The status of household food security targets in South Africa

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Abstract

This article investigates the conceptual and methodological challenges to develop a set of baseline indicators for South African food security targets. A food security target is a well-defined and measurable goal to reduce the numbers of people who lack enough food of the right quality to live healthy lives. To derive baseline indicators for household food security, the following question is asked: what is the average cost of a nutritionally adequate food basket per person? The cost of recommended nutrient intake is based on estimates of dietary energy costs. Reported food expenditure for each household based on 2005/2006 Income and Expenditure Survey data gets compared to two dietary energy cost baskets. The food expenditure shares of the poorest households vary between 38% and 71% according to different surveys. At food expenditure levels reported in the IES, one in five households meet their average dietary energy cost. Deep levels of food insecurity exist in rural areas with 85% of rural households unable to afford even the 'below average dietary energy costs'. Food security policy based on refined baseline indicators can better target food insecure households. Another policy benefit is that robust indicators help to develop effective monitoring capabilities.

Keywords: Food security; dietary energy cost; household expenditure; methodology; South Africa

1. Introduction

South Africa has set itself the overarching target of halving poverty between 2004 and 2014, and the national Constitution includes a clause affirming the right to food security. To help in achieving this target, government adopted an Integrated Food Security Strategy (IFSS) in 2002 which explicitly aims to eradicate hunger and nutrition deficits among low-income households. This strategy was subsequently translated into the Integrated Food Security and Nutrition Programme (IFSNP), with a task team in the national Department of Agriculture (DoA) overseeing its implementation (DoA, 2002; Hart, 2009). The War on Poverty campaign, launched at the height of the food price crisis in 2008, also gives priority to food insecurity among low-income households. How are these policy commitments to be realised? It requires, among other

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things, solid information about the nature of the food insecurity challenge and effective implementation strategies. An initial hurdle to bridge is to make the policy commitments more concrete or tangible. It is necessary to express them in clearly measurable goals or targets that are easy to monitor. South Africa has yet to develop a well-defined set of food security targets. This article addresses the conceptual and methodological challenges to the development of such measurable food security goals.

A food security target depends on reliable baseline information. What is needed is a picture of the state of food insecurity at an initial point in time. Without this information it is not possible to systematically monitor distance and progress to the specified target over time. Baseline information ought to provide answers to critical questions like: 1) which households are unable to access adequate food?; and 2) what are the determinants of their food insecurity? Answers to these questions based on South African food security data offer patchy and incoherent stories. To illustrate this point, compare the contrasting perspectives on the state of hunger generated by the General Household Survey (GHS) and the National Food Consumption Survey (NFCS). Meanings of hunger, and likewise food insecurity, differ. The 2005 NFCS, uses a more nuanced hunger scale and therefore finds a much higher percentage of the population experiencing hunger at roughly similar average incomes to the GHS. The question arising from this conflicting evidence is: which conceptual and methodological approach might offer the foundation for a meaningful food security baseline?

This article is an initial contribution to the conceptualisation of a household food security target. In this initial effort, we consider the cost of a nutritious food basket at current prices and levels of fortification to assess affordability for poor households. We are asking whether consuming this basket of food is within reach of the majority of South African households. An illustrative example of dietary energy cost, a food access measure suggested in the nutrition literature, is estimated. It compares the dietary energy cost of a food basket with the most common ingredients for the South African consumer to actual food spending data in the 2005/2006 Income and Expenditure Survey (IES).[2] Future research needs to review policy options to improve access to

[2] *This paper borrows liberally from insights gained through engagements with a diverse panel of experts recently convened by the Human Sciences Research Council (HSRC) as part of its effort to construct a scientifically robust and policy-relevant baseline for a food security target. The panel brought together experts in nutrition, economics, agriculture and the policy arena with deep knowledge of food security. It asked challenging questions about the state of food and nutrition insecurity in South Africa and identified the core ingredients of a food security baseline. The best approach, panellists agreed, is to start from a recommended nutrient intake for every South African to live a healthy life. Key research questions are: 1) how many individuals or households fall short of this norm or standard?; and 2) what are the reasons for this shortfall and what should be done to ensure that every South African is food and nutrition-secure?*

adequate food and investigate low-cost and effective tools to continuously monitor household food security status.

This article is organised as follows: Given the centrality of measurable indicators on which to base any food security target, section 2 presents a critical evaluation of three classes of food security indicators: food availability, food expenditure/consumption and composite food indicators. It underscores the importance of household characteristics and contextual determinants of food insecurity. Section 3 reviews empirical data on food expenditure for low-income households in South Africa. Section 4 provides an illustrative example of the proposed approach to a food and nutrition security baseline: to cost the levels of nutrient intake (using a proxy of the cost of dietary energy) and compare this to actual food expenditure reported in 2005/2006 IES.

2. Indicators to develop food security targets

Food security is a broad concept which cuts across many dimensions.3 At its most basic level, it means access to adequate food for a healthy life. Even this simple definition points to at least two parts of this complex concept: access to available food and adequate nutrient intake for sustainable health. What indicators are used to measure each of these dimensions? How do various dimensions of food security translate into meaningful indicators?

It is a complex and tricky task to formulate a one-size-fits-all set of food security targets. This is clear from the multiple determinants of the food security status of a household or its members. The most salient determinants can be summarised in the following way:

- *Household composition*: Households vary in terms of size (number of household members), age structure (adults and children) and gender (females and males). Nord and Hopwood (2007) examine the importance of household composition insofar as it aids in understanding the food security status of children in the household.
- *Wealth and livelihood strategy*: This consists of various incomes (wages, social grants, etc) and assets (land, livestock, etc.).
- *Geographic location:* This refers to the rural and urban locations, whether the settlement is largely formal or informal, and distance from the nearest or from frequently-used food markets.
- *Institutions:* markets, the state, social capital/networks.

[3] *A comprehensive definition of food security includes availability, access and utilisation aspects (Swindale & Bilinsky, 2006). A more nuanced definition informs the research of Koc* et al. *(2007). They refer to the five As of food security: availability, access, adequacy, acceptability and agency. See Hart (2009) for a more comprehensive review.*

- *Time*: the food security condition could be transitory or chronic.
- *Risk*: shocks that are related to the weather, health as well as commodity price movements.[4]

Household food security depends substantially on household income and asset (or wealth)[5] status. A low-income household is more likely to suffer food shortages than a wealthier household. Food expenditure comprises a large share of the spending of poor households, making them relatively more vulnerable to the impacts of food price inflation.

This relationship between a household's food security status and its purchasing power is far from static; it changes over time (Aliber, 2009; Romer-Lovendal & Knowles, 2006). All other factors remaining constant, changes in income alter the quantity and quality of foods purchased and consumed. Price movements of food and non-food items also affect the ability to buy food.[6] For example, to cope with rapid food inflation a household could cut its food purchases and adjust its consumption patterns. Typical coping strategies are: buy a smaller quantity of food, switch to different types of food, reduce dietary diversity and skip meals (Oldewage-Theron *et al*., 2006). Aliber (2009) points out that high dependency ratios mean that losing an income-earning opportunity can make a household that might have been food-secure into one that is not. As a large proportion of new jobs in the South African economy are relatively precarious, a household that sits so close to the precipice can also be seen as food insecure.

Context-specific targets for typical food-insecure households rely on food security indicators. Table 1 offers a summary of three types of frequently used indicators: food availability, food consumption/ access and a composite food security indicator. This is not an exhaustive map of all food security measures. Any meaningful application of these indicators requires an understanding of their respective strengths, weaknesses and data requirements.

[4] *Risk has evolved into a major cross-cutter as it affects all elements of food insecurity (Webb* et al., *2006). It includes disruptions such as climatic fluctuations, social conflicts and other crises that make households more vulnerable to food shortages.*

[5] *Wealth generally refers to the income and all the assets of a social unit. Based on this definition, a low-income household is therefore wealth-constrained, a condition which may or may not include asset poverty. Alternatively, one could just refer to these households as poor, assuming that the deprivation reference is some kind of wealth.*

[6] *In highlighting the increasing emphasis on 'access' in the definition and measurement of food security, Webb* et al. *(2006:1405S) observe that '[p]urchasing power is the key to access, and this varies according to market integration, price policies and temporal market conditions'.*

Table 1: Mapping food security indicators

Indicator/measure	Focus	Examples
Food availability	National or household agro-food output/supply	Food balance sheets
Food consumption/access	Food demand or consumption at the household level (ways in which institutions regulate access to food)	Household expenditure models; food expenditure ratio; income elasticity
Composite food security	Simultaneously captures each dimension in a single indicator	Poverty Hunger Index; Rose-Charlton Indicators; Food Security Gap Index

2.1 Food availability indicator

Food availability refers to food supply or productive capacity. It is usually, but not always, measured with a tally of aggregate national agro-food output (Coates *et al*., 2006). South Africa has a well-established track record of using this approach (Groenewald & Nieuwoudt, 2003). The national Department of Agriculture publishes the *Monthly Food Security Bulletin* on aggregate supply-and-demand data for many winter and summer cereals (e.g. DoA, 2008). Whereas South Africa uses a highly aggregated food availability measure, it is fairly common to compile household or per capita food balance sheets. The Food and Agriculture Organisation of the United Nations (FAO), for instance, uses food balance sheets to calculate the daily per capita dietary energy supplies for countries (Gentilini & Webb, 2008).

The food availability indicator does not offer information on food quality and nutrient intake. Haddad *et al*. (1997) tested the correlation of food availability with the nutritional dimensions of food security (using child nutrition, dietary diversity etc.) and found it to be a weak indicator of the nutrient content and quality of food consumed. Clearly, food insecurity defined in terms of food availability and access will give a different picture about the extent of food insecurity than will a definition based on nutrient intake or actual food consumption (Webb & Thorne-Lyman, 2006).

2.2 Food consumption (spending) and access (distribution) indicators

How can the effects of food access and distribution systems on household food security be measured? Food access is "embedded in markets, prices and legal systems" and there is thus no precise measurement of "access to food" (Webb *et al*., 2006). However, tracking agro-food price data is a widely used proxy and is not as complex as trying to find one measurement for the 'market' or 'laws' (Webb & Thorne-Lyman, 2006). Indicators for food expenditure, consumption and nutrient intake and some of their determinants (including

proxies) are some of the other indicators (Maxwell & Slater, 2003; Webb *et al*., 2006).

Economists have been using mainly quantitative data on food expenditure from surveys, whether purpose-built or nationally representative, to measure food access and consumption. A specific criticism of this approach, noted by Webb *et al*. (2006:1407S), is its reliance on "monetary imputation of values and remoteness from the de facto experience of poverty". Direct qualitative assessments, on the other hand, investigate "how individuals express their own, and their household members', perceptions and responses to insecurity" (Webb *et al*., 2006:1407S). A more recent trend is to combine objective and subjective information about household experiences of food access and consumption (Maxwell & Slater, 2003). Webb *et al*. (2006) note the slow convergence of the so-called quantitative-objective instruments and research based on 'qualitative-subjective' assessments.

2.3 Composite food security indicator

Technically, constructing a food security target which simultaneously captures each dimension in a single indicator, or an index, is more of a challenge. Yet a composite index allows for a more comprehensive measurement of food security. It also enables a more flexible approach to monitoring overall targets and components of interest (which includes evaluating the outcomes or consequences of policy interventions).

Gentilini and Webb (2008) draw on the underlying methodology of the Human Development Index (HDI)[7] to build a Poverty and Hunger Index (PHI) as a multidimensional food security index. The PHI relates food security to poverty and tracks nutritional components; it offers a measurable breakdown of Millennium Development Goal (MDG) 1. It consists of five equally weighted components: the proportion of the population living on less than US$1/day, the poverty gap, the share of the poorest quintile in national income or consumption, under-nourishment and underweight. Composite indices like the PHI have shortcomings that relate to "the selection of components, their weighting and possible compensations across the board, and the loss of fine detail in the aggregation process" (Gentilini & Webb, 2008:522).

[7] *The HDI, the United Nations' flagship index to measure human wellbeing, is a traditional example of a composite index which is in widespread usage. The standard HDI incorporates measures of health status, educational attainment and income (Foster* et al. *2005).*

Using South African data sets, Rose and Charlton (2002) formulated a composite measure of food insecurity based on two main elements, namely food expenditure and nutrient intake.[8] Both the food expenditure and nutrient intake ratios are straightforward measures of the individual and household food security status. The starting point of the Food Poverty ratio (FP) is a household Food Cost Plan (FCP), which is the monetary value of a nutritionally adequate food basket. This means that households that are identical in composition should have the same FCP. But even if households do not differ in terms of their composition, it does not follow that the actual amount of food that households with the same FCP can afford will be identical. Where actual Household Spending (HS) on a nutritional diet falls below the FCP, then such a household is food-poor because it is not purchasing enough food. The Low Energy Availability (LEA) ratio is derived in similar fashion. Naturally, the main difference in this instance is that it starts from the recommended energy norm for all household members on a daily basis (see endnote 7 for more information on average South African RDA norms). Figure 1 is a summary of the framework used by Rose and Charlton to identify food-insecure households.

Food expenditure **Food Poverty indicator (FP)**	**Nutritional intake** **Low Energy Availability indicator (LEA)**
$FP \equiv \frac{HS}{FCP} < 1$	$LEA \equiv \frac{EA}{REA} < 1$
$HS =$ household spending on a nutritional diet $FCP =$ cost of a nutritionally adequate household food plan	$EA =$ energy available from food supplies $REA =$ recommended energy intake

Figure 1: Food insecurity based on expenditure and nutrient intake
Source: Rose & Charlton 2002

With this framework it is possible to identify four 'food security' categories:

- The first category refers to *food-secure households* because their food expenditure and nutrient indices taken together show no evidence of food poverty and LEA. Understanding the characteristics of this group is perhaps more interesting for comparative purposes than using it as a national benchmark.

[8] *A variety of data sources were combined to compute food prices and the nutritional value of foods consumed. Nutrient information for more than 1 400 food items was obtained from the Medical Research Council (MRC) database and then matched with 124 foods reported in the Income and Expenditure Survey. In the case of food prices, for instance, it linked foods reported in the IES with detailed retail price data reported by Statistics South Africa. Imputed prices were derived for home-produced foods and in-kind food donations. The MRC commissioned an in-depth study in 2002 which connects the nutrient content of the 124 foods reported in the IES 1995. In a way, this MRC study translates nutrient content (calories etc.) into monetary values. For further discussions on this, see Rose* et al. *(2002).*

- The second group consists of *food-poor households* who are unable to purchase and produce enough foods to meet their own FCPs.
- The third group consists of those households with *low energy availability*. Households in the LEA category are defined as those who "spend their money on taste, convenience and other attributes in food in addition to energy" (Rose & Charlton, 2002:3241).
- A fourth group, *food-insecure households*, comprises those with both food poverty and LEA.

Rose and Charlton incorporate multiple dimensions of food insecurity into a single 'index' making it a comprehensive approach to measure and monitor the outcomes of pro-poor food policies. However, two limitations of this Rose-Charlton framework must be noted. Firstly, the subdivision of households based on the FP and LEA ratios provides insufficient information on the distribution of inter- and intra-household food insecurity. At-risk households that may become food-insecure as a result of shocks are not identified. Secondly, the relationship of household composition to duration of the impact of food insecurity over time is unexplored. This relationship is particularly important for food-insecure households with children under five, because lack of adequate food exposes such children to longer-term mental and physical stunting.[9]

In summary, different classes of food security indicators exist and these tend to measure specific dimensions of food security, especially food availability and food expenditure/consumption. While potentially more meaningful, constructing composite indices that simultaneously measure a number of dimensions in a single indicator or index are more challenging.

To construct a set of measurable food security goals it is necessary to know what the food intake standard or consumption norm is or might be to live a healthy life. This consumption standard is usually expressed in terms of a level of nutrient intake (or kilocalories) to provide a human being with a certain level of energy. It is common to translate this food intake standard into some monetary value, which is basically the cost to buy a set of calories, protein and other essential nutrients. This represents an ideal starting point to build household food security targets.

[9] *This last shortcoming, however, probably relates mainly to the fact that the IES is conducted every five years (it is not a longitudinal panel data set tracking the same household over time), coupled with the fact that no other nationally comparable food and nutrition surveys exist.*

3. South African evidence on household food insecurity

So far the analytical approaches that underpin what follows have been described in broad terms. In an effort to understand what is known about household food insecurity, the findings of various empirical studies are summarised in Table 2. The reader's attention is drawn to the following columns:

- *Content of food security indicators*: the predominant focus is on food consumption and access and less so on composite indicators.
- *Underlying data/survey*: describes the data collection instrument and gives a sense of the suitability of this tool for gather meaningful information on food security.
- *Food spending share*: a percentage indicating the weight of food expenditure in the overall household spending basket. For the food-insecure household it gives a ballpark estimate of the "shortfall in affording a basic food-secure basket".
- *Household food security status*: expresses the percentage of households below the food consumption/ expenditure threshold. If this measure is derived from the conversion of recommended nutrient intake into food costs, it can be used to illustrate the 'household food insecurity gap' – in other words, to indicate what percentage of households lack the means to meet their basic food cost plans and what kind of support they need to be food-secure.

The left-hand column in Table 2 reveals that research tends to describe food security status of households with a single indicator or a collection of separate indicators (e.g. as in Aliber, 2009). The exception is of course Rose and Charlton (2002), who measured food security with a composite index as discussed above. There is an almost exclusive concern with household food expenditure (which is used in most cases as a proxy for food consumption and rarely based on nutritional recommendations). This appears to be an unavoidable restriction flowing from the scope and content of existing national surveys. One study offers an in-depth examination of food availability from household farming and thus helps to reflect on its contribution to food security (Aliber, 2009). While Fraser *et al*. (2003) observed household own food production as a coping strategy in their 1999 village-level case study, they did not estimate the full impact of such farming activities on food security. Subjective experiences of hunger also feature in some cases, but because of the different hunger scales used, hunger is measured in different ways. The limited scale question in the General Household Survey, for instance, places the emphasis on the quantity of food whilst the National Food

Consumption Survey also incorporates food quality, nutrient intake and anthropometric data for children in the sample (Labadarios *et al*., 2008).

Table 2: Comparison of food security measures among low-income households

Content of food security indicator (author)	Underlying data/survey period	Food spending share (%)	Household food security status (% of households falling below food security threshold)	Lessons for food security target
Food expenditure shares (Aliber, 2009)	IES 2005/2006	Poorest 10% spend 37% of total spending on food; approx. R1 100 per household per month; restricted dietary diversity	Ranges up to lower 40% of sample	IES probably under-estimates addition of own production to household food security (e.g. meat); similarly, local informal trade in locally produced agro-foods; *households eat less diverse diets*
Hunger Scale proxy (Aliber, 2009)	GHS 2002–2007	Per capita food spending 2006/2007 for hungry person: R117–R155	Hunger scale proxy; for 2007 children (12.2%) and adults (10.6%) experienced hunger	Profiles hungry households in terms of location, dwelling and employment; access to social grants affects movements in and out of hunger, especially for children
Household food production (Aliber, 2009)	Labour Force Survey 2000–2007	Farm as main or extra food supply	4 million people	Farm to supply main or extra source of food; own production perhaps makes up gap in meat consumption
Hunger Scale Index (Labadarios *et al*., 2008)	National Food Consumption Survey 2005	Food insufficiency and insecurity due to constrained resources; monthly income <R1 000 (55%); spent lowest amount of money weekly on food	51.6% experienced hunger; 33.0% at risk of hunger	Department of Health research; sampled 2 894 households drawn from 2001 Census; Hunger Scale Index comprising 8 questions probing aspects of hunger
Food spending and prices (NAMC, 2008)	Quarterly food price monitor (2008, 3rd Q)	Per capita cost of most common South African food basket in Oct/Nov 2008, R344 per month (R260 in 2007)	No explicit indicator	Focus on food expenditure; Rural food inflation relatively higher making basic food basket more expensive; Food inflation falls disproportionately more on low-income households

Content of food security indicator (author)	Underlying data/survey period	Food spending share (%)	Household food security status (% of households falling below food security threshold)	Lessons for food security target
Composite Food Security Indicator (Rose & Charlton, 2002)	IES 1995, Food prices, Medical Research Council Energy Index	Food-insecure (35.2%); monthly per capita food spending R61.60 (R114.00, 2007 Rand)	National (38.7%) Rural (54.0%) Urban (26.5%)	Low per capita income; low expenditure on food; poor level of dietary diversity
Energy requirement and HIV stages (micro study) (Ladzani, 2009)	North West case study 2005–2007	Low-cost basic nutritional food basket = R645.52 for household with 2 adults and 2 children	No explicit indicator	Excludes monetary value for self-provisioned fruits and vegetables (no meat) For infected persons energy intake increase for adults (20–30%) and children (50–100%) above asymptomatic persons; protein intake for adults 12–15% of total energy intake
Food spending and rural poverty (micro study) (Fraser *et al.*, 2003)	Once-off village-level case studies in 1999 (Eastern Cape)	R476.30/ave. expenditure/month poverty-line = food spending (25%); R238.18/ave. expenditure/month poverty-line = food spending (>50%)	No explicit indicator	Purpose-built and small sample size; ultra-poor often go without food; piecework to supply children with food

Attention now turns to a synthesis of the information in Columns 3 and 4. The food spending share (Column 3) is the monetary value of food spending relative to total household expenditure or income reported in each study. The lowest per capita expenditure on food is slightly below R120 per month, or R117 based on the GHS 2007. The IES 2005/2006 data reveal that in a household of five persons, the total spending on food was in the order of R1 100 (or ±R225 per person) for the poorest decile. Secondly, column 3 further shows the weight of this food spending in a household's total spending basket. The poorest income decile spends 37% of their income on food, based on the IES 2005/2006. Compared to the IES 1995 data, the food spending share for a food-insecure household was in the order of 35% based on the Rose-Charlton index – implying a fairly stable share for food spending among low-income households over the 10-year period. (Although not directly comparable, this amount of spending on food is fairly close to R114, which is the inflation-adjusted spending for the average food-insecure person based on the Rose-Charlton indicator.)

Next, consider a slightly higher level of per capita food expenditure of ±R225- roughly ±R100 per person above the spending category examined above. An estimated 60% of 'food-poor persons' fall below this food expenditure cut-off. The total amount spent on food still falls well below the per capita cost of a basic food basket pegged at R344 according to the National Agricultural Marketing Council (NAMC, 2008) Food Price Monitor (FPM). In this category, 35% to 50% of household expenditure is allocated to food according to the IES 2005/2006. For the poorest Living Standards Measure groups, LSM 1-4, 2005 food expenditure ranged between 71% and 37% (BMR, 2005).

The household food security status (Column 4) shows the percentage (or number) of households that fall below a food security threshold and thus correlates with the information in Column 3. Estimates reported in Table 2 have not been derived from a nutrient-based food security benchmark, with the exception of the Rose-Charlton measure. Both the NFCS and GHS asked questions about experiences of hunger in households but report surprisingly different findings. The GHS is conducted by the official national statistical agency, Statistics South Africa (StatsSA), and includes a hunger scale module to gather information on adult and child hunger. It is conducted annually and the 2007 findings show that 12% of children and 10% of adults sometimes or always went hungry in that year (Aliber, 2009). In sharp contrast, the 2005 National Food Consumption Survey reports that 51.6% of South African households experience hunger and 33% is at risk of hunger (Labadarios *et al*., 2009) at roughly similar average incomes to the GHS.

How can the extraordinary large discrepancies in the findings on hunger across these two surveys be accounted for? Indeed, some variation in the findings across these surveys might be explained in terms of their different sampling methodologies and timeframes. Closer inspection of their respective hunger scale questions show that the NFCS asked a more nuanced set of questions about hunger than the GHS. The respective survey questions flow from different understandings of hunger. Labadarios *et al*. (2008) elaborate that the NFCS hunger index seeks to better understand "chronic or sub-clinical under-nutrition" (p. 259). Hunger and under-nutrition are both outcomes of inadequate food intake but the meanings need to be clarified. Hunger is commonly understood to mean 'not eating enough food'. Under-nutrition, on the other hand, refers to the lack of essential micro-nutrients- like key vitamins, iron, zinc. In children, this usually reflects in underweight and stunting. This in-depth investigation of hunger with an eye on healthy nutrition further revealed that one out of every 5 children aged 1-9 years is stunted. Frequent tiredness among adults might be symptomatic of under-nutrition, such as iron deficiency. This requires a mindset shift on the state of

food and nutrition insecurity in South Africa. In their review of the nutritional status of South Africans, Faber and Wenhold (2007), underscore a number of noteworthy fundamentals: micro-nutrient deficiencies interact and visible signs of micro-nutrient deficiencies only show after a considerable period of inadequate food intake (food insecurity). They propose several food security interventions to tackle micro-nutrient deficiencies. Firstly, secure access to adequate food to expand intake of naturally occurring micro-nutrients. Secondly, extensive food fortification programmes such as the legally prescribed Vitamin A in bread and maize. Thirdly, consumers need better education on the nutrient content of foods they buy and consume.

In summary, given the lack of consistent baseline data on food security, any comparative assessment of current knowledge about household food insecurity must be interpreted with caution. Further research is required to consistently match the conceptual and methodological puzzles highlighted above.

4. A household 'food security' baseline for South Africa

As explained in Section 2, a food security target requires at least two pieces of information: a food consumption norm or standard, and data on actual food consumption. In this section the 2005/2006 IES and alternative food baskets are used to identify the number of households below a specified 'dietary energy cost line'.

4.1 Food consumption standard

A food security target must start from what people must eat for sustenance of the human body. The way to figure out the amount of food a person needs to live a healthy life is to estimate the nutrient content of food consumed. A standard measure of food adequacy is the kilocalories because this gives the amount of energy gained from food consumed. Table 3 presents the energy values for foods based on the NAMC food basket – which is what the average South African adult purchases every month (NAMC, 2008). Foods marked with an asterisk (*) have been added for several reasons: non-availability of detailed information on some products in the basket therefore the inclusion of alternatives (different types of maize and beef, for example); anecdotal information suggests that sugar and bread flour are common foods consumed in South Africa and must therefore be included; allowing for likely variation in volumes of included foods (Oldewage-Theron *et al*., 2006; Temple & Steyn 2009).

The NAMC basket reports the quantity (or volume) of foods purchased for one month. Food composition information for South Africa reported by the Medical Research Council (n.d.) was used to convert this into daily energy values. This is linked to the MRC database on food composition for each 100 g serving – the food composition tables separate volumes of purchased foods from portions actually eaten. First, the author estimates the total monthly energy represented by the reported volume of each food item in this basket. This gives the total energy value expressed in (kJ) which is converted into kilocalories as suggested in Temple and Steyn (2009). Dividing this monthly figure by 30 gives the average daily kilocalories. The table suggests two possible dietary energy food baskets based on variations in the number and volumes of purchased foods included: an 'average dietary energy basket' of 2 053 kcal per person per day and a below average dietary energy basket of 1 554 kcal.

Table 3: Food basket energy values (kJ and kilocalories)

Food groups and items	**Total energy value (kJ)**		**Kilocalories (4.18 MJ)**	
Cereals & staple grains	**Per month**	**Per day**	**Per month**	**Per day**
Loaf of white bread (700 g)	7 714	257.14	1 845.46	61.52
Loaf of brown bread (700 g)	7 574	252.47	1 811.97	60.40
*Maize meal (2.5 kg)**	*42 225*	*1 407.50*	*10 101.68*	*336.73*
Super maize meal (5 kg)	-	-	-	-
Special maize meal (5 kg)	84 450	2 815	20 203.35	673.45
Rice (2 kg)	10 620	354	2 540.67	84.69
*Bread flour (2.5 kg)**	*39 100*	*1 303.34*	*9 354.07*	*311.81*
*Samp (2.5 kg)**	*12 725*	*424.17*	*3 044.26*	*101.48*
Vegetables & beans				
Tinned butter beans (410 g)	2 194	73.12	524.77	17.50
Onions (1 kg)	1 920	64.00	459.34	15.32
Cabbage (1 head)	1 360	45.34	325.36	10.85
Potatoes (1 kg)	3 250	108.34	777.52	25.92
*Potatoes (10 kg)**	*32 500*	*1 083.34*	*7 775.12*	*259.18*
Tomatoes (1 kg)	910	30.34	217.71	7.26
*Beans, dried (500 g)**	*7 255*	*241.84*	*1 735.65*	*57.86*
Fruits				
Apples (1 kg)	2 670	89.00	638.76	21.30
Bananas (1 kg)	3 820	127.34	913.88	30.47
Oranges (1 kg)	2 280	76.00	545.46	18.19
Animal protein				
Pilchards in tomato sauce (425 g)	2 257	75.23	539.90	18.00
Whole fresh chicken (/kg)	6 390	213.00	1 528.71	50.96
Stewing beef (1 kg)	-	-	-	-
*Beef (chuck) 1 kg**	*7 370*	*245.67*	*1 763.16*	*58.78*
*Hake (500 g)**	*3 850*	*128.34*	*921.06*	*30.71*
Dairy & eggs				
Long life milk full cream (1l)	2 080	69.34	497.61	16.59
Extra large eggs (1.5 dozen)	3 975	132.50	950.96	31.70
*Fresh milk (full cream, 1l)**	*2 080*	*69.34*	*497.61*	*16.59*

Food groups and items	Total energy value (kJ)		Kilocalories (4.18 MJ)	
Cereals & staple grains	**Per month**	**Per day**	**Per month**	**Per day**
Fats/ oils				
Sunflower oil (750 ml)	25 500	850.00	6 100.48	203.35
Brick margarine (500 g)	15 400	513.34	3 684.22	122.81
Peanut butter (410 g)	10 521	350.69	2 516.89	83.90
Coffee / tea				
*Instant coffee (750 g)**	*67.50*	*2.25*	*16.15*	*0.54*
Ricoffy regular (750 g)	67.50	2.25	16.15	0.54
Black/Ceylon tea, tagless (62.5 g)	3.13	0.11	0.75	0.03
*Tea leaves (250 g)**	*12.50*	*0.42*	*3.00*	*0.10*
*Sugar (2.5 kg)**	*42 450.00*	*1 415.00*	*10 155.51*	*338.52*
NAMC food basket	194 954.48	6 498.49	46 639.79	1 554.66
Plus: samp, beef, instant coffee & sugar	*62 612.50*	*2 087.09*	*14 979.08*	*499.31*
NAMC basket with alternative foods	257 566.98	8 585.57	61 618.87	2 053.97

Sources: Own calculations based on NAMC (2008), MRC Electronic Food Composition Tables, Temple and Steyn (2009)

To get a more accurate costing of the NAMC food basket, the author reconstructed this basket in Table 4 to connect each food item with its available 2000 and 2005 prices. The food prices are the average annual prices from Statistics South Africa's pricing data collected to compile its monthly Consumer Price Index (CPI and CPI-X).[10] Using the 2005 prices allows for expressing food costs in nominal terms in the survey year rather than converting the total food basket cost (R344) reported in the Food Price Monitor of October/November 2008 into 2000 constant prices. The actually observed or recorded 2000 food prices must be used for analysis of the 2000 IES data and they are reported here to compare how food prices increased over the five-year interval. Food pricing information in Table 4 is linked to the dietary energy information in Table 3. Taken together, the two tables give ballpark estimates of the cost of dietary energy (CDE) similar to those proposed in Temple and Steyn (2009). This means that in 2005 the cost of the 'average dietary energy food basket' (2 053 kcal/p/d) was R262,66 per month per person while the cost of the 'below average' basket (1 554 kcal/p/d) was R189,25. Nutritionists might consider these conservative under-estimates of food portion costs for two reasons: the estimates ignore the composition of dietary energy and micro/macro nutrients actually consumed. The idea however is not to exhaustively estimate how high the costs of actual food composition baskets might be, but to demonstrate a high-level approach to a food security baseline using available data in the public domain.

[10] *CPI-X is the CPI excluding interest rates on mortgage bonds.*

Table 4: Cost of NAMC Food Basket in 2000 and 2005 prices for each item

Food groups and items	**2000**	**2005**
Cereals & staple grain products		
Loaf of white bread (700 g)	3.31	4.66
Loaf of brown bread (700 g)	2.82	4.06
*Maize meal (2.5 kg)**	*6.2*	*7.3*
Super maize meal (5 kg)	-	12.57
Special maize meal (5 kg)	-	10.53
Rice (2 kg)	8.48	9.64
*Bread flour (2.5 kg)**	*10.26*	*11.98*
*Samp (2.5 kg)**	*6.68*	*8.34*
Vegetables & beans		
Tinned butter beans (410 g)	3.92	6.14
Onions (1 kg)	2.96	5.02
Cabbage (1 head)	2.8	3.98
Potatoes (1 kg)	3.25	5.00
*Potatoes (10 kg)**	*17.16*	*23.99*
Tomatoes (1 kg)	2.73	6.86
*Beans, dried (500 g)**	*4.01*	*4.94*
Fruits		
Apples (1 kg)	5.85	7.4
Bananas (1 kg)	-	4.37
Oranges (1 kg)	-	6.94
Animal protein		
Pilchards in tomato sauce (425 g)	4.43	6.58
Whole fresh chicken (1 kg)	12.08	18.31
Stewing beef (1 kg)	-	-
*Beef chuck (1 kg)**	*18.45*	*26.49*
*Hake (500 g)**	*15.35*	*38.93*
Dairy & eggs		
Long life milk full cream (1*l*)	3.86	6.43
Extra large eggs (1.5 dozen)	7.23	16.49
*Fresh milk (full cream, 1l)**	*3.27*	*4.33*
Fats/ oils		
Sunflower oil (750 ml)	4.39	7.26
Brick margarine (500 g)	5.68	7.35
Peanut butter (410 g)	6.08	9.35
Coffee/ tea		
*Instant coffee (750 g)**	*14.03*	*25.84*
Ricoffy regular (750 g)		25.90
Black/Ceylon tea, tagless (62.5 g)	3.77	4.41
*Tea leaves (250 g)**	*12.19*	*14.64*
*Sugar (2.5 kg)**	*9.93*	*12.74*
NAMC food basket	83.64	189.25
***Plus:** Samp, beef, instant coffee & sugar*	*49.09*	*73.41*
NAMC Basket with alternative foods	132.73	262.66

Sources: NAMC (2008); StatsSA (2000, 2005)

4.2 Use of IES 2005/2006 data

The Income and Expenditure Survey is a large and useful dataset to understand food expenditure patterns among different income categories. Statistics South Africa, the official national statistical agency, conducts the IES every five years. One stated purpose of the survey is to collect detailed expenditure information to assist StatsSA to develop weights for the consumer price index. The sample frame of the IES is representative of the South African population thus making it a reliable information source for national and provincial quantitative analyses (Labadarios *et al*., 2009). In the 2005/2006 survey, respondent households were asked to complete a weekly diary as well with the aim to improve the accuracy of income and expenses.

The IES dataset contains food spending amounts on all major food groups and items consumed by South African households (Aliber, 2009). For each food item purchased, the monetary value of spending is collected but no details that separate the quantity of an item from its unit price. Collecting quantities and related prices is not a common method of data collection because it makes the surveying process very cumbersome.[11]. However, splitting quantity from price has some benefit: it enables tracking of the actual amount of food flowing into a household and how this might vary with price changes. People frequently adjust the quantity and quality of food they buy in response to price changes. The monetary value of food expenditure gathered through the IES is one of many proxies for investigating household food security. But the quantity of food purchased is a better indicator of household food security than the total monetary value of food expenditure. Temple and Steyn (2009) go a step further by focusing on nutrition linked to volumes of food intake. With a focus on dietary health, they report the amount of energy (in kilocalories) most commonly consumed in South Africa and the contribution of various food items (for each 100g serving) to this dietary energy.

Despite improvements in the method of data collection used in IES 2005/2006, particularly with the aid of the weekly diaries, Table 5 indicates that 14 578 households reported zero food expenditure. This percentage of households is about 0.12% of the 12,6 million households represented in the IES and its influence on the overall analysis might therefore not considered to be very significant. Nonetheless, this offers a sense of the quality of IES and raises questions about the possible sources of this anomaly in reported food expenditure. It is worth noting that the spread of these 'zero food spending

[11] *The first wave of the National Income Dynamics Survey (NIDS) and the Bureau for Marketing Research (BMR) surveys on household income and expenditure also collect only the monetary value of food expenditure for specific items. The General Household Survey, on the other hand, collects total estimated food spending but no information on items or food groups.*

households' is not concentrated only among the bottom income deciles but is found across all income deciles. Fewer upper income households reported zero food expenditure compared to the bottom four deciles and it is probably not surprising that poorer households may be accessing food through donations and some own production. However, it is unclear why some upper income deciles reported zero food expenditure. This could be a result of typical survey non-response problem or it may reflect a more general problem of under-reporting of food expenditure in the IES. If this is evidence of food expenditure under-reporting, then this is likely to result in an understatement of food spending as a proportion of overall household expenditure or income.

Table 5: Households reporting 'zero' food expenditure by income deciles

Income deciles	'Zero' food spending households	
	N	%
1	1 465	10.05
2	830	5.69
3	2 492	17.09
4	2 228	15.28
5	2 041	14
6	1 774	12.17
7	2 063	14.15
8	280	1.92
9	992	6.8
10	413	2.83
Total	14 578	100

Source: IES 2005/2006 (Stats SA, 2008)

A food consumption norm or standard is a tool similar to a poverty line. A poverty line splits the non-poor from the poor and also measures the degrees or depth destitution – usually measured in terms of income, expenditure, assets, etc. Basic food needs form a building block and starting point for constructing a food security baseline. A minimum sustainable level of food security based on nutrient intake therefore needs to be established. However, the construction of a universal food consumption benchmark is bound to be tricky because it involves a number of complex determinants of food security. Furthermore, there are many subjective notions of what ought to be included in an adequate food basket.

Table 6 is based on IES 2005/2006 data and separates households into those that can afford the cost an adequate level of dietary energy, and those that fall below this threshold:

- *Food spend > dietary energy food cost*: this shows the number and percentage of households with actual food spending above the estimated cost of dietary energy.

- *Food spend < dietary energy food cost*: this shows the number and percentage of households whose actual food spending fell below the estimated cost of dietary energy.

At the cost of the average dietary energy basket, which was R262 per person per month based on 2005 food prices, 81% of households had total food expenditures below this dietary energy cost. However, 77% of urban households and slightly more than 90% of rural households had food expenditures below the average dietary energy basket. The below average dietary energy cost line as it has been constructed here is slightly lower R189 per person per month based on 2005 food prices. The percentage of households with food expenditures below this cut-off falls to 73% for all households, but this is unevenly spread across urban areas (85%) and rural districts (67%). Which households are able to meet their 'dietary energy costs'? Taking all households together, 27% can afford the 'below average dietary energy cost' whilst slightly more than 18% (1 in 5 households) spend enough to buy their 'average dietary cost'. This means that more households have food spending patterns to meet the 'below average cost of dietary energy'. The picture is not surprising when focusing on a rural-urban breakdown of the ability of households to meet their dietary energy costs. Interestingly, while this percentage of urban households rises by roughly 10%, the rise in the number of rural households is around 5%. In other words, depth of food insecurity based on the 'cost of dietary energy' is substantially more in rural areas.

Table 6: Number of households above and below 'basic' dietary energy food costs, urban and rural

	Location	**Food spend > dietary energy cost**		**Food spend < dietary energy cost**	
		N	%	N	%
Below average dietary energy cost	All households	3 331 670	26.8	9 100 764	73.2
	Urban	2 679 563	33.08	5 420 440	66.92
	Rural	652 107	15.05	3 680 324	84.95
Average dietary energy cost	All households	2 293 886	18.45	10 138 548	81.55
	Urban	1 881 692	23.23	6 218 311	76.77
	Rural	412 194	9.51	3 920 237	90.49

Source: Own calculations based on IES 2005/2006 (StatsSA, 2008)

In conclusion, the above results ought to be interpreted with caution. Surprisingly high percentages of rural and urban households report food spending levels below the estimated dietary energy costs. Some of this could be explained by the data limitations discussed above. Additional robustness tests could help to validate these findings. However, the 2005 NFCS, despite

its small but nationally representative sample size, found "one in five households to be food secure" (Labadarios *et al*., 2008:259). Its emphasis was on micro-nutrient deficiencies. In this context, the estimates based on dietary energy costs reported in table 6 appear more plausible. Moreover, the food spending shares of the poorest households vary widely across surveys: 71% in the BMR survey, 51% in the NFCS and 38% in the IES. More in-depth work is required to find possible nutritionally adequate food expenditure ranges and how these might change the percentages of "food poor households".

5. Conclusion

This article contributes an initial approach to developing a food security baseline which can then be used to develop targets that are easy to measure and monitor. A food security target is a measurable goal to reduce hunger among low-income people. The article thus investigated the broad make-up of such baseline information and illustrated ways to adapt or fine-tune it to household composition, geographic location, wealth generating and livelihood activities, institutional dynamics and risks. A food security target depends heavily on indicators and the measurement of food (in)security. Three categories of food security indicators exist with their respective strengths and limitations: food availability indicators focus on national food supply, yet pay scant attention to individual nutritional status; food expenditure and access indicators measure the monetary value of food as a proxy for food consumption, but often exclude individual nutritional status (or other anthropometric measurements); composite indexes incorporate all the available dimensions of food security into a single index, but the weights attached to components of the index might misrepresent their values in practice.

The proposed methodological approach has revealed that incredibly high percentages of rural and urban households report food spending levels below the estimated dietary energy costs. Whilst further robustness tests might be helpful to validate this finding, the result that one in five households can afford the average dietary energy costs appears consistent with recent surveys that focus on micro-nutrient intake. Future studies need to develop the conceptual and methodological tools for more nuanced food security baseline information. More specifically, the need exists to investigate: composite indicators for food security targeting, survey tools to improve the comprehensiveness and quality of household food security data, capabilities for ongoing bottom-up food security monitoring to understand how households cope with various livelihood shocks and feasible food security policy interventions.

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