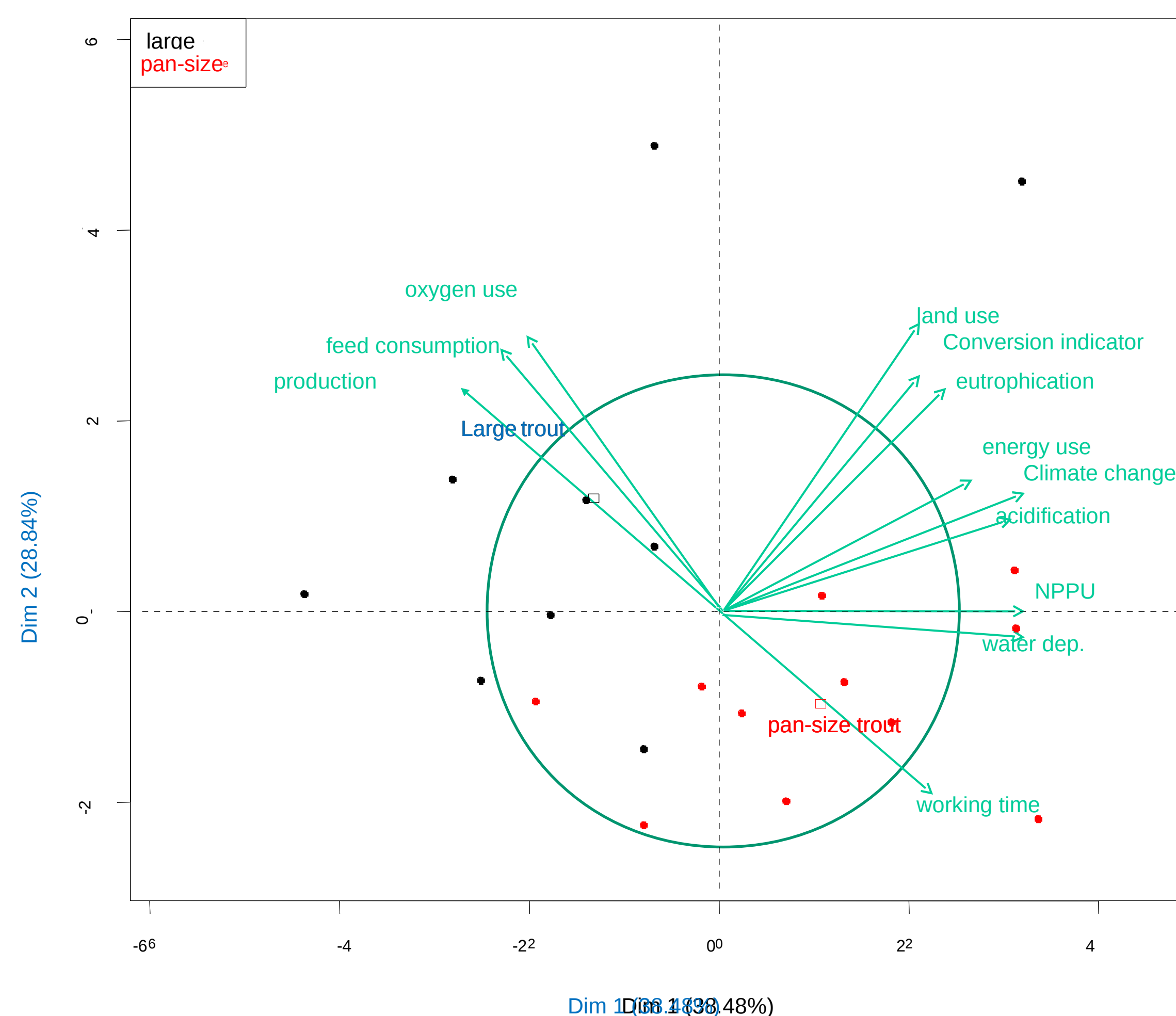
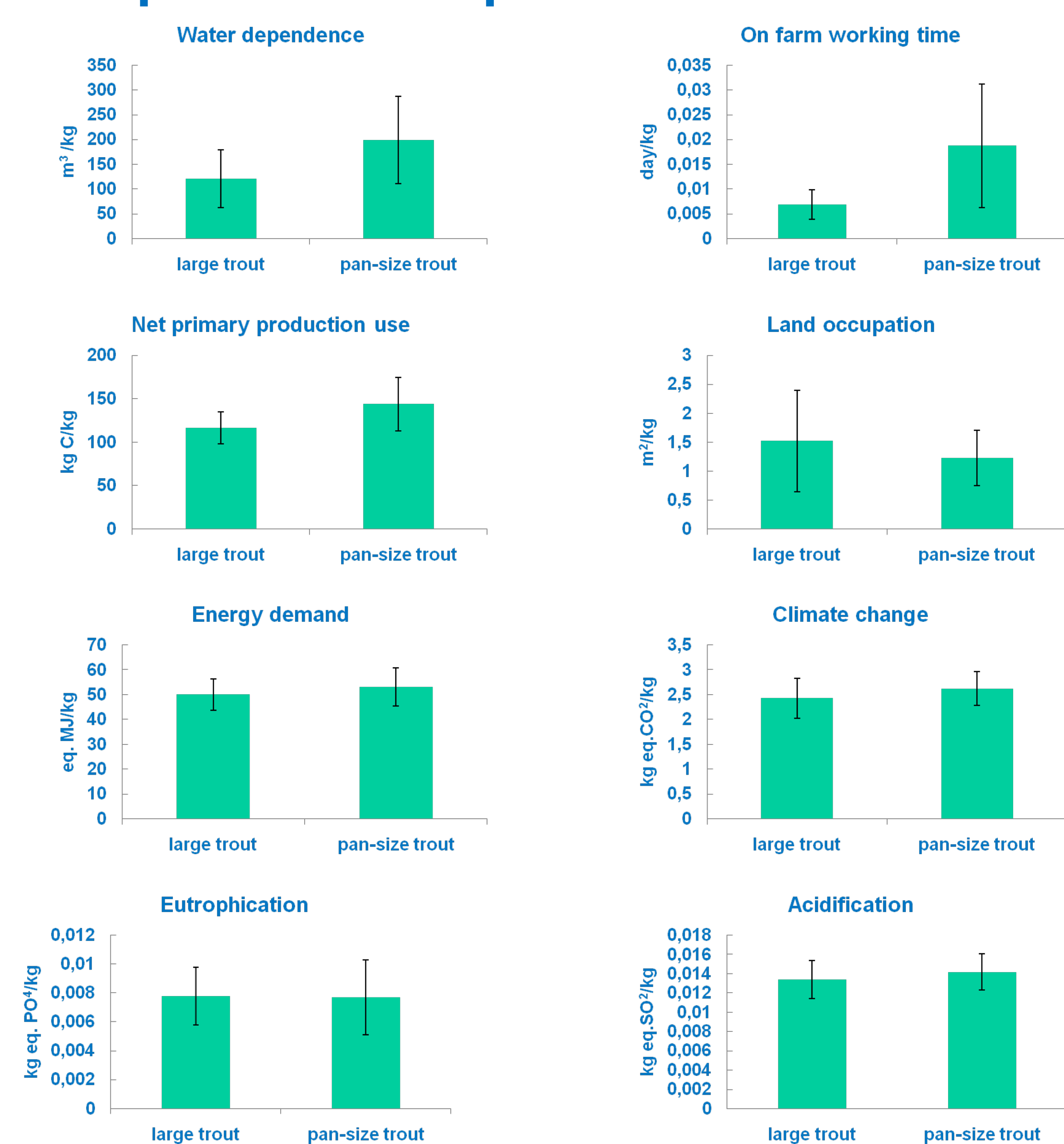
### Statistical analysis

- variance analysis and equality tests,
- Principal Components Analysis (PCA),
- including both economical performances (production level, feed consumption, oxygen use) and environmental indicators (LCA indicators).



## Preliminary results:

### Comparison of impacts between the two groups of fish farms and their position according to PCA



#### Variance analysis and equality tests show

- significant higher levels in the pan-size trout farms for: water dependence, on farm working time and net primary production use,
- but a great variability for: on farm working time, land occupation and water dependence,
- few differences between the two groups for energy demand, climate change, acidification and eutrophication.

#### PCA shows

- that production and working time have the greatest influence on the position of each fish farm,
- consequently, large size trout farms have a better position regarding production level and working time,
- however, most of environmental impacts are at the same distance of the two groups except water dependence and net primary production use.



## Conclusions

### Association of LCA and statistical analysis:

- is adapted to investigate joint economical and environmental performances,
- the study reveals significant few differences between the two groups:
  - large size trout farms seem slightly more efficient than pan-size trout farms
  - higher impact variability in pan size trout farms.

Production objectives (i.e. restocking, recreational angling, consumption) can influence the environmental impacts variability of the production activity. This variability indicates a high potential of system improvement.