SZENT ISTVAN UNIVERSITY

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Factors affecting food security in Malawi

Theses of PhD dissertation

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Gödöllő

2017.

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INTRODUCTION

Malawi is one of the worst countries in regards of food security. In 2015 only sixteen countries performed worse than Malawi in this respect according to the global food security index. Based on the human development index of UNDP out of the 188 examined countries Malawi could be found on the 173rd place in the rankings (UNDP 2015). Twenty years later Malawi gained independence in 1964, and the country was still able to produce its full supply of necessary food. However, today this is not the case anymore, and neither food production, nor food trade supply enough food for the country. In the region the lack of food became almost a constant issue and the number of undernourished is permanently high. It is common knowledge that starving is the collateral of wars and natural disasters. In Malawi peace and economic stability has been disrupted by smaller domestic disturbances since World War II. Different international sources contemplate the reasons for this, among which the clearly bad economic policy of the 20th century is mentioned, which caused to the living standard of the population to be one of the worst one in the world.

However, the world mostly hears about the bad food supply security of Malawi in relation to some kind of natural disaster. Not long ago the agriculture minister of the country, George Chaponda has issued a warning saying that starvation was threatening 8.5 million people due to the severe drought caused by El Nino. Food crisis is not a new phenomenon here; a few years before the present crisis in 2012-2013 the news reports talked about an unfavourable situation.

For policy makers to be able to take proper actions in this field, the propelling forces of supply and demand for food must be understood, as well as one must find out more about the main determining factors of food security.

According to my presupposition bad food security and the backward state of the agriculture, which lacks modern technology, both contribute to food shortages significantly. This has an effect on the total amount of food in the country but also on the amount of food available for households as well, since the majority of the population of Malawi farms the land for their own food supply.

In the year 2000, 198 UN member states committed themselves to half the number of starving people by 2015 (UN, 2015). This aim was not completely and utterly achieved and the effort made towards eliminating food insecurity is worthless if we do not know which factors cause food insecurity on the micro level that is, on the level of households. The aim of my dissertation is to examine this issue from a scientific angle and thus filling the gap in the scientific publications discussing food insecurity in Malawi.

RESEARCH AIMS AND HYPOTHESES

The aim of my dissertation is to provide a gap-filling analysis and assessment regarding the complex issue of food security in Malawi. My goal is to discover those cause-effect relations which lead to the bad food security of households. Food insecurity is a complex issue which cannot simply be explained by citing solely the climatic conditions (e.g. drought). In my estimation, the lack of some factors greatly contribute to this problem, like the lack of vocational training, competence, the specialized and adequate agricultural knowledge related to sub-Saharan African countries, as well as the underdevelopment of agricultural markets, the bad infrastructure but such individual factors also like the qualifications of those farming the land, lack of information and the local culture and the inner motivations which can be brought in connection with these.

Apparently, the road to food insecurity leads through a series of different factors, even independent of each other, so this issue is really complex and multi-faceted. Often these factors evolve from each other, but this is not true in every case. My primary goal is to provide a comprehensive understanding of food insecurity in Malawi in such a way that I would discover the correlations of bad food security and the different socio-demographic, geographic and individual features of the given household. Furthermore, my goal was to examine the discovered influencing factors together to determine those internal and external factors which have their own effect when bad food security is developing.

In my dissertation I am paying special attention to the correlation of agriculture and food insecurity. I will achieve this by examining micro-data on household levels and I seek the answer to the question how the features of agricultural activities in the households affect food insecurity. The aim of this type of examination was to determine how and to what extent the size of the farmed land, the diversified agriculture, having multiple sources of income, producing for the market and the different agricultural grants affect food insecurity in the households.

My research of the literature confirms that the hypotheses below might result in gap-filling ascertainment regarding the food insecurity of Malawi.

My research aims are the following:

A1: To discover those cause and result correlations which lead to bad food security in a household.

A2: To provide a comprehensive understanding of the food security of Malawi in such a way that I discover different socio-demographic, geographic and individual features of the given household.

A3: My highlighted aim is to discover the correlation system of the agricultural activities of Malawi households and food insecurity.

A4: To determine those internal and external factors of households which have their own individual effect when bad food security is developing.

Based on the studied literature I formulated the following hypotheses:

H1: The different characteristics of the householder and the household (gender, age, qualifications, illiteracy, connections of the householder, the size of the household etc.) affect, though to different extent, but systematically the development of the food insecurity of the household.

H2: The conditions of telecommunications and infrastructure of households play a major role in the development of food insecurity.

H3: The agricultural activity of households (plant-growing, husbandry) has a positive effect on food security. This positive effect can be seen in the urban and rural regions as well.

H4: The different services related to agriculture used by households working in agriculture, the agricultural vouchers, the free-of-charge inputs, as well as the received loans in the urban and rural households decrease the food insecurity of households to varying extent.

H5: The factors affecting food security have significant transferred effects and these effects at times can only be shown accumulatively, which can be filtered by ordinal regression. By using ordinal regression to screen the transferred effects, different correlations can be discovered from the results of those of binary analyses.

H6: Regarding the individual factors affecting the status of food insecurity of the households, having filtered the transferred effects, differences can be experienced between the urban and rural households in Malawi.

MATERIALS AND METHODS

In my dissertation I applied three methods of scientific observation. Since already existing data was available to achieve my goals, all I had to do was to process these secondary data by adjusting these to my purposes. The secondary data derives from the 2013 wave of the Integrated Household Survey (IHS).

There is a wide array of quantitative methods to be used for analysis. At the same time because of the sensitive nature of the topic, qualitative prospective methods were in order to be used, so that I would be able to confirm my findings by primary research work used in the field. I chose the interview from the options of qualitative methods, since this approach makes it possible to have

deep insight, which can be used extremely well when studying the nuances of attitude and behaviour.

Below I shall present the details of the used secondary data and primary qualitative field research, as well as the different methods applied during my research.

Having studied the available measuring methods in the literature, I formulated my own indicators for reaching a conclusion regarding food security on household levels.

Table 1: The conditionality and the concept of food security categories

Categories of food insecurity	j	m	Concept
Permanently low	j=0	m=0	Neither in the seven days prior the survey, nor in the previous year a lack of food was present.
Temporarily low	j=0	m=1	At the time of survey lack of food was not reported, but in the previous year they were affected.
Temporarily high	j>0	m=0	Food issues are temporary since at the time of the survey lack of food was reported, however in the previous year they were not affected.
Permanently high	j>0	m=1	Lack of food was reported at the time of the survey, as well as in the previous year.

Explanation: j: on how many days out of the seven days prior the survey austerity measures had to be applied; m: whether it happened that in the 12 months prior the survey they did not have enough food.

Source: own editing

When formulating the continuous variables, I applied the above basic variables (j and m). For the process of making the scale I used a multi-variable statistical method, the main component analysis. By using this approach my aim was to create a continuous scale with the highest possible sensitivity for measuring food security, which summarises most of the information deemed useful by me in such a way, that I would not assign different weights to the examined factors.

The applied mathematical-statistical methods used during the examination of hypotheses are the following:

- Association (cross tabulation analysis)
- Correlation analysis
- Main component analysis
- Multiple linear regression analysis
- Ordinal regression

RESULTS

The correlations of the characteristics of the householder and food insecurity

According to some studies the gender of the householder affects poverty as well as food security. Previous studies supported the notion that families with female householders have higher food insecurity (Mutenje et al., 2016).

Table 2: The gender and food security circumstances of the householder in urban and rural households

		Food Insecurity				Total
		Permanently low	Temporarily low	Temporarily high	Permanently high	
Urban*	Woman	22.6%	11.1%	17.9%	48.4%	100.0%
	Man	20.7%	11.2%	10.3%	57.8%	100.0%
	Total	**21.0%**	**11.2%**	**11.4%**	**56.4%**	**100.0%**
Rural*	Woman	37.4%	23.5%	9.3%	29.8%	100.0%
	Man	27.3%	23.5%	11.9%	37.3%	100.0%
	Total	**29.8%**	**23.5%**	**11.2%**	**35.5%**	**100.0%**
Malawi*	Woman	35.9%	22.3%	10.1%	31.7%	100.0%
	Man	26.1%	21.4%	11.6%	40.9%	100.0%
	Total	**28.4%**	**21.6%**	**11.3%**	**38.7%**	**100.0%**

Note: N=3246; *p<0.01

Source: own editing

The tendency of the correlation is supported by my own results. This is confirmed by the results displayed in Table 2, since a significant correlation can be observed between the gender of the householder and the food security of the household. Households with a female householder are less likely to get into the permanently high category that is, into the category posing the highest risk. To be able to reach the final conclusion it is advisable to observe the permanently low and permanently high categories, because the standardised residuals show significant differences here.

The school system of Malawi comprises of 8-grade elementary schools, 4-year secondary schools and 4-year higher education. The certificate of elementary school is the PSLC (Primary School Leaving Certificate). After finishing the first two years of secondary school, students write the JCE (Malawi Junior Certificate Examination), and when finishing secondary school they write the MSCE (Malawi School Certificate of Education Examination).

Table 3: The householder's highest qualification and the food insecurity circumstances in urban and rural households

		Food Insecurity				Total
		Permanently low	Temporarily low	Temporarily high	Permanently high	
Urban*	No	26.8%	16.2%	13.4%	43.6%	100.0%
	PSLC	24.4%	9.8%	12.7%	53.0%	100.0%
	JCE	23.3%	10.0%	6.3%	60.4%	1000%
	MSCE	11.5%	5.6%	8.0%	74.9%	100.0%
	Higher level	n/a	n/a	15.9%	84.1%	100.0%
	Total	**21.0%**	**11.1%**	**11.5%**	**56.4%**	**100.0%**
Rural*	No	32.5%	24.7%	10.6%	32.2%	100.0%
	PSLC	21.6%	21.7%	14.8%	41.8%	100.0%
	JCE	23.1%	18.6%	13.7%	44.6%	100.0%
	MSCE	14.8%	17.7%	8.2%	59.2%	100.0%
	Higher level	1.3%	5.0%	6.6%	87.1%	100.0%
	Total	**29.9%**	**23.5%**	**11.0%**	**35.6%**	**100.0%**
Malawi*	No	31.9%	23.9%	10.9%	33.3%	100.0%
	PSLC	22.3%	18.8%	14.3%	44.6%	100.0%
	JCE	23.2%	15.9%	11.4%	49.6%	100.0%
	MSCE	13.5%	12.8%	8.2%	65.6%	100.0%
	Higher level	0.5%	1.8%	12.5%	85.2%	100.0%
	Total	**28.5%**	**21.6%**	**11.1%**	**38.8%**	**100.0%**

Note: N=3216; *p<0.01

Source: own research

Table 3 bears evidence of the fact that correlation can be seen between the qualifications of householder and the food security of the household. Having examined all the households of Malawi, the tendency is obvious but at the same time it is quite surprising, since with the increase of the level of qualification food security steadily decreases. This tendency can be observed in both urban and rural households, nevertheless the effect is much stronger in urban households (urban: r=0.281; rural r=0.171). This phenomenon can be in correlation with what I found when carrying out the examination, that is, the increase of qualification adversely affects the willingness to farm, and the same can be said of husbandry also.

Table 4: The correlation between the householder's birthplace and food security

	Food Insecurity				Total
	Permanently low	Temporarily low	Temporarily high	Permanently high	
The same city/village where the householder lives now	30.2%	25.0%	9.6%	35.2%	100.0%
In this region but in another city/village	29.7%	18.7%	11.9%	39.7%	100.0%
In a city/village in another region, or outside of Malawi	24.3%	17.6%	13.6%	44.5%	100.0%
Malawi	28.4%	21.6%	11.2%	38.8%	100.0%

Note: N=3219; $p<0.001$

Source: own research

From the householder's birthplace I can conclude how many relatives and friends are in the area where the householder lives. These relationships strengthen the social capital of the households which can help during crisis or temporary difficulties, not just in handling a food crisis but in other areas as well (e.g. information). The results shown in Table 4 testify of highly significant correlations. Based on the table we can conclude that living in one's birthplace results in decreased food insecurity.

It can be a significant crisis decreasing factor if the household lacking food is able to reach out for help to the households of neighbours or relatives. This is often comprised of eating the main meals with other households and they eat the necessary amount of food there. Based on my analysis we can conclude that in case of rural households with the deterioration of food security, the households are less and less able to help others from other households with meals. Comparing the results of rural households with urban households, it appears, that even though a household has permanently low food security, the number of days of sharing their available meals with others is significant. Based on all this, it can be stated that in the rural areas of Malawi the natural social network functions better, meaning if someone does not have food problems, he/she shares the meals with others, while – based on the results - in the cities this is not obvious.

Finally, I have examined the correlations between the age of the householder and the size of the household, and how these affect food insecurity (continuous variable). The analysis of correlations show that the increase of the householder's age, however slightly, but increases food insecurity both in rural ($r=0.109$; $p<0.01$) and urban ($r=0.062$; $p<0.01$) areas. The size of the household affects the development of food insecurity also, as in the cities it increases ($r=0.063$), in rural areas it decreases it ($r=-0.028$).

Based on the above examinations my hypothesis H1, according to which the different characteristics of the householder and the household (gender, age, qualifications, illiteracy,

connections of the householder, the size of the household etc.) affect, though to different extent, but systematically the development of the food insecurity of the household, I consider verified.

The correlations of infrastructure, telecommunications, housing and food insecurity

The lack of good infrastructure makes it difficult to acquire the goods and services needed for life and it disrupts the flow of information. When I examined the infrastructure continuous variables were available, therefore I applied the continuous variable of food insecurity for my analysis. I used the linear regression model to check the effects of different factors on food insecurity. The results show that the infrastructural characteristics of urban and rural households affect food insecurity in different ways. The distance between the household and the nearest settlement centre plays a significant role for urban and rural households also, but their effects have different directions. While in the cases of rural households the closeness of the settlement centre has a favourable effect on the development of food security, an unfavourable effect can be observed in the cases of urban households. This difference is caused probably by the fact that the proximity of the city centre and the high density of population do not make it possible for growing one's own food, thus decreasing food security. In Table 5 I summarised the intensity of the examined variables where number one is for the strongest effect and number four is for the weakest.

Table 5: The importance of infrastructure and telecommunications in the development of food insecurity (based on beta regression)

	RURAL	URBAN
1.	Number of mobile phones per capita	Number of mobile phones per capita
2.	Number of hours spent carrying wood (or other types of fuel)	Hours spent carrying water
3.	Hours spent carrying water	Number of hours spent carrying wood (or other types of fuel)
4.	Distance from the centre of the nearest settlement	Distance from the centre of the nearest settlement

Source: own research

I carried out further examinations regarding the location of the household and how its food conditions are affected by the distances from certain points. The following information is available: the distance of the household from the closest (1) road, (2) centre of settlement, (3) ADMARC, (4) location of tobacco bidding, (5) boma, (6) border crossing. Importing these variables into a regression model we can find out which factors have an effect, and how strong these effects are in the development of food insecurity. The results confirm that in cases of rural and urban households also, the factor of the distance measured from the commercial centre is outstanding and has an

individual determining characteristic, since getting further away from the commercial centres the food insecurity of the households is decreasing. Obviously, commercial centres come together with urbanised environments, however since the rural factor was placed in the model as a control variable, the phenomenon cannot be explained by citing the lower food insecurity of rural households.

Based on the above analyses my hypothesis H2, which states that the circumstances of telecommunications and infrastructure of households play a significant role in the development of food insecurity, I consider verified.

The correlation between the agricultural activity of the household and food insecurity

Besides examining the householder's characteristics and the features of the infrastructure and telecommunications of the household, the aim of my research was to understand the factors on a deeper level, which are related to food insecurity by looking at the agricultural activities of Malawi households. According my presupposition, effectively participating in agricultural production can lead to a steady food security.

Table 6: The connection between farming and food insecurity

	Food Insecurity				**Total**
	Permanently low	Temporarily low	Temporarily high	Permanently high	
Cultivated the land	29.0%	24.0%	10.2%	36.8%	100.0%
Did not cultivate the land	25.1%	7.2%	17.4%	50.3%	100.0%
Total	**28.4%**	**21.6%**	**11.3%**	**38.7%**	**100.0%**

Note: N=3246; $p<0.01$

Source: own research

Table 6 represents the correlation between the agricultural activities of households and food security. The results show that cultivating the land significantly affects food security that is, those households where the members were not cultivating the land in the reference period, ranked among the households in much higher ratio which belonged to the permanently high food insecurity group.

Table 7: The number of days spent with food austerity measures on average (result of f-trial)

Did they cultivate the land in the reference period?		D (estimated)	Average	Deviation
URBAN*	Yes	181 940	1.58	3.54
	No	287 549	2.31	3.88
RURAL*	Yes	2 384 605	2.73	4.68
	No	147 930	3.44	4.36

p<0.01

Source: own research

The correlation of farming and food security is proven also by the result of the F-trial shown in Table 7. I was examining with the statistical trial whether farming has an effect on one of the indicators of food insecurity that is, during the seven days prior to the survey, the household on how many days had to introduce some kind of food austerity measure in their own household. The result proves that those households, which cultivated the land in the reference period, had to introduce food austerity measures on significantly less days. This result is true for farmers in the urban and rural environment as well. Hereafter I will present those results, which are still closely related to the agricultural activities of households and their food security, but only those households are included in the analyses which proclaimed they were carrying out agricultural activities in the reference period. 92.9% of the households included in the examination live in rural areas. This way not many urban households were left in the sample (7.1%); they participated in special agricultural activities which in many respects are different from those in the rural areas.

First I will introduce the correlations between the factors of production potential of households and food security. Table 8 represents some of the basic data of the examined correlations.

Table 8: The correlation between the agricultural production potential of rural households and their food insecurity

	Size of cultivated land	Number of harvested produce	Income from sold crops (MKW)
r (food insecurity)	-0.179*	-0.106*	-0.092*
average	1.92	2.48	11 945
n (real)	2 259	2 296	2 558
n (pop. estimate)	2 384 426	2 411 538	2 538 924

*p<0.01

Source: own research

The size of the cultivated land expressed in hectares is significant but it shows an opposite correlation with food insecurity that is, bigger areas of land are accompanied by lower food

insecurity. This result verifies the ability of establishing food security in case of the bigger farms. The number of harvested produce refers to the diversification of the farm and indirectly to the possibility of having a varied diet. According to the data the variety of the harvested produce and the varied diet are in correlation with each other; those who harvest different types of produce, they have a varied diet and their food security is higher. 41.6% of the households cultivating the land sell part of the crops they produce. A slightly negative correlation can be observed between the income from the produced crops and food insecurity that is, the more income is earned from the crops sold, the lower the food insecurity of the household is.

Based on the above analyses and on the analyses presented in the dissertation, my hypothesis H3, according to which both in the urban and rural areas the agricultural activities (farming, husbandry) have positive effects on food security, I consider verified.

Table 9: The correlations between consultation services given to rural households and food security

	Number of advice received (e.g. artificial fertilizing, irrigation, plant protection, loan options etc.)	Number of consultation visits
r (food insecurity)	-0.144*	-0.039*
average	1.56	1.32
n (real)	2 264	587
n (pop. estimate)	2 382 727	624 164

*p<0.01

Source: own research

One of the tasks of the consultants is to have personal visits with the households which carry out agricultural activities. According to my analyses personal visits and contact, as well as genuine, first-hand information show positive correlations with food security that is, an increase in the number of visits results in improved food security.

Starting from 2005 the government of Malawi introduced an aid programme to distribute agricultural input, which is aimed at improving the productivity of agricultural smallholders and their food security. The target group of the programme was comprised of those smallholders who lacked resources but had a piece of land in their possession.

Based on these and on the analyses presented in my dissertation I consider my hypothesis H4 verified, according to which the different agricultural and farming services provided to farming households, the agricultural vouchers, the free inputs available, as well as the received loans decrease the food insecurity of urban and rural households to varying measures.

The examination of factors affecting food insecurity by applying ordinal regression

The model to be presented now – besides the main characteristics of the householder and the household - highlights the agricultural factors, and it analyses to what extent these factors contribute to the development of food insecurity. For the simultaneous examination of the different characteristics of households I have chosen the method of ordinal regression. This method makes it possible to examine the effects of individual factors also, since the unique feature of the method is that it determines the efficacy of the explanatory variables by filtering the effect of the other variables entered into the model. When constructing the model, the primary aspect was to examine those factors which were included in the previous binary analyses and their correlations have already been experienced. However, certain previously used variables had to be left out of the regression model since their missing values would have unacceptably decreased the number of households used as a basis of establishing the model. Thus the secondary aspect was to maximise the sample-element number of the regression model. This way I was able to use the data of 2,536 households to establish the model.

Table 10 presents the results of the ordinal regression model. In the model I have examined the main demographic characteristics of the households, the householders' main characteristics, as well as the criteria related to their agricultural activities. The primary aim of this was to discover the separate effects of different agricultural and food producing activities on food security, and to be able to determine their efficacy in a way that the effects of all other demographic factors are simultaneously filtered. The explanatory power of the model is 0.21 that is out of the food security variance 21% can be attributed to the explanatory variables. The other part of the variance is influenced by other criteria not included in the model. All variables included in the model have a significant effect on the development of food insecurity ($p<0.05$).

Examining first the age of the householder among the continuous variables, the regression model shows that with the increase of the age food security slightly decreases, meaning if the age of the householder increases one year, the chance of getting into the lower food security category increases to 1.003 times (95% CI:0.003; 0.004). That is – as opposed to the results of the binary analyses – with the growth of the householder's age, after filtering the effects of the other variables, slightly but significantly decreases food insecurity. When examining the sizes of the households, the binary analyses showed that in cities it increases, in rural areas it decreases food insecurity. Having filtered the factor of rurality, according to the result of the regression model increasing the size of the household with one member, the chance of getting into the lower food insecurity category is increased 1.054 times (95% CI: 0.053; 0.054).

The householder's gender also plays a significant role according to the model. After filtering the effects of the demographic and agricultural characteristics of the households in the model, supporting the results of the binary analyses, the households with female householders have less of a chance of getting into the higher food insecurity categories. Qualifications are also in accordance with the results of the binary analyses. Having higher qualifications in Malawi, even according to the multi-factorial regression model, does not constitute as a food insecurity decreasing factor. The effects filtered with the help of the model such as farming or rurality clearly verify that qualifications have a separate effect on food insecurity, and not the effects of these were presented in the binary analyses. The result experienced in Malawi poses the question whether the educational system is successful or effective, and this issue requires further examination. Detailed research in finding the reasons is not the topic of this dissertation and a separate research should be dedicated to this issue.

The regional location of the household and whether the household is in a rural or urban environment, significantly affects food insecurity. Urban households have half as much of a chance (Exp. B=0.552; 95% CI: 0.546; 0.557) to get into the permanently low food security category. Poverty does not determine the development of food insecurity since people living in rural areas indeed have less options to have an income, but their chances of producing the needed amount of food for the household by carrying out agricultural activities is much higher compared to the urban households where, due to the density of population, there are less cultivable pieces of land. Therefore it is reasonable to think about food insecurity and poverty as separate issues.

Since there are considerable regional differences in development within Malawi, I deemed it reasonable to include the regions in the regression model. Malawi can be divided into three big regions: northern, central and southern regions. Considering the developed central region as a reference category it can be stated that the households in the northern region have lower chances to get into the group of the permanently low food insecurity category (Exp. B=0.697; 95% CI: 0.692; 0.703). People living in the southern region also have lower chances to avoid food insecurity, but the ratio of chance compared to the central region shows less difference here. It is worthy to note that these results were received after eliminating the rurality criterion, so the results are not tainted by the uneven urban or rural population ratio which can be experienced in certain regions.

Those households, which did not cultivate the land in the reference period, had a 0.616 times more chance to get into the permanently low food insecurity group (95% CI: 0.579; 0.655) compared to those households where the members cultivated the land. The above result proves the positive significant effect of cultivating the land in the framework of households in regards of avoiding food insecurity. On the other hand husbandry, as opposed to the results of the analyses of binary variables, does not prove the same. Those households which kept animals in the reference period

have a higher chance of having bad food insecurity. Therefore, husbandry in itself – after having filtered among others the effects of cultivating the land – does not contribute to decreasing food insecurity.

Table 10: Factors affecting food insecurity (the results of the ordinal regression model with odds ratio calculation)

	Sig.	Odds ratio
Food insecurity (Permanently low)		
Permanently high	0.000	4.175
Temporarily high	0.000	6.785
Temporarily low	0.000	22.597
Size of household	0.000	1.054
Householder's age	0.000	1.003
Hours spent cultivating the land	0.000	1.009
Size of land cultivated by the household (ha./person)	0.000	0.646
Number of harvested crops	0.000	1.154
Stored crops	0.000	0.709
Number of professional advice received	0.000	1.006
Number of outer shocks	0.000	1.190
Number of income sources	0.000	1.181
Householder's gender (Male)		
Female	0.000	1.288
Householder's birth place (The same place where he/she lives now)		
In the region but in another town/village	0.000	0.966
In another region, in another town/village, or outside of Malawi	0.000	0.955
Householder is literate in the Chicewa language (Yes)		
No	0.000	1.185
Householder is literate in the English language (Yes)		
No	0.000	1.241
Householder's highest qualification (High)		
No	0.000	6.642
PSLC	0.000	6.516
JCE	0.000	5.385
MSCE	0.000	3.249
Householder was involved in agricultural work for the season (Yes)		
No	0.000	0.464
Householder was working (except seasonal work) (Yes)		
No	0.002	1.011
Rurality (the Rural)		
Urban	0.000	0.552
Region (Central)		
North	0.000	0.697
South	0.000	0.920
Was the household cultivating land in the reference period? (Yes)		
No	0.000	0.616
Was the household raising animals in the reference period? (Yes)		
No	0.000	1.208
Agricultural loans received (Yes)		
No	0.000	0.852
Did the household receive an agricultural voucher in the rainy season? (Yes)		
No	0.000	1.273

n=2536
-2 LOG Likelihood= 5973831.1
Nagelkerke r^2= 0.210

Source: own research

The increase of the cultivated land per capita, according to our expectations, increases food security. However, the odds ratio of the regression model 0.646 (95% CI: 0.643; 0.650) refers to the fact, that the increase in the amount of land owned by the households decreases the chances of

belonging to the permanently high food security group. This observation leads to the conclusion that leaving the criteria included in the model unchanged, the increase in the size of cultivated land does not entail the increase in food security. According to my results one hectare growth in the cultivated land results in a 0.6 times decrease in the chances of belonging into the permanently low food insecurity group that is, the land itself does not help the food security conditions of households in Malawi. This is a noteworthy result since the binary variables analysis proved the opposite. In Malawi the productivity of agricultural activities is low and therefore having big areas of land in itself does not guarantee the production of sufficient amount of food for the households.

The binary variables analyses show that with the increase of the number of stored crops food insecurity increases significantly. However, the result of the ordinal regression, after filtering the effects of the other variables shows that this observation is not relevant any more, and in fact the number of crops harvested is the only significant, independent factor with a positive effect on food security.

The results show that agricultural seasonal work significantly decreases the likelihood of food insecurity (Exp. B=0.464; 95% CI: 0.462; 0.467). It would be worthwhile to further discover and examine this issue in regards of urban and rural households, but according to my supposition during harder time periods seasonal work helps households in urban and rural households as well.

Based on the above analyses I concluded that my hypothesis H5, which states that the factors affecting the development of food security have significant indirect effect, their effect can only be detected cumulatively at times, and by filtering the indirect effects, new light can be shed on results different from those one can find in the professional literature, can be viewed as verified only in part.

While working on my binary variables analyses, I showed the different situations of urban and rural households and how the factors affecting food insecurity often manifest their effects differently in cases of urban and rural households. This is the reason why I deem important to examine the ordinal regression model in cases of urban and rural populations separately. With my sixth and last hypothesis I am examining the existence of this difference. I did not change the explanatory variables of the previously seen regression model in order to be able to detect the differences easier. In the following section I would like to present these results.

Table 11: Factors affecting food insecurity for urban and rural households (the results of the ordinal regression model with odds ratio calculation)

	Odds ratio URBAN	Odds ratio RURAL
Food insecurity (Permanently low)		
Permanently high	12.609	2.986
Temporarily high	20.584	4.882
Temporarily low	77.500	16.407
Size of household	1.156	1.048
Householder's age	1.011	1.003
Hours spent cultivating the land	0.998	1.009
Size of land cultivated by the household (ha./person)	0.251	0.661
Number of harvested crops	0.995	1.165
Stored crops	0.841	0.699
Number of professional advice received	1.053	1.004
Number of outer shocks	1.281	1.188
Number of income sources	1.124	1.221
Householder's gender (Male)		
Female	0.817	1.329
Householder's birth place (The same place where he/she lives now)		
In the region but in another town/village	0.290	1.003
In another region, in another town/village, or outside of Malawi	0.368	1.015
Householder is literate in the Chicewa language (Yes)		
No	0.340	1.231
Householder is literate in the English language (Yes)		
No	2.212	1.208
Householder's highest qualification (High)		
No	24.464	4.605
PSLC	27.288	4.467
JCE	7.751	4.067
MSCE	7.919	2.292
Householder was involved in agricultural work for the season (Yes)	0.911	0.447
No		
Householder was working (except seasonal work) (Yes)		
No	1.414	0.963
Region (Central)		
North	0.178	0.714
South	0.161	1.004
Was the household cultivating land in the reference period? (Yes)		
No	-	0.642
Was the household raising animals in the reference period? (Yes)		
No	1.573	0.908
Agricultural loans received (Yes)		
No	0.500	1.258
Did the household receive an agricultural voucher in the rainy season? (Yes)		
No	1.903	0.642
URBAN n=335 -2 LOG Likelihood= 318651.547 Nagelkerke r^2= 0.397	THE RURAL n=2201 -2 LOG Likelihood= 5607195.642 Nagelkerke r^2= 0.200	

Source: own research

In Table 11 I am presenting the odds ratio of the completed regression model for rural and urban households separately. In regards of the householder's gender it can be stated that rural households with female householders have better chances (Exp. B=1.329) to work themselves up into the permanently low food insecurity group than the households with male householders. In towns the odds ratio refers to the opposite (Exp. B=0.817), there the households with female householders are more likely to have food insecurity. The effect of the householder's origin also shows significant differences regarding rural and urban households. In cases of those households where the householders did not live in their birthplaces at the time of the survey, their chances of belonging to the permanently low food security group were considerably lessened (Exp. B=0.290) as opposed to the situation in the rural areas, where the odds ratio is 1.003, which means the same chance for food insecurity as if the householders were born in their hometowns. According to the results found for the country, it does not pose a problem if a person was not born in that location, since people settling in have equal chances of avoiding food problems.

In regards of qualifications the result of the regression model completed for rural households shows that the value of the odds ratio changes to a much lesser extent with the changes in qualifications, and that the unschooled and the groups with PSLC and JCE qualifications equally have a four times chance to get into the permanently low food insecurity group compared to the people with higher level qualifications. This probability only decreases significantly for the group of MSCE qualifications, where people can permanently avoid low food insecurity only with a two times chance. When looking at the urban households, one can see outstanding odds ratios, which forecast unprecedented probabilities for people with lower qualifications. These households have a 24-time (unschooled) and a 27-time (completed elementary school) chance to avoid food insecurity. In summary, people with lower qualifications have much more of a chance to avoid starvation if they live in the city. However, if the householder went to secondary school (JCE) or even finished it (MSCE), the probability of the household being able to avoid bad food status falls to one third.

Illiteracy (Chicewa is the local language) has a different effect on the development of food insecurity for urban and rural households. In the country an illiterate householder has higher chances (Exp. B=1.231) to have a problem-free food supply situation as opposed to the families where the householder is literate. However, this effect is not experienced in the cities, since in an urban setting illiteracy considerably hinders the chances of becoming part of the permanently low food insecurity group (Exp. B=0.340). When examining husbandry, I found considerable differences between the rural and urban households. The regression model completed for these two groups verified that raising animals can only aid the food situation of households in rural environment, and in cities the opposite is true with greater probability. Thus compared to the

previous, cumulated regression model I was able to verify that husbandry in the country in fact decreases food insecurity, therefore improving, development and support is suggested in this field.
Agricultural seasonal work carried out by the householder provides significant aid for rural households in avoiding food problems, because for those households where the householder did not have seasonal jobs, the probability to possibly to get into the permanently low food security group is 0.447 times higher than of those who had seasonal work.
Another result I deem important is that I was able to demonstrate empirically that agricultural type of loans do not facilitate the avoidance of food insecurity, since those households which received such loans, have a higher chance to get into the permanently high food insecurity category.
Based on all these points my hypothesis H6, which stated that there are significant differences in regards of factors affecting food security in urban and rural households, I was able to verify partly.

The results of the interviews

Residents of Malawi consider such external and environmental factors which can be connected to the weather, for example floods, drought or climate changes, seriously threatening regarding their food insecurity. Residents claim that fluctuating food prices are also responsible for the bad food security situation which they consider as an external factor not influenced by them.
Many blame the government, or some even blame the president for the unfavourable food insecurity situation in the country. They expect the strategies of solution to come from the government and from the community leaders, although based on the answers given, it can be clearly felt that they accept their own responsibility also in the situation since many have reported laziness, uncultivated land and wastefulness.
The residents basically expect the decrease of food insecurity by having improvements in agricultural cultivation techniques, development of tools, improving the quality of the soil and installing irrigating systems. Farmers do not have the chance to make bigger investments and they are expecting external aid to solve these problems. According to responders the diversification of agricultural production also would play an important role in decreasing food insecurity, however the same is true in this case also, that they expect the government or the local leaders to provide the means to be able to get the sowing-seeds.
All in all, it can be said that orientation and education would be necessary on the level of individuals in Malawi, but in my opinion the need is mainly to build feature-farms, so the average people would have a sample to follow. Good practise might be able to facilitate the growth of motivation and knowledge. It is important however, that these good examples would not come from books or education, but showing an example must be on a local level and should start on the lowest

level. The responsibility of highly qualified members of the local communities is not to be underestimated. During the time of the interviews it was obvious that people with higher qualification understood more the problems of food insecurity and they have strategies for the solution.

The interview method fundamentally confirmed my conception that the micro level of agricultural production is closely linked to the food insecurity of households, and the importance of the cultivated land, moreover the diversification of agricultural production and husbandry all came up in the interview discussions.

New scientific results

1. I introduced and validated two food security indices pertaining to the households of Malawi. Related to this I defined the concept of the permanently high, temporarily high, temporarily low and permanently low food insecurity. Furthermore, I created an index which is built on the complex group of issues of food insecurity and is able to capture the food insecurity situation of households in this complicated environment.
2. With the help of the new indices I proved that as opposed to the expectations, higher qualifications do not necessarily mean the decrease of food insecurity, and in my opinion this correlation is worthy of special attention from politicians. The extremely interesting result of the effect of qualifications was detectable by comparing the rural and urban households, and according to my results people with lower qualifications were many times likely to avoid starving if living in cities.
3. I was able to prove that the householder's gender is in correlation with the food insecurity index of the household and it has its own verified effect that is, rural households led by female householders have much better chances to work themselves up into the permanently low food insecurity group compared to the households with male householders. Examining the urban households we can see the opposite: households with female householders have a higher chance to become part of the permanently high food insecurity group.
4. Using quantitative analyses I verified that the examined characteristics of households and their agricultural activities have separate and individual effects on food insecurity.
5. I used ordinal regression functions and I proved that the householder's characteristics and the agricultural activities of the household affect differently the food insecurity of Malawi in rural and urban households. Special attention must be paid to the householder's gender, birthplace, illiteracy and qualifications and the considerably different effects of these, as well as the different effects of the characteristics of the households, namely husbandry, agricultural loans and the received agricultural vouchers.

CONCLUSIONS AND RECOMMENDATIONS

When examining my first hypothesis I was searching for the answer to the question how the different characteristics of the householder and the household affect the food security of Malawi households. During the examination of the householder's gender I have found that households with female householders became part of the high food insecurity category at a lower rate, which is indicative of the possibility that those families with female householders are less likely to have food insecurity. Since this correlation is true for both urban and rural households and I have worked with data based on a representative sample, therefore I conclude that this phenomenon is true for the whole population. Consequently, households with female householders react more effectively to the possible food problems. This is an interesting result for two reasons. Firstly, because of the widespread view, which states that a household is more vulnerable because of female householders, did not prove entirely true, and secondly a recommendation can be formulated based on the results that the focus must be shifted from the households led by female householders to the households with male householders since their situation proved worse according to my studies. Due to the different results found in the professional literature in regards to the food insecurity of households with female and male householders, I conclude however, that the food distribution within households is not equal, and female members of the household are disadvantaged in this respect. Since researching the professional literature and conducting my own research did not make it possible to prove that women have a smaller share of the food distributed, therefore as a recommendation for the future can be formulated and it is suggested and necessary to examine this topic in detail to get an even clearer idea.

Further examination of the effect of the householder's characteristics on food insecurity, regarding the age I came to the conclusion that an increase in the age of the householder might slightly escalate the development of food insecurity, which may not be considered as a surprising result. As the householder ages, the household is less and less able to provide the conditions which are crucial for having the proper and necessary food supply. The householder's knowledge might be outdated, his/her health might be deteriorating therefore he/she may not be able to fulfil the role of the supplier any more. Consequently, it can be concluded that the change in the age of the householder affects the food insecurity of the household. This supports my recommendation that families with aging householders must be focused on, if a positive effect is to be reached in the food supply of families in Malawi.

Regarding the householders' qualifications the result presented earlier that is, the higher qualification unfortunately did not yield the expected result but actually the opposite, having the effect of higher food insecurity, the conclusion can be drawn that householders with higher qualifications have more of a chance to have to face unfavourable food issues than those

householders with no schooling or low qualifications. In my opinion this result shatters the idea formulated about the role of qualifications among the population of Malawi, and it makes us conclude that knowledge acquired in school does not sufficiently facilitate the improvement of the quality of life in Malawi households. The reason for this I was not able to determine with scientific methods – since examining this could be a separate thesis topic – but having spent time with Malawi residents and based on my own experiences I conclude that it can be traced back to the negative relationship between the willingness to cultivate the land and schooling. Based on all these points, the recommendation can be put forth that during the educational years it is important to strengthen the willingness to work in agriculture and to enhance its prestige, as well as to provide job opportunities for those with higher qualifications. Furthermore, the co-ordination of education and the labour market is equally important in the rural and urban regions as well.

During the examination of the householder's birthplace I formulated the question whether origin has significance in regards to food security problems in urban and rural settings. Based on the results I came to the conclusion that local systems of connections (relatives, friends) help overcome temporary food problems, and this is true both in rural and urban environments. According to these empirical observations it is recommended to highlight such food insecurity decreasing programmes which pay special attention to households where the householder was not born locally.

Besides the householder's characteristics I examined the geographical locations of the households and the infrastructure available for the households. My presupposition was that the infrastructural environment and the geographical location significantly affect food supply, the options to the availability of food, thus affecting food insecurity. Based on my analyses I can conclude that in rural households the proximity of the settlement centre is just as favourable in regards to the development of food security as it is unfavourable for urban households in the same aspect. This difference therefore lets us conclude that on one hand in the case of urban population the proximity of the settlement centre and the density of population does not make it possible to produce their own food, thus it decreases food security. However, for the rural population the proximity of the settlement centre provides an opportunity to receive agricultural input, food, information, and this way improves food security. Based on these points a clear recommendation can be formulated, that programmes with the target of decreasing food insecurity in urban and rural environment must have different aims. In the countryside, those households should be helped which live far away from densely populated areas, whereas in urban settings those households need more attention which live close to densely populated city centres.

The third hypothesis of my research focuses on the agricultural activities of the households, and my aim was to prove that participating in agricultural activities has positive effects on food security. Based on my analyses the conclusion is obvious, meaning that cultivating the land significantly affects food security, namely it contributes to its improvement. This proved to be true in both rural

and urban environments, and my analyses showed that the average number of days spent with austerity measures in urban setting was 1.58 if the household was cultivating the land and 2.31 if the household did not have agricultural activities. The same difference can be observed in the case of rural households as well. Furthermore, I verified with my research results that those households where the members work in agriculture, they spend considerably less funds on food since they themselves produce it for their own use. In my opinion the significance of the effect of agricultural activities to decrease food insecurity lies mainly in this point. Therefore I consider it important that with my recommendations I would draw attention to the vital role of agricultural activities in Malawi households, including the subsidising the purchase of farmlands, facilitating the training on agricultural knowledge, improving the effectiveness of professional advisor networks, and propagating good agricultural activities tailored to local circumstances. It is a proven fact that agricultural activities contribute to not having food insecurity.

According to my results the average size of plough-land in cases of those households which cultivate the land is 1.92 hectares. I verified the correlation between the size of the cultivated land and the food insecurity index by using correlation analysis, and based on my findings the conclusion is that with the growth of the land food insecurity shows a decrease, in another words a bigger sized land might create a better food security position. Therefore it is recommended for decision makers and politicians to support the purchase of land by Malawi households in order to encourage the ability of the households to produce more types of food, so this way they would be able to have a variety of diet for their families and for themselves.

Households with agricultural activities produce their food in the rainy season which must be stored in order to provide food for the family in the dry season. My analyses verified that with the growth of the number of crops stored the average of the food insecurity index decreases. Households which do not store food have the highest food insecurity index, 0.7 on average, and those households where they stored 6 or more crops the average index is -0.7. Based on these points we can conclude that storing food plays a significant role in the food supply balance, thus enhancing food security.

Applying correlation examination we can conclude that participating in the advisory service has an obvious and clear effect on the food insecurity of households because due to the increasing number of advice and the number of advisory visits, food insecurity has a great chance to decrease. As a recommendation it can be formulated that strengthening and extending the advisory network to all households with agricultural activities, food insecurity might improve significantly among those, who cultivate the land but are still not able to avoid food related problems.

Examining further the food insecurity of households where members participated in agricultural activities, I included those types of aids which Malawi households had the opportunity to receive. One of these is the option of vouchers, which households can use for obtaining agricultural inputs. On the other hand, I examined how the agricultural loans can affect the development of food

insecurity index. Based on my results I concluded that both the vouchers and the received agricultural loans had significantly positive effect on food insecurity, and this merits the suggestion for politicians to further develop these tools and make them widespread, since the effectiveness of these is verified through scientific methods.

In the second part of my dissertation I examined the indirect effects of factors influencing food security. According to my hypothesis by screening out the indirect effects we can shed light on new, previously not detected correlations in the professional literature. Firstly, I used ordinal regression to examine how the individual effects of different factors change if we consider all the characteristics of householder together.

I chose the method of the interview with the purpose of being able to complement my results with first-hand information, besides the quantitative data. Based on the interviews the conclusion can be drawn that the population of Malawi consider external factors related to natural events – such as the weather, floods, droughts or climate change - as serious food insecurity increasing elements. Furthermore, residents regard the fluctuating food prices as responsible for the bad food supply situation which is considered as an external factor also and it cannot be influenced by them. Solutions are expected from the government or from the community leaders. Fundamentally, residents expect the decrease of food insecurity from the development of agricultural production techniques, such as developing the equipment, improving the quality of the soil and installing irrigation systems.

RELATED PUBLICATIONS OF THE AUTHOR

English language, journal articles

Juhász P. G.: Global problems, "unsolvable" problems. Africa. Kingston upon Hull, UK, Develepment Instructor Team 2005/2006. 1.p.

Juhász P. G. – Kanizsay E.: The agriculture and the globalization in Africa. Tradecraft Review 2012/1 Special Issue. 72-86. pp. ISSN 1785-1181

Juhasz P.G.: Challenges in Food Safety and the Possible Solutions Fizi and Mwenga Territory, South Kivu, Democratic Republic of the Congo, International Journal of Humanities and Social Science Invention ISSN (Online): 2319 – 7722, ISSN (Print): 2319 – 7714 www.ijhssi.org ||Volume 6 Issue 1||Janaury. 2017 || PP.37-40

Hungarian language, journal articles

Juhász P. G. – Kanizsay E.: Az afrikai mezőgazdaság és a globalizáció. Afrika tanulmányok. 2008. II. évfolyam, 1. szám. 47 – 53.pp.

Juhász P.G.: Az élelmezés-bizonytalanságra ható tényezők vizsgálata Malawiban. Date of acceptance: Budapest, 2017 április 20. Külügyi Szemle. Expected publishing time of the articel: 2017/3. ISSN 1587-9089

English language presentations in scientific proceedings

Juhász P. G. – Kanizsay E.: The African agriculture and globalization. Tradition and innovation. International Scientific Conference. Gödöllő, 3-5. December 2007. „Agricultural development – International view" session. International scientific conference Issue. Abstract. 37.p. ISBN 978-963-9483-84-2. CD kiadvány. ISBN 978-963-9483-85-9.

Juhász P. G. – Kanizsay E.: The agriculture and globalization in Africa. Global Growing. International Conference. Brussels, Belgium. „International Dialogue Brussels". 3-4. July, 2012.

Hungarian language presentations in scientific proceedings

Juhász P. G.: Talaljalkalmassági szakvélemények és telepítések alakulása a beregi régióban. XXX. Tudományos Diákköri Konferencia. Nyíregyháza, 2002. május 8. Környezetgazdálkodási szekció. Konferencia kiadvány. 20.p.

Juhász P. G. – Kanizsay E. – Sadig K. Omara: Szudán termelési jellemzői, élelmiszergazdasági befektetési lehetőségek. Szegénységcsökkentési programok Afrikában – Az Európai Fejlesztési Alap forrásainak hasznosítása. Tankönyv. KÜM – NEFE – GTF 2007-EDF programjának kiadásában. Gödöllő, 2007. 144 – 150. pp.

Juhász P. G. – Kanizsay E.: Afrika mezőgazdasága és a globalizáció. Tradíció és innováció. Nemzetközi tudományos konferencia. Gödöllő, 2007. december 3-5. „Mezőgazdasági fejlesztés – nemzetközi kitekintés" szekció. Tudományos konferencia kiadványai. Abstract (Magyar és angol nyelvű összefoglalóval). 37.p. ISBN 978-963-9483-84-2. CD kiadvány. ISBN 978-963-9483-85-9.

Hungarian language article in scientific publications

Juhász P. G.: – Kanizsay E. – Varga J.: A mezőgazdasági termelés fejlesztési lehetőségei Afrikában. Harambee (ELTE, BTK, Afrikanisztikai Oktatási Program. Pécs, 2006). 208 – 219. pp. ISBN-10: 963-06-1501-0. ISBN-13: 978-963-06-1501-3.

Presentations in scientific conferences

Juhász P. **G.:** Talajalkalmassági szakvélemények és telepítések alakulása a beregi régióban. XXX. Tudományos Diákköri Konferencia. Környezetgazdálkodási szekció. Nyíregyháza, 2002. május 8.

Juhász P. G. – Kanizsay E. – Sadig K. Omara: Szudán termelési jellemzői, élelmiszergazdasági befektetési lehetősége. Szegénységcsökkentési programok Afrikában (KÜM – NEFE – GTF 2007-EDF PROGRAM). Nemzetközi tudományos konferencia. Gödöllő, 2007. november 9-11.

Juhász P. G. – Kanizsay E.: Afrika mezőgazdasága és a globalizáció. Tradíció és innováció. Nemzetközi tudományos konferencia. Gödöllő, 2007. december 3-5. „Mezőgazdasági fejlesztés – nemzetközi kitekintés" szekció.

Presentations in international conferences

Juhász P. G.: Poverty and agriculture relation. Fair Trade Festival. Blantyre, Malawi. 1-3. June 2005.

Juhász P. G. – Kanizsay E.: Miért éhezik Afrika? Nemzetközi fejlesztési tapasztalatok. Nemzetközi konferencia. Budapest, 2006. október 20-21.

Juhász P. G.: - A non-profit szervezetek szerepe a nemzetközi fejlesztésben: a Humana People to People bemutatása. Az afrikai mezőgazdaság és élelmiszer-ellátás helyzete, fejlesztési lehetőségei. Nemzetközi konferencia. Szerencs, 2007.

Juhász P. G. – Kanizsay E. - Varga J.: A mezőgazdasági termelés fejlesztési lehetőségei Afrikában. Az afrikai mezőgazdaság és élelmiszer-ellátás helyzete, fejlesztési lehetőségei. Nemzetközi konferencia. Szerencs, 2007.

Juhász P. G.: Agriculture of developing countries. Planet Aid Conferenc. Birmingham, United Kingdom. 20. September 2007.

Juhász P. G.: Hungarian agro-business in Uganda. Partnership Conference for AHU and Respond Re-Nuh Cooperation. Gulu, Uganda 15. May 2008.

Juhász P. **G**.: Don't donate, cooperate. Partnership Meeting for AHU and APIDE Cooperation. Bukavu, DRC 5. June 2008.

Juhász P. G.: Benefits of water as an economic good. Side by side for the Black Sea. International Conference. Gura Portitei, Romania. 5-14. September 2011.

Juhász P. G.: The agroforestry system and fish-husbandry. Side by side for the Black Sea. International Conference. Gura Portitei, Romania. 5-14. September 2011.

Juhász P. G.: Nyangezi pig-project introduction. Humana Day. International Conference. Corby, United Kingdom. 23. September 2011.

Juhász P. G.: Krízis és valóság – a jelenkor Afrikája. Mezőgazdasági termelés a szubszaharai Afrikában. Globális termesztés. Nemzetközi tudományos konferencia. Eger, 2012. június 20.

Juhász P. **G.:** Cooperation possibilities between DRC and Hungary. Jubilee of Foundation for Africa. Kinshasa, DRC, 30. November 2012.

Hungarian language publications in international conference proceedings

Juhász P. G. – Kanizsay E.: Miért éhezik Afrika? Nemzetközi fejlesztési tapasztalatok. Nemzetközi konferencia. Budapest, 2006. október 20-21. Konferencia kiadvány. CD kiadvány.

Juhász P. G.: A non-profit szervezetek szerepe a nemzetközi fejlesztésben: a Humana People to People bemutatása. Az afrikai mezőgazdaság és élelmiszer-ellátás helyzete, fejlesztési lehetőségei. Nemzetközi konferencia. Szerencs, 2007., „Szerencs Summit II." 15 – 20. pp.

Juhász P. G. – Kanizsay E. – Varga J.: A mezőgazdasági termelés fejlesztési lehetőségei Afrikában. Az afrikai mezőgazdaság és élelmiszer-ellátás helyzete, fejlesztési lehetőségei. Nemzetközi konferencia. Szerencs, 2007., „Szerencs Summit II." 21 – 33. pp.

Juhász P. G.: Krízis és valóság – a jelenkor Afrikája. Mezőgazdasági termelés a szubszaharai Afrikában. Globális termesztés. Nemzetközi tudományos konferencia. Eger, 2012. június 20.

English language publications in international conference proceedings

Juhász P. G.: The role of non-profit organizations int he international development. Humana People to People – an example. Current position ont he future and the possibilities of the African agriculture. International Conference. Szerencs, 2007. „Szerencs Summit II." 15 – 21. pp.

Juhász P. G. – Kanizsay E. - Varga J.. Potentials of the Agricutural Development in Africa. Current position ont he future and the possibilities of the African agriculture. International Conference. Szerencs, 2007. „Szerencs Summit II." 21 – 33. pp.

Juhász P. **G.:** Benefits of water as an economic good. Side by side for the Black Sea. International Conference. Gura Portitei, Romania. 5-14. September 2011. Capacity Building for Youth NGOs to Implement Projects on Preventing Water Pollution. 32-35.pp.

Kanizsay E.- Bodnár Á.- **Juhász P.G**.- Máthé A.:Hungarian technology case study of agricultural development of family farming in tropical and subtropical countries. In: AGRINATURA SCIENCE DAYS. Bécs, Ausztria 2014, 15 p.