**FORWARD – CoExist**

**Minutes International Workshop**

**21-22 February 2011, Algarve, Portugal**

Framework for Ria Formosa water quality, aquaculture, and resource development

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |

<http://www.imar.pt/>

<http://www.polislitoralriaformosa.pt/plano.php?p=3>

<http://www.inrb.pt/ipimar>

<http://www.ecowin.org/forward/>

<http://www.coexistproject.eu>

|  |  |
| --- | --- |
| **Dates:** | 21-22 February 2011 |
| **Venue:** | Centro de Educação de Marim, Parque Natural da Ria Formosa Quinta de Marim, Olhão, Algarve, Portugal.  <http://www.olhao.web.pt/ParqueNatural.htm> |

# Introduction and objectives

The FORWARD International workshop was held in late February 2011, in Olhão, Algarve, Portugal. This document provides a synthesis of activities and outcomes.

The objectives of the meeting were:

1. To present the general scope and activities of the CoExist project, funded through the European Union’s FP7 programme, to the management community in the Algarve, with particular focus on those most relevant to the Armona offshore aquaculture CoExist case study (CS3);
2. To present to the CoExist team the work being developed in the FORWARD project, co-led by IMAR and IPIMAR, and funded through the Portuguese national POLIS and PROMAR programmes.
3. To give local stakeholders a clear picture of what the two projects are doing, and how they interact;
4. To discuss and agree on which tools being developed or implemented in either project are of most value in this regional context, what difficulties need to be overcome, and to take on board the views of other external experts.

# Participant list

|  |  |  |
| --- | --- | --- |
| **Name** | **Organisation** | **Context** |
| Øivind Bergh | Institute of Marine Research (IMR), Norway | CoExist |
| Katrine Soma | LEI, part of Wageningen UR, Netherlands | CoExist |
| Arie van Duijn | LEI, part of Wageningen UR, Netherlands | CoExist |
| David Verner-Jeffreys | CEFAS, UK | CoExist |
| Nick Taylor | CEFAS, UK | CoExist |
| Joao G. Ferreira | FCT-UNL (IMAR), Portugal | FORWARD |
| Camille Saurel | FCT-UNL (IMAR), Portugal | FORWARD |
| Laudemira Ramos | Administração de Região Hidrográfica - Tejo, Portugal | FORWARD |
| Joao Lencart | Univ. Aveiro, Portugal | FORWARD |
| Carlos Vale | IPIMAR (fisheries institute), Portugal | FORWARD |
| Domitilia Matias | IPIMAR (fisheries institute), Portugal | FORWARD |
| Florbela Soares | IPIMAR (fisheries institute), Portugal | FORWARD |
| Frederico Batista | IPIMAR (fisheries institute), Portugal | FORWARD |
| William Dewey | Taylor Shellfish, WA., USA | External expert |
| Valentina Calixto | Administração de Região Hidrográfica - Algarve, Portugal | POLIS |
| Alexandre Furtado | Administração de Região Hidrográfica - Algarve, Portugal | ARH |
| Augusto da Paz | Cooperativa Formosa (Growers association), Portugal | Stakeholders |
| Marta Rocha | Cooperativa Formosa (Growers association), Portugal | Stakeholders |
| António Vieira | Associação Portuguesa de Aquacultura, Portugal | Stakeholders |
| Maria Joao Bebiano | University of the Algarve | External expert |
| Nuno Grade | ICNB (Nature conservancy), Portugal | ICNB |
| Cristina Borges | DGPA | Regulators |
| Jorge Ramos | IPIMAR (fisheries institute), Portugal | CoExist |

# Synthesis of expert recommendations

|  |
| --- |
| 1- Bill Dewey – External expert  *Taylor Shellfish Farms, Inc. 130 SE Lynch Road Shelton, WA 98584, USA*   * The use conflicts being addressed by FORWARD and CoExist are very similar to those restricting the growth of aquaculture in the U.S; * Europe seems way ahead of the U.S. in attempting to address use conflicts relative to fisheries and aquaculture; in particular in the use of social science, modeling and marine spatial planning. |
| 2- Øivind Bergh – Coordinator of CoExist  *Institute of Marine Research, PO Box 1870 Nordnes, No-5817 Bergen Norway*   * It appears to be a current mismatch between current aquaculture activities and legislation; This is a constraint for both of reducing growth potential of aquaculture production and of reducing the potential to increase; * Disease control requires demands high degree of transparency and “the rule of law”; * Biosecurity, production and area protection could be improved by implementing improved regulation combined with a high degree of stakeholder influence; * Idea of local (low-tech and sustainable in economic terms) hatchery with higher degree of biosecurity: transparency diagnose and of relaying and seed sources. * Improve the husbandery practice by labour efficiency and area productivity; * APPA de Armona: be careful with the culture practice. An idea is the “all in all out” management strategy (mandatory in Norwegian salmonid aquaculture); * APPA: high risk of “pathogen abundance build-up”, in area with high density cultured population, with potential consequences on the wild populations; * APPA: another idea is to some degree a joint management with other offshore sites, allowing for temporary non-use of given localities in a production cycle without fatal damages to markets; * APPA: a transparent policy on information of diagnoses, prophylaxis and biomass and movement of animals made available to all stakeholders and users of the offshore site will be needed. |
| 3- Katrin Soma – Economical modeling CoExist project  *LEI, part of Wageningen UR, Netherlands*   * Comparing the production systems in Southern Portugal and the US, it is obvious that more profits can be obtained by changing existing production system in Portugal; * Moreover, the nowadays mixed ages of shells, of which the biggest ones are selected from the smaller ones, can be replaced by cultivation of same age structures of shells in rows to further improve the efficiency of the production systems * The shell production system is non-manageable as producers neglect to cooperate in fear of having to pay taxes, and exact information of production and profits are thus not obtained. As the formal regulations are sometimes too strict and non-flexible to the existing production system, it is almost impossible to avoid breaking some of the rules. * The extent to which these people form a cultural value to the Portuguese society is for me unclear. * More profits are expected to be welcomed in any sector if ecological and cultural values are not lost for future. * Main conclusion is that changes would be welcomed if ensuring that experiences elsewhere regarding sicknesses and environmentally friendliness would be taken into account, and that changes would not occur without consulting with a larger publics’ opinion. The present static regulations of the park could be changed to a more flexible one if arguments would be well defined. * Spatial data on localization of vessels’ harvests could be combined with information of fuel costs are necessary to be able to apply any spatial model to the site that includes moving vessels * Also data on employment, discards, TAC-shares etc are also needed if existing model should be applied |
| 4- Arie van Duijn – Economist CoExist  *LEI, part of Wageningen UR, Netherlands*   * When applying spatial management to manage the area it will be interesting to investigate how it can be applied to manage the activities (e.g. fisheries, aquaculture, salt farming, nature) in highly dynamic systems; * Besides it would be interesting to compare the cost/benefit of stabilizing the system with the cost/benefit of applying spatial management to manage the activities in a dynamic system; * Link the carrying capacity modelling and clams culture with economic model and then with spatial management of the human activities in the dynamic system and disease management and its spatial consequences; * Certification and codes of practice of shellfish culture in relationship to market access. Branding and labelling of shellfish from Ria Formosa in order to create a higher market demand and try and increase the sales price; * Use of Value Chain Analysis (VCA) to analyse and develop the shellfish value chain with the objective of increasing effectiveness and competitiveness of the sector. This may involve looking at mechanisation, farmer cooperation, logistics, chain partners, markets, etc; * Market analysis. To look at different markets (local, national, EU, global) and competitors. This should not be limited to currently cultured species, but rather to species which are occurring locally and can potentially be cultured like for instance geoducks; |
| 5- Nick Taylor & David Verner-Jeffreys – Disease expert CoExist  *Centre for Environment, Fisheries & Aquaculture Science, England.*   * Effective coastal zone management is required to allow the Ria Formosa to maintain its unique character, but also allow its sensible exploitation for tourism, aquaculture and fisheries related activities; * Problem of regulation due to the natural parque that are not being adhered to, and cannot be enforced effectively; * Greater emphasis needs to be placed on working with stakeholders/user to develop practices that fulfil their needs whilst minimising their impact to the reserve. * Disease is obviously an integral part of the ecology of farmed and wild fish and shellfish, as with other animals. This needs to be recognised and integrated into aquaculture and fisheries planning and development activities; * The ability to source and/or produce seed is critical and should be a priority; * It should be emphasised that all aquaculture production businesses should have effective biosecurity plans in place that will minimise the chances of disease outbreaks taking place, and when they do take place, what steps should be taken to control them (at all levels; farm to National); |

# Action points

## Information requested for the FORWARD project

* Artificial reefsnext to the APPA de Armona, there are two zones: Coordinates (ask Carlos Vale or Florbela Soares);
* Other future offshore farms, where are the sites ?(Carlos Vale, ARH, ICNB);
* Maria J. Bebiano mentioned the problem of the French oyster herpes the past 3 months: What would be the impact on the Ria Formosa: IPIMAR team will check that;
* Look at the problem of licensing that are illegally granted;
* Report summary in English to circulate;
* Place ppt presentations on the websites (POLIS, EcoWin2000, CoExist);
* Learning from others mistakes: e.g. diseases and hatcheries;
* Contact Patrick Marshall that has ideas that might interest EU, which might be a breakout for Lisbon CoExist project?

## Interaction with the CoExist project

* Øivind Bergh requested that the presentations and the agenda will be sent to Emma Bello for posting on the CoExist site;
* Some photos from the visit to the sites (22.01.2011) should also be sent to Emma Bello for futures illustrations of the project;
* Øivind Bergh and Nick Taylor/David Verner-Jeffreys to give contacts of specialized people on offshore structure in exposed area to António Vieira;
* Marine Spatial Planning (MSP) similar breakout to organize for the meeting in June in Lisbon;
* Patrick Marshall for breakout session for the meeting in June in Lisbon?
* CoExist reporting for the FIW to see with Emma Bello and Øivind Bergh.

## Breakout sessions action points (see in more detail in the notes)

* MSP breakout:
  + Explore the recreational fisheries around the APPA de Armona (local business, buffer zone, high price…)
  + Need some datasets for Katrine Soma (see KS feedbacks)
  + What kind of data, mobile fisheries that changes seasonally to accommodate this in a plan?
* Health management
  + Use expertise from expert in order to not make the same mistakes
  + Nick Taylor-Camille Saurel in contact for sampling in April
  + Submit PhD studentship proposal (see at the document end)
* Culture practice
  + Investigate the mechanisation aspect of the clam culture. IPIMAR will work on that.
  + Give video of Taylor Shellfish Farm to the Cooperativa Ria Formosa and other stakeholders
  + Check for new species (e.g. geoduck…) that could be interesting and of high value.
  + Check the market for other species
  + Check TIMAR (Florbela Soares) that is starting an hatchery as a private company

## Breakout session notes

|  |  |  |
| --- | --- | --- |
| **Marine spatial planning** | **Animal health** | **Culture practice** |
| **Arie van Duijn (Chair)** | David Verner-Jeffreys (C) | Carlos Vale (C) |
| **Laudemira Ramos (Rapp)** | Nick Taylor (R) | Joao G. Ferreira (R) |
| **Katrine Soma** | Frederico Batista | Bill Dewey |
| **Joao Lencart** | Florbela Soares | Cristina Borges |
| **Marta Rocha** | António Vieira | Augusto da Paz |
| **Camille Saurel** | Øivind Bergh | Alexandre Furtado |
| **Nuno Grade** |  | Domitilia Matias |
| **Jorge Ramos** |  |  |

## Breakout 1: Marine Spatial Planning (MSP) in the context of highly mobile fisheries

* Importance of Data:

- Data about vessels usually fishing in the area of each case study of CoExist project will be required. Data should cover a larger adjacent area, needed for the application of the economic model;

- Apparently, vessels fishing in Ria Formosa case study area have less than 9m length. They are obliged to register in local ports and are not allowed to go further than 3 miles away from the port; hopefully, it will be possible to get information about registered vessels in the 4-5 existing ports.

- Another useful information is the identification of fishing grounds normally used by fishers and of the discharge points; The Institute for Marine Research (IPIMAR) and the Directorate-General for Fisheries and Aquaculture (DGPA) may have this information or will be able to get it;

- Existence of other aquaculture farms, besides APPA, in the CoExist case study area: There is only one exploitation of tuna fish, but located in APPA area;

- Social opposition to the APPA area: APPA is located on a traditional fishing area, and now fishing is totally forbidden in that area. Fisherman also complains because they now have to make the double of the distance to get to the fishing grounds, due to the presence of APPA.

- Problematic of Spanish fishing vessels: There are Spanish fishing vessels that are allowed to fish in Portuguese waters. This is a relevant matter that needs to be clarified;

* Area Available for Shellfish Culture and Number of Licensed Farms:

- The location of shellfish farms can be changed as a consequence of the sediment movements occurring in Ria Formosa; the Institute for Nature Conservation and Biodiversity (ICNB), responsible for the licensing in the lagoon, informed that it is not possible to make changes, because there is no space available.

- Recently, ICNB has extended the area for shellfish culture and additional areas would imply the reduction of those dedicated to seed catchment,

- Future recommendations of FORWARD project, namely if it arrives to identify zones with lower residence time, will influence or allow the revision of licencing criteria;

* Perception of Economic Value of Interventions:

- It was discussed the economic value of the interventions to be made by the Administration, in order to fix the entry bars and to maintain the navigation channels, versus its social relevance. There is a big pressure from public opinion, favorable to the interventions;

## Breakout 2: Health management in the context of the Ria Formosa-Offshore aquaculture system

|  |  |
| --- | --- |
| **Original topics:**   * + Background     - Main species and pathogens     - Who manages disease problems   + Realistic management options   + How can modelling help decision making? | **Actual discussion:**  - Background,  - problems & improvements |

* Background
  + Species: clams, oyster, sea bream & bass.
  + Pathogens: usual suspects, mainly macroparasites some bacteria.
  + Pathogen screening (bivalves) IPIMAR (NRL) = random sampling + mortalities.
  + Seed etc pathogens screened by independents.
  + No finfish screening.
* Requirements
  + Species: clams, oyster, sea bream & bass.
  + Bring the industry together in terms of disease understanding and approaches.
  + Expert group to advise on disease that includes IPIMAR and vets.
  + Integrated, transparent monitoring scheme that involves stakeholders.
  + Hatchery reared/safe seed.
  + Research into pathogen management.

## Breakout 3: Current culture practice and potential improvements

Three main topics with their key points:

* Certification/codes of practice
  + Producers’ association: voluntary compliance by producers with a code of practice, adds value to the product, yearly update (e.g. 8h session)
  + Move from producers’ association to third party certification
  + Farm plan – simple template, one per species (e.g. clam, oyster), 5-6 pages. Bill Dewey will forward an example
* Hatchery/nursery
  + Hatchery: important for local autonomy, biosecurity. Would allow selection for desirable traits
  + Expensive (100K’s €), market risk if natural seed beds have high recruitment
  + Local discussion on private/public model. US – Washington State uses a private model
  + Nursery: FLUPSY would allow purchase of smaller seed, development to a size suitable for planting. 24 bins, 10K’s €. Local Ria interest more on oysters
* Culture practice (mechanisation, substrate , transport)
  + Use of mechanical devices, predator nets: plots are very small: 500 ha - 1300 licensees, 0.4 ha per plot. Lease sizes and authorization to use mechanical devices are both issues
  + Constant digging because animals of different year classes are mixed together. No “year class rotation”, as is often used elsewhere

# Feedbacks from the CoExist team and external experts

The external experts were impressed by the “openness, competence, enthusiasm, positiveness to suggestion and willingness to utilize the results from this and other cases from the present stakeholders”.

In general, the experts agreed that there was an obvious problem of management with a “mismatch between aquaculture activities and the current legislation” and that culture practice could be modified for a better production and a respect of an improved regulation. Transparency of the seed origin and movements together with transparency diagnose and effective biosecurity plans need also to be applied. The example of mechanized aquaculture with mono-cohort culture in rows on the American farm of Bill Dewey was very inspiring.

## 1- William Dewey – External expert

*Taylor Shellfish Farms, Inc. 130 SE Lynch Road Shelton, WA 98584, USA*

It was a privilege and honor to be invited to participate in this meeting. The topics covered and the expertise of the participants was excellent. The meeting planning, facilitation and hospitality were all exceptional. It is always fascinating to travel to other parts of the world and see how shellfish are cultured and what the local issues are. The mix of scientists, resource managers and practitioners represented at this meeting made it particularly interesting. The informal conversations over meals and on the tour were as or more informative than the structured presentations.

The use conflicts being addressed by FORWARD and CoExist are very similar to those restricting the growth of aquaculture in the U.S. and in particular in the Pacific Northwest. After participating in this meeting and learning more about the projects it became evident to me that Europe is way ahead of the U.S. in attempting to address use conflicts relative to fisheries and aquaculture. In particular Europe is clearly ahead in the use of social science, modeling and marine spatial planning. Katrine’s presentation regarding bioeconomic modeling was particularly interesting to me. It really helped me understand the concept of bioeconomics and application to this issue.

I gained more from attending this meeting than I was able to contribute. I look forward to sharing what I learned with policy makers in the United States and opening their eyes to the tools and expertise available to facilitate the growth of aquaculture.

## 2- Øivind Bergh – Coordinator of CoExist project

*Institute of Marine Research, PO Box 1870 Nordnes, No-5817 Bergen Norway*

**The Ria Formosa system**

The Ria Formosa is a beautiful area, apparently with high diversity of species and high productivity. It is a large area, really unique in Europe. Apparently the area is highly attractive for several competing stakeholders, and the competition among them can be expected to increase. Thus coastal zone planning and management is necessary both in order to maintain the area as a nature reserve, but also to use the area in a productive as well as sustainable way. This applies to aquaculture just as well as tourism purposes. The recent efforts to implement the Water Framework Directive in the area were promising, stakeholders appeared motivated and competent.

A main concern from my viewpoint: there appears to be a current mismatch between current aquaculture activities and legislation. The aquaculture activities thus are to a large extent unregulated and based on traditional rights only. This is probably a major constraint both in terms of reducing growth potential of aquaculture production in the area, and in terms of reducing the potential to increase biosecurity by implying adequate regulations. Modernized disease control would imply several management practices that demands high degree of transparency and “the rule of law”. The local stakeholders were highly competent and also enthusiastic and positive to suggestions, and showed willingness to utilise results and learn from other cases, not necessarily limited to bivalve culture. It appears that improved regulations combined with high degree of stakeholder influence could improve both biosecurity, aquaculture production and the general protection of the area. Suggestions discussed during the “disease breakout” were:

* Local (low-tech, sustainable also in economic terms) hatchery, higher degree of biosecurity
* Transparency about which animals are moved into the area, sources of juveniles, harvesting in different parts of the area
* Transparency about diagnoses, if any
* Improved husbandry practices, improving labour efficiency and area productivity

The practices demonstrated by Bill Dewey were very impressive, and inspirational! This applies both in terms of labour efficiency, in terms of productivity, and in terms of organisation and marketing of a larger-scale aquaculture enterprise working with local stakeholders (land-owners, other shellfish farmers, authorities).

My personal experience: it was extremely relevant for my own work in CoExist to see the area, and learn about the local aquaculture practices. (Besides – it was fun!)

**The offshore aquaculture site**

The offshore site looked promising, with apparently good water exchange, competent personnel nearby and apparently key regulations in place. One weakness with concentrating a large offshore aquaculture enterprise in a limited area is the difficulties to practice for instance an “all in all out” management strategy, which is now mandatory in for instance Norwegian salmonid aquaculture. There is a significant risk that the constant presence of a high-density cultured population may gradually cause a “pathogen abundance build-up”, leading to increased infection pressure on new arrivals as well as wild fish stocks in the surroundings. This can partly be avoided by an “all in all out” strategy per species, or, probably better, to some degree a joint management with other offshore sites, allowing for temporary non-use of given localities in a production cycle without fatal damages to markets. Furthermore a transparent policy on information of diagnoses, prophylaxis and biomass and movement of animals made available to all stakeholders and users of the offshore site will be needed.

**The workshop**

The overall idea of the workshop, bringing together some selected key personnel of CoExist and FORWARD was really excellent. Furthermore, I was impressed by the openness and competence of the local contributors, both those involved in the project and the stakeholders in the private and the public sector. For CoExist this initiative literary helped putting several key-persons “on track”, and I expect increased performance and improved output of the project as a result! We should follow up with some other cases too.

## 3- Katrin Soma – Economical modeling CoExist project

*LEI, part of Wageningen UR, Netherlands*

Having learnt from producers as well as from experts on micro-biology for two days about aquaculture of shells including mussels and oysters the way they are cultivated in the US and in Southern Portugal, I am rather updated in a relatively new field. There are two species of oysters, both appearing in Southern Portugal. They are similar, and hence difficult to distinguish. Whereas one was originally imported to the US and later on reintroduced in Europe, they stem from the same origin, and can thus reproduce. The oyster shell is vulnerable to pollution, especially to paint appearing on the larger vessels. When defending themselves, the oysters develop large heavy shells, with relatively smaller share of meat, resulting in lower quality oysters. Note that the fishers get better market price for the heavier oysters in the short run.

Comparing the production systems in Southern Portugal and the US, it is obvious that more profits can be obtained by changing existing production system in Portugal. For instance, tractor alike machines can replace a large share of the heavy man-made collecting system with bent backs and static positions in Portugal. Moreover, the nowadays mixed ages of shells, of which the biggest ones are selected from the smaller ones, can be replaced by cultivation of same age structures of shells in rows to further improve the efficiency of the production systems.

The Ria Formosa Natural Reserve has strict regulations to avoid changes although it includes the production system of shells. The shell production system is non-manageable as producers neglect to cooperate in fear of having to pay taxes, and exact information of production and profits are thus not obtained. The present system is competitive, and producers are frequently stretching regulations that would limit their activities. As the formal regulations are sometimes too strict and non-flexible to the existing production system, it is almost impossible to avoid breaking some of the rules. For instance, the bottom consists of moving sand, and it is necessary to do some dredging to be able to ensure that the production system remains at all.

The people working on the shell production in the Ria Formosa Natural Reserve are born in families that did this for generations. With more efficient production system a large share of the employees will have to search for other jobs. The extent to which these people form a cultural value to the Portuguese society is for me unclear.

The shell production systems appearing at present are not more favourable to existing ecosystems than a more efficient production system would have – to my knowledge. Changing the production system to a more efficient one will therefore not result in lower ecosystem values in this region.

Although I did not get a clear YES as answer during the workshop when I asked if Portugal as a whole would welcome a more efficient shell production system in the Ria Formosa Natural Reserve in the future, I believe it does. More profits are expected to be welcomed in any sector if ecological and cultural values are not lost for future. Given the financial situation in Portugal at this stage, with dependence on external loans with 7% interest, it is expected that the higher profits is more than welcomed.

Main conclusion to the workshop included that changes would be welcomed if ensuring that experiences elsewhere regarding sicknesses and environmentally friendliness would be taken into account, and that changes would not occur without consulting with a larger publics’ opinion. The present static regulations of the park could be changed to a more flexible one if arguments would be well defined.

Although focus of the workshop was aquaculture, I was asked to present a spatial profit maximization model for the fishery sector. During group discussion I understood that spatial data on localization of vessels’ harvests could be combined with information of fuel costs that the vessels would have for the obtained harvests. These data are necessary to be able to apply any spatial model to the site that includes moving vessels. Also data on employment, discards, TAC-shares etc are also needed if existing model should be applied. Application of such a model to Ria Formosa Natural Reserve could be relevant.

As I will begin on developing a model for the Dutch oyster sector in one of the fjords in the Netherlands (Oosterschelde), this may be useful for future collaboration in Ria Formosa Natural Reserve. In this project the concern is a production system with reduced quality of oysters the last years. At the same time, a previous flow of fresh water stream into the fjord is blocked resulting in lower circulation. Given that oysters’ quality peak differs from market price peak, the sector wants to know the consequences of different production strategies. Also harvest intensity, recycling, fertilization and fresh water provision are considered as changes to the system. Based on growth functions of oysters developed by biologists (IMARES), a profit maximization problem will be created to compare marginal costs and revenues.

## 4- Arie van Duijn – Economist CoExist project

*LEI, part of Wageningen UR, Netherlands*

The lagoon system with its barrier islands is highly dynamic and prone to changes. Currently the management seems to be focussed on stabilizing barrier islands, inlets and farms. This is costly. When applying spatial management to manage the area it will be interesting to investigate how spatial management can be applied to manage the activities (e.g. fisheries, aquaculture, salt farming, nature) in highly dynamic systems. Besides it would be interesting to compare the cost/benefit of stabilizing the system with the cost/benefit of applying spatial management to manage the activities in a dynamic system.

Like in the case of modelling the carrying capacity and oyster culture in the Oosterschelde and linking this to an economic model it might be interesting to do the same in the case of Ria Formosa. This is particularly the case if this is then linked to spatial management of the human activities in the dynamic system and disease management and its spatial consequences.

Certification and codes of practice of shellfish culture in relationship to market access. This can also be linked to branding and labelling of shellfish from Ria Formosa in order to create a higher market demand and try and increase the sales price.

Use of Value Chain Analysis (VCA) to analyse and develop the shellfish value chain with the objective of increasing effectiveness and competitiveness of the sector. This may involve looking at mechanisation, farmer cooperation, logistics, chain partners, markets, etc.

Market analysis. To look at different markets (local, national, EU, global) and competitors. This should not be limited to currently cultured species, but rather to species which are occurring locally and can potentially be cultured like for instance geoducks. This is very much linked to the VCA and certification/labelling as when potential markets have been identified thought needs to be given to how to access them successfully.

## 5- Nick Taylor & David Verner-Jeffreys – Disease experts CoExist project

*Centre for Environment, Fisheries & Aquaculture Science, England.*

Thoughts on the Ria Formosa system: The Ria Formosa is a beautiful and precious natural area. Effective coastal zone management is required to allow it to maintain its unique character, but also allow its sensible exploitation for tourism, aquaculture and fisheries related activities. This is clearly a challenging issue. It is obvious that there has been great emphasis on trying to protect the reserve, and this has predominantly be been driven through regulations placed on the shellfish farmers (and other users). Though well intentioned, it appears these regulations are not being adhered to, and cannot be enforced effectively. This was clearly observed on the field trip through, for example, the amount of gravel on the clam beds, and the laying of breeze blocks to mark territories - practices which are prohibited. Greater emphasis needs to be placed on working with stakeholders/user to develop practices that fulfil their needs whilst minimising their impact to the reserve. However, overall, the forward thinking approach taken by Portugal towards sustainable development of aquaculture activities in this unique region is impressive. It would be difficult to see similar enthusiasm in England towards development of such activities in such protected marine environments off our coast. In this respect, there is much we can learn from the processes observed. The apparent willingness of the stakeholders to learn and potentially change practices if given alternatives was refreshing. The American production examples provided by Bill Dewey were excellent, and we feel could offer a lot to production in the Ria Formosa, both in terms of practices, but also in terms of expanding and exploiting new markets.

Thoughts on the workshop: The level of constructive cross-stakeholder engagement evidenced at the workshop was truly impressive, and something we can learn a lot from in the UK. On a personal level we both learned a lot about the Ria Formosa Case Study that will directly benefit the CoExist project. In particular there are obvious interactions between aquaculture and fisheries activities in this area (e.g. between artisanal a clam harvesters and fishermen and the newer aquaculture related activities - finfish cage culture etc.). From a fish and shellfish health perspective, some of the experiences that have already been experienced (e.g. possible outbreaks of oyster herpes virus) show the importance of effectively managing the health of the animals being cultured there. Disease is obviously an integral part of the ecology of farmed and wild fish and shellfish, as with other animals. This needs to be recognised and integrated into aquaculture and fisheries planning and development activities. The ability to source and/or produce seed is critical and should be a priority. In terms of the CoExist project, understanding the practices and interactions that occur between the huge number of small operators in the lagoon will be key to understanding disease processes. It should be emphasised that all aquaculture production businesses should have effective biosecurity plans in place that will minimise the chances of disease outbreaks taking place, and when they do take place, what steps should be taken to control them (at all levels; farm to National). The stakeholders showed clearly great interest in understanding disease and pathogen issues, and there was a generally positive response to trying to incorporate a disease component within the CoExist project. Overall this was an extremely positive meeting.

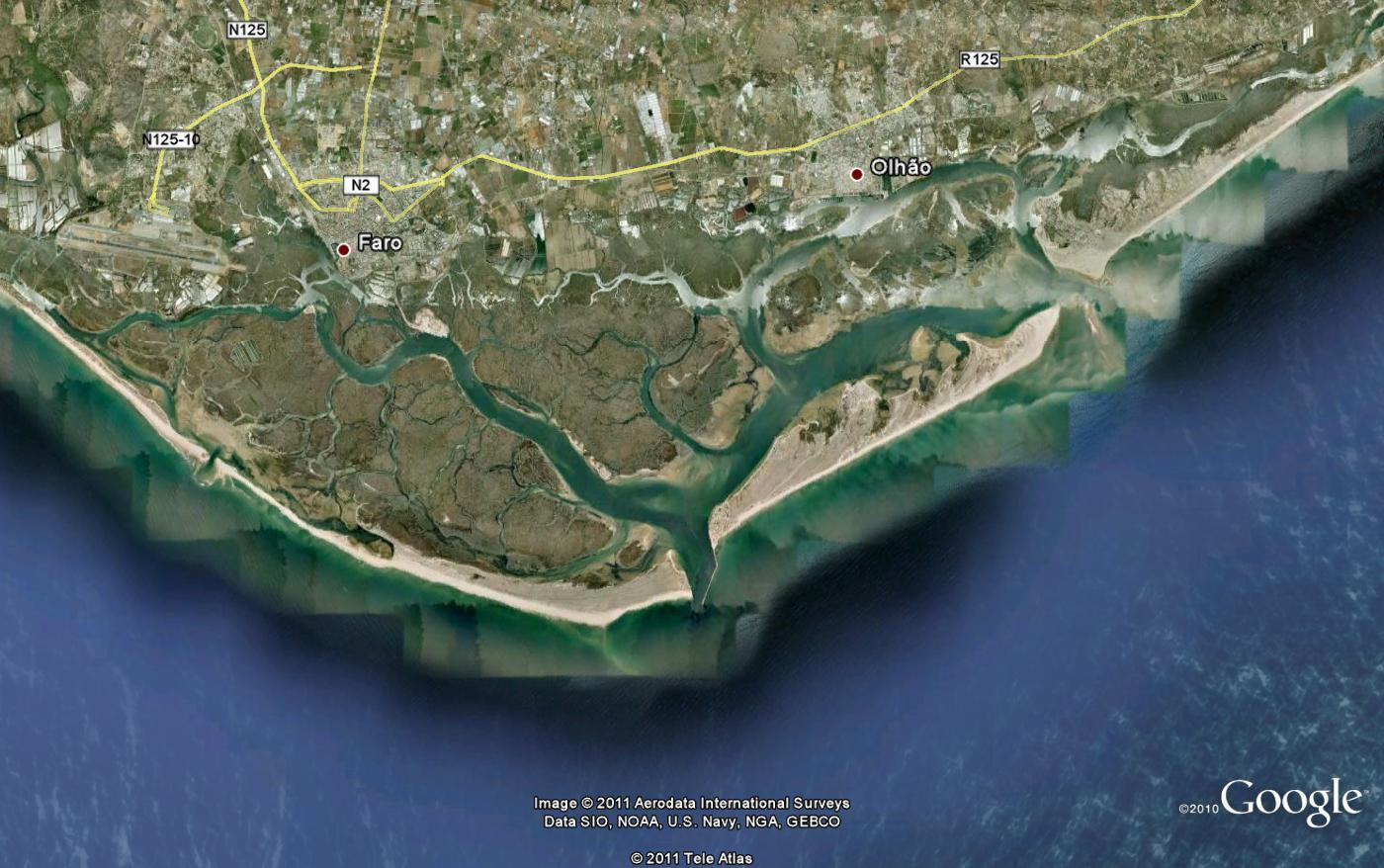
# Agenda

## Monday 21.02.2011

|  |  |  |
| --- | --- | --- |
| ***Time*** | ***Topic*** | ***Presentation*** |
| *9:00* | *Arrival of participants, coffee* |  |
| ***9.30-9.40*** | ***Welcome, order of business, and logistics*** | João G. Ferreira |
| ***9.40-11.00*** | ***Administrative, legal, and project framework*** |  |
| 9.40-9.55 | POLIS and ARH | Valentina Calixto |
| 9.55-10.10 | The Ria Formosa Natural Park | João Alves |
| 10.10-10.25 | Administrative framework in Portugal | Laudemira Ramos |
| 10.25-10.40 | The FORWARD project | João G. Ferreira |
| 10.40-10.55 | The CoExist project – objectives and key case studies | Øivind Bergh |
| ***11.20-12.05*** | ***General overview of the study area*** |  |
| 11.20-11.35 | Pressures on the system, circulation patterns | João Lencart |
| 11.35-11.50 | Renewable resources, culture practice, licensing | Domitilia Matias |
| 11.50-12.05 | Water quality | Carlos Vale |
| ***12.05-14.30*** | ***Comparisons, tools, and issues*** |  |
| 12.05-12.35 | Case study from the US – scale, operations (including products, FLUPSY, land-based processing, markets), issues (e.g. larval recruitment and ocean acidification)  Bill, maybe you can show also some video | Bill Dewey |
| 12.35-12.50 | Aquaculture in Hardangerfjord (including some of the welfare issues | Øivind Bergh |
| 12.50-13.05 | Animal welfare and model development | Nick Taylor |
| 14.30-14.45 | Native species, genetics | Frederico Batista |
| 14.45-15.00 | Offshore interactions | Camille Saurel |
| ***15.00-16.30*** | ***Management approaches and tools*** |  |
| 15.00-15.15 | Bioeconomic models – application to CoExist Case Study 3 | Katrine Soma |
| 15.00-15.30 | Best management practices and certification | Laudemira Ramos |
| 15.30-15.45 | Evaluation of spatial management with a focus on fisheries and aquaculture. | Arie vanDuijn |
| 15.45-16.00 | Issues and commentary from Cooperativa Formosa and APA | Augusto da Paz, Marta Rocha, António VIeira |
| 16.20-16.30 | Presentation and review of breakout topics | João G. Ferreira |
| 16.30-17.15 | Breakout discussions (tentative, for adaptation)   1. Marine spatial planning in the context of highly mobile fisheries; 2. Animal welfare in the context of the Ria Formosa-Offshore aquaculture system 3. Current culture practice and potential improvements | Divided into three groups of roughly seven people each |

## Tuesday 22.02.2011

Visit to Olhão fish market. The objective is to give the group a perspective of the types of species and biodiversity of the local fishery.



**The western part of the Ria Formosa. Faro and Olhão are marked in red. The barrier island of Armona is on the eastern (right) side of the image.**

Site visit: 9.30am

Board at Olhão harbour for a boat visit to the viveiros da Fortaleza clam and oyster cultivation areas. Then past the barrier Islands to the offshore aquaculture area.

|  |  |  |
| --- | --- | --- |
| ***Time*** | ***Topic*** | ***Presentation*** |
| 14.30-15.00 | Break out reports | Rapporteurs, 10m each (max) |
| 15.00-15.45 | Comments from various participants with respect to the study area, challenges, opportunities | CoExist partners and Bill Dewey |
| 15.45-16.00 | Address socio-economic aspects of particular relevance to the coastal zone (tentative) | Katrine Soma, Arie van Duijn |
| 16.20-16.35 | Thoughts for the future | João G. Ferreira |
| 16.35-17.15 | Calendar of joint activities for CoExist /FORWARD, potential for leveraging work at other locations | All |
| 17.15-17.30 | Any other business and close | João G. Ferreira |