Market Analysis to Assist Selection between Response Options in Conditions of Food Insecurity

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Abstract

Markets are key elements of people's livelihood both in normal conditions and in the immediate aftermath of a disaster, as long as markets function properly. Such recognition has contributed to the progressive acceptance of cash-based instruments and, more generally, to the strategic shift from food aid to food assistance with particular reference to cash transfers. However, such a shift has highlighted new needs, mainly in the form of analytical skills required to optimize the analysis of response options and support strategic decision making. Lack of capacity in this respect may be a critical constraint in the initial stages of emergency response.

This study has proposed and applied a few tools to assess the feasibility of cash transfers and to support the selection of intervention strategy. This has been done by assessing the functionality of markets and simulating the response of recipients and traders to an eventual cash-based intervention. Particular attention has been provided to the simulation of supply response. This is motivated by the consideration that when demand is artificially increased through cash transfers, much of the final outcome is determined by the capacity to scale up local supply. The profiling exercise of traders conducted through the case studies has provided interesting behavioural information. In particular, how much price increases trigger traders' decision to scale up their business size has been investigated. Price rises generate a range of responses from different types of traders in different contexts, highlighting the need to define response capacity at local level. From this contextualized perspective the comparison between increased demand and supply has been used to estimate the price increase that can be expected from a certain injection of cash transfer to a set number of beneficiaries.

Keywords: food assistance, cash transfers, market analysis

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Acknowledgements

My interest on the topic of food market analysis goes back to around 15 years ago when I started my work as food aid and food security adviser in Tanzania and I happened to bump into Bryceson's book. I cannot remember whether I found more intriguing the political analysis of trade liberalization or the analytical part related to changing patterns of local market integration. Since then such an interest has remained among my priorities. Therefore, while the fieldwork on which is based the analytical part of the present study has been carried out through the past five years, considerations expressed in this occasion have been matured though a longer time span. In this perspective it is really difficult to mention all those who have directly or indirectly contributed to the production of this study. Nevertheless, I am grateful to all of them.

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I thoroughly enjoyed the effort and I hope that this study, critical though it may be in places, may be of help. None of the persons or institutions mentioned above bears the slightest responsibility for any error that may remain in the study or for the opinions expressed.

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Acronyms

AIDS	Almost Ideal Demand System
ALRMP	Arid Land Resource Management Project
ANLA	Annual Needs and Livelihood Assessment
AVG	Average
CaLP	Cash Learning Partnership Project
CBS	Central Bureau of Statistics
CFSAM	Crop and Food Supply Assessment Mission
CFW	Cash for Work
CGE	Computable General Equilibrium
CPA	Comprehensive Peace Agreement
CSO	Central Statistics Office
DES	Dietary Energy Supply
DFID	Department for International Development
DMTF	Disaster Management Task Force
DRP	Drought Recovery Programme
ECHO	European Commission Directorate General for Humanitarian Aid
ECM	Error Correction Mechanism
EMMA	Emergency Market Mapping and Analysis
EMOP	Emergency Operation
EPP	Export Parity Price
FAC	Food Aid Convention
FAO	Food and Agriculture Organization
FEG	Food Economy Group
FEWSNET	Famine Early Warning System Network
FSP	Food Security Programme
GAM	Global Acute Malnutrition
GDP	Gross Domestic Product
GFD	General Food Distribution
GIEWS	Global Information and Early Warning System
GoK	Government of Kenya
GoSS	Government of Southern Sudan
HEA	Household Economy Approach
HFE	Household Food Economy
HHI	Herfindal-Hirshman Index
HSNP	Hunger and Safety Net Programme
IDP	Internally Displaced Person
IMC	Index of Market Connection
IPP	Import Parity Price
KCAL	Kilocalorie
KCAL/P/D	Kilocalories per Person per Day
KG	Kilogram
KSH	Kenyan Shilling
L	Lerner Index
LA/AIDS	Linear Approximation of Almost Ideal Demand System
LAF	Livelihood Analysis Forum

LCM	Lowveld Cattle and Maize
LES	Linear Expenditure System
LTSH	Land Transport Storage and Handling
MDG	Millennium Development Goal
MIFIRA	Market Information for Food Insecurity Response Analysis
MT	Metric Ton
MUAC	Middle Upper Arm Circumference
NAMBoard	National Agricultural Marketing Board
NBeG	Northern Bahr el Ghazal
NDTF	National Disaster Task Force
NGO	Non Governmental Organization
NMC	National Maize Corporation
OLS	Operation Lifeline Sudan
PED	Price Elasticity of Demand
PRRO	Protracted Relief and Recovery Operation
RAT	Rapid Appraisal Technique
RATES	Regional Agricultural Trade Enhancement Support Program
RATIN	Regional Agricultural Trade Intelligence Network
SAFEX	South Africa Futures Exchange
SAM	Severe Acute Malnutrition
SAM	Social Accounting Matrix
SC	Save the Children
S-C-P	Structure Conduct Performance
SDG	New Sudanese Pound
SEEP	Small Enterprise Education and Promotion
SZL	Swaziland Lilangeni
TH	Timber Highlands
ToT	Terms of Trade
UNDSS	United Nations Department for Safety and Security
UNICEF	United Nations International Children's Fund
USD	US Dollar
VAC	Vulnerability Assessment Committee
VAM	Vulnerability Assessment and Mapping
WB	World Bank
WFP	World Food Programme
WFP-N	Western Floods Plains North
WFP-S	Western Floods Plains South
W/S	Wholesale
WTT	Willingness to Trade
YED	Income Elasticity of Demand
YR	Year

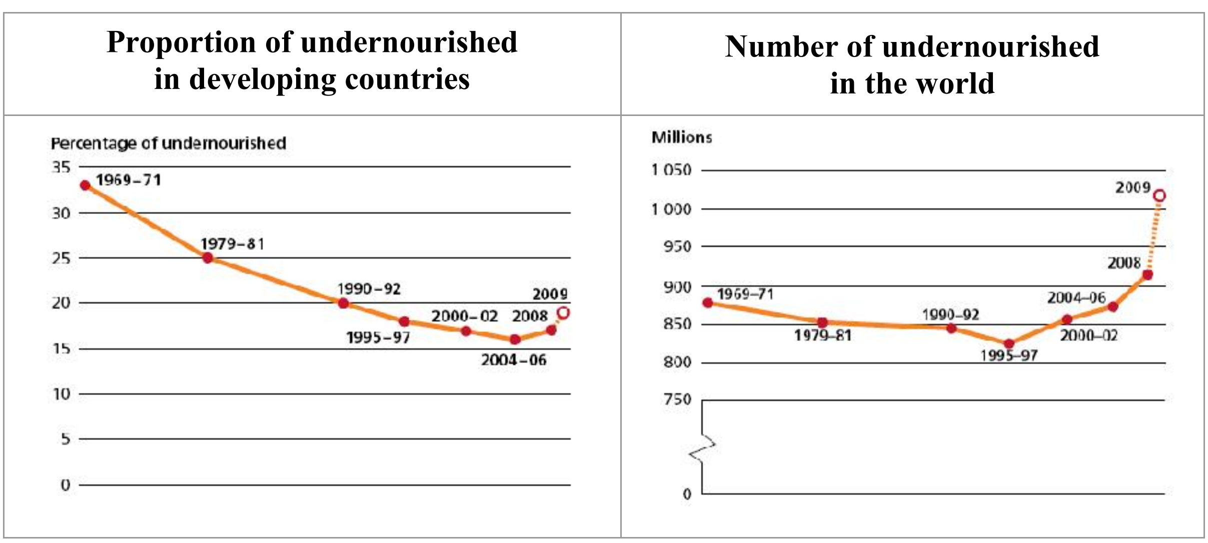
1

Introduction

1.1 Cash and food

Despite some long-term economic growth experienced by low-income countries since the middle of last century, in general hunger and vulnerability around the globe have increased. This has reversed the declining trend in the proportion of undernourished in developing countries and has raised the estimate of hungry people in the world to a peak (FAO, 2009; IFPRI, 2009).

Figure 1.1 Evolution of undernourishment



Source: FAO, 2009

Such a setback in hunger reduction reflects a multi-faceted situation. On one side, the combined rise in the annual number of natural disasters as well as in the number of people affected by disasters has contributed to reducing availability and/or access to food. On the other side, structural changes in the global system have contributed to making it progressively more distorted (Van der Ploeg, 2010). While this has affected various aspects of the economy, it has hit the international food system particularly hard. During the last couple of decades developing countries have become progressively more integrated, both financially and commercially, into the world economy, and as an inevitable consequence they have become more exposed to changes in the international markets (FAO, 2009). This has been dramatically evidenced in the crisis of soaring food prices experienced in 2007-08, characterized by sharp increases and volatility in food commodity prices. FAO states that *"the increase in food insecurity is not a result of poor crop harvests, but because high domestic food prices, lower incomes and increasing unemployment have reduced access to food by the poor"* (FAO, 2009).

The increasing relevance of food access causing of food insecurity has reignited discussion about the effectiveness and efficiency of food aid responses to food insecurity and stimulated interest in cash transfers and similar instruments[1] as an alternative response option. Despite the consideration that the greater the need for social protection, the lower the capacity of the state to provide it (Devereux, 2000; Devereux *et al*., 2005), cash transfers have become common practice through social protection programmes, in some cases on a large or even country-wide scale. Following such developments, recent years have been marked by progressive moves towards the use of cash-based programming in fragile states and unstable situations and in response to emergencies. Initial attempts to implement cash and voucher interventions in such contexts as Somalia and Darfur have shown that cash need not only be considered in stable contexts (Bailey *et al.*, 2008). After all, it has been remarked how the constraints

[1] Although vouchers, conditional and unconditional cash transfers, cash-for-work and other variations of transfer program strategy, present some differences, not only from an economic perspective, such peculiarities are ignored here because they are not strictly relevant from the market analysis perspective which is the focus of the present analysis. Therefore, throughout this analysis the general expression of cash transfer is used to refer to any form of cash or voucher transfer, with no difference about any conditionality involved.

facing cash (security risks, impacts on local markets, entanglement in predatory economies) in unstable contexts also apply to in-kind assistance (Harvey, 2007).

On the supply side, the position towards the emergence of the new transfer strategy, though generally supportive, has been rather diverse, with a few convinced supporters and some others more reluctant to adjust established systems of aid delivery. The growing support for cash transfers as an alternative mechanism to the delivery of food assistance is partly motivated by a certain long-term criticism of the lack of effectiveness and efficiency of traditional food aid management, as well as by dissatisfaction with its global governance mechanisms and lack of vision about their future.[2] Anyway, interest in cash transfers as a food security instrument has grown remarkably and the discussion is quickly expanding to involve non-food sectors of assistance. Such interest is fuelled by the fact that markets in developing countries function better than they used to, food systems are more integrated, the pace of urbanization is accelerating and basic financial services are increasingly diffused, including in rural areas (McCullogh *et al.*, 2008; WFP, 2008). Furthermore, besides their primary objective of increasing access to food cash transfers may have the comparative advantage against food transfers of helping to increase – and, eventually, even kick-start – market activities, improving this way the local economy and creating new livelihood opportunities for the poor (Davies *et al.*, 2008; Ahmed *et al.*, 2007).

[2] In this regard it may be enough to mention the repeated criticism of the ineffectiveness of such an institution as the Food Aid Convention (FAC). Maxwell (2007) remarks on the weak enforcing compliance of legal obligations included in the FAC such as the prescription of minimum tonnage to be provided by signatories. Although the tonnage minima were intended to make the availability of food aid somewhat counter-cyclical, there is evidence that food aid is strongly pro-cyclical. In other words, the availability of food aid increases when food prices are lower, that is when at global level food assistance is needed less (Maxwell, 2007; Barrett *et al.*, 2005).

1.2 The present study

Throughout its compilation, the present research, parts of which have been conducted over a period of five years, has witnessed remarkable changes with regard to the planning and management of food assistance. It has seen an increasing number of pilot initiatives meant to explore the feasibility and impact of any possible combination and/or variation of delivery mechanisms in very different contexts, as well as a proliferation of initiatives to discuss and promote the use of different aid delivery mechanisms in order to improve aid effectiveness and efficiency. The present research is contextual to initiatives meant to progressively recognize and institutionalize the use of cash transfers, such as most relevant donors' initiatives to prepare guidelines on the funding of cash transfer programmes as well as that of the mandated United Nations (UN) agency on food assistance to set up an apposite policy framework. At the same time, discussion is currently ongoing about the possibility of proposing minimum standards for cash and voucher transfers – as well as on strategies for economic recovery in crisis-affected environment – as already done through the Sphere Project for the definition of a humanitarian charter and minimum standards in disaster response.[3] Despite all such enthusiasm and progress, there are a number of gaps still to be faced when considering, planning or managing a cash-based intervention.[4] Amongst these the need to increase knowledge and capacity in market analysis is often highlighted as a priority. The technical knowledge and capacity required to conduct a market study, which nowadays is becoming a necessary prerequisite to the design of cash-based interventions, is often seen as a discouraging factor. As remarked on various occasions, poorly-designed and/or managed aid can do damage, and, like commodity-based intervention strategies, cash-based ones are not immune to such a risk. Therefore, once again, improved analysis is required in order to address the inappropriate use of food assistance (Maxwell *et al.*, 2003).

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[3] Efforts in this direction are currently coordinated by the Cash Learning Partnership Project (CaLP) and the Small Enterprise Education and Promotion (SEEP) Network, respectively.

[4] Such consideration can be easily extended to the entire field of food assistance, as well as to the other sectors of aid.

The aim of this study is to try to fill part of such a gap. The study focuses on some of the typical analysis required for the selection of humanitarian response options and is based on real analytical work carried out in relation to market interventions and market assessment and monitoring. The leading principle throughout the research is that no intervention is neutral to the system in which it is put in place, be it economic, social, political, or of any other type, although in our specific case it is mainly economic. Therefore a proper understanding of the context-specific factors and specific circumstances in which any intervention is eventually required is key to identifying the most appropriate food assistance instrument or combination of instruments. In particular, the aim of this study is to test the assumption that contextual factors are key determinants of market functionality and therefore both directly and indirectly play an essential role in affecting the effectiveness and efficiency of different intervention strategies.

The study tries to maintain a field perspective, with acknowledgement that analytical as well as any other kind of constraints regularly encountered through this type of studies in “normal” circumstances are unnecessarily magnified in developing countries. In particular, wherever possible some rigidities prescribed by the books are circumvented, trying to maintain a balance between the significance of the analysis and the usual constraints dictated by shortage of resources or even lack of physical access. The use of Rapid Appraisal Techniques (RATs) is a case in point.

The initial part of the study provides the basic steps before proceeding to the applicative part. The literature review provides an overview of the range of tools and analyses that can be used around markets and market interventions. The conceptual and methodological chapter is focused on the analytical approach adopted and the description of the tools considered most appropriate for the scope of this study. The second part is devoted to the application of the analytical tools. In particular, three case studies are developed in parallel. These have been the subject of preliminary market assessments aimed at assessing the feasibility of cash transfers. The three different set-ups considered through the case studies manage to cover a set of diverse realities. They range from conditions of a chronically low level of development, to somehow more dynamic contexts characterized by either a protracted economic recession or, at the other end, by the start of a process of generalized reprise after a long period of civil conflict. Finally, the applicative part continues with a more in-depth analysis of particular aspects or tools referred to in the case studies. In particular, in chapter 7 the use of such a diverse set of contextual features considered through the case studies provides a good background to the comparative analysis of different intervention strategies. Chapter 8 builds on one of the case studies to deepen the analysis of efficiency and effectiveness of alternative response options in support of decision making purposes. Chapter 9 summarizes the findings of the study and provides conclusive remarks.

2

Literature review

2.1 The economics of cash and food transfers

The discussion on the advantages and disadvantages of different types of intervention strategies is a controversial, though recurrent, subject. In particular, food aid is usually considered to dominate the emergency response, despite the common perception that such a form of assistance may be an inefficient – and in many cases even inappropriate – form of resource transfer. Such a perception has regularly generated discussion about the feasibility and appropriateness of alternatives to food aid, among which are market support, cash-for-work, distribution of vouchers and cash transfers. In particular, various studies have been carried out on the comparative role that such different instruments as cash and food can play. Normally the analysis has focused on the comparative advantages and performance of different strategies, providing regularly mixed results. What follows is a review of the major positions expressed on the subject.

It is evident that, at least from a theoretical point of view, in such situations where an insufficient purchasing power is at least partly responsible for the problem, a cash response can make sense. Drèze and Sen (1989) make the case for cash provision, arguing that lack of purchasing power prevents the normal functioning of markets and in such conditions a famine may develop even if there is not a food shortage. In such cases, cash distribution can not only increase household access to food, but also play a pivotal role in stimulating a demand-driven process of growth of the local economy. On the same lines Coate (1989) provides a comprehensive theoretical framework arguing that if there are food markets in the country to be assisted, a relief agency or a donor country could just as easily distribute money to the needy and let them purchase food in these markets. Coate's model stresses the relevance of trade and highlights that *"the relative effectiveness of cash and direct food relief will depend critically on the behaviour of traders and on whether food will be exported, imported or neither exported nor imported"* (Coate, 1989). In particular, cash relief is more likely to be optimal when food is exported, the larger the degree of price responsiveness of the excess supply of the non-needy population and the larger the relief agency's transport costs, and the smaller the money or asset holdings of the needy population.

In addition, the advantages of cash compared to food in terms of its fungibility are usually listed in support of a cash-based response. In particular, the use of cash is considered to be efficient since it is assumed to require smaller logistic costs than commodity-based alternatives, as well as allowing optimum use of resources transferred through direct beneficiaries' decisions.

The perception of food aid as an income transfer, introduced more than two decades ago (Reutlinger, 1984, and Reutlinger *et al.*, 1984), highlighted the need to pay attention to the efficiency of such a transfer. It was recognized how *"transfer of income is usually not the sole objective of payments in kind. ... In any case, augmentation of poor people's incomes should be the dominant objective of project food aid"* (Reutlinger, 1984). The use of *alpha-value* was proposed on such occasion to measure the efficiency of income transfer achieved through food aid commodities. It is the ratio between the value of the food aid basket to the recipient and the full cost faced to acquire it and get it delivered and distributed. However, the alpha-value is recognized to be quite generic and, furthermore, a constraint to its application is that accurate analysis of the alternative options requires data-intensive modelling of supply and demand effects, which in many emergency contexts is seen as neither feasible nor appropriate.

A cross-country study conducted by OECD highlights how *"food aid in-kind carries substantial efficiency costs, conservatively estimated as at least 30% on average ... In contrast, most local purchases or regionally sourced imports are relatively efficient* *ways of providing food aid. Thus, there is scope for considerable efficiency gains by switching to less restricted sourcing of food. The study therefore argues that, in most circumstances, financial aid (cash) is the preferable way to fund direct distribution of food ...”* (OECD, 2005).

From this perspective Faminow (1995) considers that in theory cash transfers are more efficient for both beneficiaries and donors, though in-kind transfers are usually preferred because of strong political support. He suggests that under emergency conditions, when the aim is to save lives, the choice of intervention strategy is rather uncontroversial, since in such circumstances both a cash-based and a commodity-based strategy seem to converge towards consumer equilibrium conditions. He considers, however, that such an approach becomes increasingly less appropriate as the recovery stage progresses and a cash-based strategy becomes the most efficient option.

Box 2.1 In-kind and cash-equivalent value trade-offs

Faminow’s analysis is focused on a consumer perspective of the beneficiary’s equilibrium. What follows is drawn from Faminow (1995).

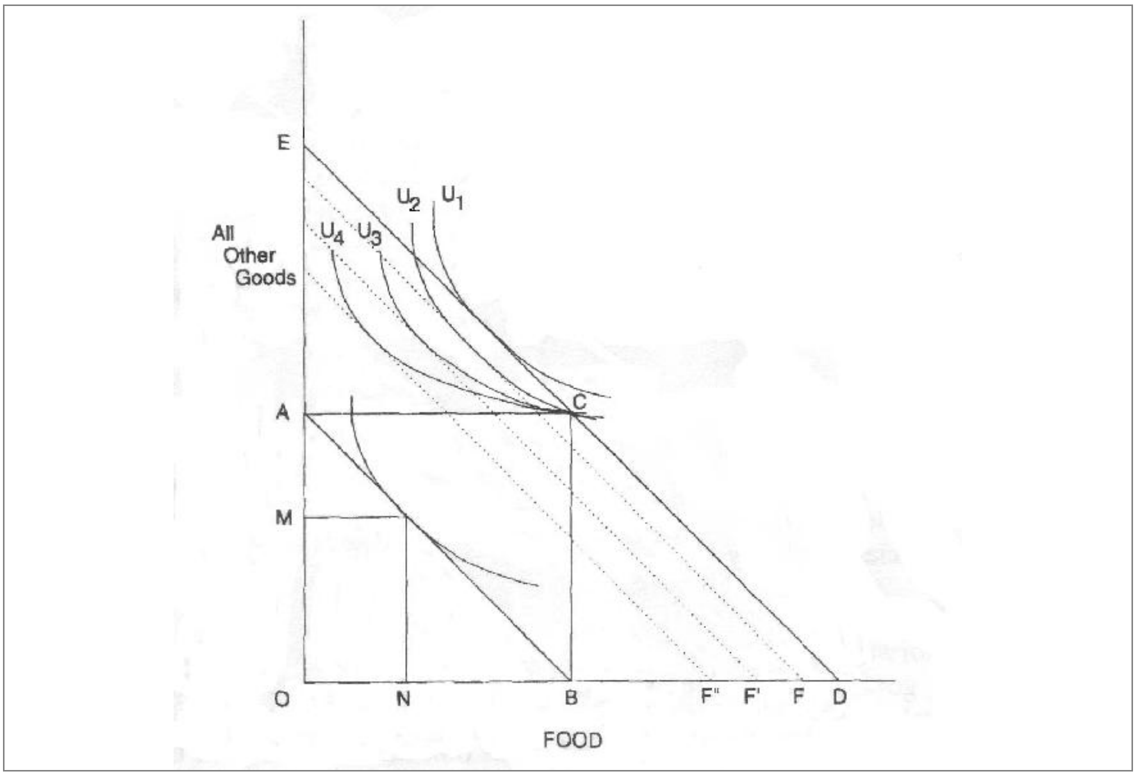
The figure below represents budget constraints (as indicated by budget lines) and preferences (as indicated by indifference curves) for households eligible for in-kind transfers. Prior to the in-kind transfer, households face the budget constraint AB, consuming ON units of food and OM units of other goods. An amount of food equal to BD provided to households as an in-kind transfer causes the budget constraint to become ACD. If the value of the food transfer (BD) were made as a cash payment the budget constraint would be ECD. However, since the transfer is in-kind, the EC portion of the budget constraint is not relevant to recipients, unless they can exchange the in-kind transfer with cash value at market prices. Therefore, in all cases in which beneficiaries cannot exchange in-kind transfers at market prices their optimum choice is to consume where ACD meets the indifference curve U_2 at point C. In the figure below, recipients would consume OB units of food and OA units of other goods. If we try to estimate the cash-equivalent value of the in-kind transfer for the recipient, that is the amount of cash transfer that would leave the recipient as well-off as a given amount of in-kind food transfer, we face a Hicksian equivalent variation, which allows us to remain on the same indifference curve (U_2), but finding an efficient outcome. In particular, a parallel shift inward of the budget constraint to where the new budget constraint is just tangent to U_2 would be a more efficient transfer. Thus, a cash transfer of BF for a total income of OF would leave the recipient as well off as an in-kind transfer of BD. In other words, BF measures the cash-equivalent of an in-kind transfer equal to the amount BD.

The case can be generalized and consideration needs to be given to the fact that the gap between the cash-equivalent value relative to the market value is dependent on recipients' preferences for food and other goods. Such preferences are indicated by the shape and position of the indifferent curves. For example, U_3 and U_4 show cases where recipients are ready to give up higher amounts of food in order to consume greater amounts of other goods. BF' and BF" are the cash-equivalent values in these two cases. When recipient preferences are more oriented towards consuming goods other than the ones received from an in-kind transfer, the cash-equivalent value decreases so that the overstatement from using market values is higher.

The above has obvious implications in terms of the efficiency of the allocation of assistance. In effect, only an amount of resources equivalent to BF (or BF', or BF") is required to satisfy the average requirements, compared to an amount equivalent to BD in the case of in-kind transfer. Therefore, a fixed amount of resources for aid can be distributed more widely by choosing the most efficient payment method without reducing the per capita recipient benefits. Following on from the above, during a food crisis and in general when food is highly valued by recipients relative to other goods, the effects of in-kind and cash transfers can be equivalent. This would occur if indifference curves like U_1-U_4 were located downwards and to the right of those shown in the figure. In fact, tangencies along the segment CD of the budget constraint result in equivalence between in-kind and cash transfers. However, during less severe crises or during the transition from relief to recovery it can be expected that some or most of the potential recipients might fall into those described by the tangency along the EC portion of the budget constraint.

The analysis above suggests a range of conditions where the well-being of transfer recipients could be improved if transfers were made using cash instead of in-kind benefits. For the same cost of transfer (BD), recipients could have a higher level of well-being, as indicated by indifference curve U_1. Alternatively, from a donors' perspective it would be possible to extend the same recipient value of transfers at a lower cost. That is, recipients could remain on U_2, but at a lower cost than BD: BF (or BF', or BF", for other preference structures).

Figure 2.1 In-kind and cash-equivalent value trade-offs



Source: Faminow, 1995

The analysis proposed by Faminow has been further developed (Sharma, 2006; Alderman, 2002; Castaneda, 2000; among others). The relative size of the transfer is recognized as a key in the comparative analysis of alternative strategies. The transfer is called "extramarginal" when it is greater than the amount (of the commodity or of money required to purchase the amount of food) the recipient household would have consumed without the transfer; otherwise, it is called "inframarginal". According to neoclassical microeconomic theory, while an inframarginal transfer would trigger an income effect by increasing the recipient's budget, an extramarginal transfer would also have a price effect which would be determined by the feasibility of exchange and its conditions. Gentilini (2007) provides a summary overview of the economic effects of alternative transfers, as depicted in Figure 2.2. According to Gentilini, the two options would be equivalent when dealing with an inframarginal transfer, and when dealing with an extramarginal transfer the price effect would make the difference: the two options would be in general equivalent and the in-kind transfer would be more effective in the presence of a price effect.

Figure 2.2 Economics of cash and food transfers

Is the amount of the in-kind transfer ***greater*** *than the amount normally consumed?*

Yes	→	Extramarginal transfer	→	Income & price effects	→	In-kind better than cash*
No	→	Inframarginal transfer	→	Income effect only	→	In-kind = cash

* If resale of the ration is prohibited, or if it is resold below the market price, or if the resale entails high transaction costs. Otherwise it is equal to cash, even if extramarginal.

Source: Gentilini, 2007

From this perspective the income elasticity of demand for the specific food aid commodity and, more generally, consumers' preferences seem to play a critical role. In line with Faminow's view, this means trying to position food aid beneficiaries along the line ECD of Figure 2.1. In the case of extramarginal transfer, the further down the CD segment, the lower would be the preference for cash. Conversely, as suggested by microeconomic theory and pointed out by Ahmed *et al.* (1993), the higher up along the segment EC, the attempt to reach a higher feasible indifference curve will lead towards a higher preference for a cash transfer. In the case of inframarginal transfer, the two transfers would be equivalent.

From a different perspective, a common economic argument against the use of cash transfers makes reference to the risk of an effect on inflation. Such price increases would end up reducing the effective value of the transfer and would instead negatively affect the living conditions of the non-beneficiaries. In this regard, considering that the non-beneficiaries may be a large and still vulnerable section of the population, a cash-based intervention could simply result in a shift of the food access problem from one group to another. Along these lines, Basu (1996) developed a theoretical model to examine how *"a cash-for-work programme would typically enhance the demand for food, cause food prices to rise, and result in more food in the hands of those who have received the wage. This means that those who are left out of the programme (for example the old and the infirm) could be worse off"*. Therefore, he argues, *"depending on the parameters of the economy, a generalised cash relief policy (that is cash to all) could help all the poor, but a generalised food relief policy always helps the poor. In times of crisis, if a government has the choice, it may be safer to give food relief"* (Basu, 1996).

A further perspective from which in-kind and cash-based strategies have been contrasted makes reference to their respective effectiveness on nutrition. Because of its lack of fungibility, a commodity-based option is thought to be more effective. This is supported by studies which suggest that the marginal propensity to consume food (MPCf) is higher as a result of food transfers than with equivalent cash transfers (Ahmed, 2005; Del Ninno *et al.*, 2002; Pinstrup-Andersen, 1988). More pragmatically, it is argued that gender factors may work as determinants in this regard. In fact, according to WFP (2008), one possible reason for the differential nutritional impact of cash and food-based measures is the greater control that women generally have over food as opposed to cash resources. From such a perspective, the provision of food handouts may lead to higher nutritional effects at the household level, while cash may be used for meeting needs not related to nutrition. However, other studies seem to give the opposite impression by reporting high shares of cash transfers spent to purchase food (Devereux, 2008), showing that cash transfers may trigger higher kilocalorie consumption than food aid (De Matteis, 2007; Sharma, 2006) or at least comparable to a standard food aid ration (Harvey *et al.*, 2006), or may be associated with lower malnutrition (Meyer, 2007).[5] At the end of the day, as Gentilini (2007) suggests, the

[5] Through a review of 27 projects or programs worldwide that made use of cash and/or vouchers, Meyer (2007) provides a few cases of nutritional impact, showing favourable results, including reduced incidence of stunting and decreased levels of iron-deficiency anemia.

multidimensional nature of malnutrition as well as the complexities of the non-linear link between any transfer, food consumption and nutrition, make it difficult to detect a single tool, whether food or cash, as the determinant of a nutritional outcome. Nevertheless, it is easy to consider how the higher fungibility of cash can be of greater help in supporting a more diversified diet than a standard food aid ration (Sharma, 2006; Meyer, 2007; Devereux, 2008). However, it is regularly remarked that cash transfers are not a replacement for supplementary or therapeutic feeding (Jaspars *et al*., 2007; Bailey *et al*., 2008) and is also necessary to consider how in some cases food transfer programs may provide high-quality and fortified foods which may not be readily available through markets (WFP, 2008).

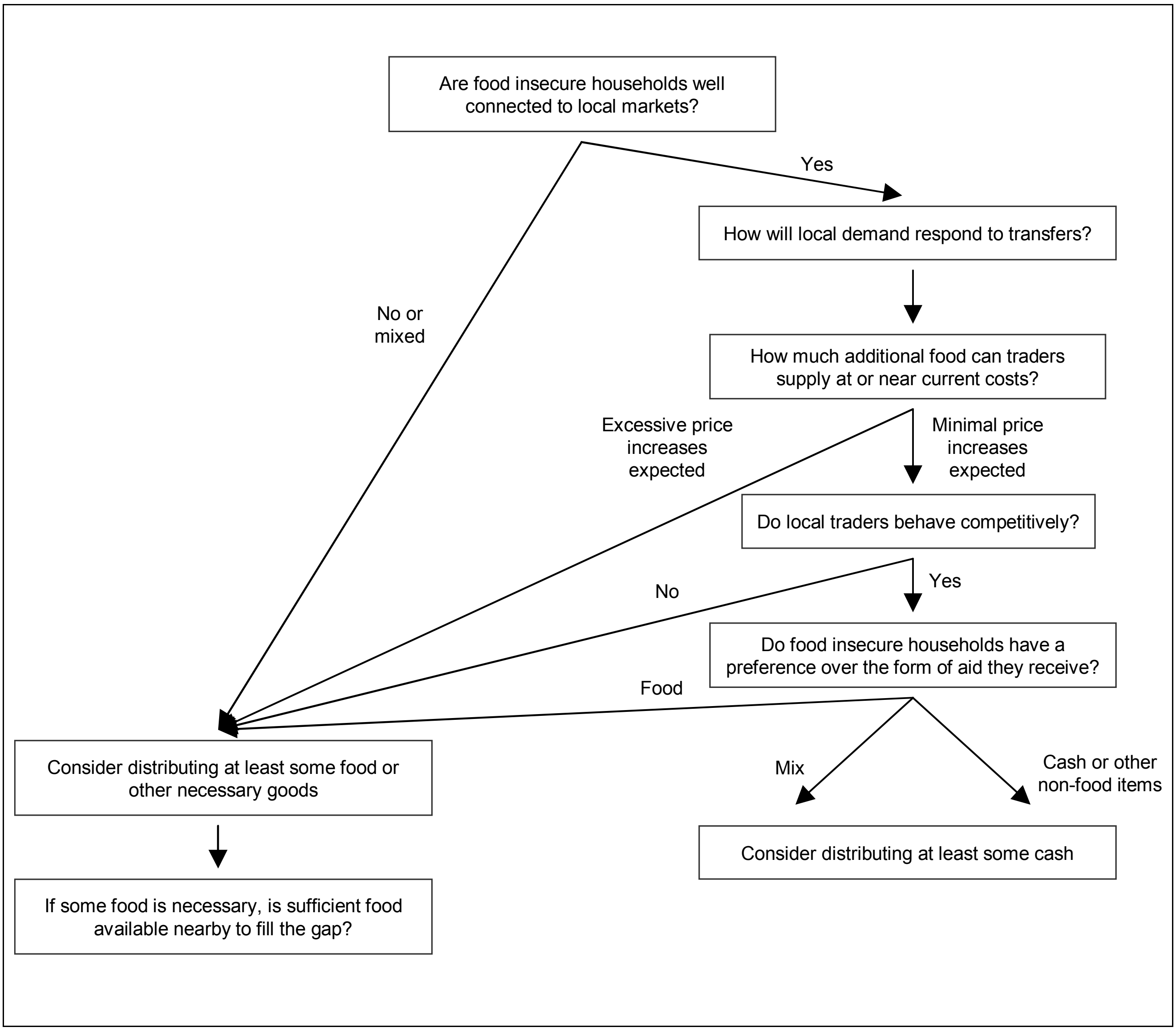
2.2 The relevance of the market for the choice of intervention strategy

Markets facilitate and influence the movement of (food) commodities, contributing to determining the interaction between supply and demand. Price movements signal changes in an economy reflecting events or expectations of events of various natures (climatic, economic, physical security, and policy, among others). As such, market analysis provides information which is critical for decision making, regarding the selection of appropriate intervention strategy and the size of the intervention, as well as the possibility to foresee the type and size of potential positive and negative effects of the intervention. The relevance of such analysis and support for decision making covers quite a large spectrum of possible situations: from addressing priority needs in response to emergencies, to livelihood rehabilitation, for social protection purposes, or to make markets work for the poor (Albu *et al*., 2007).

The local availability of food provides a criterion for the choice of intervention strategy, but it can provide only a limited basis for response option analysis. Access to food is regularly considered as another major dimension of the analysis; not just in terms of consumers' purchasing capacity, but in more general terms, as the capacity to make demand and supply meet. In other words, it is the strength of market functionality which can play a critical role in the analysis of intervention strategy (Barrett *et al.*, 2007; Creti *et al.*, 2006; De Matteis, 2006). Such functionality affects the type of intervention strategy: while a cash-based strategy acts through the demand side, leaving the supply side to the private sector, food transfers bypass the private sector through artificial support to the supply side. In the former case, market functionality is essential to convert increased purchasing capacity into effective demand. At the same time, market functionality may be affected in different ways by different intervention strategies: while a cash-based strategy may strengthen the market and stimulate a demand-driven process of local growth, a commodity-based strategy may risk replacing local supply rather than just filling its gaps. In light of such considerations, the controversial discussion about the preference for *either* cash *or* food finally seems to be shifting towards a compromise in favour of a *combination of both* to be adjusted according to contextual factors (Gentilini, 2007).

The increasing recognition of the role played by market functionality in the selection of intervention strategy has raised attention to market monitoring and assessment. Various tools for the purpose of market analysis have been developed recently and/or are being developed. Among the most relevant are Barrett *et al.* (2009, 2007), Creti *et al.* (2006) and WFP (2009), presented in Figure 2.3a-c. The "decision tree" proposed by Barrett *et al*. (2007) and developed in Barrett *et al.* (2009) as an analytical framework for Market Information and Food Insecurity Response Analysis (MIFIRA) is designed to assess how markets respond to a crisis as the basis for response option analysis. It is rather ambitious, intended, according to its authors, to be relevant for chronic, sudden or complex crises. It addresses two fundamental questions: a) the functioning of local markets, and b) the local availability of food. It is proposed as a stepwise process: in the first instance, cash is to be preferred wherever local markets are well functioning; and in the case of negative feedback the option of procuring food commodities through the neighbouring markets is considered. Only in case of negative feedback to both steps is the import of food commodities considered. The decision tree proposed by Creti *et al.* is on the same lines. Although slightly more articulated into different scenarios which may be linked to alternative intervention strategies, it does not differentiate on the source of eventual food assistance. Finally, the response option tool proposed by WFP adds a certain stress on the physical access to markets, from both the supply and the demand sides.

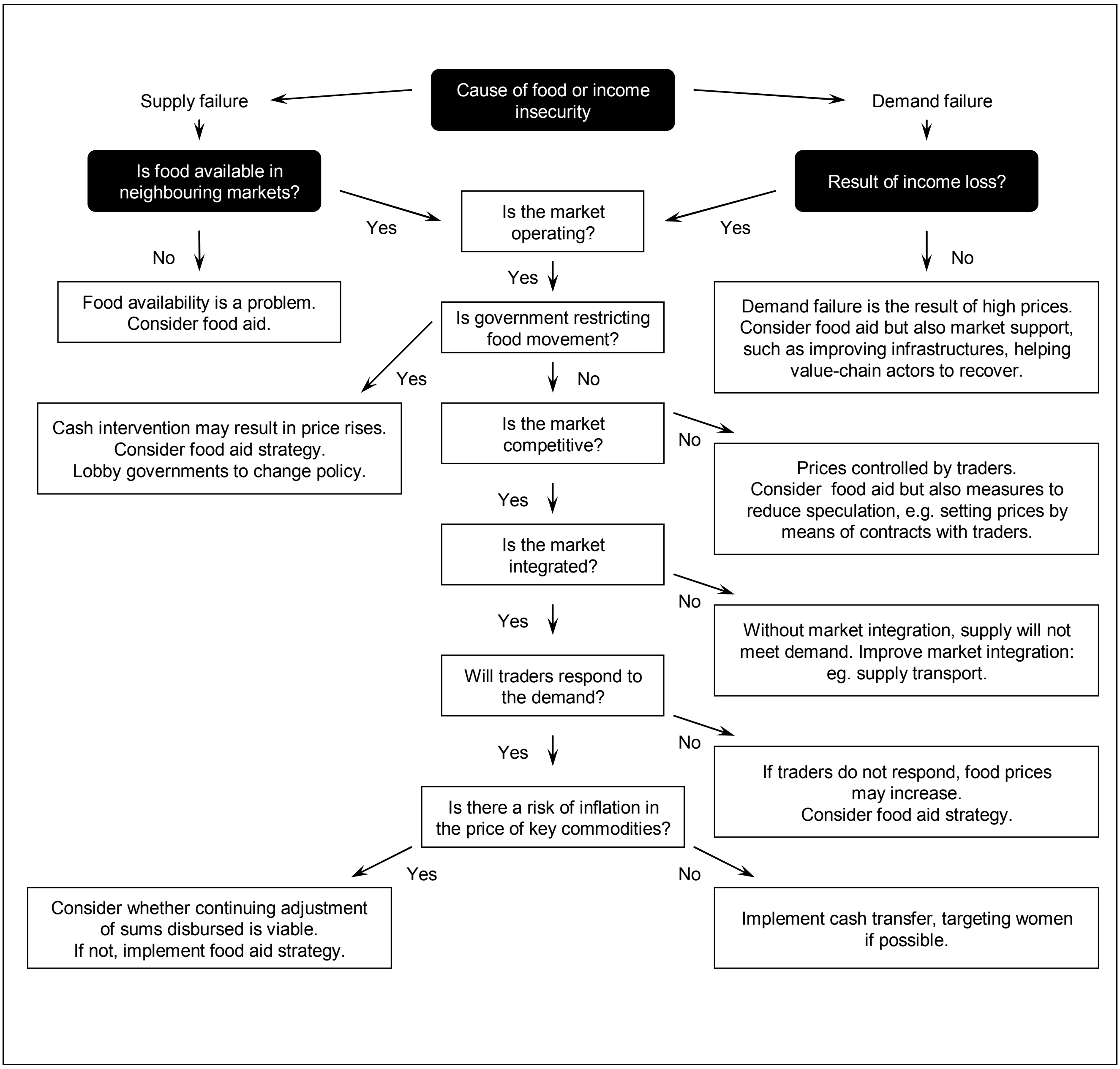
Figure 2.3a The decision tree tool - MIFIRA[6]



Source: Barrett *et al.*, 2009

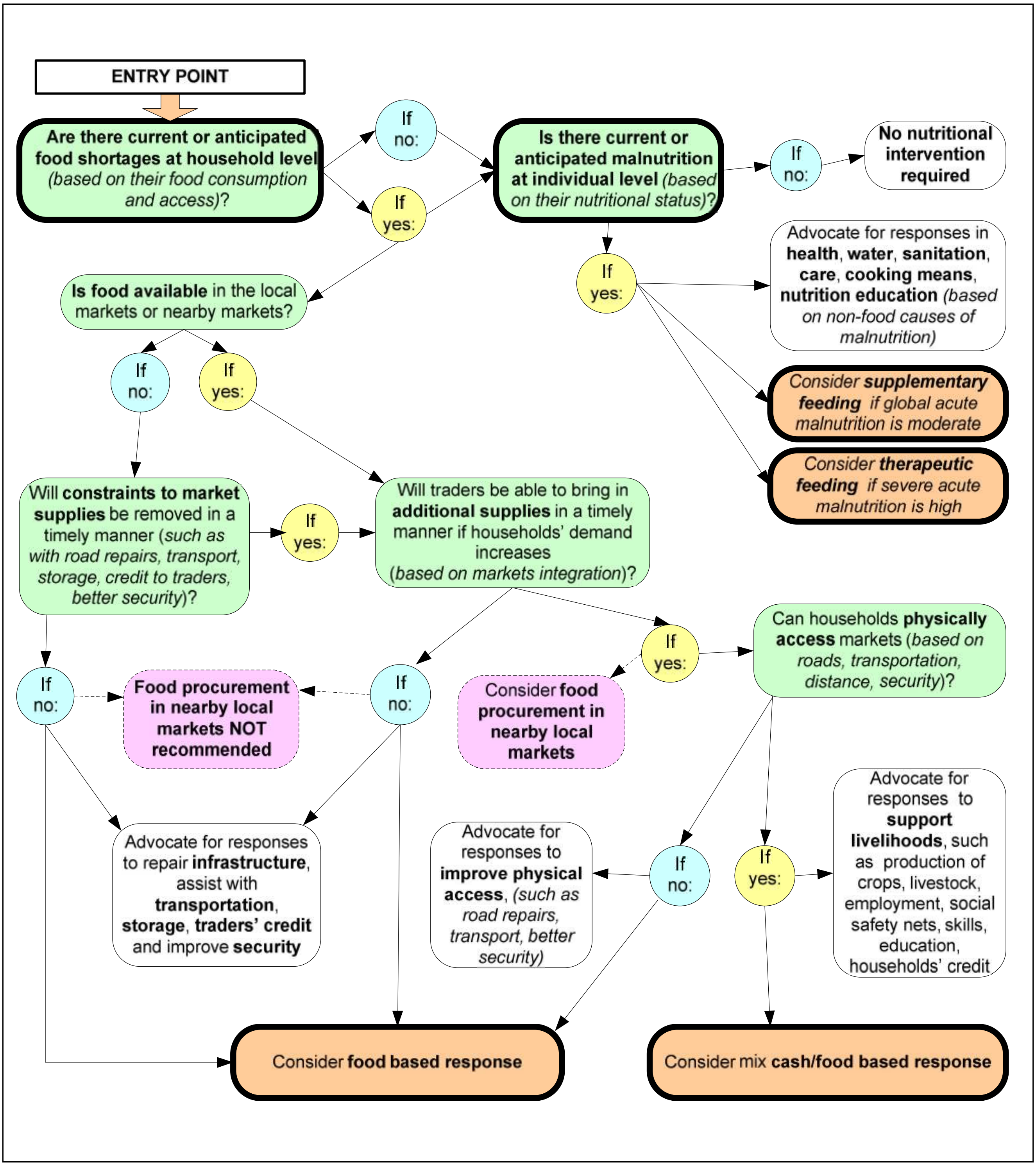
[6] In this case it is reported only the first stage of MIFIRA which addresses the functioning of local markets. The second stage, addressing the choice of the source of eventual food assistance, is omitted.

Figure 2.3b The decision tree tool - OXFAM



Source: Creti *et al.*, 2006

Figure 2.3c The decision tree tool - WFP



Source: WFP, 2009

As typical of decision trees, all the tools presented are based on a sequence of questions which seem to allow only for binary response options (i.e. "yes" or "no" against a preset benchmark). This is most evident in the decision tree proposed by Creti *et al*. An immediate reaction to such a constraint is that a more sensible approach for assessing the feasibility of cash- and commodity-based strategies would be to identify the degree of imperfection of the markets. Such an approach would allow for more flexibility in programming in order to adjust to changing market circumstances (Gentilini, 2007; Alderman *et al.*, 2006).

Claims about the relative advantages of cash- and commodity-based transfers tend to refer to programmes that are often implemented in different contexts. As increasingly stressed, particularly in the latter studies, it seems incorrect to perceive one strategy as better than another, but in general program features and contextual factors help to determine the effect of the transfer and therefore potentially play a key role in the selection of intervention strategy. In particular, from both theoretical and empirical perspectives the relevance of the market is regularly stressed as a determinant of programme performance (Davies *et al.*, 2008; Barrett *et al.*, 2007; Ahmed *et al.*, 2007, Mohiddin *et al.*, 2007, among others). Davies *et al.* (2008) remark that *"although cash transfers should not be used under all circumstances, where the market is able to respond to increased demand cash transfers should be considered as an alternative to in-kind aid"* (Davies *et al*., 2008). Furthermore, in areas where markets are functioning and accessible cash transfers are reported to be more cost-effective and preferred by beneficiaries. On the contrary, in areas where markets are less functional or accessible, food assistance is seen as more cost-effective and preferred by beneficiaries. Therefore, it seems that *"appropriateness of cash programming depends on market access and functioning (whether they are competitive and integrated), and security. Food aid is more appropriate in contexts where markets are not working well, where security conditions impose higher market transaction costs for consumers, and in situations of high and unpredictable inflation. Opportunities exist for using both interventions in parallel or in a phased approach depending on seasonal and contextual changes over time and space. This is especially relevant to emergencies, where market access could be a limiting factor. In the immediate aftermath of a shock, food intervention may be more appropriate. Cash based interventions may be gradually introduced as markets recover and could potentially be used as an exit strategy"* (Mohiddin *et al.*, 2007).

2.3 Market analysis

In order to provide a useful basis for strategy analysis and choice, market analysis will have to link three aspects: food supply, demand and market functioning. Some contextual factors affecting one or more of the three aspects just mentioned can be considered as well to improve the analysis whenever possible: transport and storage infrastructure, security, credit facilities, policies and public control, etc. The main objective is to provide a basic understanding of markets, spelling out the extent to which markets function and ultimately their relevance to food availability and people's access to food. Such knowledge and understanding of market structure and functioning would form the framework for the simulation of alternative intervention strategies, aiming at reducing an eventual gap between supply and demand generated by either an excess of demand or a shortage of supply manifesting in problems of either availability or access to food, or both.

In order to assess market capacity and functionality, various models and analytical tools have been proposed, each focusing on some of the most relevant factors and adopting a range of methodological approaches. The number of such tools is so high that a few years ago the resurgence of strong interest on the subject led to the need to take stock of what was available.[7] It is expected that in the

Table 2.1 List of market indicators proposed for Emergency Food Security Assessments

1. *Availability:*
   a. Current and pre-shock (at same season) availability of different items
2. *Prices:*
   a. Current and pre-shock prices (terms of trade) of e.g. food staples, livestock, etc.
   b. Level of casual labour wages
   c. Own- and cross-price elasticities
3. *Response capacity of traders:*
   a. Changes in number of market places operating
   b. Changes in market turn-over
   c. Changes in credit facilities for traders
   d. Roads, bridges, railways, transportation means
   e. Security issues related to trade
   f. Prices in neighbouring (supply) areas / IPP
4. *Policies / Governmental programmes*
   a. Changes in government policies

Source: WFP, 2007

[7] See Development Alternatives Inc., 2003, for a list on the subject.

meantime the raised interest in the subject may have generated a number of variants of such tools. But after considering the abundance of tools and approaches available for market analysis, there is a need to be more selective, particularly in situations characterized by scarcity of data and key resources. Table 2.1 reports the list of market indicators proposed by WFP for the purposes of market analysis in conditions of emergency food insecurity. In its simplicity, such a list manages to capture most of the critical factors required for market analysis.

Traditionally, price analysis has occupied a central place in market analysis not so much, or at least not only, because price data are often the most common – if not unique – form of market information to be found in developing countries, but also because of the signalling role they provide on supply and demand (Scott, 1995). From such a perspective the analysis of demand and supply elasticities as well as of terms of trade are predominant and the analysis of market integration the most developed output.

A different approach uses participatory methods to develop knowledge of local market characteristics, trying to estimate the strength and roles of stakeholders as well as of links among them. While this approach has traditionally focused on the local market supply chain, links have recently been strengthened with similar methodologies focused on local micro-demand.

2.3.1 Price analysis

Whenever relevant to the purpose of the study, price analysis is the most common and developed approach and, therefore, literature on this type of analysis is vast. Table 2.2 provides an overview of basic types of price analysis.

Price elasticities establish the strength of the relationship between price and quantity, both in terms of supply and demand, as well as both for specific commodities and with reference to other ones. As such, together with income elasticities, price elasticities provide synthetic but critical information essential for the purpose of basic modelling and the simulation of various events (e.g. shocks) and/or intervention strategies. Hence their regular use in these types of studies.

Table 2.2 Price analysis

Type of price analysis	*Data requirements*
Trends in real prices	Farmgate prices Wholesale prices Retail prices Deflator
Relative price relationships	Prices for key substitutes and complements
International / domestic price comparison	Import parity prices, including international transport costs Export parity prices, including domestic transport costs
Seasonal price variation	Average monthly, weekly, or daily prices at same level of marketing system
Interspatial price variation	Price data for several locations, at same point in time and preferably at same level of the marketing system
Marketing margins	Prices at different levels of the food system for the same commodity Data on marketing costs

Source: Extracted from Holtzman *et al.*, 1995

On the demand side, the analysis of elasticities for different food groups in different countries has revealed a certain regularity between elasticities and income levels. In view of their key relevance, datasets have been arranged with estimates of income and price elasticities for a series of countries for a few food groups.[8] Such data can be very useful for analysts and practitioners, with the major cautions however that: a) the validity of such estimates is rather broad and not linked to specific categories, and b) it

[8] http://www.ers.usda.gov/Data/InternationalFoodDemand/

is strongly time-specific, reflecting the conditions in which the analysis, normally a survey, was conducted.

The analysis of terms of trade (ToT)[9] is particularly useful when assessing vulnerability linked to changes in access to food and other basic needs. Such a tool is revealed to be particularly useful when dealing with basic economic contexts in which different groups are characterized by their reliance on very few activities whose output is mainly exchanged, and by their dependency on the procurement of few key products. From such a perspective the ToT have been often used as a proxy for vulnerability, particularly from a dynamic perspective of specific groups' access to food or other basic resources expressed as changes in their purchasing power. In fact, the relevance of the TOT is mainly in its contribution to making comparisons more homogeneous, mainly from an intertemporal and interspatial perspective.

The use of Import Parity Prices (IPP) and Export Parity Prices (EPP) helps to link the analysis of domestic prices with the international market.[10] In general, parity prices measure the economic incentives or disincentives for agricultural production and/or for moving production across borders, given competition from international trade and/or cross-border flows. If a country is integrated into regional and global food markets and trade is basically free, food supply shortages, which would normally cause rising domestic prices, are likely to be met through private imports if there is domestic purchasing power. As a result, prices will stabilize at import parity (WFP, 2007; FEWSNET, 2008).

[9] This term originates from international trade where it denotes the relative price value of a country's exports to its imports. In the context of market analysis for food security, the ToT jargon is used to reflect a "barter-trade" approach. In this sense it often refers to the relative value of one commodity (for instance a unit of cereals) to another commodity (for example a unit of livestock). Based on this particular example, the commodity ToT helps gauge the impact of certain conditions, such as those linked to a shock) on one group of a society (e.g. herders) in comparison to another one (e.g. crop farmers).

[10] The IPP is the price at the border of a good that is imported which includes international transport costs and tariffs. Reciprocally, the EPP is the price at the border of a good which is exported with the inclusion of international transport costs and tariffs.

Price analysis has benefited from and contributed to the development of methodologies for the analysis of time series, cross-section and panel data. Timmer, Tschirley, Ravallion, Goletti are among those who have provided the basis for the current stage of such type of price analysis. The use of the Index of Market Connection (IMC) initially proposed by Timmer (1987) has led to the more technically sound analysis of market integration, considered today as among the best tools for assessing market functionality.[11] The most developed version of this type of analysis involves trade flows, prices, and transfer costs, but in view of the complexities involved it is rarely used;[12] a focus on prices is much more common.

2.3.2 Market chain analysis

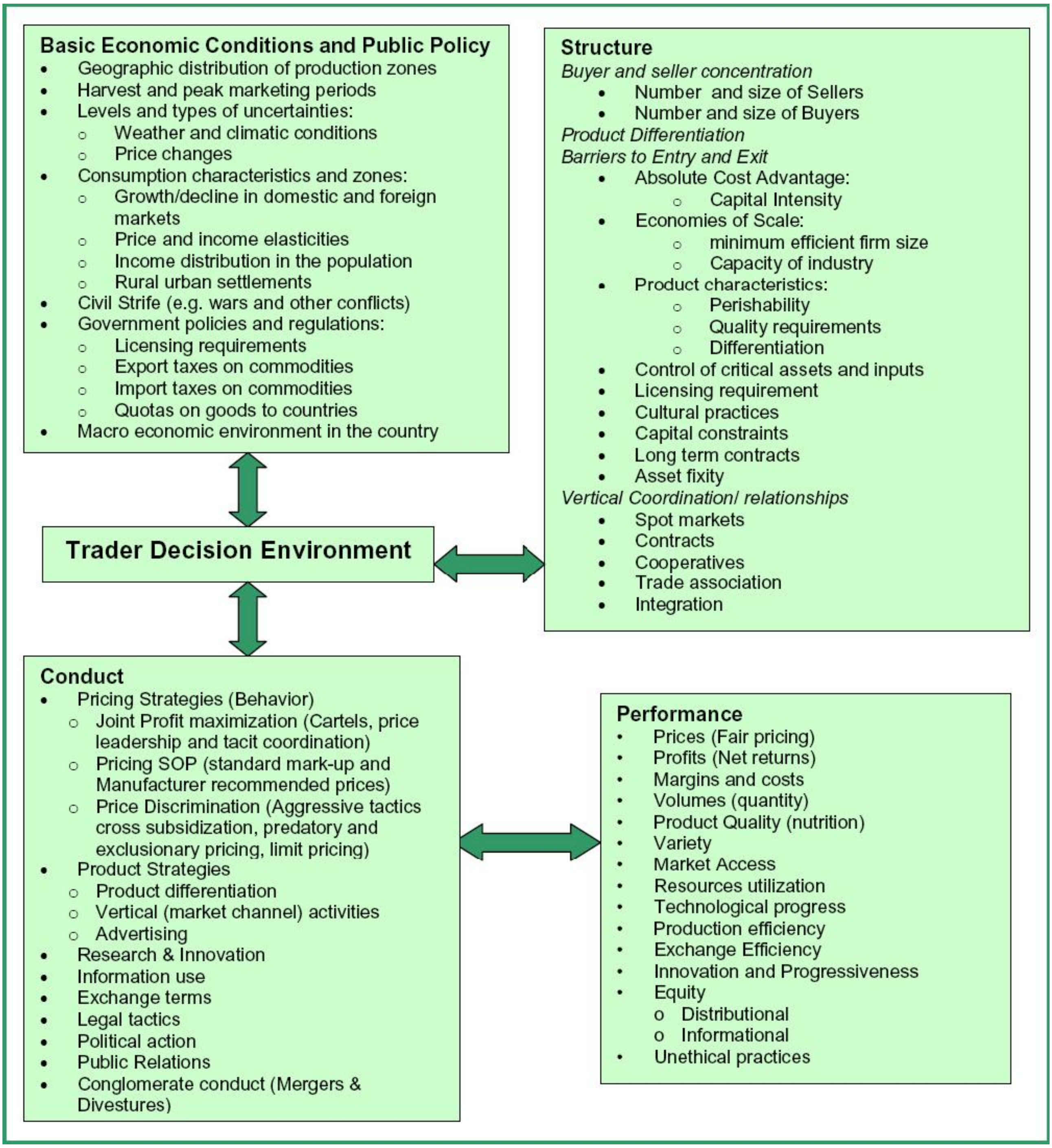
The analysis of market prices is insufficient to evaluate how markets function and the role that they may play (Donovan *et al*., 2005). On the basis of the consideration that prices are the outcome of market forces, it makes sense to widen the analysis from price and price dynamics towards market and market dynamics. This shift of perspective should help to provide a more in-depth understanding of market functioning as well as to define relevant scenarios and conduct simulations of possible strategy options.

The Structure-Conduct-Performance (S-C-P) analysis, initially designed with reference to industrial economies, has over time been adjusted to be applied for market analysis in developing economies. Initial efforts in this direction can be referred to Holtzman (1986), Holtzman *et al.* (1995) and Pomeroy *et al.* (1995). Recently FEWSNET (2008) has provided a summary review of the elements of S-C-P, as well as of other basic economic conditions and public policy, as well as of their relevance for the traders' decision process. A list of such elements and their systemic links is presented in Figure 2.4, while Table 2.4 provides a more pragmatic illustration of how market structure determines market conduct and performance.

[11] Other milestones are Goletti *et al*. (1994, 1995), Ravallion (1986) and Tshirley (1995), among others.

[12] See Moser *et al.* (2009) and Barrett (1996) for some excellent examples of such type of analysis.

Figure 2.4 Elements of S-C-P, basic economic conditions and public policy



Source: FEWSNET, 2008

Table 2.3 Relevance of market characteristics for food security

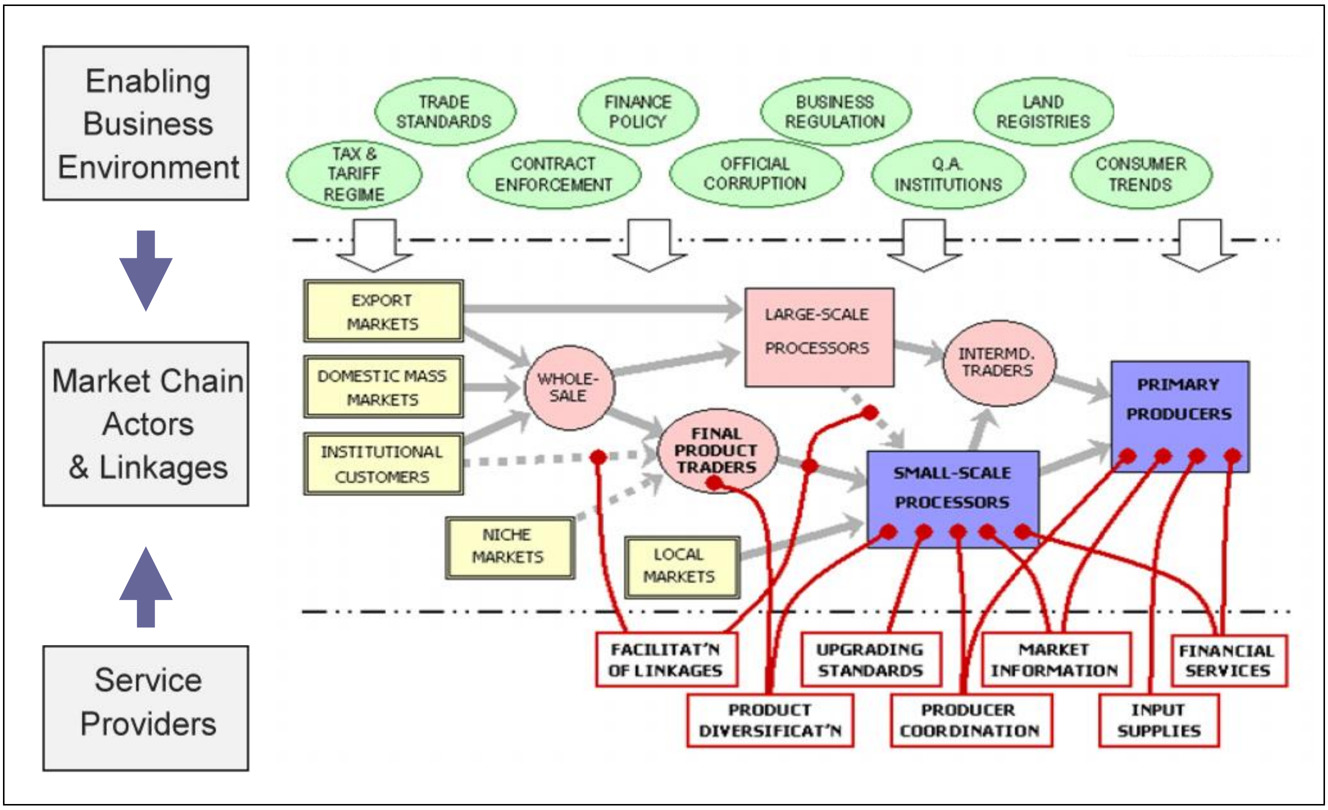
Structure, conduct and performance characteristics and effect on food security								
Structural elements			Conduct variables		Food Security Performance variables			
Number of sellers / buyers	Cost of starting business	Economies of Scale (EOS)	Ways of determining prices	Buying and selling practices	Net Returns to traders	Marketing Margins to traders	Producer Share / Income	Consumer Prices
Many	Low	None	Market (open)	Spot markets	Low	Low	High	Low
Few	Medium	Medium	Collusion Discrimination	Contract sale Commission	Medium to High	Medium to High	Medium	Medium
One	High	High	Collusion Discrimination	Contract sale Commission	High	High	Low	High

Source: FEWSNET, 2008

A specific branch of S-C-P analysis is market chain analysis. A market chain is defined as the set of economic actors who produce and transact a particular product as it moves from primary producer to final consumer. The fortune of each economic actor involved in the chain is bound up with the capability of the whole market chain to respond systematically in a proactive manner to emerging market signals (Albu *et al*., 2005). Therefore greater efficiency throughout the market chain, as well as a more competitive market structure, are good for all stakeholders and particularly the poor ones from both the supply and the demand side (FEWSNET, 2008; Albu *et al*., 2005). Under such perspective market chain analysis can help to identify constraints and to design – as well as to select among – a range of possible interventions. Among the analytical approaches and tools proposed for this purpose are participatory techniques which aim at developing an overall perception of the system involved through a direct contribution from the stakeholders in the chain, in order to highlight features of the system which may otherwise be misinterpreted or not properly rated.

One such technique consists of mapping out the market system. As shown in Figure 2.5 the Market Map is made up of three interlinked components centred around the market chain itself. This combined view helps to identify the potential of a specific market channel as well as favourable factors or bottlenecks encountered during the process. In particular, by understanding how the product value accumulates along the market chain, this approach helps to identify inefficiencies, inequities and losses which could be remedied, or added value which could be captured, particularly by poor producers.

Figure 2.5 Overview and example of market map



Source: Adapted from Albu *et al.*, (2005)

2.3.3 Market profiling and modelling

While the techniques for market mapping proposed above are essentially recommended for rough and rapid assessments, particularly as an initial step in response to emergencies, another approach to market analysis has developed the systemic perspective presented above further. Essentially, it is proposed to combine information at different levels (i.e. micro, meta, macro) in a systemic way in order to provide a profile of the markets under investigation. The aim of such profiling goes beyond the purpose of analyzing the detailed characteristics of a market, but rather seeks to link it to some predefined models. The combination of reference models and the most relevant characteristics of the market in question should allow some simulation exercises ranging from the possible consequences of shocks to the impact of response strategies. After considering the advantages of such an approach, mainly in terms of the precision of the analysis, it is as well to be considered that this type of analysis may not be appropriate for rapid response but is useful as a preparatory measure in the case of slow-onset crises or in countries with recurrent and predictable shocks (Donovan *et al*., 2006).

While market profiling has recently become quite popular, experience with market modelling has been more limited, mainly in view of the greater complexity of the exercise. Market models come in various degrees of detail and complexity, ranging from single-market to multi-market models and up to computable general equilibrium (CGE) models. In the first case the analysis is limited to the estimation of consumers' and producers' functions, ignoring the interaction among markets (i.e. substitution effects on consumption and production) and paying limited attention to income effects. In this case, ignoring the direct and indirect effects on wages, prices and incomes means that the estimate of welfare changes will be biased in unknown directions (Arulpragasam *et al*., 2003; Croppenstedt *et al*., 2007). At the other extreme are the CGE models which try to incorporate the direct and indirect effects of both goods and factors in several markets, allowing for wages, prices and incomes to be determined endogenously. This helps to provide a systemic perspective which manages to capture multiplier effects which would otherwise remain unaccounted for.[13] The main drawbacks of these models are their complexity and large data requirements.[14] Multi-market models, also known as 'limited general equilibrium models' or 'multi-market partial equilibrium models' focus only on one sector, as opposed to eight to ten, as in the case of CGEs, but manage to include direct and indirect effects in a small number of markets (Croppenstedt *et al*., 2007). Although all types of models are used widely for policy analysis in developing countries, mainly to simulate *ex ante* policy options, their application to the analysis of food aid has been more limited. This is very probably due

[13] Such higher precision of CGE models has led in a few occasions to diverge from results achieved through descriptive or econometric techniques. For instance, assessing the price effect of an eventual abolishment of food aid in Ethiopia has led to remarkably different results: Levinsohn *et al*. (2004) predicted a food price rise of 52.8% by using a single commodity (wheat) supply and demand equations, while Gelan (2006) estimated a maximum price rise of 2.51% through simulations based on a CGE model.

[14] See Sadoulet *et al*., 1995 for a more detailed presentation of CGE models.

mainly to the fact that they have mostly been applied for policy analysis at national level, missing the various food aid interventions implemented mainly at project level which quite often have a more localized nature. In particular, their application to the comparative analysis of commodity-based versus cash-based intervention strategies has been very limited so far. A few recent studies are of particular relevance in this case. The general equilibrium analysis conducted by Gelan (2006) with reference to the Ethiopian case examines the relative effectiveness of cash and in-kind food aid using an economy-wide modelling framework which allows attention to be drawn to the indirect benefits resulting from the multiplier effects of cash aid. By accounting for all the direct and indirect feedback effects in all sectors of the economy, the economy-wide efficiency gains result much larger than the simple sum of the welfare gains achieved by direct beneficiaries.

In another study, Davies *et al*. (2008), using a reduced Social Accounting Matrix (SAM) manages to estimate the *multiplier effect* of the cash grant provided through a project in Malawi. In other words the study tries to capture the indirect effects of the grant, such as market expansion for local goods and income growth for non-recipients, which follow increased expenditure by the recipients of the grant. This systemic perspective allows to estimate that each dollar transferred through the grant had economic effects more than double its original value. In both cases a limitation of this approach is recognized as how the highly aggregated nature of the model allows only generic policy recommendations in favour of a cash-based strategy.

Dorosh *et al.* (2009) make use of data from Zambia to apply a simple two-commodity economic model to assess the impact of maize production shocks on the domestic maize price and staple food consumption under alternative policy regimes. The study suggests that, given a favourable policy environment, two key price responses will contribute to protect consumers from the impact of the shock: a) consumers' substitution effect among staples, and b) traders' response in scaling up food imports to the affected region. It is estimated that these key price responses together could make up for approximately two thirds of the initial maize consumption shortfall. Neglecting such key components in emergency needs assessments would lead to overstating food aid needs and eventually to excessive food aid flows which would discourage domestic production. The analysis stresses how careful assessments of market conditions, in terms of market competitiveness, potential sources of supply and, as well, of potential traders' response are needed as part of emergency needs assessments (Dorosh *et al.*, 2006).

Box 2.2 A two-commodities economic model

What follows is drawn mainly from Dorosh *et al*. (2006, 2009) who present a simple two-commodity economic model developed to quantify the impact of production shocks on domestic food prices. In turn, the model assesses the impact of these changing prices on consumers, farmer and trader behaviour as well as on the food consumption of vulnerable groups. Likewise, the model evaluates prospects for using trade policy, food aid or cash transfers, or various government policy interventions to protect consumers from production-induced shocks in staple food consumption.

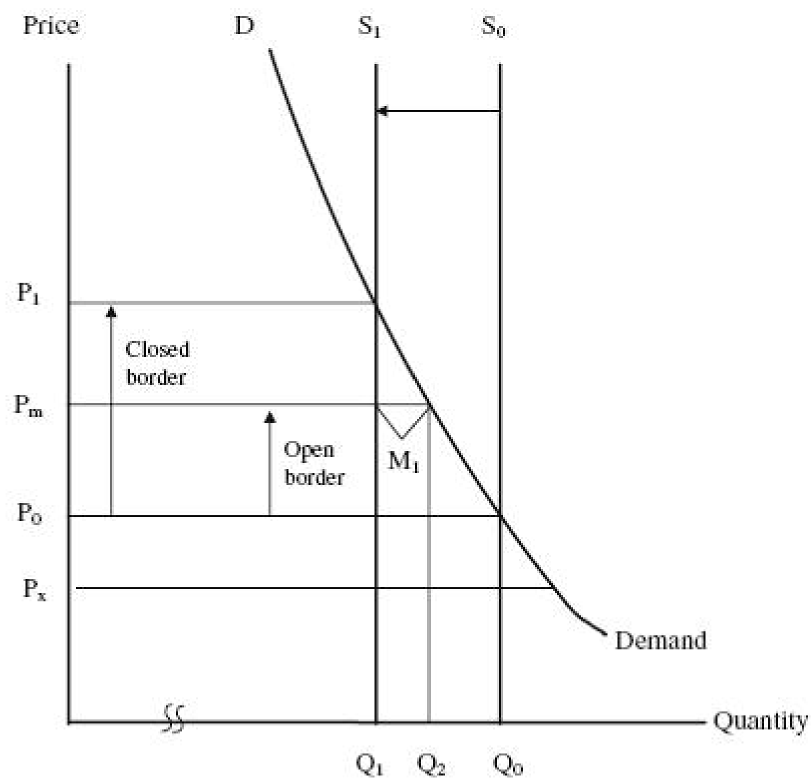
The model differs from standard methods of food aid needs assessments through its explicit modelling of market prices for key staple foods (maize and cassava) as well as the resulting impact of price changes on farm household income, food consumption by various groups, staple food imports and exports, and production the following season. In order to anticipate all such outcomes, the framework incorporates price responses by three groups:

- poor consumers, who reduce maize consumption and substitute maize with other staples as the price of maize rises;
- traders and millers, who decide their trade movements in response to differentials between domestic and border prices;
- farmers who take planting decisions in response to changing prices.

The model includes as exogenous variables a range of potential instruments wielded by government and donors: trade quotas and tariffs, public import and exports, local procurement, government stockholding and sales, and targeted income transfers.

The model tries to estimate how much the domestic maize price will change following an exogenous shock. Figure 2.6 shows the impact of a major supply shock which causes production to decrease from S_0 to S_1. This leads maize supply to fall from Q_0 to Q_1 and maize price to increase from P_0 to P_1, affecting both the income of maize producers and consumption decisions of all household groups. When the domestic maize price (P_0) lies between import parity (P_m) and export parity (P_x), no trade takes place. But when a supply shock causes the domestic price to rise, P_m sets an upper limit on the price increase. In the absence of trade, the domestic maize price would spike to P_1. But if imports are allowed, traders will import an amount $M_1 = Q_2 - Q_1$ at P_m, capping the domestic price increase at import parity. Conversely, in case of a bumper maize harvest P_x sets a floor price below which the domestic price will not fall. The domestic price will move outside these parity bands only when government policy limits imports or exports.

Figure 2.6 Effects of private imports in moderating a production shortfall



Source: Dorosh *et al.*, 2009

Various simulations are run under two possible scenarios, drought and bumper harvest, and various combinations of possible policy and intervention measures (autarky, free trade, public imports – with and without food aid – export controls, targeted cash transfers, local procurement).

To capture key consumption responses to a price shock the model includes two food staples: maize and cassava. In case the price of maize rises, consumers reduce their consumption of maize and substitute with cassava. Cassava has a perfectly elastic supply in the short run and its price remains unchanged in this model.

Model equations

Production

$X^i = X^i_0 * (P^i / P^i_0)^{ESii} * (P^j / P^j_0)^{ESij}$

Consumption

$C^i_h = \alpha^i_{h0} * C^i_{h0} * (P^i / P^i_o)^{EDhii} * (P^j / P^j_0)^{EDhij} * (Y_h / Y_{h0})^{EDYhi}$

Income

$Y_h = \nu^i * P^i * X^i_h + \nu^j * P^j * X^j_h + Y^k_{h0} + YTFR_h$

Trade

Private imports:	under free trade	$MPRIV^M = C^M - X^M - MPUB^M$
	under quotas	$MPRIV^M = MPRIV^M$
Public imports:		$MPUB^M = MGOV^M + MFOODAID^M$

Commodity supply

Maize: $S^M = X^M - LOSS^M + MPRIV^M + MPUB^M$

Cassava: $S^C = X^C$

Demand

Maize: $D^M = C^M + \Delta STOCKS^M + GOVPURCH^M - GOVSALE^M$

Cassava: $D^C = C^C$

Equilibrium

Maize: $S^M = D^M$

Cassava: $S^C = D^C$

Market price

Maize: $P^M = PIMP^M$ if $PD^M > PIMP^M$

	$P^M = PD^M$	if $PEXP^M < PD^M < PIMP^M$
	$P^M = PEXP^M$	if $PD^M < PEXP^M$
Cassava:	$P^C = P^C_o$	because the supply of cassava is considered perfectly elastic in the short run.

Variable names

C^i_h	=	consumption of commodity i by household group h, following a shock
C^i_{h0}	=	base level of consumption of commodity i by household group h
C^i	=	total household consumption of commodity i, M = maize, C = cassava
D^i	=	total demand for commodity i, M = maize, C = cassava
$GOVPURCH^M$	=	government purchases of maize
$GOVSALE^M$	=	government sales of maize
$LOSS^M$	=	national maize losses
$MPRIV^M$	=	net private maize imports (negative imports = exports), or level of net private imports fixed by government quota
$MPUB^M$	=	net public imports of maize
$MGOV^M$	=	net national government imports of maize
$MFOODAID^M$	=	net food aid imports of maize
P^i	=	price of commodity after new equilibrium is reached after a shock
P^i_0	=	base price of commodity i

Source: Dorosh *et al*., 2009

2.4 Conclusions

Scarcity of information and particularly of skills to generate useful information or to make proper use of available information can be a critical constraint at the initial stages of emergency response, when hard choices among alternative response options are to be made.

The most relevant approaches to market analysis that can effectively provide support for such an effort have been considered. They differ in the tools and techniques used, some being more rigorous and data-hungry than others. This is reflected in a necessary trade-off between analytical rigour and the availability of resources required for the analysis, mainly in terms of time and skills.

While the various decision-tree tools propose key questions as sequential steps along the decisional process, they do not clarify the way in which such questions are to be addressed. The use of different analytical approaches to measure the various indicators proposed can provide a series of both advantages and drawbacks.

Under certain conditions, such as when decisions refer to life-saving interventions, the urgency of the response may justify a less rigorous approach. For such a purpose Rapid Assessment Techniques (RATs) have been developed. Being designed in support of rapid response, they trade off part of the rigour and significance of the analysis in exchange for rapidity of findings and recommendations.

However, while RATs offer rapidity and flexibility of implementation, their limitations in the analysis must also be taken into account. Their built-in approximate approach does not allow them to pay due attention to all the effects, direct and indirect, induced by – or linked to – each option. Thus, contrary to more lengthy techniques of in-depth analysis the RATs may lead to strongly biased estimations and therefore to inappropriate decisions.

From such a perspective it is possible to think about a series of approaches and techniques which can be ordered according to their degree of analytical rigour and resource – mainly time – use. The decision maker will select the technique to be used on the basis of such criteria as: a) urgency of receiving findings and recommendations, b) minimum acceptable degree of analytical rigour, c) feasibility of techniques dictated by contextual conditions (i.e. mainly security) and, finally, d) costs involved.

The present study considers the possibility of combining different approaches. As it will be made clear in the following chapter, while reflecting the need to maintain a certain degree of rigour throughout the analysis, it is made use of data collected through various techniques and approaches.

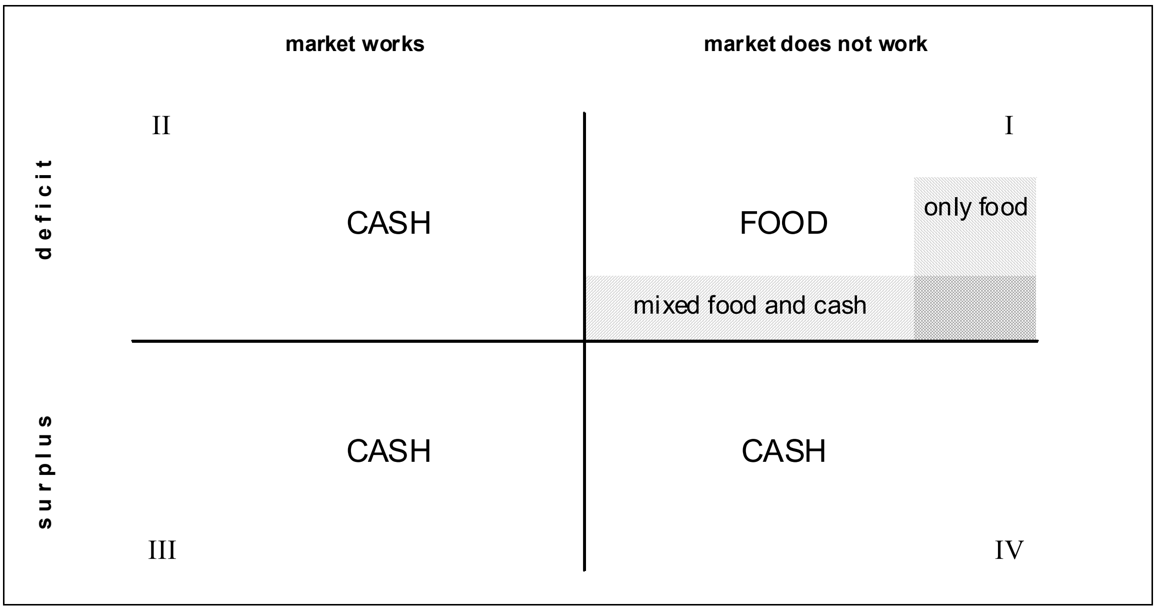
3

Conceptual framework and methodology

3.1 Conceptual framework

As mentioned in the introduction and the literature review, the positions both in favour and against a cash-based response are somehow centred on the economic question of how markets will be able to react to the use of cash. Often in developing countries market functioning is already weak in normal conditions, but it becomes of particular concern in situations affected by conflict or natural disaster. Figure 3.1 helps to summarize under what basic conditions a food-based or cash-based strategy may be more appropriate with reference to market functioning. In particular, while the degree of market functioning is less relevant in situations of food surplus (III and IV quadrant), its role is critical in situations of food deficit (I and II quadrant). In fact, while in situations of surplus the preference for a cash-based intervention responds essentially to a problem of access (the increased demand generated through the injection of cash is not expected to generate inflation in view of the condition of surplus), in situations of deficit the choice is wider. In such situations, if the market works (II quadrant), an injection of cash can generate demand-led growth and traders are expected to be able to respond to the increased demand; on this basis, cash is the appropriate tool. If the market does not work (I quadrant) at all, or works inappropriately, a commodity-based intervention is generally appropriate. However in this latest case extreme situations may require a different response: situations characterized by strong deficit and absence or absolute disruption of the market should be addressed solely through commodity-based interventions, while situations characterized by minor deficit and limited functioning of the market can be addressed through a combination of both cash- and commodity-based interventions.

Figure 3.1 Preference for a food-based versus a cash-based approach



Source: De Matteis, 2006

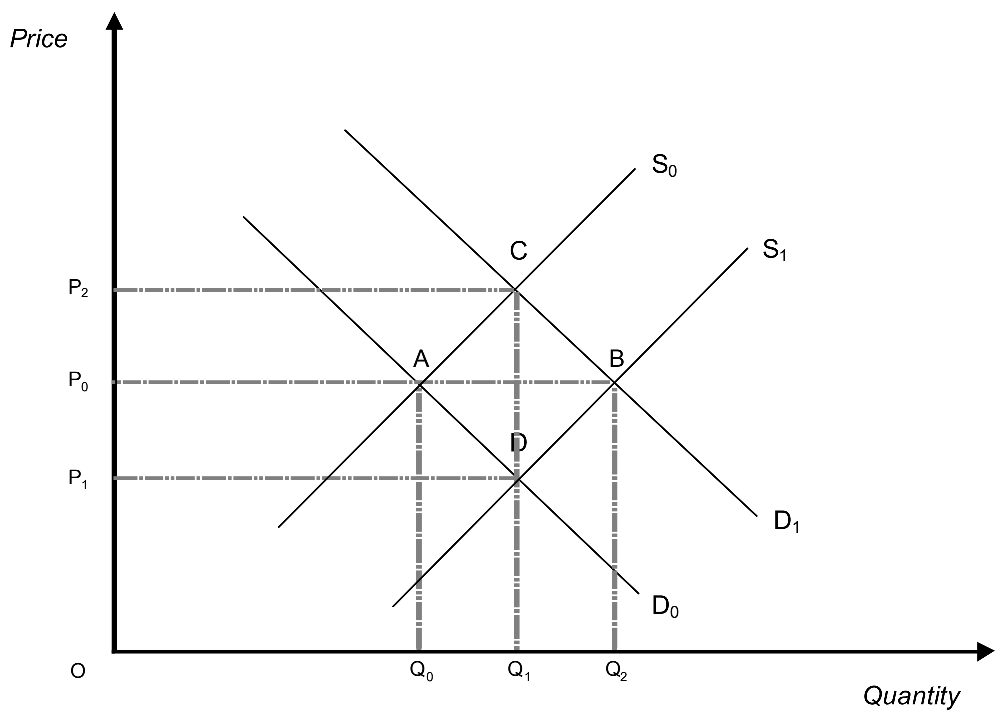
Having said the above, the question moves onto how to draw the line between the different cases considered. Essentially, this involves verifying the existence of a functioning market and local availability of the commodity in question. However, it has already been pointed out that availability is not enough to ensure access, which then needs to be included in the analysis. The following parts address these points through the demand-supply framework and analysis of market integration.

3.1.1 The demand-supply framework

To cover the points just mentioned it is necessary to analyze: supply (availability), demand (access), and the interaction between the two. The price of food commodities exchanged becomes the link between supply and demand and constitutes the key to the analysis by combining information about both consumers' willingness to pay for a good and traders' costs in supplying it.[15]

Figure 3.2 presents a simplified supply-demand framework to consider the short-run impact of cash and food aid on the market.

Figure 3.2 Short-run impact of food aid and cash on market prices



Any transfer, be it in cash, kind, or any other form, can be expected to affect household demand for basic needs such as food. The relative size of the transfer and its form are particularly relevant. The larger the transfer, the larger the shift in the demand curve.

A cash transfer determines an increase in beneficiaries' income. How much this is going to translate into increased demand for food depends on the income demand elasticity and price demand elasticity (see below). Assuming that the entire amount of the transfer is spent on food, the demand curve will shift from D_0 to D_1. If, instead, no share of the transfer is spent on food, there is no shift in the demand curve D_0. In the first case, the

[15] Throughout this document we make the assumption that authorities do not interfere in the market determination of prices.

equilibrium shifts along the supply curve S_0 from A to C, corresponding in an increase of the market price from P_0 to P_2. Under ideal market conditions, the price rise – or even the expectation of price rise – would induce traders to respond to increased demand by scaling up the quantities supplied from Q_0 to Q_1. Such a response would help to shift the supply curve from S_0 to S_1 re-establishing this way the initial equilibrium price P_0 but in correspondence of a higher equilibrium quantity Q_2. If only a share of the transfer is spent on food the same process above would still apply, but with reduced shifts in the demand and supply curves. This would correspond to a new price P_2' with $P_0 > P_2' > P_2$ which, in ideal conditions, will lead to a shift in the supply curve leading to a new equilibrium corresponding to equilibrium price P_0 and equilibrium quantity Q_1' with $Q_0 > Q_1' > Q_1$. It comes clear that any constraint on the supply side to scale up quantities marketed in accordance to the rise in quantities demanded deriving from the cash transfer will inevitably result in new equilibriums to be reached at higher prices. In other words, the capacity of the system, mainly, but not only, through trade, to respond to the increased demand will determine the price rise. The higher such capacity, the lower the gap between increase in demand and increase in supply, the lower the price rise, that is the rate of inflation.

Let us consider now the provision of a certain quantity Q_0Q_1 of food aid purchased outside the system considered in Figure 3.2. If the food aid is provided to hungry poor people who have no purchasing capacity to buy from the market, the transfer should not affect the equilibrium price P_0. In fact, the shift in the supply curve from S_0 to S_1, which reflects the physical increase of supply in the system, is only fictitious, as fictitious is as well the corresponding shift of the demand curve from D_0 to D_1 which reflects the increased income. In other words, provided that food aid responds to needs not expressed on the market (i.e. lack of purchasing capacity cannot generate any effective demand), the income transfer generated to the recipients through the provision of food aid will not affect the market. In such conditions, the market equilibrium is still at point A (Q_0, P_0), despite the presence of food aid in the system. If, instead, the recipients were to sell all the food aid received on the market, the supply curve would shift from S_0 to S_1 and the equilibrium would shift to point D corresponding to an increase in market supply (Q_1) and to a reduction in equilibrium price (P_1).[16] If recipients were to sell only a share of the quantity received, there would be a partial shift of the supply curve from S_0 towards S_1 and this would lead to new equilibrium conditions with $P_0 > P_0' > P_1$ and $Q_0 > Q_0' > Q_1$.

The points above show how important it is to know how recipients will make use of the transfer, being it in cash or commodities. In particular, it is essential to estimate how much the demand, particularly for staple food, will change after an income rise, generated either through a cash transfer or food aid. This is called the *income elasticity of demand*: According to whether an income rise leads to an increased or decreased consumption of a certain good, reflected in a shift of the demand curve, such good is said to have positive or negative income elasticity of demand. The *price elasticity of demand* expresses the sensitivity of quantities demanded to changes in market prices and, on the reverse, the sensitivity of prices to changes in the quantities demanded. The *cross-price elasticity of demand* is relevant when considering two products (either substitutes or complements). It is a measure of the responsiveness of quantity (price) demanded for one product to changes in the price (quantity) of the other product. The *price elasticity of supply* is similar to the *price elasticity of demand* but in this case expresses the responsiveness of the supply to price changes: in other words, the sensitivity of quantities to changes in market prices and, on the reverse, the sensitivity of prices to changes in the quantities supplied. While both income and price elasticity of demand refer to households and try to explain consumers' behaviour and their interaction with the market, price elasticity of supply refers to suppliers, in this case mainly traders, trying to explain how they take their decisions and therefore how they interact with the market.

The effects of food aid on the beneficiary's consumption of food and non-food will depend on the size of the ration as well as on the way it is used. The food ration is said to be *inframarginal* if its size is lower than the amount the household would have consumed in its absence; otherwise it is called *extramarginal*.

[16] In this case it is assumed that recipients sell food aid at market price. It is much more likely that food aid will be sold below market price, in which case the recipient will not be able to monetize the entire value of the income transfer received in the form of food aid, the difference being transferred to traders.

If the ration is inframarginal, it will affect consumption through an income effect only. On the other hand, if the ration is extramarginal, the situation is further diversified according to the conditions of eventual resale. If resale is feasible and occurs at market prices, the only effect is the income effect. If, instead, resale is not feasible or, anyway, entails high transaction costs, then the income transfer through such a food ration may have two effects: an income effect and a substitution effect.

The case of an extramarginal ration is illustrated in Figure 3.3. The quantity of food commodity X is shown on the horizontal axis and the aggregate quantity of all other goods (Y) is shown on the vertical axis. The budget line AB shows the maximum quantities of X and Y that the household could purchase with its budget before receiving assistance. Let $OX_{0'}$ be the quantity of food commodity received through the food ration. If we assume that the household consumes the full amount of the ration, the reception of food aid would let AB rotate around A and become horizontal, as in AR. Therefore, the new budget line is ARD, where RD is an outward shift of AB.[17]

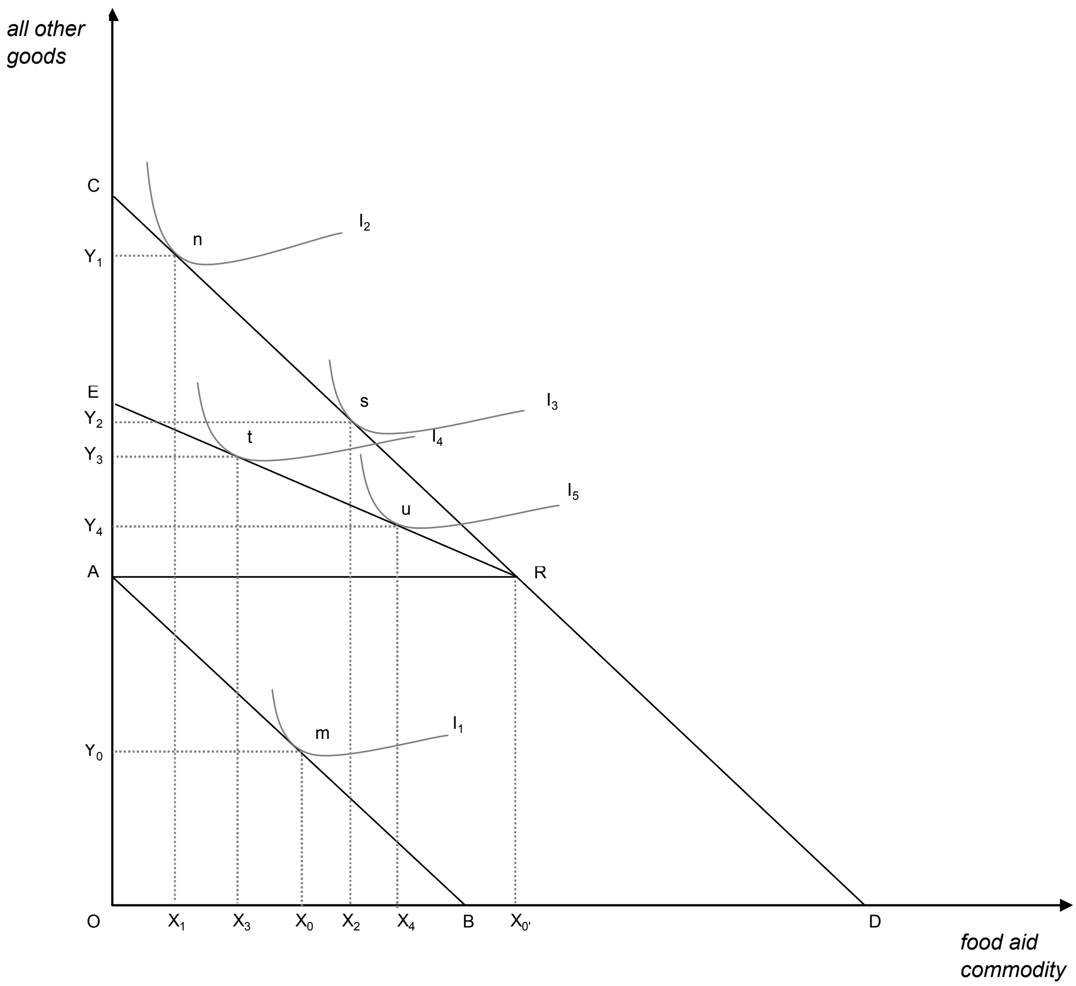
The situation would be different if the beneficiary were to sell the food aid received. In such case, the amount of resale and the conditions of resale would matter. If the recipient household could sell the entire ration at market price, the budget line would shift outwards in a parallel way passing through R. In such case the effect of income transfer would be equivalent to the income effect only, and any change in the amount of the commodity received as assistance would depend merely on the type of good: it would increase in the case of normal goods and it would reduce in the case of inferior goods.[18] Finally, if the resale price of the food aid commodity is lower than the market price, or if the resale entails anyway high transaction costs, then the upward portion of the budget line, RC, would become flatter as in RE and the new budget line would be represented by ERD. The lower the effective selling price, the flatter is going to be RE. On the other hand, RD is unaffected since the market price of the commodity remains

[17] The size of the shift is equivalent to AR and $OX_{0'}$, which is the amount of the food commodity received.

[18] Those goods for which demand increases as a result of an income rise are called “normal” goods; the opposite is the case of the so-called “inferior goods”.

unchanged. In such case the effect of income transfer would be the result of a combination of income and substitution effects.

Figure 3.3 Consumption effects of an extramarginal ration

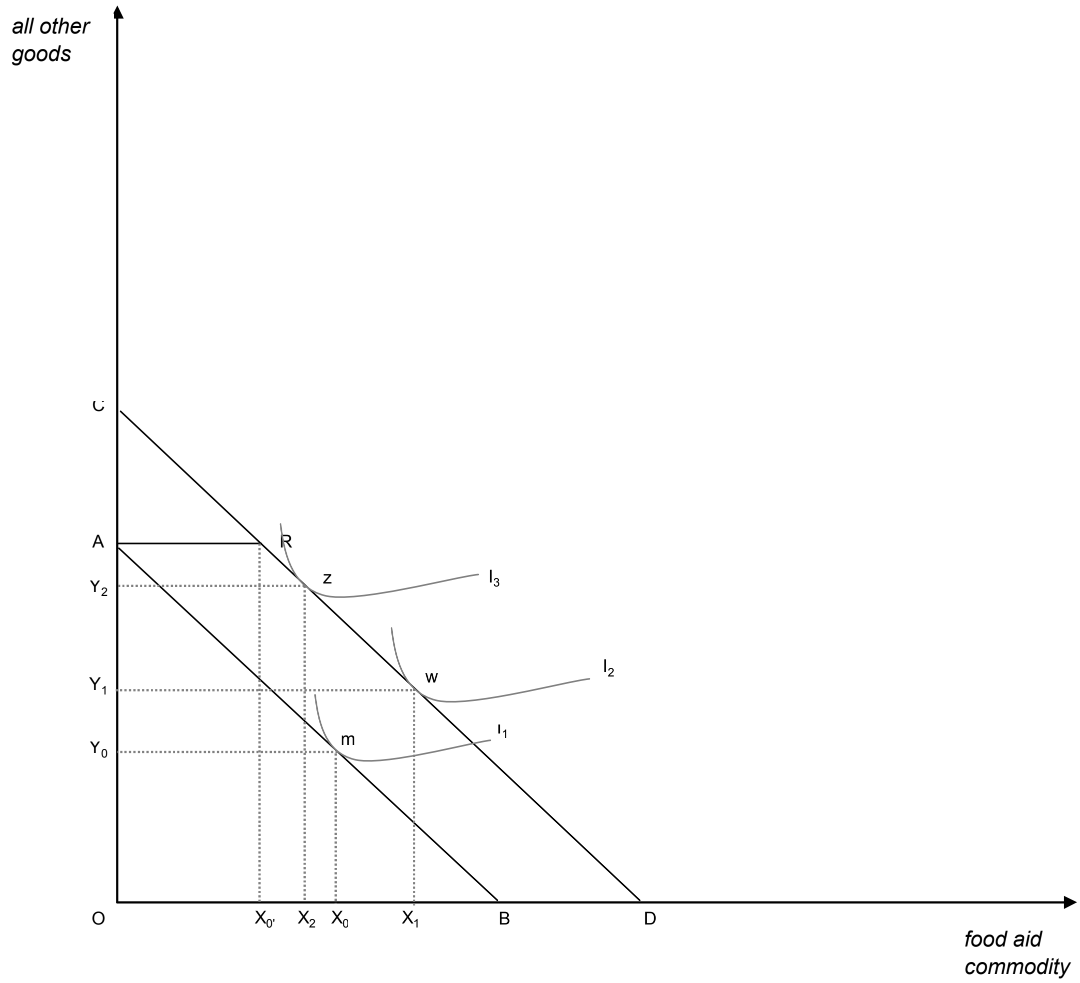


Each indifference curve I_1, I_2, … I_5, identifies the various combinations of X and Y that would give to the recipient equal satisfaction. In the original conditions, i.e. before receiving food aid, point *m*, the point of tangency between the budget line AB and the indifference curve I_1, identifies the optimum choice which corresponds to OX_0 amount of the commodity received as food aid and OY_0 amount of all other consumption goods. After receiving food aid, if the beneficiary is free to sell the food aid received at market prices points *n* and *s*, points of tangency between CD and I_2 and I_3, represent the optimum quantities of both X and Y in the case of inferior and normal goods respectively. Finally, if the resale prices are quite below market prices, points *t* and *u*, points of tangency between ER and I_4 and I_5, represent the optimum quantities of X and Y for inferior and normal goods respectively.

As mentioned above, in the case of an extramarginal ration, when resale is feasible and occurs at market prices the only effect is the income effect, as reflected by the parallel shift of the initial budget line AB to the new budget line CD. When, instead, resale is not feasible or occurs at below market prices the income transfer through such a food ration may have two effects: an income effect and a substitution effect. The substitution effect (of a price change of the food aid commodity) is always negative. On the other hand the income effect will vary according to the nature of the food commodity: in the case of an inferior good the income effect would offset part of the substitution effect, while in the case of a normal good it will reinforce it.

Figure 3.4 illustrates the case of an inframarginal food ration. The rationed quantity $OX_{0'}$ is less than the quantity of such food commodity consumed by the beneficiary before receiving assistance OX_0. As a result of the income effect of the transfer, the budget line AB shifts outward horizontally and becomes the new budget line ARD with a kink at point R. If the food commodity in this case is a normal good, the optimum choice for the beneficiary household will be given by, say, *w*, the point of tangency between the budget line ARD and the indifference curve I_2, which corresponds to OX_1 amount of the commodity received as food aid and OY_1 amount of all other consumption goods. If instead the food commodity is an inferior good, the optimum choice for the beneficiary household will be given by, say, *z*, the point of tangency between the budget line ARD and the indifference curve I_3, which corresponds to OX_2 amount of the commodity received as food aid and OY_2 amount of all other consumption goods.

Figure 3.4 Consumption effects of an inframarginal ration



The effects of a cash transfer on the beneficiary's food consumption depend on the way such a transfer is used. According to Engel's law, we can expect that the poorer the conditions of the recipient, the higher the share of the transfer spent on food or the satisfaction of other primary needs.

To compare cash-based and commodity-based transfers it is worth considering that the consumption effect generated through a cash transfer has equivalent value to the beneficiary as when a commodity transfer is fully sold at market prices. In general terms, with the cash received through the transfer or generated through the market resale, the recipient of a transfer is expected to increase his/her purchase of normal goods and to reduce the purchase of inferior goods.[19]

Regarding the supply side, much has been said on the impact of cash and particularly food transfers on the supply of food. Although not really settled as an issue, various studies seem to have found no evidence of displacement effect against food production or, more generally, food availability generated by the provision of food aid. In view of the market focus of the present study as well as of the temporal complications related to the production process, the present analysis neglects the implications for production and assumes that all changes in availability are due to trade factors. From this perspective changes in supply are linked to characteristics of the market environment as well as of market operators. Market signals, as well as the functionality and capacity of both market institutions and stakeholders are expected to affect elasticity of supply. Therefore besides issues of availability, the major determinants of supply elasticity are expected to be: the prices and functionality of price transmission mechanisms, transport and storage capacity, security, and access to credit. Business size is expected to be the most relevant characteristic of traders.

3.1.2 Market functioning and market integration

The market is essentially the encounter of demand and supply. Therefore, a measure of market functioning could be considered the extent to which supply manages to make demanded goods and services available at affordable prices. If markets work well, customers should be able to find what they need at prices that exceed traders' costs by reasonable margins. Conversely, insufficient quantities of demanded goods or their excessively high prices reflect the incapacity of the market to make supply and demand properly meet.

As Barrett (2001) puts it, market integration concerns the free flow of goods and information – and thus prices – over form, space and time. Vertical market integration

[19] However, it is worth considering that the same good can be normal or inferior for different strata of the population. In particular, a basic food commodity which has the characteristics of an inferior good for middle and higher strata of population may be a normal good for the poorest ones.

involves stages in marketing and processing channels, spatial integration relates spatially distinct markets, and intertemporal integration refers to arbitrage across periods. For the purposes of the present analysis we focus here on spatial market integration. From this perspective market integration is a measure of the extent to which markets in different areas are linked. When two or more markets are integrated, the flow of commodities among them reflects effective demand, price evolution reported for the same good is similar and price differentials are closely related to the transaction costs. Otherwise, they are not integrated but segmented or isolated.

As just mentioned, three characteristics can be identified to describe spatial market integration: similar patterns of price movements, equilibrium between quantities demanded and supplied, and size of profit margins. The last point highlights how integration is closely related to the concept of efficiency (Barrett, 2001; Moser, 2009). In particular, the following relationship should be observed:

$$\mathrm{E}\{p_{it}\} \le p_{jt} + \tau_{jit} \tag{3.1}$$

where:

p_t is the price of the same commodity at time *t* in location specified by *i* or *j*;

τ_{jit} is the total cost of moving the commodity from location *j* to location *i* at time *t*;

E is the expectation operator

In case (3.1) holds with equality, that is $\mathrm{E}\{p_{it}\} = p_{jt} + \tau_{jit}$, there is a condition of competitive equilibrium under tradability. This condition is defined as *Regime 1* in Baulch (1997).

A second possibility, defined by Moser (2009) as *segmented competitive equilibrium* and by Baulch (1997) as *Regime 2*, exists if $\mathrm{E}\{|p_{it} - p_{jt}|\} < \tau_{ijt}$, indicating unprofitable arbitrage.

Finally, there is a condition of imperfectly competitive equilibrium, defined as *Regime 3* in Baulch (1997), when $\mathrm{E}\{|p_{it} - p_{jt}|\} > \tau_{ijt}$, indicating positive expected returns from intermarket trade due to imperfect market behaviour.

Moser (2009) highlights a limitation of empirical price analysis when prices are known but that is not the case for either total transfer costs (i.e. τ_{ijt}) or the nature of market (dis)equilibrium (i.e. the operator relating $\mathrm{E}\left\{\left| p_{it} - p_{jt} \right|\right\}$ and τ_{ijt}), or both. In fact, common practice in testing market integration through time series analysis of price data relies on strong assumptions about total transfer costs, market equilibrium and quantities traded. However it is also commonly recognized that the paucity of data in developing countries makes empirical analysis of price time series still quite a valuable tool.

3.2 Analytical techniques

The following part presents methodologies for the estimation of elasticities of demand and supply and for the analysis of market integration.

The analysis of seasonal dimension is relevant with relation to the focus of the study. However, the data currently available to tackle such component are limited to price time series data which can contribute to assess how seasonality affects market integration, while data collection for the estimation of supply and demand has not been designed to take account of the seasonal dimension.

3.2.1 Elasticity of demand

For the purposes of our analysis, we focus on *income elasticity of demand* and *price elasticity of demand*. Whenever possible, the estimation of the *cross-price elasticity of demand* will contribute to the analysis.

Box 3.1 Main measures of elasticity of demand

Income[20] elasticity of demand (YED) measures the percentage change in demand caused by a one percent change in income. This can be visualized in Figure 3.2 as how a change in income causes the demand curve to shift reflecting the change in demand. YED is a measurement of how far the curve shifts horizontally along the X-axis. Mathematically YED = $(\partial Q / \partial Y)(Y / Q)$. The use of the partial derivative indicates that all other determinants of demand, including the price of the good, are being held constant. When YED is less than one (YED < 1) demand is income inelastic. When YED is greater than one (YED > 1) demand is income elastic.

Price elasticity of demand (PED) measures the percentage change in quantity demanded caused by a one percent change in price. Again, Figure 3.2 shows how a change in price induces a movement along the demand curve that reflects the change in quantity demanded. PED is a measurement of how far along the curve the movement is, or in other words, how much is the change of quantity demanded. Mathematically PED = $(\partial Q / \partial P)(P / Q)$. The partial derivative $\partial Q / \partial P$ indicates that all other determinants of demand are being held constant. PEDs are almost always negative. If the PED is less than minus one (PED < -1) demand is said to be elastic. If the PED is between minus one and zero (-1 < PED < 0) demand is inelastic and if PED equals minus one (PED = -1) demand is unit-elastic. A perfectly inelastic demand curve, perpendicular to Q axis, has zero elasticity. A perfectly elastic demand curve, horizontal to Q axis, is infinitely elastic.

Cross price elasticity of demand (XED) measures the percentage change in demand for the good in question caused by a one percent change in the price of a related good. A change in the price of a related good causes the demand curve to shift reflecting the change in demand; XED is a measurement of how far the curve shifts horizontally along the X-axis. Mathematically XED = $(\partial Q / \partial \mathrm{Pr}\, g)(\mathrm{Pr}\, g / Q)$ where $\mathrm{Pr}\, g$ is the price of the related good.

[20] Sometime elasticity of demand is considered with reference to expenditure rather than income. Unless otherwise specified, the two terms are used interchangeably here.

A few models are available for demand analysis. The simplest is a one-commodity model such as:

$$Ln\, q_i = \alpha + \beta_1\, Ln\, p_i + \beta_2\, Ln\, X_i \tag{3.2}$$

where:

q_i	is the quantity of the examined commodity demanded by the i^{th} household;
p_i	is the average price paid by the i^{th} household to purchase the commodity;
X_i	is the expenditure or income of the i^{th} household.

Such a simple model can be improved with: a) the introduction of an interaction term $Ln\, p_i\, Ln\, X_i$ to allow the price and income elasticity to vary, and b) some form of price index to capture eventual changes in the value of the monetary unit over the time frame considered.

The evolution of (3.2) is represented by the *Linear Expenditure System* (LES) model which a) moves from the use of generic income/expenditure variable X towards a more focused approach with the inclusion of total expenditure on a restricted set of goods being analyzed, and b) includes of a dedicated price index:

$$Ln\, q_i = \alpha_i + e_i \left(Ln\, x / P\right) + \sum_{k=1}^{n} e_{ik}^{*}\, Ln\left(p_k / P\right) \tag{3.3}$$

where:

q_i	is the quantity demanded of the i^{th} good;
p_k	is the nominal price of the k^{th} good;
x	is the total expenditure on the group of goods being analyzed;
e_i	is the total expenditure elasticity;
e_{ik}^{*}	is the cross-price elasticity of the demand of the i^{th} good on the price of the k^{th} good;

P is an index of prices of the goods considered.[21]

Both (3.2) and (3.3) are logarithmic models and therefore the coefficients estimated are directly interpreted as elasticities. However, the preferred model is the *Almost Ideal Demand System* (AIDS). Its simplified version, called *Linear Approximate of AIDS* (LA/AIDS) is the following:

$$w_{it} = \alpha_i + \sum_{j}^{n} \gamma_{ij}\, Ln\, p_{jt} + \beta_i \left(Ln\, x - \sum_{i=1}^{n} w_{i,t-1}\, Ln\, p_{it} \right) + u_{it} \qquad (3.4)$$

where:

w_{it} is the expenditure share of the i^{th} good;

p_{it} and p_{jt} are the nominal prices of the i^{th} and j^{th} goods respectively;

x is the total expenditure on the group of goods being analyzed.

A series of properties make (3.4) the preferred model.[22] However, the selection of models is affected by the purposes of the analysis as well as by the data available. If the purpose of the analysis is to consider the possible use of an eventual cash transfer, (3.3) and (3.4) may not be the most appropriate tools since they somehow impose the restriction that the increased expenditure (Δx) is limited among the categories of goods and expenses covered by x. This is not necessarily correct in the case of unconditional cash transfers and therefore (3.2) may be more appropriate.

In terms of data constraints, while (3.3) and (3.4) require information on prices and quantities of all the goods included in the basket under examination, (3.2) requires not only the price and quantity of the good (or goods) considered but also the total expenditure incurred. Sometimes some of these data may not be available or may not be collected through a survey due to shortage of time or other resources. In that case it is necessary to make the best use of secondary data and/or, if possible, proceed to some limited data collection through rapid appraisal techniques.

[21] In particular, $Ln\, P = \sum_{k} w_k\, Ln\, p_k$ where: w_k is the expenditure share of the k^{th} good.

[22] See Deaton *et al.* (1980a, 1980b) for a more in-depth discussion of the AIDS model.

3.2.1.1 Estimation of elasticities from rapid appraisal techniques data

Rapid appraisal techniques (RAT) do not aim to collect new data *per se*, or at least, the collection of new data is carried out in a succinct way which can provide a higher or lower degree of acceptability but cannot ensure any statistical significance that the value or range of values derived is representative of the true value of the unknown variable. However, in some circumstances rapid appraisal techniques are the preferred or even the only option available. The quality of data obtained through RATs varies with the standards of the technique adopted. In general, much care need to be taken when making use of data collected through RATs, although continuous improvements achieved in some of such techniques have managed to gain them remarkable recognition.

The Household Economy Approach (HEA) is probably the one that has managed to gain the highest recognition due to its capacity to reach a good degree of approximation in its estimations through the use of a systemic approach. HEA is a livelihoods-based framework for analyzing the way people obtain food, non-food goods and services, and how they might respond to changes in their external environment – for example a negative shock such as a drought or crop failure, or a positive policy change such as a cash transfer scheme.[23] It is a very useful source of information when trying to estimate income and price elasticities.

The main form of information gathering for HEA baselines is through semi-structured interviews with focus groups. In this way average key variables such as household food production, food consumption, sources of food consumed, ways to cope with shocks, and similar are estimated in a systemic fashion rounded on food. In order to maintain a certain homogeneity, wherever possible monetary values are converted into energetic values (expressed in kilocalories). This allows the researcher to come up with a reasonably good basic profile of average units within different, though reasonably homogeneous, groups which vary mainly in terms of wealth and livelihood characteristics.

[23] See Boudreau, 2008.

Due to the structure of the data set used (limited sample of average data with no measurable statistical significance) the application of models presented above for the estimation of income and price elasticity cannot provide valid results. Therefore it is necessary to resort to alternative methods to estimate some proxies.

As a proxy for income elasticity we can use what can be called *effective demand for food* estimated for each wealth group as the ratio between the market value of food consumed by the household and the sum of total household expenditure plus the market value of food produced for self-consumption by the household and that received as food aid:

$$\textit{effective demand for food} = \frac{\sum_{i=1}^{n} p_i q_i^c}{\sum x^f + \sum x^{nf} + \sum_{i=1}^{n} p_i q_i^s + \sum_{i=1}^{n} p_i q_i^a} \qquad (3.5)$$

where:

p_i is the market price of the i^{th} good;

q_i^c is the quantity of the i^{th} good consumed by the household;

x^f is the total household expenditure on food;

x^{nf} is the total household expenditure on non-food;

q_i^s is the quantity of the i^{th} good produced by the household for self-consumption;

q_i^a is the quantity of the i^{th} good received by the household as food aid or as gift.

Through (3.5) it is possible to estimate proxies for the income elasticity of different wealth groups. This could help to estimate how an eventual cash transfer will contribute to increasing the demand for food from a typical household of a specific group defined by a series of characteristics such as livelihood zone and wealth group.[24] The more specific the characterization of the groups for which (3.5) is calculated, the lower the discrepancy between the estimate and its true value can be expected to be.

[24] In this case the use of typical characteristics of livelihood zones and wealth groups provides a similar role as the one played by the inclusion of fixed effect in the usual conduction of demand analysis through conventional techniques.

Estimating price elasticity of demand on the basis of average data can be a little more complicated. An option is provided by the simulation of fictitious distributions based on the average values of each relevant variable assumed for each wealth group for each wider group identified by a set of characteristics such as livelihood zone. In other words, it is a process of imputation of *missing* variable values through some relationship among the assumed average values of such variable for the various wealth groups. The easiest such imputation is through linear interpolation. Such estimates may be refined through the adoption of the functional form which better fits the interpolated data.

The estimation process becomes a bit less fictitious, though still based on average data which are not statistically significant, when the initial RAT data collection design has included the simulation of possible price changes in the staple food commodity with the aim of analyzing the household's capacity to cope with possible price rises. If such data are available and sufficiently developed, they can provide a good basis for the estimation of price elasticity of demand.

Table 3.1 and Figure 3.5 help to clarify the procedure. Table 3.1 summarizes the results of simulations in the changes in share of food consumption covered by food staples purchased following changes in their price. The price changes simulated in this case range between -80% and 200%. The simulation has been repeated for the various wealth groups considered (i.e. very poor, poor, middle, better off). Knowing the average market price of staple food as well as average quantities purchased by a typical household, it is possible to estimate changes in Q related to changes in P. Then, values of $Ln\,Q$ are regressed against $Ln\,P$ to estimate the inverse of the price elasticity of demand. In the case of the Very Poor wealth group reported in Figure 3.5 the price elasticity of demand is given by the inverse of the coefficient of $Ln\,Q$ = 1 / -0.9853 = -1.0149. In this case the use of a loglinear model serves various purposes:

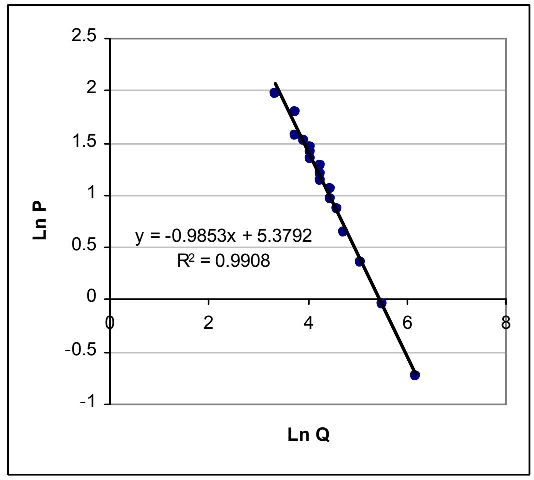
- it helps to reduce the relevance of outliers and improve the fitness of the model;
- it facilitates the estimation of elasticities;
- it reflects common practice in the literature.

Table 3.1 Share of food consumption covered by food staple purchase (%)

price change %	Very poor	Poor	Middle	Better off
-80	34	26	163	238
-60	17	13	81	119
-40	11	9	54	79
-20	8	7	41	59
0	7	5	33	48
10	6	5	30	43
20	6	4	27	40
30	5	4	25	37
40	5	4	23	34
50	5	4	22	32
60	4	3	20	30
70	4	3	19	28
80	4	3	18	26
90	4	3	17	25
100	3	3	16	24
150	3	2	13	19
200	2	2	11	16

(wealth group)

Figure 3.5 Relationship between LnP and LnQ for Very Poor wealth group



Source: Author's elaboration of HEA data from Swaziland VAC and FEG, 2007

At this stage it is worth considering some possible reservations about the approach adopted for the estimation of demand elasticities. On general grounds the methods proposed are sufficient to identify demand. First, data used for the estimation of effective demand do not directly capture market transactions. Furthermore, it is not limited to market transactions but includes non-market sources of food such as assistance, gifts and exchange. Having said the above, it must be recognized that reservations are justified the closer the focus of the analysis is to minimum nutrition requirements. From this perspective, in conditions of famine the typical demand-supply framework can provide biased estimations. Such bias is partially taken into account by HEA by focusing on changes in quantities demanded between times of famine and reference *normal* conditions. Therefore while in general the proposed RAT technique manages to achieve proper identification of demand, a certain risk of bias is acknowledged when food consumption in the case under investigation is close to minimum food requirements.

3.2.2 Elasticity of supply

For the purposes of the present study the analysis of supply is centred on the assessment of its expandability. A key step in such a direction is the estimation of price elasticity of supply (i.e. how the supply of a specific food commodity will change following a change in the commodity price) as well as of its determinants. Considering the market focus of our perspective, the aim of this part of the analysis is to try to establish the relevance of the trading sector in responding to the demand for food, and its flexibility to expand in response to an eventual increase in demand. It is proposed to do this through a traders' survey. The aim of the survey is to establish traders' profiles as well as assessing their capacity and willingness to scale up their business size. In particular, this study proposes a rather simple method of contingent valuation to estimate traders' capacity and willingness to expand the supply of food.

3.2.2.1 Traders' survey

A traders' survey should be able to provide a description of the traders operating in a certain geographical area and a specific sector. In principle, in order to be representative the sample drawn for the survey should be based on a complete knowledge of number and generic characteristics (mainly, typology[25] and size) of traders operating in the area of investigation and in its surroundings. However, this is normally not feasible in developing countries and therefore the sample is normally selected purposively, mainly on the basis of key informants' good knowledge. When the geographical area covered by the survey is not very large, such a limitation of the survey design can be reduced by increasing the sample size in order to cover a higher number of traders per location.[26]

[25] In this case, in terms of typology traders could be described as collectors, wholesalers, retailers, according to their role along the market chain.

[26] Donovan (2006) suggests that in each location the sample should include at least 10 traders, or 10% of traders operating in a large retail market, or at least five traders in the case of a wholesale market. WFP (2009) recommends interviewing a total of six traders, including two retailers, two wholesalers and two collectors, per location and per market chain.

The sample size needs to be increased when there is a suspicion of high heterogeneity among traders.

Besides the role played within the market chain, one of the descriptive bits of information detected through a traders' survey that is of particular relevance for the purposes of this analysis is the business size of each operator. Different sizes of business are expected to raise different type of constraints and may therefore play a certain role in contributing to traders' decision making. However, estimating business size is not so easy and even a group categorization such as *small*, *medium* and *large* is very context-specific. The method proposed in this case is quite rough, but acceptable for the purpose of the analysis conducted here, which is not aimed at an exact definition of the business size but rather its approximate classification. From this perspective, traders' business size can be estimated by considering the value of the few major commodities traded.[27] Such a value can be arbitrarily assumed to represent approximately half of the entire turnover eventually achieved by each individual. It is to be considered that the estimate derived this way is not necessarily the total business size of each trader but is rather the individual size of the trader's food trade business. Information on the composition of commodities traded in terms of food versus non-food may be collected through the survey; however, estimating the total business size of each trader is not considered relevant for the purpose of this analysis.

The estimation of traders' business size can also help to assess market structure and functioning. The analysis of market share estimates covered by individual traders or groups can help to estimate concentration ratios and therefore to consider the degree of competitiveness of the food marketing channels as well as the risk of collusion.[28]

[27] It is reasonable to assume that the number of most relevant commodities dealt with by a trader varies according to the degree of development of the market or geographical area under investigation. This consideration goes beyond the degree of specialization of a single trader and is focused on the degree of diversification of both the commodities traded in the market and the commodities consumed within the local community. Such a degree of diversification is expected to be higher the higher the development of the local economic system.

[28] Timmer (1983) suggests that the greater the number and the diversity of traders operating in a market, the lower the risk of collusion.

Box 3.2 Measures of market competitiveness estimated through a traders' survey

The higher the aggregate market share of a few large firms, the higher the concentration of trade activities and the risk of collusive behaviour. Therefore, the *Concentration Ratio* (CR_X) of the largest X traders in a market of N traders is given by:

$$CR_X = \sum_{i=1}^{X} BS_i \Bigg/ \sum_{i=1}^{N} BS_i \qquad (3.6)$$

where BS_i is a measure of the business size of the i^{th} trader.

The *Herfindahl-Hirshman Index* (HHI) assesses the degree of competition in a market by comparing the squared business size of each unit against that of the entire market. Assuming a market composed by N units, each unit i with a market share s_i, HHI is given by:

$$HHI = \sum_{i=1}^{N} s_i^2 \qquad (3.7)$$

The *Normalized Herfindahl-Hirshman Index* (HHI') is given by:

$$HHI' = (HHI - 1/N)/(1 - 1/N) \qquad (3.8)$$

HHI ranges from 1/N to 1 and HHI' ranges from 0 to 1.

3.2.2.2 Willingness to trade and constraints to scaling up supply

The use of contingent valuation has mainly focused on the estimation of consumers' willingness to pay for a specific service or good. Although the validity of contingent valuation studies for supply estimates has been the subject of much academic debate (e.g. Hausman, 1993; Weinshenk, 1994), it is commonly agreed that such a methodology provides at least an approximation of true behaviour. A condition for its application is that, similar to consumer surveys about public goods, the contingent scenario places the respondents in a hypothetical market situation, meaning that the marketed supply is not fixed but can be decided by the decision maker. The approach proposed here is not limited to the estimation of traders' *willingness to trade* (WTT), but will refer such choice to specific increases in price levels. Therefore the hypothetical bias inherent in contingent valuation studies (Green and Tunstall, 1999) is minimized because the options considered reflect real scenarios.

A preliminary step in the analysis has tried to determine availability and access to critical inputs. In fact, it goes without saying that traders' confidence in accessing a sufficient amount of critical inputs such as food commodities in particular would constitute a necessary precondition for the feasibility of a cash-based initiative.

Through the traders' survey it is possible to find out traders' willingness to scale up their supply as well as to investigate the eventual constraints to doing so that they may face. The number of possible reasons for the acceptance or rejection of traders' interest in scaling up their business can vary from case to case, but the most relevant for our analysis can be reduced to the following five:

- prices
- security
- roads and accessibility
- credit
- storage facilities.

In particular, the variability of prices is instrumental to the analysis of possible consequences of increasing demand, in this case limited to food items. The analysis of traders' *willingness to accept* to scaling up their activities should help to consider the feasibility of expanding and adapting supply to the estimated increased demand and concurrently estimating the possible risk of inflation.

The analysis can be carried out through multivariate regression. Since the decision to start or scale up own business size can be considered a dichotomous choice problem, it is possible to carry out econometric estimation through the application of limited dependent variable models. This type of non-linear statistical model relates choice probability to explanatory factors. In the present case the objective is to estimate the probability that traders are willing to start new activities or scale up their existing activities conditional upon specific trade and trader's characteristics. The present analysis focuses on business size for what concerns the trader's characteristics and on the factors highlighted above as major determinants of business size. In order to do this a model is required that is able to reflect the adoption of a certain set of behavioural responses which are empirically observed. This 'adoption behavioural model' with binary dependent variables can provide a conceptual framework to examine variables that are associated with the adoption of certain behaviour and eventually provide a stimulating role in such respect. Although ordinary least squares estimates can be computed for binary models, the error terms are likely to be heteroskedastic leading to inefficient parameter estimates and thus making inappropriate classical hypothesis tests. Probability models can be of help in overcoming such a constraint. In particular the *logit* model has been applied in this study. The use of the logit model, which gives maximum likelihood estimators, helps to overcome most of the problems associated with linear probability models and provides parameter estimators which are asymptotically consistent, efficient and Gaussian so that the analogue of the regression *t-test* can be applied (Pindyck *et al.*, 1981).[29]

The adoption behavioural model used to examine factors influencing traders' WTT can be presented as follows:

$$Y = f\left(I\right)_i \qquad (3.9)$$

$$I_i = b_0 + \sum b_j \, X_{ji} \qquad (3.10)$$

[29] The logit model, based on the cumulative logistic probability function, is computationally easier to use than other similar models, such as the *probit* and *tobit*.

where:

Y_i is the observed response for the i^{th} trader (Y_i=1 for a positive response, Y_i=0 otherwise);

I_i is an underlying and unobserved stimulus index for the i^{th} observation;

f is the functional relationship between the field observation (Y_i) and the stimulus index (I_i) which determines the probability of strategy adoption;

i identifies observations on variables for the adoption model (i = 1, 2, …, n, n being the sample size);

X_{ji} is the j^{th} explanatory variable for the i^{th} observation (j = 1, 2, …, n);

b_j is an unknown parameter (j = 0, 1, …, n);

j identifies the explanatory variables (j = 0, 1, …, m, where m is the total number of explanatory variables).

The logit model assumes that the underlying stimulus index (I_i) is a random variable which predicts the probability of adopting a certain strategy. Such probability can be expressed as:

$$P_i = \frac{e^{I_i}}{1+e^{I_i}} \tag{3.11}$$

Therefore, for the i^{th} observation (i^{th} trader), equation (3.10) expressed through a logit model becomes:

$$I_i = Ln\frac{P_i}{1-P_i} = b_0 + \sum b_j X_{ji} \tag{3.12}$$

On the basis of such a model, the relative effect of each explanatory variable (X_{ji}) on the probability of strategy adoption can be measured by differentiating with respect to X_{ji}:

$$\frac{\delta P_i}{\delta X_{ji}} = \frac{e^{I_i}}{\left(1+e^{I_i}\right)^2} * \frac{I_i}{X_{ji}} \tag{3.13}$$

Finally, the interpolation and linearization of the WTT rates estimated in correspondence of different rates of price increase allow the estimation of the WTT multipliers.

3.2.2.3 Price elasticity of supply

Since the survey is able to provide only a snapshot of the reality, the existing variations in price at the time of the survey are insufficient to generate the amount of information required to simulate an increase of quantity demanded. The best way to fill such a gap is to run a simulation exercise by proposing a set of price changes and ask the interviewee for his/her most likely response on the basis of his/her current/expected capacity.

To do so the following model can be used for the estimation of the elasticity of supply:

$$Ln\, q_{ijn} = b_0 + b_1\, Ln\, p_{ijn} \tag{3.14}$$

where:

q_{ijn} is the quantity of the n^{th} commodity supplied by the i^{th} trader in the current (j=0) or simulated (j=1, 2) situations corresponding to the j^{th} price change;

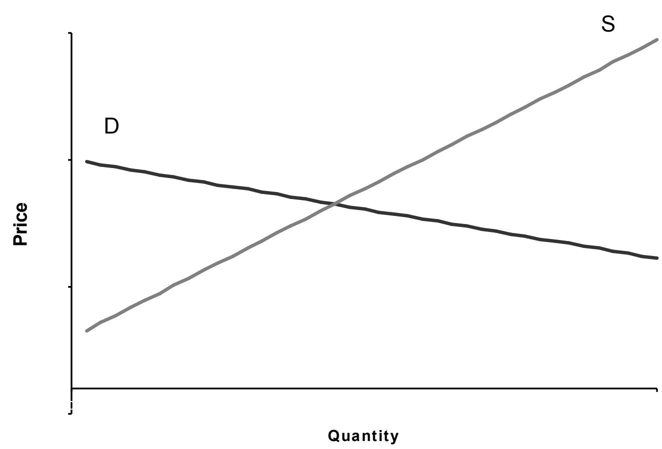
p_{ijn} is the current (j=0) or desirable (j=1, 2) price of the n^{th} commodity as expressed by the i^{th} trader.

In case of high variation in traders' business size and capacity in general, the analysis can be diversified to capture different attitude to price changes from different typologies of traders. The simplest way to do this is through the use of dummy variables in (3.14). An alternative way to carry out such analysis would be through the use of a multiple logit model.

3.2.3 Simulation of intervention strategies through a demand-supply framework

Once the elasticities of demand and supply have been estimated, they can be combined to simulate intervention strategies and particularly to try to estimate the eventual inflationary consequences that can be expected from such strategies. Figure 3.6 presents the supply and demand curves estimated on the basis of the inverse elasticities as measured above. Since the focus of the intervention is the poorest strata of the population, it is wise to estimate the demand curves on the basis of the average inverse elasticity for very poor groups of households, the target of eventual interventions.

Figure 3.6 Demand and supply curves



At the equilibrium point demand equals supply, therefore both demand and supply specifications have to be analyzed simultaneously. In simultaneous equations systems some of the independent variables in a regression may be correlated with errors.[30] In such a system there is a contemporaneous feedback between endogenous variables and therefore the Ordinary Least Squares technique does not provide unbiased and consistent estimates. Various possible estimation techniques can be applied in this case.[31] It is recognized how the proposed approach for the simultaneous estimation of Demand and Supply does not control for the interdependence between the two functions. In addition it is recognized that some unobservable variables may affect both functions.

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[30] Thus violating the fourth Gauss-Markov assumption.

[31] In the Three Stages Least Squares technique the Instrumental Variable approach is used first and this is followed by a Generalized Least Squares approach.

If demand elasticities have been estimated through RATs on the basis of average data, once again it is necessary to follow a more pragmatic approach. This can be summarized in a few steps, which are described below.

The first step is the estimation of the increased demand eventually induced by a potential cash transfer. The best way to do this is by establishing scenarios derived from the estimates provided in previous phases of the analysis, mainly the share of increased income/expenditure following the cash injection which is spent on food by the poorest strata of the population. Unless cross-price elasticities have been estimated, the simplifying assumption is made that all additional demand for food is covered by staple food. This monetary amount is converted into physical quantities on the basis of the average market price of the staple commodity (or commodities) considered. Obviously, in the case of a cash transfer programme the additional quantities would rise with the amount of the transfer and the number of beneficiaries, as well as with the number of distributions in the case of interventions protracted over time. Therefore the daily amount of per capita physical demand increase estimated so far is adjusted by the size of the prospective caseload and foreseen duration. Such estimates are based on the assumption of constant prices, and more realistically can be considered as the maximum increase in possible additional quantity demanded.

At this stage, for the analysis of expandability of supply it is possible to make use of the multipliers estimated earlier for the various categories of traders. In this case we need an estimate of the normal market supply. Unless there are reliable estimates of market supplies provided by traders[32] or other market operators, the assumption can be made that the quantity purchased by the households in normal conditions in a certain market *is* the average quantity which corresponds to the equilibrium price. Being the equilibrium quantity, this amount also corresponds to the average tonnage handled by the various suppliers and traders in normal conditions. In other words, on the assumption of the supply-demand equilibrium, we use demand-related data as the basis for the estimation of normal market supply. It goes without saying that such estimate is an approximation in defect, since it is reasonable to assume that quantities supplied by traders supply the market with greater quantities than are actually sold. Converting the

[32] Traders’ avoidance of direct questions about the size of their business is well known. See Harris, 1992

quantities of all food commodities into the cereal equivalent and multiplying the average daily individual purchase of the different wealth groups by the estimated number of household within each group, it is possible to estimate the aggregated supply-demand equilibrium quantity over a certain period. These amounts can be arbitrarily split among the various traders' business sizes and form the basis for the analysis of expandability of supply.

The final stage of the simulation exercise associates possible market price increase rates with likely increases in marketed supply. Arranging such data in a matrix form allows quick estimation of the range of inflation rates that can be reasonably expected from the eventual injection of cash in the local economy. This tool can assist in selecting intervention measures (e.g. commodity-based, cash-based, mixed, etc) or fine-tuning details such as caseload of recipients, duration of the programme and amount of the transfer.

3.2.4 Market integration

In this study the analysis of market integration makes use of time series data. In order to study the interdependence of price time series between any pair of markets *i* and *I*, we can refer to a linear relationship of the type:

$$p_{it} = \theta_1 + \theta_2 \, p_{It} + u_t \tag{3.15}$$

where:

p_{it} represents the retail price prevalent on market *i* at time *t*;

p_{It} represents the retail price prevalent on market *I* at time *t*;

u_t represents the error term;

θ_1 and θ_2 represent the coefficients to be estimated.

As is typical of time-series analysis, in order to be co-integrated p_{it} and p_{It} need to satisfy the following two conditions:

- both variables need to be difference stationary: I(1);
- the residuals from the regression of the two variables need to be stationary: I(0).

When this occurs the two price series and consequently the two markets are said to be co-integrated.

In order to test the condition of stationarity, the Augmented Dickey-Fuller (ADF) unit root test is applied. In a second step, the ADF test is applied to the series of residuals u_t of the two initial time series.

Once the condition of stationarity of the series and their co-integration are verified, the analysis can move on to consider the following model known as the Error-Correction Model or Error-Correction Mechanism (ECM):

$$\Delta p_{it} = \alpha_1 + \alpha_2 \Delta p_{It} + \alpha_3 \left(p_i - \theta_1 - \theta_2 p_I \right)_{t-1} + u_t \tag{3.16}$$

where Δ indicates the change in price in market *i* or *I* between one period and the previous one (*t* and *t-1*).

The model above can be interpreted by considering how traders adjust the price of their merchandise from one period to the next in response to changes in concurrent prices on other relevant markets (in this case indicated by: Δp_{It}) as well as to the previous disequilibrium between the price prevalent on their market *i* and the prevalent price on market *I*. From this perspective the coefficient α_2 measures the short-run effect in the process of price change and the coefficient α_3 measures the speed of adjustment of price on market *i* to a discrepancy between p_i and the price prevalent on what we could call the reference market (p_I) in the previous period.

At this stage the half-life index *h* can be used to achieve a summary measure of the process of price transmission, which is particularly useful for comparative purposes. The *h* index measures the number of time units required for the process of price change in one market to take effect in the other market, per each pair of markets, before restoring half of the long-run equilibrium between their prices. This is measured as:

$$h = \frac{\ln(1/2)}{\ln(\hat{\beta})} \tag{3.17}$$

where $\hat{\beta}$ is the estimate of β, the coefficient of the lagged price difference in:

$$p_{it} - p_{It} = \alpha + \beta\left(p_{it-1} - p_{It-1}\right) + u_t \tag{3.18}$$

The *h* index results are particularly useful in order to derive a combined picture of the characteristics of the adjustment process and facilitate comparisons. Such a combined view is provided by the ratio θ_2 / h.[33]

In addition to the above, the Granger causality test is used to verify the presence and direction of *causality*. Per each couple of markets it can test: 1) whether price changes experienced in one market have induced or influenced price changes in another market; 2) whether any influence is unidirectional or bilateral. With reference to the two equations:

$$Y_t = \sum_{i=1}^{m} \alpha_i Y_{t-i} + \sum_{j=1}^{m} \beta_j X_{t-j} + u_t \tag{3.19}$$

$$X_t = \sum_{i=1}^{m} \gamma_i Y_{t-i} + \sum_{j=1}^{m} \delta_j X_{t-j} + v_t \tag{3.20}$$

there are four possible cases:

(1) Unidirectional causality from X to Y (X is said to "Granger-cause" Y):

[33] Goletti (1994) provides a very simple and clear example in support of the use of the ratio between size of adjustment and time to complete the adjustment: *"Given two markets A and B with the same value of the magnitude of price adjustment with respect to a third market C, then the lower is the time to complete this adjustment, the better integrated the market"*.

In this case past values of X have an effect on current values of Y (i.e. β_i's not all zero), but past values of Y have no effect on X (i.e. δ_i's all zero).

(2) Unidirectional causality from Y to X (Y is said to "Granger-cause" X):

β_i's all zero; δ_i's not all zero.

(3) Bilateral causality:

β_i's not all zero; δ_i's not all zero.

(4) Independence:

β_i's all zero; δ_i's all zero.

3.3 Field activities

The following section is a description of field activities related to the case studies.

3.3.1 Selection of case studies

Since the aim of this study is to test the relevance of the context and, in particular, market functionality in supporting the preference for one or another intervention strategy, it is appropriate to refer to specific case studies reflecting real conditions in order to test theoretical positions. In the early stages of this study it was considered appropriate to use three case studies to achieve this purpose. In order to reduce the author's personal preference, the selection of the three case studies was determined by the demand for such studies from the practitioners' community. In fact, all three case studies were carried out by the author in response to specific requests raised by either NGOs or donors. Table 3.2 summarizes the fieldwork by commissioner, time and location.

Table 3.2 Fieldwork

Area	Commissioner of study	Period of fieldwork
Turkana, Kenya	OXFAM	December 2005
Lubombo and Shiselweni, Swaziland	SC	July 2007
Northern Bahr el Ghazal and Lakes, Southern Sudan	EC – DG ECHO	February – March 2009

The three contexts analyzed through the three case studies provide a good combination of different contexts in which a choice between response options is normally faced. On one hand there is Turkana, a district of Kenya characterized by a chronically low level of development and very limited resources, while on the other are two districts in Swaziland with much higher living and economic standards but affected – as is the entire country – by a certain long-term recession. Finally, the case of Southern Sudan is somewhere between the two extremes, in some ways closer to Turkana but also currently undergoing the initial stage of a process of generalized reprise after a long civil conflict.

It is hoped that setting the analysis in such a diversified set of contexts can highlight the relevance of contextual factors for the effectiveness and efficiency of alternative intervention strategies.

3.3.2 Summary of data and data sources

As the research focuses on the relevance of market functioning in different contexts, the analysis is articulated at different levels, some relevant at country level and others at a comparative multi-country level.

Overall, the approach proposed as the most appropriate to assess the feasibility of cash transfers and to compare alternative response options through market analysis is composed of three components:

a) estimation of income and price elasticity of demand;
b) estimation of price elasticity of supply and its determinants;
c) estimation of market integration.

To cover these tasks, a combination of secondary and primary data have been used.

Demand elasticity has been estimated through:

a) secondary data from recent HEA,
b) primary data collected through a household survey.

The aim of the household survey was to test the validity of HEA data and mainly to integrate existing data with aspects not yet covered (i.e. simulation of recipients' use of an eventual cash transfer).

Supply elasticity has been estimated through:

a) primary data collected through a trader survey.

The estimation of market integration has made use of secondary data: a time series analysis of market price data.

A list of data sources is provided in the overview table below.

Table 3.3 Data and data sources

Area	Type of data		Source
Kenya	*Supply analysis*		
	Trader survey in Turkana and neighbouring areas	Primary	Author
	Price analysis		
	Time series for Turkana	Secondary	ALRMP

	Time series for RoK	Secondary	CBS
	Time series for Uganda	Secondary	RATIN, RATES, TRADENET
	Market prices prevalent at time of fieldwork	Primary	Author
	Demographics		
	Time series of population data in Turkana	Secondary	CBS
	Malnutrition		
	Series of nutritional data in Turkana	Secondary	ALRMP
	Dietary energy supply		
	Estimate for Kenya	Secondary	FAO
	Food aid deliveries		
	Time series of food aid in Turkana	Secondary	WFP
	Perceived impact of CFW and GFD		
	Survey	Secondary	OXFAM
	Cost of food aid		
	Project budget	Secondary	WFP, OXFAM
Swaziland	*Demand analysis*		
	Household economy (HEA)	Secondary	VAC, FEG
	Household survey in Lubombo and Shiselweni	Primary	Author
	Supply analysis		
	Trader survey in Lubombo, Shiselweni and neighbouring areas	Primary	Author
	Price analysis		
	Time series for Swaziland	Secondary	CSO
	Time series for South Africa (SAFEX) and neighbouring countries	Secondary	SAFEX, FEWSNET, Dradri
	Market prices prevalent at time of fieldwork	Primary	Author
	Food production, dietary energy supply, malnutrition		
	Time series of cereal production	Secondary	FAO / WFP

	Time series of dietary energy supply	Secondary	FAO
	Time series of other nutritional data	Secondary	FAO
	Distribution of food insecurity by socio-economic group	Secondary	VAC
	Cost of food aid		
	Project budget	Secondary	WFP
Southern Sudan	*Demand analysis*		
	Household economy (HEA)	Secondary	LAF
	Household survey in NBeG and Lakes	Primary	Author
	Supply analysis		
	Trader survey in NBeG and Lakes	Primary	Author
	Price analysis		
	Time series for Southern Sudan	Secondary	WFP
	Time series for USA	Secondary	FAO
	Market prices prevalent at time of fieldwork	Primary	Author
	Food production, food consumption, malnutrition		
	Time series of cereal production	Secondary	FAO / WFP
	Estimate of food consumption	Secondary	FAO / WFP
	Time series of nutritional data	Secondary	FAO / WFP
	Cost of food aid		
	Project budget	Secondary	WFP

3.3.3 Approaches used for sampling

Table 3.4 shows the sample size used for primary data collection in the various case studies.

Table 3.4 Sample sizes

	on site			surrounding areas	total
Trader survey					
Kenya	205			47	252
Swaziland	186	94	Lubombo	49	235
		92	Shiselweni		
Southern Sudan	373	150	NBeG	0	373
		223	Lakes		
Household survey					
Kenya	0			0	0
Swaziland	490	360	Lubombo	0	490
		130	Shiselweni		
Southern Sudan	557	248	NBeG	0	557
		309	Lakes		

Since in all cases the total population of food traders was unknown, any sophisticated sampling technique was bound to add nothing more than false rigour. Instead, the sampling for the traders' survey was purposive, relying heavily on the enumerators' knowledge of the local area. The enumerators were instructed to cover a certain number of local markets identified along both major and minor trade paths, as well as bus stops and other meeting points and localities where food transactions occurred. They were also instructed to interview traders spread across all functional levels of trade, ranging from very small-scale retailers through mobile intermediaries to large-scale wholesalers. As such it is felt that although the surveys cannot be considered representative of the traders' communities in the various case studies, such a limitation is somehow balanced by the consideration that in each case the sample size is large enough compared to the assumed population.

Sampling for the household survey was slightly different. The main aim of the household survey was to cover a wide spectrum of income levels while minimizing financial and time costs. Additional household characteristics considered determinant in the choice of the location were different in the various case studies (e.g. beneficiaries of food assistance, status of returnees/displaced/sedentary or nomadic, etc). Therefore, in the absence of any recent census data and/or data related to the distribution of the various categories of households, the selection of geographical units within the focus areas mainly relied upon expert knowledge from key stakeholders (i.e. key informants from central and local administrative offices, members of bodies mandated to livelihoods and vulnerability analysis, NGOs, CBOs, etc). In each location chosen through such a first stage, households were selected through systematic sampling. It is acknowledged that since beneficiary and non beneficiary households are different a comparison between the two is not unbiased.[34]

3.3.4 The author's role

The role of the author has been essential in all parts of the research, from the early design of the structure of the first case study to the comparative analysis of the three case studies.

In particular, the author:

a) has developed the research strategy followed in parallel through each case study. In particular he has developed the approach used to estimate the supply elasticity and proposed and field-tested the use of the traders' *willingness to trade* as a tool to estimate the likely rate of inflation to be expected from a certain injection of cash in the local economy;
b) has adjusted available household data (essentially provided in average form through HEA datasets) for the estimation of demand elasticity;[35]

[34] It is expected that beneficiaries were initially selected to participate in the programme because more in need than those who were not selected.

[35] This refers only to the Swaziland and Southern Sudan case studies. As indicated above, the bulk of each case study is reflected in the estimation of demand, supply and market integration. The first case

c) has designed the questionnaires for all the various activities of primary data collection, be they market prices, household data, traders' data;
d) has trained enumerators and piloted the data collection in each case study;
e) has trained the data-entry staff;
f) has supervised data collection and data entry;
g) has conducted all data analysis, both related to each case study and to the aggregate dataset;
h) has carried out all reporting activities.[36]

study (Turkana, Kenya), where the estimation of elasticity of demand is omitted, is an exception. This omission is justified by the total reliance of local demand for cereals on external inputs, through either food aid or commercial channels.

[36] In the case of Southern Sudan, the market analysis conducted by the author, was part of a wider assessment conducted by a team led by the author.

4

Kenya: Turkana

4.1 Background

4.1.1 Introduction

The regular recurrence of major droughts in Kenya during the past few decades has raised concerns over the provision of food aid as the standard response. The chronic nature of good size of food insecure people has raised concerns over the appropriateness of emergency response to what have become “predictable needs”. And the consideration that predictable needs can be met more effectively with predictable resource flows has led to direct efforts towards the introduction of the Hunger Safety Net Programme (HSNP).

The present case study was conducted as part of wider efforts in preparation of the HSNP. It is focused on the analysis of market functioning in one of the districts selected to pilot the implementation of the HSNP and where some pilot cash-based activities had already been attempted.

This case study is organized as follows. The initial part provides a review of the context and the justification for assistance. After an analysis of market functioning through a review of market behaviour, the focus shifts the estimation of the demand for and supply of food. This will allow the simulation of a cash transfer strategy.

4.1.2 Demographics and food requirements

On the basis of official statistics, in 1999 the population of Turkana district in Kenya was estimated at 447,000 individuals. According to more recent reports, the Turkana population in 2005 was estimated to be around 510,000 people, apparently reducing the high demographic growth recorded in the 1990s.[37]

In the absence of a specific estimation of daily food consumption in Turkana, we can make reference to the average estimate of daily food consumption in Kenya, with the understanding that such estimation is clearly in excess of the case in Turkana. On such a basis, it is useful to make reference to FAO estimate of Dietary Energy Supply (DES), estimated at 2,110 kilocalories per person per day in the case of Kenya.[38] We can use DES as proxy for estimation of food requirements.

Once established estimates for both population and DES as proxy for food requirements, we can infer food demand by converting kilocalories into cereal equivalent. Table 4.1 provides all such estimates. Given that in Turkana standards of

[37] It is worth noting the remarkable demographic increase that has occurred in Turkana during the recent three decades, as depicted by the snapshots provided by the three Population Censuses carried out in 1979, 1989 and 1999 and by the subsequent projections:

Population in Turkana district	1979	1989	1999	2005'
	143,000	184,000	447,000	509,286

' projection

Source: Government of Kenya, Central Bureau of Statistics, Statistical Abstract 2004, pag.24; projection from http://www.knbs.or.ke/

From the above it can be assumed that the annual growth rate increased between the 1980s and the 1990s from 2.8% to 9.2%. However, a more realistic explanation would lead us to assume an under-enumeration in the 1979 and 1989 censuses.

[38] See FAO, The State of Food Insecurity in the World, 2004, pag.38

food consumption are expected to be below the national average, the estimate was carried out as well on the assumption of a lower DES level, arbitrarily fixed at 1,900 kilocalories per person per day, equivalent to 90% of national average.[39]

Table 4.1 Estimated food requirements in Turkana in 2005

DES	Cereal equivalent requirements	
kcal / person / day	kgs / person / day	MTs / year
2,110	0.630	117,275
1,900	0.567	105,547

Source: Author's estimates

From Table 4.1 it seems reasonable to consider the annual food requirements in Turkana to be within the range of 106,000 to 117,000 MTs of cereal equivalent.

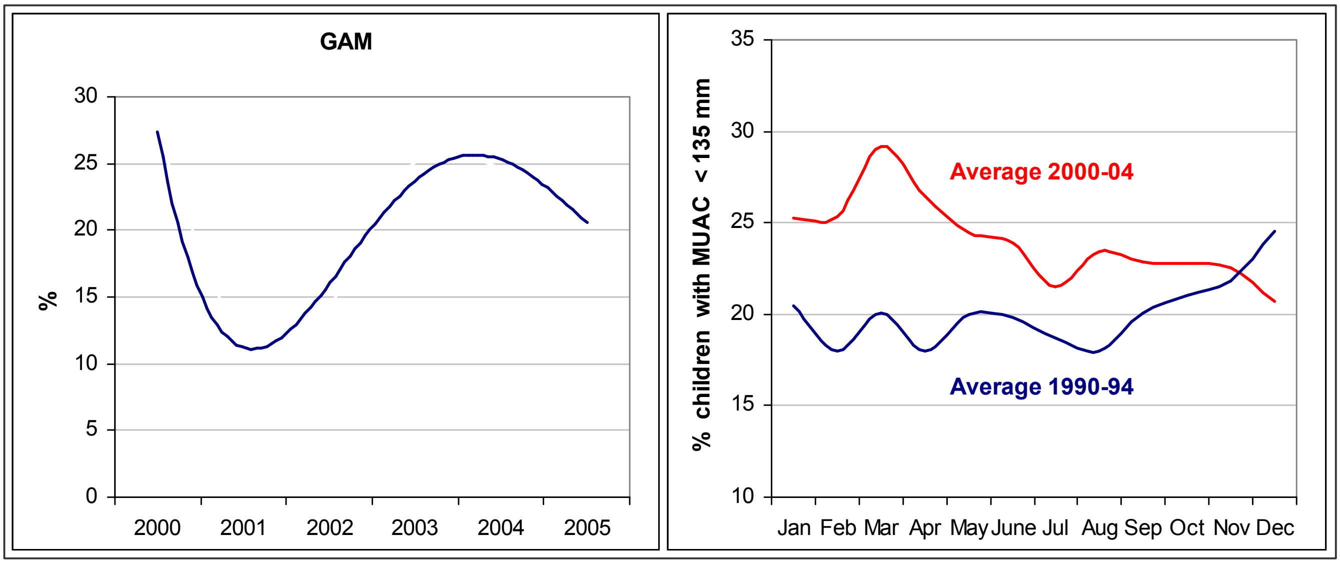
4.1.3 Trade, food security and nutrition

The economy of Turkana is extremely limited and predominantly based on trade, as is typical for a pastoral society. Therefore, trade is the backbone of food security and, as such, major determinant of food supply and, consequently, of nutritional status.

[39] On the basis of population age composition, a breakdown of nutritional requirements could be:

Age group (years)	Kcal / person / day
0 – 14	1,620
15 – ω	2,040

Figure 4.1 Changes in nutritional status in Turkana



Source: Adapted from McKinney, ALRMP / OXFAM, (2005)

Figure 4.1 provides a summary overview of magnitude and trends in malnutrition in Turkana.[40] In particular, it shows how high malnutrition rates are recurrent in Turkana and how a long-term view does not seem to show a favourable trend. It is interesting to mention the analysis carried out by McKinney (ALRMP / OXFAM) who has managed to highlight the changes in nutritional status occurred in Turkana in the latest 15 years. In particular, comparing the magnitude and trend of malnutrition measures as the middle upper arm circumference (MUAC) between the early nineties and the initial five years of the current decade, he notes "the general shift upwards in the percentage of children falling below the MUAC 135mm cut-off. This seems to be in spite of the large EMOPs[41] during 2000-2002."

In order to better appreciate the link between trade, food security and nutrition, following up on McKinney's analysis, a simple review of trends of cereal prices,

[40] The smoothed evolution of GAM estimates is based on the average of a set of 35 anthropometric surveys all conducted to the standard methodology of 30x30 two-stage random cluster sampling.

[41] The acronym EMOP stands for Emergency Operation, which is the major channel of food aid in Turkana.

livestock prices and malnutrition rates was carried out.[42] In particular, time series (years: 2000-2005) of indexes were generated and correlated. As in Table 4.2, the correlation between the three indexes (CI: cereal prices; LSI: livestock prices; NI: malnutrition rates) gives a good picture of the strong link between cereal market and livestock market (with almost 70% of variability of each index explained by the other) as well as of the remarkable link between livestock market and nutrition (around 60% of variability explained). The link between cereal market and nutritional status seems to be left behind, though still on reasonable values: 40%. However, given that malnutrition is often considered a late indicator, the correlation among the three indexes was repeated with the inclusion of increasing monthly lags (from t_0 reflecting the case of no time lag to t_{11} in the case of 11 month lag).[43] Table 4.2 and Figure 4.2 help to clarify the point and highlight that the gap which helps to maximize the correlation is of five months in the case of the livestock price and six months in the case of the cereal price. This is surprising, since the time lag estimated is longer than expected; but at the same time a few consideration are of high interest:

- Both the cereal and livestock market evolution seem to be quite good predictors of malnutrition, being able to explain in both cases more than two thirds of variation in nutritional status.
- In comparative terms, the predictive value exercised by livestock price is stronger (higher and quicker to reach its maximum value), but the improvement of the predictive value is stronger in the case of the cereal price index (approximately 50% increase in six months).

[42] Data source is the database of the Government of Kenya (GoK) Arid Land Resource Management Project (ALRMP).

[43] In this case, the objective is to determine the lag which corresponds to the maximum level of correlation, or, in other words, the delay in the two correlated time series which helps to maximize the predictive value of cereal and livestock market in terms of malnutrition.

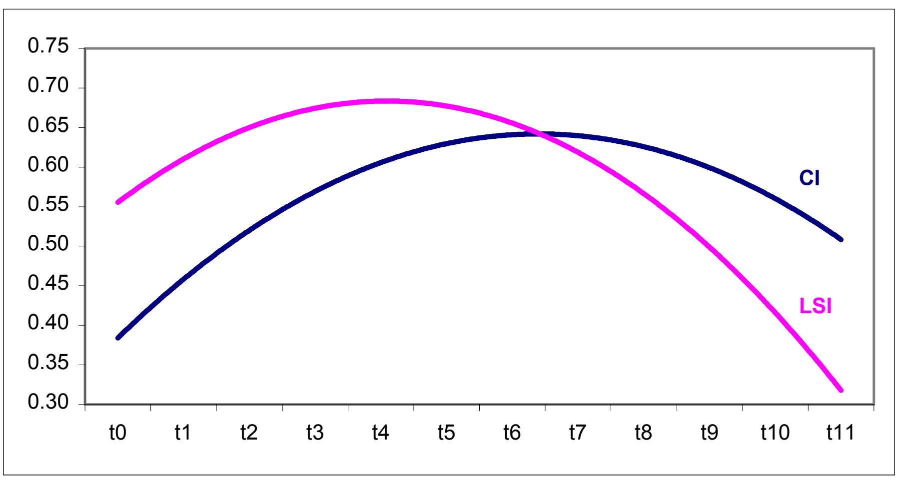
Table 4.2 Correlation among cereal price index, livestock price index, nutrition index

	lag (months)											
	0	1	2	3	4	5	6	7	8	9	10	11
CI - NI	0.40	0.45	0.50	0.58	0.60	0.62	**0.67**	0.66	0.59	0.58	0.58	0.50
LSI - NI	-0.60	-0.60	-0.61	-0.63	-0.67	**-0.70**	-0.69	-0.65	-0.55	-0.50	-0.41	-0.31
LSI - CI	-0.68	**-0.69**	-0.64	-0.57	-0.47	-0.47	-0.36	-0.32	-0.31	-0.21	-0.09	-0.08

CI: cereal price index; LSI: livestock price index; NI: nutrition index
Max values in bold

Source: Author's estimates

Figure 4.2 Evolution of correlation between nutrition index and the market price indexes*



* Correlation between LSI and nutrition is in absolute value

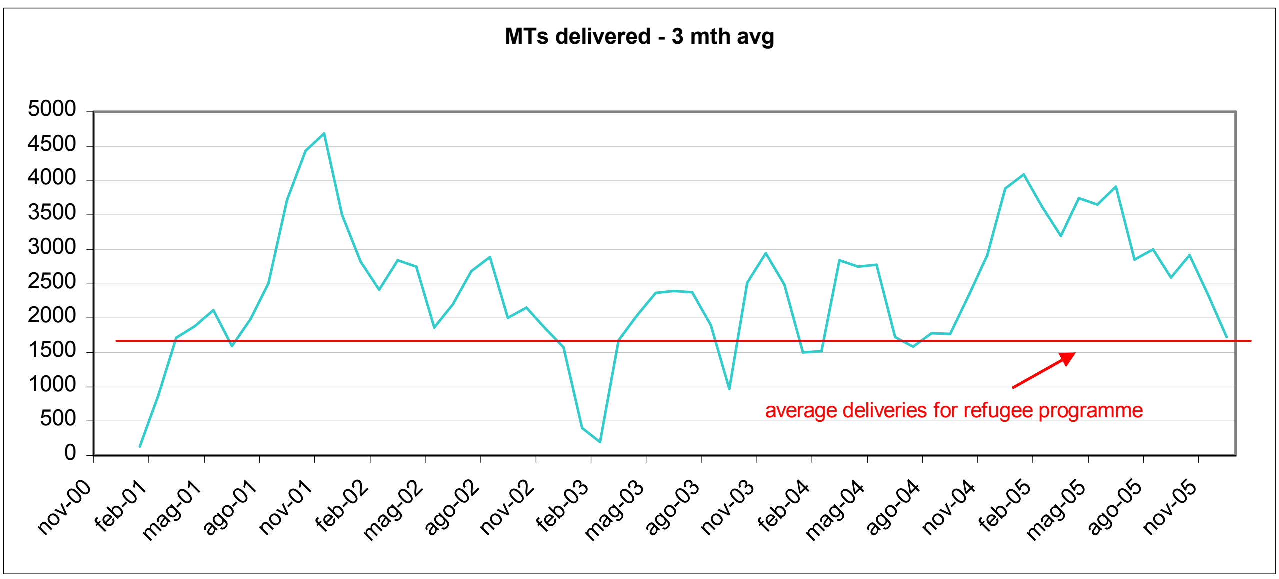
Source: Author's estimates

The points above underline the strong link between trade and nutrition, and therefore, the need to adapt development policies as well as short-term strategies in a way to provide due attention to trade. This is not only in the sense of increasing attention on market analysis as a component of the decision making process with the aim of getting the highest benefit from trade, but rather in the sense of considering the indispensable role of trade as a major determinant of food security and nutrition, to be properly developed and at the same time protected from the likely negative side effect of short-term interventions.

4.1.4 Food aid

Proper tracking of food aid deliveries in Turkana was initiated only in 2000. Data on food aid deliveries were converted in cereal equivalent in order to facilitate the analysis. On such a basis Figure 4.3 was produced, taking the initiative of reducing the curve fluctuations through a 3-month moving average smoothing.

Figure 4.3 Evolution of food aid deliveries in Turkana (in MTs of cereal equivalent)

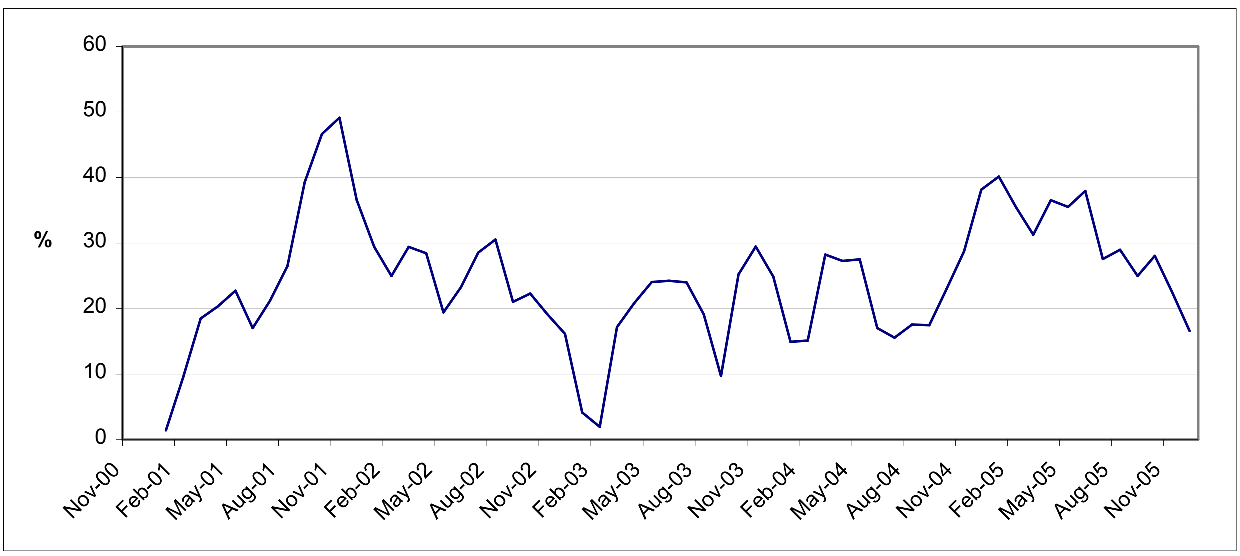


Source: Author's estimates from WFP data

As shown in Figure 4.3, the quantities delivered include a component for the refugee intervention. Such tonnage was been rather constant over the period considered, around 1,600 MTs of cereal equivalent per month. Additional tonnage refers almost completely to the Emergency Intervention (EMOP10374.0) put in place by the World Food Programme (WFP).

In order to properly assess the role played by the food aid delivered, a proper analysis on nutritional status, on livelihood status, and on the cereal market should be considered in order to establish positive and negative, direct and side-effects of the intervention. But unfortunately information available is so scanty and patchy as to make such analysis virtually impossible. However, while a proper analysis of the final impact is difficult at this stage, it is possible to consider the role played by food aid in increasing food availability. For such a purpose, food aid deliveries presented above were considered against nutritional requirements.[44] As shown in Figure 4.4, the share of food requirements covered through food aid is rather low, with an overall average of 25%, although in a few occasions has reached remarkable peaks.

Figure 4.4 Share of nutritional requirements covered by food aid



Source: Author's estimates

[44] In this case, nutritional requirements were estimated in terms of cereal equivalent on the assumption of a constant annual demographic increase between 2000 and 2005, as well as on the assumption of constant 1,900 Kcal average intake throughout the period considered. The refugee population was estimated on the basis of official registration statistics. Nutritional requirements were estimated as for the local population. In fact, Post Distribution Monitoring shows that between 65% and 85% of refugee population consume less than 2,100 kcal per day.

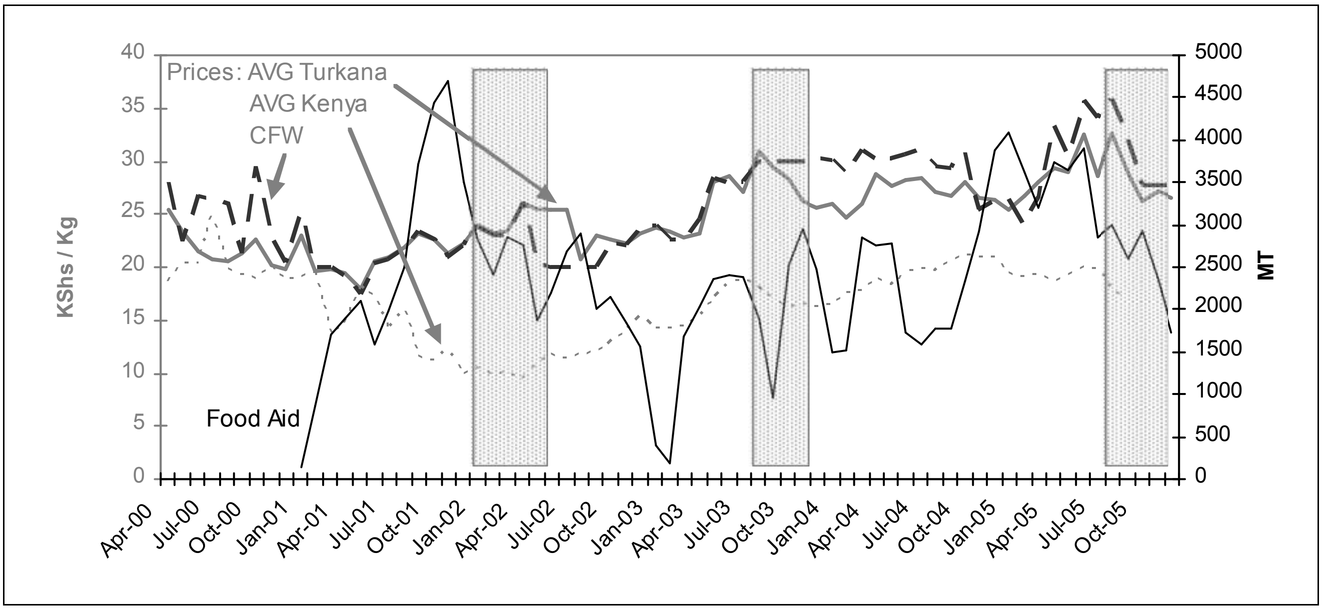
4.1.5 Cash interventions

Since mid 2007 Turkana has benefited of the National Hunger and Safety Net Programme (HSNP); however HSNP is not covered through this study since the latter refers to a period prior to the launch of the programme. In fact, by the time the fieldwork for the present study was conducted the experience of cash interventions in Turkana was quite limited. Essentially, it can be reduced to the cash-for-work (CFW) component of the Drought Recovery Programme implemented by OXFAM that started by the end of 2001, and since then implemented irregularly through various phases till end 2005. An additional phase of CFW was under preparation by the time of this study. The coverage of the initiative was quite limited, with a targeted caseload varying between 25,000 and 70,000 people and geographically rather concentrated in a few project areas.

An evaluation of the DRP has highlighted the appropriateness of the CFW programme in its first phase. In particular, it is interesting to consider that the evaluation report summarizes how *"in view of the limited infrastructure available ... and the low number of beneficiaries, CFW appears to have been the most appropriate intervention ... for maximum focused impact"*. Moreover, the report stresses how *"with an operating market and with fairly stable prices for cereals, milk and livestock over the December 2001 and June 2002 period when cash payments were mostly made, cash was considered ... as the most appropriate form of resource transfer"*.

This statement just mentioned is of particular relevance for the purposes of this analysis. Unfortunately, the supporting evidence provided by the document is limited to the evolution of average livestock prices in the district, while in the CFW project areas, as well as in most areas in Turkana, it is essentially impossible to find price records for major commodities. In regard to this, in Figure 4.5 an attempt is done to visualize the periods of implementation of CFW interventions as well as of food aid distributions together with the evolution of the average price of maize between 2000 and 2006.

Figure 4.5 Link between CFW implementation, food aid distribution and price of maize‘



‘ shaded areas identify the periods of CFW implementation

Source: Author’s estimates

It is very interesting to consider how in Figure 4.5 neither of the two interventions seems to have an effect on the price evolution of the major staple food in Turkana. In particular, in the case of CFW, while in its first phase (Jan – June 2002) it is possible to identify a minimum association between the cash intervention and a certain price increase, in the other two phases (Aug – Dec 2003 and Aug – Dec 2005, respectively) the distribution of cash seems surprisingly associated to a certain price reduction. Furthermore, it is very interesting to consider how during the latest period mentioned the tendency towards a price decrease is associated with both the implementation of cash distribution as well as to the progressive scaling down of food aid – two events that would be normally considered as inflationary factors. However, this can be considered a major approximation, since the scale of the two interventions (food aid and CFW) is quite different and since the evolution of the average price in the district may not be able to capture the effect of the quite localized CFW intervention. However, it is interesting to consider the price margin between the district average and the average in the CFW project area. While such a margin may be explained by transport costs, it tends to gain certain stability only after the second phase of CFW intervention and it reduces only when there is a rise in the amount of food aid. The available data is not enough to support such an interpretation. However, there is the impression that the increased purchasing capacity and consequent demand may have contributed to raise local market prices. Having said that, it is necessary to take into account that the beneficiaries of CFW programme have benefited at the same time of the ongoing food aid intervention and therefore it is doubtful that the increased purchasing capacity has raised the demand for maize, but most likely has affected the price of other commodities.

In order to further explore the concern expressed above about the relevance of the link between the CFW implementation and the average cereal price, we can refer to another set of data. In fact, in order to monitor the possible impact of the intervention as well as the possible risk of inflation generated by the CFW intervention, OXFAM has conducted a baseline and a monitoring survey among the beneficiaries of the CFW as well as among traders operating in the areas covered by the intervention.

Table 4.3 Changes in perceived impact of CFW and GFD

	anticipated impact of CFW			actual impact of GFD		
	Higher	Lower	No change	Higher	Lower	No change
Baseline						
Stock levels	86	7	7	15	75	10
Diversity	92	3	5	23	70	7
Price	12	10	78	8	30	62
Competition	60	3	37	22	35	43
Monitoring						
Stock levels	100	0	0	0	95	5
Diversity	97	0	3	3	92	5
Price	45	0	55	0	55	45
Competition	87	0	13	8	77	15

Source: Author’s estimates

Table 4.3 reports the traders’ perception about the impact of the two types of interventions: CFW and general food distribution (GFD). Two types of comparison can be drawn:

- between the impact of CFW and of the GFD at the time of the baseline and monitoring surveys, to compare expectations and impressions on the impact of the two interventions.
- between the initial expectations of the CFW and GFD impact and the follow-up monitoring survey, to consider how such perceptions have changed through the implementation period.

With reference to the first comparison (CFW versus GFD), it is possible to consider how expectations seem to indicate that a stronger and more favourable impact was expected from CFW. This is in terms of allowing higher stock levels, increasing diversity of products, increasing competition. Both interventions seem to have had no significant influence over price levels.[45] In particular, the higher stock levels and higher diversity of products can be explained in view of the higher value transferred to the beneficiary through cash as well through the lower fungibility, and consequent loss of value in the following exchanges, of GFD commodities. It is interesting to consider the expectation/consideration of higher competition in combination with the one about price stability. The results of the monitoring exercise strengthen the divergence between CFW and GFD under all aspects. In fact, contrary to GFD, CFW is seen to support higher stock levels, increasing diversity of commodities and increasing competition. To a lesser extent the divergence is clear as well in terms of impact on prices: while CFW is perceived as stimulating a *no change-higher* price effect, GFD is associated to a *lower-no change* price effect.

The results of such analysis seem to highlight a preference for CFW, particularly, as expected, in the sense of its capacity to favour the market system. Having said the above, it is to be recognized that such analysis reflects the opinion of traders and not necessarily that of consumers, particularly the most vulnerable who should be the primary target of food aid. In support of this consideration it is worth taking into

[45] After considering the majority shares of responses, it is interesting to note the clear tendency identified in the case of GFD in terms of reducing prices. On the contrary, in the case of CFW, no clear tendency can be identified in terms of either increasing or decreasing prices.

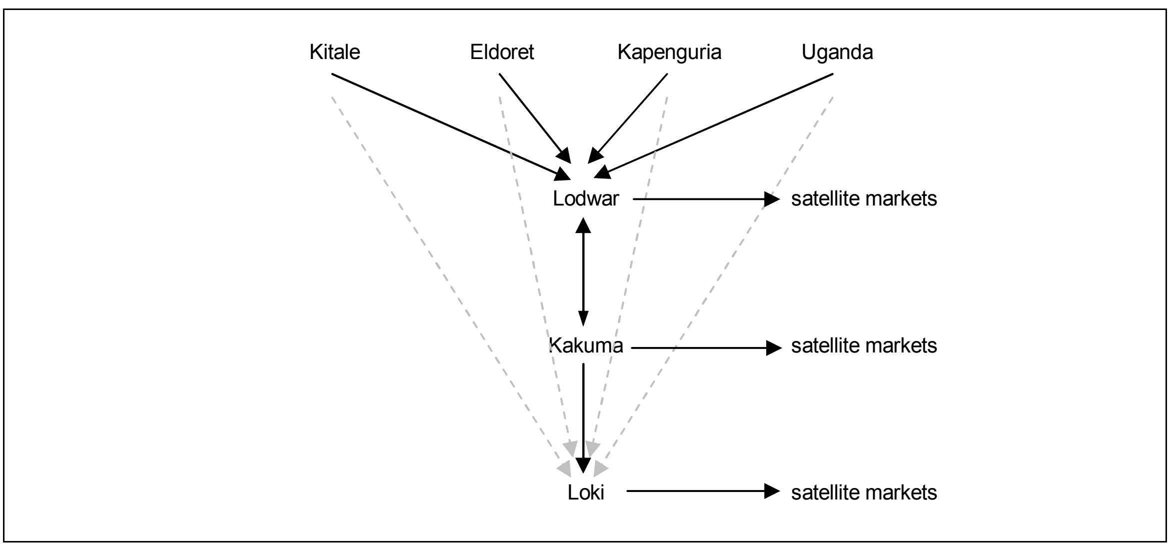
account how group interviews conducted *ex-post* have shown more mixed results in terms of preference for either form of intervention. [46]

4.2 Prices and profit margins

4.2.1 Trade flow

In view of the high market prices prevalent in Turkana and of their determinant role on the cost-efficiency of different interventions, as described in the previous section, it is important to examine this issue more closely.

Figure 4.6 Cereal trade flows



Source: De Matteis, 2006

As a first step in the analysis, Figure 4.6 summarizes the major trade flows for cereals and other commodities with the major exception of livestock. [47] Figure 4.6 stresses the

[46] Reference is made to community group discussions carried out in December 2005 between the author and the communities targeted by the CFW intervention.

district dependency on trade inflows. In fact, apart from livestock trade flows, Turkana is almost completely dependent on imports of food and other commodities. In general, major supplying markets are Kitale and Eldoret, which are essentially transit markets, particularly for what concerns food commodities. Part of such flows finds its origin in Ugandan markets, though of less relevance is the trade flow which proceeds directly from Ugandan markets to markets in Turkana.

Within Turkana the major markets are Lodwar, Kakuma and Lokichokio. In view of their location along the transport routes, a major role is played by Lodwar, where a large part of the quantities which enter the district happens to be exchanged before finding its way towards the various satellite markets or proceeding along the major transport routes towards Kakuma and Lokichokio. The case of Kakuma is strongly affected by the presence of a major parallel market in food aid commodities brought in through the refugee programme. This constitutes a major additional supply for the district and has an obvious economic impact. In fact, while on the one hand it releases to some extent the burden on the local commercial capacity in terms of availability of transport and access to other resources, on the other it increases artificially the supply to the local markets contributing this way to containing market price increases. Therefore, Kakuma functions as a source market for the two other major markets in the district as well as for its satellite markets. Lokichokio is essentially a major final destination market, as well as a transit for its satellite markets.

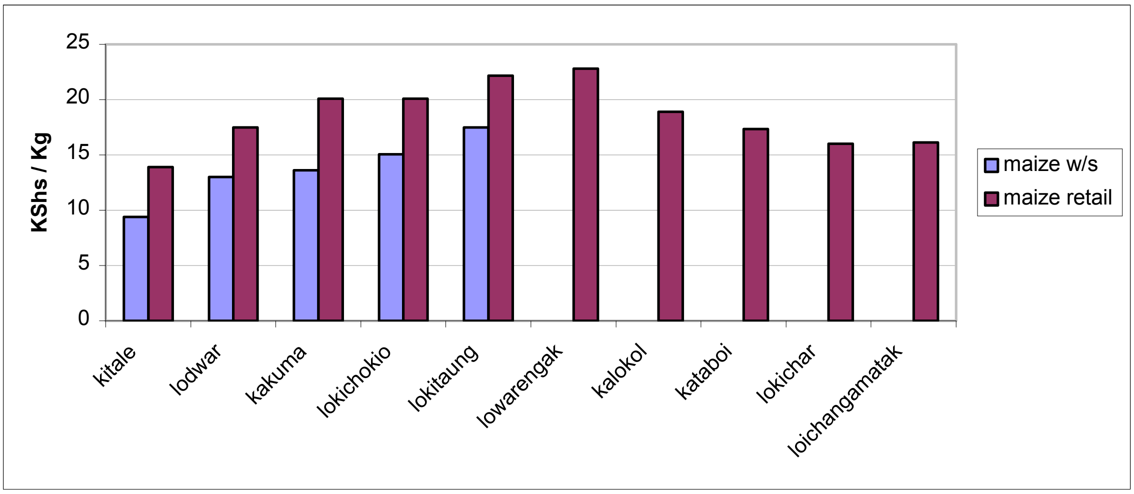
4.2.2 Prices and profit margins

The trade flows described above are reflected in the level of market prices. As expected, prices tend to increase along the trade flow as the distance from sources of supply increases. The average rate of price increase between source markets out of the district and Lokichokio (as the furthest major market in Turkana) is in the range of 40-50%, with peaks of up to 80% in the case of some commodities such as beans. Such average rates can get slightly higher when considering some final markets such as Lokitaung, where the highest prices are recorded. Having said that, some minor remote markets,

[47] For an analysis of the livestock market in Turkana, see Mathuva, 2005

such as Kataboi and Kalokol (respectively, in and around the area covered by the OXFAM CFW intervention) and others, tend to show a different tendency with lower differentials. This can be interpreted in view of lower purchasing capacity.

Figure 4.7 Price of maize on various markets



Source: Author's estimates

In order to get a better understanding of the market system, we have tried to estimate costs and consequently traders' profits and profit margins. For this purpose, information was collected on costs incurred by a sample of 250 traders as well as on their purchasing and selling prices.[48] Costs eventually incurred were identified as follows:

- purchase of commodities,
- store rent,
- transport costs,
- labour costs,
- taxes and other administrative costs.

In addition, in order to differentiate the analysis, the cases of wholesale and retail, as well as a combination of the two, were identified according to traders' typology. In this regard it is necessary to consider that while in general 97% of traders can be considered

[48] This information has been collected within a survey aiming at assessing traders' capacity and is better described in 4.4.

retailers, the factor that characterizes most the trader typology is the use of transport. In fact, while it is estimated that around 15% of the traders makes use of transport, such share is spread between the two groups of wholesalers and retailers. In particular, while it is reasonably expected that all wholesalers make use of transport, only a small portion of retailers is expected to have access to it. Such a share constitutes what can be defined as the wholesaler-retailer: they are essentially retailers who have access to transport (almost always on a rent basis) and optimize the transport cost-efficiency by supplying smaller retailers who cannot afford to advance money to cover the transport cost.

Table 4.4 summarizes profit margins and rates estimated for different commodities and different categories of traders. It is interesting to consider how the rates of return are on average slightly higher for wholesalers (18.5% versus 15.5%) and are rather doubled in the case of mixed wholesale-retail. In terms of commodities, the highest margins are linked to sugar; however when considered in relative terms such margins get reduced by the high cost of procurement of the commodity, and the most profitable commodity to trade turns out to be maize meal (20% and 22% for retail and wholesale respectively and a remarkable 47% for the mixed case).

Table 4.4 Profit margins for various commodities and trader categories

	KShs / Kg			%		
	wholesale	retail	w & r	wholesale	retail	w & r
maize	2.23	3.03	4.37	17.69	18.45	30.60
maize meal	2.73	3.88	7.00	22.20	20.40	47.25
beans	3.80	3.34	7.35	24.89	12.72	40.23
sugar	2.71	4.55	8.10	8.04	7.41	17.25
average	2.80	3.66	6.48	18.50	15.52	35.16

Source: Author’s estimates

4.2.3 The role of transport

As highlighted above, profits are not necessarily linked to the cost of the commodities. It is also reasonable to assume that in a situation which is totally dependent on imports from external markets, transport must play an important role in determining profit. On this basis, costs incurred by traders were rearranged in order to isolate the role of transport and procurement costs on profits achieved. For such a purpose the following production function of the Cobb-Douglas type was used:

$$Y_{ij} = X_{1ij}^{b_1} X_{2ij}^{b_2} X_{3ij}^{b_3} e^{u_i} \qquad (4.1)$$

where:

Y_{ij}	is the rate of return achieved by trader i dealing with commodity j;
X_{1ij}	is the procurement cost faced by trader i in relation to commodity j;
X_{2ij}	is the transport cost faced by trader i in relation to commodity j;
X_{3ij}	is any other cost faced by trader i in relation to commodity j;
u	is the error term;
e	is the base of natural logarithm;
b_1, b_2 and b_3	are the parameters to be estimated.

The results of regression analysis report that transport is the most productive factor and its contribution in determining the rate of return is double that of commodity costs, and almost tenfold that of all remaining costs. In particular, holding other factors constant, it shows that:

- an additional investment of 1% in transport leads on average to about 1.2% increase in the rate of return;
- an additional investment of 1% in commodity purchase leads on average to about 0.7% increase in the rate of return;
- an additional investment of 1% in other factors leads on average to about 0.1% increase in the rate of return.

This estimation has clear implications in terms of resource allocation and highlights the key role played by transport.

4.2.4 Entrepreneurial approach and the role of cash

The analysis above has shown how trade activities in Turkana can be quite profitable. This is particularly relevant for Turkana traders who, due to the quite isolated nature of a large part of the district, and the low number of business opportunities, should be ready to accept moderate expectations of profit margins.

Having said that, various constraints currently inhibit any economic initiative in Turkana. Of particular relevance in this regard is the access to critical inputs such as finance[49] and transport capacity. Such constraints impose a critical limitation to traders' choice among available options. Such conditions immediately highlight the possibility that an eventual intervention in support of local purchasing capacity would be helpful only in the short-term, it can be expected to have an inflationary effect on the local market, and would not be of much help in facing the major constraints encountered by local traders. At the same time, a food aid-led strategy would help to artificially contain prices, but would have a discouraging economic impact by depressing local trade.[50]

In such conditions, initiatives that can help to maintain the economic viability of trade should be promoted. In this regard, all initiatives which can contribute to reducing costs should be preferred as well as initiatives aimed at stimulating a stronger entrepreneurial

[49] The cost of credit was reported to be around 25% per month.

[50] The case of Kaikor, which has in the past benefited of both types of intervention (CFW and food aid) provides a good example. The population of Kaikor, estimated around 10,000 people, essentially relies on the quantities of food and other merchandize brought in by a very limited group of traders. It was reported that six traders (based in Kaikor) purchase in Lodwar and sell in Kaikor. In addition, three (two based in Lodwar and one in Kakuma) sell in Kaikor. In both cases the frequency of traders' movement is linked to food aid and cash interventions. In the absence of food aid distributions, each trader makes on average two journeys per month; in case of ongoing food aid interventions in and around Kaikor, the frequency is reduced to once every three months. During the second half of 2005, in the absence of food aid and during the implementation of CFW programme, such frequency increased to once per week mainly in view of price increases. According to local views, during the first half of 2005 the average price of white maize was around 600 KShs per 45 Kg bag; during the second half of 2005 (characterized by the combination of no food aid and implementation of CFW project) the average price of white maize prevailing in Kaikor market was around 1,000 - 1,200 KShs per 45 Kg bag.

approach. Among such measures is the facilitation of links, and creating confidence between Turkana traders and operators in the major and/or potential supplying markets. Such initiatives should not be limited to major traditional supplying markets such as Kitale and Eldoret, but should be extended to explore more competitive alternatives. The analysis of market prices and of trader capacity out of Turkana, better described in the following parts of this chapter, has revealed some interesting trade links between Turkana and a few markets along the Ugandan border (mainly Suam and Mbale). In view of their competitive prices, such markets have traditionally provided a stable source of supply to such markets as Kitale and Eldoret, while their direct trade link with markets in Turkana has so far been quite limited. In particular, it was estimated that around 30 traders from the Kenya-Uganda border markets deal directly with Turkana traders; such trade flow is rather continuous and quite profitable. Moreover, in view of their competitiveness compared to the traditional suppliers of Turkana markets, their risk of dependence on high price is low, which contributes to the reliability of their supply flows.

4.3 Market integration

4.3.1 Analysis and findings

The purposes and methodology of this part of the analysis are described in section 3.2.4.

4.3.1.1 The data

The analysis of market integration utilizes time series data. It is clear that the longer the time series the more precise can be the analysis. In Kenya the collection of market data is rather limited; the two major datasets being the one collected by the Central Bureau of Statistics (CBS) and the one collected by the Arid Lands Resource Management Project (ALRMP). Both systems present some limitations, with the major ones as follows:

- the CBS data does not include any market in Turkana;

- while both datasets focus on prices, the CBS dataset does not include quantities exchanged and the ALRMP dataset also remains vague in this regard;
- both datasets are limited in terms of food commodities covered: the CBS focuses on maize and beans, while the ALRMP covers maize, maize flour, millet and sorghum.[51]
- CBS data refers to average city markets, while the ALRMP data is arranged on divisions and sample areas and therefore ALRMP data provide a sort of limited geographical average.
- while the price data in the CBS set refers to retail price, the price in the ALRMP set refers to household expenditures.

Needless to say, with Turkana's markets being the object of the present analysis, the ALRMP dataset was taken as the principal data source. This has involved a series of limitations, the major ones being as follows:

- The analysis focuses on prices and does not take into account quantities exchanged. This is not a major limitation, but rather common practice for the analysis of market integration.
- The analysis focuses on one commodity: maize. Again, this is not a major limitation, since maize is by far the most important staple food in Turkana, and, though to less extent, in the country as a whole.
- The first point and the last couple of points mentioned above raise the major concerns. However, in principle, the different nature of the prices collected in the two cases (average monthly retail market price of maize versus average monthly household expenditure for the market purchase of maize) should not be such as to prevent a comparative analysis of the time series. After all, attention is rather directed towards price changes than towards their absolute levels.

The markets in the analysis include seven sample areas (from now on called "markets") as well as another set of nine major markets which should work as terms of comparison. Such non-Turkana markets are either major markets with country relevance or major

[51] The number of food commodities covered by the ALRMP dataset was increased since mid 2005.

supply markets neighbouring Turkana. Attention to cross-border trade is provided through the inclusion of border markets both from Kenya and from Uganda. Price data for Ugandan markets were obtained from regional sources such as RATIN, RATES and TRADENET. Wherever feasible, retail market price data were reproduced. When only wholesale prices were available, retail prices were estimated through the use of a conversion rate estimated on the basis of Ugandan and Kenyan wholesale and retail maize prices.[52] Ugandan price data were converted into Kenyan Shilling using a time series of exchange rates. All were deflated by using the series of USD exchange rates.

The period covered by the present analysis is between April 2000 and November 2005. For such a period very few short gaps (i.e.: 1-month or 2-month) in the monthly price dataset were present, which, where feasible, were filled through linear interpolation.[53] Longer gaps have remained unfilled; this is the case particularly of Busia-Uganda whose time series is very limited and in which case results should be interpreted with caution. The time series of Kitale, critical market for Turkana, is also shorter than the other markets in the dataset; however it is considered to be continuously long enough to provide significant results.

4.3.1.2 Analysis of correlation

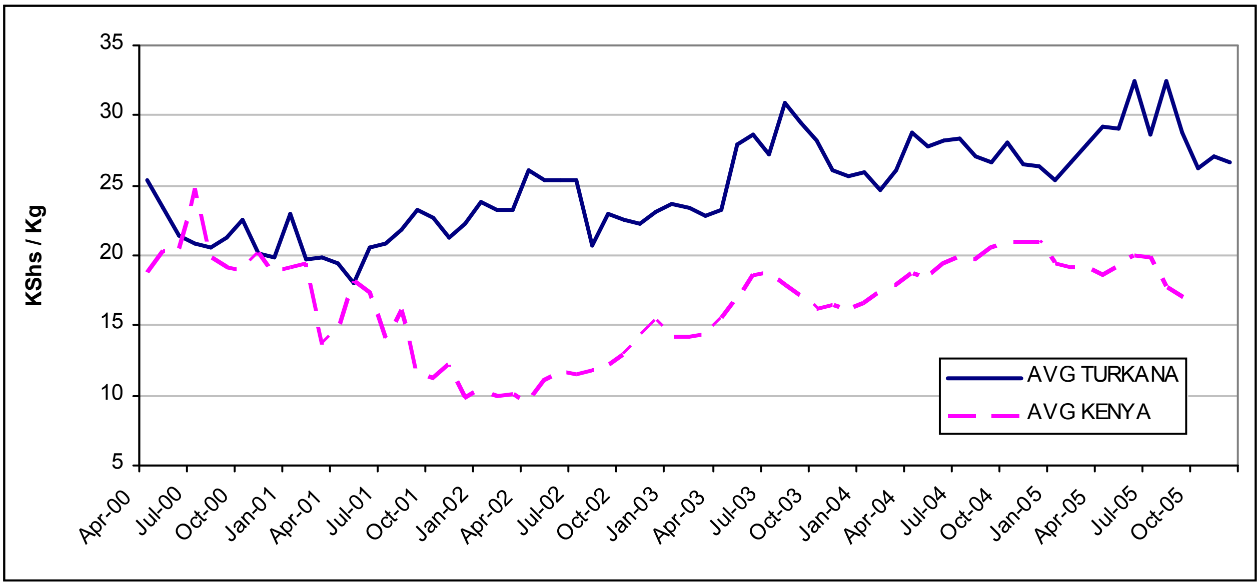
In order to put the analysis in context, Figure 4.8 provides an interesting summary visualization of the evolution of maize prices by comparing the average evolution in Turkana with that in the rest of the country.[54]

[52] The conversion rate from wholesale to retail prices was estimated on the basis of current prices at 13.5%, corresponding on average to a margin of 1.8 KShs / Kg.

[53] This seems the most sensible way to fill such short gaps, on the assumption that the lack of data is due to recording problems irrelevant to the evolution of prices on the market. The possibility should be recognized, though, that such gaps exist because no quantities may have been sold at that time. There is no significant difference between results conducted by using interpolated data and living missing data.

[54] It is worth remembering that the analysis of market integration was carried out exclusively on the price of maize, staple food both in Turkana and in the rest of Kenya.

Figure 4.8 Evolution of average price of maize in Turkana and in the rest of Kenya

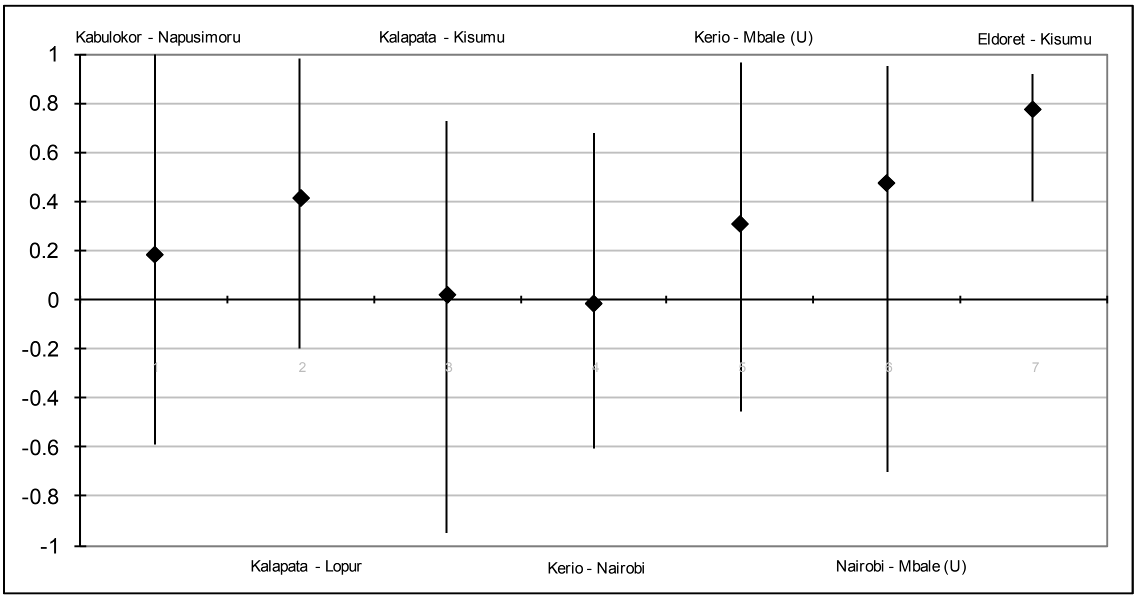


Source: Author's estimates

A brief consideration of the graph suggests that it is appropriate to distinguish between three phases: an initial period (roughly one year since the beginning of the timeframe considered) in which there is no clear link between the path of the two lines; a second period (between mid-2001 and mid-2002) in which the two series evolve in opposite directions resulting in an increasing gap; and finally a 3-year period (from end 2002 to end 2005) in which the gap between the two values seems to maintain within a reasonably stable range, which could eventually be considered the normal gap between the two average prices in conditions of equilibrium. This seems to be confirmed by considering the evolution of the coefficient of correlation between the two series. In order to capture the change highlighted above, the correlation was estimated for all pairs of markets on a 13-month moving interval.[55] The results can be visualized in Figure 4.9 as summary representation of minimum, maximum and average values recorded during the period considered for a selected number of market combinations.

[55] The use of a 13-month moving average allows a centred moving average system while minimizing the modification of seasonal patterns of data.

Figure 4.9 Average values of moving 13-month coefficient of correlation estimated for a selected number of market pairs



Source: Author's estimate

As shown in Figure 4.9, the range of the coefficient is generally very large. And, while averages seem in general to be positive but modest, the minimum and maximum values may easily fall in the extreme positive and negative quarters at the same time. In contrast, in a few cases the range is short and the average quite high. The full set of averages and extreme values of the coefficient of correlations estimated on a 13-month period for all pairs of markets covered in this study is reported in Table A1 in Annex 2.

4.3.1.3 Analysis of cointegration

In line with the methodology presented under section 3.2.4, the Augmented Dickey-Fuller (ADF) unit root test is applied to test the condition of stationarity of each price series. In a second step, the ADF test is to be applied to the series of residuals u_t of the two initial time series. Finally, the analysis of the Error Correction Mechanism (ECM) manages to estimates the various relevant aspects of price transmission. Results are reported in Table A2 and Table A3 in Annex 2.

Table A2 shows that all price series are integrated of order 1: I(1). Table A3 reports on different aspects of price transmission among the markets considered, such as in particular: the magnitude of adjustment in the long-run and short-run, the speed of adjustment, and the so-called half-life, which is the time required to correct half of the price disequilibrium among the price of the same commodities in two markets.

A summary of such data is provided in Table 4.5. First of all, the strength of market connection as expressed by the long-run evolution of price series is reflected through coefficient θ_2. Its average value decreases substantially when shifting from non-Turkana markets identified as Rest of Kenya (RoK) to those in Turkana. The adjusted measure θ_2/h, appropriate for comparisons, reduces the gap only mildly. This was somehow expected, though a proper analysis and a measure of it was not yet available. While the market interconnection within Turkana is not very bad, neither does it seem especially good, particularly when compared with the average value for Kenya. In this case there seems to be a disconnect between markets in Turkana and those in the rest of the country: the weak market link is further reduced when shifting from the internal connections to the external, particularly between markets in Turkana and RoK. Within Turkana, such a disconnect is significantly higher in the northern part of the district. This, as well, was expected, confirming the compounded effect of increasing distance both in physical and economic terms. The gap seems to be lower in the short-run dynamics expressed through α_2.[56]

Table 4.5 Price transmission: magnitude and speed of adjustment

	internal					external				
	θ_2	α_2	α_3	h	θ_2/h	θ_2	α_2	α_3	h	θ_2/h
North Turkana	0.348	0.262	0.403	1.042	0.334	0.217	…	0.618	1.027	0.212
South Turkana	0.482	0.356	0.443	0.976	0.494	0.340	…	0.420	1.007	0.336
Rest of Kenya	0.910	0.580	0.404	1.066	0.854	0.873	0.492	0.309	1.047	0.834

Source: Author's estimates

[56] A possible interpretation of such a shorter gap in the short run may be found in the chronic nature of backwardness in Turkana compared with the rest of the country and reflected in the drastically different patters of economic growth experienced through the past few decades.

The first point above is of major interest, as well as concern, in the analysis of market integration in Turkana, and of the possible strategies to deal with it. The crucial question to be asked is: Why there is such a disconnect between markets in Turkana and the ones outside the district? It is assumed that such reduced link in terms of market prices is reflected in a similar drop in the amount of quantities exchanged; however, such assumption cannot be tested through a price analysis. Further, if there is a drastic reduction in trade flow, which side of the flow is mainly affected? This last question does not refer to the direction of trade (in fact, it is quite immediate to think that the cereal trade flows move almost entirely from non-Turkana towards Turkana markets, contrary to livestock trade ones), but rather on the origin and motivation of the traders involved.

Having said that, an in-depth look at disaggregated results in Table A2 suggests that market integration is far from homogeneous in each of the groups considered. In particular, in all sub-groups there are a few market links which seem to be stronger than the others. A good understanding of successful market links can be very instrumental in identifying where a market-oriented intervention can be more successful. In order to identify the most integrated markets in Turkana, the various Turkana markets considered in the analysis were ordered according to the frequency and intensity of co-integration with other markets. In particular, in each of the two cases involving Turkana markets – i.e.: a) within Turkana, and b) between Turkana and rest of the country – a restricted list was established of the 20 pairs of markets recording the highest values in terms of both magnitude and speed of price adjustment. Such a list helps to identify within each pair the market which tends to play a role of price maker rather than price taker. On such a basis four lists were generated and for each of them the two markets with the highest score were selected, as reported in Table 4.6 below. Following such an approach, the markets most integrated and with a certain price-making attitude in Turkana seem to be Napusimoru and Lokwi. In the case of the co-integration between Turkana market and the others, Lokwi, Kalimapus and Napeililim are the most integrated. In this case, the Turkana markets play essentially a role of price-takers.

At this point it is interesting to consider the location of those markets identified as most integrated. Napusimoru and Lokwi are located in the southern part of the district, rather well connected to markets such as Lokichar on the main route which links Turkana with neighbouring districts. Napeililim and Kalimapus are in the central-northern part of the district with a major difference in terms of accessibility, the former being on the major transport route between two major markets (Lodwar and Kakuma), and the latter being rather isolated along the lakeshore. It is interesting to consider that Kalimapus is close to the CFW project area, though it is difficult at this stage to determine the role that such small and localized project may have played in strengthening the commercial link between the rest of the country and such remote area in Turkana. This finding, which is quite interesting, deserves more attention.

Table 4.6 Most integrated markets

Within Turkana	
magnitude of adjustment	*speed of adjustment*
Napusimoru	Napusimoru
Lokwi	Lokwi
Between Turkana and rest of the country	
magnitude of adjustment	*speed of adjustment*
Lokwi	Kalimapus
Kalimapus	Napeililim

Source: Author's estimates

4.4 Traders' capacity

4.4.1 Scope of the analysis

As mentioned in the analysis of market integration, the analysis of prices needs to be put in perspective. For such a purpose it is particularly relevant to pay closer attention to one major category of actors involved in the sector: traders.

There is no recent census or survey of the trade sector in Turkana. For this purpose an estimation of trading capacity was attempted. This was done in two ways. First, through a series of interviews and particularly benefiting from the great knowledge of CFW field monitors, an initial estimate of trader population was carried out. Second, the major trading centres in the region were visited and a more in-dept analysis of traders and their capacity was conducted.

The major aim of this effort is to try to establish the role so far played by the trading sector in responding to the demand for food coming from the various parts of the region, as well as the flexibility of such capacity to expand in response to eventual increase in demand.

4.4.2 An attempt to estimate food supply and demand

4.4.2.1 Estimate of traders' population and capacity

On the basis of information provided by key informants and through a survey detailed below, an estimate of traders' population was attempted. At this point it is necessary to specify here that this analysis is focused on trade in food and, to a limited extent, in livestock. Therefore, in this case a trader is not accounted as such unless even partially involved in these activities.

A first rough indicator is provided by the ratio between traders and total population (a sort of measure of traders' density within the population). Such a measure seems to vary in Turkana between 80 and 120 with an average around 100; in other words it seems possible to simplify without serious risk of mistake by saying that there is one trader more or less per every 100 people. On such a basis we can estimate the total population of traders involved with food trade in Turkana at around 5,100 individuals.

However, such a measure does not tell us much, unless more characteristics of the traders are provided. For such a purpose, a summary classification of traders is provided in Table 4.7.

Table 4.7 Traders' key characteristics (%)

Size	Large	Medium	Small
	3	20	77
Type	Wholesaler		Retailer
	3		97
Use of transport	Transporter		Non Transporter
	15		85

Source: Author's estimates

The first two characteristics reported (size and typology of business) seem to provide a clear overlap to the extent that we can immediately consider as very likely that the big traders are also the wholesalers. Access to – and use of – transport is another major characteristic to be considered, in view of both the cost involved as well the associated rate of return, as considered under section 4.2.3. As expected, transport proves to be a prerogative of large traders and of half of medium-sized traders.

The following step was to try to get a more in-depth insight on traders' business size using the data collected through the survey. The assumption is that the basket of commodities traded is very limited, thus reflecting the food demand and consumption patterns in the district and in most of the rest of the country. On such a basis, the size was estimated by considering the value of the two major commodities traded and assumed to represent between half and two thirds of the entire turnover eventually achieved by each individual. It is to be considered that the estimate derived this way is not necessarily the total business size of each trader, but rather the individual size of food trade business.[57] Such monetary value was finally converted into a cereal equivalent, as reported in Table 4.8, to estimate the quantity of food sold on a monthly average.

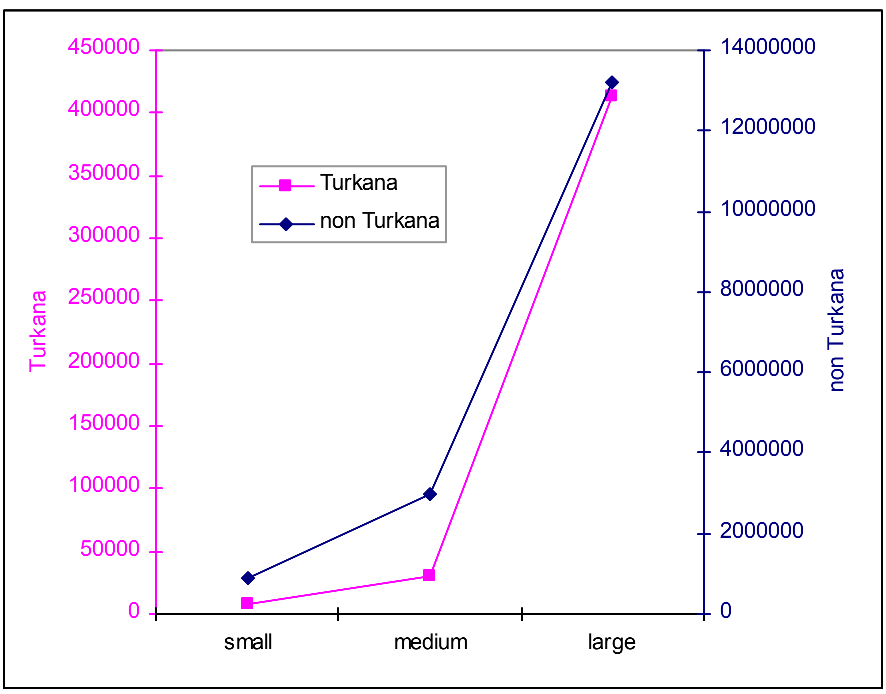
[57] Information on the composition of trade in terms of food versus non-food was collected through the survey. However an estimation of the total business size of each trader is not considered relevant for the purpose of this analysis.

Table 4.8 Monthly turnover of food traders

		Turkana			non Turkana		
		small	medium	large	small	medium	large
food budget							
KShs	min	1800	15733	49000	413840	1800000	4860000
	max	15140	48800	6793333	1275000	4240000	32000000
	avg	**7376**	**31008**	**413543**	**900982**	**2961911**	**13189045**
cereal equivalent							
Kgs	min	150	1311	4083	34487	150000	405000
	max	1262	4067	566111	106250	353333	2666667
	avg	**615**	**2584**	**34462**	**75082**	**246826**	**1099087**

Source: Author's estimates

Figure 4.10 Monthly turnover of food traders



Source: Table 4.8

The comparison between the business size of Turkana and non-Turkana food traders is striking: the turnover as well as amount of food sold on a monthly average by a large Turkana trader is lower than in the case of a small non-Turkana trader. In addition to that, both Table 4.8 and Figure 4.10 give an impression of the higher concentration of the business in the Turkana context. In other words, the more skewed distribution in terms of business size in Turkana highlights the determinant role played by the large traders who happen to run and control the bulk of the food trade in the district.

4.4.2.2 Food supply versus food demand

On the basis of estimates for the number and composition of the trader population as well as for their monthly turnover, it is possible to try to provide an estimate for the amount of food traded on a monthly basis in Turkana. In particular, earlier on in the analysis the population of traders involved in food trade in Turkana was estimated at around 5,100. Finally, information on their typology and business size was combined as summarized in Table 4.9.

Table 4.9 Annual food trade (cereal equivalent) according to trader typology

	%	n	avg kg	tot kg	%	MTs / yr
Small	77	3927	615	2415105	23	28981
Medium	20	1020	2584	2635680	26	31628
Large	3	153	34462	5272686	51	63272
Tot	*100*	*5100*		*10323471*	*100*	*123882*
Retailer	97	4947		5050785	49	60609
Wholsaler	3	153		5272686	51	63272
Tot	*100*	*5100*		*10323471*	*100*	*123882*
Transporters	15	765		6854094	66	82249
Non transporters	85	4335		3469377	34	41633
Tot	*100*	*5100*		*10323471*	*100*	*123882*

Source: Author’s estimates

However, considering that trade is carried out at different stages along the trade chain, there is a high risk of double counting the quantities of food that need to go through various stages. In such case various criteria can be utilized. First of all, we can start considering the quantity provided by retailers, since this is passed directly to consumers. In such case, the annual tonnage would be in the range of 60,600 MTs. However we can certainly argue that even wholesalers may get involved on a small scale in retailer trade; but in such case which share of total wholesale trade estimated (63,272 MTs) could be considered to reach the customers directly? We could assume that the balance between the tonnage provided by wholesalers and that channelled through the following phase of retailer trade could be the quantity directly sold by wholesalers to final customers (around 2,600 MTs per year). However, we think that probably this is much higher considering the remarkable marginal profit increase deriving from the capacity to combine wholesale and retail activity, as shown in section 4.2.3. Following this line of argument, it is quite interesting to differentiate the trading capacity according to the availability and access to transport. In fact, this perspective is linked to the total dependency of Turkana on the import of food from neighbouring districts and countries. Under such a perspective the amount of food exchanged in Turkana would be around 82,000 MTs of cereal equivalent per year, and in this case, the difference between such an amount and the estimate of tonnage provided through the retail link (60,600 MTs) would be the estimate for the tonnage sold directly from wholesale traders to the final customers.

At this point it is possible to make a comparison between food supply provided through trade, just estimated at around 82,000 MTs per year, against the food requirements which were estimated earlier on in the range between 106,000 and 117,000 MTs of cereal equivalent per year. The gap between the estimates of food supply and food requirements can be therefore estimated in the range of 24,000 – 35,000 MTs of cereal equivalent per year, which corresponds approximately to a gap in food requirements between 29% and 30%. On such a basis, the question to be raised at this stage is about the expandability of the current trading capacity in a way to be able to absorb such a gap.

4.4.3 Traders' survey

4.4.3.1 Data and methodology

A survey of 252 traders was carried out; 205 being based in the district and the rest being in the surrounding areas. The selection process was essentially dictated by geographical considerations, where preference was given to major urban and trading centres. As such it is felt that such a survey is not necessarily representative of the traders in Turkana; however, it is felt as well that such limitation is somehow balanced by the consideration that the sample size covered by this analysis is sufficiently large (approximately 5%) compared to the assumed population of traders in Turkana.

The analysis of traders based in Turkana has focused on the identification of major determinants of business size in order to consider its possible expandability. In addition, a certain number of traders based outside the region were asked whether they were or had been operational in Turkana and in both cases were presented with the hypothetical proposal to start or increase business activities in Turkana. In particular, traders were given the opportunity to indicate the reasons for their eventual lack of interest to start or increase their involvement in Turkana.

The methodology applied for the analysis follows the one presented under section 3.2.2.

4.4.3.2 Findings

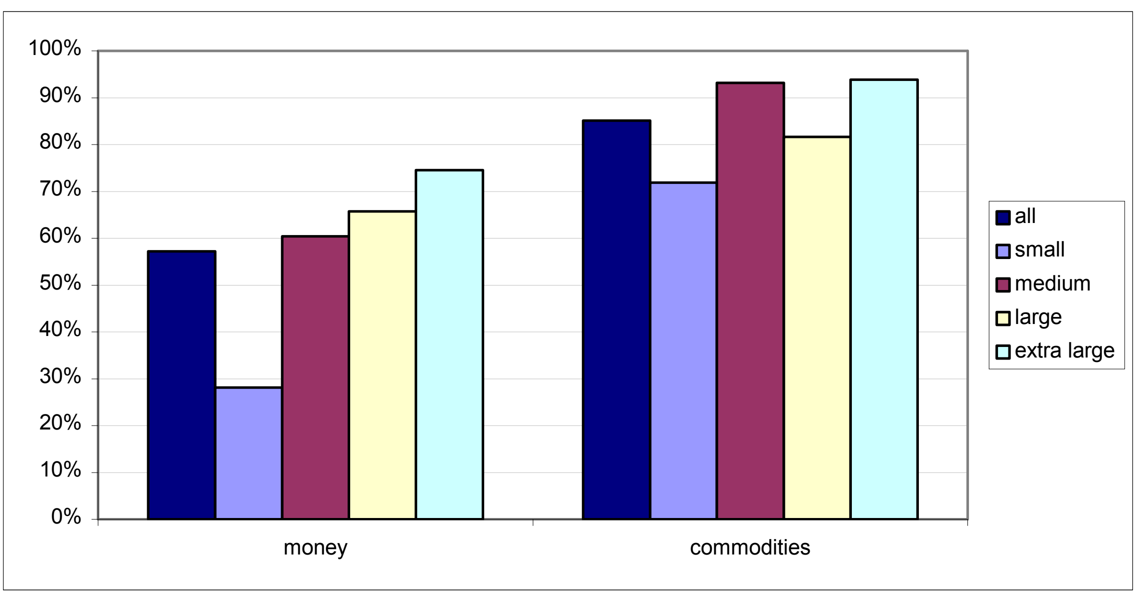
Firstly, it is worth noting that, out of the 252 traders in the sample, only seven, all based out of the district, have not manifested an interest in starting business in Turkana, and only one based and operational in Turkana has expressed an unwillingness to consider the possibility of scaling up the size of his/her business. In other words, the survey has disclosed a general interest in starting new business or scaling up existing activities in Turkana. However, as expected, major constraints are envisaged and traders have contributed to identify these.

4.4.3.3 Availability and access to key inputs: money versus commodities

As a first step in the analysis, consideration was given to the question of availability of – as well as access to – additional key inputs that are a precondition for considering the feasibility of scaling up the business size: financial resources and commodities. Another key input in the case under consideration, the availability and access to transport capacity, was not considered at this stage, because it can be considered as an intermediate input which, in a wider perspective, can be reduced under the category of resources and ultimately, through a major approximation, of financial resources.

As shown in Figure 4.11, availability of and access to (additional) financial resources seems on average more difficult than in the case of availability of and access to (additional) commodities. In particular, Figure 4.11 can be interpreted as on average a trader has a little less than 60% probability of accessing additional money required and, at the same time, has around 85% probability of accessing additional commodities required to scale up his/her business. In this case the focus is on the perceived higher constraint given by the need to find the required financial resources rather than the need to find the commodities. This consideration seems to be common to all business sizes.

Figure 4.11 Traders' confidence in getting access to critical inputs



Source: Author's estimates

4.4.3.4 Determinants of willingness to trade

Once the question of the comparative access to critical inputs was clarified, attention was shifted to the analysis of other contextual factors which play a determinant role in the decision of the business size. Four of these factors were included in this analysis: prices, security, roads, markets – the last one to be interpreted in terms of credit services and other facilities which are normally associated with markets.

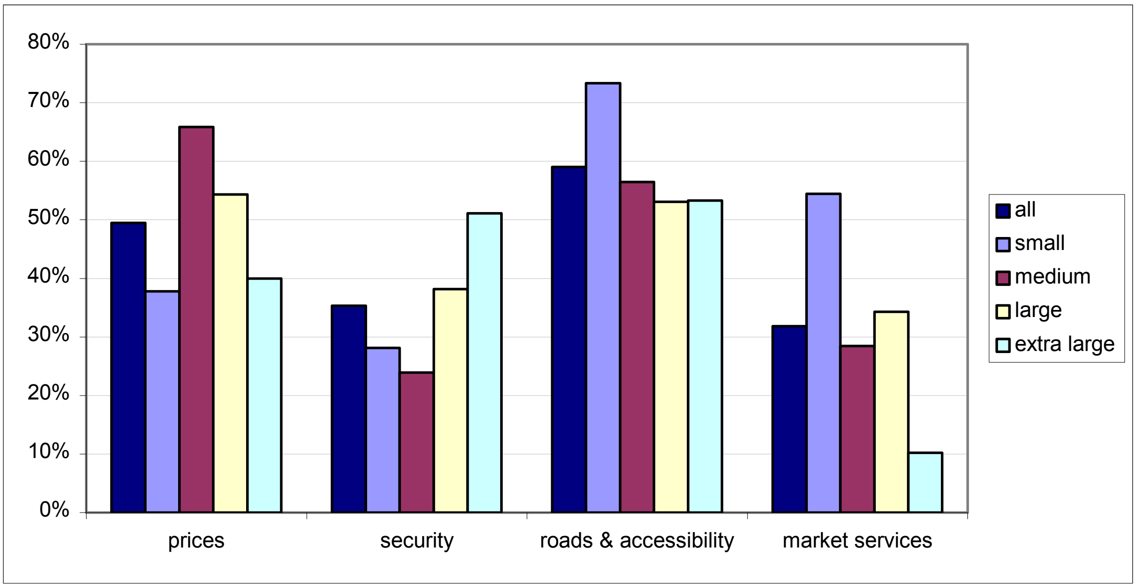
In general terms, the current limited accessibility throughout the district, as summarily identified by the status of the roads, was apportioned most significance in the survey, while the price factor was the second priority in the traders' decision to invest. The third and fourth factors were identified respectively as the poor security conditions and the poor access to credit. Having said this, the picture changes somewhat when considering the different trade categories separately. In fact, while transport and accessibility concerns seem to be particularly relevant for small traders (highly dependent on suppliers), for medium-size traders the level of prices seems to be more influential than other factors in decision making. In between is the case of large traders, for whom such factors as price levels and the quality of roads have the same influence on their willingness to (scale-up) trade in Turkana. Overall, roads and security are major determinants for the extra-large out-of-Turkana traders. Access to cash and other credit facilities play an important role for small traders. Table 4.10 and Figure 4.12 help to classify the main priorities and determinants of willingness to trade of the different categories of traders.

Table 4.10 Main determinants of willingness to trade

	First	Second
All	Accessibility	Prices
Small	Accessibility	Market services
Medium	Prices	Accessibility
Large	Prices	Accessibility
Extra large	Accessibility	Security

Source: Author's estimates

Figure 4.12 Determinants of willingness to trade



Source: Author's estimates

As summarized in Table 4.10, it is clear that:

- availability of – and access to – credit and similar market services are a necessary prerogative of small traders;
- improvement in security is a type of "luxury" prerogative of extra-large – essentially out-of-Turkana – traders;
- improvement in accessibility and increase in prices are the two predominant factors which seem to be common more or less across the spectrum of categories of traders covered in this analysis.

With reference to the last point, it is necessary to consider how improvements in the quality of roads and increases in commodity prices are two sides of the same coin, since both aim at increasing the trader profit, either through a reduction of costs (improvement of accessibility) or through an increase of income (price increase).

Indeed, the aim of increasing profit is understandable as the leading criterion for interpreting a trader's willingness to trade and in general of an entrepreneur to scale up the size of his/her business. In this light, both options (increase accessibility and consider the feasibility of price increase) are worth considering. However, having said that, it is easy to consider how the two strategies are of a totally different nature: the first one requires major budgetary and major political support, more in line with a proper developmental perspective, while the second is instead much lighter and directly linked with initiatives carried out in emergency and rehabilitation contexts. Consequently, under a more pragmatic and short-term perspective, we leave aside the option of increasing accessibility and focus on considering the feasibility of making use of price increases as a determinant of traders' willingness to trade (WTT) and therefore as a factor to increase local food supply. In other words, the question now becomes: "How much does price need to rise to be able the gap in food supply – identified in 4.4.2.2 – to be covered?"

4.4.3.5 Trade-off between price and food supply

In order to answer the question just raised above, traders' willingness to react to price changes has been estimated on the basis of traders' business size and their perception of availability and access to key inputs – i.e. cash and food. The following ordered logit model has been adopted:

$$WTT_i = \alpha\, size_i + \beta\, money_i + \chi\, food_i \qquad (4.2)$$

where:

WTT_i	is the willingness to trade manifested by the i^{th} trader,
$size_i$	is the business size of the i^{th} trader,
$money_i$	is the i^{th} trader's expectation to access cash,
$food_i$	is the i^{th} trader's expectation to access food commodities.

Table 4.11, Table 4.12 and Figure 4.13 present the estimates of WTT of the various categories of traders considered in this case study in response to changes in the prevailing market prices. In particular, the possible price increases envisaged range between 0% (no increase) and 20% or more. In this case the price changes do not refer to a specific commodity, but rather to the major commodities dealt with by each trader interviewed.

Table 4.11 Willingness to trade in response to price changes

	A	B	C
traders' confidence in accessing cash (%)		-0.876 ***	-0.847 ***
traders' confidence in accessing commodities (%)		-0.683 ***	-0.843 ***
Ln business size	-0.199 ***	-0.111 ***	
cut 1	-4.955	-5.234	-4.178
cut 2	-2.734	-2.951	-1.986
cut 3	-0.494	-0.575	0.277
cut 4	-0.549	0.502	1.421
N. obs	648	648	756
LR chi^2	30.05	73.69	60.90
Prob > chi^2	0.0000	0.0000	0.0000
Pseudo R^2	0.0178	0.0436	0.0305

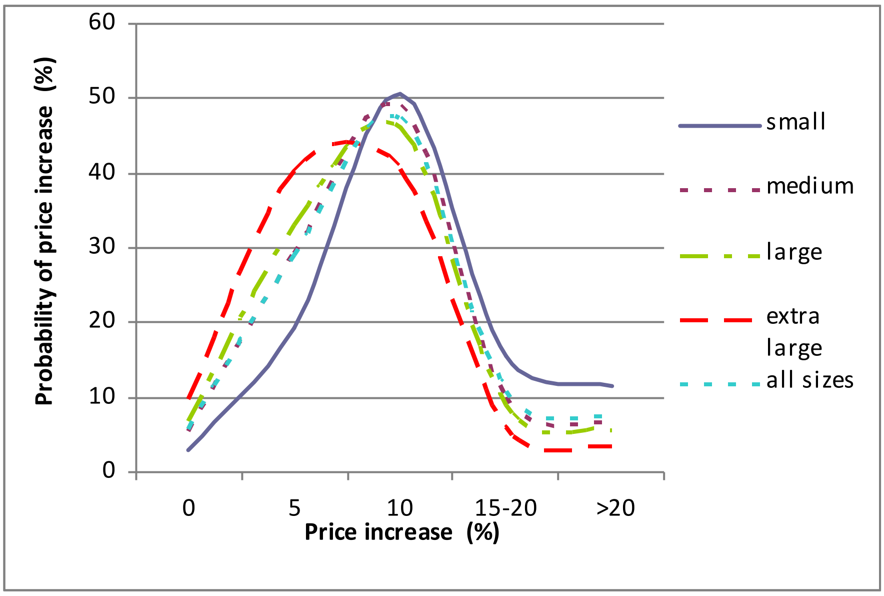
Source: Author's elaboration

Table 4.12 Probability of WTT

	rate of price increase (%)				
	0	5	10	15-20	>20
small	3.042	19.413	50.543	15.415	11.588
medium	5.373	29.249	48.926	9.995	6.457
large	6.691	32.826	46.167	8.721	5.594
extra large	9.760	40.253	40.512	5.925	3.550
all sizes	5.710	29.012	47.383	10.614	7.281

Source: Table 4.11specification B

Figure 4.13 Willingness to trade in response to price changes



Source: Table 4.12

For all categories of traders considered the evolution of the WTT has the expected inverted-U shape.[58] Small traders are the slowest to react, at least for rates of price increase lower than 10%, which also corresponds to the maximum WTT value. On the other end, extra-large traders report the fastest capacity to react to price changes. The reason why this does not happen in reality is due to the lower relevance of the price factor in their decision to invest or scale-up their investment in Turkana, as observed above. The other categories are in between the two extremes, showing very limited difference in terms of traders' attitude and capacity to react to price changes.

On the basis of these points, it seems possible to assume in a rather arbitrary manner that:

[58] The inverted-U shape reflects the relevance of a specific variable or set of variables in the traders' decision making process. In this case the inverted-U shows that traders' WTT initially tends to increase in response to price increases in the commodity or group of commodities exchanged. In a second phase, after reaching its maximum value, the WTT starts decreasing, showing that the variable under consideration (in this case the price of the commodities exchanged) has exhausted its role as a determinant of the trader's decision making process.

- Extra-large traders' reaction to price increases would be rather limited (unless other concomitant measures were taken, as in particular improvement of road quality and in general increased accessibility).
- Small traders' reaction would be slower than the other groups.
- Medium and large traders would be very close to overall average.

The above considerations help to envisage the possible direct implications of a price increase. At this stage it is necessary to separate two possible objectives that may be eventually pursued through a cash injection strategy:

- increase in marketed supply;
- promotion of small-scale traders.

In particular, with regard to the latter point, it seems possible to argue that any strategy aiming at small-scale trade promotion eventually pursued through a purely market-driven strategy (demand support through cash distribution) would find it hard to achieve success. In fact, it can be expected that the faster response from medium and large traders would drastically reduce the possibility of small traders' involvement in any additional market share created through cash injection. Moreover, under such perspective, any cash injection purely aiming at promoting small-scale trade can be expected to have inflationary consequences. Both problems (ineffective support to small-scale traders and high risk of contributing to inflationary pressure) can be contained by channelling the demand-driven support through alternative mechanisms properly coordinated with suppliers (i.e. provision of vouchers).

With regard to the feasibility of achieving an increased marketed supply through a cash injection strategy, a simulation was carried out on the basis of the assumptions mentioned above. Table 4.13 and Table 4.14 help to follow the analysis of the expandability of supply from the different categories of traders. In particular, Table 4.13 estimates the multipliers to be used in Table 4.14 for the estimation of expandability of food supply marketed by different trader categories. In Table 4.14 the assumption considered earlier on of limited influence of price changes on quantities marketed by extra-large traders is applied. In this case, it is a pessimistic assumption, since any response, though limited, will contribute to an increase in the food supply traded in the district and, as such, will contribute to a reduction in the possible price increase required to achieve the target.

Table 4.13 WTT multipliers

	Rate of price increase										
	0%	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%
Trader category											
Small	0.030	0.063	0.096	0.129	0.161	0.194	0.256	0.319	0.381	0.443	0.505
Medium	0.054	0.101	0.149	0.197	0.245	0.292	0.332	0.371	0.411	0.450	0.489
Large	0.067	0.119	0.171	0.224	0.276	0.328	0.355	0.382	0.408	0.435	0.462
Extra large	0.098	0.159	0.220	0.281	0.342	0.403	0.403	0.404	0.404	0.405	0.405

Source: Author’s estimates

Table 4.14 provides the results of the simulation exercise. At a first glance, a price increase of approximately 3-5% should be able to generate through the market system the increase in marketed supply estimated in section 4.4.2.2 (approximately within the range 24,000 – 35,000 MT per year) to be able to cover the normal gap of annual food requirements in Turkana. However, the consideration that Turkana relies almost completely on the import of cereals from neighbouring areas makes it is reasonable to restrict the “additional” contribution to those provided by the groups of medium and large-size traders. In such perspective, the price increase required can be reasonably expected to range between 4% and 7%.

Table 4.14 Expandability of food supply

	Traders category							
	Small		Medium		Large		TOT	
Estimated Food Supply	28981		31628		63272		123882	
Expandability								
Rate of price increase	additional	cumulative	additional	cumulative	additional	cumulative	additional	cumulative
0%	882	29863	1699	33328	4234	67506	6815	130696
1%	1830	30812	3210	34838	7541	70813	12581	136463
2%	2779	31761	4720	36348	10848	74120	18348	142229
3%	3728	32710	6230	37858	14155	77428	24114	147996
4%	4677	33658	7741	39369	17463	80735	29880	153762
5%	5626	34607	9251	40879	20770	84042	35647	159528
6%	7430	36412	10496	42124	22458	85730	40384	164266
7%	9235	38216	11740	43369	24146	87418	45121	169003
8%	11039	40020	12985	44613	25835	89107	49859	173740
9%	12844	41825	14230	45858	27523	90795	54596	178478
10%	14648	43629	15475	47103	29211	92483	59334	183215

Source: Author’s estimates

With this in mind, it is worth considering that:

- such an estimate deliberately does not take into account the contribution that a price increase in combination with other eventual concomitant initiatives (particularly in terms of increased accessibility) may stimulate through the category of out-of-Turkana extra-large traders.
- such an estimate does not take into account the possibility of increasing traders’ capacity (particularly of medium size). It is expected that such eventual increased capacity would help to raise further expandability of supply in correspondence of lower price increases than the ones determined in Table 4.14.

The latter point is of great relevance in the analysis and formulation of strategies aiming at increasing food supply in Turkana.

4.5 Conclusions

This chapter has focused on the relevance of market capacity and functioning for food security and related issues in a district in Kenya, Turkana, which is prone to chronic food insecurity and totally dependent on food trade.

First of all, it has been considered how the food trade flow is insufficient to cover local requirements, even when taking into account the role played by the refugee intervention in Kakuma, which artificially contributes to increase the supply of food within the district. Such concern becomes more and more relevant when considered under a dynamic perspective, which is characterized by a steady population growth, with consequent increase in food requirements. Within a stagnant and rudimentary economic background, such dynamics only contribute to widen the gap between requirements and availability of food.

In addition, it has been considered how the gap between food requirements and supply in the district is reflected in high prices, almost double the average level for the country. This inevitably affects the problem from both sides of the coin: while, on one side, high prices are a prerequisite to attract traders' interest and involvement, on the other, they drastically limit access to a large part of the population.

In general, trading activities in Turkana are found to be profitable. This is due in particular to the high market prices prevalent in the district. Despite the profitability of the trade business, potentialities are far from being optimized and a large share of both actual and potential demand remains uncovered. The major constraint identified is the access to critical inputs such as cash and transport capacity. In fact, both inputs are very expensive, essentially because in short supply in the district.

In terms of market functioning, the degree of market integration for the Turkana markets is below the average for the rest of the country. This was to some extent expected, though a proper analysis and a measure of market integration was not yet available. The two most interesting points raised by this analysis are the following:

- The market interconnection within Turkana is low, though on average acceptable, particularly in light of the gap between the local economic structure and the average one in the rest of the country. This is worsened by a certain disconnect between markets in Turkana and the ones in the rest of the country.
- At all levels, that is in Turkana, in the rest of the country, and between Turkana and the rest of the country, the degree of market integration is far from homogeneous: some markets are well connected to others, while others are not.

With reference to the points just highlighted, the proposed strategy for any market-related intervention in Turkana is to utilize the markets which are currently most connected, since they are best placed to work as a link between the rest of the country and the remote areas in Turkana. In particular, the markets most integrated and with a certain price-making attitude within the district seem to be Napusimoru and Lokwi. In the case of the co-integration between Turkana markets and the others, Lokwi, Kalimapus and Napeililim are the most integrated; in this case, the Turkana markets play essentially a role of price-takers. In this regard, it was found out that, while three of the four most integrated markets are rather well located along the main transport routes, Kalimapus is instead located in a remote area along the lake shore close to the area of implementation of the CFW project. Though it is difficult at this stage to consider the role that such small and localized project may have played in strengthening the commercial link between the rest of the country and such remote area in Turkana, this finding deserves more attention.

The risk of implementing market-based interventions in areas where markets are disconnected from the district's major trade network is that a certain level of local inflation may be among the by-products of the initiative. In particular, the more disconnected the market where a cash-based intervention is implemented, the higher the expected risk of inflationary consequences. In this regard, a review of market prices in the area of implementation of CFW has not been able to recognize a direct association between cash intervention and price increase. Having said that, the link is expected and wherever market-related initiatives are implemented efforts should be done to put in place a system to provide regular monitoring of market prices of major commodities.

A profiling of the traders involved in food commerce in Turkana and in the neighbouring areas in Kenya was carried out in order to analyze the feasibility of increasing trade inflows in the district. Such profiling highlighted the drastic gap in terms of capacity between traders based in Turkana and in the neighbouring areas in Kenya. Following on from this exercise, the analysis tried to identify the major determinants of traders' involvement in Turkana and explored their willingness to scale up (or to initiate at all) such involvement. In general terms, the very poor status of infrastructure throughout the district was lamented as the major disincentive, while the price factor was recorded as the second priority in the traders' decision to invest. The third and fourth factors were identified respectively as the poor security conditions and the poor access to credit. [59]

Having said this, it is necessary to consider how improvements in the quality of infrastructure and increases in commodity prices are two sides of the same coin, since both contribute to increase the trader's profit, either through a reduction of costs (improvement of accessibility) or through an increase of income (price increase). From this perspective, both options – i.e.: a) increase accessibility, and b) consider the feasibility of price increase – are worth considering. However, the two strategies are of a totally different nature, the first one requiring heavy budgetary and political support, more in line with a proper developmental perspective, the second being, instead, much lighter and directly linked with initiatives carried out in emergency and rehabilitation contexts. Thus, while highlighting the need for more attention from the central authorities on improving transport infrastructure, this study has focused on considering the feasibility of making use of price increase as a factor to strengthen food supply. This highlighted the need to separate two possible objectives that may eventually be pursued through a cash injection strategy:

- increase in marketed supply;

[59] Accessibility concerns seem to be particularly relevant for small traders (highly dependent on suppliers), while for medium-size traders the level of prices seems to be more influential than other factors in decision making. In between is the case of large traders, for whom such factors as price levels and the quality of roads have the same influence on their willingness to (scale-up) trade in Turkana. Overall, quality of roads and security are major determinants for the extra-large out-of-Turkana traders. Access to cash and other credit facilities play an important role for small traders.

- promotion of small-scale traders.

In particular, with regard to the latter point, it seems possible to argue that any strategy aiming at small-scale trade promotion eventually pursued through a purely market-driven strategy (i.e. demand support through cash distribution) would find it hard to succeed. In fact, it can be expected that the faster response from medium and large traders would drastically reduce the possibility of small traders involvement in any additional market share created through cash injection. Moreover, from this perspective, any cash injection purely aiming at promoting small-scale trade would be expected to have inflationary consequences. Both problems (i.e. ineffective support for small-scale traders and high risk of contributing to inflation) can be contained by channelling the demand-driven support through alternative mechanisms properly coordinated with suppliers (i.e. provision of vouchers).[60]

With regard to the feasibility of achieving an increased marketed supply through a cash injection strategy, the results of a simulation exercise show that a price increase of approximately 3-5% should be able to generate through the market system the increase in marketed supply required to be able to cover the gap recorded in annual food requirements in Turkana.

Having said this, it is worth considering that:

- such estimate deliberately does not take into account the contribution that a price increase in combination with other eventual concomitant initiatives (particularly

[60] In broad terms, cash injected in the system will determine a disequilibrium through an increase of overall financial wealth which is not due/linked to a parallel increase in material wealth (increased supply of whichever good). The risk of inflation will depend on the capacity of the increased demand generated by the increased financial wealth to stimulate an increased supply (variable according to market strength). The case of vouchers is slightly different. Indeed vouchers are *quasi*-money and, as such, the risk of inflation remains high. However, the use of vouchers gives the chance to regulate in advance the conditions of the increased supply through negotiations with the traders. Such negotiations moderate – rather than eliminate – the level of price increase likely to be generated by the introduction of *quasi*-money. In addition, contrary to the case of cash, in the case of vouchers, the increase in financial wealth raises the general confidence that the process (increased supply of commodities) will be completed, and such confidence helps to contain the risk of price increase.

in terms of increased accessibility) may stimulate through the category of out-of-Turkana extra-large traders.

- neither does not take into account the possibility to increase traders' capacity (particularly of medium size). It is expected that an eventual increased capacity would help to raise further expandability of supply in correspondence to lower price increases.

The first point just raised identifies a rather contained level of inflation to be expected from an increased demand. However, such favourable perspective needs to be considered within the current context of already quite high prices.

Following on from such concerns, it is advisable to combine demand-driven and supply-driven strategies. From this perspective, the latter point mentioned above is extremely relevant to the analysis and formulation of strategies aimed at increasing food supply in Turkana. In order to minimize the risk of inflation, a demand-driven approach should be accompanied by local investment promotion. Such initiatives in support of traders' capacity should anticipate any cash injection. Further, in view of Turkana traders' motivation and willingness to scale up activities, an endogenous growth process is preferable to one led from neighbouring, more advanced districts. In particular, initiatives targeting large traders based in Turkana would be more reliable and efficient.

In terms of actual measures, two sets are particularly recommendable:

- support to strengthen local transport capacity, by increasing availability of and access to local transport;
- support to improve local business knowledge and attitude:
    - by improving collection and analysis of market information and their dissemination both within the district and in neighbouring areas;
    - by facilitating links between medium and large Turkana traders and traders operating in most competitive markets (such as the markets along the Kenya-Uganda border).

5

Swaziland: Lubombo and Shiselweni

5.1 Introduction

5.1.1 Background and structure of case study

Swaziland was one of the countries worst affected by the drought which struck Southern Africa in 2006, with an estimated maize production for 2006/2007 nearly 60% below that of the previous year. The drought compounded the country's high levels of chronic poverty.[61] In a context of rising unemployment and increasing poverty, the harvest failure resulted in significant income losses for both producers and the poorest workers, who had few labour opportunities. As a result, an increased number of households were reported to be below the food security line, with an additional 10-15% of the population unable to access sufficient food. Even self-reliant households which usually managed to access sufficient food were predicted to face food shortages and to require assistance until the following harvest.

The aim of this case study is to consider the feasibility and appropriateness of cash-based interventions in a chronically food deficit country: Swaziland. In particular, the

[61] According to the Human Development Report 2005, produced by the United Nations Development Programme (UNDP), about 43% of the population live in poverty.

analysis is restricted to two geographical areas, characterized by different agro-ecological and livelihood systems. The analysis is conducted from an economic perspective focused on the functioning of the market. In particular, the attention of the study is focused on the market of food in general and of cereals in particular.

The study is organized as follows. The initial part provides a review of the context and the justification for assistance. After an analysis of market functioning through a review of market behaviour, the focus shifts the estimation of the demand for and supply of food. This will allow a cash transfer strategy to be simulated.

As part of the study, fieldwork was conducted in July 2007. In particular, a household survey and a traders' survey were conducted throughout the focus areas and surrounding areas as well as in the main commercial centres. The aim of such activities was to capture some characteristics of demand and supply of food and arrive to estimate their elasticities.

The household survey covered a sample of 490 units: 360 in Lubombo (LCM) and 130 in Shiselweni (TH).[62] The sampling framework was stratified, with households and enumeration areas selected randomly. In Lubombo 56% of the households in the sample happened to be among the beneficiaries of food aid intervention and the remaining 44% non-beneficiaries. In Shiselweni all households in the sample were non-beneficiaries.

The traders' survey covered a sample of 235 units, 94 based in Lubombo, 92 in Shiselweni, and 49 in the major commercial centres in the country, mainly Matsapha and Manzini.

[62] Throughout this study the names of administrative areas ("Lubombo" and "Shiselweni") and of livelihood zones ("Lowveld Cattle and Maize" and "Timber Highlands") are used interchangeably, either in combination or on their own. The reference is in all cases to the specific part of the administrative area identified by the relevant livelihood zone: LMC for Lubombo and TH for Shiselweni.

5.1.2 General context[63]

Swaziland is classified as a Lower Middle Income country in view of its per capita GDP which is well above the sub-Saharan African average. At the same time it is classified under the Low Human Development category of countries.

Its economy is closely linked to South Africa, with the national currency (Lilangeni) pegged at par to the South African Rand. This is reflected in the solid trading patterns between the two countries, with 90% of Swaziland exports being directed to South Africa, which is also the source of more than half of its imports.

The Swaziland economy is still largely based on agriculture. While agriculture contributes only a small share (12%) of total GDP, it provides the major source of income for more than 60% of the population. Such discrepancy is reflected in the low productivity of the agricultural sector and the relevance of subsistence farming.

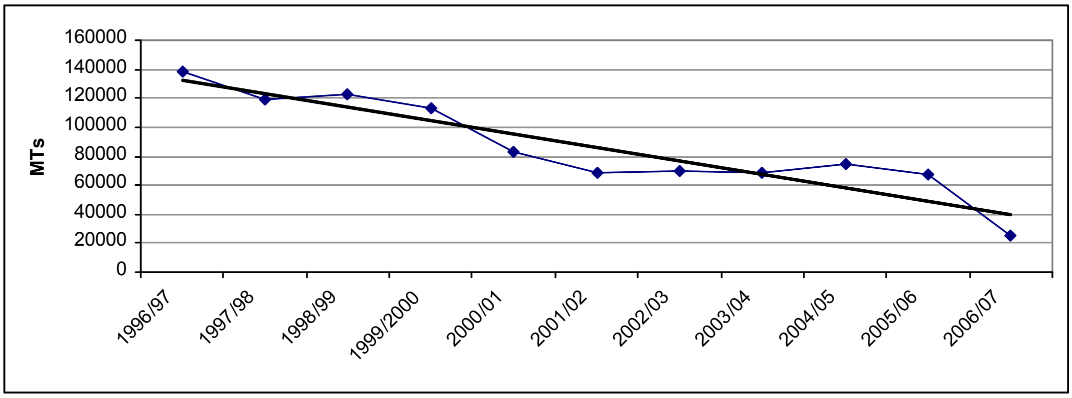
5.1.3 Food production and marketing

The local staple food is maize, which comprises approximately 95% of the country's cereal production. Other cereals produced and consumed on a much smaller scale are sorghum and rice. As shown in Figure 5.1, the trend in maize production during the last decade was characterized by a continuous decline. Several factors contributed to such downward trend, including erratic weather, inadequate policy implementation, the impact of HIV/AIDS and low productivity. The decline is reported across all agro-ecological zones and manifested particularly in the drier Lowveld and Lubombo

[63] This section provides the essential background to introduce and contextualize the bulk of the analysis conducted in the following parts of this chapter. Additional background on the country can be found in Swazi VAC (2006), while Swazi VAC (2007) and FAO/WFP CFSAM (2007) provide wider insight into the case of food shortage experienced in the country. Finally, Dradri (2007) provides a regional perspective of the food market analysis in Southern Africa.

plateau, where farming is essentially on a subsistence basis characterized by very low productivity.[64]

Figure 5.1 Trend in maize production during the past decade



Source: CFSAM Report 2007, FAO/WFP

As shown in Table 5.1, the downward trend in food production has contributed to reversing the major achievements in terms of increased food availability recorded in Swaziland from the 1960s to the mid 1980s. This is reflected in the reported increase of the rates of undernourishment.

Table 5.1 Food availability and malnutrition

Dietary Energy Supply kcal / person / day					Proportion of undernourished in total population %	
1961 - 63	1971 - 73	1981- 83	1990 - 92	2001 - 03	1990 - 92	2001 - 03
2178	2316	2431	2450	2360	14	19

According to FAO definition, it is here considered as "undernourished" the proportion of population whose daily food consumption falls below the minimum daily requirements.

Source: FAO, State of Food Insecurity 2006, and FAO Statistical Database

The low productivity of agriculture forces a certain dependency on imports of food, which has been fluctuating at between 50% and 60% of national food consumption. As

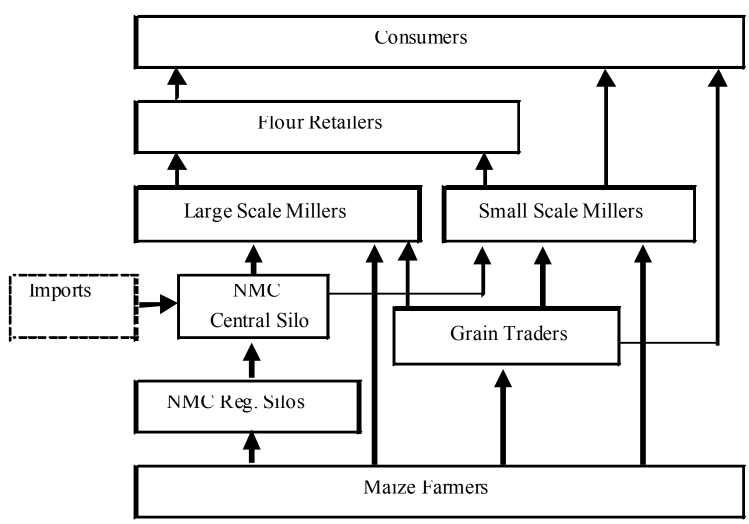
64 In Lowveld and Lubombo plateau average yields are less than two MT per hectare. Average yields reported by commercial producers in the more productive Highveld areas are around six MT per hectare.

remarked by the FAO/WFP CFSAM 2007 report, *"commercial food imports appear to have been quite responsive to the fluctuations and general downward trend in national production"*, also facilitated by the direct convertibility of the local currency into South African Rand.

The bulk of imports is accounted for by maize. Importation rights for maize are owned by a state monopoly. Maize is imported through the National Maize Corporation (NMC), a parastatal entity established in 1985 with the aim of guaranteeing a market to local producers by protecting them against competition from cheaper maize from South Africa while at the same time ensuring the provision of good quality maize to Swazi consumers at affordable prices. In other words, the NMC is mandated with the double aim of market protection and stabilization. In normal production years about 10% of domestic maize production is formally marketed, mostly through the NMC. The FAO/WFP CFSAM report highlights how *"the dual role of NMC as the an importer as well as a competitor in the domestic market gives it an unfair advantage over its competitors, thus creating market imperfections that distort producer and consumer incentives. It sells the imported maize to millers (two main ones control about 90% of the domestic maize flour market) at a price it determines, while the millers in turn determine the prices to charge consumers for maize meal. Maize meal prices tend to be on the high side for poor households which, therefore, have difficulties accessing adequate supplies"*.

The structure of maize marketing in the country is summarized in Figure 5.2. While maize grain and milling are dominated by a few companies,[65] the retail market is more competitive.

Figure 5.2 Structure of maize market



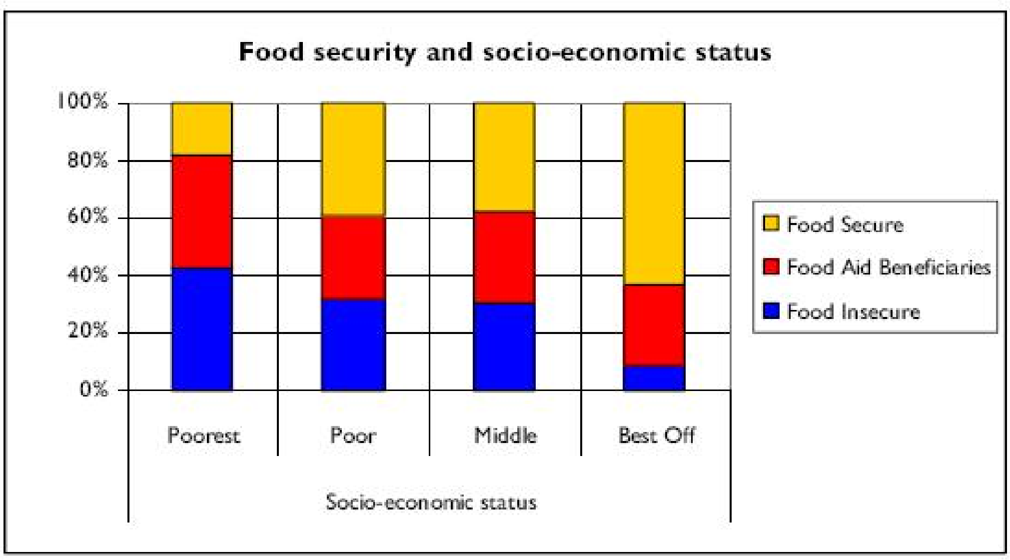
Source: Mukeere and Dradri, WFP, 2006

[65] Maize milling is dominated by two large-scale millers (Ngwane Mills Ltd and Universal Milling Company), which account for approximately 60% and 25% of total market respectively.

5.1.4 Food aid

In response to the decreasing household production of food coupled with the increasing difficulty of poor households in accessing food there has been an increased role for external assistance. Food aid has been the standard response mechanism for meeting food insecurity for several years. The National Disaster Task Force (NDTF) and the World Food Programme (WFP) are the two agencies running the major food assistance programmes in the country in parallel, with NGOs typically running the food delivery programmes in communities. According to the Swazi VAC report 2006, approximately a quarter of the rural population are recipients of food aid. If we consider that almost 80% of the Swazi population is rural-based with livelihoods predominantly dependent on small-holder agriculture, we can appreciate the relevance of food aid in covering nutritional requirements.

Figure 5.3 Distribution of food insecurity among different socio-economic groups



Source: Swaziland Vulnerability Assessment Report, Swazi VAC 2006

Having said the above, it is widely acknowledged that food assistance in Swaziland is characterized by poor targeting. In fact, as documented in Figure 5.3, taken from the Swazi VAC report 2006, food aid seems to be distributed to all socio-economic strata of the population independently of their different purchasing capacity and access to food.

Improving targeting is a general concern since misdirected resources not only unnecessarily reduce the efficiency of food aid, but also severely reduce its effectiveness, leading to market displacement and disincentives to food production.

The bulk of WFP intervention in Swaziland is part of the regional Protracted Relief and Recovery Operation (PRRO). In terms of resources, as of 1st May 2007 approximately two thirds of WFP Swaziland's budget requirements were covered.[66] This appears lower than the one reported for the regional operation as a whole, which by end of July 2007 had managed to secure 83% of requirements for the period January 2005 – April 2008. Despite that, operations seem to be performing better in Swaziland than in most of other countries in the region. In fact, as reported by FEWSNET in Table 5.2, during the period April – June 2007 Swaziland managed to achieve among the highest results in terms of the ratio between distributed and planned tonnages: approximately 70% of quantities planned were distributed against a mere 42% achieved as an average for the region. However, prospects for the period July 2007 – April 2008 were below the regional average.

Table 5.2 WFP Southern Africa PRRO: cereal distributions for April-June 2007 and pipeline requirements for July 2007 – April 2008 (in MTs)

	Apr - June 2007		Jul 07 - Apr 2008		
	Planned	Distributed	Requirements	In Pipeline	Shortfall
Lesotho	2,798	1,470	25,839	11,126	-14,713
Malawi	9,310	7,333	11,175	1,018	-10,157
Mozambique	11,485	591	36,011	21,853	-14,158
Namibia	3,157	2,257	6,714	2,363	-4,351
Swaziland	2,583	1,804	18,586	5,483	-13,103
Zambia	10,822	3,749	42,008	5,148	-36,860
Zimbabwe	16,889	6,537	300,366	122,188	-178,178
TOTAL	**57,046**	**23,741**	**440,699**	**169,179**	**-271,520**

Source: FEWSNET, 2007

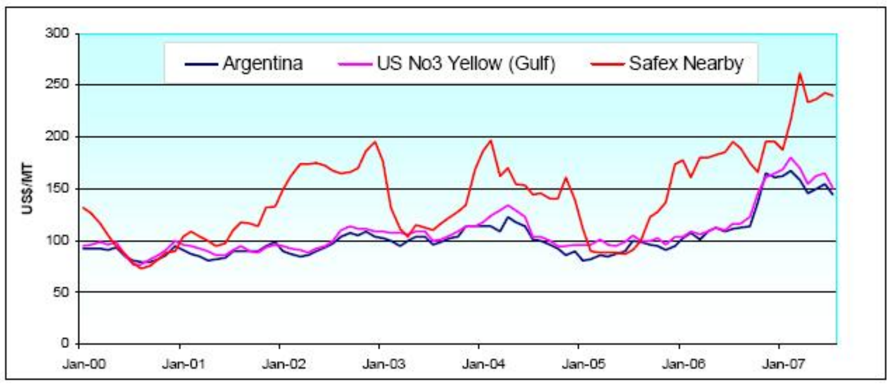
66 The rate of coverage was 62% in financial terms and 68% in terms of commodities.

5.2 Market price analysis

5.2.1 Market prices

The low production experienced in South Africa was expected to affect the food security of the entire region and, in particular, of countries like Swaziland which regularly source most of their food imports from South Africa. As a consequence a certain rise of food prices was expected. Such expectation was supported by rising trends of world prices for cereals mainly reflecting the increasing demand for the production of biofuels.[67] Figure 5.4 compares the evolution of maize prices in USA and Argentina against the one recorded by the South Africa Futures Exchange (SAFEX).[68]

Figure 5.4 USA and Argentina maize prices compared to SAFEX



Source: FEWSNET, 2007

On the basis of historical trends, Dradri (2007) attempted some projections of maize prices throughout the region. In particular, as shown in Figure 5.5, SAFEX prices were expected to remain *"steady around the USD 250/MT mark between July and November and then fall below this mark from December"*.

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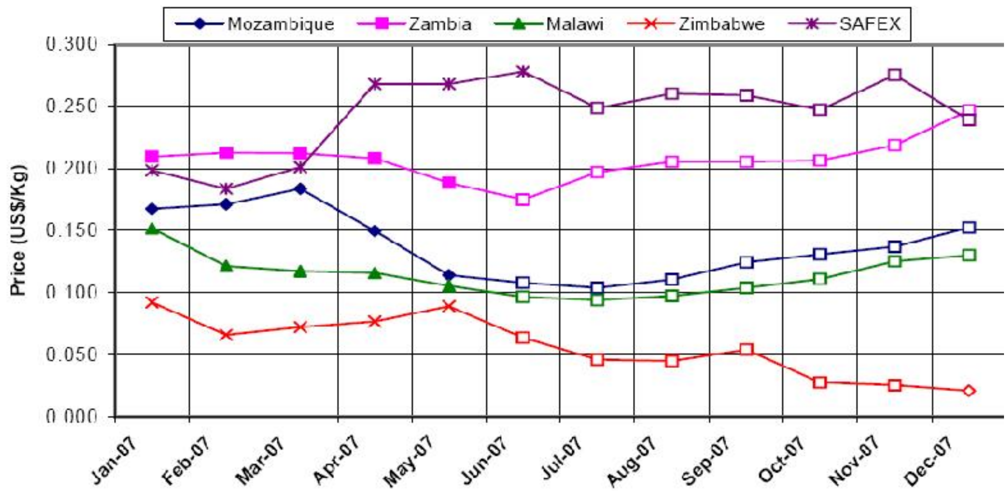
[67] FAO (2007) suggests that, despite record global cereal production during 2007 (4.8% above 2006 levels), total supply would barely meet increased demand.

[68] South Africa usually imports maize to meet its requirements from Argentina and the USA.

Figure 5.5 Maize price projections for selected countries (USD/Kg)



Source: Dradri, 2007

The projections reported in Figure 5.5 were used to estimate the Import Parity Price (IPP)[69] for Swaziland for the period June – December 2007, reported in Table 5.3. Dradri (2007) considered the two best options for Swaziland as source of imports: South Africa, – its traditional source – and Malawi, which had reported a surplus.

Table 5.3 Import Parity Prices for Swaziland: June – December 2007 (USD/MT)

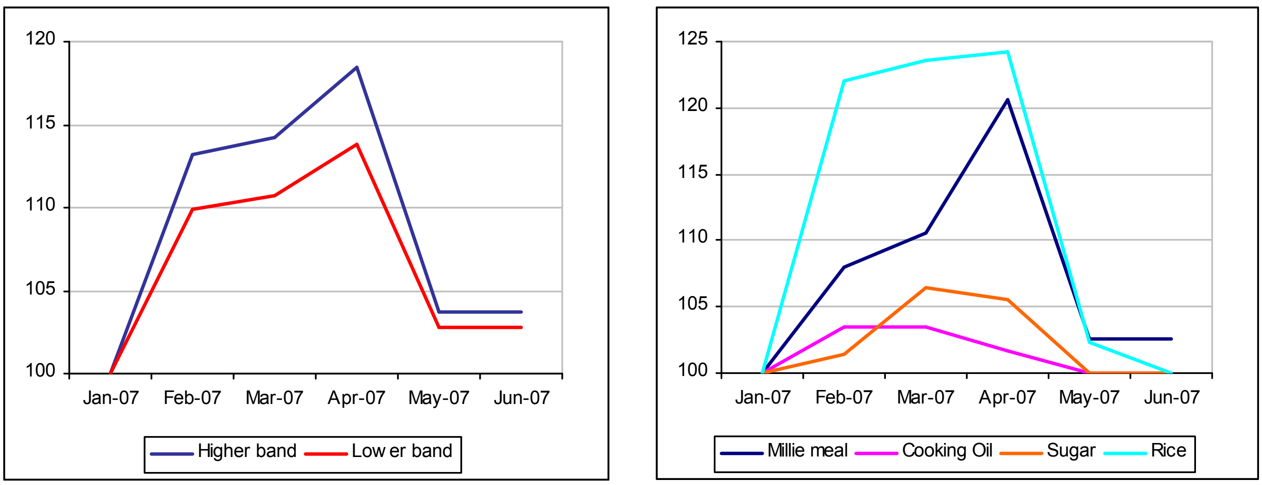
	June	September	December
South Africa	361	339	316
Malawi	211	219	250

Source: Dradri, 2007

[69] Import Parity Price is the sum of all costs incurred: procurement price in the country of origin plus the costs of transport, handling and insurance.

Figure 5.6 helps to visualize the price evolution for food commodities in Swaziland during the first half of the year. In particular, it highlights the peak recorded in April and how this was mostly reabsorbed after the harvest. The figure also shows how the problem has been general, but particularly affected cereals. This is in line with the evolution registered in South Africa and in a few other countries of Southern Africa.

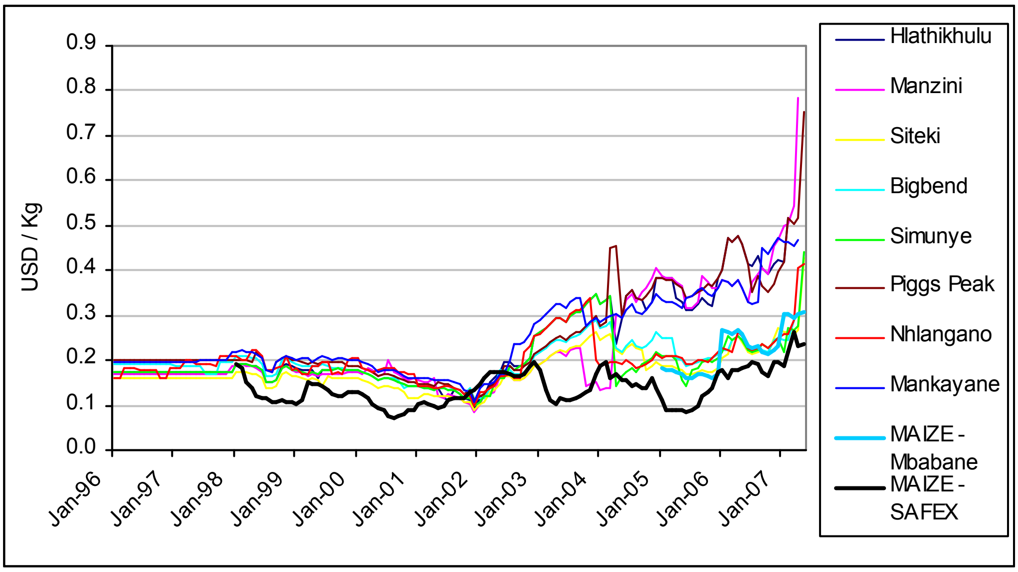
Figure 5.6 Evolution of food price indexes



Source: Elaboration of CSO data

In view of constraints in data availability, prices of maize and of maize meal are considered together. Figure 5.7 presents the evolution of prices of maize for Mbabane and for maize meal for the following markets: Manzini, Hlathikhulu, Siteki, Bigbend, Simunye, Piggs Peak, Nhlangano, Mankayane. They are expressed in USD/kg to be comparable with the SAFEX price for white maize.

Figure 5.7 Prices of maize and maize meal



Source: Elaboration of CSO data

It is interesting to notice how prices for maize meal in Swaziland remained within a limited range for some time and they seem to develop into two main groups after mid 2002. Such groups, called here A and B, are formed by Mbabane, Manzini, Hlathikhulu, Piggs Peak, Mankayane (Group A) and Bigbend, Siteky, Simunye, Nhlangano (Group B). The prices for the two groups of markets maintain a certain similarity of movement and the gap between the two groups has remained fairly constant since 2005, with Group A being 1.5 to two times the value of Group B.

It is difficult to understand the cause of such a gap, particularly in view of the small size of the country. Vicinity between markets does not seem to be the only reason: in fact, while for Group B this could be understandable in the case of Simunye, Siteki and Bigbend, grouped along the eastern border, it seems difficult to be valid in the case of Nhlangano, which lies along the south-western border. A possible theory along the lines of centre-periphery could be considered, with markets in Group B being less influenced by the centre than the others.

Finally, it is interesting to notice how the SAFEX price oscillated within a rather stable range and the price increase experienced since during the first months of 2007 seemed to break such virtual ceiling. This seemed to show a certain structural change upwards in the mid-term equilibrium of this price trend. Along such interpretation, part of the price rise experienced in Swaziland in the first part of 2007 could be expected to be structural as well.

5.2.2 Market integration

The purposes and methodology of this part of the analysis are described in section 3.2.4.

5.2.2.1 Findings

The Augmented Dickey-Fuller (ADF) unit root test is applied to test the condition of stationarity of each price series. In a second step, the ADF test is to be applied to the series of residuals u_t of the two initial time series. Finally, the analysis of the Error Correction Mechanism (ECM) manages to estimates the various relevant aspects of price transmission. Results are reported in Table A4 and Table A5 in Annex 2.

Table A4 shows that all price series are integrated of order 1: I(1). Table A5 reports different aspects of price transmission such as the magnitude of long-run and short-run adjustment to price changes and the speed of adjustment. An overview of such data is provided below in Table 5.4. First of all, the long-term market connection reflected in θ_2 seems to be quite good throughout the areas considered and beyond. In other words, most of the price changes eventually experienced in a market get transmitted to other markets. This good level of interconnection was expected, some of the major reasons being summarized by the very good road connections within a small country neighbouring wealthy South Africa. However, the good level of market connection in the long-run is not mirrored in the short-run. In fact, weaker rates of price transmission are recorded in the short term, expressed by α_2, and this reflected in a low speed of transmission, α_3. In other words, the degree of market integration is good, but not at full speed. An adjusted summary measure is provided by the ratio between θ_2 and half of the time required to restore half of the long-run equilibrium between prices in market pairs: θ_2/h. In this case the gap widens between Lubombo and Shiselweni on one side and the rest of the country on the other. Interestingly, this consideration seems to apply only within each of the areas considered while it does not hold on the external side, that is between each area and the others as well as between each area and the reference market at regional level. In such case, the degree of integration seems to be less diversified, though at a lower average level.

With reference to groups of markets identified above, Group A records the highest levels of combined measures of integration. Such markets seem to play the role of price markers within the country, or at least are in a good position as predictors of price changes. However, the slightly different patterns of price evolution between the two groups, as highlighted in Figure 5.7**,** makes price monitoring in the proposed areas for cash based intervention even more interesting and useful. In fact, it can be quite helpful not only to try to capture early signs of price changes but also to try to distinguish the share of an eventual price rise determined by what can be called "imported inflation" from the direct and indirect impact of an eventual price injection.

Table 5.4 Market price transmission: magnitude and speed of adjustment

	internal					external				
	θ_2	α_2	α_3	h	θ_2/h	θ_2	α_2	α_3	h	θ_2/h
Shiselweni	0.876	0.314	0.146	1.530	0.573	0.915	0.467	0.261	1.317	0.695
Lubombo	0.921	0.652	0.225	1.396	0.660	0.892	0.442	0.191	1.511	0.590
Rest of Swaziland	0.926	0.272	0.197	1.135	0.815	0.745	0.305	0.239	1.282	0.569

Source: Author's estimates

5.3 The demand for food: a household perspective

5.3.1 Scope of the analysis

The aim of this part of the analysis is to improve knowledge of consumer behaviour, with a particular focus on the demand for food. Two datasets have been used:

a) one collected by the Swazi VAC and Food Economy Group (FEG) in occasion of the establishment of the Household Economy Assessment (HEA) baseline conducted in June 2006;

b) one collected through a household survey conducted *ad hoc* for the present study with the major aim of assessing household preferences and any comparative advantage between cash-based and commodity-based assistance.

5.3.2 Household economy and the demand for food

While a full presentation of the household economy background and characteristics in the different livelihood zones in Swaziland can be found in the HEA baseline report, Table 5.5 provides the key information required to start the analysis. It is limited to the two livelihood zones which are the focus of the present study: "Lowveld Cattle and Maize" (LCM) and "Timber Highlands" (TH).

Table 5.5 Income, expenditure and relevance of food consumption

		LCM				TH			
		Very Poor	Poor	Middle	Better Off	Very Poor	Poor	Middle	Better Off
Income	SZL	2179	6063	22958	53075	3515	6320	36560	62370
Expenditures	SZL	2042	5210	15665	40602	3310	6298	35233	55575
Food share of total expenditures	%	18.2	18.5	21.9	17.0	37.0	26.9	12.4	6.5
Kcal consumed	kcal	2163	2226	2478	2688	2121	2184	2331	2646
Kcal purchased as % Kcal consumed	%	8.7	7.5	37.3	58.6	20.8	24.0	39.6	30.2
Kcal purchased as % of 2100 Kcal	%	9.0	8.0	44.0	75.0	21.0	25.0	44.0	38.0
Food aid	kcal	1492	1536	719	0	0	0	0	0
School feeding	kcal	260	200	273	242	255	240	256	238
Tot food aid as % of food consumed	%	81.0	78.0	40.0	9.0	12.0	11.0	11.0	9.0

Source: Author's estimates based on VAC and FEG, Household Economy Assessment Baseline, 2007

Income and expenditure of the various wealth groups show very concentrated patterns in both areas, though the lower average levels for LCM in Lubombo are remarkable compared to TH in Shiselweni. This is not reflected in the estimates of average food consumption. The provision of food aid in LCM and not in TH helps to explain: up to 81% of food consumed by the poorest group in Lubombo is obtained through food aid, while in Shiselweni food aid, provided only in the form of school feeding, accounts for only 12%. This disparity also affects the estimation of the share of expenditure covered by food: while in the case of TH this tends to decrease normally as income and expenditures rise, in LCM it remain more or less stable. This is a clear reflection of a biased situation in LCM. The bias can easily be perceived when considering the major contribution of food aid in covering food requirements: in the absence of food aid the poorest group in LCM would be confronted by a major food gap even in normal circumstances. This bias is inevitably reflected in the estimation of the income elasticity of demand for food, as well as for other commodities.

Because of the structure of the data set used (cross-section of a limited sample) the application of traditional techniques for the estimation of income elasticity cannot provide significant results. Therefore, we resorted to estimating a linear interpolation of the average values of what can be called "effective demand for food" for each wealth group as the ratio between the market value of food consumed by the household and the sum of total expenditure plus the market value of food produced by the household and/or received as food aid. The results achieved through this approximation are shown in Table 5.6.

Table 5.6 Elasticity of demand for food from different wealth groups

	Lubombo LCM					Shiselweni TH				
Wealth groups	Very poor	Poor	Middle	Better Off	All	Very poor	Poor	Middle	Better Off	All
Expenditures	0.70	0.68	0.51	0.31		0.56	0.52	0.26	0.24	
Income	0.68	0.64	0.39	0.25		0.54	0.52	0.26	0.22	
Price (staple only)	-1.02	-1.04	-0.97	-0.77	-1.02	-0.76	-0.63	-0.39	-0.29	-0.54

Source: Author's estimates

In the case of price elasticity, also reported in Table 5.6,[70] the demand for food in Lubombo is much more elastic than in the case of Shiselweni: a percentage increase in price is expected to determine a (just more-than) proportional decrease in the quantity demanded; which is somehow typical of conditions of a certain oversupply. It is very likely that a big part of the price elasticity estimated in Lubombo is linked to food aid.

5.3.3 Household survey

A survey of 490 households (360 in Lubombo and 130 in Shiselweni, respectively) was conducted. The sampling framework was stratified, with households and enumeration areas selected randomly. The condition of benefitting of any programme of assistance was not included as a selection criterion.[71] In Lubombo 56% of the households in the sample were beneficiaries of food aid intervention and the remaining 44% non-beneficiaries. Since in Shiselweni no food aid is distributed, besides school feeding, all households in the sample were categorized as non-beneficiaries.[72]

A first piece of information achieved through the survey was on the perspective use of assistance eventually provided in the form of cash. In particular, non-beneficiaries were asked how they would use an amount of 500 SZL if it was provided to them as cash free of charge. Such amount was estimated *a priori* as roughly equivalent to the monthly cost of food required for an average household with the addition of a relatively small amount to cover other basic non-food expenditure. Beneficiaries of food aid were presented with a double task: they were asked to estimate the monetary value of the food commodities received through the latest distribution and to consider the alternative

[70] The dataset available through the HEA baseline allowed the estimation of price elasticity of the staple food (maize) but not any cross-price elasticity.

[71] It is worth considering that the condition of being beneficiary or non beneficiary identifies two different populations, as reflected in the underlying eligibility and selection criteria defining different degree of need for assistance.

[72] Information required to assess the effectiveness of targeting was not collected since this was not the specific aim of the analysis.

use they would make of such an amount if they had the chance to do so. Finally, all interviewed were asked about their preference among value-equivalent forms of assistance: food, cash, or half and half.

5.3.3.1 Use of cash

Table 5.7 reports the interviewees' preferred repartition of eventual cash assistance or cash-equivalent of food assistance. The very strong similarities between the shares provided by households in Shiselweni and by non-beneficiary households in Lubombo are interesting. The preferred allocation indicated by beneficiary households in Lubombo highlights a reduced interest in food and a general increased interest in all other categories of expenditure. It is worth considering the different amounts that beneficiaries and non-beneficiaries were given the chance to allocate: the amount made available to non-beneficiaries was more than double that of beneficiaries, mainly because the latest food aid distribution before the interview had been limited to half ration.[73] Eventually, in line with the income elasticity of demand, the marginal increase in disposable income generated through the provision of assistance is indeed expected to determine a tendency to reduce the relative share of expenditure for food and other basic needs. However, if there is an expectation that the assistance will be maintained in the future, the perception in the medium term is more relevant than the disruptions linked to occasional reductions in the amount of assistance received. In other words, the fact that the previous food aid distribution had been run on a half-ration can be considered irrelevant to the purposes of the analysis; and, if it is at all relevant, the additional reduction in the share of expenses spent on food reported in Table 5.7 is expected to be quite small and therefore can be reasonably ignored. As indicated above, it is the expectation that average levels received in the past may be maintained in the future, which generates in the beneficiaries a certain impression of welfare and suggests increased attention to alternative uses of resources available or received as assistance.

[73] The full ration provided by the WFP intervention is composed of: 400 gr. of cereals, 60 gr. of legumes and 25 gr. of oil, corresponding to an individual daily intake of approximately 1,880 kcal.

Table 5.7 Use of cash

	% of expenses						
	food	assets	debts	school fees	medical	non food	other
Lubombo LCM non-beneficiaries	62.4	3.2	1.4	6.6	5.5	9.0	11.9
Lubombo LCM beneficiaries	42.8	10.4	5.9	10.7	7.9	7.7	14.6
Shiselweni TH	64.8	4.7	1.8	4.5	3.4	7.3	13.7

Source: Author's estimates

5.3.3.2 Preference for cash or food

Table 5.8 presents the preference expressed by the interviewees about the form of transfer. It is interesting to consider the strong similarities between beneficiaries and non-beneficiaries in Lubombo in terms of expressed preference for cash, averaging around 25%. A certain gap is found in the other two cases (preference for food or a combination of both), with the proportion in support of a commodity-based approach decreasing from 64% to 50% when shifting from beneficiaries to non-beneficiaries. The case of Shiselweni shows an even stronger support for food aid, which reaches almost the two thirds of the sample. A review of the motivations provided by the households for such support highlights a certain lack of confidence in the beneficiaries about their capacity to make proper use of cash. It is somehow difficult to comment on such lack of confidence since experience with cash distributions in the country is very limited and potential beneficiaries have not been exposed so far to the opportunity of making such a decision. It is as well to recognize that the perceived deficiencies in targeting of food aid do not provide the interviewees with any confidence that cash assistance might be better targeted.

Table 5.8 Preference for food or cash (%)

	Lubombo			Shiselweni			Lubombo and Shiselweni		
	Benef.	Non Benef.	All	Benef.	Non Benef.	All	Benef.	Non Benef.	All
Food aid	64.18	49.69	57.78	…	65.12	…	64.18	56.60	59.71
Cash	24.38	25.79	25.00	…	18.60	…	24.38	22.57	23.31
Half of both	11.44	24.53	17.22	…	16.28	…	11.44	20.83	16.97

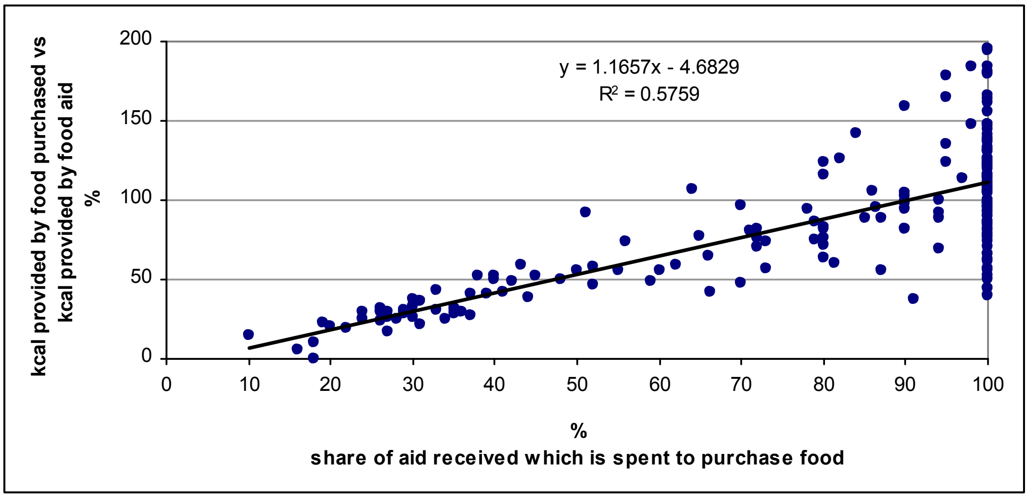
Source: Author's estimates

5.3.3.3 Nutritional contribution of aid: cash versus food

The preferences expressed by the sample about their potential use of the resources received were used to attempt a comparative analysis of caloric contribution provided by food and by cash. In particular, the share of the potential cash transfer that households had decided to spend on food was split into the various commodities that they would eventually buy. This allowed the estimation of the nutritional value – in kilocalories – of the transfer. This part of the analysis is obviously limited to the case of beneficiaries of food aid in the sample. On average, the nutritional contribution achieved through the simulated purchase of food by the recipients of cash assistance covered 93% of that provided through food aid. This is remarkable, particularly considering that, on average, 76% of the market value of the food aid basket was declared to be spent on food. In other words, there seems to be an added value transferred to the beneficiaries through the provision of assistance in the form of cash.

At this point, in order to avoid the subjective component linked to the individual estimation of prices of the various commodities and of quantities, the estimation was repeated with the imposition of the average price for each commodity in all cases. This contributed to reducing the share of nutritional contribution provided through purchase of food to 89% compared to that provided by the food aid basket distributed. This amount, though slightly reduced, remains remarkable because still confirms the added transfer value of cash assistance.

Figure 5.8 Nutritional contribution of aid: cash versus food



Source: Author's estimates

Figure 5.8 helps to show that 1% increase in the share of cash assistance spent on food corresponds to 1.165% increase in the ratio between the nutritional contribution generated through the provision of cash compared to food aid. The ratio is assumed to be constant and therefore the advantage for the beneficiary increases with the amount of the cash transfer. At the same time, the advantage for the beneficiary increases with the increase in the share of cash used to buy food. As shown in Figure 5.8, on average a beneficiary should be able to purchase the same number of kilocalories that s/he would receive through food aid by spending the equivalent of 85.8% of the market value of the food commodities received on food.[74] This would make the remaining 14.2% of the cash transfer available to the beneficiary to purchase additional commodities or for additional expenses.

[74] Transport costs faced by the beneficiary to go to the market or shop to purchase the food are minimal and were ignored. In parallel, transports cost faced by the beneficiaries to reach food distribution points and transport the food aid commodities received were also ignored.

Table 5.9 Cost of kilocalories

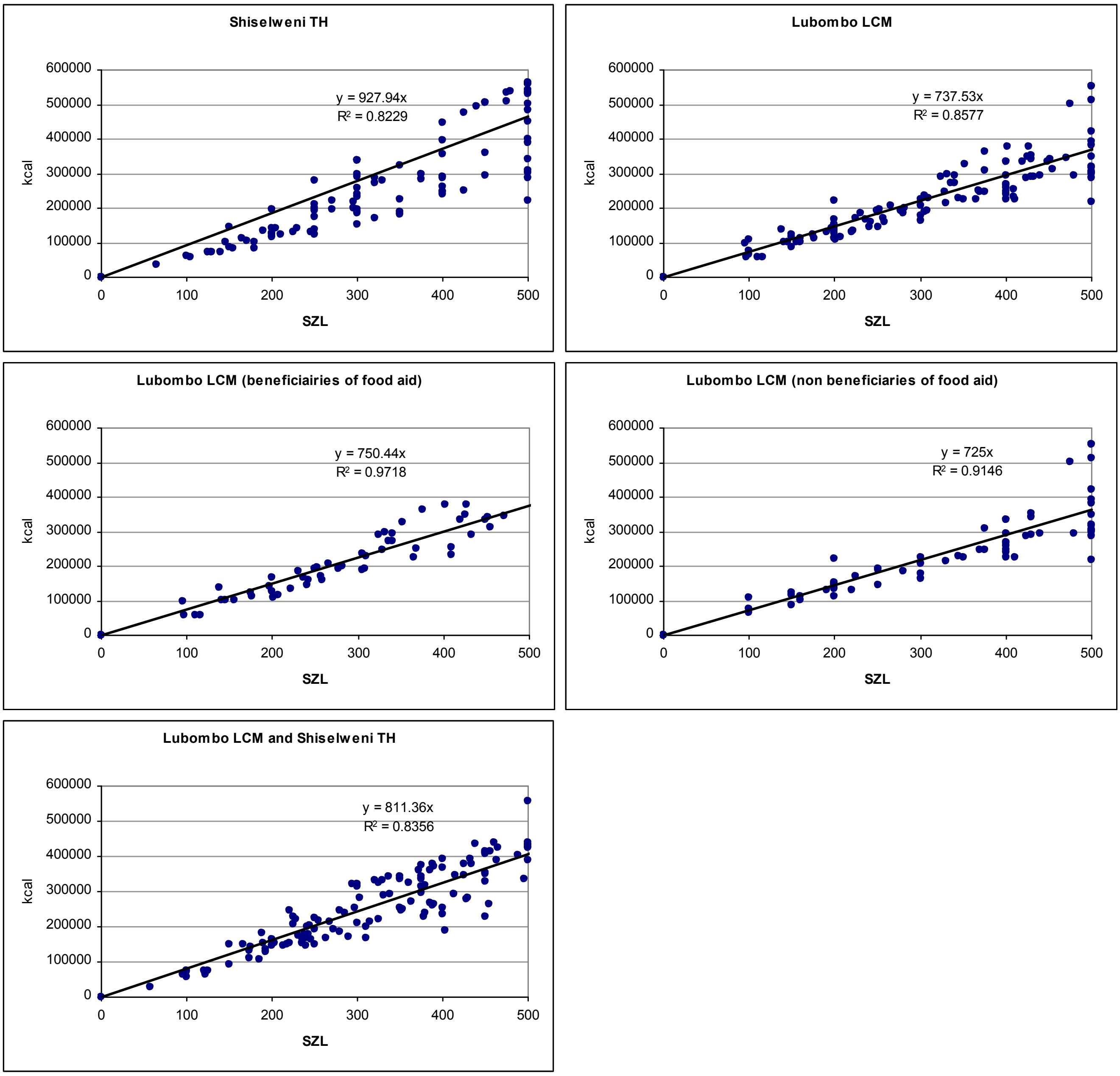
	kcal purchased with one SZL	SZL required to purchase 1880 kcal	SZL required to purchase 1880 kcal on a daily basis for one month
Shiselweni TH	928	2.03	60.78
Lubombo LCM (beneficiairies of food aid)	750	2.51	75.20
Lubombo LCM (non beneficiairies of food aid)	725	2.59	77.79
Lubombo LCM	738	2.55	76.42
Shiselweni TH & Lubombo LCM	811	2.32	69.54

Source: Author's estimates

The food basket that the interviewees would be willing to purchase with the hypothetical cash transfer can provide another interesting piece of information: the amount of cash transfer required to achieve a certain nutritional contribution.[75] Table 5.9 and Figure 5.9 help to estimate the food purchasing capacity of one SZL in the different areas and for the different groups considered. The average number of kilocalories purchased with one SZL ranges between 725 and 928. This gap reflects the difference in market prices as well as different preferences expressed for the use of cash. The amount required on a monthly basis to purchase the amount of food equivalent to the calorific contribution provided through the ongoing food aid intervention (1,880 kcal per person per day) would range between 60.8 SZL in Shiselweni TH and an average of 76.4 SZL in Lubombo LMC. The overall average for the two focus areas would be almost 70 SZL per person per month.

[75] The following groups of food commodities were considered: maize, maize meal, rice, other cereals, bread, irish potatoes, sweet potatoes, beans, vegetables including leaves, fruits, fish, meat, poultry, eggs, oil and fat, sugar and sugar products, milk and milk products. A few households added the category of soup; this was not considered in view of the reduced significance of its calorific content.

Figure 5.9 Nutritional contribution obtained through the purchase of food



Source: Author's estimates

5.4 The supply of food: a trader's perspective

5.4.1 Scope of the analysis

As in all food deficit countries, an essential role in increasing food availability is covered by trade. For this reason it is particularly relevant to provide closer attention to one major category of players involved in the sector: traders. The aim of this part of the analysis is to try to establish the relevance of the trading sector in responding to demand for food, as well as its capacity to expand in response to an eventual increase in demand.

5.4.2 Traders' survey: findings

A survey of 235 traders was conducted, 94 based in Lubombo, 92 from Shiselweni, and 49 from the major commercial centres in the country, mainly Matsapha and Manzini. The selection process was essentially dictated by geographical considerations, with preference given to major urban and trading centres. The survey is not necessarily representative of the traders in the two focus areas; however, this limitation is somehow balanced by the consideration that the sample size covered by this analysis is remarkably large compared to the assumed traders' population in the two areas.

It is worth noting that 91% of the traders in the sample showed interest an in increasing their business size. However, as expected, major constraints were highlighted.

5.4.2.1 Business size

The first step in the estimation of traders' capacity was to get a more in-depth insight into their average business size. In this case the assumption is that the basket of commodities traded is limited; on such a basis, size was estimated by considering the value of the two major commodities traded which were assumed to represent approximately half of the entire turnover eventually achieved by each trader. This is not necessarily the total business size of each trader, but rather the individual size of the food trade business.[76] This monetary value was finally converted into cereal equivalent, as reported in Table 5.10, to estimate the quantity of food sold on a monthly average.

Table 5.10 Monthly turnover of food traders

		Lubombo	Shiselweni	Manzini
food budget				
	avg	6635	555	48146
SZL	min	252	63	734
	max	230040	4870	1442000
cereal budget				
	avg	2212	185	16049
Kgs	min	84	21	245
	max	76680	1623	480667
deciles				
	1	491	125	1843
	2	665	196	2418
	3	768	275	3522
	4	840	345	4651
	5	965	413	5822
SZL	6	1140	492	7517
	7	1694	579	11497
	8	2490	712	19573
	9	4910	1026	33750
	10	230040	4870	1442000

Source: Author's estimates

The comparison between the average business size of food traders in the three different areas is striking. While the dominance reported by the traders based in Manzini was expected, the values found in the case of Shiselweni are somehow below expectations. Eventually, this can be considered in line with the typical livelihoods in the TH characterized by higher self-sufficiency.

[76] Information on the composition of trade in terms of food versus non-food were collected through the survey, however an estimation of the total business size of each trader it is not considered relevant for the purpose of this analysis.

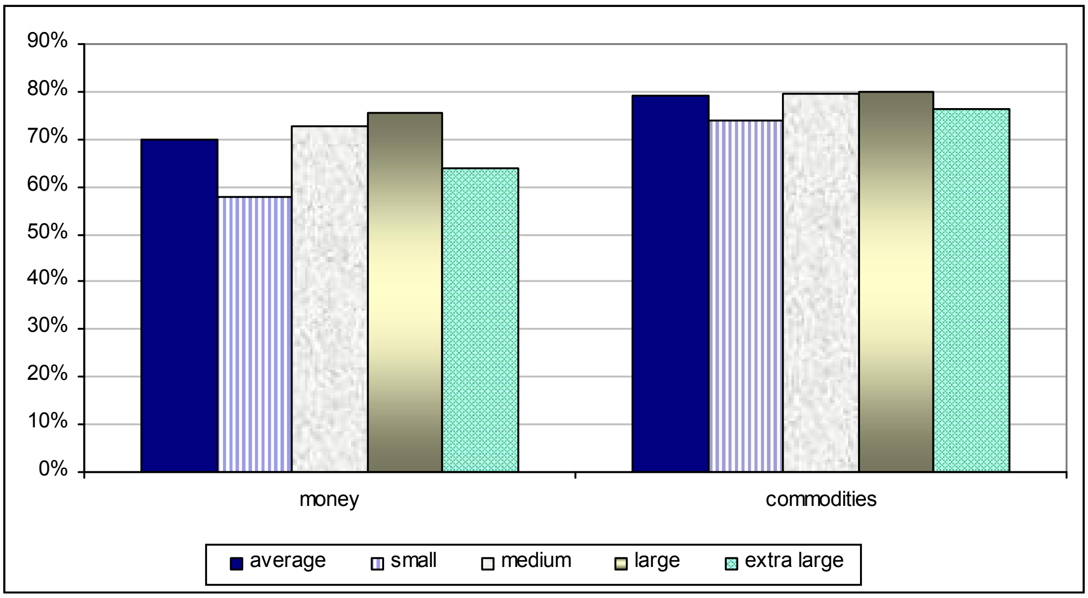
In addition to that, Table 5.10 gives an immediate impression of the high concentration of the food trade business. In all areas considered the average business size among the largest 10% is greater than the sum of the average sizes for all other shares. This is a clear indication of the relevance, and eventually of the control, exercised by the biggest traders on the rest of the market chain.

For homogeneity and simplicity all the traders in the sample were split into four size groups: less than 1,000 SZL ("small"), between 1,000 and 5,000 SZL ("medium"), between 5,000 ad 20,000 SZL ("large"), and more than 20,000 SZL ("extra large"). It is worth noting that according to such arbitrary classification only small and medium traders are in Shiselweni and that very large traders are found only in Manzini.

5.4.2.2 Availability and access to key inputs: money and commodities

As a first step in the analysis the question of availability of – as well as access to – additional key inputs which are a precondition for considering the feasibility of scaling up the business size was considered: financial resources and commodities. Figure 5.10 reports general confidence in the availability of and access to additional key inputs, such as money and food commodities. In particular, confidence about availability of and access to additional financial resources seems on average slightly more difficult than confidence about availability of and access to additional commodities. Figure 5.10 shows that on average a trader has around 70% probability of accessing additional money required and around 80% probability of accessing additional commodities required to scale up his/her business. In this case the focus is on perceived general confidence, which is slightly higher in the case of commodities than in the case of the financial resources required. This consideration seems to be common to all business sizes.

Figure 5.10 Traders' confidence in getting access to key inputs



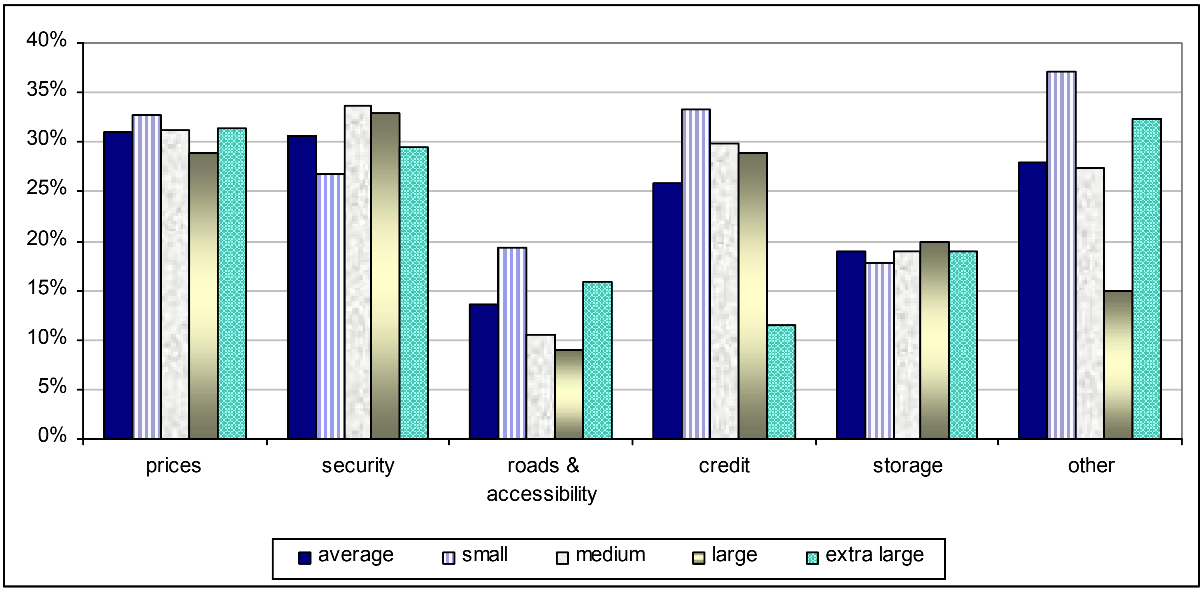
Source: Author's estimates

5.4.2.3 Determinants of willingness to trade

Once the question of the comparative access to critical inputs was clarified, attention was shifted to the analysis of other contextual factors that determine business performance as well as decisions on business size. Five such factors were explicitly included in this analysis (prices, security, accessibility, access to credit, storage capacity) with the possibility of including others in order to properly capture the opinion of the interviewees. Figure 5.11 helps to identify the main priorities and determinants of willingness to trade of the different categories of traders.

As expected, the very good accessibility throughout the country, characterized by the small size of the country as well as the excellent state of the roads, is reflected in the results. Access to credit is reported to play an important role (though apparently this is not the case for extra-large traders). Overall, the two most critical factors are prices and security conditions, although it is difficult to interpret the meaning of traders' concerns over the security conditions in a country which is stable and peaceful. Of more interest is the role played by price levels, and all categories of business size were concordant in defining the relevance of price levels and changes as a major constraint to business performance as well as a major determinant of business size.

Figure 5.11 Constraints identified and determinants of willingness to trade

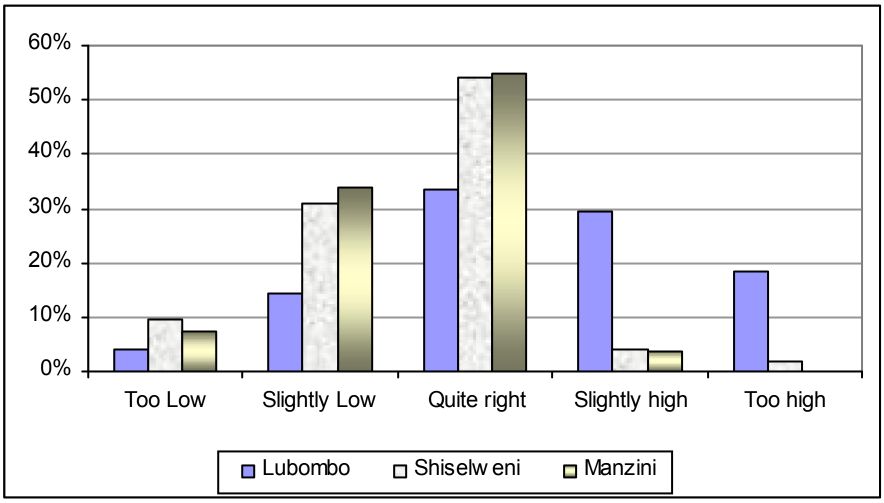


Source: Author's estimates

Finally, the combination of residual factors identified under the category 'other' seems to be relevant. A review of the answers provided under this category is revealing and shifts attention towards a few critical aspects of market functioning. The vast majority of these are covered by lack of demand and excessive supply, which cover 40% and 35% respectively of the problems combined under the category 'other'. The first problem is caused by a lack of purchasing capacity and the second is identified by traders with the perceived relevance of informal business. Both factors contribute to keep prices low; therefore, they confirm the relevance of prices in everyday's traders' decision making.

The analysis of traders' opinion about the current price levels at the time does not look straightforward. As shown in Figure 5.12, while a remarkable proportion considered current price levels appropriate, the rest of the opinions seemed to be quite divergent in the different regions. While in Manzini and Shiselweni a general tendency to consider current prices on the low side was reported, in Lubombo the tendency was in the opposite direction.

Figure 5.12 Traders' opinion on market price levels



Source: Author's estimates

Despite such apparent divergence, most traders in all regions reported that they were more or less in favour of a price increase, and the increase they would consider favourable for their decision to scale up their activities ranged between 7.8% and 9.3%, as shown in Table 5.11.

Table 5.11 Average price increase considered favourable to scale up business size (%)

Lubombo	9.36
Shiselweni	7.84
Manzini	9.15
Average	8.45

Source: Author's estimates

From this perspective, we focus on the feasibility of making use of prices as a factor to increase food supply. In other words, we make use of the price factor as a determinant of the WTT to estimate the elasticity of food supply.

5.4.2.4 Willingness to trade and elasticity of supply

The values in Table 5.11 were re-estimated on the basis of the traders' business size and their perception of availability and access to key inputs: cash and food. The following ordered logit model was used:

$$WTT_i = \alpha\, size_i + \beta\, money_i + \chi\, food_i \qquad (5.1)$$

where:

WTT_i	is the willingness to trade manifested by the i^{th} trader,
$size_i$	is the business size of the i^{th} trader,
$money_i$	is the i^{th} trader's expectation to access cash,
$food_i$	is the i^{th} trader's expectation to access food commodities.

Table 5.12 presents the results of three different specifications of (5.1). The coefficient of business size is insignificant which means that traders' behaviour in response to price changes is similar for all the groups considered.

Table 5.12 Willingness to trade in response to price changes

	A	B	C
traders' confidence in accessing cash (%)		0.417 **	0.406 ***
traders' confidence in accessing commodities (%)		0.488 **	0.488 ***
Ln business size	0.043	-0.010	
cut 1	-1.135	-0.841	-0.778
cut 2	-0.063	0.262	0.326
cut 3	1.273	1.631	1.694
cut 4	2.313	2.679	2.743
cut 5	3.795	4.158	4.222
N. obs	705	705	705
LR chi^2	0.98	21.61	21.57
Prob > chi^2	0.3222	0.0001	0.0000
Pseudo R^2	0.0004	0.0094	0.0094

Source: Author's elaboration

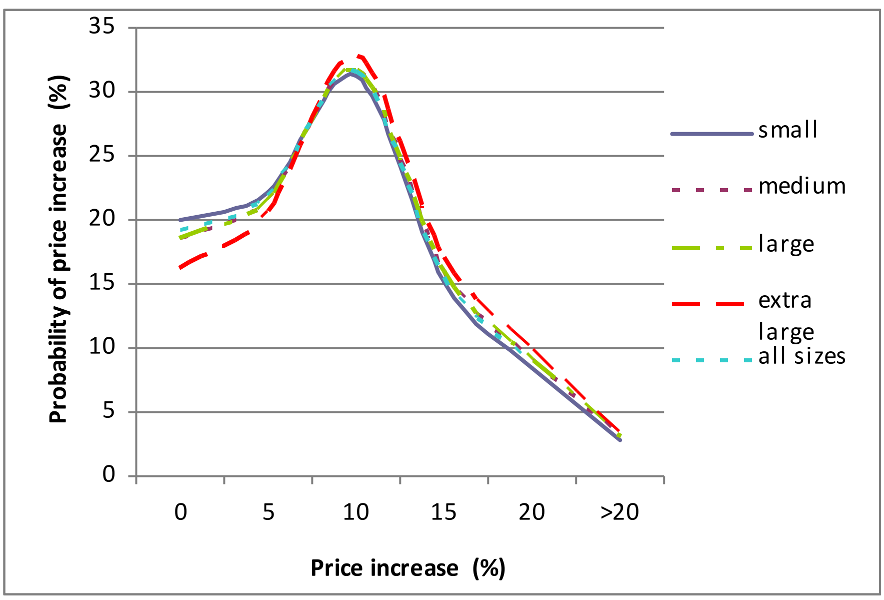
Table 5.13 and Figure 5.13 present the estimates of WTT of the various categories of traders considered in this study, that is the likelihood that different groups of traders may decide to scale up their business size in response to a certain price increase. The possible price increases considered range between 0% (no increase) and 20% or more. In this case the price changes do not refer to a specific commodity, but can be rather generalized with reference to the combination of major commodities dealt with by each trader interviewed.

Table 5.13 Probability of WTT

	rate of price increase (%)					
	0	5	10	15	20	>20
small	20.049	22.265	31.228	15.111	8.491	2.856
medium	18.584	21.604	31.792	15.900	9.056	3.064
large	18.614	21.553	31.756	15.923	9.081	3.073
extra large	16.303	20.700	32.764	17.048	9.840	3.346
all sizes	19.258	21.910	31.536	15.535	8.794	2.967

Source: Table 5.12 specification B

Figure 5.13 Willingness to trade in response to price changes



Source: Table 5.13

As already mentioned, the evolution of the WTT is very similar for all groups, characterized by a certain value (between 16% and 20%) even in the absence of a price increase and by a sharp increase before reaching their maximum values (between 30% and 35%) in correspondence to a 10% rise in price.[77] In line with Figure 5.13, Table 5.14 provides estimates of the WTT multipliers.

[77] See note 53 in chapter 4.

Table 5.14 WTT multipliers

	Rate of price increase										
	0%	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%
Trader category											
Small	0.200	0.205	0.209	0.214	0.218	0.223	0.241	0.259	0.276	0.294	0.312
Medium	0.186	0.192	0.198	0.204	0.210	0.216	0.236	0.257	0.277	0.298	0.318
Large	0.186	0.192	0.198	0.204	0.210	0.216	0.236	0.256	0.277	0.297	0.318
Extra large	0.163	0.172	0.181	0.189	0.198	0.207	0.231	0.255	0.279	0.304	0.328

Source: Author's estimates

Table 5.15 provides estimates of inverse elasticity of supply for a few commodities.[78] On average it can be expected to vary between 2.5% and 3.9% according to commodity. From a geographical perspective the rates seem to be higher in Lubombo than in Shiselweni for most of the commodities considered. However, the critical role in the supply chain played by the main commercial centres in Manzini, particularly in the view of the high reliance on imports, somehow forces a reduction in the effective range of values by making them converge towards the values reported in Manzini.

Table 5.15 Inverse elasticity of supply by commodity and area (%)

	Average				*Weighted average*			
	Maize	Maize meal	Rice	Beans	Maize	Maize meal	Rice	Beans
Lubombo	4.95	3.43	2.88	2.79	2.93	4.03	2.84	2.77
Shiselweni	2.28	2.98	2.69	4.34	2.34	3.99	2.15	3.35
Manzini	2.51	2.31	3.07	2.19	2.94	3.63	2.94	2.54
All	2.89	2.83	2.87	2.87	2.70	3.87	2.59	2.85

Source: Author's estimates

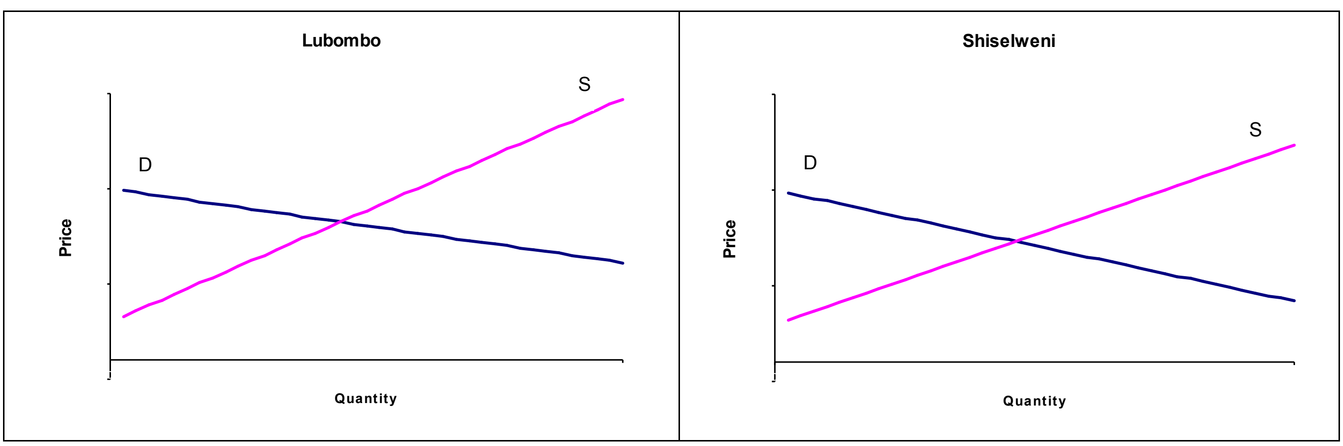
[78] It is worth stressing the different interpretation for WTT (in Table 5.14) and inverse elasticity (in Table 5.15) which are both expressed in percentage terms. While WTT rates indicate the probability that traders will react to a certain price change, the inverse elasticity of supply indicates the percent change of quantity marketed in response to a certain price change.

5.5 A simulation exercise

5.5.1 A combined perspective: joining demand and supply

Once the elasticities of demand and supply were estimated, they were combined to simulate intervention strategies and particularly to try to estimate the eventual inflationary consequences that could be expected from such strategies. Figure 5.14 presents the supply and demand curves estimated on the basis of the inverse elasticities as measured above. In particular, since the focus of the intervention is on the poorest strata of the population, the demand curves in Figure 5.14 were estimated on the basis of the average inverse elasticity for very poor and poor groups. For the sake of consistency, since the elasticity of demand was estimated only in the case of maize, in this case even the supply curve was limited to the staple food. It is interesting to notice how both demand and supply seem to be rather elastic.

Figure 5.14 Demand and supply curves



Source: Author's estimates

5.5.2 A simulation of cash transfer

In order to assess the feasibility of achieving an increased food supply through a cash injection strategy a simulation was carried out. As a first step the increased demand was estimated. For the elasticity of demand the following scenarios, derived from the various estimates provided in the previous parts of this analysis, were considered:

- the share of increased income/expenditure following the cash injection which is spent on food varies between 64% and 70% for very poor and poor in Lubombo and between 52% and 56% for very poor and poor in Shiselweni, as derived from the HEA data and reported in Table 5.6;
- the share of increased expenditure following the cash injection which is spent on food varies between 43% in the case of food aid beneficiaries in Lubombo and 62% in the case of non-beneficiaries in Lubombo, and is around 65% in Shiselweni, as derived from the household survey and reported in Table 5.7.

In addition, we make the simplifying assumption that all additional demand for food is covered by maize, since we do not have a cross-price elasticity of demand.[79] Therefore, we make use of the price elasticities estimated for maize.

On such a basis, the additional amount purchased by a household following a cash transfer of say 100 SZL would vary between 62 and 70 SZL in Lubombo, with the exception of food aid beneficiaries who would spend only 43 SZL on maize. In Shiselweni the amounts would vary between 52 and 65 SZL. In terms of quantities, on the basis of average market prices such additional demand would range between 24.8 and 28.0 kgs of maize in Lubombo (17.2 kgs in the case of food aid beneficiaries) and would be between 20.8 and 26.0 kgs in Shiselweni. Obviously the additional quantities would rise with the amount of the transfer and with the number of beneficiaries, as well as with the number of distributions in the case of interventions protracted over time. For instance, assuming a caseload of 5,000 households – corresponding approximately to 30,000 individuals – equally distributed between the two focus areas considered for this study, with each household receiving a monthly cash transfer of 300 SZL for six months, the additional quantities of maize demanded over a period of six months would vary between 1,116 and 1,260 MTs in Lubombo and between 936 and 1,170 MTs in Shiselweni. Such estimates are, of course, based on the assumption of constant prices, and more realistically can be considered as the maximum increase in possible additional quantity demanded.

[79] Such an assumption is reasonable in view of the high share of total food demand covered by maize.

At this stage, we can make use of the multipliers estimated for the various categories of traders in Table 5.12 to simulate the expandability of supply. In this case we need an estimate of the normal market supply. For such a purpose we assume that the quantity purchased by the households in normal conditions is the average quantity which corresponds to the equilibrium price. This quantity also corresponds to the average tonnage handled by the various suppliers and traders in normal conditions. Therefore, on the assumption of supply-demand equilibrium, we can estimate the quantities from the HEA baseline. Converting the quantities of all food commodities into maize and, more generally, into cereal equivalent, and multiplying the daily individual purchase of the different wealth groups by their estimated number in each focus area, the aggregated supply-demand equilibrium quantity over a period of six months can be estimated at around 1,254 MTs in the case of Lubombo LMC and 647 MTs in Shiselweni TH. Such amounts were arbitrarily split among the various business sizes on the basis of the estimates provided in Table 5.10 and constitute the basis for the analysis of expandability of supply.

Table 5.16 provides the results of the simulation exercise. In the case of Lubombo a price increase estimated approximately between 2% and 6% should be able to generate the increase in marketed supply expected through the injection of cash (300 SZL per household per month over a period of six months). In Shiselweni the required price increase would be higher, around 10%; this is a reflection of the weaker supply capacity in the area.[80] In both cases an increased reliance on very large traders based outside the focus areas would contain the estimated rates of price increase.

[80] As described earlier on, in Shiselweni the food trade structure essentially relies on small and medium size business, and there is limited reliance on large and extra large traders based outside the area.

Table 5.16 Expandability of food supply

Lubombo	Traders category									
	Small		Medium		Large		Extra - Large		TOT	
Normal Food Supply	125		502		5016		627		6270	
Expandability										
Rate of price increase	additional	cumulative	additional	cumulative	additional	cumulative	additional	cumulative	additional	cumulative
0%	25	151	93	595	934	5950	102	729	1052	6695
1%	26	151	96	598	963	5979	108	735	1085	6728
2%	26	152	99	601	993	6009	113	740	1118	6761
3%	27	152	102	604	1022	6038	119	746	1151	6794
4%	27	153	105	607	1052	6068	124	751	1184	6827
5%	28	153	108	610	1081	6097	130	757	1217	6860
6%	30	156	119	620	1183	6199	145	772	1332	6975
7%	32	158	129	630	1286	6302	160	787	1447	7090
8%	35	160	139	641	1388	6404	175	802	1562	7205
9%	37	162	149	651	1491	6507	190	817	1677	7320
10%	39	165	159	661	1593	6609	205	832	1792	7435

Shiselweni	Traders category									
	Small		Medium		Large		Extra - Large		TOT	
Normal Food Supply	647		2265		162		162		3235	
Expandability										
Rate of price increase	additional	cumulative	additional	cumulative	additional	cumulative	additional	cumulative	additional	cumulative
0%	130	777	421	2685	30	192	26	188	581	3654
1%	133	780	435	2699	31	193	28	190	598	3671
2%	135	782	448	2713	32	194	29	191	616	3689
3%	138	785	462	2726	33	195	31	192	633	3706
4%	141	788	476	2740	34	196	32	194	651	3724
5%	144	791	489	2754	35	197	33	195	668	3741
6%	156	803	535	2800	38	200	37	199	729	3802
7%	167	814	582	2846	41	203	41	203	790	3863
8%	179	826	628	2892	45	207	45	207	851	3925
9%	190	837	674	2938	48	210	49	211	912	3986
10%	202	849	720	2984	51	213	53	215	973	4047

Source: Author's estimates

5.5.3 Amount of cash transfer

As estimated in Table 5.9, the amount required on a monthly basis to purchase on the local market an amount of food equivalent to the nutritional contribution provided by the ongoing food aid intervention (1,880 kcal per person per day) would range between

60.8 SZL in the case of Shiselweni TH and an average of 76.4 SZL in the case of Lubombo LMC. Therefore the overall average for the two focus areas would be almost 70 SZL per person per month. The other categories of expenses can be estimated on the basis of their share of total expenditure as reported in Table 5.7. On this basis the size of the cash transfer required to achieve a calorific contribution of 1,880 is indicated in Table 5.17. Once again, different scenarios were considered according to the different estimates of income/expenditure elasticities of demand. At a first sight, the estimated amounts of cash transfer range between 93.8 and 175.5 SZL per person per month. This range is remarkably reduced if we ignore the case of food aid beneficiaries in Lubombo. The high value recorded in their case is useful to consider the lower comparative value of the cash transfer when provided in addition to food aid rather than in its – partial or full – replacement. In fact, the wide difference in the size of cash transfers required to achieve the same calorific transfer for the two groups in LCM (beneficiaries and non-beneficiaries of food aid) shows how much more efficient it is to target the cash to non-beneficiaries of food aid, or anyway not to provide it in addition to a parallel food aid transfer. As a result, the estimated size of the cash transfer would range between 111 and 125 SZL for Lubombo LCM and between 94 and 118 SZL for Shiselweni TH. Despite the slightly higher values estimated for Lubombo, the partial overlap between the two ranges leads to consider reasonable a unique range for both cases. This is particularly valuable for its operational implications. From this perspective and in a certain arbitrary way, the average value of the two extremes, corresponding to 110 SZL, can be considered a good approximation of the size of cash transfer that would allow an average transfer of 1,880 kcal. As mentioned above, such amount is not supposed to be additional to the provision of food aid. If for any reason the same person were to be targeted with food aid and cash, the cash transfer should be reduced and provided as replacement for an equivalent quantity of commodities. Such equivalence is both economic and nutritional. For instance half of the food aid ration could be replaced with half of the proposed amount of cash (55 SZL).

Table 5.17 Estimated amount of cash transfer and foreseen distribution by category of expenditure

	Amount of transfer (SZL per month)	Amount of transfer spent on (SZL per month): food	assets	debts	school fees	medical	non food	other	kcal purchased
Elasticity of demand based on HH survey									
Lubombo LCM non-beneficiaries	124.6	77.8	4.0	1.8	8.2	6.8	11.3	14.8	1880
Lubombo LCM beneficiaries	175.5	75.2	18.2	10.3	18.8	13.9	13.5	25.7	1880
Shiselweni TH	93.8	60.8	4.4	1.7	4.2	3.2	6.8	12.8	1880
Elasticity of demand based on HEA									
Lubombo LCM	110.9	77.8							1880
Shiselweni TH	118.2	60.8							1880

Source: Author's estimates

Along the example made above, we can try to estimate the inflationary impact which can be expected from a six-month intervention with a caseload of 5,000 households – corresponding approximately to 30,000 individuals – equally distributed between the two focus areas. We can consider the proposed individual monthly transfer of 110 SZL in both of the proposed intervention areas. As above, we make the simplifying assumption that all additional demand for food is covered by maize. The additional quantities of maize demanded over a period of six months would be around 2,800 MTs in Lubombo and 2,189 MTs in Shiselweni. Such estimates are, of course, based on the assumption of constant prices and more realistically can be considered as the maximum increase in possible additional quantity demanded.

From Table 5.10 we can relate such quantities to estimated market capacity and expandability of supply to estimate the inflationary consequences of the intervention. In the case of Lubombo LCM the estimated price increase would be in the range of 10%, while in the case of Shiselweni, characterized by a weaker trading structure, the price increase is expected to go well beyond 10%. From this perspective, a smaller size, possibly characterized by a combination of commodities and cash would be advisable. In particular, a cash transfer of 55 SZL, combined with a half-ration of food aid, is expected to contain the price increase to around 6-7% in Shiselweni and 5% in Lubombo and therefore is considered more appropriate.

It is worth considering how the price increase estimated above has a localized nature and is additional to any “imported” inflation. Proper comparative analysis of import parity prices versus local market prices at different proximity from the areas of cash intervention was seen as the most appropriate way to assess the nature of any eventual price rise. The relevance of some markets in the areas of the proposed cash intervention makes their monitoring particularly interesting to try to capture early signs of price changes as well as to try to distinguish the share of an eventual price rise determined by what can be called “imported inflation” from the direct and indirect impact of an eventual localized price injection. An eventual widening gap between the rates of price increase in reference markets such as Nhlangano, Bigbend and Mbabane during the period of cash intervention and its immediate aftermath could be used to measure the inflationary consequence of the localized cash injection. If such gap in comparative market price changes were to exceed alarming rates, it should be seriously considered scaling down the cash intervention and its replacement through a commodity-only intervention. There are no set rules at this regard, even in view of the reported different market structure in the two proposed areas of intervention. As a benchmark, in this case such alarming rates were identified around 15-20%.[81]

5.6 Conclusions

This chapter has focused on the relevance of market capacity and functioning for food security and related issues in Swaziland with particular reference to two areas of the country: Lubombo LMC and Shiselweni TH. The aim of the study was to assess the feasibility of a cash transfer strategy in response to the widespread households’ income

[81] It is worth repeating that the proposed benchmark (15-20%) does not represent a measure of price increase, but refers to the *difference between price increase recorded in key reference markets in the proximity of the proposed project areas* (Nhlangano and Bigbend) *versus the price increase recorded in other reference markets*, such as Mbabane. It is assumed that price changes in Mbabane would be essentially linked to “imported inflation” and therefore the proposed method should help to isolate the eventual inflationary impact of cash injection.

deficit determined by harvest failure. The study led to the following conclusions and recommendations.

The initial part of the analysis considered the use that beneficiaries would make of a cash transfer. It was found that most recipients of cash transfers would spend a decent portion of the funds received on food, with some expenditure on essential non-food items and other services. The share spent on food is foreseen as ranging between 52% and 70% of the cash transfer received by the poor and very poor strata of the population in Lubombo LMC and Shiselweni TH, respectively. As expected, this share was reduced to approximately 43% in the case of beneficiaries of food aid in Lubombo LMC area, which highlights a reduced interest in food and a general increase in interest in other categories of expenditure.

The preferences expressed by the sample regarding their potential use of the resources received were used to attempt a comparative analysis of calorific contribution provided by food and by cash. Interestingly, this revealed an added value transferred to the beneficiaries through the provision of assistance in the form of cash. On average, a recipient of a cash transfer was expected *ceteris paribus* to be able to purchase the same number of kilocalories that s/he would receive through food aid by spending on food purchase the equivalent of 85.8% of the market value of the food commodities received. In other words, a cash-based strategy was found able to provide a comparative advantage: an additional component, equivalent to 14.2% of the cash transfer, which would be available to the beneficiary to purchase additional commodities or for additional expenses.

Despite the latest point above, a general preference for in-kind assistance was expressed by both beneficiaries and non-beneficiaries of food assistance interventions ongoing at the time of the fieldwork. The motivations provided by the households for such support should be considered in light of an almost absolute lack of experience with cash distributions in the country by then. Very likely, their luck of confidence was compounded by the commonly perceived deficiencies in targeting food assistance which did not help to increase their confidence that cash assistance would be better targeted.

A second part of the chapter tackled the analysis from the supply side to assess traders' capacity to respond to an eventual increased demand for food. A profiling of the traders involved in food commerce in the focus areas and the neighbouring areas was carried out to analyze the feasibility of an increase in trade inflow in the two focus areas. General confidence was reported by the traders in their capacity to access the additional commodities required as well as the additional financial resources.

As expected, the analysis highlighted the major role played by price levels in balancing demand and supply. Some critical constraints to market functioning quoted by traders, such as lack of purchasing capacity and the existing excessive supply, confirm the relevance of prices and, more in general, of market functioning in traders' everyday decision making process. The overriding emphasis on price as the key determinant for traders suggested that market was responsive. The relevance of the price factor as determinant of traders' willingness and capacity to scale-up business size was used to estimate the elasticity of food supply. The analysis of traders' willingness to intervene in response to price increases highlighted the relevance of extra-large traders in the national market. The analysis showed that a few at the top of the market chain play a key role in responding to increasing demand for volume (mostly by importing) and do not necessarily need price increases to achieve this. This is important in view of the quantities that they are able to handle in normal conditions and the fact that they are the main importers of all food commodities, with the exception of maize. In other words, not only do they have the capacity to scale up their tonnage, but they also seem to be ready to do so in response to an increase in effective demand, even without the need of a price increase. However, large-size traders were not present in the focus areas and their relevance in terms of direct source of supply to final customers was quite limited, particularly in the case of TH Shiselweni. The weaker trading capacity at local level compared to central level was associated to a slightly higher risk of a moderate price increase.

On more general grounds, the political implications of the conditions of market control exercised by the NMC are seen as a major constraint to the free flow of commodities. The removal of such a constraint would be reasonably expected to improve the free functioning of the market forces and to facilitate the quick adaptation of quantities imported in response to an increase in domestic demand, as in the case examined.

In the final part of the chapter, elasticities of demand and supply were combined to simulate intervention strategies. In particular, the possibility of a cash injection into the system through the provision of cash transfers to households was simulated and the likely rate of price increase was estimated accordingly. A cash transfer of 110 SZL was estimated as a good approximation of the amount that would allow an average transfer of 1,880 kcal, equivalent to the caloric contribution provided by food aid programmes at that time.

In order to estimate the price increase expected from the cash injection an overall caseload of 5,000 households was considered. Higher caseloads were not considered because the induced additional demand was expected to lead to higher price rises. For a caseload of 5,000 households, corresponding to approximately 30,000 people, equally split between the two proposed intervention areas, a monthly cash transfer of 110 SZL per person for a period of six months was estimated to lead to 10% price increase in Lubombo and higher in Shiselweni. As an alternative option, a combination of commodities and cash would be preferable because this would be associated with lower price increases. The optimum size of cash transfer was estimated as around 55 SZL combined with a half-ration of food aid. This was expected to contain the price increase to around 6-7% in Shiselweni and 5% in Lubombo.

It is worth considering how the price rise mentioned above has a localized nature and was additional to what can be called “imported inflation”. In order to distinguish the nature of an eventual price change in the areas of market-based interventions it is necessary to strengthen price monitoring. This would help not only to capture early signs of price changes, but also to enable a proper comparative analysis of import parity prices versus local market prices at various distances from the cash intervention areas and take appropriate corrective measures.

6

Southern Sudan:
Northern Bahr el Ghazal and Lakes

6.1 Background

6.1.1 Introduction

Southern Sudan suffered disproportionately during the years of civil war. In addition to the remarkable human toll taken by the conflict, the protracted fighting destroyed much of the existing infrastructure. This has made harder any attempt of rehabilitation and to launch a process of reprise after the signing of the Comprehensive Peace Agreement (CPA). Having said that, household livelihoods have improved steadily, as confirmed by various assessments conducted since the CPA. Resettlement activities have returned among the many previously displaced hence allowing these households to resume their livelihoods. This has contributed to bolster agricultural production. At the same time migration to urban areas has increased market dependence leading to increases in demand for agricultural commodities. As demand has increased so has trade.[82]

This case study analyzes market functioning and the appropriateness of food aid and cash transfers in Southern Sudan, as part a rehabilitation strategy after a prolonged period of civil war.

[82] WFP *et al*., 2008

The structure of this case study reflects the one adopted in the previous two chapters. Initially, a general review of the context is provided. The analysis is then focused on market functioning. Finally, the estimation of supply and demand for food enables the simulation of intervention strategies.

6.1.2 Agriculture and food production

Agricultural performance during the 2007-08 season was quite good at aggregate level, confirming the success recorded during the previous season. Two recent assessments, the Crop and Food Supply Assessment Mission (CFSAM) and the Food and Livelihood Assessment (ANLA) have helped to provide an estimate. The favourable rainfall patterns contributed to increasing the estimates of areas cultivated as well as of yields achieved.[83] This was also made possible by increased security and accessibility.[84]

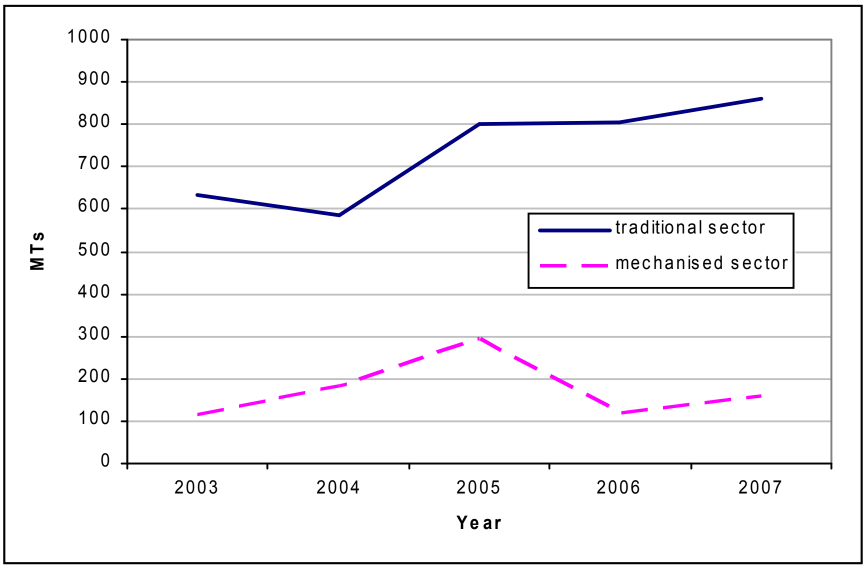
Figure 6.1 confirms the favourable trend achieved until 2007 in the traditional sector and the improvements in the mechanized sector compared to the performance of the previous year. This aggregated perspective, however, masks varying performance at sub-national level. In particular, in the traditional sector, despite some general improvements in Bahr el Ghazal and Equatoria,[85] a big decline in production was suffered in Upper Nile due to the floods.

[83] The quantity of rainfalls, well above average, resulted in a generalized average or better than average vegetation index throughout Southern Sudan.

[84] The CFSAM Report reckons that these factors have contributed to increasing the size of cultivated areas (estimated at 1.01 ha). For instance, in the productive Eastern Equatoria improvements to the road network and a reduction in hostilities have been determinant in allowing farming on more-distant fields.

[85] With the exception of Northern Bahr el Ghazal and Central Equatoria, where mild reductions in production over the previous year have been recorded.

Figure 6.1 Evolution of cereal production



Source: CFSAM 2008

The net estimate of 859,000 MTs of cereal production achieved by the traditional sector was estimated after taking into account the impact of floods which destroyed approximately 60,000 MTs. [86] In addition, this estimate takes into account the activities of approximately 130,000 assisted returnees, but does not consider the activities of spontaneous returnees (around 1,100,000 of IDPs and refugees), whose capacity to farm was expected to be low. In the production of the mechanized sector, estimated by CFSAM at 159,000 MTs, cereal production achieved results in excess of the estimated requirements, even after including in the equation an assumed 10% rate of harvest/storage losses.[87]

[86] It is worth considering the regular occurrence of floods in parts of Southern Sudan. To get a full account of the consequences of the floods it would be necessary to take into account also the secondary beneficial effects of the floods, such as increased fish availability, replenishment of soil fertility through siltation of flooded areas, and extended period for recessional farming.

[87] As regular practice in Southern Sudan, the average per capita cereal consumption is assumed to be 85 kg per year (ranging between 60 and 120, according to location). This is based on food economy estimates carried out since the late 1980s and adjusted upwards by the CFSAM in 2003. The balance is made up of non-cereal products, animal products, and wild food.

6.1.2.1 Agricultural inputs

Agricultural performance is strictly linked to availability and use of inputs. Despite the reported increase in average farm size, a lot of potential remains unexploited. FAO has estimated that the use of animal traction could help to more than double the cultivated areas, though such input is recognized as unaffordable for many farmers. Such access problems, in addition to problems of availability of spare parts, are seen as major constraints in the uptake of the technology. The problem of availability of and access to inputs was aggravated by the large-scale movement of returnees. Besides the likely affordability constraints, it is unlikely that local markets can respond to the increased demand for seeds and tools.

6.1.3 Agricultural marketing

The positive agricultural performance is reflected in the market. The evolution of sorghum market prices during 2006 and the first three quarters of 2007 had a clear decreasing trend reflecting the good supply situation: i.e. the good performance experienced in 2006-07 and the expectation of good performance during the 2007-08 marketing year. This was mirrored by the increasing trend of livestock prices, confirming a phase of improving terms of trade. Such patterns were common throughout Southern Sudan and provides and important signal of reducing of the prevalent regional fragmentation of the market. In fact, though a proper analysis of market integration in Southern Sudan has not yet been conducted, it is expected that a combination of factors (among which the most relevant are: more than two decades of conflict and insecurity, the poor quality of transport routes and in general of physical infrastructure with consequent high transport costs, the presence of formal and informal taxation systems) would drastically reduce the movement of grains, as well as other goods, from surplus areas to areas of deficit. As well-expressed by the CFSAM Report, *"… Although some movements of surpluses between adjacent zones will occur through the activities of the petty traders, who move from state to state by bicycle and motor-cycle, neither the physical infrastructure nor the trading patterns yet exist that will* *enable the movement of large quantities of surpluses necessary to meet the estimated deficits in Equatoria to Upper Nile, Unity, Jongley, or Bahr-el-Ghazal. ... Large sorghum prices in Renk may have influenced the prices in Upper Nile. Maize meal imports from Uganda into Juba, at an estimated 10,000 MTs per annum, are very likely to have influenced cereal prices in Juba and elsewhere in Central Equatoria."* [88]

From the perspective of such fragmented markets, each market is to be considered as a reality on its own and the protracted co-existence of similar price trends is a clear indication of a generalized positive performance achieved. From this perspective it can be reasonably expected that the decreasing trend in cereal prices would be further strengthened along a certain convergence among the various markets if the degree of integration were to increase with consequent more rational allocation of surpluses.

6.1.4 Livelihoods

As expected, the 2007 Annual Needs and Livelihoods Assessment highlighted a substantial improvement in livelihoods since the signing of the CPA. This is in line with the findings of previous similar exercises and indicates the ongoing process of livelihoods improvement.

6.1.5 Food Consumption

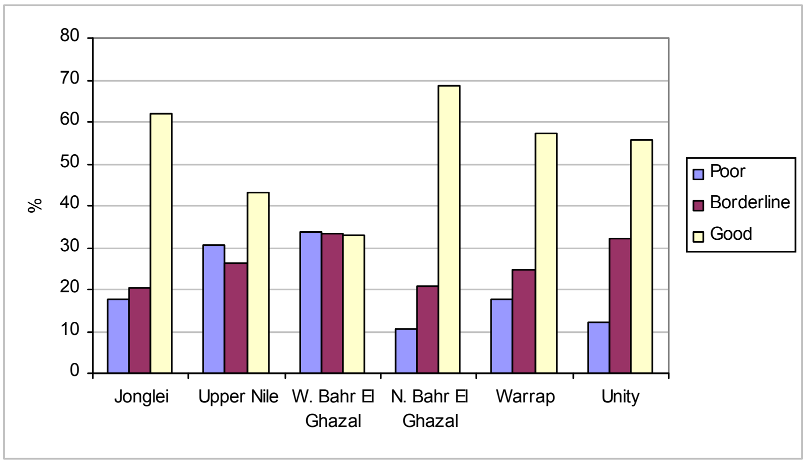
On the basis of both frequency and quality of food consumption it was estimated that around 18% of households in Southern Sudan can be classified as falling under the *poor* consumption group, 25% can be considered *borderline* and the remaining 57% fall in the *good* food consumption group.[89] The geographical distribution of the different

[88] CFSAM 2008, pag.28 and pag.30

[89] The analysis was conducted with reference to the threshold of an individual daily consumption of 2,100 kcals. While this reflects accepted international standards, it is to be considered that an analysis more reflective of the actual average consumption (unknown for Southern Sudan, but reasonably expected to be

groups is presented in Figure 6.2. The highest share of the poor food consumption group was found in Western Bahr el Ghazal and Upper Nile and the lowest share in Northern Bahr el Ghazal.

Figure 6.2 Food consumption groups by State



Source: ANLA 2007

Subsequently, through an arbitrary choice, the poor and borderline food consumption groups were merged and used to identify, as proxy, the food insecure group. [90] Figure 6.3 presents the geographical distribution of the derived food insecure group. The highest concentrations are found in Jonglei, Upper Nile, Northern Bahr el Gahzal, Western Bahr el Gahzal and Warab. The ANLA remarks how the distribution of the food insecure group follows the patterns of the areas affected by floods and by localized insecurity. This is supported by another finding by ANLA: the percentage of households that did not manage to cultivate even for one season, which is in fact higher in the states identified above as affected by the higher proportion of people vulnerable to food insecurity. Finally, in terms of residency status, the analysis conducted by ANLA does not find a significant difference between the prevalence of household vulnerable to food

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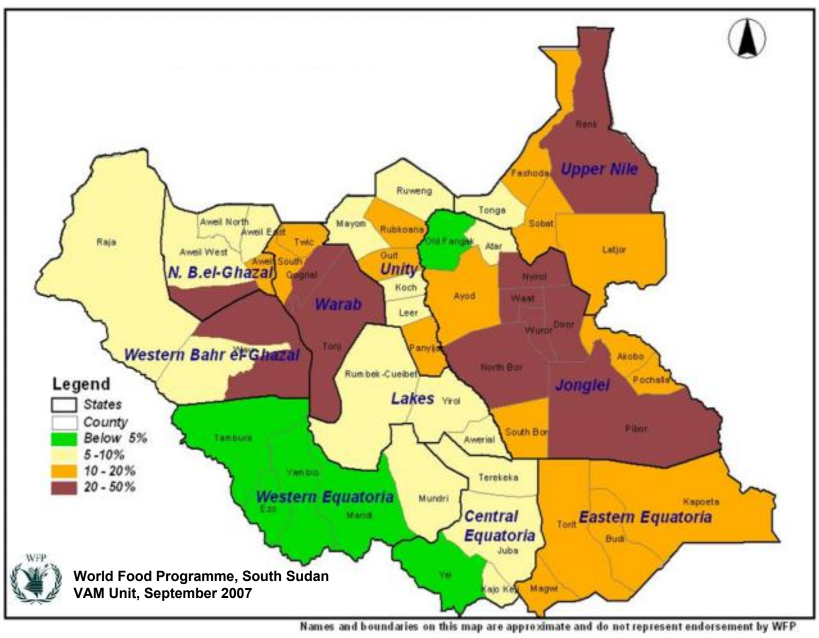
below the standard adopted in this case) would arrive at lower estimates of the poor food consumption group than the ones estimated in this case.

[90] While the need to proceed to an integration of two groups is understood, such a process inevitably loses the capacity to maintain a focus on the poorest food consumption group in the proceedings of the analysis.

insecurity (as estimated though the analysis of food consumption) of returnees and residents. For both groups the prevalence of vulnerable households is estimated at slightly more than 40%. This is quite relevant, particularly in view of its programmatic implications. At the same time, the analysis estimates a significantly higher prevalence (60%) of vulnerable households among the Internally Displaced People (IDP). In other words, according to the findings of such analysis, while there is the same probability that a resident and a returnee may be in conditions of vulnerability to food insecurity, such probability results to be 50% higher in the case of an IDP.

Figure 6.3 Distribution of population vulnerable to food insecurity



Source: ANLA 2007

6.1.6 Coping with shocks and food insecurity

According to the ANLA analysis, the highest proportion of households with lowest resilience which had to resort to worst coping strategies was found in Jongley and Upper Nile. With the exclusions of the Equatorias, the lowest – though still a remarkable 31% – share of households resorting to worst coping strategies are in Unity

State. Such findings support the results presented above through the analysis of food consumption.

6.1.7 Malnutrition

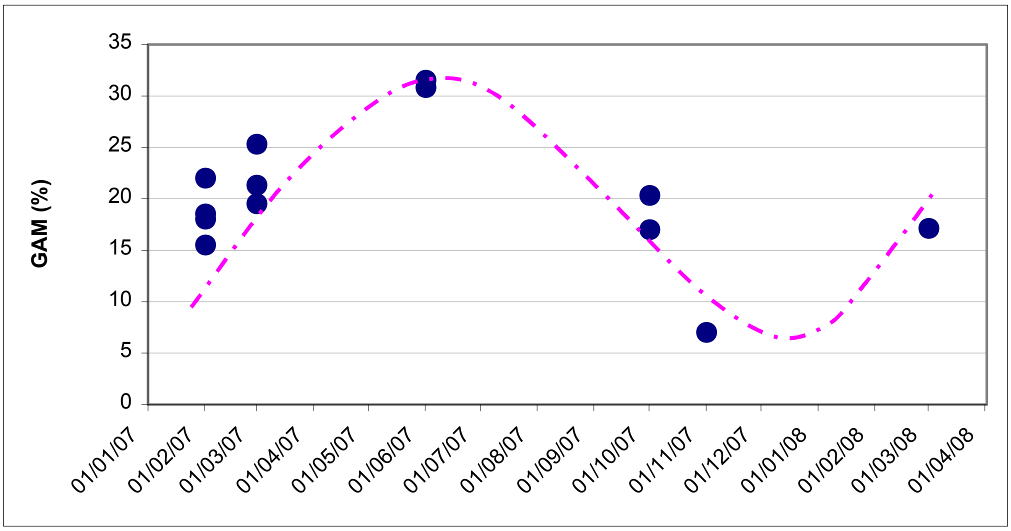
The nutritional situation has generally improved compared to the conflict period. However, surveys conducted before this fieldwork indicate that in 8 out of 10 of the states of Southern Sudan global acute malnutrition (GAM) rates were still above the emergency threshold of 15%. They were found particularly high[91] in Unity State (39%), Upper Nile (37%), Western Bahr el Ghazal (35%), and Northern Bahr el Ghazal (32%). Although each case has its own peculiarities, recent analysis of a robust conflict and post-conflict dataset seems to show that, in general, many of the cases of malnutrition were not primarily due to lack of food but rather related to problems with water and sanitation and, more generally, health. In addition, it is considered that feeding habits that developed as a result of the long civil war have not evolved into healthier and more diversified forms of diet, resulting in chronic malnutrition problems.[92] Many of the vulnerable population spoken to did complain about a lack of food and that they had not received any food deliveries from WFP in two years, but this is rather a manifestation of the perseverance of a dependency attitude despite the appropriate scaling down of food aid intervention.

Figure 6.4 reports the GAM rates estimated from surveys carried out between Jan 2007 and March 2008. From a general perspective it is possible to identify the typical sinusoidal curve which reflects seasonal changes. On the basis of Figure 6.4, it seems, in general terms, that a certain range (approximately between 10% and 25% on a seasonality basis) can be pragmatically considered normal in Southern Sudan.

[91] Figures: courtesy of UNICEF.

[92] See: CARE, 2007

Figure 6.4 Global Acute Malnutrition rates during 2007 and 2008



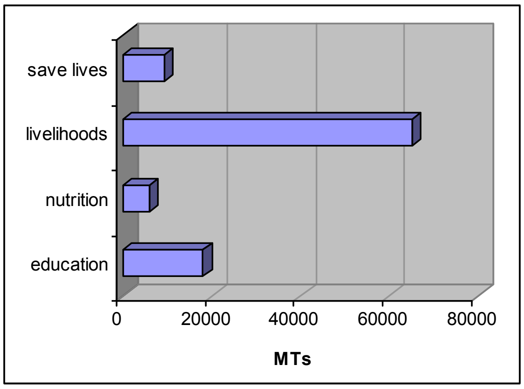
Source: ANLA 2007 and various nutritional survey reports

6.1.8 Response

6.1.8.1 Food aid

By the time of the fieldwork, Sudan was still WFP's largest humanitarian operation aiming to provide food assistance to 5.6 million people throughout the country. Since 2006 the various WFP interventions have been combined into one EMOP in order to increase flexibility in resource allocation and ultimately improve performance. Despite the fact that such a combination is indeed helpful in adapting resource allocation reasonably quickly to changing priorities dictated by accessibility problems due to security, environmental and infrastructural constraints, it does not necessarily help with a review of its different components. According to initial plans, the share of the operation which refers to the South Sudan component varies between 16% of total tonnage and 25% of total beneficiaries. This point, combined with the different standard ration provided in the South and balanced by a higher unit of transport-related costs, leads to estimation the share of the EMOP budget associated with the South Sudan component around approximately one fifth.[93]

Figure 6.5 EMOP components



Source: Elaboration of EMOP budget

Four components can be identified within the structure of the EMOP in the South (saving life, livelihood support, nutritional programmes, education), with a prevalence of livelihood support which is typical of a rehabilitation approach. As appreciated through the field visits, WFP's attempt to adapt programming strategies to the changing environment towards a more rehabilitative approach is quite appreciated.

Benefiting from continued favourable agricultural performance, WFP had planned to procure 150,000 MTs in North Sudan, while efforts to carry out local purchase in the South were constrained by the prevalence of small-size farming and trading.

6.1.8.2 Food aid versus food production

Based on the strong agricultural potentialities in Southern Sudan, FAO has been advocating more support for food production programmes. Their programme is organized in three components focusing on restoration of agricultural production, promotion of appropriate agricultural technologies and enhancing coordination in the food security sector.

Twenty years of continuous food aid has not been a very imaginative or sustainable strategy or use of funding, and it is debatable whether it has, in the long run, improved the overall humanitarian situation, having created a major dependency culture that will

[93] The net energy contribution of the food ration provided by the EMOP in the South was 1,789 kcal versus the 2,006 kcal provided in Darfur.

be difficult to wean the vulnerable population away from. Nevertheless, a) the priority in the years of the war was to save lives, and b) nowadays when stability allows a more sustainable approach, there is need for major interventions to stimulate food supply by strengthening both food production and marketing. FAO is keen to promote food production through the introduction of simple technology for improving farming, and in this respect ox-plough technology would play a major role. On the contrary, the priorities of GoSS are in support of large scale mechanized farming, good strategy but which raises wider problems of sustainability. Despite some major discussion going on this critical issue, in view of the focus of this study, we turn now towards a market perspective.

6.2 Market analysis

6.2.1 Rationale and scope of the analysis

Trade and exchange provide a relevant source of household food consumption. The ANLA report estimates that such a source covers between 35% and 46% of the food needs of different food consumption groups (i.e. 46% for the *poor* food consumption group, 35% for the *borderline* group, and 40% for the *good* food consumption group). Furthermore, as mentioned above, the progressive improvement recorded in terms of market stability since the CPA as well as the synergic process established between the process of economic growth and the development of trade highlight the need to promote all strategies which support, directly and/or indirectly, the improvement of market functionality. With this background, the aim of this part of the study is to consider market functionality and the feasibility and appropriateness of cash-based interventions in Southern Sudan. In particular, the study is focused on the food market in general and cereals in particular. The analysis is conducted from an economic perspective and is restricted to two geographical areas, characterized by similar agro-ecological and livelihood systems.

6.2.2 Methodology

The initial part of this study focuses on the analysis of food market prices and tries to assess the degree of functionality of the local food market. In particular, it tries to assess the degree of trade interconnection among the various areas of Southern Sudan as well as between the local market and the global markets.

As part of the study, fieldwork was conducted in February and March 2008. In particular, a household survey and a traders' survey were conducted throughout the focus areas. The aim of such activities was to capture some characteristics of the demand and supply of food and arrive to an estimate of their elasticities.

The household survey covered a sample of 557 units: 248 in Northern Bahr el Ghazal (NBeG) and 309 in Lakes, respectively. The sampling framework was stratified, with households and enumeration areas selected randomly. In NBeG 26% of the households in the sample were found to be among the beneficiaries of food aid intervention, while in Lakes the share was 19%.

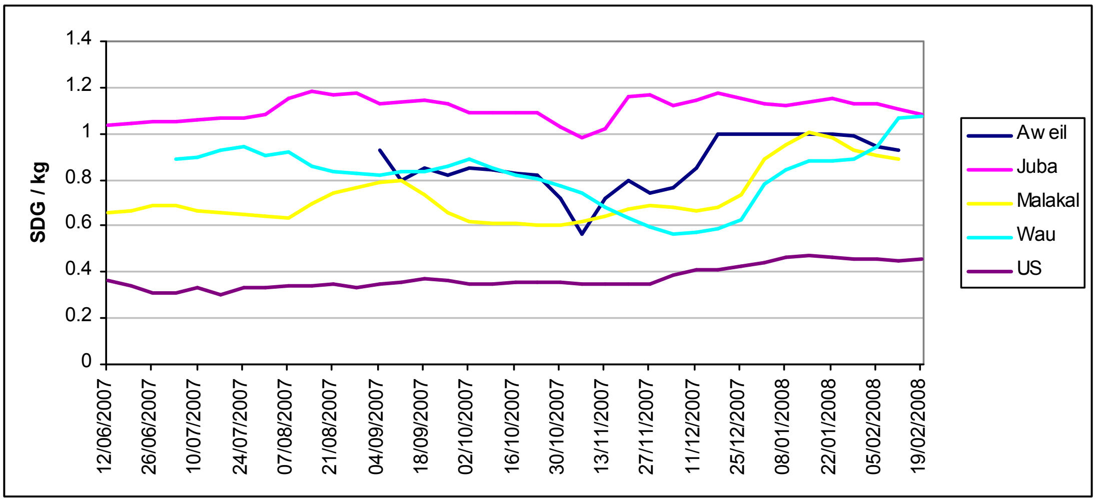
The traders' survey covered a sample of 235 units, 150 based and/or operational in NBeG and 223 in Lakes.

The methodology applied in the different parts of the analysis follows the one presented in chapter 3.

6.2.3 Market prices

Figure 6.6 presents the evolution of sorghum prices in four major markets (Aweil, Juba, Malakal, Wau) in comparison with the evolution on the US market, taken as proxy for the global market. The short duration of the time span covered (six months) is a major limitation to the current analysis; having said it has been done full use of data available and it was decided to limit the timeframe to the period after the CPA for reasons of data homogeneity.

Figure 6.6 Evolution of sorghum prices on selected markets



Source: Author's elaboration of WFP VAM dataset and FAO GIEWS dataset

In a comparative perspective it is worth noting:

- The remarkable gap between the price on the various local markets and the international market. By the end of the period considered, local prices were more than double those on the international market. While such a gap can be partly explained by the sum of all costs involved in the hypothetical movement of the commodity from the international market to local markets, not enough information was available to estimate the respective Import Parity Prices.
- After a decrease in 2006 and the first half of 2007 (not in the figure), a certain tendency to increase can be spotted in most price series. Such tendency towards a price rise leads to a certain convergence towards the higher values recorded.[94]

[94] The highest price is found in Juba. This is probably a reflection of the major urban and economic centre. At the same time, Juba registers the lowest price increase among the four markets considered. This is probably a reflection of: a) the reduced relevance of sorghum as staple food, b) the different source pattern (mainly from Uganda and Kenya, contrary to the other markets considered where sorghum trade proceeds from the North); c) the strong financial inflow experienced in Juba since the CPA.

- On the basis of the timing of the price rise mentioned above, two groups can be identified: Aweil and Juba on one side, and Malakal and Wau on the other.

6.2.4 Market integration

The purposes and methodology of this part of the analysis are described in section 3.2.4.

6.2.4.1 Findings

The Augmented Dickey-Fuller (ADF) unit root test is applied to test the condition of stationarity of each price series. In a second step, the ADF test is to be applied to the series of residuals u_t of the two initial time series. Finally, the analysis of the Error Correction Mechanism (ECM) manages to estimates the various relevant aspects of price transmission. Results are reported in Table A6 and Table A7 in Annex 2.

Table A6 shows that all price series are integrated of order 1: I(1). Table A7 reports different aspects of price transmission such as the magnitude of long-run and short-run adjustment to price changes and the speed of adjustment. Summary results of price transmission are reported in Table 6.1. Such results reflect different aspects of market integration. In particular, they inform about the magnitude of adjustment as the short-run effect of price changes (α_2), the speed of adjustment (α_3), and the magnitude of adjustment as the long-run effect (θ_2). A few disaggregated data are in Table A3 in Annex 2.

Table 6.1 Market price transmission: magnitude and speed of adjustment

	internal					external				
	θ_2	α_2	α_3	h	θ_2 / h	θ_2	α_2	α_3	h	θ_2 / h
NBeG	0.566	…	0.441	1.061	0.534	0.747	0.578	…	1.212	0.616

Source: Author's estimates

Within the few markets considered, a significant degree of integration is found only among Aweil, Juba, Malakal and US as proxy for the international market. Therefore, the findings provided by this type of analysis are rather limited and need to be considered with caution.

All in all, results show that the markets most exposed globally are Juba, Aweil and Malakal.[95] In the short run Aweil is the most sensitive to changes of the global market prices, while in the long-run Juba seems to be more integrated. At the local level, results are even sparser and report the existence of a significant relationship only between Aweil and Malakal.

Overall, Aweil appears to be the most relevant predictor of market signals among the markets considered in this case study and, therefore, monitoring price evolution on such a market can provide useful and early signals of price changes in the country, both in response to price changes on the domestic market and on the global market. Such a contribution can be very useful in monitoring the effect of any eventual cash intervention: price monitoring can help not only to capture early signs of price changes, but also to distinguish the share of an eventual price rise determined by what can be called “imported inflation” from the direct and indirect impact of an eventual cash injection.

6.3 The demand for food

The aim of this part of the analysis is to improve our knowledge of consumer behaviour with a particular focus on the demand for food. From this perspective this part of the analysis essentially tries to estimate the elasticity of demand for food.

Two datasets were used:

[95] Although, as reported in Table A3, the granger test detected a link with bi-directional causality between US and Aweil, it is reasonable to assume that the US market, as proxy for the global market, is dominant and the relationship can, therefore, be considered uni-directional.

c) one collected by various organizations over time and consolidated with the establishment of the Household Economy Assessment (HEA) baseline, updated in 2007;

d) one collected through a household survey conducted *ad hoc* for the present study with the major aim of assessing household preferences and any comparative advantages between cash-based and commodity-based assistance.

6.3.1 Estimation of demand elasticity through Household Economy data

While a full presentation of the household economy background and characteristics in the different livelihood zones in Southern Sudan can be found in the HEA baseline report,[96] Table 6.2 provides the key information required to start the analysis. It is limited to the two livelihood zones which are the focus of the present study: the Western Flood Plains North (WFP-N) here identified more generally as NBeG, and the Western Flood Plains South (WFP-S) here identified more generally as Lakes.

Table 6.2 Household expenditure and relevance of food consumption

		NBeG				Lakes			
		Very Poor	Poor	Middle	Better Off	Very Poor	Poor	Middle	Better Off
Expenditures	SDG	304	315	662	1159	304	316	662	1158
Food share of total expenditures	%	100.0	88.9	25.7	8.7	100.0	80.1	36.1	8.7
Kcal consumed	kcal	2100	2100	2100	2310	2100	2100	2100	2394
Kcal purchased as % Kcal consumed	%	22.0	18.0	10.0	4.5	22.0	16.0	15.0	4.4
Kcal purchased as % of 2100 Kcal	%	22.0	18.0	10.0	5.0	22.0	16.0	15.0	5.0

Source: Author's estimates based on LAF Household Economy Assessment Baseline

[96] See Muchomba, Sharp (2007)

As expected, estimates of expenditure by the different groups, as well as the wide gap in terms of share of expenditure on food purchase, reflect a concentrated distribution of wealth. The estimate of kcal consumed by the poorest group may be overestimated. It is interesting to consider the different relevance of purchase – and in general external sources – for different groups: it is much higher for the poorest and most vulnerable groups.

Because of the structure of the data set used (cross-section of a limited sample) the application of traditional techniques for the estimation of income elasticity cannot provide significant results. Therefore, and in line with similar studies, we resorted to estimating a linear interpolation of the average values of what can be called "effective demand for food" estimated for each wealth group as the ratio between the market value of food consumed by the household and the sum of total expenditures plus the market value of food produced by the household and/or received as food aid. The results of this approximation are shown in Table 6.3. The results are limited to NBeG, but in view of the very strong similarities between the two livelihood zones they can also be assumed to be representative for Lakes.

Table 6.3 Elasticity of demand for food from different wealth groups

	NBeG				
Wealth groups	Very poor	Poor	Middle	Better Off	All
Expenditures	1.52	1.14	0.39	…	0.64
Price (staple only)	-1.04	-1.05	-1.26	…	-1.08

Source: Author's estimates

In the case of price elasticity, also reported in Table 6.3,[97] the demand for food is quite elastic: a percentage increase in price is expected to determine a (just more than) proportional decrease in the quantity demanded, which is a reflection of balanced market conditions.

[97] The dataset available through the HEA baseline didn't allow the estimation of cross-price elasticity.

6.3.2 Household survey

A survey of 557 households (248 in NBeG and 309 in Lakes, respectively) was conducted. The sampling framework was stratified, with households and enumeration areas selected randomly. The condition of benefitting of any programme of assistance was not included as a selection criterion.[98] In NBeG 26% of the households in the sample were among the beneficiaries of food aid intervention and 19% in Lakes State.

A first information achieved through the survey regards the prospective use of assistance eventually provided in the form of cash. In particular, non-beneficiaries were asked about how they would use an amount of 200 SDG if it was provided to them as cash free of charge. Such an amount was estimated *a priori* as roughly equivalent to the monthly cost of food required for an average household in addition to a relatively small amount to cover other basic non-food expenditures. Beneficiaries of food aid were presented with a double task: they were asked to estimate the monetary value of the food commodities received through the latest distribution and to consider the alternative use they would make of such an amount if they had the chance to do so. Finally, all interviewees were asked their preference among value-equivalent forms of assistance: food, cash, half and half.

Table 6.4 reports the interviewees' preferred repartition of an eventual cash assistance or cash-equivalent of food assistance. It is interesting to consider the gap between the average share which would be spent on the purchase of food in the two areas. First of all, such share is on average higher in NBeG than in Lakes. In general, this seems to reflect the higher availability of and stronger access to food in NBeG. However, such an interpretation seems to be rather contrary to expectations, mainly in view of the security problems along the northern border reported during the few months before the survey. Such security problems may have affected the traditional commercial flows from the North and are said have consequently determined a certain price increase, particularly in

[98] It is worth considering that the condition of being beneficiary or non beneficiary identifies two different populations, as reflected in the underlying eligibility and selection criteria defining different degree of need for assistance.

the northern part of NBeG. The comparison between residents and IDPs/returnees provides interesting results in the case of NBeG, with the latter group willing to spend less on the purchase of food than the residents. This is somehow expected and is interpretable as the result of effective targeting of ongoing food aid interventions. Such interpretation is supported by the allocation reported by food aid beneficiaries – on average 49.8% of the transfer spent on food purchase – the lowest among all the groups considered. The data from Rumbek are more difficult to interpret, with the IDPs/returnees willing to allocate a higher share of the theoretical transfer to the purchase of food than the residents. Such a result could be interpreted as the consequence of poor targeting of food aid in that area, and this interpretation would be supported by the significant differential between the preference reported by the group of IDPs/returnees who had been in the area for more than one year compared to those who had been there for less than a year. Having said that, the consideration that the food aid beneficiaries group would allocate most of the cash transfer to the purchase of food seems excessive and is more difficult to interpret.

Table 6.4 Use of cash

	food	assets	debts	school fees	medical	non food	other
NBeG							
all	55.1	8.4	5.6	11.3	10.1	7.5	2.0
residents	57.1	7.5	4.8	11.1	9.9	7.7	1.8
IDPs / returnees (< 1 year)	52.3	9.6	6.7	11.6	10.5	7.2	2.1
IDPs / returnees (< 2 years)	52.2	9.9	6.8	11.2	10.2	7.7	2.0
Food aid beneficiaries	49.8	9.3	6.8	11.6	11.4	8.2	2.9
Lakes							
all	43.6	13.0	9.0	12.3	10.4	8.5	3.4
residents	39.7	12.5	9.2	14.0	11.9	9.0	3.6
IDPs / returnees (< 1 year)	51.4	13.8	8.7	8.7	7.2	7.3	3.0
IDPs / returnees (< 2 years)	46.5	13.8	9.2	10.6	9.2	8.1	2.7
Food aid beneficiaries	59.8	11.2	7.6	6.9	6.5	6.9	1.0

Source: Author's estimates

Table 6.5 presents the preference expressed by the interviewees on the form of the transfer. As expected, there is a general preference to receive commodities (approximately half of the sample) and substantial support for a combined transfer (food and cash), while the explicit preference for cash remains quite limited. The preference for cash is remarkably higher in Lakes than in NBeG. A review of the motivations provided by the households for such preferences highlights a certain lack of confidence in the beneficiaries of their capacity to make proper use of cash. It is difficult to comment on such lack of confidence since experience with cash distributions in the country is almost inexistent.

Table 6.5 Preference for food or cash (%)

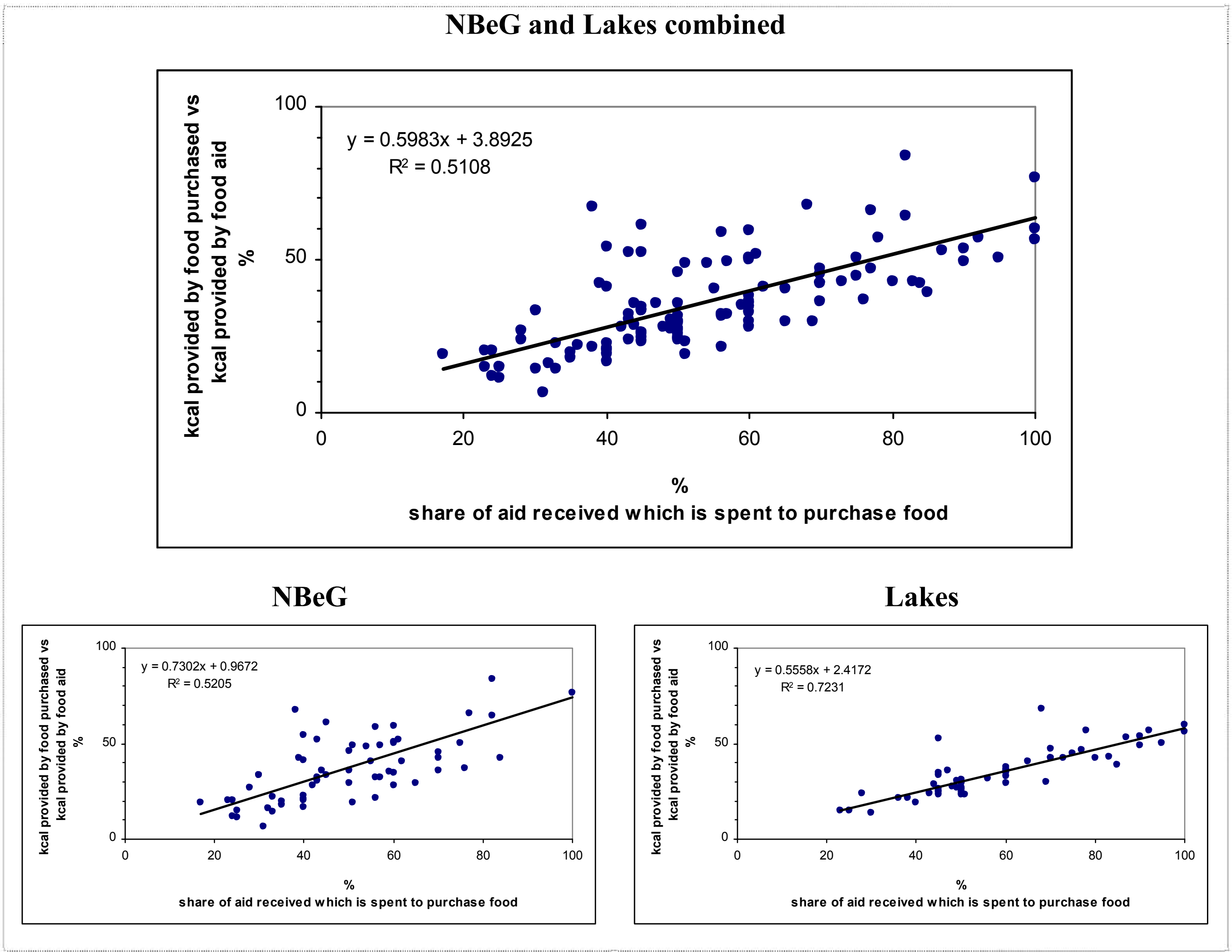
	NBeG			Lakes			NBeG and Lakes		
	Food aid	Cash	Half of both	Food aid	Cash	Half of both	Food aid	Cash	Half of both
All	53.94	11.20	34.85	41.41	23.05	35.55	47.48	17.30	35.21
Beneficiaries	58.06	14.52	27.42	48.00	10.00	42.00	53.57	12.50	33.93
Non beneficiaries	52.51	10.06	37.43	39.81	26.21	33.98	45.71	18.70	35.58
IDPs / Returnees	51.92	12.50	35.58	50.98	10.78	38.24	51.46	11.65	36.89
Residents	55.47	10.22	34.31	33.17	23.41	43.41	42.11	18.13	39.77

Source: Author's estimates

The preferences expressed by the sample about their potential use of the resources received were used to attempt a comparative analysis of the caloric contribution provided by food and that by cash. In particular, the share of the potential cash transfer that households decided to spend on food was split into the various commodities that would be eventually bought by beneficiaries. This allowed estimation of the nutritional value – in kilocalories – of the transfer. This part of the analysis is obviously limited to the case of beneficiaries of food aid in the sample. On average the nutritional contribution achieved through the simulated purchase of food by the recipients of cash assistance was rather low compared to that provided through food aid, varying between 44.0% in NBeG and 35.1% in Lakes approximately. Such an estimation is based on the weak assumption that all the food aid received is consumed and not exchanged by the beneficiary to achieve other purposes.[99] As a consequence of a combination of factors, among which, in particular, the relatively high local market prices and rather high share of the potential cash transfer spent for non-food purposes (mainly in response to a large series of needs still uncovered or not sufficiently covered), the comparison between the nutritional value provided by a cash transfer and a commodity-based transfer seems to be in favour of the latter. In fact, Figure 6.7 helps to show that 1% increase in the share of cash assistance spent on food corresponds to approximately 0.6% increase in the ratio between the nutritional contribution generated through the provision of cash compared to that from food aid. But beyond such an average, Figure 6.7 shows rather different results in the two cases considered. The effectiveness – and, presumably, the efficiency as well – of the cash transfer strategy considered here seems be higher in NBeG than in Lakes: a 1% increase in the share of cash assistance spent on food purchase corresponds to approximately 0.73% increase in the ratio between the nutritional contribution obtained through the cash transfer compared to the food basket in NBeG, compared to only 0.55% in Lakes.

[99] A certain degree of exchange of food commodities received as food aid is assumed to occur even in normal circumstances. A proper assessment of the nutritional – and, in general, economic – consequences of such exchange in favour of or against the beneficiary's interests should take account of all major transactions as well as the relative local market prices at which the transaction occurred. However, for simplicity, such indirect/secondary uses of the food commodities have been ignored here.

Figure 6.7 Nutritional contribution of aid: cash versus food



Source: Author’s estimates

The last point mentioned above means that, on average, the amount of the cash transfer should be higher than the 200 SDG per household proposed in the field test for a beneficiary to be able to purchase the same amount of kilocalories that s/he would receive through food aid.[100] To establish such amounts, the food basket that the interviewees indicated would be purchased with the hypothetical cash transfer was used to estimate the food purchasing capacity of one SDG in the different areas and the different groups considered.[101]

Table 6.6 Cost of kilocalories

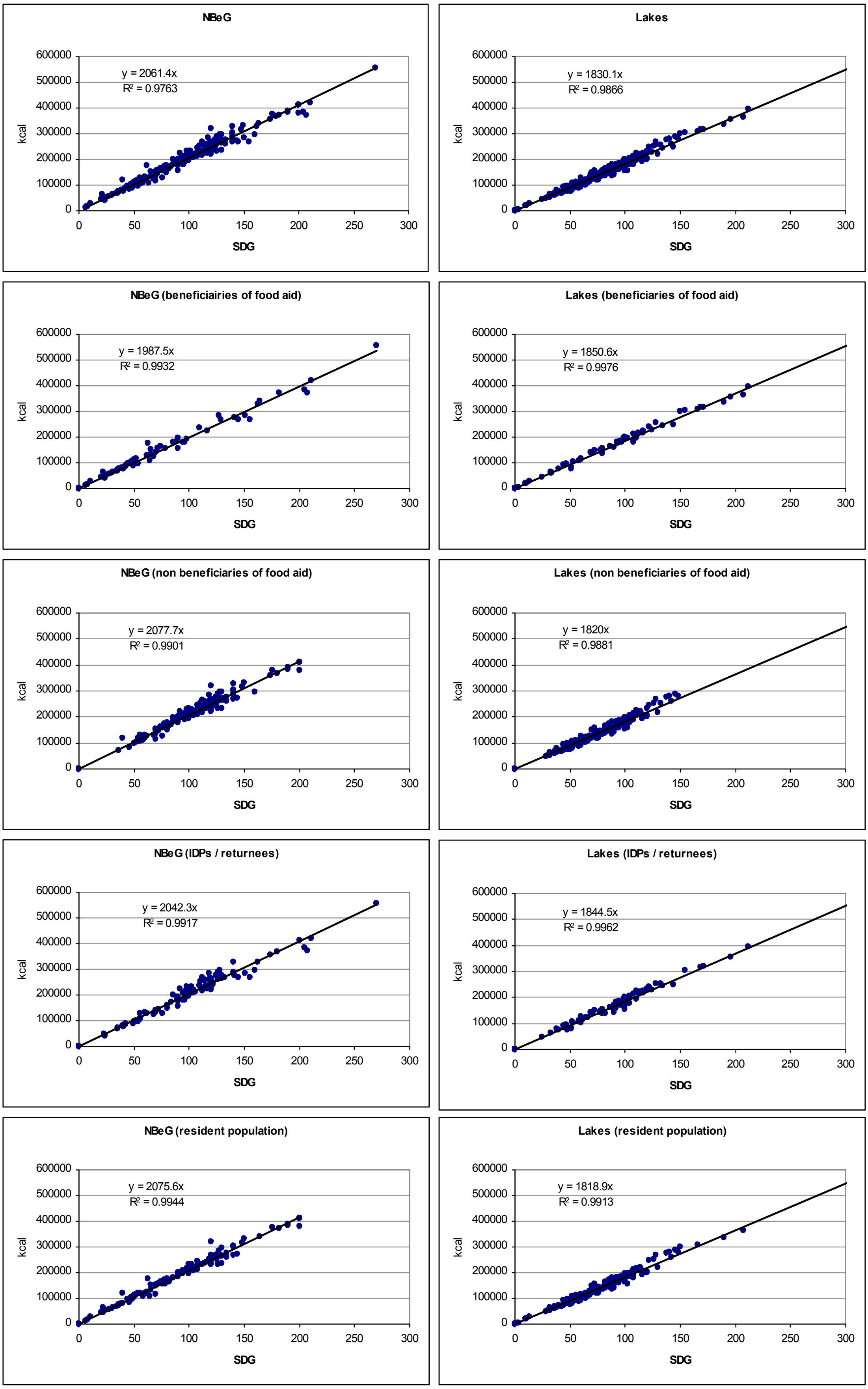
		kcal purchased with one SDG	SDG required to purchase 1940 kcal	SDG required to purchase 1940 kcal on a daily basis for one month
NBeG	average	2061	0.94	28.23
	beneficiairies of food aid	1988	0.98	29.28
	non beneficiairies of food aid	2078	0.93	28.01
	IDPs / returnees	2042	0.95	28.50
	residents	2076	0.93	28.04
Lakes	average	1830	1.06	31.80
	beneficiairies of food aid	1851	1.05	31.45
	non beneficiairies of food aid	1820	1.07	31.98
	IDPs / returnees	1845	1.05	31.55
	residents	1819	1.07	32.00

Source: Author's estimates

[100] In this case, the transport costs faced by the cash recipients to go to market to purchase the food and the transport costs faced by food aid beneficiaries to reach the food distribution point and move the food aid commodities received are not included in the estimation.

[101] The following groups of food commodities were considered: sorghum, maize, maize meal, rice, other cereals, bread, sweet potatoes, cassava, beans, yam, groundnuts, simsim, other vegetables including leaves, fruits, fish, meat, poultry, eggs, oil and fat, sugar and sugar products, milk and milk products.

Figure 6.8 Nutritional contribution obtained through the purchase of food



Source: Author's estimates

As shown in Table 6.6 and Figure 6.8, the average number of kilocalories purchased with one SDG ranges between 1,819 and 2,078. Such a gap reflects the difference in market prices as well as different preferences for the use of cash expressed by the interviewees. With reference to the nutritional contribution provided through the food aid intervention ongoing by the time of fieldwork (1,940 kcal per person per day), the amount required on a monthly basis for food purchase able to provide the equivalent amount of calorific contribution would range between 28 SDG in the case of population non benefiting from food aid in NBeG and 32 SDG in the case of the resident population in Lakes. Under a more comparable perspective, focusing on the category of food aid beneficiaries, the required cash transfer would range between 29.3 SDG and 31.5 SDG per person per month in NBeG and Lakes respectively. This seems to confirm the point raised above on the greater effectiveness, and probably efficiency, of a cash transfer strategy in NBeG than in Lakes. Such consideration is valid in general terms and reminds us how intervention strategies should be considered on an *ad hoc* basis.

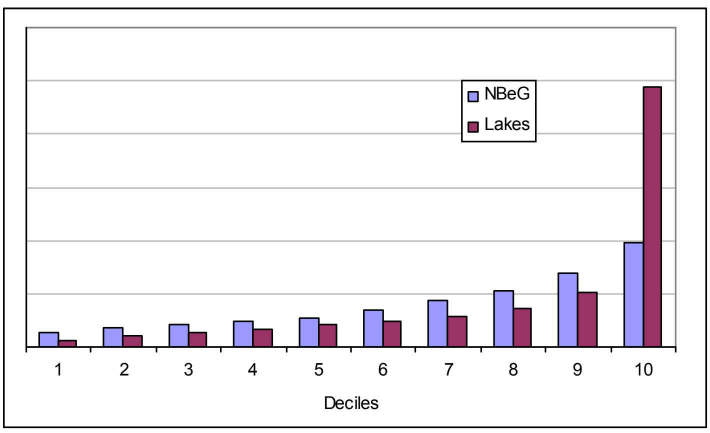
6.4 The supply of food

The good performance presented in the previous section raises a lot of optimism on the potential role that trade can play in increasing food availability. In order to investigate such potentialities further it is particularly relevant to provide closer attention to the category of traders as major players involved in the sector. The aim of this section is to try to establish the part so far played by the trading sector in responding to the demand for food, as well as the flexibility of its capacity to expand in response to an eventual increase in demand.

A survey of 373 traders, 150 based and/or operational in NBeG and 223 in Lakes, was conducted. The selection process was essentially dictated by geographical and logistic considerations, with preference given to areas close to major concentrations of IDPs and returnees. Such a survey is not necessarily representative of the traders in the two focus areas; however, it this limitation is balanced by the consideration that the sample size is remarkably large compared to the assumed traders' population in the two areas.

The traders' business size was estimated by considering the value of the two major commodities traded and assumed to represent approximately half of the entire turnover eventually achieved by each trader. The estimate derived in this way does not necessarily reflect the total business size of each trader, but rather the individual size of their food trade business.[102] On this basis, Figure 6.9 illustrates the distribution of average monthly turnover for the various deciles.

Figure 6.9 Distribution of traders' business size



Source: Author's erstimates

The striking difference between the two distributions is the much higher degree of concentration in the case of Lakes, signalled by the strong presence of a group of big traders, a category which seems to be missing in NBeG. A possible explanation can be found in the different patterns of trade links assumed to be prevalent in the two areas, which are mainly characterized by stronger links with Ugandan and Kenyan markets in the case of Lakes, while the markets in NBeG seem to be more under the influence of markets in North Sudan. For simplicity, all traders in the sample were split into three

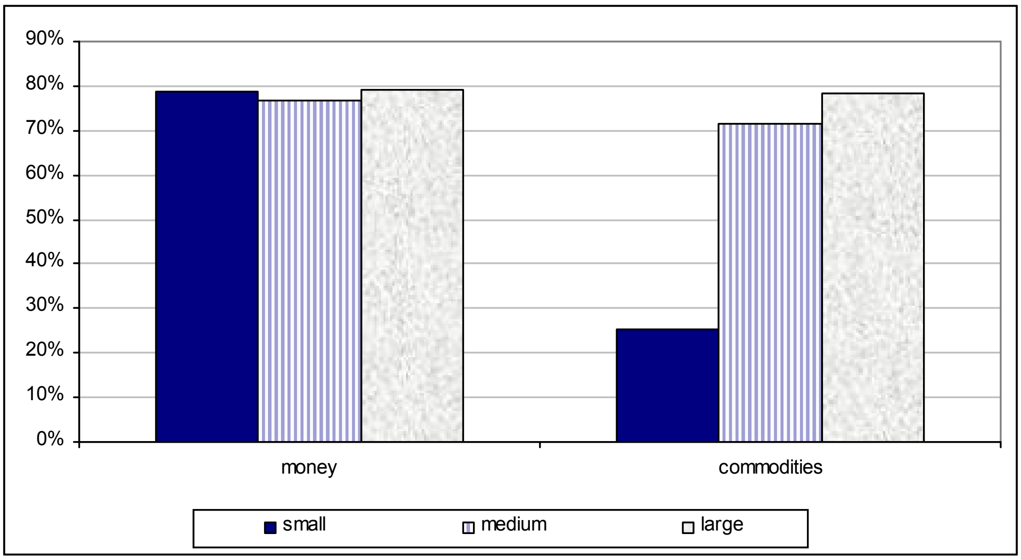
[102] Information on the composition of trade in terms of food versus non-food was collected through the survey, however an estimation of the total business size of each trader is not considered relevant for the purpose of this analysis.

groups (small, medium, large), with the small and large groups covering the first and last quarters respectively.

The major objective of this part of the analysis is to assess the feasibility to scale up the size of businesses as a way to improve overall supply. It is worth noting that 97.5% of the traders in the sample manifested an interest in increasing their business size, with the vast majority of those unwilling to do so being in NBeG.[103] However, beside traders' willingness, two major constraints are the availability of and access to the major inputs: money and commodities. Figure 6.10 reports traders' confidence about accessing such additional key inputs. The general confidence about accessing additional financial resources is remarkable; such confidence was shared by an amazingly high 78% to 80% of all sizes of business. While such generally strong confidence may seem unjustified, a possible explanation may be found in the general expectation that the continued and progressive economic improvement enjoyed since the CPA would continue and even strengthen further. However, a more cautious approach was reported, particularly by small-size traders, in terms of accessing additional food commodities. A very likely interpretation of the large gap may be linked to access to transport capacity, which, although improving in recent years, still remains for obvious reasons inaccessible to the category of small traders.

[103] Nine traders out of 373 (i.e. eight from NBeG and one from Lakes, approximately 5.3% versus 0.5% respectively) did not express interest in scaling up their business.

Figure 6.10 Traders' confidence about availability of and access to key inputs



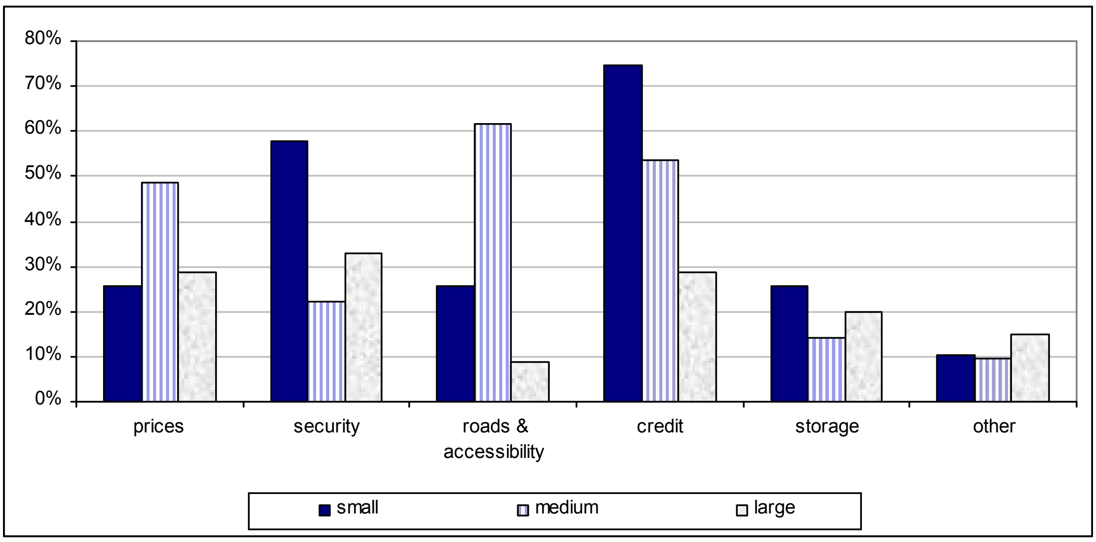
Source: Author's estimates

Having clarified the question of comparative access to critical inputs, attention was shifted to the analysis of other contextual factors which play a determinant role in business performance and the decision about the business size. Five such factors were explicitly included in this analysis – prices, security, accessibility, access to credit, storage capacity – as well as possible others in order to capture the opinions of the interviewees. Figure 6.11 helps to identify the main priorities and determinants of willingness to scale up business in the different categories of traders. Different factors seem to play a different role in the various size groups. Access to credit and security seem to be priority concerns for small traders.[104] The relevance of price levels for this group is low, mainly due to their negligible influence on the market in their role of *price takers*. For medium traders, the quality of roads and in general accessibility are the major concern. Any improvement in this direction can be a strong motivation. This is understandable in view of how they move around in search of best business

[104] The varying relevance of access to credit for the different size groups as expressed in Figure 6.11 seems to contradict what is said above. However, while Figure 6.10 focuses on traders' confidence about accessing additional credit as a critical input, Figure 6.11 emphasizes the relevance of different factors as constraints/determinants of an eventual decision to scale up business size by the different size groups.

opportunities. In their case, price matters and they are willing to face higher security risks than the other groups. Obviously, to afford all this, particularly the necessary use of transport, there is a certain need for credit. The patterns of large traders are less defined and in general all factors considered here are less relevant than for the other two groups. It is worth considering that one constraint was frequent throughout the sample: the discouraging pressure of taxation exercised in various forms, both legal and mainly illegal.

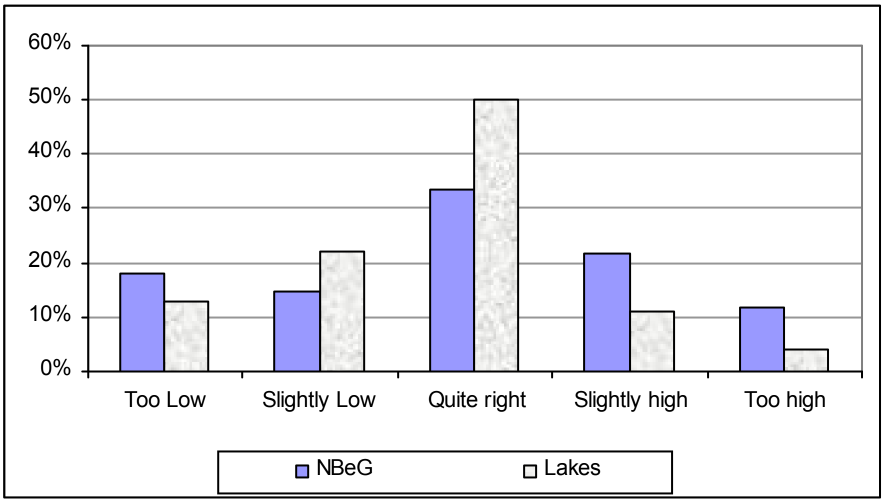
Figure 6.11 Constraints to scaling up business size



Source: Author's estimates

Despite the limited relevance of prices as determinants of traders' decisions to scale up their business size, as shown in Figure 6.11, traders' opinions of current price levels were far from homogeneous. Figure 6.12 shows how such opinions were varied but tended in general to be distributed in a rather normal way. Such distribution appears to be more normally shaped in the case of Lakes than in NBeG; this can be interpreted as a reflection of a more stable market structure in the former case.

Figure 6.12 Traders' opinions of market price levels



Source: Author's estimates

Table 6.7 Average price increase considered favourable to scale up business size (%)

NBeG	3.69
Lakes	4.36

Source: Author's estimates

The average rate of price increase that traders would consider favourable for their decision to scale up their business size ranges between 3.7% and 4.4%, as in Table 6.7.

From this perspective we focus on the feasibility of making use of prices as a factor to increase food supply. In other words, we make use of the price factor as determinant of the WTT to estimate the elasticity of food supply.

The values in Table 6.7 were re-estimated by traders' business size group and their perception of availability and access to key inputs: cash and food. The following ordered logit model was used:

$$WTT_i = \alpha\, size_i + \beta\, money_i + \chi\, food_i \qquad (6.1)$$

where:

WTT_i	is the willingness to trade manifested by the i^{th} trader,
$size_i$	is the business size of the i^{th} trader,
$money_i$	is the i^{th} trader's expectation to access cash,
$food_i$	is the i^{th} trader's expectation to access food commodities.

Table 6.8 presents the results of three different specifications of (6.1). The coefficient of business size is significant which means that traders' behaviour in response to price changes is different among the groups considered. On the contrary, traders' confidence in accessing cash is insignificant and is dropped. Specification (C) is used to estimate probabilities of WTT summarized in Table 6.9.

Table 6.8 Willingness to trade in response to price changes

	A	B	C
traders' confidence in accessing cash (%)		-0.235	
traders' confidence in accessing commodities (%)		0.920 ***	0.832 ***
Ln business size	-0.369 ***	-0.397 ***	-0.402 ***
cut 1	-3.079	-2.778	-2.675
cut 2	-0.300	0.074	0.174
N. obs	1026	1026	1026
LR chi^2	17.83	53.54	51.86
Prob > chi^2	0.0000	0.0000	0.0000
Pseudo R^2	0.0092	0.0275	0.0267

Source: Author's elaboration

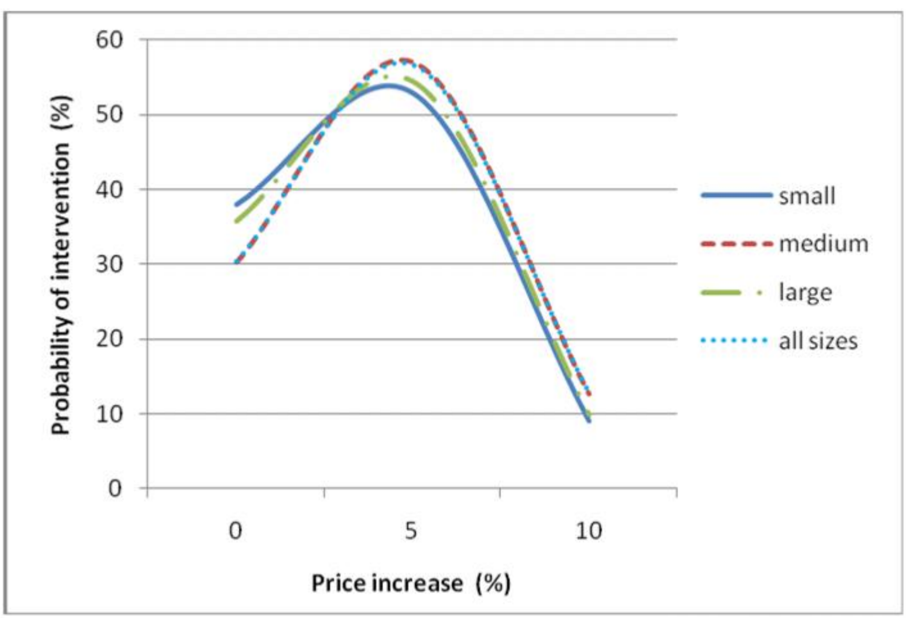
Table 6.9 and Figure 6.13 report the likelihood that different groups of traders may decide to scale up their business size in response to certain price increases. The possible price increases referred to in this study fall within a range which is unexpectedly limited compared to the previous case studies: between 0% (no increase) and 10%. It can be assumed that the general process of economic expansion characterized by a trend of decreasing prices may have an influence in this regard. In this case the price changes do not refer to a specific commodity, but can be rather generalized with reference to the combination of major commodities dealt with by each trader interviewed.

Table 6.9 Probability of WTT

	rate of price increase (%)		
	0	5	10
small	37.985	52.873	9.142
medium	30.264	57.095	12.641
large	35.712	54.413	9.875
all sizes	30.437	56.710	12.853

Source: Table 6.8 specification C

Figure 6.13 Willingness to trade in response to price changes



Source: Table 6.9

The evolution of the WTT is quite similar for all groups of traders, characterized by a good response even in the absence of a price increase and by reaching their maximum values (around 55%) around a 5% rise in price.[105] In this case the level of price increase required to generate the strongest response reaction results lower than the ones estimated earlier on in different contexts.

Table 6.10 provides estimates of the inverse elasticity of supply for different commodities in the two areas considered. Such estimates range between 6.3% and 7.6% showing a remarkable confidence in responding to even small price changes. Such elasticities result to be regularly higher in Lakes than in NBeG.

Table 6.10 Inverse elasticity of supply by commodity and area (%)

	NBeG				Lakes			
	Sorghum	Maize	Maize meal	Beans	Sorghum	Maize	Maize meal	Beans
average	6.51	6.30	6.34	6.25	6.86	6.73	6.59	6.30
weighted average	7.17	6.67	6.51	6.86	7.60	7.60	7.54	6.88

Source: Author’s estimates

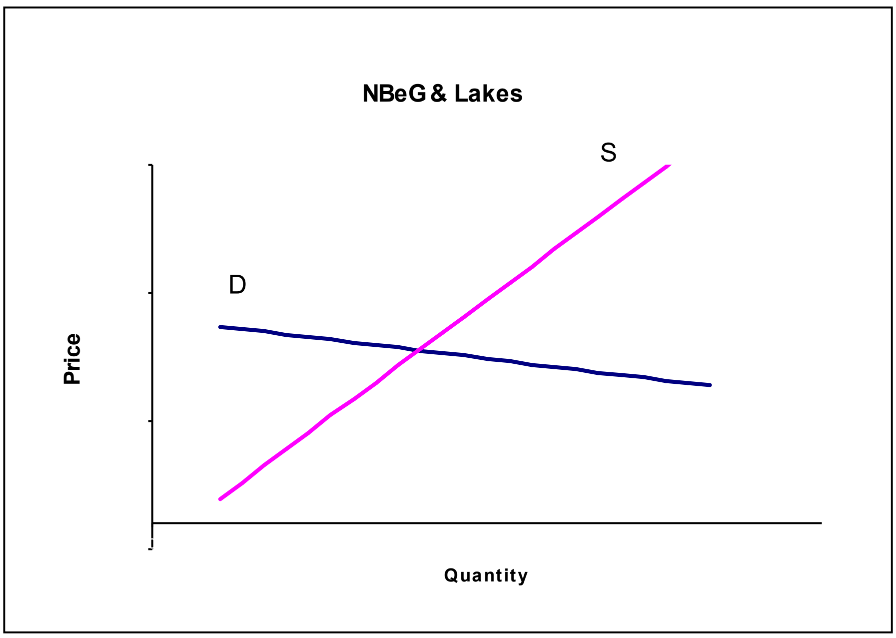
6.5 Simulation of cash transfers

Once the elasticities of demand and supply have been estimated, they can be combined to simulate intervention strategies. Figure 6.14 presents the supply and demand curves estimated on the basis of the inverse elasticities as measured above. In particular, since the focus of the intervention is the poorest strata of the population, the demand curves in Figure 6.14 were estimated on the basis of the average inverse elasticity for very poor and poor groups. For the sake of consistency, since the elasticity of demand was estimated only in the case of sorghum (as in Table 6.3), in this case even the supply curve was limited to the staple food. It is interesting to notice how both demand and

[105] See note 53 in chapter 4.

supply seem to be rather elastic, but with higher elasticity on the demand side. In other words, both buyers and sellers react to price changes, but this reaction is faster and stronger on the side of the buyers. This is an important finding, according to which incapacity to react to price changes seems to be rather dictated by traders' limited capacity. In this, the availability of commodities as well as traders' capacity to access them (in terms of both financial and physical access) can be assumed to play a relevant role.

Figure 6.14 Demand and supply curves



Source: Author's estimates

It is clear that in order to respond coherently to the points raised above, much should be done to increase food production and marketing. Such interventions would help to overcome a few of the strongest constraints identified. However, such a case requires rather long-term measures, which is not the perspective adopted within the framework of the present analysis. In a shorter term perspective, strategies focusing on the demand side may seem more appropriate, as well as capable to provide a more targeted approach. From such a viewpoint, the provision of a cash transfer, particularly to the most vulnerable groups, is easiest to consider.

In order to assess the feasibility of inducing an increased food supply through a cash injection strategy a simulation was carried out. As a first step the increased demand was estimated. For the elasticity of demand the following scenarios were considered on the basis of the various estimates provided in the previous parts of this analysis:

- the amount provided through a cash transfer would be entirely spent on food purchase, as derived from the HEA data and reported in Table 6.3;
- the share of increased expenditure following the cash injection which is spent on food ranges between 50% and 57% in NBeG for different categories and ranges between 40% and 60% in Lakes, as derived from the household survey and reported in Table 6.4.

In addition, we made the simplifying assumption that all additional demand for food is entirely covered by sorghum, since we did not have a cross-price elasticity of demand[106] and therefore we made use of the price elasticities estimated for the staple food.

On such a basis, the additional amount purchased by a household following a cash transfer of say 100 SDG would vary between 50 and 100 SDG in NBeG. In Lakes the additional demand would vary between 40 and 100 SDG. In terms of quantities, on the basis of average market prices the additional demand would range between 40 and 80 kgs of sorghum in NBeG and 32 and 80 kgs in Lakes. Obviously the additional demand would rise with the amount of the transfer and with the caseload of beneficiaries, as well as with the number of distributions in case of interventions protracted over time. For instance, assuming a caseload of 5,000 households to be equally distributed between the two areas considered for this study, with each household receiving a monthly cash transfer of 100 SDG for six months, the additional quantities of sorghum demanded over the period would vary between 1,200 and 2,400 MTs in NBeG and 960 and 2,400 MTs in Lakes. Such estimates are, of course, based on the assumption of constant prices, and can more realistically be considered the maximum increase in possible additional quantity demanded.

At this stage we need an estimate of the normal market supply. A series of assumptions was made, since no reliable estimate of number and capacity of traders operational in

[106] Such an assumption seems reasonable in view of the high share of total food demand covered by sorghum.

the areas was available. It can be assumed as well that the estimates of quantities and prices utilized for the analysis reflect a condition of equilibrium and therefore reflect both demand and supply in normal conditions. Therefore, on the assumption of supply-demand equilibrium the estimate of supply can be inferred from the estimate of demand provided through the HEA baseline. Converting the quantities of all food commodities purchased by all household groups into cereal equivalent and multiplying the daily individual purchase of the different wealth groups by their estimated number in each focus area, the aggregated supply-demand equilibrium quantity over a period of six months can be estimated at around 79,525 MTs in the case of NBeG and 33,559 MTs in the case of Lakes.[107] Such amounts can be taken as rough estimates of the quantities of food that are exchanged in the markets in the focus areas in normal circumstances over a period of six months.[108] They were arbitrarily split among the various business sizes on the basis of the distribution presented in Figure 6.9 and constitute the basis for the analysis of expandability of supply.

[107] In the absence of population data per livelihood zone, the recently revised state demographic data were used (NBeG: 1,377,056; Lakes: 551,050). See WFP VAM South Sudan, *Population estimates*, 2007. Though such a solution is recognized as not ideal, the limited divergences in terms of food sources among the various livelihood zones involved helps to contain the risk of error.

[108] Another approximation introduced in this part of the analysis is the seasonality of market exchanges, which in this case is ignored. It is to be said, however, that the various assumptions and approximations introduced in this part of the process are not considered to significantly affect the final results. In fact, as will become evident, the increased quantity demanded as a consequence of a reasonable cash-based intervention remains quite limited when compared to the amount of total food exchanged in the two areas covered by the analysis. Such a consideration would stand even if the total amount of food assumed to be sourced by the households through exchanges were significantly scaled down.

Table 6.11 WTT multipliers

	Rate of price increase					
	0%	1%	2%	3%	4%	5%
Trader category						
Small	0.380	0.410	0.439	0.469	0.499	0.529
Medium	0.303	0.356	0.410	0.464	0.517	0.571
Large	0.357	0.395	0.432	0.469	0.507	0.544

Source: Author's estimates

The WTT multipliers provided in Table 6.11 – derived through interpolation of data in Table 6.8 – were used to assess the expandability of food supply. The multipliers are arranged by trader category, which helps to take into account the similar relevance of different business sizes in terms of expandability of supply in response to price changes.

Table 6.12 provides the results of the simulation exercise. With reference to the case considered above (i.e. provision of a monthly cash transfer of 100 SDG per household to a caseload of 5,000 households) the required increase in supply induced by the cash injection seems to be well within the reach of the market system. It is surprising to consider how a programme on a much bigger scale (i.e. the provision of a monthly transfer of 200 SDG per household to a caseload of 10,000 households[109]) seems to be feasible with no inflationary consequence in either NBeG or Lakes.

[109] The additional demand expected to be generated through such intervention would range between 4,780 and 9,600 MTs in NBeG and between 3,811 and 9,600 MTs in Lakes.

Table 6.12 Expandability of food supply

NBeG	Traders category							
	Small		Medium		Large		TOT	
Normal Food Market Exchange during six months	23858		39763		15905		79525	
Expandability of Food Market Supply								
Rate of price increase	additional	cumulative	additional	cumulative	additional	cumulative	additional	cumulative
0%	9062	32920	12034	51796	5680	21585	26776	106301
1%	9773	33630	14168	53930	6275	22180	30215	109740
2%	10483	34341	16301	56064	6870	22775	33654	113179
3%	11193	35051	18435	58197	7465	23370	37093	116618
4%	11904	35761	20569	60331	8059	23964	40532	120057
5%	12614	36472	22702	62465	8654	24559	43971	123496

Lakes	Traders category							
	Small		Medium		Large		TOT	
Normal Food Market Exchange during six months	10068		20135		3356		33559	
Expandability of Food Market Supply								
Rate of price increase	additional	cumulative	additional	cumulative	additional	cumulative	additional	cumulative
0%	3824	13892	6094	26229	1198	4554	11117	44676
1%	4124	14192	7174	27310	1324	4680	12622	46181
2%	4424	14491	8255	28390	1449	4805	14128	47687
3%	4724	14791	9335	29471	1575	4931	15634	49193
4%	5023	15091	10416	30551	1701	5056	17140	50699
5%	5323	15391	11496	31632	1826	5182	18645	52204

Source: Author's estimates

As estimated in Table 6.6, the sum required on a monthly basis to purchase on the local market an amount of food equivalent to the nutritional contribution provided by the ongoing food aid intervention (1,940 kcal per person per day in the case of General Food Distribution) would be on average 28.2 SDG per person in NBeG and 31.8 SDG in Lakes. Therefore, despite the slightly higher values estimated in the latter case, the small gap between the two values leads to a unique value for the two focus areas of approximately 30 SDG per person per month. The other categories of expenses can be estimated on the basis of their share of total expenditure as reported in Table 6.4. On such a basis the size of the cash transfer required to achieve a calorific contribution of 1,940 kcal is indicated in Table 6.11. In the case of NBeG the value of the monthly cash transfer seems to range between 51 and 54 SDG per person. The higher value in this range refers to IDPs and in general to beneficiaries of ongoing food aid programs and seems to be the appropriate amount for a cash transfer to address the immediate needs of the most vulnerable groups. In the case of Lakes the range of estimates is wider and on average higher. Adopting again the focus on IDPs and food aid beneficiaries as the leading criterion to reflect the needs and attitudes of the various categories considered in this case, it seems reasonable to estimate 58 SDG as the recommended size of monthly cash transfer per person.

Table 6.13 Amount of cash transfer

		Amount of transfer (SDG / person / month)	Amount of transfer spent on (SDG / person / month)							kcal purchased
			food	assets	debts	school fees	medical	non food	other	
NBeG	all categories	51.2	28.2	4.3	2.9	5.8	5.2	3.8	1.0	1940
	residents	51.2	29.3	3.8	2.5	5.7	5.1	3.9	0.9	1940
	IDPs / returnees	53.6	28.0	5.1	3.6	6.2	5.6	3.9	1.1	1940
	food aid beneficiaries	53.6	26.7	5.0	3.6	6.2	6.1	4.4	1.6	1940
Lakes	all categories	73.1	31.8	9.5	6.6	9.0	7.6	6.2	2.5	1940
	residents	79.2	31.5	9.9	7.3	11.1	9.4	7.1	2.9	1940
	IDPs / returnees	62.3	32.0	8.6	5.4	5.4	4.5	4.5	1.9	1940
	food aid beneficiaries	53.5	32.0	6.0	4.1	3.7	3.5	3.7	0.5	1940

Source: Author's estimates

As considered above, the analysis seems to show that the proposed amounts of cash transfer are not expected to generate any inflationary process induced by an increased demand. However, such an optimistic finding should be taken with caution in view of the dispersed distribution of food production as well as the limited operational and financial capacity of the largest share of traders. In order to prevent and contain any possible inflationary impact it would be advisable to consider the provision of cash transfers through small-scale pilot initiatives, as far as possible located in proximity to regular surplus areas and well established and connected markets. To optimize the effectiveness of the system, the transfers should be targeted at the most vulnerable groups, expected to be found mainly within the categories of IDPs and beneficiaries of food aid. The amounts proposed above refer to the full transfer and therefore should not be provided in combination with other forms of transfer unless the value of the transfer is reduced accordingly. It would be considered good practice to provide the transfer to the most vulnerable free of charge. A cash-for-work transfer is advisable if the potential beneficiary household can provide labour resources which, it can be expected, would remain otherwise under-utilized. In such a case the amount of the transfer should be increased in line with the calorific contribution provided by the ongoing food-for-work / food-for-recovery intervention: 67 SDG (corresponding approximately to 32.8 USD)[110] per person per month.

There is no valid comparison for such values estimated above since only very recently cash transfer programmes have been initiated on a pilot basis in Southern Sudan.[111] At this stage the only comparison can be with the costs of the WFP intervention, though even here the analysis is biased from various perspectives:

- the WFP EMOP covers a set of quite different contexts, including Darfur, with associated different cost structure;
- economies of scale introduce a major bias in favour of the commodity based strategy;
- the amount recommended above for cash transfer includes a series of non-food expenses that reflect uncovered basic needs;
- this analysis does not take into account the transactions/exchanges of food commodities which normally involve losses for the beneficiary of food aid and reduce the efficiency of a commodity based intervention.

The points above prevent any significant comparison between the unit costs of the two intervention strategies. Having said that, for informative purposes Table 6.12 compares the cost of the daily ration provided under the current EMOP with its cost as a cash transfer. The cost of the daily ration (i.e. the cost of food commodities included in the daily ration only, against the amount of money transferred to allow the beneficiary to purchase his/her equivalent of the daily ration plus covering other basic needs)

[110] Exchange rates used: 1 USD = 2.040 SDG.

[111] In this regard interesting information is expected from a cash-transfer pilot project initiated in 2009 in NBeG by SC.

estimated under an hypothetical cash transfer is more than five times higher than the cost estimated in the case of a commodity-based intervention strategy. Taking into account the points mentioned above, the gap between the two estimates gets reduced, but this is achieved at the cost of reducing the significance of the results. A major unknown in this analysis due to lack of hard data in the case of Southern Sudan is the overhead costs of an eventual cash transfer. In other contexts diverging results have been provided, and analysis based on actual cash-based interventions has shown that the overall unit cost of a cash-based strategy is not necessarily lower than a commodity-based one. Following Table 6.12, if in the present case the overhead costs of a cash-based strategy were the same as those estimated for the WFP EMOP, the overall cost of a daily ration would be 1.358 USD[112], which corresponds to 2.3 times the overall cost of a daily commodity ration, therefore reducing the disadvantage of a cash-based approach. Such a consideration is just in the realm of hypothesis, but it makes the point in stressing the relevance of non-food costs in WFP intervention.

Table 6.14 Comparative cost of daily ration

	Tot cost		Cost of transfer	
	USD / MT	USD / 1940 Kcal	USD / MT	USD / 1940 Kcal
EMOP	1102	0.590	338	0.180
cash	…	…	…	0.948

Source: Author's estimates

6.6 Conclusions

This chapter has focused on the relevance of market functioning for food security in two areas of Southern Sudan: NBeG and Lakes. The aim of the study was to assess the feasibility of a cash transfer strategy in a context characterized by a sustained improvement in food production during the initial phase of economic reprise after a prolonged civil war. Such a positive agricultural performance and the good expectations

[112] See note 103.

for the future were reflected in a certain decreasing trend of cereal prices. This was mirrored by a substantial improvement in livelihoods.

The initial part of the analysis considered household's preference for cash or food. It revealed a general preference to receive commodities as well as a certain support for a combined transfer, while the explicit preference for cash remains quite limited. This can be interpreted as a certain lack of confidence in the beneficiaries about their capacity to make proper use of cash.

A comparative analysis of the calorific contribution provided by food and by cash was attempted on the basis of the preferences expressed by households about their potential use of the cash transfer. Such a comparison seems to be in favour of a commodity-based strategy, mainly due to the relatively high local market prices and to the high share of the potential transfer declared to be spent for non-food purposes.

With reference to the food aid programme going on at the time of fieldwork, the sum required on a monthly basis to purchase on the local market an amount of food equivalent to the calorific contribution provided by the food aid basket is estimated at approximately 30 SDG per person per month. The average estimate for Lakes is slightly higher than the one for NBeG.

Very interestingly, the analysis seems to show that the provision of cash transfers is not expected to generate any inflationary process induced by an increased demand. This can be explained by a combination of factors among which the most relevant seem to be:

- a certain decreasing trend of market prices, maintained at high levels for protracted periods du to the conflict and insecurity;
- traders' confidence about their capacity to cover the increased demand associated to the cash injection. This is in line with the general improvement in security conditions, which allow a stronger implementation of the existing supply capacity.

Having said the above, it is to be considered that such a result may be also a reflection of the enthusiasm associated to the process of economic reprise after the CPA. Therefore, such an optimistic finding should be taken with caution in view of the dispersed distribution of food production as well as the limited operational and financial capacity of a large share of traders.

The lack of data related to cash-transfer projects in Southern Sudan makes it difficult to compare unit costs of different strategies. An estimate based on a series of approximations made to the budget of the food aid operation indicates that the unit cost of a cash transfer programme may be between 2.3 and 5.2 times the one of a commodity-based programme. It is expected that further improvements in security and scale-up of supply capacity may reduce such a gap between unit costs.

7

Contextual factors as determinants of supply

7.1 Introduction

The analysis of the case studies has shown how context can affect market functioning. A set of diverse realities has been considered, ranging from a chronically low level of development in Turkana, characterized by severely limited resources to much higher living and economic conditions affected by a long-term recession in Swaziland. Finally, the Southern Sudan case falls between the two extremes with a context which in some respects is close to that of Turkana but whose conditions of development have been affected by a long conflict and which is currently undergoing the initial stages of rehabilitation and general reprise.

In such a diverse set of conditions the process of institutional development is arguably at different stages, and the market, considered either as an institution in itself or as the outcome of the initiative and control of other institutions, is no exception. At this point it may be tempting to let the discussion shift towards the contraposition between market and economic and general development in the effort to establish a complex set of institutional and economic links, but that is not the perspective which is taken in this analysis. The focus here is rather on market functionality and its varying degrees in different contexts, with the final aim making use of such functionality to optimize intervention strategies. The assumption throughout this analysis is that in the presence of a functional market market-based strategies are preferable because they are more effective and efficient than alternative strategies, while it is more difficult to make a choice in the case of low market functionality. Through the previous chapters this perspective has been applied to the analysis of each case study, the findings of which are considered below in a comparative manner.

7.2 The context

When analysis is conducted from a contextual perspective the focus is on both the characteristics of the context and the interaction between the main players and the context itself. In the present case with the focus on the supply side of the food trade relationship, the players are the traders, while the context is provided by the various aspects of natural, social, economic, institutional structure and infrastructure.

The links among the various factors shaping the functioning of the local market can be complex and articulated. To simplify the analysis, a degree of sequentiality can be assumed among them. Some general factors play a major role, both directly and indirectly, in making the local environment more or less conducive for business. Among these are: a) political and institutional factors such as governance and security, and b) mobility, in terms of both availability of infrastructure (i.e. roads, bridges, etc) and measures in support of transport. Economic, political and governance factors, eventually in combination with ethnic and cultural ones where relevant, determine the degree of competitiveness in the market which affects the process of price formation and profit. This is reflected in the distribution of business size as well as the spatial integration or segmentation of markets. The degree of competitiveness and business size affect access to inputs, costs and pricing process, finally contributing to the determination of profit rates and consequent reinforcement or exclusion of individual traders.

In reality such links are much more complicated than as briefly sketched above; however, a simple comparative review of the case studies can help in understanding how different strategies can facilitate or constrain the development of local business and how contextual analysis can support the design of intervention strategies.

7.2.1 Market power and profitability

An initial contextual aspect to be considered is the degree of competitiveness in the local market and how this affects profitability. For such a purpose various measures are commonly used. This analysis uses the Herfindal-Hirshman Index (HHI), a measure of competitiveness introduced in section 3.2.2.1, as well as measures of market power, such as the Lerner Index, and of profitability.

The data in Table 7.1 seem to show a reduction in competitiveness when shifting the analysis from Southern Sudan to Kenya and from Kenya to Swaziland. However, at country level the picture is rather diversified. In Kenya the value of the index is reduced and therefore the degree of market competitiveness increases when moving southwards within Turkana and beyond towards the more productive and commercially lively areas of the Rift Valley. Conversely, in Swaziland a substantial reduction in the degree of competitiveness is recorded when moving towards the commercial centre of the country. A possible interpretation of this distribution could be given by the assumption of an inverted U-shaped relationship between the local economic environment and general development and market power. The very low levels recorded in Southern Sudan could support such an interpretation. However, it is to be recognized that the survey may have been unable to fully capture in the estimation of this index the role played by transporters based outside the most remote and economically depressed areas.

Table 7.1 Indicators of competitiveness and profitability

	HHI	Lerner index					Profit rate				
		maize	maize flour	rice	sorghum	beans	maize	maize flour	rice	sorghum	beans
Kenya											
Turkana North	0.112	0.201	0.166			0.122	27.120	20.890			15.930
Turkana South	0.070	0.166	0.184			0.138	20.380	22.990			16.570
Rift Valley	0.049										
Swaziland											
Shiselweni	0.013		0.227	0.101		0.201		30.980	12.150		27.120
Lubombo	0.199		0.066	0.122		0.254		7.640	14.920		36.670
Manzini	0.379		0.074	0.046		0.180		8.550	4.960		24.910
Southern Sudan											
NBeG	0.003		0.067		0.060	0.078		7.230		6.400	8.810
Lakes	0.002		0.066		0.063	0.066		6.750		6.700	7.099

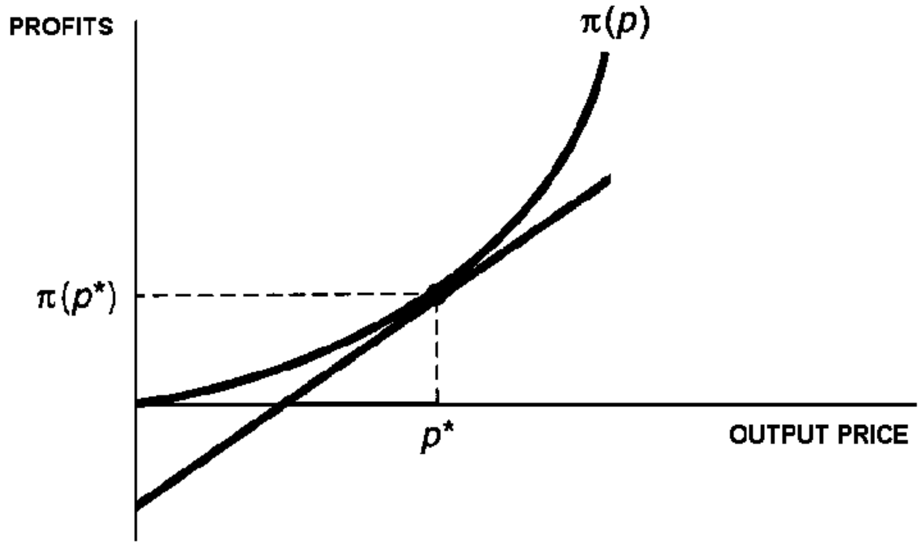
Source: Author's estimates

Another measure of market power reported in Table 7.1 is the Lerner Index (L). This index provides a wider view of market power and competitiveness than that provided by the HHI on the basis of business size. The L index is defined for each individual firm as the ratio between the profit margin achieved for a product and the price at which such a product is marketed. The index ranges from a high of one to a low of zero, with higher numbers implying greater market power. In this case the highest values are once again recorded in Swaziland and refer to higher-value products such as beans and maize flour. However, the geographical distribution of market power appears to be quite different to that seen so far. Competitiveness appears to decrease from North Turkana southwards and to increase in Swaziland from the two peripheral regions towards the economic and administrative centre of the country.

Although the aim of the L index is to reflect the market power of firms, due to the construction of the index its values are strictly linked to those of the profit rate. The contradictory findings reported by the HHI and L indexes should be considered from this perspective. Figure 7.1 combines average data on price and profit rates related to different commodities in the different areas and tries to detect the shape of a possible profit function for each of the three areas. For this purpose price data have been converted into a common currency: US dollars (USD).

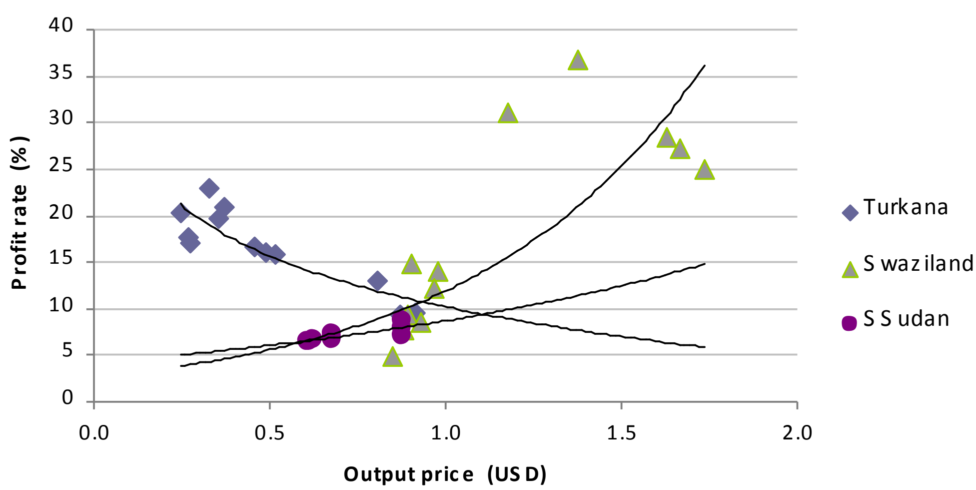
Figure 7.1 Profit functions

a) Reference



Source: Varian, 1992

b) Case studies



Source: Author's estimates

According to basic principles of microeconomics, the profit function *π(p)* should aim at the maximum profit attainable at prices *p* and one of its properties is its convexity in *p*. In other words, as the output price increases, the profit function increases at an increasing rate. A general case can be visualized in the first part of Figure 7.1, which can be taken as a reference to countercheck the profit functions estimated for each of the specific cases considered here in the second part. The convexity in *p* of the profit function is quite clear in the case of Swaziland as well as that of Southern Sudan, although to a lesser extent. Conversely, data from Turkana shows a less clear pattern giving the impression of a decreasing slope. There are good reasons to assume that traders in Turkana and Southern Sudan are not maximizing profits due to various constraints such as the level of technology utilized (i.e. transport), access to inputs and availability of basic infrastructure. However, in this case the explanation is rather found on the demand side: the downward trend shown in the case of Turkana is solely linked to high-priced commodities, beans and particularly sugar, which in such contexts can be considered a luxury commodity. The removal of such items completely changes the slope and shape of the trend line. Figure 7.1 shows that in Turkana traders manage to achieve comparatively high profit rates by dealing solely with the cheaper commodities and the usual increasing pattern could be expected to apply even in this case if the purchasing power were able to generate higher demand for high-price commodities.

Table 7.2 provides some further insight into the profitability and efficiency of trading activities. It reports the contribution of major costs incurred by traders in their activities estimated through the Cobb-Douglas model:

$$Y_{ij} = X_{1ij}^{b_1} X_{2ij}^{b_2} e^{u_i} \tag{7.1}$$

where:

Y_{ij}	is the output achieved by trader *i* dealing with commodity *j*;
X_{1ij}	is the procurement cost faced by trader *i* in relation to commodity *j*;
X_{2ij}	is the transport cost faced by trader *i* in relation to commodity *j*;
u	is the error term;
e	is the base of natural logarithm;
b_1, b_2	are the parameters to be estimated.

In equation 7.1 a few factors such as labour costs are omitted due to lack of data. Therefore, the focus here is on procurement and transport costs. Under the reasonable assumption that labour costs are not correlated with those of procurement and transport, equation 7.1 provides unbiased estimates.[113]

Table 7.2 Cobb-Douglas coefficients of trading production function

	North & South Turkana	Lubombo & Shiselweni	NBeG & Lakes
procurement cost	0.822 ***	0.792 ***	0.758 ***
	(0.113)	(0.048)	(0.068)
transport costs	0.103 ***	0.139 ***	0.065 ***
	(0.030)	(0.030)	(0.006)
constant	0.932 **	0.729 ***	0.450 ***
	(0.376)	(0.084)	(0.033)
R^2	0.894	0.637	0.975
N	45	222	67

significance: *** = 0.001, ** = 0.005, * = 0.01
robust standard errors in brackets

Source: Author's elaboration

It is to be stressed that in this case no account has been taken of different technology adopted by traders, essentially relevant in terms of access to different prevalent forms of transport and related costs. This is somehow reflected in the different value of the coefficient for transport costs, highest for the Swaziland case and lowest for Southern Sudan. However, the most interesting thing to consider is how the combined contribution of procurement and transport costs to the value of output is very close in the case of Turkana and the areas of Swaziland at 92% and 93% respectively, while it is much lower for the areas of Southern Sudan. Under the major assumption that the

113 Throughout this analysis problems of omitted variables are not investigated. In the specific case labour costs are not expected to be correlated with the variables included in the model (i.e. procurement costs and transport costs); therefore the omission of labour costs is not expected to generate biased estimates.

contribution of all inputs would add up to unity, the results leave unexplained a major share of additional costs, equivalent to almost one fifth of the output value in the case of Southern Sudan, more than double that of the other two cases. In other words, a higher degree of inefficiency is found in the case of Southern Sudan.

7.2.2 Access to inputs

One of the prerequisites of any market-based intervention strategy is expandability of supply, which ultimately leads to traders' access to critical inputs. The list of such inputs is quite long, however the analysis of such key inputs as cash, essentially in the form of credit, and commodities, can go a long way.

Data related to the case studies covered in this analysis are summarized in Table 7.3. In each case study traders' confidence in the accessibility of each key input has been considered separately in order to avoid any risk of simultaneity bias.

The first remark is about traders' regularly greater confidence in accessing food commodities rather than cash, with the only exception Northern Bahr el Ghazal in Southern Sudan. The gap in confidence ranges from a mere 3% recorded in Lakes, Southern Sudan, and Lubombo, Swaziland, to a maximum of almost 40% in North Turkana. Such information could provide substantial assistance in exploring alternative intervention strategies. The greater the traders' confidence about accessing commodities and the larger the gap between their ability to access the two key inputs, the stronger the justification for cash-based strategies. The contrary is the case when traders' confidence in the accessibility of cash appears to be significantly higher than their confidence in the accessibility of the quantity of commodities envisaged as necessary to respond to an increased demand. From this perspective, among the cases considered in Table 7.3, North Turkana and Shiselweni seem to be ideal candidates for a cash-based intervention strategy, while in North Bahr el Ghazal a commodity-based approach appears to be more appropriate.

Table 7.3 Confidence in accessing key inputs (%)

	cash	commodities
Kenya		
Turkana North	0.497	0.889
Turkana South	0.588	0.794
Kitale - Eldoret	0.809	0.979
Swaziland		
Shiselweni	0.489	0.739
Lubombo	0.840	0.872
Manzini	0.816	0.918
Southern Sudan		
NBeG	0.867	0.647
Lakes	0.807	0.834

Source: Author's estimates

However, a certain caution is deemed appropriate since a biased attitude may be expected from traders: this may occur in two ways. In traders' opinion their ability to access cash may be downscaled in order to support a cash-based intervention which would stimulate local demand and, hopefully, their business as well. The same attitude may lead them to overemphasize their optimism about accessing additional commodities.

When considering the points above it may be worth as well enlarging the geographical scope of the contextual analysis in order to consider food trade links in the markets or area considered within a wider picture. A review of the links between local markets and the supplying areas would help to understand the solidity of traders' confidence in the accessibility of inputs and therefore in their supply capacity.

At the end of the day, it is important to keep in mind that commodities need to be sourced somewhere, and every time we enlarge the geographical scope for cash intervention, it is necessary to include in the analysis an additional level of source markets. This analysis cannot go on forever and such a process could confidently stop only after reaching a solid level which can ensure a stable flow of commodities capable of covering the increased demand. Such observation is crucial for areas and markets that rely on imports from other areas to satisfy local requirements.[114] This leads to the crucial role of the integration of different areas and markets in affecting local supply capacity.

7.2.3 Market integration

The analysis of market integration can help to examine the effectiveness of market functioning. In chapter 3 we presented the basic principles and tools of this part of the analysis, which have subsequently been applied to the various case studies analyzed with reference to respective staple food commodities.[115]

Results from the analysis of the case studies have been combined in Table 7.4. In addition to average values of size of adjustment in the long-run θ_2 and the short-run α_2, and the speed of adjustment α_3, this features the half-life index *h*. The *h* index measures the number of time units required for the process of price change in one market to take effect in the other market, per each pair of markets, before restoring half of the long-run equilibrium between their prices. The values of the *h* index are particularly useful in order to derive a combined picture of the characteristics of the adjustment process and facilitate comparisons. Such a combined view is provided by the ratio θ_2 / h.

[114] Incidentally, it is worth remarking that such local requirements may not necessarily manifest as local demand, but may consist as well of a regular flow of commodities procured and moved by residents or relatives for their own consumption.

[115] Maize for Kenya and Swaziland and sorghum for Southern Sudan.

Table 7.4 Average coefficients of price transmission

	internal					external				
	θ_2	α_2	α_3	h	θ_2 / h	θ_2	α_2	α_3	h	θ_2 / h
Kenya										
North Turkana	0.348	0.262	0.403	1.042	0.334	0.217	…	0.618	1.027	0.212
South Turkana	0.482	0.356	0.443	0.976	0.494	0.340	…	0.420	1.007	0.336
Rest of Kenya	0.910	0.580	0.404	1.066	0.854	0.873	0.492	0.309	1.047	0.834
Swaziland										
Shiselweni	0.876	0.314	0.146	1.530	0.573	0.915	0.467	0.261	1.317	0.695
Lubombo	0.921	0.652	0.225	1.396	0.660	0.892	0.442	0.191	1.511	0.590
Rest of Swaziland	0.926	0.272	0.197	1.135	0.815	0.745	0.305	0.239	1.282	0.569
Southern Sudan										
NBeG	0.566	…	0.441	1.061	0.534	0.747	0.578	…	1.212	0.616

Source: Author's estimates

First of all, higher rates of long-term adjustment are found in Swaziland and differences among the different areas of the country are rather minor. This is understandable in view of the limited size of the country and its excellent transport system. A similar level of integration is found in Kenya, with the exclusion of Turkana and other arid and semiarid areas. The size of long-run adjustment in Turkana ranges between one third and half of the average in the rest of the country and, as expected, shows a decreasing degree of market functionality when moving northwards. Southern Sudan appears to be closer to Turkana than to Rest of Kenya or Swaziland; however a word of caution is required since such a value reflects only a very limited number of markets for which data are available and which result to be cointegrated.

Data on the speed of adjustment bring in an interesting new perspective, surprisingly characterized by a slower process of price transmission in Swaziland compared to the other areas considered. This finding appears to be generalized throughout this small country and also affects areas that are more commercially active than others. This is reflected in both the size of short-run adjustment and the time required for the price adjustment to be completed.

The two effects of size of long-term adjustment and time required to complete adjustment are summarized through the combined measure θ_2 / *h*. As expected, the commercially advanced areas of Kenya and Swaziland record the highest scores and North Turkana the lowest.

The analysis of external cointegration is conditioned by the market used as a term of reference. For the purposes of each case study a different reference has been considered appropriate as proxy for the external market, mainly reflecting the neighbouring areas rather than the global market *per se*. Therefore Ugandan markets along the Kenya-Uganda border and the main South African food market are used as references for Kenya and Swaziland respectively. In other words, in the present analysis the reference reflects a regional rather than an international dimension.[116] Once again the exception is represented by Southern Sudan, where the paucity of data constrains the analysis and some significant cointegration has been found only with the market in the United States, usually taken as proxy for the global market.

Coefficients are generally lower than their internal counterparts, with the exception of Shiselweni in Swaziland and North Bahr el Ghazal in Southern Sudan. There is no evident reason for this stronger degree of integration between Shiselweni and South Africa compared to the rest of Swaziland. Conversely, the case of Southern Sudan can be seen in light of the protracted constriction of external[117] trade links with neighbouring countries experienced during the decades of civil war and the heavy reliance on international aid, particularly in terms of food aid.

In terms of comparison between commercial centres and peripheral areas, in Kenya and Swaziland the reduction in the degree of integration seems to follow different patterns. In the former case the higher reductions are reported in Turkana, while they seem to be

[116] The stronger relevance of the regional rather global dimension of staple food market integration in East Africa and Southern Africa is confirmed by other studies. For instance, a recent study (World Bank, 2009) confirms the strong integration of maize market between Kenya and Uganda and the weaker integration between such two countries and the international market.

[117] As well as domestic trade links.

quite minor in the rest of the country, while in the Swaziland case it is the other way around.

7.2.4 Density of road network

Roads are known to be among the major drivers of economic growth at local level. A recent study has estimated the dominant role of transport charges in the structure of food marketing costs in Eastern Africa.[118] Not only are such charges transmitted to end users by raising market prices; it has also been shown that in Africa such costs have also a significant impact on agricultural productivity and supply response.[119] Therefore, the simple indicator of the road density in an area can be quite revealing, particularly when considering market-based development strategies. Table 7.5 provides a summary view of average values of this indicator in the areas considered in the case studies.

Table 7.5 Road density

	km / km^2
Kenya	
Turkana North	1.54
Turkana South	1.69
Pokot	4.10
Kitale - Eldoret	8.88
Swaziland	
Shiselweni	7.52
Lubombo	8.14
Manzini	8.62
Southern Sudan	
NBeG	0.97
Lakes	1.96

Source: Author's estimates

[118] The study (World Bank, 2009) reports that in Eastern Africa about 45% of average transport charges occur during the initial 28% of the distance due to disproportionately higher transport costs on rural roads compared to national/tarmac roads.

[119] Dorosh *et al.*, 2008; Lall *et al.*, 2009.

The data utilized for the estimation of road density have been selected on the basis of purposive sampling[120] and cannot therefore be considered as representative, but are deemed good enough for the purposes of this study.

The index shows a striking difference between more and less developed areas. This is particularly evident in the case of the Kenyan data, with an almost sixfold increase in road density from North Turkana southwards through Pokot down to the very productive and commercially lively area of Rift Valley along Lake Victoria.

The data from Southern Sudan reflect the North-South increase in road density observed in Turkana, although with a higher disparity between the states of Lakes and Northern Bahr el Ghazal.

The Swaziland case shows a relatively small disparity among the three areas considered. Once again, as expected, the most developed area has the highest road density.

7.2.5 Security

Physical security is expected to play a role in defining trader behaviour and productive activity in general. The assumption is that *ceteris paribus* activities are discouraged in areas of higher insecurity. Table 7.6 reports security levels defined by the United Nations Department for Safety and Security (UNDSS). The index is constructed in such a way to express a measure of insecurity: it ranges between zero and five with the higher the value the poorer the security conditions. It is interesting that the index follows the distribution of road density, above, quite closely, showing a direct relationship between roads and security, as expected.

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[120] In each case three spots have been selected and from each of them the estimation area has been defined as a circle with a radius of approximately 18 km. For the estimation of the index of road density weights have been attributed arbitrarily to different types of roads: primary roads have been given a weight of one and secondary roads a weight of 0.75.

Table 7.6 Security

	security level
Kenya	
Turkana North	3
Turkana South	1
Pokot	1
Kitale - Eldoret	1
Swaziland	
Shiselweni	0
Lubombo	0
Manzini	0
Southern Sudan	
NBeG	3
Lakes	3

Source: UNDSS

7.3 Elasticity of supply

The variables considered above are either a direct or an indirect expression of market functioning or of some of its determinants. In both cases they provide different points of view from which is possible to consider market functioning. As such, their study can provide an invaluable contribution to response option analysis. The same type of contextual analysis is also useful on the demand side;[121] however in line with the approach taken in this part of the study the focus here is on how the analysis of contextual factors can help to assess supply elasticity and more generally traders' response to an increase in demand.

[121] The focus in such case would be on the eventual beneficiaries and communities, with particular reference to their involvement with local markets.

Table 7.7 Correlation among variables relevant to market analysis

	herfindal index	trader's confidence (access to cash)	traders' confidence (access to commodities)	profit rate	market integration (local)	market integration (with neighbouring areas)	road density	insecurity
herfindal index	1							
trader's confidence (access to cash)	0.134	1						
traders' confidence (access to commodities)	0.481	-0.028	1					
profit rate	0.224	-0.726	0.282	1				
market integration (local)	0.475	0.587	0.406	-0.071	1			
market integration (with neighbouring areas)	-0.085	0.630	-0.067	-0.271	0.783	1		
road density	0.594	0.188	0.475	0.441	0.835	0.639	1	
insecurity	-0.627	0.071	-0.301	-0.662	-0.628	-0.357	-0.867	1

Source: Author's elaboration

Table 7.7 provides a summary view of the relationship among the variables considered above.[122] A series of strong links, already mentioned above, is evident, such as those between security and density of road network and between both variables and local market integration. As expected, the availability of a good road network in a secure environment provides favourable conditions for profitability and growth of business initiatives. Local market integration seems to strengthen conditions of market power in favour of large traders, though contributing to mild reductions in profit rates. Trade integration with neighbouring areas seems to play a stronger role in reducing local traders' profit margins but is less relevant to business size and market power. Finally, it is worth considering the high profit rates associated with low trader confidence in the accessibility of cash; this could be explained as the consequence of high demand for credit in a favourable business environment.

At this stage the links highlighted in Table 7.7 can be formalized in such a way as to gear towards the analysis of determinants of supply and elasticity of supply. Therefore

[122] A larger set of variables can be considered for such type of exploratory analysis; the limitation being mainly availability of relevant data.

the rest of the analysis seeks to determine the role and relevance of each of the factors considered above in influencing traders' decisions to scale up their business size. For this purpose data on traders' response to eventual price increases simulated through the traders' survey in the three case studies is used. It is worth remembering that on such occasions traders' potential response to an eventual rise in demand has been elicited by considering various eventual price changes ranging between a zero and a 30% price increase. In particular, two price changes have been considered: a) a minimum price change considered necessary by each trader before deciding to scale up own business size, and b) a 20% price increase. Traders' response to both price changes were elicited in terms of changes in quantities they would be interested in and capable of supplying. This process has generated a set of three price-quantity combinations for each unit; the first based on actual data (p_0, q_0 at t_0) and the other two on the basis of the simulations just described (p_1, q_1 at t_1; p_2, q_2 at t_2). This has allowed to generate a panel dataset for each commodity and the same process has been repeated in each case study for the three major commodities traded by each unit within a predefined set of major commodities. The combination of the three case-study datasets provides a shift in perspective from the local to a more general dimension allowing the introduction into the analysis of a few contextual variables which would otherwise be difficult to capture in each individual case study.

Model specification has tried to put together a few contextual factors deemed critical in influencing supply elasticity. These are expressed either as perceived by traders (i.e. availability and accessibility of commodities and credit), or as totally exogenous such as road density, security, market integration in both local and neighbouring areas, degree of market power. Business size and profit rate are included in a sort of intermediary position, with a degree of multi-collinearity expected. The inclusion of business size in quadratic form to capture a possible parabolic link between business size and supply is regularly dropped and has been omitted. Since the structure of the dataset is based on simulations, no lag is considered between price formation and trader response; therefore variables values at t_0, t_1 and t_2 are considered independently and all are summarized as t. The basic model specification is:

$$\begin{aligned} Ln\, q_{ijt} = \alpha\, +\, \beta_1\, Ln\, p_{ijt} + \beta_2 Ln\, size_i\, + \beta_3\, cash_i\, + \beta_4\, food_i\, + \\ \beta_5\, market\ local\, +\, \beta_6\, market\, neighbor\, +\, \beta_7\, hhi\, + \\ \beta_8\, profit\, +\, \beta_9\, roads\, +\, \beta_{10}\, \mathrm{sec}urity\, +\, u \end{aligned} \tag{7.3}$$

where:

q_{ijt}	is the current or simulated quantity of the j^{th} commodity supplied by the i^{th} trader at time t;
p_{ijt}	is the current or simulated market price of the j^{th} commodity supplied by the i^{th} trader at time t;
$size_i$	is the business size of the i^{th} trader;
$cash_i$	reflects the i^{th} trader's expectation of accessing the additional cash eventually required to scale-up his/her business size;
$food_i$	reflects the i^{th} trader's expectation of accessing additional quantities of food commodities required to satisfy an eventual increase in demand;
market local	is a measure of price integration in the local markets;
market neighbor	is a measure of price integration in the markets in neighboring areas;
hhi	is a measure of market power in the local markets;
profit	is a measure of average profit rates achieved by traders in the local area;
roads	is a measure of road density in the local area;
$\mathrm{sec}urity$	is a measure of security in the local area.

Table 7.8 Determinants of supply elasticity

	Maize				Maize flour				Beans			
ln p	1.213 ***	1.208 ***	0.906 ***	1.232 ***	1.679 ***	1.584 ***	0.565 ***	1.576 ***	1.342 ***	1.333 ***	1.031 ***	1.336 ***
ln size	0.894 ***	0.902 ***	0.540 ***		0.925 ***	0.893 ***	0.579 ***		0.906 ***	0.897 ***	0.609 ***	
cash	0.170	0.183 *	0.603 ***	1.068 ***	0.169 *	0.243 **	0.497 ***	0.768 ***	-0.113	-0.073	0.174	0.441
food	-0.338 ***	-0.380 ***	-0.951 ***	-0.814 ***	-0.382 ***	-0.401 **	-0.251	-0.183	0.062	0.057	-0.194	0.040
market local	6.359 ***	0.586	4.329 ***	6.088 ***	4.919 ***	2.372 ***	3.487 ***	8.852 ***	2.577 *	0.834	8.395 ***	11.347 ***
market neighbor	28.539 ***	3.934 ***	4.251 ***	3.353 ***	15.205 ***	4.072 ***	2.767 ***	3.713 ***	11.820 **	3.697 ***	5.290 ***	3.889 ***
hhi	86.023 ***				37.929 ***				27.979			
profit	0.645 ***	-0.289 ***			0.061	-0.327 ***			-0.042	-0.348 ***		
roads	-16.721 ***	-2.179 ***	-0.373 ***	0.219 *	-8.821 ***	-2.002 ***	0.321 **	0.850 ***	-7.028 **	-2.179 ***	-0.643 ***	0.423 ***
security	-31.359 ***	-5.904 ***	-0.914 ***	0.091	-17.059 ***	-4.892 ***	0.995 ***	2.776 ***	-13.899 ***	-5.371 ***	-0.460 *	2.073 ***
constant	83.925 ***	18.806 ***	-0.735	-1.374	46.134 ***	14.204 ***	-7.004 ***	-13.390 ***	38.522 ***	16.532 ***	-5.821 ***	-11.568 ***
N. obs	543	543	612	612	759	759	768	768	417	417	450	450
chi^2	1857.74	1788.18	2329.32	1400.02	1481.35	1415.15	781.54	503.26	1171.36	1163.02	1417.23	933.37
R^2 within	0.67	0.67	0.70	0.70	0.49	0.49	0.48	0.48	0.69	0.69	0.70	0.70
R^2 between	0.86	0.85	0.85	0.70	0.78	0.77	0.69	0.33	0.80	0.80	0.82	0.62
R^2 overall	0.86	0.85	0.85	0.70	0.77	0.76	0.67	0.33	0.80	0.80	0.82	0.62
σ_u	0.51	0.52	0.54	1.27	0.53	0.53	0.58	1.11	0.53	0.53	0.53	1.22
σ_e	0.09	0.09	0.08	0.08	0.21	0.21	0.21	0.21	0.09	0.09	0.09	0.09
rho	0.97	0.97	0.98	1.00	0.86	0.86	0.88	0.96	0.97	0.97	0.97	0.99

continued

Table 7.8 continued

	Rice[1]				Sorghum[2]		Sugar[3]			
ln p	2.182 ***	2.182 ***	2.135 ***	2.584 ***	1.316 ***	1.316 ***	1.100 ***	1.100 ***	1.112 ***	1.112 ***
ln size	1.030 ***	1.030 ***	0.986 ***		0.570 ***		0.795 ***	0.795 ***	0.820 ***	
cash	-0.131	-0.131	-0.176	0.180	0.021	-0.050	-0.086	-0.086	-0.112	0.797 ***
food	0.487 **	0.487 **	0.485 **	1.159 ***	0.092	0.330 ***	0.006	0.006	-0.011	0.530
market local	-14.039 **	-14.194 ***	4.374	21.925 ***	-0.298	0.568	-1.190	-1.190	-9.666 ***	1.954
market neighbor	34.460 ***	34.931 ***	-2.602 **	1.671					10.641 ***	4.127
hhi	-0.159									
profit	-1.293 ***	-1.305 ***								
roads		-0.018	-0.836 **	-1.412 **					0.031	0.267
security			-3.745 ***	-1.880 **						
constant	7.124	7.303	-1.332	-5.675 ***	1.596 ***	4.728 ***	-6.865 ***	-6.865 ***	-6.594 ***	-2.440 **
N. obs	315	315	327	327	351	351	258	258	285	288
chi^2	690.02	690.02	920.56	380.75	3810.60	3739.05	4391.90	4391.90	4666.72	4127.55
R^2 within	0.61	0.61	0.60	0.60	0.94	0.94	0.96	0.96	0.95	0.95
R^2 between	0.78	0.78	0.83	0.49	0.38	0.07	0.75	0.75	0.90	0.64
R^2 overall	0.77	0.77	0.82	0.49	0.40	0.10	0.75	0.75	0.90	0.64
σ_u	0.48	0.48	0.49	0.95	0.44	0.54	0.63	0.63	0.62	1.17
σ_e	0.24	0.24	0.24	0.24	0.03	0.03	0.02	0.02	0.02	0.02
rho	0.80	0.80	0.80	0.94	0.99	1.00	1.00	1.00	1.00	1.00

significance: *** = 0.001, ** = 0.005, * = 0.01

[1] Kenya and Swaziland only; [2] South Sudan only; [3] Kenya only.

Source: Author's elaboration

In terms of model specification, the random effect approach is preferred since the fixed effect cannot accommodate invariant regressors.[123] Results reported in Table 7.8 show a generally high significance confirming the appropriateness of the adopted model specification.

As expected, the highest values of the chi^2 test refer to the single-country analysis, as it is the case for sorghum and sugar. In such cases there is less variation within the data, allowing for higher explanatory power of the model as confirmed by the higher values of R^2. However, this lower variation raises the risk of collinearity among variables, as it is particularly evident in the case of sorghum.

The coefficient related to commodity price is particularly relevant in this part of the analysis. Expressed in logarithmic form, it represents the price elasticity of supply. The range of coefficient values reported through different model specifications for each commodity is rather contained, with the largest gap related to maize flour and the smallest to sorghum and sugar, the latter both referring to single-country samples. For staples such as maize and sorghum, as well as for beans, price elasticity ranges between 0.9 and 1.3. The range seems to be wider in the case of maize flour: between 0.6 and 1.7, though averaging at the higher end. The other two commodities, rice and sugar, which in this case can be both considered luxury goods, show different patterns. The coefficient is significantly higher in the case of rice compared to the other commodities considered, while in the case of sugar it falls within the range of staples. This difference can be explained by the different degree of perishability of the two products which, despite the high profitability of both commodities, affects their shelf life and the associated risk of loss. The estimation of sugar price elasticity is limited to the Turkana sample, where there is limited storage capacity and harsher climatic conditions than in the combined Turkana-Swaziland sample applied for rice, supporting this interpretation. Furthermore, the higher average income elasticity of demand expected in the Swaziland case study provides further support in explaining the different pattern observed.

[123] Since all contextual variables are fixed per each area considered, they are automatically omitted under a fixed effect approach due to collinearity. Results are not reported.

The coefficient for business size has the expected sign in all cases. Its size is remarkable, ranging between 0.5 and one, thus confirming the higher capacity in scaling up supply expected from large-size business. This is supported by the high positive coefficient of market power, though significant only for maize and maize flour: a higher degree of market power seems to be associated with higher supply response capacity.

There are conflicting signals about traders' confidence in their ability to access additional critical inputs such as cash and commodities. Confidence about availability of and access to additional cash appears to be significant only for maize, maize flour and sugar. In such cases, traders' confidence can be a good predictor of local supply capacity. Expressed as a percentage, it can be interpreted in terms of elasticity: a 1% increase in average confidence can predict between 0.2% and 1% increase in supply capacity for maize and slightly lower on the upper end for maize flour. Contrary to the case of cash input, it is more difficult to interpret results related to the role of traders' confidence about accessing additional commodities. Significant results have different signs for different commodities: negative for maize and maize flour and positive for rice and sorghum, respectively. It is difficult to find a single general answer to such different patters. A possible interpretation could link such different relationships to the different staple/non-staple nature of maize and maize flour on one side and rice on the other. Individual traders' perceptions of the availability and accessibility of additional quantities of rice is more likely to be correct, and as such lead to actual increases in supply. Conversely, the staple nature of maize and maize flour, reflected in a more rigid demand, can be misleading to the individual trader, with the consequence that the higher quantities of staple regularly marketed may give to him/her the erroneous impression that it is possible to scale up his/her individual supply, while this is prevented by a tighter balance between aggregate demand and aggregate supply. However, while such an interpretation may intuitively sound acceptable, it is not supported by the positive coefficient detected for sorghum.

Market integration has the expected positive sign for maize, maize flour and beans. A higher degree of market integration in both the local area and neighbouring areas has a positive effect in raising local supply capacity. The size of the coefficients is reasonably high, varying according to model specification, with higher values reported interchangeably at the two levels. This provides strong support for the relevance of market functioning as a precondition for the use of market-based strategies. A higher degree of market functioning can strongly support a supply response to an increased demand.

The relevance shown by market integration not only in the areas of concern but as well in neighbouring areas is of particular interest. In an open local economy trade is not carried out in isolation from neighbouring areas and limiting the analysis to the local context can be misleading. This is even more evident when focusing on areas that are not self-sufficient and rely, to various degrees, on other areas to source their supplies. Therefore there is a need to place the analysis of local trade links within a wider picture. Strong integration with the supplying areas can help in understanding the solidity of traders' confidence about accessing additional inputs, mainly commodities, and therefore in assessing the flexibility of local supply capacity. In fact, commodities need to be sourced somewhere, and when considering the feasibility of cash-based interventions it is necessary to include in the analysis an additional layer of possible source markets.[124]

Having said the above, it is necessary to recognize how the link between market integration and local supply capacity comes up less clearly from the findings related to the other commodities. Such variables are dropped in the analysis of sorghum and show contrasting patterns in the cases of rice and sugar. These finding raise a question about the general validity of the relevance and role of market integration outlined above, and whether this relevance and role may get eventually decrease or even disappear altogether when the focus is shifted to higher price and luxury-type commodities.

The role that profitability of different commodities plays on their local supply provides controversial results. Anyway, the doubtful reliability of the data on which profit rates are estimated and their inclusion in the model in average form do not contribute to making it of enough interest, so it has been dropped, increasing the fitness of the model.

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[124] In principle the geographical focus of such an analysis can be ignored only on reaching a solid level of confidence about aggregate production and trade capacity which can ensure a stable flow of food commodities towards the geographical area of interest and which is capable of covering the increased demand stimulated at local level.

Density of local road network is expected to contribute positively to market functioning and therefore to increase traders' capacity to scale up their business size. However, even in this case different models provide conflicting results.

Finally, similar findings are reported in the case of security. In view of the structure of the index, higher values signal worsening security conditions and therefore a negative coefficient sign is expected. This expectation is fulfilled with reference to maize and rice, but only partially in the case of maize flour and beans.

7.4 Willingness to trade and price increase

Some of the aspects of the elasticity of supply considered above can be tackled from a slightly different angle. Estimation of elasticity of supply requires sufficient knowledge of the prices and quantities at which the transaction has been made or is expected to be made. Even with the assumption of a good knowledge-based decision making process followed by the trader, it would be rather ingenuous to assume that it is possible for the trader to gather this amount of knowledge. After all, reality is more complicated than theoretical models. Various types of constraints – which ultimately translate into potential or actual costs – can be assumed to be faced by the trader when considering scaling up his/her business. Trying to detect and measure all such big and small costs at the level of the individual trader, while still trying to maintain a certain level of rigour in the analysis, may be difficult. Even more so if this is done in the rush dictated by the preparation of an emergency response. In such conditions a quicker method of assessing existing response capacity is to accept a higher degree of approximation in the analysis and focus on the triggers of traders' responses to market signals. As seen above, price changes can play a major role in raising the entrepreneurial attitude typical of a trader. But what level of price change? In other words, how much do prices need to rise before action can be expected? And after all, prices cannot be expected to be the only determinant of traders' behaviour: other factors play a role, whether related directly to the individual trader or a certain typology of traders, or simply to external factors. Such exogenous factors are linked to the context in which the trader happens to operate and can be called contextual factors. They can be either a direct or indirect expression of the context, or, more subtly, be a reflection of how the trader, either as an individual or a professional category, perceives a specific aspect of the context. All such factors, endogenous or contextual, real or perceived, contribute to forming the trader's willingness to trade and consequent action. A system capable of combining and analyzing information on these contextual factors is required. A few components of the a system can be identified. A certain knowledge of local trading structure and capacity is necessary, with a summary identification of local trader categories. This component refers to the core of the implementation of a potential response to an eventual disequilibrium manifesting in the local market. This core component does not operate in isolation but is linked to another focal point of the system: the source of the additional quantity to be supplied. This may involve the farming sector only marginally, but as long as the area under consideration is not a surplus producing area the focus of the analysis will be on the identification of the major trading links for major commodities both at the local level as well as mainly in neighbouring areas. The strength of these links constitutes a key component in assessing the solidity of any market-related strategy, and price transmission analysis is the appropriate tool for the job. A good understanding of transport-related factors (e.g. availability and access to transport) as well as other eventual constraints, such as security in the source markets and along the main transport routes, will contribute to the contextual picture. Finally, information required from traders is limited to: a) estimation of the minimum average price increase at which they would be willing and ready to invest and scale up their business size, and b) their perception of the eventual availability and accessibility of additional critical inputs such as credit and commodities.

The use of the WTT approach has been introduced through the case studies in parallel with and/or in support of the estimation of the supply elasticity. At this stage it is applied through the combined dataset related to the case studies as used earlier in this chapter to estimate supply elasticity. The ultimate purpose of its use is related to the estimation of the likely price increase expected to be associated with a local increase in demand. At this stage it can be useful to show how contextual information collected through the various case studies can help to model very different market conditions. Table 7.9 provides the results of a likelihood analysis conducted through a few variations of *ordered logit* and *probit* models. The use of such a type of model is justified by the structure of the dependent variable (i.e. price increase) where values are condensed along the average value in each class considered. In this case, ordinary regression analysis would fail to capture the discrete scale used for the underlying continuous variable. Finally, probabilities estimated for the various case studies through the logit model (C) are reported in Table 7.10.

Table 7.9 Modelling willingness to trade in the three case studies

	logit			probit		
	A	B	C	A	B	C
traders' confidence in accessing cash (%)	-0.081	-0.216 **	-0.255 ***	-0.076	-0.131 **	-0.151 ***
traders' confidence in accessing commodities (%)	0.390 ***	0.469 ***	0.444 ***	0.230 ***	0.264 ***	0.251 ***
Ln business size	-0.090 ***	0.100 ***	0.084 ***	-0.012	0.074 ***	0.068 ***
market integration (local)	-5.733 ***	-5.574 ***	-5.580 ***	-3.375 ***	-3.336 ***	-3.295 ***
market integration (neighboring areas)	-2.986 ***	-1.888 ***	-1.576 ***	-1.578 ***	-1.081 ***	-0.944 ***
security	-1.443 ***			-0.580 ***		
road density	1.028 ***			0.475 ***		
security * road density		0.059 ***	0.050 ***		0.033 ***	0.030 ***
hhi			3.068 ***			1.223 ***
cut 1	-8.906	-3.698	-3.523	-4.212	-2.042	-1.969
cut 2	-6.724	-1.557	-1.366	-2.946	-0.791	-0.713
cut 3	-4.862	0.273	0.490	-1.863	0.280	0.365
cut 4	-3.856	1.280	1.502	-1.337	0.809	0.893
cut 5	-3.165	1.972	2.192	-1.017	1.130	1.211
N. obs	2379	2379	2379	2379	2379	2379
LR chi^2	719.64	661.11	688.36	686.36	644.09	659.36
Prob > chi^2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Pseudo R^2	0.1048	0.0962	0.1002	0.0999	0.0938	0.0960

significance: *** = 0.001, ** = 0.005, * = 0.01

Source: Author's elaboration

Table 7.10 Probabilities of WTT

	rate of price increase (%)					
	0-2	3-5	6-10	11-15	16-20	> 20
All areas	20.134	38.636	28.432	7.420	2.552	2.825
Turkana	6.677	29.355	40.832	13.101	4.709	5.326
RoK	26.255	47.408	20.917	3.372	1.010	1.038
Lubombo	6.060	29.633	42.211	12.727	4.439	4.931
Shiselweni	9.779	38.281	37.341	8.731	2.835	3.033
Manzini	4.731	25.169	43.070	15.119	5.555	6.356
NBeG	42.053	43.948	11.506	1.571	0.457	0.464
Lakes	29.503	48.669	17.633	2.627	0.776	0.792

Source: Table 7.9 Logit model specification C

Among the coefficients in Table 7.9, market integration in its various forms records the strongest values throughout all the model specifications considered, always with the expected sign. This supports the position held throughout this analysis about the key relevance of market functioning as a determinant of the choice between a cash-based or a commodity-based strategy or a combination of both. As expected, the stronger the degree of market functioning, particularly at local level but also in neighbouring areas, the lower the inflationary consequences of a cash injection.

Traders' confidence in accessing key inputs also has the expected sign. Confidence in the availability and accessibility of cash helps to limit price increase; however this holds only if balanced by access to commodities. Once the latter becomes more restricted than the former, financial surplus automatically translates into price increase.

Conditions of security help to contain price increase. In this case the original scores have been inverted, retaining the original domain of the index. This inversion is motivated by the need to align the security variable and the measure of road density, on the consideration that density of roads cannot necessarily contribute to containing prices on its own if prevailing security conditions do not allow proper use of the road network.

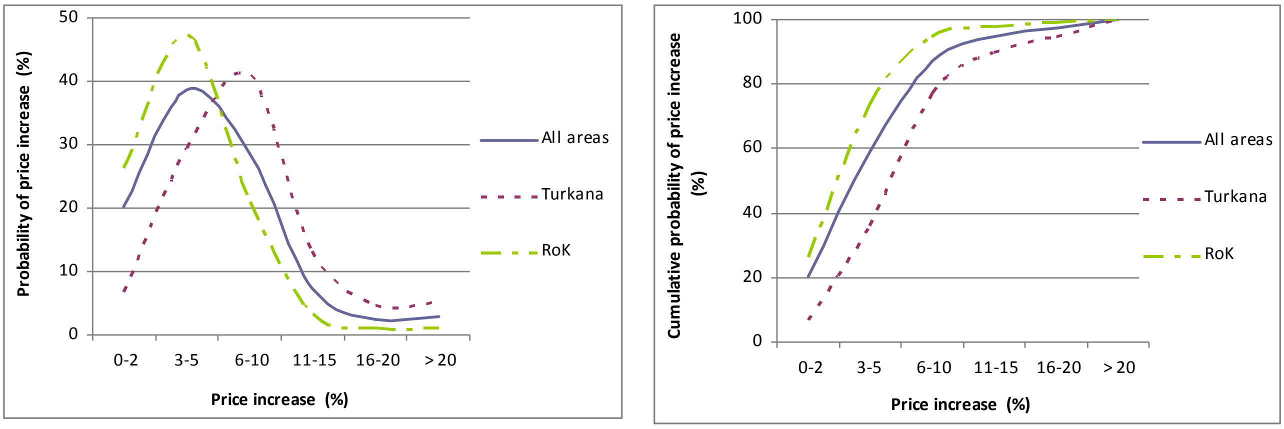
However, road density does not seem to help to contain price increases either on its own or in combination with a secure environment.

Finally, business size and market power provide an additional dimension. The sign of the business size coefficient provides conflicting information throughout the different model specifications, probably due to problems of multicollinearity. This does not help to support the hypothesis of economy of scale. Conversely, as expected, it is clear that conditions of market power favour price rise and increase the risk of inflation.

Table 7.10 reports the probability of each range of price increase considered for each area and thus provides a good basis from which to easily compare the likely inflationary consequences of various intervention strategies. The highest probabilities are related to rates of price increase from 3-5% to 6-10%. However, some differences are worth considering. Interestingly, the highest probability for the lowest range of price increase (0-2%) is recorded by NBeG. This very good result, and that achieved by Lakes, are encouraging, but should be considered with caution in view of the doubtful significance of some of the data related to Southern Sudan utilized in the model mainly due to the limited data available.[125] A similar distribution of probability of price increase is reported for the three areas of Swaziland, reflecting similar conditions as well as similar potentiality for scaling up supply. The major divergence reported refers to the Kenyan case. The distribution of price increase probabilities in Turkana seems to be significantly different to that in Rest of Kenya as well as for the average of all the areas considered, as clearly shown in Figure 7.2. This finding, somehow expected, does not express any *a priori* judgement of the feasibility and appropriateness of a cash-based intervention strategy in Turkana, but can be very useful in a decision making process. Not only does the analysis manage to draw attention to the higher-than-average risk of inflation; it also helps in estimating this risk and can be expanded to consider, on a preliminary basis, eventual mitigating measures that can be adopted in order to contain this risk.

[125] This consideration refers essentially to the limited price data utilized for the analysis of market integration.

Figure 7.2 Probabilities of price increase



Source: Author's elaboration

7.5 Conclusions

This chapter has focused on the relevance of contextual factors in affecting local supply. A few key factors shaping the functioning of the local market have been examined. The case studies considered in the previous chapters have been combined to provide a simple comparative perspective. This approach has shown quite helpful in highlighting how different strategies can facilitate or constrain the development of local business, remarking therefore how contextual analysis can provide a critical contribution in the design of intervention strategies.

The case studies have provided a diverse background to the analysis of contextual factors and of the various relevant links among them. This has geared towards the analysis of elasticity of supply as well as of the relevance of various factors in influencing traders' decisions to scale up supply. Commodity prices, business size, market integration, and confidence in accessing key inputs have been found among the main determinants of supply elasticity, at least with reference to the main staple food commodities.

Finally, some of the aspects of elasticity of supply have been tackled from a different angle. The consideration that price changes can play a major role in raising the trader's entrepreneurial attitude raises the question about the price rise required before trader's action can be expected. At the same time, the consideration that such a decision is not merely the result of price changes, but involves other contextual factors, as faced or perceived by the trader, highlights the need for a system capable of combining and analyzing information on these contextual factors.

The WTT approach, earlier on applied through the case studies, has been now applied to the combined case-studies dataset. Results of the analysis stress the relevance of market integration, used as proxy of market functioning. This supports the position held throughout this analysis about the relevance of market functioning as a determinant of the choice between a cash-based or a commodity-based strategy or a combination of both. As expected, the stronger the degree of market functioning, the lower the inflationary consequences of a cash injection.

In more general terms, the ultimate purpose of this exercise is the estimation of the likely price rise associated to a certain increase in local demand which can be reasonably expected from an increase in purchasing capacity as in the case of cash-based programmes. Therefore, this approach can be quite helpful to compare intervention strategies that may provide more or less emphasis on the provision of cash. At this regard the analysis of the combined case-study dataset reveals some interesting results. The rate of price increase expected in Turkana (i.e. 6-10%) results significantly higher than the one expected in the other parts of Kenya as well as in all the three case studies (i.e. 3-5%). This type of information can be very useful for decision making purposes when designing or fine-tuning an intervention strategy.

8

Relevance of contextual factors for the choice of intervention strategy

The case of market prices in Turkana

8.1 Introduction

According to general principles of sound project management, decision making needs to be based on a balance between the key concepts of effectiveness and cost-efficiency. However, concerns about the way in which such a balance can be put into practice are common. The choice between drastic alternatives such as a commodity-based versus a cash-based response to a situation of food insecurity is an example of such a case. Is too much attention to cost-efficiency detrimental to the selection of the most appropriate strategy? What is the trade-off between effectiveness and cost-efficiency? How relevant are localized contextual factors for decision making and for such a trade-off?

This chapter considers the appropriateness and cost-efficiency of cash-based and commodity-based interventions in food insecure situations. It focuses on the comparative analysis of available options in order to support the decision making process. In particular, it examines the relevance of contextual factors, such as market prices, in choices about the composition of the package to be transferred.

It is intuitive to consider how a price decrease on the local market helps to increase the transfer value of money, while the opposite happens in case of a price increase. In the former case, since an increase in local prices has the effect of reducing the purchasing power of cash, the more the intervention relies on the use of money the greater is the effective loss suffered through the transfer.

The concern expressed above is evident in instances of high price rises or price volatility. It is well known that cash transfers are not suitable in the case of price rises: not only because in such conditions they can be a very inefficient and ineffective transfer system, but also because they are likely to contribute to exacerbation of the price rise. The soaring food price crisis experienced in 2007-2008 and the expectation that for some time food prices will remain higher than they used to be have attracted attention to this topic.

This chapter highlights the relevance of market prices in fine-tuning the composition of the donation package. The analysis is conducted from the supply perspective; nevertheless, this is adjusted through the inclusion of a few side-effects which partially reflect the utility of transfer recipients.

The applicative part of the analysis in this study builds on the experience of food aid and cash-based interventions implemented and piloted respectively in Turkana, Kenya. Contrary to the general picture at country level, the high prices prevalent in the district make a commodity-based strategy more cost-efficient than a cash-based one. However, this is seen as a constraint to the growth of the local economy and to any attempt to overcome the current condition of semi-isolation experienced in the district.

The rest of this chapter is organized as follows. The next section introduces the conceptual framework of this analysis. Section 8.3 expands on the case-study considered in chapter 4 with a comparison of unit cost estimates of alternative strategies and their relevance for decision making. Section 8.4 presents concluding remarks.

8.2 Relevance of effectiveness and cost-efficiency for decision making

8.2.1 A supply perspective

Earlier, when considering the basic framework of our analysis, we considered how market functioning can play a critical role in defining the optimum response strategy or combination of response options to a food security crisis. In general, although sometimes the decision maker tends to emphasize a certain perspective on the basis of institutional factors such as "mandate" and "comparative advantage", a sound decision making process should be based on a wider perspective if it is to lead to optimum choices. According to economic theory a certain strategy can be considered appropriate in a specific setting when, besides being feasible and responding to the specific needs previously identified, it proves to be effective and cost-efficient. When a plurality of possible options is available, a strategy or combination of strategies should be preferred on the basis of a substitution effect that reflects the preferences of the decision maker. The last mentioned case reflects the situation presented in the I quadrant of Figure 3.1, where a choice among multiple strategies is to be made. This process should help to select an appropriate intervention strategy. However, the framework presented in Figure 3.1 is only a general one which needs to be contextualized from case to case in order to avoid basing strategies on principles, or even worse, fashion. In fact, assuming that some critical deficit is identified in either monetary or in kilocalorie terms, the strategic choice is not just a matter of principle but instead should be made on the basis of a careful analysis of the context. Even if the aim of the programme is a simple nutritional transfer, the context in which the initiative is to be placed can make a difference. In particular, market prices play a major role in this regard; a role that can affect the efficiency of the intervention even more than such programme-related factors as its size and, consequently, the possibility of achieving economies of scale.

Let us define the model from a donor's perspective. We will suppose that the donor tries to optimize the quantity of the donation package (the transfer) as measured in terms of kilocalories or another type of indicator. Defining the total donation requires knowing the total cost (restraint) involved in the program. We will use a classical production model (isoquant-isocost analysis) to find the optimal decision for the donor in terms of the combination of cash and food to form any donation package. For this a purpose the concepts of total donation and total costs are defined below.

The total donation is given by:

$$D = g(F, M) \tag{8.1}$$

which depends upon two inputs, food and money. The function g can be thought of as a strategic decision of the donor (i.e. it involves political, economic, and other issues). F is the quantity of food required to produce a donation package and M is the amount of money required to make a donation package. For consistency purposes both F and M are measured in terms of kilocalories.

The total cost is equal to:

$$TC = c_f * F + c_m * M \tag{8.2}$$

where:

TC is the total cost

c_f is the total cost of one unit of food in the donation package

F is the quantity of food needed to form a donation package

c_m is the total cost of one unit of money in the donation package

M is the quantity of money, measured in kilocalories, required to form a donation package.

The unitary cost for each input c_f and c_m are defined as a linear combination of different costs required to produce the donation package:

$$c_f = \alpha P_g + \beta c_t + \chi c_{man} + \delta c_{oth} \tag{8.3}$$

with $0 < \alpha, \beta, \chi, \delta < 1$ and $\alpha + \beta + \chi + \delta = 1$

$$c_m = \alpha' M * (1+r) + \chi' c_{man} + \delta' c_{oth} \tag{8.4}$$

with $0 < \alpha', \chi', \delta' < 1$ and $\alpha' + \chi' + \delta' = 1$

where:

P_g is the consumer price of one unit of food on the international market

c_t is the transportation cost per unit of food

c_{man} is the management and administrative unit cost

c_{oth} reflects any other costs per unit of transfer

r is the interest rate, taken here as an estimate of the opportunity cost of money. In principle, r should reflect a combined measure of the rate faced by the donor and by the recipient for the effective use of M.

As such, *TC* can be expressed as the relationship between the weighted costs of the two transfer mechanisms, that is the relationship between the quantity of food transferred measured either in nutritional terms (i.e. kilocalories, metric tonnes, etc) or economic terms (i.e. USD) and the amount of cash measured in the same unit. This relationship can take different shapes, of which the most relevant are presented in Figure 8.1.

Box 8.1 The shape of a donation package curve

The donation package curve can take different shapes. Such shapes reflect different assumptions made by the donor about the rate of substitution between money and food; in other words they reflect the donor's preferences according to the estimated productivity/efficiency of the different ways in which the donation is given.

Theoretically speaking, we could have three different donation functions: a) a straight line in which the rate of substitution between the two inputs is assumed to be constant;

b) the Cobb-Douglas case in which the curve is convex from the origin, thus involving different substitution rates between food and money; and c) the Leontieff curve with fixed coefficients.

These three functional forms reflect a different attitude towards the choice under discussion and each can provide the best representation of the donation curve according to initial assumptions about the donor's perspective and key contextual issues.

While the straight line identifies a condition of indifference towards one strategy or the other, a Cobb-Douglas-shaped curve identifies a certain more or less strong preference for one solution. As well known, this provides a good reflection of the current diversification among donors' attitude about the use of food and/or cash, with a few convinced supporters of rather extreme positions and the bulk spread between the two sides. But it also raises the choice that each donor is confronted with when considering specific allocations of donations to interventions in different contexts. In order to optimize the efficiency of the transfer, the same donor may want to adjust the food-money combination to the specific characteristics of the context in which the package is finally transferred. In theory this means that each context may be defined by different points within the entire range of the possible combinations along a Cobb-Douglas curve. The convexity of the curve reflects the opportunity cost of moving along it: shifting from a food-predominant combination to a money-predominant one and vice-versa involves different rates of substitution and therefore opportunity costs, according to the position along the curve.[126]

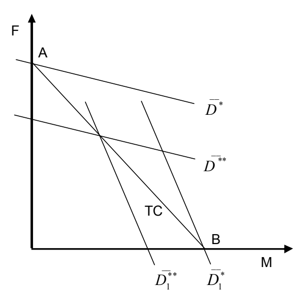
Despite the simplifications provided by the linear function and the higher sensitivity shown by the Cobb-Douglas curve, the Leontieff function seems to better reflect current practice in the provision of food and money combination packages, with the ratio tending to be fixed over time within each intervention among some reference values usually expressed in terms of shares of the assumed total transfer value (e.g. 80%-20% or 70/-30%, etc). In fact, first of all, despite the high interest developed in the recent

[126] The upward concavity means that moving downwards along the curve allows the ratio to shift from a condition which is initially favourable to money (i.e. ceteris paribus it is necessary to give out more units of food against money) to the opposite one.

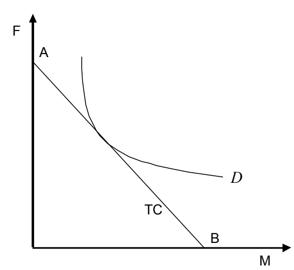
years in the increasing substitution of food in favour of money, the share of the latter remains on average modest and therefore it very rarely happens to span along the full range of possible combinations. But, in particular, the limited number of combinations among the range of possibilities that are actually implemented highlights some rigidities dictated by implementation constraints.

Figure 8.1 Isocosts and isoquants

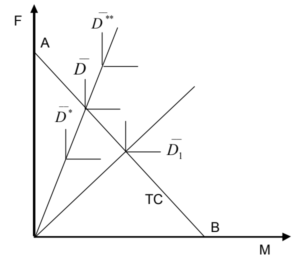
Straight line



Cobb-Douglas



Leontieff



Along the points highlighted above it is probably impossible to find any functional form that is more appropriate in absolute terms to represent the donation function, because it will depend on such key determinants as the donor's preference, beneficiaries' preference, contextual factors of destination such as market functioning, institutional set-up, implementation bottlenecks, etc, the costs involved in the package, and so on.

In this case the relationship is assumed to be linear, which means imposing the simplifying assumption that the market substitution rate between the two transfer systems is constant and equal to $P = c_f / c_m$. In terms of isoquant-isocost analysis this can be thought of as the Marginal Rate of Substitution given by the market.

The above is supported by the consideration that since $TC = c_f * F + c_m * M$ is fixed, the optimal market decision involves the differentiation of this expression:

$dTC = c_f * dF + c_m * dM$ which, under the imposition of $dTC = 0$, leads to:

$$\frac{dM}{dF} = -\frac{c_f}{c_m} \tag{8.5}$$

From a donor's perspective the main transfer strategy decision is related to selecting the best combination of food and money to be donated. In broad terms this is expected to reflect the preferences of each donor behind the donation, be they countries, agencies or interest groups. In this case, considering the donation package given by (8.1), if the target pursued is to provide a fixed package D = $\bar{D}$ (isoquant) the optimal decision involves the maximization of the donation function subject to the cost constraint. Thus:

$$\frac{\partial g}{\partial F} * dF + \frac{\partial g}{\partial M} * dM = 0 \tag{8.6}$$

and hence:

$$\frac{dM}{dF} = -\frac{\left(\frac{\partial g}{\partial F}\right)}{\left(\frac{\partial g}{\partial M}\right)} \tag{8.7}$$

where:

$\frac{\partial g}{\partial F}$ may be considered in light of the efficiency of the transfer, as well as of a certain selfish attitude of the donor. The latter may be justified by donor interest in stabilizing an eventual surplus on the domestic market (reflected in low domestic prices), or in response to an eventual unfavourable imbalance on the international market. The aim of maximizing the transfer efficiency reflects the utility of the beneficiary, taking into account the local market price of the commodity in the donation package.

dF corresponds to the marginal change in the quantity of food measured in kilocalories.

$\frac{\partial g}{\partial M}$ may be seen in light of the beneficiary's interests and consequently is associated with a higher efficiency of the transfer. In economic terms, the use of cash allows avoidance of unnecessary losses in the eventual resale of food commodities. From a nutritional perspective, the contribution of cash transfers towards a higher diet diversification is regularly highlighted. Furthermore, it is appreciated that such a form of transfer is more respectful of the recipient's dignity.

dM corresponds to the marginal change in the amount of money measured in kilocalories.

Despite the various factors that may affect the donor's choice of the combination of cash and food, for the purposes of this study our analysis is limited to an economic perspective. It is assumed here that this perspective is mainly aimed at the maximization of the transfer efficiency under the constraint of a higher or lower predisposition towards a cash-based or commodity-based approach. In this case, if we assume that the total amount of the donation is given, the donor tries to maximize the amount of the transfer D – as shown in equation (8.1) – subject to a cost constraint shown in equation (8.2).

Summing up, the allocation of D is based on the ratio shown in equation (8.7) and the relative market prices given in equation (8.5).

However, no criterion is set as a general rule in this regard, with contrasting opinions expressed by different donors and the international community in general. Our opinion is that this combination is to be defined on a case-by-case basis according to the market prices prevailing in the area of destination of the transfer as well as on the degree of market functioning in the same area. In particular, the higher the local market prices, the lower the effective value of a cash transfer (either in terms of size of transfer to each recipient or in terms of number of recipients, or *ceteris paribus* in terms of the duration of the intervention). Conversely, in the case of high local market prices a commodity-based transfer would both leave the transfer unaffected in physical and nutritional terms and increase the money that a recipient could receive through eventual monetization of part of the transfer. The opposite would hold in case of low food prices on the local market.

The relevance of market functioning concerns the very nature of cash as a tool for exchange. The degree of market functioning reflects the supply capacity to respond to the increase in demand generated through the cash transfer. In a functioning market, a lower degree of price increase is to be expected, if any at all. But the opposite is expected to be the case when dealing with a malfunctioning market. In these conditions a cash injection is expected to generate an increase in the price of the food, which in turn will alter the relative price between food and other goods.

Having said the above, in our model the donor's optimal choice is obtained by equalizing equations (8.5) and (8.7):

$$\frac{dM}{dF} = \left(-\frac{\frac{\partial g}{\partial F}}{\frac{\partial g}{\partial M}} = -\frac{c_f}{c_m} \right) \tag{8.8}$$

which in turn means that the optimal decision is given by:

$$\frac{\left(\frac{\partial g}{\partial F}\right)}{c_f} = \frac{\left(\frac{\partial g}{\partial M}\right)}{c_m} \tag{8.9}$$

Equation (8.9) sets the condition that determines the optimal donation package for the donor. It is given by the equalization between a) the efficiency of the last US dollar contributed to the donation package in the form of food and b) the efficiency of the last US dollar contributed to the package in the form of money.

8.2.2 What would happen if the donor's preference is different from the donation package defined by the relative price of food and money?

With reference to the straight line donation curve presented in Figure 8.1, the donor's preference affects the slope of the line: a higher slope reflects a preference for a higher share of the donation package to be covered by food – as it is the case with $\overline{D}^{**}$ – and the opposite otherwise, as with $\overline{D}_1^{**}$. In the two cases considered the optimization of the aid package would be achieved in the two corner solutions obtained by contributing the entire package in the form of food (i.e. corner solution achieved through $\overline{D}^{*}$ in A) or in the form of cash (i.e. corner solution achieved through $\overline{D}_1^{*}$ in B). These corner solutions correspond to the following conditions:

a) Corner solution with food:

$$\frac{\left(\frac{\partial g}{\partial F}\right)}{\left(\frac{\partial g}{\partial M}\right)} < \frac{c_f}{c_m} \tag{8.10}$$

b) Corner solution with money:

$$\frac{\left(\frac{\partial g}{\partial F}\right)}{\left(\frac{\partial g}{\partial M}\right)} > \frac{c_f}{c_m} \tag{8.11}$$

8.2.3 An enlarged perspective

A more elaborated version of (8.3) and (8.4) is given by (8.12) and (8.13) which try to take into account some forms of unintended uses of the transfer.

$$c_f^* = \alpha^* \left(P_g / P_l\right) + \beta^* c_t + \chi^* c_{man} + \delta^* c_{oth} + \varepsilon\, SF_{res} * P_l \tag{8.12}$$

with $0 < \alpha^*, \beta^*, \chi^*, \delta^*, \varepsilon < 1$ and $\alpha^* + \beta^* + \chi^* + \delta^* + \varepsilon = 1$

$$c_m^* = \alpha'^* M * (1+r) + \chi'^* c_{man} + \delta'^* c_{oth} + \gamma (1-\vartheta)\, SM_f * \left(P_g / P_l\right) \tag{8.13}$$

with $0 < \alpha'^*, \chi'^*, \delta'^*, \gamma < 1$ and $\alpha'^* + \chi'^* + \delta'^* + \gamma = 1$

where:

SF_{res}	is an estimate of the share of food commodities received that are eventually resold by the beneficiary;
P_l	is an estimate of the price at which food commodities are eventually resold. In this case, for simplicity the resale price is assumed to be equal to the local price of food;
SM_f	is an estimate of the share of the cash transfer used by the beneficiary to purchase food. Therefore the quantity $(1-\vartheta)$ measures the share of money transfer eventually used by the beneficiary for non-food related purposes.

Expressed in such a formulation, the role of relative prices is critical in defining the optimum composition of the donation package. *Ceteris paribus*, a change in P_g and/or P_l due to exogenous factors would determine a shift in the isocost.

8.2.4 What would happen if the relative price of food changes for exogenous reasons?

Let us assume that the donor has different preferences about the composition of the package. In this case it is better to use the Cobb-Douglas curve.

First of all, shortened c_f^* and c_m^* can be reduced as follows:

$$c_f^* = \alpha^* \left(P_g / P_l\right) + \overline{\Theta} + \varepsilon\, SF_{res} * P_l \tag{8.14}$$

$$c_m^* = \overline{\Phi} + \gamma\left(1-\vartheta\right) SM_f * \left(P_g / P_l\right) \tag{8.15}$$

where $\overline{\Theta}$ and $\overline{\Phi}$ are fixed:

$$\overline{\Theta} = \beta^* c_t + \chi^* c_{man} + \delta^* c_{oth} \tag{8.16}$$

$$\overline{\Phi} = \alpha^{'*} M * \left(1+r\right) + \chi^{'*} c_{man} + \delta^{'*} c_{oth} \tag{8.17}$$

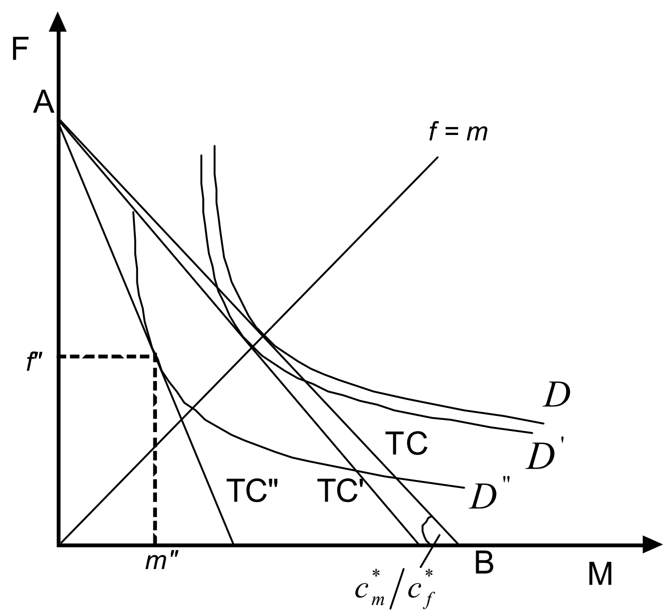
As a simplification, let us make the assumption that the beneficiary can spend the money transfer only on the purchase of food – which means imposing the condition: $SM_f = 0$ in equation (8.13) – so that any variation of the international price just affects the unit cost of food c_f^*. Along the same lines we make also the assumption that no resale of food commodities received occurs, which means assuming that $SF_{res} = 0$. In these conditions:

$$\frac{c_f^*}{c_m^*} = \frac{\alpha^* \left(P_g / P_l\right) + \overline{\Theta}}{\overline{\Phi}} = \frac{\alpha^* \left(P_g / P_l\right)}{\overline{\Phi}} + \frac{\overline{\Theta}}{\overline{\Phi}} = \overline{\kappa} * \frac{P_g}{P_l} + \overline{\overline{\kappa}} \tag{8.18}$$

where $\overline{\kappa}$ and $\overline{\overline{\kappa}}$ are constant.

As the relative price P_g/P_l decreases, the cost of food c_f^* will decrease. In turn, this means that the donor will face a different cost constraint and hence his preference may change, which will affect the optimum combination of food and money in the donation package.

Figure 8.2 Changes in relative prices determine changes in relative costs



Source: Author

As c_f^* depends on $\bar{\kappa} * (P_g/P_l)$, the final impact on the combination of the donation package is related to the value of $\bar{\kappa}$. As $\bar{\kappa}$ moves between zero and one, the closer its value to zero, the lower the impact of a change in the relative price, and the opposite otherwise.

This is shown in Figure 8.2 where the shift in the relative prices determines an increase in the relative cost, which is reflected in a shift in the isocost: a decrease in the relative price of food – determined either by a decrease in P_g or by an increase in P_l – will determine a shift in the isocost. The isocost will move towards the origin pivoting on A.

The size of the shift is determined by $\bar{\kappa}$: values of $\bar{\kappa}$ close to zero will determine small shifts, while values of $\bar{\kappa}$ close to one will determine large shifts.

Each shift in the isocost will determine a change in the point of tangency between the isocost and the isoquant; this will modify the optimum composition of the donation package. This can be clearly visualized by considering eventual shifts of the isocost line from an optimum combination equally formed by money and food, which corresponds to a point of tangency positioned along the 45 degree line. A small shift of TC, as from TC to TC', will only marginally affect the composition of the package, determining a slight increase in the share of the transfer covered by food and decreasing the share of money accordingly. Conversely, a larger shift, as from TC to TC", will be reflected in a wider gap between the point of tangency and the diagonal, determining an optimum combination package formed by a higher share of food (*f"*) and a lower share of money (*m"*).

8.2.5 Relaxing the assumptions

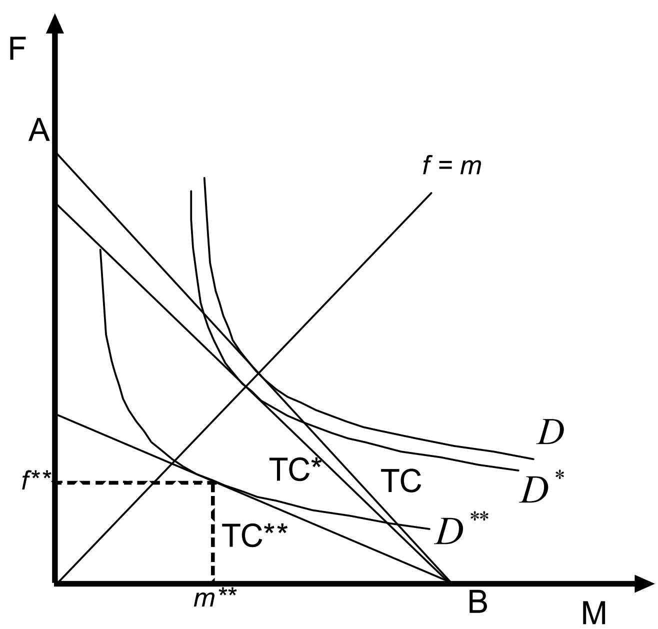
At this stage let us reconsider one of the assumptions made above. In particular we are going to focus on the assumption that all food received through the donation package is consumed by the beneficiary.[127] This assumption is quite unlikely.

The assumption that the totality of the food commodities received is consumed by the beneficiary has allowed consideration of these commodities only for their nutritional value and not for their economic value. This theoretical limitation can be overcome by allowing that all possible combinations which include some quantity of food can involve a certain rate of monetization (i.e. partial resale of the food received).

[127] Another major assumption made above imposes the condition that the recipient spends all money received through the donation package on food. This assumption involves the analysis of the beneficiary's utility and goes beyond the perspective adopted throughout the present study, which focuses instead on the efficiency of the provision of aid. For this purpose the assumption made above is maintained, or at the maximum can be partially relaxed by imposing the condition that all money received that is not spent on food is used by the recipient for other purposes which have the same cost-efficiency of kilocalories as would have been otherwise achieved through the consumption of the same quantity of food.

Under the assumption that this would happen at the local market price P_l, TC would shift, pivoting on B in response to a change in the ratio P_g / P_l and consequent change in the slope of the isocost. If $P_l > P_g$ the ratio P_g / P_l will decrease and TC will shift downwards. Conversely, if $P_l < P_g$ the ratio will increase and the isocost will shift upwards. The size of the shift would depend on the share of food commodity received which is resold: the higher the share, the higher the size of the shift.

Figure 8.3 Accounting for any eventual monetization of food aid



Source: Author

The case in which $P_l > P_g$ is shown in Figure 8.3. The initial optimum combination is identified by the point of tangency between the donation curve D and the isocost TC which happens to fall on the point of tangency along the 45 degree line where *m* = *f*. Starting from this initial optimum combination, a small share of monetization will lead to a shift from TC to TC*. In this new condition the point of tangency between TC* and the donation curve D* will generate a minor change in the composition of the optimum package. Conversely, a larger share of monetization will cause the isocost to move from

TC to TC**. In this case the point of tangency between the donation curve D** and TC** is farther from the 45 degree line, and this corresponds to a wider gap between food and cash with an increase in the share of cash in the composition of the optimum donation package.

8.2.6 Relative advantage

Based on the above, some areas of relative advantage have been identified. These areas are identified by a series of factors considered above: donor preferences, relative price of food on the global and local market, size of eventual resale of food. The first factor determines the shape of the isoquant, while the others determine the position and movements of the isocost.

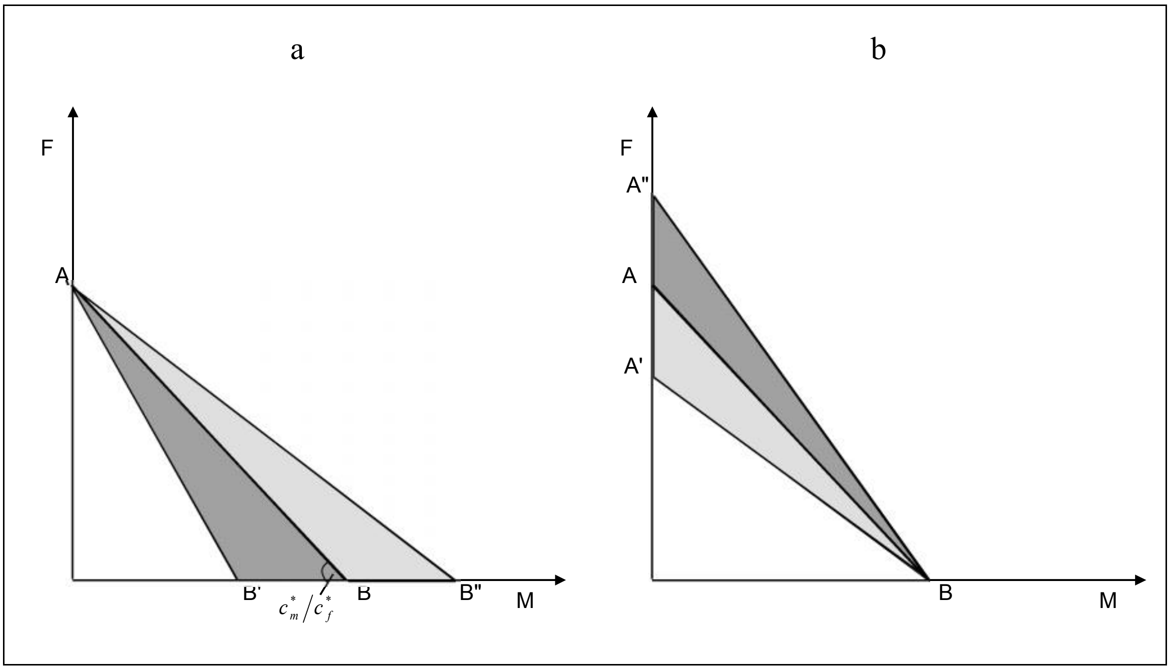
As summarized in Figure 8.4, the area of relative advantage of different strategies is identified by the movements of the isocost. It depends on a) whether the shift of the isocost happens by pivoting on its point of intersection with either of the two axes, and b) the direction of the shift.

When TC happens to pivot on its point of intersection with the food axis, as in Figure 8.4a, a shift of the isocost to the right makes any combination which involves a certain component of cash transfer less efficient. In particular, the higher the relevance of the cash transfer and the reduction in the relative price P_g / P_l, the less efficient the donation package. The opposite is the case if the isocost shifts leftwards. In this case, as said above, while a reduction of P_l does not affect directly the cost-efficiency of a commodity-based (i.e. mainly providing food through the donation package) programme, it makes it less efficient in comparative terms by increasing the transfer value of a cash-based transfer. In other words, while in the former case we have identified a relative loss for a cash approach – and, consequently, this is of relative advantage for a food approach – in the latter we have identified a relative advantage for a cash approach and consequently, this is a relative loss for a food approach.

The inverse results to be the case when TC pivots on the intersection with the money axis, as in Figure 8.4b.

In Figure 8.4 light-shaded areas identify areas of relative advantage of food, dark-shaded areas otherwise.

Figure 8.4 Areas of relative advantage



Source: Author

While the movements of the isocost allow identification of the areas of relative advantage of different strategies, the estimation of the differential cost associated with each strategy requires the definition of the isoquant. This is reflected in a shift of the point of tangency between the isoquant and the isocost. As a consequence of this shift, the differential cost is measured by the transposition of the points of tangency onto the relevant axis: the M axis in Figure 8.4a and the F axis in Figure 8.4b.

As indicated above, the shape of the isoquant reflects the donor's *a priori* attitude towards the composition of the donation package in terms of higher preference for either food or money. Therefore, the higher the donor's preference for money (food), the closer will be the point of tangency to the M (F) axis.

In Figure 8.4a the estimate of the loss or advantage in case of a package composed entirely by money is given by BB' or BB" respectively. In this case the size of advantage or loss is determined solely by the change in the ratio c_m^* / c_f^* and ultimately in the ratio P_g / P_l. In view of the linear structure of the isocost, the size of the loss or advantage will decline linearly as the point of tangency moves along the isocost. Therefore the size of advantage or loss can be estimated as a function of the price ratio and of the composition of the donation package.

The same reasoning can be followed in Figure 8.4b with the due changes.

8.3 Possible applications

The estimation of relative advantage which can be eventually associated with different strategies, as well as the simulation of possible scenarios, can provide major support in different phases of an intervention. In fact, its role can be critical at the planning stage when considering alternative intervention strategies. In the same way it can also be quite helpful in a monitoring phase when reviewing the performance of an intervention and projecting it into the future through the simulation of future conditions associated with either expected or hypothetical events.

More generally, the process described above is useful for fine-tuning intervention strategy in time and space. In the first case, the change over time in the price ratio, determined by changes of either P_g and/or P_l, can help to adjust the composition of the donation package accordingly.[128] In the latter case, when used in a time-invariant

[128] In this case prices are the only exogenous factor allowed to change over time. In other words, the analysis maintains a comparative statics perspective. The different dynamic implications of the two types of strategies are ignored here because their discussion goes beyond the purpose of this study.

fashion it can help to provide a snapshot of the different values of the price ratio in different contexts, be they countries or parts of the same country. When the comparative analysis is conducted from this static perspective, changes in P_g become irrelevant and the focus of the analysis centres on the eventual spatial differences in the relative value of P_l.

While the information presented so far is mainly focused on a cost-efficiency perspective, it may be of help to also consider the selection of intervention strategy in a wider perspective which goes beyond a project dimension and is able to take into account not only direct and positive effects, but also indirect and negative ones. The problem usually encountered with this approach is the lack of homogeneity of the issues at stake. Unfortunately, even in this case the quantification of the relative advantage of one strategy against the others does not help to answer recurrent questions, such as the estimation of the value added in terms of total effectiveness expected from an intervention which can be associated with a marginal increase of its unit cost. What is feasible instead, though less robust, is an ordinal approach which allows estimation of the cost associated with strategies that, on the basis of a pre-set list of principles, can be given an ordinal value. In other words, as long as we are able to identify the priority of one strategy over another we should be able to estimate, *ceteris paribus*, the differential cost associated with the selection of the one considered most effective.

To make a simple case, let us consider the task of deciding between a cash-based and a commodity-based strategy for a relatively small intervention in a remote area chronically affected by food shortage and dependent on imports of food commodities. Assume that a preliminary assessment has indicated that local market functioning is rather mixed and that a cash-based strategy is feasible. The consideration the decision maker is confronted with is that while commodity-based assistance is vital to maintaining the commodity flow, a cash-based strategy would not only provide the same inflow of food commodities but would also be beneficial in stimulating the local economy and helping to overcome the current situation of isolation. In this case, the main objective of the strategy remains the nutritional and livelihood support to be achieved through the improvement of food availability and food access. However, the two strategies considered here (on the assumption of total reliance on either one of the two inputs) are quite different, first and foremost because of the different concerns about possible side-effects, which may be relevant to a perspective of longer duration than the intervention under discussion. This wider perspective taken by the decision maker allows consideration to be given to aspects which would be normally neglected, as they are deemed secondary to the purposes of the specific initiative. Through a simulation exercise we could try to get a reasonable grasp of the possible impact in terms of the identified side-effect, and this could eventually allow the decision maker to evaluate such an impact and include this value in the analysis of cost-efficiency. Having said that, even without making this effort, the cost-efficiency analysis will help to give a shadow value to the side-effect under discussion, in our case estimated as the difference between the unit costs of the two strategies considered. This estimate is a measure of the additional costs that need to be faced in order to achieve the side- or secondary effect identified in addition to the main aim of the intervention. In other words, such an analysis will tell us how much the unit cost of the less expensive option needs to be increased by in order to achieve, *ceteris paribus*, the additional result proposed as a side-effect. With specific reference to the case mentioned earlier, this analysis should help to estimate the increment in unit cost required to make the intervention favourable to the local economy, in addition to it being capable of properly pursuing its main objective.

A possible application of the process presented above is in helping to adjust strategies to the specific conditions of implementation by fine-tuning the combination of available options according to variables such as space and time. The former would mean that the strategy is diversified geographically according to localized characteristics such as market strength and livelihood, and the latter would involve the adjustment of strategies over time to take into account seasonal variation of relevant factors. This would allow enlargement of the scale and time frame of the analysis by drawing as many isoquants as the number of areas and periods for which estimates of both relevant project costs and contextual relevant data are available. By comparing the specific isoquant with the relevant isocost it is possible to estimate a monetary value of the comparative advantage of each option within a set of strategies for each area and period.

In more general terms, the process presented above can be expanded and inverted in order to compare the differences in cost-efficiency between a series of alternative strategies assumed – or adapted – to have similar level of effectiveness.

The following section provides a simple application of the analytical process presented above, using project data from Kenya.

8.4 The case of Turkana: cost-efficiency of cash-based and food-based strategies

Chapter 4 highlighted the critical role played by trade within the food economy of Turkana and consequently as a major determinant of food supply and nutritional status. The complexities of the Turkana case, its chronic dimension and particularly its strong dependence on food imports from neighbouring areas make it an ideal case to underline the need to adapt development policies as well as short-term strategies in a way to provide due attention to trade issues.

The comparative analysis conducted in chapter 4 about the implementation of food aid and cash-based programmes in Turkana considered the relative performance of both strategies. Relevant indicators were considered such as the share of food requirements covered through food assistance and traders' and beneficiaries' preferences for the various strategies. However, no attention was paid to a basic efficiency analysis which can provide some valuable insights into and critical support for decision making.

The role of food aid comes at a remarkable cost. For an estimate of the cost of food aid distributed in Turkana, we can refer to the overall budget of the emergency operation (EMOP) implemented by WFP in Kenya in response to the drought. The operation was started in August 2004 for an initial period of six months and has gone through a series of budget revisions which have both modified the budget and the duration of the intervention. The latest budget revision considered for the present analysis was approved in February 2006, extending the intervention till the end of June 2007 and increasing the budget from 128.93 million USD to 354.32 million USD. Table 8.1 provides a summary of the unit cost estimated on the basis of the official budget for the intervention and of the various revisions undergone up to June 2007.

Table 8.1 Estimated unit cost of food aid delivered through EMOP 10374.0

	USD / 1000 Kcal	USD / MT
Initial Budget	0.129	426
Budget Revision n.1 (combined to previous budget)	0.134	442
Budget Revision n.3 (combined to previous budget)	0.139	458
Budget Revision n.4 (combined to previous budget)	0.140	463
Budget Revision n.6 (combined to previous budget)	0.152	500
Budget Revision n.6 (on its own)	0.158	522
Budget Revision n.6 (on its own) - EMOP	*0.106*	*350*
Budget Revision n.6 (on its own) - Turkana	*0.128*	*424*

Source: Author's elaboration of EMOP data

It is interesting to note how the average total cost of the intervention has consistently risen over its period of implementation, from 426 USD per MT in terms of cereal equivalent to 500 USD. In particular, limiting the estimation to the latest budget revision, the unit cost rises to 522 USD per MT of cereal equivalent. Both estimates (500 and 522 USD per MT) refer to the same budget revision, considered either as an average for the tonnage of the entire EMOP, or as an average for the tonnage of the sixth budget revision (which on its own represents almost two thirds of the cumulative budget).

However, if we want to establish an estimate limited to the case of Turkana, we can expect this to be higher than the average, mainly in view of the longer distance from major logistic centres. At this point an arbitrary approximation is made and, following discussions with WFP, it seems reasonable to consider the average transport-related costs (identified by the acronym LTSH in WFP jargon)[129] for Turkana as around 25% higher than the average for the rest of the areas covered by the EMOP.[130] On this basis, and with reference to an average unit cost estimated at 511 USD per MT of cereal equivalent, the average estimate in the case of food aid delivered in Turkana would be *ceteris paribus* around 556 USD per MT.

It is necessary to recognize how the unit cost just estimated is based on an *ex-ante* budget rather than on a review of tonnage actually delivered and costs actually incurred. Unfortunately, a review of costs actually incurred is not available, either in the case of the EMOP or in particular in the case of the share of food aid distributed in Turkana. Despite the higher-than-average LTSH rate which can be reasonably assumed in the case of Turkana, there are a few considerations that could help in approximating the unit cost estimate to its real value. A major adjustment is feasible in the estimate of the LTSH rate applied in the budget. As is normal practice, this rate is fixed around its maximum value in order to ensure the feasibility of the operations. Following discussions with WFP it seems possible to reduce the average LTSH for the EMOP to 70-75 USD per MT without undermining its operational feasibility.[131] On the basis of this consideration, taking 75 USD per MT as a shadow rate for the EMOP LTSH, the value of this rate in the case of food aid delivered in Turkana would be 100 USD per MT. On the basis of these shadow values of the LTSH rate the unit cost is re-estimated at around 350 USD per MT and 424 USD per MT respectively as the EMOP average and as the average for the Turkana share of the EMOP. These are presented in Table 8.1 in italics.[132]

[129] The acronym LTSH stands for Land Transport Storage and Handling and reflects the unit cost estimated for the movement of one MT of commodity.

[130] Source: Informal discussion between the author and the logistics unit of WFP Kenya country office.

[131] Ibidem

[132] Some additional reduction of the unit cost could be envisaged with reference to the procurement cost of the commodities; however such approximation has not been taken into account in this case. In particular, the possibility of purchasing a part of the commodities required in Kenya, in case of favourable overall production and supply, should help to reduce some costs initially budgeted for such as

At this stage, in order to get a complete view of the process, it is appropriate to include in the estimate the distribution cost incurred by WFP collaborating partner and not included in the EMOP budget. In the case of Turkana the non-refundable cost incurred by WFP collaborating partner, OXFAM, has been estimated at around six USD per MT. This leads to an estimated average unit cost of 430 USD per MT.[133]

Finally, in order to gain a full comparative perspective between the food aid and CFW interventions implemented in Turkana, a unit cost for the cash-based programme is estimated. As in the case of the food aid programme considered above, reference is made to *ex-ante* budget data. In particular, the relevant unit costs have been estimated from the six-month budget. In this case, attention has been paid to the transfer value of the intervention and particularly to the nutritional equivalent value of the cash transfer. Therefore the cost of the CFW material input has not been included in the analysis.[134, 135]

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international transport and associated costs as well as various components of the LTSH rate, besides providing a favourable contribution to the Kenyan economy.

[133] This is a minimum estimation of non-refundable costs strictly linked to a larger unit cost (estimated in this case to be around 31 USD / MT) which is included in the EMOP budget and is to be refunded by WFP to its collaborating partners on the basis of MTs distributed. Bearing in mind that the number of MTs distributed by the partner depends on the WFP pipeline, which can be affected by various problems including funding and operational delays (procurement of commodities, international and local transport, etc), it is possible to understand how, in normal circumstances, the non-refundable costs incurred by the WFP partner are expected to increase in view of the fixed costs, which are obviously not related to the tonnage finally distributed.

[134] The inclusion of the CFW component would have involved a much deeper analysis which is not necessary to the central aim of this study.

[135] For reasons of homogeneity all the costs in Table 8.2 are expressed as unit costs and include the value of the transfer. In other words, as the estimate of 659 USD includes the cost of the food commodities, the estimate of 1.77 USD includes the value of one USD to be transferred.

Table 8.2 Unit cost of transfer through CFW and EMOP

CFW		E MOP	
	Ex-ante		
Cost to transfer:	USD	Cost to transfer:	USD
1 USD	*1.766*	*1 USD*	-
1000 Kcal	*0.188*	*1000 Kcal*	*0.128*
1 MT cereal equivalent	*659*	*1 MT cereal equivalent*	*424*
	Ex-post adjusted to scale of intervention		
Cost to transfer:	USD	Cost to transfer:	USD
1 USD	*1.327*	*1 USD*	-
1000 Kcal	*0.142*	*1000 Kcal*	*0.128*
1 MT cereal equivalent	*496*	*1 MT cereal equivalent*	*454*
	Ex-post adjusted to scale of intervention and national average prices		
Cost to transfer:	USD	Cost to transfer:	USD
1 USD	*1.327*	*1 USD*	-
1000 Kcal	*0.094*	*1000 Kcal*	*0.128*
1 MT cereal equivalent	*330*	*1 MT cereal equivalent*	*454*

Source: Author's elaboration of EMOP and CFW data

The upper part of Table 8.2 provides an opportunity to compare the average costs estimated for the two strategies. Surprisingly, it seems to be more expensive to deliver and distribute cash than the equivalent in terms of food: 659 versus 430 USD per MT of cereal equivalent. A few clarifications are required:

- In both cases the unit cost has been estimated on *ex-ante* budgets rather than on expenses actually incurred;
- The scale of the intervention can be expected to affect the unit cost;
- The transfer value, for the conversion of cash into food, is based on local market price, expected to be higher than national average.

To address the first two points raised, the analysis has been repeated, refocusing on the timeframe and the scale of the intervention. In particular, it has been repeated on the costs incurred by OXFAM in a previous phase of both interventions (CFW and GFD).

This gives us the chance to deal with *ex-post* data, which are sufficiently comparable in terms of the scale of the intervention. It is necessary to specify that in this case costs included in the analysis purely reflect the costs supported by OXFAM through the two interventions: distribution of food aid as WFP's collaborating partner and distribution of cash.[136, 137] As shown in the central part of Table 8.2, the comparison now gives us a different picture: the cost to transfer cash has decreased, while the cost to transfer food has increased, drastically reducing the gap between the two estimates. This is essentially linked to the cost structure of the two interventions, with the EMOP having a higher share of fixed costs, and is therefore more sensitive to discrepancies between planned and actual tonnage delivered.[138]

Finally, as mentioned above, a major determinant of the transfer value is given by the prices of food on the local market because such market prices determine the amount of food that can be purchased with the cash transferred. Clearly, the higher the price of the food on the local market, the lower the effective value of the cash transfer. As shown earlier in Figure 4.8, prices prevailing on the Turkana markets are almost double the national average. These high prices prevailing on the local market drastically reduce the cost-efficiency of cash transfers. In order to get a clearer idea of the imbalance caused by the level of prices prevailing on local markets, the unit costs have been re-estimated on the basis of national average market prices. This provides us with a simulation of incurred project costs on the theoretical assumption that market prices prevailing on the

[136] The two interventions under discussion in this case have been implemented by OXFAM respectively during the periods May – November 2005 (CFW) and October 2004 – August 2005 (implementation of WFP EMOP).

[137] Once again, the budget analysis of the cash-related intervention does not include the cost of material inputs in order to focus on the component of cash transfer. In addition, the usual 7% share for indirect administrative costs, previously included, has been deducted from the budget of the cash-related intervention in order to make the budget of the two interventions as much as possible homogeneous reflecting the actual costs at local project implementation level.

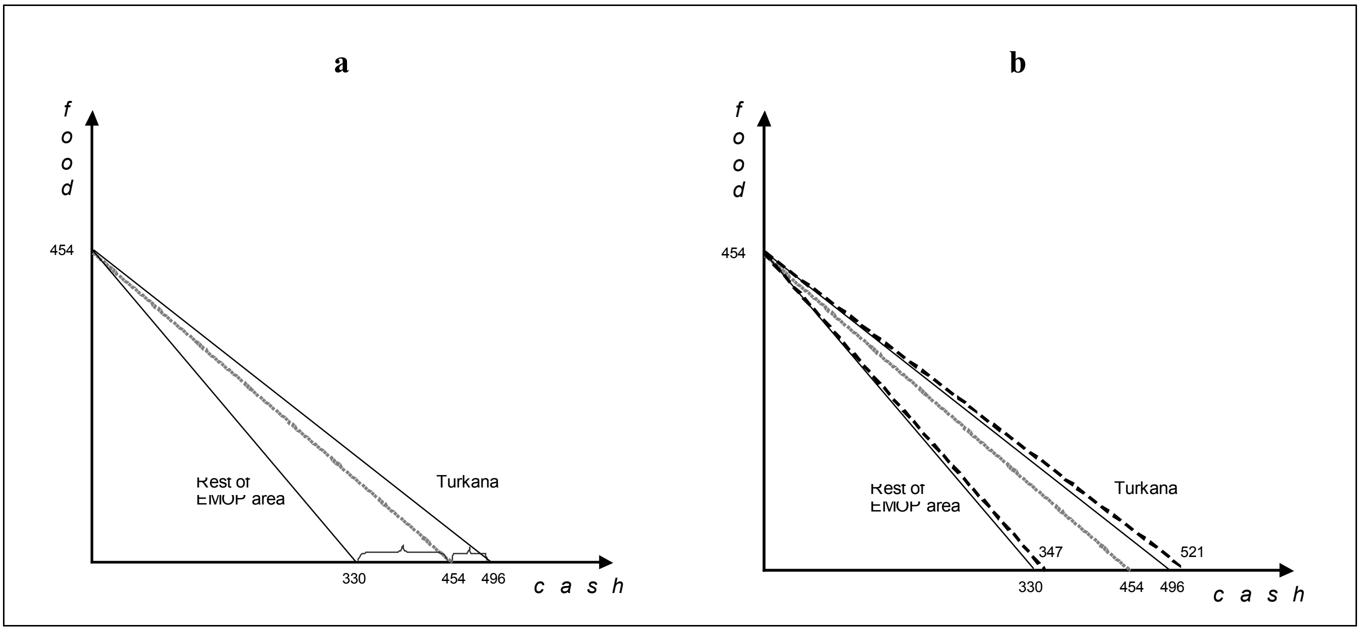
[138] The discrepancy between planned and actually delivered quantity of food is a regular feature of food aid programs and can vary widely. In the specific case considered here – WFP EMOP implemented in Turkana through OXFAM – the rate delivered–versus–planned is around 42% in terms of MTs and 44% in terms of nutritional value transferred.

Turkana markets are in line with the national average ones. The new estimates, reported in the lower part of Table 8.2, show how in this case the unit cost of CFW is reduced by almost a third, evidencing its much higher cost-efficiency. This consideration offers a clear reminder of the relevance of contextual factors, such as local price levels in particular, on the cost-efficiency of intervention strategies and, therefore, on their relevance for decision making.

A graphic visualization of the unit costs estimated in Table 8.2 can assist in comparing intervention strategies: in Figure 8.3 any input combination above or on the right side of the isocost is in favour of a commodity-based strategy, while the opposite applies below or on the left side of the isocost line. In Figure 8.3.a an amount of 42 USD per MT (i.e. 496 USD per MT – 454 USD per MT) can be estimated as the savings deriving from choosing to implement a 100% commodity-based strategy rather than a 100% cash-based strategy in Turkana. When shifting to a combined input approach such a saving is expected to continuously fall towards zero at any increase of the cash component. In the same way, when considering the non-Turkana part of the operation the unit cost estimated for a cash-based strategy is mainly on the left side of the isocost, in the area that in Figure 8.2 was defined as the area of cash comparative advantage. In this case the maximum average loss associated with the choice of a commodity-based strategy proves to be quite high: 124 USD per MT (i.e. 454 USD per MT – 330 USD per MT). Under a combined strategy, this loss continuously falls towards zero at any increase of the cash component.[139]

[139] If relevant data are available for various locations, using the same process it is possible to estimate the isoquant associated with the various geographical components of the current EMOP as well as the difference between the appropriate unit cost and the isocost. By comparing the localized isoquant against the isocost it is possible to estimate for each area a monetary value of the comparative advantage of a different set of strategies. In the absence of relevant data at local level, it seems reasonable to expect that for areas reasonably well integrated with the national market the unit cost associated with a 100% cash-strategy is closer to the lower end of the range identified (i.e. 330 USD per MT rather than 454 USD per MT). The opposite would apply for areas less integrated.

Figure 8.5 Comparative analysis of preferential advantage of cash-based versus commodity-based strategies



Source: Author's estimates

In Figure 8.3.a the isoquant connecting the possible strategy options for non-Turkana is based on the assumption that the scale of the intervention implemented in Turkana is replicated in other parts of the country, the only difference being local market prices, which affect the transfer value. This assumption is rather theoretical since it does not take into account factors such as the economies of scale or price-related side-effects of the intervention, particularly relevant when dealing with large size interventions. Under the strong assumption that a commodity-based strategy affects downwards prices in the beneficiary areas and the opposite happens following a cash-based strategy, it is possible to consider a wide range of effects that can be expected from a full set of possible intervention options. The dataset on which the analysis is based does not consider how the substitution effect would influence prices in the rest of the country, but we can refer to the estimate conducted in chapter 4 about the inflationary effect of a switch from a commodity-based to a cash-based approach in Turkana. Through the analysis of supply capacity expandability and traders' willingness to scale-up business, it has been estimated that around a 5% price increase would be required to cover, through market channels, the gap eventually determined by the end of the food aid programme in the district. This price increase is remarkable considering that local market prices are already much higher than the national average. As a result of such a price increase the isoquant for Turkana would shift rightwards along the *x* axis and downwards along the *y* axis. The new values for the unit cost in the rest of the country have been estimated under the reasonable assumption that the rate of price increase induced by a complete substitution of food aid with cash would generate a price increase not higher than that expected in the case of Turkana. Therefore, taking a pessimistic view, the new unit costs have been estimated assuming the same rate of price rise as simulated for Turkana. This assumption is rather in favour of a commodity-based perspective. Figure 8.3.b presents the new estimates and the adjustment in the isoquant analysis. The unit cost of the commodity-based strategy would be affected by the price rise only with regard to the share of food aid monetized by the beneficiaries. Assuming an average rate of monetization of around 25%, the isocost should shift slightly downwards; however this shift is minimal and the effect on the unit cost can be ignored (i.e. the effective unit cost of a 100% commodity-based strategy is reduced from 454.280 USD per MT to 454.279 USD per MT).

The overall adjustment of unit cost estimates determined by a change in market prices shows, as expected, an improvement in favour of a commodity-based approach. The difference between the old and the new area of each input advantage appears to be modest. In Turkana the gap associated with a 100% cash-based strategy increases from 42 USD per MT (i.e. 496 USD per MT – 454 USD per MT) to 67 USD per MT (i.e. 521 USD per MT – 454 USD per MT). This improvement does not affect the strong relative advantage of a cash-based approach in food aid intervention areas outside Turkana. In such a case the gap associated with a 100% cash-based strategy decreases from 124 USD per MT (i.e. 454 USD per MT – 330 USD per MT) to 107 USD per MT (i.e. 454 USD per MT – 347 USD per MT). As mentioned above, it is reasonable to expect that within the ranges identified for the areas of relative advantage of each strategy there may be remarkable differences in unit costs, determined by various factors which are ultimately reflected in market prices, with the areas characterized by lower market prices closer to the isoquant, reflecting the lower estimate of unit costs.

At this stage, after defining and adjusting the isoquant and estimating the unit costs associated with different strategies, it is possible to include in the analysis the side-effects that the decision maker considers worth taking into account in selecting a strategy. In a case such as that of Turkana, characterized by a rudimentary economy and a certain degree of isolation from the rest of the country, it is relevant to consider any stimulus to the local economic growth a high priority. Therefore the selection among feasible intervention strategies should prefer any option that offers the opportunity to generate this stimulus either directly or, *ceteris paribus*, indirectly.

It is difficult to see food aid as a strategy to promote the local economy; on the contrary, it is expected to have a discouraging effect on local supply and, in general, on local initiative, and Turkana is no exception. However, the local market capacity seems to give contradictory signs: despite the profitability of trade, a large share of both actual and potential demand remains uncovered. This condition would fall into the I quadrant of Figure 3.1 in which a strategy based on a combination of commodity and cash may prove most effective. In other words, while a strategy totally reliant on commodities is not seen as favourable to stimulate the local economy, a certain cash component is seen as an appropriate way to contribute to achieving the main objective of improving household food security whilst helping to counterbalance the unfavourable effect of a commodity-based strategy on the local economy. While the framework proposed is unable to give a value to the side-effect of supporting the local economy through the cash injection, it is possible to estimate the changes in the costs of the intervention under preparation. Table 8.3 summarizes the unit costs for a few critical combinations of input shares. The estimation of unit costs and their differentials here is based on the assumption of their linear distribution; this allows for an easy interpolation to estimate an expanded matrix based on both input shares and price increases, which are not considered in Table 8.3.

Table 8.3 Unit cost of various combinations of cash- and commodity-based strategies

	program share (%)		local price increase 0%		local price increase 5%	
			unit cost (USD / MT)		unit cost (USD / MT)	
	food	cash	avg	increment to zero-cash	avg	increment to zero-cash
Turkana	100	0	454	0	454	0
	75	25	465	11	471	17
	50	50	475	21	488	34
	25	75	486	32	504	50
	0	100	496	42	521	67
Rest of country programme	100	0	454	0	454	0
	75	25	423	-31	427	-27
	50	50	392	-62	401	-54
	25	75	361	-93	374	-80
	0	100	330	-124	347	-107

Source: Author’s estimates

Table 8.3 provides a summary view of the changes in unit costs associated with different input combination strategies. The approach is quite versatile, since it allows the optimization of strategy choice at geographical level. In fact, by replicating the project structure applied to Turkana in other areas and adjusting it to local market prices, it is possible to estimate additional local isoquant functions that help to estimate the relevant unit costs as done above. In the case of Turkana, as previously mentioned, a balanced approach appears preferable as it combines external support to local supply through food aid with a cash component to increase purchasing power and consequently stimulate local business. A combination based on equal shares of cash and commodity raises the unit cost by 21 USD per MT (i.e. 475 USD per MT – 454 USD per MT), corresponding to around a 4.6% increase. This amount rises to 34 USD per MT (corresponding to a 7.4% increase) in the case of a 5% price rise on the local market. These can be seen as the shadow values, or shadow unit costs, that can be attributed to the secondary objective of developing the local economy through an intervention whose primary aim is to increase household food security and nutrition.

While a balanced approach is preferable for Turkana, the results of the analysis show that for the rest of the country currently covered by the food aid intervention a commodity-based approach is neither the most appropriate nor the most efficient approach. Apart from a few cases characterized by limited market functioning, the average degree of market integration is acceptable. This supports a cash-based strategy. In addition, local market prices are much lower and more stable than in Turkana, which helps to improve the cost-efficiency of the intervention and to maintain the economic value of the cash transfer. In line with this position, Table 8.3 shows also that a commodity-based strategy is inefficient. On average the unit cost associated with a 100% cash-based strategy is 27.3% lower than that associated with a 100% commodity-based strategy. This means that converting most of the programme from a commodity-based to a cash-based approach would not only be beneficial to the local economy, but would be able as well to generate some remarkable savings. In this case, the unit cost would be reduced from 454 USD per MT to 330 USD per MT. Even when taking into account a 5% market price rise eventually induced by the cash injection, the savings would remain remarkable: 107 USD per MT.

8.5 Conclusions

The present chapter has considered the appropriateness and cost-efficiency of intervention strategies responding to instances of food insecurity. The relevance of contextual factors, particularly local market prices, in affecting the choice between cash-based and commodity-based strategies has been examined.[140] It has been considered that even if the aim of the programme is a simple nutrition transfer, the

[140] On more general grounds, other contextual factors, such as physical security, market stability, and others, are critical issues to be taken into account when comparing response options. They have not been included in the present analysis, which mainly focuses on the relevance of local prices for the cost-efficiency of interventions.

context in which the initiative is to be implemented can make a difference. The use of the isocost and isoquant functions has been presented as a way to strengthen the comparative analysis of feasible options. It has been shown that this analytical setup allows for definition of the conditions of comparative advantage for each strategy and shows how these conditions vary according to some contextual variables. The estimation of comparative advantage associated with different strategies and the simulation of possible scenarios can provide major support for both planning and monitoring. While the analytical approach proposed mainly reflects a cost-efficiency perspective, how it can be adapted to incorporate an effectiveness perspective has also been examined. Since estimation of the value added in terms of total effectiveness associated with a marginal increase in unit cost of the intervention is not feasible, the proposed approach allows estimation, *ceteris paribus*, of the differential cost associated with the strategy which is considered, *a priori*, more effective than the other considered. In this case, the choice of the strategy is based on a wider perspective in which the aim of the intervention remains the same but the analysis manages to take into account relevant by-products in either a positive or a negative way.

An application of the proposed comparative approach has been presented, focusing on the choice between a commodity-based and a cash-based intervention strategy in Turkana, a Kenyan district chronically prone to food insecurity and totally dependent on food trade. The way the gap between food requirements and supply in the district is reflected in high prices has been considered. The role played by local market prices in affecting the cost-efficiency of cash-based interventions and therefore their critical role in the selection of intervention strategy has been discussed. While a cash-based approach appears much more efficient than a commodity-based one on the basis of average national prices, this is no longer the case in Turkana, where the high prices drastically reduce the transfer value of cash interventions.

Furthermore, the presence of high prices needs to be taken into account when considering the appropriateness of a cash-based strategy, in view of its likely inflationary consequences. At the same time, the option of reliance on food aid may have disincentive effects which may discourage economic growth in the district in the long run.[141]

A simulation of the cost-efficiency of both types of intervention has revealed the preference for a commodity-based strategy. However, in view of the small margin detected in favour of food aid, and in view of its mid- and long-term drawbacks, the feasibility of a cash-based approach has been considered. A balanced approach appears to be preferable, as it combines external support for local food supply with an increase in local purchasing capacity. However, the shift from a fully commodity-based strategy to a mixed one based on equal shares of food and cash is expected to raise the unit cost by between 4.5% and 7.5% depending on the associated price increase on the local market. The results of the analysis for the rest of the country are straightforward, showing that a commodity-based strategy is neither the most appropriate nor the most efficient approach. The unit cost of a cash-based intervention is expected to be around 107-124 USD per MT lower than that of food aid. Therefore converting intervention strategy for most of the programme is expected to contribute to producing major project savings and to benefit the local economic system.

[141] Harvey *et al*. (2005) make the case that relief should not be unnecessarily criticized for failing to enable recovery or development. This is even after taking into account the potential negative effects of aid and the possible disincentive effects of relief. The matter is that humanitarian aid may be a wholly inappropriate instrument for that purpose. As Harvey *et al*. put it, the problem lies not with relief and its failings but with the lack of other forms of international engagement with crises.

9

Concluding remarks

9.1 Relevance and challenges of market analysis

Markets are a key element of people's livelihoods in all contexts, both in normal conditions and in the immediate aftermath of a disaster, as far as conditions allow market forces to work. Such a recognition is valid both in the short-term as well in the long-term. In recent years a series of events has contributed to raising the relevance of market analysis as part of food security analysis and planning. Concerns about achieving the relevant MDGs have increased with the growing complexity of food security issue both at global and local level, as dramatically reflected in the global food and financial crisis in 2008 and 2009. At the same time, the likely consequences of the ongoing process of global warming do not help to brighten the prospects for agricultural production in some of the most depressed parts of the world. Following on the above, a combination of factors has contributed to strengthening efforts already ongoing towards the design and delivery of more effective and efficient assistance. In particular, the progressive acceptance of cash-based instruments and, more in general, a strategic shift from food aid to food assistance has increased the importance of the use of market analysis both strategically and at all phases of the project cycle.

From an economic perspective, the success and overall preference for a cash- or commodity-based intervention strategy is strictly linked to the possible economic reaction that can be expected from local markets, which varies according to context. Thus, focused analysis is necessary. In line with theoretical approaches such as those proposed by Coate and Sen, decision making need to be based on the proper analysis of availability (i.e. supply), access (i.e. demand), and the interaction between the two as reflected in the degree of market functioning. Any attempt to sideline any of these three points will end up reflecting a more or less limited perspective.

Having said the above, the long-awaited strategic shift has highlighted new needs, mainly expressed in terms of analytical skills and discerning capacity required to optimize response option analysis and strategic decision making. As in other fields, market-based measures depend on the availability and accessibility of quality information for effective results. For this reason databases and information systems are regularly updated, adjusted and enlarged to provide a more detailed knowledge base for analysis. But that is not enough: data and information systems are not valuable unless actually utilized, and utilized in a proper manner. This leads to another problem: the scarcity of available skills to make proper use of available information or to generate useful information. This is a general problem: in many situations there are more data than capacity to make proper use of them.

Such a shortage can become a critical constraint in the initial stages of an emergency response when there is an urgent need to mobilize resources and tackle the difficult question of selecting alternative response options. There are few approaches to market analysis that can effectively provide support in this effort; they have been considered in the initial part of this study. They differ in the tools and techniques adopted, some being more data hungry than others. In general this is also reflected in a trade-off between analytical rigour and availability of resources, mainly in terms of the time and skills required to carry out the analysis. In some cases the complexity of the analysis can be justified by the major political and economic implications of alternative available options or simply by budgetary constraints. However, in other contexts, such as when decisions must be made about life-saving interventions, the urgency of the response may justify a less rigorous approach. For this, tools and techniques have been developed that trade off part of the rigour and significance of the analysis in exchange for rapidity of the findings and recommendations. Such Rapid Assessment Techniques (RATs) as the Household Economy Approach (HEA) and the more recently developed Emergency

Market Mapping and Analysis (EMMA) can provide invaluable information and support for rapid response interventions. In some cases, such as in conflict situations, these may be the only feasible approaches.[142] However, while the implementation of RATs is rapid and flexible they have limitations where assessing the possible risks associated to a cash-based strategy is concerned.

9.2 Main findings of this study

The general consideration proposed throughout this study is that preference for a cash-based rather than a commodity-based strategy is essentially based on a double condition:

- a certain degree of market functioning;
- a certain level of price increase to be expected from the cash-based intervention.

These two conditions are strictly linked by an inverse relationship: the lower the functionality of a market, the higher the inflationary risk to be expected from a cash-based strategy. A certain level of inflation is acceptable and may be even favourable for the development of the local economy. However, inflation can easily get into a vicious cycle and then out of control. Regular adjustment of the amount of the transfer is normally suggested as a preventive measure to keep pace with the rate of inflation.

Such a system is not always advisable, however. First of all, it penalizes the non-recipients and therefore the risk of adverse side-effects is higher the smaller the coverage of the programme compared to the total affected population. Second, even ignoring the previous remark, such a measure is acceptable only in the short run and in response to low rates of inflation, because otherwise it would end up fuelling the spiralling process of price increases. Ideally such a risk should be assessed at an initial stage with a certain degree of confidence, but normally this task is beyond the capacity of RATs and furthermore, would contradict the reasons in support of a quick decision

[142] It is worth mentioning that in such humanitarian interventions as Operation Lifeline Sudan (OLS) HEA has for years played an excellent role in support of not only the massive food aid intervention but also of other sectoral strategies.

making process mentioned above. Very likely the best option lies in a combined approach: a RAT assessment conducted in the immediate aftermath of a crisis followed within a couple of months – the time required to mobilize adequate capacity – by a more in-depth analysis. Such a combined approach should be able to support both main perspectives: the RAT assessment would support decisions required for an initial response, while a more in-depth analysis would provide the wider picture from which to mobilize a longer and more substantial and articulated response strategy. Hopefully this type of combined but sequenced assessment and analytical approach could assist all stakeholders in optimizing their role in the strategy. In particular, it should be able to contribute to optimizing the effectiveness and efficiency of interventions.

One of the central issues that come out of the present study is the critical relevance of context in determining the appropriateness of different feasible strategies. In other words the feasibility of a strategy does not necessarily mean that it is appropriate, or if it is, that it is the most appropriate strategy for the specific case. It has been considered how even within the same country, or local area, some determinant factors may favour a diversified strategy. This does not mean that the optimum strategy can be totally adapted to the characteristics of the context; this would be either impossible or an inefficient option from the point of view not only of the donors but also of the implementing and associated stakeholders. It means rather that such differences are influent in determining the wider impact of the strategy and therefore cannot be generalized. Through a major simplification it is possible to say that the characteristics of potential recipient communities and relevant traders, as well as of the wider context in which both groups live and operate, are essentially the main determinants of the success or failure of any local-level strategy. When considering the analysis from a market point of view, whatever the proposed intervention strategy, these determinants translate into market demand, supply and prices; therefore such determinants, including the contextual variables, are precisely the aspects upon which the analysis needs to focus.

This study has proposed and applied a few tools for assessing the feasibility of cash transfers. This has been done by testing the functionality of the market and simulating demand and supply, that is, the likely response of possible recipients and traders to an eventual cash-based intervention. Particular attention has been paid to the simulation of supply response, motivated by the consideration that when demand is artificially increased through cash transfers, much of the final outcome is determined by the capacity to scale up local supply. This is particularly relevant both in deficit areas, which normally rely on imports, and in areas where the majority of households are self-sufficient and consequently there is very little engagement with the market. The profiling exercise of traders conducted through the case studies has provided interesting behavioural information. In particular, the relevance of price increases as a trigger of traders' decision to scale up their business size, named in this study as *willingness to trade* (WTT) has been investigated. The fact that different price rises generate a range of different responses from different typologies of traders in different contexts has highlighted the need to define response capacity at the local level. From this contextualized perspective, the comparison between increased demand and supply has been used to estimate the price increase that can be expected from a certain injection of cash through transfers to a set number of beneficiaries. The three case studies have illustrated the application of the methodology proposed in different contexts. In more general terms, the combination of different case studies has allowed the generation of a simulation model which, on the basis of key contextual factors, can help to provide an estimate of the rate of inflation that can be reasonably expected. The use of such a model should contribute to improving the picture provided by RATs and is therefore expected to offer more solid grounds for decision making. Moreover, such a model should be of general use and therefore reasonably easy and fast in its application, even at the early stages of response planning. Having said that, it is recognized that the three case studies have provided only a limited basis for the generalization of the model, and its replication through a larger set of case studies could strengthen its power and increase its usability.

The final chapter focuses on the use of market prices as discriminatory factors in the comparative efficiency of different strategies and combinations of strategies. Simplified versions of isocosts and isoquants have been used as simple tools to define the conditions of relative advantage of different strategies and to capture the effect of some contextual variables on such conditions. This type of approach can be useful when trying to optimize response strategy through its geographical diversification. While this analytical approach mainly reflects a static cost-efficiency perspective, it can be sharpened through the partial inclusion of an effectiveness perspective. This does not entail the inclusion of a full cost-benefit or cost-effectiveness analysis, but rather the estimation and comparison of differential costs associated with improvements in the overall effectiveness of the strategy.

9.3 Final considerations

The discussion about the opportunities and constraints of cash transfers is a recurrent subject in the field of assistance in general and food assistance in particular. The current wave of interest in cash transfers in the humanitarian sector, reflecting the increasing recognition of social protection policies, seems to have achieved enough support to generate some initial changes in the design and administration of food assistance. Time will tell whether such changes will become more structural and contribute to making assistance more effective and efficient. It is very likely that, as in other sectors, part of the future success of this increasingly popular form of assistance will depend on efforts done to improve its design and implementation.

Providing cash transfers means much more than just transferring cash. It is worth remembering that together with the many good aspects of cash-based strategy, such as greater dignity for the recipient and support for local economy, such a strategy also involves a few more risks. This is particularly evident in light of the ongoing process of globalization and consequent exposure of middle- and low-income countries to the increasing fluctuations of the global market. Such fluctuations can pose a serious risk of economic instability, particularly in countries with a fragile economic structure, as experienced during the recent global problems of soaring food prices and financial crises. In such conditions operating through cash-based strategies requires particular care in order to avoid assistance having a distorted and eventually even a counterproductive impact. It is right that *"in a context of high food prices ... the provision of vouchers and cash transfers may be a way ... to mobilize assistance more cost-efficiently when international food prices ... are higher than national and local prices"* (WFP, 2008a), but it must be recognized that such an approach does not necessarily reflect the interests of the recipients. The use of cash-based strategies should be discouraged in conditions of high level or risk of inflation, either at local or global level, because they can be reasonably expected to add to local inflation what can be called “imported inflation”. On more general grounds, the care required when transferring cash also applies in conditions of global and local economic and financial stability. Profit-making is one of the main objectives of business, as confirmed through the case studies by the relevance of eventual price rises as determinants of traders’ decisions. Assuming that, in conditions of food shortage and weak market structure, the increased demand stimulated by cash transfers can induce a gratuitous increase of local food supply is rather naïve, particularly when considering large-scale operations. Hence the need for careful market analysis.

All in all, the message here is that cash transfers are good, and that there is wide scope for their increased use as a major channel for food assistance, provided that this is done with due care and caution. It is sincerely hoped that the tools and analysis developed through this study will contribute to making food assistance work better.

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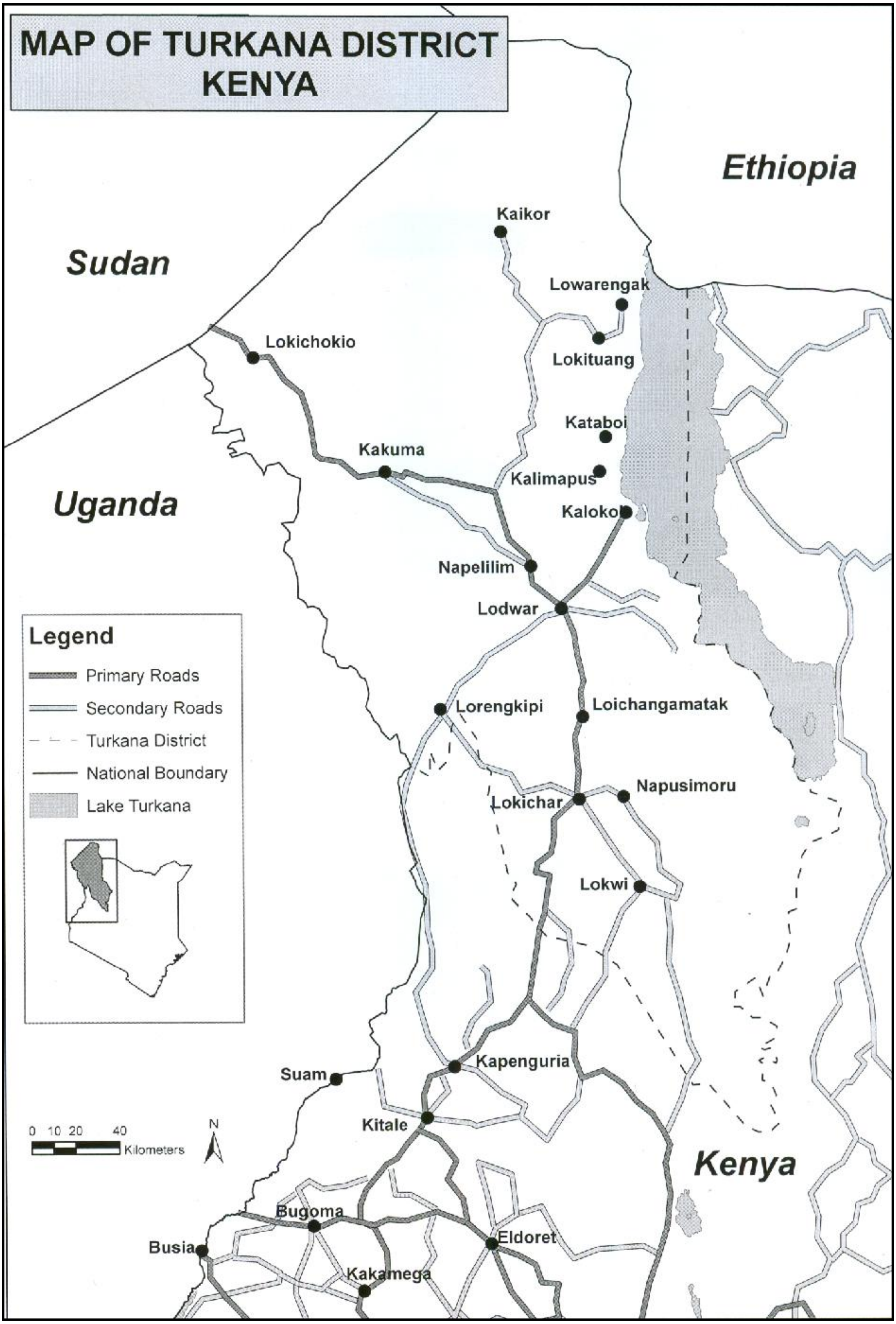
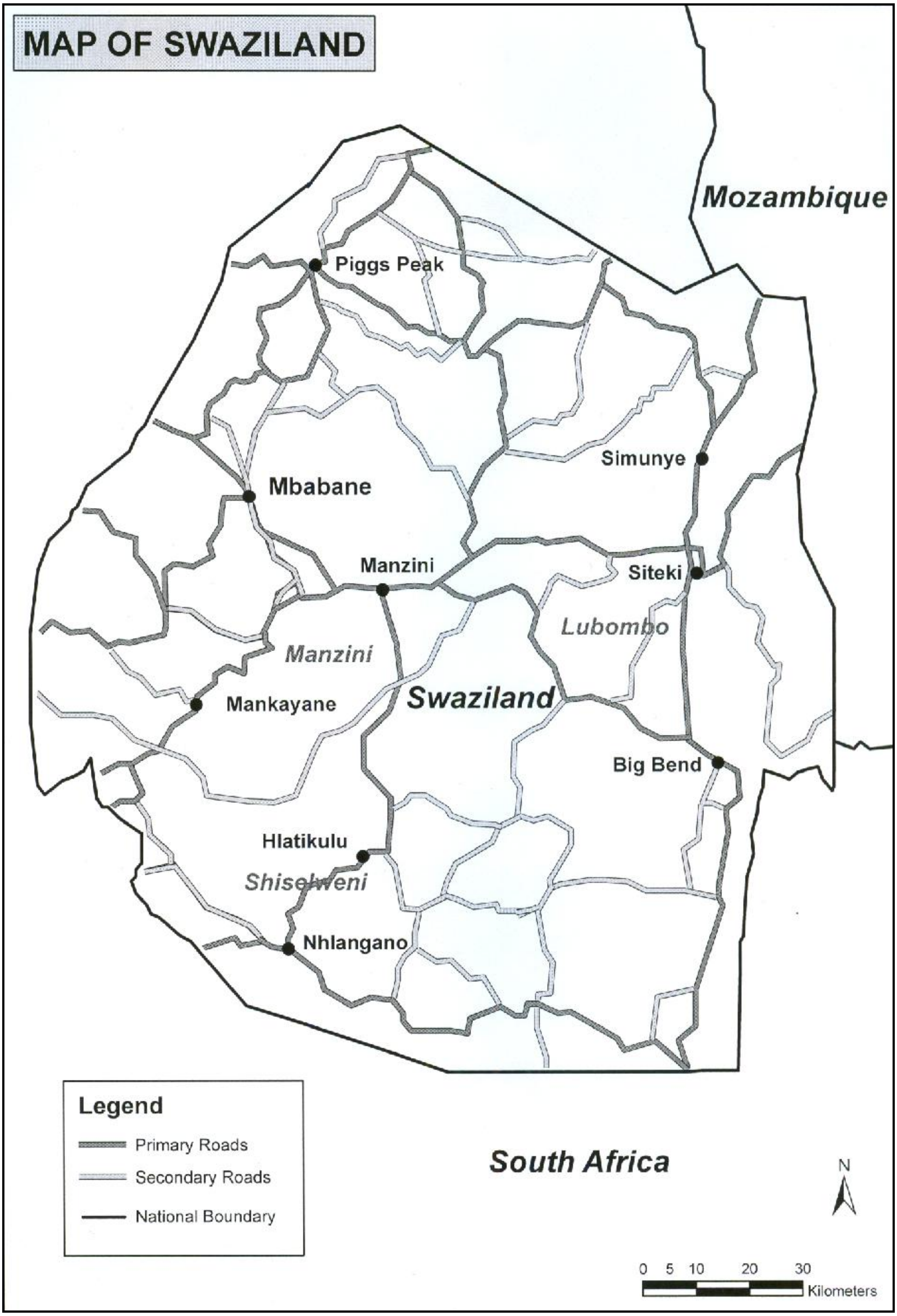
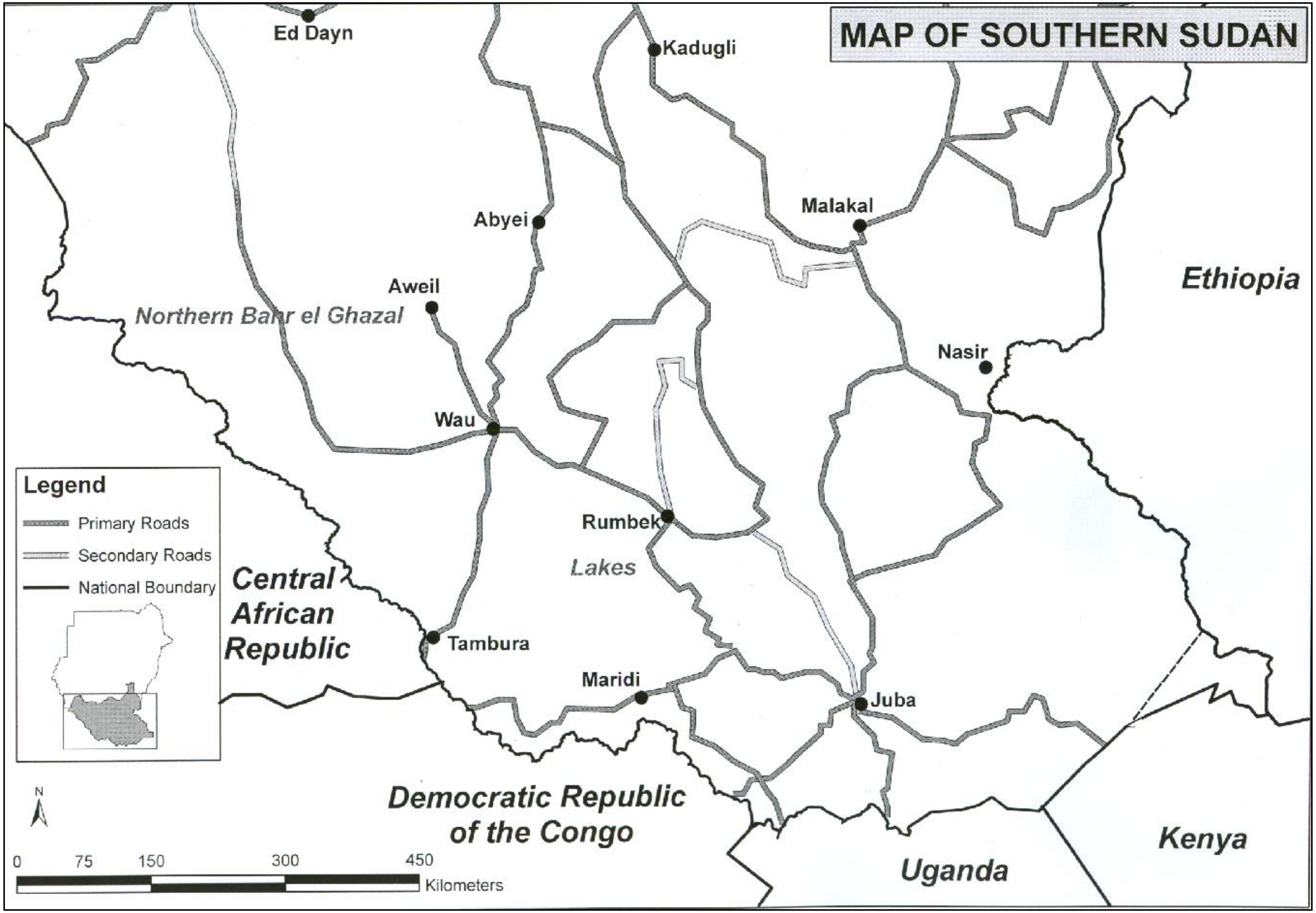
Annexes

Annex 1

Maps


MAP OF TURKANA DISTRICT
KENYA
Ethiopia
Sudan
Uganda
Kenya
Kaikor
Lowarengak
Lokichokio
Lokituang
Kataboi
Kakuma
Kalimapus
Kalokol
Napelilim
Lodwar
Lorengkipi
Loichangamatak
Napusimoru
Lokichar
Lokwi
Kapenguria
Suam
Kitale
Bugoma
Busia
Eldoret
Kakamega
Legend
Primary Roads
Secondary Roads
Turkana District
National Boundary
Lake Turkana
0 10 20 40
Kilometers
N


MAP OF SWAZILAND
Mozambique
Piggs Peak
Simunye
Mbabane
Manzini
Siteki
Lubombo
Manzini
Mankayane
Swaziland
Big Bend
Hlatikulu
Shiselweni
Nhlangano
Legend
Primary Roads
Secondary Roads
National Boundary
South Africa
N
0 5 10 20 30
Kilometers



MAP OF SOUTHERN SUDAN
Ed Dayn
Kadugli
Malakal
Abyei
Aweil
Northern Bahr el Ghazal
Ethiopia
Nasir
Wau
Rumbek
Lakes
Legend
Primary Roads
Secondary Roads
National Boundary
Central African Republic
Tambura
Maridi
Juba
Democratic Republic of the Congo
Uganda
Kenya
N
0 75 150 300 450
Kilometers

Annex 2

Price analysis

Table A1 Range values of 13-month moving coefficient of correlation (average, min, max)*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1 kabulokor																	
2 kalapata	**0.095** *-0.595* *0.980*																
3 kalimapus	**0.323** *-0.377* *0.906*	**-0.037** *-0.560* *0.847*															
4 kerio	**-0.022** *-0.824* *0.904*	**0.156** *-0.643* *0.937*	**-0.072** *-0.672* *0.818*														
5 lokwi	**0.072** *-0.789* *0.999*	**0.398** *-0.338* *0.981*	**0.215** *-0.701* *0.896*	**0.158** *-0.591* *0.941*													
6 lopur	**0.096** *-0.622* *0.999*	**0.413** *-0.201* *0.981*	**0.224** *-0.429* *0.950*	**0.115** *-0.438* *0.846*	**0.331** *-0.731* *1.000*												
7 napeililim	**0.233** *-0.438* *0.999*	**0.268** *-0.707* *0.981*	**-0.043** *-0.897* *0.876*	**0.088** *-0.385* *0.917*	**0.261** *-0.795* *1.000*	**0.388** *-0.080* *1.000*											
8 napusimoru	**0.181** *-0.590* *0.999*	**0.299** *-0.611* *0.981*	**0.319** *-0.286* *0.920*	**-0.005** *-0.574* *0.846*	**0.567** *-0.368* *1.000*	**0.460** *-0.470* *1.000*	**0.326** *-0.718* *1.000*										
9 nairobi	**0.156** *-0.758* *0.871*	**0.151** *-0.869* *0.859*	**0.242** *-0.462* *0.971*	**-0.020** *-0.608* *0.678*	**0.261** *-0.614* *0.917*	**0.075** *-0.613* *0.926*	**0.059** *-0.719* *0.607*	**0.226** *-0.675* *0.795*									
10 mombasa	**0.084** *-0.956* *0.906*	**-0.129** *-0.959* *0.677*	**0.128** *-0.911* *0.876*	**-0.140** *-0.747* *0.725*	**0.057** *-0.904* *0.926*	**-0.099** *-0.916* *0.893*	**-0.180** *-0.904* *0.668*	**0.033** *-0.906* *0.869*	**0.626** *-0.074* *0.965*								
11 eldoret	**0.185** *-0.733* *0.884*	**0.132** *-0.878* *0.765*	**0.222** *-0.673* *0.940*	**0.002** *-0.800* *0.802*	**0.153** *-0.728* *0.900*	**0.104** *-0.760* *0.928*	**0.006** *-0.728* *0.586*	**0.045** *-0.738* *0.718*	**0.644** *0.139* *0.924*	**0.623** *-0.170* *0.912*							
12 kitale	**0.281** *-0.720* *0.739*	**-0.017** *-0.822* *0.945*	**0.225** *-0.713* *0.976*	**-0.119** *-0.630* *0.778*	**0.132** *-0.830* *0.971*	**-0.046** *-0.827* *0.924*	**0.037** *-0.830* *0.826*	**0.084** *-0.830* *1.000*	**0.542** *-0.195* *1.000*	**0.465** *-0.505* *0.867*	**0.724** *-0.108* *0.997*						
13 kisumu	**0.273** *-0.808* *0.874*	**0.016** *-0.947* *0.729*	**0.139** *-0.737* *0.965*	**-0.009** *-0.515* *0.770*	**0.123** *-0.825* *0.879*	**0.060** *-0.817* *0.905*	**0.204** *-0.838* *0.819*	**-0.043** *-0.829* *0.687*	**0.645** *-0.339* *0.967*	**0.622** *-0.442* *0.969*	**0.776** *0.397* *0.920*	**0.714** *-0.326* *0.959*					
14 bugoma	**0.332** *-0.708* *0.899*	**-0.185** *-0.828* *0.918*	**0.167** *-0.732* *0.947*	**-0.223** *-0.633* *0.317*	**-0.057** *-0.948* *0.855*	**-0.228** *-0.749* *0.871*	**0.002** *-0.751* *0.560*	**-0.130** *-0.859* *0.638*	**0.284** *-0.964* *0.947*	**0.431** *-0.994* *0.889*	**0.448** *-0.996* *0.928*	**0.482** *-0.905* *0.911*	**0.675** *-0.340* *0.982*				
15 mbale - K	**0.585** *-0.520* *0.931*	**0.109** *-0.673* *0.833*	**0.293** *-0.874* *0.961*	**-0.104** *-0.924* *0.854*	**0.215** *-0.592* *0.932*	**-0.031** *-0.754* *0.932*	**0.177** *-0.568* *0.932*	**0.118** *-0.751* *0.932*	**0.543** *-0.145* *0.960*	**0.461** *-0.275* *0.867*	**0.727** *-0.669* *0.982*	**0.823** *-0.056* *0.982*	**0.746** *0.039* *0.992*	**0.619** *-1.000* *0.990*			
16 mbale - U	**0.314** *-0.679* *0.857*	**0.009** *-0.936* *0.651*	**0.055** *-0.961* *0.757*	**0.306** *-0.452* *0.965*	**0.003** *-0.890* *0.768*	**-0.013** *-0.800* *0.655*	**0.144** *-0.798* *0.890*	**0.007** *-0.824* *0.710*	**0.474** *-0.702* *0.945*	**0.360** *-0.620* *0.945*	**0.559** *0.159* *0.867*	**0.401** *-0.710* *0.880*	**0.594** *-0.371* *0.952*	**0.472** *-0.810* *0.998*	**0.471** *-1.000* *0.817*		
17 busia - U	**-0.949** *-0.994* *-0.934*	**0.660** *0.401* *0.823*	**0.011** *-0.994* *0.331*	**0.416** *0.305* *0.774*	**0.431** *0.431* *0.431*	**0.612** *0.577* *0.810*	**0.577** *0.459* *0.932*	**…** *…* *…*	**-0.140** *-1.000* *0.097*	**0.201** *-0.633* *0.434*	**0.876** *0.665* *0.919*	**…** *…* *…*	**0.238** *-0.996* *0.496*	**…** *…* *…*	**-0.477** *-0.997* *-0.311*	**0.981** *0.977* *1.000*	

* average in bold

Table A2 ADF unit root test of logged price series - Kenya

	Levels		First differences	
Price series	ADF statistic	Critical value 1%	ADF statistic	Critical value 1%
Kabulokor	-0.610	-2.613	-8.452	-2.613
Kalapata	-0.270	-2.613	-8.910	-2.613
Kalimapus	-0.086	-2.613	-12.396	-2.613
Kerio	-0.143	-2.613	-17.517	-2.613
Lokwii	-0.371	-2.613	-10.495	-2.613
Lopur	-0.332	-2.613	-9.387	-2.613
Napeililim	0.135	-2.613	-12.158	-2.613
Napusimoru	-0.159	-2.613	-8.852	-2.613
Nairobi	-0.472	-2.614	-6.413	-2.614
Mombasa	-0.210	-2.614	-7.454	-2.614
Eldoret	-0.597	-2.614	-5.312	-2.614
Kitale	-0.536	-2.630	-4.801	-2.631
Kisumu	-0.494	-2.614	-6.807	-2.614
Bugoma	-0.146	-2.619	-6.288	-2.620
Mbale K	0.506	-2.630	-6.073	-2.631
Mbale U	-0.433	-2.617	-9.727	-2.614
Busia U	1.565	-2.660	-7.586	-2.659

Table A3 Price transmission in Kenya

i	←	l	θ_2	α_2	α_3	λ	direction of causality	Half life
Kabulokor		Kalimapus	-0.713 ***	0.240 *	-0.206 **	1	↔	0.904
Kabulokor		Lopur	-0.834 ***		-0.165 *	1		0.960
Kabulokor		Busia U	2.271 **			3		
Kabulokor		Napeililim	-0.628 **		-0.171 *	1		1.015
Kabulokor		Napusimoru	-0.744 **		-0.152 *	1	→	0.903
Kalapata		Kabulokor	-0.158 *	0.201 *	-0.388 ***	1	→	0.922
Kalapata		Kalimapus			-0.403 ***	3		1.001
Kalapata		Kerio	-0.485 *		-0.418 ***	2		1.013
Kalapata		Lokwii	-0.563 ***		-0.514 ***	1		0.993
Kalapata		Lopur	-0.502 ***		-0.507 ***	1	←	0.994
Kalapata		Nairobi			-0.388 ***	1		0.985
Kalapata		Napeililim	-0.260 *		-0.419 ***	1		1.105
Kalapata		Napusimoru	-0.513 ***		-0.525 ***	1	←	0.996
Kalapata		Bugoma			-0.444 ***	1		0.975
Kalapata		Busia U				1		
Kalapata		Eldoret			-0.398 ***	3	←	1.033
Kalapata		Kisumu			-0.396 ***	1		0.963
Kalapata		Kitale			-0.445 **	2		0.969
Kalapata		Mbale K			-0.515 ***	1	→	
Kalapata		Mbale U			-0.412 ***	1		1.023
Kalapata		Mombasa			-0.394 ***	1		0.992
Kalimapus		Kabulokor	-0.375 ***	0.294 *	-0.520 ***	1	↔	0.904
Kalimapus		Kalapata			-0.388 ***	3		1.001
Kalimapus		Kerio			-0.386 ***	3		0.980
Kalimapus		Lokwii		0.425 *	-0.389 ***	4	←	0.979
Kalimapus		Lopur	-0.539 **		-0.438 ***	1	→	0.983
Kalimapus		Bugoma	-0.334 *		-0.397 ***	3	←	0.944
Kalimapus		Eldoret	-0.207 *		-0.415 ***	3		1.029
Kalimapus		Kisumu			-0.414 ***	1		0.931
Kalimapus		Kitale			-0.322 *	2	→	0.942
Kalimapus		Mbale U	-0.265 **		-0.455 ***	1		1.017
Kalimapus		Mombasa			-0.408 ***	1	→	0.945
Kalimapus		Nairobi			-0.410 ***	1		0.966
Kalimapus		Napeililim	-0.409 **		-0.441 ***	1		1.017
Kalimapus		Napusimoru	-0.637 ***		-0.465 ***	1	→	1.012
Kerio		Kabulokor			-0.594 ***	2	→	0.962
Kerio		Kalapata	-0.171 *		-0.631 ***	2		1.013
Kerio		Kalimapus			-0.577 ***	3		0.980
Kerio		Lokwii	-0.285 ***		-0.736 ***	2	←	1.017
Kerio		Lopur		0.397 ***	-0.453 ***	3	→	1.028
Kerio		Bugoma			-0.422 ***	1	↔	1.037
Kerio		Eldoret	-0.100 *		-0.637 ***	2		1.094

continued

Table A3 continued

i	←	l	θ_2	α_2	α_3	λ	direction of causality	Half life
Kerio		Kisumu	-0.139 *		-0.631 ***	2	→	0.964
Kerio		Kitale			-0.355 *	2	→	0.964
Kerio		Mbale K			-0.655 ***	2		
Kerio		Mbale U	-0.127 **		-0.648 ***	2		1.069
Kerio		Mombasa	-0.170 **		-0.641 ***	2		0.989
Kerio		Nairobi	-0.179 *		-0.642 ***	2		1.009
Kerio		Napeililim	-0.171 **	0.187 **	-0.588 ***	2		1.068
Kerio		Napusimoru	-0.277 ***		-0.730 ***	2	←	1.006
Lokwii		Kabulokor			-0.313 ***	1	→	0.968
Lokwii		Kalapata	-0.401 ***		-0.394 ***	1		0.993
Lokwii		Kalimapus			-0.293 **	4	→	0.979
Lokwii		Kerio	-0.576 ***		-0.361 ***	2	→	1.017
Lokwii		Lopur	-0.249 *		-0.321 ***	1		1.000
Lokwii		Bugoma			-0.394 **	1		1.006
Lokwii		Eldoret	-0.183 **		-0.356 ***	2	←	1.034
Lokwii		Kisumu	-0.230 **		-0.363 ***	1	←	0.990
Lokwii		Kitale			-0.410 **	2		0.984
Lokwii		Mbale K	-0.235 *		-0.318 **	2	↔	
Lokwii		Mbale U	-0.130 *		-0.294 **	1	←	1.016
Lokwii		Mombasa	-0.266 **		-0.338 ***	1		1.056
Lokwii		Nairobi	-0.375 ***		-0.362 ***	1		1.001
Lokwii		Napeililim			-0.293 **	1	←	1.136
Lokwii		Napusimoru	-0.611 ***	0.407 ***	-0.502 ***	1	→	0.957
Lopur		Eldoret	-0.171 **		-0.307 **	2		1.036
Lopur		Kabulokor	-0.188 ***		-0.329 ***	1		0.960
Lopur		Kalapata	-0.414 ***		-0.332 **	1	→	0.994
Lopur		Kalimapus	-0.232 **		-0.346 ***	1	←	0.983
Lopur		Kerio		0.519 ***	-0.206 **	3	←	1.028
Lopur		Kisumu	-0.236 **		-0.308 **	1		0.982
Lopur		Kitale	-0.154 *			2		1.094
Lopur		Lokwii	-0.288 *		-0.283 **	1		1.000
Lopur		Mbale K	-0.220 *		-0.325 **	1		
Lopur		Mbale U	-0.149 *		-0.312 **	1		1.022
Lopur		Mombasa	-0.233 *		-0.296 **	1		1.032
Lopur		Nairobi	-0.307 **		-0.307 **	1	←	0.998
Lopur		Napeililim	-0.259 **	0.164 *	-0.281 **	1		1.127
Lopur		Napusimoru	-0.371 **	0.396 ***	-0.273 **	1		0.964
Napeililim		Napusimoru	-0.508 ***	0.340 *	-0.490 ***	4	←	1.162
Napeililim		Bugoma			-0.442 ***	1	→	1.035
Napeililim		Eldoret			-0.481 ***	2	→	1.167
Napeililim		Kabulokor	-0.212 **		-0.501 ***	1		1.015
Napeililim		Kalapata	-0.321 *		-0.462 ***	1		1.105

continued

Table A3 continued

i ← l		θ_2	α_2	α_3	λ	direction of causality	Half life
Napeililim	Kalimapus	-0.263 **		-0.479 ***	1		1.017
Napeililim	Kerio	-0.599 **	0.487 **	-0.421 ***	2		1.068
Napeililim	Kisumu		0.618 **	-0.440 ***	2	→	1.006
Napeililim	Kitale			-0.418 **	4	→	0.911
Napeililim	Lokwii			-0.416 ***	1	→	1.136
Napeililim	Lopur	-0.388 **	0.359 *	-0.436 ***	1		1.127
Napeililim	Mbale K			-0.844 ***	1		
Napeililim	Mbale U	-0.190 **		-0.646 ***	1		1.146
Napeililim	Mombasa			-0.477 ***	1	→	0.991
Napeililim	Nairobi			-0.473 ***	1		1.071
Napusimoru	Bugoma			-0.381 **	1	←	0.969
Napusimoru	Eldoret	-0.160 *		-0.259 **	2		0.999
Napusimoru	Kabulokor	-0.180 **		-0.302 ***	1	←	0.903
Napusimoru	Kalapata	-0.453 ***		-0.285 **	1	→	0.996
Napusimoru	Kalimapus	-0.292 ***		-0.319 ***	1	←	1.012
Napusimoru	Kerio	-0.694 ***		-0.277 **	2	→	1.006
Napusimoru	Kisumu	-0.188 *		-0.268 **	1	←	0.899
Napusimoru	Kitale			-0.335 **	2		0.907
Napusimoru	Lokwii	-0.757 ***	0.458 ***	-0.391 ***	1	←	0.957
Napusimoru	Lopur	-0.396 **	0.362 ***	-0.239 **	1		0.964
Napusimoru	Mbale K	-0.290 **		-0.363 **	1	←	
Napusimoru	Mbale U	-0.168 *		-0.341 ***	1		0.996
Napusimoru	Mombasa	-0.254 *		-0.259 **	1		0.967
Napusimoru	Nairobi	-0.300 **		-0.251 **	1	←	0.930
Napusimoru	Napeililim	-0.363 ***	0.154 *	-0.273 **	4	→	1.162
Nairobi	Eldoret	-0.504 ***	0.229 ***	-0.306 ***	3	←	1.105
Nairobi	Kisumu	-0.702 ***	0.312 ***	-0.511 ***	4	↔	0.977
Nairobi	Mbale K	-0.606 ***	0.281 ***	-0.311 ***	1	←	
Nairobi	Mbale U	-0.419 ***	0.114 *	-0.242 ***	1	←	1.043
Nairobi	Mombasa	-0.811 ***	0.401 ***	-0.351 **	2	→	1.106
Mombasa	Bugoma	-0.545 ***	0.150 *	-0.178 *	1	→	1.000
Mombasa	Eldoret		0.248 ***	-0.262 **	2	←	1.371
Mombasa	Kisumu		0.379 ***	-0.392 ***	1	↔	1.027
Mombasa	Mbale K		0.196 *	-0.313 **	1	←	
Mombasa	Mbale U			-0.221 ***	1	←	1.106
Mombasa	Nairobi		0.450 ***	-0.390 ***	2	←	1.106
Eldoret	Bugoma	-0.897 ***			2	↔	1.056
Eldoret	Kisumu	-1.236 ***	0.517 ***	-0.487 ***	2	↔	1.102
Eldoret	Mbale K	-1.258 ***	0.779 ***	-0.459 **	1		
Eldoret	Mbale U	-0.790 ***		-0.283 ***	2	↔	1.000
Eldoret	Mombasa	-1.369 ***	0.731 ***		2	→	1.371

continued

Table A3 continued

i ←	l	θ_2	α_2	α_3	λ	direction of causality	Half life
Eldoret	Nairobi	-1.577 ***	0.839 ***	-0.205 *	3	→	1.105
Kitale	Bugoma	-0.617 ***		-0.266 *	2	←	1.003
Kitale	Eldoret	-0.681 ***	0.856 ***	-0.316 **	2	←	1.011
Kitale	Kisumu	-0.935 ***	0.936 ***	-0.321 **	2	←	1.028
Kitale	Mbale U	-0.598 ***		-0.432 ***	2	←	1.052
Kisumu	Bugoma	-0.722 ***	0.267 ***		2	↔	0.995
Kisumu	Eldoret	-0.699 ***	0.364 ***	-0.416 ***	2	↔	1.102
Kisumu	Mbale K	-0.906 ***	0.538 ***	-0.656 ***	2	↔	
Kisumu	Mbale U	-0.612 ***	0.127 *	-0.341 ***	2	↔	1.049
Kisumu	Mombasa	-1.080 ***	0.680 ***	-0.303 **	1	↔	1.027
Kisumu	Nairobi	-1.242 ***	0.750 ***	-0.386 **	4	↔	0.977
Bugoma	Eldoret	-0.536		-0.167 *	2	↔	1.056
Bugoma	Kisumu	-0.918 ***	0.902 ***	-0.388 **	2	↔	0.995
Bugoma	Kitale	-0.562 ***		-0.287 *	2	→	1.003
Bugoma	Mbale U	-0.554 ***		-0.351 ***	1	←	1.001
Bugoma	Mbale K	-1.160 ***	1.359 ***	-0.883 ***	2	↔	
Bugoma	Mombasa	-1.038 ***	0.802 **	-0.343 **	1	←	1.000
Bugoma	Nairobi	-1.028 ***		-0.285 **	1	→	0.999
Mbale K	Kalimapus	-0.689 ***		-0.186 *	1	→	
Mbale K	Lokwii	-0.575 *			2	↔	
Mbale K	Bugoma	-0.801 ***	0.437 ***	-0.794 ***	2	↔	
Mbale K	Eldoret	-0.717 ***	0.567 ***	-0.617 ***	1		
Mbale K	Kisumu	-0.981 ***	0.555 ***	-0.815 ***	2	↔	
Mbale K	Mbale U	-0.719 ***		-0.362 ***	1		
Mbale K	Mombasa	-1.007 ***	0.562 *	-0.359 **	1	→	
Mbale K	Nairobi	-1.262 ***	1.148 ***	-0.342 **	1	→	
Mbale K	Napeililim			-0.153 *	1		
Mbale K	Napusimoru	-0.599 **			1	→	
Mbale U	Busia U	-0.860 ***	0.792 *		1		
Mbale U	Eldoret	-0.811 ***	0.447 *	-0.275 *	2	↔	1.000
Mbale U	Kalimapus	-0.641 **			1		1.017
Mbale U	Kisumu	-1.124 ***	0.756 **	-0.328 *	2	↔	1.049
Mbale U	Kitale	-0.761 ***			2	→	1.052
Mbale U	Mombasa	-1.117 ***			1	→	1.106
Mbale U	Nairobi	-1.429 ***	1.018 **	-0.256 *	1	→	1.043
Busia U	Kabulokor	0.389 **			3		
Busia U	Kerio				1		
Busia U	Eldoret	-1.543 *			0		
Busia U	Napeililim				0		

significance: *** = 0.001, ** = 0.005, * = 0.01

Table A4 ADF unit root test of logged price series - Swaziland

	Levels		First differences	
Price series	ADF statistic	Critical value 1%	ADF statistic	Critical value 1%
Mbabane	-1.052	-2.652	-4.761	-2.654
Hlathikhulu	-1.210	-2.596	-11.019	-2.596
Manzini	-1.145	-2.595	-10.875	-2.595
Siteki	-1.126	-2.595	-8.274	-2.595
Big bend	-0.806	-2.595	-10.354	-2.595
Symunie	-0.934	-2.595	-11.232	-2.595
Piggs peak	-1.186	-2.595	-10.601	-2.595
Nhlangano	-1.062	-2.595	-11.033	-2.595
Mankayane	-1.275	-2.595	-10.515	-2.595
SAFEX	-0.424	-2.598	-7.214	-2.598

Table A5 Price transmission in Swaziland

i ←	I	θ_2		α_2		α_3		λ	direction of causality	Half life
Mbabane	Hlathikhulu	-1.327	***	0.971	**	-0.901	**	2	↔	0.966
Mbabane	Siteki	-0.956	***			-0.434	*	1	←	1.491
Mbabane	Bigbend	-1.354	***					1	→	0.761
Mbabane	Symunie	-0.897	***					1	↔	1.228
Mbabane	SAFEX	-0.566	***			-0.468	**	1	←	1.003
Hlathikhulu	Mbabane	-0.615	***	0.326	**	-0.948	***	2	↔	0.966
Hlathikhulu	Manzini	-0.875	***			-0.071	*	2	↔	1.000
Hlathikhulu	Siteki	-1.558	***	0.880	***			2	→	1.673
Hlathikhulu	Big bend	-1.679	***	0.900	***			2	→	5.358
Hlathikhulu	Piggs peak	-1.063	***	0.431	***	-0.127	*	3	↔	0.993
Hlathikhulu	Nhlangano	-1.372	***	0.292	***			1		1.530
Hlathikhulu	Mankayane	-1.196	***	0.496	***	-0.272	***	1	↔	1.048
Manzini	Hlathikhulu	-0.854	***			-0.124	**	2	↔	1.000
Manzini	Piggs peak	-1.010	***	0.274	*	-0.184	***	1	←	1.246
Siteki	Hlathikhulu	-0.516	***	0.498	***	-0.096	*	2	←	1.673
Siteki	Big bend	-1.098	***	0.741	***	-0.212	**	1	↔	1.954
Siteki	Symunie	-0.839	***	0.415	***	-0.136	**	1	→	1.005
Siteki	Nhlangano	-0.896	***	0.260	***	-0.151	***	1	←	1.016
Siteki	Mankayane	-0.632	***	0.413	***	-0.136	**	1	←	1.114
Bigbend	Siteki	-0.819	***	0.475	***	-0.279	***	1	↔	1.954
Bigbend	Symunie	-0.724	***	0.308	***	-0.179	***	2	↔	1.228
Bigbend	Piggs peak	-0.470	***	0.306	***	-0.099	*	3	→	2.938
Bigbend	Nhlangano	-0.768	***	0.263	***	-0.141	***	1	←	1.093
Bigbend	Mankayane	-0.542	***	0.325	***	-0.142	**	1	←	1.071
Symunie	Mbabane	-0.684	***			-0.634	*	1	↔	1.228
Symunie	Hlathikhulu	-0.477	***	0.884	***	-0.088	*	1	←	1.627
Symunie	Manzini	-0.278	***	-0.250	**	-0.092	*	1	←	1.465
Symunie	Siteki	-0.948	***	0.920	***	-0.267	***	1	←	1.005
Symunie	Big bend	-1.097	***	1.052	***	-0.279	***	2	↔	1.228
Symunie	Piggs peak	-0.474	***	0.504	***	-0.139	**	4	↔	1.091
Symunie	Nhlangano	-0.981	***	0.286	**	-0.374	***	1	←	0.999
Symunie	Mankayane	-0.585	***	0.483	***	-0.172	***	1	←	1.089
Piggs peak	Hlathikhulu	-0.865	***	0.343	***	-0.332	***	3	↔	0.993
Piggs peak	Manzini	-0.798	***	0.165	*			1	→	1.246
Piggs peak	Siteki	-1.356	***	0.674	***	-0.081	*	3	↔	1.136
Piggs peak	Big bend	-1.526	***	0.584	***	-0.068	*	3	←	2.938
Piggs peak	Nhlangano	-1.158	***	0.247	**			4	←	1.200
Piggs peak	Mankayane	-1.056	***	0.394	***	-0.211	***	1	←	1.023
Nhlangano	Hlathikhulu	-0.380	***	0.336	***	-0.146	**	1		1.530
Nhlangano	Siteki	-0.778	***	0.443	***	-0.195	***	1	→	1.016
Nhlangano	Big bend	-0.894	***	0.625	***	-0.171	**	1	→	1.093
Nhlangano	Symunie	-0.753	***	0.246	**	-0.221	**	1	→	0.999
Nhlangano	Piggs peak	-0.415	***	0.292	**	-0.118	**	4	→	1.200
Nhlangano	Mankayane	-0.520	***	0.438	***	-0.162	**	3	←	1.004
Mankayane	Hlathikhulu	-0.779	***	0.301	***	-0.211	***	1	↔	1.048
Mankayane	Big bend	-1.346	***	0.345	***			1	→	1.071
Mankayane	Symunie	-1.003	***	0.178	***			1	→	1.089
Mankayane	Piggs Peak	-0.838	***	0.255	***			1		1.023
Mankayane	Nhlangano	-1.162	***	0.210	***			3	→	1.004
SAFEX	Piggs peak	-0.291	***					3	→	1.031

significance: *** = 0.001, ** = 0.005, * = 0.01

Table A6 ADF unit root test of logged price series – Southern Sudan

	Levels		First differences	
Price series	ADF statistic	Critical value 1%	ADF statistic	Critical value 1%
Aweil	-1.097	-2.660	-4.819	-2.660
Juba	-0.759	-2.642	-4.553	-2.644
Malakal	-1.116	-2.644	-2.739	-2.646
Wau	-0.677	-2.647	-3.120	-2.649
US	-0.908	-2.642	-5.633	-2.644

Table A7 Price transmission in Southern Sudan

i	←	l	θ_2	α_2	α_3	λ	direction of causality	Half life
Aweil		Malakal	-0.5663 ***		-0.441 *	2		1.061
Aweil		US		-0.578 **		4	↔	0.776
US		Aweil	-0.6142 ***			4	↔	0.776
US		Juba	-0.9918 *			2		2.341
US		Malakal	-0.6364 ***			2	→	0.956

significance: *** = 0.001, ** = 0.005, * = 0.01

Annex 3

Prototypes of questionnaires used for case-studies

Enumerator	________________
Date of interview	________________
Place of interview	________________
Interviewed Name	________________

<u>Questionnaire for RETAILERS</u>

Area of operation

1. Location of business: ______________

2. What share of your business is covered by:

   A. food trade _______% B. livestock _______% C. other commodities _______%

Business size and Capacity

3. If trading food, how many kg (or bags) of food did you sell last month?

   List the 2 major commodities: ________________/_________ & ________________/___________
   commodity / (bags, kg, ...) *commodity / (bags, kg, ...)*

4. If trading livestock, how many animals did you sell last month:

   A. goats _______ B. chicken _______ C. cows _______

5. If you realize that the demand for the items you sell is increasing, would you be interested to increase your business? ______

   A. If YES, would you find additional money required to increase your business? _______

   B. If YES, would you find the additional quantities required? _______

6. Which is the most difficult constraint that you encounter in your business?
(Circle up to 3options and rank priorities: 1, 2, 3)

   A. Prices are low
   B. Security is poor and discourages traders
   C. Road infrastructure is poor and increases transport cost
   D. Access to credit is poor
   E. Lack of storage facilities
   F. Other: (specify) ....

7. What would be the most important factor for you to increase your business?
(Circle up to 3options and rank priorities: 1, 2, 3)

   A. Not interested in increasing business
   B. Increase in prices
   C. Improvement in security
   D. Improvement in road infrastructure
   E. Improvement in access to credit
   F. Improvement in availability / quality of storage facility
   G. Other: (specify) ....

7. Do you think that the price at which you are currently selling your commodities is the right price?

Commodity	Current price	Current price is :				
		Too low	Slightly low	Quite right	Slightly high	Too high
A.						
B.						
C.						

8. According to your opinion, which would be the right price for each commodity?

   A. __________________ B. __________________ C. __________________

9. If prices are low or too low, what is the main reason in your opinion? ________________________

10. If consumer prices were to go higher than they are now, would you be ready to increase the quantities that you sell?
(Put a √ in correspondence of the lowest price increase accepted by the respondent and then move to question 11.)

Commodity	Current price	Price increase by					
		2%	5%	10%	15%	20%	> 20%
A.							
B.							
C.							

11. If consumer prices were to increase, how much do you think you could be able to increase the quantities that you sell?

Commodity	Mention the lowest price increase at which the trader would be willing to scale up business *(identified under question 10.)*	20% price increase
A.		
B.		

Cost structure

12. Where are your major suppliers from? ____________

13. Would you know how much do they pay for each commodity in their major market of procurement?

Commodity	Market of procurement	Cost per unit *Specify unit (kg, ...)*
A.		
B.		
C.		

14. How much do you pay to buy from your suppliers a unit of each commodity?

Commodity	Cost per unit *Specify unit (kg, ...)*
A.	
B.	
C.	

15. How much does it cost to your suppliers to transport their commodities from their major market of procurement to here?

Commodity	Market of procurement	Cost per unit *Specify unit (kg, ...)*
A.		
B.		
C.		

16. Which other costs apart of transport do your suppliers need to face?

Give a definition of the cost	Cost per unit *Specify unit (kg, ...)*
A.	
B.	

Customers' preference

17. If your customers were to receive some assistance, which type of assistance they would prefer: food aid or cash? ______________

18. If people in need of assistance were to be given cash, according to your opinion, how do you think they would spend the money received through the assistance?

What share they would use to :					
Buy food	Buy goats/cattle/assets	Repay debts	Pay children school fees	Pay medical expenses	Buy non-food items

Enumerator	______________
Date of interview	______________
Place of interview	______________
Interviewed Name	______________

Questionnaire for WHOLESALERS / SUPPLIERS

Area of operation

1. Location of business ______________

2. What share of your business is covered by:

   A. food trade _______% B. livestock _______% C. other commodities _______%

Business size and Capacity

3. If trading food, how many kg (or bags) of food did you sell last month?

   List the 2 major commodities: ______________/__________ & ______________/__________
   commodity / (bags, kg, ...) *commodity / (bags, kg, ...)*

4. If trading livestock, how many animals did you sell last month:

   A. goats _______ B. chicken _______ C. cows _______

5. If you realize that the demand for the items you sell is increasing, would you be interested to increase your business? ______
   A. If YES, would you find additional money required to increase your business? _______
   B. If YES, would you find the additional quantities required? _______

6. Which is the most difficult constraint that you encounter in your business?
(Circle up to 3options and rank priorities: 1, 2, 3)
   A. Prices are low
   B. Security is poor and discourages traders
   C. Road infrastructure is poor and increases transport cost
   D. Access to credit is poor
   E. Lack of storage facilities
   F. Other: (specify) ....

7. What would be the most important factor for you to increase your business?
(Circle up to 3options and rank priorities: 1, 2, 3)
   A. Not interested in increasing business
   B. Increase in prices
   C. Improvement in security
   D. Improvement in road infrastructure
   E. Improvement in access to credit
   F. Improvement in availability / quality of storage facility
   G. Other: (specify) ....

7. Do you think that the price at which you are currently selling your commodities is the right price?

Commodity	Current price	Current price is :				
		Too low	Slightly low	Quite right	Slightly high	Too high
A.						
B.						
C.						

8. According to your opinion, which would be the right price for each commodity?

   A. ______________ B. ______________ C. ______________

9. If prices are low or too low, what is the main reason in your opinion? ____________________

10. If consumer prices were to go higher than they are now, would you be ready to increase the quantities that you sell?
(Put a √ in correspondence of the lowest price increase accepted by the respondent and then move to question 11.)

Commodity	Current price	Price increase by					
		2%	5%	10%	15%	20%	> 20%
A.							
B.							
C.							

11. If consumer prices were to increase, how much do you think you could be able to increase the quantities that you sell?

Commodity	Mention the lowest price increase at which the trader would be willing to scale up business *(identified under question 10.)*	20% price increase
A.		
B.		

Cost structure

12. In which markets do you buy your commodities? ____________

13. How much do you pay to buy a unit of each commodity in the major market of procurement?

Commodity	Market of procurement	Cost per unit *Specify unit (kg, ...)*
A.		
B.		
C.		
D.		

14. How much does it cost to you to transport your commodities from your major market of procurement and here?

Commodity	Market of procurement	Cost per unit *Specify unit (kg, ...)*
A.		
B.		
C.		
D.		

15. Which other costs apart of transport do you need to cover?

Give a definition of the cost	Cost per unit *Specify unit (kg, ...)*
A.	
B.	

Enumerator	________________
Date of interview	________________
Place of interview	________________
Interviewed Name	________________

Questionnaire for traders OUTSIDE study area

Area of operation

1. Where is your base? _______________

2. Which are the markets of your major interest? _______________

3. What share of your business is covered by:

A. food trade _______% B. livestock _______% C. other commodities _______%

Business size and Capacity

4. If trading food, how many kg (or bags) of food did you sell last month?

List the 2 major commodities: ________________/_________ & ________________/___________

commodity / (bags, kg, ...) *commodity / (bags, kg, ...)*

5. If trading livestock, how many animals did you sell last month:

A. goats _______ B. chicken _______ C. cows _______

6. If you realize that in the market you cover there is a possibility to increase quantity sold, would you be interested to increase business? _____

A. If YES, would you find additional money required? _____

B. If YES, would you find additional transport capacity required? _____

C. If YES, would you find additional commodities required? _____

Involvement in study areas

7. Do you operate on markets in ……….….. (*specify area*)? _____ If NO, go to question 15

If YES, go to question 8.

8. Which markets, commodities and quantities?

Market ________________ Commodity ________________ Quantity sold during last month______________

Market ________________ Commodity ________________ Quantity sold during last month______________

Market ________________ Commodity ________________ Quantity sold during last month______________

Market ________________ Commodity ________________ Quantity sold during last month______________

9. Which is the most difficult constraint that you encounter in your business in the study area? (*Circle up to 3options and rank priorities: 1, 2, 3)*

A. Prices are low
B. Security is poor and discourages traders
C. Road infrastructure is poor and increase transport cost
D. Access to credit is poor
E. Lack of storage facilities
F. Other: (specify): ………………………

10. Do you think that the price at which you are currently selling your commodities is the right price?

Commodity	Current price	Current price is :				
		Too low	Slightly low	Quite right	Slightly high	Too high
A.						
B.						
C.						

11. According to your opinion, which would be the right price for each commodity?

A. ____________________ B. ____________________ C. ____________________

12. If prices are low or too low, what is the main reason in your opinion? ____________________________

13. If retail prices were to go higher than they are now, would you be ready to increase the quantities that you transport there?
(Put a √ in correspondence of the lowest price increase accepted by the respondent and then move to question 14.)

Commodity	Market	Current price	Price increase by					
			2%	5%	10%	15%	20%	> 20%
A.								
A.								
B.								
B.								

14. If prices were to increase, how much you think you could be able to increase the quantities that you sell?

Commodity	Mention the lowest price increase at which the trader would be willing to scale up business *(identified under question 13.)*	20% price increase
A.		
B.		

Go to question n. 21.

15. What would be the most important factor for you to start business in the study area?

A. Not interested in opening business there
B. Increase in prices
C. Improvement in security
D. Improvement in road infrastructure
E. Improvement in access to credit
F. Improvement in availability / quality of storage facilities
G. Other: (specify) ....

16. Do you think that the price at which you are currently selling your commodities is the right price?

Commodity	Current price	Current price is :				
		Too low	Slightly low	Quite right	Slightly high	Too high
A.						
B.						
C.						

17. According to your opinion, which would be the right price for each commodity?

A. __________________ B. __________________ C. __________________

18. If prices are low or too low, what is the main reason in your opinion? __________________________

19. If retail prices were to go higher than they are now, would you be ready to start business there?
(Put a √ in correspondence of the lowest price increase accepted by the respondent and then move to question 20.)

Commodity	Market	Current price	Price increase by					
			2%	5%	10%	15%	20%	> 20%
A.								
A.								
B.								
B.								

20. If prices were to increase, how much you think you could be able to increase the quantities that you sell?

Commodity	Mention the lowest price increase at which the trader would be willing to scale up business (identified under question 19.)	20% price increase
A.		
B.		

Cost structure

21. Where is your major supply market? ___________

22. How much do you pay to purchase a unit of your stuff in your major market of procurement?

Commodity	Market of procurement	Cost per unit *Specify unit (kg, ...)*
A.		
B.		
C.		

23. At what price would you be interested to sell a unit of your commodities in the following markets?

Commodity	Market of sell	Cost per unit *Specify unit (kg, ...)*
A.		
A.		
B.		
B.		
C.		
C.		

24. How much does it cost to you to transport your commodities between major market of procurement and the following markets?

Commodity	Market of sell	Cost per unit *Specify unit (kg, ...)*
A.		
A.		
B.		
B.		
C.		
C.		

25. Which other costs apart of transport do you need to face to trade your stuff?

Give a definition of the cost	Cost per unit *Specify unit (kg, ...)*
A.	
B.	

FOOD AID or CASH TRANSFER **Household Questionnaire**

Enumerator	
Date of interview	
Area of interview	
Gender of respondent:	M F

Assessment on household expenditures and on the household capacity to cover basic needs such as in particular food consumption

1 How many individuals live in this household? ______

2 Have you received food aid during the last 12 months? Y N *If NO, go to question 13*

3 What quantities of food aid do you receive during a normal distribution?

commodity	*quantity*	*commodity*	*quantity*	*commodity*	*quantity*
A.		B.		C.	
D.		E.		F.	

4 If you were to buy the same quantities of the commodities that you have received, how much would it cost you?

commodity	*quantity*	*cost*	*commodity*	*quantity*	*cost*
A.			D.		
B.			E.		
C.			F.		

Calculate the total cost in the cells highlighted = ______

5 If you were to receive the same amount of money and you could decide how to spend it, how much would you spend on the following groups of commodities?

A. Buy food ______ % *This corresponds to:* ....

B. Buy assets ______ %

C. Repay debts ______ %

D. Pay children school fees ______ %

E. Pay medical expenses ______ %

F. Buy non-food items (specify) .... %

G. Other (specify) .... %

6 Therefore, you would spend ....* to buy food. In particular, which food commodities would you buy, in which quantity, and how much would it cost to you?

*(* Mention the amount estimated under question 5.A.)*

	quantity	*cost*		*quantity*	*cost*
A. Maize			J. Fruits		
B. Maize Meal			K. Fish		
C. Rice			L. Meat		
D. Other cereals *(specify)*			M. Poultry		
E. Bread			N. Eggs		
F. Irish potatoes			O. Oil, fat, butter		
G. Sweet potatoes			P. Sugar and sugar products		
H. Beans			Q. Milk and milk products		
I. Vegetables, including leaves					

7 Where do you normally buy your food commodities?

	A. local informal market / neighbours	B. shop / store	C. supermarket	D. In which town / centre?
maize grain				
rice				
beans				
oil				

8 How often do you go to the town mentioned under 7.D? ______

9 What transport do you use to go to the town mentioned under 7.D? ______

10 How much does it cost to you to go to the town mentioned under 7.D? ______

11 If you were to be given assistance, would you prefer to receive food commodities or the equivalent value of cash? A. food B. cash C. half of both A & B

12 Give reasons for the above answer ______________________________

13 If you were to receive .... of local currency and you could decide how to spend it, how much would you spend on the following groups of commodities?

A. Buy food	____ %	*This corresponds to: ....*
B. Buy assets	____ %	
C. Repay debts	____ %	
D. Pay children school fees	____ %	
E. Pay medical expenses	____ %	
F. Buy non-food items (specify)	____ %	
G. Other (specify)	____ %	

14 Therefore, you would spend ....* of local currency to buy food. In particular, which food commodities would you buy, in which quantity, and how much would it cost to you?

*(* Mention the amount estimated under question 13.A.)*

	quantity	*cost*		*quantity*	*cost*
A. Maize			J. Fruits		
B. Maize Meal			K. Fish		
C. Rice			L. Meat		
D. Other cereals *(specify)*			M. Poultry		
E. Bread			N. Eggs		
F. Irish potatoes			O. Oil, fat, butter		
G. Sweet potatoes			P. Sugar and sugar products		
H. Beans			Q. Milk and milk products		
I. Vegetables, including leaves					

15 Where do you normally buy your food commodities?

	A. local informal market / neighbours	B. shop / store	C. supermarket	D. In which town / centre?
maize grain				
rice				
beans				
oil				

16 How often do you go to the location mentioned under 15.D? _______

17 What transport do you use to go to the location mentioned under 15.D? _______

18 How much does it cost to you to go to the location mentioned under 15.D? _______

19 If you were to be given assistance, would you prefer to receive food commodities or the equivalent value of cash? A. food B. cash C. half of both A & B

20 Give reasons for the above answer ____

____

____

____