FOODLAND

Inception report on the socio-economic, demographic, and technological characteristics of each relevant supply chain and location, and on first experimental results

D3.3

Website	foodland-africa.eu
Twitter	@FoodLANDafrica
Facebook	FoodLANDafrica
LinkedIn	foodland-africa

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

Deliverable information	
Deliverable no.:	D3.3
Work package no.:	WP3 – Task 3.1, 3,2
Document version:	V1
Document Preparation Date:	01/01/22
Responsibility:	UoM

Project information	
Project acronym and name:	FoodLAND
EC Grant Agreement no.:	862802
Project coordinator:	UNIBO
Project start date:	01.09.2020
Duration:	48 months

Document Information & Version Management			
Document title:	Inception report on the socio-economic, demographic, and technological characteristics of each relevant supply chain and location, and on first experimental results		
Document type:	Report		
Main author(s):	Marini Govigli V., Kuhfuss, L., Piras, S., Kapour, G., Alboni, F., Setti, M.		
Contributor(s):	Adamo, F., Adhiambo, S., Ahikiriza, E., Aruho, C., Atukunda, G., Chimoita, E., Costea, C., Etxeberria Iradi, L., Frija, A., Guya, E., Hannafi, A., Khamassi, F., Kisakye, E., Kogi-Makau, W., Koussani, W., Idrissi, A., Jamai, D., Masette, M., Massawe, B., Mishili, F., Mokhtari, N., Mwangi, S., Mwanri, A., Mwaseba, D., Mugisha, J., Munubi R., Nakyewa, P., Nchimbi-Msolla, S., Ndetto E., Ogenrwoth, B., Rhouma, O., Samaki, K., Sanga, C., Soussi, A., Soussi, I., Suleiman, R.,Thabet, C.		
Reviewed by:	UNIBO, JHI		
Approved by:	UNIBO		
Version	**Date**	**Modified by**	**Comments**
V1	28.02.2022	-	-

Short Description
This inception report describes the organization and implementation of the activities conducted with farmers, integrates additional information ensuring an in-depth understanding of the key features of the task, and provides a guidance on a proper evaluation and analysis of the achieved results.

Dissemination level	
CO	Confidential, only for Members of the Consortium, including the EU Commission Services

Table of Contents

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

1. Introduction

1.1 Rationale and Objectives of Task 3.1 and Deliverable D3.3

The main objective of WP3 is to create 14 local Food Hubs where to develop or enhance the organizational, technological, cultural, and operational conditions enabling local food supply chains, and to strengthen their nutrition-responsive agro-biodiversity and food diversity in selected African countries. Task 3.1 consolidates knowledge of Pan-African crop and fish supply chains through small-scale farmers' structured surveys and lab-in-the-field behavioural economic experiments. This as to gain insights on **smallholder farmers' preferences and behaviours relevant to innovation-related decision-making**.

This Deliverable serves as an inception report on **small-scale farmers' socio-economic conditions, operational and technological states, and on experimental results**. It details the data collection process undertaken in 12 food hubs across 5 African countries (Kenya, Morocco, Tanzania, Tunisia, and Uganda), its research objectives, as well as preliminary comparative assessments across countries and Food Hubs.

The assessment of smallholder farmers' preferences and behaviours, and identification of their socio-economic drivers, will feed into WP4 and WP5 to tailor the development and validation of innovations. The experimental results will also be used as a baseline on behavioural characteristics for the implementation of RCTs of innovations in T5.9.

1.2 Scope of the document

The scope of Deliverable D3.3 is to report on the approach to the data collection, analysis, and production of preliminary results on small-scale farmers. The data gathered includes:

1. A **baseline, gender-sensitive survey** measuring **farmers' structural, organizational, environmental, productive factors** (e.g., farm and pond size, techniques adopted, varieties, fertilizing and feeding practices, input costs, yields, food losses and waste, farm workload, and division of labour by gender in the household), **including socio-economic conditions** (e.g., family income, migration choices, and remittance use) affecting the local food supply chains and producers' choices.
2. **Structured behavioural economic experiments** to identify behavioural factors influencing, either as a barrier or as a driver, smallholders' decision-making.

The main objectives expected from this research are (but not limited to):

1. Detecting determinants (socio-economic conditions and preferences) of **smallholder farmers' propensity to adopt technological innovations**.
2. Analyzing drivers of **intention to introduce nutrient-dense more profitable products.**
3. Identifying contextual and individual variables of **cooperative attitude/time preferences/risk preferences.**

These will be pursued blending information arising from the assessment of survey-based results delivered to individual small-scale farmers (**stated preferences**) and preferences and attitudes revealed by studying the actual decisions farmers make, in experimental settings (**revealed preferences**). Subjects' stated preferences might in fact be very different from their actual behaviour, as people often have unclear understandings of what they really value and what truly motivates them. This is especially relevant when

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

assessing time (receiving a certain cash benefit at an earlier date compared with receiving it at a later date), risk preferences (tendency to choose between a risky or less risky option), trust toward peers, and cooperative behaviours.

1.3 Structure of the document

This document is structured into six sections:

1. An introduction to the scope of the document (Section 1);
2. An overview of the research objectives (Section 2);
3. An overview of the methodological approach and research procedure followed, with details on local pilots, ethical considerations, and gender perspective (Section 3);
4. A presentation of the data collection methods and tools used (Section 44);
5. A presentation of the first results on small-scale farmers (surveys and economic behavioural experiments) including first comparative assessments across countries and/or Food Hubs (Section 55);
6. A concluding chapter highlighting planned future steps on results' exploitation (Section 66).

The report is concluded with a series of appendices illustrating the data collection tools used as well as the full preliminary descriptive results.

2. Research Objectives

The research objectives linked to the small-scale farmers' research can be subdivided in two main groups: General Objectives and Specific Objectives. **General objectives** are those pursued at project level, to achieve projected-based Key Performance Indicators (KPIs). FoodLAND's overall objective is *developing, implementing, and validating innovative, scalable, and sustainable technologies aimed at supporting the nutrition performance of local food systems in Africa, while strengthening agro-biodiversity and food diversity as well as diversity of healthy diets*.

Along these lines, FoodLAND small-scale farmers' research aims at:

A. Developing organizational innovation for the local food supply chains.
B. Creating suitable conditions for technological innovations in the farming systems.

Objectives A and B will be achieved through the detection of socio-economic determinants and preference of smallholder farmers' propensity to adopt technological innovations (e.g., risk and time preferences, demographic factors such as gender and age, income levels, trust levels, cooperative behaviours, etc.). The identification of these variables will support the segmentation of small-scale farmers into homogeneous target groups, preparing the ground for the implementation of FoodLAND technological and organisational innovations for farming systems. Moreover, it will support FoodLAND project partners in tailoring proposed technological innovations to the farmers' conditions (e.g., in term of digitalisations, main trouble faced, and propensity to cooperation).

Specific objectives of this research are those objectives directly linked to farmers' activities with the aim of further advancing the current state-of-the-art on African farmers' research. These will be pursued at either local level (Food Hub), country level (by comparing/contrasting findings from 2 or more Food Hubs), cross-country level (comparing findings across one or more countries), and project level (comparing emerging trends across all countries and Food Hubs). T3.1's specific objectives are:

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

1. To identify the current socio-economic conditions relevant to the farmers' activities (crop and fish; rural and peri-urban) and to analyze the major contextual drivers and obstacles to organizational and technological innovation adoption and diffusion.
2. To elicit and measure the farmers' preferences (behavioural precursors such as their attitudes toward innovation, status quo bias, propensity to cooperate, small risk aversion, status concern/imitation, other-regarding preferences), and to analyze the farmers' decision-making process relevant to organizational and technological innovation adoption and diffusion.

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

3. Methodological approach

We rely on two complementary activities, which were developed and implemented in a coordinated way: a survey of fish and crop farmers implemented in all 12 Food Hubs, and behavioural experiments to be implemented in 6 selected Food Hubs. In this section we describe how these two activities were developed.

3.1 Survey and behavioural experiments instruments

First versions of the crop and fish farmers surveys were developed by the core T3.1 team, with regular feedback sought from local partners' team to adjust the content of the questionnaire to the needs of the teams working with the farmers and developing the innovations. These first versions were tested, conjointly with the behavioural experiments' protocol during pre-tests with farmers implemented in March 2021 and described below.

The development of the first version of the behavioural experiments protocols was described in detail in Deliverable D3.2 (Protocol to implement economic experiments with farmers, December 2020).

All local teams (except for Ethiopia due to the ongoing Tigray war) pre-tested the surveys and experimental protocols in field conditions with farmers between March and April 2021 (Table 1).

Table 1: Pre-tests of survey instruments and experimental protocols

Country	Pre-test with farmers
Morocco	Pre-test on 19/03/2021, 20 farmers participated, the procedure took 1h35m (experiments only), 6 enumerators were present and one coordinator
Tunisia	Pre-test on 18/03/2021, 20 (80% illiterate) farmers participated, procedure took 3 hours, 2 enumerators present
Uganda	18 fish farmers participated, 12 enumerators present
Tanzania	Pre-test on 19/03/2021, 13 farmers participated, procedure took 3 hours
Kenya	Pre-test on 12/06/2021, 14 farmers participated; survey took 54 minutes and behavioural experiments 2 hours. 15 enumerators and 2 UoN staff were involved

Feedback was received from all teams, followed up by bilateral and core T3.2 and T3.1 team meetings to finalise the survey instrument, experimental protocols and accompanying material to maximise the homogeneity of data collection across countries, while providing, where possible, flexibility to adapt to local constraint without compromising data quality. The main changes implemented following the pre-tests were:

- **Reduce length of experiments**: we decided to focus only on three protocols (risk aversion, time preferences and public good game), to reduce the number of follow-up questions included in the experimental protocol and to ensure enough enumerators are present to reduce the wait time of participants.

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

- **Simplify explanations in experimental protocols** and provide additional examples as well as illustrations for the public good game (see Appendix 2: Banknotes used during experimental sessions).
- **Consolidate and finalise the data entry tables.**

Table 2 indicates the agreed sequence of games used in the behavioural experiments.

Table 2: sequence of games included in the behavioural experiments protocol (PGG = public good game)

Game	Kenya	Uganda	Morocco	Tunisia	Ethiopia	Tanzania
1	PGG - unequal endowment	PGG - disentangling altruism	PGG - disentangling altruism	PGG - standard	PGG - common pool framing	PGG - lower multiplication factor
2	PGG - standard	PGG - standard	PGG - standard	PGG - standard	PGG - standard	PGG - standard
3	Risk	Risk	Risk	Risk	Risk	Risk
4	Time	Time	Time	Time	Time	Time

The Public Good Game was implemented in a standard treatment in all countries to allow for cross-country comparisons as well as with one country-specific treatment to test hypothesis on the effect of framing, repetition, unequal endowment, the multiplication factors for the common account and whether participants contribute to the public good out of altruism rather than for self-benefit.

Where logistically possible, partners were asked to follow the order displayed in Table 2, and farmers should complete the relevant crop of fish farmers survey after they participated to the behavioural experiment.

3.2 Ethical and gender considerations

The FOODLAND project adopts a gender mainstreaming strategy, considering the gender perspective at every phase of the project, namely, preparation, design, implementation, monitoring and evaluation, with the aim of promoting equality between women and men, and combating discrimination. With regards to the small-scale farmers' activities, **gender perspective was considered in the sampling strategy** (Appendix 9), through the following actions:

- **Farmers recruitment per Food Hub was conducted following consecutive sampling or stratified random sampling by gender** (Appendix 4: Sampling Strategy). This as to guarantee that the sample selected was also representative of female farmers, so to analyse results through a gender perspective (e.g., are female farmers more/less propense to innovate/take risks?; see Section 5.1)
- To adopt a **gender-sensitive approach**, enumerators were further given the possibility to extend the definition of smallholder farmer used to screen participants to "all individuals actively involved in the farming activities (i.e., no matters the tenure status of the land)". This as it was obvious that most women farmers didn't own the land where they used to work.
- While conducting the survey and economic experiments, if men where oversampled, we **compensated the sample including more women in the study**. If we didn't manage to reach at least 1/3 of both genders, we develop in-depth qualitative interviews with the female farmers who were attending to the study (Appendix 9)

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

- **We created a gender sensitive content** regarding the content of the survey and the protocols of the economic experiments, collaborating with FoodLAND gender experts.
- **We included the gender variable in the survey and in the economic experiments**, to be able to disaggregate all the gathered data, to be able to identify specific socio-economic conditions regarding women and men farmers (to identify gender biases), and to identify if there is any relevant aspect that differs between women and men farmers regarding innovation and cooperation.

Moreover, cultural sensitivity and autonomy of participants was also fostered, always ensuring that enumerators respect the context-based characteristics of villages within the Food Hubs (e.g., languages and dialects, traditions and costumes, local holidays, etc.). Finally, careful adaptations to the sampling procedure were undertaken to ensure that all materials and survey and experimental venues respect COVID19 minimum safety standards (hand hygiene, sanitization of tools and venues, social distancing), accordingly to national guidelines.

A consent form (in the local language of each Food Hub) was used to collect consent from participants to take part in the farmers' experimental and survey activities (Deliverable D7.1: H - Requirement No. 1). Local enumerators ensured that each participant understood the aforementioned information to make an informed decision. No sensitive personal data was collected. All data collected was properly anonymized when compiled at Food Hub and project levels.

4. Data collection: methods and tools

4.1 Data collection instruments development

Once the experimental protocols and survey instruments were finalised, complementary material was prepared to support the data collection from local partners while having to work remotely. This material included:

- The final version of the behavioural experiments protocol with instructions for enumerators (Appendix 1: Final version of Behavioural experiments protocols).
- The sampling strategy to be followed to ensure sample representativeness and sufficient gender representation (Appendix 4: Sampling Strategy). We used a stratified sampling strategy based on age, gender, and farm size. Local teams used available lists of farmers to draw a representative sample according to these characteristics.
- The survey instrument (crop or fish farmers; Appendix 5: Survey instrument for crop farmersAppendix 6: Survey instrument for fish farmers).
- For each the experimental and survey data collections: a data collection table template (with restricted data input to ensure homogeneity in data entry) with accompanying instructions on how to fill in the table (Appendix 7: Instructions for data entry (experiments)).
- A video explaining how to prepare the material required to implement the behavioural experiments with pen and paper.
- A list of material that partners would need to bring for each session during fieldwork to implement the behavioural experiments using pen and paper (Appendix 8: Session material list for experimental sessions).
- Foodland (bank)notes developed by INAT for the partners to print and use during the experimental sessions to facilitate farmers' understanding of the public good game (Appendix 2: Banknotes used during experimental sessions.
- The consent form to be signed by each participant ahead of participation (Section 3.2).

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

Where the gender balance required in the sampling strategy was deemed not achievable by local partners, which was the case for example in Morocco, partners were provided with the option to run a complementary survey of female farmers, using in depth qualitative interviews (see interview guide in Appendix 9: Interview guide to be used for in depth survey of female farmers (optional complementary activity)) to ensure women's perspective is well represented in the project development. These additional interviews will be run as an additional separate activity in later stages of the project.

Once all the material was sent, with an accompanying explanatory email, to local partners by the core T3.1 and T3.2 teams, bilateral meetings were offered to local teams to clarify any remaining question ahead of the final data collection.

4.2 Data collection implementation

The data collection from farmers started in April 2021 and was completed for all countries towards the end of 2021, with data collection being constrained by Covid 19 restrictions in many countries. Data collection in Ethiopia was postponed due to the ongoing Tigray war since November 30, 2020, and the interruption of any communication with the local partners (UoM, REST). Table 3 shows the completion date for data collection in the Food Hubs.

In Tanzania, Uganda, Kenya and Morocco, the data collection of the survey and of experimental data, in relevant Food Hubs, were implemented jointly with participants attending sessions in which they took part in both activities. However, for logistical reasons, in Tunisia the two activities were implemented separately but in a coordinated manner to include all experiment participants in the survey. In all cases, unique identifiers of participants were used to match both datasets.

The data was collected with the help of enumerators using pen and paper. When illiterate farmers were present, the enumerator would provide 1 to 1 support to complete the required task. Data collection was implemented using tablets in Morocco, using an App developed by ENAM that creates an online replication of the survey questionnaire and of the experimental protocol. This app was further developed, tested and used for the urban consumers' research. Similarly, a specific App was used to implement the data collection using tablets in Tanzania.

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

Table 3: Targeted sample sizes and date at which data collection was completed in all Food Hubs

Food Hub	Targeted sample size	First activities with farmers	
		Dataset on experimental results	Dataset on survey results
Beni Mellal (MA)	400	**---**	**02/06/2021**
Meknes (MA)	500	**25/05/2021**	**25/05/2021**
Chebika/Enfidha (TN)	400	**---**	**26/11/2021**
Jendouba (TN)	500	**02/07/2021**	**02/07/2021**
Laelay Machew (ET)	-	**---**	**---**
Akaki/Nifas Silk (ET)	500	**---**	**---**
Mukurweini (KE)	500	**30/07/2021**	**30/07/2021**
Kitui (KE)	400	**---**	**06/08/2021**
Kisumu (KE)	400	**---**	**01/07/2021**
Mvomero/Morogoro (TZ)	500	**01/07/2021**	**01/07/2021**
Kilombero/Lindi (TZ)	400	**---**	**01/07/2021**
Kamuli (UG)	400	**---**	**09/07/2021**
Nakaseke (UG)	400	**----**	**15/08/2021**
Kajjansi/Masaka (UG)	500	**09/07/2021 + complementary data collected December 2021**	**15/08/2021**

4.3 Data validation and homogenisation

Between September 2021 and February 2022, several iterations of validation checks, followed by verifications by local partners, were implemented to:

- Fill **missing data** (by calling back some respondents to complement responses) and **entry errors** (e.g., values outside admitted range) by checking the paper version of the questionnaire or of the experimental data.
- Ensure coherence between conditioning and conditioned variables (e.g., migration, crop rotation, etc.)
- Ensure coherence in experimental data
- Ensure coherence between all the variables related to the crops / fish species grown (land / pond areas, production, sales, prices, production method, waste)
- Ensure coherence and standardisation of string variables (villages, etc.)
- Homogenise the measurement units (hectares / cubic meters, kg, currency)
- Review the **outliers** in terms of yields and prices and correct if needed

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

- Ensure that the **unique identifiers** match between experiments and surveys
- Address mismatches in payments (e.g., additional payments made by phone)
- Ensure that all variables are named in the same way in all datasets to facilitate the merging of the datasets for cross-country comparisons

In line with data management best practice, the initial raw data was archived, all edits made to the data during the validation checks were recorded using logs, and the final clean and homogenised datasets were shared with local partners.

5. First results

5.1 First results from crop and fish farmers surveys

In the following section, we present the first comparative results on small-scale farmers from the structured surveys. Results are grouped by thematic aspects (e.g., demographics, income levels, farm size and structure, impacts over farm activities, propensity to innovate, etc.) and include a gender-sensitive analysis, aimed at identifying whether demographic factors such as gender and age have a significant effect on the farmers' propensity to innovate and take risks when conducting farming activities.

These analyses were based on a final sample of **5,440 valid observations** (Table 4). Data was gathered in 12 Food Hubs located in five countries (Kenya, Morocco, Tanzania, Tunisia, and Uganda). The survey was standardized across all Food Hubs (survey available in AppendicesAppendix 5: Survey instrument for crop farmersAppendix 6: Survey instrument for fish farmers). Full descriptive results are available in Appendix 10: Surveys: comparison across countries (tables and graphs) – complete overview

Table 4. The final sample of the small-scale farmers' survey by Food Hubs and gender.

Country	Food hub	Final sample	Male	Female
KE	Kisumu	403	292	111
KE	Kitui	482	209	273
KE	Mukurweini	505	288	217
MA	Beni Mellal	400	390	10
MA	Meknes	500	429	71
TN	Chebika_Enfidha	431	384	47
TN	Jendouba	500	267	233
UG	Kajjansi_Masaka	508	370	138
UG	Kamuli	400	218	182
UG	Nakaseke	400	277	123
TZ	Kilombero/Lindi	407	267	140
TZ	Mvomero/Morogoro	504	290	214
TOTAL		**5,440**	**3,681**	**1,759**

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

Survey demographics

Male farmers average 67.7% across all food hubs, while female farmers are 32.3% of the total (Figure 1). Food Hubs with the lowest number of detected female farmers are the MA Food Hub in Beni Mellal (2.5% of female famers) and the TN Food Hub Chebika_Enfidha (10.9%). Farmers' age average to 46 years. UG and TZ show the lowest farmers' age recorded across the 12 Food Hubs (Fig.1). Concerning the famers' educational level, 81.7% of the sample on average has at attended some form of education (primary, secondary, or more than secondary). 12% of the farmers are illiterate. 34.4% of farmers have family members that have migrated elsewhere. These farmers have sent remittances which in 64.7% of the cases have been used to cover farm investments, and in 24.5% of the cases to cover regularly farm costs. Finally, Table 5 indicates the average household size by Food Hub.

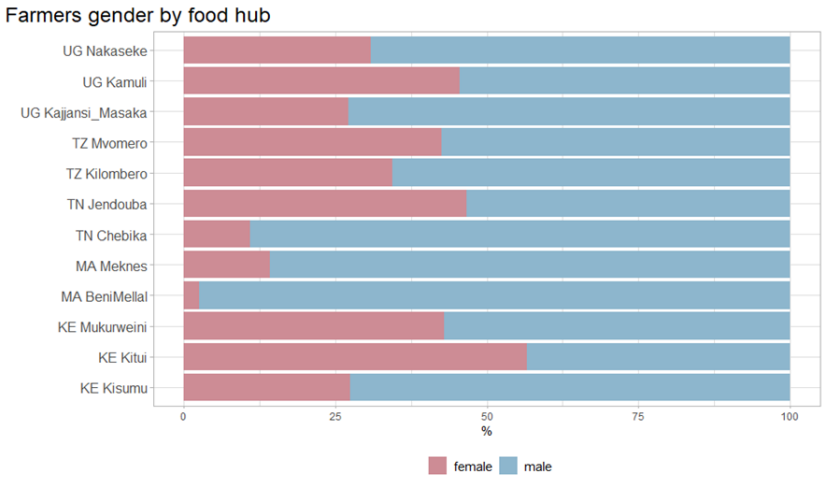


Figure 1. Farmers' gender in the 12 FoodLAND Food Hubs.

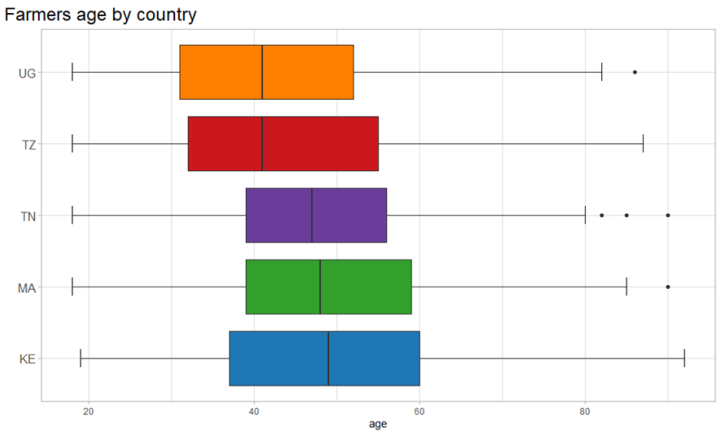


Figure 2. Farmers' age in the 12 FoodLAND Food Hubs.

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

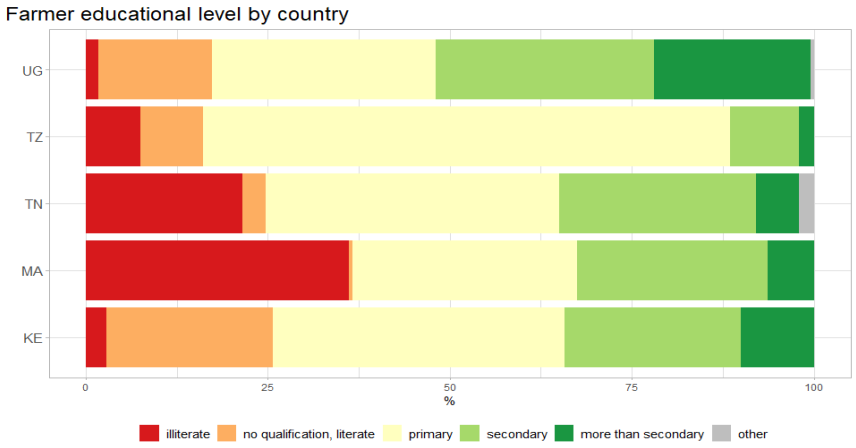


Figure 3. Farmers' educational level by country.

Table 5. Household size by food hub (average values)

country	hub	adults 14 or older	aged 3-13 years	aged 0-2 years	Total
KE	Kisumu	3.65	1.72	0.30	5.67
	Kitui	3.98	1.45	0.31	5.74
	Mukurweini	4.10	0.97	0.14	5.21
	Subtotal	3.93	1.35	0.25	5.53
MA	Beni Mellal	4.73	0.67	0.11	5.51
	Meknes	5.07	0.99	0.20	6.26
	Subtotal	4.92	0.84	0.16	5.93
TN	Chebika	4.35	0.98	0.16	5.50
	Jendouba	3.99	0.88	0.13	5.00
	Subtotal	4.16	0.93	0.15	5.23
TZ	Kilombero	3.06	1.66	0.81	5.52
	Mvomero	3.02	1.70	0.56	5.28
	Subtotal	3.04	1.68	0.67	5.39
UG	Kajjansi_Masaka	5.31	2.73	0.70	8.75
	Kamuli	4.61	2.91	0.65	8.16
	Nakaseke	3.92	2.77	0.72	7.42
	Subtotal	4.67	2.80	0.69	8.16
Total	-	4.16	1.60	0.39	6.15

Income level and food needs

The average farmer's income across Food Hubs is perceived by farmers as being lower than the average income level in 36.8% of the cases (Figure 4). This is a common pattern for all Food Hubs except for Tanzania, where only 5.7% of the farmers have an income level lower than the average. When asked about their capability of meeting household food needs, farmers indicate that around35.7% of farmers experience some or serious food shortages (Figure 5). 27.1% is the average share of households spending more than half of their income on purchased food, which goes up to 47.1% if we include those spending "about half". The share of households spending more than half of their income to cover farm costs is 16.7 % on average (37.4 including those spending "about half") (Figure 6 and Figure 7).

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

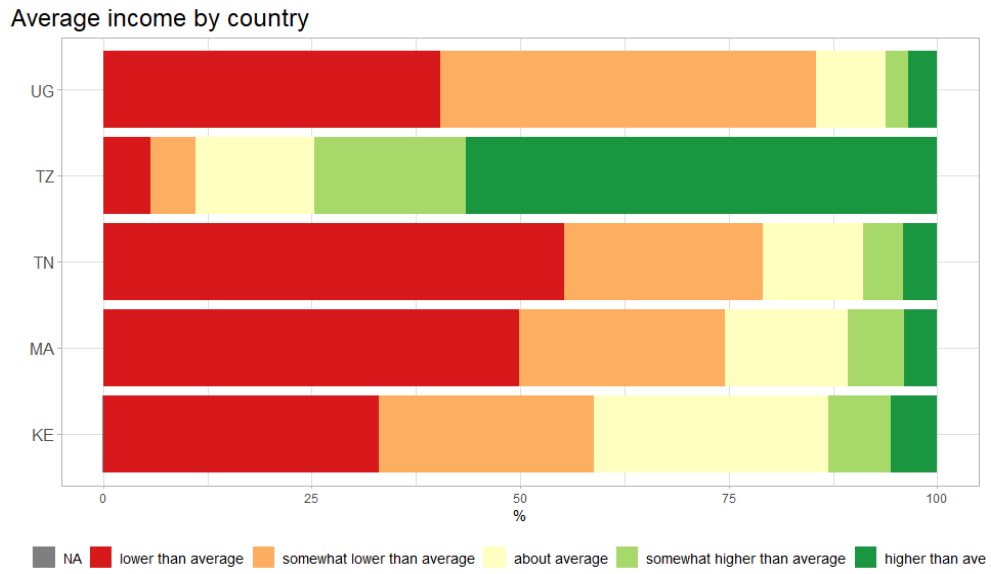


Figure 4 Average farmers' income in the five counties.

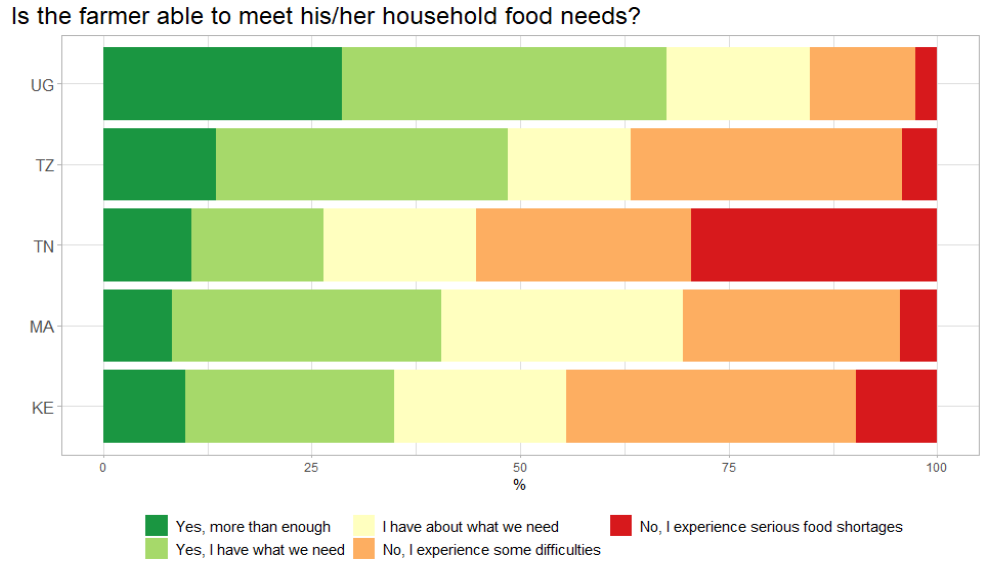


Figure 5. Were you able to meet your household food needs during the last year? (Q23).

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

The views and opinions expressed in this document are the sole responsibility of the author and do not necessarily reflect the views of the European Commission.

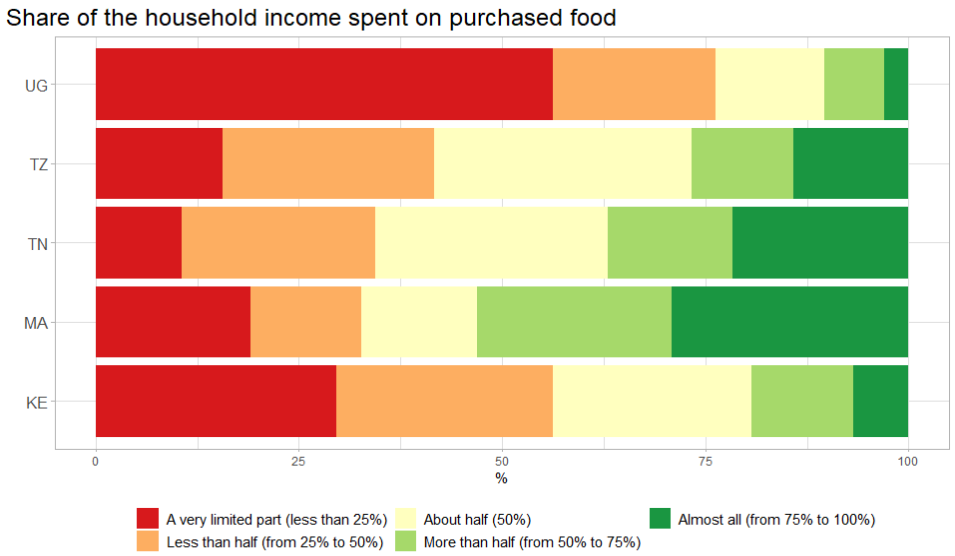


Figure 6. Farmers' average answer to the question: what share of your household income is spent on purchased food (Q30).

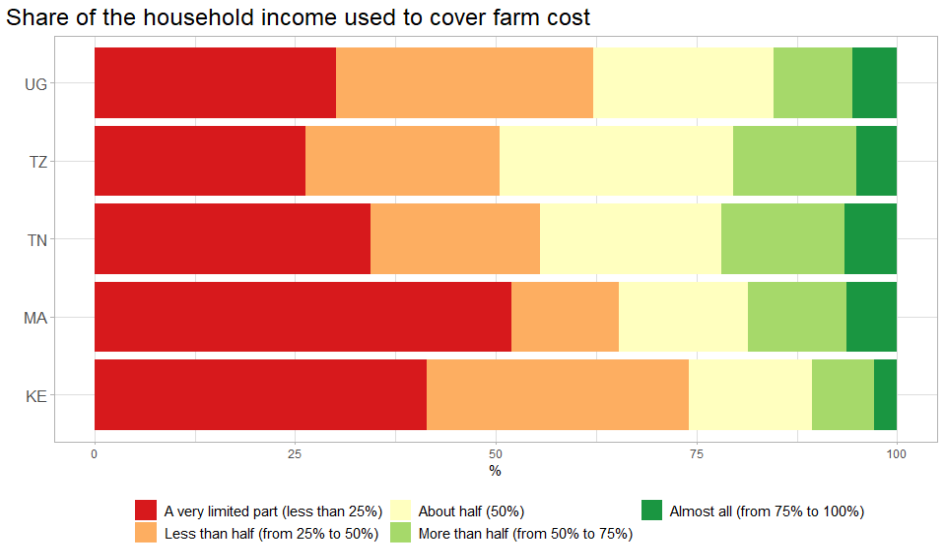


Figure 7. Farmers' average answer to the question: What share of your household income is used to cover farm costs? (Q31).

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

Farm size and structure

The average reported farm size is 3.06 (±6.12) ha (Figure 8). The most important productions are recurrent across Food Hubs being Maize, Wheat, Olive and Beans for small-scale crop farmers, and Tilapia for fish farmers (Figure 9Figure 10). The most important productions are also those that show somewhat important losses in production (=3; on a scale to 5; Figure 11Figure 12).

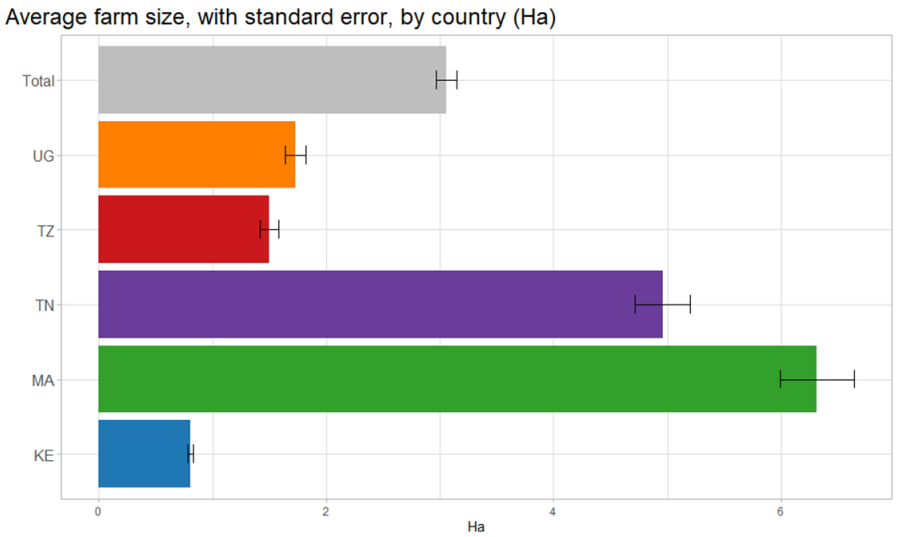


Figure 8. Average farm size in the five counties.

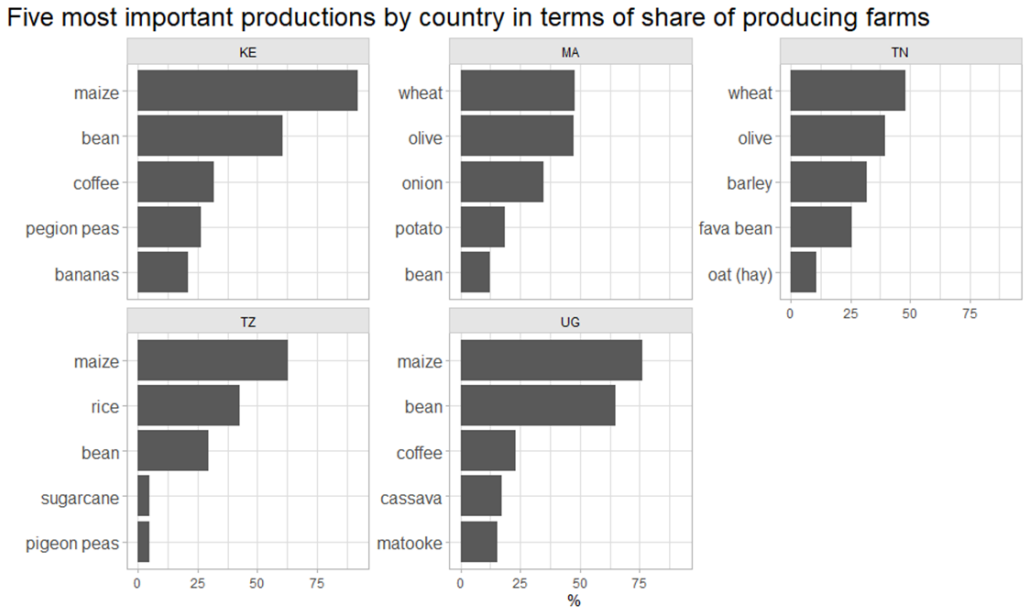


Figure 9. Most important crop productions by country.

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

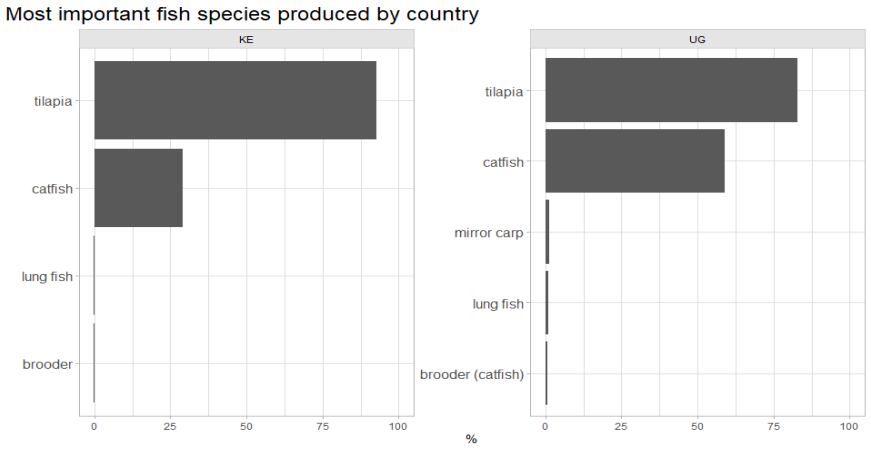


Figure 10. Most important fish productions by country.

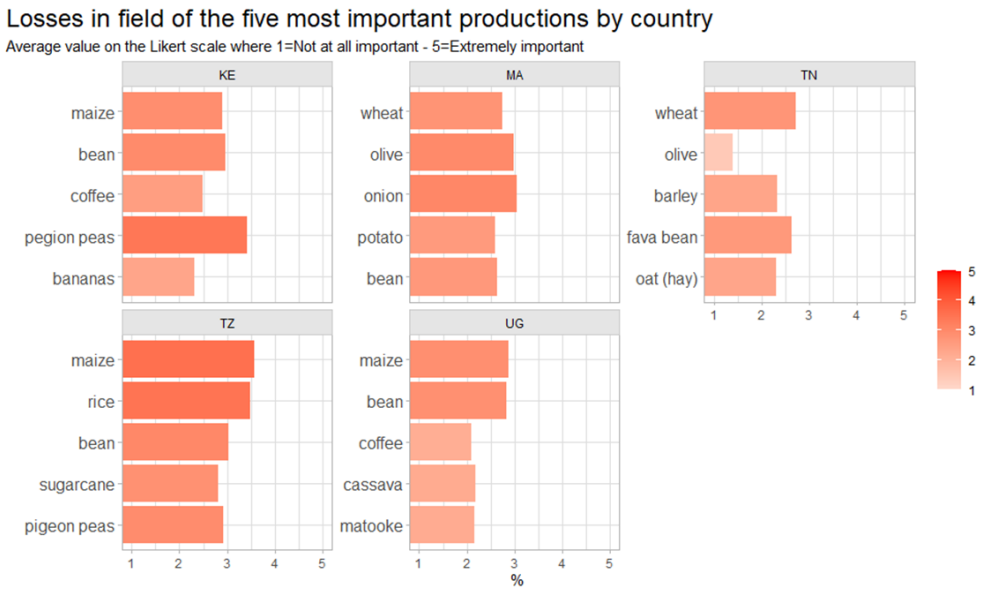


Figure 11. Losses in the field (crop) by country.

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

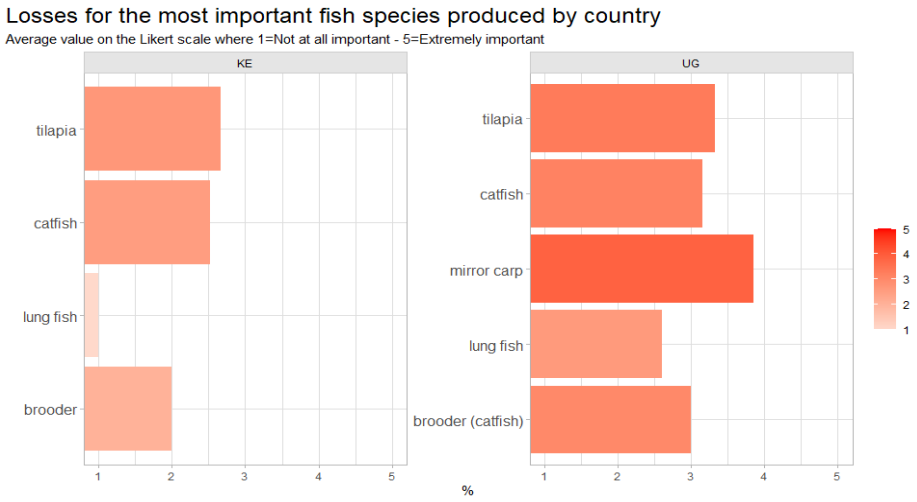


Figure 12. Losses in fish production by country.

Impacts, troubles, and worries over farm activities

FiguresFigure 13Figure 14 show the most common problems which affected farmers activities (both crop and fish farmers) during the last productive season, while farmer's worries concerning the near future are presented in Figure 15. These concerns include the shortage/quality/cost of available fingerlings (fish farmers), pesticides and seed feeds (crop farmers).

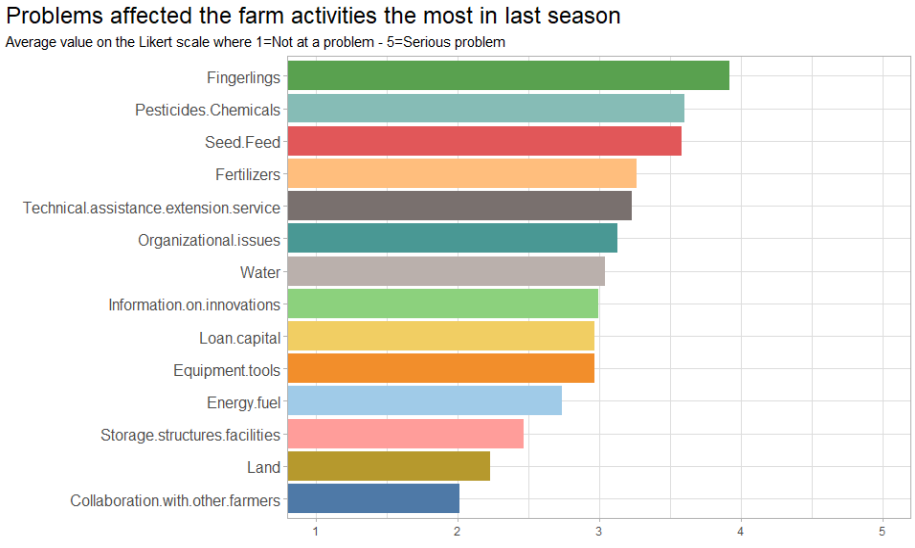


Figure 13. Most common answers to the question: What affected your farm activities the most in last growing year/season? (Q11).

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

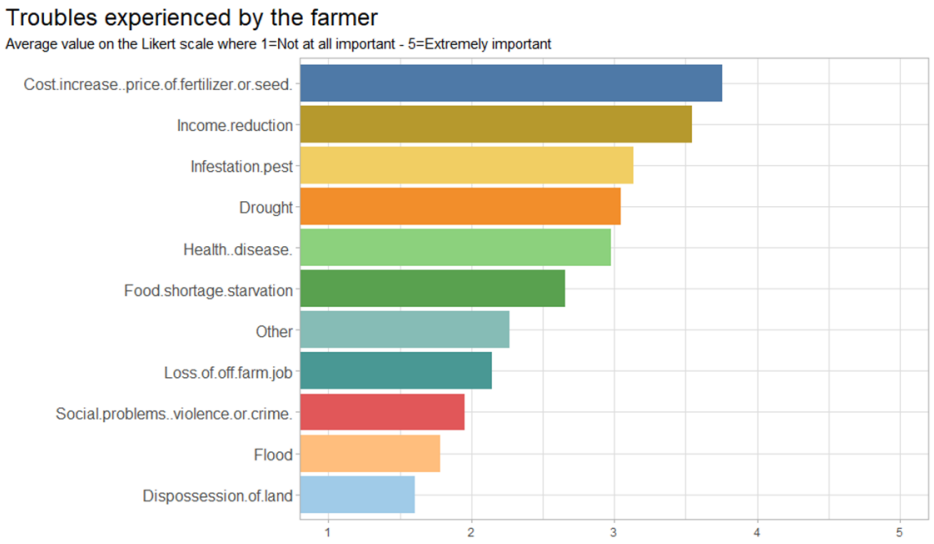


Figure 14. Most common answers to the question: Did you experience any of the following setbacks during the last year? (Q32).

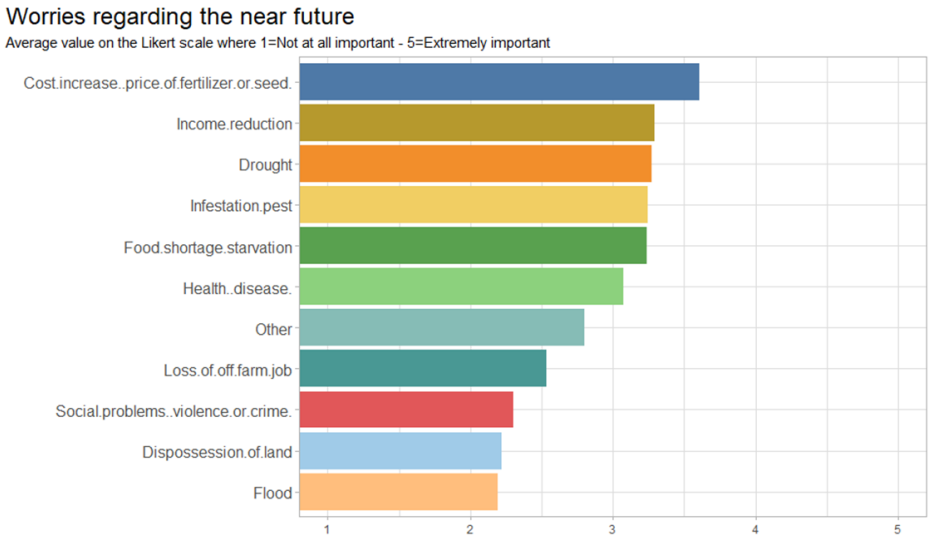


Figure 15. Most common answers to the question: Regarding your near future, are you worried about any of the reasons below? (Q33).

Farmers' propensity to innovate

When asked, most farmers are willing to introduce a new irrigation system raising yields when growing irrigated crops (Figure 16), or new technology that e.g., drains water from the bottom of the pond to remove the ammonia contaminated water (fish farmers). In addition to that, most farmers are willing to adapt a new technology that allows to change their production activity while overcome a limitation (Figure 17). Finally, most farmers are willing to implement a new technology (with certain investments costs) that can enable to reduce crop/fish production losses (4.5 on a scale to 5). These first findings will need to be validated contrasting them with the revealed preferences emerging from the economic behavioural experiments (Section 5.2).

When looking at the reason behind the farmers' propensity to innovate, the propensity to try new ways of production merge as the most ranked reason (4.5 on a scale to 5), followed by trust in organizations

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

promoting innovation (4.0). Farmers' risk aversion scores 3.3 on a scale to 5. (Figure 18). Moreover, most farmers are interested in selling jointly their production (4.0 on a scale to 5), introduce higher nutritional crop/fish species (4.0) and more profitable crops/fish species (4.4) (Figure 19). Farmers with higher risk aversion emerge as being less propense to innovate (Figure 20).

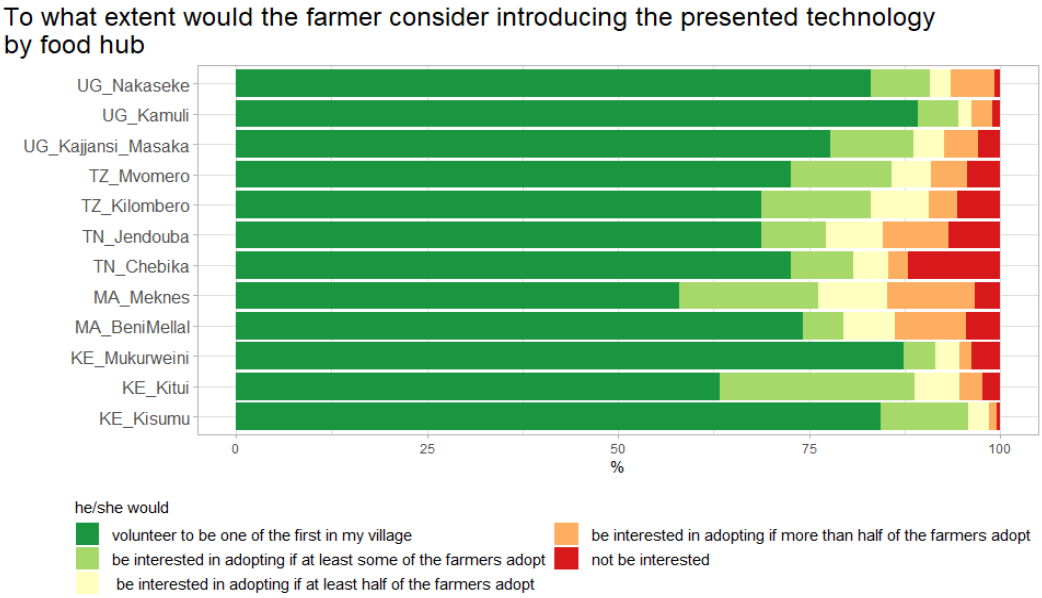


Figure 16. Farmers' answer to the question: Imagine that a new […] has been adopted in the area: to what extent would you consider introducing this technology in your farm? (Q8).

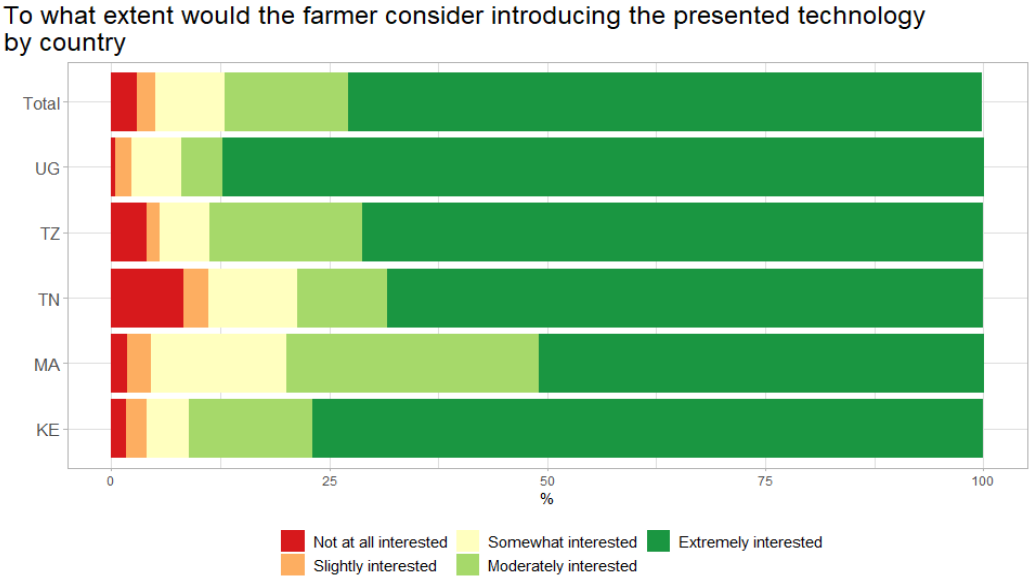


Figure 17. Farmers' answer to the question: You are given the option to change your production activity by adopting a new technology that allows you to overcome a limitation you are facing: to what extent would you be interested in adopting this technological innovation? (Q12).

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

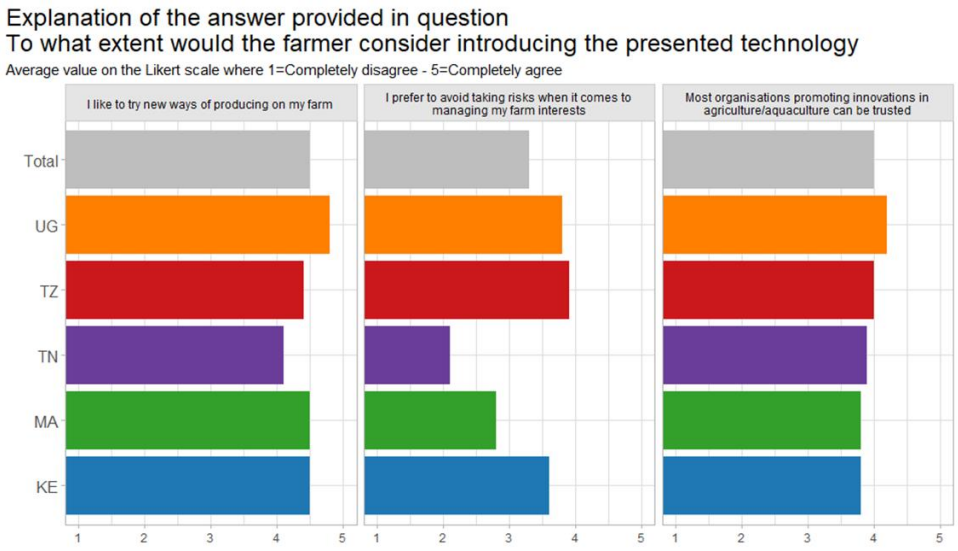


Figure 18. Farmers' average answer to the question Q13 (reason to innovate). Scale 1 to 5.

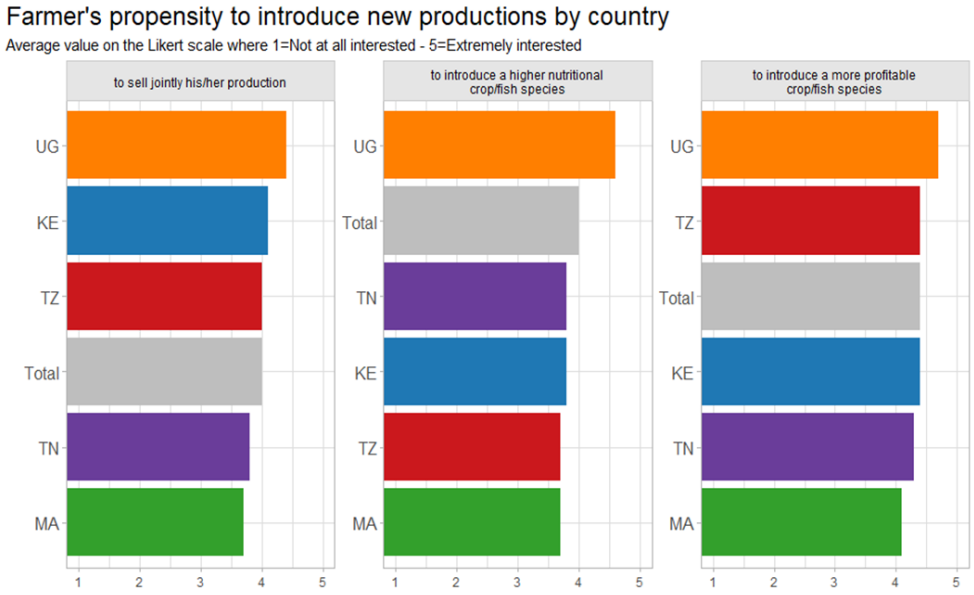


Figure 19. Farmers' propensity to 1. Sell jointly his/her production, 2. Introduce more nutritional crop/fish species, 3. Introduce more profitable crop/fish species (Q19-20-21). Scale 1 to 5.

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

The views and opinions expressed in this document are the sole responsibility of the author and do not necessarily reflect the views of the European Commission.

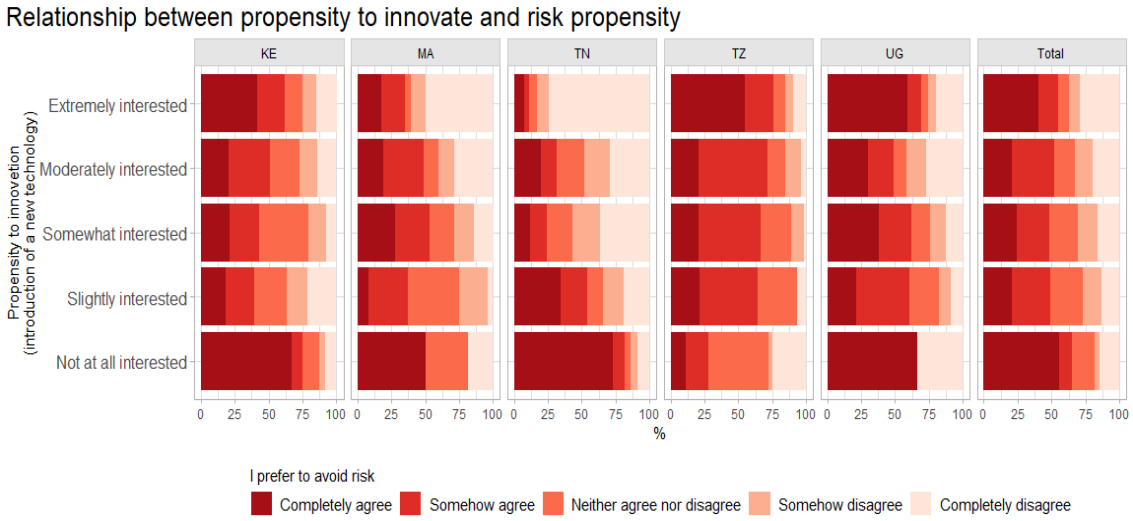


Figure 20. Relationship between farmers' propensity to innovate and farmers' risk propensity.

Cooperation potential and trust vs. other farmers

43.1% of farmers are member of one or more local associations (Figure 21). Farmers in UG and KE Food Hubs value the most the importance of such assistance (Figure 22). Trust levels towards nearby farmers overall average 41.9% (Figure 23)

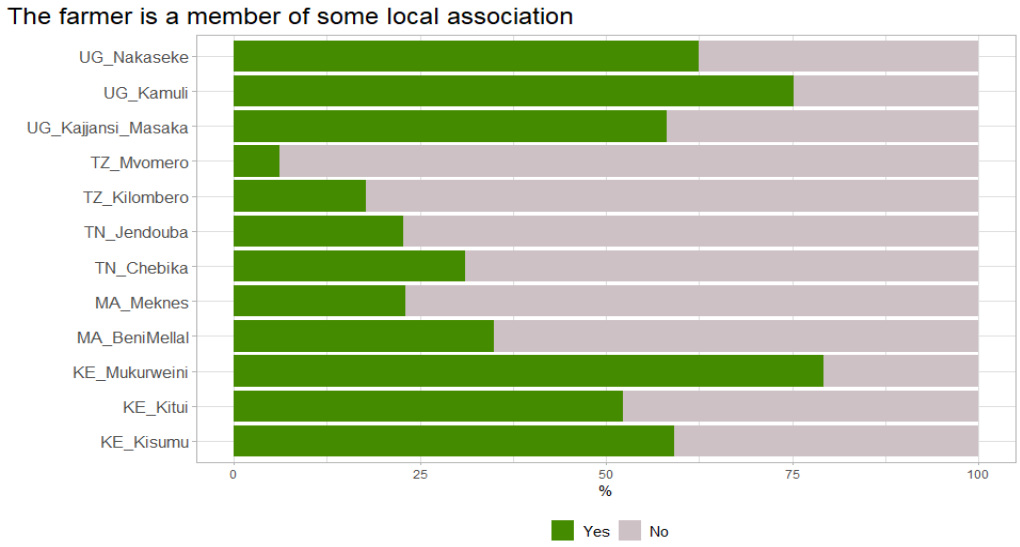


Figure 21. Members of local farmers' association / organization / cooperative in the 12 Food Hubs. (Q1)

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

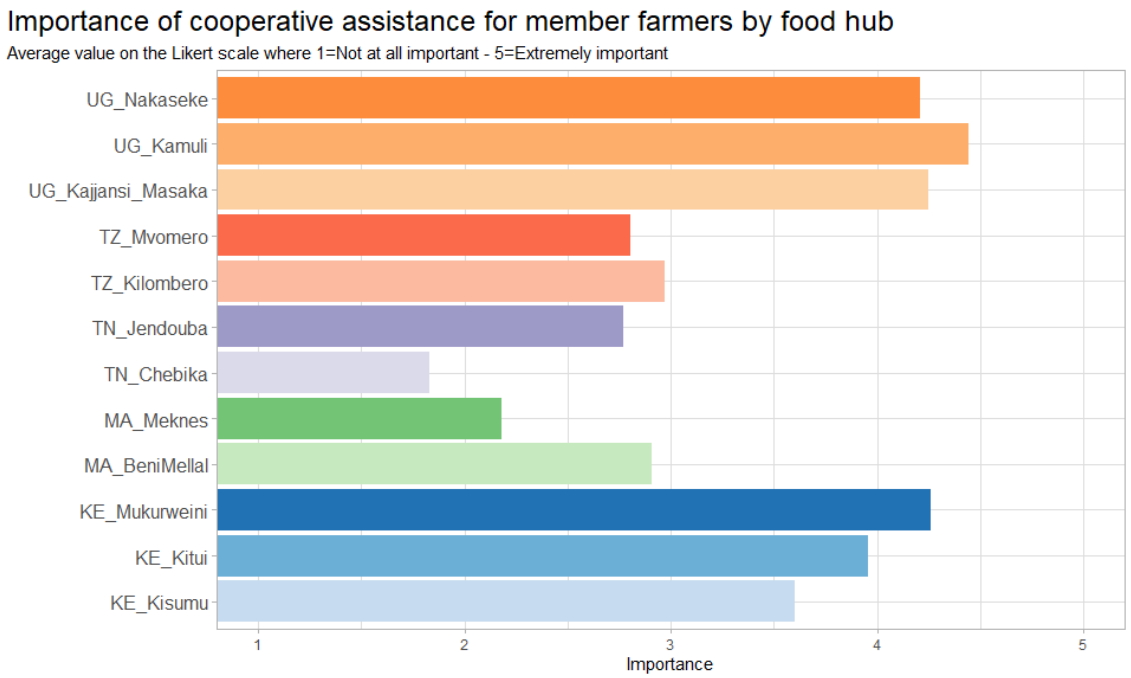


Figure 22. Rate of importance of farmers' cooperative (answers to question: If you are receiving any technical assistance/service from cooperatives or from some other institution/organization, how important is it for you and your farm? Q3)

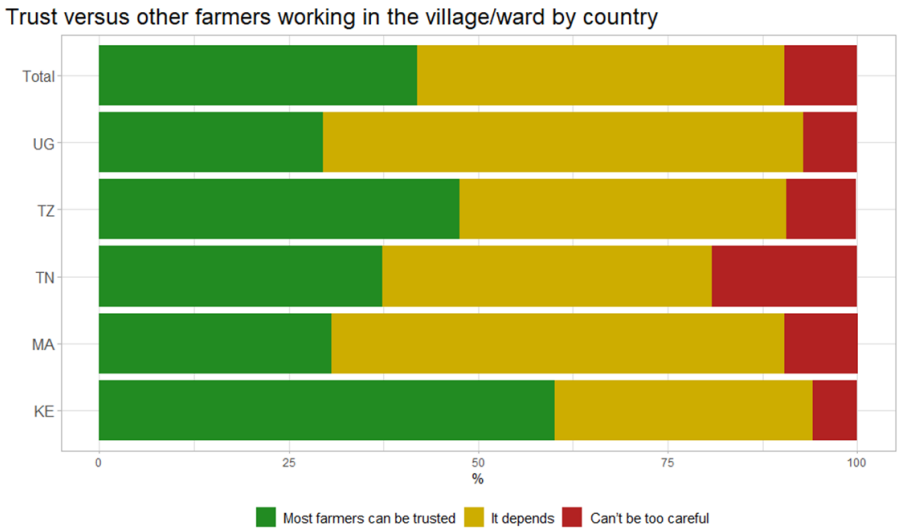


Figure 23. Farmers' answer to the question: Generally speaking, would you say that most farmers working in your village/ward can be trusted or that you can't be too careful in dealing with them? (Q34).

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

Gender perspective

The following figures explore some of the first results by gender (Figure 24-Figure 25. They tend to indicate that a gender perspective is relevant when analysing small-scale farmers' and behaviours relevant to innovation-related decision-making. All Food Hubs show higher income levels for male farmers compared to female ones. (Figure 26). Similar trends can be identified when looking at the farmers' capability to meet family's food needs and their farm size (Figure 27 and Figure 28). Finally, at project level, propensity to innovate appears to also be influenced by gender, although differences emerge across countries (Figure 29 and Figure 30; Table 6 andTable 7).

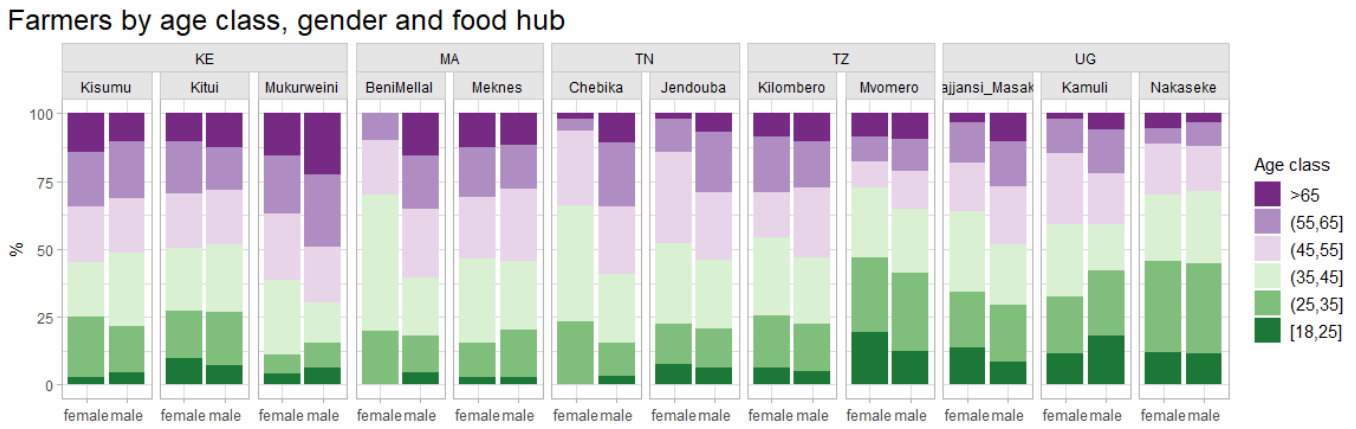


Figure 24. Farmers by gender and age across the 12 Food Hubs

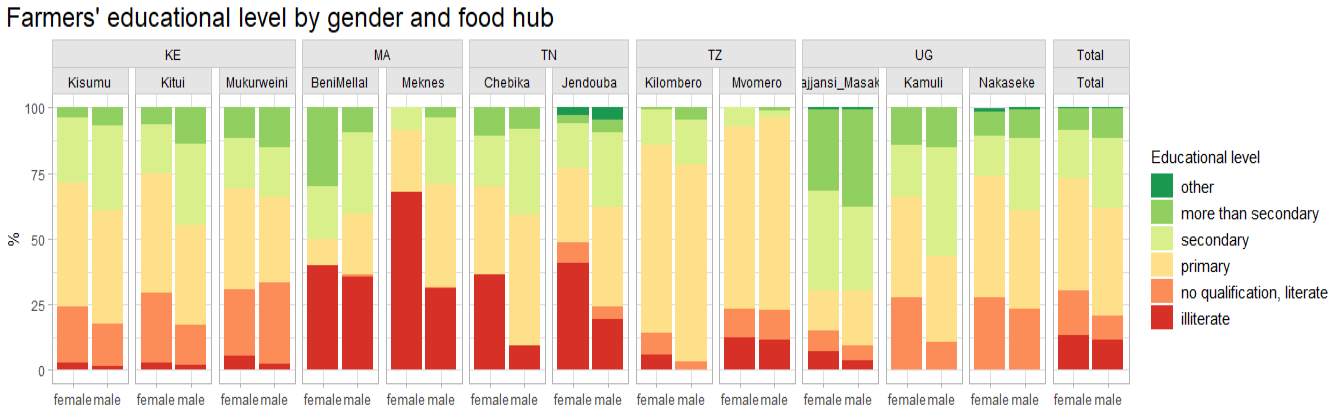


Figure 25. Farmers by gender and educational level across the 12 Food Hubs

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

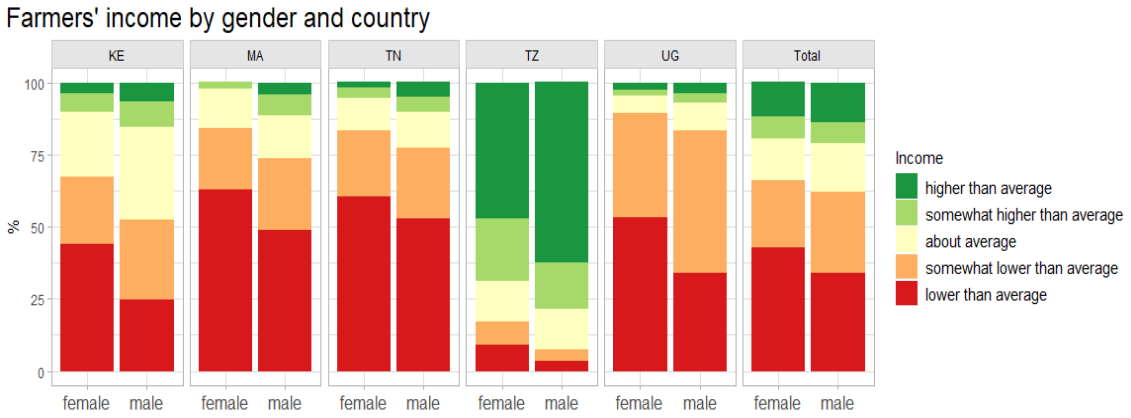


Figure 26. Farmers' income level by gender across the five countries.

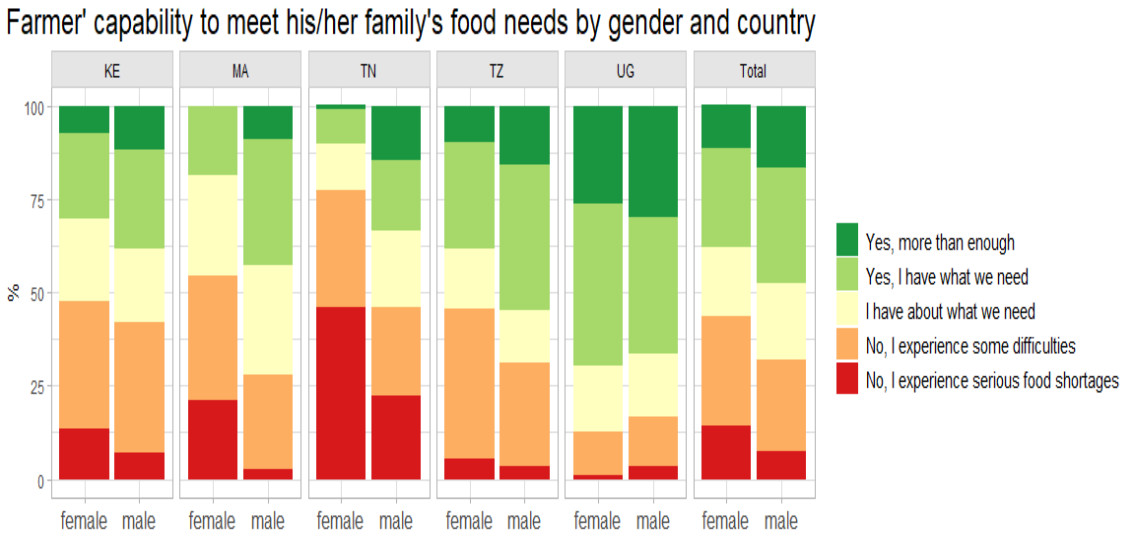


Figure 27. Farmers' ability to meet family's food needs by gender across the five countries.

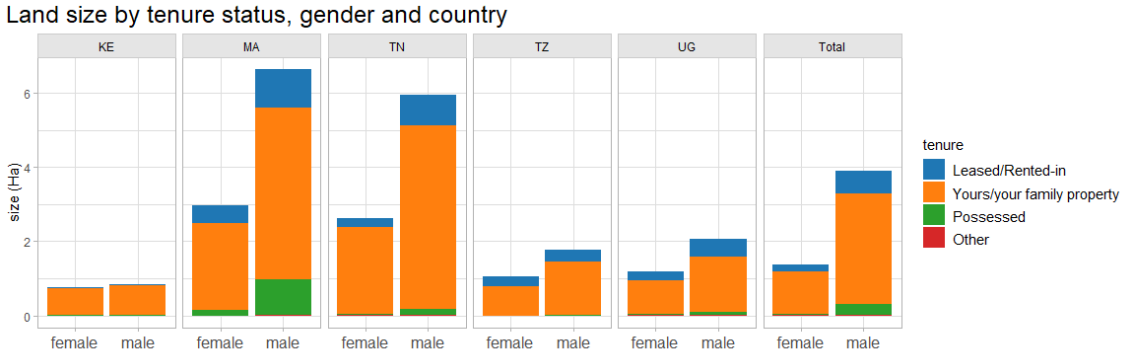


Figure 28. Farmers' farm size by gender across the five countries.

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

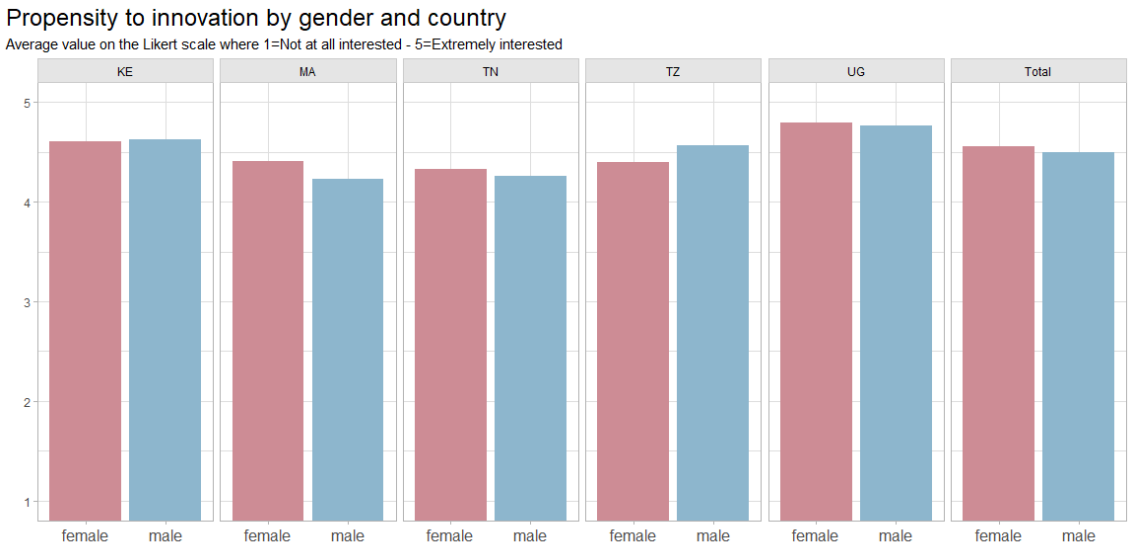


Figure 29. Farmers' propensity to innovate (Q20) by gender and country.

Table 6. Wilcoxon tests on propensity to innovate by gender by country

country	statistic	df	p.value	Signif
KE	241,815.0		0.3872	
MA	27,917.5		0.0102	*
TN	87,271.0		0.2114	
TZ	105,123.5		0.0339	*
UG	189,978.0		0.6649	
Total	3,083,220.5		0.0003	***

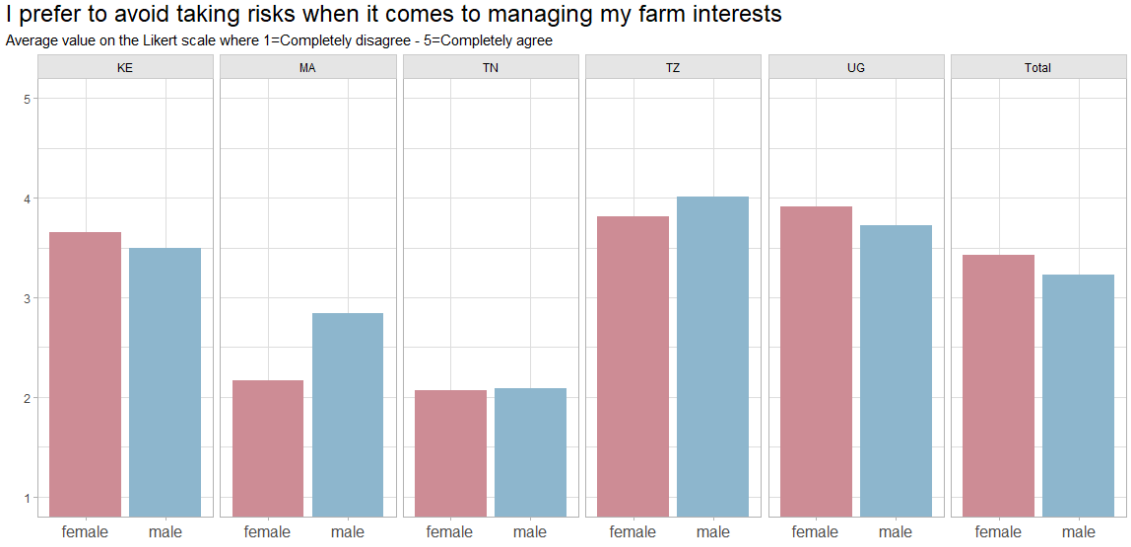


Figure 30. Farmers' propensity to avoid taking risks (Q13) by gender and country.

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

Table 7. Wilcoxon tests on propensity to avoid risks by gender by country

country	statistic	df	p.value	Signif
KE	222,521.5		0.0415	*
MA	40,372.5		8e-04	***
TN	91,940.0		0.8108	
TZ	108,352.0		0.0074	**
UG	180,188.5		0.0506	.
Total	3,017,623.5		2.5e-05	***

5.2 First results from behavioural experiments

We obtained a total of 2,393 valid observations for the behavioural experiments, including 400 to 500 for each of the 5 Food Hubs (Table 8). While the protocols were prepared and refined in collaboration with the team from the University of Mekelle, no data collection was possible in the Ethiopian Food Hubs due to the current civil war.

Table 8: total number of participating farmers in the behavioural experiments, per country

Country	Frequency	Percentage (%)
Kenya	505	21.1
Morocco	500	20.89
Tunisia	500	20.89
Tanzania	482	20.14
Uganda	406	16.97
Total	2,393	100

We start by providing the results of the behavioural experiments per game and will then provide an analysis of how these relate to each other.

Farmers' attitudes to risk

Farmers' attitudes to risk are presented here using a 1 to 10 score, with 1 showing a low willingness to take risks and 10 a high willingness to take risks. These scores correspond to the switching point at which farmers start choosing the high stakes lottery in the series of 10 choices, rather than the low stakes lottery.

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

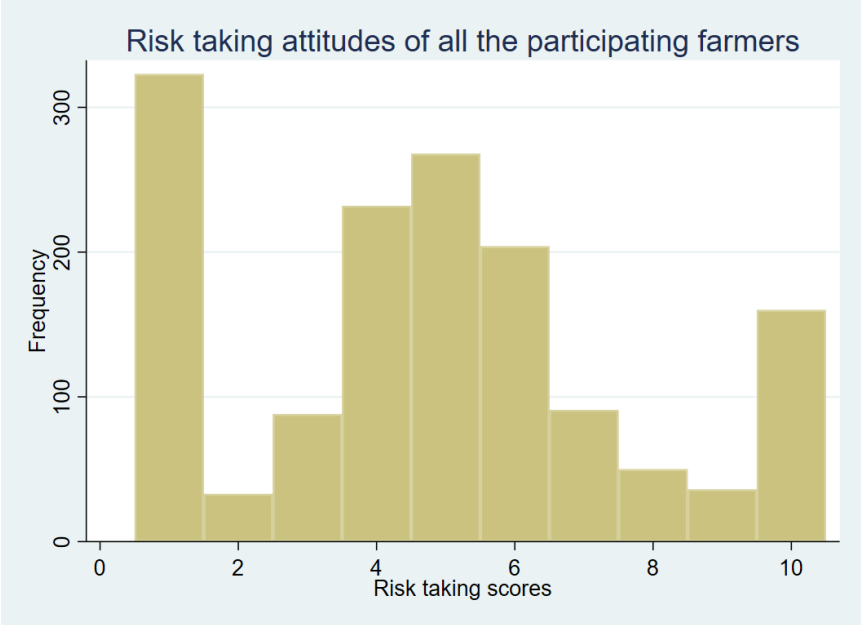


Figure 31: Distribution of risk-taking scores (all countries pooled together)

Figure 31 shows that risk taking attitudes are **distributed around average values** (31.8% of the farmers rank between 4-6), with two additional **peaks at 1** (21.8% of farmers are very risk averse) **and at 10** (10.8% of farmers are very risk taking).

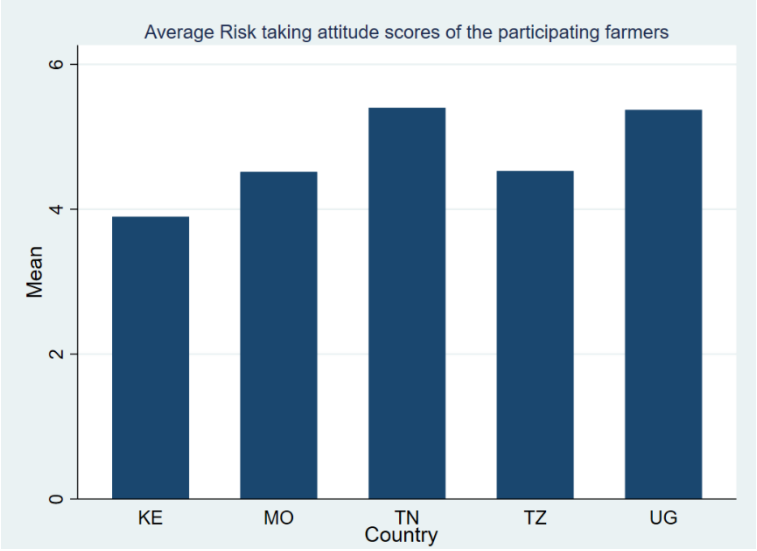


Figure 32: Average risk-taking score per-country (1 = low willingness to take risks to 10 = high willingness to take risks)

A cross country comparison of risk-taking scores (Fig.32) shows that Tunisian (average score of 5.40) and Ugandan (5.37) farmers display the same average level of risk taking (no significant different found), while Tanzanian (4.53) and Moroccan (4.51) farmers display significantly lower levels of risk taking, with Kenyan farmers being the most risk averse with a risk-taking score of 3.90. The distributions of risk aversion also show different patterns depending on the countries, with for example large numbers of farmers being either very risk averse or very risk takers in Uganda and Kenya (Figure 33), while farmers are more evenly distributed (around average levels of risk aversion) in Tunisia, Tanzania, and Morocco.

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

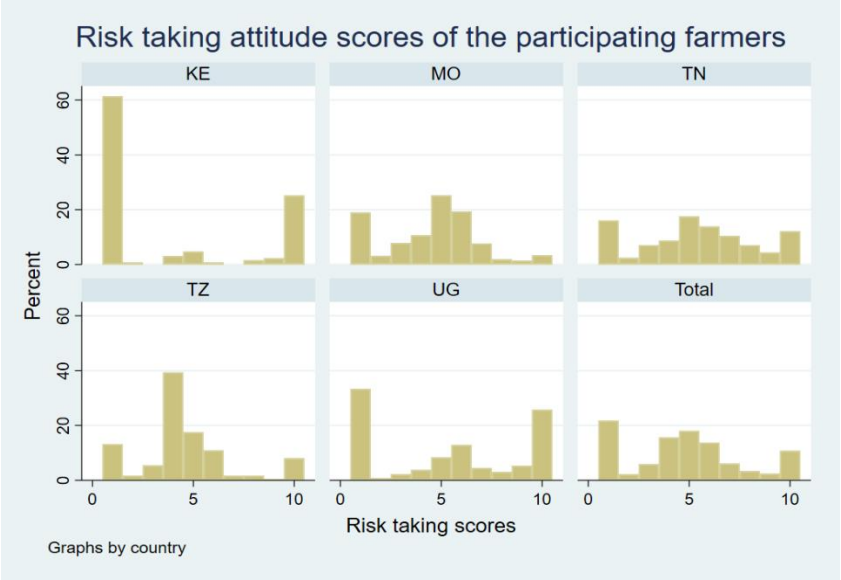


Figure 33: Distribution of risk-taking scores per country (1 = low willingness to take risks to 10 = high willingness to take risks)

There is a pool of *risk averse* and a pool of *risk takers* who are likely to react differently to the proposition to adopt innovations. These initial results suggest that s**upport** may be **necessary for the risk averse farmers** to adopt innovations.

Farmers' time preferences

Farmers' time preferences are presented using a 1 to 10 patience score. Farmers with a low patience score are more impatient while those with higher score tend to be more willing to wait to receive the benefits of an investment. This score is based on the switching point from which farmers start choosing to wait for 2 more weeks (they choose the payment in 4 weeks rather than in 2 weeks), to get a higher payment. This switching point shows how much more they need to be paid, at least, to accept to wait before being paid. Farmers who accept to wait for 2 more weeks even for small amounts of additional payments are more patient than those who require larger sums to prefer the pater payment.

The **distribution** of time preferences (Fig.34) is **skewed** towards **high levels of patience** (farmers chose the higher late payment regardless of the interest rate). 35.3% of the farmers show the maximum observable patience, while a smaller cluster (19.8%) prefer to get the money earlier regardless of the interest rate.

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

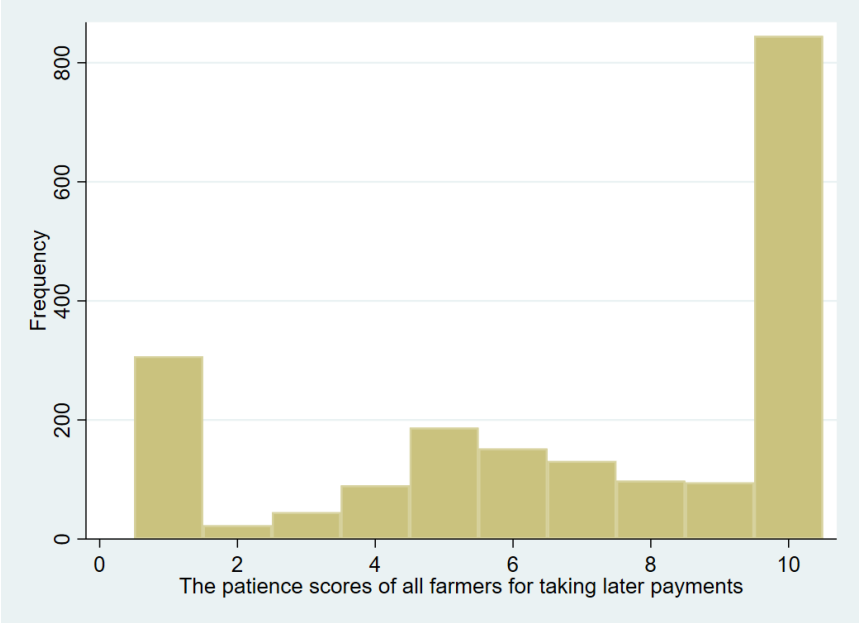


Figure 34: Distribution of farmer's patience scores, in opting for a later payment (all countries pooled together)

The most patient farmers are in **Kenya** (7.99) and Tanzania (7.81, no significant difference compared to Kenya as baseline in a pooled regression), followed by Tunisia (7.19, *p* 0.001), Uganda (6.54, *p* 0.000), and Morocco (5.56, *p* 0.000) (Fig.35).

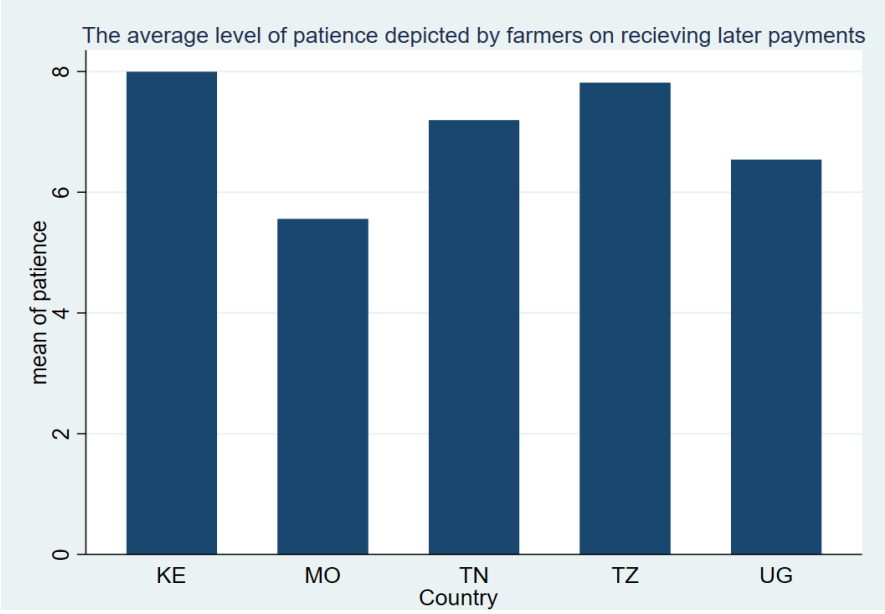


Figure 35: Average patience level scores when choosing to opt for a later payment, per-country (1 = low level of patience to 10 = high level of patience)

The **peaks at 1 and 10** exist in all the countries (Fig.36), but farmers' preferences are **more evenly distributed in Morocco**, less in Tunisia and Uganda, while in **Kenya and Tanzania** farmers are **clearly divided** between very patient (71.8% and 67.6%) and very inpatient (less than one fifth)

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

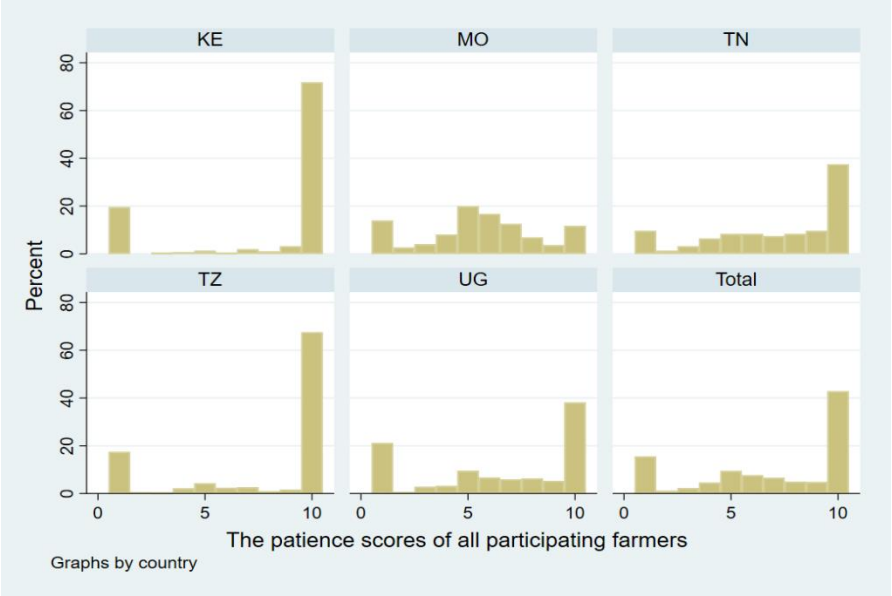


Figure 36: Distribution of Average patience level scores when choosing to opt for a later payment, per-country (1 = low level of patience to 10 = high level of patience)

- First results suggest that having to wait to see the benefits of an investment (**delayed return**) is **not** likely to be **an issue for most farmers.**

Farmers' propensity to collaborate

In the public good game, farmers received an initial endowment of 150 tokens (in the standard version of the game, played in all Food Hubs). The more they invest in the common account, the more the group will benefit as a whole. However, individually, they would be better off keeping their own endowment and free-riding on everyone else's investment in the common account. Therefore, the number of tokens that a farmer invests in the common account is an indication of their willingness to collaborate with others. This is particularly important when looking at the adoption of innovations that require a collective investment or a collaboration amongst farmers.

The average contribution in the standard round (2 rounds in Tunisia) is **69.0 tokens (46.0%)** (Fig.37). A large share of farmers (22.4%) donated 1/3 of the tokens, 13.5% donated 2/3, and smaller groups donated **all 150** (**fully cooperative**, **9.1%**) or 1/2 (7.3%); only 1.5% of farmers donated zero, showing a very low number of pure free riders.

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

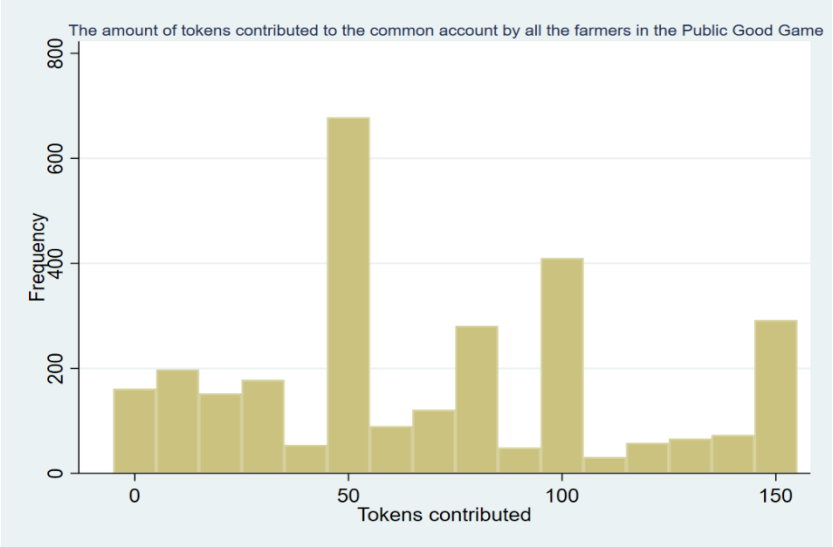


Figure 37: Distribution of farmer's token contributions to the common account in the Public Good Game (all countries pooled together)

The **most cooperative** farmers are in **Uganda** (85.6 tokens or 57.0% of initial endowment) followed by Kenya (75.3), Tunisia (68.3), Tanzania (59.9), and Morocco (59.1 tokens, 39.4%) – all values are significantly different from Uganda as a baseline in a pooled regression (Fig.38).

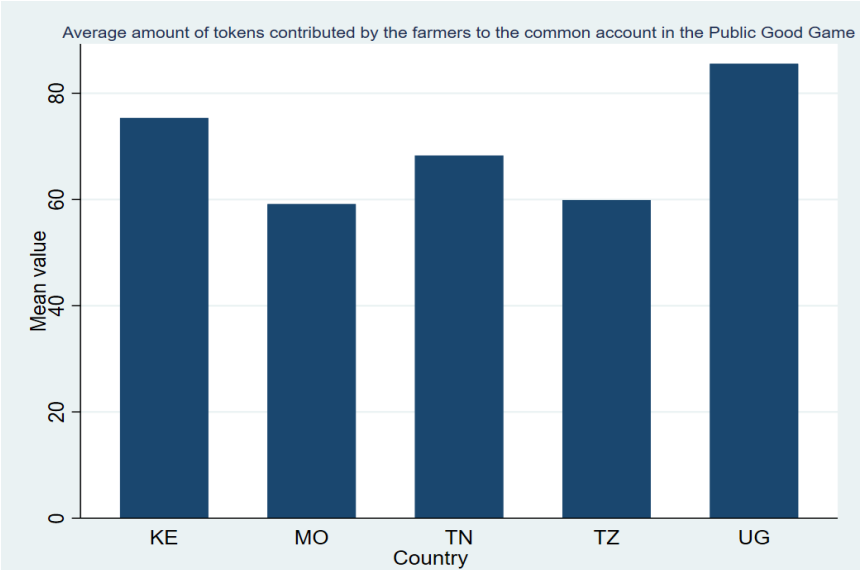


Figure 38: Average tokens contributed to the common account in the Public Good Game, per-country (from a total of 150 available tokens per farmer)

Country specific distributions have different shapes (Fig.39):

- In **Kenya** and **Morocco**, the farmers tend to concentrate around **average cooperation values**
- In **Tunisia** and **Tanzania** they are more evenly distributed, with **several peaks** at meaningful values (zero or close, 50, 100, 150)

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

- In **Uganda** (**fish farmers)** the farmers are evenly distributed, with a significant number of **strong co-operators**

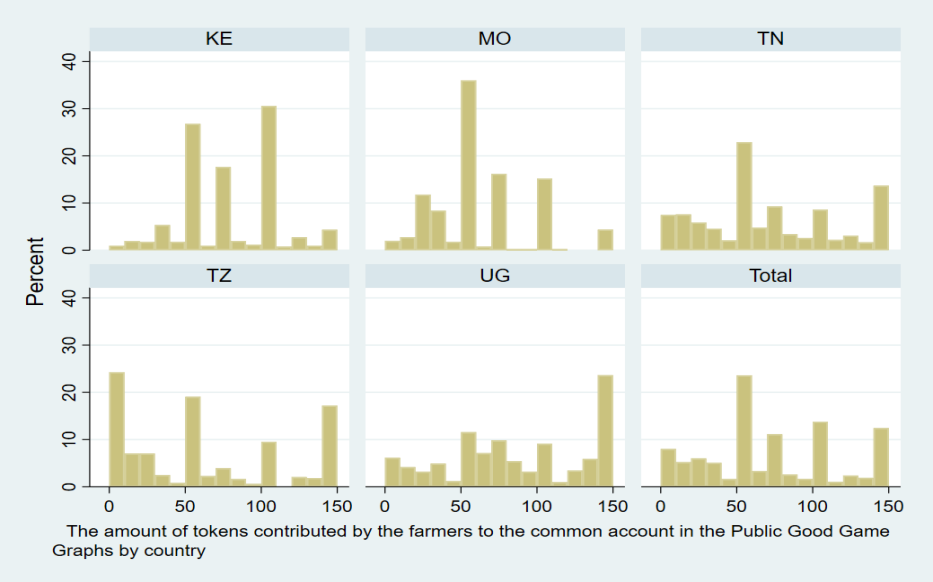


Figure 39: Distribution of tokens contributed to the common account in the Public Good Game (from a total of 150 available tokens per farmer)

We therefore find that cooperation to manage innovations or common resources will be more or less challenging in **different countries**, and possibly easier with fish farmers.

However, further analysis is needed based on a comparison of **both rounds** of the public good game. Preliminary modelling shows that donating to the other group in Uganda and Morocco results in higher donations, by 6 tokens (*p* 0.028); other treatments (inequality of endowment, multiplication factor) do not yield statistically significant effects.

Correlations between behavioural factors

Preliminary attempts were made to identify **clusters of behaviours** using the pooled cross-country sample. However, the clusters identified tended to **differ in terms of cooperation**, but not in terms of risk aversion and time preferences, i.e. these behavioural factors are not correlated at cross-country level. Linear regression models were estimated using the result of the three games and country specific indicators. A significant and **negative correlation** (coeff. -0.114, *p* 0.000) was identified **between risk aversion & patience**: more patient farmers are also less risk averse, and could therefore ***potentially be early adopters*** *for FoodLAND's innovations.*

5.3 Joint analysis of survey data and behavioural experiments data: example from Morocco

The experimental datasets will be merged with the survey datasets in the same Food Hubs, using unique identifiers (already checked).

To demonstrate the potential use of such a merged dataset, we present here preliminary results to three main questions, obtained using the merged datasets from Morocco. The analysis for other countries will follow, as the validation check detected potential issues that needed to be solved before proceeding to merging the survey and experimental datasets (issues now solved).

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

1. Do behavioural factors differ significantly along **demographic characteristics** of the farmers?

Female farmers in Morocco (71 out 500) are **more patient** (6.34 *vs* 5.45, *p* 0.005) and **less risk averse** (6.05 vs 6.51, *p* 0.052). **Older** farmers show less patience (coeff. -0.014, *p* 0.090)

2. Are behavioural factors related to farmers' **stated propensity to innovate**?

Interest in **adopting a new technology** is negatively related to risk aversion (coeff. -0.077, *p* 0.044) but not to other behavioural factors.

Interest in **selling one's own production jointly** with other farmers is negatively related to risk aversion (coeff. -0.085, *p* 0.020) but not to other behavioural factors.

Neither willingness to adopt more nutritious crop nor the willingness to adopt more profitable crops are related to behavioural factors.

3. Are behavioural factors correlated with total **farm production**, total **farm sales**, and the **share of produce commercialised**?

Contributions to the common account in the public good game are positively but marginally correlated with the share of produce sold rather than kept for self-consumption.

Further analysis by including more controls will allow to draw more in-depth conclusions.

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

6. Next steps: planned exploitation and Open science strategy

Small-scale farmers' data and initial results will be the basis for:

- the **development and validation of innovations (WP4 and WP5)**. The experimental results will also be used as a baseline on behavioural characteristics for the **implementation of RCTs of innovations** in T5.9.
- The preparation of joint publications on **smallholder farmers' preferences and behaviours relevant to innovation-related decision-making**.

Research hypotheses will be addressed at different levels:

- **Food Hub** (e.g., descriptive study on the context-based results of one Food Hub);
- **Country** (e.g., comparative study assessing 2 or more Food Hubs within a given country)
- **Cross-country** (e.g., cross-country comparative studies)
- **Project** (e.g., assessing broader FoodLAND research questions using the entire pool of data)

Examples of these initial publication ideas include (but not limited to):

1. Detecting determinants (socio-economic conditions and preferences) of smallholder farmers' propensity to adopt a yield-enhancing / limitation-overcoming technological innovation;
2. Analysing drivers of intention to introduce a nutrient-dense/ more profitable product;
3. Detecting determinants of the propensity towards agro-biodiversity;
4. Detecting contextual, production, behavioural factors of farmers' household income and deriving anti-poverty policies;
5. Identifying explanatory (contextual and individual) variables / potential biases (i.e. assessing differences between stated and revealed preferences) of cooperative attitude;
6. Identifying potential biases (i.e. assessing differences between stated and revealed preferences) of time preferences;
7. Identifying explanatory (contextual and individual) variables / potential biases (i.e. assessing differences between stated and revealed preferences) of risk preferences;
8. Testing interrelationships occurring between revealed preferences (e.g., risk / time preferences and prosocial attitude) and between biases;
9. Comparing collaborative (standard version: one-shot public good games) / time / risk preferences across farmer segments (e.g., income brackets, gender, villages, education) and countries;
10. Assessing connections between revealed preferences / propensity to behavioural change of consumers and farmers, using a mirroring set of experimental data.

Collaborative analysis groups (by publications line) have been kickstarted during as to develop scientific publications on the farmers' data, involving interested FoodLAND partners. Additional publications lines will emerge by comparing farmers' data with findings from the urban consumers' study mirroring surveys and behavioural experiments. A detail presentation of the farmers' results will be included in Deliverable D3.4, Report on productive and behavioural profiles of smallholder farmers linked to socio-economic and demographic factors).

The publication process will follow FoodLAND Guidelines on Open Science (inclusive, favouring Open Access Journals, and with prior signal to EB). The Farmers' research procedure will be made available through Open Access Repositories (Zenodo).

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

7. Appendices

Appendix 1: Final version of Behavioural experiments protocols

This is an example of the protocol used in Tunisia. Only the framing of 1 round of the public good game differed by country /Table 2).

Colour code:

Text in red – instructions for enumerators

Text in black – instructions for participants

Text with yellow highlight – to be adjusted separately for every country/session

Enumerators roles:

1. **Lead enumerator – reading the instructions, answering general participant questions**
2. **1 to 1 enumerators – assisting the participants during the experiment, individual help with the experiment**
3. **Mobile enumerators – distribution and collection of the envelopes and tokens**
4. **Data entry enumerator – entering data into the excel spreadsheet**

Instructions to Data Entry Enumerator:

- Please register the participant's name and interview information (including the document number, if available) in a separate list and provide her/him with their unique ID.
- Please read the consent form and information sheet to each participant and answer questions they may have. Then ask if they agree to have the interview and participate in the experiment. If they agree, please have them sign the consent form. Collect the form for project records.
- Please do not prompt the respondent for answers. If the respondent takes time to answer, wait. Do not suggest answers.
- Please give to the participant the large envelope containing the 4 small envelopes for the games. Make sure that the unique ID on the large envelope (and thus on the small envelopes and sheets in it) matches the unique ID of the participant. Tell them not to open the envelope until asked to do so.

Please read aloud to participants the text in black but not the text in red. The text in red is guidance for the enumerators.

INTRODUCTION

[Lead Enumerator: Please read the script below slowly and clearly to the participants. Check if they follow. Repeat the script if necessary].

Thank you for coming today. We are researchers from the FoodLAND project. We would like to know farmers' attitude towards innovations, and for doing so we will play a number of games. Please listen to the instructions of the games carefully.

All the people you can see in this room will play the same games as you. We will not share information about their or your identity, even at the end of the session. If you know some of them, we ask you not to share information about their identity with other participants. We will ask each of you to make different decisions. Your decisions as well as other participants' decisions will be made in private, and individual decisions will not be revealed, even at the end of the session. The games you will play recreate situations you might face when deciding whether to adopt innovations on your farm. Just as the decisions you make on your farm impact your earnings and wellbeing, each of the games will allow you to earn real money.

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

The views and opinions expressed in this document are the sole responsibility of the author and do not necessarily reflect the views of the European Commission.

And as in real life, the amount of money that you will earn depends on your decision and, for group games, on the decisions of others too. But sometimes, the amount you will earn will also depend on chance.

There are no wrong of right decisions; therefore, we ask you to decide based exclusively on your preferences. In some of the games you will be given FoodLAND tokens in the form of fake banknotes that you will use to play the games. At the end of the session, you will get X LC for 10 units of FoodLAND tokens. Besides the money that you will earn from the games, you will receive a stipend of XX LC to thank you for your participation today. Your total earnings will be communicated to you privately at the end of the full session today. Other participants will not know your total earnings.

If you have any question, please raise your hand and an enumerator will come close to you to listen and will provide an answer for everyone.

[Lead Enumerator to check if anyone has any question and in case answer them for everyone]

We kindly ask you not to speak aloud, and not to communicate with other participants until the end of the session. If you fail to comply with this rule, you will have to leave the session and you will not receive your earnings in the games and only get to keep the participation stipend. After having played the games, we'll take a break.

There are X enumerators especially trained to help you during today's games. Those of you who need help will be assisted individually by an enumerator during the whole session. All of you have received a large envelope containing 4 smaller envelopes and a pen/pencil. The smaller envelopes contain answer sheets. You, or the enumerator assisting you, will write down your answers directly on these sheets of papers. Please, do not to take these sheets of paper out of the envelope unless asked by the enumerators.

In the big envelope you will find 4 smaller envelopes each with a different shape on them, each shape corresponds to a different game we will play today. The shapes are:

▲ - Includes Questionnaire 1, 150 units of FoodLAND currency, and visuals (images 03 and 04)

★ - Includes 150 units of FoodLAND currency

■ - Includes answer sheet 1

● - Includes answer sheet 2

If you have any question, please raise your hand and an enumerator will come close to you to listen and will provide an answer for everyone; please do not ask your questions aloud.

[Lead Enumerator to check if anyone has any question and in case answer them for everyone]

We will now proceed with the first game.

[Enumerators: Control for the gender composition of the groups: 1/3 of the sessions must be run with men only, 1/3 with women only, 1/3 with mixed groups. The number of groups with women only can be reduced if their creation proves problematic, but the number of mixed groups cannot overcome half of the total.]

PUBLIC GOOD GAME ROUND 1

[Enumerators: There are 2 groups of 10 participants in this game. If there are less than 20 farmers present at the session, please create 2 groups of equal size, sending home one farmer if needed. Please pay the stipend money to the farmer sent home].

[Lead Enumerator: randomly divide participants into two sub-groups by extracting half of the unique IDs].

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

The views and opinions expressed in this document are the sole responsibility of the author and do not necessarily reflect the views of the European Commission.

Thank you again for coming today. We will now play the first game. Please remain seated at your desk. The game is to proceed in silence; talking or moving are prohibited, and if you talk with one of the other participants, you will be asked to leave the room.

Please now take the small envelope with a triangle shape on it.

In this game, the participants present today will be split in two groups. You will be in the same group as half of the participants, while the remaining half will form another group.

Each of you will be asked to make a decision that will influence both your earnings, and the earnings of other members of **your group**. Each of you will receive 150 tokens.

You and each member of your group will have the opportunity to put as many of these tokens as you want on a common account, or to keep some or all of them for yourself. The tokens that you keep for yourself will remain with you and will contribute to your earnings.

After all the members of your group have had the opportunity to put tokens on the common account, the enumerators will top up your group's common account with the same amount as the total that was put in the common account, so that the amount is doubled. This will then be shared equally amongst the members of your group. Each member of your group, including you, will receive their share **regardless of the amount they put on the common account**.

[Lead Enumerator: Please provide here concrete examples standardised for all the sessions, for example: you are a part of an association that wants to gather funds to help support a project. This project would benefit you and your group and you are free to decide how much you want to contribute to the common account that will be shared at the end. The individual amount you contribute will stay anonymous.**].**

Do you have any questions? **[Enumerators: Please answer the questions for everyone]**

Before we proceed with the real decision, we will give you some examples that illustrate the possible outcomes of that game. **[Enumerators: Please replace the values in the examples to take account of the actual number of people if the number of people *n* in each group is less than 10. Please refer to the visuals (images) inserted in the envelopes to help explain the examples].**

- If everyone puts everything in the common account, 1,500 tokens will be in it. Twice this sum (3,000 tokens) is then divided equally among all participants, such that each participant will earn 300 tokens.
- If everyone keeps the tokens for themselves, no money will be in the common account, thus leaving no money to be divided equally. Each participant will then earn their initial endowment of 150 tokens.
- Remember that you can put any amount between 0 and 150 tokens in the common account.

Now we will ask you some questions to help you understand the game. Please take questionnaire 1 from your personal envelope with a triangle, fill it in and put it back in your personal envelope with a triangle. An enumerator will assist you in case of need.

Now we will play the game. One enumerator will come at your desk with an empty envelope and will ask you to make your decision. When you are approached, please extract from the envelope with the triangle the tokens that you want to put in the common account, and put them in the empty envelope provided by the enumerator. Please make sure that the amount contributed is not seen by other players. Your decision won't be communicated to anyone but will be noted by the enumerator. Likewise, you won't know what other participants have chosen.

Once everyone in the room has made their decisions, we will count the total number of tokens put in the common account, the enumerators will add the same amount as the total put in your group's common

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

The views and opinions expressed in this document are the sole responsibility of the author and do not necessarily reflect the views of the European Commission.

account, so that the amount is doubled. This amount will be shared equally between your and all members of your group. The result will be communicated to you at the end of the session.

Do you have any questions? **[Enumerators: Please answer the questions for everyone]**

Now we will play for this round. An enumerator will assist you.

[Enumerators:

1- approach the participants one by one, give them the empty common account envelopes and ask them to make their decision. Make sure that they clearly identify which envelope is the common account one.

2- once all envelopes are distributed, remind them the rules: "You can take any amount from your personal envelope to put in the common account envelope. Return the common account envelope to me and keep your personal envelope with your tokens with you. You can exchange these for real money at the end of the session";

3- once everyone has made their decision, collect all common account envelopes (make sure to check the participant ID), and continue reading].

Thanks for making your decision.

Please put the small envelope with a triangle back in the large envelope and wait in silence while we count the total number of tokens in the common accounts and make the calculations. **[Enumerators: make the calculations; make sure that participants do not communicate with each other while waiting].** The enumerators will now distribute to everyone the envelopes with your share of twice the money put on the common account by participants in your group. Please have a look at this amount without communicating it to other players, and then put the envelope in the large envelope. These tokens are in addition to the tokens you kept for yourself during the game, and will be exchanged for real money at the end of the session. **[Enumerators to distribute envelopes with the tokens]**.

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

PUBLIC GOOD GAME – ROUND 2

Now we will play a second round of this game.

Please now take the small envelope with a star shape on it.

This round will follow exactly the same rules of the previous one. Again, each of you will receive 150 tokens. These are new tokens and the earnings from the previous round will not be affected. You and each member of your group will have the opportunity to put as many of these tokens as you want on a common account, or to keep some or all of them for yourself. The tokens that you keep for yourself will remain with you and contribute to your final gain.

After all the members of your group have had the opportunity to put tokens on the common account, the enumerators will top up your group's common account with the same amount as the total that was put in the common account, so that the amount is doubled. This will then be shared equally amongst the members of your group. Each member of your group, including you, will receive their share **regardless of the amount they put on the common account**.

Do you have any questions? **[Enumerators: Please answer the questions for everyone]**

Now we will play this round of the game. When you are approached, please extract from the envelope with a star the tokens that you want to put in the common account, and put them in the empty envelope provided by the enumerator.

[Enumerators: approach the participants one by one, give them the empty common account envelopes (make sure to check the participant ID), and ask them to make their decision. Remind them the rules: "You can take any amount from your personal envelope to put in the common account envelope. Return the common account envelope to me and keep your personal envelope with your tokens with you. You can exchange these for real money at the end of the session"; **once everyone has stated their decision continue reading].**

Thanks for making your decision.

Please put the small envelope with a star back in the large envelope and wait in silence while we count the total number of tokens in the common accounts and make the calculations. [Enumerator: Please prepare envelopes for each individual containing earning from the common accounts].

We will now distribute in envelopes your earnings from the common accounts. These tokens are in addition to the tokens you kept during the game and can be exchanged for real money at the end of the session. Please put the small envelope in the large envelope.

[Enumerators: Please distribute the envelopes].

We will now move on to another game.

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

The views and opinions expressed in this document are the sole responsibility of the author and do not necessarily reflect the views of the European Commission.

RISK ATTITUDE MEASUREMENT EXPERIMENT

Please remember to remain seated and not to communicate with other people in the room. Now take the small envelope with a square shape ■ on it.

In this game, you will be asked to make 10 decisions, one after the other.

Your task is to choose between two alternative lotteries, A and B. The lotteries differ in the number of tokens that can be won in each of them. Each of the 10 decisions bear a different chance of earning tokens; the number of tokens to be won also varies between lottery A and B in each of the 10 decisions.

[Lead Enumerator: Please provide here concrete examples standardised for all the sessions, for example: present an analogy between irrigated and non-irrigated zones for options A and B related to a frequency of good and bad years from 1 to 10 with different profitability according to the scenarios. The balls represent years. You have to choose according to your level of risk assessment: in which moment will you move from the irrigated zone (A) to the non-irrigated zone (B); (would you plant your crop that year or not and in which area); according to the proposed gain possibilities (80 to 100) and (5 to 190).**].**

After you have made your decisions, we will randomly select one of the 10 decisions to execute for real. We will drop the other 9 decisions and you will not get any cash from them. Each of the 10 decisions is equally likely to be selected. Your selected lottery (A or B) corresponding to the randomly selected decision number will be executed. Using a box with an appropriate number of red and white balls, you will randomly pick a ball form the box. The colour of the picked ball will indicate the number of tokens won. Here is a hypothetical example, whereby a decision corresponding to 3/10 and 7/10 odds of winning the tokens is randomly drawn.

[Here 2 enumerators to "play" (as in acting) the whole process.

Actors: Lead enumerator + mobile enumerator

Lead enumerator to prepare a box containing 3 red balls and 7 white balls

Lead enumerator: "This is an example of one of your 10 decisions: in this box there are 3 red balls and 7 white balls. In option X, if you draw a red ball you win 100 tokens, if white you win 80 tokens. In option Y, if you draw a red ball you win 190 tokens, if white you win 5 tokens. Which option, X or Y, would you like to be executed?"

Mobile enumerator : "I choose option X"

Lead enumerator: " I am now going to randomly pick a ball from the box." Lead enumerator to pick a ball. "The ball I randomly picked is white. I will take note of this and you will receive your earnings at the end of the session, based on the lottery you have chosen."]

Now please take from your envelope with the square shape ■ the sheet of paper relative to this game, and select option A or B for each of the 10 decisions. Remember, only one of the decisions will be executed in the end. If needed, an enumerator will assist you in performing this task. After answering all decisions, please insert your answer sheet in the envelope with the square shape ■.

[1 to 1 Enumerators: Help illiterate people write down their choices without intervening in the decisions. Please limit the communication with the participants to the minimum and refrain from any comments or suggestions on performance. Communication should be limited to asking about the bid choice and writing down the decision. All the lotteries must be asked and answered].

[1 to 1 Enumerators: Double check that all the lottery options are answered by everyone].

[Lead enumerator: Read the following instructions]

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

The views and opinions expressed in this document are the sole responsibility of the author and do not necessarily reflect the views of the European Commission.

Now, we will randomly select one of the 10 decisions to execute. I will pick a random paper sheet with a number from the box; in the box there are 10 paper sheets; each has a number from 1 to 10 on it. The randomly drawn paper sheet represents the decision that we will execute, and thus the chance of winning. **[Lead Enumerator: show that indeed the box contains 10 paper sheets with number 1 to 10 and pick the paper sheet].**

The decision drawn is ___, which means ____red balls and ____ white balls will be in the box. If you draw a red ball you win 100 tokens if you chose lottery A and 190 tokens if you chose lottery B. If you draw a white ball you win 80 tokens if you chose lottery A and 5 tokens if you chose lottery B.

Each of you will now randomly draw a red or white ball from the box. An enumerator will approach you with the box, so that you can make your extraction. When approached by the enumerator, please give them your envelope with the answer sheet.

[Enumerators: approach the participants one by one]. Please give us your envelope. **[Enumerators: open the envelope, take answer sheet, check ID number and make the participant extract a ball].** The drawn ball is red/white. I will take note of this and you will receive your earnings at the end of the session. **[Enumerator: take note of the result (ball colour) on top of the envelope and show to the farmers that you have noted the right colour].**

[Enumerators: after everyone have extracted their ball and you have collected all square envelopes continue reading].

We will now move to the last game.

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

TIME PREFERENCES EXPERIMENT

Again, thank you for coming today. Please remember to stay silent, not to move from your seat, and not to communicate with other participants.

[Enumerators: do not distribute the FoodLAND banknotes in this game]

We will now play another game. Please now take the small envelope with a circle shape ● on it.

We will ask you to make 10 decisions. In each decision, you can choose to receive the equivalent of 100 tokens converted in local currency after two weeks, or you can choose to wait and receive more than 100 tokens in four weeks. The amount you would receive in 4 weeks will differ for each decision.

[Lead Enumerator: Please provide here concrete examples standardised for all the sessions, for example: You have an opportunity to store a non-perishable agricultural product (that won't have any additional costs) and sell them in two weeks at 100 tokens, or in four weeks at a higher price (ten possibilities shown in the table). The prices are set today and cannot change in the future.**].**

We ask you to fully consider the two options, and make your decisions carefully based only on your own preferences. Whatever the option you choose, we will give you a deposit voucher and you will come back to collect your money two or four weeks later. You will have the opportunity to receive this money by phone payment: if you prefer to use this method, you will have the opportunity to provide a mobile phone to the enumerators at the end of the session today.

Do you have questions? **[Lead Enumerator: Reread the script and answer questions as necessary].**

At the end of the game, we will pick a random paper sheet with a number from a box; in the box there are 10 paper sheets, each has a number from 1 to 10 on it. The randomly drawn paper sheet represents the decision that we will execute. We will tell you the number, review the decision you have made, and pay you according to your choice in that decision. Do you have any question?

[Lead Enumerator: Ask respondents if they have any question then answer questions as necessary. Show to the respondent all the paper sheets (1 to 10) and the box. Make sure the numbers are not visible from the outside when making the extraction].

Now, let's start the experiment. Please take your answer sheet from your envelope with a circle ● on it, and make a decision for each of the ten questions. Once you have made your ten decisions, please answer to the two questions at the bottom. If needed, an enumerator will assist you in performing this task. After you have filled your answer sheet, please put it back in the envelope with a circle on it.

[1 to 1 Enumerators: Go close to the players who need help and fill the table together].

[Lead Enumerator: Once all people have filled their answer sheet and put it back into the envelope, continue reading. Mobile Enumerators: please collect envelopes with circles, check ID number].

Thank you for your decisions. We will now select a single decision that will be used to pay you either in 2 or in 4 weeks. We will extract one of the sheets of paper with numbers representing the decisions. **[Lead Enumerator to extract a sheet of paper].** The sheet of paper extracted is the number _____, therefore the timing and the amount of your payment will be determined by your chosen alternative in this decision. We will give you a voucher at the end of the session and you can come in two/four weeks to collect your tokens in local currency. Alternatively, you can receive this money by phone payment: if you prefer to use this method, you will have the opportunity to provide a mobile phone to the enumerators at the end of the session today.

[Enumerator to start entering data from envelopes while participants fill the FoodLAND questionnaire].

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

The views and opinions expressed in this document are the sole responsibility of the author and do not necessarily reflect the views of the European Commission.

We are now done with the games. While we are preparing your payments, we will kindly ask you to fill in a questionnaire about your farm. But first, we will take a break.

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

PAYMENT OF PARTICIPANTS

[Enumerators: Payment can be done at the end of the session, before participants return home].

[Enumerators: Please use the data entry table to help you calculate the total payoff for each participant and the value and time delay for the voucher to be issued to participants; prepare vouchers and receipts for each participant]

[Enumerator: Please approach the participants one by one to pay them the stipend money, their payoff, give them the voucher, and make them sign the receipt for the total amount; please collect back from them all envelopes containing their tokens. You must count their tokens and check with them that they agree with the amount received].

Thank you again for your participation today. To thank you for your participation, you will receive ___ LC.

In addition, you have earned during the games:

- ____ tokens in the first game (triangle envelope),

- ____ tokens in the second round of this game (star envelope),

- and ____ tokens in the second game (square envelope),

for a total of ____ tokens, which correspond to ____ LC.

Here is an envelope with your money. **[Enumerator to give cash in envelope]**

Here is the voucher to withdraw the earnings of the last game: ____ tokens in 2/4 weeks, which corresponds to ____ LC. **[Enumerator to give voucher].** If you would like to be paid by phone, please give your phone number to the enumerator now. **[Enumerators to write down phone number on receipt and enter in data entry table].**

Please now sign this receipt stating that you have received a total amount of ____LC in cash and will receive ____ LC in 2/4 weeks. **[Enumerator to collect signature on voucher]**

Thank you again. This is now the end of the session.

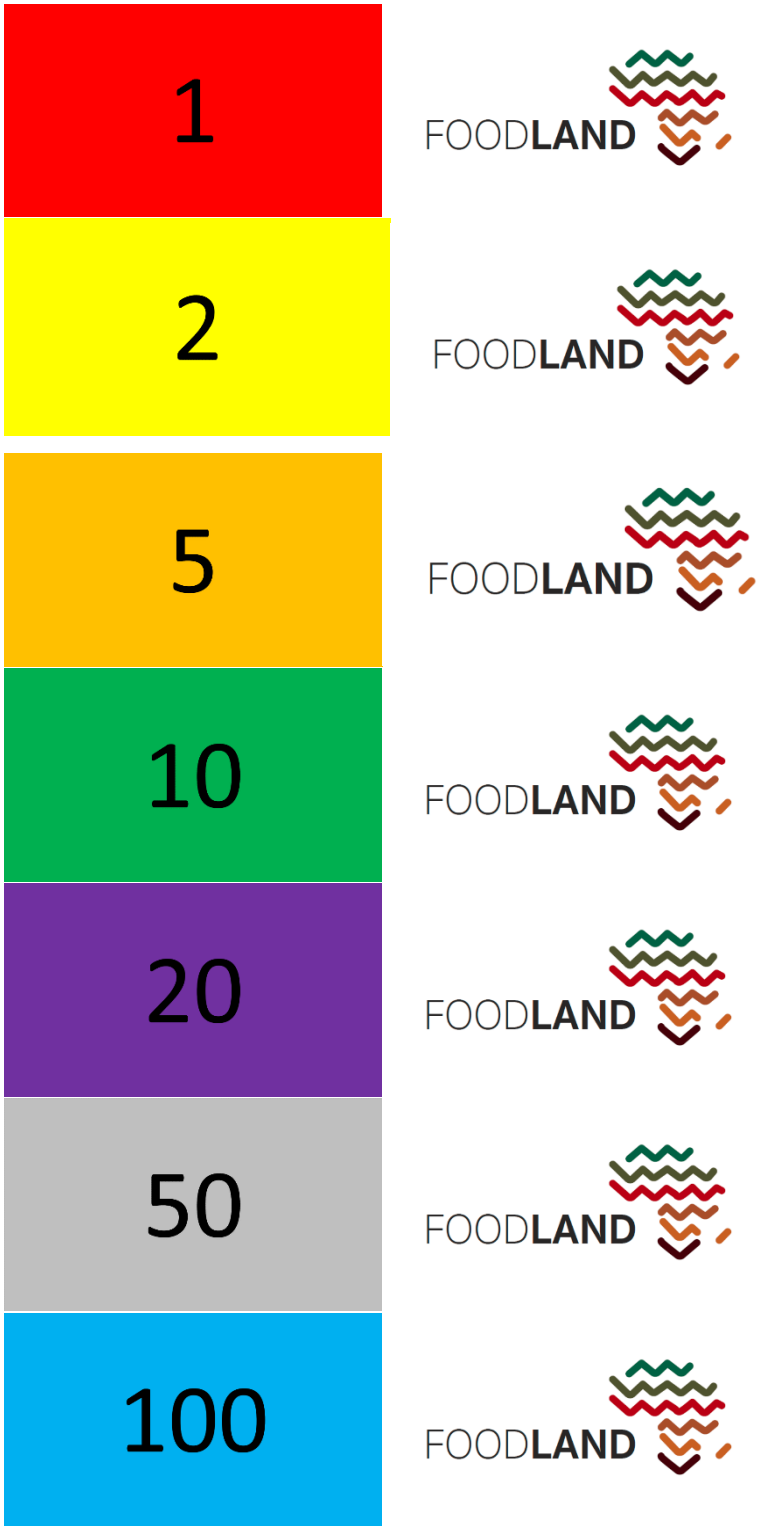
Please do not reveal to the other participants the total amount earned until you leave the building/session. Once you have left the building/session you are free to decide whether you want to share this information. Please remember to come back in two/four weeks with your voucher to withdraw the remaining money.

END OF SESSION. Thank you very much for your participation!

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

The views and opinions expressed in this document are the sole responsibility of the author and do not necessarily reflect the views of the European Commission.

Appendix 2: Banknotes used during experimental sessions (front and rear)



Appendix 3: Visuals provided to farmers to support their understanding of the public good game

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

The views and opinions expressed in this document are the sole responsibility of the author and do not necessarily reflect the views of the European Commission.

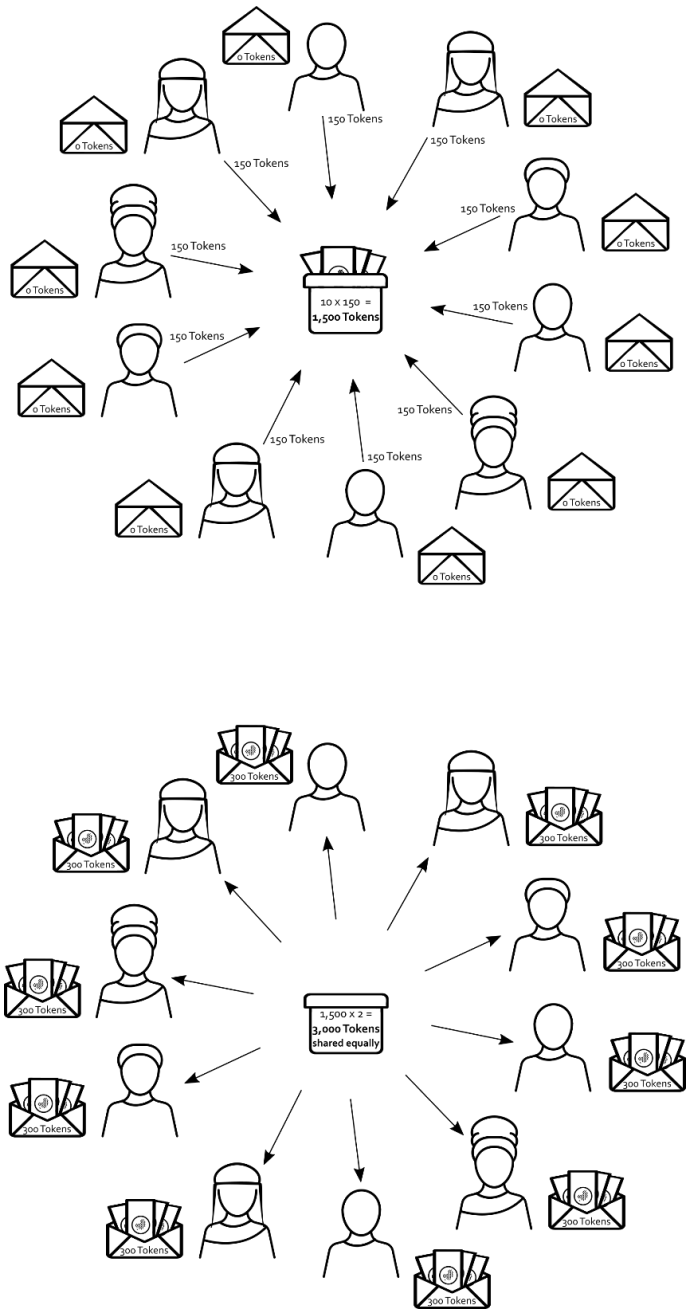


Figure 37. illustration of outcome of the public good game if all group members contribute their whole initial endowment

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

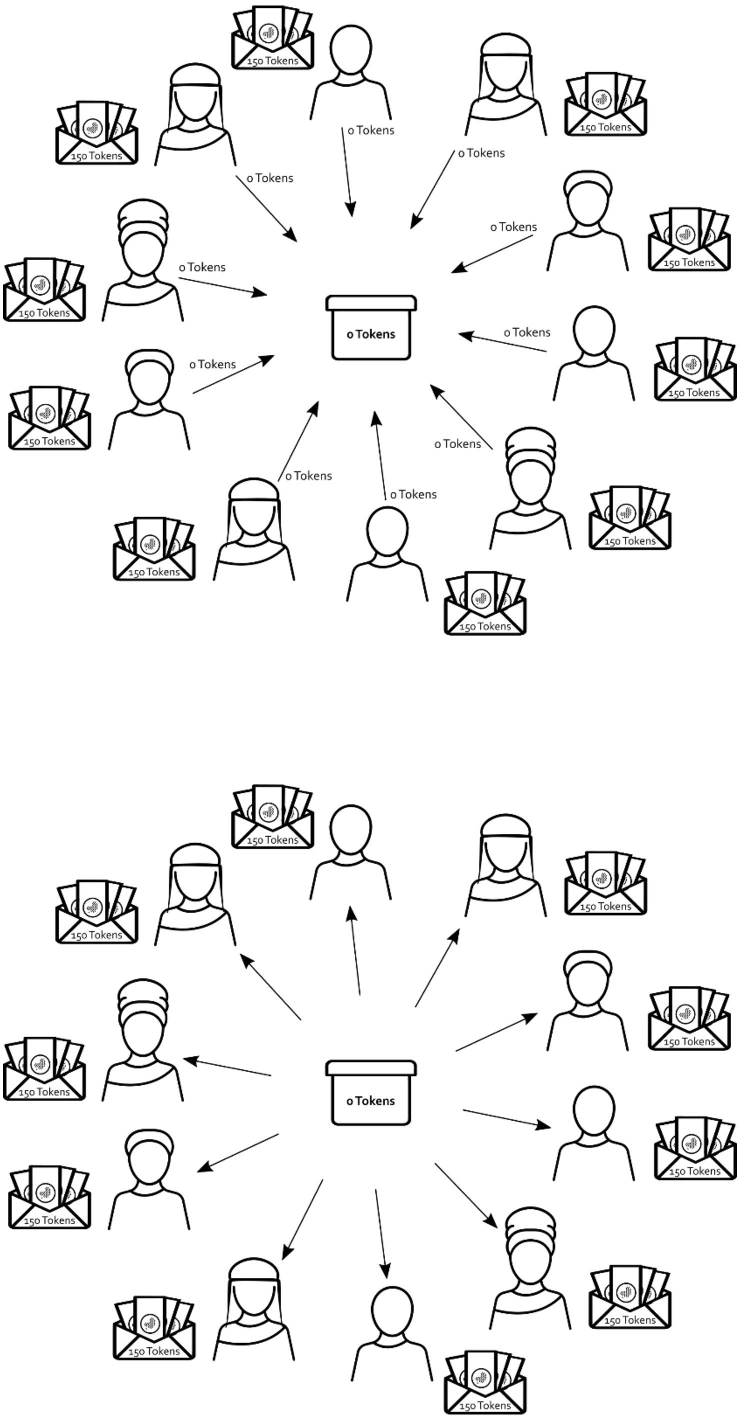


Figure 38. illustration of outcome of the public good game if all group members contribute 0

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

The views and opinions expressed in this document are the sole responsibility of the author and do not necessarily reflect the views of the European Commission.

Appendix 4: Sampling Strategy

Farmers' sampling strategy

1. This strategy should be adopted in all the 14 FoodLAND Food Hubs, including the eight Food Hubs where no economic experiment will be run. As a preliminary stage, you should define clear boundaries of the Food Hub area, i.e. which villages and towns belong to it and which do not. This will be used as a reference area to calculate all statistics and run all activities (experiments, questionnaires, training, RCTs where relevant).
2. Within this area, you need to randomly select a sample of 500 farmers that is representative of the farmers in the Food Hub (please read "fish farmers" if this is the case in your Food Hub).
3. Since each Food Hub has a different size and a different settlement structure, if the number of villages/localities is large, you can adopt a two-stage sampling by randomly selecting the villages/localities first, and then the farmers (as explained below). The number of smallholders in each single village/locality should be enough to create one or more 20-people groups. The selection could be restricted to villages/localities with land area covered with crops relevant to the project. If your Food Hub presents villages/localities with very different level of accessibility or development, we suggest that you select villages representative of all these conditions. Please contact UNIBO and the JHI if you need to discuss the selection of the villages. If your Food Hub includes a single town, or a limited number of settlements, you can avoid this stage.
4. Within the villages/localities selected (where the experiments, the questionnaires, and the training will be run), the sampling will be based on the lists of farmers living and working there. Please make sure that the farmers in the lists meet your definition of smallholder. In order to adopt a gender perspective, you can extend the definition of smallholder farmer to the individuals actively involved in the farming activities (i.e., no matters the tenure status of the land). In this case, all the statistics should be calculated accordingly.
5. Please make sure that, for each person in these lists, you know the gender, the age, and the farm size (land area), which will be used for stratification. If some of these variables are not available, please contact UNIBO and the JHI and we will discuss other options.
6. If your Food Hub has a limited number of settlements and thus your lists cover all the farmers in the Food Hub, you do not need any additional information; otherwise, you need to know the distribution of farmers by age, gender and farm size in the whole Food Hub (or at least an approximative distribution). You can recover this information for example from the last Census; for this reason, we suggest that your Food Hub borders follow administrative borders.
7. As a following step, since we adopt a stratified sampling, you need to calculate the size of strata: based on official statistics (or on your lists, if they cover the whole Food Hub), calculate the share of farmers belonging to each group in the Food Hub (e.g., young men with small farms are 30%, old men with small farm 20%, old women with small farm 5%, young women with large farms 1%, etc.). Using these shares, calculate how many farmers should belong to each stratum in a theoretical sample of 400 farmers. Please contact UNIBO and the JHI if this stage is not clear, and we will identify the best sampling strata together.
8. When you recruit farmers for the experiments, you need to align to the shares calculated as above; thus, if you see that, for example, too many young farmers have already attended the sessions in previous villages/ localities, in the following ones you should recruit more old farmers to compensate; equally, if you see that too many men have attended, you should try to recruit more women; if you see that too many large farmers have attended, try to gather more small farmers; etc.
9. It would be beneficial to replicate this strategy in each village/locality from the start, otherwise you could end up with a need of young farmers and only old villages left! This means that you can try

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

to replicate the shares of farmers in each experimental group of 20 farmers, or that you can try to gather specific types of farmers where it is easier.

10. The sample built as above (i.e., with representative strata) should account for 400 farmers; the additional 100 farmers should be sampled as follows:
    a. If the initial sample of 400 farmers already includes at least 1/3 of either gender, you can allocate the additional 100 farmers using the same methodology (i.e. you replicate the size of the strata).
    b. Otherwise, you ask some of the households that both partners attend the experiments, but in a different session (we are assuming that there are no same sex couples, therefore all partners are a man and a woman). Please remember to do this from the beginning, because it would be difficult to gather the partners later and you will know from the beginning if one gender represents less than 1/3 of the farmers.
    c. If you reach 1/3 of the underrepresented gender before reaching 500 farmers, you can recruit the additional farmers to reach 500 using the initial stratification approach, or oversample other groups that are underrepresented (e.g. elderly farmers).
11. If you do not manage to reach at least 1/3 of both genders even after this stage (for example because the male farmers do not want to involve their partners), please let UNIBO and the JHI know and we will arrange some in-depth qualitative interviews with the female farmers who are able to attend.

In the following, we provide two examples of calculation of sample strata for countries with a different share of female farmers.

Example 1: In this country female farmers are a small minority. We assume that according to statistics, there are 50,000 farmers in the Food Hub area; this number is used to calculate the relative size of the sample strata, and thus the required size of each stratum in the initial sample of 400 farmers

Sample strata[1]	Farmers[2]	Shares	Sample	Partners (women)
Men, young, small size	16,500	33.0%	132	0
Men, young, large size	3,000	6.0%	24	0
Men, old, small size	23,500	47.0%	188	0
Men, old, large size	4,000	8.0%	32	0
Women, young, small size	1,200	2.4%	9	35
Women, young, large size	200	0.4%	2	6
Women, old, small size	1,500	3.0%	12	50
Women, old, large size	100	0.2%	1	9
TOTAL	50,000	100%	400	100

In the sample calculated based on the real population, women are 24 out of 400, i.e. 6.0%. This share is much lower that the required 33.3%. If all the additional 100 participants are chosen among female partners of the male farmers, the share of women is (100+24)/500=24.8%, which is still below the target of 33.3%. This means that you would need to recruit 100 women amongst the partners/wives of the participating farmers, following the distribution of the latter in terms of farm size, as shown in the last column. If this cannot be achieved, we can discuss a different solution. In addition, since the total share of women is still low, we will organise qualitative interviews with women; please get in touch with the JHI and UNIBO for this.

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

Example 2: In this country female farmers are almost 1/3. We assume that according to statistics, there are 70,000 farmers in the Food Hub; this number is used to calculate the relative sizes of the sample strata, and thus the required size of each stratum in the initial sample of 400 farmers

Sample strata[1]	Farmers[2]	Shares	Sample 1	Sample 2	Partners (women)
Men, young, small size	13,100	18.7%	75	82	0
Men, young, large size	6,400	9.1%	36	40	0
Men, old, small size	24,300	34.7%	139	153	0
Men, old, large size	9,200	13.1%	53	58	0
Women, young, small size	4,500	6.4%	26	28	15
Women, young, large size	1,700	2.4%	10	11	7
Women, old, small size	8,500	12.1%	48	53	28
Women, old, large size	2,300	3.3%	13	15	10
TOTAL	70,000	100.0 %	400	440	60

In the sample calculated based on the real population, women are 97 out of 400, i.e. 24.3%. This share is lower that the required 33.3%, but you do not need 100 female partners to achieve this target. To know how many female partners to involve, you can use the following formula:

;

f = share of female farmers in the Food Hub (here 0.243); p = partners to be called; s = new sample size.

Using this formula, you obtain that you need to involve p = 60 female partners. Hence, the new sample of s = 440 farmers can be sampled according to the initial strata, and your final sample strata become like those in the red columns at the end of the table. The distribution of the female partners should align to distribution of male farmers in terms of farm size, as shown in the last column.

[1] This is just an example of potential strata, and the final thresholds between groups can be defined by the local partners based on their knowledge of the local situation (e.g., the farm size can be used as a filtering variable instead of a stratifying variable, thus excluding 'large' smallholders; or the age groups can be three – young, adults, old).

[2] These examples are based on the assumption that you know the characteristics of all farmers in your Food Hub.

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

FOODLAND

Appendix 5: Survey instrument for crop farmers

Before you start, please read this!

The questionnaire does not require your name or any information with which you could be identified.

***Filling in the questionnaire is voluntary** - if you wish not to answer any of the questions, please, leave it blank!*

*The questionnaire is not a test – **there are no good or bad answers**.*

*Please **answer honestly and carefully**.*

We are grateful for your help.

Your farm location: Village [_____]

[*Only Food Hubs where the lab-in-the-field behavioural experiments are conducted with crop farmers*]
Please give your personal code found next to your name: ID code [_____]

Your farm

Your farm: the context

1. **Are you a member of a local farmers' association / organization / cooperative?**
   ☐ Yes ☐ No → Go to question 3.
2. **If yes, please indicate its/their name/s:** _____
   _____
3. **If you are receiving any technical assistance/service from cooperatives or from some other institution/organization, how important is it for you and your farm?** Tick √ the chosen answer

Not at all important	Slightly important	Somewhat important	Moderately important	Extremely important

4. **Are there any productive means/resources that you use in common with other farmers or with your community/organization (e.g., equipment, land/pasture, storage facilities, …)?**
   ☐ Yes ☐ No

Your farm: resources and technology

5. **What is the tenure status of the land you use for your work?** (you may choose more answers)
   (if you do not know the precise area of land in each condition, please indicate an approximate total)

Type of land	**Land size** (specify the unit: acres, …)
Leased / Rented-in	
Yours / your family property (formal title deed)	

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

Possessed (common/community land / trust land)	
Other (please specify)	
Total	

6. **What was the size of land for your main three cultivated crops during the last agricultural/production year or crop season? (Enumerators:** identify both the main crops for the Food Hub and the crops concerned by the innovation(s) before running the survey, and make sure to ask about each of those if the farmer does not mention them, e.g., because they are secondary)

Crop	**Land size** (specify the unit: acres, ha …)
1.	
2.	
3.	

7. **Did you irrigate your crops during the last agricultural/production year or crop season?**

☐ Yes ☐ No

8. **Imagine you are growing an irrigated crop and that a new irrigation system raising yields has been adopted in the area: to what extent would you consider introducing this technology in your farm?** Tick √ the chosen answer

I would not be interested	I would be interested in adopting if more than half of the farmers adopt	I would be interested in adopting if at least half of the farmers adopt	I would be interested in adopting if at least some of the farmers adopt	I would volunteer to be one of the first in my village

9. **Did you obtain any formal loan for your agricultural production last year (from banks or institutions/NGOs)?**

☐ Yes ☐ No

10. **Did you receive any informal credit last year (from friends, relatives, villagers, …)?**

☐ Yes ☐ No

11. **What affected your farm activities the most in last growing year/season?** (you may choose more than one answer)

Resource	Not at all a problem	Minor problem	Neutral	Moderate problem	Serious problem
Seed (shortage, quality, cost, …)					
Energy / fuel (access, cost, …)					
Pesticides (shortage, quality, cost, …)					
Fertilizers (shortage, quality, cost, …)					
Water (shortage, quality, cost, …)					
Equipment/tools (shortage, cost, …)					
Loan capital (access, cost, …)					
Land (shortage, quality, cost, …)					
Collaboration with other farmers					
Storage structures/facilities					
Information on innovations					

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

The views and opinions expressed in this document are the sole responsibility of the author and do not necessarily reflect the views of the European Commission.

Technical assistance/extension service					
Organizational issues (unfair contracting, lack of market access, …)					

12. **You are given the option to change your production activity by adopting a new technology (e.g., a new fertilizer, a new equipment/tool, or a new irrigation system) that allows you to overcome a limitation you are facing: to what extent would you be interested in adopting this technological innovation?** Tick √ the chosen answer

Not at all interested	Slightly interested	Somewhat interested	Moderately interested	Extremely interested

13. **Can you explain why?** Tick √ the chosen answer

Reason	Completely disagree	Somehow disagree	Neither agree nor disagree	Somehow agree	Completely agree
I like to try new ways of producing on my farm					
I prefer to avoid taking risks when it comes to managing my farm interests					
Most organisations promoting innovations in agriculture can be trusted					

Your farm: production

14. **With reference to the main three cultivated crops you grew during the last agricultural/production year or crop season, to what extent have you produced and sold from each crop?**

Crop	**Total quantity produced** (specify the unit: kg, …)	**Total quantity sold** (specify the unit: kg, …)	**On-farm-price per unit** (specify the unit: kg, …)
1.			
2.			
3.			

15. **Have you been growing the same crop(s) over the years?**

☐ Yes, but in different production unit
☐ Yes, in the same production units
☐ No → Go to question 17.

16. **If yes, why did you?** (multiple choice, tick the three most important reasons)

☐ Because it's a perennial crop
☐ That's what my parents / our ancestors did
☐ That's the tradition of our community
☐ Because I have the resources to do so (seed, soil quality, water, equipment, …)

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

☐ Because there is a demand for my product

☐ Because it's what the other farmers produce

☐ Because I don't know about any alternative

☐ Because I want to avoid any risk or trouble in my activity due to a change

☐ Because other crops I grew did not yield the results I expected

17. **Please assess the extent of losses of crop production you incurred during the last agricultural/production year or crop season:** Tick √ the chosen answer

Crop	**Phase**	**Losses**				
		Not at all important	Slightly important	Somewhat important	Moderately important	Extremely important
1.	In the field					
	Post-harvest					
2.	In the field					
	Post-harvest					
3.	In the field					
	Post-harvest					

18. **Think about a new technology – such as a new equipment or a new monitoring tool – that can enable you to reduce your crop production losses at the end of the third year. What do you choose between situation A and B?** Tick √ the chosen answer

☐ **A. keeping your current technology that implies for you:** • **no investment costs and** • **high crop production losses at the end of the third year (30 out of 100).**	☐ **B. adopting the new technology that implies for you:** • **some investment cost now and** • **lower crop production losses at the end of the third year (10 out of 100)**

19. **Imagine you can sell your crop production jointly with the other farmers' crop production so as to sell them at a slightly higher unit price for the whole group, but you have to align the variety you grow as well as the seeding and harvesting time with the group: would you sell your production jointly?** Tick √ the chosen answer

Not at all interested	Slightly interested	Somewhat interested	Moderately interested	Extremely interested

20. **You are given the option to change your production by introducing a new crop (e.g., an orphan crop, an improved vegetable line, or a novel local variety) with a higher nutritional content at parity of selling price and costs: to what extent would you be interested in adopting this new crop?** Tick √ the chosen answer

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

The views and opinions expressed in this document are the sole responsibility of the author and do not necessarily reflect the views of the European Commission.

Not at all interested	Slightly interested	Somewhat interested	Moderately interested	Extremely interested

21. **You are given the option to change your production by introducing a new crop (e.g., an orphan crop, an improved vegetable line, or a novel local variety) with a higher selling price at parity of costs: to what extent would you be interested in adopting this new crop?** Tick √ the chosen answer

Not at all interested	Slightly interested	Somewhat interested	Moderately interested	Extremely interested

About you

22. **Please indicate your:**

22.1 Age: _____

22.2 Gender: ☐ Male ☐ Female

22.3 Education level: [**Enumerator**: if the respondent is illiterate tick this box •]

☐ = no qualification, literate;

☐ = primary;

☐ = secondary;

☐ = more than secondary;

☐ = other (specify, e.g., apprenticeship) _____

[**Enumerators**: household members include (1) Head and his/her partner; (2) All of their unmarried children; (3) Their married children who are currently living and eating together; (4) Other relatives and non-relatives living and eating together for over 3 months.
Hence, the definition of household size is based on the number of people present in the home.]

22.4 No. of household members (adults 14 or older): _____

22.5 No. of children (aged 3-13 years): _____

22.6 No. of children (aged 0-2 years): _____

23. **Were you able to meet your household food needs during the last year?**

☐ Yes, more than enough

☐ Yes, I have what we need

☐ I have about what we need

☐ No, I experience some difficulties

☐

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

The views and opinions expressed in this document are the sole responsibility of the author and do not necessarily reflect the views of the European Commission.

No, I experience serious food shortages

24. **Do you or other household members possess a mobile phone?**

☐ Yes ☐ No

[**Enumerators**: migration of household members in the last 5 years]

25. **Did any of your household members emigrate to urban areas/abroad in search for a job?**

☐ Yes ☐ No → Go to question 27.

26. **If yes,**

26.1 How many of them? _____

26.2 Where did they emigrate? (you can choose more than one answer)

☐ other districts in the same region

☐ other region of same country

☐ other country in Africa

☐ out of Africa

26.3 Is their migration (you can choose more than one answer):

☐ permanent

☐ temporary (they plan to return after a given period)

☐ seasonal (they spend some time every year)

26.4 Do they (at least one of them) send remittances to you?

Yes ☐ ☐ No → Go to question 27

26.5 If yes, to what extent do those remittances contribute to your family welfare?

Not at all important	Slightly important	Somewhat important	Moderately important	Extremely important

26.6 Have you ever used these remittances to make farm investments (e.g., equipment, land, etc.)?

☐ Yes ☐ No

26.7 Do you use remittances to cover regular farm costs (e.g., seeds, feed, irrigation)?

☐ Yes, regularly ☐ Yes, sometimes ☐ No

27. **How many household members aged 14 or older are directly employed/involved in the farm during the last agricultural/production year or crop season?** _____

28. **How many people outside your household are directly employed/involved in the farm during the last agricultural/production year or crop season?** _____

29. **What is your average weekly/monthly household income from all sources?**
[please adapt the following classes according to the local average income in local currency (LC):

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

The views and opinions expressed in this document are the sole responsibility of the author and do not necessarily reflect the views of the European Commission.

lower than average, somewhat lower, about average, somewhat higher, higher than average]

☐ Weekly ☐ Monthly

Less than … (LC)	From … to … (LC)	From … to … (LC)	From … to … (LC)	Greater than … (LC)

30. What share of your household income is spent on purchased food?

☐ a very limited part (less than 25%)

☐ less than half (from 25 to 50%)

☐ about half (50%)

☐ more than half (from 50% to 75%)

☐ almost all (from 75% to 100%)

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

The views and opinions expressed in this document are the sole responsibility of the author and do not necessarily reflect the views of the European Commission.

31. What share of your household income is used to cover farm costs?

- ☐ a very limited part (less than 25%)
- ☐ less than half (from 25 to 50%)
- ☐ about half (50%)
- ☐ more than half (from 50% to 75%)
- ☐ almost all (from 75% to 100%)

32. Did you experience any of the following setbacks during the last year?

Troubles	Not at all important	Slightly important	Somewhat important	Moderately important	Extremely important
Food shortage/starvation					
Health (disease)					
Drought					
Flood					
Infestation/pest					
Dispossession of land					
Cost increase (price of fertilizer or seed)					
Loss of off-farm job					
Income reduction					
Social problems (violence or crime)					
Other (specify:)					

33. Regarding your near future, are you worried about any of the reasons below?

Reason	Not at all important	Slightly important	Somewhat important	Moderately important	Extremely important
Food shortage/starvation					
Health (disease)					
Drought					
Flood					
Infestation/pest					
Dispossession of land					
Cost increase (price of fertilizer or seed)					
Loss of off-farm job					
Income reduction					
Social problems (violence or crime)					
Other (specify:)					

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

34. **Generally speaking, would you say that most farmers working in your village/ward can be trusted or that you can't be too careful in dealing with them?**

☐	Most farmers can be trusted
☐	It depends
☐	Can't be too careful

35. **Do you think most farmers working in your village/ward would try to take advantage of you if they got a chance, or would they try to be fair?**

☐	Would try to be fair
☐	It depends
☐	Would take advantage

36. **Would you say that most of the time farmers working in your village/ward try to be helpful, or that they are mostly just looking out for themselves?**

☐	Try to be helpful
☐	It depends
☐	Just look out for themselves

The questionnaire is complete. Thank you very much for your collaboration!

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

Appendix 6: Survey instrument for fish farmers

Before you start, please read this!

The questionnairedoes not require your name or any information with which you could be identified.

***Filling in the questionnaire is voluntary** - if you wish not to answer any of the questions, please, leave it blank!*

*The questionnaire is not a test – **there are no good or bad answers**.*

*Please **answer honestly and carefully**.*

We are grateful for your help.

Your farm location: Village [_____]

[*Only Food Hubs where the lab-in-the-field behavioural experiments are conducted with fish farmers*]
Please give your personal code found next to your name: ID code [_____]

Your farm

Your farm: the context

1. **Are you a member of a local farmers' association / organization / cooperative?**

   ☐ Yes ☐ No→ Go to question 3.

2. **If yes, please indicate its/their name/s:**

   _____

3. **If you are receiving any technical assistance/service from cooperatives or from some other institution/organization, how important is it for you and your farm?** Tick √ the chosen answer

Not at all important	Slightly important	Somewhat important	Moderately important	Extremely important

4. **Are there any productive means/resources that you use in common with other farmers or with your community/organization (e.g., equipment, land/ponds, …)?**

   ☐ Yes ☐ No

Your farm: resources and technology

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

5. **Tenure status of the ponds/tanks/cages you use for your work:** (you may choose more answers)

Tenure of area holding your system	Tick as appropriate
Leased / Rented-in	
Yours / your family property (formal title deed)	
Possessed (common/community land/trust land)	
Other (please specify)	

6. **What is your production system (pond / tank / cage / etc.)?** _____

7. **What is the number and total size of your ponds/tanks/cages?**
(if you do not know the precise area of land in each condition, please indicate an approximate total)

Production system	Number	Total size (specify the unit: M^3 …)
Ponds		
Tanks		
Cages		
Total		

8. **What was the total size used for the three main farmed fish species during the last production year or cycle? (Enumerators:** identify both the main fish species/ type for the Food Hub and the species concerned by the innovation(s) before running the survey, and make sure to ask about each of those if the farmer does not mention them, e.g., because they are secondary)

Fish species	Total size (specify the unit: M^3 …)
1.	
2.	
3.	

9. **If a new technology that for example drains water from the bottom of the pond to remove the ammonia contaminated water is introduced in your area: to what extent would you consider introducing it for use in your ponds.** Tick √ the chosen answer

I would not be interested	I would be interested in adopting if more than half of the farmers adopt	I would be interested in adopting if at least half of the farmers adopt	I would be interested in adopting if at least some of the farmers adopt	I would volunteer to be one of the first in my village

10. **Did you obtain any formal loan for your fish production last year (from banks or institutions/NGOs)?**

☐ Yes ☐ No

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

11. **Did you receive any informal credit last year (from friends, relatives, villagers, …)?**

☐ Yes ☐ No

12. **What affected your farm activities the most in last rearing season?** (you may choose more than one answer)

Resource	Not at all a problem	Minor problem	Neutral	Moderate problem	Serious problem
Fingerlings (shortage, quality, cost,)					
Feed (shortage, quality, cost, …)					
Energy / fuel (access, cost, …)					
Chemicals (shortage, quality, cost, …)					
Fertilizers (shortage, quality, cost, …)					
Water (shortage, quality, cost, …)					
Equipment/tools (shortage, cost, …)					
Loan capital (access, cost, …)					
Land (shortage, quality, cost, …)					
Collaboration with other farmers					
Storage structures/facilities					
Information on innovations					
Technical assistance/extension service					
Organizational issues (unfair contracting, lack of market access, …)					

1. **You are given the option to change your production activity by adopting a new technology (e.g. a new fertilizer, a new equipment/tool, or a new production-water generation technology) that allows you to overcome a limitation you are facing: to what extent would you be interested in adopting this technological innovation?** Tick √ the chosen answer

Not at all interested	Slightly interested	Somewhat interested	Moderately interested	Extremely interested

2. **Can you explain why?** Tick √ the chosen answer

Resource	Completely disagree	Somehow disagree	Neither agree nor disagree	Somehow agree	Completely agree
I like to try new ways of producing on my farm					
I prefer to avoid taking risks when it comes to managing my farm interests					
Most organisations promoting innovations in agriculture/ aquaculture can be trusted					

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

Your farm: production

3. **With reference to the three main farmed fish species you grew during the last production year or cycle, to what extent have you produced and sold from each species?**

Fish species	**Total quantity produced** (specify the unit: kg, …)	**Total quantity sold** (specify the unit: kg, …)	**On-farm-price per unit** (specify the unit: kg, …)
1.			
2.			
3.			

4. **With reference to the three main farmed fish species you grew during the last production year or cycle, which method of farming do you use to farm your fish and which species?**

Fish species	**Method of farming**	
	Poly culture	**Monoculture**
1.		
2.		
3.		

5. **Have you been farming the same fish species over the years?**

☐ Yes, but in different production unit
☐ Yes, in the same production units
☐ No → Go to question 19.

6. **If yes, why did you?** (multiple choice, tick the three most important reasons)

☐ Because it's a major farmed fish species
☐ That's what my parents / our ancestors did
☐ That's the tradition of our community
☐ Because I have the resources to do so (seed, feed, water, equipment, …)
☐ Because there is a demand for my product
☐ Because it's what the other farmers produce
☐ Because I don't know about any alternative
☐ Because I want to avoid any risk or trouble in my activity due to a change
☐ Because other fish species I grew did not yield the results I expected

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

7. **Please assess the extent of losses of fish production you incurred during the last production year or cycle:**

Fish species	Losses				
	Not at all important	Slightly important	Somewhat important	Moderately important	Extremely important
1.					
2.					
3.					

5. **Think about a new technology – such as a new equipment or a new monitoring tool – that can enable you to reduce your fish production losses at the end of the third year. What do you choose between situation A and B?** Tick √ the chosen answer

☐ **A. keeping your current technology that implies for you:** • **no investment costs and** • **highfish production losses at the end of the third year (30 out of 100).**	☐ **B. adopting the new technology that implies for you:** • **some investment cost now and** • **lowerfish production losses at the end of the third year (10 out of 100)**

6. **Imagine you can sell your fish production jointly with the other farmers' fish so as to sell them at a slightly higher unit price for the whole group, but you have to align the species you grow as well as the stocking and harvesting time with the group: would you sell your production jointly?** Tick √ the chosen answer

Not at all interested	Slightly interested	Somewhat interested	Moderately interested	Extremely interested

7. **You are given the option to change your production by introducing a new fish species (e.g., locally demanded but rare, improved faster growing breed, or a novel local fish species) with a higher nutritional content at parity of selling price and costs: to what extent would you be interested in adopting this new fish species/ breed?** Tick √ the chosen answer

Not at all interested	Slightly interested	Somewhat interested	Moderately interested	Extremely interested

8. **You are given the option to change your production by introducing a new fish species (e.g., locally demanded but rare, improved faster growing breed, or a novel local fish) with a higher selling price at parity of costs: to what extent would you be interested in adopting this new fish species/ breed?** Tick √ the chosen answer

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

Not at all interested	Slightly interested	Somewhat interested	Moderately interested	Extremely interested

About you

9. Please indicate your:

24.1 Age: _____

24.2 Gender: ☐ Male ☐ Female

24.3 Education level: [**Enumerator**s: if the respondent is illiterate tick this box •]

☐ = no qualification, literate;

☐ = primary;

☐ = secondary;

☐ = more than secondary;

☐ = other (specify, e.g., apprenticeship)_____

[**Enumerators**: household members include (1) Head and his/her partner; (2) All of their unmarried children; (3) Their married children who are currently living and eating together; (4) Other relatives and non-relatives living and eating together for over 3 months.
Hence, the definition of household size is based on the number of people present in the home.]

24.4 No. of household members (adults 14 or older): _____

24.5 No. of children (aged 3-13 years): _____

24.6 No. of children (aged 0-2 years):_____

10. Were you able to meet your household food needs during the last year?

☐ Yes, more than enough

☐ Yes, I have what we need

☐ I have about what we need

☐ No, I experience some difficulties

☐ No, I experience serious food shortages

11. Do you or other household members possess a mobile phone?

☐ Yes ☐ No

[**Enumerators**: migration of household members in the last 5 years]

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

12. **Did any of your household members emigrate to urban areas/abroad in search for a job?** ☐ Yes ☐ No→ Go to question 29.

13. **If yes,**

28.1 How many of them? _____

28.2 Where did they emigrate? (you can choose more than one answer)

☐ other districts in the same region

☐ other region of same country

☐ other country in Africa

☐ out of Africa

28.3 Is their migration (you can choose more than one answer):

☐ permanent

☐ temporary (they plan to return after a given period)

☐ seasonal (they spend some time every year)

28.4 Do they (at least one of them) send remittances to you?

☐ Yes ☐ No→ Go to question 29.

28.5 If yes, to whatextent do those remittances contribute to your family welfare?

Not at all important	Slightly important	Somewhat important	Moderately important	Extremely important

28.6 Have you ever used these remittances to make farm investments (e.g., equipment, land, etc.)?

☐ Yes ☐ No

28.7 Do you use remittances to cover regular farm costs (e.g., feed, aquaculture system)?

☐ Yes, regularly ☐ Yes, sometimes

☐ No

14. **How many household members aged 14 or older are directly employed/involved in the farm during the last production year or cycle?** _____

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

15. **How many people outside your household are directly employed/involved in the farm during the last production year or cycle?** _____

16. **What is your average weekly/monthly household income from all sources?**
[please adapt the following classes according to the local average income in local currency (LC):
lower than average, somewhat lower, about average, somewhat higher, higher than average]

☐ Weekly ☐ Monthly

Less than …	From … to …	From … to …	From … to …	Greater than …

17. **What share of your household income is spent on purchased food?**

☐ a very limited part (less than 25%)
☐ less than half (from 25 to 50%)
☐ about half (50%)
☐ more than half (from 50% to 75%)
☐ almost all (from 75% to 100%)

18. **What share of your household income is used to cover farm costs?**

☐ a very limited part (less than 25%)
☐ less than half (from 25 to 50%)
☐ about half (50%)
☐ more than half (from 50% to 75%)
☐ almost all (from 75% to 100%)

19. **Did you experience any of the following setbacks during the last year?**

Troubles	Not at all important	Slightly important	Somewhat important	Moderately important	Extremely important
Food shortage/starvation					
Health (disease)					
Drought					
Flood					

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

Infestation/pest/ fish diseases					
Dispossession of land					
Cost increase (e.g., price of feed)					
Loss of off-farm job					
Income reduction					
Social problems (violence or crime)					
Other (specify:)					

20. Regarding your near future, are you worried about any of the reasons below?

Reason	Not at all important	Slightly important	Somewhat important	Moderately important	Extremely important
Food shortage/starvation					
Health (disease)					
Drought					
Flood					
Infestation/pest/ fish diseases					
Dispossession of land					
Cost increase (e.g., price of feed)					
Loss of off-farm job					
Income reduction					
Social problems (violence or crime)					
Other (specify:)					

21. Generally speaking, would you say that most farmers working in your village/ward can be trusted or that you can't be too careful in dealing with them?

☐ Most farmers can be trusted ☐ It depends ☐ Can't be too careful

22. Do you think most farmers working in your village/ward would try to take advantage of you if they got a chance, or would they try to be fair?

☐ Would try to be fair ☐ It depends ☐ Would take advantage

23. Would you say that most of the time farmers working in your village/ward to be helpful, or that they are mostly just looking out for themselves?

☐ Try to be helpful ☐ It depends ☐ Just look out for themselves

The questionnaire is complete. Thank you very much for your collaboration!

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

Appendix 7: Instructions for data entry (experiments)

Data Table instructions

The excel spreadsheet consists of 7 different data collection tables in 7 separate sheets, in a single Excel document. The tables are color-coded, with each colour corresponding to a different table:

Black – General participant information table

Dark blue – Risk Attitudes table

Grey – Time Preferences game table

Green – Public Good Game round 1 and questionnaire 1 tables (2 separate sheets)

Red – Public good game round 2 table

Purple – Table of Tokens Due

Different Excel spreadsheet should be used for each session, each spreadsheet should only consist of one experimental session. Each session should be saved and the saved file should include the session number in the file name. The spreadsheets will be merged together after all the experimental sessions are run.

In order to input the data in the most efficient way, a data entry form should be set up. Follow this link for instructions on how to set up a data entry form for the tables on your device: https://support.microsoft.com/en-us/office/add-edit-find-and-delete-rows-by-using-a-data-form-17bca0a4-3ba5-444a-983c-a8ce70609374

Both of the public good game tables have a column for Treatment ID, this should be filled under the following rules:

-Put in the number 1 if the PGG has a standard format (participants put their tokens in the common pool, equal initial endowment, multiplication factor = 2, benefits their own group)

-Put in the number 2 if the initial endowment is unequal (participants put their tokens in the common pool, unequal initial endowment, multiplication factor = 2, benefits their own group)

-Put in the number 3 if the participant plays to benefit the other group (participants put their tokens in the common pool, equal initial endowment, multiplication factor = 2, benefits the other group)

-Put in the number 4 if the participant can take money from the common pool (participants take from the common pool, equal initial endowment, multiplication factor = 2, benefits their own group)

-Put in the number 5 if the multiplication factor is 1.5 (participants put their tokens into the common pool, equal initial endowment, multiplication factor = 1.5, benefits their own group)

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

-Put in the number 6 if the participant plays with only the participants of the same gender (participants put their tokens in the common pool, equal initial endowment, multiplication factor = 2, benefits their own group, same gender group)

-Put in the number 7 if participants take from the common pool and play to benefit the other group (participants take from the common pool, equal initial endowment, multiplication factor = 2, benefits the other group)

For example, if the participants have to decide how much to put into the common pool share, when the initial endowment is unequal, the multiplication factor is 2 and the participant plays to benefit his/her own group the Treatment ID is: 2

In order to ensure accurate data entry, data validation was implemented in each table. Each cell in the table will only accept the values specified by the data validation i.e., values that correspond to only the choices that are possible for the chosen cell. For example, the risk attitudes table will only accept values ranging from 0 to a 100, as this is the only possible choice range for participants in that task.

List of data validation format constraints (In case an unexpected error message appears when entering data, please consult this list):

1. General participant information table
    a. Interview date – any date in DD/MM/YYYY format
    b. Starting time – any time between 00:00 – 23:59 in HH:MM format
    c. Ending time - any time between 00:00 – 23:59 in HH:MM format
2. Public Good Game – round 1
    a. Amount put in the common account, amount of tokens kept by the participant – any whole number from 0 to 150
    b. Amount of tokens received from the common pool share – any whole number from 0 to 300
    c. Treatment ID – any whole number from 1 to 7
3. Public Good game table – round 2
    a. Amount put in the common account, amount kept by the participant – any whole number from 0 to 150
    b. Amount of tokens received from the common pool– any whole number from 0 to 300
    c. Treatment ID – any whole number from 1 to 7
4. Questionnaire 1 table
    a. Q1a, Q1b, Q2 – any whole number higher or equal to 0
    b. Q3 – any whole number from 0 to 20
5. Risk attitudes table
    a. Choice 1-10 – A, a, B, b
    b. Choice drawn to be executed – any whole number from 1 to 10
    c. Colour of the drawn ball – answers available: red, white, RED, WHITE, Red, White, R, W, r, w
    d. Tokens due – a whole number from 0 to 200
6. Time preferences game table
    a. Choice 1-10 – answers available: A, a, B, b

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

b. Q1 – any whole number greater or equal to
c. Q2 – a whole number from 1 to 5
d. Number from the random draw – a whole number from 1 to 10
e. Tokens due- a whole number between 0 and 200
f. When is the amount due? – answers available: 2, 4, 2 weeks, 2 WEEKS, 2 w, 2 W, 2 Weeks, 4 weeks, 4 WEEKS, 4 Weeks, 4 w, 4 W

7. Table of Tokens due – no constraints, the table automatically calculates the tokens, using the numbers put into the previous tables

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

Appendix 8: Session material list for experimental sessions

Before the start of the experiment, prepare one big envelope for each participant. In the big envelope there should be four smaller envelopes, each corresponding to a different game. The big envelopes and each of the four small envelopes should have the unique participant ID on it. The four small envelopes should also have 4 different symbols on them. All the sheets of paper in the small envelopes should also include the same shape of the small envelope, and the unique ID of the participant.

Each of the four small envelopes has a different content:

- Triangle shape corresponding to the first round of the public good game: should include FoodLAND banknotes (1 banknote of value 1, 2 banknotes of value 2, 1 banknote of value 5, 2 banknotes of value 10, 1 banknote of value 20, 2 banknotes of value 50), questionnaire 1, and visuals (images 03 and 04)
- Star shape corresponding to the second round of the public good game: should include FoodLAND banknotes (1 banknote of value 1, 2 banknotes of value 2, 1 banknote of value 5, 2 banknotes of value 10, 1 banknote of value 20, 2 banknotes of value 50)
- Square shape corresponding to the risk attitudes experiment: should include the relative answer sheet
- Circle shape corresponding to the time preferences game: should include the relative answer sheet

The big envelopes, containing the 4 smaller envelopes must be distributed to the participants before the start of the session.

List of experiment materials per each session of 20 participants:

- Participant information list, with participant ID
- Procedural script for the enumerators
- Stipend and reward money
- Stipend receipts
- Ping-pong balls (at least 9 red and 8 white)
- Box for the balls and paper sheets, ideally non-see-through

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

- FoodLAND banknotes – used in public good game, enough banknotes to pay between 30 and 420 in each round for each participant. This could be achieved with the following combination of notes (per participant **and per round**): 2 banknotes of value 1, 4 banknotes of value 2, 2 banknotes of value 5, 4 banknotes of value 10, 2 banknotes of value 20, 6 banknotes of value 50, 2 banknotes of value 100 – total of 22 banknotes per person per round
- Numbered paper sheets – from 1 to 10 (10 sheets minimum)
- Minimum 20 pens per session
- Minumum 20 large envelopes
- Minimum 80 small envelopes
- 20 Questionnaire 1
- 20 risk attitude measurement experiment sheet
- 20 time preferences experiment sheet
- Digital data entry table
- Vouchers for delayed money collection – 2 types (collection after 2 or 4 weeks)
- Minimum 20 small bottles of hand sanitiser
- Minimum 20 disposable face masks
- Visuals (20 of each images 03 and 04) for the experiments (Public Good Game)

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

Appendix 9: Interview guide to be used for in depth survey of female farmers (optional complementary activity)

In-depth interview guide

Female Farmers

Some issues to take into account before the interview:

- It is important to make the interviewees (female farmers) feel as comfortable as possible; they need to feel secure to speak, as we are asking to tell us about their everyday life, personal perceptions and feelings. In this sense, the **interviewers should be women** too, and it is strongly recommended that they fulfil all or most of these **characteristics:**
  - She should be thoroughly familiar with gender issues, and the focus of the interview
  - She should be gentle, let the interviewee finish when she is talking, give her time to think, and tolerate the pauses.
  - She should speak clearly, and try to use a language that is comprehensive and relevant for the women we are going to be interviewing.
  - She should be sensitive, and create a comfortable atmosphere, although empathy should interfere with the third party role of the researcher.
  - She should be no-judgemental, let the interviewee express herself.
  - She should be a good listener, being active and alert in the interview. The interviewer should be able to pick up on things interviewees mention, and ask new questions to follow up on a specific issue.
  - She should be balanced, neither talking too much, making the interviewee passive; neither talking too little, as the interviewee could feel she is not talking along the right line.
- Regarding **the setting** it is important for it to be **quiet** (quality of the recording) **and especially private**, the female farmers we will interview should not be worried about being overheard, they should feel secure to describe their realities and say what they think.
- Even if we have an interview guide, questions might vary both in order, or wording. The **interview guide is a flexible tool** that will be used as a reference. But it will be more important for the interview / conversation to follow a natural / comprehensive order, than strictly following the interview guide. However, we have thought it giving it a logical order.
- Ideally **it would be good to record the interviews**, as this will be a useful backup for consultation/correct the natural limitations of our memory. It will led the interviewer focus on the interview, rather than being only focused on taking notes off what it is mentioned.

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

- Regarding this, we should ask for permission to the interviewee. Explain her that the recording will be used only to enrich the notes we take, and it will then be destroyed. But if she does not feel comfortable being recorded we should avoid it.
- Even if the interview is being recorded, make sure to take notes. Technology sometimes does not work, and we took no notes at all we could end up only relying on the interviewers memory, and information could be too vague.

Draft interview-guide:

Recording of general "factsheet" information. Such as: Food Hub nº, and profile questions-ID

11. Please tell me about the different activities you implement during a day from the time you wake up, to the time you go to sleep. (Describe your routine, average day)
- Hints: ask about household chores, childcare, off-farm jobs (e.g., seller, etc.)

12. Could you tell me the main challenges, obstacles or problems you face in your day-to-day?
- And how do you deal with those challenges, does anything or anyone help you in doing so?
- Hints: are other female farmers or women in your community an asset to you? We would like to know what/who they rely on to face their everyday difficulties. Everyday difficulties could be things such as lack of time, not being able to do something, not being able to go somewhere, not having something or anything they mention as a problem.

13. In your household, how do you take farm related decisions? Who is involved in that process?

14. Which farm-related tasks are mainly implemented by you and which by other household members (e.g., ploughing, seeding, weeding, harvesting, food processing, selling in the market, etc.)?

15. How is the family land managed and transferred across people and generations in your village?
- Hint: is that your case too? Was it different for some reason?

16. [If the farmer has at least one daughter.] Thinking about farm succession, would you recommend to your daughter to taking over your farm? Or would you prefer if your son does it? Why?
- Hints: ask her option about female education, and especially farm-related education, for success in farming/life, and for freedom of decision/autonomy

17. Are you involved in dealing with market stakeholders (e.g., in negotiations with input suppliers, purchasers, credit institutions, etc.) for the management of the farm? If not, is someone else from your household dealing with these stakeholders? If yes,

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

do you feel that you are discriminated compared to male farmers when dealing with these stakeholders?

18. Are you involved in dealing with public institutions in the framework of farming activities? If not, is someone else from your household dealing with these institutions? If yes, do you feel that you are discriminated compared to male farmers when dealing with these institutions? Can you mention any discriminatory regulations in place?

19. We are interviewing you today as a female farmer. How do you value yourself as a farmer? Would you say you are good at it? And as a woman?

20. To conclude, could you please tell me what would make you happy, and what I mean is, what or how could your life be improved?

21. Would you like to add anything else?

Thank you very much for your collaboration!

REMINDER- Some characteristics of a qualitative interview:

- Qualitative in-depth interview tends to be much less structured than quantitative surveys; there is an emphasis on greater generality in the formulation of initial research ideas, and on interviewees' own perspective.
- A great interest in the interviewee's point of view.
- Rambling or going off at tangents is often encouraged since it gives insight into what the interviewee sees as relevant or important.
- The interviewer can ask new questions that follow up interviewees replies and can vary the order and even the wording in questions.
- The interview tends to be flexible, responding to the direction in which interviewees take the interview and to the issues that emerge in the course of the interview.

We want reach and detailed answers, as opposed to answers that could be easily coded in quantitative or very structured interviews.

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

Appendix 10: Surveys: comparison across countries (tables and graphs) – complete overview

Farmer

Farmer gender

Table 1: Farmer gender (count)

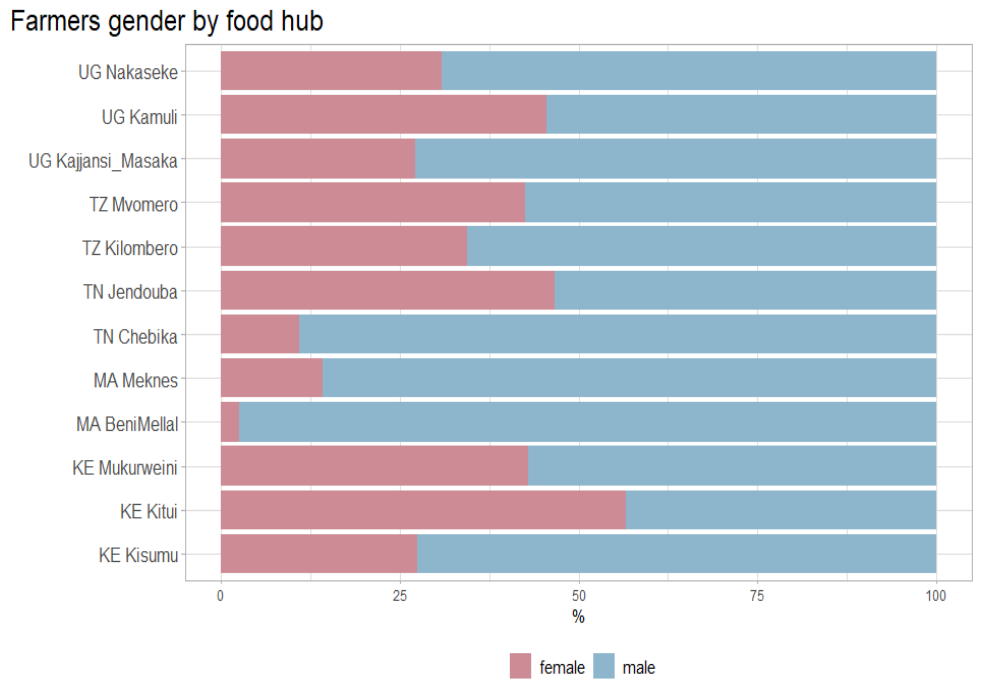
country	hub	male	female	row.sum
KE	Kisumu	292	111	403
	Kitui	209	273	482
	Mukurweini	288	217	505
	Subtotal	789	601	1,390
MA	BeniMellal	390	10	400
	Meknes	429	71	500
	Subtotal	819	81	900
TN	Chebika	384	47	431
	Jendouba	267	233	500
	Subtotal	651	280	931
TZ	Kilombero	267	140	407
	Mvomero	290	214	504
	Subtotal	557	354	911
UG	Kajjansi_Masaka	370	138	508
	Kamuli	218	182	400
	Nakaseke	277	123	400
	Subtotal	865	443	1,308
Total		3,681	1,759	5,440

Table 2: Farmer gender (% values)

country	hub	male	female	row.sum
KE	Kisumu	72.5	27.5	100
	Kitui	43.4	56.6	100
	Mukurweini	57.0	43.0	100

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

country	hub	male	female	row.sum
	Subtotal	56.8	43.2	100
MA	BeniMellal	97.5	2.5	100
	Meknes	85.8	14.2	100
	Subtotal	91.0	9.0	100
TN	Chebika	89.1	10.9	100
	Jendouba	53.4	46.6	100
	Subtotal	69.9	30.1	100
TZ	Kilombero	65.6	34.4	100
	Mvomero	57.5	42.5	100
	Subtotal	61.1	38.9	100
UG	Kajjansi_Masaka	72.8	27.2	100
	Kamuli	54.5	45.5	100
	Nakaseke	69.2	30.8	100
	Subtotal	66.1	33.9	100
Total		67.7	32.3	100



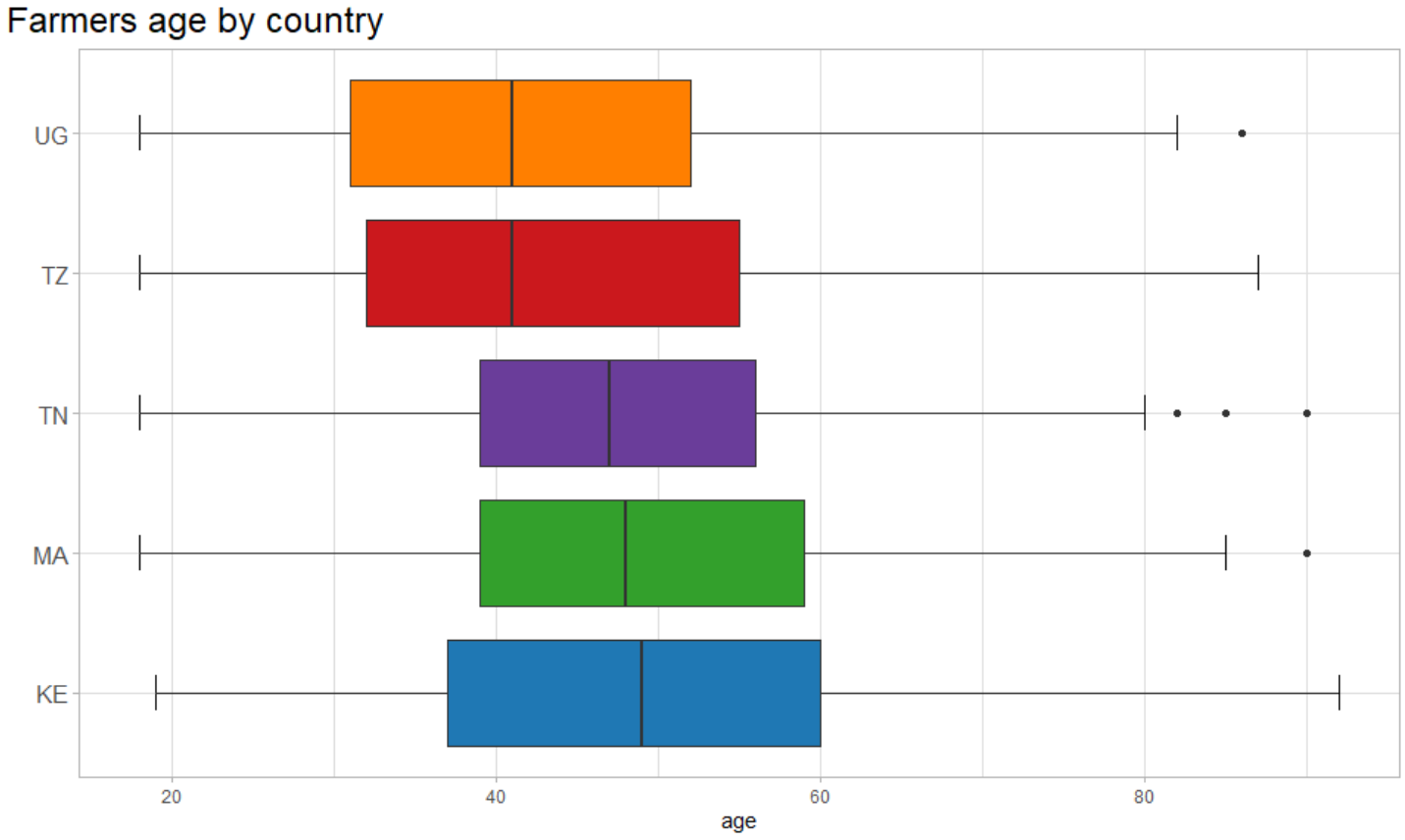
Farmer age

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

Table 3: Farmer age

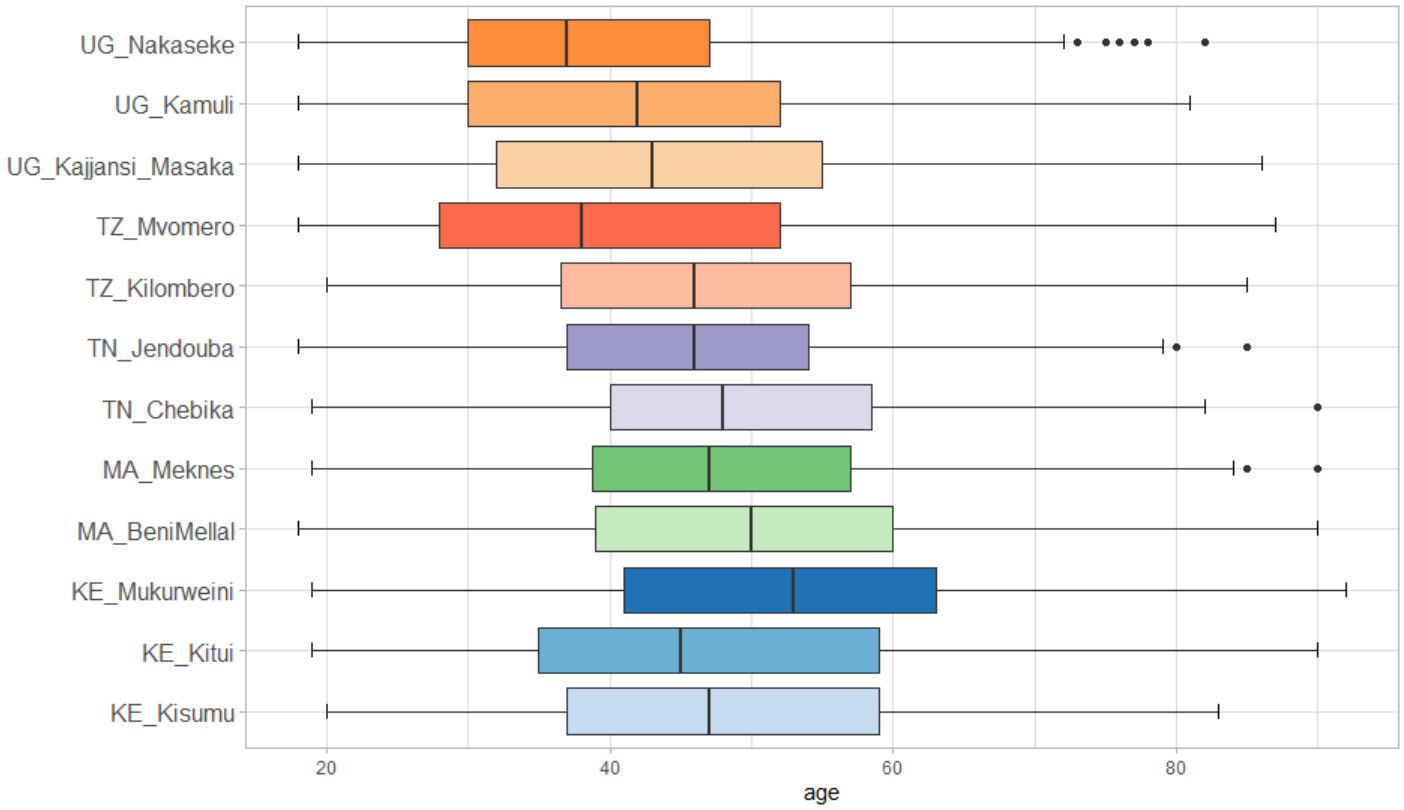
country	hub	average
KE	Kisumu	47.8
	Kitui	46.0
	Mukurweini	52.3
	Subtotal	48.8
MA	BeniMellal	49.6
	Meknes	48.2
	Subtotal	48.8
TN	Chebika	48.9
	Jendouba	45.5
	Subtotal	47.1
TZ	Kilombero	47.0
	Mvomero	41.0
	Subtotal	43.7
UG	Kajjansi_Masaka	44.4
	Kamuli	41.7
	Nakaseke	39.5
	Subtotal	42.1
Total	-	46.0

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).



FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

Farmer age by food hub



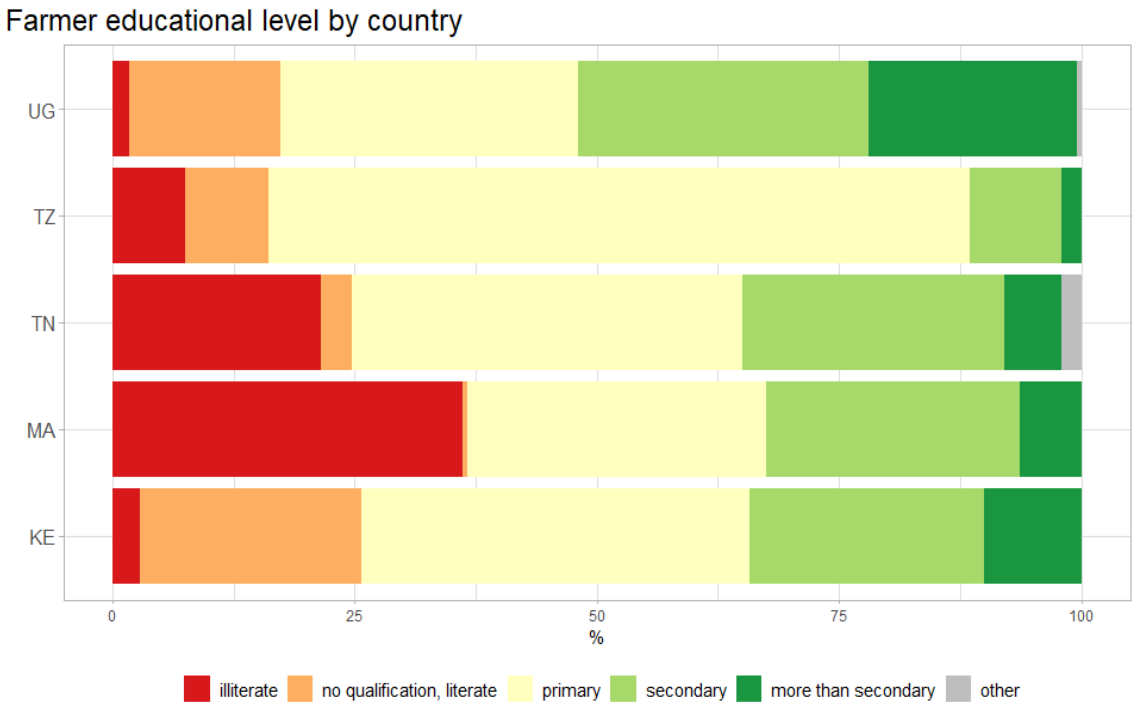
Farmer educational level

Table 4: Educational level by food hub (% values)

country	hub	illiterate	no qualification, literate	primary	secondary	more than secondary	other	row.sum
KE	Kisumu	2.0	17.4	44.2	30.5	6.0	0.0	100
	Kitui	2.5	21.8	41.9	24.1	9.8	0.0	100
	Mukurweini	3.8	28.5	35.0	19.2	13.5	0.0	100
	Subtotal	2.8	22.9	40.1	24.2	10.0	0.0	100
MA	BeniMellal	35.8	1.0	22.8	30.5	10.0	0.0	100
	Meknes	36.4	0.2	37.2	22.8	3.4	0.0	100
	Subtotal	36.1	0.6	30.8	26.2	6.3	0.0	100
TN	Chebika	12.3	0.0	48.0	31.3	8.4	0.0	100
	Jendouba	29.4	6.0	33.6	23.2	3.8	4.0	100
	Subtotal	21.5	3.2	40.3	27.0	5.9	2.1	100

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

country	hub	illiterate	no qualification, literate	primary	secondary	more than secondary	other	row.sum
TZ	Kilombero	2.0	5.2	73.7	15.7	3.4	0.0	100
	Mvomero	11.9	11.3	71.4	4.6	0.8	0.0	100
	Subtotal	7.5	8.6	72.4	9.5	2.0	0.0	100
UG	Kajjansi_Masaka	4.5	6.3	19.5	33.5	35.4	0.8	100
	Kamuli	0.0	18.2	35.2	31.8	14.8	0.0	100
	Nakaseke	0.0	24.8	40.2	23.8	10.2	1.0	100
	Subtotal	1.8	15.6	30.7	30.0	21.4	0.6	100
Total		12.0	11.7	41.7	23.9	10.1	0.5	100



FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

Household size

Table 5: Household size by food hub (average values)

country	hub	adults 14 older	oraged years	3-13aged years	0-2	Total
KE	Kisumu	3.65	1.72	0.30		5.67
	Kitui	3.98	1.45	0.31		5.74
	Mukurweini	4.10	0.97	0.14		5.21
	Subtotal	3.93	1.35	0.25		5.53
MA	BeniMellal	4.73	0.67	0.11		5.51
	Meknes	5.07	0.99	0.20		6.26
	Subtotal	4.92	0.84	0.16		5.93
TN	Chebika	4.35	0.98	0.16		5.50
	Jendouba	3.99	0.88	0.13		5.00
	Subtotal	4.16	0.93	0.15		5.23
TZ	Kilombero	3.06	1.66	0.81		5.52
	Mvomero	3.02	1.70	0.56		5.28
	Subtotal	3.04	1.68	0.67		5.39
UG	Kajjansi_Masaka	5.31	2.73	0.70		8.75
	Kamuli	4.61	2.91	0.65		8.16
	Nakaseke	3.92	2.77	0.72		7.42
	Subtotal	4.67	2.80	0.69		8.16
Total	-	4.16	1.60	0.39		6.15

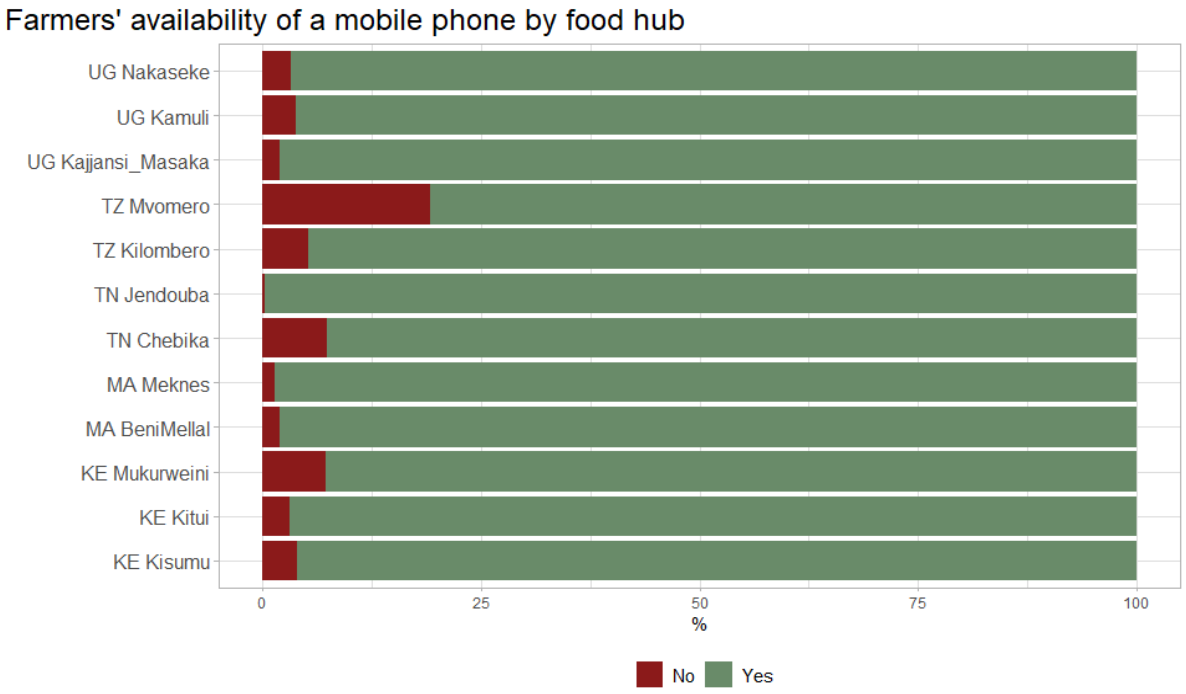
Availability of a mobile phone

Table 6: Do the farmer or other household members possess a mobile phone? (row %)

country	hub	Yes	No	row.sum
KE	Kisumu	96.0	4.0	100
	Kitui	96.9	3.1	100
	Mukurweini	92.7	7.3	100
	Subtotal	95.1	4.9	100
MA	BeniMellal	98.0	2.0	100
	Meknes	98.6	1.4	100

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

country	hub	Yes	No	row.sum
	Subtotal	98.3	1.7	100
TN	Chebika	92.6	7.4	100
	Jendouba	99.8	0.2	100
	Subtotal	96.5	3.5	100
TZ	Kilombero	94.8	5.2	100
	Mvomero	80.8	19.2	100
	Subtotal	87.0	13.0	100
UG	Kajjansi_Masaka	98.0	2.0	100
	Kamuli	96.2	3.8	100
	Nakaseke	96.8	3.2	100
	Subtotal	97.1	2.9	100
Total		95.0	5.0	100



FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

Emigration

Table 7: Farmers whose family members have migrated to urban areas/abroad in search of work (% values)

country	hub	Yes	No	row.sum
KE	Kisumu	28.0	72.0	100
	Kitui	45.4	54.6	100
	Mukurweini	40.4	59.6	100
	Subtotal	38.6	61.4	100
MA	BeniMellal	41.2	58.8	100
	Meknes	26.6	73.4	100
	Subtotal	33.1	66.9	100
TN	Chebika	10.9	89.1	100
	Jendouba	39.4	60.6	100
	Subtotal	26.2	73.8	100
TZ	Kilombero	34.2	65.8	100
	Mvomero	14.3	85.7	100
	Subtotal	23.2	76.8	100
UG	Kajjansi_Masaka	51.6	48.4	100
	Kamuli	40.8	59.2	100
	Nakaseke	39.0	61.0	100
	Subtotal	44.4	55.6	100
Total		34.4	65.6	100

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

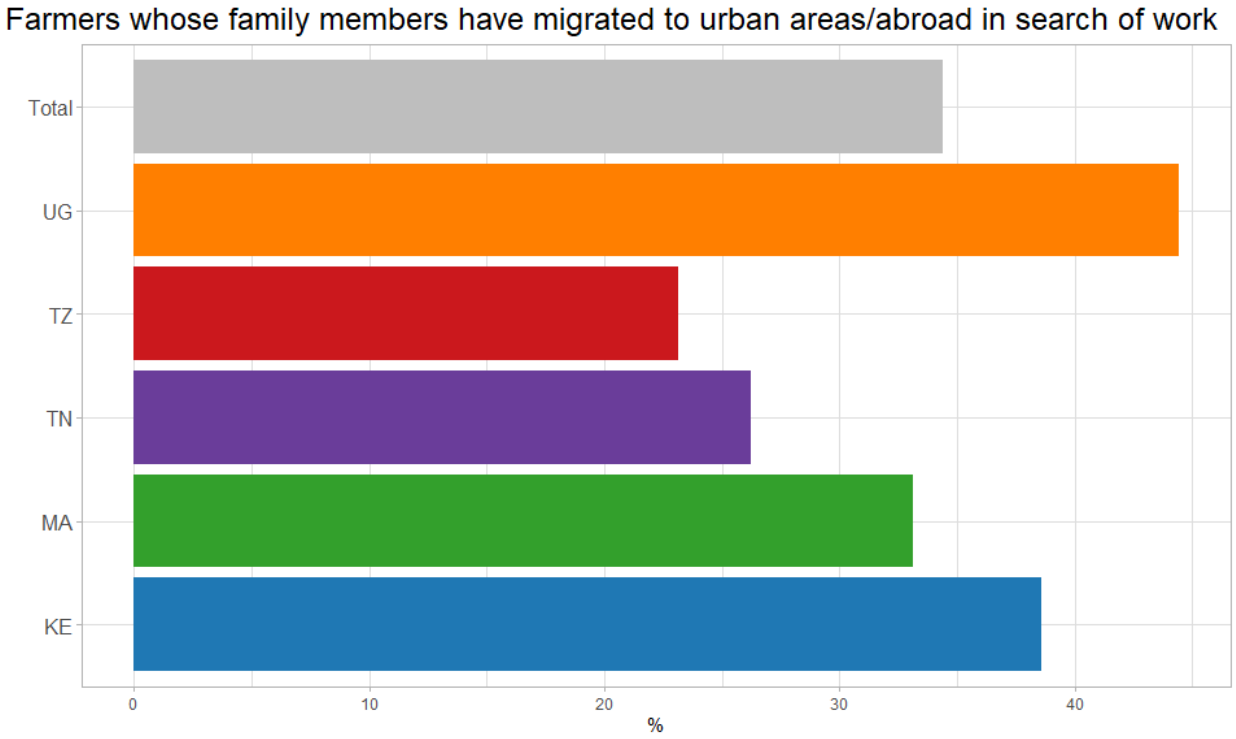


Table 8: Location in which household members emigrated (% on Respondents)

variable	other district in the same region	other region of same country	other country in Africa	out of Africa
KE	24.4	79.9	1.5	1.7
MA	14.8	54.4	6.0	46.3
TN	4.9	68.4	4.1	24.6
TZ	54.5	63.0	0.5	0.0
UG	42.7	43.0	9.8	23.6
Total	29.4	61.0	5.0	18.4

Multiple choices question

Table 9: Type of migration (% on Respondents)

variable	permanent	temporary	seasonal
KE	1.7	29.7	66.2

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

variable	permanent	temporary	seasonal
MA	46.3	30.2	19.1
TN	24.6	24.6	52.5
TZ	0.0	70.1	26.1
UG	23.6	17.6	61.4
Total	18.4	29.9	50.9

Multiple choices question

Table 10: Do migrated household members send remittances? (% values)

country	hub	Yes	No	missing.value	row.sum
KE	Kisumu	56.6	43.4	0.0	100
	Kitui	40.2	59.8	0.0	100
	Mukurweini	14.2	10.8	75.0	100
	Subtotal	33.8	37.7	28.5	100
MA	BeniMellal	41.8	58.2	0.0	100
	Meknes	31.6	68.4	0.0	100
	Subtotal	37.2	62.8	0.0	100
TN	Chebika	36.2	63.8	0.0	100
	Jendouba	29.4	70.6	0.0	100
	Subtotal	30.7	69.3	0.0	100
TZ	Kilombero	92.1	7.9	0.0	100
	Mvomero	95.8	4.2	0.0	100
	Subtotal	93.4	6.6	0.0	100
UG	Kajjansi_Masaka	70.2	29.8	0.0	100
	Kamuli	77.3	22.7	0.0	100
	Nakaseke	71.8	28.2	0.0	100
	Subtotal	72.6	27.4	0.0	100
Total		52.7	39.1	8.2	100

Table 11: Extent to which remittances contribute to family welfare

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

country	hub	average
KE	Kisumu	2.58
	Kitui	3.59
	Mukurweini	3.52
	Subtotal	3.22
MA	BeniMellal	3.01
	Meknes	3.17
	Subtotal	3.07
TN	Chebika	2.65
	Jendouba	3.19
	Subtotal	3.07
TZ	Kilombero	3.27
	Mvomero	3.21
	Subtotal	3.25
UG	Kajjansi_Masaka	3.60
	Kamuli	3.39
	Nakaseke	3.30
	Subtotal	3.46
Total	-	3.30

Average value on the Likert scale where 1=Not at all important - 5=Extremely important

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

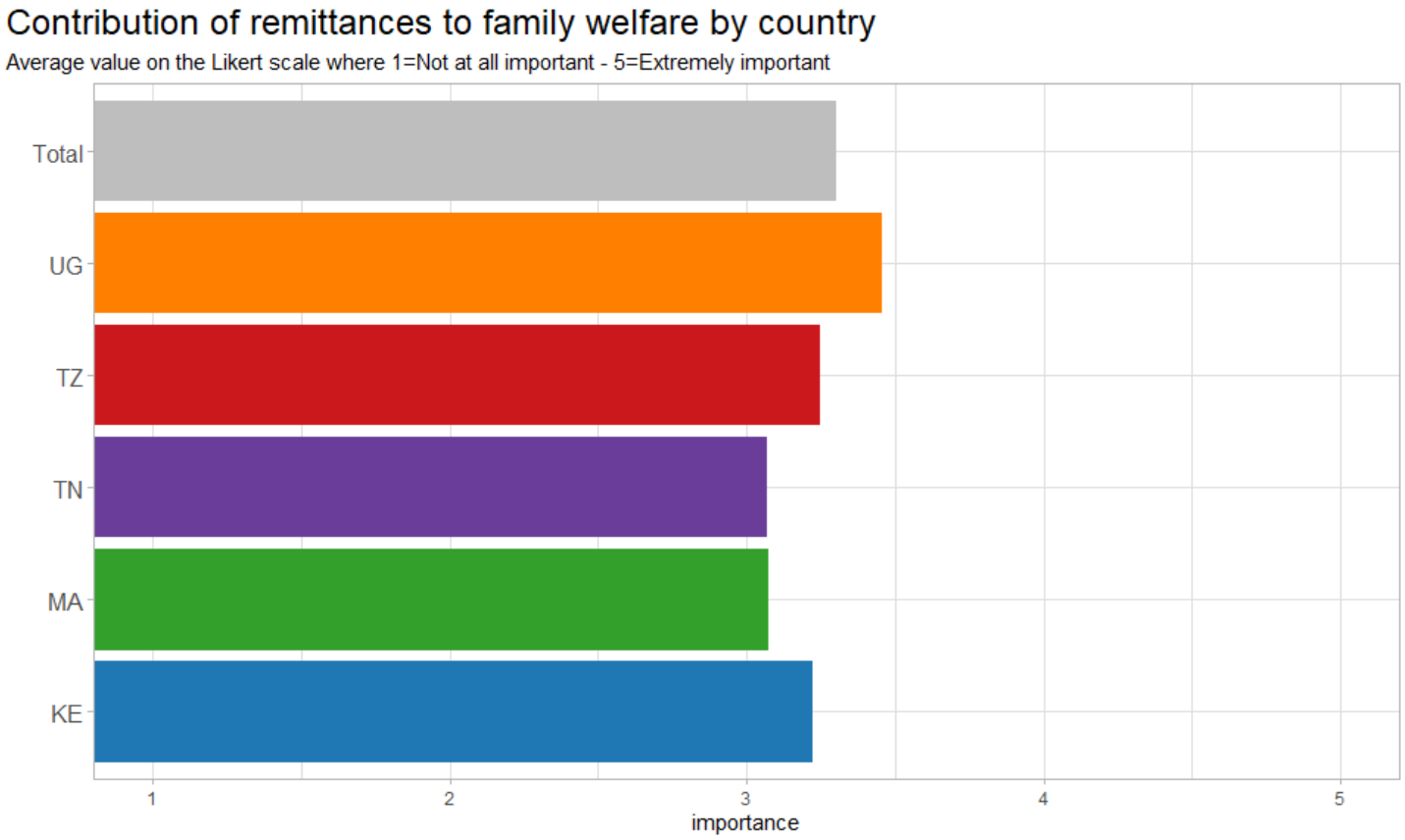


Table 12: Have remittances been used for farm investments? (% value)

country	hub	Yes	No	row.sum
KE	Kisumu	59.4	40.6	100
	Kitui	85.2	14.8	100
	Mukurweini	44.8	55.2	100
	Subtotal	69.6	30.4	100
MA	BeniMellal	59.4	40.6	100
	Meknes	35.7	64.3	100
	Subtotal	50.5	49.5	100
TN	Chebika	41.2	58.8	100
	Jendouba	43.1	56.9	100
	Subtotal	42.7	57.3	100

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

country	hub	Yes	No	row.sum
TZ	Kilombero	100.0	0.0	100
	Mvomero	100.0	0.0	100
	Subtotal	100.0	0.0	100
UG	Kajjansi_Masaka	52.2	47.8	100
	Kamuli	60.3	39.7	100
	Nakaseke	49.1	50.9	100
	Subtotal	53.8	46.2	100
Total		64.7	35.3	100

Table 13: Have remittances been used to cover farm costs? (% value)

country	hub	Yes regularly	Yes, sometimes	No	row.sum
KE	Kisumu	23.4	76.6	0.0	100
	Kitui	20.5	70.5	9.1	100
	Mukurweini	10.3	48.3	41.4	100
	Subtotal	19.9	69.1	11.0	100
MA	BeniMellal	13.0	46.4	40.6	100
	Meknes	7.1	28.6	64.3	100
	Subtotal	10.8	39.6	49.5	100
TN	Chebika	17.6	47.1	35.3	100
	Jendouba	22.4	74.1	3.4	100
	Subtotal	21.3	68.0	10.7	100
TZ	Kilombero	14.1	40.6	45.3	100
	Mvomero	14.5	30.4	55.1	100
	Subtotal	14.2	37.1	48.7	100
UG	Kajjansi_Masaka	38.0	62.0	0.0	100
	Kamuli	38.1	57.9	4.0	100
	Nakaseke	28.6	55.4	16.1	100
	Subtotal	35.5	59.0	5.5	100
Total		24.5	55.0	20.5	100

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

Income

Table 14: Average income (% value)

country	hub	lower than average	somewhat lower than average	about average	somewhat higher than average	higher than average	<NA>	row.sum
KE	Kisumu	17.9	50.1	24.3	3.2	4.2	0.2	100
	Kitui	58.7	14.7	9.1	7.7	9.8	0.0	100
	Mukurweini	20.4	16.8	49.3	10.9	2.6	0.0	100
	Subtotal	32.9	25.8	28.1	7.6	5.5	0.1	100
MA	BeniMellal	56.5	22.0	9.8	7.2	4.5	0.0	100
	Meknes	44.6	26.8	18.6	6.4	3.6	0.0	100
	Subtotal	49.9	24.7	14.7	6.8	4.0	0.0	100
TN	Chebika	59.6	25.5	11.8	2.8	0.2	0.0	100
	Jendouba	51.4	22.4	12.2	6.6	7.4	0.0	100
	Subtotal	55.2	23.8	12.0	4.8	4.1	0.0	100
TZ	Kilombero	7.4	3.2	11.5	14.5	63.4	0.0	100
	Mvomero	4.4	7.1	16.5	21.0	51.0	0.0	100
	Subtotal	5.7	5.4	14.3	18.1	56.5	0.0	100
UG	Kajjansi_Masaka	29.1	45.5	13.8	4.7	6.9	0.0	100
	Kamuli	60.0	35.5	2.2	1.8	0.5	0.0	100
	Nakaseke	35.2	54.0	7.5	1.0	2.2	0.0	100
	Subtotal	40.4	45.0	8.3	2.7	3.5	0.0	100
Total		36.8	26.5	16.1	7.6	13.1	0.0	100

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

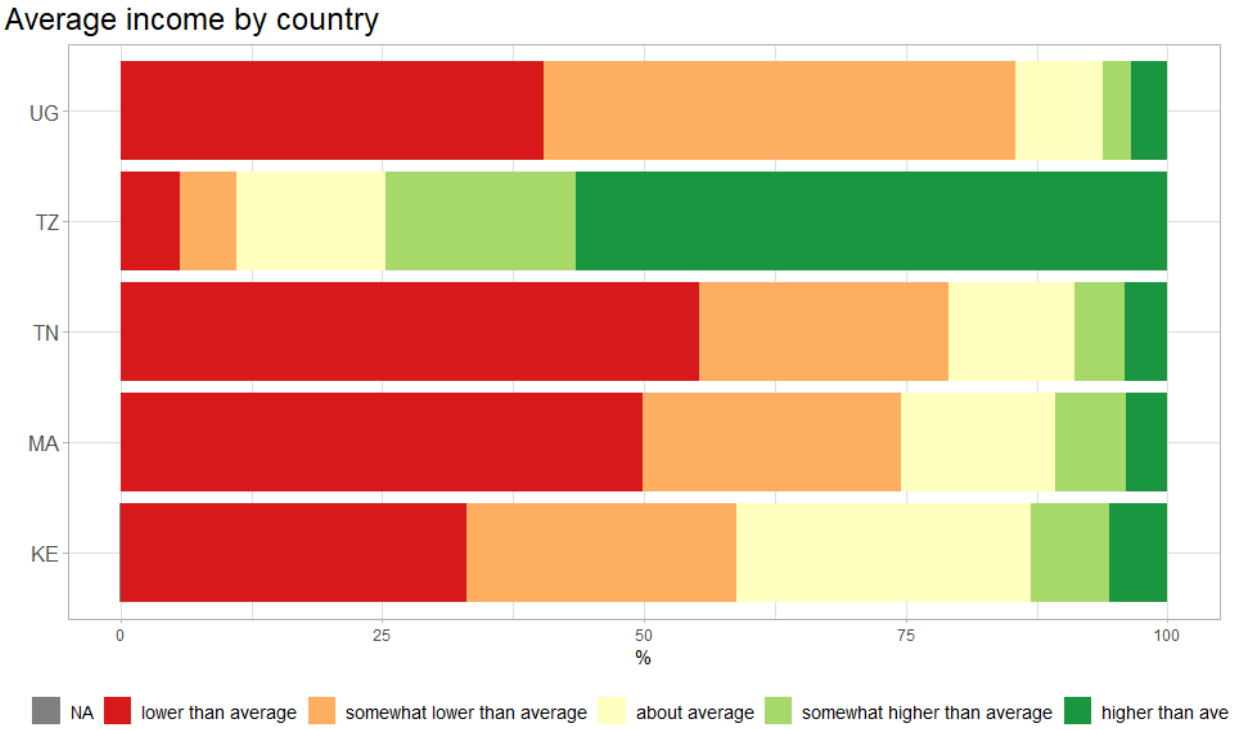


Table 15: Is the farmer able to meet his/her household food needs? (% value)

country	hub	Yes, more than enough	Yes, I have what I need	I have we need	about we	No, experience some difficulties	No, I experience serious food shortages	row.sum
KE	Kisumu	9.4	20.8	20.8		43.2	5.7	100
	Kitui	6.4	19.7	19.3		39.4	15.1	100
	Mukurweini	13.5	33.5	21.6		23.8	7.7	100
	Subtotal	9.9	25.0	20.6		34.8	9.7	100
MA	BeniMellal	14.5	35.5	18.0		30.5	1.5	100
	Meknes	3.2	29.8	37.8		22.4	6.8	100
	Subtotal	8.2	32.3	29.0		26.0	4.4	100
TN	Chebika	18.6	22.5	19.7		20.4	18.8	100
	Jendouba	3.8	10.0	17.0		30.4	38.8	100
	Subtotal	10.6	15.8	18.3		25.8	29.5	100
TZ	Kilombero	18.2	41.0	13.8		23.8	3.2	100

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

country	hub	Yes, more than enough	Yes, I have what we need	I have about what we need	No, I experience some difficulties	No, I experience serious food shortages	row.sum
	Mvomero	9.7	30.2	15.5	39.5	5.2	100
	Subtotal	13.5	35.0	14.7	32.5	4.3	100
UG	Kajjansi_Masaka	24.8	36.6	19.7	15.7	3.1	100
	Kamuli	29.5	38.2	18.2	11.5	2.5	100
	Nakaseke	32.8	42.2	13.0	10.0	2.0	100
	Subtotal	28.7	38.8	17.2	12.7	2.6	100
Total		14.9	29.7	19.8	26.1	9.6	100

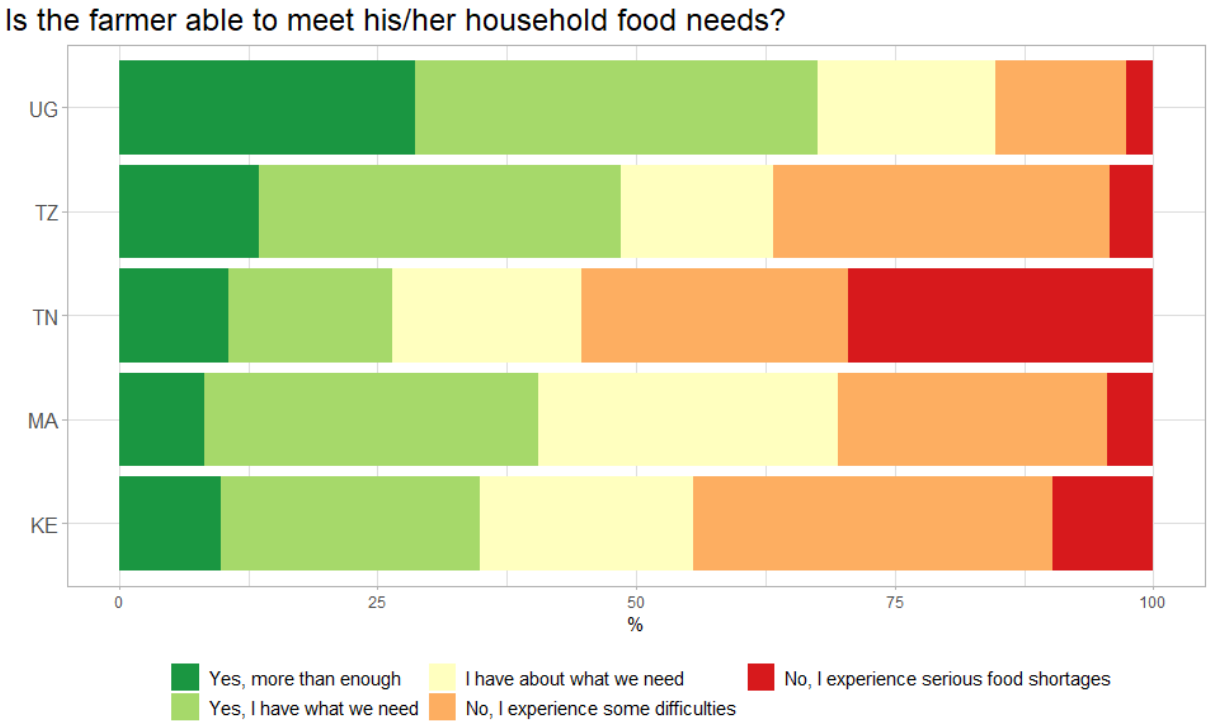


Table 16: Is the farmer able to meet his/her household food needs? (% value)

country	hub	A very limited part (less than 25%)	Less than half (from 25% to 50%)	About half (50%)	More than half (from 50% to 75%)	Almost all (from 75% to 100%)	row.sum
KE	Kisumu	7.7	31.5	41.4	16.4	3.0	100
	Kitui	40.2	34.9	15.6	5.8	3.5	100

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

country	hub	A very limited part (less than 25%)	Less than half (from 25% to 50%)	About half (50%)	More than half (from 50% to 75%)	Almost all (from 75% to 100%)	torow.sum
	Mukurweini	36.8	14.9	19.4	15.8	13.1	100
	Subtotal	29.6	26.6	24.5	12.5	6.8	100
MA	BeniMellal	15.2	7.0	11.0	28.5	38.2	100
	Meknes	22.0	19.0	16.8	20.4	21.8	100
	Subtotal	19.0	13.7	14.2	24.0	29.1	100
TN	Chebika	15.3	29.5	22.0	15.3	17.9	100
	Jendouba	6.6	18.8	34.2	15.4	25.0	100
	Subtotal	10.6	23.7	28.6	15.4	21.7	100
TZ	Kilombero	17.7	29.5	31.4	12.3	9.1	100
	Mvomero	13.9	23.2	31.9	12.7	18.3	100
	Subtotal	15.6	26.0	31.7	12.5	14.2	100
UG	Kajjansi_Masaka	44.7	25.2	15.6	12.0	2.6	100
	Kamuli	65.8	14.2	12.0	3.5	4.5	100
	Nakaseke	61.3	19.2	12.0	5.2	2.2	100
	Subtotal	56.2	20.0	13.4	7.3	3.1	100
Total		28.6	22.3	22.0	13.7	13.4	100

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

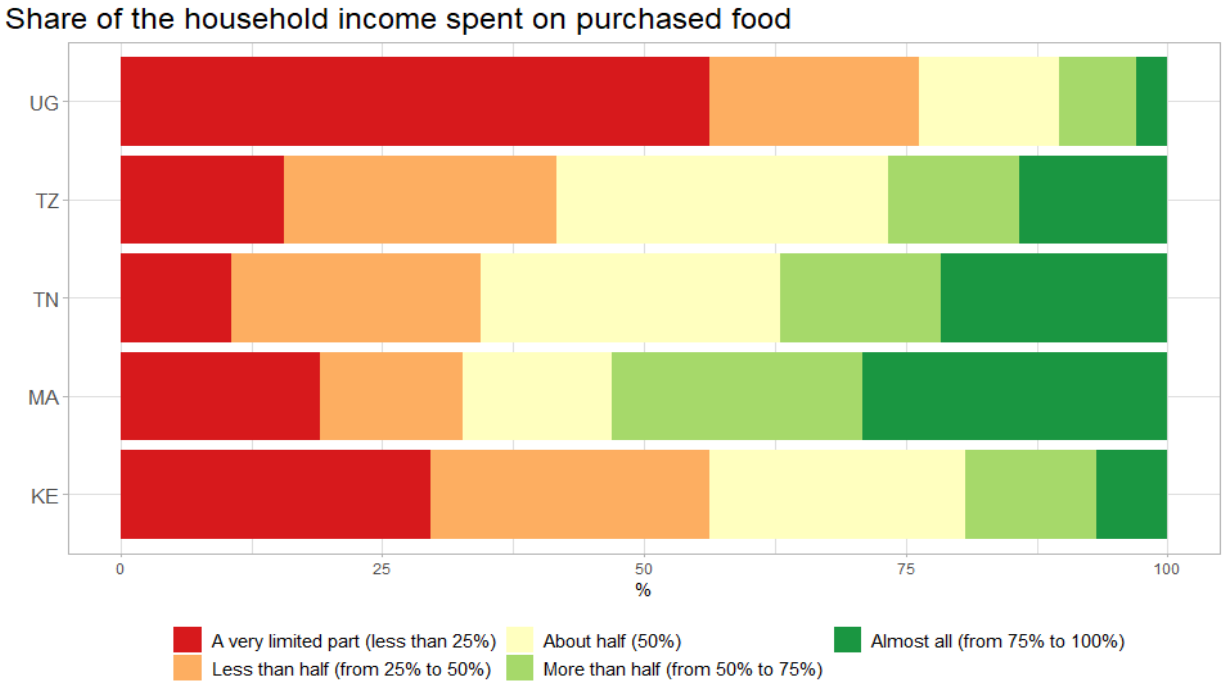
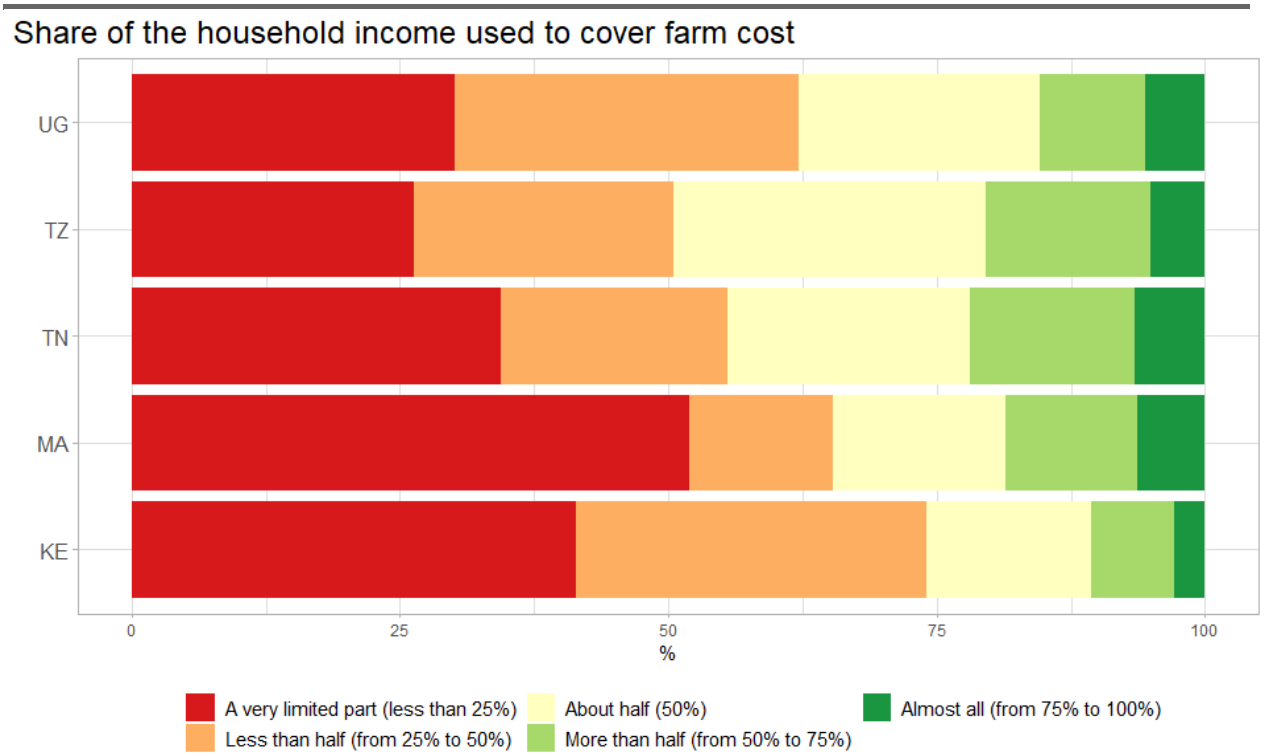


Table 17: Is the farmer able to meet his/her household food needs? (% value)

country	hub	A very limited part (less than 25%)	Less than half (from 25% to 50%)	About half (50%)	More than half (from 50% to 75%)	Almost all (from 75% to 100%)	torow.sum
KE	Kisumu	30.3	47.4	14.9	6.2	1.2	100
	Kitui	40.2	34.9	15.6	5.8	3.5	100
	Mukurweini	51.3	19.0	15.4	10.7	3.6	100
	Subtotal	41.4	32.7	15.3	7.7	2.9	100
MA	BeniMellal	70.2	6.5	12.5	10.5	0.2	100
	Meknes	37.2	19.0	19.0	13.6	11.2	100
	Subtotal	51.9	13.4	16.1	12.2	6.3	100
TN	Chebika	26.9	12.8	21.1	28.1	11.1	100
	Jendouba	40.8	28.4	23.8	4.4	2.6	100
	Subtotal	34.4	21.2	22.6	15.4	6.6	100
TZ	Kilombero	21.9	26.8	29.7	17.9	3.7	100
	Mvomero	29.8	22.2	28.6	13.3	6.2	100
	Subtotal	26.2	24.3	29.1	15.4	5.0	100

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

country	hub	A very limited part (less than 25%)	Less than half (from 25% to 50%)	About half (50%)	More than half (from 50% to 75%)	Almost all (from 75% to 100%)	row.sum
UG	Kajjansi_Masaka	35.0	28.3	20.9	10.0	5.7	100
	Kamuli	32.5	31.2	23.8	8.8	3.8	100
	Nakaseke	21.2	37.5	23.2	10.8	7.2	100
	Subtotal	30.0	32.0	22.5	9.9	5.6	100
Total		36.7	26.0	20.7	11.6	5.1	100



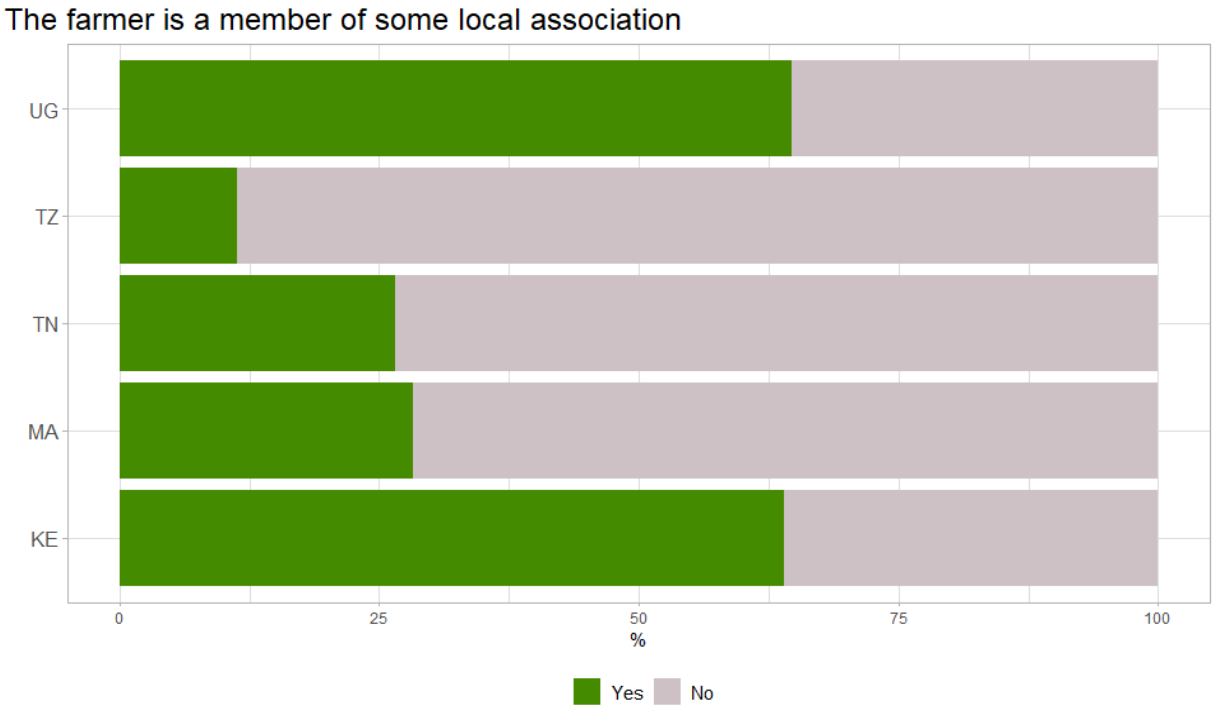
Member of any local associations

Table 18: Is the farmer a member of any local associations? (% value)

country	hub	Yes	No	row.sum
KE	Kisumu	59.1	40.9	100
	Kitui	52.3	47.7	100
	Mukurweini	79.2	20.8	100
	Subtotal	64.0	36.0	100
MA	BeniMellal	35.0	65.0	100

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

country	hub	Yes	No	row.sum
	Meknes	23.0	77.0	100
	Subtotal	28.3	71.7	100
TN	Chebika	31.1	68.9	100
	Jendouba	22.8	77.2	100
	Subtotal	26.6	73.4	100
TZ	Kilombero	17.7	82.3	100
	Mvomero	6.2	93.8	100
	Subtotal	11.3	88.7	100
UG	Kajjansi_Masaka	58.1	41.9	100
	Kamuli	75.2	24.8	100
	Nakaseke	62.5	37.5	100
	Subtotal	64.7	35.3	100
Total		43.1	56.9	100



FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

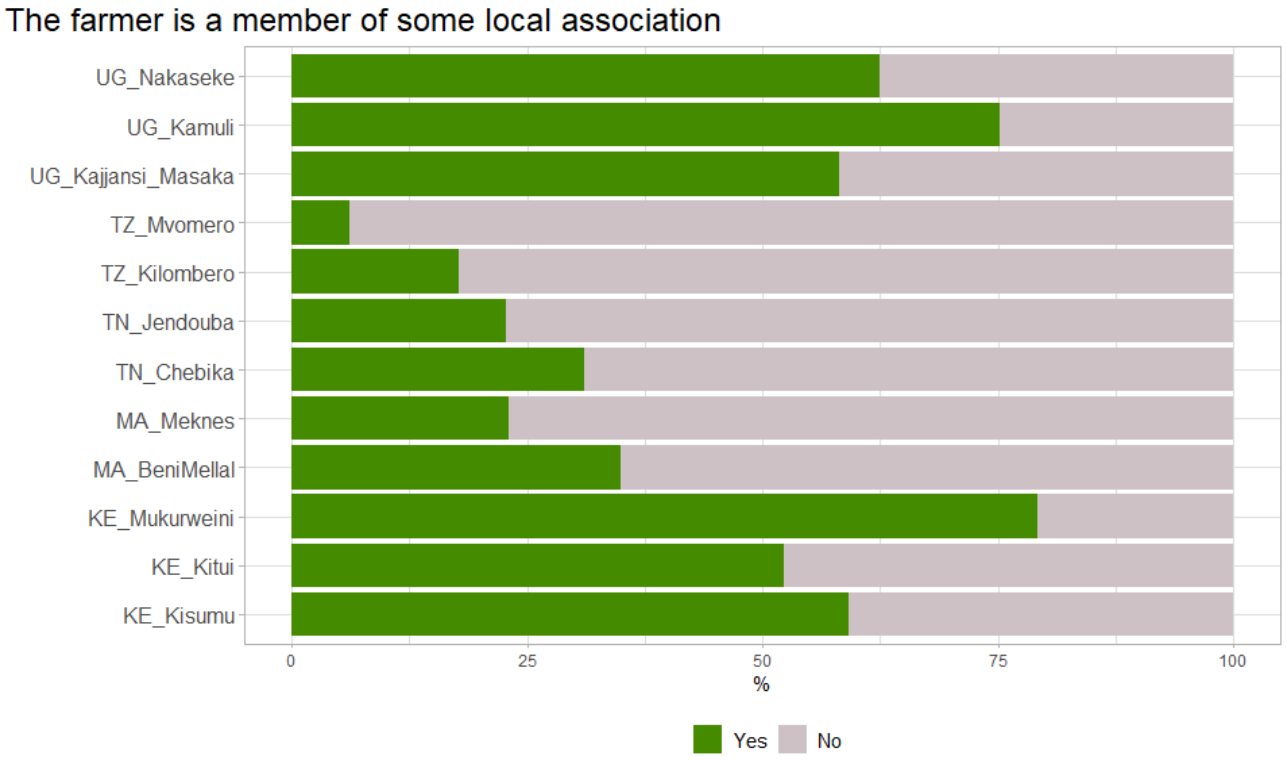


Table 19: Importance of cooperatives' assistance to farmers over membership of some local association

food.hub	Yes	No	Total
KE_Kisumu	3.60	2.65	3.21
KE_Kitui	3.96	2.13	3.09
KE_Mukurweini	4.26	2.30	3.85
MA_BeniMellal	2.91	1.87	2.23
MA_Meknes	2.18	1.57	1.71
TN_Chebika	1.83	1.29	1.46
TN_Jendouba	2.77	1.08	1.47
TZ_Kilombero	2.97	1.85	2.05
TZ_Mvomero	2.81	1.93	1.99
UG_Kajjansi_Masaka	4.25	4.13	4.20
UG_Kamuli	4.45	2.64	4.00
UG_Nakaseke	4.21	2.97	3.74
Total	3.72	1.99	2.74

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

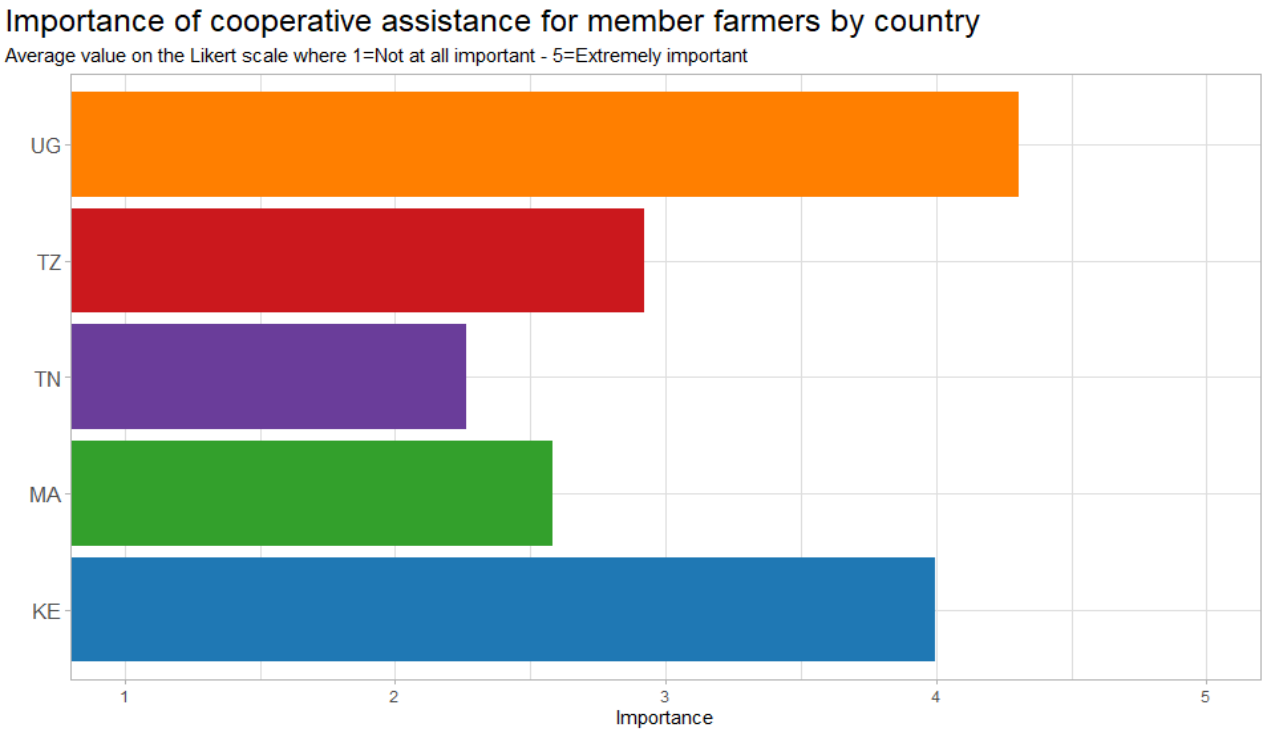
food.hub	Yes	No	Total

Average value on the Likert scale where 1=Not at all important - 5=Extremely important

Table 20: Importance of cooperatives' assistance to farmers over membership of some local association

country	Yes	No	Total
KE	4.00	2.34	3.40
MA	2.58	1.69	1.94
TN	2.26	1.17	1.46
TZ	2.92	1.90	2.02
UG	4.31	3.43	4.00
Total	3.72	1.99	2.74

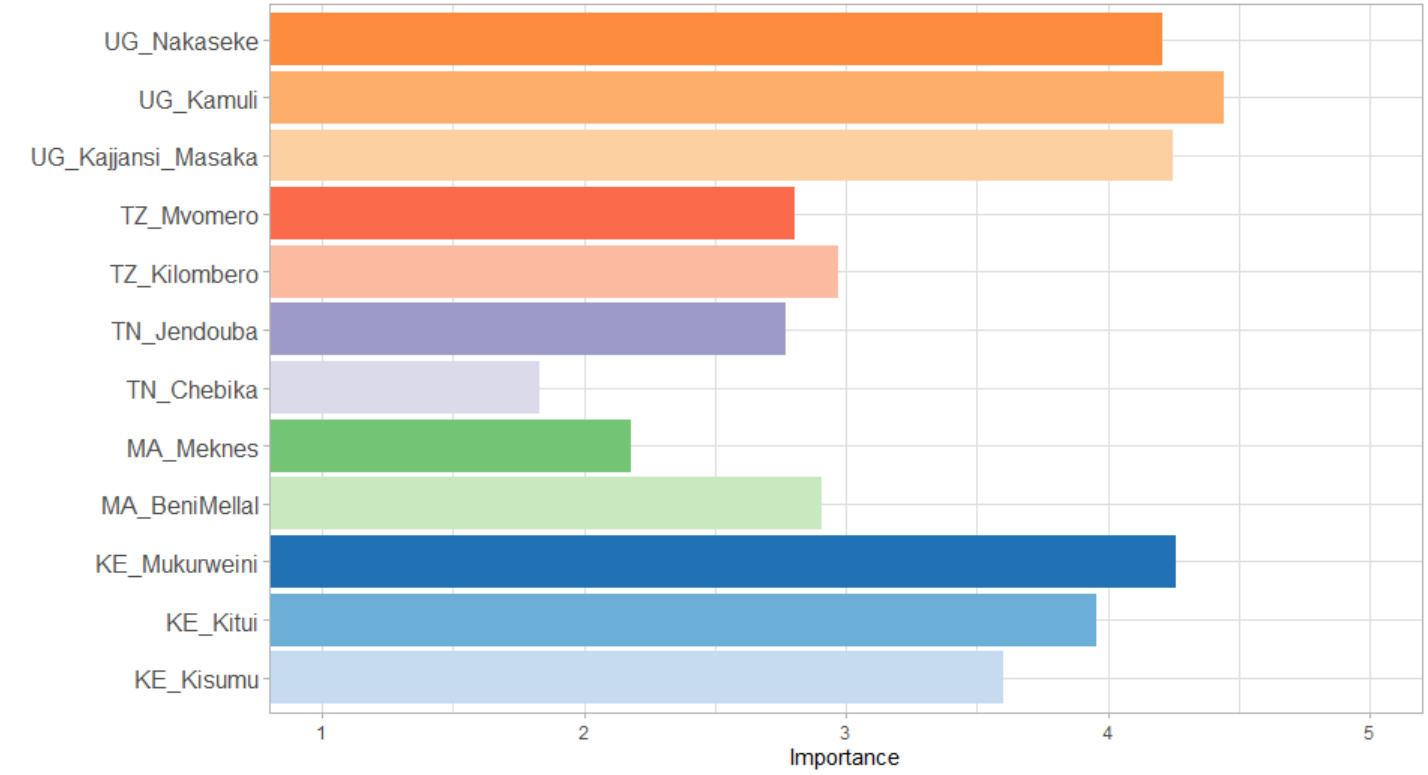
Average value on the Likert scale where 1=Not at all important - 5=Extremely important



FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

Importance of cooperative assistance for member farmers by food hub

Average value on the Likert scale where 1=Not at all important - 5=Extremely important



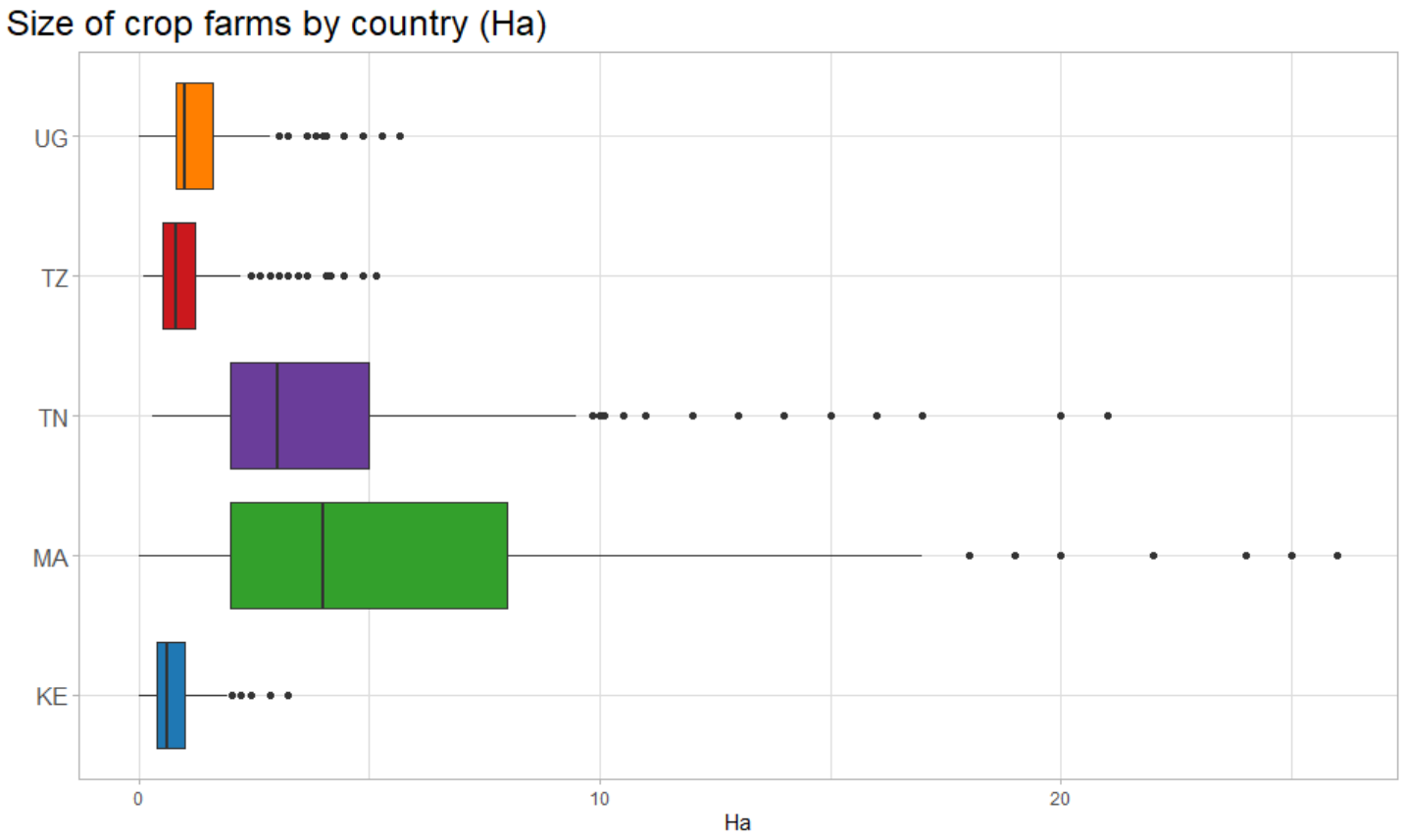
FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

Farm Crop Size

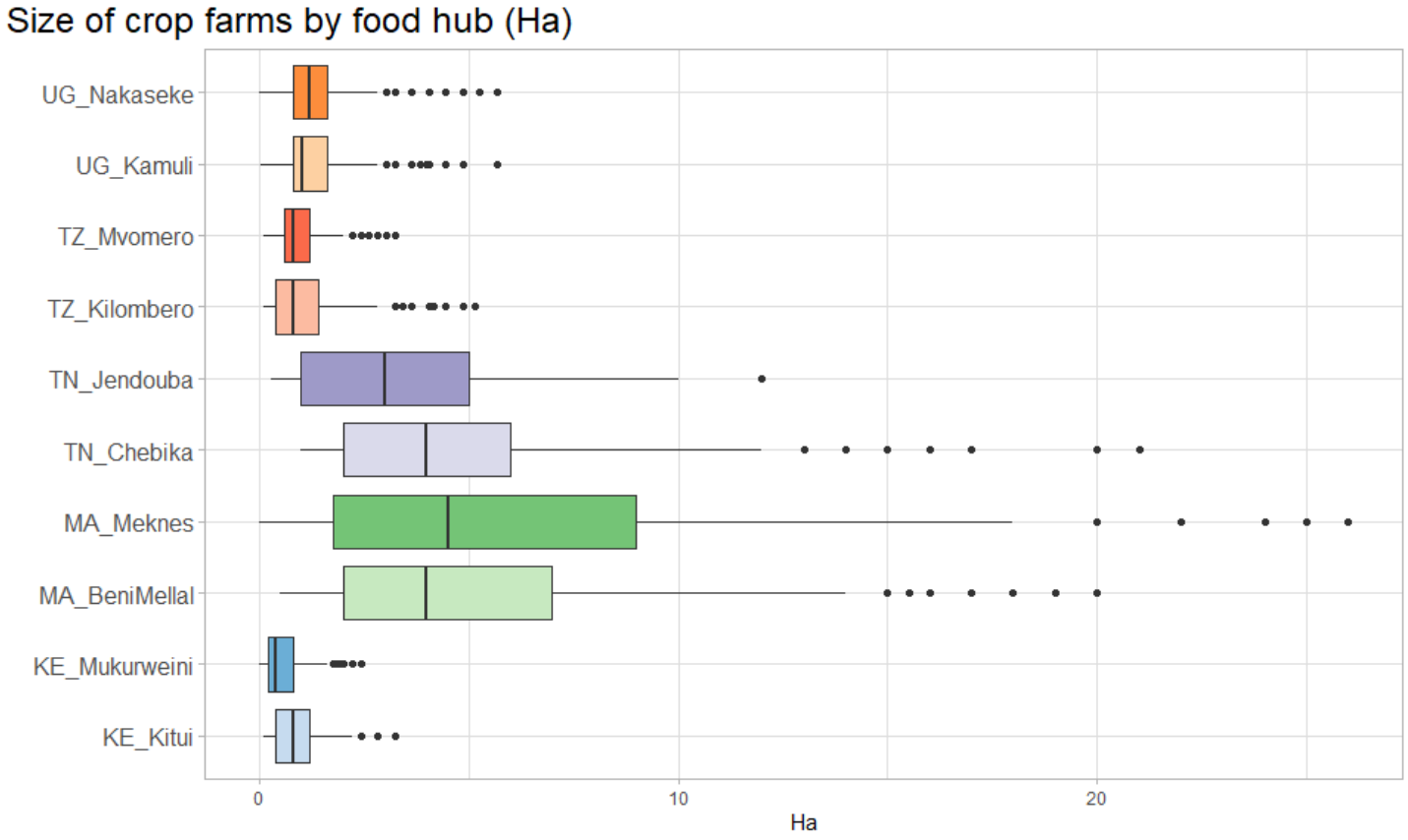
Table 21: Farm size (crop farms) in Ha

country	hub	n	%	Mean	st.Dev	Min	Q1	Median	Q3	Max
KE	Kitui	482	48.8	1.06	0.88	0.1	0.4	0.8	1.2	8.1
	Mukurweini	505	51.2	0.56	0.52	0.0	0.2	0.4	0.8	6.1
	Subtotal	987	21.8	0.80	0.76	0.0	0.4	0.6	1.0	8.1
MA	BeniMellal	400	44.4	6.52	8.97	0.5	2.0	4.0	7.0	100.0
	Meknes	500	55.6	6.15	10.41	0.0	1.8	4.8	9.0	211.0
	Subtotal	900	19.9	6.32	9.79	0.0	2.0	4.0	8.6	211.0
TN	Chebika	431	46.3	6.74	10.16	1.0	2.0	4.0	7.0	127.0
	Jendouba	500	53.7	3.42	2.68	0.3	1.0	3.0	5.0	12.0
	Subtotal	931	20.6	4.96	7.37	0.3	2.0	3.0	6.0	127.0
TZ	Kilombero	407	44.7	1.79	3.38	0.1	0.4	0.8	1.6	32.4
	Mvomero	504	55.3	1.26	1.57	0.1	0.6	0.8	1.4	20.2
	Subtotal	911	20.1	1.50	2.56	0.1	0.6	0.8	1.6	32.4
UG	Kamuli	400	50.0	1.63	1.81	0.0	0.8	1.0	2.0	16.2
	Nakaseke	400	50.0	1.83	3.00	0.0	0.8	1.2	2.0	40.5
	Subtotal	800	17.7	1.73	2.48	0.0	0.8	1.2	2.0	40.5
Total	-	4,529	100.0	3.06	6.12	0.0	0.7	1.2	3.0	211.0

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

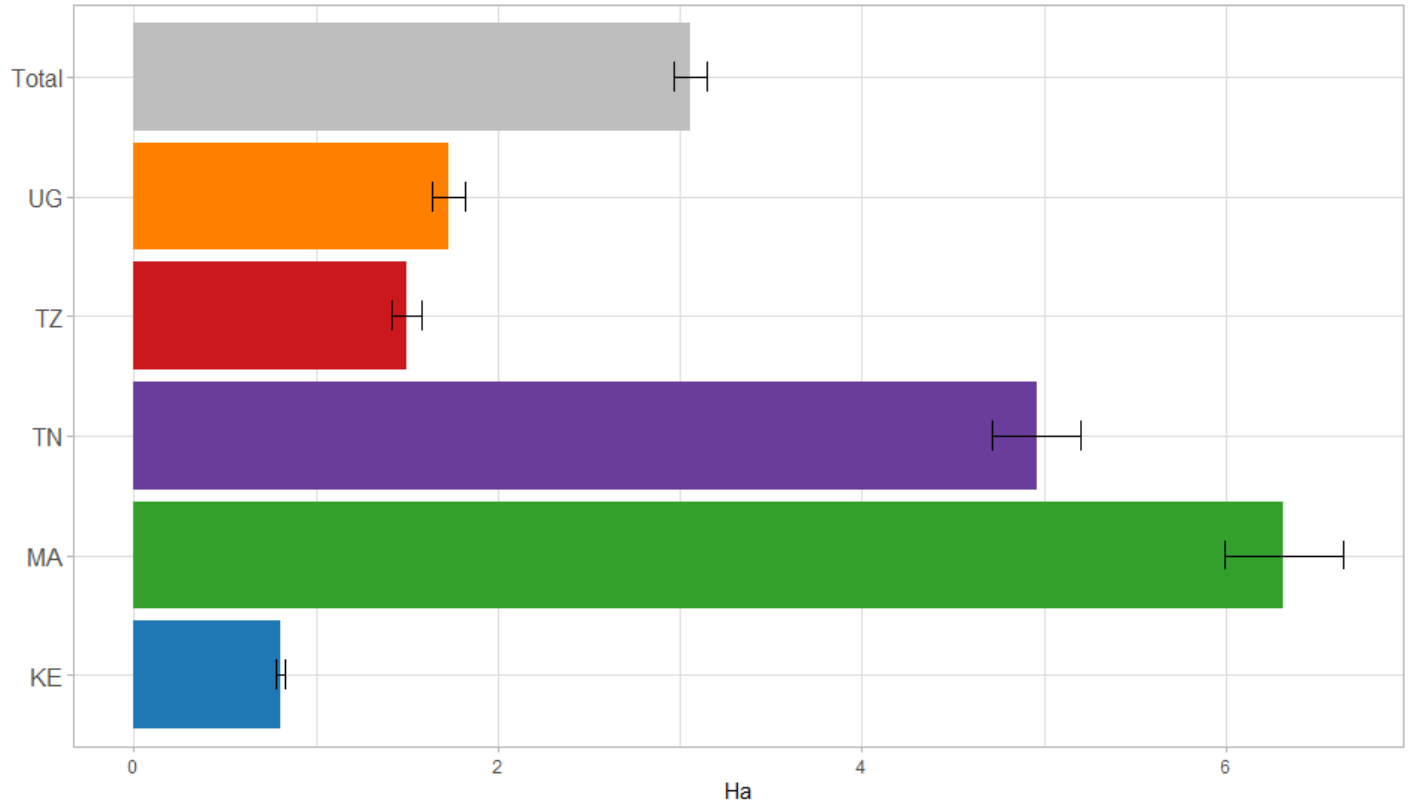


FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

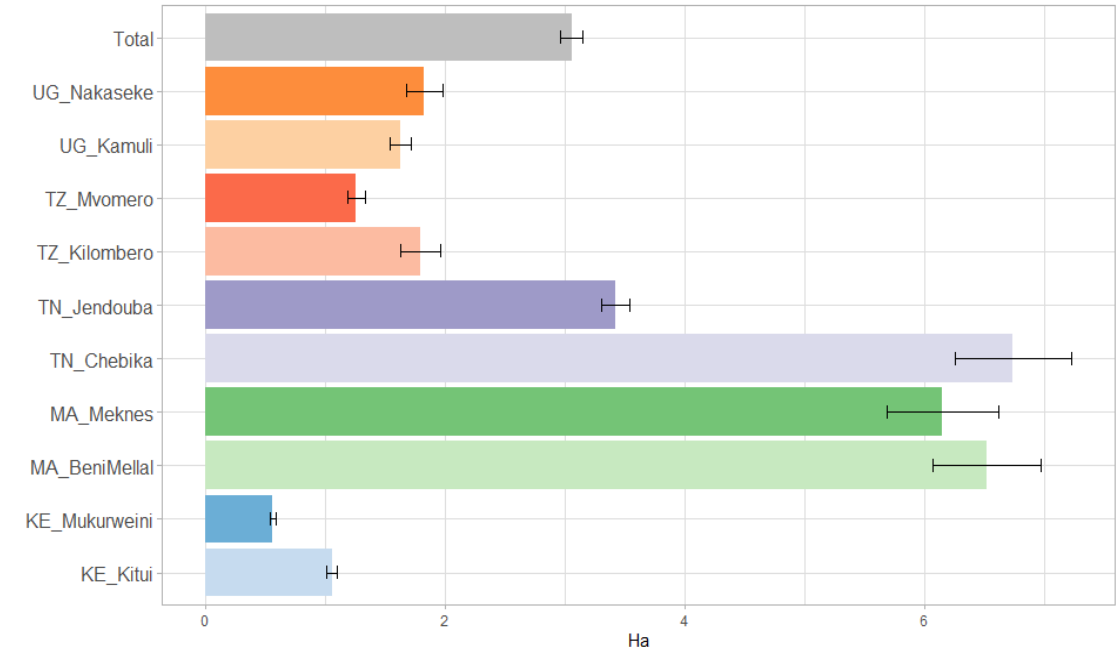


FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

Average farm size, with standard error, by country (Ha)



Average farm size, with standard error, by food hub (Ha)



FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

Productions

Table 22: Most important crop production by country

country	crop	count	% on farms	avg.size	avg.loss.field	avg.loss.post.harvest
KE	maize	910	92.2	0.35	2.89	2.05
	bean	600	60.8	0.27	2.96	1.97
	coffee	316	32.0	0.18	2.50	2.25
	pegion peas	260	26.3	0.30	3.42	1.87
	bananas	208	21.1	0.10	2.31	2.12
	green grams	136	13.8	0.37	3.43	1.86
	cow peas	105	10.6	0.29	3.45	1.90
	arrow root	48	4.9	0.15	2.46	2.46
	tree tomato	33	3.3	0.10	2.36	2.55
	potato	31	3.1	0.13	2.35	2.45
MA	wheat	431	47.9	2.54	2.75	2.59
	olive	425	47.2	2.43	2.99	2.58
	onion	315	35.0	1.46	3.06	3.25
	potato	169	18.8	1.43	2.60	2.62
	bean	111	12.3	1.45	2.64	2.52
	grain	97	10.8	2.95	2.77	2.53
	soft wheat	85	9.4	2.71	2.54	2.27
	barley	84	9.3	1.84	2.81	2.60
	carob	57	6.3	2.53	2.54	2.44
	oat	36	4.0	1.58	2.44	2.06
TN	wheat	449	48.2	2.30	2.72	1.39
	olive	371	39.8	3.80	1.40	1.33
	barley	299	32.1	1.08	2.33	1.22
	fava bean	237	25.5	1.07	2.63	1.44
	oat (hay)	102	11.0	1.14	2.31	1.24
	oat	101	10.8	1.32	2.43	1.17
	chilli	92	9.9	2.05	2.77	1.85

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

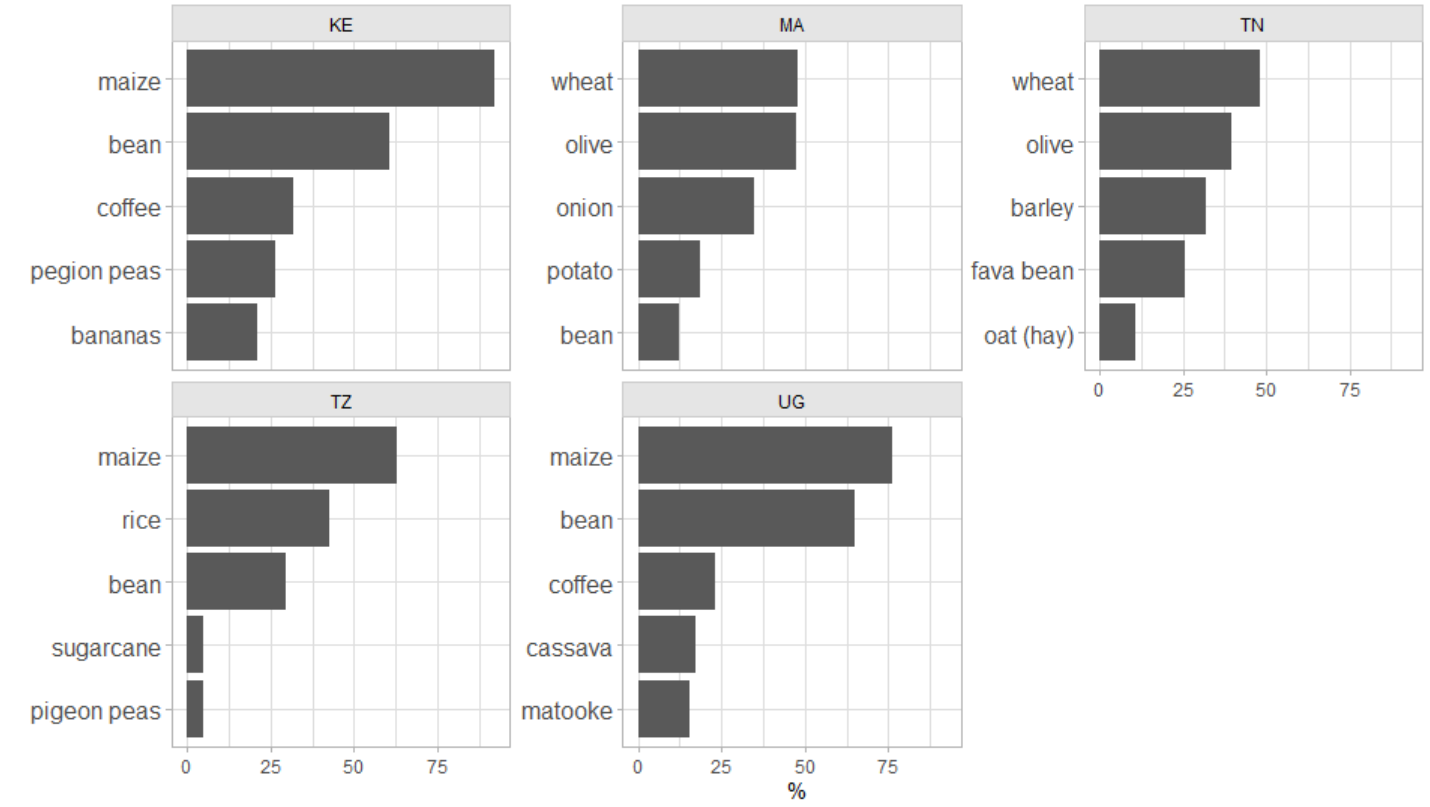
country	crop	count	% on farms	avg.size	avg.loss.field	avg.loss.post.harvest
	tomato	56	6.0	3.58	2.91	1.95
	pomegranate	31	3.3	2.65	2.42	1.87
	olive tree	24	2.6	0.61	2.00	1.50
TZ	maize	572	62.8	0.59	3.57	2.55
	rice	387	42.5	1.06	3.48	2.68
	bean	269	29.5	0.37	3.04	2.16
	sugarcane	45	4.9	1.85	2.82	2.49
	pigeon peas	43	4.7	0.30	2.93	2.19
	vegetables	22	2.4	0.21	2.52	2.00
	tomatoes	15	1.6	0.30	3.29	2.29
	sesame	12	1.3	0.28	2.36	2.45
	cassava	10	1.1	0.19	2.20	1.70
	groundnuts	9	1.0	0.31	3.50	2.50
UG	maize	610	76.2	0.64	2.87	2.86
	bean	520	65.0	0.34	2.84	2.73
	coffee	184	23.0	0.83	2.10	2.15
	cassava	139	17.4	0.37	2.19	2.19
	matooke	124	15.5	0.50	2.17	2.04
	tomato	85	10.6	0.39	3.00	2.99
	eggplant	69	8.6	0.37	2.91	2.91
	sweet_potato	69	8.6	0.29	2.12	2.00
	groundnut	65	8.1	0.27	2.72	2.42
	rice	40	5.0	0.88	2.83	2.67
	sweet potato	40	5.0	0.30	2.98	3.10

Average size in Ha

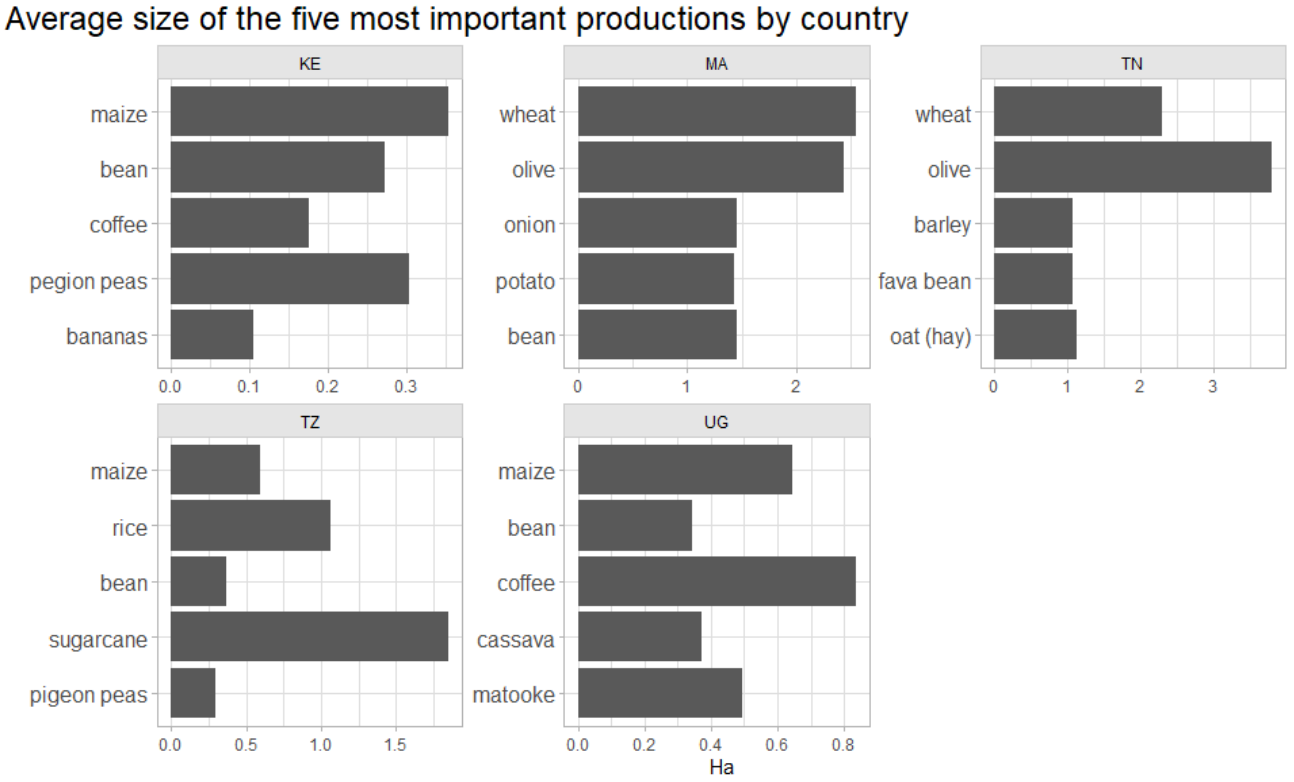
For losses in field and losses post harvest average value on the Likert scale where 1=Not at all important - 5=Extremely important

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

Five most important productions by country in terms of share of producing farms



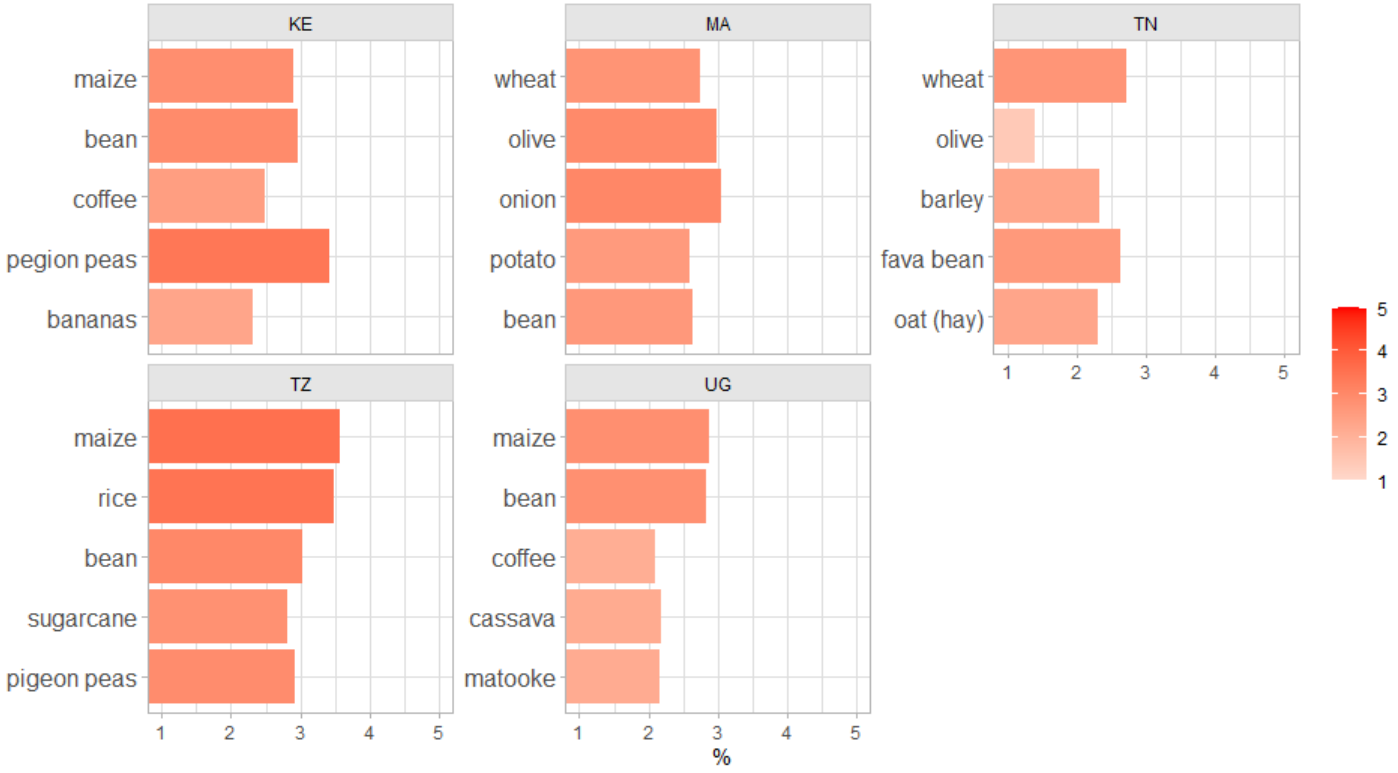
FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).



FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

Losses in field of the five most important productions by country

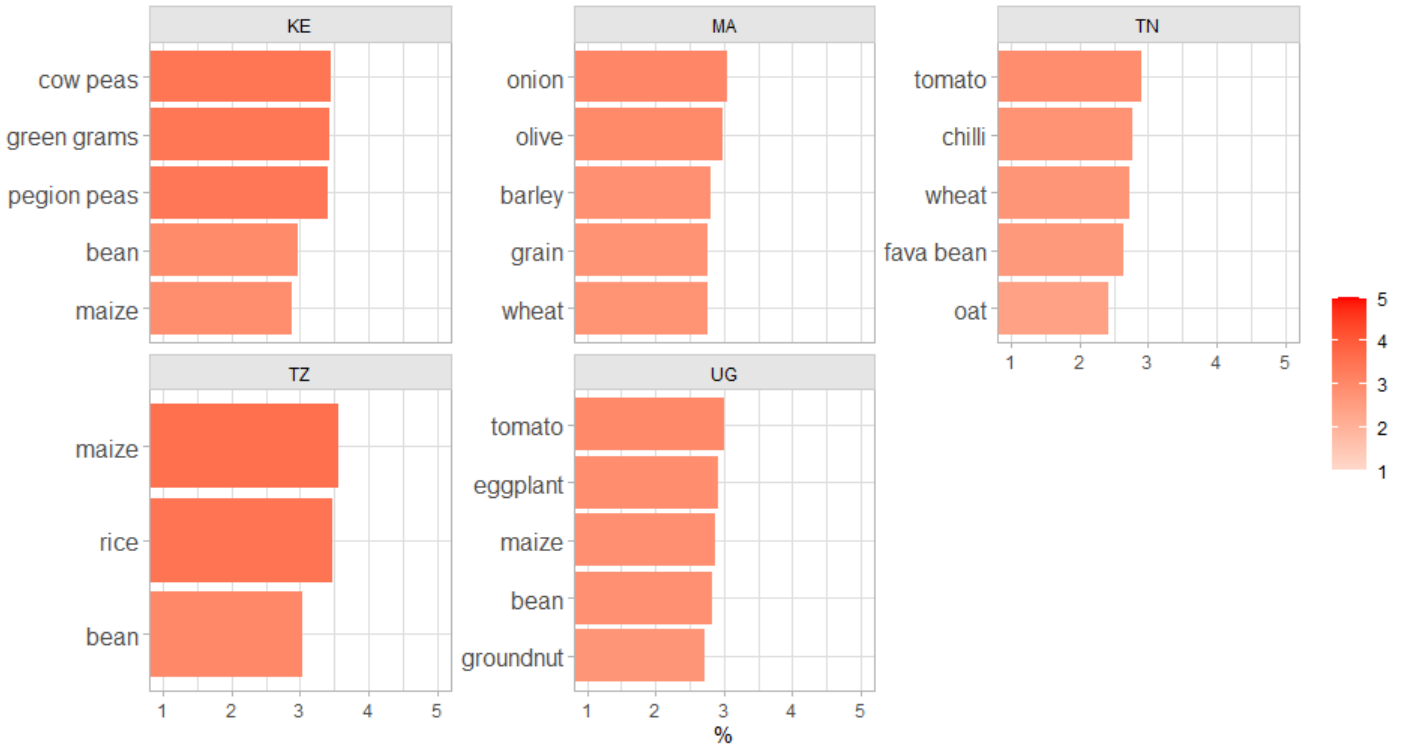
Average value on the Likert scale where 1=Not at all important - 5=Extremely important



FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

Five most important productions per Losses in field by country

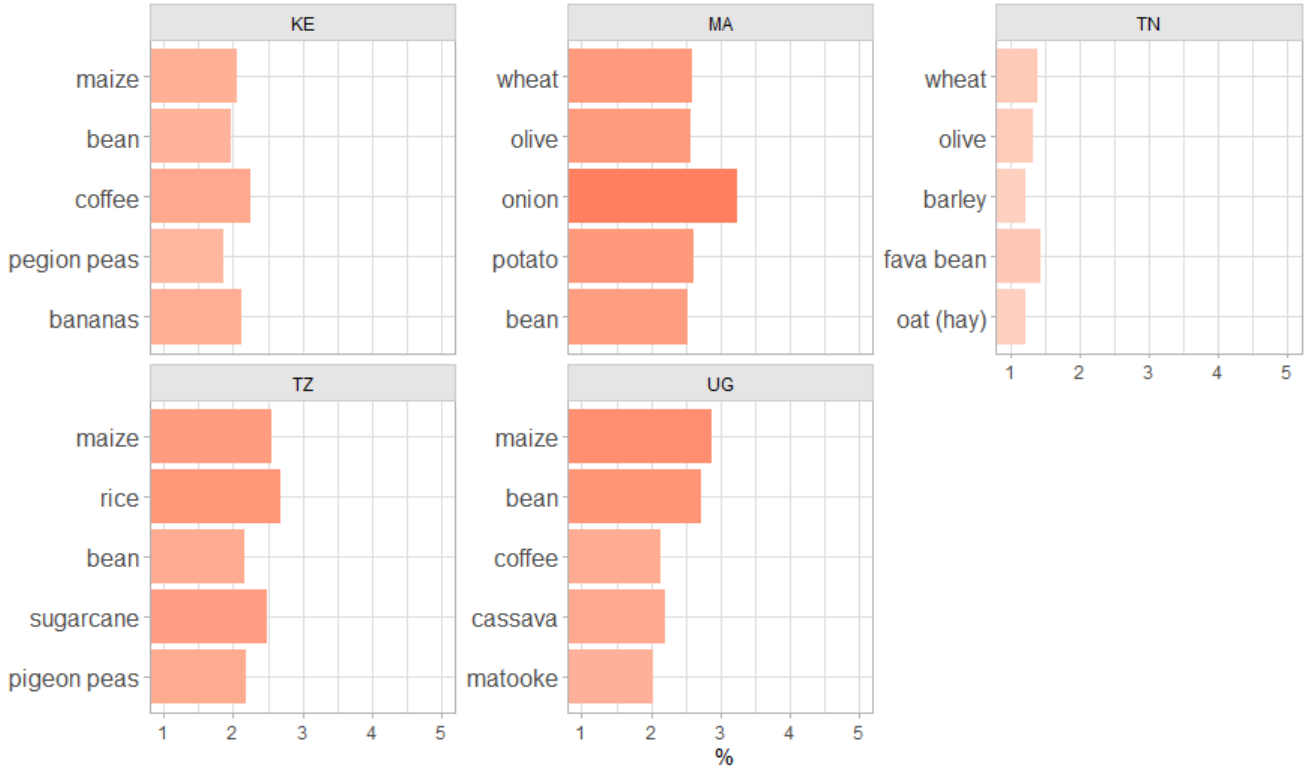
Average value on the Likert scale where 1=Not at all important - 5=Extremely important
Crops produced by at least 5% of farmers



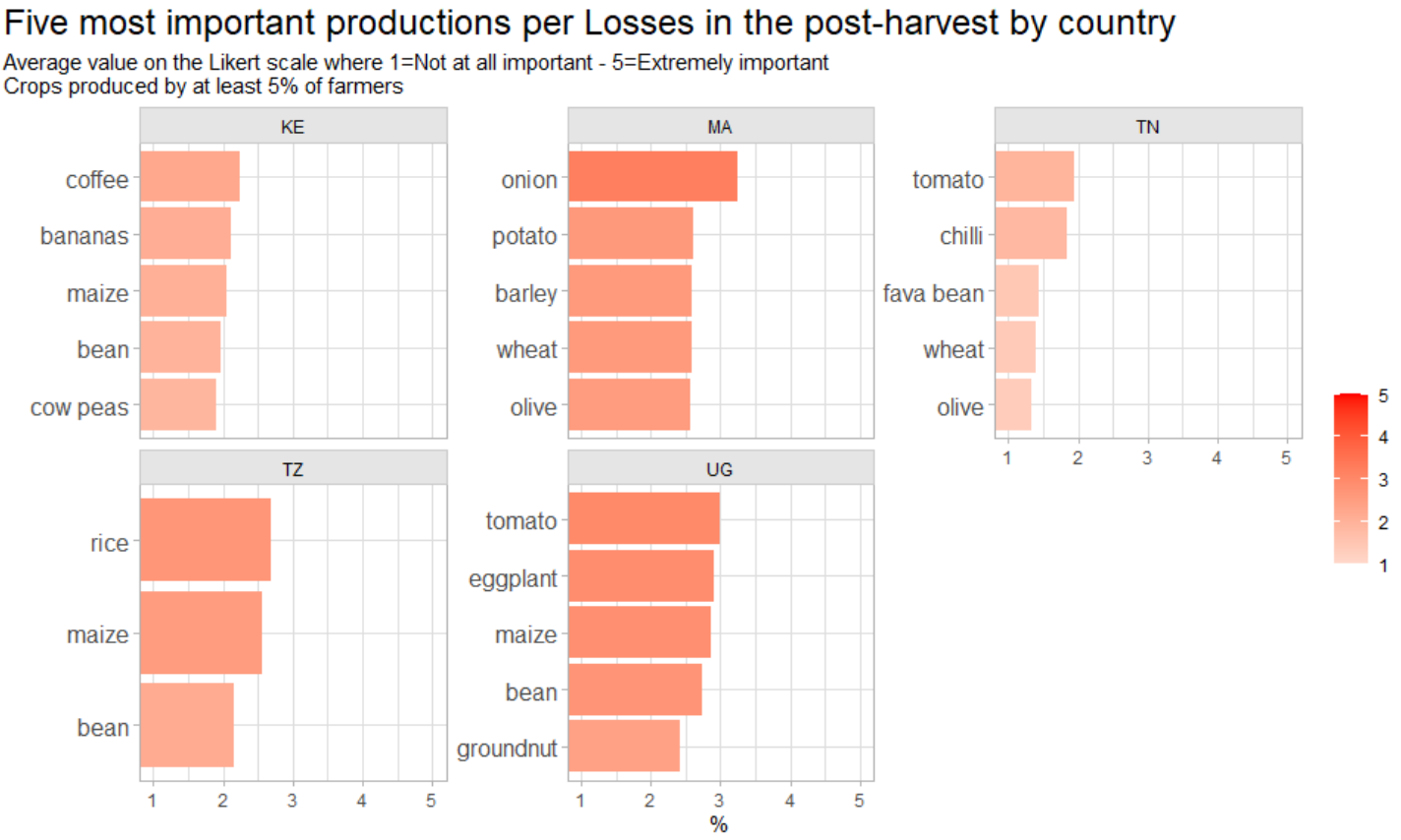
FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

Losses in the post-harvest of the five most important productions by country

Average value on the Likert scale where 1=Not at all important - 5=Extremely important



FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).



Fish

Size

Table 23: Number of farms and average total size by country

country	hub	n	avg.size
KE	Kisumu	403	473.5
UG	Kajjansi_Masaka	508	1,968.4
Total	-	911	1,307.1

Table 24: Production system by country

country	production.system	count	avg.size	avg.number
KE	cage	2	1,404.0	6.0
	pond	397	459.4	1.6

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

country	production.system	count	avg.size	avg.number
	tank	4	1,700.0	2.2
	Subtotal	403	476.4	1.6
UG	cage	33	2,165.5	11.4
	pond	475	1,968.0	3.7
	tank	29	188.1	5.0
	Subtotal	537	1,884.0	4.2
Total		940	1,280.5	3.1

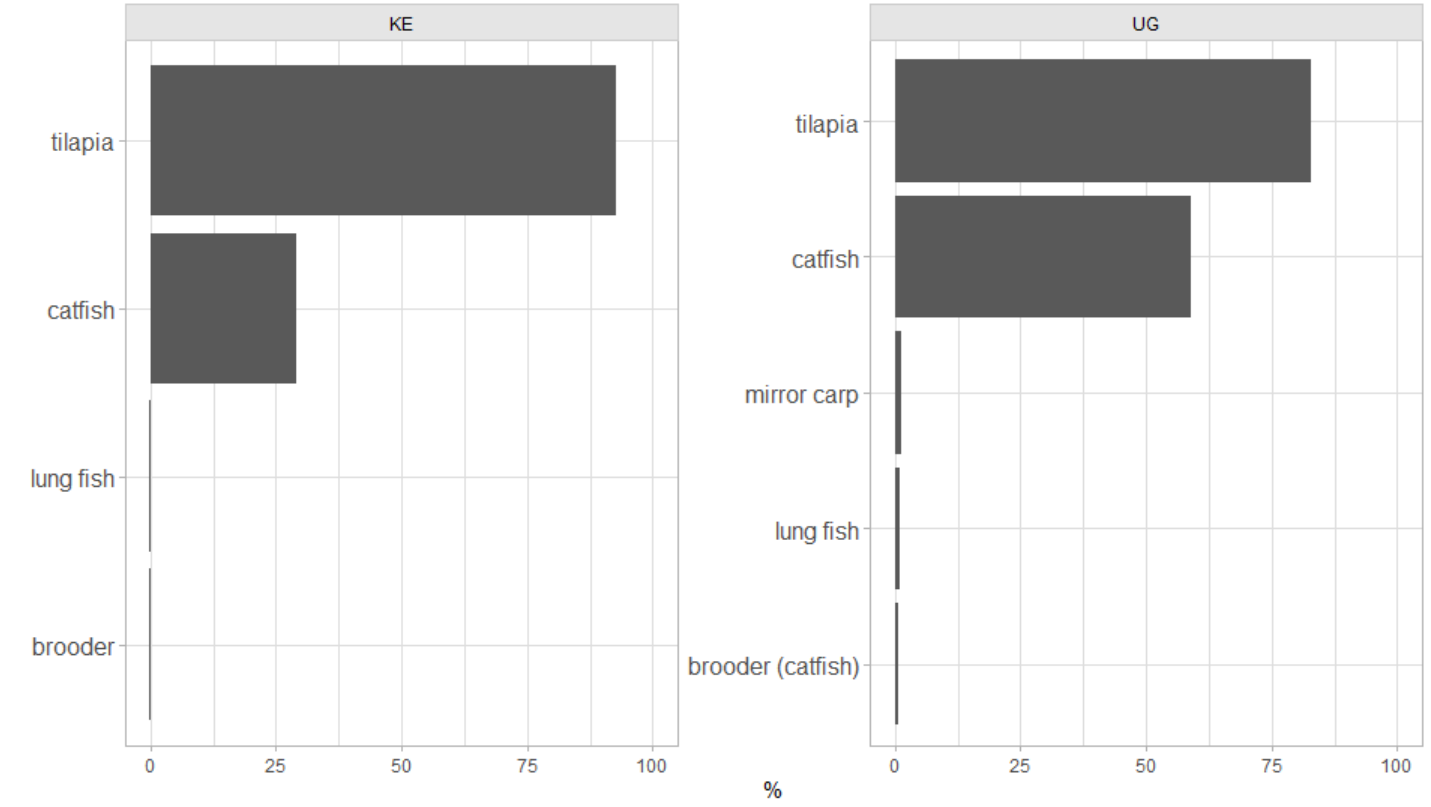
Productions

Table 25: Most important fish species produced and average losses by country

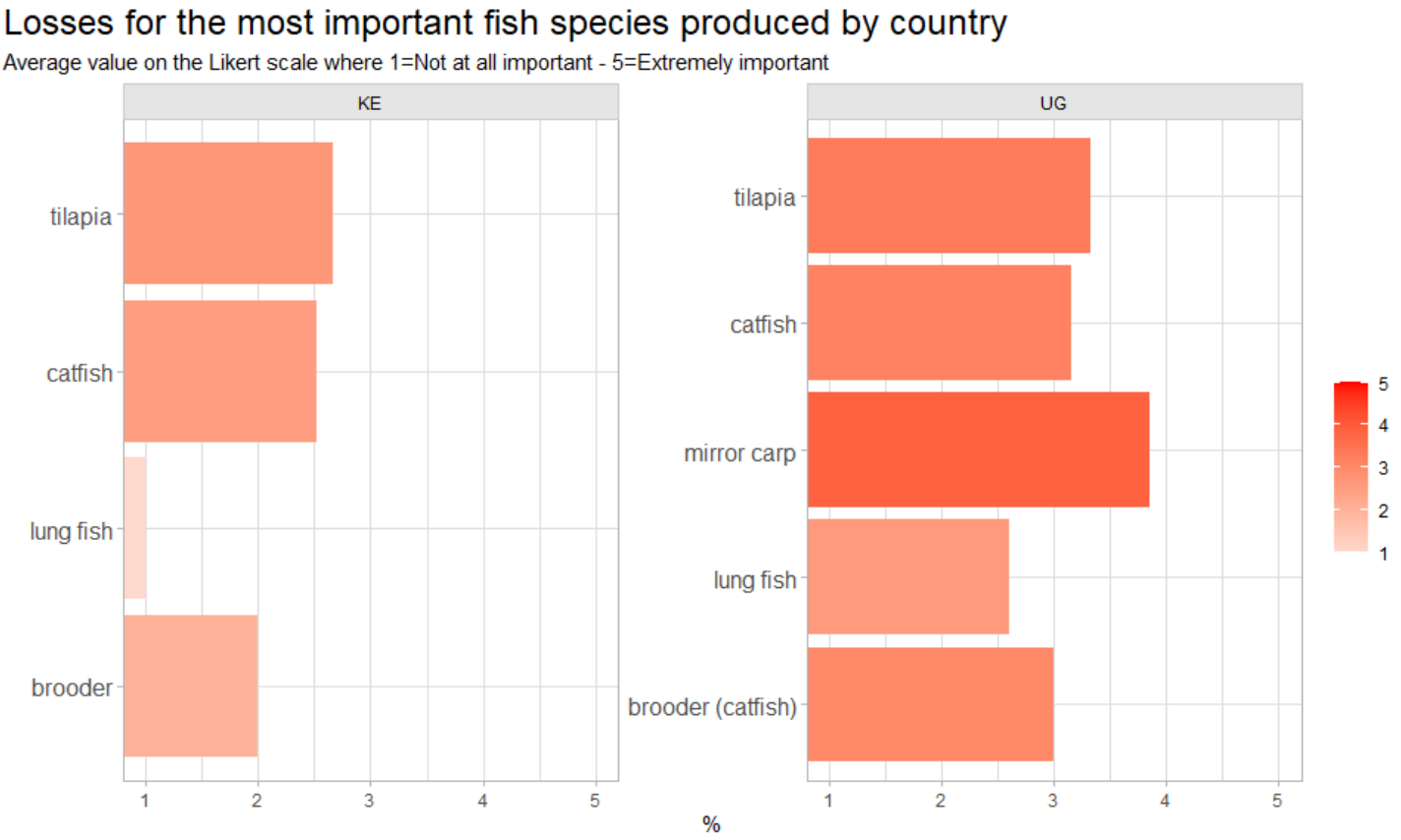
country	Fish.species	count	%	avg.losses
KE	brooder	1	0.2	2.00
	catfish	117	23.8	2.53
	lung fish	1	0.2	1.00
	tilapia	373	75.8	2.66
	Subtotal	492	40.0	2.63
UG	brooder (catfish)	3	0.4	3.00
	brooder (tilapia)	2	0.3	3.50
	catfish	299	40.5	3.16
	lung fish	5	0.7	2.60
	mirror carp	7	0.9	3.86
	nile perch	2	0.3	3.00
	tilapia	420	56.9	3.33
	Subtotal	738	60.0	3.26
Total	-	1,230	100.0	3.01

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

Most important fish species produced by country



FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).



What affected the farm activities the most in last growing season?

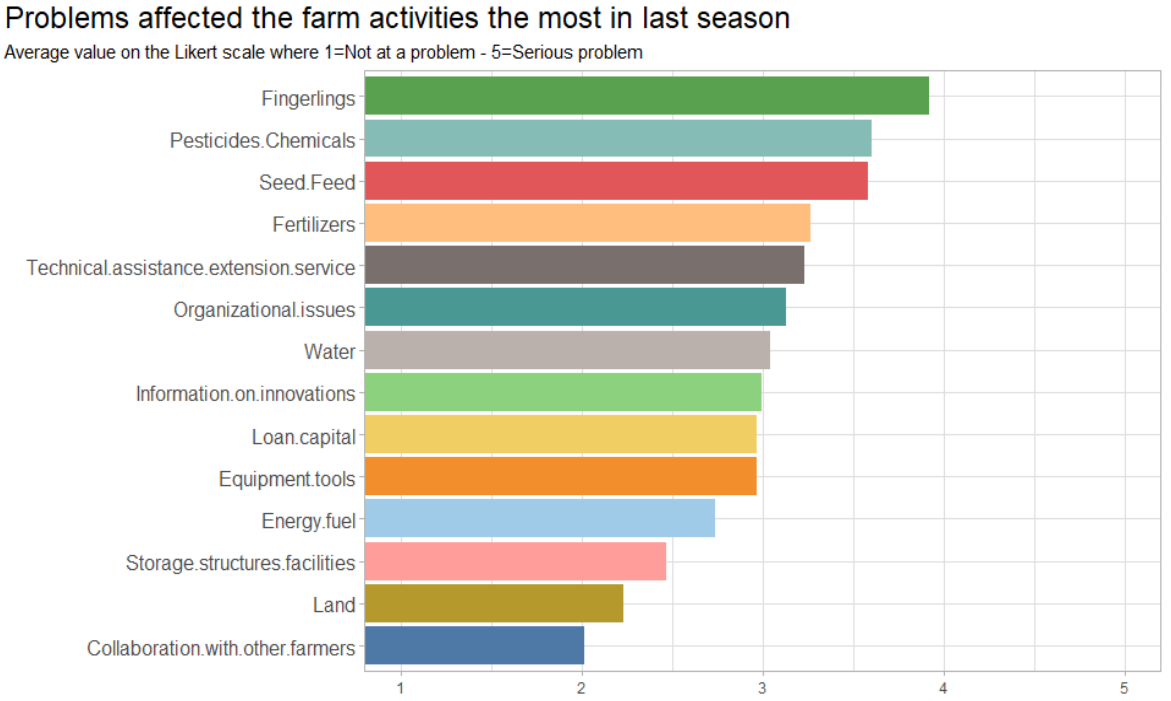
Table 26: What affected the farm activities the most in last growing season?

country	hub	Seed.Feed	Energy.fuel	Pesticides.Chemicals	Fertilizers	Water	Equipment.tools	Loan.capital	Land	Collaboration.with.other.farmers	Storage.structures.facilities	Information.on.innovations	Technical.assistance.extension.service	Organizational.issues	Fingerlings
KE	Kisumu	4.32	2.66	2.28	2.11	2.56	2.95	3.78	1.70	2.14	3.78	3.27	3.38	2.98	4.02
	Kitui	4.07	2.63	4.39	3.43	4.34	2.77	2.49	2.21	1.82	2.67	2.97	3.00	2.95	
	Mukurweini	3.62	2.29	3.71	3.50	2.80	1.95	2.80	2.42	1.74	1.92	2.34	2.59	2.91	
	Subtotal	3.98	2.52	3.53	3.07	3.27	2.52	2.98	2.14	1.88	2.72	2.83	2.96	2.94	4.02
MA	BeniMellal	3.06	2.36	3.39	3.47	3.52	2.98	3.32	1.85	2.24	2.50	2.68	3.28	3.29	
	Meknes	2.84	2.47	3.17	3.11	2.83	2.41	2.74	2.09	2.09	2.26	2.38	2.78	3.39	
	Subtotal	2.93	2.42	3.27	3.27	3.13	2.66	3.00	1.98	2.16	2.37	2.51	3.00	3.34	
TN	Chebika	3.86	3.52	3.98	4.14	4.52	3.47	1.94	1.52	2.13	1.94	4.13	4.35	2.64	

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

country	hub	Seed.Feed	Energy.fuel	Pesticides.Chemicals	Fertilizers	Water	Equipment.tools	Loan.capital	Land	Collaboration.with.other.farmers	Storage.structures.facilities	Information.on.innovations	Technical.assistance.extension.service	Organizational.issues	Fingerlings
	Jendouba	4.08	3.86	4.38	4.65	4.21	4.04	3.22	2.89	1.81	1.73	3.43	3.90	2.74	
	Subtotal	3.98	3.71	4.20	4.41	4.35	3.77	2.62	2.26	1.95	1.83	3.76	4.11	2.69	
TZ	Kilombero	2.84	1.68	3.60	3.23	2.33	2.32	3.07	2.26	2.02	1.90	2.95	3.31	3.85	
	Mvomero	3.13	2.08	3.58	2.12	1.78	2.30	2.90	1.65	1.57	1.75	2.81	2.97	3.32	
	Subtotal	3.00	1.90	3.59	2.62	2.03	2.31	2.97	1.92	1.77	1.82	2.87	3.12	3.55	
UG	Kajjansi_Masaka	4.19	3.07	2.71	2.55	2.01	3.42	3.03	2.09	2.31	2.82	3.18	2.81	3.12	3.84
	Kamuli	3.50	3.33	4.13	3.61	2.86	3.63	3.24	3.20	2.23	3.50	2.85	3.02	3.46	
	Nakaseke	3.41	2.91	3.84	3.26	2.79	3.60	3.33	2.98	2.28	3.29	3.11	3.61	3.08	
	Subtotal	3.74	3.10	3.49	3.09	2.51	3.54	3.19	2.70	2.27	3.17	3.06	3.12	3.21	3.84
Total	-	3.59	2.74	3.60	3.26	3.04	2.97	2.97	2.23	2.02	2.47	3.00	3.23	3.13	3.92

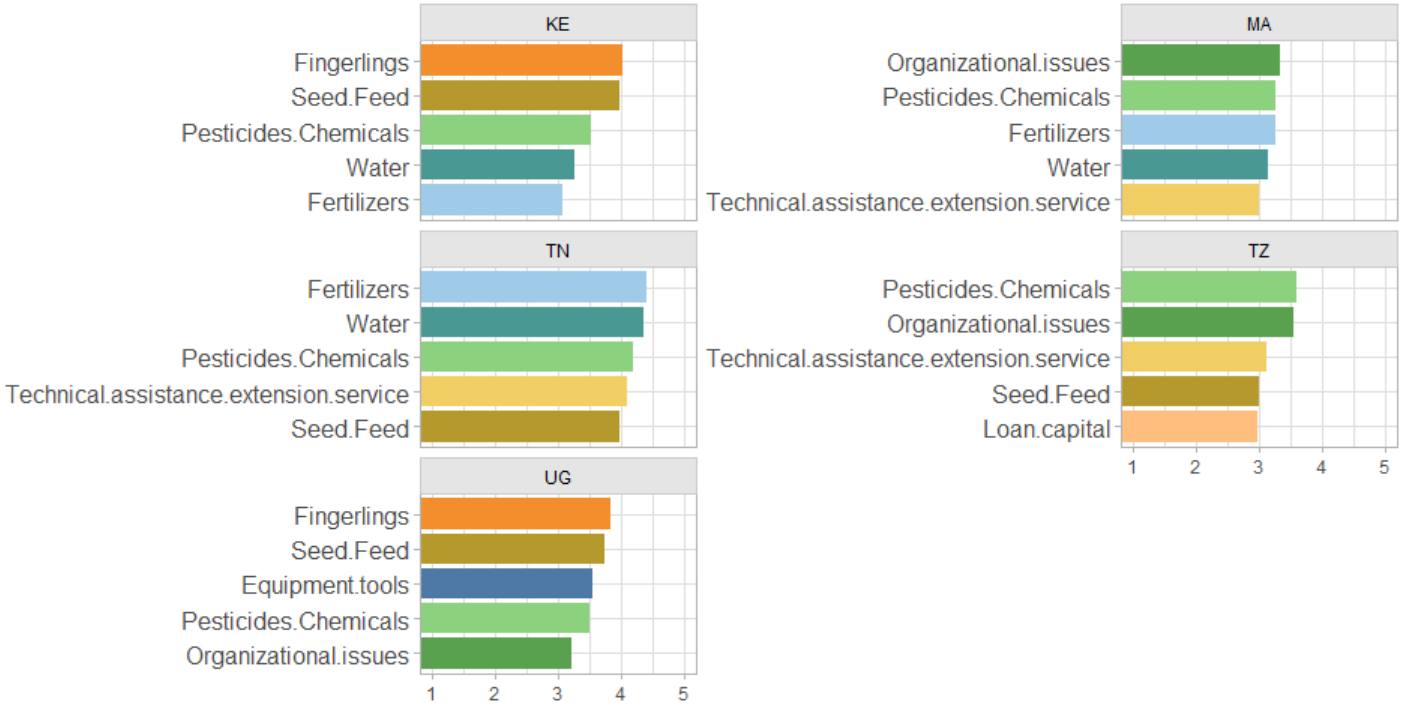
Average value on the Likert scale where 1=Not at a problem - 5=Serious problem



FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

Five most important problems affected the farm activities the most in last season by country

Average value on the Likert scale where 1=Not at a problem - 5=Serious problem



Troubles experienced by the farmer

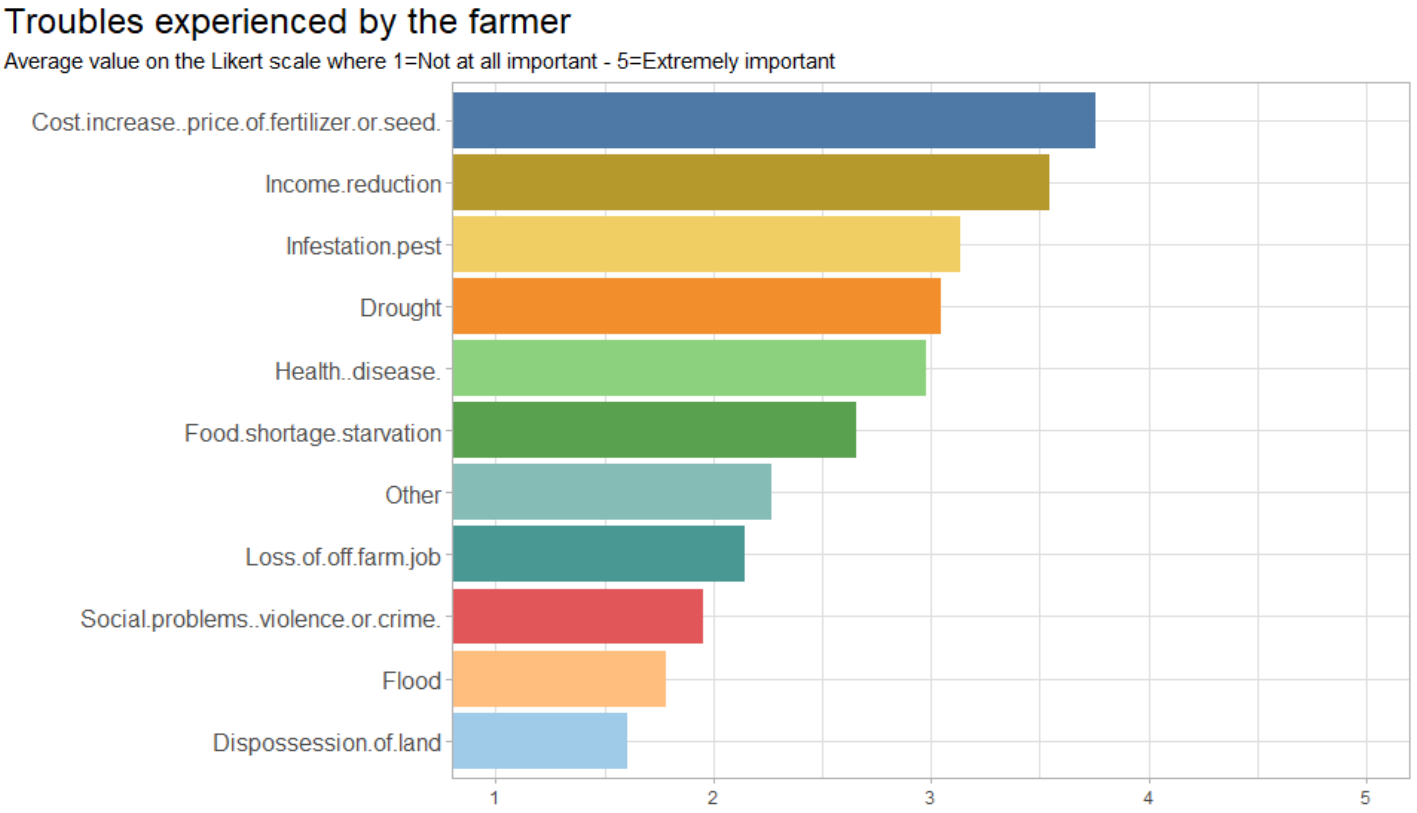
Table 27: Troubles experienced by the farmer

country	hub	Food.shortage.starvation	Health..disease.	Drought	Flood	Infestation.pest	Dispossession.of.land	Cost.increase..price.of.fertilizer.or.sbeed.	Loss.of.off.farm.job	Income.reduction	Social.problems..violence.or.crime.	Other
KE	Kisumu	3.63	3.05	3.31	3.17	2.55	2.08	3.87	2.38	3.29	2.73	3.97
	Kitui	3.85	3.25	4.21	1.41	4.16	1.43	3.75	2.20	3.74	1.80	3.50
	Mukurweini	3.10	2.45	2.01	1.47	3.84	1.47	3.73	2.39	3.12	1.88	2.89
	Subtotal	3.51	2.90	3.15	1.94	3.57	1.63	3.78	2.32	3.38	2.10	3.32
MA	BeniMellal	1.82	2.30	3.60	1.51	1.64	1.42	3.84	1.54	2.76	1.28	
	Meknes	2.48	2.66	3.21	1.30	1.78	1.49	3.75	1.77	2.85	1.26	4.95
	Subtotal	2.19	2.50	3.39	1.40	1.72	1.46	3.79	1.67	2.81	1.27	4.95
TN	Chebika	1.32	3.64	4.60	1.07	2.81	1.08	4.34	1.50	4.29	1.18	1.33

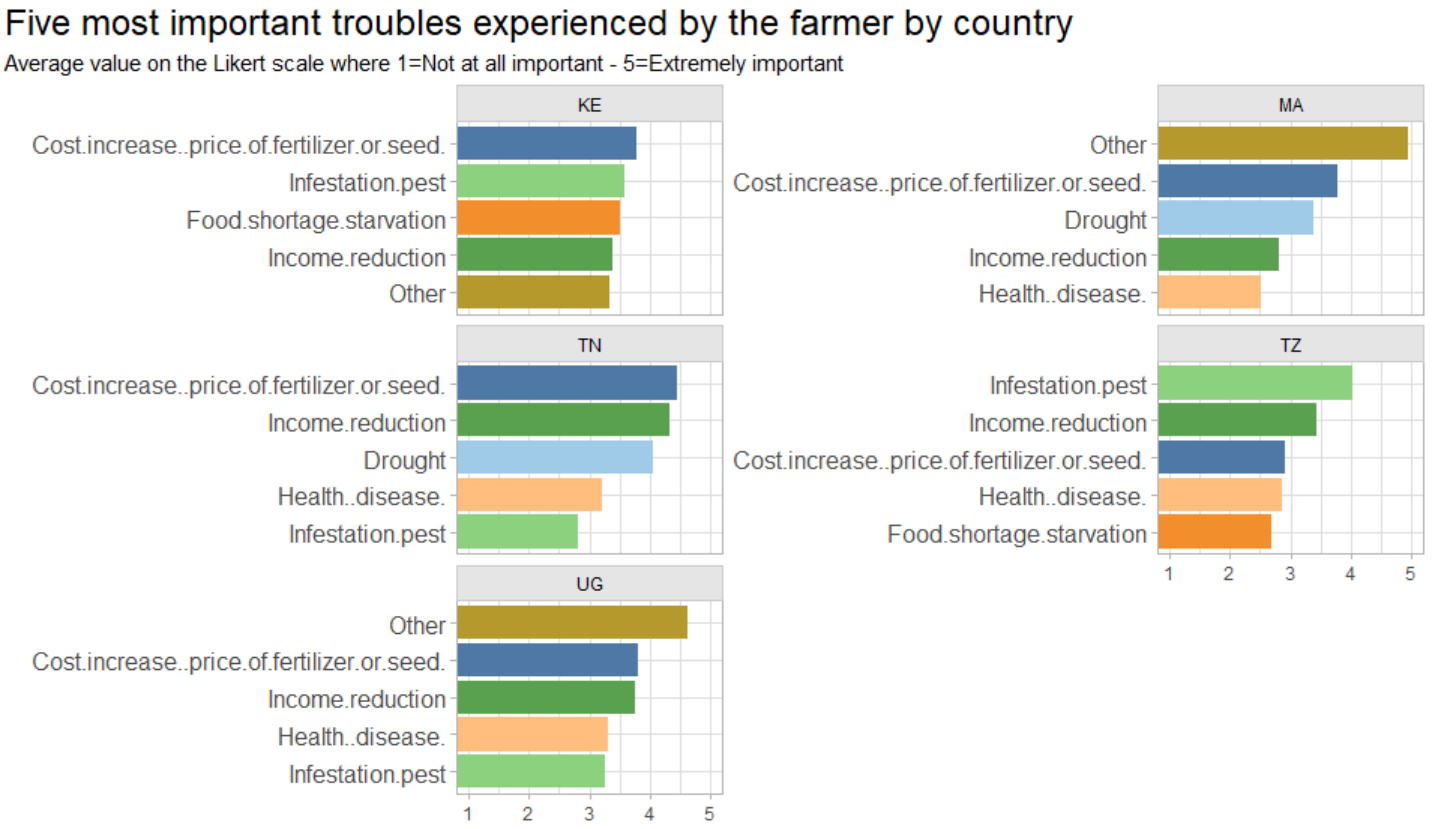
FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

country	hub	Food.shortage.starvation	Health..disease.	Drought	Flood	Infestation.pest	Dispossession.of.land	Cost.increase..price.of.fertilizer.or.seed.	Loss.of.off.farm.job	Income.reduction	Social.problems..violence.or.crime.	Other
	Jendouba	3.45	2.86	3.58	1.44	2.80	1.34	4.57	1.84	4.38	1.21	2.31
	Subtotal	2.47	3.22	4.05	1.27	2.81	1.22	4.46	1.68	4.34	1.20	1.85
TZ	Kilombero	2.48	2.93	1.95	2.40	3.81	1.53	3.22	1.50	3.17	1.70	
	Mvomero	2.83	2.83	2.28	1.49	4.21	1.34	2.66	1.36	3.65	1.37	
	Subtotal	2.68	2.87	2.13	1.90	4.03	1.42	2.91	1.42	3.44	1.52	
UG	Kajjansi_Masaka	2.69	2.86	2.20	2.15	2.32	1.80	3.77	2.63	3.43	2.53	4.78
	Kamuli	1.98	3.56	2.69	2.42	3.84	2.06	3.74	3.38	3.97	3.70	4.43
	Nakaseke	1.75	3.60	3.12	1.99	3.88	2.49	3.92	3.46	3.93	3.31	4.58
	Subtotal	2.18	3.30	2.63	2.18	3.26	2.09	3.81	3.11	3.75	3.13	4.62
Total	-	2.66	2.98	3.05	1.79	3.14	1.61	3.76	2.14	3.55	1.96	2.27

Average value on the Likert scale where 1=Not at all important - 5=Extremely important



FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).



Worries regarding the near future

Table 28: Worries regarding the near future

country	hub	Food.shortage.starvation	Health..disease.	Drought	Flood	Infestation.pest	Dispossession.of.land	Cost.increase..price.of.fertilizer.or.seed.	Loss.of.off.farm.job	Income.reduction	Social.problems..violence.or.crime.	Other
KE	Kisumu	3.74	3.09	3.41	3.46	2.77	2.02	4.05	2.55	3.35	2.81	3.75
	Kitui	4.19	3.40	4.25	1.64	4.11	1.48	3.77	2.36	3.77	2.01	4.20
	Mukurweini	3.43	2.90	2.55	1.94	3.83	1.85	3.69	2.64	3.13	2.35	2.95
	Subtotal	3.78	3.13	3.39	2.28	3.62	1.77	3.82	2.52	3.41	2.37	3.42
MA	BeniMellal	1.94	2.42	3.13	1.96	1.88	1.52	3.75	1.57	2.60	1.31	
	Meknes	2.65	3.00	3.35	1.79	2.17	1.70	3.82	2.07	3.05	1.62	4.91
	Subtotal	2.33	2.74	3.25	1.87	2.04	1.62	3.79	1.85	2.85	1.48	4.91
TN	Chebika	3.58	1.16	2.89	1.16	1.49	4.22	1.19	4.16	1.45		

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

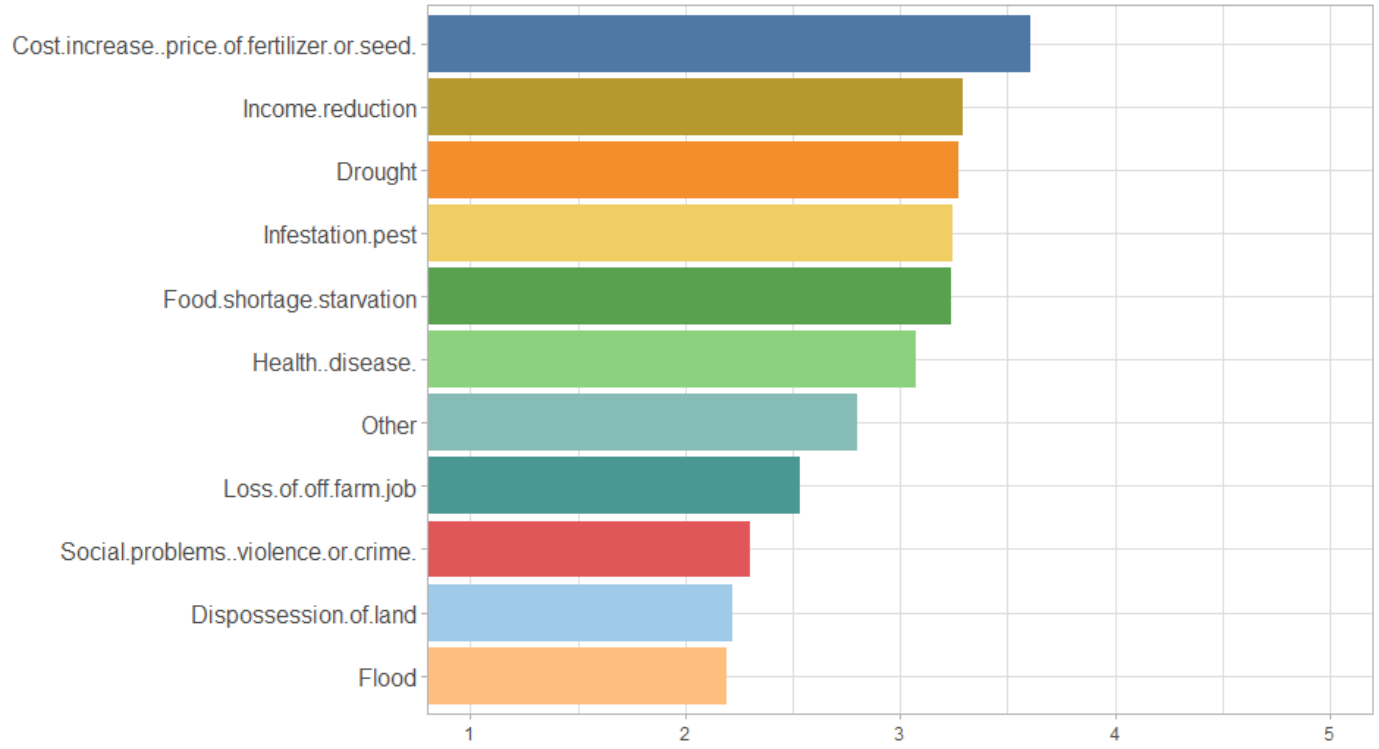
country	hub	Food.shortage.starvation	Health..disease.	Drought	Flood	Infestation.pest	Dispossession.of.land	Cost.increase..price.of.fertilizer.or.seed.	Loss.of.off.farm.job	Income.reduction	Social.problems..violence.or.crime.	Other
	Jendouba	3.98	3.81	4.17	1.91	3.72	1.42	4.65	1.94	4.41	1.34	2.37
	Subtotal	3.80	2.58	3.58	1.56	2.69	2.72	3.05	2.97	3.04	1.34	2.37
TZ	Kilombero	2.65	2.78	2.42	2.40	3.66	1.82	3.25	1.75	2.99	1.87	
	Mvomero	3.02	2.71	2.58	1.73	3.90	1.75	2.77	1.72	3.46	1.77	
	Subtotal	2.85	2.74	2.51	2.03	3.79	1.78	2.99	1.73	3.25	1.81	
UG	Kajjansi_Masaka	2.95	3.21	2.71	2.46	2.77	2.28	3.82	2.70	3.34	2.64	4.75
	Kamuli	3.65	4.34	4.02	3.41	4.30	3.51	4.26	3.74	4.04	4.23	5.00
	Nakaseke	2.94	4.07	3.88	2.89	4.24	3.65	4.22	3.55	3.75	3.88	4.50
	Subtotal	3.16	3.82	3.47	2.88	3.69	3.08	4.08	3.28	3.68	3.51	4.63
Total	-	3.24	3.07	3.27	2.19	3.24	2.22	3.61	2.54	3.29	2.30	2.80

Average value on the Likert scale where 1=Not at all important - 5=Extremely important

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

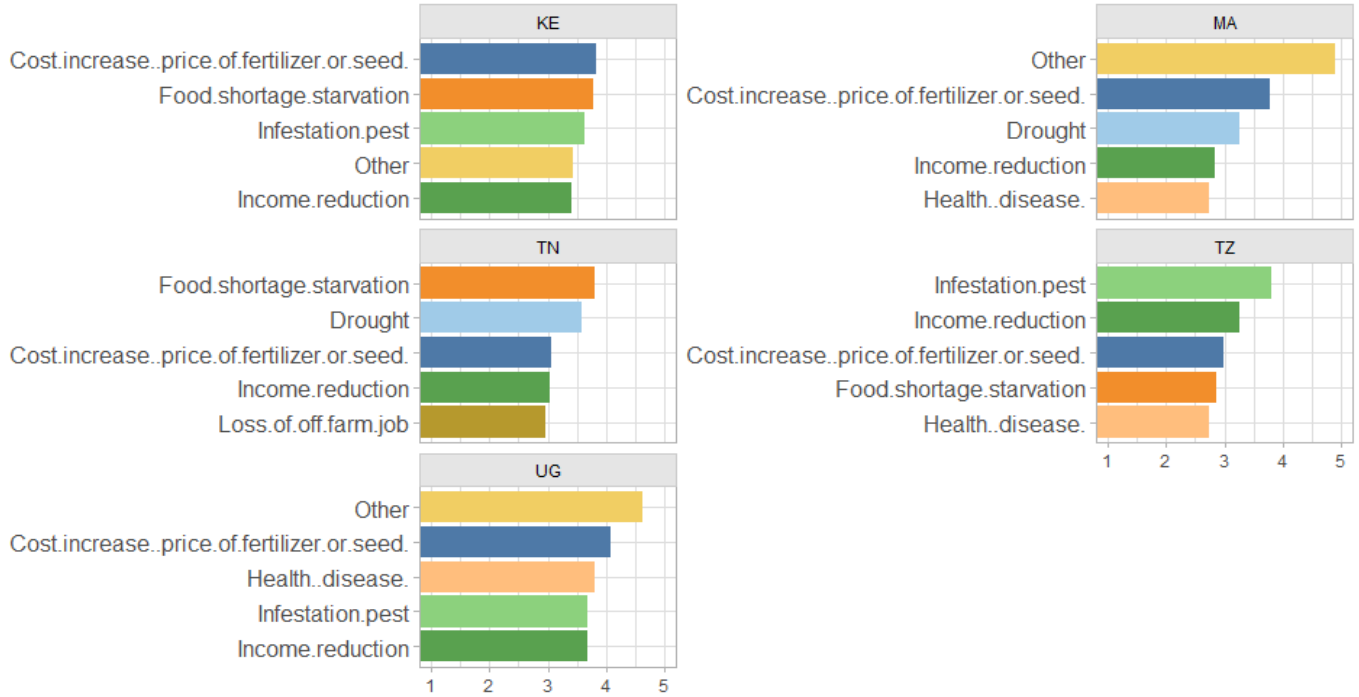
Worries regarding the near future

Average value on the Likert scale where 1=Not at all important - 5=Extremely important



Five most important troubles experienced by the farmer by country

Average value on the Likert scale where 1=Not at all important - 5=Extremely important



FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

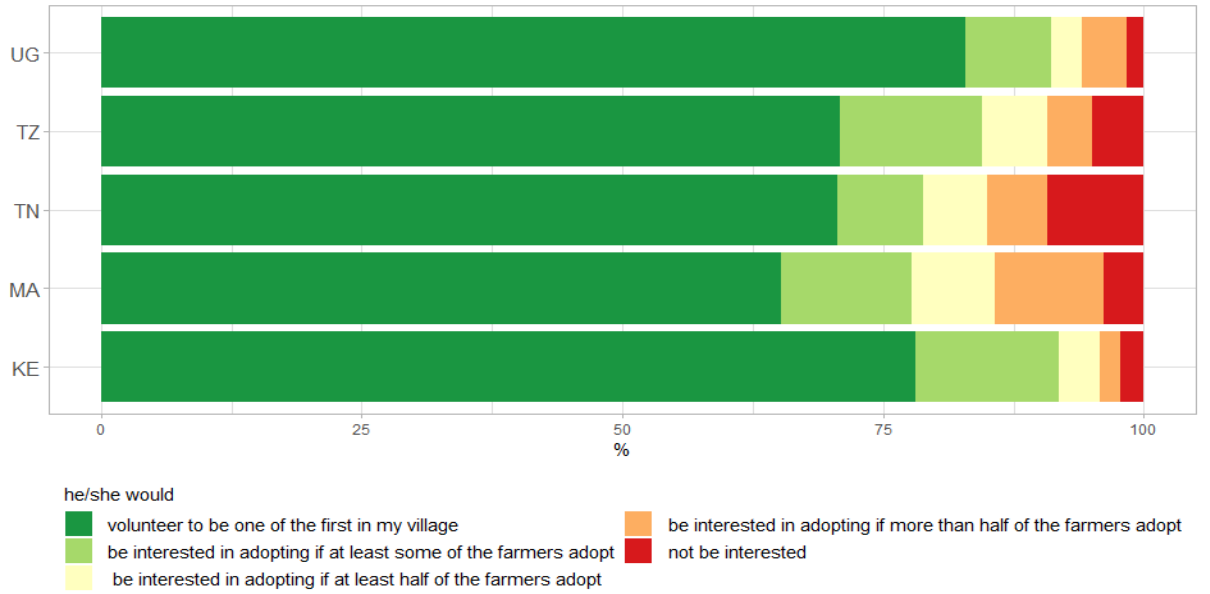
Propensity to innovation

Table 29: To what extent would the farmer consider introducing the presented technology (% value)

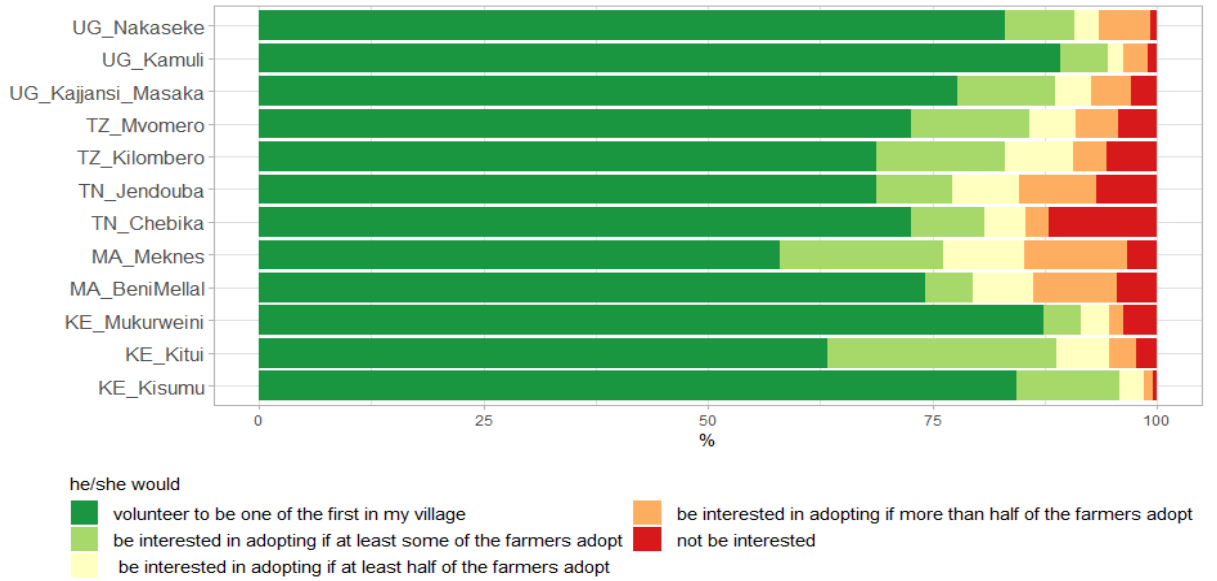
country	hub	he/she would not be interested	he/she would be interested in adopting if more than half of the farmers adopt	he/she would be ininterested in adopting if at least half of the farmers adopt	he/she would be ininterested in adopting if at least some of the farmers adopt	he/she would volunteer to be one of the first in my village	row.sum
KE	Kisumu	0.5	1.0	2.7	11.4	84.4	100
	Kitui	2.3	3.1	5.8	25.5	63.3	100
	Mukurweini	3.8	1.6	3.2	4.2	87.3	100
	Subtotal	2.3	1.9	4.0	13.7	78.1	100
MA	BeniMellal	4.5	9.2	6.8	5.2	74.2	100
	Meknes	3.4	11.4	9.0	18.2	58.0	100
	Subtotal	3.9	10.4	8.0	12.4	65.2	100
TN	Chebika	12.1	2.6	4.6	8.1	72.6	100
	Jendouba	6.8	8.6	7.4	8.4	68.8	100
	Subtotal	9.2	5.8	6.1	8.3	70.6	100
TZ	Kilombero	5.7	3.7	7.6	14.3	68.8	100
	Mvomero	4.4	4.8	5.2	13.1	72.6	100
	Subtotal	4.9	4.3	6.3	13.6	70.9	100
UG	Kajjansi_Masaka	3.0	4.3	4.1	10.8	77.8	100
	Kamuli	1.0	2.8	1.8	5.2	89.2	100
	Nakaseke	0.8	5.8	2.8	7.8	83.0	100
	Subtotal	1.7	4.3	3.0	8.2	82.9	100
Total		4.0	5.0	5.1	11.2	74.6	100

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

To what extent would the farmer consider introducing the presented technology by country



To what extent would the farmer consider introducing the presented technology by food hub



FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

Table 30: To what extent would the farmer consider introducing the presented technology by country (% value)

country	hub	Not at all interested	Slightly interested	Somewhat interested	Moderately interested	Extremely interested	row.sum
KE	Kisumu	0.0	2.0	1.5	10.7	85.9	100
	Kitui	2.7	3.1	8.7	20.3	65.1	100
	Mukurweini	2.2	2.0	3.8	11.1	81.0	100
	Subtotal	1.7	2.4	4.8	14.2	76.9	100
MA	BeniMellal	1.8	2.5	12.0	36.0	47.8	100
	Meknes	1.8	2.8	18.4	23.2	53.8	100
	Subtotal	1.8	2.7	15.6	28.9	51.1	100
TN	Chebika	8.4	4.2	16.5	7.9	63.1	100
	Jendouba	8.2	1.6	4.8	12.4	73.0	100
	Subtotal	8.3	2.8	10.2	10.3	68.4	100
TZ	Kilombero	4.7	1.2	7.1	23.3	63.6	100
	Mvomero	3.4	1.8	4.8	12.7	77.4	100
	Subtotal	4.0	1.5	5.8	17.5	71.2	100
UG	Kajjansi_Masaka	1.2	2.6	6.1	9.3	80.9	100
	Kamuli	0.0	0.2	3.2	2.2	94.2	100
	Nakaseke	0.0	2.2	7.5	1.8	88.5	100
	Subtotal	0.5	1.8	5.7	4.8	87.3	100
Total		2.9	2.2	7.9	14.2	72.7	100

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

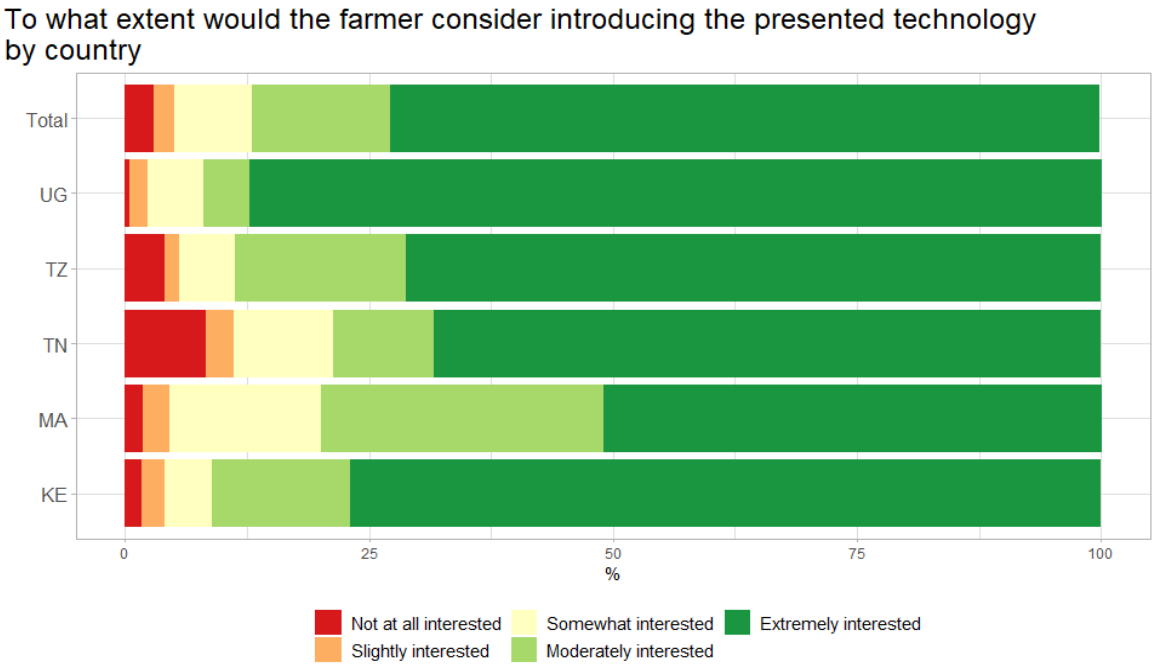


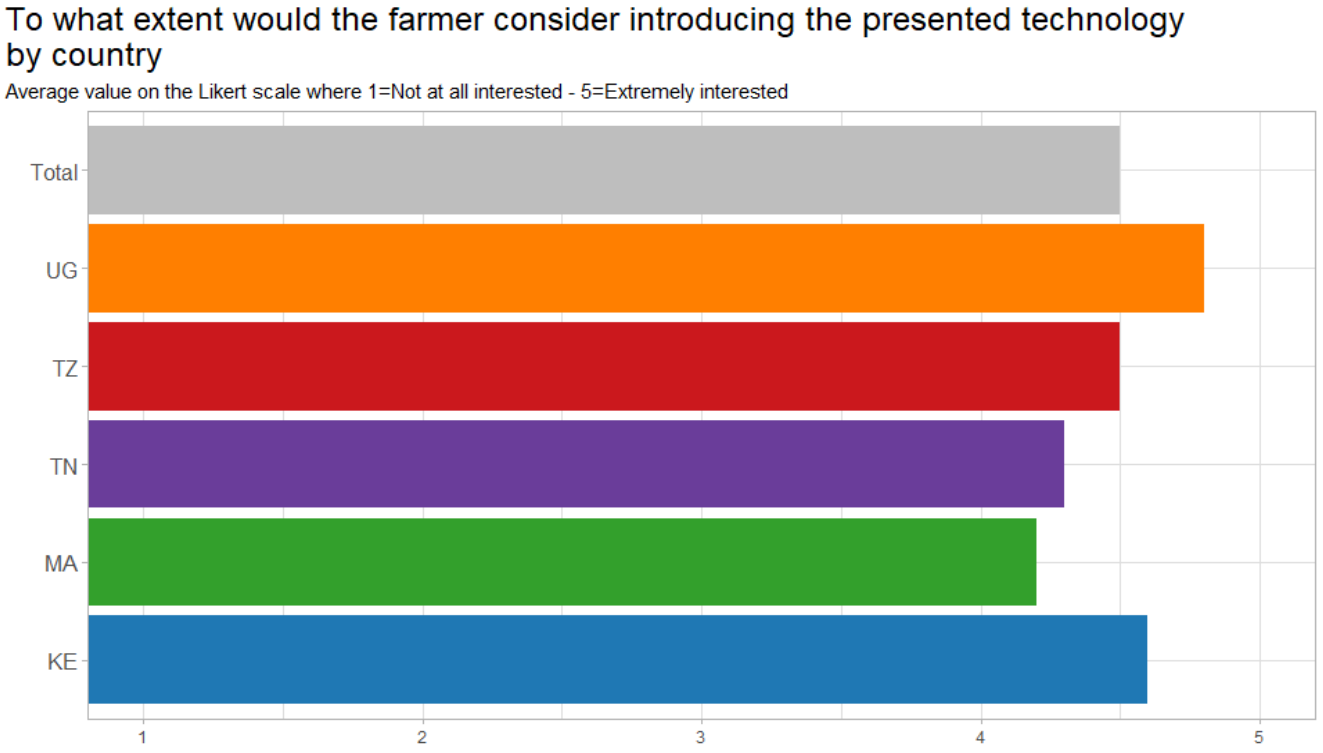
Table 31: To what extent would the farmer consider introducing the presented technology by country (% value)

country	hub	average
KE	Kisumu	4.8
	Kitui	4.4
	Mukurweini	4.7
	Subtotal	4.6
MA	BeniMellal	4.3
	Meknes	4.2
	Subtotal	4.2
TN	Chebika	4.1
	Jendouba	4.4
	Subtotal	4.3
TZ	Kilombero	4.4
	Mvomero	4.6
	Subtotal	4.5

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

country	hub	average
UG	Kajjansi_Masaka	4.7
	Kamuli	4.9
	Nakaseke	4.8
	Subtotal	4.8
Total	-	4.5

Average value on the Likert scale where 1=Not at all interested - 5=Extremely interested



Are there differences between countries in the propensity to introduce new technologies?

Table 32: Kruskal-Wallis test on propensity to introduce new tecnology by country

Test	Statistic	df	p.value	Signif
Kruskal-Wallis rank sum test	345.0361	4	2.068721e-73	***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

Table 33: Multiple pairwise comparisons from a Kruskal-Wallis test - p.values

Pairs	KE	MA	TN	TZ
MA	<0.001			
TN	<0.001	<0.001		
TZ	0.0301	<0.001	0.0973	
UG	<0.001	<0.001	<0.001	<0.001

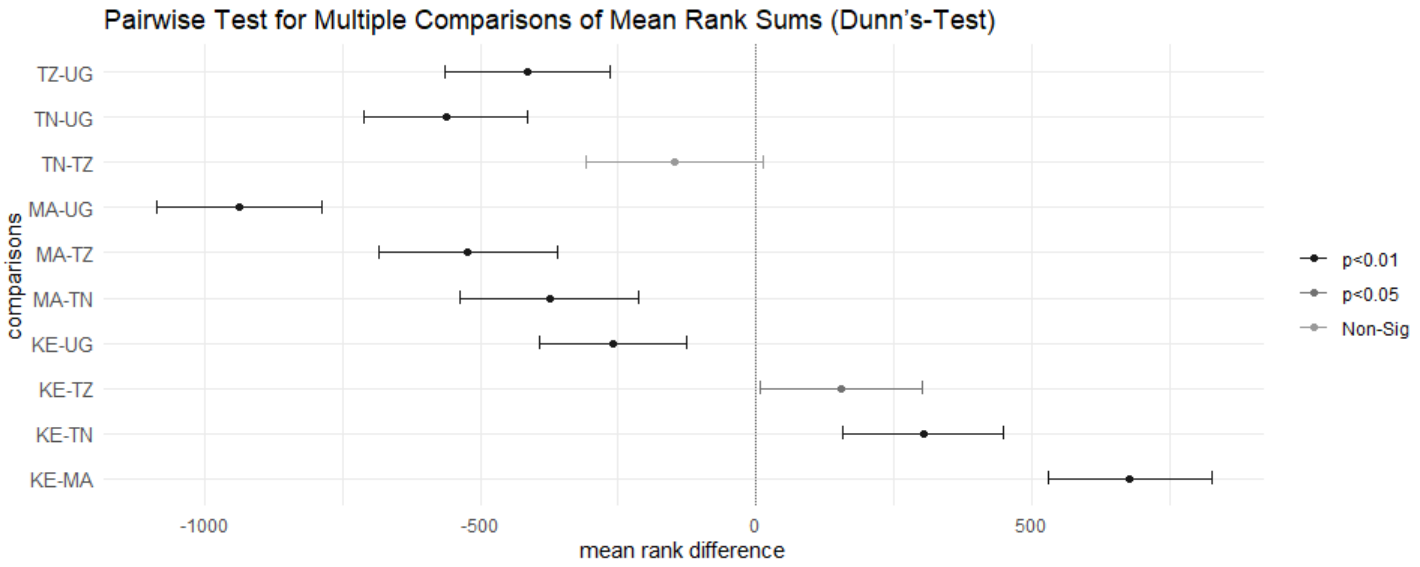


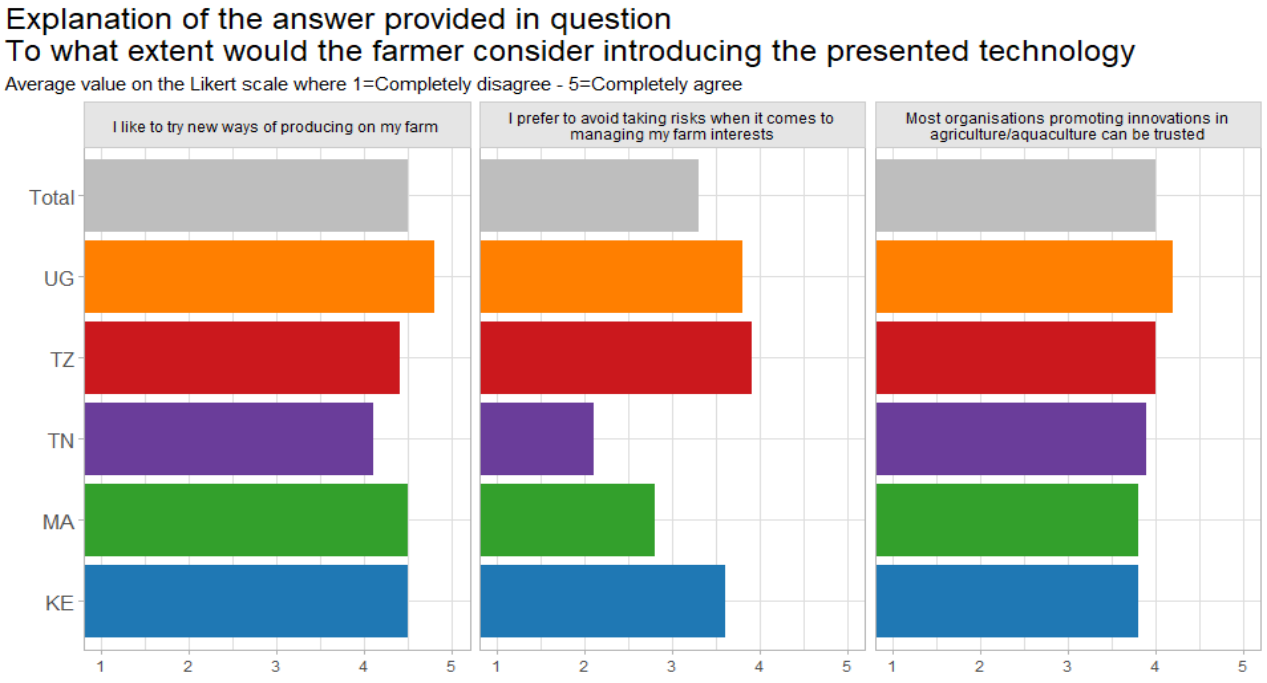
Table 34: Explanation of the answer provided in question To what extent would the farmer consider introducing the presented technology

country	hub	I like to try newl ways producing my farm	I prefer to avoid oftaking risks when it oncomes to managing my farm interests	Most organisations promoting innovations in agriculture/aquaculture can be trusted
KE	Kisumu	4.5	3.2	3.7
	Kitui	4.6	3.4	3.8
	Mukurweini	4.5	4.0	3.9
	Subtotal	4.5	3.6	3.8
MA	BeniMellal	4.3	2.7	4.0
	Meknes	4.5	2.8	3.7
	Subtotal	4.5	2.8	3.8

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

country	hub	I like to try newl ways producing my farm	I prefer to avoid oftaking risks when it oncomes to managing my farm interests	Most organisations promoting innovations in agriculture/aquaculture can be trusted
TN	Chebika	4.1	2.1	3.9
	Jendouba	4.2	2.0	4.0
	Subtotal	4.1	2.1	3.9
TZ	Kilombero	4.4	3.7	3.7
	Mvomero	4.5	4.1	4.3
	Subtotal	4.4	3.9	4.0
UG	Kajjansi_Masaka	4.6	3.1	4.0
	Kamuli	4.9	4.3	4.6
	Nakaseke	4.7	4.1	4.1
	Subtotal	4.8	3.8	4.2
Total	-	4.5	3.3	4.0

Average value on the Likert scale where 1=Completely disagree - 5=Completely agree



FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

Relationship between question Q12 and questions Q13

Table 35: Correlation between propensity to innovetion and answers to questions Q13

country	Explanation of question 12	rho	p.value	Signif
KE	I like to try new ways of producing on my farm	0.3645	0.000e+00	***
	I prefer to avoid taking risks when it comes to managing my farm interests	0.1027	1.244e-04	***
	Most organisations promoting innovations in agriculture/aquaculture can be trusted	0.1343	5.074e-07	***
MA	I like to try new ways of producing on my farm	0.4484	0.000e+00	***
	I prefer to avoid taking risks when it comes to managing my farm interests	-0.2409	2.380e-13	***
	Most organisations promoting innovations in agriculture/aquaculture can be trusted	0.3221	0.000e+00	***
TN	I like to try new ways of producing on my farm	0.6581	0.000e+00	***
	I prefer to avoid taking risks when it comes to managing my farm interests	-0.5011	0.000e+00	***
	Most organisations promoting innovations in agriculture/aquaculture can be trusted	0.4337	0.000e+00	***
TZ	I like to try new ways of producing on my farm	0.5007	0.000e+00	***
	I prefer to avoid taking risks when it comes to managing my farm interests	0.2564	3.775e-15	***
	Most organisations promoting innovations in agriculture/aquaculture can be trusted	0.3865	0.000e+00	***
UG	I like to try new ways of producing on my farm	0.4965	0.000e+00	***
	I prefer to avoid taking risks when it comes to managing my farm interests	0.1223	9.116e-06	***
	Most organisations promoting innovations in agriculture/aquaculture can be trusted	0.1538	2.268e-08	***
Total	I like to try new ways of producing on my farm	0.4988	0.000e+00	***
	I prefer to avoid taking risks when it comes to managing my farm interests	0.0200	1.411e-01	
	Most organisations promoting innovations in agriculture/aquaculture can be trusted	0.2862	0.000e+00	***

Signif. codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

FOODLAND has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

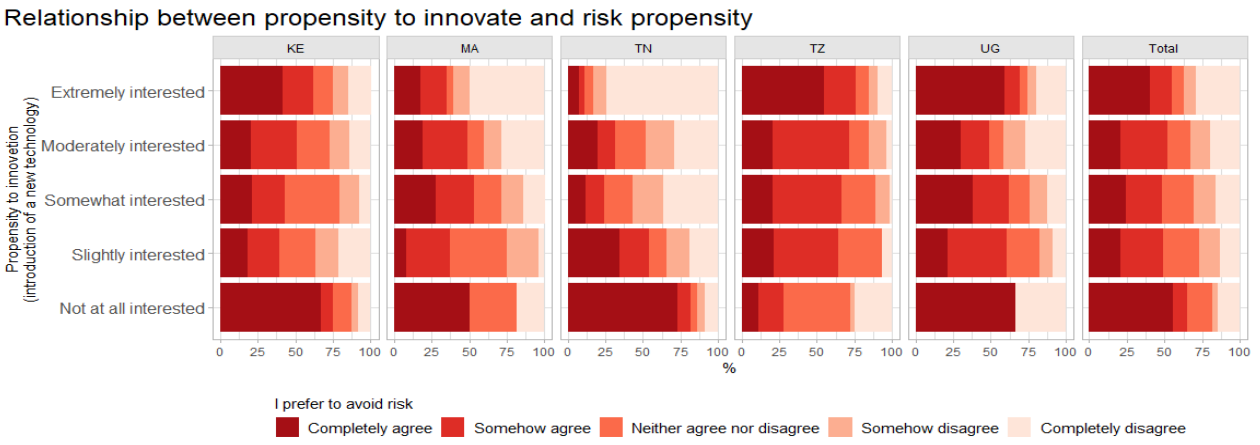
Relationship between interest in introducing a new technology and risk propensity

Table 36: Relationship between propensity to innovate and risk propensity (% value)

country	Interested in a new technology	Completely disagree	Somehow disagree	Neither agree nor disagree	Somehow agree	Completely agree	row.sum
KE	Not at all interested	8.3	4.2	12.5	8.3	66.7	100
	Slightly interested	21.2	15.2	24.2	21.2	18.2	100
	Somewhat interested	7.5	13.4	35.8	22.4	20.9	100
	Moderately interested	13.7	13.7	21.8	29.9	20.8	100
	Extremely interested	15.0	10.0	13.3	20.5	41.3	100
	Subtotal	14.5	10.7	15.8	21.7	37.3	100
MA	Not at all interested	18.8	0.0	31.2	0.0	50.0	100
	Slightly interested	4.2	20.8	37.5	29.2	8.3	100
	Somewhat interested	14.3	14.3	18.6	25.0	27.9	100
	Moderately interested	28.8	11.5	10.4	30.4	18.8	100
	Extremely interested	49.3	11.5	4.1	17.2	17.8	100
	Subtotal	36.2	12.0	9.6	22.2	20.0	100
TN	Not at all interested	9.1	5.2	3.9	9.1	72.7	100
	Slightly interested	19.2	15.4	11.5	19.2	34.6	100
	Somewhat interested	36.8	20.0	18.9	12.6	11.6	100
	Moderately interested	29.2	18.8	20.8	11.5	19.8	100
	Extremely interested	74.6	8.5	5.8	3.6	7.5	100
	Subtotal	59.1	10.6	8.7	6.2	15.4	100
TZ	Not at all interested	25.0	2.8	44.4	16.7	11.1	100
	Slightly interested	7.1	0.0	28.6	42.9	21.4	100
	Somewhat interested	1.9	9.4	22.6	45.3	20.8	100
	Moderately interested	3.8	11.9	12.6	50.9	20.8	100
	Extremely interested	9.2	5.9	9.2	21.1	54.5	100
	Subtotal	8.5	6.9	12.3	27.9	44.5	100
UG	Not at all interested	33.3	0.0	0.0	0.0	66.7	100
	Slightly interested	8.7	8.7	21.7	39.1	21.7	100
	Somewhat interested	12.2	12.2	13.5	24.3	37.8	100
	Moderately interested	27.0	14.3	9.5	19.0	30.2	100

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

country	Interested in a new technology	Completely disagree	Somehow disagree	Neither agree nor disagree	Somehow agree	Completely agree	row.sum
	Extremely interested	19.8	5.5	5.4	10.1	59.2	100
	Subtotal	19.6	6.3	6.3	11.8	56.0	100
Total	Not at all interested	14.5	3.8	17.0	9.4	55.3	100
	Slightly interested	13.3	13.3	24.2	28.3	20.8	100
	Somewhat interested	16.3	14.5	21.0	24.2	24.0	100
	Moderately interested	19.7	13.3	15.0	31.2	20.8	100
	Extremely interested	29.0	8.0	8.1	14.5	40.5	100
	Total	25.9	9.2	10.7	17.8	36.4	100



FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

Propensity to introduce new productions

Table 37: Farmer's propensity to introduce new productions

country	Propensity of the farmer	Not at all interested	Slightly interested	Somewhat interested	Moderately interested	Extremely interested	sum
KE	to sell jointly his/her production	5.8	8.8	11.5	17.1	56.9	100
	to introduce a higher nutritional crop/fish species	3.7	25.6	5.5	13.0	52.1	100
	to introduce a more profitable crop/fish species	3.3	5.8	5.6	14.2	71.1	100
MA	to sell jointly his/her production	12.8	5.2	15.0	34.9	32.1	100
	to introduce a higher nutritional crop/fish species	7.6	5.9	20.1	38.0	28.4	100
	to introduce a more profitable crop/fish species	4.7	2.7	14.4	31.9	46.3	100
TN	to sell jointly his/her production	17.1	5.4	10.6	9.6	57.4	100
	to introduce a higher nutritional crop/fish species	13.0	4.6	17.2	17.6	47.6	100
	to introduce a more profitable crop/fish species	9.5	4.0	7.8	9.3	69.4	100
TZ	to sell jointly his/her production	13.8	3.7	10.8	15.6	56.1	100
	to introduce a higher nutritional crop/fish species	12.4	9.8	15.8	23.3	38.7	100
	to introduce a more profitable crop/fish species	5.8	3.4	5.8	14.9	70.0	100
UG	to sell jointly his/her production	4.7	3.1	10.3	7.6	74.3	100
	to introduce a higher nutritional crop/fish species	1.7	2.6	10.4	8.7	76.6	100
	to introduce a more profitable crop/fish species	1.9	2.1	6.7	7.5	81.8	100
Total	to sell jointly his/her production	10.0	5.4	11.5	16.2	56.9	100
	to introduce a higher nutritional crop/fish species	6.9	10.6	12.8	18.6	51.1	100
	to introduce a more profitable crop/fish species	4.7	3.7	7.8	14.8	69.1	100

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

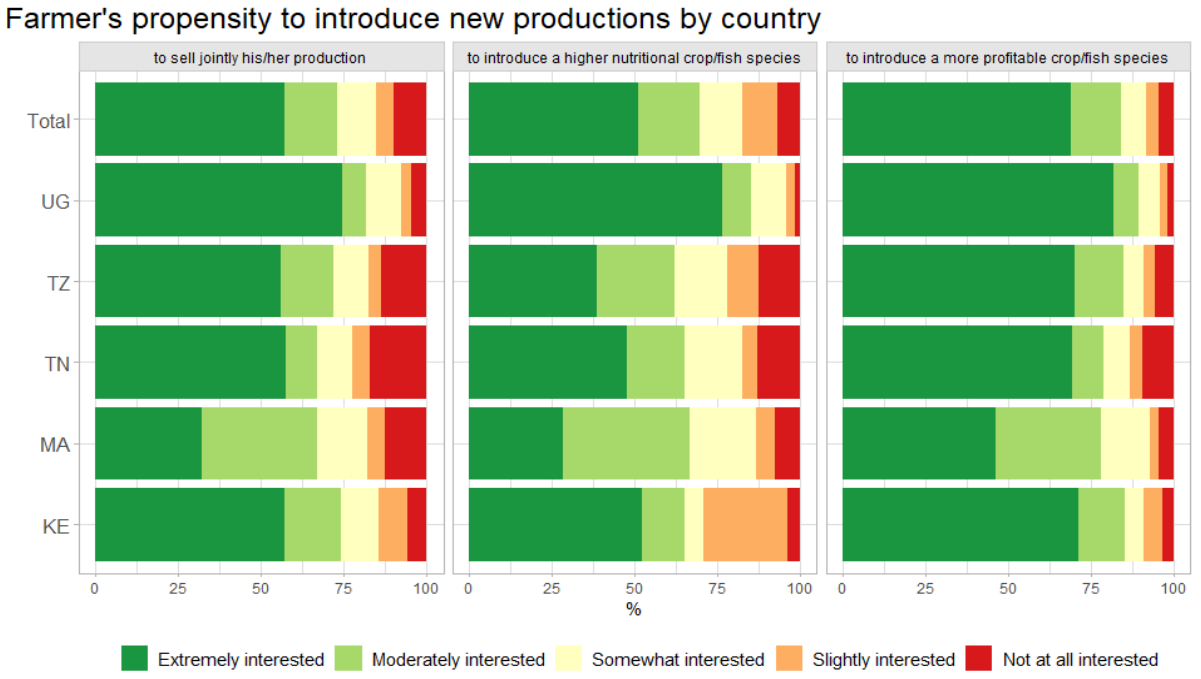


Table 38: Farmer's propensity to introduce new productions by food hub

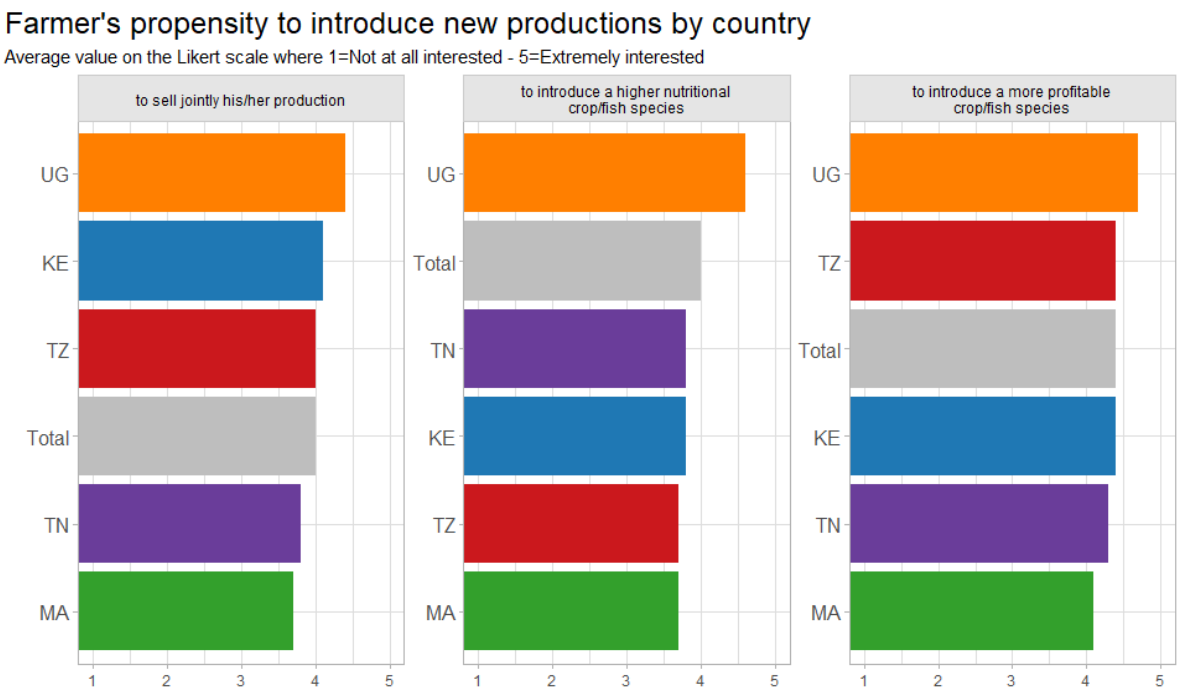
country	hub	Propensity of the farmer to sell jointly his/her production	Propensity of the farmer to introduce a higher nutritional crops/fish species	Propensity of the farmer to introduce a more profitable crops/fish species
KE	Kisumu	3.7	2.7	4.7
	Kitui	4.3	4.2	4.2
	Mukurweini	4.3	4.4	4.5
	Subtotal	4.1	3.8	4.4
MA	BeniMellal	3.4	3.8	4.2
	Meknes	3.9	3.7	4.1
	Subtotal	3.7	3.7	4.1
TN	Chebika	3.8	3.4	4.0
	Jendouba	3.9	4.2	4.5
	Subtotal	3.8	3.8	4.3
TZ	Kilombero	4.0	3.7	4.3
	Mvomero	3.9	3.7	4.5

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

country	hub	Propensity of the farmer to sell jointly his/her production	Propensity of the farmer to introduce a higher nutritional crops/fish species	Propensity of the farmer to introduce a more profitable crops/fish species
	Subtotal	4.0	3.7	4.4
UG	Kajjansi_Masaka	4.3	4.4	4.5
	Kamuli	4.6	4.7	4.8
	Nakaseke	4.4	4.5	4.7
	Subtotal	4.4	4.6	4.7
Total	BeniMellal	3.4	3.8	4.2
	Chebika	3.8	3.4	4.0
	Jendouba	3.9	4.2	4.5
	Kajjansi_Masaka	4.3	4.4	4.5
	Kamuli	4.6	4.7	4.8
	Kilombero	4.0	3.7	4.3
	Kisumu	3.7	2.7	4.7
	Kitui	4.3	4.2	4.2
	Meknes	3.9	3.7	4.1
	Mukurweini	4.3	4.4	4.5
	Mvomero	3.9	3.7	4.5
	Nakaseke	4.4	4.5	4.7
	-	4.0	4.0	4.4

Average value on the Likert scale where 1=Not at all interested - 5=Extremely interested

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).



Test on propensity to introduce new productions by country

Table 39: Kruskal-Wallis test on propensity to introduce new production by country

variable	Kruskal.Wallis.chi.squared	df	p.value	Signif
Propensity of the farmer to sell jointly his/her production	293.8	4	2.33e-62	***
Propensity of the farmer to introduce a higher nutritional crops/fish species	473.6	4	3.43e-101	***
Propensity of the farmer to introduce a more profitable crops/fish species	264.4	4	5.03e-56	***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

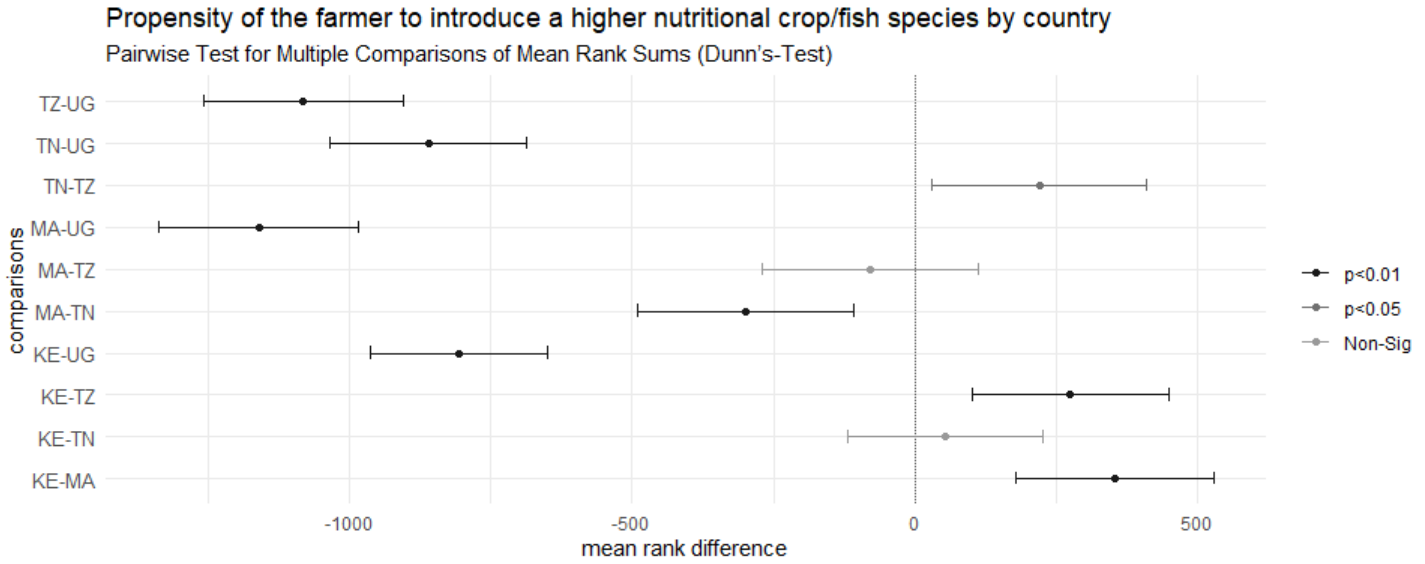
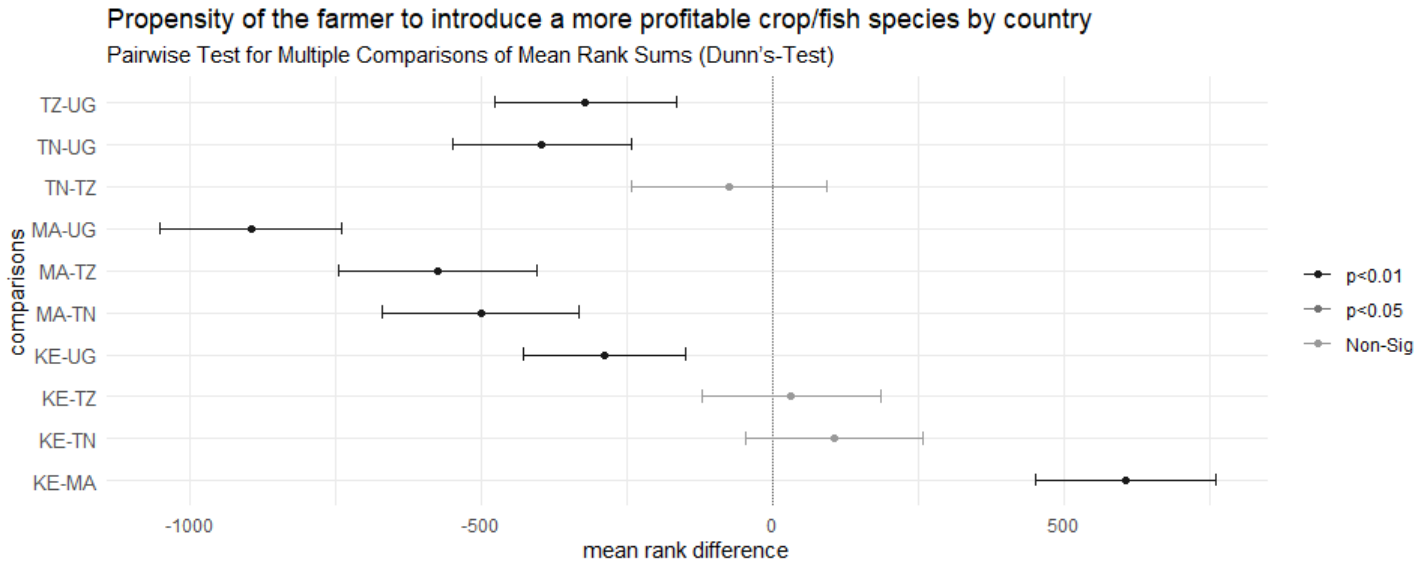


Table 40: Multiple pairwise comparisons from a Kruskal-Wallis test - p.values

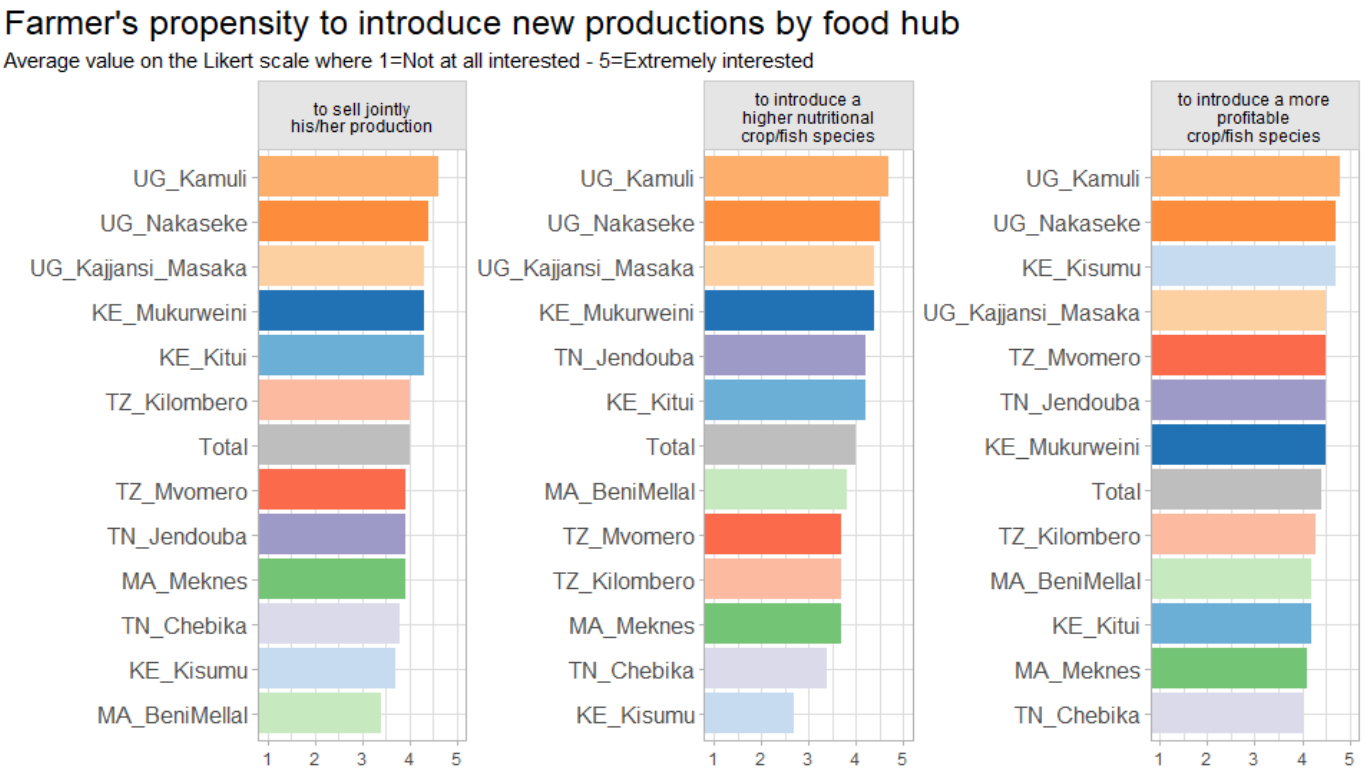
Pairs	KE	MA	TN	TZ
MA	<0.001			
TN	1	<0.001		
TZ	<0.001	1	0.0111	
UG	<0.001	<0.001	<0.001	<0.001



FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

Table 41: Multiple pairwise comparisons from a Kruskal-Wallis test - p.values

Pairs	KE	MA	TN	TZ
MA	<0.001			
TN	0.4972	<0.001		
TZ	1	<0.001	1	
UG	<0.001	<0.001	<0.001	<0.001



FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

Propensity to innovation by gender and age

Gender

Table 42: Farmer's propensity to introduce new productions and to risk by country and gender

country	gender	propensity innovate	topropensity to risk
KE	male	4.63	3.50
	female	4.61	3.65
	Subtotal	4.62	3.57
MA	male	4.23	2.84
	female	4.41	2.17
	Subtotal	4.25	2.78
TN	male	4.26	2.09
	female	4.33	2.07
	Subtotal	4.28	2.08
TZ	male	4.57	4.01
	female	4.40	3.81
	Subtotal	4.50	3.93
UG	male	4.76	3.72
	female	4.79	3.91
	Subtotal	4.77	3.78
Total	male	4.50	3.23
	female	4.56	3.43
	-	4.52	3.29

propensity to innovate: Average value on the Likert scale where 1=Not at all interested - 5=Extremely interested

propensity to risk: Average value on the Likert scale where 1=Completely disagree - 5=Completely agree

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

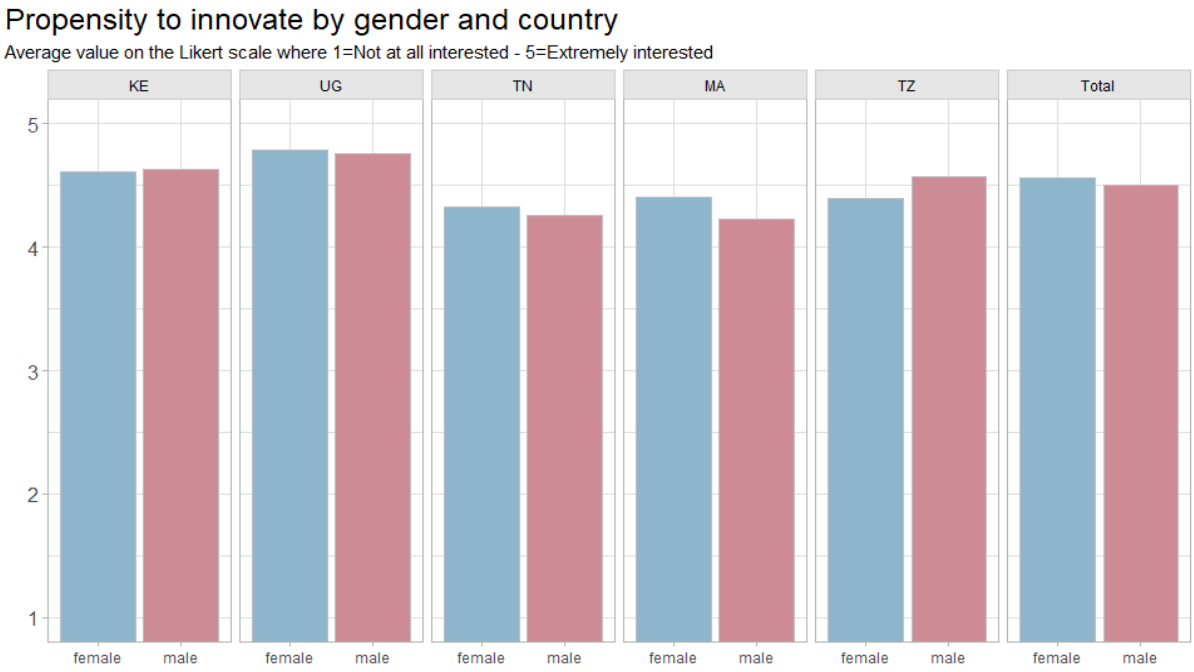


Table 43: Wilcoxon tests on propensity to innovate by gender by country

country	statistic	df	p.value	Signif
KE	241,815.0		0.3872	
MA	27,917.5		0.0102	*
TN	87,271.0		0.2114	
TZ	105,123.5		0.0339	*
UG	189,978.0		0.6649	
Total	3,083,220.5		0.0003	***

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

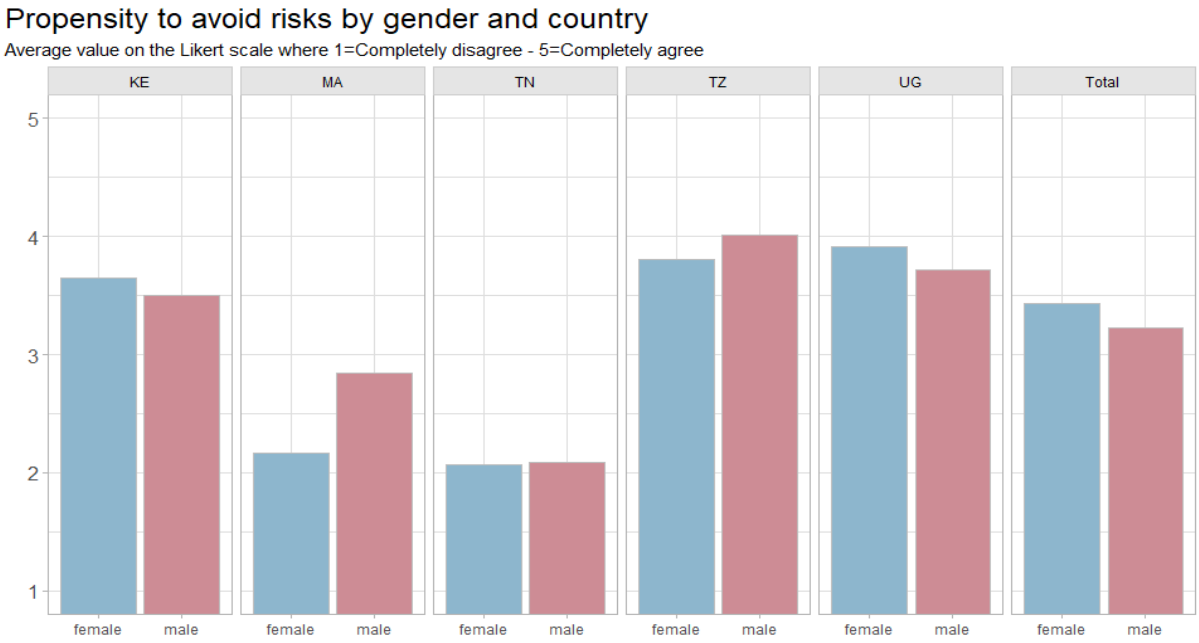


Table 44: Wilcoxon tests on propensity to avoid risks by gender by country

country	statistic	df	p.value	Signif
KE	222,521.5		0.0415	*
MA	40,372.5		8e-04	***
TN	91,940.0		0.8108	
TZ	108,352.0		0.0074	**
UG	180,188.5		0.0506	.
Total	3,017,623.5		2.5e-05	***

Age

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

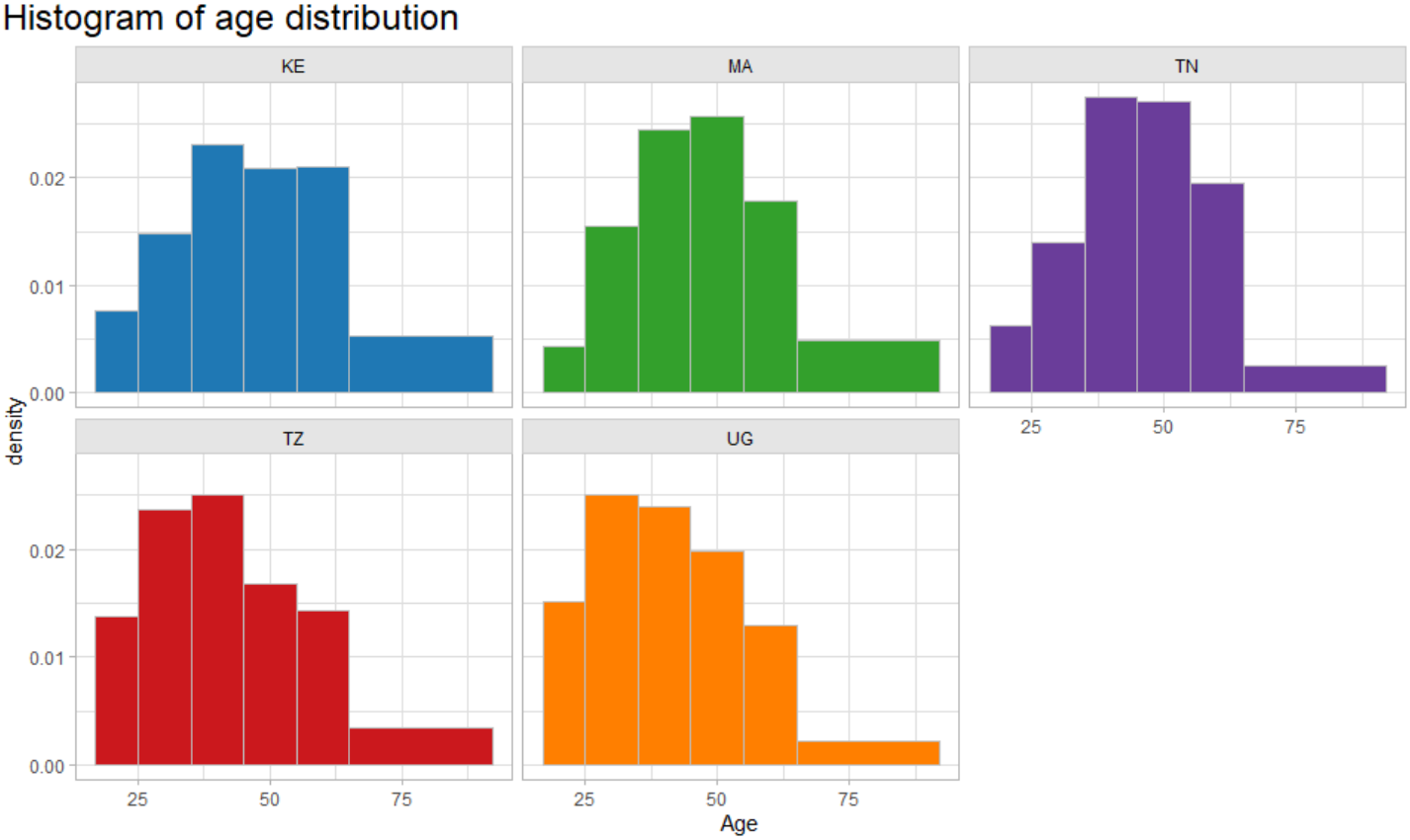


Table 45: Farmer's propensity to introduce new productions and to risk by country and age class

country	age class	propensity innovate	topropensity to risk
KE	[18,25]	4.64	3.61
	(25,35]	4.69	3.57
	(35,45]	4.65	3.51
	(45,55]	4.64	3.63
	(55,65]	4.56	3.64
	(65,92]	4.56	3.43
	Subtotal	4.62	3.57
MA	[18,25]	4.06	2.45
	(25,35]	4.44	2.87
	(35,45]	4.29	2.98
	(45,55]	4.29	2.84

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

country	age class	propensity innovate	topropensity to risk
	(55,65]	4.23	2.65
	(65,92]	3.93	2.42
	Subtotal	4.25	2.78
TN	[18,25]	3.94	3.00
	(25,35]	4.46	2.04
	(35,45]	4.45	1.88
	(45,55]	4.19	2.07
	(55,65]	4.10	2.08
	(65,92]	4.29	2.35
	Subtotal	4.28	2.08
TZ	[18,25]	4.60	3.94
	(25,35]	4.63	4.04
	(35,45]	4.56	3.88
	(45,55]	4.54	3.92
	(55,65]	4.56	4.06
	(65,92]	3.76	3.58
	Subtotal	4.50	3.93
UG	[18,25]	4.65	3.99
	(25,35]	4.80	3.85
	(35,45]	4.81	3.86
	(45,55]	4.76	3.83
	(55,65]	4.79	3.51
	(65,92]	4.69	3.24
	Subtotal	4.77	3.78
Total	[18,25]	4.51	3.68
	(25,35]	4.65	3.47
	(35,45]	4.57	3.26
	(45,55]	4.49	3.23
	(55,65]	4.46	3.20

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

country	age class	propensity to innovate	propensity to risk
	(65,92]	4.29	3.08
	-	4.52	3.29

propensity to innovate: Average value on the Likert scale where 1=Not at all interested - 5=Extremely interested

propensity to risk: Average value on the Likert scale where 1=Completely disagree - 5=Completely agree

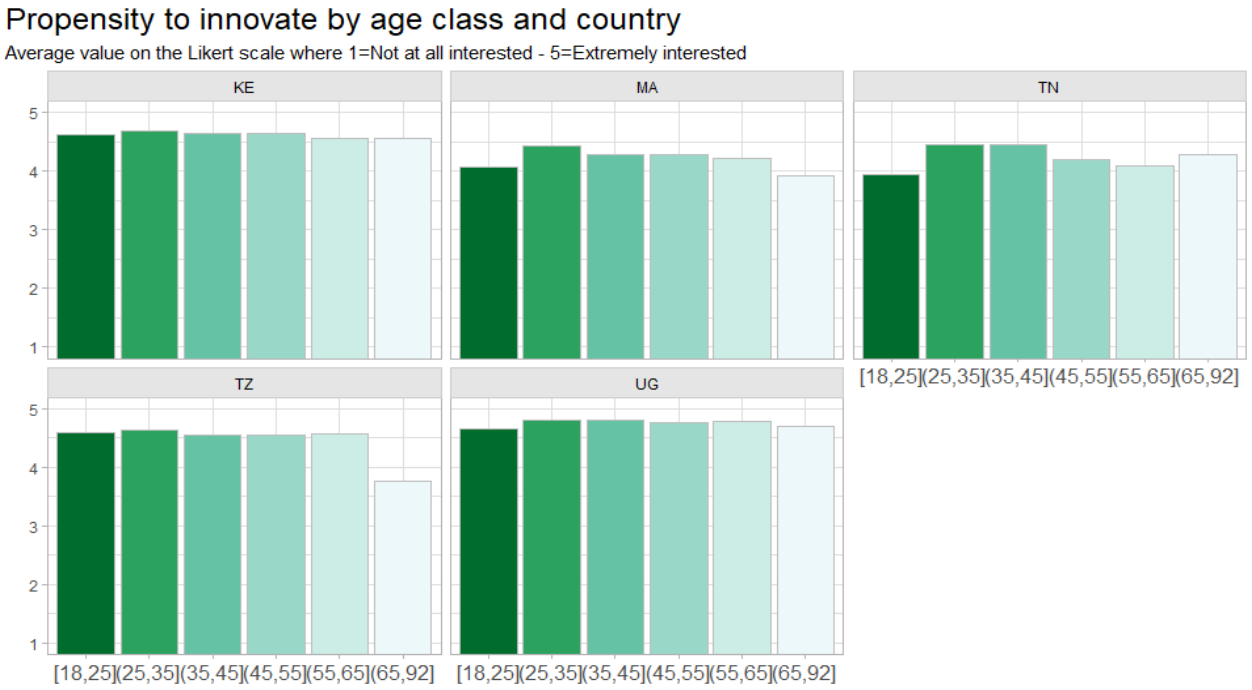


Table 46: Kruskal-Wallis tests on propensity to innovate by age class by country

country	statistic	df	p.value	Signif
KE	5.04	5	0.4116	
MA	18.81	5	0.0021	**
TN	20.60	5	0.001	***
TZ	38.51	5	3.0e-07	***
UG	5.11	5	0.4022	
Total	57.27	5	4.5e-11	***

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

Table 47: Kruskal-Wallis tests on propensity to avoid risks by age class by country

country	statistic	df	p.value	Signif
KE	2.51	5	0.7748	
MA	12.48	5	0.0287	*
TN	30.32	5	1.3e-05	***
TZ	12.38	5	0.03	*
UG	14.39	5	0.0133	*
Total	50.75	5	9.7e-10	***

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

Relationship with nearby farmers

Table 48: Trust versus other farmers working in the village/ward (% values)

country	hub	Most farmers can be trusted	It depends	Can't be too careful	row.sum
KE	Kisumu	46.2	49.4	4.5	100
	Kitui	66.6	27.2	6.2	100
	Mukurweini	65.0	28.3	6.7	100
	Subtotal	60.1	34.0	5.9	100
MA	BeniMellal	22.8	68.0	9.2	100
	Meknes	37.0	53.0	10.0	100
	Subtotal	30.7	59.7	9.7	100
TN	Chebika	53.4	35.3	11.4	100
	Jendouba	23.4	50.8	25.8	100
	Subtotal	37.3	43.6	19.1	100
TZ	Kilombero	42.0	47.9	10.1	100
	Mvomero	52.2	39.3	8.5	100
	Subtotal	47.6	43.1	9.2	100
UG	Kajjansi_Masaka	29.9	59.4	10.6	100
	Kamuli	31.5	61.5	7.0	100
	Nakaseke	27.0	70.2	2.8	100
	Subtotal	29.5	63.4	7.1	100
Total		41.9	48.5	9.6	100

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

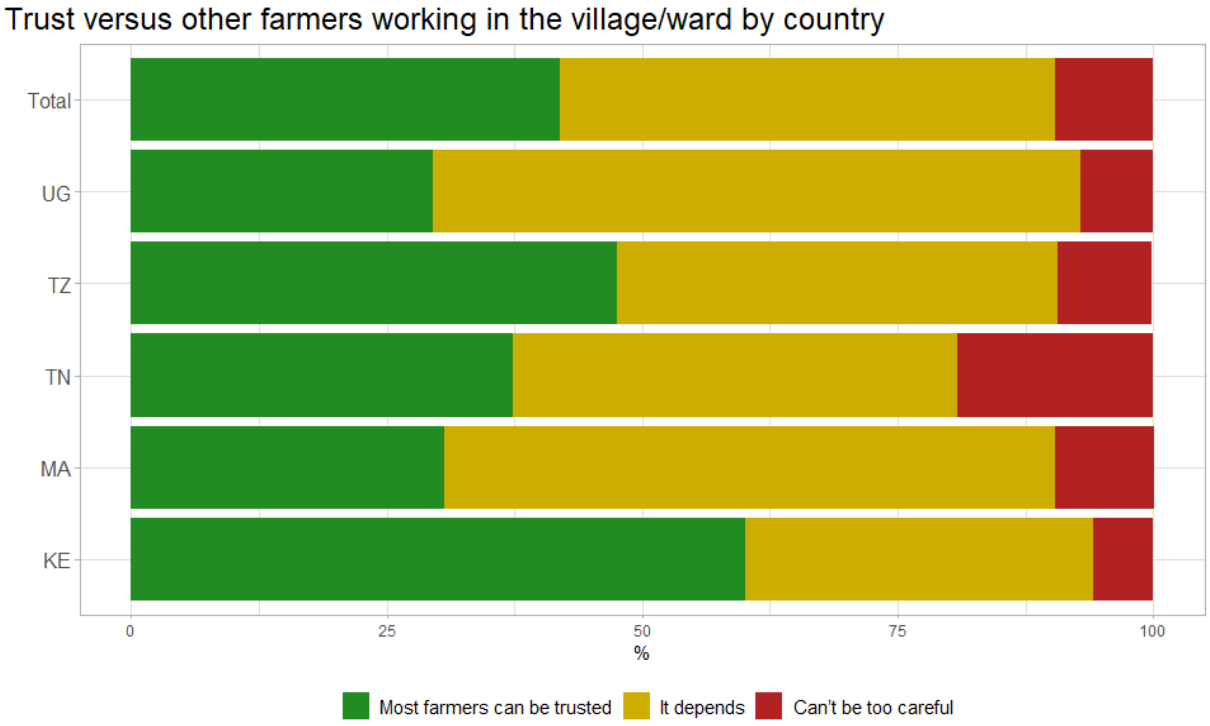


Table 49: Willingness of nearby farmers in taking advantage of him/her (% values)

country	hub	Would try to be fair	It depends	Would take advantage	row.sum
KE	Kisumu	43.7	49.1	7.2	100
	Kitui	61.2	30.1	8.7	100
	Mukurweini	49.3	36.4	14.3	100
	Subtotal	51.8	37.9	10.3	100
MA	BeniMellal	5.2	76.8	18.0	100
	Meknes	24.6	62.4	13.0	100
	Subtotal	16.0	68.8	15.2	100
TN	Chebika	52.9	39.4	7.7	100
	Jendouba	30.6	42.0	27.4	100
	Subtotal	40.9	40.8	18.3	100
TZ	Kilombero	29.0	53.8	17.2	100
	Mvomero	31.2	53.6	15.3	100

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

country	hub	Would try to be fair	It depends	Would take advantage	row.sum
	Subtotal	30.2	53.7	16.1	100
UG	Kajjansi_Masaka	18.1	50.0	31.9	100
	Kamuli	21.0	52.0	27.0	100
	Nakaseke	19.0	57.2	23.8	100
	Subtotal	19.3	52.8	27.9	100
Total		32.6	49.7	17.7	100

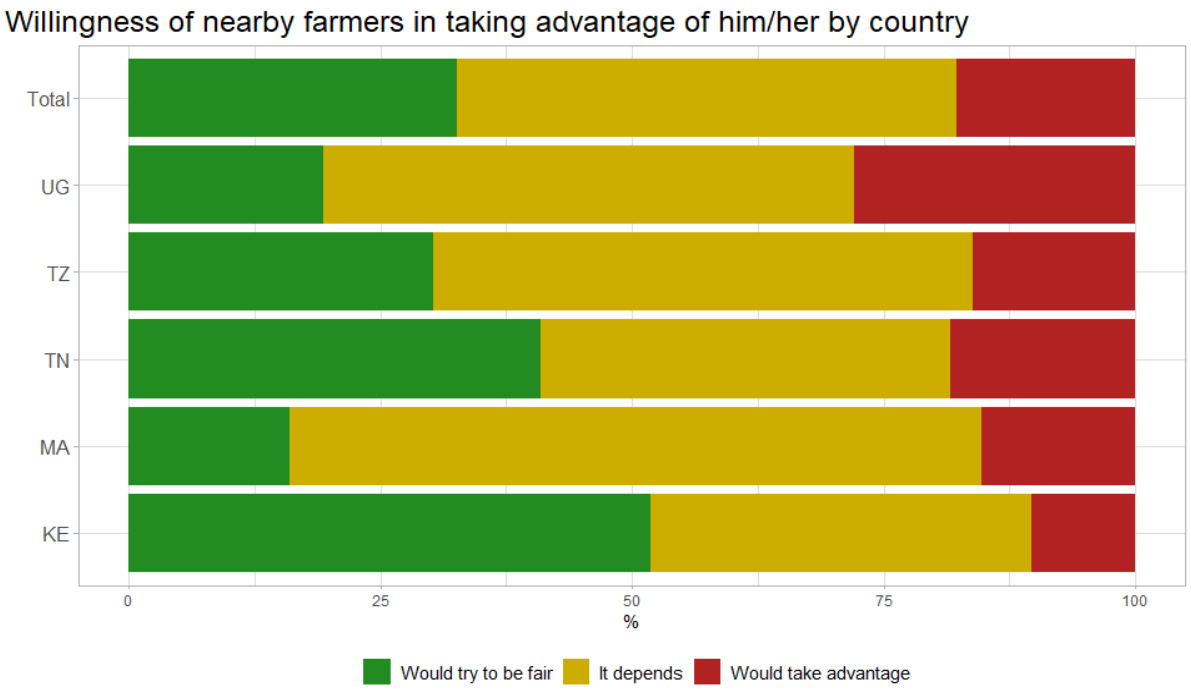
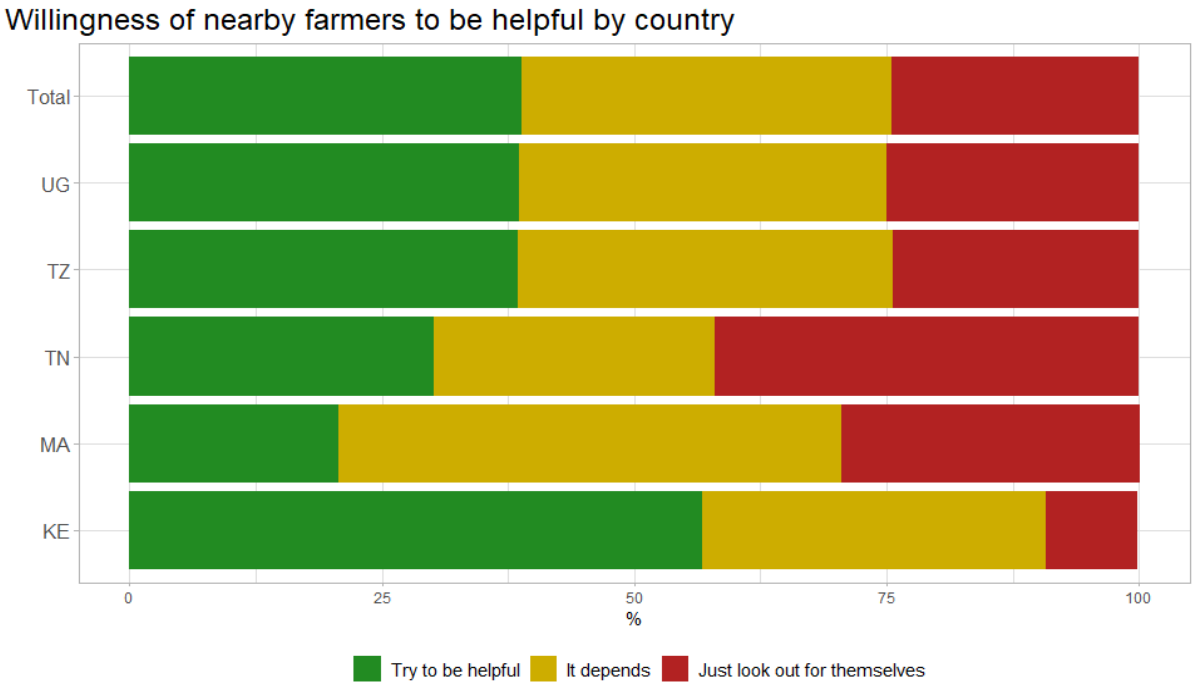


Table 50: Willingness of nearby farmers to be helpful (% values)

country	hub	Try to be helpful	It depends	Just look out for themselves	row.sum
KE	Kisumu	51.4	44.9	3.7	100
	Kitui	61.8	29.3	8.9	100
	Mukurweini	56.4	29.9	13.7	100
	Subtotal	56.8	34.0	9.1	100
MA	BeniMellal	15.5	48.0	36.5	100

FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).

country	hub	Try to be helpful	It depends	Just look out for themselves	row.sum
	Meknes	24.8	51.2	24.0	100
	Subtotal	20.7	49.8	29.6	100
TN	Chebika	48.7	39.4	11.8	100
	Jendouba	14.0	18.0	68.0	100
	Subtotal	30.1	27.9	42.0	100
TZ	Kilombero	35.1	40.8	24.1	100
	Mvomero	41.3	34.1	24.6	100
	Subtotal	38.5	37.1	24.4	100
UG	Kajjansi_Masaka	42.1	34.4	23.4	100
	Kamuli	38.0	39.0	23.0	100
	Nakaseke	34.8	36.2	29.0	100
	Subtotal	38.6	36.4	25.0	100
Total		38.8	36.7	24.5	100



FOODLAND has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (GA No 862802).