Full Length Research Paper

A study on prisoner population and food demand in Malawi 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 general objective of this study was to project prisoner population and food demand for ten years, from 2015 to 2025. 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 analysed using Excel employing demand projection models. Results from the analysis showed that Malawi prison food demand was going to grow by 32% from 5,046 tonnes in 2015 to 6,648 tonnes in 2025, while prisoner population was projected to grow from 12,598 prisoners in 2015 to 16,605 prisoners in 2025. This huge growth in food demand as well as prisoner population would call for drastic strategic management policies.

Key words: Malawi's prisons, Malawi's prison population growth, Malawi's prison food demand projections.

INTRODUCTION

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 12,598 prisoners in Malawi's 30 prisons in 2016 when this study was conducted.

The focus of this paper was on projecting the growth in Malawi's prisoner population and associated food demand for the period 2015 to 2025, based on food items commonly eaten in Malawi's prisons. Theories relating to food acquirement, utilization and nutrition were outside the scope of this study.

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

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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 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 (De Graaff, 1985; Kidane et al., 2006; World Bank, 2008; Food and Agriculture Organization (FAO), 2010, 2015).

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 (Malawi Government, 1983). 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. Neither meat nor fish was provided but salt was available in all prisons. This is a typical case of food insecurity.

Statement of the problem

Although Malawi is generally food insecure, it is common in Malawi that most people consume three meals per day. What differs is 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 studies specifically studied Malawi's prison population growth nor food demand projections for any future period.

Justification of the study

The 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 active life (Malawi Government, 2006a, b, c; Malawi Government, 2012). Since prisons accommodate about 0.08% of the Malawi population, it is important that prisons are food secure and that every prisoner has access to not less than the minimum meal requirement. Given the Malawi Government's commitment to ensuring food security, it was important that this study be carried out so that the growth in prisoner population and future food demand levels in Malawi's prisons could be ascertained. It was important to study and understand these economic parameters in order to lay the foundation upon which efforts to improve and re-engineer the food situation in Malawi's 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, food production or procurement, and food demand and consumption levels to accurately address the problem and ensure prison food preparedness and improve prison food security. Also, since no study has 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 project prisoner population and prison food demand for ten years. The specific objectives were to project prisoner population for the period 2015 to 2025, and to project prisoner food demand for the period 2015 to 2025.

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. A total of 1,000 male prisoners from all the 30 prisons were randomly selected and interviewed using questionnaires administered in face to face interviews. 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 and analysed in Excel. 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 (Maxwel and Frankenberger, 1992; Swindale and Bilinsky, 2006) 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 *n* units out of *N* sub-populations called strata. In this case, each prison was a strata and from each strata *n* number of inmates were selected using simple random sampling in order to give each prisoner an equal chance of being selected (Bryars, 1983; Agresti, 1996; Zikmund, 1997; McGill et al., 2000). 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).

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

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 un-convicted inmates in Malawi's prisons was 12,598 (Malawi Government, 2012), 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 (1), the value of *n,* the sample size, was found to be 1418. However, 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.

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 to access 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. The second limitation was that 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 was not allowed to enter into the female side of

the prison. As a result of these two limitations only 1000 prisoners, instead of the required 1418 prisoners were interviewed.

Model specification

Trends and projections of demand and supply of various important food items help policy makers to make informed policy decisions relating to the food security and food sufficiency situation of a country (Mittal, 2012). The basic model for making demand projections may take the form given in Equation 3:

$$d = \beta + \mu y + z \tag{3}$$

where d is annual rate of change in consumption, β is annual rate of change in population, μ is income elasticity, y is annual rate of change in per capita income, and z is the annual trend factor. This model can be applied to aggregate consumption in a given base year, and it is expressed as shown in Equation 4:

$$D_t = D_0 (1 + d)^t \tag{4}$$

where D_t is total consumption in year *t*, D_0 is total consumption in base year, and *t* is the number of years after the base year. A growth rate model based on estimated expenditure elasticity (Mittal, 2006; Kumar et al., 2009) is as shown in Equation 5.

$$D_t = d_0 * N_t (1 + y e)^t \tag{5}$$

where D_t is total demand for the food item in question, d_0 is prisoner per capita demand for the food item (Kumar et al., 2009) in base year, y is growth in national per capita income, e is national expenditure elasticity of demand for the food item, and N_t is the projected prisoner population in year *t*. But in this study, the law imposed a constraint and the legal quantities provided in Table 1 needed to be observed. Therefore, in order not to deviate negatively nor positively at any one time period from the provisions made in the prison Act, d_0 for each food item was fixed to the legally provided quantity as provided in Table 1. For the legal constraint to be upheld, $(1 + y e)^t$ needed to be normalized to 1. This was achieved by reasoning that since the legal quantities shown in Table 1 were not time dependent, *t* in Equation 5 was irrelevant and therefore zero.

The projected prisoner population, N_t, was given as Equation 6:

$$N_t = N_0 * (g + 1)^t \tag{6}$$

where N_t is prisoner population in year *t*, N_0 is base year prisoner population, and *g* is growth rate in prisoner population.

The foods commonly eaten in Malawi prisons were maize (eaten as *nsima*), beans and salt which were consumed practically every day in all prisons in the country. Other foods, for example, meat and vegetables, were consumed rarely. The rest of the foods provided in Table 1 were either not eaten at all or were eaten only once in a long while and in extremely rare occasions in certain prisons. As such, these foods were excluded from the study. Demand projections of the commonly eaten foods were made based on the quantities legally provided in the Malawi Prison Act (Cap. 9.02) as shown in Table 1.

Quantities provided in Table 1 were used as constants so that projected food quantities should not deviate negatively nor positively from provisions made in the law. This was done despite that the practice on the ground was that food provisions made to prisoners were far below the legally recommended quantities. The base year was 2015. The base year prisoner population, N_0, was 12,598. Figures for prisoner population and total food demand were computed using Excel.

Table 1. Malawi prison dietary provision.

Ordinary diet	Daily issues per prisoner
Maize Meal	680 g
or Rice	454 g
or Cassava Meal	680 g
or Millet Meal	680 g
Peas or Beans	113 g
Fresh Vegetables	170 g
or Fresh Peas or Beans	57 g
or Sweet Potatoes	284 g
Chillies or Peppers	4 g
Dripping	14 g
or Groundnut Oil	7 g
or Groundnuts (shelled)	28 g
or Red Palm Oil	4 g
Salt	21 g
Fruit (in season)	113 g

Ordinary diet	Daily issues to class I and class II prisons
Meat	113 g
or Fresh Fish	227 g
or Dry Fish	113g
Cocoa or Coffee	7 g
Sugar	7 g
Unlimited Water	

Penal diet	Daily issues to class I prisons
Maize Meal	454 g
or Cassava Meal	454 g
or Millet Meal	454 g
Unlimited Water	

Reduced diet	Daily issues to class I prisons
Maize Meal	340 g
or Cassava Meal	340 g
or Millet Meal	340 g
Fresh Vegetables	170 g
or Fresh Peas or Beans	57 g
or Sweet Potatoes	284 g
Peas or Beans	57 g
Dripping	14 g
or Groundnut Oil	7 g
or Groundnuts (shelled)	28 g
or Red Palm Oil	4 g
Salt	21 g
Unlimited Water	

Source: Laws of Malawi, Prison Act (Cap. 9:02).

RESULTS AND DISCUSSION

Prisoner population is estimated to grow from 12,598 prisoners in 2015 to 16,605 prisoners in 2025. As a result of this, demand for prison food is also expected to grow. During the same period, annual maize demand is

Table 2. Annual prisoner population and food demand projections for all prisons in Malawi from 2015 to 2025.

Years	Base Year (2015) Prisoner Pop. Size (N_0)	Prisoner Pop. In Year t $\{N_t=N_0(g+1)^t\}$	Total Maize Demand in Year t $\{D_t=d_0*N_t(1+Y*e)^t\}$ Tonnes	Total Meat Demand in Year t $\{D_t=d_0*N_t(1+Y*e)^t\}$ Tonnes	Total Beans Demand in Year t $\{D_t=d_0*N_t(1+Y*e)^t\}$ Tonnes	Total Veges Demand in Year t $\{D_t=d_0*N_t(1+Y*e)^t\}$ Tonnes	Total Salt Demand in Year t $\{D_t=d_0*N_t(1+Y*e)^t\}$ Tonnes
2015	12,598	12598	3127	520	520	782	97
2016	12,598	12951	3214	534	534	804	99
2017	12,598	13313	3304	549	548	826	102
2018	12,598	13686	3397	564	564	849	105
2019	12,598	14069	3492	580	580	873	108
2020	12,598	14463	3590	597	597	897	111
2021	12,598	14868	3690	613	613	923	114
2022	12,598	15285	3794	630	630	948	117
2023	12,598	15713	3900	648	648	975	120
2024	12,598	16152	4009	666	666	1002	124
2025	12,598	16605	4121	685	685	1030	127

estimated to grow from 3,127 tonnes to 4,121 tonnes; demand for meat and beans will each grow from 520 tonnes to 685 tonnes; vegetable demand from 782 tonnes to 1,030 tonnes and salt demand will grow from 97 tonnes to 127 tonnes. Aggregate food demand is, therefore, estimated to grow by 32% from 5,046 tonnes in 2015 to 6,648 tonnes in 2025. Table 2 shows 10 year demand projections for food items commonly eaten in Malawi's prisons.

The growth in food demand was big, so big that it would be almost impossible for the prison service to meet it. Although the projected food demand was worked out from recommended food quantities provided for in the Prison Act, the actual quantities given to prisoners were much less. This was an indication that the prisons could not afford the recommended quantities. It was not hard, therefore, to see that if the prisons could not afford 5,046 tonnes in 2015, they would possibly not afford 6,648 tonnes in 2025. The failure to purchase the required quantity of food would be

because prisons run on government subvention, just like all other government departments, and subvention to departments as a percentage of GDP has been declining over the years (Ministry of Finance, Economic Planning and Development, 2014). Government subvention to Malawi prisons, for example, dropped by 37.2% between 2009 and 2014 and this resulted into a precarious food and health situation in the prisons (Jali, 2016). A possible government policy intervention could be to make it a requirement that every prison in the country owns and operates a farm where, using prisoner labour, crops and animals are produced as food for the prisoners. Normally, own-produced food is cheaper than procured food.

In 2015, with 12,598 prisoners, prisons in Malawi were over-crowded. In 2025, there is likely to be 16,605 prisoners in the prisons. A deliberate policy to build more prisons could arrest the situation. The Malawi Prison Service (MPS), however, does not seem to have plans to build more prisons. In the absence of additional

prisons, this growth in prisoner numbers will put serious pressure on the existing facilities.

The problems discussed above could possibly also be reduced or put under control if government allowed entrepreneurs to own and operate private prisons alongside government prisons. A private prison or for-profit prison is a place in which individuals are physically confined or incarcerated by a third party that is contracted by a government agency (Goyer, 2001). Private prison companies typically enter into contractual agreements with governments that commit prisoners and then pay a monthly rate, either for each prisoner in the facility, or for each place available, whether occupied or not (Le Vay, 2015). Some countries that have a private prison policy are the United Kingdom, Australia, Canada, The United States of America, Brazil, Chile, Greece, Jamaica, Japan, Mexico, New Zealand, Peru, South Africa and Thailand (Biron, 2013). Because of funding problems, private prison operation in Malawi would have to be negotiated and funded

differently from the way it is done elsewhere. The objective of this study was to project prison food demand for ten years from 2015 to 2025. The research hypothesis was that demand for food in Malawi Prisons was going to increase annually in the ten years. Based on the study findings as presented in this paper, this hypothesis was accepted.

Conclusion

The findings of the study showed that prisoner population was to grow from 12,598 prisoners in 2015 to 16,605 prisoners in 2025. During the same period, aggregate food demand was to increase by 32% from 5,046 tonnes to 6,648 tonnes. This huge growth in food demand would call for drastic strategic management policies. Possible interventions would include prisons producing their own food from prison farms, government building more prisons to ease congestion, and allowing entrepreneurs to build and operate private prisons as the case is in some countries.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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