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Agriculture, agricultural income and rural poverty in Malawi – Spatial analysis of determinants and differences[1]

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Zusammenfassung

Seit 1980 ist die Agrarpolitik in Malawi durch eine Vielzahl von Reformen gekennzeichnet. In den ländlichen Gebieten, in denen die Mehrzahl der armen Bevölkerung lebt, ist die Landwirtschaft der bedeutendste Sektor. Im Mittelpunkt des Artikels steht die Untersuchung des landwirtschaftlichen Einkommens und der Armut in ländlichen Distrikten in Malawi. Unter Rückgriff der zweiten nationalen „*Integrated Household Budget Survey*" 2004/05 wird gezeigt, dass erhebliche räumliche Disparitäten zwischen den Distrikten vorhanden sind. Während überwiegend in den südlichen Distrikten die höchsten Armutsraten und geringsten landwirtschaftlichen Einkommen vorhanden sind, zeigen die zentralen und nördlichen Distrikte die geringeren Armutsraten und höhere Einkommen. Die Ergebnisse verdeutlichen, dass die Distrikte, in denen ein höherer Anteil von Haushalten sowohl *Cash Crops* als auch Nahrungsmittel anbauen, ein höheres Einkommen und eine geringe Armutsrate aufweisen. Die aufgezeigten räumlichen Ergebnisse und ermittelte Gründe für die Disparitäten zeigen im Vergleich mit anderen Studien sowohl Gemeinsamkeiten als auch Unterschiede.

Abstract

Since the 1980s the agricultural policies in Malawi are characterized by several reforms. Agriculture is the fundamental sector for livelihood in rural areas where the majority of the poor population lives. The article examines agricultural income and rural poverty on spatial rural level. By using recent data of the *Second Integrated Household Budget Survey* 2004/05 it is shown that there are considerable differences in agricultural income and rural poverty among districts in Malawi. Overwhelmingly, the highest poverty rates and lowest

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agricultural income is found in the southern districts, while the central and northern districts have lowest rates and higher income respectively. The results indicate that districts with a higher share of households involved in cash crop growing but also in food crops growing and respective related characteristics have a higher agricultural income and lower poverty headcount. Compared with other studies similarities and differences are present and the article concludes with recommendations basing on spatial outcomes.

1. Introduction

While a majority of studies concerning distributional effects examine the relationship on household or national level, limited analyses examine effects of policies like trade liberalization at the sub-national level of districts or regions (e.g. Silva 2007). There are several reasons for the importance of spatial analyses of poverty and income. First, it can provide information on regions which fall behind in the process of economic development and reveal extents of disparities. Second, spatial information are the foundation for poverty alleviating programs and support complementary actions. Hence, efforts from governmental and non-governmental side can be targeted more specific. And third, relevant factors like geographic or economic conditions can be revealed (Benson et al. 2005:532-533; Minot/Baulch 2005:461-462).

The following text focuses on the relationship between agricultural variables on agricultural income and poverty incidence in rural districts of Malawi. Malawi belongs to the poorest countries, where the majority of poor people lives in rural areas and the agricultural sector is the most significant source of livelihoods. Like many developing countries Malawi implemented agricultural reforms in the recent decades covering removal of quotas or privatization of state marketing boards for key crops. After now nearly three decades of agricultural liberalization and pro-market policy reforms a low agricultural income and deep rural poverty is still present.

Therefore, the overall aim is to focus on agricultural income and rural poverty on a spatial level, to investigate regional disparities and to explain differences. Hence the objectives are: First, to describe the past and present agricultural policy of Malawi; second, to illustrate the differences of agricultural income and rural poverty between districts as well as to determine the relationship and correlation of agricultural income and poverty with agricultural characteristics on a district level. Hence, spatial factors that can explain variation in agricultural income and poverty shall be identified. And third, to compare recent data and own results with findings from other studies to examine possible similarities and differences in distributional issues.

By using mainly recent data of the last ‘Integrated Household Budget Survey’ 2004/05 it is shown that there are considerable differences in agricultural household income and rural poverty among districts in Malawi. Mainly the central districts show the highest income and lowest poverty. Several variables show a relationship to the existing pattern of income and poverty, which include local as well as international agricultural trade variables. In addition, results on district level show similarities, differences and continuities in distributional issues.

The arrangement of the rest of the paper is as follows: chapter 2 provides a short introduction into the agricultural policy and development of Malawi in recent decades. Chapter 3 examines and analyzes income and

poverty on district level. Chapter 4 compares and discusses the results and finally, chapter 5 concludes with a summary and recommendations.

2. Recent agricultural policy and current situation

Agricultural policy in recent decades

Since the 1980s, the agricultural policy of Malawi is characterized by periods of extensive liberalization and structural adjustment programs as well a phase of structuralism in the early to mid 1990s. Thus, Harrigan (2003) speaks of 'U-turn' and 'full circles' policies from the World Bank and the Malawian Government in these decades. A further characteristic are the existing discrepancies in opinions between donors and the government.[2]

The first phase of liberalization and structural adjustment programs started after economic troubles, when first in 1981 the government begun negotiations with the International Monetary Fund (IMF) and the World Bank for Structural Adjustment Loans. In the aftermath producer prices for non-maize crops like tobacco, cotton and groundnuts were increased while in contrast subsidies on fertilizer were removed. The effects were a shift to export crops by displacing maize and a sharp decline in hybrid maize production because of decreasing profitability resulted by the reduction of fertilizer subsidy. Overall, the reforms were inappropriate and poorly sequenced, resulted in a food crisis in 1987. The reasons were twofold: on the one side a doubling of maize consumer prices between 1983 and 1988 and on the other side a collapse in ADMARC's[3] ability to purchase maize. General prize liberalization lead to a financial strain of ADMARC and a reaction was to close ADMARC markets in remote areas as well as to encourage private traders. However, these traders were confronted by credit constraints. The food crisis in 1987 led the government under president Banda to some unilateral changes and reversing policy measures. An introduction of new sets of smallholder prices at ADMARC, an increasing in maize producer prices by 36% and the introduction of the fertilizer subsidy by 22%. This was a level above the pre-reform period (Harrigan 2003:849-850; Peters 2006:323).

The phase between 1987 and 1994 was characterized by a structuralist reorientation and a more flexible policy by both the World Bank and the state (Harrigan 2003:847). As a consequence a reappraisal of the World Bank policies in Malawi (and generally in Sub-Saharan Africa) was conducted with acceptance of interactions between state and market in particular to enhance supply response. As a reaction an *'Agricultural Sector Adjustment Program'* (ASAC) was introduced in 1990. This program emphasized the need for food crop productivity improvement through targeted subsidies, adoption of high yielding maize varieties (hybrid maize) and agricultural diversification. Exemplary reforms by the ASAC were the permission growing burley tobacco for smallholder (a 'revolutionary move' in Peters (2006:323) words) which was a prerogative of estates; continue fertilizer subsidies to food crop production; halting of the transfer of customary land to estates as well as the

[2] For a view on macroeconomic policies before 1980 see e.g. Chirwa (2005:3-4); Kydd/Christiansen (1982). Of course, the literature presents different assessments of reform phases (Chirwa 2005:4).
[3] The parastatal agricultural marketing board of the *Agricultural Development and Marketing Corporation* (ADMARC) was created 1971 and provides input and output market with a major role for food security.

continuation to encourage private traders and ADMARC's divesture program. In addition the phase was characterized by increased supplies of seeds and credits as well as research and extension services. Effects of reforms were a growth of smallholder agriculture by 16%, mainly due to bumper maize harvest and in creased tobacco production. However, this recovery was interrupted and growth has been negative in the next years through droughts, the influx of Mozambican refugees and suspension of western non-humanitarian aid in protest against the government of President Banda (Harrigan 2003:851-852).

The next phase from 1994 to 2000 was characterized by a structural transformation and political divergences between the Bank and the Government, for instance in the question how to reach food security. Measures during this phase were a lift of the ban on the export of food crops, a liberalization of agricultural producer and consumer prices as well as the removing of fertilizer subsidies. In 1998, in opposition to donors the government introduced the '*Starter Pack Program*' to provide free seed, fertilizer and extension advice to smallholder.[4] During these years smallholder burley tobacco production increased clearly and also the diversification into non-maize food crops like pulses, cassava and millet increased. In addition, a promotion of private traders and ADMARC's financial problems lead to a decline in ADMARC's marketing dominance (Harrigan 2003:852-857; Peters 2006:329-330). Overall, Harrigan (2003:854) argues that:

> The smallholder-led growth in the 1990s represented a major shift in the structure of the Malawian economy. A smallholder growth dynamic replaced the previous estate dominance, whilst both production and marketing patterns in the smallholder sector changed significantly. This provides clear evidence that it is possible for the agricultural sector of low-income LDCs such as Malawi to respond to a combination of orthodox liberalization policies supported by more structuralist nonprice policies.

In the years 2001/02 Malawi was affected by a famine in parts of the country. Three reasons were responsible: Bad harvest through less rain, pressure of IMF to reduce the grain reserves held by the government, but also mismanagement and corruption from administrative sides (Peters 2006:325). Also in 2005 the country was affected by a drought.

Actually, several issues stand on the 'agricultural' agenda: the reform on customary land tenure (Peters/Kambewa 2007), the increasing of small-scale irrigation as a newest direction of agricultural policy in Malawi (Peters 2006:343) and the replacement of Starter Pack Program in the season 2005/06 by a rationed fertilizer subsidy in the form of a fertilizer voucher program (GOM/World Bank 2007:225-226).

Current agricultural situation

In present Malawi, overall 90% of the population lives in rural areas and agriculture is the fundamental sector. In 2004/05 81% of the active rural population over 15 years was classified as "Mlimi" or subsistence farmer. About 38% of household heads – or for instance as extreme, 55% in the northern rural region – earn their livelihood

[4] Aim of the program was to cultivate 0.1 ha of staple food i.e. grains or legumes in the growing season of 1998/99 to enhance food security (Harrigan 2003:856). The program was successful in maize production rise and on maize harvest on national and household level. However, gains were reduced due to delays in distribution and lower-yielding composites replaced the hybrid seeds (Peters 2006:324).

only from household farm and fishing activity, with little opportunities for off-farm income. Almost half of the rural households are subsistence farmer in the strictest sense of the word with no crop sales. For 30% resp. 18% of rural households livestock sales and tree crop sales are an income source. An additional quarter of household heads work in additional jobs which are mostly in agriculture, while in rural areas just 8% are wage workers. While agriculture is significant for livelihoods, it is a major reason for shocks which are for instance reduced crop yields due to droughts or floods and food price increases (GOM/World Bank 2007:1, 25-26, 74, 61-65, 105; NSO 2005:60, 136-137).

The agricultural sector is subdivided into smallholder producers and larger estate producers. While the first farm on a customary land tenure system in which the rights to sell land are restricted, the latter produce mainly export cash crops like tobacco, tea or sugar on freehold and leasehold land. Average smallholder ownership of agricultural land is small with 0.32 hectares per capita or 1.2 hectares per household. Plot size is the lowest in then southern region and the highest in the northern (GOM/World Bank 2007:39).

In 2007, the share of agriculture of GDP was 34%. Looking at the international agricultural trade Malawi is a net exporter with an export value of US$ 413 million compared to an import value of US$ 167 million between 2003 and 2005. Overall, agricultural exports cover 85% of total exports (World Bank 2007:327) with the main export crops of tobacco, sugar and tea. Maize is the main staple food with cassava, soybeans, sweet potato, and millet as further crops. For a comprehensive overview on the recent and current agricultural situation see e.g. GOM/World Bank (2007:151-212); Takane (2005); Takane (2006).

After the description of the recent policy changes and “national” view the questions are now: How is the situation on a regional level after nearly 30 years of agricultural liberalization and agricultural sector reforms? What measures in the respective periods show possible relationships to income and poverty? Which agriculture related variables show a relationship to the current distributional spatial picture? These questions will be answered in the following chapter.

3. Empirical investigation: Agricultural income and rural poverty

a. Indicators, data and method

Indicators: Agricultural income and headcount poverty

The two indicators which are used for the analysis of distributional effects are agricultural household income and headcount poverty. Concerning income it has to be taken into consideration that it has a transitory character through the process of earning and consumption. After harvests households receive large amounts of cash, but smaller or no amounts during the rest of the year. The ‘headcount poverty index’ gives an estimate of the share of households that live under an assumed poverty line. In the IHS 2 the total annual per capita consumption

expenditure by a household is the measure for the poverty analysis.[5] The poverty line for "poor" is MK 16,165 per person/year (NSO 2005:138). Comparing to income, expenditure is a more stable indicator through the inclusion of consumption and thus, a measure of welfare over time with constantly income spending and consumption (Benson et al. 2004:4). However, both are accepted indicators for welfare analysis of households: "*Consumption and expenditure can be viewed as realized welfare, whereas income is more a measure of potential welfare*" (Benson et al. 2001:14). Another reason for the consideration of agricultural income is that it is rarely explained in spatial analysis.

Data

The following analysis bases mostly on the *Second Integrated Household Survey* (IHS) of Malawi and was conducted by the National Statistical Office (NSO) of Malawi in collaboration with the World Bank between March 2004 and April 2005. This survey encompasses 11,280 households and provides information on social (e.g. demographic, education or health), economic characteristics as well as data on income, expenditure and poverty on a district and national representative level (NSO 2005:1-6).

As in the IHS 1997/98 and 2004/05 all districts are handle as "rural" except the four urban centers Blantyre, Zomba, Lilongwe, and Mzuzu. District administrative centers, so-called *bomas*, are included in the rural poverty line also under the condition that agriculture is the essential livelihood strategy in these centers too (Benson et al. 2004:6; Benson et al. 2005:535).

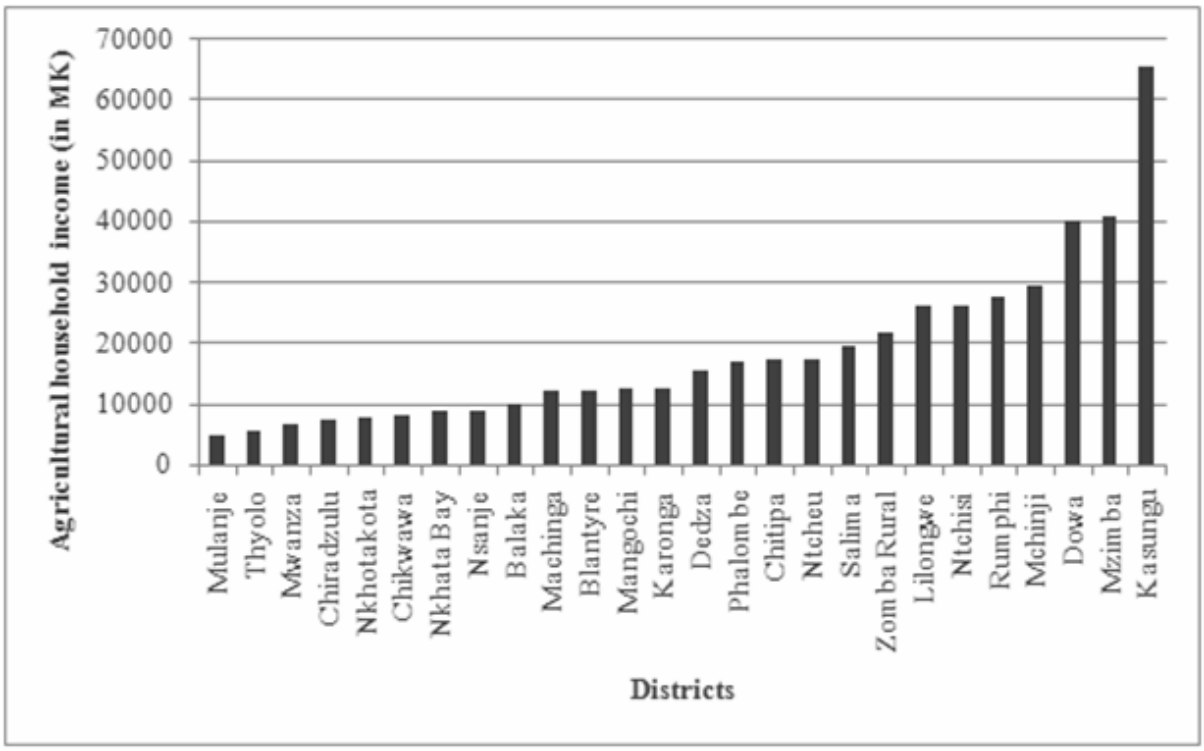
Method and variables

The applied method is drawn from the field of descriptive statistics. In the first step there are some graphical representation of disparities in agricultural income and poverty. In the second step, a bivariate correlation is used to identify relationship between variables and income (in MK) or poverty (in %) respective and to examine strength and nature (positive, negative or without). Despite the recognition that correlation does not examine causalities it offers a relevant assessment and comparison. According to the text' objective agricultural variables on the necessary availability of district level are used. Overall, 20 variables were selected (see table 2 in chapter 3.4). As agricultural income and poverty the chosen variables are static, referring at one point of time.

[5] As written in the IHS: 'The poverty line is a subsistence minimum expressed in Malawi Kwacha based on the cost-of-basic-needs methodology. It is comprised of two parts: minimum food expenditure based on the food requirements of individual and critical non-food consumption.' (NSO 2005:138).

b. Agricultural income: Disparities among regions

In graph 1, the mean agricultural income of households across districts is documented.



Graph 1: Mean agricultural household income across districts, 2005 (in MK).

Source: NSO 2005:75. Own graph.

Generally a broad divergence is existing ranging from a 4,688.8 MK in Mulanje (Southern Region) to 65,679.3 MK in Kasungu (Central Region). The arithmetic mean is 19,878.97 MK on a regional basis. In eight districts, the income is below the border of 10,000 MK and in nine districts it is between 10,000 and 20,000 MK. In contrast, eight districts of the 26 have an income above 20,000 with Kasungu clearly at the top. A geographic view provides the figure 1.

Predominantly, districts with income in the lower sphere are located in southern region, while middle incomes are reached in northern districts. In average, the central districts have the highest agricultural incomes. Overall, districts with low agricultural income are located throughout the country. Higher agricultural income in districts around cities compared to non-bordered districts is not rather valid for Lilongwe (Central Region) or Mzuzu City (Northern Region), but more obvious for Blantyre or Zomba in Southern Region. This is in line with Benson et al. (2005:545) or Peters (2006:332) that areas around cities benefit from urban food market which enhance farmers' productivity.

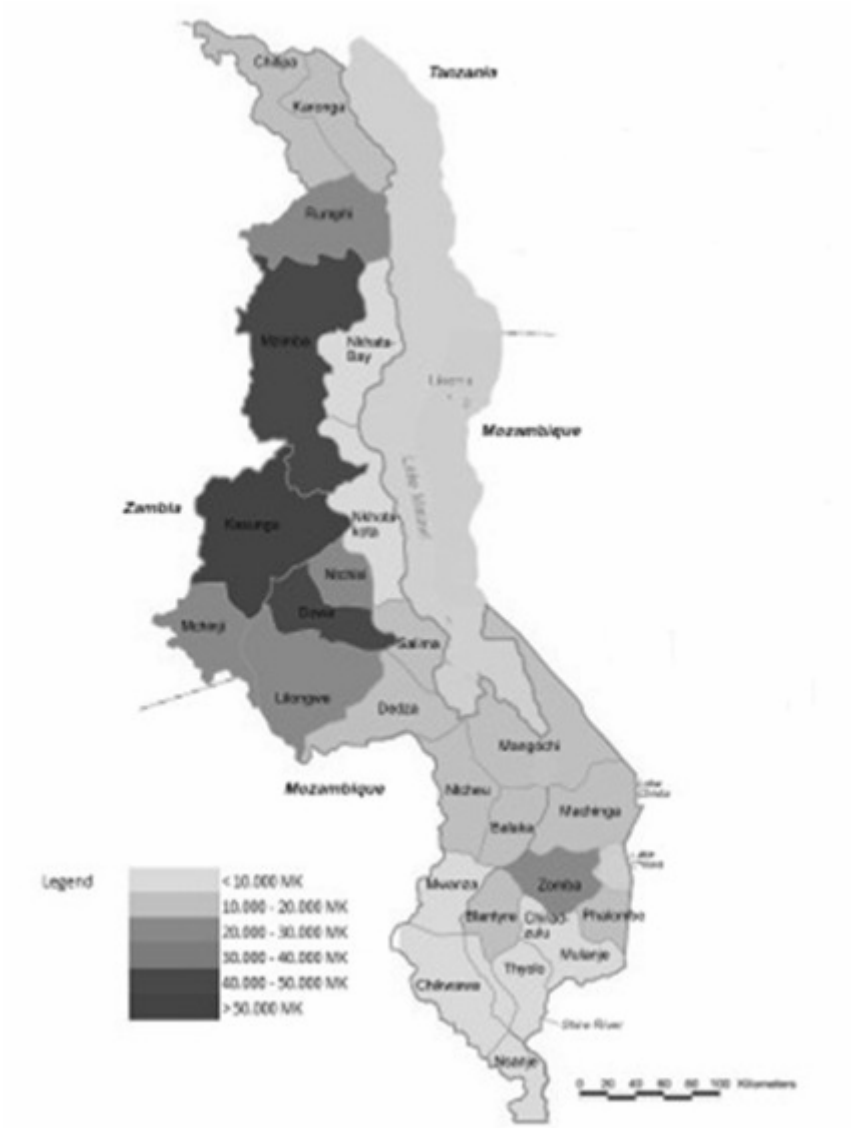
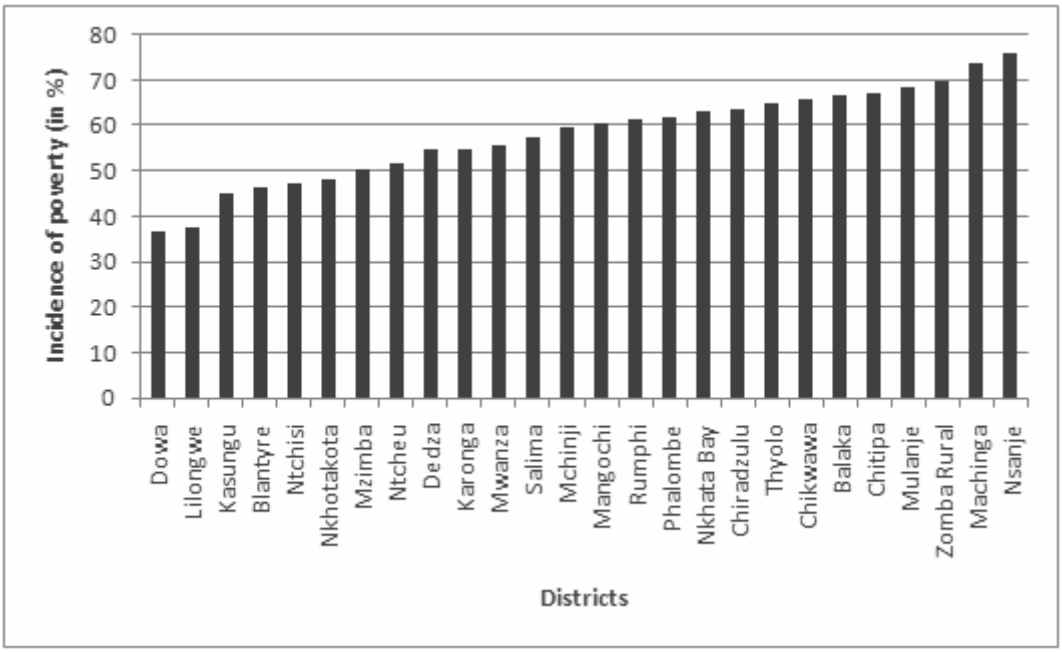


Figure 1: Map of the agricultural household income of each district in Malawi, 2005.

Source: NSO 2005:75. Own graph.

c. Rural poverty: Differences between regions

In graph 2, the poverty incidence for the rural districts is shown.



Graph 2: Poverty headcount across districts (in %)

Source: NSO 2005:142-143. Own graph.

The lowest poverty rate has the district of Dowa (Central Region) with 36.6% while the highest incidence has Nsanje (Southern region) with 76% and thus, more than the double as Dowa at the opposite end. In accordance to the view on agricultural income the figure 2 illustrates the regional pattern of poverty.

As shown in figure 2, the highest poverty rates are in the southern and northern districts and the lowest are mainly in the central districts. However, there are variations between regions. In the southern region the poverty rates range between 46.5% (Blantyre) and 76% (Nsanje). In the northern region the difference between the highest and the lowest rate is 16.6% and in the central region is 23%.

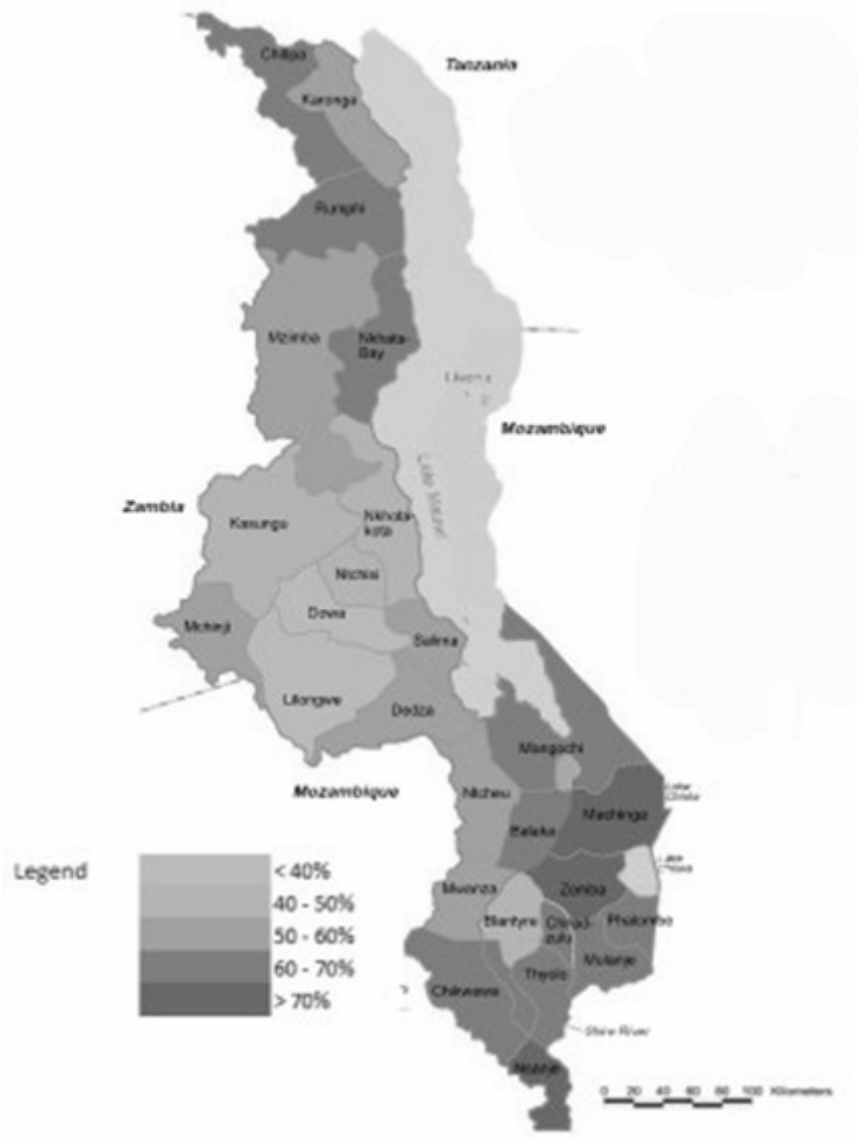


Figure 2: Map of the incidence of poverty in each district in Malawi, 2005.

Source: NSO 2005:142-143. Own graph.

The picture of poverty distribution across rural regions documents also the table 1 and in addition, a comparison with data from the first IHS 1997/98[6] is presented.

[6] The first IHS was administered and conducted by the Malawi National Statistical Office between November 1997 and October 1998 and covered 12,960 households in all districts. The cleaned data set compromises of 10,968 households (Benson et al. 2004:2-3).

	Poverty headcount	
Region	**1998**	**2004/2005**
Urban	18.5	25.4
Rural	58.1	55.9
Rural Northern Region	56.3	56.3
Rural Central Region	47.6	46.7
Rural Southern Region	68.4	64.4
Malawi	54.1	52.4

Table 1: Poverty incidence by region, rural and urban areas in 1998 and 2004/05 (in %).

Source: GOM/World Bank 2007:11.

By comparing the data in table 1 it is obvious that between the first IHS 1998 and the second IHS 2004/05 the rural poverty sunk about 2%. In contrast, the poverty in urban centers increased by 7%. In the rural North poverty has the same level, while in the central and southern region poverty decreases.

d. Relationship between agriculture, agricultural income and rural poverty

The following remarks focus on the bivariate correlation of agricultural variables on agricultural household income and rural poverty to get an assessment of relationship between both welfare indicators and agricultural variables. Table 2 describes the chosen variables and documents their relationship.

		Pearson Correlation (in parenthesis Sig. 2-tailed)	
Variable	**Description**	**Agricultural income**	**Headcount poverty**
Maize	Agr. hhs[1] who grow maize (in %)	,212 (,299)	-,094 (,648)
Maize_Hybrid	Agr. hhs who grow hybrid maize (in %)	-,095 (,645)	,005 (,981)
Rain_Crops	Agr. hhs who grow other rain fed food crops[1] (in %)	**,492* (,011)**	-,290 (,151)
Groundnuts	Agr. hhs who grow groundnuts (in %)	**,669** (,000)**	**-,458* (,019)**
Cotton	Agr. hhs who grow cotton (in %)	-,175 (,391)	,183 (,372)
Tobacco	Agr. hhs who cultivate tobacco (in %)	**,859** (,000)**	**-,427** (,029)**
Tobacco_Club	Tobacco club member in the last 5 years (in %)	-,148 (,469)	,007 (,971)
Farmer_Club	Functional farmer clubs	**,650** (,000)**	**-,447* (,022)**
Loan_Food	Person who obtain loan inputs for food crops (in %)	,214 (,294)	-,197 (,336)
Loan_Tobacco	Person who obtain loan inputs for tobacco (in %)	**,613** (,001)**	-,245 (,227)
Starter	Agr. hhs who received a Starter Pack 2001–2004 (in %)	-,202 (,322)	,231 (,256)
Dimba	Agr. hhs who cultivated a dimba garden (in %)	**,389* (,050)**	-,209 (,305)
Dimba_Irrigated	Agr. hhs who used any irrigation method (in %)	**,516** (,007)**	**-,504** (,009)**
Agri_Ext.	Agr. hhs who get advice (in %)	,140 (,494)	,118 (,567)
Agri_Ext_Use	Agr. hhs who found extension useful (in %)	,244 (,229)	-,085 (,678)
Cattle	Agr. hhs who raised cattle (in %)	,222 (,276)	-,116 (,573)
Land	Land per household	,127 (,537)	,021 (,918)
Ganyu_Labor	Average weekly hours of ganyu labor	,015 (,941)	-,201 (,324)
		Spearman's rho (in parenthesis Sig. 2-tailed)	
Market_Access	Market access assessment in the districts (poor to fair)	,028 (,891)	-,011 (,956)
Agri_Potential	Agricultural potential of the district (poor to high)	,087 (,672)	,191 (,349)

[1]Agr. hhs = Agricultural households

[2]Other rain fed crops covers pulses, groundnuts, cassava, other grains, cotton and rice (NSO 2005:97-98). However, groundnut and cotton are treating here as separate cash crop additionally.

** Correlation significant at 0.01 level; * at 0.05 level.

Table 2: Variables, description and correlation results.

Source: MoAFS 2008; NEC et al. 2001:42; NSO 2005; NSO 2008:11. Own composition and calculation.

The cropping seasons of 2002/03 and 2003/04 are the reference period for the cultivation of crops (NSO 2005:95). Most of the variables encompass the percentage share of districts' household involved in special cropping system or in agriculture-related activities and conditions. Few variables cover natural or economic characteristics of the districts. The majority of the variables is self-explanatory and some are explained in the above stated description of agricultural policy history; however some demand a closer description or explanation. *Rain_crops* is as an indicator for diversity of crops growing by households which play an increasing role for household poverty and food security (Peters 2006:336-339). The non-market institution of *Tobacco_Club* is important for export promotion and smallholder access on auction floors to get world prices (Peters 2006:339).[7] Also the variable *Farmer_Club* covers a rural institution and encompasses here functioning clubs compared to existing. Variables' concerning *Loans* including loans from formal as well as informal sources in the past 12 months prior the survey. While here a distinction between loans for food crops or tobacco is done, no reference is made concerning the source like relatives, state and so on. Starter packs (*Starter*) are distributed to farming households, whether they belong to the poorer or richer quintile (NSO 2005:100-101). Here the variable covers the period 2001-2004; therefore it covers not the newer fertilizer voucher program which stated above. The variable *Dimba* refer to wetland or streambed gardens in the dry season to grow crops for own consumption or for sale. With *Dimba_Irrigated* the percent of irrigated dimbas is included, the overwhelming majority of farming households uses traditional irrigation methods including use of water canes or diverting the stream (NSO 2005:99). The share of households who gets advice of agricultural extension as well as the assessment of usefulness is incorporated through *Agri_Ext* and *Agri_Ext_Use* respectively. Corresponding with the starter pack all quintiles got advice. *Cattle* is a proxy for wealth in most rural areas. *Ganyu* refers to casual, short-term rural daily labour. With the variables *Land* and *Agri_Potential* cover some location-specific endowments. *Land* is the scarce resource for agricultural development and supply.

Here we orientate on Silva (2007) where household engagement in the production of cash crops is taken as a proxy for export trade orientation and of food crops for domestic trade orientation and subsistence. Hence, export orientation is connected with formal agricultural sector, while the second is largely informal. Other selected agricultural variable like *Dimba, Loan, Market_Access* or *Tobacco_Club* influence the respective trade orientation and should influence additional benefits for households.

The results give an assessment of direction and strength and the interpretation is very straightforward: A positive value of the association indicates an increase of the variables in the same direction (like higher share in tobacco cropping and higher income); while in contrast a negative value suggests an inverse relationship (like higher household involvement and less poverty). The strength indicates the magnitude of the association.

For a first view it is interesting that just few variables show a statistical significance, however also the direction of coherences is interesting. There are significant positive correlations between agricultural income and

[7] An actual assessment of tobacco clubs as nonmarket institutions provide e.g. Negri/Porto (2008).

Rain_Crops, *Groundnuts*, *Tobacco*, *Farmer_Club*, *Loan_Tobacco*, *Dimba* and *Dimba_Irrigated* and with two exceptions the variables show a strong positive relationship which means that districts with a high share of households involved in these productions and institutions have a higher income. Other variables show some less positive or negative correlation. That *Maize* and *Maize_Hybrid* correlate marginal is reasoned by the circumstances that almost all households crop maize. While *Maize* shows a positive sign, *Maize_Hybrid* in contrast is negative. An exception of cash crops is *Cotton* which shows a negative relationship. However, all negative relationships are weak. According to the results of table 2 variables which are linked to higher income are correlated predominantly with a lower poverty rate on district level. In particular *Dimba_Irrigated*, *Groundnuts*, *Farmer_Club* and *Tobacco* indicate with the significant relationship that the variables with lower poverty covary. *Maize* and *Land* show small correlation.

Trade orientation through cash crop production show a relationship between higher income and lower poverty rates and thus, underline the impact in poverty alleviation. However, a blanket view is not possible if the relationship of *Cotton* is taken into account as well as the relationship of *Rain_Crops* and *Dimba* as a proxy for local agricultural trade.

In contrast, some variables reveal an ambivalent or not-expected character. Districts with higher share of households which receive a *Starter_Pack*; members in *Tobacco_Clubs* and cropping *Cotton* show lesser income and higher poverty. While both variables of agricultural extension indicate a positive relationship on income, just a useful assessment of extension correlates with lesser poverty (as expected). Interestingly and no expected, agricultural potential and market access show a low relationship, whether neither on income nor on poverty.

Variable	Poverty
Annual_Agricultural_Income	**-,545** (,004)**
Annual_Salaries/Wages	-,166 (,416)
Annual_Income_Enterprise	-,313 (,119)

** Correlation significant at 0.01 level; * at 0.05 level.

Table 3: Correlation results.

Source: NSO 2005: 75. Own calculation.

Table 3 documents the correlation between incomes sources and poverty as well as Figure 3 plots the agricultural household income and rural poverty of the district. The correlation is large and negative (-.545), implying association between increasing household income from agriculture and lower poverty rates in the districts. Of course, as expected, other increasing incomes (salaries/wages and enterprises) show the same direction but the strength is the highest by agriculture.

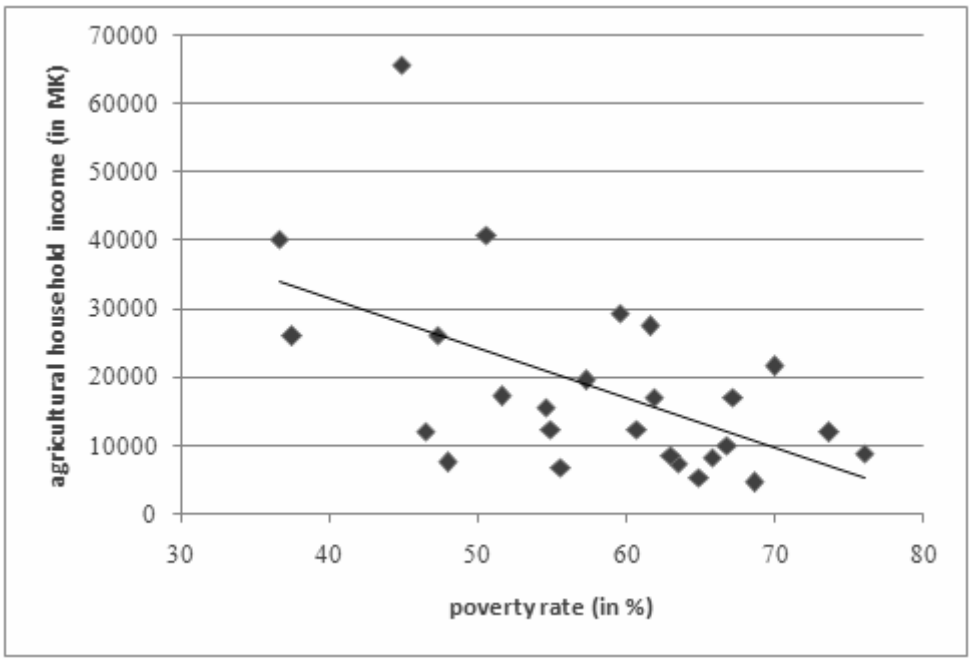


Figure 3: Agricultural household income and districts poverty rate

Source: NSO 2005:75, 142-143. Own calculation.

4. Comparison and discussion of results

In the following some questions will be shortly discussed: Are the above stated spatial results based on recent data similar with other literature on income and poverty in Malawi? Which regional differences can be expected in the future? Where are unresolved issues and some limitations?

The positive relationship between tobacco and higher income is also determined in Masanjala (2006) who took data from 404 households in five districts in the year 1995. However, as the author conducts: 'we also find that due to the lumpiness and seasonality of cash crop incomes, higher household incomes, while increasing food purchases did not significantly affect per capita food intake' (Masanjala 2006:231). Peters (2006) used household data of three sample years during the 1980's and 1990's and Benson et al. (2005) analyzed data of the first IHS 1997/98. The authors also revealed the role of irrigated dimbas, engagement in cash crops production and the role of crop diversification for income earning of agricultural households and influence on poverty (Benson et al. 2005:542; Peters 2006:334, 336-337). As the present regional view a study of GOM/World Bank (2007) examines effects of the new IHS. The low correlation between land size and poverty is also assessing[8] as well as the role of irrigation and cash crop production (GOM/World Bank 2007:52-53, 105, 155, 202-203). The contrast sign of cotton as a further cash crop compared to tobacco and groundnut as well as the small correlation

[8] In the report it is stated that 'Smaller landholdings are not synonymous with poverty.' (GOM/World Bank 2007:105).

role of (hybrid) maize is also revealed by GOM/World Bank (2007:203) and Benson et al. (2005:542) with some earlier data. With new data, Negri/Porto (2008:3, 26) find that tobacco club provide higher income effects for members, however, such an influence of tobacco clubs do not exist with regional data. Diametric is also the result concerning cropping of groundnuts examined by Chirwa (2005) under the use of data between 1998 and 2002: While non-poor households which grow groundnuts fall less likely into poverty, poor households with groundnut are characterized by reduced probability to escape poverty. In addition, the author finds that agricultural land is an influential determinant on poverty in Malawi.

Overall, the regional picture shows similarities and continuities but less difference to other recent or earlier studies.

A second relevant question is whether differences and disparities in agricultural income and poverty will increase or decrease in the nearer future? However, this question is hardly to answer and it is not possible to do it here extensively. An equal increase of per capita cultivable land by one-quarter of an acre for all rural household shows similar effects between the regions (NEC 2001:36). A further increase of crop diversity cultivated by rural households would lead to higher effects in the northern and central regions than in the southern districts (NEC 2001:37); and thus would increase disparities. If theoretically all households would crop tobacco the southern districts would gain the most (NEC 2001:38). However, agro-ecological constraints would not lead to this nationwide cropping system. In contrast, it seems more relevant that tobacco cropping leads to increasing disparities because in the nearer future commercial farm household with cash crops like particularly tobacco will benefit from further international liberalization (OECD 2006). Overall, it can be stated that single measures will lead to increasing disparities, also under the assumption that mainly the central and to a lesser degree the northern districts will gain.

And the third question is: What are drawbacks and limitations of the analysis? First, in this paper just a snapshot on one point of time is presented. While this view is relevant to get an assessment on the current state after decades of agricultural reforms it must be recognized that income and poverty is transitory (see e.g. Chirwa 2005; Peters 2006). Second, just a view on correlation is taken and not on causality. However, it provides a first assessment on recent distributional conditions in rural Malawi. Third, there are some missing data like productivity and agricultural prices on district level. And the fourth point is the missing stratification within the districts. Current literature shows that liberalization and agricultural transition lead to increasing disparities and benefit wealthier smallholder instead the poor (Peters 2006:326-327). Also the recent report of the GOM/World Bank (2007) reveals such disparities between wealthier and poorer households.

5. Conclusion

Malawi is heavily reliant on the agricultural sector, both for subsistence and commercial activities and the majority of people live in rural areas. Since the 1980s, the agricultural sector of Malawi had undergone several reforms and transformations. Like most developing countries Malawi shows considerable disparities of agricultural income and rural poverty on sub-national level after these years of reforms. Overwhelmingly, the central districts are characterized by lesser poverty and higher agricultural household income. Agricultural trade orientation through the involvement of districts households on cash or food crops reveal a positive relationship on higher income and lesser poverty on district level. Other variables like *dimba* gardens, the number of farmer clubs or loans for tobacco underline this positive relationship, while some variables show mixed effects. Furthermore, several variables generally have a weak relationship on agricultural income and poverty prevalence. Within the rural employment and activities agricultural income reveals a major positive relationship to decreasing poverty on a district level.

What are recommendations based on these spatial results? Generally, agricultural activities should be promoted among rural households in Malawi, because it remains a major income source for the households and thus influential for poverty. Concerning the scarcity of agricultural land measures to increase agricultural productivity through targeted projects with agricultural extension, improved seed or irrigation – if possible – are necessary and influential. Through the descriptive statistic results a linear relationship between productivity-enhancing measures and higher agricultural income and lower rural poverty respectively are revealed. Support from the state like extension and loans seem to be important as well as the support of farmers associations. Also a diversification of food and cash crops outside of tobacco, in particular groundnuts, but also cotton should be promoted, because these crops are also involved in future liberalization tendencies and thus contribute to effects. Groundnuts are also relevant in local trade and thus there is an opportunity to kink local and export trade potential. Export trade orientation is important, however it must be recognized that this can displace maize and other food crops[9] and can deepen the dependence on tobacco[10].

Promotion and support of the state should focus on the poorer farm households in the districts which have lesser access to credits and fertilizer to ensure an equitable access and switch to cash crops or food crops for local trade. Several recommendations based on this analysis are similar to those emphasized (e.g. irrigation, fertilizer) by other authors like Benson et al. (2005:543); GOM/World Bank (2007:191-200; 244-246); Peters (2006). Furthermore, a promotion of off-farm wage opportunities in rural areas for smallholder with land constraints (despite it does not play a role in the text) should be incorporated in a broad-based rural development strategy.

[9] The same is valid for the case of income from export crop promotion which leads to seasonality and lumpiness of income. Therefore, policymakers should also promote complimentary sources of income (Masanjala 2006:239-240).

[10] Also the ecological and social aspects on tobacco growing in Malawi should be taken into account and lead to the recommendation that the single promotion of tobacco can not be seen as panacea for poverty reduction.

Thus, overall poverty reduction efforts must be designed specifically at district level and more targeted programs have to influence public awareness of well-being as well as public policies and programs. Hence, assessment of geographic heterogeneity of poverty and income is a prerequisite for geographic targeting of interventions. Such analysis of distributional issues on district level is valuable for further action and complement analysis on other geographic levels like villages or nationwide.

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