# Theme 5 - Capture fisheries, aquaculture and food security
# Annex

Conference “Research & Policy: two peas in a pod? A dialogue for food security impact”

- **ARF-2 project ‘Resilience inland fishers Benin’**
  With the ‘new’ challenges (mounting population, pollution from urban areas and changing climatic conditions), this research examines the regulations among fishermen to share the common water resources and evaluates whether these customary rules can cope with new challenges or not. Preliminary results indicate that food insecurity prevails by 32 per cent of the fishermen and the shared water resource management is not functioning well given the high incidence of conflicts. Creation of a platform with a solid collaboration between fishermen and local authorities should pave the way for future sustainable solutions.

- **ARF-2 project ‘Technology innovations towards sustainability in Indonesia's tuna supply chains’**
  This research implemented a technology platform on top of an existing paper-based traceability system in select tuna fisheries in Indonesia. Following a needs assessment, fishers expressed a desire for technology that helped them predict issues at sea and protect them (for example apps for due weather and emergency signals), while processors expressed a desire for greater automation of existing logistics practices. Based on the needs assessment a set of coordinated technological interventions were implemented. Following implementation, the consequences of these interventions were researched. In practice the introduction of these technologies has led to the creation of digital records of key information needed for traceability, albeit not coordinated throughout the chain. From a research perspective new insights were gained on both practical and social challenges of these technology interventions. Due to the action research approach of this project lessons learnt were incorporated into a staggered approach of implementation of these technologies. Barriers were confronted along the way and these have been communicated to policy makers and technology providers at various conferences, in hopes of resulting lessons learned leading to more streamlined implementation in future sites.

- **ARF-3 project ‘Fish feeds for catfish breeding Benin’**
  This project “Developing and promoting efficient fish feeds to enable emergence of catfish breeding in Benin (ProfishBenin)” aims at developing and promoting affordable, nutritive, floating, and easy to use fish feeds based on locally available feed ingredients in Benin. This is an applied research to be carried out in an interdisciplinary setting that addresses the: (i) characterization of local feed ingredients, (ii) formulation and functionalization of nutritionally dense-fish feeds, (iii) assessment of the socio-economic factors influencing the success of the products and (iv) technology transfer to stakeholders. Capacity building is also ascertained in 6 research projects for MSc students.

- **GCP-1 project ‘Nutritious system pond farming in Viet Nam’**
  Aquaculture, the farming of fish and shellfish, has become more important than fishery for providing healthy animal proteins. An essential component of increased aquaculture production is feed, using significant quantities of aquatic (e.g. fish meal) and terrestrial (e.g. soya) resources. At present, the aquaculture feeding systems target the requirements of the animal (fish or shellfish) without considering the contribution of the pond’s food web to the animal’s diet, while the animals (can) use this. Using shrimp aquaculture as a model, the objective of Nutritious Ponds is to design a “nutritious-system” concept that increases the contribution of natural feed produced in ponds to total production, and to make aquaculture less reliant on fish-oil and fishmeal. The project’s first findings show that shrimp growth/production was not significantly affected by:
  - Removing fishmeal and oil from shrimp feed;
  - Replacing expensive organic nitrogen and carbon inputs by cheap inorganic forms;
  - Reducing the feed load with 40% while doubling the Carbon/Nitrogen ratio (up to 16);
  - Replacing about 25% of high priced ingredients with less expensive carbohydrate sources, which reduced the cost of production up to 10% in semi-intensive and improved extensive systems.
  - Participatory analysis showed that the uptake of the technology will be easier if the system becomes more robust than the existing systems, e.g. less sensitive to climate change and disease agents.

- **GCP-2 project 'Aquaponics Ethiopia: sustainable integrated fish vegetable production'**
  Aquaponics has been put forward as highly suitable to overcome droughts and/or a lack of arable lands and increase dietary diversification. A number of beneficiaries have been selected in cooperation with the local administration to evaluate the business model with individual entrepreneurs and a (youth) cooperative farm. The technical functioning of aquaponics has been proven, increased production of fish and vegetables is achieved and the entrepreneurs have started micro-enterprises in selling their produce locally. Main challenges that remain are on knowledge dissemination (aquaponics does require a high knowledge input) and the focus on business development. A part of the beneficiaries tends to grow crops they consume in their households without selling much to the local markets, thus not generating cashflow for expansion of their micro-enterprises.

- **GCP-2 project 'Serious games for sustainable shrimp farming in Viet Nam'**
  Aquaculture of shrimp provides a good income to many small holders, but has environmental trade-offs. In Vietnam, integrated mangrove-shrimp aquaculture (IMSA) is a compulsory farming system in the buffer zone along the coast of the Mekong Delta. The voluntary adoption beyond this zone is constrained by short term interests. Wageningen University & Research, together with Can Tho University, developed an Agent Based Model (ABM) to support planning in CaMau province. The involved scientists observed that both the ABM and the Role Playing Games (RPG) used for ABM calibration might support changes in knowledge and attitude of shrimp farmers towards IMSA and the more intensive shrimp farming systems. ALEGAMS aims to assess the learning effects of combining RPG and ABM on (1) farmers knowledge and attitude towards IMSA, and on (2) policymakers knowledge and opinion on the pros and cons of the various shrimp farming systems. The ALEGAMS team refined the RPG and ABM for three other sites, will monitor and assess the changes in attitude, opinion and practices of farmers after RPG participation. After the 1st round of RPGs, the participants of the mid-term workshop concluded that the RPG implementation needed an overhaul before continuing. At present the new RPG is printed in a distributable version and the new round will be carried out soon. After the 2nd round of RPGs, the latter and the adjusted ABM will be used in workshops with policymakers of two provinces in 2018. After which, the project can assess the impacts and present its findings.

- **GCP-2 project 'Governing aquaculture in Southeast Asia (SUPERSEAS)'**
  Southeast Asia's aquaculture industry is strongly related to the environment within which it is practiced. This has led to a range of a series of production risks that threaten the capacity of the industry to maintain current levels of output. To overcome these production risks the SUPERSEAS team has assessed the potential for market-led area-based management of aquaculture. In particular we have found potential for linking area based approaches to insurance, finance, value chain contracts and certification. The success of these area based approaches appears to be dependent on the cooperation between farmers to improve the availability of information on production and promote risk transfer in the value chain and different types of formal and informal insurers.

- **GCP-3 project 'Sustainable aquaculture to support mangrove forest restoration in Indonesia (PASMI)'**
  This research focuses on multi-trophic coastal aquaculture systems, which support the restoration of mangrove forests in Indonesia. In these systems, different organisms, such as shrimp, blue crab and others, are produced in an integrated way, thereby supporting resilient livelihoods while also safeguarding the mangrove functions for coastal protection.

- **GCP-3 project 'Fish for food security in city regions of India and Ghana (FiSH4FOOD)'.**
  Seafood is vital to the health and food security of millions of poor consumers in rapidly expanding city regions in the global south. This project aims to understand how low-price fish chains contribute to urban food security in India and Ghana and to identify policy and business interventions that have potential to improve them.