

1. Project's summary/abstract:

The SmallFishFood consortium is a multidisciplinary research team from Norway, the Netherlands, Germany, Ghana, Kenya and Uganda, covering the fields of fish stock assessment, processing, marketing, nutrition, risk assessment and governance. We provide innovative rethinking of the food security discourse by focusing on the nutritional value of small fish (e.g. sardines). We aim for transformation to ecological sustainability and food security by asking: How can socio-cultural, economic and institutional transformations of the fish value chain, as well as technical and infrastructural innovations, contribute to improved, sustainable utilization of small fish resources for Africa's low-income population? The fact that the nutrients in fish can play a significant role in combating the triple burden of hunger, micronutrient deficiencies and non-communicable diseases is the starting point of the project. However, the unique qualities of fish are seldom recognized in the global food security discourse, and fish is strikingly missing from nutrient deficiency strategies among disadvantaged groups. Small fish are ubiquitous in all aquatic environments from large marine ecosystems to seasonal ponds, as well as in market places and low-income household diets, but their significance is underrated and little understood as they are consumed locally and often go unrecorded in catch statistics. In fact, fisheries are the most energy efficient producers in comparison to other food production systems and have the least environmental impact in terms of greenhouse gases and use of freshwater, fertilizers, insecticides/herbicides. Catching small fish, which are simply sun-dried and consumed whole, is the most high-yielding, eco-friendly, low CO₂-emission and nourishing way of utilizing aquatic resources. However, a range of social, technical, economic and legal barriers inhibit the full potential of utilizing small fish and it is the aim of this project to contribute to solving these.

2. Project's main objective (s):

- Identify, quantify and map current patterns of production and distribution of small fish for food and feed, with particular reference to Ghana, Kenya and Uganda;
- Identify and describe the harvesting, marketing and utilization patterns of small fish and how they contribute to food and nutritional security in these countries;
- Improve the production processes to achieve better quality and longer shelf life;
- Disseminate the nutritious value of small fish to stakeholders and governance agencies and analyse how barriers to sustainable utilization can be resolved.

Consortium

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Sub themes:

- Post harvest innovations
- Food value chain
- Rural development and agricultural economy
- Food systems governance and farm organizations

3. Theory of Change and Impact Pathway

3.1 Summary ToC with assumptions

Nutritional qualities of (small)fish are not appreciated in the global food security discourse, and fish is strikingly missing from strategies for nutrient deficiency reduction. This leads to misrepresentations in policy attention, limited recognition of the ubiquitous and abundant resources; lack of innovation to improve nutritional qualities, processing and marketing; and low awareness of the potential dietary and economic importance. Causes are manifold but include i) a biased focus on the less abundant large fish, ii) a large and widely distributed small-scale fisheries sector involving numerous actors in catch, processing and trade, and iii) a general belief that the fisheries sector is overexploited (although this is rarely the case for small fish). In addition, the value of micronutrients in 'low-value' small fish is high but not well known. While small fish has always been part of the diet in African societies, they have received little focus from local or international development interventions. With few exceptions, fishing, processing and trade institutions have rarely addressed the large quantities of small fish that are produced and processed by mainly the small-scale artisanal, and often part-time sector, many of whom are women. All this reflects the current neglect and resulting knowledge gaps with regard to local importance, the natural production potential, as well as possibilities for improvements and innovations in catches (volumes, technologies information), processing (nutritional value, products, safety, losses) and trade (losses, diversification consumer awareness). The overall objective of the SmallFishFood project is to contribute to improved sustainable utilisation of highly productive resources of small fish for Africa's low-income population in order to alleviate hunger, micronutrient deficiencies and non-communicable diseases. Our assumptions and aspirations are that by systematically addressing the constraints, knowledge gaps and policy issues throughout the whole production and value chain, in a comprehensive way, will help highlighting the importance of the resource to obtain the required necessary policy attention, as well as the technical institutional and socio-cultural transitions needed for this sector to contribute to the SDGs.



3.2 Expected outcomes and impact:

Research outputs	Indicators	Research outcomes	Indicators	Impact
WP1: Improved catch statistics of small fish and assessment of harvest	Catch assessment (electronic) implemented. Report/article by end of project	Sustainable management of small fish species stocks by local and government institutions	Small fish stocks included in fisheries management plans. Sustainable harvesting techniques of small fish.	More balanced harvest of the aquatic food chain leading to increased production of fish and less harvest induced distortion of the aquatic ecosystem structure.
WP1/2: Improved quantification of biomass (and value) flows of small fish from landing to end consumer (food or feed)	Biomass flows quantified and mapped. Losses in value chains quantified. Report/article socio-ecological system analysis by end of project	Fish processors produce higher quality products Dried fish products are viewed as healthy, attractive and affordable Nutrient supplement product innovation by SMEs	Reduced post-harvest losses and higher incomes	Higher income to producers. Increased consumption of high quality fish. Reduced malnutrition and micronutrient deficiency. Improved cognitive development and immune systems for infants. Improved public health for pregnant women and low-income population.
WP2: Mapping dried fish marketing constraints	Stakeholder workshop. Report/article by end of project		New (urban) consumer groups buy high quality products based on small fish. Increased usage of dried fish as nutrient supplements	
WP2: Techniques developed for reduced post-harvest losses	Training on drying fish using solar dryers in 20 pilot fish landing sites. Improved product quality.			
WP2: Novel processing measures developed.	Guideline/training/implementation of hammer mill processing			
WP2/3: Measures for value addition and longer shelf life of dried fish	Guideline, transfer workshop on hygienic packaging and labelling Database on small fish consumption patterns.			
WP3: Map contribution of small fish in local diets.	Database on small fish consumption patterns.			
WP3: Detailed nutrient analysis and safety of small fish	Results published in articles 1) Nutrients declarations, 2) Food safety protocols, 3) FAO database	Better risk assessment and safety awareness of traders and consumers	Product declarations. Databases on consumption patterns and nutritional -> quality/safety of processed fish.	
WP4: understanding and improving SIS value chain governance	- Report on SIS value chain governance obstacles in Ghana, Uganda and Kenya. - Scientific article by end of project	Value of small fish for human consumption is recognised	Improved quality of products, hygienic packing, Dependence of small fish in animal feed quantified and considered in policies	
WP4: Understanding impact of fishmeal value chains on SIS based food security	- Scientific article by end of project on fishmeal supply chains. - Short film produced.			
WP4: Awareness raising of small fish potential for reducing malnutrition	- Stakeholder workshops. - Policy brief - Social media coverage - Public media coverage	Stronger public awareness of importance of small fish for food security and nutrition	Fisheries management, food producers and health policies prioritize nutrition potential of fish	Knowledge on sustainable utilisation of small fish for food security and nutrition is up-scaled to Africa and worldwide