



Horizon 2020  
European Union funding  
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AQUASMART

## Aquaculture Open Data Cloud Innovation

USE OF OPEN DATA FRAMEWORKS. GLOBAL DATA ACCESS AND DATA MINING TO HELP AQUACULTURE COMPANIES IMPROVE EFFICIENCY AND REDUCE ENVIRONMENTAL IMPACT.

# What is aquaSmart?

aquaSmart is an EU funded project. It is about enhancing innovation capacity within the aquaculture sector.

We are developing an innovative cloud platform that helps companies to transform captured data into knowledge, and sharing this knowledge to improve efficiency, increase profitability and help them grow in a sustainable way.



The project consortium includes prominent industrial organizations and research institutes from six countries (Ireland, Greece, Portugal, Spain Slovenia and Israel)

Web site: [www.aquasmartdata.eu](http://www.aquasmartdata.eu)



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# What is new with it?

It is completely novel and unique. Globally, it is the only data mining and big data technologies initiative applied to the aquaculture sector.

Our team consists of experts from academia and experienced personnel from Aquaculture companies.

We are committed to improving the fish production through the science of **Statistics, Data Mining and Machine Learning**. And all that in the context of **adding extra business value into your corporate data**



# Mission statement

aquaSmart will support

- Lower production costs.
- Higher profitability
- Improved operational efficiency
- Carry out business in a sustainable, environmentally friendly way.



from 45  
millions tons in  
2014 to 85  
million by 2030

define best  
practices for  
the industry

Sustainable  
Growth

# What is the need?

Aquaculture companies are drowning in data, but starving for knowledge

Data can tell a lot about the parameters influencing the success of the production from **environmental parameters, to feed types, feed composition, feeding rates and practices, net changes, production management strategies** and many others

They can also be used to identify patterns, trends, problem causes and also to develop models.

Unfortunately the data are currently unexploited. It is almost impossible to transform these data into knowledge in order to support **smarter decisions, better production and efficient management**

If we manage to transform data into to knowledge, this knowledge can help companies to dramatically improve performance

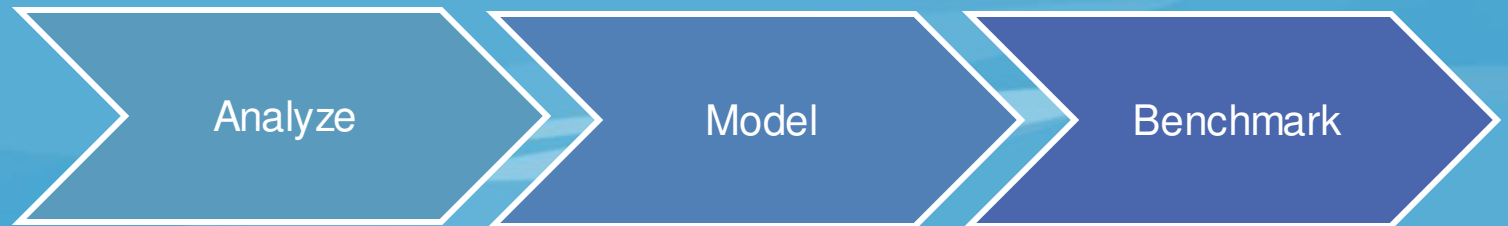


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# Main Idea

- Use state-of-the-art technologies to perform **data mining at the local level and get actionable results**. Companies will be able to know how **environmental parameters, feed types, feed composition, feeding rates and practices, net changes, production management strategies** influence the **main KPIs of the production like FCR, mortality rate, growth rate, production time, health, etc.**
- We will offer these tools as a cloud service in order to be easily accessible by all companies, including the SMEs
- However, the project goes much further: through the availability of multi-lingual Open Data, companies will be able to **compare their result of their analysis with the ones that are stored into the cloud**. This will generate a **knowledge base** that will be of maximum usefulness for all the stakeholders of the aquaculture sector



# aquaSmart Approach

## Cloud platform

Most aquaculture companies are SME companies. They can't afford to hire the skilled personnel needed to start their own Data analytics programs.

We wanted companies to have seamless data exchange and reuse of stored data , models, forecasts etc.

Move from data Islands to a global data Lake .

## Multilingual Open Data

We target at global knowledge access

Exchange of best practices between countries, regions , species .

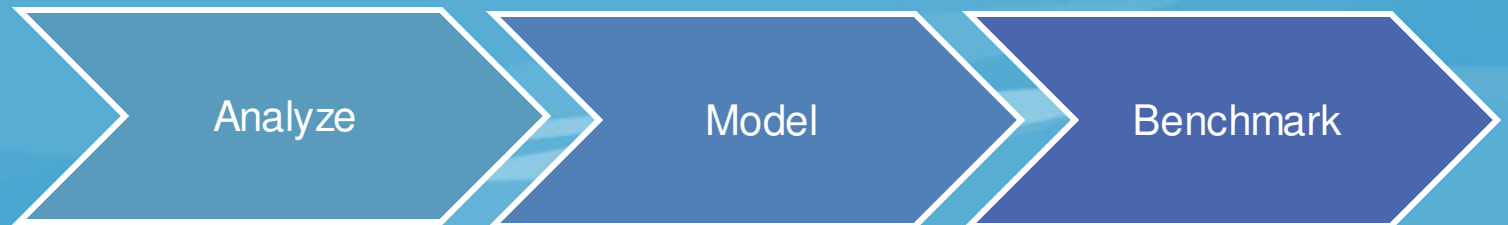
## Answer Business Questions

Cutting edge technologies

Data mining

Machine Learning

Visualization, Ontology, Advanced analytics, statistics.



# Questions to Be answered

- Evaluate Feed
- Better Estimation of Fish Number and Average Weight
- Evaluate production strategies
  - Grading or not
  - Frequency of net changes
  - Evaluate Feeders
  - Get optimum feeding rate
- Detect kpi's change between years and production life cycles
- Identify variation from models and analyze causes



# Lets get Practical

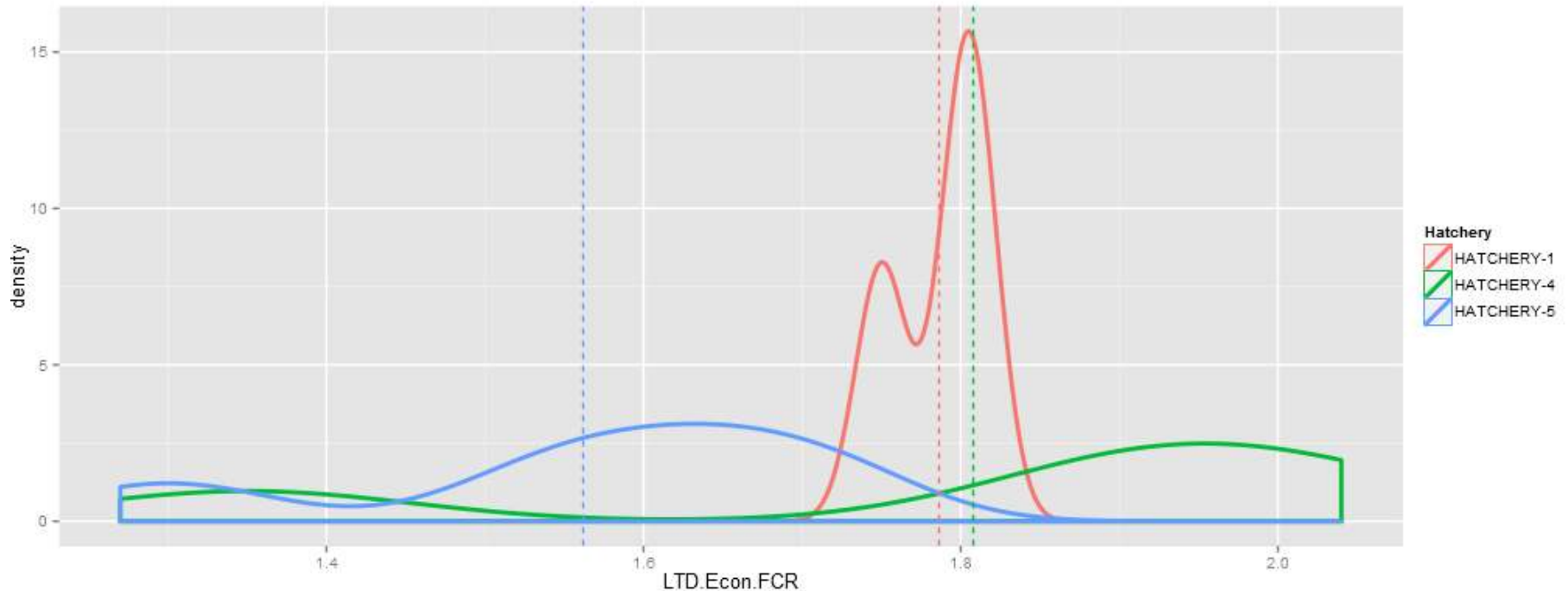
## How can aquaSmart Analytics help you answer the questions?



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# Descriptive Statistics & Visualization/1

Example: Evaluation of different hatcheries in terms of FCR. Hatcheries 1 and 4 have the same average but 4 is unpredictable!



# Descriptive Statistics & Visualization/2

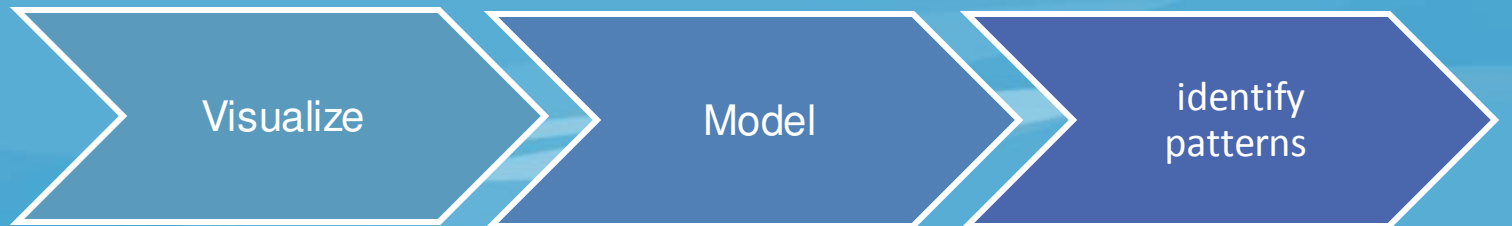
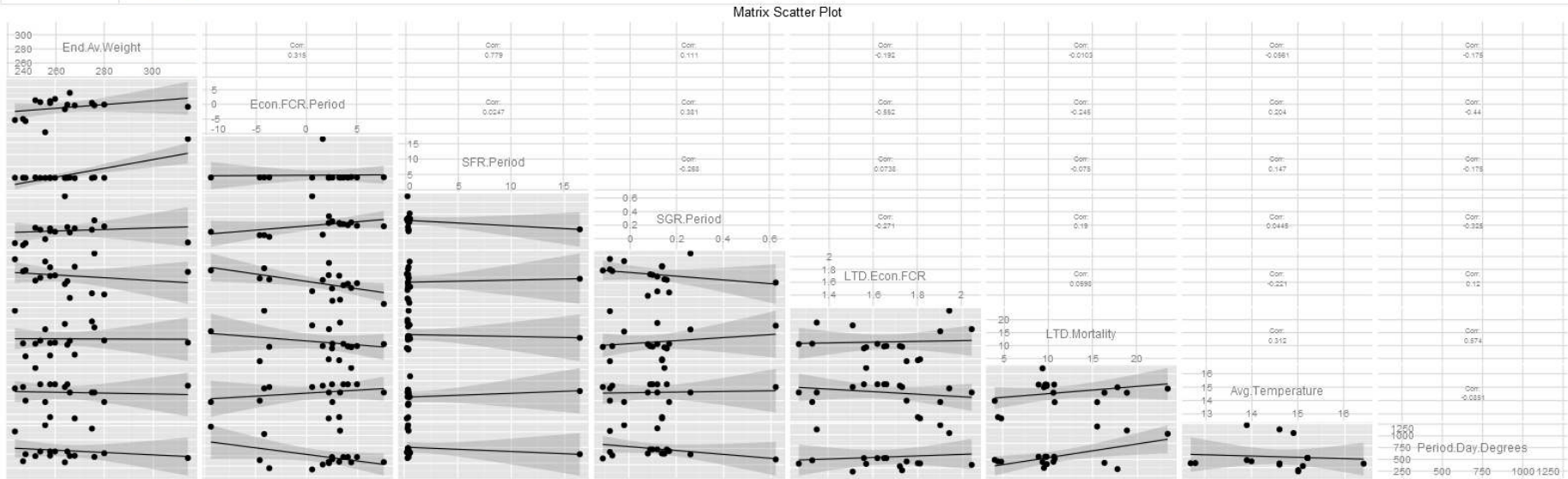
Example: scatterplot showing the relationships between all parameters affecting the main KPIs

Separate The Dataset By:

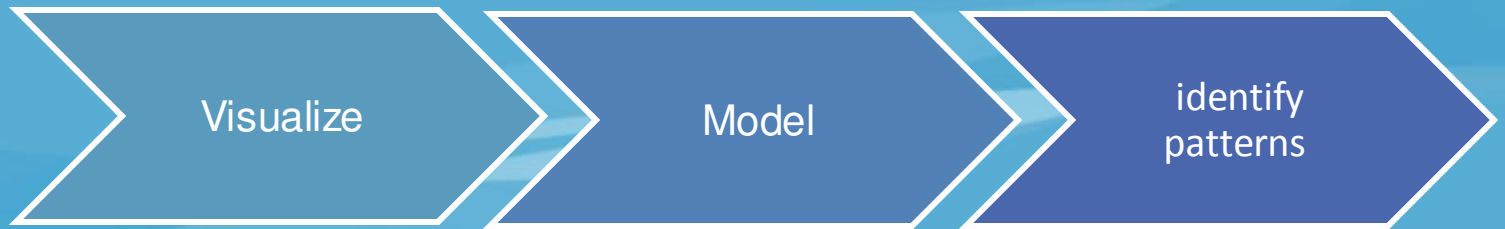
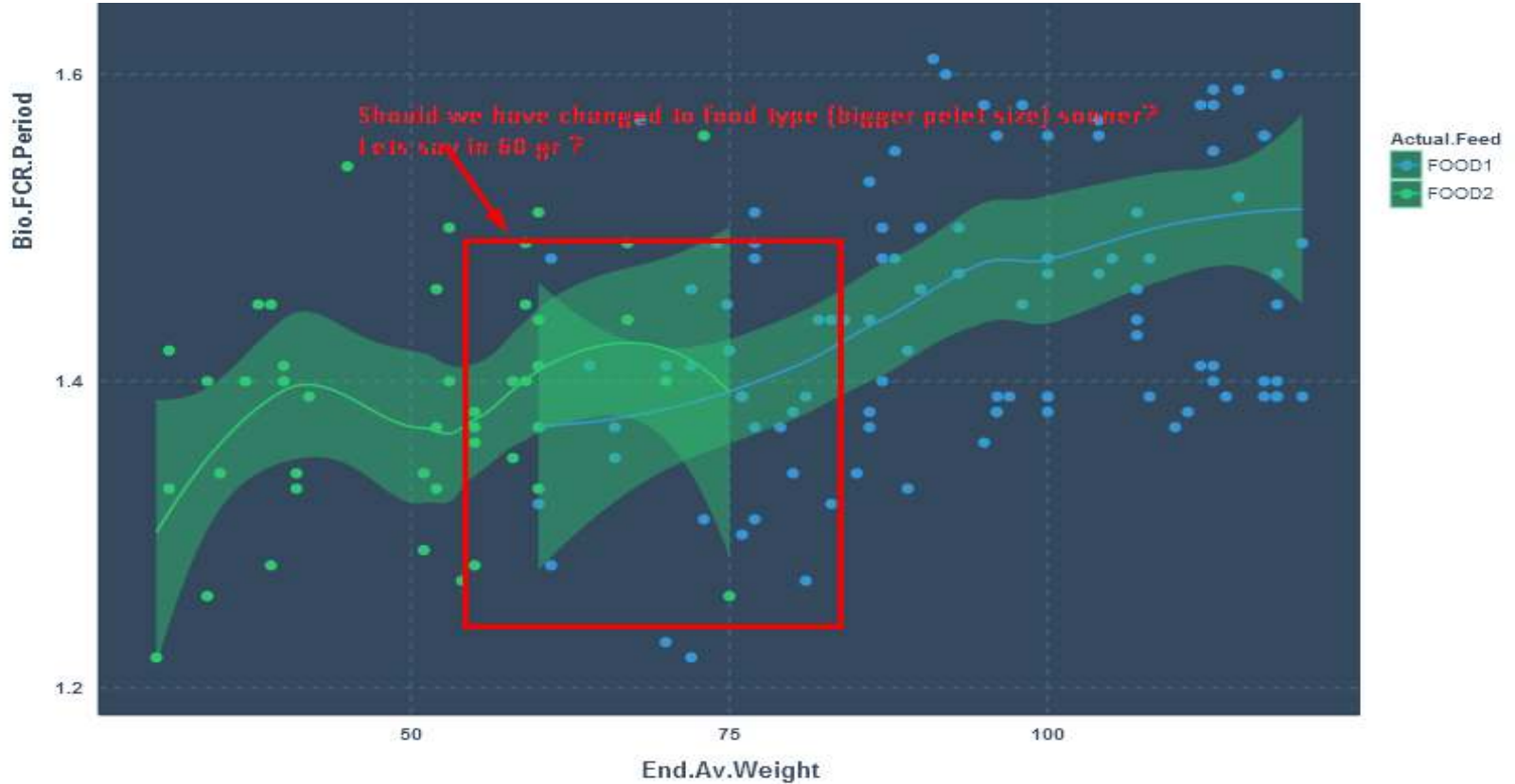
Refresh multivariate plots

None  Region  Site  Batch  Unit  Hatchery  Origin.Month  Origin.Year  Current.Grading  Feed.Type  Feed.Category  Feed.Supplier

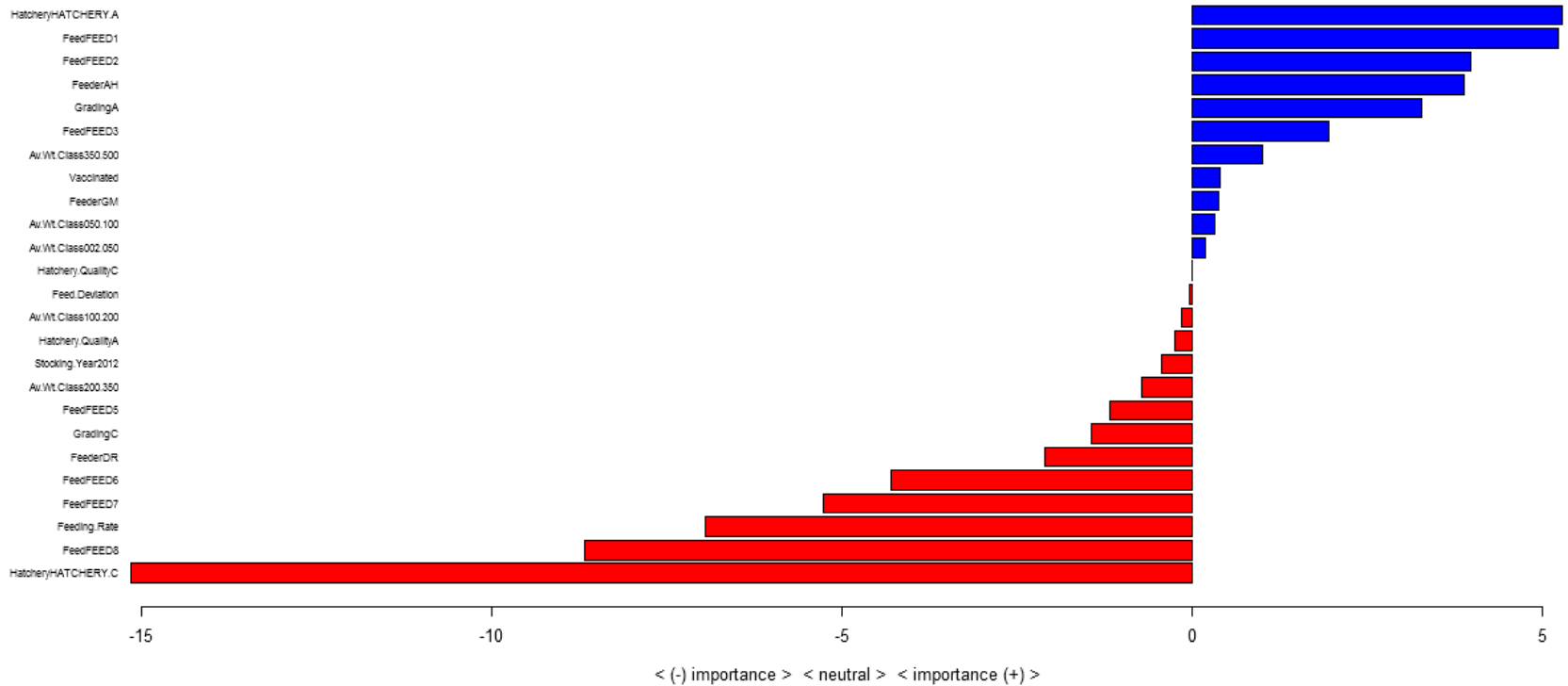
Scatter Matrix Plots Scatter Plots



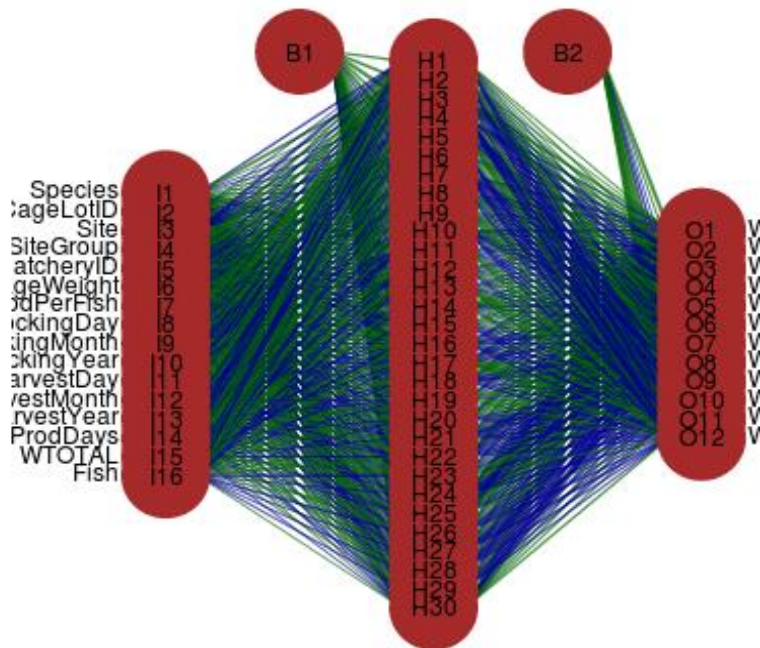
# Get insights & Spot patterns / 2



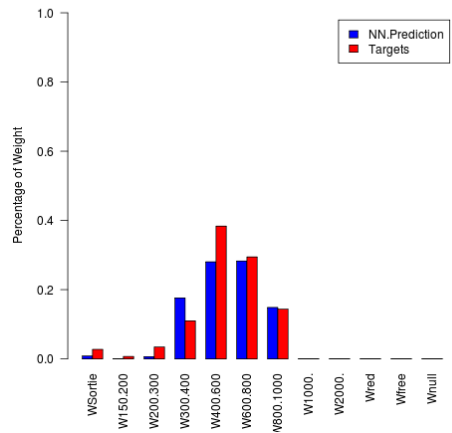
# Advanced Machine Learning algorithms: descriptive data mining



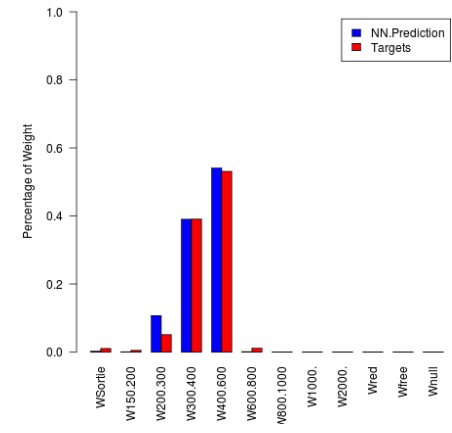
# Advanced Machine Learning algorithms: predictive models (neural network example to predict size distribution in harvesting)



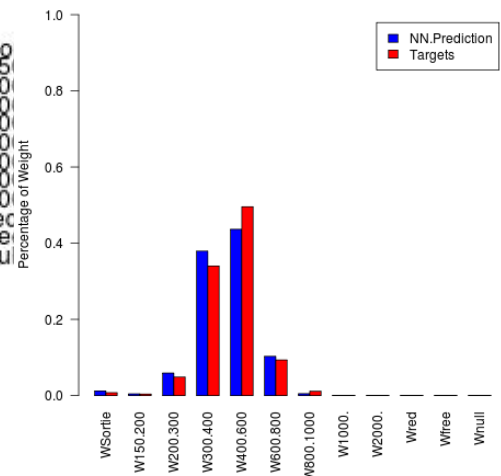
Inst.6 RMSE= || 0.0370001222760975 || MSE= || 0.0013690090484461



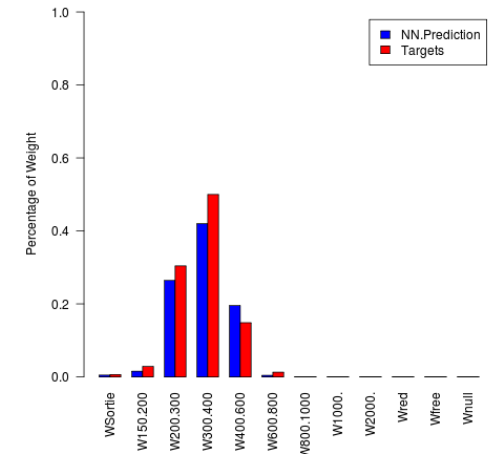
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Inst.29 RMSE= || 0.0210168260141607 || MSE= || 0.0004417069757091



Inst.8 RMSE= || 0.0295425320956364 || MSE= || 0.0008727612026217



# Thank you for your attention !



We will be happy to hear from you!

If you have any comments, ideas or you would like to be involved in aquaSmart, please send us an email at:

[research@aquamanager.com](mailto:research@aquamanager.com) .