



Bundesministerium
für Ernährung
und Landwirtschaft

NUTRITION

Diversified Agriculture for a Balanced Nutrition in Sub-Saharan Africa

HealthyLAND: Linking agriculture and nutrition for healthy diets

country/countries	Kenya, Uganda, Malawi
funding agency	Federal Ministry of Food and Agriculture – BMEL
project management	Federal Office for Agriculture and Food – BLE
project coordinator	Prof. Dr. Ernst-August Nuppenau and Dr. Irmgard Jordan
project partner(s)	Dr. Elizabeth Kamau-Mbuthia and Dr. Lydia Waswa, Egerton University, Kenya Prof. Johnny Mugisha and Jeninah Karungi, Makerere University, Uganda Prof. Charles Masangano and colleagues, Lilongwe University of Agriculture and Natural Resources, Malawi Prof. Georg Cadisch and Dr. Thomas Hilger, Universität Hohenheim, Deutschland (Project component 2)
project budget	Project 1 (Justus Liebig University Gießen): 945.978,56 €, Project 2 (Hohenheim University): 159.188,23 €
project duration	16.4.2015 - 31.12.2019
key words	food and nutrition security, dietary diversity, smallholder agriculture, soil health, agrobiodiversity, monoculture, nutrient availability

<p>background</p>	<p>At the start of the project there was limited knowledge available on how a diversified agriculture affects the nutritional status of smallholder farm-families in the project areas. Previous studies have shown how agrobiodiversity can be achieved, but it was unknown to what extent farmers can implement the required technologies in rural areas and why they would do it. Several studies showed that the effectiveness of agricultural interventions in regard to its effect on people's nutritional status was limited and depends on the introduced innovation (Berti <i>et al.</i> 2014). A mixed-methods approach was used in order to finally evaluate the effectiveness of tested innovations on the nutritional status of the population (Masset <i>et al.</i> 2012). The focus was primarily on dietary diversity, a globally accepted proxy indicator for the adequacy of diets (Arimond <i>et al.</i> 2004), which is a requirement for a healthy nutritional status.</p> <p>The HealthyLAND project goal was to discover linkages between agricultural diversity and dietary diversity which were specifically hypothesized in the project. The research was carried out in collaboration with scientists of the University of Hohenheim (project part 2), Makerere University in Kampala, Uganda, Egerton University in Nakuru, Kenya and the Lilongwe University of Agriculture and Natural Resources (LUANAR) in Lilongwe, Malawi. They jointly investigated soil health, farming systems, agriculture extension, dietary patterns and the economy of smallholder farms.</p> <p>The findings of the cross-sectional surveys, focus group discussions, expert interviews, soil and plant samples as well as literature reviews (Kuchenbecker <i>et al.</i> 2017; Waswa <i>et al.</i> 2015) were used by the team to design context specific nutrition education and agriculture extension concepts, field trials, etc.. Training materials were developed based on these concepts and used for training extension officers, community health volunteers and other facilitators, who implemented the programs among small holder farmers who had at least one child below the age of five years and lived in the study regions.</p> <p>Arimond M & Ruel MT (2004) Dietary diversity is associated with child nutritional status: evidence from 11 demographic and health surveys. <i>The Journal of Nutrition</i>, 134(10), pp.2579–2585.</p> <p>Berti PR, Krusevec J & FitzGerald S (2004) A review of the effectiveness of agriculture interventions in improving nutrition outcomes. <i>Public Health Nutrition</i>, 7(5), pp.599–609.</p> <p>Kuchenbecker J, Reinbott A, Mtimuni B, <i>et al.</i> (2017) Nutrition education improves dietary diversity of children 6-23 months at community-level: Results from a cluster randomized controlled trial in Malawi. <i>PLOS ONE</i>, 12(4), p.e0175216.</p> <p>Masset E, Haddad L, Cornelius A, <i>et al.</i> (2012) Effectiveness of agricultural interventions that aim to improve nutritional status of children: systematic review. <i>BMJ</i>, 344(jan17 1), pp.d8222–d8222.</p> <p>Waswa LM, Jordan I, Herrmann J, <i>et al.</i> (2015) Community-based educational intervention improved the diversity of complementary diets in western Kenya: results from a randomized controlled trial. <i>Public Health Nutrition</i>, pp.1–14.</p>
<p>objective</p>	<p>The specific objective was to better understand why in various African regions dietary diversity is not ensured although smallholder farmers do produce sufficient food.</p>
<p>results</p>	<p>The double burden of malnutrition increasingly affects farm families in rural areas like Kapchorwa District, Uganda, Teso-South District in Kenya and Lilongwe District in Malawi. At baseline the mean body mass index (BMI) of women in the study areas were within normal range (BMI = 23 kg/m² ±4 ; min-max = 13,5 – 45,5 kg/m², but the</p>

prevalence of overweight and obesity was higher than underweight. At the same time not even half of the women achieved the recommended minimum dietary diversity level (W-MDD=foods of at least 5 food groups out of 10); in Kenya W-MDD was 41%, in Uganda 45% and in Malawi 34%. At all three sites, double burden of malnutrition existed, i.e. coexistence of different forms of malnutrition in the same household. The rates ranged from 6% in Kenya to 9% in Uganda and 18% in Malawi. Most prevalent form of double burden was a stunted child and an overweight or obese parent. Underweight but also overweight and obesity among adults was negatively associated with physical fitness. This may limit their capacity to conduct labour intensive activities on farm associated with measures for farm system changes improving soil health and biodiversity. Hence, there were linkages and feedback loops identified.

The hypothesis that production diversity is insufficient and soils are degraded was confirmed at all study sites referenced to other studies. The results of the plant and soil sample analysis showed that micronutrient contents in produced foods and their yields are negatively affected during drought. Different drought intensities led to different effects on nutrient concentrations in foods; an effect that has not been researched deeply before. While severe droughts reduce food nutrient concentrations, mild droughts can actually increase nutrient concentrations (Project part 2).

The evaluation of the interventions designed for improving soils and agro- and production diversity, yet linked with nutrition education, showed that a good participatory approach supports the acceptance of most recommendations made on soil management and cropping systems; especially intercropping with legumes. Tested innovations and nutrition education programs lead to more sustainable behaviour change, if behaviour change messages are continuously delivered by trained staff over a longer period. A set of ten sessions once is not sufficient.

We further found, that the Kenyan nutrition education approach changed the cropping behaviour more likely if recommendations were linked with kitchen-gardens. In Uganda participants reported to have practiced drying vegetables, which was introduced in our nutrition education. Drying can help households bridging vegetable shortages and diversifying their diets in the dried season, which was subject of the nutrition education messages. Further, field trials in Uganda showed that for examples intercropping with beans reduces infestations of pests and improves the soils.

However, the innovations, which have been introduced in Uganda and Kenya, did not affect the care capacity of the households; although the recommendations implied more time usage for food preparation and farm activities. Thus, successfully tested innovations and nutrition education messages were recommended to the local authorities and suggested to be taken up in planning and program activities.

The project duration of around four years allowed us to assess first long-term effects. However, the issue is still that time did not allow us sufficiently to proof whether recommended soil management improves soil health as well as whether the dietary recommendations lead to sustainable change.

The results of the HealthyLAND project have led to new questions in regard to intensification of the linkages between farming systems and farm household behaviour

recommendations

and objectives. The hypothesis is: as farming systems differ, extension needs to address more specifically, yet in more details, state, knowledge and joint objectives of farm and its household; (semi)commercial, family farm with or without extra income and stages in-between are variable towards subsistence and success.

Our findings indicate that a well-designed agriculture extension linked to few nutrition messages is less efficient than a nutrition education campaign linked to few agriculture messages, i.e. in promoting dietary diversity at household level. However, it is still not known which impact on dietary behaviour can be expected from a nutrition sensitive agriculture extension program that shall lead to changes in farm practices and soil health. Yet, it is highly recommended to intensify agriculture extension and regularly train extension officers on new study findings.

An evaluation of the impacts of an improved agriculture extension program on soil health, food availability and farmers' resilience is only possible within long-term projects (minimum 5 years). We therefore recommend to design future research project in two phases which, if the first phase has been successful, allows to measure long-term effects on soil health and yields.

photos

