

*Full Length Research Paper*

# Factors affecting perceptions of prisoners on food security in Malawi's prisons

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While Malawi's per capita cereal production may be higher than her per capita cereal consumption, Malawi is a net cereal importer and thus food insecure. The food situation is much worse in Malawi's prisons because inmates generally eat one meal per day. The objective of this study was to delineate factors that affect perceptions of prisoners on food security in Malawi prisons. Using structured questionnaires in face to face interviews, the study collected data from 1000 prisoners and 30 officers-in-charge from all prisons in the country. The data was analyzed using Stata 12. Results from the analysis showed that inmate numbers, how far from prison the prisoners' home was, meals per week received from home, prisoners' socioeconomic status, age of officer-in-charge, sex of officer-in-charge, education of officer-in-charge, farmland size, log of subvention, education of prisoner, and age of prisoner were factors that in various ways and at various levels of significance affected the perceptions of prisoners on food security in Malawi's prisons.

**Key words:** Malawi's prisons, food insufficiency, food security, perception of prisoners.

## Introduction

The introduction gives a brief narrative about Malawi's prisons, states the problem and makes a justification for the study. Study objectives are then given and finally, study limitations are presented.

Politically, Malawi is divided into four regions, these being the Northern, the Central, the Eastern and the Southern regions. There are six prisons with a prisoner population of 1,717 in the Northern region. In the Central region, there are eight prisons with a prisoner population of 3,784. The Eastern region has eight prisons with 4,072 prisoners, while the Southern region has 3,025 prisoners in eight prisons. There were thus 12,598 prisoners in Malawi's 30 prisons in 2016 when this study was conducted.

**Statement of the problem:** Although Malawi is generally food insecure, it is common in Malawi that most people consume three meals per day. What differ are mainly the quality, quantity and variety of the food that they eat. Inmates in Malawi's prisons, however, generally eat one meal per day (African Commission on Human and Peoples' Rights, 2002; Penal Reform International 2005).

These reports mention food issues as observations made in relation to health and human rights. None of these reports is specifically about factors affecting perceptions of prisoners on food security in Malawi's prisons. The fact that no report or study delineated factors affecting perceptions of prisoners on food security in Malawi's prisons became a problem that this study intended to address.

**Justification of the study:** The Malawi Government's overall objective of the Food and Nutrition Security Policy is to significantly improve the food and nutrition security of the Malawi population (Malawi Government, 2005) while the specific objective of the Food Security Policy, is to guarantee that all men, women and youth in Malawi have, at all times, physical and economic access to sufficient nutritious food required to lead a healthy and

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active life (Malawi Government, 2006). Since prisons accommodate about 0.08 percent of the Malawi population, it is important that prisons are food secured and that every prisoner has access to not less than the minimum meal requirement. It was important that this study be carried out so that factors affecting perceptions of prisoners on food security in Malawi's prisons could be delineated in order to lay the foundation upon which efforts to improve and re-engineer the food situation in Malawi prisons could be based. This would enable policy makers and prison management to take appropriate policy and budgetary measures regarding prison subvention, strategic resource allocation, and food production or procurement to accurately address the problem and improve prison food security. Also, since no study had been conducted in this area, it was important to conduct this study so that the existing knowledge gap could be filled.

**Objectives of the study:** The general objective of this study was to delineate factors affecting perceptions of prisoners on food security in Malawi prisons. Specifically, the study aimed at delineating prisoner-related, officer-related as well as institution-related factors affecting perceptions of prisoners on food security in Malawi prisons.

**Limitations of the study:** There were two major limitations to the study. The first was that all interviewees were male. This was because, for security reasons, the research team was only allowed access to prisoners that committed less serious offenses. Such prisoners were allowed to go out for farming activities because they were considered a lower security risk. The research team was advised to interview the sampled ones as they carried out their farming chores. No female prisoners were in this category, not necessarily because they committed serious crimes, but because female prisoners were not allowed to go out for farming duties and the research team were not allowed to enter into the female side of the prison.

The second limitation was that only 1000 prisoners, instead of the required 1418 prisoners were interviewed. This was because some of the prisoners that were selected for interviewing, according to the random sampling method used in the study, were males that were not allowed to go out of confinement because of the nature of their crimes or females, who the research team was not allowed to meet. The research team was not permitted to follow prisoners to their cells.

**The food situation in Malawi:** The Millennium Development Goals (MDGs) through the medium term development strategy, the Malawi Growth and Development Strategy (MGDS), identified nine key priority development goals (Malawi Government, 2010). The first of these development goals is to eradicate

extreme poverty and hunger. To achieve this, the Government's target was to halve, between 1990 and 2015, the proportion of people who suffered from hunger. One of the indicators for monitoring hunger was the proportion of the population living below the minimum level of dietary energy consumption of 2,100 kilocalories per person per day (Ecker and Qaim, 2008; Malawi Government, 1999).

Malawi is an aggregate net exporter of food. The bulk of the food exports, however, are non-cereals such as tea and sugar and so although the country is a net food exporter, it remains a net importer of cereals and thus food insecure. Maize is the staple food in Malawi (Kidane, et al., 2006; FAO, 2010; World Bank, 2008, 2008a; FAO, 2015; De Graaff, 1985; IFPRI, 2012).

**The food situation in Malawi's prisons:** It is a requirement of the United Nations that every prisoner should be provided, by the administration at the usual hours, with food of nutritional value adequate for health and strength, of wholesome quality and well prepared and served (Medecins Sans Frontieres, 2009). The Malawi Prison Act (Cap. 9:02, 1983) provides a dietary schedule for prisoners belonging to various categories of prisons. Despite these legally binding dietary guidelines, the practice on the ground is different. The African Commission on Human and Peoples' Rights (2002) observed that Malawian prisoners receive only one meal per day and that meals are not balanced as prisoners eat the same food every day. The report also observed that the meals comprise of maize (*nsima*) and boiled beans and sometimes pigeon peas or vegetables. It further observed that almost no meat nor fish is provided, but that salt is available in all prisons. This is a typical case of food insecurity.

## Materials and methods

**Data Collection Techniques:** Both primary and secondary data were collected using questionnaires, one administered to prisoners, and the other to prison officers-in-charge. These questionnaires were administered by interviewers on face to face basis. Secondary data were collected from official records obtained from the Malawi Prison Service Headquarters and the various prisons that were visited.

**Data analysis:** Data were entered in Excel and analysed using Stata 12. The output from the analysis was reported using descriptive statistics such as means, proportions and percentages.

**Sampling methods:** All prisons in Malawi formed the field of study and every inmate, except those that had been in prison for less than four weeks, was an eligible interviewee. The four week requirement is a normal procedure followed by the USAID-funded Food and Nutrition Technical Assistance (FANTA) project which

developed a questionnaire (Swindale and Bilinsky, 2006; Maxwell and Frankenberger, 1992) upon which the questionnaires used in this study were based. In order to select respondents from the population of inmates, the stratified random sampling and simple random sampling methods were used. The stratified random sampling method was applied to select units out of  $N$  sub-populations called strata. In this case, each prison was a stratum and from each strata number of inmates were selected using simple random sampling in order to give each prisoner an equal chance of being selected (Agresti, 1996; Zikmund, 1997; McGill et al., 2000; Bryars, 1983). In order to select participating inmates, tables of random numbers (Magnani, 1997) were used. In selecting prison officers for the interview, the purposive sampling method was used.

**Sample Size:** For more precision on sample size calculation, when population size and population proportions are known, the formula given below is used (Kothari, 2004).

$$n = \frac{z^2 \cdot p \cdot q \cdot N}{e^2 (N-1) + z^2 \cdot p \cdot q} \tag{1}$$

Where  $n$  = sample size,  $z = 1.96$  = z-value yielding 95% confidence level,  $p$  = proportion of the population of interest,  $q = 1 - p$ ,  $N = 12,598$  = the population of interest,  $e = 5\%$  = absolute error in estimating  $p$ .

The population proportion for each prison was calculated as in Equation (2).

$$\text{Prison proportion, } p = \frac{\text{Number of prisoners at a given prison}}{\text{Total prisoner population in Malawi}} \tag{2}$$

In 2016, the total number of, both convicted and unconvicted, inmates in Malawi prisons was 12,598 (Malawi Government, 2014), while the population of Malawi as given by the UNDP in its 2011 Human Development Report was 15,380,900 (UNDP, 2011). Following the reasoning articulated above and applying Equation (2), the value of  $n$ , the sample size, was found to be 1418. However, when conducting the survey, only 1,000 inmates were interviewed because of the study limitations.

Data were collected by three trained interviewers using a questionnaire that had been reviewed by a group of key informants, refined by eight prisoners that were representative of the survey population but who were not part of the survey sample, and pretested on fifteen prisoners through a preliminary survey. Data collected were subjected to regression and correlation analysis and results summarized.

**Model specification:** The logit model was used to analyse the data. The logit model was considered

appropriate because the questionnaire resulted in dichotomous variables which could easily be analyzed using this model. Following the arguments presented by (Maddala, 1992; Wooldridge, 2002; Verbeek, 2004; Gujarati, 2004; Greene, 2003), a regression model shown below was assumed.

$$y_i^* = \beta_0 + \sum_{j=1}^k \beta_j X_{ij} + U_i \tag{3}$$

where  $y_i^*$  is not observed, in which case it is a “latent” variable, then what is observed is a dummy variable  $y$ , defined by

$$\begin{aligned} y_i &= 1 \text{ if } y^* > 0 \\ y_i &= 0 \text{ otherwise} \end{aligned} \tag{4}$$

The model assumes that a latent variable exists for which a dichotomous realization is observed. For example, if the observed dummy variable was whether or not the prisoner was food secure,  $y_i^*$  would be defined as “prisoner’s perception of being food secure”.

After estimating the parameters,  $\beta_i$ , it is important to predict the effects of changes in any of the independent variables on the probabilities of any observation of the dependent variable. These effects are called marginal

effects, given by  $\frac{dy}{dx}$ . Marginal effects are calculated at different levels of the independent variables to obtain an idea of the range of variation of the resulting changes in probabilities (Maddala, 1992; Gujarati, 2004). The logit model has been used widely in analyzing data in various research endeavours (Saka and Lawal, 2009; Adesina and Zinna, 1993; Jabar, et al., 1998; Baidu-Forson, 1999).

The functional form of the logit model is given by Friendly (1995) as:

$$Y(X_{ij}) = \frac{e^{\alpha + \beta X_{ij}}}{1 + e^{\alpha + \beta X_{ij}}} \tag{5}$$

This function is then transformed into a logistic regression model by a linear function of explanatory variables as follows:

$$\text{Logit } Y_{ij} = \alpha + \beta X_{ij} \tag{6}$$

Where  $Y_{ij}$  is the decision of prisoner  $i$  assuming binary form of (1) for Yes and (0) for No,  $X_{ij}$  is the  $j^{\text{th}}$  predetermined variable,  $\alpha$  is the constant term of the regression equation to be estimated, and  $\beta$  are the

parameters to be estimated. The functional form of the logit model could also be expressed as (Agresti, 1996):

$$\ln\left[\frac{P_x}{(1-P_x)}\right] = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_{ki} \quad (7)$$

where the subscript  $i$  is the  $i^{\text{th}}$  prisoner,  $P_x$  is the probability of a "Yes" response, i.e., probability that the prisoner perceived himself to be food sufficient,  $(1-P_x)$  is the probability of a "No" response, i.e., probability that the prisoner perceived himself not to be food sufficient,  $\beta_0$  is the intercept term, and  $\beta_1, \beta_2, \beta_3, \dots, \beta_k$  are the coefficients of the independent variables  $X_1, X_2, X_3, \dots, X_k$ , (Odeno, et al., 2009).

Data from the prisoner questionnaire were entered in SPSS and then imported into Stata 12 for analysis using the logit model. Each of the food security conditions of *food sufficient, anxiety, unpreferred food, limited variety, unwanted food, smaller meal, fewer meals, no food at all, sleeping hungry, whole day and night, augmenting, and shameful means* were dependent variables regressed against the independent variables of *inmatenumbers, howfar, meals/week, prisonerstatus, ageofficer, sexofficer, educationofficer, farmland, insubvention, educationprisoner, and ageprisoner*.

**Heteroskedasticity, multicollinearity, normality and robust regression:** The models were checked for heteroskedasticity using the Breuch-Pagan (BP) test and no evidence of heteroskedasticity was found. They were also checked for multicollinearity using the Variance Inflation Factor (VIF) and no multicollinearity was found. Normality was using the kernel density plot (Wooldridge, 2002) and the plot confirmed that non-normality did not exist. Although neither non-normality nor heteroskedasticity was expected, robust regression was used all-the-same so that no risks are taken.

## Results and Discussion

Table 1 gives marginal effect coefficients of the prisoners' perception of food insecurity in Malawi's prisons.

**Food sufficient:** The variables that positively and significantly made prisoners perceive themselves as food sufficient were *howfar, meals/week, prisonerstatus, sexofficer* and *farmland*. *Ageofficer, educationofficer* and *Insubvention* had a negative but significant influence.

**Howfar.** A unit increase in the distance between prison and the prisoner's home caused a six percent increase in the prisoner's perception of being food sufficient. This result was unexpected and contrary to common logic. This possibly meant that prisoners from far-away places felt so helpless that they psychologically accepted their

fate and resigned to the prison food situation. These prisoners possibly saw no sense in complaining about food as nothing would change. So, they accepted and received whatever food that came their way.

Another possible explanation, however, may be found in the coefficient of this variable when analyzing the dependent variable, *shameful means*. There, too, the coefficient of *howfar* was positive. This may further help to explain the anomaly found here in that prisoners from far-away places possibly survived on obtaining food using shameful means such as stealing or begging food from other inmates or members of the general public. Because of food provisions obtained in this manner, the prisoner from a far-away place may have considered himself food sufficient when prison food was combined with food from outside prison.

**meals/week.** A unit increase in the number of meals per week that one received from home increased their perception of being food sufficient by 11 percent. This result was expected as more home meals meant more food and, therefore, better food sufficiency.

**prisonerstatus.** Being of higher socioeconomic status led to a six percent increase in the prisoner's perception of being food sufficient. This kind of relationship was not surprising as one would expect a prisoner of higher socioeconomic status to have access to resources and to be able to afford alternative means of acquiring food and hence to perceive himself as being food sufficient. Also, it was learned during interviews that prisoners of high socioeconomic status had the means to be able to bribe cooks and get bigger portions of food than other prisoners.

**sexofficer.** Having a male officer-in-charge at a prison caused an 11 percent increase in the prisoner's perception of being food sufficient. There could be three reasons for this. Either it could be that male officers-in-charge were more active in food sourcing endeavours such that their prisons indeed were better supplied with food, or that male officers-in-charge were generally posted at prisons with farms which were naturally better endowed with food, or that prisoners were stereotyped into believing that a male officer-in-charge was a better provider than a female one.

**farmland.** A unit increase in the amount of farm land held by a prison led to a 0.1 percent increase in the prisoner's perception of being food sufficient. This may have been because having farm land meant that the prison was able to produce its own food which prisoners consumed, thereby giving them the perception of food sufficiency.

**ageofficer.** Increased age of the officer-in-charge caused a two percent drop in the prisoner's perception of being

Table 1: Perceptions of prisoners on food security in prisons.

| Independent Variables | Dependent Variables                |                                   |                                    |                                    |                                   |                                   |                                   |                                 |                                 |                                 |                                   |                                  |
|-----------------------|------------------------------------|-----------------------------------|------------------------------------|------------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|---------------------------------|---------------------------------|---------------------------------|-----------------------------------|----------------------------------|
|                       | Food Sufficient                    | Anxiety                           | Unpreferred Food                   | Limited Variety                    | Unwanted Food                     | Small Meal                        | Fewer Meals                       | No food                         | Sleep Hungry                    | Day Night                       | Augment                           | Shamefull Means                  |
| Inmatenumbers(No)     | -0.0003<br>(0.0004)                | 0.0013***<br>(0.0004)             | -0.0001<br>(0.0003)                | -0.0003<br>(0.0003)                | 0.001***<br>(0.0004)              | 0.001***<br>(0.0003)              | 0.0008**<br>(0.0004)              | 0.0004***<br>(0.0002)           | 0.001***<br>(0.0002)            | 0.0007***<br>(0.0002)           | 0.0007**<br>(0.0004)              | 0.0008**<br>(0.0004)             |
| Howfar (km)           | 0.0609*                            | -0.0255                           | -0.0584**                          | -0.0171                            | 0.1527***                         | -0.0088                           | -0.098***                         | -0.0215                         | -0.0381                         | -                               | 0.128***                          | 0.1364***                        |
| Meals (No.)           | (0.0366)<br>0.1104***<br>(0.0197)  | (0.0379)<br>-0.048***<br>(0.018)  | (0.0292)<br>-0.0388***<br>(0.0111) | (0.0282)<br>-0.0322***<br>(0.0118) | (0.0376)<br>-0.0011<br>(0.0184)   | (0.0292)<br>0.0509***<br>(0.0111) | (0.0322)<br>-0.0165<br>(0.0126)   | (0.0176)<br>-0.0002<br>(0.0107) | (0.0282)<br>0.0035<br>(0.0152)  | (0.0174)<br>-0.0132<br>(0.0143) | (0.0378)<br>0.0839***<br>(0.0213) | (0.0349)<br>-0.0113<br>(0.0177)  |
| Prisonerstatus        | 0.0588*                            | 0.0262                            | -0.0287                            | -0.0638**                          | -0.0759**                         | -0.0253                           | -                                 | -0.0307*                        | -0.0327                         | -0.0079                         | 0.1041***                         | 0.0848***                        |
| Ageofficer (yrs)      | (0.0345)<br>-0.0196***<br>(0.0043) | (0.0355)<br>0.0151***<br>(0.0045) | (0.0269)<br>0.0149***<br>(0.0034)  | (0.0284)<br>0.0178***<br>(0.0033)  | (0.0367)<br>0.0038<br>(0.0047)    | (0.0269)<br>0.0143***<br>(0.0034) | (0.0296)<br>0.0123***<br>(0.0034) | (0.0172)<br>0.004<br>(0.0027)   | (0.0274)<br>0.0086**<br>(0.004) | (0.0188)<br>0.0021<br>(0.0029)  | (0.0363)<br>0.005<br>(0.0047)     | (0.0345)<br>0.0107**<br>(0.0045) |
| Sexofficer            | 0.114***                           | -                                 | -0.001                             | -0.0816***                         | 0.1182***                         | 0.1193***                         | -                                 | -                               | -                               | -0.177***                       | -0.0415                           | 0.0935*                          |
| Eduofficer (yrs)      | (0.0419)<br>-0.0201*<br>(0.0111)   | (0.0454)<br>-0.0092<br>(0.0119)   | 0.0097<br>(0.0086)                 | (0.029)<br>0.0109<br>(0.0084)      | (0.0481)<br>0.0023<br>(0.0122)    | (-0.0344)<br>0.0166*<br>(0.0086)  | (0.0319)<br>0.028***<br>(0.009)   | (0.0378)<br>0.0039<br>(0.0067)  | (0.05)<br>0.0071<br>(0.0099)    | (0.0425)<br>-0.001<br>(0.0069)  | (0.0505)<br>0.0051<br>(0.0122)    | (0.0518)<br>0.013<br>(0.0118)    |
| Farmland (Ha)         | 0.0008***                          | -0.0005*                          | -0.0004**                          | -0.0009***                         | 0.0014***                         | 0.0006***                         | -                                 | -0.0002                         | -0.00004                        | 3.15E-06                        | -0.0003                           | -0.0011***                       |
| Insubvention (MK)     | (0.0003)<br>-0.0508***<br>(0.0178) | (0.0003)<br>-0.0294<br>(0.02)     | (0.0002)<br>0.0057<br>(0.015)      | (0.0002)<br>0.0267*<br>(0.0145)    | (0.0003)<br>-0.0384**<br>(0.0198) | (0.0002)<br>-0.0008<br>(0.015)    | (0.0002)<br>0.0292**<br>(0.0149)  | (0.0002)<br>0.0047<br>(0.0101)  | (0.0002)<br>-0.0078<br>(0.0145) | (0.0002)<br>-0.0115<br>(0.01)   | (0.0003)<br>-0.0124<br>(0.0196)   | (0.0003)<br>0.0255<br>(0.0192)   |
| Eduprisoner (yrs)     | -0.0023<br>(0.005)                 | 0.0037<br>(0.0052)                | 0.0027<br>(0.0039)                 | 0.0107***<br>(0.0038)              | 0.0091*<br>(0.0054)               | 0.0044<br>(0.0039)                | 0.0011<br>(0.004)                 | -0.0029<br>(0.0027)             | -0.0083**<br>(0.0041)           | -0.0061**<br>(0.0027)           | 0.0039<br>(0.0053)                | -0.0042<br>(0.0052)              |
| Ageprisoner (yrs)     | 0.0002<br>(0.0019)                 | 0.0022<br>(0.0021)                | 0.0001<br>(0.0015)                 | 0.0027*<br>(0.0016)                | 0.0025<br>(0.0021)                | 0.0007<br>(0.0015)                | 0.0007<br>(0.0016)                | -0.0004<br>(0.001)              | 0.0021<br>(0.0015)              | 0.0013<br>(0.001)               | 0.0001<br>(0.002)                 | -0.0027<br>(0.002)               |
| LR chi2(11)           | 125.73***                          | 76.72***                          | 48.45***                           | 85.33***                           | 61.12***                          | 77.27***                          | 95.67***                          | 55.67***                        | 98.69***                        | 103.58***                       | 62.42***                          | 63.09***                         |
| No. Observations      | 1000                               | 1000                              | 1000                               | 1000                               | 1000                              | 1000                              | 1000                              | 1000                            | 1000                            | 1000                            | 1000                              | 1000                             |

Note: Coefficients are marginal effects.

\*\*\* significant at 1%, i.e.  $p < 0.01$

\*\* significant at 5%, i.e.  $p < 0.05$

\* significant at 10%, i.e.  $p < 0.1$

food sufficient. Prisoners possibly found older officers-in-charge less capable of mobilizing food resources.

**educationofficer.** Increased education of the

officer-in-charge led to two percent reduction in the prisoner's perception of being food sufficient. This finding was surprising but there could be two reasons why this was the case. Firstly, it could be that the Malawi Prison Service (MPS) posted

more educated officers-in-charge to high security prisons with large prisoner numbers but without farm land, where food was consequently scarce. Secondly, it could be that the highly educated officers-in-charge concentrated on paper work

and did not pay much attention to the “dirty work” of ensuring food availability at the prison.

**Insubvention.** A unit increase in the amount of subvention led to a five percent decline in the prisoner’s perception of being food sufficient. This was an anomaly as one would expect more subventions to translate into more food. But this possibly showed that the increased subvention was used to fund administrative and other operational costs and did not necessarily go into food acquisition.

**Anxiety over food:** *inmatenumbers* and *ageofficer* positively and significantly influenced the prisoner’s perception of being anxious and worried about food, while *meals/week*, *sexofficer* and *farmland* had a negative but significant influence.

**inmatenumbers.** A unit increase in inmate numbers led to a 0.1 percent increase in the prisoner’s anxiety over food, meaning that increases in inmate numbers were not matched with increased food provisions. The converse could be that smaller prisoner numbers were better as far as the perception of anxiety over food was concerned.

**ageofficer.** In as far as perceptions of anxiety were concerned; a prison was worse off when managed by an older officer-in-charge. A unit increase in the age of the officer-in-charge triggered a two percent increase in the perception of anxiety over food. This finding was in tandem with the earlier finding that increased officer age caused a decline in the perception of food sufficiency.

**meals/week.** A unit increase in the number of meals per week received from home led to a five percent drop in the prisoner’s perception of anxiety over food. This was possibly because frequent receipt of home meals meant that the prisoner was often food sufficient and, therefore, was less anxious about whether or not there would be food available in prison.

**sexofficer.** Perceptions of anxiety over food were reduced by 15 percent if the prison was managed by a male officer-in-charge. This agreed well with an earlier finding that a male officer-in-charge caused an increase in the perception of food sufficiency.

**farmland.** A unit increase in farm land led to a 0.1 percent reduction in the prisoner’s perception of anxiety over food. The result meant that ownership of increased farm land, led to better availability of food leading to decreased perceptions of anxiety over food.

**Un-preferred food:** The age of the officer-in-charge positively and significantly influenced the perception of eating un-preferred food, whereas *howfar*, *meals/week*, and *farmland* had a negative but significant influence on eating un-preferred food.

**ageofficer.** Having an older officer-in-charge caused a one percent increase in the prisoner’s perception of eating un-preferred food. It seems prisoners did not have much confidence in the older officer’s ability to make food available in prison.

**howfar.** A unit increase in the distance from prison to the prisoner’s home caused a six percent decrease in the prisoner’s perception of eating un-preferred food. Being further away from home conditioned the prisoner to accept whatever food that was presented to him and not to be demanding. Also, as seen earlier, prisoners from far-away places may have resorted to stealing, begging or borrowing as survival mechanisms thereby allowing them access to better food and thus giving them a reduced perception of eating un-preferred food.

**meals/week.** A unit increase in the frequency of home-meal receipts caused a four percent reduction in the prisoner’s perception of eating un-preferred food. Notes written down during interviews indicated that prisoners who often received meals from home did not rely on prison food. Those who received home meals every day did not eat much prison food. Because of this comfort, these prisoners ate more of the food that they preferred and less of the un-preferred prison food, hence their reduced perception of eating un-preferred food.

**farmland.** A unit increase in the amount of farm land held by a prison resulted in a 0.04 percent drop in the prisoner’s perception of eating un-preferred food. The finding meant that ownership of farm land helped to increase availability of better food.

**Limited variety:** Independent variables that positively and significantly influenced the perception of eating a limited variety of food were *ageofficer*, *Insubvention*, *educationprisoner*, and *ageprisoner*. Those that negatively but significantly influenced this perception were *meals/week*, *prisonerstatus*, *sexofficer*, and *farmland*.

**ageofficer.** Increased age of the officer-in-charge was a disadvantage in so far as availability of food variety was concerned. A unit increase in the age of the officer-in-charge led to a two percent increase in the prisoner’s perception of eating a limited variety of food. Possibly as officers-in-charge advanced in age, they became less active in the pursuit of food acquisition of different varieties.

**Insubvention.** As was observed earlier, increased subvention did not translate into increased food availability of various types. A unit increase in subvention resulted in a three percent increase in the prisoner’s perception of eating a limited variety of food. This showed that diversity of the prisoner’s diet did not benefit from increased subvention.

**educationprisoner.** Prisoner education also exerted a positive effect on the prisoner's perception of eating a limited variety. A unit increase in the prisoner's education caused a one percent increase in his perception of eating a limited variety of food. This was possibly because education helped one to understand the six food groups and thus allowing him to find prison food to be of limited variety.

**ageprisoner.** A unit increase in the age of the prisoner led to a 0.3 percent increase in the prisoner's perception of eating a limited variety of food. This finding was understood in the sense that prisoner age had a positive effect possibly because the older the prisoner was, the more readily he understood food varieties and the more easily he discerned that prison food was of limited variety.

**meals/week.** A unit increase in the number of meals per week that one received from home reduced one's perception of eating a limited variety of food by three percent. The higher the frequency of home meal receipts meant that one would be better nourished, even in variety of food, and therefore found prison food less adequate in its variety.

**prisonerstatus.** An increase in the socioeconomic status of the prisoner caused a six percent decrease in the prisoner's perception of eating a limited variety of food. Higher socioeconomic status meant easy access to resources and social power which possibly enabled the prisoner to enjoy a decreased perception of eating a limited food variety, possibly because he had the means and ability to acquire more and better food variety.

**sexofficer.** Having a male officer-in-charge managing a prison led to an eight percent drop in the prisoner's perception of eating a limited variety of food. As was discussed earlier on, this finding meant that prisoners had more confidence in the abilities of male officers-in-charge in matters of food acquisition.

**farmland.** Increasing the prison farm land by a unit measure induced a 0.1 percent decline in the prisoner's perception of eating a limited variety of food. As has been said before, this finding showed that the prisoners would be better off food-wise if prisons cultivated bigger farm lands.

**Unwanted food:** The variables that positively and significantly influenced eating unwanted food were *inmatenumbers*, *howfar*, *sexofficer*, *farmland* and *educationprisoner*. Those that negatively but significantly caused this perception were *prisonerstatus* and *Insubvention*.

**inmatenumbers.** An increase in inmate numbers caused a 0.1 percent increase in the prisoner's perception that he

ate unwanted food. As has been observed already, increased inmate numbers were possibly not matched with increased food provisions, thereby leading to compromises in the quality of food being given to the inmates.

**howfar.** Increased distance between prison and the inmate's home caused an increase in the perception of eating unwanted food. A unit increase in this distance resulted in a 15 percent increase in the perception of eating unwanted food. Hitherto, it has been found that increased distance turned the prisoners into submission and compliance but this time around it has not. The reason for this could be that the food quality was probably so bad, possibly in its preparation, that even those from far-away places found it necessary to express their dislike. It was not uncommon for prison food to be so badly prepared that one would find it unwanted.

**sexofficer.** Having a male officer-in-charge led to a 12 percent increase in the prisoner's perception of eating unwanted food. This finding was an anomaly because all through, it had been found that having a male officer-in-charge was an advantage. This finding possibly was evidence that male officers-in-charge were more interested in making sure that food was available at the prison than in minding the quality of food preparation. So, while indeed food was available, prisoners found it unwanted possibly due to bad preparation.

**farmland.** So far, increased farm land has resulted into better food availability but this time, a unit increase in farm land led to a 0.1 percent increase in the prisoner's perception of eating unwanted food. This is an anomaly. The explanation here could be similar to the one given above concerning the sex of the officer-in-charge. The food was there but its bad preparation may have caused prisoners to find it unwanted despite that there was increased farm land.

**educationprisoner.** A unit increase in the prisoner's education led to a one percent increase in the prisoner's perception of eating unwanted food. This finding was expected because all along, it had been found that the higher the prisoner's education, the more critical they were about prison food. So, better education possibly enabled the prisoner to be more critical about prison food preparation and quality, thereby making him to find prison food unwanted.

**prisonerstatus.** Being of higher socioeconomic status caused an eight percent decrease in the prisoner's perception of eating unwanted food. Higher socioeconomic status, as discussed earlier, enabled the prisoner easy access to resources and power which would allow him better access to alternative and better food thereby making him possibly not even eat prison food, and thus selfishly declaring reduced perception of

eating unwanted food.

**Insubvention.** A unit increase in the level of subvention resulted in a four percent decline in the prisoner's perception of eating unwanted food. This finding gave the impression that increased subvention translated into better food which prisoners wanted. This finding was an anomaly because all along, it was found that increased subvention did not translate into more or better food for prisoners. But side-notes written during interviews with officers-in-charge showed that towards the end of the government financial year, subvention sometimes simply did not come to prisons. When that happened, acquisition of food became difficult and erratic. The prisoners were being interviewed for this study in July/August and were being asked to recall facts about the food situation in prison in the previous four weeks, a period when there were subvention difficulties and their associated food scarcities. July/August happened to be at the beginning of a new government financial year when new subvention inflows had started coming, meaning that the prisoners were recalling facts that occurred at the end of the previous financial year when possibly food was very scarce due to lack of subvention. This meant that the prisoners may have been comparing their food situation between a period of no or little subvention to a period of fresh subvention inflows. With renewed inflows of subvention, came better food acquisition, and given the difficult food situation just experienced, the prisoners may have welcomed any food regardless of its quality. With this understanding in mind, it was clear why prisoners in July/August insinuated that an increase in the level of subvention resulted in a decline in their perception of eating unwanted food.

**Small meal:** The variables *inmatenumbers*, *meals/week*, *ageofficer*, *sexofficer*, *educationofficer* and *farmland* positively and significantly influenced the prisoner's perception of eating a smaller meal.

**inmatenumbers.** Any one additional inmate that was incarcerated in prison caused the prisoners' perception of eating a smaller meal to increase by 0.1 percent. Needless to say, any one additional inmate in prison worsened the congestion and increased the pressure on resources, including food, hence causing an increase in the perception of eating a smaller meal.

**meals/week.** A unit increase in the number of meals per week received from home caused a five percent increase in the prisoner's perception of prison rations being smaller. This could be attributed to the fact that home portions were likely more generous thereby having the effect of making the recipient prisoner notice that prison rations were smaller by comparison.

**ageofficer.** A one year increase in the age of the officer-in-charge resulted into a one percent increase in the

prisoner's perception of eating a small meal. Again, this was an indication that prisoners doubted the ability of older officers-in-charge in food acquisition.

**sexofficer.** A male officer-in-charge was a disadvantage where quantity of food provision was concerned as having a male officer-in-charge caused a 12 percent increase in the prisoner's perception of eating a small meal. As was observed earlier on, while the male officer-in-charge may have ensured food availability, he did not mind much if the quantity given to prisoners was inadequate. The male officer-in-charge may have been more contented with the fact that, at least, his inmates had eaten something, regardless of its quantity.

**educationofficer.** Each additional year in the education of the officer-in-charge resulted in a two percent increase in the prisoner's perception of eating a small meal. Again, as has already been observed, possibly better educated officers-in-charge were more interested in paper work than in physical food acquisition or were posted to prisons with little or no farm land, where food availability was naturally a problem.

**farmland.** A unit increase in the amount of farm land that a prison farmed led to a 0.1 percent increase in the prisoner's perception of eating a small meal. This was another anomaly. However, notes taken during interviews indicated that it was normal practice that prisons with increased farm land would share their harvest with other prisons which were in dire need. It was, therefore, possible that as a result of the sharing, food producing prisons ended up without enough supplies for their own prisoners, hence the increased perception of eating a smaller meal.

**Fewer meals:** Independent variables that were positive and significant were *inmatenumbers*, *ageofficer*, *educationofficer* and *Insubvention* while those that were negative but significant were *howfar*, *prisonerstatus*, *sexofficer* and *farmland*.

**inmatenumbers.** A unit increase in inmate numbers led to a 0.1 percent increase in the prisoner's perception of eating fewer meals. The finding was an indication that increases in inmate numbers were not matched with corresponding increases in food provisions.

**ageofficer.** Increased age of the officer-in-charge caused a one percent increase in the prisoner's perception of eating fewer meals, implying lack of trust in the food acquisition abilities of the older officers-in-charge.

**educationofficer.** Increased education of the officer-in-charge resulted in a three percent increase in the prisoner's perception of eating fewer meals. As observed already, better educated officers-in-charge were considered not the best food providers.

**Insubvention.** An increase in subvention led to a three percent increase in the prisoner's perception of eating fewer meals. Again this showed that the increase in funding did not go into food acquisition.

**howfar.** As distance between the prison and the prisoner's home increased, the prisoner's perception of eating fewer meals reduced by ten percent. As was observed earlier on, this indicated resignation to the situation leading to psychological compliance. The reduction in the perception of eating fewer meals may also be attributed to consumption of food accessed through stealing, begging or borrowing.

**prisonerstatus.** An increase in the prisoner's socioeconomic status led to an eight percent reduction in the prisoner's perception of eating fewer meals. Again, being of higher socioeconomic status and having all the good things associated with that, enabled the prisoner to eat better than otherwise, thereby allowing him the privilege of the reduced perception of eating fewer meals.

**sexofficer.** Again, having a male officer-in-charge was advantageous as it led to a ten percent decline in the prisoner's perception of eating fewer meals. So, while having a male officer-in-charge may have been problematic in some aspects, it assured prisoners that they would have fewer occasions of eating fewer meals.

**farmland.** A unit increase in the amount of farm land that a prison cultivated caused a 0.1 percent drop in the prisoner's perception of eating fewer meals. This finding lent credence to the importance of prisons owning farm land.

**No food:** The only positive and significant variable that influenced the perception of having no food at all to eat was *inmatenumbers*. The variables that negatively but significantly influenced this perception were *prisonerstatus* and *sexofficer*.

**inmatenumbers.** A unit increase in inmate numbers induced a 0.04 percent increase in the prisoner's perception of there being no food at all at their prison. Increased inmate numbers were, therefore, a disadvantage as far as food availability at the prison was concerned.

**prisonerstatus.** Being a prisoner of higher socioeconomic status caused a three percent drop in the prisoner's perception of having no food at all to eat. This finding was expected for reasons already articulated earlier on.

**sexofficer.** Once again, having a male officer-in-charge was an advantage as this resulted in a 12 percent reduction in the prisoner's perception of not having food

to eat at their prison. Again, possible reasons for this sort of outcome were articulated earlier on.

**Sleep hungry:** The variables that positively and significantly influenced the prisoner's perception of sleeping hungry were *inmatenumbers* and *ageofficer*. Those that had a negative but significant influence were *sexofficer* and *educationprisoner*.

**inmatenumbers.** A unit increase in inmate numbers resulted in a 0.1 percent increase in the prisoner's perception of sleeping hungry because there was no food to eat at their prison. As already observed, this finding implied that increased inmate numbers were not matched with increased food provisions.

**ageofficer.** Increased age of the officer-in-charge led to a one percent increase in the prisoner's perception of sleeping hungry. Just as earlier observed, the older the officer-in-charge, the less the confidence the prisoners had in his or her food acquisition abilities and the more they perceived themselves sleeping hungry under his/her leadership.

**sexofficer.** Having a male officer-in-charge caused a 26 percent decrease in the prisoner's perception of sleeping hungry. This finding was further evidence that prisoners had more confidence in the male officers' food acquisition abilities and thus perceived themselves as less likely that they would go to sleep hungry under his management.

**educationprisoner.** A unit increase in the education of the prisoner induced a one percent decline in the prisoner's perception of sleeping hungry. The meaning of this finding was that a better educated prisoner had better chances of acquiring alternative food provisions and, therefore, had fewer chances of sleeping hungry, hence his reduced perception of sleeping hungry.

**Day and night:** The variable that was a positive and significant factor in causing the perception of going a whole day and night without eating was *inmatenumbers*. Variables that were negative but significant factors were *howfar*, *sexofficer* and *educationprisoner*.

**Inmatenumbers.** As has been consistently observed, increased inmate numbers were an instrumental factor in causing increased perceptions of conditions of food insecurity. In the case at hand, a unit increase in inmate numbers caused a 0.1 percent increase in the perception of going a whole day and night without eating.

**howfar.** Prisoners who came from distant places showed a reduced perception of staying a whole day and night without eating, as a unit increase in the distance to home caused a four percent drop in the prisoner's perception of going a whole day and night without eating. One

plausible explanation for this scenario could be that these prisoners had completely lost hope or any sense of self-worth that they had resorted to simply accept life and situations as they unfolded. Possibly these prisoners had stayed a whole day and night without eating many times before so much so that it did not matter anymore now, hence a reduced perception of staying a whole day and night without eating. Another explanation could be that these prisoners thrived on stolen, begged or borrowed food and so they never really stayed a whole day and night without eating.

**sexofficer.** Having a male officer-in-charge managing a prison reduced the prisoner's perception of staying a whole day and night without eating by 18 percent. This finding served as confirmation that prisoners had more confidence in the abilities of male officers-in-charge in acquiring food, either through trade or own production.

**educationprisoner.** Being a more educated prisoner caused a one percent decline in the prisoner's perception of staying a whole day and night without eating. This was because higher education possibly allowed the prisoner to have alternative means of accessing food and this may have helped the prisoner not to stay a whole day and night without food, hence his reduced perception of this condition.

**Augment:** The independent variables that were positive and significant factors in influencing the perception of augmenting prison food with food from outside prison were *inmatenumbers*, *howfar*, *meals/week* and *prisonerstatus*. No factor was found to be negative but significant.

**inmatenumbers.** A unit increase in inmate numbers caused a 0.1 percent increase in the prisoner's perception of augmenting prison food with food from outside prison. What this finding implied was that the more inmates there were at a prison, the more inadequate the food was at that prison, and the more the inmates relied on food from outside prison. This finding further implied that having large inmate numbers at a prison was not desirable.

**howfar.** Increased distance between prison and the prisoner's home led to a 13 percent increase in the prisoner's perception of augmenting prison food with food from outside prison. This was an anomaly considering that prisoners from far-away places could not expect food supplies from their homes. However, it may be seen that the coefficient of this variable in *shameful means* was also positive. This may help to explain the anomaly found here. The explanation being that prisoners from far-away places possibly survived on obtaining food using shameful means such as stealing or begging food from other inmates or members of the general public, hence his increased perception of food augmentation.

**meals/week.** A unit increase in the number of meals per week received from home caused an eight percent increase in the prisoner's perception of augmenting prison food with outside food. This finding was expected and followed logic.

**prisonerstatus.** Being of higher socioeconomic status caused a ten percent increase in the prisoner's perception of augmenting prison food with supplies from outside prison. As observed earlier on, prisoners of higher socioeconomic status possibly had access to resources and means which would enable them acquire food from outside prison, hence their increased perception of augmenting.

**Shamefulmeans:** The variables that positively and significantly influenced the perception of using shameful means of obtaining food were *inmatenumbers*, *howfar*, *prisonerstatus*, *ageofficer* and *sexofficer*. The variable, *farmland*, was of negative but significant influence.

**inmatenumbers.** Any one additional inmate that was incarcerated into prison led to a 0.1 percent increase in the prisoners' perception of obtaining food through shameful means such as stealing, begging or borrowing. This finding strengthened the observation made earlier on that increased inmate numbers were undesirable and were not matched with increased food provisions.

**howfar.** An increase in the distance between prison and the prisoner's home increased the perception of obtaining food through shameful means by about 14 percent. This meant that increased distance to the prisoner's home, probably out of desperation, made the prisoner resort to these shameful means more and more as a survival strategy, possibly because chances of receiving food from home diminished with increased distance from home.

**prisonerstatus.** An increase in the prisoner's socioeconomic status increased the prisoner's perception of finding food using shameful means by about eight percent. This was another anomaly because, so far, it had been seen that prisoners of higher status lacked no food and, therefore, had no reason to borrow, beg or steal food from anyone. The question that was asked to the inmates was "In the past four weeks, did you **or any inmate** at your prison resort to other means of acquiring food such as borrowing, begging or stealing from other inmates or people because there was not enough food?" If attention is focussed on "**or any inmate**", it may be seen that the prisoner could give a "yes" response not with respect to himself, but other inmates. If that respondent was a prisoner of higher socioeconomic status, chances were that he was the one from whom food was borrowed, begged or stolen, considering that he was the one in possession of more food than anyone else. Given the foregoing, the prisoner of higher

socioeconomic status would likely know some inmates at his prison who resorted to shameful means of obtaining food, such as borrowing, begging or stealing. His “yes” must, therefore, be understood in the sense that an increase in the prisoner’s socioeconomic status increased his perception of suffering from these shameful means.

**ageofficer.** A unit increase in the age of the officer-in-charge caused a one percent increase in the prisoner’s perception of employing shameful means of obtaining food. This finding was strange, possibly, pointing to the fact that older officers-in-charge were more of disciplinarians who did not hesitate to rebuke and discipline prisoners who stole or begged food from other prisoners or members of the general public. This use of disciplinary measures may have sensitized the prisoner into being more aware of the undesirability of using the shameful means and, therefore, caused the prisoners’ increased perception of stealing, begging or borrowing as shameful means of obtaining food. It could, however, also be that, as observed elsewhere, increased age of the officer-in-charge resulted in food scarcity at the prison, thereby forcing prisoners to resort into shameful means of obtaining food.

**sexofficer.** Having a male officer-in-charge caused a nine percent increase in the prisoner’s perception of using shameful means of acquiring food. Male officers-in-charge, as was the case with older officers-in-charge, may have been more firm in exacting discipline against stealing, begging or borrowing food, thereby causing, in prisoners, an increased sensitivity against these remedies, hence the increased perception of employing these means.

**farmland.** A unit increase in the amount of farm land cultivated by the prison led to a 0.1 percent reduction in the prisoners’ perception of using shameful means of obtaining food. As was observed earlier on, cultivation of increased farm land was advantageous in making food available to the prisoners. It was, therefore, in order that cultivation of increased farm land caused a reduced perception of using shameful means of obtaining food.

## Conclusion

The results of the study showed that *inmatenumbers*, *howfar*, *meals/week*, *prisonerstatus*, *ageofficer*, *sexofficer*, *educationofficer*, *farmland*, *Insubvention*, *educationprisoner*, and *ageprisoner* were factors that in various ways and at various levels of significance affected the perceptions of prisoners on food security in Malawi’s prisons.

## References

Adesina AA, Zinna MM (1993). Technology characteristics, farmers perceptions and adoption

- decisions. A Tobit model application in Sierra-Leone. J. Agri. Econ. Vol. 9(4): 297-311.
- African Commission on Human and Peoples' Rights. (2002). Prisons in Malawi-Report on a Visit 17 to 28 June 2001 by Dr. V.M. Chirwa Special Rapporteur on Prisons and Conditions of Detention in Africa. Paris, France.
- Agresti A. (1996). An introduction to categorical data analysis. New York: Wiley and Sons Inc. .
- Baidu-Forson J. (1999). Factors influencing adoption of land-enhancing technology in the Sahel: lessons from a case study in Niger . J. Agric. Econ. 20: 231-239.
- Bryars D. (1983). Advanced Level Statistics . Slough : University Tutorial Press.
- De Graaff J (1985). Introduction to the economics of maize. (Unpublished manuscript).
- Ecker O, Qaim M (2008). Income and price elasticities of food demand and nutrient consumption in Malawi. Orlando: Am. Agric. Econ. Ass.
- FAO (2010). Food Security Information for Decision Making. [www.fao.org/docrep/013/am187e/am187e00.pdf](http://www.fao.org/docrep/013/am187e/am187e00.pdf).
- FAO (2015). Food Balance Sheets 2015.<http://Knoema.com/FAOFBS2015R/food-balance-sheets-2015>.
- Friendly M (1995). Categorical data analysis with graphics SCS short course. York: Statistical Consulting Services at York University.
- Governmentof Malawi (2010). Malawi Millenium Development Goals Report.
- Greene W (2003). Econometric Analysis, 5th Edition. New Jersey: Prentice Hall.
- Gujarati DN (2004). Basic Econometrics. 4th Edition. McGraw-Hill.
- IFPRI (2012). Malawi Strategy Support Program, Policy Note 11. Lilongwe: IFPRI.
- Jabar MA, Beyene H, Mohamed-Saleem MA, Solomon G (1998). Adoption pathways for new Agricultural Technologies: an approach and application to vertisol management technology in Ethiopia. Livestock Policy Analysis Brief No. 16 . Addis Ababa: International Livestock Research Institute.
- Kidane W, Maetz M, Dardel P (2006). Food security and agricultural development in Sub-Saharan Africa; building a case for more public support. Rome: FAO.
- Kothari C (2004). Research Methodology: methods and techniques, 2nd edition . New Delhi: New Age International.
- Maddala G (1992). Introduction to Econometrics, 2nd Edition . New York: MacMillan Publishing Co.
- Magnani R (1997). Sampling Guide. IMPACT Monitoring Project. Va: Arlington.
- The Malawi Prison Act (Cap. 9:02, 1983). Zomba: Malawi Government.
- Malawi Government (1999). Food Security and Nutrition Bulletin. Lilongwe: Ministry of Economic Planning and Development.

- Malawi Government (2005). Food and Nutrition Security Policy. Lilongwe.: Ministry of Agriculture and Food Security.
- Malawi Government (2006). Food Security Policy. Lilongwe: Ministry of Agriculture and Food Security.
- Malawi Government (2006). Agricultural and livestock development strategy and action plan. Lilongwe: Ministry of Agriculture and Food Security.
- Malawi Government (2006). Malawi Growth and Development Strategy-from poverty to prosperity 2006-2011.
- Maxwel S, Frankenberger T (1992). Household Food Security: concepts, indicators and measurements; a technical review. New York: UNICEF and IFAD.
- McGill F, McLennan S, Migliorini J (2000). Complete Advanced Level Mathematics – Statistics . Cheltenham : Stanley Thornes.
- Medecins Sans Frontieres (2009). No food or medicine here until you die.<http://www.doctorswithoutborders.org/publications/article.cfm?id=3433&cat=special-report>.
- Ministry of Finance, Economic Planning and Development (2014). Annual Economic Report. Lilongwe: Malawi Government.
- Odendo V, Obare G, Salasya B (2009). Factors responsible for differences in uptake of integrated soil fertility management practices amongst smallholders in Western Kenya. *Afr. J. Agric. Res.*, 4(11): 1303-1311 <http://www.academicjournals.org/AJAR>.
- Penal Reform International (2005). A model for good prison farm management in Africa. Penal Reform in Africa 2000.[http://www.panelreform.org/download/prison\\_farms\\_eng.pdf](http://www.panelreform.org/download/prison_farms_eng.pdf)
- Saka JO, Lawal BO (2009). Determinants of adoption and productivity of improved rice varieties in South-western Nigeria . *Afr. J. Biotechnol.*, 8(19): 4923-4932.
- Swindale A, Bilinsky P (2006). Development of a universally applicable household food insecurity measurement tool: Process, current status and outstanding issues. *J. Nut.* 136: 1449s-1452s.
- UNDP (2011). Human Development Report. UNDP.
- Verbeck M (2004). A Guide to Modern Econometrics, 2nd Edition. West Sussex: John Wiley & Sons Ltd.
- Wooldridge J (2002). Econometric Analysis of Cross Sectional and Panel Data. Cambridge: The MIT Press.
- World Bank (2008). World Development Report. Washington D.C: World Bank.
- World Bank (2008a). World development report 2008. Washington D.C.: World Bank.
- Zikmund WG (1997). Business Research Methods, 5th edition. Fort Worth: The Dryden Press.