Cotton Price Fluctuations at the Ground-level: Assessing the Difference in Impact in Rural Tanzania

Hannah Bargawi

ABSTRACT
Liberalisation of Tanzania’s cotton sector in the early 1990s has had mixed results, including greater exposure of cotton producers to the vagaries of the international market, partly in the form of more unstable prices. This investigation analyses the differences in experience of cotton price changes at the ground-level and the responses of different villages and the producers within them. A major aim of this work is to set the experience of commodity prices alongside other institutional and marketing changes that have occurred since liberalisation of the sector. This study relies on first-hand data collected in three cotton-producing villages in rural Mwanza and Shinyanga regions in Tanzania. The experience, amplitude and frequency of price changes and the response options and strategies available are shown to be very different in the three villages. Furthermore within each of the villages clear distinctions between producers can be made. These differences need to be seen as a function of the changes and effects resulting from the liberalisation of the cotton sector.

KEY WORDS
Tanzania, Cotton, Agriculture, Producers, Price Changes

* Hannah Bargawi is a PhD candidate and member of Individual Project IP12.1, “Primary Commodities” based at SOAS, University of London. Contact at hb19@soas.ac.uk.

The Author is grateful to SNF and NCCR-Trade for generous financial assistance and support, which have enabled the completion of this work.
1. Introduction

Liberalisation of Tanzania’s export sectors, including cotton in the early 1990s have seen mixed results, including greater exposure of primary commodity producers to the vagaries of the international market. Liberalisation of the Tanzanian cotton sector was far-reaching, with input subsidies and credit removed and marketing and export of the crop put into private hands. The process and outcomes of liberalisation are discussed in more detail in section 2. Part of the increased uncertainty faced by producers has come in the form of more unstable prices, internationally as well as at the producer level and within as well as between seasons. The effect of this vulnerability to price fluctuations on national variables and on export sectors within Tanzania is now well documented (Bryceson, Deborah Fahy 1993; Cooksey, Brian 2003; Ponte, Stefano 2002; Shao, John R. 2002; Skarstein, Rune 2005). Furthermore, recent micro-level or household studies have also demonstrated the effects of commodity instability on producers in Tanzania and regarding cotton (Kabelwa, George and Josaphat Kweka 2006; Kähkönen, Satu and Howard Leathers 1999; Nylandsted Larsen, Marianne 2006; Ponte, Stefano 2002).

However, for the most part research has relied on the assumption of uniform groups of producers or households and a homogenous experience of price changes within these groups (Christiaensen, Luc, Vivian Hoffmann, and Alexander Sarris 2006; Dercon, Stefan 1993; Eriksson, Gun 1993; Krivonos, Ekatarina 2004; McKay, Andrew, Oliver Morrissey, and Charlotte Vaillant 1998; Sarris, Alexander, Panayiotis Karfakis, and Luc Christiaensen 2006). Furthermore, our aim here is to gain a better understanding of what role the current production environment plays in shaping the experience of prices across different regions, villages and producers. Research has noted the increasing differentiation in rural markets created by liberalisation policies and the failure to address this consistently. (Bryceson, Deborah Fahy 1999; Justino, Patricia and Julie Litchfield 2003; Ponte, Stefano 1998; 2002) We hope to build and add to this literature by investigating the differentiated experience of prices in the post-liberalisation production climate.

This study relies on first-hand data collected in three cotton-producing villages in rural Mwanza and Shinyanga regions in Tanzania. Data collection took place at a variety of points, from semi-structured producer interviews to focus group discussions as well as interviews with extension staff and other institutional stakeholders in the cotton sector in these regions. The effects of liberalisation and institutional changes over the last 15 years have clearly interacted heavily with the experience of price changes by all producers. However, an important distinction between the three villages in terms of the experience, amplitude and frequency of price changes and the response strategies available is evident. Furthermore within each of the villages clear distinctions by wealth characteristics can be made. Not only are changes in price perceived in a different way by producers of different wealth but their methods of response also differ markedly.

This study will begin with a brief history of Tanzanian cotton production familiarising the reader with the major policy, production and price changes that have occurred. In section 3 we can turn to a discussion of prices and price fluctuations, highlighting definitional distinctions and the underlying motivation for this investigation. Section 4 introduces the case study villages and sets these into the wider context of Tanzanian cotton production. Here we also introduce the categorisation of results by wealth in each of the villages. Section 5 focuses on the results of fieldwork to uncover the effects and responses to prices and price changes in three different villages and by different wealth groups. Section 6 interprets our results further, relating these to existing findings on this topic and presenting some concluding remarks.
2. Cotton producers in Tanzania: From Ujamaa to liberalisation

2.1 A brief history of Tanzanian cotton production

Cotton was introduced to Tanzania at the turn of the 20th century by German settlers and was initially focused in the Eastern growing zone. Over the 1920s and 30s better varieties were imported and production expanded into the Western zone, increasingly taken forward by smallholders rather than the original plantation model the Germans had attempted to introduce. Over the subsequent decades production rose steadily, facilitated by the establishment of the Tanganyika Lint and Seed Marketing Board (TLSB) in 1956. (Baffes, John 2004) While the purchasing, marketing and exporting of the crop had been under private ownership, over the 1960s a process of primary society and cooperative union control over the domestic sale and trade of cotton became entrenched. In this period Tanzanian cotton production steadily grew, increasing almost tenfold between 1950 and the mid-1960s. In 1968 the cooperative unions and the TCLB became, respectively, the sole buyer and exporter of cotton in Tanzania. (Baffes, John 2004)


Figure 1: Tanzanian cotton production and world prices (1970/71-2007/08)

Over the 1970s, following the Arusha Declaration in 1967, the policy focus shifted to returning agricultural control and decision-making to the newly-formed Ujamaa villages, linked directly to central government. As a consequence the Tanzanian government eliminated the role of the cooperatives, whose involvement was felt to have become too extensive and controlled by larger farmers with vested interests. (Baffes, John 2004)

Following the removal of cooperatives a two-tier system of village unions linked directly to
the newly established Tanzania Cotton Authority was instated. However production was by and large declining over this time (see figure 1) and complaints over collection and handling failures as well payment delays were paramount. (Dercon, Stefan 1993)

Over the late 1970s and early 1980s the Tanzanian economy entered a crisis period, partly driven by the international oil shocks and the ensuing debt crisis which had severe consequences on the demand for agricultural export crops, including cotton as well as for the productivity and longer term development of these sectors. A substantial reduction in aid to the country led to a drastic reduction in imports of agricultural inputs, including pesticide and fuel (Skarstein, Rune 2005). Between 1980 and 1984 the cooperative unions were reintroduced and were in charge of purchasing cotton at a fixed price, transporting this to the Tanzania Cotton Marketing Board (TCMB, the successor of the TCA). Cooperative Unions were also in charge of input provision through the village primary societies. The TCMB retained all processing, sales and export functions. Both data obtained from FAO and the Tanzanian government show a decline in production over this period. Between 1979/80 and 1985/86 production declined from 148 000 tonnes to 108 000 tonnes (see figure 1), despite relatively stable producer prices at this time. (Forster, Peter G. and Sam Maghimbi 1992;Tanzania Cotton Board 2007)

The 1990s saw the beginning of the liberalisation process in Tanzania’s agricultural export sectors. Gradual steps were taken to remove fixed producer prices and open markets. In 1994 the Cotton Act allowed private companies to compete with the Tanzania Cotton Board and the cooperative unions in the domestic ginning and marketing of seed cotton. National statistics show that while prices initially responded positively, they subsequently declined and production responded in a highly volatile way, declining sharply in the late 1990s (see figure 1). Problems relating to the new private marketing and export channels as well as a lack of coherent input supply provision can in part be attributed to this erratic and negative production response. Not only were fertilizer subsidies gradually lowered from 70% in 1990/91 to 0 in 1994/95 but producers were for the first time, at the mercy of local, open market input and output prices (Skarstein, Rune 2005). Table 1 clearly demonstrates the increase in the real price of pesticides and chemicals in Tanzanian cotton-growing areas over the last 10 years.

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Year</th>
<th>Price Support</th>
<th>Nominal Price in TSH per 1lt equivalent</th>
<th>Real Price in TSH per 1lt equivalent (1999/2000 Prices)</th>
<th>Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical*</td>
<td>1996/97</td>
<td>Cash price</td>
<td>3000</td>
<td>3867</td>
<td>ICRA (1997)</td>
</tr>
<tr>
<td>Chemical*</td>
<td>2001/02</td>
<td>Cash price</td>
<td>4500-7000</td>
<td>4262-6629</td>
<td>Nylandsted (2003)</td>
</tr>
<tr>
<td>Chemical*</td>
<td>2001/02</td>
<td>subsidised by TCB through CDF</td>
<td>1500</td>
<td>1421</td>
<td>Nylandsted (2003)</td>
</tr>
<tr>
<td>Various chemicals</td>
<td>2001/02</td>
<td>Cash price</td>
<td>3500-6000</td>
<td>3315-5682</td>
<td>Shao (2002)</td>
</tr>
<tr>
<td>Chemical*</td>
<td>2004/05</td>
<td>Cash price: Passbook in effect</td>
<td>10000</td>
<td>9360</td>
<td>Kabelwa &amp; Kweka (2006)</td>
</tr>
<tr>
<td>Karate 5 EC</td>
<td>2005/06</td>
<td>Cash price: Passbook in effect</td>
<td>19375</td>
<td>18040</td>
<td>Agenda (2006)</td>
</tr>
</tbody>
</table>

* Exact name of chemical not provided
Source: various
Ponte (1998) highlighted the concerns confronting Tanzania’s agricultural producers immediately after liberalisation in general terms, reflecting the squeezing of the margins of production, with expenditures on crops such as cotton increasing but incomes not rising at the same rate. As we will see, despite the first liberalisation policies having been introduced over 15 years ago many of these problems and concerns persist today, particularly in certain areas.

2.2 An overview of the Tanzanian cotton sector today

The results of the collapse of the input provision system, the removal of pan-territorial and seasonally stable producer prices as well as the total opening of the domestic and export sales channels have had clear effects on production, yields and prices. Poulton et al, in their study of six sub-Saharan African cotton sectors showed that “Tanzania is the only one of the six sectors to see lower mean production in the last five years than in the five years prior to liberalization” (Poulton, Colin, Peter Gibbon, Benjamin Hanyani-Mlambo, Jonathan Kydd, Wilbald Maro, Marianne Nylandsted-Larson, Afonso Osorio, David Tschirley, and Ballard Zulu 2004). Other concerns have been raised over the quality of Tanzanian cotton, stressing the need for tighter quality control and regulation of the ginning industry. (Baffes, John 2004).

The “Cotton Regulations 2000” (United Republic of Tanzania 2000) saw the emergence of the Cotton Development Fund (CDF), a tri-partite (farmer, ginner and government) input-provision system, whose main aim is to supplement the price of agro-chemicals and cotton seeds for planting. 2001/02 was the first season of the CDF’s operations, during which farmers were asked to contribute part income, together with a contribution from ginners and government to allow for the purchasing of cotton inputs for the following season. The contribution of each producer is noted in a passbook and the following season, depending on the amount sold, each producer receives a certain entitlement to inputs in that season. The success of the CDF remains to be seen, although initial reports suggest some unevenness in distribution and access. Problems relate to ginners noting the incorrect amount in producers’ passbooks limiting their access in the following year. This is exacerbated by many producers’ inability to read and write and therefore to verify the information noted down by the ginners. Furthermore, the CDF is unable to provide inputs unless cotton was produced in the previous season, making it difficult for those in more erratic production areas to participate in the scheme. Ratter also points to some further issues with the CDF. “If Magu and Bariadi are excluded from the calculations, only 15% of the chemicals made available through CDF this season were taken up by producers. The rest will have to be returned to CDF via village and district administrations…. This was mainly due to the decision to purchase and distribute water-based pesticides to producers i.e. Decis and Karate, rather than oil-based ones which were used in Magu and Bariadi and had been used in the past by producers.” (Ratter, Saro G. 2002)

Production in recent years has been volatile, with statistics showing the largest annual variations in production output in the last 10 years (see figure 1). Deep troughs in 1999/00, 2003/04 and 2006/07 are juxtaposed by high peaks in production in 1996/97 and 2005/06. It is hard to determine whether these swings in production are in part a response to changes in the relative producer price of cotton or whether external factors such as adverse weather conditions in 2003 and 2006 have affected output. Like the majority of Tanzanian agriculture, cotton production is rain-fed, with negligible areas of irrigated production. Consequently cotton output can be linked to weather outcomes, particularly rainfall amount, timing and distribution. In the Western cotton-growing areas (WCGA) an important time is March, following seed planting in November - January. If these long rains are too early/late or insufficient/too much then production may be adversely affected. Annual rainfall figures are
therefore insufficient for labelling a particular year “good” or “bad” in terms of cotton production. Instead it is necessary to consider distribution and timing of rains and the occurrence of particular dry spells. Table 2 gives us clearer idea of the potential relationship between rainfall patterns and cotton output in the Tanzanian case. It is evident that years of low production in the WCGA can, at least in part, be attributed to the pattern of rainfall over that season. However, weather variations are broad within the WCGA, especially between the areas closer to Lake Victoria and those lying further south. Soil water requirements also vary by altitude, fertility and drainage. Whilst a more thorough analysis of these factors is not possible here, it is important to recognise the significance of rainfall in determining production output in the case of rain-fed cotton production in the WCGA.

Table 2: Rainfall patterns and Cotton production in the WCGA of Tanzania

<table>
<thead>
<tr>
<th>Harvest Year</th>
<th>Production (seed cotton in tonnes for WCGA only)</th>
<th>Rainfall Pattern</th>
<th>Average nom. Cotton Producer Price (TSH per kg)</th>
<th>Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999</td>
<td>97,042</td>
<td>Rainfall below average in Mwanza and Shinyanga region over the season.</td>
<td>123</td>
<td>Ratter (2002)</td>
</tr>
<tr>
<td>2000</td>
<td>123,291</td>
<td>Overall rainfall significantly below average, especially in Shinyanga. Mar 2000 rains well below average.</td>
<td>180</td>
<td>FAO, CLIMPAG website</td>
</tr>
<tr>
<td>2001</td>
<td>147,575</td>
<td>Seasonal rainfall higher than previous years but Mar 2001 rains still below average in Mwanza region.</td>
<td>165</td>
<td>TCB website; Maro &amp; Poulton (2004)</td>
</tr>
<tr>
<td>2002</td>
<td>187,147</td>
<td>Average rainfall conditions on the whole with high Mar rainfall in Shinyanga and Mwanza.</td>
<td>180</td>
<td>TCB website</td>
</tr>
<tr>
<td>2003</td>
<td>138,904</td>
<td>Delayed rainfall in Mar 2003, especially for Shinyanga region. Otherwise</td>
<td>280</td>
<td>USDA, FAS website</td>
</tr>
<tr>
<td>2006</td>
<td>129,265</td>
<td>Drought conditions with below normal rainfall in both regions and late arrival of Mar 2006 rains</td>
<td>317</td>
<td>USDA, FAS website</td>
</tr>
<tr>
<td>2007</td>
<td>199,690</td>
<td>Initial flooding at beginning of the planting season in both Shinyanga and Mwanza regions, followed by low rainfall in Mar to Apr 2007.</td>
<td>317</td>
<td>TZ Met Agency, Mar 2007; TCB website</td>
</tr>
</tbody>
</table>

Source: Directorate of Meteorology, Ministry of Communications and Transport and Tanzania Meteorological Agency for rainfall information (plus various other sources for individual years); Tanzania Cotton Board for Production and Price information.

From the above it is clear that cotton producers in Tanzanian have been confronted by particularly difficult policy, market and exogenous conditions in recent years. As Morris summarises: “Tanzanian farmers have been faced with a more uncertain market environment, producer prices subject to wide fluctuations, input prices sky rocketed and supply became
tenuous as most traders did not have the rural outreach of the parastatals they replaced.” (Morris, Mike 2001)

As well as this negative portrayal of the Tanzanian cotton sector, there have been studies reflecting a more “positive” picture, especially in terms of price transmission and payment timing. Baffes (Baffes, John 2004), Shao (Shao, John R. 2002), Poulton et al (Poulton, Colin, Peter Gibbon, Benjamin Hanyani-Mlambo, Jonathan Kydd, Wilbald Maro, Marianne Nylandsted-Larson, Afonso Osorio, David Tschirley, and Ballard Zulu 2004) and Maro and Poulton (Maro, W.E. and Colin Poulton 2002) all find evidence of faster price transmission from world to domestic markets and prompter payment of producers. Maro and Poulton (Maro, W.E. and Colin Poulton 2002) argue that the stronger transmission of prices from the international level to the producer may also explain the heightened volatility in prices on the ground-level in recent years. (Maro, W.E. and Colin Poulton 2002) One major concern with these studies is the data used to obtain their results. Maro and Poulton highlight the increased share of export prices received by producers but caveat this result. They highlight that any apparent increase in the nominal prices received by producers must be understood alongside the increase in pan-territorial and pan-seasonal price differences as well as the increase in the cost of inputs to production. (Maro, W.E. and Colin Poulton 2002) There is therefore a need to go beyond annual, national price statistics in order to analyse these effects more concretely, which we will turn to in the next section.

3. Cotton prices: from international markets to Tanzanian villages
3.1 Uncovering the real producer price

![Figure 2: Nominal cotton prices in US$ per kg](image_url)

Sources: World Prices are taken from Cotlook, [www.cotlook.com](http://www.cotlook.com) (1990/91-2006/07) A Index Price*; Producer Prices are taken from Government of Tanzania, Economic Survey, 2006 (1990/91-2005/06) and our own survey (2006/07); Export Prices are derived from Tanzania Cotton Board (1990/91-2006/07).

*The A index is an average of the cheapest five types of cotton offered on the European market and is the most frequently quoted international indicator price used by ginners, traders and government agencies in Tanzania.
Figure 2 shows the development of cotton prices in US$ terms following liberalisation, highlighting the general erratic nature of cotton prices, with official producer prices tending to follow export and world prices relatively closely. This is supported by previous studies, discussed above and is seen by some as one of the few “positive” developments since the liberalisation of the sector. However in order to understand more closely what is occurring at the producer level we must go beyond these statistics. Turning to producer price data at the national level and in local currency a more interesting and relevant picture emerges. In nominal terms, as figure 3 shows, the producer price has increased over time but in an erratic fashion with particularly alarming large falls in nominal prices in 1999/00 and more recently in 2005/06.

Figure 3: Nominal Cotton Producer Prices (1990/91-2006/07)
*Source: Producer Prices (Tanzanian Cotton Board in TSH/kg (1990/1-2005/06) and own survey (2006/07)*

Whilst the information contained in figure 3 may be closer to the price received by cotton producers across Tanzania in certain years, a number of caveats must be noted. In the first instance, the nominal price given in this figure hides the purchasing power of producers’ cotton income over time. It is therefore useful to appreciate the change in the price of cotton alongside the price of major expenses for cotton producers. We can note from other studies on Tanzania that the majority of expenses of households in Tanzania and particularly in rural areas will be devoted to food.(Bryceson, Deborah Fahy 1993; Rutasitara, Longinus 2002) A major share of this in Tanzania will be on maize and rice, although some territorial and seasonal variations are prevalent. (Rutasitara, Longinus 2002). In our three villages in Mwanza and Shinyanga region maize and rice make up a large share of producer expenditure (Rutasitara, Longinus 2002) and the sum of retail prices for these are therefore a useful numéraire. However when considering the national consumer price index (CPI) it is evident that the basket of goods used to estimate this is largely made up of food expenses (56%), followed by transport expenditure (9.7%) and fuel, power and water costs (8.5%). (United

3 It is important to note that the different trends regarding producer prices that emerge from Figure 2 and 3 are largely driven by the continued depreciation of the Tanzanian Shilling over the last decade.
Republic of Tanzania 2006c) This is reflected in figure 4 which shows the relative producer price of cotton, on the one hand relative to the price of maize and rice and on the other hand relative to the national CPI. Evidently, the two series follow each other quite closely, highlighting the true erratic nature of the prices faced by cotton producers. In particular the graph shows the increased amplitude of real cotton price fluctuations and in more recent years the dramatic real decline in prices over the late 1990s to 1999/00.

![Figure 4: Real Cotton Producer Prices (1990/91-2006/07)](image)

Source: The real cotton price is given by the producer price (Tanzanian Cotton Board in TSH/kg (1990/1-2005/06); and own survey (2006/07)) divided by the consumer price index (World Development Indicators (1990/91 – 2006/07)) using 1999/2000 as a deflator. The relative cotton price is given as the nominal cotton price in TSH/kg divided by the sum of the nominal retail price of maize and rice (United Republic of Tanzania, 2003 (1991/92-2003/4)).

Despite figure 4 giving us a clearer picture of real price developments as cotton producers experience them, we are still lacking important information. Data shortages prevent us from analysing the progression of nominal producer prices relative to the cost of labour and non-labour inputs, such as pesticide, fertilizer and fuel. Whilst we do not have a full time-series dataset of costs and prices for these inputs we can determine from our own surveys as well as from secondary data (Ferrigno, Simon, Saro G.Ratter, Peter Ton, Davo Simplice Vodouhê, Stephanie Williamson, and John Wilson 2005; Gibbon, Peter 1999; Nylandsted Larsen, Marianne 2006; Ponte, Stefano 1998; Shao, John R. 2002) that the cost of these inputs has increased noticeably since liberalisation, leaving producers with an even lower real price than depicted in figure 4. In particular the removal of subsidies and credit arrangements over the liberalisation period has increased the real cost of non-labour inputs even further. A World Bank study in 2000 found that the ratio of cotton producer prices to farm gate fertilizer prices had declined from 4.37 between 1985-1989 to 0.81 in 1998. (World Bank 2000) A further point in reference to figure 4 is the development of prices over one season and the importance of the timing of sale, as this may explain differences in prices received by producers to an even greater extent than annual differences. It is to a more detailed discussion of this that we now turn.
3.2 Defining cotton price fluctuations: distinguishing between and within season price changes

Various studies have considered the origin, nature and effect of price volatility in rural export markets (Dehn, J., C.L. Gilbert, and P Varangis 2006; Fafchamps, Marcel, Ruth Vargas Hill, and Aliziki Kaudha 2007; Gilbert, C.L. 2004) and on producers (Christiaensen, Luc, Vivian Hoffmann, and Alexander Sarris 2006; Kilima, F.T.M. 2006; Mwakalobo, B. S Adam 2000; Rapsomanikis, George and Alexander Sarris 2005) Movements in prices between seasons, as shown above are clearly a concern for Tanzania’s cotton producers and the effects of this need to be understood more closely, especially when it comes to the response of different groups of producers. Having considered the transmission of prices from international to producer prices in section 3.1 and the complexities surrounding the uncovering of the real producer price, we focus in the remainder of the paper on the changes in prices as experienced by producers. Therefore no particular instances or years of price decline or increase were selected to analyse producers’ responses. Instead the focus is on the development and experience of prices by individual and groups of producers within the three villages. Producers were questioned on the development of the cotton price and particular instances of price changes, both positive and negative and between as well as within seasons. They were then questioned on their actions and responses following these sudden changes in the price, how these differed from past actions and what role prices play in their production decisions.

Frequently, current literature on price volatility has failed to distinguish between annual price changes and movements in the price within one season. Within-season price changes have become a particularly important issue, following the liberalisation of export markets, such as Tanzania’s cotton sector. (Maro, W.E. and Colin Poulton 2002) This is because one the consequences of liberalisation has been the removal of pan-territorial and pan-seasonal pricing. Unlike Tanzania’s other export sectors, such as coffee where cooperative unions are still able to provide producers with second and final payments as the season proceeds, thereby mitigating within-season price changes, this is not the case in the cotton sector. Therefore cotton producers in Shinyanga and Mwanza regions are exposed to changes in price that occur within each buying season. However, the strength and the potential to mitigate this within-season volatility clearly differs between regions, districts and villages and therefore those interviewed were asked in general terms about the nature of this within-season volatility.

Many producers and stakeholders interviewed noted a general seasonal pattern of price changes over the last few years (with the exception of 2004/05). This seasonal pattern has been one of a gradual rise of prices as the season proceeds, before dropping off slightly at the very end of the season. Therefore the timing of cotton sales will partially determine the price received, with those selling earlier receiving lower prices than those able to either store or harvest their crop later and sell at a point when prices are at their highest. There is no systematic data collected on the movement of prices over one season and this will vary, depending on location and year. Furthermore most previous studies have not analysed within-season price changes in much detail and therefore secondary data is also thin. Shao (Shao, John R. 2002) determines prices in Bunda district to vary with the season by almost 50% in 2000/01. Similarly Maro and Poulton (Maro, W.E. and Colin Poulton 2002) found prices to have increased from TSH 140 per kg at the beginning of the 2001/02 season to TSH 210 by the middle of the buying season, before declining again slightly by the end of the season. Our own data on the average prices received by producers in last season indicate large discrepancies between villages and producers, which may in part be explained by the timing of sales, although other factors are also relevant.
4. Village and Producer characteristics in context

4.1 Introducing the Fieldwork Areas

A mixture of focus groups and interviews with producers, extension staff and other stakeholders at the village and regional level lie at the heart of this study. These mixed methods were used in three different villages in rural Mwanza and Shinyanga regions. It is useful at this point to briefly discuss these villages in more detail. In Mwanza region two villages, Iteja and Mwagala village, both in Misungwi district were selected. These two villages, while geographically proximate face very different social, economic and agricultural challenges and therefore proved interesting case studies. The third village lies in Meatu district in Shinyanga region, a historically more remote area, also facing interesting and complex conditions worth further investigation.

Iteja Village, Mwanza Region

Iteja village lies around 50km south-east of Mwanza town and roughly 8km south of Misungwi town, along the Mwanza-Shinyanga road. The village begun as an Ujamaa village but now many farmers have returned to their previous plots and spread across both sides of the main road. The village has a population of just over 5000 inhabitants, with roughly 800 households. The major activities in the village involve subsistence and cash-crop farming as well as livestock-keeping. “Small trade” and mining are also mentioned as secondary or additional income sources for villagers. The main crops cultivated include maize, rice, sorghum, sweet potato, cotton and groundnuts. Soil fertility is low to moderate and whilst cotton was introduced and successfully encouraged by the cooperatives in the 1960s, more recently rice cultivation on the lower slopes has been introduced. Currently, cotton and rice are important substitutes, depending on rainfall. (ICRA 1997)

Mwagala Village, Mwanza Region

Mwagala village existed before Ujamaa and lies around 5km east of the main Mwanza-Shinyanga road, around 30km South of Mwanza town. The village lies on higher ground (above 1250m), around 4km away from the government’s Lake Zone Agricultural Research and Development Institute (LZARDI) at Ukiriguru. The close proximity to this institute has resulted in some peculiar and relevant issues. The village is often used as a testing ground for research and experimentation at Ukiriguru. Furthermore the opportunity for seasonal, waged employment at Ukiriguru occasionally arises for inhabitants of Mwagala village. The village has a population of almost 3000 made up of around 500 households. The main activities of inhabitants here are agricultural production and more limited livestock keeping. The main soil here is sandy, Luseni soil and fertility is low. Crop intensification has occurred due to limited land availability and there are almost no opportunities for fallow land. Sorghum has been replaced by maize and rice varieties and cotton has been replaced with tomatoes and other horticultural crops. Major crops grown are diverse, ranging from cotton and horticultural cash crops to maize, sorghum, sweet potato, green gram, chickpeas and rice. Furthermore, off-farm employment has increased in recent years. (ICRA 1997)

Mwambiti Village, Shinyanga Region

Mwambiti, an Ujamaa village, lies around 5km away from Mwanhuizi town in Meatu District, an intensive and productive cotton-producing area of Shinyanga region. Mwambiti itself is around 100km away from Shinyanga town. The village is easily accessible from the main road running between Mwanhuizi and Shinyanga and lies on a flat plain with naturally fertile soils, resulting in relatively easy soil preparation. Rainfall is too low for rice cultivation and cotton remains the main and only cash crop and by far the most important income source for households in Meatu district. Sorghum is the main food crop, followed to a more limited
extent by maize and sweet potato. Incomes from cotton can vary dramatically between seasons but overall they are higher than the rest of Shinyanga and Mwanza regions. (ICRA 1997) Considerable parts of the farm are left fallow because farmers are following crop rotation with cotton, sorghum and maize. Partly for these reasons the village is part of an organic cotton production project, run by a private Swiss company, offering organic producers extension services as well as a premium for their output. There are almost 3500 inhabitants made up of 450 households. Almost all inhabitants are in some way involved in agricultural production and livestock keeping, with over 80% of village farmers producing cotton on a regular basis.

4.2 The national and regional picture: context for our own study
Cotton has historically been an important export crop, bringing in valuable foreign exchange at the national level and forming an important source of cash income for the numerous smallholder producers in western Tanzania. One study in Kwimba district, Mwanza reports that around 80% of producers in the field study villages depend on cotton. (Madulu, F. Ndalahwa 1998) The percentage area under cotton cultivation in table 3 further supports this high dependence on cotton in Mwanza and Shinyanga regions. In recent years the traditional importance of cotton at the national level has been replaced by new exports such as gold, minerals and fish-related products (Kabelwa, George and Josaphat Kweka 2006). The share of traditional exports (including cotton) in all merchandise exports went from over 60% in 1994 to less than 30% in 2001. Over the last five years the importance of traditional exports has declined further and now stands at less than 20%. (United Republic of Tanzania 2006a) However, the importance of cotton as a source of cash income remains, so that according to one recent study around 40% of the Tanzanian population depend on cotton in one way or another for their livelihood (Kabelwa, George and Josaphat Kweka 2006).

Table 3: Regional Overview of Cotton Production (2002/03)

<table>
<thead>
<tr>
<th>Region</th>
<th>Quantity Harvested (tonnes)</th>
<th>Area planted for Cotton (Hectares)</th>
<th>% of Total Planted Area</th>
<th>Area planted as % of Total Land Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mwanza</td>
<td>49837</td>
<td>86533</td>
<td>26%</td>
<td>4.4</td>
</tr>
<tr>
<td>Shinyanga</td>
<td>101595</td>
<td>199390</td>
<td>59%</td>
<td>3.9</td>
</tr>
<tr>
<td>Mara</td>
<td>14097</td>
<td>20342</td>
<td>6%</td>
<td>1</td>
</tr>
<tr>
<td>Kagera</td>
<td>4706</td>
<td>6387</td>
<td>2%</td>
<td>0.2</td>
</tr>
<tr>
<td>Tabora</td>
<td>9932</td>
<td>22409</td>
<td>7%</td>
<td>0.3</td>
</tr>
<tr>
<td>Rest</td>
<td>907</td>
<td>1378</td>
<td>0%</td>
<td>/</td>
</tr>
<tr>
<td>TOTAL</td>
<td>181074</td>
<td>336439</td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>


Cotton is predominantly cultivated by smallholder producers in the regions to the South and East of Lake Victoria. Shinyanga region is the largest producer, followed by Mwanza, Mara and Tabora regions. The dominant production system in the western cotton growing areas of Tanzania is described by Morris as the “the livestock-sorghum-millet-cotton-rice system” (Morris, Mike 2001) Once again there are variations between Shinyanga and Mwanza regions, relevant to our study. “In many districts of Shinyanga, farmers have no choice between maize and cotton growing, because rainfall is insufficient for maize. The second crop in those districts is sorghum, which is mostly less profitable than cotton, even in years with relatively low cotton prices and yields.” (Ratter, Saro G. 2002)

Average cotton acreage remains small in Tanzania compared with other African producers. National statistics show average cotton plot sizes to be around one hectare, with little
variation between regions. (United Republic of Tanzania 2006b) However, data obtained from other studies shows the large variation in average farm sizes and cotton plots in particular. (Nylandsted-Larson, Marianne 2006 p.109). In our own sample, the geographical variation in acreage is also reflected, although our sample may reflect a bias towards somewhat larger producers (in terms of acreage) across all three villages. While the size of cotton plots in Iteja and Mwagala averaged under 2 hectares the average plot size in Mwambiti village in Shinyanga region was over three times this figure. Within each of the villages, significant variation between producers in terms of acreage does exist.

Yields in Tanzania as a whole are lower than other African producers, especially those in West Africa. Here and in Zimbabwe, where irrigation is similarly infrequent to Tanzania, yields are 50 to 150 percent higher than in Tanzania (Ratter, Saro G. 2002). The average cotton yield in Tanzania has been given as 700kg/ha by Ferrigno et al (Ferrigno, Simon, Saro G.Ratter, Peter Ton, Davo Simplice Vodouhê, Stephanie Williamson, and John Wilson 2005 p.12), as 421 kg/ha by Poulton et al (Poulton, Colin, Peter Gibbon, Benjamine Hanyani-Mlambo, Jonathan Kydd, Wilbald Maro, Marianne Nylandsted-Larson, Aftons Osorio, David Tschirley, and Ballard Zulu 2004) and between 375 and 500 kg/ha by Ratter. (Ratter, Saro G. 2002) It is clear that yields vary dramatically between locations and soil types within Tanzania. Our own study once again reflects this large variation in yields not only between villages but also within them. Whilst the focus groups and extension staff interviews noted maximum yields of between 750 kg/ha in Mwagala to 1000 kg/ha in Iteja and a staggering 2500 kg/ha in Mwambiti our own sample did not reflect these high figures.

As cotton production in Tanzania tends to be performed by smallholder producers, the use of labour on a permanent basis is limited in the production process. However, the employment of labour in other areas of processing, ginning and marketing does remain important as does the use of temporary and group labour by larger producers, as the following study suggests: “…many cotton farmers are engaged in seasonal employment and own just small size farms. Only medium sized farms of around 40 hectares exist and there are virtually no large-scale farms. The owners of the medium-scale farms are involved in the demand for labor as cotton farming is a very tedious undertaking.” (Kabelwa, George and Josaphat Kweka 2006 p. 14) Our samples in all three villages support this type of labour employment, with only the minority of cotton-producing households relying exclusively on family labour. In Mwambiti the employment of non-family labour was the highest, followed by Mwagala and Iteja. In all cases the employment of labour was seasonal, with small or larger groups performing distinct tasks relating to the cultivation of cotton.

In terms of non-labour inputs we can focus here on pesticides, as the use of inorganic fertilizer is historically low in Tanzania and particularly on cotton land (under 1%). (United Republic of Tanzania 2006b) The picture on pesticide use is more interesting. Whilst in 1990 the coffee and cotton sectors together were said to account for over 70% of pesticide use, this figure has dropped dramatically with cashew and tobacco increasing their share. (World Bank 2000) According to the 2002/03 Agricultural Sample Census(United Republic of Tanzania 2006b), insecticide was applied by 61% of cotton producing households and applied to 54% of the total area planted with cotton. However other studies show more ambiguous results. “It is estimated that no more than 20% of cotton farmers use pesticides and many of them use less than optimal quantities.” (Ratter, Saro G. 2002) While in Shinyanga region overall application of insecticide and fungicide on all crops is around 22%, in Mwanza region the figure is only 17%. (United Republic of Tanzania 2006b) The national data is supported by our own information on pesticide application on cotton. While the majority of producers in all
three villages had applied pesticides at one point in time, application rates in Iteja and Mwagala village have declined significantly over time. In the last season rates of pesticide application\(^4\) in Iteja were below 50% and Mwagala below\(^4\) 40% on cotton land whilst in Mwambiti village in Shinyanga region the figure is closer to 80%. The effects of the introduction of the CDF input-distribution system appear to have been weak in Iteja and Mwagala, although it may still be too early to tell.

Production of cotton is closely linked to weather patterns, requiring less water than other potential crops in the areas where cotton is grown, but still not being entirely drought resistant and liable to flooding following period of large and sustained rainfall. Irrigation in these areas of Tanzania is negligible. A recent survey shows the percentage of households practicing irrigation to be 2% and 4% in Shinyanga and Mwanza regions respectively, under half the national average of 8%. (United Republic of Tanzania 2006b) For many producers of the crop, particularly in areas where weather patterns are more varied (Mwanza region) the cultivation of cotton can be in part linked to variations in rainfall, with some producers shifting cultivation between rice and cotton, depending on rainfall in that season. (ICRA 1997)

4.3 Categorising producers within villages

The above overview of our case study village allows us to categorise farmers within these villages according to relative wealth or size. Previous studies have considered the strategies of different groups of producers in the wake of external shocks, including commodity price volatility. They have highlighted important characteristics of those most vulnerable as well as those most able to cope and mitigate against sudden falls in income or increases in expenditure. These studies have pointed to the importance of assets, both physical and human in lowering the vulnerability of households and producers to commodity price volatility. Furthermore this literature has shown the divergence in effect of particular negative commodity price shocks, depending on wealth. (Bourguignon, Francois, Sylvie Lambert, and Akiko Suwa-Eisenmann 2004;Christiaensen, Luc, Vivian Hoffmann, and Alexander Sarris 2006;Minot, Nicholas and Lisa Daniels 2002;Rapsomanikis, George and Alexander Sarris 2005)

In much research on the effects of liberalisation policies there has been an assumption of uniformity among cash crop producers in their motivations for growing certain crops, either as part of a wider risk management or diversification strategy (Dercon, Stefan and Pramila Krishnan 1996;Kochar, Anjini 1995;Morduch, Johnathan 1995) or in response to absolute or relative movements in prices for crops such as cotton. (Eriksson, Gun 1993;Govindan, Kumaressan and Suresh Chandra Babu 2001;McKay, Andrew, Oliver Morrissey, and Charlotte Vaillant 1998) In this research we hope to identify a more complex picture regarding the motivation and behaviour of different groups of producers, recalling points made by Bryceson (Bryceson, Deborah Fahy 1981) in reference to the role of policy, institutional factors, local politics and force as well as relative prices in determining the production decisions of different producers in Tanzania.

For the purposes of this paper we can distinguish producers (both cotton and non-cotton) along the lines of wealth within each of the villages. Land and livestock ownership have proven important indicators of wealth in the Lake Zone (ICRA 1997;Morris, Mike 2001;Wella, E. B. and A.C.W. Roeleveld 2000) and are therefore also used in our analysis.

\(^4\) This figure may be seen to be overestimated the real application of pesticides as it only shows the percentage of producers sampled using any pesticide in the previous season, rather than those using the recommended amount of pesticides in that year.
Furthermore, the employment of non-family labour on a regular basis has proven helpful in other studies (Forster, Peter G. and Sam Maghimbì 1992; Seavoy, Ronald E. 2000) and will also be used by us. Whilst a full asset-indexation of producers in the three case study villages was not possible in this study, more limited use house observation information is useful in determining relative wealth at the village-level. (Isinika, A.C. and N.S.Y. Mdoe 2001; Sender, John and Sheila Smith 1990) Using these measures of relative wealth we can establish three groups of producers within each of the villages.

Table 4: Summary of Producer Characteristics

<table>
<thead>
<tr>
<th>Village</th>
<th>Number of producers interviewed</th>
<th>Number current cotton producers</th>
<th>Average amount of total land owned (acres)</th>
<th>Mean land under cotton cultivation (acres)</th>
<th>Median land under cotton cultivation (acres)</th>
<th>Average number of large livestock owned</th>
<th>Median number of large livestock owned</th>
<th>Cotton yields for 2006/07 (kg/ha)</th>
<th>Percentage employing non-family labour on cotton</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iteja</td>
<td>12</td>
<td>5</td>
<td>17.7</td>
<td>4.8</td>
<td>4.0</td>
<td>19.1</td>
<td>7</td>
<td>508</td>
<td>67%</td>
</tr>
<tr>
<td>Mwagala</td>
<td>13</td>
<td>5</td>
<td>8.6</td>
<td>2.8</td>
<td>2.0</td>
<td>14.1</td>
<td>6</td>
<td>714</td>
<td>85%</td>
</tr>
<tr>
<td>Mwambiti</td>
<td>9</td>
<td>9</td>
<td>64.7</td>
<td>20.1</td>
<td>12.0</td>
<td>25.4</td>
<td>23</td>
<td>399</td>
<td>100%</td>
</tr>
</tbody>
</table>

Source: Author’s calculations based on field interviews, March – May 2007

The first group of producers can be classified as the wealthy or largest producers, owning relatively larger plots of land and livestock within the village. They employ high and regular levels of non-family labour. These producers are also inclined to have the highest asset and house observation scores and do not themselves seek employment on other farmer’s land. The second group of producers fall less easily into a neat category. They have an average wealth at the village level and distinguish themselves from the poorest and smallest producers by occasional use of non-family labour and higher livestock and land ownership. The third group of producers are the poorest and smallest producers. They own the least amount of land, often leasing further plots or they supplement their income by being employed on larger producers’ farms. Livestock ownership is also the lowest for the village and asset and household observations similarly score low. The above classification of producers is particularly helpful when it comes to assessing the relative impact of price changes within villages. Using these groupings we hope to highlight important differences in behaviour regarding the motivations behind production of cotton and other crops that go beyond village specificities, which previous research has not shown in the context of Tanzanian cotton production.

5. Cotton producers’ responses to between and within season price changes

Having described the general picture regarding producer prices and the case study villages we can now turn to a closer analysis and evaluation of the effects and response strategies of producers in the wake of cotton price changes. The analysis and reporting of these results relies on data primarily from the semi-structured producer interviews, as well as the village-level focus groups and interviews with agricultural extension staff. The effects and responses of cotton price instability were varied and difficult to isolate from responses to other challenges and concerns. Asking respondents to recall this information from past years also posed challenges to the researcher. Furthermore, the frequent movement in and out of cotton production by producers and the differing lengths of production experience meant that some producers had not been affected by movements in prices by virtue of not producing cotton in the affected year(s). One important caveat to the discussion that follows in the necessity of understanding the response of producers to price changes alongside other production and
marketing challenges and developments as well as national and regional policy shifts, which will be discussed subsequently.

5.1 Differences in price experience between and within villages
From table 5 it is evident that when we speak of producer prices, different agencies and points of reference within Tanzania provide us with very different prices. Whilst it is the concept of the producer price that is most important and relevant to our discussion of price instability and its effects, we need to be clear about which producer price is being discussed and at which point in time. It would appear that national level statistics and even district level data tend to overestimate the price actually received by producers.

Data from our interviews, whilst not entirely divergent from district and national statistics do demonstrate the array in different prices experienced by producers within one season. Not only can we see distinct differences in the prices received by producers in different villages but also within the villages. Looking at the spread of prices received by producers in the survey, these varied by 29-46% within one village, with Iteja and Mwagala villages showing particularly acute variation in prices within one season. This variation in prices between and within villages may be reflecting the within-season variation in prices, discussed above. However, as the subsequent discussion will show, further explanation need to be sought for these price discrepancies.

### Table 5: Summary of Prices received by Producers

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Iteja</td>
<td>1513</td>
<td>450</td>
<td>300</td>
<td>273</td>
<td>44%</td>
</tr>
<tr>
<td>Mwagala</td>
<td>1513</td>
<td>450</td>
<td>300</td>
<td>293</td>
<td>46%</td>
</tr>
<tr>
<td>Mwambiti</td>
<td>1513</td>
<td>450</td>
<td>350</td>
<td>344</td>
<td>29%</td>
</tr>
</tbody>
</table>

Sources: Export and producer prices are taken from the Tanzania Cotton Board, [www.tancotton.co.tz](http://www.tancotton.co.tz). District level price data for 2006/07 were obtained from district offices in Meatu and Misungwi district. Producer prices from the survey show the average price reported to have been received by cotton producers over the 2006/07 season. The spread of prices shows variation around the average price within each of the villages.

Beyond the simple experience of prices at a particular point in time it is useful to note the differences in the general experience of prices over recent years. Here once again the variety of experiences between and within the villages can be noted. While in Iteja and Mwagala village the general development of prices as witnessed by current or previous producers of cotton has been largely negative or neutral, producers in Mwambiti had a more positive tale to tell. Within Mwambiti village, the only producer to mention a more ambiguous experience of cotton prices also happens to be one of the smallest cotton producers sampled, owning the least land and livestock. In Iteja and Mwagala, as one would expect, most of the producers having witnessed a particularly negative progression of prices were those who have subsequently stopped producing cotton or decreased their cotton acreage. Producers interviewed in these two villages noted a non-uniform trend in prices, with periods of price falls in the late 1990s and early 2000s and more recent years of higher nominal cotton prices.

When it comes to price volatility within the season, producers in all villages noted an increase in these fluctuations over time. Here little differentiation between producers and villages can be made although only a few producers spoke of a distinct pattern of seasonal price movement with most producers in Iteja and Mwagala village highlighting their failure to do
anything about this problem. Producers in Mwagala were the only ones to draw attention to the nature and competition between buyers alongside price developments more generally.

5.2 Responses to price changes within the case study villages

Iteja village, Misungwi district, Mwanza

The effects of between and within-season price fluctuations appear to have been relatively strong in Iteja village, although clearly a number of other institutional and marketing changes have contributed to the transformation of cotton production in this village. In this village a large number of producers had either temporarily stopped producing cotton over the last 15 years or had given up on cotton completely. This has especially been the case among the poorest producers in the village. The time periods experienced by these producers were very mixed, frequently with long production gaps. It is important to note that these gaps in experience also limited the amount of information available on these non-productive periods. As a result it is difficult to determine whether or not wealthier producers, as measured by our composite index have been able to obtain higher prices on average, when compared to less wealthy producers, although their experiences of prices in general does appear more positive.

Various years, most notably 1999/2000 as well as the period between 2001 and 2004 were mentioned by all producers, apart from the wealthiest, as period during which prices were low. There was a lack of consensus among those sampled as to which years had been particularly positive or negative regarding prices, indicating a variety of price experiences here. Producers mentioning the sale of cattle and food crops, such as rice, in order to cope with the fall in incomes from cotton tended to be below average wealth producers. Medium-wealth producers also spoke of expenditure strategies in the form of delays in making planned investments as a result of a fall in the price of cotton. The wealthier producers here were less concerned with movements in the cotton price, basing their production decisions on other factors, including institutional and marketing problems relating to cotton production. However, all other producers in this village felt that the cotton price was an important determinant of production.

Only the wealthiest producer sampled in this village mentioned a positive movement of cotton prices in Iteja in the last two years. There was however a sense of anticipation of increases in the price in years to come among most producers, as rumours of this had been circulated by government officials and/or private buyers. Most of those moving out of cotton both temporarily and permanently gave a mixture of reasons and this cannot therefore be solely attributed to price volatility. Payment delays, lack of sufficient input provision combined with low prices discouraged them from further cotton production and shifted them towards alternative activities instead. However those that have moved out have favoured planting an alternative food crop (rice, maize or sorghum) rather than horticultural or other cash crops. Echoing the importance of other factors alongside price changes, when questioned on their response to a positive movement in the price, all but two of the poorest producers said they would increase production, only on the condition that policy changes to ensure prompt payment and subsidised input supply took place concurrently.

Those continuing to produce cotton noted the increase in within-season price volatility in recent years but felt unable to deal with this problem. Storage risks, most notably the risk of fire prevented producers from storing their crop in their home or elsewhere in order to take strategic advantage of increases in price over the season. Across wealth groups, producers spoke of selling their crop as soon as it was harvested in order to mitigate any changes to the price subsequently and also to ensure they would be paid promptly and in cash. However this strategy of early selling can also be linked to the limited numbers of buyers in Iteja and in
surrounding villages and towns, leading producers to sell their crop early on so as to guarantee a sale. This is seen more markedly in Mwagala Village, where the lack of competition between buyers is a distinct concern.

**Mwagala village, Misungwi district, Mwanza**

In Mwagala a more permanent movement out of cotton production has occurred in recent years, with many younger producers opting to cultivate horticultural crops instead of cotton. Horticultural crops have a very different production and marketing system to cotton, requiring higher levels of irrigation and non-labour inputs, particularly fertilizer and pesticides. Furthermore they perish quickly and have a less systematic and historic sales structure than cotton (at least in theory). Despite the high requirements of horticultural crop production many felt the returns offered by producing these crops were higher than those for cotton in the current climate. The decline in the price of cotton was usually mentioned as one of the contributing factors pushing them to move out of production in the last decade in particular. Otherwise the experience of prices, whilst still varied, was overall a negative one, across those sampled.

Overall, the effect of a negative movement in the cotton price in Mwagala was the strongest out of the three villages with the wealthiest producers also affected. 1996/97 was highlighted as a year of particularly harsh decline in the cotton price although 1999/2000 and other years were also mentioned as having had a negative effect on some producers. The response strategies covered a mixture of income-raising and production-related tactics but were diverse within this. The sale of food crops across all wealth groups was significant following the price decline, with the wealthiest also relying on the sale of cattle. For the poorest producers the search for employment on larger farms and involvement in other activities, such as charcoal making and fishing were important in the short and medium-term. Comparing Mwagala to the other villages it was clear that producers here were opting for more than one strategy, indicating the severity of the effect felt. Most were raising their income in the immediate wake of the decline in prices and in the medium-term they would also reduce or stop production. This manifested itself in the fact that the wealthier producers opted to lower the size of their cotton plot whilst other producers stopped production all together in favour of alternative crops, namely food and horticultural crops. Once again a majority of producers across all wealth groups felt that while prices were an important production determinant the failure to pay producers promptly combined with issues over input provision had resulted in a generally unfavourable environment for cotton production in the village.

Despite the relatively higher prices in recent years, producers in Mwagala highlighted that the lack of buyers in the village and failure of provide inputs fairly and systematically, even through the new CDF system meant that any positive effects from the price rise were negated. Consequently there was a less optimistic view of cotton prices and production in Mwagala village, with some non-cotton producers vowing to not return to cotton production even if the prices continued to increase, highlighting the high risks and low returns associated with cotton production in this village. This negative image regarding cotton was however contrasted by a couple of the poorer producers who felt that despite the negative production environment, cotton was the only crop to provide them with significant amount of cash income and that therefore independent of prices, they would continue with the production of the crop.

Fewer producers than in Iteja mentioned the harmful effects of within-season volatility, focusing instead on the territorial differences in prices between villages. Interviews with producers, extension staff and focus group results showed that the low number of buyers and
resultant low prices in Mwagala, when compared to other villages, were a major concern for producers here. Those that spoke of within-season price fluctuations mentioned the lack of options to deal with this in the same way as in Iteja, noting the risks posed by fire among other things. Furthermore many producers mentioned the lack of choice as to the timing of sale of their crop as the presence of buyers in the village was limited to a few days. Only the wealthiest producers here were able to strategically choose the way they sold their crop, either selling illegally to a trader at the farm gate or transporting their crop to a neighbouring village. Other producers in Mwagala felt at the mercy of traders and ginners, particularly in the 2004/05 and 2005/06 buying seasons during which only one and no buying posts respectively were set up in Mwagala.

Almost all producers in Mwagala admitted to reducing or stopping cotton production in part due to low prices, but also due to other factors relating to the post-liberalisation environment. The severe cash-flow problems of the cooperative union and resultant long payment delays were a significant contributor to the production decline. Furthermore the lack of alternative buyers in the village and the high and rising price of seeds and pesticide inputs all added to the woes of producers in Mwagala. The shifts in production towards horticultural crops in Mwagala are clearly also a function of climate and soil specificities here. This more permanent movement out of cotton may therefore not be as easily possible in other locations.

**Mwambiti village, Meatu district, Shinyanga**

The unequal between-village price experience, talked about in reference to Mwagala was also reflected in Mwambiti village, which has been one of the net benefactors from this spatial price discrepancy. In general and across all groups, prices experienced in the last season were higher here than in the other two villages. However, a couple of the wealthiest producers had been able to garner the highest prices by either selling at a point where prices were at their highest over the season or by selling to a specialist organic cotton buyer, who paid a premium. Overall producers in Mwambiti village were least affected (out of the three villages) by negative price changes, with many stating either not to have remembered changes in price between seasons or that the effect on them was limited. What was paramount in this village was the extent to which producers had had a positive experience of prices in recent years, especially since 2000.

Here focus group participants and producers when asked about the decline in prices in the last two decades were less able to recall the effects and could only mention one year (1996/97) as having been a “bad year for cotton prices”. For the minority of those interviewed and affected by the price decline, the sale of cattle was the most frequent response, followed by the supplementing of income from other sources, such as land leasing or food crop sales. Only one of the wealthier producers explicitly mentioned changing the marketing of his cotton as a result of the fall in price, preferring to sell to a different buyer in a neighbouring village in order to obtain the best price. In our sample, the changes in the price between seasons appears not to have affected production, both in overall supply as well as in input use in the case of Mwambiti.

This is corroborated when considering the answers to a follow-up question on the reasons why producers have at any point increased or decreased their production of cotton. For those producers that had reduced the cotton area under cultivation in Mwambiti, the answer to this was given as wanting to improve management and concentrate inputs on a smaller plot, rather than being driven out of production by low output prices per se. However one of the poorer producers did have plans to substitute sorghum for cotton production in order to ensure food
security and a number of other producers were concentrating on smaller plots as input costs had risen steeply and allocation from the CDF was insufficient.

Within-season price changes were something mentioned by all producers in the sample, with most commenting on the increase in within-season price variations in recent years, similar to the other two villages. However in Mwambiti all but the poorest of producers actively engaged in strategies to overcome this volatility by storing their crop for anything from one week to four months in order to obtain the best price. It would appear that here the presence of many buyers and the high demand for cotton at specific points in the seasonal cycle has meant that those producers able to strategically store and sell their crop were able to obtain the best price for their cotton.

6. Discussion and concluding remarks
Our results highlight the diversity in the experience of prices and price changes both between and within villages. Following the evidence from our interviews and focus groups it is now useful to put these results in a wider context of Tanzanian cotton production and in particular in relation to the institutional and marketing changes that have taken place in the last 15 years. We draw on evidence from other secondary sources and place our own observations within other literature that has observed the tendency for differentiated experiences within countries following liberalisation.(Bryceson, Deborah Fahy 1999; Dixon, John, Aysen Tanyeri-Abur, Horst Wattenbach, and Brave Ndisale 2003; Justino, Patricia and Julie Litchfield 2003; Ponte, Stefano 2002) We hope to take some of these ideas further in order to assess the effects of liberalisation on the experience of prices in different situations. In particular we hope to better understand the following observations, which will be explained in turn:

1) Mwambiti village has had a more positive experience of prices when compared with Iteja and Mwagala villages.
2) There has been a general rise in within-season volatility across all villages but differences in the ability to manage this are paramount.
3) Within the villages wealth is an important determinant of the ability to manage within-season and between season price differences in the short to medium term.
4) The relationship between prices and production in the longer term is complicated by institutional and marketing challenges and the asymmetric effects of these across the three villages.

6.1 Between-village differences
Our result regarding the discrepancy of prices between regions and villages confirms existing results from other studies but goes further in locating the causes of this phenomenon. As the following quote by Oya shows “…the removal of controls often exacerbated seasonal and regional price fluctuations, so price volatility generally increased, hitting producers located in remote regions and poorer farmers compelled to sell at a lower price after the harvest.” (Oya, Carlos 2005 pp.130-1) However, here we can go even further and locate how this divergence in experience is derived and how the difference in experience in played out in practice.

The discrepancy between villages is in part due to the underlying soil and climatic conditions in each of the villages, so that in Mwambiti a lack of potential for alternative cash crops may be helping to dampen the responsive to prices here. This is set against the opportunity for alternative rice and horticultural crop production in Mwagala and to a lesser extent Iteja. Figure 5 highlights the relatively higher levels of production in Meatu district when compared with Misungwi, especially in more recent years. The heightened dependence on cotton in
Mwambiti may also help explain the attraction of more cotton buyers to this village, which we will explain in more detail later.

![Figure 5: Production in Misungwi and Meatu districts](image)

*Figure 5: Production in Misungwi and Meatu districts*

*Source: Misungwi and Meatu district offices (1996/97-2005/6)*

The existence of an organic cotton buyer in Mwambiti has also meant that some farmers are able to reap the rewards from higher prices offered by this firm. Paradoxically, producers in the other villages are less likely to be using artificial pesticides and fertilizers on their cotton in the first instance, as they cannot afford or access these as easily as producers in Mwambiti. However it is only in Mwambiti that this particular company has initiated a project. Furthermore, many producers in Mwambiti, aware that the controls and checks made by this particular buyer are weak, are taking advantage of this by selling to the firm, despite having used artificial pesticides and fertilizers on their crop.

Access and proximity to roads and towns is also relevant when discussing village differences. Mwambiti village is at an advantage in terms of its location, close to a main road with many ginneries in close proximity. Iteja village is straddled by the main Mwanza-Shinyanga road with easy access to Misungwi town and not far from Mwanza itself. However this appears to have had little effect on attracting buyers, lowering transport costs and allowing for higher producer prices. For Mwagala village, its location, not easily reached from the main road may have contributed to the lack of interest in the production and purchasing of cotton here.

Bryceson’s research showed that in the context of sub-Saharan Africa overall “on-road village transport services have markedly improved while off-road services have declined as the private traders and transporters that replaced parastatal operations restrict their services to the bigger settlements on the road which have bigger markets and lower wear-and-tear costs for their vehicles.” (Bryceson, Deborah Fahy 1999) These findings are supported by the strategic location of Mwambiti village and the remoter location of Mwagala. Iteja village, lying so close to a major main road does not however fit this picture. We must therefore turn to some additional explanations relating to results of liberalisation policies.
Since liberalisation the number and location of buyers is determined by the market and Mwambiti village has evidently benefitted from this compared with the other two villages in the form of increased competition among buyers as well as the introduction of an organic cotton buyer. In Mwambiti producers sell their crop at buying posts set up by at least 4 or 5 different buyers whilst in the other villages buyers are not as forthcoming and therefore many producers are (illegally) selling at the farm gate or taking their cotton (by bicycle or ox-cart) to buying posts in other villages. The cost of transport as well as the lack of alternative options for selling the crop, places the power in the hands on cotton buyers in Mwagala especially. This has enabled buyers in Mwagala and Iteja to offer producers lower prices than elsewhere, in the knowledge that alternative marketing channels are no longer open to them. This has been further exacerbated by the recent insolvency of the cooperative unions in the Mwanza and Shinyanga area. Previously most villages had the guarantee of at least one buyer, namely the cooperative union setting up a buying post in their village and any private companies or traders would have to compete with the cooperative union on price.

The issue of quality is also an important one when it comes to the determination of cotton prices and Tanzania has witnessed a diminishing in cotton quality, partly due to declining use of inputs and partly due to poor checks at the ginning stage (Baffes, John 2004; Maro, W.E. and Colin Poulton 2002; Nylandsted Larsen, Marianne 2006). It is difficult to determine differences in quality between villages, although most indications are that quality differentiation has declined in favour of quantity on the part of the buyers, needing to fulfil their contracts promptly or incur a penalty. (Ponte, Stefano 2002) Ponte has also shown this for both coffee and cotton production in the Tanzanian context following liberalisation “Quality problems have also arisen due to purchasing of wet coffee and unripe cotton. This happens as traders cannot spend time sorting through the crops when they buy them because they need to move them fast to maximise the speed of capital turnaround.” (Ponte, Stefano 2002 p.74) The issue of quality differences between the villages can be seen in the establishment of longer term relationships between producers and buyers in Mwambiti villages, such as through the organic cotton project and the failure of this in the other two villages, where producers and buyers are equally suspicious of each other, undermining quality control in the buying process. Quality differences may also be linked to the relative differences in inputs application.

The relative cost and effectiveness of inputs, particularly seeds and pesticides, will also be important in determining the relative price of cotton for producers. Since liberalisation the cost of pesticides has increased while their availability has diminished across Tanzania. In more recent years the introduction of the CDF aimed to subsidise the cost to producers and encourage more widespread pesticide use on cotton. However, the results have been mixed, partly because access to these inputs relies on the distribution through ginners at buying posts. This finding is similar to observations made by Ponte in two other regions in Tanzania highlighting the lack of trader motivation to reach remoter areas for fertilizer distribution. ((Ponte, Stefano 1998) p.320) Whilst in Mwambiti access and use of CDF inputs was widespread in the other two villages this was far from the case. This discrepancy in input use and cost may therefore also help explain the divergence in relative price experience between villages.

6.2 The rise of within-season volatility
The removal of seasonal prices set by the Tanzania Cotton Board has resulted in a movement of cotton prices over the season. Others have noted this increase in different settings
(Fafchamps, Marcel, Ruth Vargas Hill, and Aliziki Kaudha 2007) although in the Tanzanian case explanations can be sought from the action and behaviour of traders and ginners. With ginning over-capacity in Tanzania (Baffes, John 2004) and an urgency surrounding the fulfilment of contracts on the part of ginners one would expect prices to be high at the beginning of the season. However this is juxtaposed by cash requirements of producers, who prefer to sell early as they are guaranteed a sale and payment in cash. The history of the cash-strapped cooperative unions has left producers eager to ensure a sale. This combination of urgency on both the part of the ginners and the producers has resulted in frenzied purchasing of cotton in abundant production areas at the beginning of the season with competition among producers driving prices down. Subsequently as the season proceeds prices have tended to increase as ginners are still fulfilling their contracts and cotton availability on the part of the producers has diminished.

It is evident that those producers able to safely store their crop are therefore also able to garner higher prices by selling later in the season. However, storage and timing of sale is also closely linked to the competition among buyers. While in Mwambiti almost all producers engage in storage, in order to reap the highest possible price within the season, in the other two cotton-producing villages, producers are put off by the risks (mainly fire risk) from engaging in storage. Furthermore it is evident that when producers are at the mercy of one particular buyer who determines the timing, location and price of the transaction such as in Mwagala, the notion of storage to cope with price changes becomes extraneous.

6.3 Wealth as a determinant of the ability to manage price changes

In this investigation we have focused on the differences in the experience of prices between producers by wealth classification. Beyond this we could have considered age of the producer, level of education of the producer, gender and power relationships in determining differences in the experience of prices. However, for the most part our data is too limited to give us any clear indication of the importance of these factors. Furthermore wealth, using a proxy of various indicators and variables is most illuminating as regards longer-term development implications. Also, as Oya (Oya, Carlos 2005), Bryceson (Bryceson, Deborah Fahy 1999) and others have shown, differences in relative wealth can illuminate important differences in the extent of liberalisation effects.

Generally speaking, we can clearly see that the wealthiest producers in all cases have felt the effects of annual price fluctuations less severely than other groups and have been able to weather any significant declines in price. This may in part be due to them having received a higher price for their cotton at times of crisis, as suggested by one of the focus groups. Furthermore these producers, by producing large amount of cotton may have stronger links with buyers and can reap the benefits of this relationship when there is a downturn. Evidently these producers also own more livestock in relative terms and have the option of selling these in an emergency situation with little longer-term or production effects felt. The importance of livestock as a buffer has been reflected in studies on other negative effects on income and in other countries. (Dercon, Stefan, John Hoddinott, and Tassew Woldehanna 2005;Fafchamps, Marcel 1999;Fafchamps, Marcel, Christopher Udry, and Katherine Czukas 1998;Morduch, Johnathan 1995) In all three villages the poorest producers have been worst affected by seasonal changes in the price of cotton, as might be expected and reflected in other studies.(Bourguignon, Francois, Sylvie Lambert, and Akiko Suwa-Eisenmann 2004;Minot, Nicholas and Lisa Daniels 2002) We can also note that in many cases these producers rely on cotton for their only source of cash income and cannot therefore easily switch to alternative crops or rely on the sale of other cash crops as producers in the other groups. Therefore the
effects of a sudden fall in price may be widespread among this group, leading producers to seek employment and turn to non-traditional activities such as sales of charcoal and brewing beer, among other things.

Turning to the experience of within-season price changes we can see that this is a major concern for producers across all wealth groups and in all three villages with many reporting a heightened movement of prices over the season in recent years. The differences in wealth do emerge when considering the responses of producers to this heightened within-season volatility. None of the poorest producers stored their crop and there was a sense of inevitability and mercy to the price received among this group of producers and little else could or was done by this group to obtain the best possible price for their crop. Whilst the larger producers are still able to market their cotton through various legal and illegal channels at the moment, a further differentiation in pan-territorial and seasonal prices may push these wealthy producers in certain villages in Mwanza region to reduce their cotton acreage or even to turn to alternative crops when these are available, as has started to occur in Mwagala village.

6.4 The role of institutional and marketing arrangements in shaping the longer-term price-production relationship

Prices are an important determinant in the longer term production of cotton in all three villages, but particularly among producers of average wealth. Both the wealthiest and the poorest producers sampled across the three villages were less responsive to prices, as might be expected. Other research has shown the importance of cash income as part of wider household diversification strategies of the poorest producers (de Weerdt, Joachim 2004; Dercon, Stefan 2004; Rapsomanikis, George and Alexander Sarris 2005). This is reflected in our work with many of the poorest having committed to cotton production out of necessity, providing them with a small and regular cash income. At the other extreme the wealthiest producers in our sample were also less concerned with prices in the long-term, highlighting their long-term investment and commitment to the crop. However among the rest of those sampled producers were responding to prices in the longer-term. In particular in the two villages with the most negative results from liberalisation producers appeared to frequently move in and out of cotton production, depending in part on the price of cotton.

While differences emerge between villages and wealth groups we can note that in all cases the relationship between prices and production has become blurred by the institutional and marketing environment surrounding producers. The idea that producers are responding simply to a change in the absolute of relative price of cotton can be dismissed from our observations. Instead producers in Mwanza region are responding to the lack of input provision, payment delays and lack of buyers in the village. These concerns have combined with the reduction in prices over the seasons and the heightened volatility within the season to drive producer out of cotton production. This may be a temporary phenomenon in Iteja village, but appears a more permanent feature of Mwagala’s agricultural production with horticultural crops gaining importance. This temporary production response, especially in Mwanza region may have implications for the sector’s longer term sustainability and progress. The current situation of exposure to price fluctuations combined with other challenges is not encouraging these producers to continue producing cotton and to invest in labour and non-labour inputs in the production process. If these investments fail to be forthcoming in Mwanza region we may see further stagnation of cotton production here.
6.5 Concluding remarks
Cotton production and producers in Tanzania have seen some major changes affect the sector since the introduction of the crop under colonialism but particularly since the onset of liberalisation policies in the mid 1990s. One of the major effects has been the exposure of producers to market prices. It is this exposure that this study aimed to investigate in more detail and from a fresh perspective, taking a more holistic view of the experience of prices by producers. This study briefly reviewed the history of Tanzanian cotton production including major policy, production and price changes. In section 3 we discussed prices and price fluctuations in more detail, highlighting the importance of determining accurate producer prices. Section 4 introduced the case study villages and put these into the wider context of cotton production in Tanzania. This section also dealt with the categorisation of producers based on wealth characteristics. Section 5 focused on the results from fieldwork, showing the divergence in effects and responses to prices in three different villages and by different wealth groups. Finally the last section drew together our results under four broad headings which we interpreted and explained further, drawing on existing research and literature.

Elements of our four findings above confirm existing research from other studies, but go beyond existing work. In particular we show a richer understanding of the nature of the relationship between prices and production in the Tanzanian cotton context and the complicated interplay of policy changes since liberalisation in mediating this relationship. In particular, our research has demonstrated that there have been winners and losers from the liberalisation process and this relative gain or loss can also be seen in experience of prices and price volatility. The prices producers are receiving; the types of price volatility they face; the frequency of price changes; the methods open to producers to deal with this; and the longer-term effects of this are varied and depend largely on the institutional and marketing environment surrounding producers in different villages in Tanzania. Whilst wealth, geographic location and other village and producer-specific factors play some part in explaining these differences, it is clear that overriding these differences is the current production and marketing set-up. The role of the post-liberalisation production environment and the asymmetries created by this have been seen in other areas, as Bryceson (1999), Oya (2005) and others (Justino, Patricia and Julie Litchfield 2003;Ponte, Stefano 2002) have pointed out. However this research has highlighted some of the channels through which this discrepancy has occurred and further shown how these asymmetries can be applied to the experience of prices and price changes in developing countries.

This research also feeds into other research on the Tanzanian cotton sector more broadly. The focus of many recent studies has been on issues of quality (Baffes, John 2004;Nylandsted Larsen, Marianne 2006), input provision (Ferrigno, Simon, Saro G.Ratter, Peter Ton, Davo Simplice Vodouhê, Stephanie Williamson, and John Wilson 2005;Gibbon, Peter 1999;Shao, John R. 2002) and to a lesser extent price volatility (Kilima, F.T.M. 2006;Shao, John R. 2002). However studies on price volatility have not investigated the phenomenon from the producer perspective in a comprehensive way. We therefore hope to have filled this gap in the literature by providing a fuller picture of the nature and effects of cotton price volatility in rural Tanzania.
References
and income volatility in cash-crop exporting developing countries." European Review of
Agricultural Economics 31:3, pp. 369-87.
Bryceson, Deborah Fahy. 1993. Liberalizing Tanzania's Food Trade: Public and Private 
Bryceson, Deborah Fahy. 1999. "Sub-Saharan Africa Betwixt and Between: Rural Livelihood 
Christiaensen, Luc, Vivian Hoffmann, and Alexander Sarris. 2006. "Coffee Price Risk in 
Perspective: Household Vulnerability among Rural Coffee Growing Smallholders in rural 
Tanzania." Reducing Poverty and Inequality: How can Africa be included?: CSAE, Oxford, 
UK.
Cooksey, Brian. 2003. "Marketing Reform? The Rise and Fall of Agricultural Liberalisation 
World Bank.
Dercon, Stefan and Pramila Krishnan. 1996. "Income Portfolios in Rural Ethiopia and 
Farmers and Differentiated Responses to Globalization." FAO.
Fafchamps, Marcel. 1999. "Rural Poverty, Risk and Development." FAO.
Fafchamps, Marcel, Christopher Udry, and Katherine Czukas. 1998. "Drought and Saving in 
273-305.
Fafchamps, Marcel, Ruth Vargas Hill, and Aliziki Kaudha. 2007. "Price Transmission and 
Trader Entry in Domestic Commodity Markets." Economic Development and Cultural 
Change, forthcoming.
Ferrigno, Simon, Saro G.Ratter, Peter Ton, Davo Simplice Vodouhê, Stephanie Williamson, 
Smallholders?" International Institute for Environment and Development.
Aldershot: Avebury.
Gibbon, Peter. 1999. "Free Competition Without Sustainable Development: Tanzanian Cotton 


Tanzania Cotton Board. 2007. "Seed cotton production by regions for the last 16 seasons (tons)." Tanzania Cotton Board:, Dar es Salaam,.