



In Depth Interviews on INTRANEMMA SURVEY RESULTS

(Translated by Panos Christofilogiannis – AQUARK)

1. NAME:	PAVLINA PAVLIDOU
2. COMPANY:	SELONDA GROUP
3. POSITION:	HATCHERY COORDINATOR

4. Do you think that there are areas we missed in the initial survey of the areas where innovation could be required in Mediterranean mariculture? **Yes one addition in FISH HEALTH and one addition in GENETICS**

If YES please indicate which:

"The addition should be in FISH HEALTH the study and diagnosis of more than 200g. Sea bass anaemia along with liver damage that is experienced in the summer in the last two-three years (mortalities from secondary pathogens e.g Aeromonas etc but main importance is the impaired growth). It started in Turkey 2-3 years ago and now is evident in Greece. Viral aetiology is suspected but no progree has been made."The addition in GENETICS should be disease resistance in specific diseases like VNN

5. What is your opinion on the category average scoring?

"Markets should be the first category not policies. Genetics and Selection should be higher and policies should be lower at number 3-4 not first. Also a connection between fish health and environment should be made because most of the pathology incidences are linked with deteriorated environmental conditions"

6. What is your opinion on the overall priorities ?

"Improved work safety conditions is odd to be in number 5 (very high and cannot be explained even for Turkey since more or less the same working conditions apply in both Greece and Turkey) " Genetics selection programmes should be higher. Spawning induction should be much lower since this is an area that is largely resolved.

7. How do you feel on the priorities identified in Greece? How you explain it?

"I agree with the priorities set. I see that are largely influenced by the lack of marketing and the spatial planning needs but I don't see genetics selection that should be included". "I see Greece to be focused in markets and marketing followed by technical issues and diseases and then the spatial planning framework" It is odd to see the training of personnel on the impact to the environment as training priority.

8. How do you feel on the priorities identified in Turkey? How you explain it?

"work safety conditions should not be so high priority . It is odd to see that even in Turkey. Conditions for work are similar. Even salary wise the conditions between Greece and Turkey are similar" "Spawning induction is odd also. It seems that they have technical queries on issues that we perceive them in Greece as resolved" "Turkey



is focused or worries on growth not on production stabilisation and marketing. I believe that regarding policies Turkey has the same issues like Greece regarding the spatial planning not only for farms but also for hatcheries and probably are looking to find through a better understanding of the policies an improved equilibrium for the industry

9. How do you feel on the priorities identified in Spain? How you explain it?

"Vaccines and vaccination seems to be the main focus. Veterinary services and fish diagnosis is also highly evaluated, optimization of vet practices on fish farming procedures. ALL COUNTRIES are marketing oriented."

10. Do you agree on the areas of Mediterranean mariculture identified as those that require innovation? **no comment**

11. Do you agree on suggestions regarding product quality, consumer and market issues? **no comment**

12. Do you agree on suggestions regarding Policies and Regulations? **no comment**

13. Do you agree on the identified areas for training? Do you suggest alternative areas for training? **no comment**

14. What are the most important characteristics of effective training to maximize impact to the industry? **no comment**

15. Any other comment on the initiative?

"Evaluation of the number of fish in the cages should be coupled with robust evaluation of the mean weight distribution in the sea cages. This is essential in order to predict harvesting outputs before you start and also time points for size selection of the fish population as well as feeding optimization. The existing technologies are time consuming and new technologies should be devised."

"I don't see some where training on hatchery techniques. There is resolution on many Technical issues in the hatcheries but training is required even in these solved issues. We must improve predictability on juvenile production. Production even today is very unpredictable and we go as we see. This is not only due to the live feed but due to many factors sometimes unknown factors. In cases of hatchery production problems you start improving gradually different aspects and conditions and at the end sometimes you resolve the issue without building concrete knowledge on the underlying initial aetiology."



"There is lack of concrete standardized methodology to resolve the problems when you see it. Problems raised differ every year and are system dependent." Each hatchery requires both generic training but also system specific training. Innovation is in reducing unpredictability.

"In terms of training all new personnel even with university or postgraduate degrees arrive in a hatchery without any understanding of the practical requirements and they are trained on site. It is important to prepare these personnel before they arrive. A training where hatchery managers define what they want from the new employees could be important for the industry. The transition for total lack of practical knowledge to a problem solving professional takes a long time and reducing this lag time is very important and more productive."

"Troubleshooting decision tree / course could be an innovative way to elevate the standards although this is a complicated exercise affected by many factors. Exchange of knowledge between hatchery managers contributes in the puzzle since aetiologies identified easily recognized by one manager could be totally new to others (e.g skeletal deformities)"

"The initiative is ok .The target for transfer of innovation has to be defined in order to define delivery methods and mainly target audience. I would like to see training of new scientists before they arrive to work in hatcheries. The internal company training is focused on production. Sometimes more general training is required in order to expand people's views and improve perceptions. However the training of young graduates is very important as screening before they go in the practice"



1. NAME:	KATERINA MOUTOU
2. COMPANY:	UNIV. OF THESSALY DEPT. OF BIOCHEMISTRY AND BIOTECHNOLOGY
3. POSITION:	ASSOCIATE PROFESSOR

4. Do you think that there are areas we missed in the initial survey of the areas where innovation could be required in Mediterranean mariculture? **No**
 I don't see anything missing since I have contributed in the formation and audit of the initial list before the survey

5. What is your opinion on the category average scoring?
 "I was not expecting that husbandry and management will receive the lowest priority, because I believed that still there were many issues to be resolved. However it can be speculated that the industry has resolved many aspects on the zootechnical level practices and now demands innovation in other areas. Training is rightfully high because there is great lack of training, I see it every day but on policies I can not comment since this is not my area of expertise. Quality is also important I expected to be highly appreciated; I would expect the environment to be last. "

6. What is your opinion on the overall priorities?
 "I agree with the market /consumer focus. In Mediterranean cultured fish are presented in consumers highly educated on fisheries products and is very difficult for them to change their traditional pro-wild approach and consume more cultured fish so the sector has realized that and they see the need to focus on the perception, on the tools to pass the message to the society and increase market penetration in a population that traditionally consumes cultured fish. Mariculture industry is not new but still fights tradition especially in sea side towns like my own you see the differences in perception. Only price overcomes this perception when sea bream is 5 Euros while anchovy and sardine is 7 Euros/kg. Nutrition and FCR is high priority because is the key factor that has great economic impact and the alternative protein sources is also logic."

7. How do you feel on the priorities identified in Greece? How you explain it?
 "Perception, FCR etc are explained as above. The odd one is the training on the potential impact to the environment that is misleading since it reflects a hypersensitivity on the issue that is not reflected in reality. I don't know if it can be explained as an attempt to minimize the potential conflicts with the other coastal zone stakeholders. it was not expected."



8. How do you feel on the priorities identified in Turkey? How you explain it?

"Spawning induction and biological cycle seems strange to be identified as priority since this is an area that is resolved, the only explanation is that may be Turkey is embarked in new species than Greece but I don't have local knowledge to confirm this. All up until the number 10 everything is expected. Interest on Policies can be explained because wants to make the breakthrough to EU and they want to improve their understanding of the framework, the regulations, the prerequisites, the modus operanti and the reasoning behind it.

In addition the lengthening of shelf life of fish can be explained by the distance of Turkey from the main markets so this is very important for them overall Turkey seems to be lagging behind Greece and Spain. They have many issue to resolve, how to sell but also how to produce, policies etc. more confused with more questions from the Spanish who have longer tradition despite having higher production that Spain. The issues selected in Turkey are more basic"

9. How do you feel on the priorities identified in Spain? How you explain it?

"The priorities in Spain can be explained except the focus to the counting of fish number. Numbers 1,3,4,5 are widely accepted throughout the Mediterranean and is focused on how to win a traditional audience focused on fisheries products, and improvement of the FCR to optimize production and to reduce cost.

Spain is focused on market perception and then is focused on intensive production related problems like fish health issues.

The areas selected by Spanish are more defined."

10. Do you agree on the areas of Mediterranean mariculture identified as those that require innovation?

I would expect to see genetics selection programmes - combination of fast growth and robustness

11. Do you agree on suggestions regarding product quality, consumer and market issues?

no comment

12. Do you agree on suggestions regarding Policies and Regulations?

no comment

13. Do you agree on the identified areas for training? Do you suggest alternative areas for training?

14. What are the most important characteristics of effective training to maximize impact to the industry?



15. Any other comment on the initiative?

"In consumer issues the first group of proposed actions better answer the second set of areas for innovation.

Improvement of consumer perception requires consumer studies and personal interviews, consumer association involvement and retailers HORECA stakeholders in order to monitor preferences and consumer behavior. The subsequent analysis should be based on social background, age, nationality and religion. "

"On nutrition growth and yield management - Improvement of mean farm FCR requires training on basic digestion physiology as a prerequisite of the improved understanding for lowering FCR

IMPROVED YIELD PER FISH - The concept of yield should be defined because it differs according the production period and the eventual target product characteristics (fresh whole vs proceed)

ALTERNATIVE PROTEIN SOURCES - This requires fish feed technology training with feed formulation background explaining the role and economics of each raw material»

"On GENETICS - spawning etc is an odd identified area. To my opinion this is resolved, there is no issue, and unless this means that TURKEY is focused on new species where this issue is not yet totally resolved

GENETICS selection programme is a difficult training area. it requires training in genetics. The level of intervention has to be clarified, the different strategies for genetic selection and the terminology. The target should be to improve understanding on the importance of record keeping in order being able to implement the selected strategy.

Probably the course needs a general format for all fish farm personnel and a more executive version should be given to the selected group personnel that only work on genetic selection programmes. The issue of combination of robustness and growth is very difficult and we have to define robustness per production stage since there is confusion on the understanding.



Finally I don't understand the increased sensitivity on environmental impact training.
This is odd.

"The concept is good however I worry on the odd responses given and what they imply. I believe that can be explained by the different nationality and background of the respondents."



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(Translated by Panos Christofilogiannis – AQUARK)

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|--------------|----------------------|
| 1. NAME: | NIKOS PAPANDROULAKIS |
| 2. COMPANY: | HCMR - AQUALABS |
| 3. POSITION: | SCIENTIST |

4. Do you think that there are areas we missed in the initial survey of the areas where innovation could be required in Mediterranean mariculture? **Yes**

If YES please indicate which:

I contributed in the creation of this list and I see that my suggestion on development of welfare indicators is in the list.

5. What is your opinion on the category average scoring?

Husbandry is very low in the scoring, I can understand but I would have put it higher than welfare for sure. In relation to the environment, husbandry and management is linked to the environmental impact so husbandry and management should be higher even from environment. Policies are with no reason very high.

6. What is your opinion on the overall priorities?

Improvement of working conditions was identified of high importance for Turkey even in the LARVANET meeting in Rhodes. It seemed as living in Greece 20 ago. There is a huge distance in Training and how they respond in training and automation. This is very important. I don't see automation in the list. There are training needs in Greece, don't get me wrong but this is at a different level, two different things. Imagine if aquaculture is split in three zones, the north, the Mediterranean and the east, this implies also the state of development: the north is more evolved, Med is in the middle and Turkey is following behind. What are the steps to arrive there: automation in production and training for example, you will see that in the aquaculture developed countries in the north you need 0,3-0,5 person for 1 million fish, in Greece, 0,7-0,8 person for 1 million fish and in Turkey 1,5-2 persons for 1 million fish. This reflects the training level, the level of automation and the personnel cost.

I understand that training is very important but what is bothering me is that I don't see here anything about hatcheries and this is a mistake.

Control of sexual circle is reproduction has nothing with hatchery management. This is totally different with the findings in LARVANET survey that identifies a serious lack of training in hatchery management.

The LARVANET results of course where based on asking hatchery managers. These people replied, I don't have problems with larval rearing, I have problems with feeds,



with training with access to information, in marketing but everybody identified problems in larval rearing phase. It is lacking here.

7. How do you feel on the priorities identified in Greece? How you explain it?

Training of potential impact on the effects to the environment...very strange, whom you contacted? Very strange it sounds like an NGO response. Consumer perception is ok I can understand it. Improvement of yield per fish is not clear for me, what do you mean to take the maximum out of the fish. This is very important for big fish, to fillet them, to use the bones to use leftovers for fish meal production, to avoid mortalities etc, in Greece only mortality reduction is applicable, and only for Meagre you can speak about the other factors. All the priorities identified in Greece sound strange, results seem a bit skewed.

Some of these issues are important but not all and not with the same rating.

No 10 robustness and disease resistance should be higher. Minimization of interactions with other coastal zone stakeholders should be lower, Access to appropriate sites / zoning should also be lower. You cannot say that training is my first Priority is training, or improved image of Mediterranean mariculture sector...

Development of effective treatments on fish parasites is a problem but does not deserve number 6. Improved understanding of consumer preferences no 13, improved safety working conditions no 16, presentation strategy to the society are generic.

The list should not be given as the only definite list of areas for innovation.

There is no word on organic aquaculture, no word on improved survival and predictability in production process, no word on health management in hatcheries that are very critical issues.

A workshop on image and consumer is not relevant for the majority of the people in Greek mariculture, it is important for a small group of people that work on trade and exports.

Another area that is missed in the survey is the processing.

In general areas not important got a lot of attention while other important one seems underestimated. e.g environment is important but is not critical ..and no 21 understanding the role of farm workers in improving the sector image is extremely odd. Greek Sector seems to have reached a level of maturity where the biggest issue is the market and marketing. The only explanation is that the survey was performed in Greece in the same period with the debate on the new law for zoning in aquaculture and this explains the higher allocation of environmental priorities.

The biological component is missing as priority in Greece and although this might seem as an area that Greeks are confident in, I believe that they are not confident, it is not optimized yet. The system is producing but not to the level they could go for. It seems that Greece reached a plateau in development and is reluctant to push forward for higher performance. Experienced managers are sitting on their glory and past performance and are becoming reluctant / lazy to push the limits further. There is a barrier to innovation because technical managers are reluctant to change, are afraid on impact to their position etc and although the potential is much higher we have



reached an artificial 'plateau'. In addition the lack of successful marketing acts as an excuse for production managers to avoid to be pushed in achieving higher productivity targets. If innovation is not pushed this will be a potential boomerang.

8. How do you feel on the priorities identified in Turkey? How you explain it?

In Turkey also the results seem more correct than Greece, monitoring methods for growth, robustness, growth assessment, processing and after the training, genetics, understanding consumers and potential to work with other users in coastal zone lower, genomics, forecasting tool for growth estimation, reduction in deformities, reduction of stress ..all this is correct. Induction of spawning is high because in Turkey the sector is working with more species (this was confirmed in LARVANET). Turkey needs one management course, one regulations course, and then one on husbandry and management on critical issues of fish farming. In all countries you can give a marketing course. In Turkey I would focus on technology.

9. How do you feel on the priorities identified in Spain? How you explain it?

I would accept the priorities identified in Spain more than in Greece, the order also seems more correct. The approach seems different in Spain. Presentation tool, automation, image, FCR, consumer vaccination, self life, genetics, larval performance (predictability)...all this is correct. Spain needs health management course, marketing course and biology of species, growth performance etc.

10. Do you agree on the areas of Mediterranean mariculture identified as those that require innovation?

Improvement of yield and self life of fish are strange

11. Do you agree on suggestions regarding product quality, consumer and market issues?

12. Do you agree on suggestions regarding Policies and Regulations?

13. Do you agree on the identified areas for training? Do you suggest alternative areas for training?

14. What are the most important characteristics of effective training to maximize impact to the industry?



15. Any other comment on the initiative?

The priorities identified are not addressing the most important areas where innovation is required.

- **Predictability is of great important (hatchery management, potential to grow , mortalities and end production planning)**
- **Automation is not only in number of fish or biomass, automation is more complex and is required also in hatcheries.**
- **Feeds is also very important (FCR, alternative protein sources)**
- **Genetics seem as no priority in Greece but all companies have their own genetic improvement project. They are starting and they have many issues. The question that was raised in LARVANET was the possibility to set up a national station for genetic selection to provide eggs to all companies and/or keep selected broodstock...there are EU calls for funding for this but each company wants to move forward alone.**

Training is in 2-3 levels

- **Technical managers need training. Training now is given by the supply sector. This is tragic because training is outsourced to five people that they want to sell their products. This is not professional. Managers need another level of training on innovative technological conditions and the potential to transfer this to their company. This training should be in person and applied. People can come in HCMR aqualabs for 1 week and be trained in real conditions. Then researchers should go in the companies to evaluate if they are capable to adopt these technologies.**
- **Marketing managers should be trained on how they open new markets, how they enter in how they present their products, what products they identify that the markets require...all this knowledge has to feed the production process and to adapt in producing products relevant to market needs. We have to have a new understanding of production line e.g bream, bass, fillets..in industrial format. Training today is primitive.**
- **General managers have to be informed on environmental issues, organic aquaculture, licensing, policies etc.**
- **We cannot ask one person to do everything.**
- **Sector development is not orthological.**
- **Each country should be dealt separately.**
- **Each company or the sector should have a training policy.**
- **Final priorities should reflect the industry issues**



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(Translated by Panos Christofilogiannis – AQUARK)

1. NAME:	LEONIDAS PAPAHRISIS
2. COMPANY:	NIREUS GROUP
3. POSITION:	R & D MANAGER

4. Do you think that there are areas we missed in the initial survey of the areas where innovation could be required in Mediterranean mariculture? **No the list is complete**

5. What is your opinion on the category average scoring?

The priorities should focus on how to make people do a better job. All depends on the respondents, if they were managers or scientists or administrators then they may choose policies as priority. If they were technical personnel they would have chosen more technical applied priorities. The new spatial planning debate affected the people's opinion, but other people might say that reducing the cost of production is a much higher priority. We have not resolved husbandry/management issues so it is odd to be low but for certain policies are overestimated and training should focus on how we can do our job better.

6. What is your opinion on the overall priorities?

FCR is correctly ranked, parasites and genetics are underestimated. I would expect more technical issues. I would prioritize more technical issues, genetic selection, fish health and welfare and nutrition. I believe that high ranking of consumer issues is due to poor understanding of the questionnaire. There are basic things missing in marketing, to understand consumer preferences are high up the ladder (much more specific issue). Training in marketing is not a priority. There is a lot of material and knowledge to be utilized in marketing campaigns but there are no marketing actions due to budget or philosophy.

7. How do you feel on the priorities identified in Greece? How you explain it?

No7 is required. Top priority is the reduction of production cost environment plays a role in that. Improved work safety conditions should be higher. It should be training target. If you make a risk analysis there are many people in the sea or on the road everyday. The question is how many fatal incidences we can accept per year. One is acceptable? Of course not. Monitoring of growth should be higher should be explained at farm level. Nodavirus should also be higher. Image of the sector should be much lower and training is more specific to a few people and at farm level could involve more people.



8. How do you feel on the priorities identified in Turkey?

How you explain it?

Turkey is more sensitive to work safety conditions maybe because they are in a transitional period more offshore, it is like Greece being influenced by consumer preferences and sector image due to the recent market crisis and the spatial planning debate. High value on Policies and regulations reflect less knowledge on effects on management practices not only because Turkey is not an EU member. Spawning induction probably is explained from lack of knowledge on sea bass production (synchronization of the two species) or focus to more new species.

9. How do you feel on the priorities identified in Spain? How you explain it?

It is much more focused in technical issues, seems that more technical people responded.

10. Do you agree on the areas of Mediterranean mariculture identified as those that require innovation?

I disagree with consumer perception and sector image as training areas, except improved housekeeping at farm level. I agree with technical issues, nutrition (FCR and other aspects..)

11. Do you agree on suggestions regarding product quality, consumer and market issues?

no comment

12. Do you agree on suggestions regarding Policies and Regulations?

no comment

13. Do you agree on the identified areas for training? Do you suggest alternative areas for training?

no comment

14. What are the most important characteristics of effective training to maximize impact to the industry?

no comment

15. Any other comment on the initiative?

On work safety conditions we have this year an eight moth plan where work safety experts are visiting all our farms.

All big changes are coming in Greece from the top management. If you want to increase the impact of training and to build for the future you have to train the middle managers (provide them with knowledge and tools to improve).

Top management training needs some technical aspects to improve understanding and to give value to their work..endless talk on policies does not provide innovation. This provides better understanding to make educated decision making and better communication with middle managers that improves company performance.



In technical issues it would be good to train new scientists that come in the industry.

Resistance to change exists. Applied training is required to see innovation in practice in order to build trust.

In order to create commitment you need isolation with applied and theoretical training (with no mobile access) in order to break perceptions. Example is working but when you visit facilities but usually there is mistrust.

Supply industry is providing training because when they visit different facilities they have an internal benchmarking but there is a bias in the information flow. Each company must have an internal methodology to check and validate a new product. (validation protocol).



1. NAME:	MARIA ALEXI
2. COMPANY:	HCMR
3. POSITION:	HEAD OF NUTRITION AND PATHOLOGY LAB

4. Do you think that there are areas we missed in the initial survey of the areas where innovation could be required in Mediterranean mariculture? **No**

5. What is your opinion on the category average scoring?

6. What is your opinion on the overall priorities?

7. How do you feel on the priorities identified in Greece? How you explain it?
Markets / consumers are important across and environment and policies are high due to spatial planning debate. Image of the sector includes health benefits. Greece is focused on the markets due to high production and the pressure to open new markets and to sell their products. Environment also got attention due to the debate for the spatial planning

8. How do you feel on the priorities identified in Turkey? How you explain it?
Work safety conditions should not surprise because it might reflecting a specific country priority.

9. How do you feel on the priorities identified in Spain? How you explain it?
The Spanish are more specific and more focused on vaccines.

10. Do you agree on the areas of Mediterranean mariculture identified as those that require innovation? **no comment**

11. Do you agree on suggestions regarding product quality, consumer and market issues? **Markets do not require innovation. It needs other actions (information package). Every time I give a presentation to a new audience they ask me , should we eat cultured sea bass and sea bream?, do they have antibiotics?, what they eat?, what about their heavy environmental impact? All these questions should be answered with scientific data.**

12. Do you agree on suggestions regarding Policies and Regulations?



13. Do you agree on the identified areas for training? Do you suggest alternative areas for training?

no

comment

14. What are the most important characteristics of effective training to maximize impact to the industry?

no comment

15. Any other comment on the initiative?

FCR and feeding management, health and welfare and quality are the main priorities. Training depends on the level of the trainees. People usually want to hear about trends, new advances, how these can be applied, while higher level technical people want to know about research, research results and problems.

Feeding strategy is very important, alternative protein sources should be coupled with alternative lipid sources. Sea bass feed has Lipid content 22% while sea bream feed has 18-20% lipid content. In the additional oil there is a capacity to substitute 605 by plat oils and to use 40% fish oil. Every fish oil substitution should always keep in mind product quality and omega-3 content of the final product.



1. NAME:	PANOS KOLIOS
2. COMPANY:	ANDROMEDA GROUP
3. POSITION:	GENERAL MANAGER

4. Do you think that there are areas we missed in the initial survey of the areas where innovation could be required in Mediterranean mariculture?

It seems that many of the people that replied were administrative persons and the conditions at the time of the survey were influenced by the spatial planning debate. Fish health should be higher and the focus should be on technical issues.

5. What is your opinion on the category average scoring?

My scoring is

1. Nutrition
2. Fish health and welfare
3. Husbandry and management
4. Quality / consumers / markets
5. Environment
6. Genetics-selection-reproduction
7. Training
8. Policies

6. What is your opinion on the overall priorities?

7. How do you feel on the priorities identified in Greece? How you explain it?

FCR should be number 1. Development of treatments against parasites should go from number 6 to number 4. Development of effective vaccines against Nodavirus should go from number 18 to number 5. Improvement of yield should be downgraded from 8 to 18. Improved work safety conditions should be downgraded from 16 much lower. Two more issues deserve upgrading number 22 (monitoring of fish growth in the cages) to number 10, while improved feed performance based on alternative protein sources should be upgraded from 11 to number 7. We need to see the percentage of administration/sales/production personnel that replied to the survey.

8. How do you feel on the priorities identified in Turkey? How you explain it?

Lengthening of self life of fish is important. Italian literature mentions 7 days, Greek literature 11-12 days while Turkish literature mention 15 days. Turkey ranking is much more applied, more technical. Training however is ranked lower than Greece.

9. How do you feel on the priorities identified in Spain? How you explain it?

The ranking in Spain is much more technical and applied. The problems are affected by the more offshore character of the industry. Vaccination is high because in Spain they don't vaccinate.



10. Do you agree on the areas of Mediterranean mariculture identified as those that require innovation?
no comment

11. Do you agree on suggestions regarding product quality, consumer and market issues?

Info Pack is required in the format of a manual with top questions /answers for the representation of the sector even through an open sector meeting in the associations.

12. Do you agree on suggestions regarding Policies and Regulations?

13. Do you agree on the identified areas for training? Do you suggest alternative areas for training?
no comment

14. What are the most important characteristics of effective training to maximize impact to the industry?
no comment

15. Any other comment on the initiative?

An ichthyologist has to be trained to improve hatchery management and predictability in production. Today if people are open and well networked they could have access to solutions and new knowledge.

The FAO manual (Moreti) has to be updated to the new conditions

A Software (web application) can be developed as a decision tree to assist hatchery managers on troubleshooting and crisis management.

Training has to be given at 2 levels:

Middle /Top Management should be trained on technical issues, sustainability and predictability

New scientists have to be trained (more applied) on technical issues (ontogenesis, development, problems and needs)

Hatchery managers should develop production manuals, should learn to develop and follow a budget, to avoid deviation, to improve biosecurity in order to increase sustainability. Supplier industry training is only focused on rotifer enrichments, Artemia and larval feeds.