



Federal Ministry  
of Food  
and Agriculture

## ERA-Net LEAP AGRI

Research and Innovation for food and nutrition security  
and sustainable agriculture in Africa and Europe

### ***SmallFishFood: Small Fish and Food Security: Towards innovative integration of fish in African food systems to improve nutrition***

<b>country/countries</b>	Ghana, Kenya, Uganda
<b>funding agency</b>	Federal Ministry of Food and Agriculture - BMEL
<b>project management</b>	Federal Office for Agriculture and Food – BLE
<b>project coordinator</b>	Prof. Jeppe Kolding (University of Bergen, Norway)
<b>project partner(s)</b>	University of Bergen (Norway) Institute of Marine Research (Norway) University of Ghana (Ghana) Council for Scientific and Industrial Research - Food Research Institute (Ghana) German Federal Institute for Risk Assessment (Germany) National Fisheries Resources Research Institute (Uganda) University of Amsterdam (Netherlands)

	<p>Wageningen University and Research Centre (Netherlands)</p> <p>Kenya Marine and Fisheries Research Institute (Kenya)</p>
<b>project budget</b>	<p><b>1 052 970 € (total project budget)</b></p> <p><b>276 608 € (Budget funded by the BLE / BMEL for the activities of the University of Ghana, CSIR - Food Research Institute and the German Federal Institute for Risk Assessment)</b></p>
<b>project duration</b>	01.09.2018 – 31.08.2022
<b>key words</b>	fish, food, nutrition, food chain, food hygiene, food safety
<b>background</b>	<p>Small fish species are an important part of the global capture fishery and are mainly used as food or feed resources. Due to the low trophic level, many small fish species are available in large biomasses. In many traditional food systems, small fish species are consumed whole and are an important and affordable food resource especially for poorer consumer groups in Africa and Asia. These food chains are mainly based on small-scale stakeholders from capture fishery to processing until selling on markets. Limited data is available on nutrient composition and food safety parameters of processed small fish.</p>
<b>objective</b>	<p>SmallFishFood is an interdisciplinary project working on four interconnected objectives:</p> <ul style="list-style-type: none"> <li>• 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;</li> <li>• Identify and describe the harvesting, marketing and utilization patterns of small fish and how they contribute to food and nutritional security in these countries;</li> <li>• Improve the production processes to achieve better quality and longer shelf life;</li> <li>• Disseminate the value of small fish species to stakeholders and governance agencies and analyse how barriers to sustainable utilization can be resolved.</li> </ul>
<b>results</b>	<p>Samples of processed small fish species from different markets in Ghana and Kenya were analyzed for nutrients, microbiological quality, and contaminants. Most of the processed fish species contained significant amounts of several vitamins, minerals, and essential fatty acids. Some environmental contaminants showed elevated levels. High numbers of total bacteria counts, <i>E. coli</i>, coliform bacteria and low numbers of Shiga toxin-producing <i>E. coli</i> were found. In smoked samples, polycyclic aromatic hydrocarbons (PAH) reached high concentrations. Future research is needed to determine potential sources of contamination along the value chain, identify critical points, and devel-</p>

	<p>op applicable mitigation strategies to improve the quality and safety of small processed fish in Ghana and Kenya.</p>
<b>recommendations</b>	<p>Processed small fish species have the potential to significantly contribute to the recommended nutrient intake of vitamins, minerals and essential fatty acids in Ghana, Kenya and Uganda. Processed small fish should be recognized as an important resource towards alleviating micronutrient malnutrition in Ghana, Kenya and other Sub-Saharan African countries. Further analyses and identification of sources of contamination along the value chain are needed to mitigate the associated health hazards. The high levels of polycyclic aromatic hydrocarbons in smoked fish necessitate the improvement of the smoking processes by implementing best practices and improved kilns. Further studies are needed to reassess hygiene practices and identify critical points for microbial contamination along the value chain. In depth data on local consumption is needed, as this is essential in order to thoroughly examine the risks and bene-fits of fish consumption.</p>
<b>photos</b>	 <p data-bbox="1102 1458 1345 1485">BfR, Johannes Pucher</p> <p data-bbox="472 1541 775 1568">Landing site and fish drying</p>



BfR, Johannes Pucher

Selling dried small fish at a market