Market Functioning in Turkana District, Kenya

Conducted by:

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On behalf of:

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None of the above bears the slightest responsibility for any error that very likely remains in the study.

Alessandro De Matteis
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Acronyms

ALRMP	Arid Land Resource Management Project
AVG	Average
CBS	Central Bureau of Statistics
CFW	Cash for Work
DES	Daily Energy Supply
DRP	Drought Recovery Programme
EMOP	Emergency Operation
FAO	Food and Agriculture Organization
GFD	General Food Distribution
GOK	Government of Kenya
KCAL	Kilocalorie
KG	Kilogram
KSH	Kenyan Shilling
LTSH	Land Transport Storage and Handling
MT	Metric Ton
MUAC	Middle Upper Arm Circumference
USD	US Dollar
YR	Year
WFP	World Food Programme
W/S	Wholesale
WTT	Willingness to Trade

Executive summary

- Current food trade flow in Turkana is insufficient to cover local food requirements. Such concern is particularly relevant when considering the rapidly increasing requirements due to the steady population growth.

- The gap between food requirements and supply is reflected in high prices.

- Trading activities are found to be profitable, particularly in view of the high prices prevalent on Turkana markets.

- Despite profitability of trade business, the major constraints identified are the lack of access to critical inputs -such as cash and transport capacity- and the very poor status of infrastructure throughout the district.

- 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.

- The degree of market integration in Turkana is slightly below the average for the rest of the country. Such degree is far from homogeneous: some markets are well connected, while others are not. The weakest link is the connection between markets in Turkana and in surrounding areas.

- A drastic gap has been found in terms of capacity between traders based in Turkana and in neighbouring areas.

- It is necessary to proceed towards a combined strategy of commodity- and cash-based interventions, with the former being limited to emergency response.

- Market-related interventions should target markets which result to be most integrated, since they are best placed to work as interlink between remote areas in Turkana and the rest of the country.

- With regard to the feasibility of achieving an increased marketed supply through a cash injection strategy, a contained price increase is to be expected.

- A strategy of cash injection aiming at promoting small-scale trade can be expected to have higher inflationary consequences. Such consequences can be reduced by channelling the demand-driven support through mechanisms properly coordinated with suppliers (i.e. provision of vouchers).

- In order to minimize the risk of inflation in a context of already high prices, a demand-driven approach needs to be accompanied and possibly anticipated by local investment promotion. In other words, the major DON'T is: don't inject cash to stimulate demand in the current context before ensuring improvements on the supply side. At the same time, the major DO is: try to stimulate investments and business opportunities.

- An endogenous growth process is preferable to one led from neighbouring more advanced districts. In particular, initiatives targeting large traders based in the district would be more reliable and efficient.

- The most effective intervention to boost trade activities in Turkana is the improvement of road infrastructure and in general access.

- On a smaller scale, local transport capacity should be strengthened, by increasing availability of -and access to- local transport.

- Local business knowledge and attitude should be improved. This can be supported by:
  - ✓ Improving collection, analysis and dissemination of market information;
  - ✓ Facilitating links between medium and large Turkana traders and traders operating in competitive source markets.

Contents

1. Introduction and scope of the study

Food aid normally dominates emergency response. This is despite the common perception that food aid is an inefficient –and in many cases even inappropriate- form of resource transfer. Such perception has regularly generated discussion over the feasibility and appropriateness of alternatives to food aid, among which market support, cash-for-work programmes, distribution of vouchers, cash transfers, etc.

Essentially, the rationale for a cash-based response derives from the interpretation of famine as a problem of access to food rather than a problem of availability of food. Under an economic perspective this means to shift attention from the supply side of the problem towards the demand side. In fact, as initially presented by Sen more than two decades ago, lack of purchasing power prevents the normal functioning of markets and in such conditions a potential famine can develop even if there is not a food shortage. 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. In such case, not only cash distribution can increase household access to food, but can play as well a remarkable role in stimulating a demand-driven process of growth of the local economy.
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 less expensive logistic costs than in the case of commodity-based alternatives as well as to allow an optimum use of resources transferred through direct beneficiaries' decision.

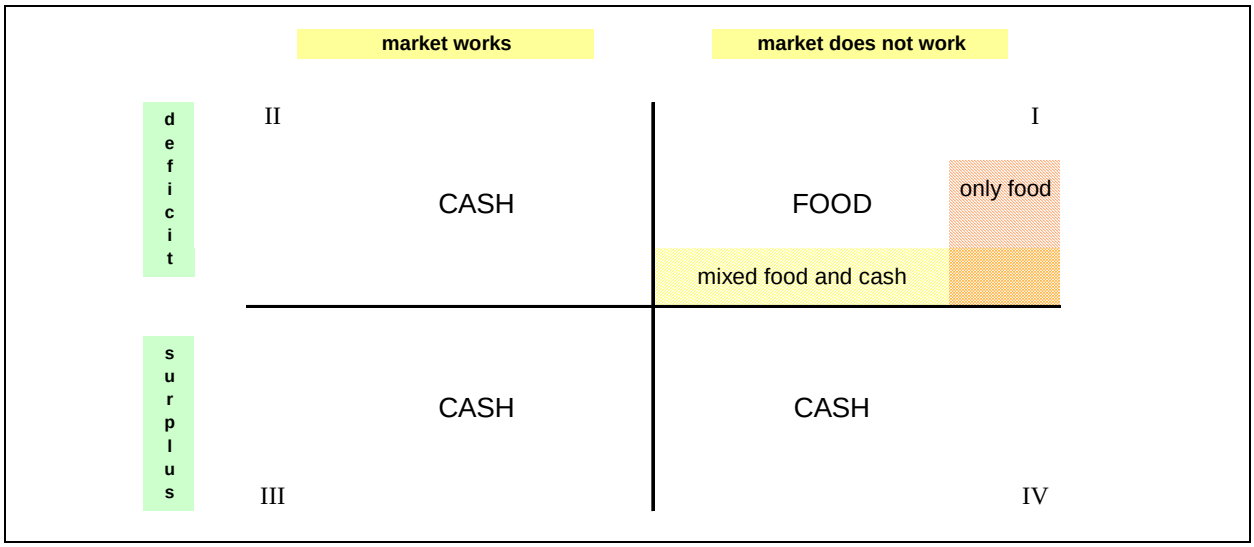
From a different perspective, the regular criticism to the use of cash makes reference to the risk of inflationary consequence of cash-based interventions. Such price increase would end-up reducing the effective value of the transfer and would rather deteriorate the condition of the non-beneficiaries. At this regard, considering that the non-beneficiaries can be a large and still vulnerable section of the population, a cash-based intervention could actually result simply in a shift of the food access problem from one group to another.
Additional disadvantages of cash-based interventions refer to the possible misuse of cash, either by the beneficiaries themselves[1] or by elites who may benefit through an improper involvement in the intervention.

As just mentioned, both positions -in favour or against a cash-based response- are somehow centred on the economic question on 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 conflicts or natural disasters.
In general, Fig.1 helps to summarise in which 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 becomes 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 diversified. In such situations, if the market works (II quadrant), an injection of cash can generate a demand-led growth and traders are expected to be able to respond to the increased demand; on such a basis cash is the appropriate tool. If the market does not work (I quadrant) –at all or appropriately- then a commodity-based intervention is in general appropriate. Having said that, in this latest case extreme situations may require a different response: situations characterised by strong deficit and absence or absolute

[1] This concern is particularly valid if the intervention is in response to particular consumption or nutrition objectives.

disruption of the market should be addressed solely through commodity-based interventions, while situations characterised by minor deficit and limited functioning of the market could be addressed through a combination of both cash- and commodity-based interventions.

Fig.1 The preference for a Food-based vs Cash-based approach



The aim of this study is to consider the feasibility and appropriateness of cash-based interventions in a chronically food insecure area in Kenya (Turkana district). The analysis is conducted from an economic perspective focused on the functioning of the market. In particular, despite the strong pastoralist character of the Turkana economy, attention of the study is focused on the market of food in general and of cereals in particular, which is almost entirely dependent on trade inflows from neighbouring districts or countries.[2]

The rest the study is organised as follows. The next chapter will present the geographical focus of the present analysis (Turkana district in Kenya), showing the relevance of trade for food security and nutrition, as well as the interventions so far put in place in support of food availability and access. Chapter 3 will review prices and profitability of trade business in Turkana. Chapter 4 will examine the functioning of the market system by comparing the market price behaviour within the district as well as in the rest of the country and beyond. Chapter 5 will tackle the analysis of market functioning from a different perspective: traders' capacity and willingness to scale up their activities. Finally, Chapter 6 will provide the conclusions and recommendations of this study.

As part of the study, fieldwork has been conducted in December 2005. In particular, a survey has been conducted throughout the district and in surrounding areas. Different types of markets have been visited:

- along the main northern routes to Sudan,
- in the area covered by the Cash-for-Work project implemented by OXFAM, and its surroundings in the north-east,
- along the main routes in the south, leading to the neighbouring districts,
- the major source markets in the neighbouring districts,
- a few markets in Uganda along the border with Kenya.

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

2. The case of Turkana

2.1 Demographics and food requirements

On the basis of official statistics, in 1999 population in Turkana was estimated at 447,000 individuals. According to more recent reports, Turkana population in 2005 was estimated to be around 510,000 people,[3] apparently reducing the high demographic growth recorded in the '90s.[4]

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 in the case of Turkana. On such a basis, it is useful to make reference to FAO estimate of Daily Energy Supply (DES), estimated at 2,110 kilocalories per person per day in the case of Kenya.[5] 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. Tab.1 provides all such estimates. Under the consideration that Turkana standards of food consumption are expected to be below the national average, the estimate has been 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.[6]

Tab.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

[3] See Tab.A1 in the Annex for details.

[4] It is worth noting the remarkable demographic increase occurred in Turkana during the recent 3 decades, as depicted by the snapshots provided by the three Population Censuses carried out in 1979, 1989 and 1999:

Population in Turkana district	1979	1989	1999
	143,000	184,000	447,000

Source: Central Bureau of Statistics, Statistical Abstract 2004, pag.24
From the above it can be assumed that the annual growth rate has increased between the '80s and the '90s 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.

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

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

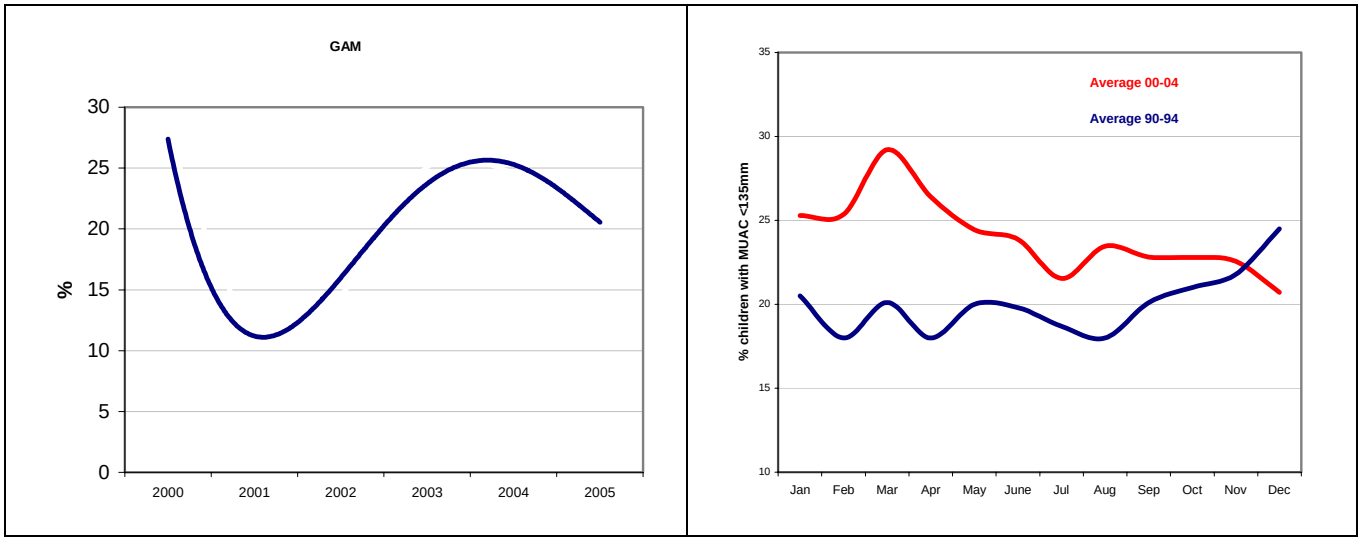
Age group (yeas)	Kcal / person / day
0 – 14	1,620
15 – ω	2,040

From Tab.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.

2.2 Trade, food security and nutrition

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

Fig.2 Changes in nutritional status in Turkana



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

Fig.2 provides a summary overview of magnitude and trends in malnutrition in Turkana.[7] 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 recently 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 magnitude and trend of malnutrition measures as the MUAC (middle upper arm circumference) between the early nineties and the initial five years of the current decade, he remarks "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[8] 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, livestock prices and malnutrition rates has been carried out.[9] In particular, time series (years: 2000-2005) of indexes have been generated and correlated.
As in Tab.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

[7] 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 2-stage random cluster sampling.

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

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

market (with almost 70% of variability of each index explained by the other one) 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 has been 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).[10] Tab.2 and Fig.3 help to clarify the point and highlight that the gap which helps to maximize the correlation is of 5 months in the case of the livestock price and 6 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:

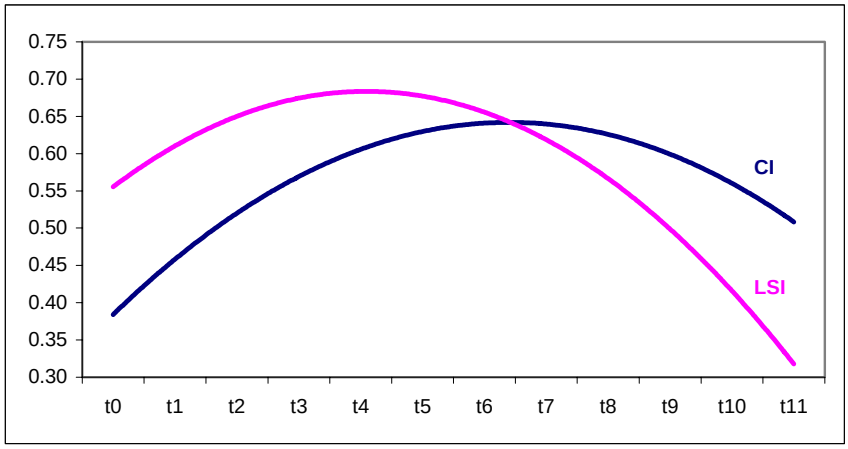
- Both the cereal and livestock market evolution seem to be quite good predictors of malnutrition, being able to explain in both cases more than two thirds of variation in nutritional status.
- In comparative terms, the predictive value exercised by livestock price is stronger (higher and quicker to reach the max value), but the improvement of the predictive value is stronger in the case of the cereal price index (approximately 50% increase in 6 months).

Tab.2 Correlation among cereal price index, livestock price index, nutrition index

	lag (months)											
	t0	t1	t2	t3	t4	t5	t6	t7	t8	t9	t10	t11
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

Fig.3 Evolution of correlation between nutrition index and the market price indexes*



* Correlation between LSI and nutrition is in absolute value

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

[10] 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 time series correlated which helps to maximize the predictive value of cereal and livestock market in terms of malnutrition.

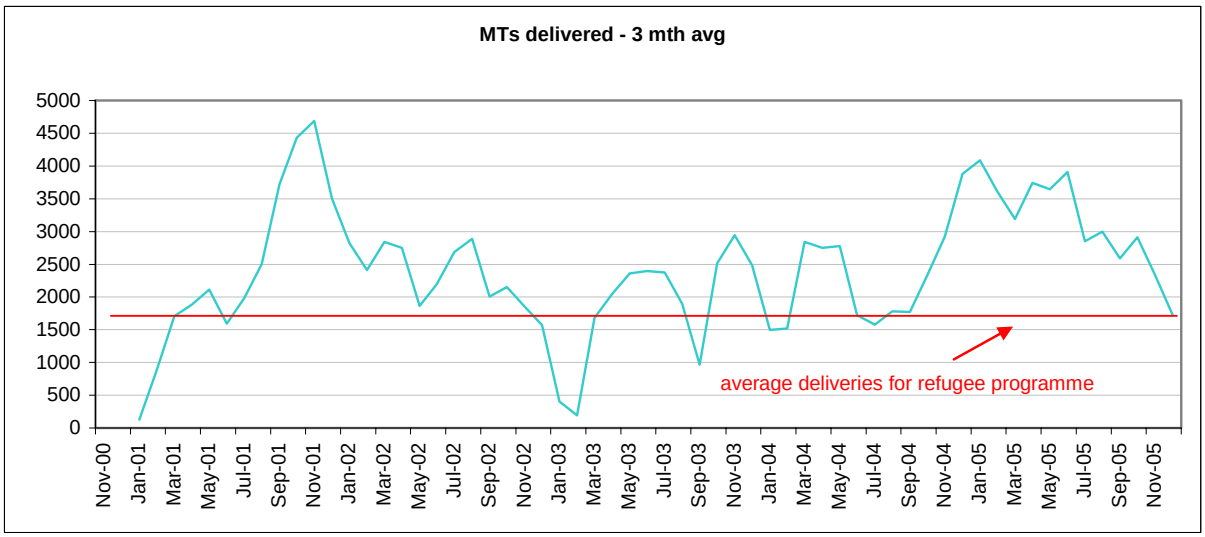
decision-making process with the aim of getting the highest benefit from trade, but rather in the sense of considering the indispensable role of trade as a major determinant of food security and nutrition, to be properly developed and at the same time protected from the likely negative side effect of short-term interventions usually improperly designed.

2.3 Food aid

Proper tracking of food aid deliveries in Turkana has been initiated only in 2000.

Data on food aid deliveries have been converted in cereal equivalent in order to facilitate the analysis. On such a basis Fig.4 below has been produced, taking the initiative of reducing the curve fluctuations through a 3-month moving average smoothing.

Fig.4 Evolution of food aid deliveries in Turkana (in MTs of cereal equivalent)



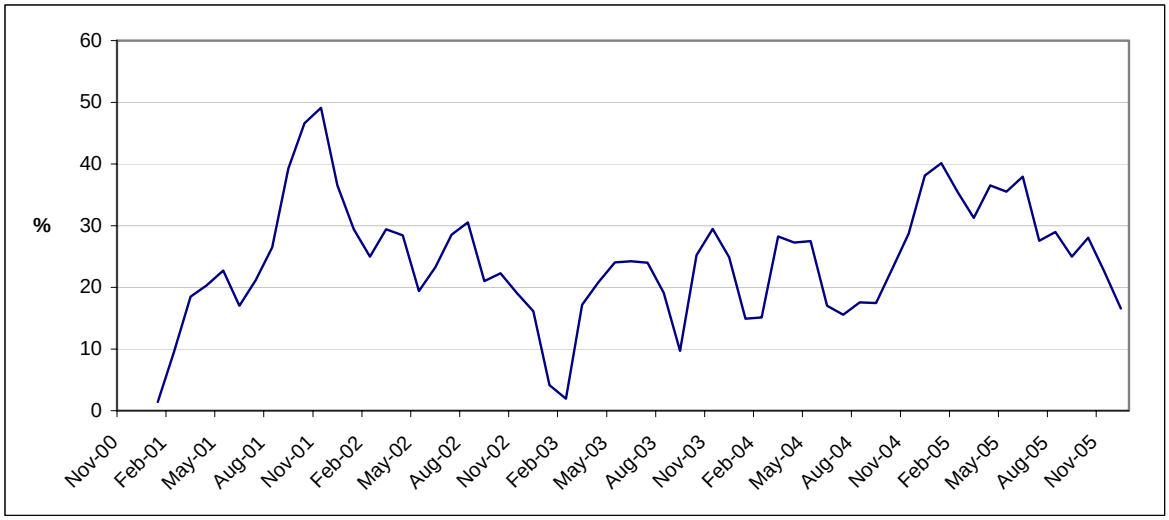
As shown in Fig.4, the quantities delivered include a component for the refugee intervention. Such tonnage has been rather constant over the period considered, around 1,600 MTs of cereal equivalent per month. Additional tonnage refers almost completely to the Emergency Intervention (EMOP10374.0) put 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 are so scanty and patchy 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 have been reported to nutritional requirements.[11] As shown in Fig.5, the share of food requirements

[11] In this case, nutritional requirements have been 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 has been estimated on the basis of official registration statistics. Nutritional requirements have been 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.

covered through food aid has reached in a few occasions remarkable peaks, with an overall average of 25%.

Fig.5 Share of nutritional requirements covered by food aid



Having said the above, the considerable role played by food aid has come with an as well remarkable cost. To get an estimate of the cost of food aid distributed in Turkana, it is possible to make reference to the overall budget of the Emergency Intervention (EMOP10374.0) implemented by WFP in Kenya in response to the drought. The operation was started in August 2004 for an initial period of 6 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 has been approved in February 2006, extending the intervention till 30 June 2007 and increasing the budget from 128.93 million USD to 354.32 million USD.
Tab.3 provides a summary of the unit cost estimated on the basis of the official budget of the intervention and of the various revisions undergone so far.

Tab.3 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*

It is interesting to notice how the average total cost of the intervention has been regularly increasing over the period of implementation of the intervention. In fact, the cost has increased from 426 USD per MT in terms of cereal equivalent to 500 USD. In particular, limiting the estimation to the

recently approved 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 recently launched budget revision, considered either as an average for the tonnage of the entire EMOP, or as an average for the tonnage of the 6th budget revision (which on its own represents almost two thirds of the cumulative budget as recently revised).

Having said the above, 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 to be made and, following discussions with WFP, it seems reasonable to consider the average LTSH for Turkana around 25% higher than the average for the rest of the areas covered by the EMOP. On such a 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.

At this point it is necessary to recognise how the unit cost just estimated is based on *ex-ante* budget rather than on a review of tonnage actually delivered and on costs actually incurred. Unfortunately, a review of costs actually incurred is not available, both in the case of the EMOP as such and in particular in the case of its share referred to the quantities 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 be of help in approximating the unit cost estimate to its real value. A major adjustment can be assumed feasible about the estimate of the LTSH rate applied in the budget. As normal practice, such rate is fixed around its maximum possible value in order to ensure not to undermine the operational 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 really undermining its operational feasibility. On the basis of such consideration, taking 75 USD per MT as a shadow rate for the EMOP LTSH, the value of such rate in the case of food aid delivered in Turkana would be 100 USD per MT. On the basis of such shadow values of the LTSH rate, the unit cost has been re-estimated around 350 USD per MT and 424 USD per MT respectively as the EMOP average and as average for the Turkana share of the EMOP. They are reported in Tab.3 in italic.[12]

Finally, in order to get a complete perspective 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 OXFAM has been estimated around 6 USD per MT. This leads to an estimated average unit cost of 430 USD per MT.[13]

2.4 Cash interventions

Experience of cash interventions in Turkana is so far quite limited. Essentially it can be reduced to the cash-for-work (CFW) component of the Drought Recovery Programme implemented by

[12] 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 purchase in Kenya part of the commodities required, combining the advantage of the good harvest achieved in 2005 and the favourable contribution to the Kenya economy, should support in reducing some costs initially budgeted for, such as international transport and associated costs, as well as various components of LTSH rate. At this regard it is remarkable the Government of Kenya (GoK)'s contribution (60,000 MTs of cereals) to the EMOP, announced in January 2006.

[13] It is to be considered that such estimate of non refundable costs is a minimum estimation. In fact, it is 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. Having in mind that the number of MTs distributed by the partner depends on the WFP pipeline, which can be affected by various problems among which funding and operational delays (procurement of commodities, international and local transport, …), it is possible to understand how the non refundable costs incurred by the WFP partner are expected in normal circumstances to increase in view of the fixed costs which are obviously not related to the tonnage finally distributed.

OXFAM GB started by the end of 2001, and since then implemented irregularly through various phases till end 2005. An additional phase of CFW is currently under preparation.
The coverage of the initiative has been 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".

The latest 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. Having said that, indeed in the CFW project areas, as well as in most areas in Turkana, it is essentially impossible to find price record for major commodities.
In regard to this, in Fig.6 an attempt is done to visualise the periods of implementation of CFW interventions as well as of food aid distributions together with the evolution of the average price of maize in Turkana. It is very interesting to consider how in Fig.6 neither of the two interventions seems to have an effect on the price evolution of the major staple food. 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 to both the implementation of cash distribution as well as to the progressive scaling down of food aid, that is to two events that would be normally considered as inflationary factors.
Indeed, this is 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 localised CFW intervention. To try to clarify this problem Fig.7 compares the evolution of maize price in the area of implementation of CFW against the average for the district and for the country. In this case, it appears a certain margin between the district average and the average in the CFW project area. While such margin may be explained by transport costs, it interesting to notice how such increase tends to get a certain stability only after the second phase of CFW intervention. Available data is not enough to support such 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.

Fig.6 Link between CFW implementation, Food Aid distribution and price of maize

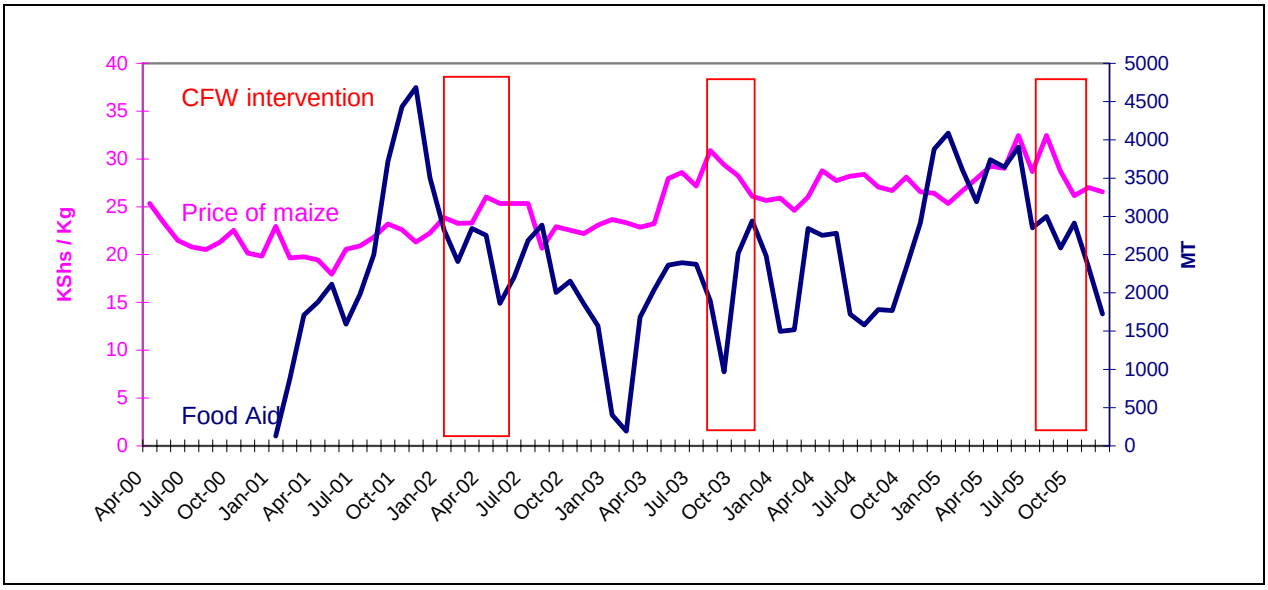
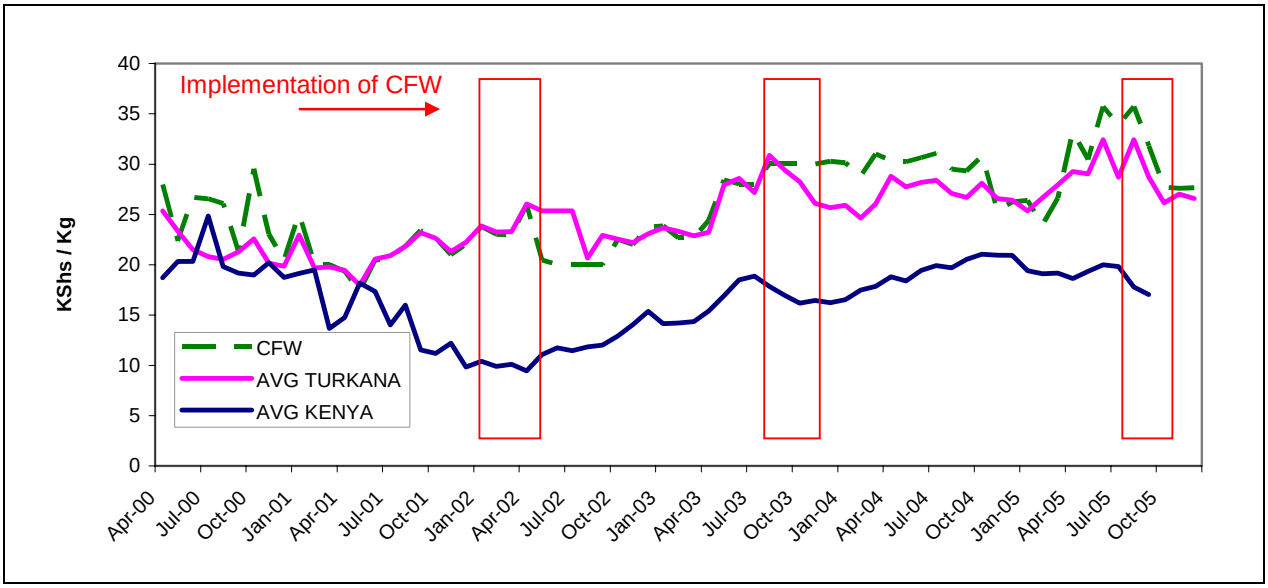


Fig.7 Maize price in CFW project area compared to district and national average



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.

Tab.4 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

Tab.4 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 done:

- 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 *vs* GFD), it is possible to consider how expectations seem to indicate a stronger and more favourable impact expected from CFW. This is in terms of allowing higher stock levels, increasing diversity of products, increasing competition. Both interventions seem to have no significant influence over price levels.[14]

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 in support of higher stock levels, of increasing diversity of commodities and of increasing competition. The divergence is as well –though to a lower extent- clear 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.

[14] 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 increaseing or decresing prices.

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 recognised that such analysis reflects the opinion of traders and not necessarily the one of consumers, particularly the most vulnerable that should be the primary target of food aid. In support to this consideration it is worth to take into account how group interviews conducted *ex-post* have shown more mixed results in terms of preference of either form of intervention. [15]

In order to get a full comparative perspective between the food aid and CFW interventions implemented in Turkana, it has been attempted to estimate a unit cost for the cash-based programme implemented by OXFAM. As in the case of the food aid programme considered above, reference has been made to *ex-ante* budget data. In particular, from the 6-month budget the relevant unit costs have been estimated as reported in Tab.5. In this case, attention has been focused on the transfer value of the intervention and particularly on the nutritional equivalent of the cash transfer and therefore the cost of the CFW material input has not been included in the analysis.[16]

Tab.5 Unit cost of cash transfers

Cost to trasfer:	USD
1 USD	*1.77*
1000 Kcal	*0.19*
1 MT cereal equivalent	*659*

At this stage, Tab.3 and Tab.5 give a first possibility to compare the average cost estimated in both cases. Surprisingly, it results more expensive to deliver and distribute cash rather than the equivalent in terms of food: 659 *vs* 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.

In order to deal with the first two points just raised, the analysis has been repeated on the costs incurred by OXFAM in a previous phase of both interventions. This gives us the chance to deal with *ex-post* data, which are as well sufficiently comparable in terms of scale of the intervention.
It is necessary to specify that in this case costs included in the analysis reflect purely the costs supported by OXFAM through the two interventions: distribution of food aid as WFP collaborating partner and distribution of cash. [17] [18] As shown in Tab.6, the comparison now gives us a different

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

[16] The inclusion of the CFW component as such would have involved a much deeper analysis which has been decided to avoid not being necessary for the central aim of this study.

[17] 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).

[18] 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.

picture: the cost to transfer cash has got reduced while the cost to transfer food has increased, reducing drastically the gap. This is essentially linked to the cost structure of the two interventions, with the EMOP having a higher share of fixed costs, and therefore more sensitive to discrepancies between planned and actual tonnage delivered.[19]

Tab.6 Unit cost of transfer through CFW and EMOP based on *ex-post* data

CFW		E MOP	
Cost to trasfer:	USD	Cost to trasfer:	USD
1 USD	*1.33*	*1 USD*	-
1000 Kcal	*0.14*	*1000 Kcal*	*0.13*
1 MT cereal equivalent	*496*	*1 MT cereal equivalent*	*454*

Finally, as mentioned above, a major determinant of the transfer value is given by the prices of food on the local market, because essentially such market prices determine the amount of food that can be purchased with the cash transferred. Clearly, the higher the price of the staple food on the local market, the lower is the value of the cash transfer. As shown in Fig.7 -and more amply discussed in Chapter 4-, prices prevailing on the Turkana markets are roughly double than the national average. In line with what described in Fig.1, such high prices prevailing on the local market drastically reduce the cost-efficiency of cash transfers. In order to get a more clear idea of the imbalance determined by the level of prices prevailing on local markets, Tab.6 has been re-estimated on the basis of national average market prices. This would provide us with a simulation of incurred project costs on the theoretical assumption that market prices prevailing on the Turkana markets were in line with the national average ones. The new estimates, reported in Tab.7, show how in such case the unit cost of CFW gets reduced of almost one third, making evident its much higher cost-efficiency.

Tab.7 Unit cost of transfer through CFW and EMOP on the basis of *ex-post* data and national average prices

CFW		E MOP	
Cost to trasfer:	USD	Cost to trasfer:	USD
1 USD	*1,33*	*1 USD*	-
1000 Kcal	*0,09*	*1000 Kcal*	*0,13*
1 MT cereal equivalent	*330*	*1 MT cereal equivalent*	*454*

Such consideration offers a clear reminder of the relevance of price levels on the cost-efficiency of intervention strategies and, therefore, on their relevance for decision making. The following two sections of this study will help to provide a closer look to this issue.

[19] 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–vs-planned is around 42% in terms of MTs and 44% in terms of nutritional value transferred.

3. Prices and profit margins

3.1 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 provide a closer look to the issue.

As a first step in the analysis, Fig.8 summarises the major trade flows for cereals and other commodities with the major exception of livestock. [20]

Fig.8 Cereal trade flows

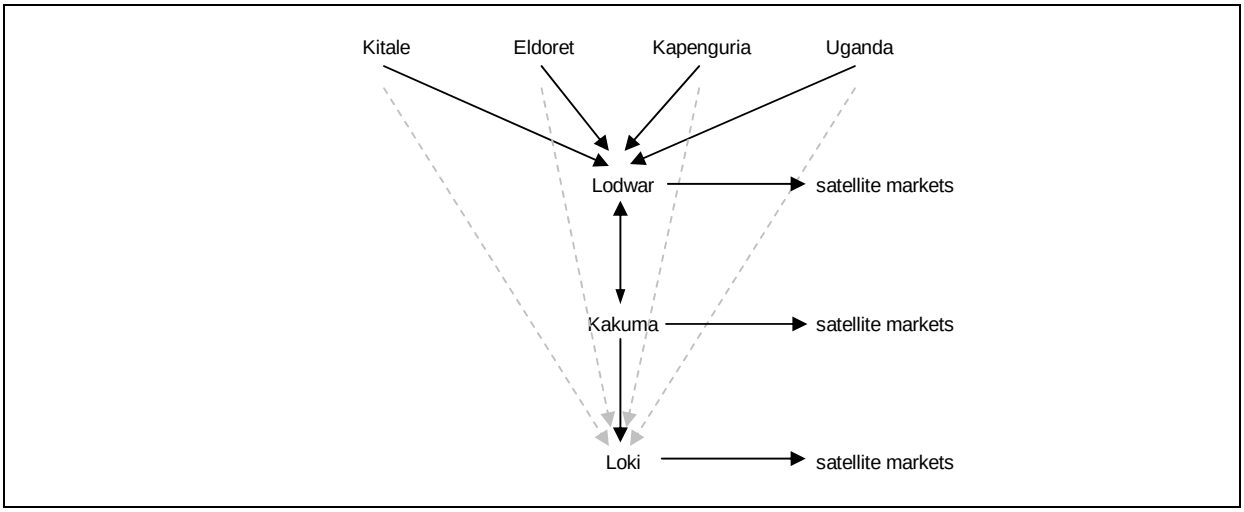


Fig.8 stresses the district dependency on trade inflows. In fact, apart from livestock trade flows, Turkana is almost completely dependent on imports of food and other commodities.
In general, major supplying markets are Kitale and Eldoret, which are essentially transit markets, particularly for what concerns food commodities. Part of such flows finds its origin in Ugandan markets; though of lower relevance is the trade flow which proceeds directly from Ugandan markets to markets in Turkana.

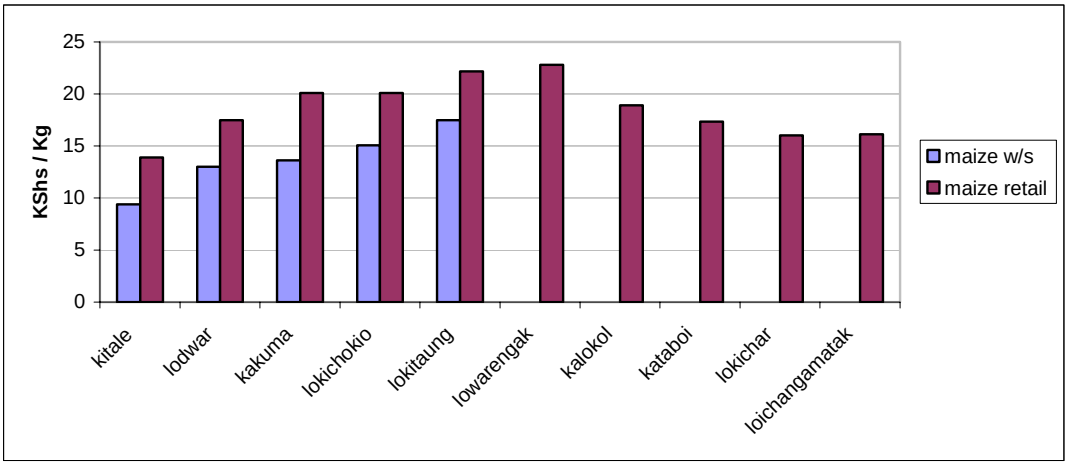
Within Turkana the major markets are Lodwer, Kakuma and Lokichokio. In view of their location along the transport routes, a major role is played by Lodwar, where a large part of the quantities which enter the district happens to be exchanged before finding its way towards the various satellite markets 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 of 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, on one side it somehow releases the burden on the local commercial capacity in terms of availability of transport and access to other resources, while on the other it increases artificially the supply on the local markets contributing this way to contain market price increase. 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.

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

3.2 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. 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 as beans. Such average rate 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, 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.

Fig.9 Price of maize on various markets



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 such purpose, information has been collected on costs incurred by a sample of 250 traders as well as on their purchasing and selling prices.[21]
Costs eventually incurred have been 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, have been identified according to traders' typology. At this regard it is necessary to consider that while in general 97% of traders can be considered 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 share constitutes what can be defined wholesaler-retailer: they are essentially retailers who have access to transport (almost always on a rent basis) and optimise the transport cost-efficiency by supplying smaller retailers who cannot afford to advance money to cover the transport cost.

[21] This information has been collected within a survey aiming at assessing traders' capacity and is better described in Chapter 5.

Tab.8 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% vs 15.5%) and are rather doubled in the mixed case 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 results to be maize meal (20% and 22% for retail and wholesale respectively and a remarkable 47% for the mixed case!).

Tab.8 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

3.3 The role of transport

It has been just highlighted how profits are not necessarily linked to the cost of the commodities. It is as well 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 such a basis, costs incurred by traders have been rearranged in a way to isolate the role of transport and procurement costs on profits achieved.
The results of regression analysis, reported in Annex 3, tell us that transport is the most productive factor and its contribution in determining the rate of return is double than the one of commodity costs and almost tenfold the one of all remaining costs. In particular, holding other factors constant, it results 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.

3.4 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 large part of the district and the low size 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 at this regard is the access to critical inputs such as money[22] and transport capacity. Such constraints impose a critical limitation to traders' choice among available options. In such conditions it is immediate to consider how an eventual intervention in support of local purchasing capacity would be helpful only in the short run, 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.[23]

In such conditions, initiatives that can help to maintain the economic viability of trade should be promoted. At this regard, all initiatives which can contribute to reduce costs should be preferred as well as initiatives aiming at stimulating a stronger entrepreneurial approach. Among such measures is the facilitation of establishing links and creating confidence between Turkana traders and operators on 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 chapters of this study, 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 has been 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 against the traditional suppliers of Turkana markets, their risk of dependence on high price is low, which contributes to the reliability of their supply flows.

[22] Cost of credit has been reported to be around 25% per month.

[23] The case of Kaikor, which has in the past benefited of both types of intervention (CFW and food aid) can provide a good example.
The population of Kaikor, estimated around 10,000 people, essentially relies on the quantities of food and other merchandise brought in by a very limited group of traders.
It has been reported that six traders (based in Kaikor) purchase in Lodwar and sell in Kaikor. In addition, 3 traders (2 based in Lodwar and 1 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 2 travels per month; in case of ongoing food aid interventions in and around Kaikor, the frequency gets reduced to 1 travel every 3 months. During the second half of 2005, in the absence of food aid and during the implementation of CFW programme, such frequency has increased to 1 travel per week mainly in view of price increase. 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.

4. Market integration

4.1 Scope of the analysis

The analysis of market integration is a tool commonly used to examine the effectiveness of market functioning. Essentially, it focuses on the transmission of market signals and checks whether such transmission proceeds in parallel throughout the economy or at different speeds. In theory a homogeneous transmission of market signals throughout the economy in exam means that the market functions well, while on the contrary any constraint in the transmission would be typical of segmented economies. In the latter case, the analysis should try to identify the segmentation and lead to understand the causes of such improper market functioning.

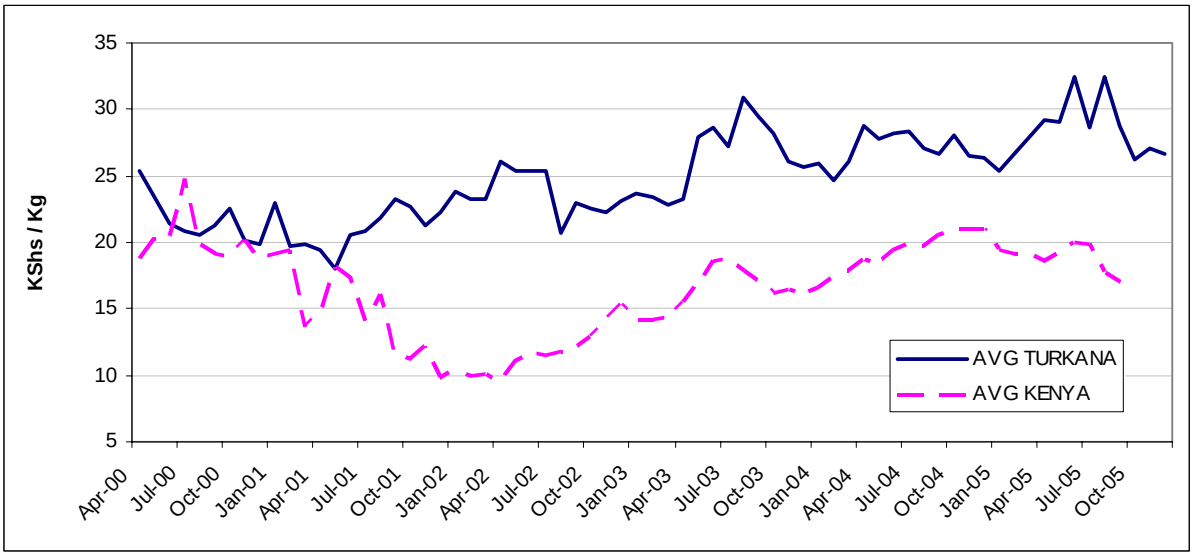
A description of data and methodology utilised is in Annex 4.

4.2 Analysis and findings

4.2.1 Analysis of correlation

In order to put the analysis in context, it is interesting to have a look at Fig.10 which provides a summary visualisation of the evolution of maize prices by comparing the average evolution in Turkana and in the rest of the country.[24]

Fig.10 Evolution of average price of maize in Turkana and in the rest of Kenya

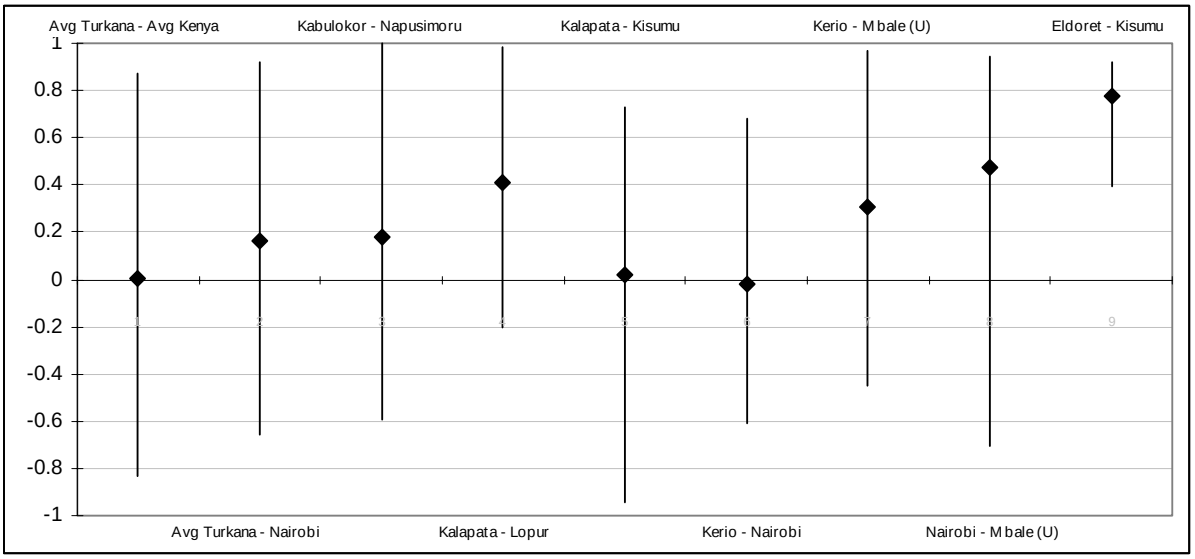


From a quick look at the graph, it seems appropriate to distinguish three phases: an initial period (roughly 1 year since the beginning of the timeframe considered) in which there is no clear link between the path of the two lines, a second period (between mid-2001 and mid-2002) in which the two series evolve in opposite direction with the result of 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 reasonably within a stable range, which could be eventually considered the normal gap between the two average prices in conditions of equilibrium.

[24] It is worth reminding that the analysis of market integration has been carried out exclusively on the price of maize, staple food both in Turkana and in the rest of Kenya.

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 has been estimated for all couples of markets on a 13-month moving interval. The results can be visualised in Fig.11 as summary representation of minimum, maximum and average values recorded during the period considered for a selected number of market combinations.

Fig.11 Minimum, maximum and average values of moving 13-month coefficient of correlation estimated for a selected number of market combinations



As shown in Fig.11, the range of the coefficient is generally very large. And, while averages seem to be in general 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 results short and the average quite high. An example of such cases is provided by the first and the last ones in Fig.11, the former being the coefficient of correlation between average prices in Turkana and Kenya, and the latter being the one for Eldoret and Kisumu.
The full set of averages and extreme values of the coefficient of correlations estimated on a 13-month period for all couples of markets covered in this study is reported in Tab.A2 in the Annex 4.

4.2.2 Analysis of co-integration

Results are reported in Tab.A4 and Tab.A5 in Annex 4. Such tables reflect different aspects of market integration. In particular, Tab.A4 reports the magnitude of adjustment as the short-run effect of price changes, and Tab.A5 reports the speed of adjustment. It is necessary to stress that such values have not been normalised and therefore reflect the Turkana and, in general, the Kenyan economy and should not be compared as such to different economic contexts.

A quick overview of such data is provided in Tab.9 below, which is also visualised through Fig.12. First of all, the strength of market connection as expressed by the evolution of price series is reflected through coefficient b. Its average value throughout the overall sample considered is 0.427. In absolute terms, such value seems to reflect a rather low level of integration; however, as mentioned above, the most appropriate way to interpret and use such value is in relative terms as a term of comparison for other specific values. Under such perspective, the value of the coefficient for the Turkana markets is below the average for the country and rather below the average value of the coefficient among the other markets considered in this study as the rest of the country ("non

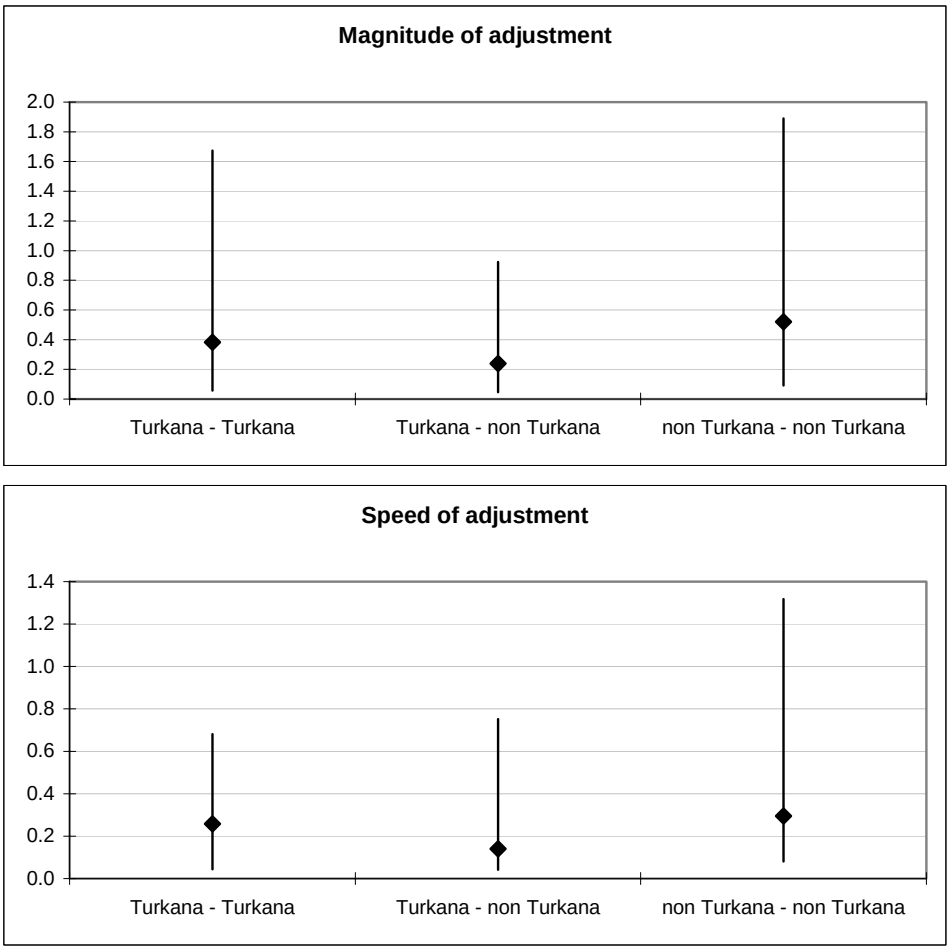
Turkana"). Such consideration was somehow expected, though a proper analysis and a measure of it was not yet available. However, the two most interesting points raised by the analysis are the following:

- While the market interconnection within Turkana seems acceptable, particularly when compared with the average value for Kenya, there seems to be a disconnect between markets in Turkana and the ones in the rest of the country. In such case, the link –as reflected in the coefficient b- gets drastically reduced (more than 50% reduction!) when shifting from the connection among non-Turkana markets to the one between Turkana and non-Turkana markets.
- In all groups the range for coefficient b results quite large.

Tab.9 Market integration: magnitude and speed of adjustment

	Markets			
	Turkana - Turkana	Turkana - non Turkana	non Turkana - non Turkana	all
coefficient b				
average	**0.383**	**0.244**	**0.525**	**0.427**
min	0.058	0.047	0.091	0.047
max	1.675	0.924	1.890	1.890
coefficient c				
average	**0.258**	**0.144**	**0.294**	**0.213**
min	0.044	0.040	0.081	0.040
max	0.681	0.752	1.318	1.318

Fig.12 Measures of market integration



The first point above is of major interest –and concern- in the analysis of market integration in Turkana and of the possible strategies to deal with it. At such regard, 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 trade flows move almost entirely from non-Turkana towards Turkana markets), but rather on the origin and motivation of the traders involved.

The second point raised above indicates that the degree of market integration is far from homogeneous in each of the groups considered. In particular, as evident from Fig.12, in each subgroup the average is in the lower part of the range, showing that in all sub-groups there are a few market links which work much better 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.

The considerations raised so far are well reflected in the case of the speed of adjustment of market prices, though the gap between within-Turkana market links and out-of-Turkana ones is in this case

lower. In general, the speed of adjustment seems to be quite low in all cases and the drop in the link between Turkana and non-Turkana markets is more pronounced.

In order to identify the markets most integrated in Turkana, the various Turkana markets considered in the analysis have been 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- it has been established a restricted list of the 20 couples of markets recording the highest values in terms of both magnitude and speed of price adjustment. Such list helps to identify within each couple the market which tends to play a role of price maker rather than price taker. On such a basis four lists have been generated and for each of them the two markets with the highest score have been selected, as reported in Tab.10 below. According to such list, 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.

Tab.10 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

At this point it is interesting to consider the location of the 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 consider the role that such small and localised project may have played in strengthening the commercial link between the rest of the country and such remote area in Turkana. This finding, quite remarkable, deserves more attention.

5. Traders' capacity

5.1 Scope of the analysis

As mentioned through the considerations of the analysis of market integration, the analysis of prices need to be put in perspective. For such a purpose it is particularly relevant to provide closer attention to one major category of players 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 has been attempted. This has been done in two ways. First, through a series of interviews and particularly benefiting of the good knowledge of OXFAM field monitors, an initial estimate of traders population has been carried out. Second, the major trading centres in the region have been visited and a more in-dept analysis of traders and their capacity has been carried out.

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.

5.2 An attempt to estimate food supply and demand

5.2.1 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 has been attempted. At this point it is necessary to specify here that this analysis is focused on trade of food and, at a limited extent, of livestock. Therefore, in this case a trader is not accounted as such unless even partially involved in such sector.

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 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 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 Tab.11.

Tab.11 Traders' key characteristics (%)

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

The first two characteristics reported (size and typology of business) seem to provide a clear overlap. In fact, it is immediate to consider as very likely that the big traders are as well 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 in Chapter 3. As expected, transport results to be a prerogative of large traders and of half of medium traders.

The next step has been to try to get a more in-depth insight on traders' business size using the data collected through a survey presented under 5.3. The assumption is that the basket of commodities traded is very limited, reflecting this way the food demand and consumption patterns in the district and in most of the rest of the country. On such a basis, the size has been 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.[25] Such monetary value has been finally converted into cereal equivalent, as reported in Tab.12, to estimate the quantity of food sold on a monthly average.

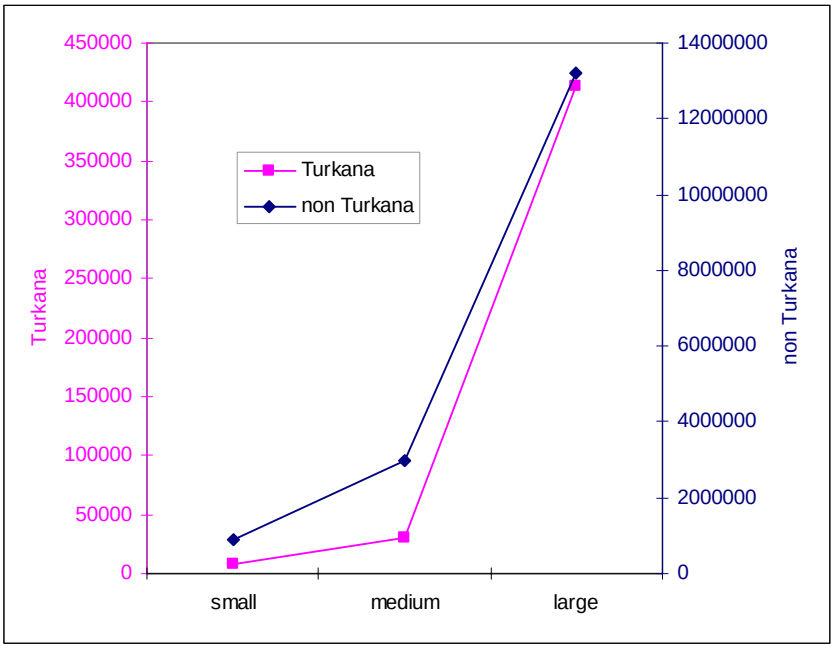
Tab.12 Monthly turnover of food traders

		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**

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 Tab.12 and Fig.13 give an immediate impression of the higher concentration of the business in the Turkana context.

[25] Information on the composition of trade in terms of food vs non-food have been 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.

Fig.13 Monthly turnover of food traders



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.

5.2.2 Food supply versus food demand

On the basis of estimates for trader population and composition 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 has been estimated around 5,100 units. Further, Tab.11 has provided a few information on the typology of Turkana traders. Finally, Tab.12 has helped to define the size of the business of different categories of traders. At this stage, such info has been combined in Tab.13.

Tab.13 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*

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 utilised. First of all, we can start considering the quantity provided by retailers, since directly passed 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 directly the customers? We could think that the balance between the tonnage provided by wholesalers and the one 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 Chapter 3. In this line, 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 perspective the amount of food exchanged in Turkana would be around 82,000 MTs of cereal equivalent per year, and in such case, the difference between such 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 have been estimated in Chapter 2 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.

5.3 Traders' survey: findings

Data and methodology conducted for the traders' survey are reported in Annex 5.

First of all, it is worth noting that, out of the 252 traders in the sample, only 7, all based out of the district, have not manifested interest in starting business in Turkana, and only 1 currently based and operational in Turkana has expressed unwillingness to consider the possibility to scale 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.

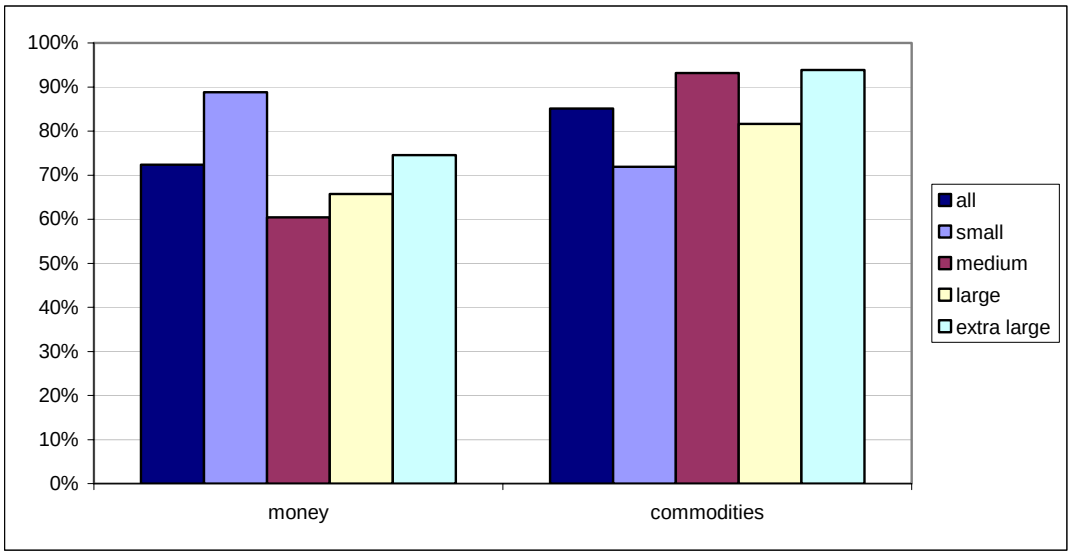
However, as expected, major constraints are envisaged and traders have contributed to identify them.

5.3.1 <u>Availability and access to key inputs: money versus commodities</u>

As a first step in the analysis, it has been considered 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: financial resources and commodities. Another key input in the case under consideration, the availability and access to transport capacity, has not been 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 Fig.14, availability of and access to (additional) financial resources seem on average slightly more difficult than in the case of availability of and access to (additional) commodities. In

particular, Fig14 can be interpreted as on average a trader has around 70% of probability to access additional money required and, at the same time, has around 85% of probability to access 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 except small traders, whose perception is reversed (i.e. easier access to money rather than to the required commodities). This case seems of simple interpretation, given on one side the minimum investment required in most of the small-size business, and on the other the major limitation of drastic immobility with consequent almost total dependency on bigger traders to secure supplies. For all other categories of business size the discrepancy in terms of access to the critical inputs identified is wider than on average. The extreme is reached in the case of medium size traders for whom the probability to be able to access the required commodities is around 50% higher than the probability to find additional financial resources.

Fig.14 Traders' confidence in getting access to critical inputs



5.3.2 Determinants of Willingness To Trade

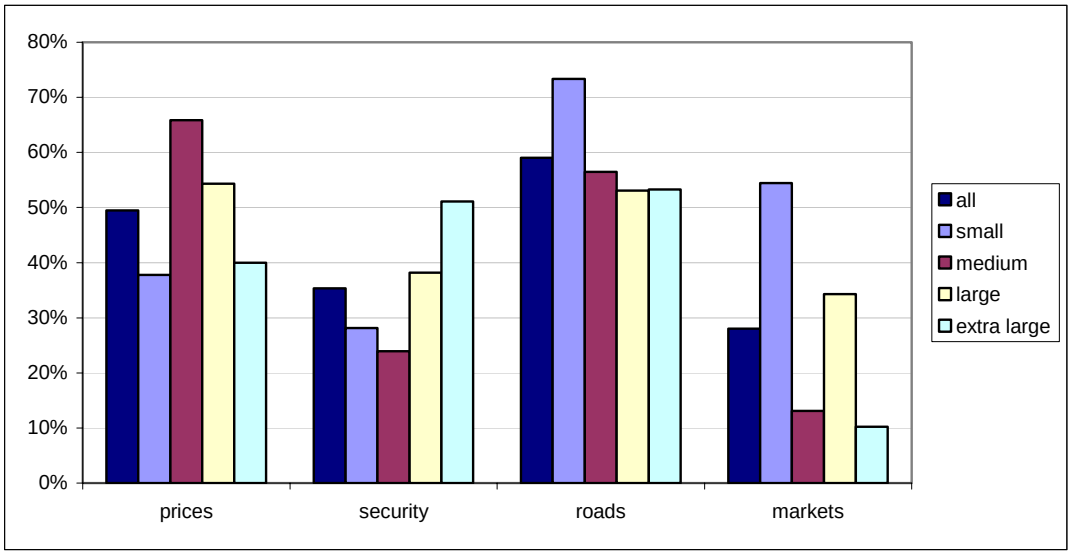
Once clarified the question of the comparative access to critical inputs, attention has been shifted to the analysis of other contextual factors which play a determinant role in the decision of the business size. Four of such factors have been included in this analysis: prices, security, roads, markets,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

In general terms, the current limited accessibility throughout the district, as summarily identified by the status of the roads has achieved the strongest support through the survey; while the price factor has been recorded on a status of second priority in the traders' decision to invest. Third and fourth factors have been identified respectively as the poor security conditions and the poor access to credit.

Having said the above, the picture gets a bit different when considering separately the different trade categories. 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.
Fig.15 and Tab.14 help to classify the main priorities and determinants of willingness to trade of the different categories of traders.

Fig.15 Determinants of willingness to trade



Tab.14 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

As summarised in Tab.14, 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 to the wide spectrum of categories of traders covered in this analysis.

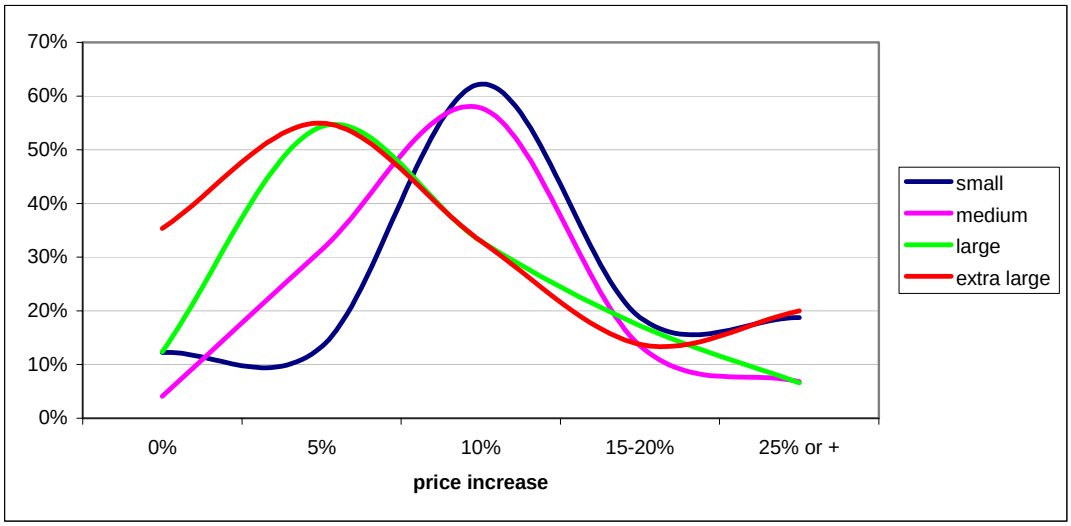
With reference to the last point mentioned above, it is necessary to consider how improvement in the quality of roads and increase in commodity prices are two sides of the same coin, since both aim at increasing the trader profit, either through a reduction of costs (improvement of accessibility) or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

Indeed, the aim of increasing profit is understandable as 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 such view, both options (increase accessibility and consider the feasibility of price increase) are worth to be considered. However, having said the above, it is easy to consider how the two strategies are of a totally different nature: the first one requiring heavy budget and major 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. In such perspective, we leave aside the option of increasing accessibility and focus on considering the feasibility of making use of price increase as determinant of WTT as a factor to increase food supply. In other words, the question now becomes: "How much does price need to rise to be able to cover the gap in food supply identified under 5.2?"

5.3.3 Trade-off between price and food supply

Fig.16 presents the estimates of WTT of the various categories of traders considered in this study in response to changes in the prevailing market prices. In particular, the possible price increases envisaged range between 0% (no increase) and 25% 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 interviewed trader.

Fig.16 Willingness to trade in response to price changes



While for all categories of traders considered the evolution of the WTT has the expected inverted-U shape,[26] two major groups can be identified: large and extra-large traders, on one side, and small and medium-size traders on the other.

In the case of small traders no much change in WTT is reported until the price increase moves from 5% towards 10%, which also corresponds to its maximum WTT value. In other words, the small traders are clearly the slowest to react to price increases.

[26] 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 of 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.

The case of medium traders is rather similar to the previous case in terms of the maximum WTT reported. However, contrary to small traders, medium-size traders seem to be much more reactive to price changes, even in case of small changes.
The cases of large and extra-large size traders are very similar, particularly in the estimated maximum WTT (around 55%) and in the level of price increase at which such maximum value is reached (around 5%). The major difference in this case remains in the starting value of WTT, that is the value of WTT corresponding to 0% price increase. In such case the value of WTT for large traders is more than three-fold the one for large traders. In other words, they would be ready to increase remarkably the quantities supplied even in absence of price increase. 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. On the contrary, large traders report the highest slope in the WTT curve –and therefore the highest marginal WTT or propensity to invest- in response to price changes between 0% and 5%. In other words, large traders would be extremely sensitive to price changes.
On the basis of the points just raised, it seems possible to assume in a rather arbitrary manner that:

- Extra-large traders' reaction to price increases would be rather limited (unless other concomitant measures are taken, as in particular improvement of road quality and in general increased accessibility).
- Small traders' reaction would start only after a minimum price increase of at least 5%.
- Medium and large traders would be quite reactive to (even minimum) price changes.

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 get 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 has been carried out on the basis of the assumptions mentioned above. In particular, Tab.15 and Tab.16 help to follow the analysis of the expandability of supply from the different categories of traders.

Tab.15 WTT multipliers

	Rate of price increase										
	0%	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%
Trader category											
Small	0,123	0,125	0,127	0,129	0,131	0,133	0,231	0,329	0,426	0,524	0,622
Medium	0,041	0,095	0,150	0,205	0,259	0,314	0,367	0,420	0,472	0,525	0,578
Large	0,123	0,207	0,290	0,374	0,458	0,543	0,500	0,458	0,415	0,373	0,330
Extra large	0,353	0,393	0,432	0,471	0,511	0,550	0,506	0,462	0,418	0,374	0,330

In particular, Tab.15 estimates the multipliers to be used in Tab.16 for the estimation of expandability of food supply marketed by different trader categories. In Tab.15 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 increase the food supply traded in the district and, as such, will contribute to reduce the possible price increase required to achieve the target.

Tab.16 provides the results of the simulation exercise. On the realistic assumption that the large traders will be willing and able to react faster, a price increase of approximately 3-5% should be able to generate through the market system the increase in marketed supply estimated under 5.2 (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.

Tab.16 Expandability of food supply

	Traders category					
	Small		Medium		Large	
Estimated Food Supply	28981		31628		63272	
Expandability						
Rate of price increase	additional	cumulative	additional	cumulative	additional	cumulative
0%	3559	32540	1290	32919	7770	71042
1%	3617	32599	3019	34647	13075	76347
2%	3676	32657	4748	36376	18379	81652
3%	3735	32716	6477	38105	23684	86956
4%	3793	32774	8206	39834	28989	92261
5%	3853	32834	9933	41561	34325	97597
6%	6689	35670	11601	43229	31661	94934
7%	9523	38505	13271	44899	28966	92238
8%	12358	41339	14941	46569	26271	89543
9%	15192	44173	16611	48239	23575	86847
10%	18026	47008	18281	49909	20880	84152

Having said the above, 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 in terms of increased accessibility) may stimulate through the category of out-of-Turkana extra-large traders.
- such estimate does not take into account the possibility to increase traders' capacity (particularly of medium size). It is expected that such eventual increased capacity would help to increase further expandability of supply in correspondence of lower price increases as the ones determined in Tab.16.

Particularly, the latter point is of extreme relevance in the analysis and formulation of strategies aiming at increasing food supply in Turkana.

6. Conclusions and recommendations

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

First of all, it has been considered how the current 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 gets more and more relevance when considered under a dynamic perspective, which is characterised 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 the two sides of the coin: while, on one side, high prices are a prerequisite to attract traders' interest and involvement, on the other side, they drastically limit access to a large part of the population.

In general, trading activities in Turkana are found to be profitable. This is particularly due 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. 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 slightly below the average for the rest of the country. Such consideration was somehow 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:

- While the market interconnection within Turkana seems, on average acceptable, particularly when compared with the average value for Kenya, there seems to be a disconnect between markets in Turkana and the ones in the rest of the country. In such case, the degree of integration gets drastically reduced when shifting from the connection among non-Turkana markets to the one between Turkana and non-Turkana markets.
- In all groups of markets the range for the degree of integration results quite large. This means that at all levels (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 tackle the markets which are currently most connected, since they are best placed to work as interlink 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 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 regard, it has been 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 localised project may have played in strengthening the

commercial link between the rest of the country and such remote area in Turkana, this finding, quite remarkable, deserves more attention.

The risk of implementing market-based interventions in areas where markets are disconnected from the district major trade network is to generate inflation. In particular, the more disconnected is the market where a cash-based intervention is implemented, the higher can be expected to be the risk of inflationary consequences. At this regard, a review of market prices in the area of implementation of CFW has not been able to provide enough support in recognising 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 has been carried out in order to analyse the feasibility of increase of trade inflow in the district. Such profiling has highlighted the drastic gap in terms of capacity between traders based in Turkana and in the neighbouring areas in Kenya.
Following on such profile exercise, the analysis has tried to identify the major determinants of traders' current involvement in Turkana and has explored the traders' willingness to scale up (or, otherwise, to initiate at all) such involvement. In general terms, the currently very poor status of infrastructure throughout the district has been lamented as the major disincentive, while the price factor has been recorded as second priority in the traders' decision to invest. Third and fourth factors have been identified respectively as the poor security conditions and the poor access to credit. [27]

Having said the above, it is necessary to consider how improvement in the quality of infrastructure and increase in commodity prices are two sides of the same coin, since both contribute to increase the trader profit, either through a reduction of costs (improvement of accessibility) or through an increase of income (price increase). In such view, both options –i.e.: a) increase accessibility, and b) consider the feasibility of price increase- are worth to be considered. However, the two strategies are of a totally different nature, the first one requiring heavy budget and major 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. In such perspective, while recommending more attention from the central authorities on the need to improve transport infrastructure, this study has focused on considering the feasibility of making use of price increase as a factor to strengthen food supply. At such regard it has been highlighted the need 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 (i.e. demand support through cash distribution) would find it hard to get 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-

[27] 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.

scale trade can be expected to have inflationary consequences. Both problems (i.e. 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).[28]

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 the above, 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 in terms of increased accessibility) may stimulate through the category of out-of-Turkana extra-large traders.
- such estimate 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 increase further expandability of supply in correspondence of 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 such concern, it is advisable to combine demand-driven and supply-driven strategies. In such perspective, the latter point mentioned above results of extreme relevance for the analysis and formulation of strategies aiming at increasing food supply in Turkana. In order to minimise 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[29] 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).

[28] 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 -not 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.

[29] Basic framework for data collection and analysis is in Annex 6.

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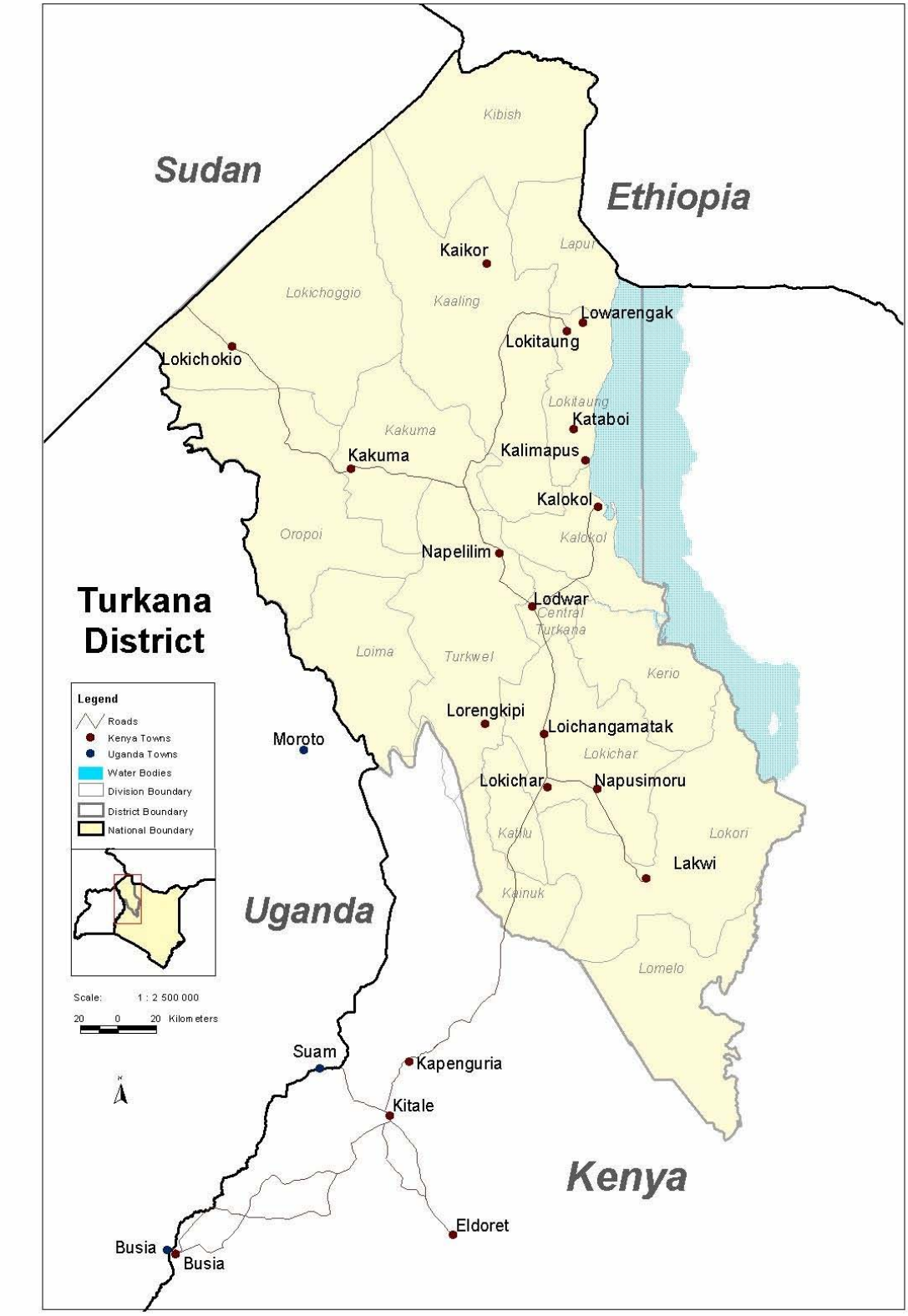
Annexes

Map of Turkana District



Tab.A1 Population in Turkana by Division in 2005

Division	Population
Central	40,574
Kaaling	27,170
Kainuk	13,328
Kakuma	109,699
Kalokol	32,459
Katilu	14,174
Kerio	17,406
Kibish	6,842
Lapur	14,436
Loima	38,382
Lokichar	24,615
Lokichoggio	40,876
Lokitaung	25,513
Logori	20,237
Lo melo	6,876
Oropoi	20,355
Turkwel	56,345
Total	**509,287**

Role of transport on profit rates

Costs incurred by traders have been rearranged in a way to isolate the role of transport and procurement costs on profits achieved. For such a purpose the following production function of Cobb-Douglas type has been used:

$$Y_i = X_{1i}^{b_1} X_{2i}^{b_2} X_{3i}^{b_3} e^{u_i} \qquad (1)$$

where:

Y_i is the rate of return
X_1 is the procurement cost of commodity
X_2 is the transport cost
X_3 is any other cost
u is the error term
e is the base of natural logarithm

Market integration

The data

Market studies usually consider prices and quantities exchanged. Very few studies have tried to combine the analysis of both, but in such cases the adoption of a much more complex methodology has been required. A more common approach is to focus on one of the two variables, prices or quantities. In some cases, as the present one, such limitation is dictated by the scarcity of data.

The analysis of market integration makes use of 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, the major ones being among others:

- 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 remains vague at such 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.[30]
- 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, being Turkana markets the object of the present analysis, the ALRMP dataset has been taken as the principal data source. This has involved a series of limitations, the major ones are reported 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 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 included in the analysis are listed in Tab.A2. They include 8 sample areas from Turkana and a provincial average (from now on called “markets”) as well as another set of 10 major markets including a country average which should work as terms of comparison. Such non-Turkana markets are either major markets with country relevance or major 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 have been deducted from regional sources such as RATIN, RATES and TRADENET. Wherever feasible, retail market price data have

[30] The number of food commodities covered by the ALRMP dataset has been increased since mid 2005.

been reproduced. When only wholesale prices were available, retail prices have been estimated through the use of a conversion rate estimated on the basis of Ugandan and Kenyan wholesale and retail maize prices.[31] Ugandan price data have been converted into Kenyan Shilling using a time series of exchange rates. All time series have been 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, have been filled through linear interpolation.[32] 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 as well shorter than the other markets in the dataset; however it is considered to be continuously long enough to provide significant results.

Methodology

A preliminary step in this type of analysis is provided by a review of the correlation among the price time series of various markets. This is carried out through common correlation. Though methodologically rather basic and approximative, this type of analysis is much easier and faster to be carried out than the proper procedure for the analysis of co-integration and therefore could be proposed as a basic system of monitoring the progress of market integration.

Having said the above, the limitations of correlation analysis need to be recognised. In particular, correlation coefficient may hide the involvement of synchronous confounding factors such as general price inflation and seasonality. Therefore, after considering the evolution of correlation coefficients, the proper co-integration analysis is to be carried out. Such analysis follows a rather cumbersome methodology; which is not necessarily required for monitoring purposes.

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:

$$p_{it} = a + b\, p_{It} + u_t \qquad (2)$$

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
a and b	represent the coefficients to be estimated

As typical of time-series analysis, a precondition for the co-integration analysis is the verification of the condition of stationarity. This implies that in the long run price changes in market i do not drift apart from those recorded in market I. When this occurs the two price series and – consequently- the two markets are said to be co-integrated.

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

[32] 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, Having said that, it is though to be recognised the possibility that such gaps exist because no quantities may have been sold at that time.

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

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

$$\Delta p_{it} = a_t + b\ \Delta p_{It} + c\ (p_i - p_I)_{t-1} + u_t \qquad (3)$$

where Δ indicates the change in price in market i or I between one month 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. Under this perspective, the coefficient b measures the short-run effect in the process of price change and the coefficient c 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.

For the present analysis the results of the test for stationarity of the time series are reported in Tab.A3 in Annex 4. In no case could the null hypothesis of a unit root be rejected. The same applies for the co-integration analysis between the various series using the residual-based unit root test.

Results of the analysis of co-integration are reported in Tab.A4 and Tab.A5 in Annex 4. Such tables reflect different aspects of market integration. In particular, Tab.A4 reports the magnitude of adjustment as the short-run effect of price changes, and Tab.A5 reports the speed of adjustment.

Tab.A2 Range values of 13-month moving coefficient of correlation (average, min, max)*

	kabulokor	kalapata	kalimapus	kerio	lokwi	lopur	napeililim	napusimoru	turkana avg	nairobi	mombasa	eldoret	kitale	kisumu	bugoma	mbale-k	kenya avg	mbale-u	busia-u
kabulokor																			
kalapata	**0.095** -0.595 0.980																		
kalimapus	**0.323** -0.377 0.906	**-0.037** -0.560 0.847																	
kerio	**-0.022** -0.824 0.904	**0.156** -0.643 0.937	**-0.072** -0.672 0.818																
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															
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														
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													
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												
turkana avg	**0.153** -0.778 0.997	**0.513** 0.166 0.990	**0.351** -0.445 0.925	**0.165** -0.625 0.927	**0.625** -0.518 0.995	**0.611** -0.044 0.997	**0.512** -0.322 0.995	**0.560** -0.258 0.996											
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	**0.164** -0.654 0.924										
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	**-0.014** -0.931 0.921	**0.626** -0.074 0.965									
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	**0.172** -0.781 0.850	**0.644** 0.139 0.924	**0.623** -0.170 0.912								
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	**0.115** -0.832 0.987	**0.542** -0.195 1.000	**0.465** -0.505 0.867	**0.724** -0.108 0.997							
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	**0.200** -0.861 0.931	**0.645** -0.339 0.967	**0.622** -0.442 0.969	**0.776** 0.397 0.920	**0.714** -0.326 0.959						
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	**0.020** -0.775 0.822	**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					
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	**0.233** -0.572 0.906	**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				
kenya avg	**0.223** -0.786 0.891	**-0.070** -0.865 0.676	**0.152** -0.805 0.927	**-0.146** -0.758 0.475	**0.134** -0.821 0.953	**-0.081** -0.818 0.886	**-0.012** -0.821 0.587	**0.047** -0.821 0.904	**0.004** -0.834 0.872	**0.674** -0.269 0.956	**0.699** 0.219 0.933	**0.661** -0.116 0.900	**0.544** -0.672 0.899	**0.685** -0.397 0.937	**0.639** -0.592 0.965	**0.654** -0.375 0.964			
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	**0.023** -0.848 0.771	**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	**0.533** -0.425 0.890		
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	**…** … …	**0.859** 0.833 0.944	**-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	**0.054** -0.732 0.264	**0.981** 0.977 1.000	

* average in bold

Tab.A3 Integration test for unit root

	Step 1		Step 2	
	No. of lags	test value	No. of lags	test value
Kabulokor	0	-2.202	0	-7.903
Kalapata	2	-2.806	2	-6.921
Kalimapus	1	-2.730	1	-8.570
Kerio	1	-2.483	1	-7.819
Lokwi	1	-2.745	1	-6.201
Lopur	1	-2.805	1	-7.532
Napeililim	1	-2.565	1	-7.220
Napusimoru	0	-2.860	0	-8.554
Turkana avg	0	-2.283	0	-10.788
Nairobi	0	-1.326	0	-6.429
Mombasa	0	-1.493	0	-7.058
Eldoret	0	-1.275	0	-5.243
Kitale	0	-1.954	0	-4.853
Kisumu	0	-1.614	0	-7.252
Bugoma	0	-2.251	0	-6.295
Mbale K	0	-2.235	0	-5.933
Kenya avg	0	-1.926	0	-9.757
Mbale U	0	-2.004	0	-6.689
Busia U	0	-0.980	0	-5.175

Step 1 is meant to test the hypothesis of integration of order 1 versus order 0 [I(1) versus I(0)]
Step 2 is meant to test the hypothesis of integration of order 2 versus order 1 [I(2) versus I(1)]
Augmented Dicky-Fuller critical value at 5% is -2.916

Tab.A4 Market integration: coefficient b (magnitude of adjustment)

I \ i	kabulokor	kalapata	kalimapus	kerio	lokwi	lopur	napeililim	napusimoru	turkana avg	nairobi	mombasa	eldoret	kitale	kisumu	bugoma	mbale-k	kenya avg	mbale-u	busia-u
kabulokor		0.297 ***	0.366 ***	0.058					0.127 **				0.152 *			0.176 *		0.204 *	
kalapata	0.407 ***			0.187 **	0.188 **	0.194 **	0.225 **	0.194 **	0.193 ***	0.077 *								0.235 **	0.924 **
kalimapus	0.271 ***				0.168 **			0.120 **	0.193 ***	0.047						0.191 **			
kerio		0.332 **				0.582 ***	0.569 ***	0.259 **						0.133 *					0.142 **
lokwi		0.305 **	0.526 **			0.179 *	0.437 **	0.497 ***	0.330 ***	0.148 **	0.127 **	0.195 **			0.262 *				
lopur		0.279 **		0.530 ***	0.162 *		0.463 ***	0.416 ***	0.197 **					0.125 *					
napeililim		0.187 **		0.261 ***	0.188 **	0.221 ***		0.200 **	0.154 **	0.058 *				0.176 **					
napusimoru		0.288 **	0.401 **	0.234 **	0.481 ***	0.454 ***	0.438 **		0.300 ***	0.155 **	0.124 **	0.196 *	0.299 *						
turkana avg	0.881 ***	0.854 ***	1.675 ***		0.906 ***	0.555 ***	0.798 ***	0.794 ***		0.217 **									
nairobi		0.443 *	0.511 *		0.461 **		0.436 *	0.485 **	0.256 **		0.439 ***	0.750 ***	0.920 **	0.663 ***	0.535 *	1.093 ***	0.280 **	0.945 **	
mombasa					0.343 **			0.330 *		0.399 ***		0.693 ***	0.516 *	0.661 ***	0.796 **	0.560 **	0.519 ***		1.890 *
eldoret			0.286 *		0.210 **			0.209 *		0.241 ***	0.270 ***		0.840 ***	0.295 **	0.345 **	0.619 ***	0.207 **	0.414 **	
kitale				0.079 **				0.131 *		0.147 **	0.118 *	0.318 ***		0.267 ***		0.607 ***	0.209 **	0.373 *	
kisumu				0.249 *		0.264 *	0.781 **			0.340 ***	0.409 ***	0.440 **	0.948 ***		0.917 ***	0.567 ***	0.415 ***	0.736 **	
bugoma			0.233 *		0.129 *					0.091 *	0.172 **	0.157 **		0.277 ***		0.481 ***	0.379 ***		
mbale-k		0.086 *	0.096 **	0.098 **	0.086 **	0.118 **				0.350 ***	0.239 **	0.675 ***	0.755 ***	0.575 ***	1.167 ***		0.319 ***	0.767 **	
kenya avg				0.082 **	0.074 **	0.110 **				0.176 **	0.374 ***	0.326 **	0.527 **	0.492 ***	0.972 ***	1.249 ***			
mbale-u	0.142 *	0.233 **								0.141 **		0.149 **	0.210 **	0.170 **		0.222 **			0.950 *
busia-u		0.903 **												0.258 *				0.773 *	

*** significant at 99%
** significant at 90%
* significant at 80%

Tab.A5 Market integration: coefficient c (speed of adjustment)

	i	kabulokor	kalapata	kalimapus	kerio	lokwi	lopur	napeililim	napusimoru	turkana avg	nairobi	mombasa	eldoret	kitale	kisumu	bugoma	mbale-k	kenya avg	mbale-u	busia-u
	kabulokor		-0.133 **	-0.282 **	-0.081 **	-0.091 **	-0.096 **	-0.176 **	-0.113 **	-0.044 *	-0.057 **	-0.060 **	-0.105 **	-0.188 **	-0.083 **	-0.122 **	-0.177 **	-0.066 **	-0.204 **	
	kalapata	-0.127 **		-0.292 **	-0.254 **	-0.282 **	-0.226 **	-0.369 ***	-0.184 **	-0.138 **		-0.050 *				-0.110 **	-0.077 *	-0.061 *	-0.115 **	
	kalimapus	-0.208 **	-0.206 **		-0.110 **	-0.128 **	-0.212 **	-0.291 **	-0.201 **	-0.117 **	-0.058 **	-0.075 **	-0.060 *	-0.174 **	-0.067 **	-0.149 **	-0.165 **	-0.090 **	-0.147 **	
	kerio	-0.120 **	-0.398 ***	-0.366 ***		-0.359 **	-0.162 **	-0.411 ***	-0.269 **	-0.197 **	-0.059 *	-0.078 **	-0.062 *	-0.194 **	-0.074 **	-0.185 **	-0.143 **	-0.115 **	-0.136 **	-0.752 **
	lokwi	-0.082 *	-0.471 ***	-0.331 **	-0.411 ***		-0.193 **	-0.300 **	-0.372 ***	-0.102 **				-0.129 *		-0.122 *	-0.096 *	-0.084 *		
	lopur	-0.162 **	-0.448 ***	-0.396 **	-0.163 **	-0.223 **		-0.346 **	-0.183 **	-0.135 **	-0.074 **	-0.086 **	-0.067 *	-0.160 **	-0.086 **	-0.134 *	-0.129 **	-0.102 **	-0.144 **	
	napeililim	-0.170 **	-0.260 **	-0.399 ***	-0.182 **	-0.170 **	-0.170 **		-0.180 **	-0.143 **				-0.158 **		-0.121 *	-0.137 **	-0.081 **	-0.126 **	
	napusimoru	-0.144 **	-0.459 ***	-0.431 ***	-0.340 ***	-0.414 ***	-0.189 **	-0.413 ***		-0.183 **		-0.052 *		-0.176 **			-0.106 *			
	turkana avg	-0.170 **	-0.530 ***	-0.487 ***	-0.470 ***	-0.272 **	-0.358 **	-0.681 ***	-0.387 ***		-0.058 *	-0.088 **		-0.171 **	-0.072 *	-0.159 **	-0.160 **	-0.108 **	-0.126 **	
I	nairobi	-0.101 *	-0.215 **	-0.312 **	-0.220 **	-0.231 **	-0.176 **	-0.271 **	-0.170 **	-0.066 *		-0.379 ***	-0.142 **	-0.259 **	-0.304 **	-0.285 **	-0.342 **	-0.559 ***	-0.240 **	
	mombasa	-0.095 *	-0.163 **	-0.267 **	-0.165 **	-0.162 **	-0.121 **	-0.249 **	-0.138 **		-0.262 **		-0.134 **	-0.256 **	-0.290 **	-0.343 **	-0.360 **	-0.615 ***	-0.139 *	-0.914 *
	eldoret		-0.120 **	-0.191 **	-0.072 *	-0.104 **	-0.076 *	-0.139 **	-0.089 **		-0.089 **	-0.105 **		-0.212 **	-0.144 **	-0.292 **	-0.248 **	-0.220 **	-0.219 **	
	kitale		-0.175 **	-0.175 *		-0.109 **		-0.097 *			-0.120 **	-0.081 *	-0.184 **		-0.110 **	-0.223 **	-0.297 *	-0.162 **		
	kisumu	-0.087 *	-0.153 **	-0.265 **	-0.126 **	-0.162 **	-0.113 **	-0.201 **	-0.136 **		-0.273 ***	-0.310 ***	-0.358 ***	-0.318 **		-0.382 **	-0.813 ***	-0.496 ***	-0.328 **	
	bugoma	-0.101 *	-0.114 **	-0.276 **		-0.110 **	-0.081 **	-0.167 **	-0.133 **		-0.086 **	-0.131 **	-0.139 **	-0.235 **	-0.121 **			-0.204 **		
	mbale-k		-0.214 **	-0.161 *	-0.121 *	-0.175 **	-0.172 **	-0.383 **	-0.210 **	-0.100 **	-0.204 **	-0.256 **	-0.348 **	-0.402 **	-0.625 ***	-0.655 **		-0.182 **	-0.411 **	
	kenya avg	-0.084 *	-0.160 **	-0.196 *	-0.137 **	-0.176 **	-0.107 **	-0.209 **	-0.122 **		-0.189 **	-0.341 **	-0.155 **	-0.193 **	-0.203 **	-0.333 **	-0.424 **		-0.152 *	
	mbale-u		-0.086 *	-0.191 *	-0.073 *			-0.188 **	-0.125 **	-0.040 *	-0.112 **	-0.148 ***	-0.294 ***	-0.376 ***	-0.253 ***	-0.320 ***	-0.355 ***	-0.208 ***		-1.318 *
	busia-u											-0.456 **			-0.197 **		-0.204 *			

*** significant at 99%
** significant at 90%
* significant at 80%

Traders' survey

Data and methodology

A survey of 252 traders has been carried out; 205 being based in the district and the rest being in the surrounding areas. The selection process has been essentially dictated by geographical considerations, where preference has been 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 have been asked whether they are or have been operational in Turkana and in both cases have been presented 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.

In both cases (traders based in or out of Turkana) the number of possible reasons for acceptance or rejection of the availability and interest in initiating and/or scaling-up their involvement in the region has been reduced to the following four:

- prices
- security
- roads
- market

The variable of prices is instrumental to the analysis of possible consequences of increasing the demand –in this case limited to food items-. In particular, the analysis of traders' *willingness to accept* to start or increase activities in Turkana should help to consider the feasibility to expand and adapt supply to the estimated increased demand and concurrently estimate the possible risk of inflation.

The analysis has been carried out through multivariate regression. In particular, the following *logit* model has been applied.

$$Y_i = f(I)_i \qquad (4)$$

$$I_i = b_0 + \Sigma\ b_j X_{ji} \qquad (5)$$

where:

Y_i is the observed response for the i^{th} observation (Y_i=1 for an adopter, Y_i=0 for a non-adopter)

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)

Market monitoring system

In order to improve collection and analysis of market information it is advisable to make reference to what is already available.
The current level of market information in Turkana is limited to what put in place through the ALRMP, whose limitations have been presented under Annex 4.

Information collected by ALRMP which is relevant for the purpose of this study is limited to price data. Considering that the structure of the ALRMP monitoring system is based on household expenditure data, such data should be used to estimate the average price of the various commodities for each market covered by ALRMP. This should be able to provide a sufficient dataset to get a good coverage throughout the district.

In addition, OXFAM should start market data collection in all major markets in the areas of intervention as well as possibly in a few others in surrounding areas.

The proposed format for data collection is in Tab.A6. Data to be collected though such form is:

- Price of key commodities
- Quantity of key commodities available on the market
- Quantity of key commodities exchanged through the market

It is recommended that the data collection is carried out in each market on the same week day. Recommended frequency is weekly, otherwise monthly.

Additional price data for reference markets outside Turkana are available in Nairobi (through ALRMP and CBS). They should provide a term of comparison in the analysis.

In terms of data analysis, the aim should be to detect changes in the evolution of prices and, possibly, in quantities supplied and exchanged. In addition, indexes can be calculated from the data collected; as in particular, the terms of trade (e.g.: price of maize / price of goat).
While, the above should be sufficient for the analysis, the data collection form includes subjective information to be gathered from both traders and consumers about their impression on changes of prices and quantities over time (1 month and 1 year lag). Such info should be subsidiary and used to integrate the analysis of actual levels (for instance it can highlight different perspectives from different operators: traders and consumers).

For the analysis of market integration, it is suggested to monitor the correlation of price trends. In particular, each month it should be estimated the coefficient of correlation of the previous 6 or 12 months for all markets for which data is available. It is recommended to carry out the full analysis of co-integration, as described in Annex 4, on a bi-annual basis, unless the analysis of correlation identifies a drastically deteriorating trend.

Recommended actions are:

- Establish collaboration arrangements with ALRMP about exchange of data
- Establish monitoring unit within OXFAM Lodwar project base

Tab.A6 Form for data collection

	Commodities																													
	Maize 45 kg			Posho 25 kg			Beans 45 kg			Sugar 25 Kg			Male Goat grade 1			Male Goat average			Cow grade 1			Cow average			Charcoal sack			Labour man/day		
Current situation																														
Current price																														
Estimated quantity on market in a day																														
Estimated quantity sold in a day																														
Compared to previous month																														
Price is Higher, Lower, Same?	H	L	S	H	L	S	H	L	S	H	L	S	H	L	S	H	L	S	H	L	S	H	L	S	H	L	S	H	L	S
Quantity on the market is Higher, Lower, Same?	H	L	S	H	L	S	H	L	S	H	L	S	H	L	S	H	L	S	H	L	S	H	L	S	H	L	S	H	L	S
Quantity sold is Higher, Lower, Same?	H	L	S	H	L	S	H	L	S	H	L	S	H	L	S	H	L	S	H	L	S	H	L	S	H	L	S	H	L	S
Compared to same month of previous year																														
Price is Higher, Lower, Same?	H	L	S	H	L	S	H	L	S	H	L	S	H	L	S	H	L	S	H	L	S	H	L	S	H	L	S	H	L	S
Quantity on the market is Higher, Lower, Same?	H	L	S	H	L	S	H	L	S	H	L	S	H	L	S	H	L	S	H	L	S	H	L	S	H	L	S	H	L	S
Quantity sold is Higher, Lower, Same?	H	L	S	H	L	S	H	L	S	H	L	S	H	L	S	H	L	S	H	L	S	H	L	S	H	L	S	H	L	S

H = Higher, L = Lower, S = Same

GoK/Oxfam GB Turkana Safety Net Programme

Market Functioning Baseline

Terms of Reference

1. Background

Over the last 25 years, there have been at least 7 major droughts in Kenya. Food relief has become the standard response to crises and is being delivered in increasing quantities in response to declared emergencies. Little data exists on the economic costs of these droughts, although it is estimated that the 1999-2001 drought cost U$ 300 million in food aid alone[33]. In addition, there is now a 'predictable' caseload of food insecure people, predominately in the ASALs, who need continual or regular assistance to meet their basic food and non-food needs. This chronic caseload makes it difficult for the national assessment process to distinguish between who is adversely affected by the current dry period and who is already unable to meet their basic food needs during normal times. This has resulted in a blanket approach to all food insecure people, using an emergency relief response.

The Short Rains Food Security Assessment recommended various actions to address the long-term impacts of drought and asset depletion. One recommendation was to focus on the current policy gap in addressing predictable needs through instruments such as a multi-annual safety net. Predictable needs can be met more effectively with predictable resource flows, which can be factored into budgets to facilitate planning of responses. Moreover, a multi-annual, predictable fund would enable government to exercise more control over management of food security responses and facilitate more joined-up decision making across relevant Ministries and Departments.

Dialogue between key stakeholders has begun on developing a safety net programme for Kenya that will deliver predictable, timely and adequate transfers to chronically food insecure people, instead of inadequate, short-term emergency responses. Safety nets better protect people against destitution, promote human and capital assets and help foster growth. They are increasingly seen as a way of empowering households to manage risk, rather than being passive recipients of handouts. Appropriate transfers, such as cash, will assist to stimulate markets, give people more choice and can provide a push factor for accessing basic services like healthcare.

The proposed national safety net programme will be piloted in a small number of districts to test effectiveness and provide guidance for national scale-up. One of the pilot districts will be Turkana, implemented through a joint programme between Government of Kenya and Oxfam GB. The programme will aim to provide protection to vulnerable households and support to enhanced productive capacity. Transfers to communities will be cash-based, building on experience from previous Oxfam cash-for-work programmes. A baseline will be carried out to inform programme design, which will include Household Economy Analysis and market assessment and analysis.

[33] Implementation Completion Report, ALRMP, December 2003

2. Objective of study

The study will provide an assessment of markets in order to address the following:

1. Assess whether markets will support the proposed pilot cash transfer programme and give recommendations on appropriate market interventions to facilitate its effectiveness
2. Provide baseline data for future M&E, including special studies
3. Recommend a framework for monitoring and regular data collection throughout the project, including guidance on how this data should be analysed and fedback into programme implementation and formats of data collection sheets for regular monitoring.

The consultant will work closely with the Household Economy Analysis baseline studies work, to address the following questions:

1. What volumes of food relief have been supplied to the area over the last decade, and how important have these supplies been compared to the overall grain flow. [the study should consider not just the injection of cash but the withdrawal of the food relief that has been a recurring feature of the area for the last decade (my assumption, this might not be true).

2. Are the key basic items are available in sufficient quantities and at reasonable prices?
    a. What are the prices and volume of key basic food commodities (to be identified) and how are the prices set?
    b. Are these prices affordable at household level (what quantity of food and for which wealth group)?
    c. What are the seasonal trends in food availability in local markets, including relief food and what implications does this have for the intended start date of the programme? (use data from the Early Warning System) (should link to HEA information about seasonality of consumption/demand for key food commodities)
    d. What kind of access do communities have to markets in terms of proximity and transport availability/affordability

3. What are the risks that cash will cause inflation in prices of key products and what contingency options should be considered?
    a. What is a reasonable threshold price for key commodities below which pastoralists will be able to afford basic commodities (or above which these commodities will be unaffordable)? And what is the “normal” historic price range for these commodities for each season?
    b. What contingency options should be put in place if prices rise above this threshold for a stated period of time

4. How and when do pastoralists interact with markets?
    a. To what extent is barter trade used in Turkana (from HEA work) and how is this likely to change with a long-term cash injection?
    b. What are the types of commodities that traders think would be most in demand if there is an injection of cash?

c. Are people purchasing small quantities often, or large quantities less frequently?

5. Are markets are functioning sufficiently and competitive enough to support a cash transfer programme?
    a. Who are the petty traders, retailers and wholesalers and what are the interactions between internal and external traders?
    b. How many traders operate in the programme area and what is their capacity to meet food needs of the population in the absence of relief?
    c. What are the most effective mechanisms that Oxfam might use for informing traders about forthcoming cash distributions, so that they can prepare accordingly?
    d. Assess informal cross-border trade between Turkana, Ethiopia, Sudan and Uganda in terms of scale and contribution to food security
    e. Is food consistently available in markets all year round and if not, what are the factors that limit this?

6. What are the wider effects of a cash programme likely to be on the local economy?
    a. How have previous cash for work programmes affected market functioning?
    b. Will the capital leave the district or be invested locally?
    c. What should Oxfam do to ensure that capital directly benefits the local economy (eg supporting to marketing through building capacity of local traders with credit and business skills). What is the government doing to support small and medium traders?

7. What market knowledge gaps are there in the community?
    a. How much information about the price of key commodities do people have?
    b. Who do communities rely on to give them that information
    c. What trading support do communities receive from the Department of Trade?
    d. What role could the Department of Trade play in this initiative at district/national level?

4. Expected Outputs

A concise report (20 pages plus annexes) to be used as a baseline and feed into programme design.

5. Timeframe

Duration: 20 working days

Timing: October- November 2005. The study will be closely linked to the HEA baseline work, including joint planning.