Federal Ministry of Food and Agriculture
Federal Office for Agriculture and Food

The nutritional status of men in rural Uganda

Findings from the HealthyLAND project

IRMGARD JORDAN • MARIE KAMRAD • JULIUS TWINAMASIKO • ANNA RÖHLIG • M. GRACIA GLAS • SAHRAH FISCHER • JOHNNY MUGISHA • ERNST-AUGUST NUPPENAU • THOMAS HILGER

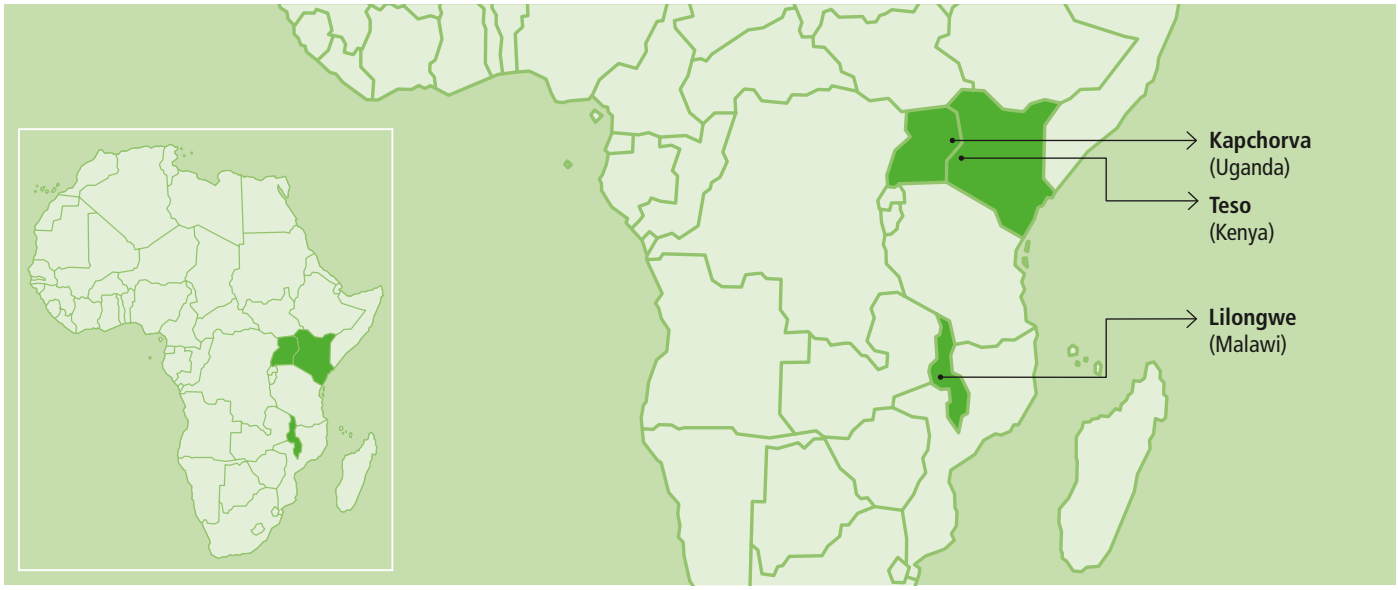
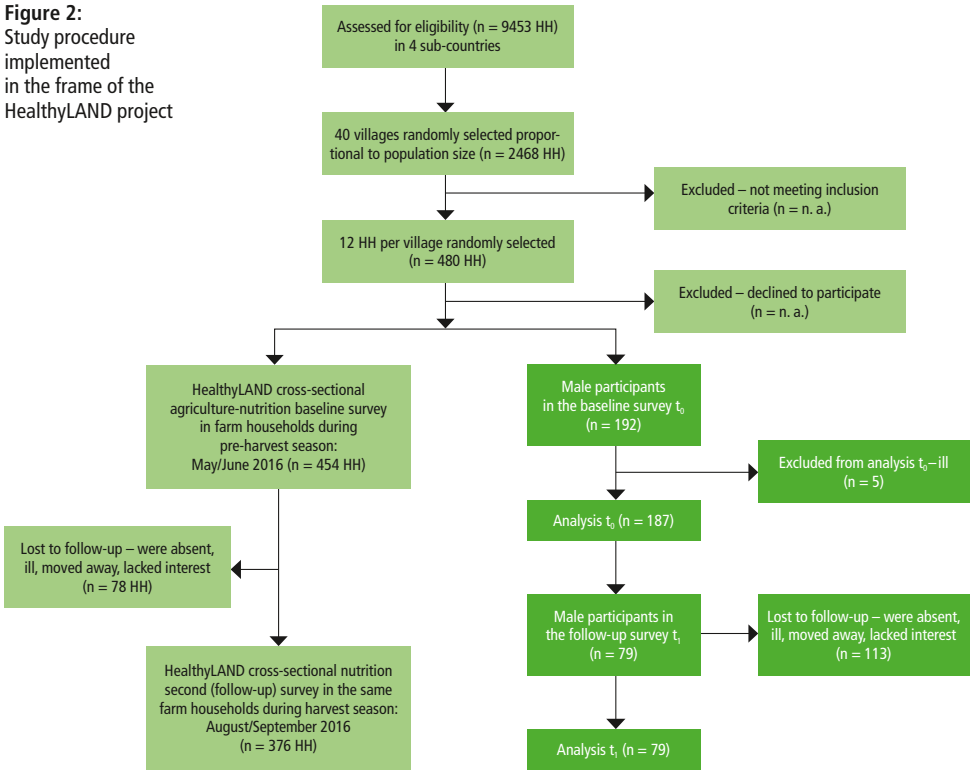


Figure 1: The HealthyLAND project regions

Figure 2: Study procedure implemented in the frame of the HealthyLAND project



The HealthyLAND project examines the interrelations between agricultural and dietary diversity. The aim is to clarify why, in different areas of Africa, diets are often not diverse despite the fact that smallholders would generally be able to produce a greater variety of food crops at the local level.

Adequate nutrition is vital for long-term good health, well-being and both, full mental and physical performance. In Uganda, Kenya and Malawi, undernutrition and the lack of micronutrients are widespread and constitute a severe problem.

Previous studies showed that farming households in Uganda, Kenya and Malawi grow predominantly maize as soon as they need to feed larger families but have only little arable land available. This led to a focus on only a small num-

ber of crops. As a result, dietary diversity also decreased among other things.
Accordingly, the HealthyLAND project explores the hypothesis that ecologically oriented agricultural cultivation has a positive effect on the food and nutrition security of the related farming family.
In 2016, basic data on agricultural production and on food security was successfully collected in the three project countries Kenya, Uganda and Malawi (**Fig.1**).

Nutritional status of farmers in Kapchorwa District, Uganda

The eastern region of Uganda, which also includes the Kapchorwa region, has the second lowest food self-sufficiency level and the lowest food diversity compared to the country as a whole. Data on the nutritional status of men is still scarce. Hence, a master's thesis written within the framework of the HealthyLAND project focused specifically on the collection of data regarding the energy balance, food composition and diversity as well as the body mass index (BMI) of men.

Method

In Uganda, a total of 454 randomly selected farming households with children under the age of five took part in the study. However, mostly women and only rarely men, answered the questions related to nutrition, the household and the agricultural practices. Nevertheless, the research team was able to recruit 192 men during the baseline survey in May/June 2016 (t_0) and motivated further 79 men for the study in August/September 2016 (t_1) (**Fig. 2**).
The data bases for the calculations of the men's energy balances and nutritional diversity were 24-hour recall protocols, which on the one hand collected information on the physical activity and on the other hand on the food that was consumed during the last 24 hours before the survey. To calculate the men's daily physical activity, the activities included in the survey were classified into different categories, depending on how much energy they require to be performed (physical-activity-level (PAL) values) (**Table 1**).
Researchers estimated the energy intake of the farmers semi-quantitatively, using portion sizes (**Fig. 3**). The same data was used to evaluate the food composition in terms of quality, using a diversity point system (**Table 2**). During the second survey (t_1), information on food intake was only qualitatively collected to calculate the individual dietary diversity score (IDDS).

Sample

Men who declared themselves ill at the time of the survey were excluded from the analysis (n=5). Men whose data was included in the analysis were between 19 and 70 years of age, and were 37 years old on average. They lived in households with an average of six

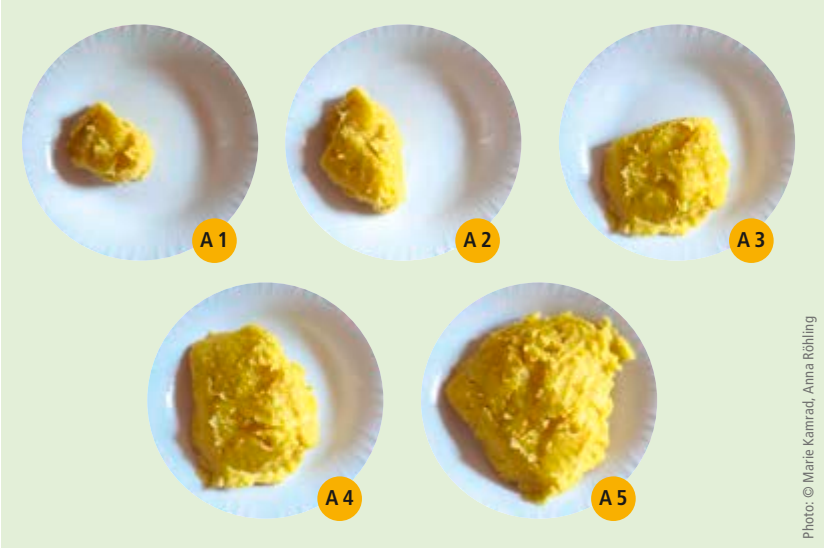


Figure 3a: Scheme of portion sizes for cooked and mashed unripe bananas (matooke)

Figure 3b: Scheme of portion sizes for green leafy vegetables as a side dish

Table 1: Selection from the activity list and the associated physical activity levels (PAL values)

Activity	PAL value (men)
General	
Eating and drinking	1,4
Sleeping	1,0
Domestic activities	
Gathering firewood	3,3
Cooking, peeling vegetables, grinding maize	1,9
Agricultural activities	
Cutting straw, cutting grass	5,0
Digging (up)	5,6
Harvesting fruit	3,4
Planting maize	4,1
Tending to cattle (feeding, watering, cleaning stables)	4,6
Weeding	4,0

PAL value = Physical Activity Level, *FAO et al. 2001*

The HealthyLAND project

With the "HealthyLAND" project ("Crops for Healthy Diets: Linking Agriculture and Nutrition"), the Federal Ministry of Food and Agriculture (BMEL) is funding research on innovative ways of applying food-sensitive and diversified agriculture to improve food security in Africa.

A consortium of five universities (Egerton University in Nakuru, Kenya, Justus Liebig University Giessen, Germany (coordinator), Lilongwe University for Agriculture and Natural Resources in Bunda, Malawi (LUANAR), Makerere University in Kampala, Uganda, and University of Hohenheim, Germany) implements the project over the course of three years. It shall end in July 2018. A total of 1,040,011 euros is available to the research team which consists of five doctoral candidates, several Master and Bachelor students as well as the supervisors from the different participating universities.

members. The main fields of activity they engaged in were agriculture (57%), regular wage work (16%), small trade activities (14%) and day labour (10%). Most of the men had attended and completed primary school. About 30 per cent of the men had advanced technical college entrance qualifications, seven per cent had A-levels qualifications, nine per cent had completed vocational training and six per cent had a university degree.

Almost all of the men surveyed belonged to the Sabiny people and spoke Kupsabiny, a language rarely used in writing. Thus, the interviews were conducted by bilingual local interviewers who spoke English and Kupsabiny. Prior to conducting the interviews, they received a special training on the interviewing methods while also the content of the questions was discussed in detail.

Findings

The data analysis revealed that the diets of the men is in terms of quantity and quality inadequate.

Energy supply

About 71 per cent of the men had too low energy intake in relation to their energy needs and could thus not cover their estimated energy requirements. On average, men had a negative energy balance of -583 kilocalories per day (standard deviation SD = 1093) while the average energy intake amounted to 2,426 kilocalories per day (SD = 853). This energy deficit of the men was reflected by the high prevalence of underweight (15%). On average, the BMI of the men was 21.2 (SD = 3.3). About 75 per cent of men were classified as normal weight, about nine percent as overweight and two percent as obese. The lowest individual BMI value was 15.5 while the highest was 39.

Macronutrients

Most of the energy intake of the farmers was covered by carbohydrates (67%), followed by fats (24%) and proteins (9%). While the intake of carbohydrates was above the required levels (Estimated Average Requirement), 30 per cent of the men did not consume enough protein. Farmers' individual dietary diversity score IDDS (min-max = 0-10) did not differ significantly between the cultivation seasons, before (t_0) and during (t_1) harvest (4.4 (SD = 1.2) vs. 4.4 (SD = 1.2), p = 0.695). However, significant seasonal differences existed in the consumption of "other fruits" (33% vs. 20%, $p < 0.05$) (**Table 2**). IDDS and energy consumption were positively associated with educational levels ($p < 0.05$), as school education is linked to higher prosperity.

This highlights promising prospects for using nutrition education measures to improve the nutrition of farmers and their families with regard to diversity and energy content.

Table 2: Ten food groups for the collection of individual dietary diversity points
(FAO et al. 2016)

No.	Food Group	Examples of foods from the respective group
1	cereals, starchy tubers and root crops as well as plantains	rice, posho (maize porridge), potatoes, chapatis (flat bread fried in oil), matooke (unripe bananas), manioc
2	pulses (beans, peas, lentils)	Kidney beans, cow (or black-eyed) peas
3	nuts and seeds	groundnut, sesame
4	milk and dairy products	fresh milk, fermented milk
5	meat, poultry meat and fish	chicken, beef, pork, tilapia (freshwater fish), offal
6	eggs	chicken eggs
7	dark green leafy vegetables	sukuma wiki, amaranth leaves, sojet, pumpkin leaves
8	other vegetables and fruits rich in vitamin A	carrots, passion fruit, ripe mangoes
9	other vegetables	tomatoes, onions, cabbage, eggplant
10	other fruits	bananas, pineapples, unripe mangos

Discussion

The simultaneous occurrence of under- and over-nutrition revealed in this study sample has become normal in many regions of Africa and represents a major financial challenge for local authorities. Besides improving the supply to households affected by hunger, awareness needs to be created for the consequences of overnutrition. This translates into additional expenses for municipalities and respective health systems, as diseases associated with overnutrition, such as cardiovascular diseases or diabetes, require additional funds for their treatment.

Food and nutrition education at community level is one possible approach towards meeting both challenges – hunger and overnutrition. As part of the HealthyLAND project, a nutrition education programme was developed and tested in some of the project villages. Main focus was given on the ways to improve food diversity for infants and families.

Nutrition education was coupled with agricultural field trials and took place interactively with the women of the families in the study areas. Initially, the research team recorded the food resources that were available regionally as well as on the farm and then discussed their nutritional and physiological value with the women. Further, recipes were jointly tested by everyone involved. The impact of the measure is currently examined.

First results point to the fact that women who took part in the measure made better use of available biodiversity and

INTERVIEW

Julius Twinamasiko

Interview with Julius Twinamasiko
Doctoral student at Makerere University Kampala, Uganda

Topic of the doctoral thesis:
Economics of crop diversification: Implications for income, food security and nutrition in Kapchorwa District, Uganda

What is your professional background?

I am an agricultural economist and lecturer at Makerere University in Kampala. At BSc and MSc levels, I teach agricultural marketing and microeconomics. At the same time I also work on my doctoral thesis, in which I am investigating the link between agriculture, nutrition and public health.

What inspires you about your dissertation topic? Why do you think it will change anything?

The doctorate is a prerequisite for me to continue teaching and researching at the university. My interest in the subject originates from the fact that we still lack knowledge about the links between agriculture, food and health in order to improve the living conditions of our population. Many farmers face problems with regard to access to land. Even when land is available, problems related to environmental damage and climate change often exist. My study examines the relationship between agriculture and nutrition in the Kapchorwa region. I will incorporate the results into my teaching. In addition, the findings of my doctoral thesis will be disseminated to the agricultural advisory service, so that local farmers can also benefit from the results. It is already evident that the field trials have a positive effect on product quality and yield.

How will you use your knowledge and experience once you have completed your doctorate?

After completing my doctorate, I will return fully to teaching. The results of my research will be included into my teaching in a suitable way. In addition, I will disseminate the results to politicians and political bodies and will try to build a bridge between agriculture and health. At the same time, I will stay committed to research in the fields of agriculture, nutrition and health.

could handle food shortages better than women who had not participated in the food education measures.

A challenge for agriculture in Uganda

Following the baseline study, a sample of the study population was interviewed in detail about their cultivation system(s). In parallel, researchers collected soil and plant samples. In all three regions where this research was conducted, the hypothesis of an insufficient degree of diversification in agricultural production was confirmed.
Within focus groups the possible causes were discussed. The answers given most frequently included:

- limited financial resources prevent necessary investments
- the size of agricultural land available per farm (household)
- lack of information on agriculture
- soil quality
- topography
- extreme weather conditions
- diseases and pests
- lack of work force
- means of transport
- lack of knowledge on cultivation methods

In addition, the surveys, observations and the soil samples revealed that soil degradation was more severe than expected. Even in Uganda's Kapchorwa region, which had been assumed to be significantly more fertile, soils are now degraded. The levels of macro- and micronutrients in soils are in the lower ranges. Simultaneously, the soil's general organic substance is very low while pH values are in the acidic range. As a consequence, the very low nutrient availability adversely affects both human nutrition and productivity of the soils.

Conclusions

Overall, the diets of the farmers in Uganda are unbalanced. The majority of men lack sufficient supplies of energy and nutrients. More than half of all families live on diets significantly more unbalanced as recommended by FAO and WHO. Hence, their nutrition is inadequate. In addition, farmers are often insufficiently supplied with calories. The undersupply hampers their physical capabilities and restricts them from intensifying and diversifying their agricultural activities. This would be necessary to improve both their own and their families' nutrition. Thus, the inadequate nutrition of men has serious implications and consequences. It urgently needs targeted concepts to solve this problem. ∎

Literature

FAO, FHI 360: Minimum Dietary Diversity for Women: A Guide for Measurement. FAO, Rome (2016)

FAO, WHO, UNU: Human energy requirements: Report of a joint FAO/WHO/UNU expert consultation. FAO, Rome (2001)

>> German version of the article available in the magazine "Ernährung im Fokus" 03–04 2018 <<

FOR THE TEAM OF AUTHORS

Dr. Irmgard Jordan is a nutritionist. She obtained her doctorate from Justus-Liebig-University in Gießen where she has been coordinating research projects in Africa and Asia and has been lecturing on the subject of food security since 2011.

Dr. Irmgard Jordan
Center for International Development and Environmental Research (ZEU)
Justus-Liebig-Universität Gießen
Senckenbergstr. 3, 35390 Gießen
Irmgard.Jordan@ernaehrung.uni-giessen.de