

# Sustainable Sea-Food Security



## Special NWO Session at the 12<sup>th</sup> AFAF

Iloilo, 10 April 2019





## Content

Chapter / section	Page number
<b>Introduction</b>	<b>2</b>
<b>Session 1:</b> Summary of the Discussions	2
<b>Session 1:</b> Summary of the Dialogue	3
<b>Session 2:</b> Summary of the Discussions	4
<b>Session 3: The World Café</b> Background about the Process	5
<b>Harvest from the World Café</b>	6
Theme1: <b>Sustainable aquaculture and feed use.</b>	7
Theme 2: <b>Sustainable fisheries</b>	8
Theme 3: <b>Co-Creation</b>	9
Theme 4: <b>Inclusive Aquaculture Business</b>	10
<b>Evaluation</b> of the Special Session	12
Report of the <b>Mangrove Learning Day</b>	13
<b>List of participants</b> of the World Cafe	16
Content of the Separate Attachments	17

## Sustainable Sea(Food) Security

Special NWO Session at 12<sup>th</sup> Asian Fisheries and Aquaculture Forum.

Dates: Special session, April 10, 2019

Mangrove learning day, April 13, 2019

### Participants:

Special sessions:

- ✓ am: 40 (23 males & 17 females);
  - ✓ pm: 27 (15 m & 12 f);  
During these sessions some attendants walked out and in to listen to other speakers.
  - ✓ World café: 25 (14 m & 11 f) participants;
- Mangrove Learning day: 15 (5 m & 10 f) participants.

For the program, the narrative introductions on the four topics for the World Café, and the three sets of presentations, please see attachments B, C and D, respectively. The participants of the World café are listed in Annex A.



## Session 1: Technologies for Sustainable Intensification of Pond Aquaculture.

### Highlights of the discussions

On request of some participants, Dr Marc Verdegem clarified the ecological background of increased efficiency of N-recovery in the product (shrimp or fish). On the question of Dr Kriengai Satapornvanit, Devi (Picture at right) and Marc recognised that indeed the nutrient balance may miss some N and C due to evaporation, but the same would happen in the control. Dr Huang Jie, incoming Director General of NACA (Right in picture below), asked Thinh if he had added substrate to his tanks (he did not), and suggested that the difference in the effect of molasses and corn starch on the production may be due to the ingredient's structure. Dr Huang and others asked Kabir to explain how a lower N-gift can lead to higher fish growth. For his answer, Kabir recalled the explanations given by Marc earlier.







### Summary of the dialogue

During the dialogue the following issues were listed for research by the participants mentioned above and the following attendants: Dr Garrett, DG of World Fish, Dr Olivier Joffre, and Mr David Villaruz, chairman of the Philippines Aquaculture Association (centre right in picture below):

- Increase sustainability by producing more from the limited area by upgrading the traditional extensive systems;
- Reduce water use by developing in-pond water recirculation, e.g. as race-ways;
- Study options to change order of water use: first for fish and then for rice irrigation in a food systems approach;
- Study whether reducing water use and preventing pollution would need to be stimulated by using financial fees;
- Explore public-private partnerships of government, research and producers;
- Keep an open eye for the food quality issues (no residues, and enough HUFA);
- Propose solutions to farmers based on proven/tried and tested knowledge, and not on trial and error;
- Make sure that the financial benefit of the proposed solution is higher than that of the current practice. This converges with the statement of Tuesday's keynote speaker, Dr Primavera, that farmers shouldn't be used for experiments without covering their risk.

Dr Garrett wondered how fast, and how, we can move solutions as proposed this morning to practice. Marc Verdegem answered that this will depend on national investments as the proposed solutions need to be tested at farm level in every country/region, due to the variation in pond bottom and water, and in the food system. This means that countries should not invest only in station research, but also in R4D with farmers. Regarding the Nutritious Pond concept, this scaling-up will start in the coming years within the four pilot countries of WorldFish.



## Session 2: Approaches to Design & Disseminate Aquaculture Technology



### Highlights of the discussions

In his talk Olivier Joffre (picture on top of page 1) stated that the approach requires the involvement of stakeholders with an interest in specific solutions (e.g. sales of feed). Mrs Widowati (centre of picture above) asked if this doesn't lead to conflicts. Indeed, said Olivier, during the process, some stakeholders may discover that the proposed solution is not in their interest (e.g. because of reduced need for probiotics), and may leave the platform; while others may join when they notice the interest for their organisation's mission. Although the Nutritious pond concept reduces the need for feed per farmer, the number of farmers who can afford feed may increase, which is the reason for Skretting to co-fund and remain in the project.

Regarding the three value chains studied by Mrs Nazneen (pictured at right), one participant asked why the income increased due to the SLP method (e.g. income from tomato was so much higher than that for aquaculture). Nazneen thinks that this might be related to the much more mature technology for which the value chain was supported already for 10 years; while that in aquaculture, was started only for 2 years before the project ended.



Regarding the Coastal Field School, the difficulty of a continuous involvement of the extension services was debated, as there is a fast turn-over of staff. Dr Rejeki (at front left in picture on bottom page 2) added that extension staff introduce new technologies that mostly fail to deliver the promised results; farmers then get disappointed. Dr Bosma (centre top in picture on page 6) specified that Dr Rejeki presented the results of 2017. The results of 2018 demonstrated that farmers who implemented the LEISA and MOL correctly, also started feeding pellets when shrimp were older; they reached harvests of 10-fold the baseline and quadrupled their income. This demonstrated that Indonesia can easily reach its goal of doubling aquaculture production if they train farmers well. Instead, they stimulate investors to enter in the business; but these are few while traditional farmers are many.



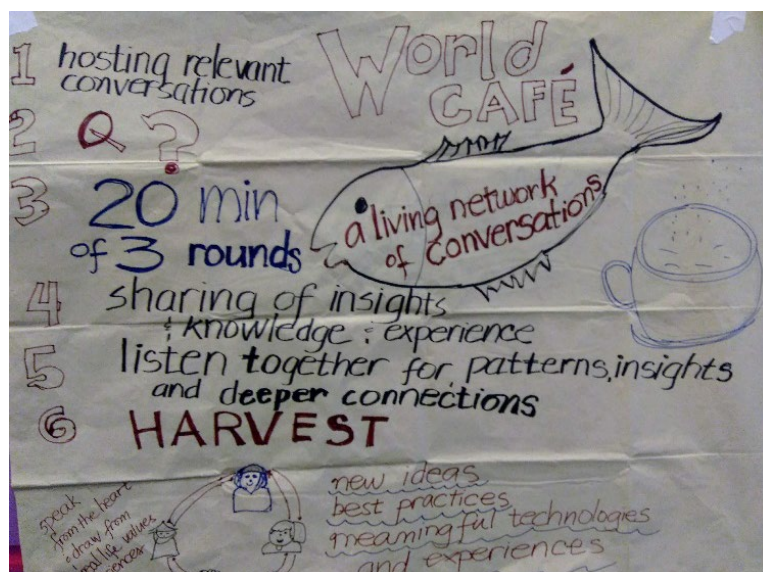
Dr Ha (at right in picture on bottom page 2) at showed that tools, such as a realistic board game, may help to change the mindset of farmers more than just talking, as extension agents usually do. Dr Bosma reported on a model exploring the future of shrimp farming systems in the Mekong delta. The present policy promoting monoculture intensive shrimp culture is decreasing the resilience of the farmers and the sector towards the impacts of climate change. Drastic changes in policies are needed to push recovery of more mangrove along the coastlines of estuaries.



### Session 3: The World Café

#### Quick Background about the Process

The World Café Session aimed to harvest innovative ideas, best practices, and experiences that have significantly changed/improved seafood sustainability and nutrient security. The participants also explored new ideas, challenges, concerns and the like that would inform future seafood sustainability and nutrient security actions. The relatively new topics of Inclusive Business and Food Systems were introduced briefly, and the challenges of small-scale fisheries extensively.



Participants chose which table to join among the four. Each group (of not more than 7) was assigned to answer one question and at the end of 20 minutes, group participants, except for the table host, were asked to move to another table to tackle another question. Originally, 3 rounds of 20-minute conversation were planned; however, for lack of time due to one lengthy introduction, only two rounds of 20-minute conversation were done.



### Harvest from the World Café

The conversations revolved around the overall theme: **"How to innovate for seafood sustainability and nutrient security?"** To explore further, the following four subthemes with accompanying specific questions (see Attachment C) were tackled.

1. Increase sustainability of aquaculture and feed use in particular:
  - What innovative practices in aquaculture and feed use have you come across that may or have significantly change(d)/improve(d) seafood sustainability and nutrient security?
2. Sustainability of fisheries and small scale fisheries in particular;
  - What innovative practices in fisheries have you come across that may or have significantly change(d)/improve(d) seafood sustainability and nutrient security?
3. Co-creation:
  - In your experience what are the constraints to adoption of innovations on aquaculture technologies; and could they be overcome by a process of co-creation?
4. Inclusive Business in the Sea-Food System:
  - Which policies are needed for: (a) vulnerable people to increase their food security in the aquaculture and fisheries value chains; (b) companies to avoid externalities and focus on efficiency, to produce more affordable seafood?





## **The summaries of the table conversations**

### **Theme 1: Sustainable aquaculture and feed use.**

*Table host and rapporteur:*

*Prof Nazmul Ahsan*

Aquaculture has grown at an impressive rate over the past decades to become one of the major sources of animal protein supply around the world. Aquaculture is becoming more important considering the fact that there remains little scope to increase production from capture fisheries, while the global population is expected to reach to 9 billion by 2050. But producing fish sustainably—without depleting productive natural resources and without damaging the precious aquatic environment—is a daunting task.



Production increase must occur in a context where resources necessary for food production, such as land and water, especially freshwater are even scarcer in a more crowded world; thus, the sector needs to be far more efficient in utilizing productive resources. To this end, participants in this table discussed the following issues and identified several knowledge gaps that need to be addressed through empirical research:

- Aquaculture operations need to be integrated with wider agri-aqua system to ensure its sustainability. In this regard the idea of landscape farming has emerged: how to use water more efficiently and more equitably among different competitive production systems. Recirculation aquaculture system (RAS) could be a viable option to reduce water use for aquaculture, while supplying nutrient-rich water for aquaculture and/or for other productive uses. Similarly, sludge collected from shrimp pond through a system called 'shrimp toilet' should be investigated further, and options for using the nutrient-dense sludge for growing agricultural products should also be explored.
- Decisions for intensive and semi-intensive aquaculture should be made carefully based on site suitability. Productivity can be increased substantially if we improve the knowledge to harness the production potential of a pond. In this regard, integrated pond systems closing the water cycle could be tested, i.e., water from reservoir would first pass through a pond for extensive culture, then to semi-intensive, subsequently for intensive operations and finally the effluents from intensive ponds will gravitate through a stabilization canal into the reservoir and the loop will continue. [See e.g. Gilles et al. (2008) *Aquacultural Engineering* 39: 113–121; Gilles et al. (2012) *Animal*; Gilles et al. (2014) *Animal*.]
- The concept of poly-culture should be further extended to incorporate other crops as well. For example, sequential cropping of different species based on their salinity requirement and the changing salinity profile of the source water. [See Gilles et al. (2014) *Marine Ecology Progress Series* 503: 289–303.]
- Yield gap should be minimized through better utilization of pond resources. Understanding the pond ecosystem and fish interaction and response to different ecosystem components in the pond are crucial to increase the productivity without increasing the inputs i.e., 'producing more with less'.
- Fish is a part of a larger ecosystem and therefore efforts should be directed toward feeding the system instead of the fish only. Research has already shown that a low protein and high carbohydrate feed can increase the production of tilapia and shrimp. More research should be carried out to know whether, and to what extent, this can be applied to other fish species and what carbohydrate sources would deliver the best result.

- In the past, farmers cultivated e.g. milkfish that fed on lablab (benthic algal mat) but now, due to indiscriminate use of various feed and chemicals, the pond bottom biota has changed so much that such biophytes can no longer grow. Thus, the role of aquatic macrophytes in the pond ecosystem need to be understood, documented and promoted for sustainable organic source of feed for fish.
- Since protein is the single most cost-determining factor in feed formulation, alternative indigenous ingredients that can replace fish meal in feed should be investigated. Past research show that plant protein can only partially replace the need for animal protein but the reason and the way to tackle this replacement have been seldom studied. Since digestibility is an issue, partially digested plant proteins or inclusion of essential amino acid and fatty acids that are missing should be investigated in feed formulation studies.
- Technology should be developed based on the principle of adaptation to local conditions, and their adoption in appropriate settings by small holders. Producing compost by using local ingredients and local knowledge and understanding their effects on pond ecosystem on fish growth are potential future research interest areas.
- Silvo-aquaculture based on mangrove plantation along the coast or along the primary canal should be studied under different contexts. This would help restore the health of the ecosystem, and communities can benefit from the many ecosystem services that mangrove can provide. However, research on these systems, particularly in relation to ecosystem services, is lacking.
- Since disease is one of the major problems affecting the aquaculture sector, research and development should be geared towards developing and promoting specific pathogen-resistant- (SPR) brood stock for prime aquaculture species.

## Theme 2: Sustainable fisheries

*Table host and rapporteur: Vriddagiri Vivekanandan (top left, picture at right)*

The discussions of the first group were entirely centered around marine capture fisheries, while that of the second group included inland fisheries. The aggregated list of possible solutions/innovations is:

- Have more protected areas (especially the no-take zones) for resource conservation;
- Involve communities in fisheries management through Community-Managed Marine areas (to improve compliance and resource health), and to reduce conflict between fishing boats.
- Educate fisherfolk on conservation and sustainable fishing;
- Develop and promote environment-friendly fishing methods, both for inland and marine, and including the reduction of by-catch and deep-sea fishing and strengthen enforcement of (existing) regulations;
- Use new cost-effective technologies for monitoring of marine resources and for improving the monitoring of fishing operations and enforcement of fishing regulations (e.g. Apps for reporting catches, locations; VMS to locate vessels and sea)
- Improve financial resilience of fishers through savings clubs and other services, to reduce compulsion on fisherfolk to catch more to reduce their debt burden (contracted with middlemen, moneylenders and boat owners);





- Insure fisherfolk (to improve the lot of fishing communities and reduce distress to families)
- Improve access of fishers to markets through e.g. (online) fish auctions.
- Improve post-harvest practices like proper & timely cooling/refrigeration of catches (to improve returns to fishing and reducing need to catch more fish), and value addition
- Provide training and support for alternative employment for fishers to reduce fishing pressure, e.g. for both inland and marine aquaculture, to take fishers out of capture fisheries;
- Stimulate mangrove recovery/replanting to improve habitat and biodiversity;
- Provide a migration/habitat corridor for fish to improve inland fisheries;
- Control industrial and agricultural effluents going to the water bodies, rivers and the sea, e.g. by Integrated Area Management, including all water-use and waste-producing activities in the area, in order to protect fisheries resources.

#### Comments of the table-host

The discussion resulted mainly in the listing of fisheries management measures that are already in use in the region, but are not well implemented or have failed to sufficiently control over-fishing and resource degradation. This means that governance aspects, which lie largely in the social and political arena, are not well understood or agreed upon. Thus, while fishers may or may not need education on conservation, our researchers and policymakers certainly need better education on managing common property resources for fisheries and aquaculture.

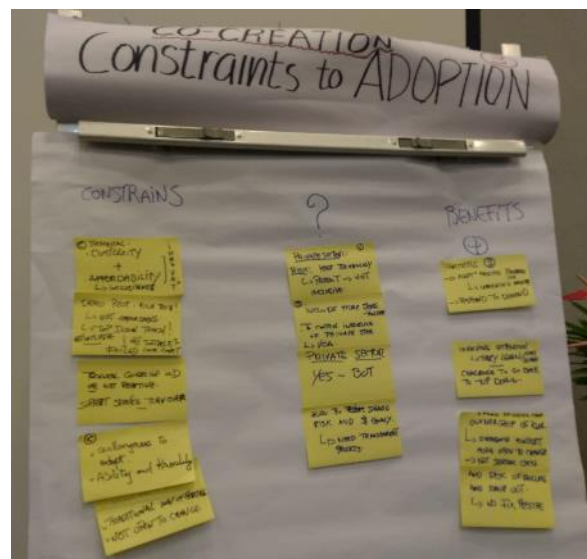
Some of the ideas proposed may actually be counter-productive in an open-access system. (1) Improving returns to fishing or providing better social security (in the absence of a social security system covering all occupations), can lead to more people getting into fisheries and further degrade the resources. (2) Unless there is a possibility to stop fresh entry, taking some fishers out of fishing by alternative employment, will not resolve the problem of over-fishing.

### **Theme 3: Co-Creation**

*Table host and rapporteur: Dr Olivier Joffre*

The participants identified the technical complexity of aquaculture innovation and the affordability as constraints to innovation in aquaculture. The participants talked about their home country context, where farmers engage in small-scale aquaculture. They mentioned four main constraints:

1. The ways of transferring knowledge are not adapted to local context. The participants explained that extension services propose and often operate high technology in a few demonstration plots which cost a lot funds, but are not working. These technologies are often not accessible and affordable to farmers. This non-inclusive approach often fails.
2. The technical guidelines are often outdated and not updated regularly, and do not respond to the needs of farmers and their local issues.
3. In addition there is a rapid turn-over of the staff of the government's support. Farmers and extension services do not have time to create strong relations that increase trust.
4. Also, innovation is often constrained by the farmer's attitude. Farmers are often reluctant to change, with limited capacity and knowledge to adopt new technology. In the case of Indonesia, participants mentioned that farmers are not open to change (which may be related to the first point).



### *What Co-innovation can change?*

Involving farmers and private sector during the innovation process will result in a better fit of the technology to the local demands and requirement. It will also hasten the learning process of farmers, bring in more progress and increase the farmers' ownership of the technology.

Co-innovation needs to involve extension services, so they can learn during the process and also increase their ownership of the technology for future dissemination.

Co-innovation can help to overcome the mindset of some farmers that are reluctant or hesitant to innovate. By involving them during the design process, they are less afraid to adopt than when they are within a top-down process.

### *Challenges to Co-innovation*

Co-innovation requires time and testing during several cycles to convince farmers that the change is beneficial. There is not a fixed recipe to innovation.

Participants all mentioned the risk of involving the private sector in the process because:

- Private sector can keep the technology for themselves and develop a patent that makes the technology not accessible to small-scale farmers.
- This process requires involving more stakeholder to control the influence of a single stakeholder or the capture of the knowledge by private sector.
- The process needs to be transparent and controlled, e.g. through a MoU or contract with the companies.

## **Theme 4: Inclusive Aquaculture Business**

While discussing the sustainable growth of the aquaculture sector, both rounds at this table came to the same stumbling block: often local policies focus on capture fisheries, while neglecting conditions needed for aquaculture development, in particular by resource poor farmers. In the countries represented (Bangladesh, Philippines, Indonesia), aquaculture is relatively "new". There is a long history of capture fisheries and



there was little need for aquaculture. But at present, in terms of feeding the world, the role of aquaculture in these countries has increased. However, farmers and companies must have a "pioneering spirit" to start aquaculture since the sector lacks governmental support and is full of risk: weather/climate problems (typhoons/rain season), unpredictable harvest, diseases, seed & feed quality, etc.

Moreover, different governmental departments have some policies that conflict with each other, and hamper aquaculture innovation. Environmental protection, mangrove/forest protection, fisheries and aquaculture must be brought under the same governmental department. Now this is often not the case and this rises conflict of interests. For example, regulations about domestication of allowed culture species.

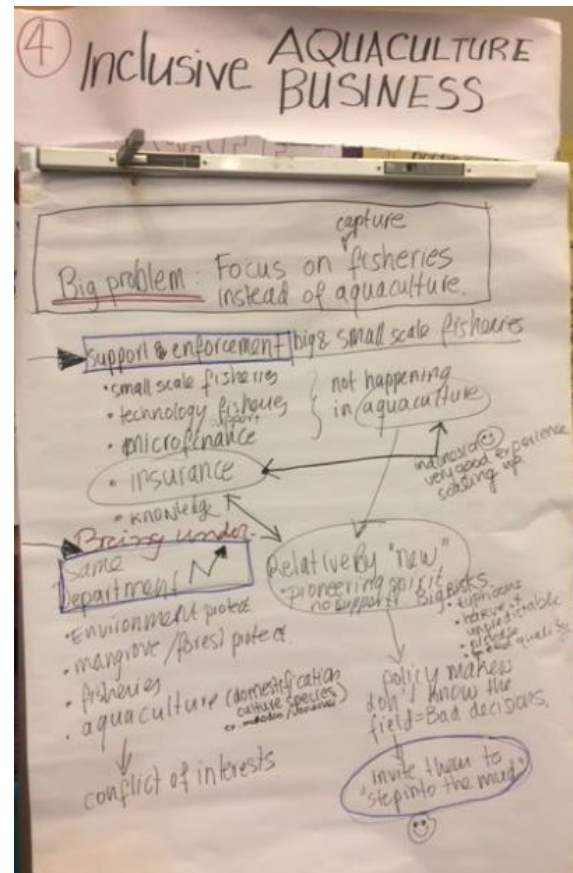
Like capture fisheries, government should enhance aquaculture by supporting development of technology and innovation for small-scale farmers, through e.g. (micro)finance programs, insurance and knowledge-sharing. This could make the aquaculture sector more sustainable with an eye for people, planet and profit. For example: certain insurance programs exist for aquaculture



sector in Indonesia. This proved to contribute to the expansion of the sector: more people dared to take the risky step of starting an aquaculture business\*.

To make the sector inclusive, policymakers should be invited to the field (to "step in the mud") because the present support is often not realistic due to lack of knowledge on the sector. To improve policymakers' decisions, more communication between government and farmers/companies is needed.

\* Comment of Roel Bosma, the general reporter:  
Research findings support insurances against damage to buildings and equipment (fixed cost). However, recent research shows that insurances against harvest failures and thus loss of operational cost, e.g. due to drought, lead to free riders and reduce investments of farmers in sustainability. At present, such insurances are often advocated by investors (banks) and implemented with subvention from governments and development banks or programs, and mirror on the long existence of crop insurances in the USA, while these are indeed supported by government for political reasons. At long term, without subvention, harvest insurances will lead to a transfer of capital from the sector to investors who will accumulate more wealth at the cost of farmers who will have less capital to invest in innovation. Control on e.g. sustainable practices, will increase transaction cost of such insurances and further decrease the farmer's margins.



## Evaluation.

The average score of the sessions by the participants was good to excellent (Table below). The score for the first two sessions was relatively low because in these sessions the persons involved in the projects scored these quite low.

According to the persons who had to leave the room shortly for some reasons, our three sessions were the most participated sessions of the day, after the morning's plenary. Our last session was also well represented in the conference's video report: [https://www.youtube.com/watch?v=3PecrEe0JQ&fbclid=IwAR2A2YSLdKNpFIU5CtR35lxJpSX3\\_471Vhy7UWqX4N0xDrRf21A15ZQQM4M](https://www.youtube.com/watch?v=3PecrEe0JQ&fbclid=IwAR2A2YSLdKNpFIU5CtR35lxJpSX3_471Vhy7UWqX4N0xDrRf21A15ZQQM4M).

The narrative impressions were very positive, except for the ones mentioning the lack of time to prepare the table host, and the briefness of the World Café (Table below). The latter was partly due to one speaker who spent more time in the introduction.

Session	Questions	Participant's average ratings on a scale of (not) to (extremely new)	
		Scale 1 - 7	On 1/10
1	How new was the information given by the speakers?	5.4	7.7
2	How new was the information given by the speakers?	4.7	6.7
3	How new was the information given by the speakers?	4.9	6.9
	How did you appreciate the discussions at the tables?	5.8	8.4
	How do you appreciate the results of the discussions (tables and plenary)?	5.9	8.5

### What is your general impression of the world café session?

RM: It was great! Maybe the best part of the whole Forum. Though limited participation but I think the ideas are great and worth pursuing.

OJ: As a facilitator, it was interesting. Good to get views of practitioners.

MV: I liked the format of the table café. It is an efficient way to get participants give their views / ideas in a receptive / non-threatening environment. The tables were very well introduced by Lorna, making it exciting and participants eager to participate. It is a pity Lorna had no time to train the table heads.

RF: World Café session is very informative, participative and active session, because all participants can contribute their ideas. Participants also got some comprehensive information about many fisheries aquaculture inclusive business aspects in this session.

WY: It was a good session to jot down the stakeholders' ideas on the key questions. Members in each table can learn and exchange experience from each other.

VE: It was a very good opportunity to know first-hand the issues and concerns pertaining to aquaculture sustainability among different countries and to know how different or similar they are from one another. Also enlightening were the various solutions and strategies offered as a way forward.

AI: It was really new arrangement for me. I learned different aspects of aquaculture and fisheries of different countries from the discussion of participants from different countries.

TH: Topics were good, and inclusive business and co-creation quite new. People joined the discussion enthusiastically.



## Mangrove Learning/Field Visit Day

The learning day started with the keynote of Dr Jurgenne Primavera on Tuesday 9 April. Thereafter, a selected group from Indonesia had a breakfast meeting with her, as Dr. Primavera couldn't join the Saturday's field visit due to a prior personal appointment. During this meeting, each participant had specific questions.



The fieldtrip was organised by the local office of the Zoological Society of London on Saturday. We were accompanied by an ecologist, a social scientist and the communication officer. Main interest of the group was in the mangrove rehabilitation at the seafront: process and duration, choice of species and nursery of these species, and in abandoned ponds having still a land owner.



0630-0830	Travel Hotel to Pedada Mangrove Ecopark, Ajuy.
0830-1000	Visit Pedada breakwater and seafront plantation Planting of seedlings with the Community organisation
1000-1030	Coffee break @ the Ecopark
1030-1130	Community sharing with Barangay Pedada Fisherfolk Association
1130-1230	Lunch at Pedada Ecopark
1230-1400	Travel Pedada, Ajuy to Leganes Municipal Hall
1400-1500	Visit Leganes Katunggan Ecopark - an abandoned fishpond reverted back to mangroves; sharing with LGU Leganes.
1500-1600	Travel Leganes to Iloilo City Hotel

ZSL gave and demonstrated a checklist of criteria for areas where mangrove can be recovered at the seafront in two locations, and of the nursery and planting of the seedlings of 50 cm height. ZSL uses longer seedlings in locations where the sedimentation is periodically higher than 20cm. Planting should be done during periods of neap-tide. At the seafront, they plant only *Sonneratia alba* and *Avicennia marina*, and never the *Rhizophora* spp. Their experience and earlier in Malaysia show that new sediment should have settled for 3 years before planting would succeed.

In the 1<sup>st</sup> site, since mangrove had disappeared over one generation ago, the beach had lost more than 1 meter height of soil. After an exhaustive study, two hard breakwaters of 1.5 m high had been built about 10 years ago. The two breakwaters allowed canoes and out-rigger boats to enter in the created bay, and also for the water to move in and out. Within ten years, the last layer was partly recovered and mangrove cover expanded year by year. They expect to move the breakwaters forward in some years to come.



In the 2<sup>nd</sup> site, the survival rate of the plantation was above 90% as they respected the sediment settlement period. This abandoned area of several ponds and hectares was returned to the government by the lessee after a huge storm because repair would be too costly. The area is visible on Google maps at the east of Iloilo, along the strait of Guimares. The commune uses T-breaks (see picture below), as used on the west coast of the Mekong delta, Vietnam, to stimulate sedimentation. Within 3 years, the layer is high enough and the bamboo becomes superfluous in this corner protected from the normal eastern winds.



At the background the island of Guimares. The arrow shows up to where the pond were washed away, and the strait of Guimares/Iloilo (dark blue water) started.





### List of participants at the SSFS World café.

Given name	Name	Organisation	E-mail (published with approval)
Perar	Keshavanath	AFSIB - Asian Fisheries Society Indian Branch, Mangaluru, Karnataka, India	.....
Roquilito	Mancao	RARE - Philippines, NGO Training & Advocacy for Marine Protection	rmancao@rare.org
Flora Monica	Belinario		fbelinario@rare.org
Katherine	Leigh	Self-Employed Marine Ecologist, hired by Conservation NGOs and USAID	Kll86@cornell.edu
Ruben	Gamala	University of the Philippines, Visayas	sigebala@yahoo.com
David B	Villaruz	Farmer, President of the Philippines Association of Aquaculturists	.....
Victor J	Estilo	Head of Dumangas Brackishwater Station, Philippines, South East Asian Fisheries Development Council	vestilo@gmail.com; veestilo@seafdec.org.ph
Andre Jon	Uychiaoco	University of the Philippines, Diliman	Andrefritz@gmail.com
Marc	Verdegem	Wageningen University & Research	marc.verdegem@wur.nl
Devi	Hermesen	Wageningen University & Research	devi.hermesen@wur.nl
Tinh	Tran	Can Tho University, Vietnam	thtinh@outlook.com
Olivier	Joffre	WorldFish R&D center, Cambodia	O.Joffre@cgiar.org
Ha	Tran Thi Phung	Can Tho University, Vietnam	ttpha@ctu.edu.vn
Vivekanandan	Vriddagiri	Fisheries Management Resource Centre (FishMARC) India	.....
Md. Nazmul	Ahsan	Khulna University, Bangladesh	nazmul_ku@yahoo.com
Md.Iftakharul	Alam	Ministry of Fisheries, Bangladesh	mdiftakharul.alam@wur.nl
Kazi Ahmed	Kabir	WorldFish R&D, Bangladesh	kazi.kabir@wur.nl
Nazneen	Khan	WorldFish R&D, Bangladesh	nazneen.khan@cgiar.org
Kurnia	Damaywanti	Indonesian Government Agents of the Fisheries Extension Services in Demak	.....
Puspitasari	Purnama Putri		hello_putribela@yahoo.com
Woro	Yuniati	Trainers of Blue Forest, an Indonesian NGO promoting Mangrove Restoration and Aquaculture Vitalisation.	woro_mdwn@yahoo.com
Weningtyas	Kismorodari		weningtyas_k@yahoo.com
Ratnawaty	Fadilah		ratnamangrove@gmail.com
Sri	Rejeki	University Diponegoro, Indonesia	sri_rejeki7356@yahoo.com
Lorna Mira	Calumpang	Self-Employed Consultant Marine and Biodiversity Conservation, Philippines	lornamiracalumpang745@gmail.com
Roel	Bosma	Wageningen University & Research	roel.bosma@xs4all.nl
Three of the persons present in sessions 1 & 2, but not at WorldCafe because they had to present in another session.			
Kriengkrai	Satapornvanit	Katsetsart University, Bangkok	ksatapornvanit@gmail.com
Gareth	Johnstone	WorldFish R&D center, Malaysia	.....
Jie	Huang	DG of NACA, Network of Asian Centers of Aquaculture, Bangkok.	.....
Toi	Huynh Thanh	Can Tho University, Vietnam	.....
Lestari (Riri)	Lhaksmi Widowati	University Diponegoro, Indonesia	rrwidowati@yahoo.com
Restiana	Wisnu Aryati	University Diponegoro, Indonesia	resti_wisnoe@yahoo.com



## Content of the Separate Attachments

Title of attach or the Presenters and co-authors	Electronic page number in AR
<b>Program of the special session</b> (Flyer)	1
<b>Info sheet for the World-Café session</b>	3
<b>Marc C.J. Verdegem:</b> Challenges for pond aquaculture	9
<b>Tran Huu Tinh,</b> T. Koppenol, Tran Ngoc Hai, & MCJ Verdegem	18
<b>Kabir Kazi A,</b> M.J Verdegem, JW Schrama, J.J Verreth, MJ Phillips	28
<b>Devi Hermesen,</b> DB. van de Waal, SAJ Declerck, & MCJ Verdegem	36
<b>Huynh Thanh Toi,</b> Olivier Joffre, Tran Ngoc Hai & Marc Verdegem	43
<b>Olivier M. Joffre</b> & Laurens Klerkx	49
Elfitasari T, L Klerx, O Joffre, S. Rejeki, <b>LL Widowati,</b> R W Ariyati, RH Bosma	57
<b>Nazneen Khan,</b> Qazi Azad-uz-zaman, S. Hossain, K. Hartley & M. Dickson	65
<b>Woro Yuniatia,</b> Ratnawaty Fadilah	72
<b>Sri Rejeki,</b> Restiana W. Ariyati, Lestari L. Widowati, & Roel H. Bosma	81
<b>Tran Thi P. Ha,</b> Nguyen Thi H. Phuong, Tong Q. Hiep, & Roel H. Bosma	90
Tong Q. Hiep, V.P.D. Tri, A. Ligtenberg, <b>RH Bosma,</b> Tran T.P. Ha & AK Bregt	100
<b>Roel H. Bosma</b> Introduction on principles and goals of inclusive business	108
<b>V. Vivekanandan</b> Strengthening Economic Agency of Women Fish Vendors`	112
The abstracts of the Special Session	120