Hackathon – fish discards

Organizers hackathon: Food Valley NL and students of Circular Economy Wageningen

Location: "De Hooilanden", Bennekom, Netherlands

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Participants

The Hackathon was organized by Food Valley NL, which is an organization that acts as a mediator for innovation and development in the agro-food sector. The day was organized in collaboration with students of the Circular Economy Wageningen. The discussion subject was initiated by fish specialist and fishmonger Nico Waasdorp who has a keen interest in sustainable fisheries. Several experts and students from different disciplines were invited to discuss the issue of fish discards.

Frances Fortuin – Organizer (Food Valley NL)
Mia Holleman – Organizer (Food Valley NL)
Nico Waasdorp – Initiator and seafood expert (Fish and Seafood Waasdorp)
Paul van der Heijden – Expert sustainable development (Mature Development)
Stefano Pascucci – Expert circular economy (Management Studies, WUR)
Mike van 't Land – Expert marine biorefinery (Fisheries department, ILVO)
Kim Poldner – Moderator (Management Studies, WUR)
Thomas Thorin – Student Management, Economics and Consumer Studies (WUR)
Tom Koppenol – Student Animal Sciences (WUR)
Emily Dougan – Student Management Studies (WUR)
Tim Daalderop - Student Sustainable Development and Entrepreneurship (WUR)
Mieke van der Laan – Student Marine Ecology (WUR)
Steven Westbroek – Student Social Sciences: consumer technology and innovation (WUR)

Introduction - Discarding, bycatch and landing obligation

To start the day an introduction was given by Nico Waasdorp on the issue of discarding and the recently implemented 'landing obligation'. The following paragraph will clarify certain definitions which were used during the discussions.

Discarding is a fisheries related issue that is receiving a lot of public attention and is seen by many as a waste of valuable resources. Discarding defines returning a part of the catch to the sea (dead or alive) due to size, species or quota restrictions. Often, fisherman also discard low valued species or low quality individuals in search of a more valuable haul, this so called high-grading is forbidden. The European Commission is gradually implementing a landing obligation for all EU commercial fisheries to

limit discarding. This new policy obliges fisherman to land all species managed under TACs (total allowable catch) and count them against their quota. The main objective of the policy is to minimize the waste of valuable and limited fisheries resources. The landing obligation will pressure the fisheries in to increasing selectivity and should lead to more reliable catch data. For the fisherman however, this means that a part of the hold that was previously filled with valuable catches will now be filled with low valued bycatch. In this report the 'bycatch' refers to the part of the catch which has to be landed and is of significantly lower value than the target species. The problem of excess bycatch is much greater in the benthic fisheries than in the pelagic fisheries. The bycatch can basically be separated in to two groups: 1) lower valued, less popular species of a legal size which are marketable for human consumption and 2) undersized individuals which are, by law, not marketable for direct human consumption. What the exact definition is of 'direct human consumption' is still unclear, however, it does indicate that some sort of processing is required before the product can be marketed. In order to prevent the newly landed bycatch from ending up as waste, biogas or low valued fish meal a means for valorizing bycatch needs to be found to.

The Hackathon

The goal of the hackathon was to brainstorm and discuss the possibilities of utilizing the low valued bycatch and ideally come up with a solution or business plan for bycatch valorization. Three groups were created each with, but not limited to, a different starting subject and led by a different expert.

Group A: bycatch as pet food (Nico Waasdorp)
Group B: bycatch on the menu (Paul van der Heijden)
Group C: out of the box (Mike van 't Land)

The hacking was done in three rounds. In the first round the idea was to determine the approach of the subject, which aspects/bottlenecks to keep in mind and to brainstorm on all the conceivable possibilities. The second round aimed at finding the most suitable possibility and pinpointing the different requirements. In the third round a business plan was made for the final pitch. After each round the ideas were presented to the group and feedback was given. Between rounds individuals were able to switch to groups that fitted their own concepts. In the first two rounds several ideas were suggested and discussed, these are summarized in the following list:

- Undersized bycatch (not marketable for human consumption) as high quality pet food
- Producing fish silage as a cheap and easy alternative for fish meal production
- Producing fish oil, mainly using pelagic fish
- Producing aquaculture feed or feeding insects using undersized bycatch, thus making the proteins available for human consumption
- Using byproducts in restaurant owned aquaponics systems
- Creating a fishery innovation platform, allowing fisherman to invest in business plans
- Onboard or offshore biogas production, possibly for fisherman.
- Fish scrapping – allowing consumers to directly buy “left over species” from the fisherman
- Onboard processing to save space in the hull, maintain a high quality and possibly increase value
- Starting a fish restaurant that focuses on using and promoting underutilized fish

- Creating a central or several centralized hubs for bycatch processing EU collaboration
- Marketing campaign (by chefs telling the message as ambassadors) for less popular species and how to cook them. Products at first in pop-up restaurants, food trucks, meal boxes. Later on, entrepreneurs pick up the ideas.
- Create a positive label for bycatch species
- Producing fish stock or taste enhancer from processing leftovers
- Transition from fisheries to aquaculture for (future) fisherman
- Let the consumers identify with the fish by sharing the background story of the catch

After the first two rounds many ideas had been proposed and discussed. The importance of a circular economy was often emphasized during the discussions. Accordingly, many of these ideas were also combined in to a web or chain of processing possibilities, here follows one example of the many discussed possibilities:

A local restaurant can serve and promote less popular fish species > the meat fraction of the undersized fish could be used as high quality per food > the leftovers could be used to produce a fish stock for restaurants > the stock leftovers can be used to produce biogas for stock production > the remaining fraction could be used as soil nutrients to grow vegetables for the restaurant.

After the discussions several bottlenecks were established. Firstly, the fact that the undersized bycatch is unmarketable for human consumption greatly limits the valorization possibilities (value limit). This also means that it is very difficult to increase the value of this raw material for the fisherman directly. Secondly, there is a large variation and uncertainty in the supply of raw materials due to the nature of the demersal fisheries. This will make it difficult to produce a constant product and increase the insecurity of the business models. Also the stability of the raw material is an issue, raw fish deteriorates rapidly and often requires expensive stabilization methods such as cooling and drying. Finally, consumers need to be made aware of the large amount of marine food sources and buy according to season and availability.

In the final round three pitches were given on bycatch valorization:

UPcatch: Investigating the opportunities for a fully automated off-shore biogas-production plant. A floating or even sailing biogas plant would allow fishermen to save hull space by allowing them to dispose (will monitored by cameras) their low valued bycatch. The plant is fully automated, controlled from land and can be located at the most fuel-effective distance to the fishing-fleet. The discards and bycatch in combination with vegetable scraps are anaerobically digested into methane (biogas) and a fertile sludge. The biogas can be used to power the plant itself, can be compressed and sold to fishermen (who can potentially power their cooling-systems with it) and shipped to land. The sludge can be shipped to land and sold as fertilizer to local farmers. A system like this should be technologically feasible, however further investigation is needed to

provide more insight into the cost structure. A fully autonomous system will require a large investment. Fishermen must pay for the service in order to repay this large investment and to maintain the incentive to reduce bycatch/discards. Vegetable scraps are very cheap but must be shipped-in from land and a large part of the methane and sludge must be shipped back. The revenue from methane depends on demand for the gas in the harbor and the possibility to supply it to the grid.

Fisheries innovation platform: "Fishing for solutions by catching entrepreneurs to upcycle bycatch. Invest to set sail in a waste free future!". The idea is to create a program similar to Climate-KIC, in which different events or hackathons could be held in cooperation with fisheries to come up with various, interdisciplinary solutions for the use of bycatch. With such a program multiple fisheries related issues could be tackled simultaneously. The "winner" of these kinds of competitions would receive funding and support, created through subsidies from the local government (or EU agencies) and some input from fisheries. Additionally, we would function as a sort of consulting practice to help entrepreneurs further develop and implement their fisheries related innovations. Such a program would also function as an excellent centralized networking facility for government, research and industry.

Something Fishy: The idea was proposed to produce a high valued taste enhancer from bycatch called Something Fishy. The product can be sold to restaurants or directly to consumers as a unique product. It would function as a food condiment which enhances the "fish taste". It could for example be used to increase the flavor of otherwise bland tasting fish, in pastas and salads that require a fishy taste or even to give flavor to water for boiling pastas. Combining Something Fishy with other flavors and spices could be experimented with to create a broad range of products, for example umami flavor from onions. The process would be kept simple by slowly boiling the bycatch at low temperatures and extracting the flavor, thus producing the stock. The stock can then be concentrated. Producing a dry powder, by for example spray drying, a stable product can be produced. After extraction the remaining fish fraction could be used to produce biogas, which in its turn can be used to fuel the process. To diversify the business model, the meat fraction of the raw material could also be separated and sold as high quality pet food. Producing Something Fishy should and could require a simple process with low investment costs, however it could result in a high profit if sold as an exclusive condiment.

Cooking with Nico Waasdorp

During lunch and dinner Nico Waasdorp introduced the group to several delicious seafood dishes such as: whole smoked salmon, shellfish puff pastry, mackerel salad, sea bream (wild), fried grey gurnard oysters and lobster soup. He also demonstrated the correct way to open oysters, how to eat bony fish and how to filet grey gurnard.

Conclusion

The possibilities of valorizing bycatch seem very divers and many ideas were discussed. It seems that consumer awareness is an important aspect for the bycatch which is available for human consumption. People need to be informed about the vast amount of food sources that the oceans and seas provide us. By doing so, the value of unpopular species will increase which will also lead to increased profits for fisherman. The undersized bycatch seem to be more difficult to valorize. The great variations in supply and low volumes make it difficult to invest in expensive processing techniques often required to produce high quality products. The fact that the law prohibits making a profit from undersized bycatch nearly makes it impossible to directly increase their value for the fisherman. However, an effort can still be made to maximally utilize these raw materials, preventing them from becoming low valued "waste". All in all the discard hackathon was an enjoyable successful and productive day, and also made for an excellent networking opportunity.

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