

CALL NIPS „Innovative Sustainable Production Systems”

Ecological, technological and capacity development strategies for a sustainable optimization of local maize-based food systems and climate-change resilient food production at the level of smallholder farmers in Kenya.

country/countries	Kenya/Germany
funding agency	Federal Ministry of Food and Agriculture - BMEL
project management	Federal Office for Agriculture and Food – BLE
project coordinator	PD Dr. Markus Schmidt-Heydt, Max Rubner-Institut Karlsruhe, Department of Safety and Quality of Fruit and Vegetables
project partner(s)	Max Rubner-Institut Detmold and Kiel ; Julius Kühn-Institut Berlin and Braunschweig ; Rheinland-Pfälzische Technische Universität Kaiserslautern-Landau ; Eastern Africa Farmers Federation, Nairobi ; Kenya Agricultural & Livestock Research Organization, Nairobi
project budget	1.722.513,76 €
project duration	1st of March 2024 till 28th of February 2027

key words	Reduction of aflatoxin contamination in maize, Kenya, improvement of the food production chain, new market perspectives for small farmers, alternative proteins, circular economy, resistant maize varieties, use of residues from food production, reduction of food losses caused by mold and mycotoxins, soil microbiome and quality
background	Maize, as the most commonly consumed staple food in Sub-Saharan Africa, is frequently and highly contaminated by mold mycotoxins such as aflatoxin, resulting in regular fatal aflatoxicosis outbreaks. Particularly in Kenya, as a high-risk model region for aflatoxin contamination in Africa, the situation worsens due to climatic changes. Heavily contaminated maize cannot be safely used for consumption by humans and animals with the consequence of economic and nutritional losses.
objective	SoLFOOD will target the reduction of fungal infestations in the field and thus the reduction of mycotoxin contaminations of maize and end products through the application of a combination of science-based, innovative and traditional best-practice methods in maize cultivation. The SoLFOOD research consortium will work hand-in-hand with farmers in Kenya and other stakeholders to develop strategies on how to keep contaminated maize in the food value chain and ensure a food source free from mycotoxin contaminations and with high nutritional value using different methods. This is achieved, for example, by applying biological detoxification measures based on the fermentation of maize with specialized fungal species. In this process, mycotoxins are degraded and mycoproteins are produced at the same time; the result is a nutritious maize-mycoprotein hybrid product. Contaminated maize will also be used to produce insect proteins for the subsequent production of fish feed. These and other approaches, which will also include the investigation of soil quality and aflatoxin-resistant maize varieties, will open up new market prospects and economic opportunities for farmers (smallholders) in the region and support existing traditional maize cultivation and processing methods by optimizing them from a scientific point of view. Comprehensive capacity building and the gender-specific and sociologically supported dissemination of the results of SoLFOOD in analogue and digital form will ensure the integration of the new strategies by the local population and other interest groups.
short description	Local maize-based food systems at the smallholder level are in the focus of this project, as this group is highly dependent on its own food production. SoLFOOD will improve the safety of the maize production chain at smallholder level in Kenya, starting in the soil and ending up with the use of the harvested products: 1) Evaluate local and traditional measures, including microbiome and mycotoxin analysis of plants and soils to improve soil/crop quality, 2) Investigate the use of plant/insect residues and microorganisms as fertilizers for maize of different varieties, 3) Investigating the use of spe-

cialized fungi to degrade the aflatoxin content by fermentation of contaminated maize to obtain a safe maize-based food with improved nutritional value, and 4) Investigating the use of aflatoxin contaminated maize to produce insect protein for fish feed production. This will open up new market perspectives and economic opportunities in the region. Knowledge exchange between scientists, farmers and regional stakeholders in an inter- and trans-disciplinary context is key to developing appropriate tools for behaviour change and resilience strategies in farms and households. SoLFOOD will carry out comprehensive capacity building in cooperation with local institutions, farmers and other stakeholders to ensure sustainable knowledge transfer, cultural acceptance and thus effective adoption of sustainably optimized methods and climate-resilient strategies by the local population.