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ISBN : 978-1-907247-20-0

***Poverty traps and livelihood options in rural
Zimbabwe:***

Evidence from three districts

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June 2010

BWPI Working Paper 121

Creating and sharing knowledge to help end poverty

www.manchester.ac.uk/bwpi

Abstract

This paper analyses poverty in three districts of Zimbabwe. It uses household data to argue that there are two dominant poverty traps individually and jointly afflicting households. It argues that asset poverty is less severe than income poverty. It further argues that assets indicate potential for future production, especially in the context of employment opportunities for the poor, and that this is the most potent and cost-effective strategy to fight poverty. It concludes by estimating household demand for labour, concluding that increasing non-farm incomes and ownership of a minimum bundle of productive assets is necessary for long-term poverty reduction.

Keywords: Poverty traps, Rural poverty, Employment, Non-farm income, Rural districts, Zimbabwe

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1. Introduction

The Millennium Development Goals set benchmarks for economic and social development to be achieved by 2015. One of the set targets is to cut global poverty by half. However, poverty reduction remains a mammoth task for many countries, predominantly in South Asia and Sub-Saharan Africa (SSA), not least because of its multidimensional nature. Collier (2008) classifies some of these countries as ‘the bottom billion’ countries that are afflicted by four development traps, namely: the conflict trap; the natural resource trap; bad neighbourhood and landlockedness; and bad governance. Notwithstanding the traps and still high levels of poverty, there have been remarkable successes in poverty reduction in some countries and regions. Between 1999 and 2005, headcount poverty (2005 PPP at \$1.25 per day) declined by seven-and-a-half percentage points, in Sub-Saharan Africa, and by close to four percentage points in South Asia (World Bank, PovCalNet), but the former remains poorer and with a wider poverty gap than the latter. Recently, the number of people below the poverty line has been increasing in SSA, but declining in other regions (UNDP, 2006).

Distribution of poverty differs between African countries. Uganda did particularly well in reducing headcount poverty by 38.5 percent in the 1990s (Appleton et al, 1999), and Ghana reduced the same by 43 percent between 1992 and 2006. Zambia experienced growth in headcount poverty from 68 percent in 1990 to 73 percent in 1998, with a steeper increase in urban poverty. Zimbabwe experienced tremendous poverty growth during the structural adjustment period (1991-1995), but more particularly so during the crisis period (1997-2008). This paper examines Zimbabwe’s poverty situation during the crisis period, arguing that, other than bad governance (Sachs, et al., 2004) and all traps mentioned by Collier (2008) (although with regard to the conflict trap, the level of conflict was of a different type to that discussed by Collier), there are two principal poverty traps that have bound many families in perpetual poverty. The main traps are low initial capital (Benajee and Newman, 1993) and low savings traps. I apply the concept of an asset threshold to illustrate the existence of the former (Adato et al., 2006; Carter and Barrett, 2006), and an income threshold to illustrate the latter. Combining the two approaches is meant to mitigate the effects of measurement errors that are usually picked up as transitory movements in poverty (Carter and Barrett, 2006).

The concept of asset-based poverty is not new: it was widely examined in the *Journal of Development Studies* special issue (Volume 42) of 2006. This paper applies it to Zimbabwean data alongside an income-based poverty measure. The asset threshold depicts the structural nature of poverty, thus giving insights into long-term poverty. Although poverty is a dynamic concept, it is not possible to incorporate dynamics in the current analysis, since it is based on cross-sectional data. Asset poverty will indicate the likelihood of the persistence of poverty among households.

Beyond the traps, this paper argues that the best strategy to fight poverty is through increasing household capabilities and livelihood options that make effective use of households’ main asset – labour. Creating conditions conducive for labour-intensive employment and market opportunities potentially enables households to build their way out of poverty, especially in the context of adverse political economy factors. Historically, Zimbabwe has successfully implemented labour-intensive production systems in both commercial and communal farming areas, resulting in falling poverty (Bowden et al., 2008). Productivity, output and employment grew significantly in the 1980s, but the

trend was reversed during and after the reform period. This paper argues that it is this reversal, together with the occurrence of covariant shocks, which pushed and trapped some households in poverty. Thus, despite the existence of several strategies for exiting poverty, one market-based approach with the potential to take households above the poverty line in a cost-effective way is operationalisation of the labour market, provided the return to labour is high enough.

The choice to examine poverty in Zimbabwe is based on the uniqueness of the country. It has been declining since 1999, and in less than ten years, it has become one of the poorest nations, worse than some countries in war situations. Worse still, the economic crisis and political violence have made it very difficult for researchers to collect data, resulting in a significant decline in academic research on the country. This paper adds to the few recent academic papers, specifically augmenting work by Horrell and Krishnan (2007) that focused on poverty in female-headed households. I use the same household data collected in 2001–2002 from 300 households in Mutoko, Makoni and Chivi districts, but focus on two poverty traps and illustrate how they individually and jointly contributed to poverty growth. I analyse household livelihood diversification strategies, and how policies towards markets can be developed to augment strategies to fight poverty.

In analysing Mutoko data, I distinguish between communal and resettlement households because they have different levels of access to resources and livelihoods. Such differentiation is absent in the Horrell and Krishnan (2007) analysis, thus potentially giving a wrong picture of poverty in the area. This paper focuses on poverty in general, rather than the narrow approach adopted by Horrell and Krishnan (2007). The reason for this focus is that although poverty may be more prevalent and extreme among female-headed households, measures of poverty depth and severity are not statistically different between male- and female-headed households (CSO, 1998). Further, females in male-headed households may be worse off when compared to those in female-headed households, notwithstanding that nationally there are more male-headed (67 percent) than female-headed households. In places, I shall examine poverty in female-headed households in order to allow comparability with the aforementioned paper. Lastly, female-headed households will definitely benefit from general anti-poverty initiatives that I propose later on.

The progression of the paper is as follows: Section 2 presents the theory behind the two poverty traps highlighted above. This is followed by an analysis of poverty at national level in Section 3. Section 4 analyses the extent of poverty on the basis of the two traps, using data from three districts. Section 5 examines the livelihood options open to households in the areas and how they can provide exit routes from poverty. Based on the argument that the labour market is an important and potent instrument against poverty, Section 6 uses an econometric approach to examine the determinants of rural labour demand. Section 7 concludes.

2. Poverty traps

Assuming, as in the Lewis Model, that developing countries have surplus labour in agriculture from which the advanced sector (manufacturing) draws labour to meet its requirements (Lewis, 1954), then the problem facing many such countries is an inability to realise the transition from agriculture to manufacturing, where productivity is higher. Entrapment in agriculture is thus an immense

problem for most developing countries, because their agricultural productivity per capita is too low to reduce poverty. Low productivity results in low savings accumulation, because poor households only save after meeting their basic needs. However, for investment and hence development to occur, households need to save a significant proportion of their incomes, as was the case for middle-income Asian countries. As advocated by endogenous growth theories, households need to invest in capital formation in order to transit into high value-added production. In the rural economy, there is a dual problem of low incomes and hence low savings, together with the fact that the mobilised savings are usually invested elsewhere (usually in urban areas), where the rate of return is higher. This impedes rural investment and hence rural development.

Notwithstanding this, the rural dominance of agriculture means it can be used as a platform for development, especially since the rural economy lacks the infrastructure to attract manufacturing sector investment. Agricultural development is gaining prominence, especially in the context of current global trends and predictions of food shortages in the not-too-distant future, which has resulted in the acquisition of agricultural land in Africa, Eastern Europe and Asia by rich and populous countries such as Saudi Arabia and China (Von Braun and Meinzen-Dick, 2009). Yet, one reason for high levels of poverty in most developing countries is the low level of agricultural productivity, which causes a poverty trap and thus underdevelopment.

Poverty traps are difficult but not impossible to exit (Collier, 2008). For Zimbabwe since 1997, more households were trapped in poverty than exited it. There are many traps, operating individually and/or together and binding to different extents (Sachs et al., 2004). Here I focus on two types of traps which I believe are the most dominant and have the worst effects, namely: the low savings trap, which reduces household wealth accumulation and the ability to mitigate idiosyncratic risks; and a trap caused by a low capital threshold, which is worsened by the frequent occurrence of covariant risks, such as drought. The impact of these traps was worsened by economic crisis.¹

The poverty trap theoretical framework is a Solow growth model representing a rural sector production function q :

$$q = sAf(k) \quad (1)$$

where q is output per capita, s is the savings rate, A is autonomous technical change, and k is the capital–labour ratio. This production function can be taken to represent a household production function, and is analogous to Carter and Barrett's (2006) expected livelihood function. The conjecture is that the rural economy lacks savings (domestic or foreign) to stimulate development. Other than governance and bureaucratic hurdles, investment is constrained by human capital and infrastructure bottlenecks. Under these conditions, productivity and growth can best be stimulated through improvements in the agricultural sector. This will also help to achieve food security and

¹ Some analysts treat the two traps as one, probably because of the inter-linkages between savings and capital accumulation. Here I treat them separately, because rural household investments may not be dependent on savings, but on agricultural productivity, which is largely determined asset ownership.

reduce poverty (as achieved by Asia's Green Revolution). Usage of capital in production results in depreciation that, if included in Equation 1, gives Equation 2:

$$q = sAf(k) - dk \quad (2)$$

where dk is depreciation per capita. In steady state, this will be equivalent to savings per capita necessary to hold the capital-labour ratio constant through time. One can also add a population growth rate parameter to Equation 2, but I leave it out because rural population growth was insignificant over the study period (Chiripanhura, 2008; Potts, 2000). I can derive an inter-temporal capital accumulation function from Equation 2 to get:

$$\frac{dk}{dt} = sAf'(k) - d \quad (3)$$

Assuming constant technical change, the economy grows as long as Equation 3 is positive – that is, as long as savings per capita is greater than capital depreciation. This has not been the case for Zimbabwe since the late 1990s. Statistics show that growth started receding in 1999, and since then, replacement capital (savings) was lower than capital lost to depreciation. This is shown graphically in Figure 1, illustrating that economic crisis forced the economy to converge prematurely at k^s around 1997-1999. The transition beyond k^s was also characterised by declining consumption expenditure per capita that resulted in growth in absolute poverty (Alwang et al., 2002). Low savings and hence capital accumulation traps the economy in the loop $k^s - k^*$. k^* is the income threshold that should allow the transition to growth. Adding dynamism to the analysis (in the form of covariant shocks such as drought (2002-2004) and a governance crisis (2000-2008) causes fluctuations in the state variable which will in turn cause some households to sink further into poverty.

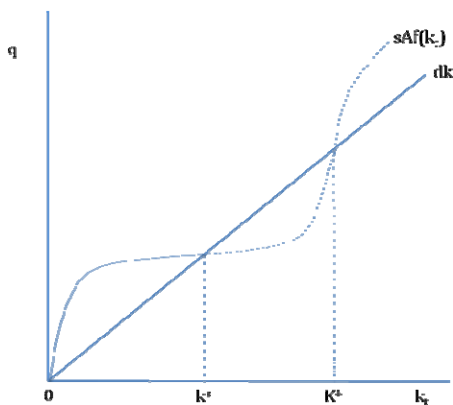


Figure 1: Illustration of the poverty trap

Labelling the X-axis in years, I can say k^s is 1997-1999, and 2002 (or even 2008) lies somewhere to the right of this point. This implies that, since the onset of the crisis, household savings declined, a situation which was worsened by drought, political violence and bad governance. The result was

decline in capital accumulation, as represented in Equation 4, which fed back through declining output and poverty growth:

$$sAf'(k) < d \quad (4)$$

Equation 4 shows that economic crisis resulted in high consumption of capital stock, with little or no replacement. Under these circumstances, the big question is: what is needed for the economy to start growing again? The answer lies in replacing capital lost to date through expanding the capital stock at a rate greater than that of depreciation. Although the solution sounds simple, there is a difficulty that such investments could be lumpy and unattainable for hard-pressed households, especially given the residual nature of household savings. The outcome is a trap that inhibits household capital accumulation and the ability to exit from poverty. Further, the absence of private capital inflows, in addition to a significant decline in remittances, precludes investment and labour income growth. This leads us to the second trap: a low capital threshold trap.

Following years of low savings and capital depreciation without replacement, capital stocks declined to levels that limited growth. Some households smoothed consumption by selling off their assets, thus compromising their future productivity. This happens notwithstanding Hoddinott's (2006) argument that households would prefer to smooth assets rather than consumption because when a crisis is persistent (in this case poor harvests were recorded between 2002 and 2004), households may, as a last resort, be forced to smooth consumption. Consumption smoothing results in low asset balances that limit households' ability to raise productivity and hence build their way out of the poverty. Thus, low capital stock poses another poverty trap.

The low capital threshold poverty trap is worsened by rural credit market failure. In Zimbabwe's case, the transformation of the Agricultural Finance Corporation into a commercial bank in the 1990s tightened the rural credit constraint, thus aggravating the situation. With the crisis biting, many commercial banks pulled out of growth points and small towns, further reducing the accessibility of financial services. With households unable to access agricultural loans, employment opportunities and productivity declined. In addition, the lack of a rural insurance market means households cannot mitigate adverse labour market outcomes. The outcome is that one of the most important strategies against poverty with the potential to benefit most poor households – that is, improving labour market performance – has been ineffective but needs to be revitalised. I shall, on the basis of data from Chivi, Mutoko and Makoni districts, support this argument, in addition to advocating that the effectiveness of employment as an instrument to fight poverty varies by geographical location. Furthermore, promoting non-farm income generating activities in drier parts of the country can enhance the effectiveness of the employment strategy. I shall analyse the rural labour market, livelihood options, and the poverty structure of the surveyed districts, arguing that employment outcomes can help to sustainably push the economy beyond k^* .

To augment the arguments proffered above regarding the low capital threshold, I develop an asset poverty line based on Mutoko and Chivi households' views of the most important assets for

production.² Asset-based poverty portrays structural poverty such that households, if left to their own strategies, will probably remain poor into the future. Households that are income-poor but not asset-poor are structurally positioned to take advantage of new economic opportunities to become non-poor in future (Adato et al., 2006). As argued by Carter and Barrett (2006), cross-sectional income poverty analysis does not distinguish between poverty that is transitional (or stochastic) and that which is structural. Combining income and asset poverty analysis allows us to gain insights into the extent and risk of structural poverty among households.

In rural structural poverty analysis, what matters most are the types of productive assets owned by households. These are tangible assets forming households' productive technology, according to the households themselves.³ The distribution of such assets among households determines the intertemporal distribution of income. The asset poverty threshold I use reveals households' perceptions of what poverty is (implying that poverty differs between different areas, depending on how society defines it) and their attitudes towards it.

The asset poverty threshold is defined here as the bundle of physical assets that households view as necessary for them to be regarded as non-poor by their peers, and that allows them to attain a locally defined and acceptable standard of living. In the words of Carter and May (2001), it is an asset base that predicts the future trajectory of (non-poor) households' standard of living. On the basis of 2006 data from Mutoko and Chivi, and after a wealth ranking of households and households' own ranking of the most important assets, ownership of a house (with corrugated iron or asbestos roof), cattle, plough, hoes and a scotch-cart, were regarded as defining the minimum asset bundle delineating the poor from the rich.⁴ These were the five most popular assets in proportionate order after a rank order of asset importance in production, ownership of which could allow households to exit poverty. Table 1 tells us how the five assets reduce poverty.⁵ These assets increased households' social standing in their communities. Owning them indicates a structural capability to escape from poverty in future, thus predicting a positive future livelihood trajectory.

In Zimbabwe's rural economy, as in the three districts studied, consumption is largely not valued at market prices. Market imperfections and barter transactions are common, indicating the limitations to income-based poverty assessment. It is therefore helpful to combine income- and asset-based poverty assessment in order to gain more understanding of poverty processes, in addition to developing effective anti-poverty strategies. One such strategy is providing households with the assets they lack, so that in the long term they can work their ways out of poverty. It may be possible to come up with an asset threshold income equivalence, but in this instance, it is not possible because of severe market distortions in the economy. Now, with an asset threshold, Section 3 examines the national state of poverty, before delving into outcomes of the sample data.

² Household views were captured through interviews and questionnaires during data collection in the two areas in 2005 and 2006. These were 84 households randomly selected from those surveyed in 2001-2002.

³ I do not consider intangible assets or assets that are not immediately used in production.

⁴ Other important assets ranked after the ones above were wheelbarrow, cultivator, goats, chickens, axe and donkeys.

⁵ Land was not mentioned as a critical asset, probably because all households had access to it. Further, needy households could benefit from the government's land distribution, or they could be allocated land by their local chiefs.

Table 1: Household asset threshold⁶

Asset name	How asset reduces poverty	Quantity and qualities
House	Shelter and security; protection from weather, elements and from mosquitoes.	One; must be secure with iron sheets or asbestos roof; built from brick.
Cattle	Draught power; store of value; provision of meat, milk and manure. Also for the payment of bride price.	At least two adult animals (a span to pull the plough).
Plough	Land cultivation with less drudgery; can be loaned out to earn rent income.	At least one functional plough.
Hoes	Weeding and land preparation; can be used to work on other households' land to earn wage income.	One for each adult household member (or for each member involved in production).
Scotch-cart	Transporting goods to and from the farm; can be loaned out to earn rent income.	One scotch-cart per household.

3. The state of national poverty

Poverty increased following the introduction of economic reforms in 1991, mainly because most people lacked resources with which to exploit the emerging market opportunities. Taking the income threshold to be the adult equivalent consumption expenditure, Alwang et al. (2002) found that the prevalence of poverty increased from 35.8 percent in 1990 to 48 percent in 1995. The CSO (1998) confirmed the high prevalence and severity of rural poverty. Using a consumption expenditure per capita poverty line, the CSO (1998) found that 76.2 percent of poor households lived in rural areas, and that 50.4 percent of households that could not meet their minimum needs (extreme poverty) were also in rural areas. The study stated that 86.4 percent of poor people and 62.8 percent of extremely poor people lived in rural areas. The Zimbabwe Human Development Report (ZHDR) (2003) examined human poverty (defined as the measure of deprivation of a decent standard of living, long healthy life and knowledge) and concluded that it was higher in rural (31.1 percent) than in urban areas (26.4 percent). Further, the 2003 Poverty Assessment Study Survey (Government of Zimbabwe, 2006) showed that the number of households living below the total consumption poverty line increased from 55 percent in 1995 to 72 percent in 2003. This growth in poverty was accompanied by increasing inequality, as shown by the increase in the Gini coefficient from 50 percent in 1995 to 61 percent in 2003 (World Bank, 2008).

Although there is no agreed poverty figure beyond 2003, it is apparent that poverty increased through to 2009. Record-breaking inflation and critical shortages of inputs forced production and productivity declines in both rural and urban economies. The destruction of hybrid seed production during commercial farm invasions from 2000 onwards resulted in reduced yields on smallholder farms. This culminated in food insecurity and the reduced potency of agriculture as an instrument to

⁶ Note that the list was applicable under the prevailing circumstances during the survey and may change over time; but I have no reason to believe that the 2006 list was significantly different from the 2002 one, or even the 2009 one, given the lack of dramatic technological change over the past decade.

fight poverty. The invasions also destroyed the livelihoods of commercial farm workers and of communities around the farms. Commercial farm workers, numbering 355,000 at the peak in 1997, suffered massive job losses and destruction of their homes and possessions. Most of them are currently living in abject poverty as squatters on new landowners' land, or in urban areas.

The high prevalence of poverty discussed above adversely affects household livelihood options, in particular labour market outcomes. From the supply side, households may suffer from poor health, due to disease and malnutrition because they are poor, and they may end up withdrawing from the labour market. Even where they remain in the labour market, hungry households have lower productivity and participation in non-farm activities. Poor households fail to engage in non-farm activities, due to lack of initial capital and access to loans. On the demand side, poverty reduces households' ability to employ outside labour, thus reducing local job opportunities. This outcome probably affects the poorest households most, because they rely heavily on local employment. In addition, high levels of poverty result in a glut of (poor) people seeking employment, driving down wages and reducing the effectiveness of employment as an exit strategy from poverty. Further, poverty may reduce households' access to social services such as education and health, resulting in qualitatively inferior labour market outcomes. Poverty and poor health are interrelated with reverse causality and similar labour market impact – that is, they both cause qualitative shrinkage of the labour market. On human capital formation, poverty makes it difficult for poor households to send their members to school, thus making it difficult for the households to use education as a ladder out of poverty.

Notwithstanding the discussion above, increasing agriculture and non-farm employment constitutes one of the most potent instruments against poverty, as argued in later sections. The following section extends the poverty story by examining household data from Mutoko, Makoni and Chivi districts, starting with a description of the areas and followed by analysis of poverty, livelihoods and labour market outcomes.

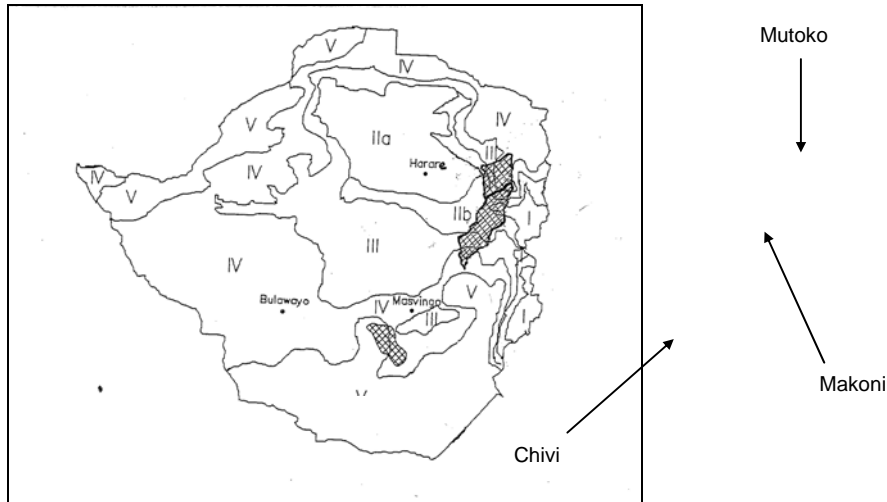
4. Poverty, livelihoods and employment outcomes: Analysis of the Mutoko, Makoni and Chivi data

4.1 Description of the study areas

The three districts are located in Mashonaland East, Manicaland, and Masvingo provinces, respectively, as shown in Figure 2.

Mutoko district is located along the Harare-Nyamapanda highway, 140 km from Harare. The surveyed villages are Chitekwe, Nyamakope, Katsukunya, Chimurenga and Zvidozvevanhu. The latter two lie in Agro-ecological Region II, receive 750-1000mm of rainfall annually, and are resettlement areas. The first three lie in Agro-ecological Region IV, receive 450-650mm of rainfall annually, and are within a 40km radius of Mutoko Business Centre. The centre is the nucleus of economic activity, offering a variety of services, including a Grain Marketing Board, a hospital and a good transport network linking the centre to Harare and Marondera.

Figure 2: Rural districts map, showing natural regions (I-V) and survey areas



Makoni district lies in Agro-ecological Region III and receives 600-800mm of rainfall annually. The villages surveyed are Nerwande, St. Theresa and St. Luke.⁷ They are located approximately 50km west of the district's capital, Rusape. They lie along the highway to Wedza and are surrounded by large-scale commercial farms. The villages have a good road network but, like other rural areas, suffer from the declining availability of public transport. The villages have good access to schools and health facilities.

Both Makoni and Mutoko are generally rain-sufficient, and the main crops produced are maize, groundnuts, sweet potatoes, yams, sunflowers and a range of vegetables. Few households produce cotton, a labour- and capital-intensive crop. The two districts have significant agricultural employment.

Chivi lies 70km southwest of Masvingo. One-third of the district lies in Agro-ecological Region IV and is prone to mid-season dry spells. The rest lies in Region V, which receives less than 450mm of rainfall annually, and is the driest part of the country. The surveyed villages are Zvamapere, Chisenga, Hlanga and Taru, which lie within a 20km radius of main public services at Chivi Growth Point, and fall within Agro-ecological Region V; and Madzivire and Neruvanga, which are located along the Masvingo-Beitbridge highway and fall within Region IV. The villages close to Chivi Growth Point have limited accessibility, because of poor roads and bridges. Madzivire and Neruvanga have access to a good transport network and to public services. The main crops produced are sorghum, millet, rapoko, maize and groundnuts. Better-off households produce cotton.

4.2 Data description

The survey covered 300 randomly selected households distributed equally between the three districts, and with 1,472 members. Structured interviews were conducted with household heads to collect data on household and individual characteristics, time budgets, relationships, age and

⁷ The identification of the latter two villages is based on the schools that the households use.

educational attainment. Other data include crop production, land sizes and types of ownership, farm inputs, livestock and types of farm equipment owned. Table 2 summarises the main variables. Agriculture was the dominant source of household income, to different extents across districts. The main household occupation was farming, and very few households engaged in non-farm production. There were no unemployed household heads, but 12 percent of their spouses reported being unemployed, even though they were responsible for home production. Further, nearly ten percent of the people surveyed were not engaged in any economic activity, because of either age, ill-health or personal choice. Of all household members, one-and-a-half percent were engaged in full-time paid employment. Overall, the labour activity rate was high, especially considering the existence of multiple occupations. Of all household heads and their spouses, nearly five percent were unemployed, a percentage higher than the reported two percent national rural unemployment rate (CSO, 2006). All tables are generated from the household data.

Table 2: Description of main variables (mean district statistics)

Variable (n=100 per district, unless stated)	Chivi	Makoni	Mutoko
Household size (persons)	5.7	5.1	4.9
Net crop income (Z\$)	19,716	21,455	44,962
Average quantity of fertiliser applied (kg)	34	215.3	416
Average quantity of purchased seed used (kg)	67.7	126.4	69
Land per capita for persons 15-65 years (in acres)	1.62	1.89	2.49
Years of education for persons 15-65 years	9	8.78	8.62
Average wages (Z\$)	700.54 (n=26)	552 (n=31)	1013 (n=64)
Average annual remittance income (Z\$)	6,102	2,384	4,575
Total labour income (Z\$)	1,844	2,895	12,129
Number of adult persons (>15 years) per household	2.72	2.44	2.21
Average number of draught power animals	4	3	4
Head of household's average age in years	43.8	45.6	40.3
Head of household's years of schooling	6.6	7.5	7.9
Percentage of female-headed households	25	25	19
Non-farm income (Z\$)	9,816	8,639	18,924
Income per capita adjusted for children (Z\$) ⁸	8,022	8,540	19,122

Source: Own calculations from dataset. The dataset is available from the author on request.

⁸The number of children in each household was multiplied by 0.5 before being added to the number of adults.

Use of fertilisers was lower in Chivi than in Mutoko and Makoni, affecting productivity. Average wages were highest in Mutoko and lowest in Makoni. The predominance of agricultural income in the household appears to indicate that there is scope to promote rural employment as a livelihood option. In Mutoko, there were clear differences in productivity, resource use and livelihood options between communal areas and resettlement areas. I shall, where possible, distinguish between these two areas. Further, non-farm income accounted for almost 47 percent of total household income. This implies that non-farm income-generating activities can be promoted as a strategy to reduce the risk of crop failure. Differences in the composition of income probably indicate differences in poverty levels among households, and this is explored in detail below, in relation to the traps discussed above.

4.3 The savings poverty trap and income poverty

In this section, I apply the theories developed earlier on to our data. As conjectured, households may be trapped in poverty because their inter-temporal savings are negative, thus jeopardising future investment and constituting a low savings trap. Since savings are a function of income, and the marginal propensity to consume is higher among low-income earners, lower income means lower savings. Although more than half the surveyed households did not have a single member with a bank account,⁹ this does not imply that the households did not save. Instead, they may have been holding other forms of savings, like holding cash in the home (hence the importance of secure houses) or accumulating assets. Reasons for not operating bank accounts include long distances to banks (those located at growth points were closing because of low business), and high minimum balances and charges for deposits and withdrawals, all of which discriminated against small savers. Households recognised the importance of savings, but were constrained by low productivity.

The low savings trap is directly linked to income poverty, defined as households' inability to achieve a given income per capita per month or year. People who are income poor may not be able to save, and hence are likely to be trapped. Adopting the rural mean consumption expenditure per capita derived by CSO (1998) from Income and Expenditure Survey data and adjusting it upwards to represent the 2002 poverty line, I get a threshold of \$3,546.95. On the basis of this threshold, the poverty structure of the districts is as follows:

Table 3: District income poverty structure

	Makoni		Mutoko		Chivi	All
		All	Resett.	Comm.		districts
Households below poverty line	44%	28%	7.1%	92.9%	58%	43.3%
Proportion of female heads of household	34.1%	7.1%	7%	93%	22.4%	23.1%

All - all areas; Resett. - resettlement areas; Comm. - communal areas.

Table 3 shows that Chivi, a rain-deficient area, had the highest prevalence of income poverty. Mutoko and Makoni had lower income poverty, presumably because they are rain-sufficient and household wealth is driven by agricultural performance. Since, in all districts, over 50 percent of

⁹ It is not possible to ascertain how much households held in their bank accounts because of data limitations.

household income came from agriculture, it is not surprising that the two districts were generally richer than Chivi. From this standpoint, one can argue that agriculture can be an effective instrument against poverty, notwithstanding the adverse effects of droughts. A two-pronged process of employment generation and appropriate output pricing drives its effectiveness. This implies that government pricing policy is important in influencing agricultural performance and hence poverty. During the survey period, wide-ranging producer price controls were in place and they contributed to low productivity and poverty. The government controlled the price of grain but did not do the same with input prices, thus forcing loss-minimising households to produce for own-consumption only. This leaves employment as the main channel for fighting poverty, since government wage policy is not effectively enforced in rural areas. However, poor performance of the production side means fewer jobs are created, limiting the effectiveness of the employment option.

Another reason for the prevalence of poverty in Chivi may have to do with its general remoteness (Bird and Shepherd, 2003) that left parts of the district inaccessible, due to underinvestment in infrastructure rehabilitation and development. Further, high population density (Chivi = 43 persons/km²; Mutoko = 32 persons/km²; Makoni = 35 persons/km²) means the fitting of extensive production systems cannot be pursued.

In Mutoko, there are spatial poverty differences between the surveyed areas. Communal area households were poorer than those in resettlement areas, and very few female-headed households were income poor in both areas. Unlike Horrell and Krishnan's (2007) blanket treatment of communal and resettlement female-headed households, the data shows that resettled female-headed households were significantly less poor than their communal area counterparts. In fact, resettled female-headed households' economic outcomes were comparable to those of their male counterparts. On average, resettlement female-headed households put more land to use than their male counterparts, and this helped to increase their incomes and thus reduced poverty.

The low level of poverty among resettled households implies that land policy is very important in addressing poverty. Resettled households have better quality and bigger pieces of land located in high rainfall areas. Communal areas have exhausted poor soils, have higher population density, and receive less rainfall. This implies that land redistribution has the potential to be poverty reducing, but not redistribution of the type being implemented by the government, which favours political supporters, with no intention of decongesting communal areas and/or raising productivity. Poverty may preclude households from holding bank accounts, notwithstanding the market failures that may contribute to the same (Horrell and Krishnan, 2007). Table 4 shows the relationship between income poverty and account holding.

Table 4: Income poverty and bank account ownership

	Makoni	Mutoko	Chivi	All districts
Poor, no bank account	57.1%	54.5%	51.7%	53.8%
Poor, bank account	42.9%	45.5%	48.3%	46.2%

Table 4 shows that the majority of income-poor households in all districts did not operate bank accounts. This is understandable, as households may lack money to deposit in accounts, notwithstanding the transaction costs of banking mentioned earlier. It is clear that there is lack of financial inclusiveness in the economy that must be addressed. There is potential for savings mobilisation among the poor, as evidenced by the successes of microfinance in different countries (Hulme and Mosley, 1996). In the studied areas, microfinance activities were absent, except in Chivi, where Care International was piloting a group-lending scheme.

A household's ability to hire labour depends on its financial outlays. Given that 81 percent of poor households did not receive remittance income, and of those that did, 18 percent received less than \$1,000 per month, it is likely that the poor did not hire labour on their farms. The incidence of remittance income among the income poor was highest in Makoni and Mutoko. Since over 50 percent of hired labour in the sample was paid in cash, it is conjectured that lack of income restricted poor households' demand for labour. Notwithstanding this, the data shows that 23.1 percent of poor households hired labour for their main crop, and of these, 31 percent paid the hired workers in cash or kind, while the rest either paid for their labour, through reciprocal labour provision, or received it free. Reciprocity and free provision of labour illustrate the importance of networks through which, under worsening poverty conditions, households were able to partially address the labour constraint and also reduce the impact of idiosyncratic shocks. Such arrangements can also be viewed as forms of informal insurance that helped households cope with risks. Analysis of household labour demand shows that 78 percent of poor households' main hiring constraint was due to shortage of cash, indicating that income poverty had an adverse effect on their productivity.

Poverty literature suggests that the majority of poor people tend to engage in wage labour as a way of mitigating their circumstances. However, our data give a completely opposite picture, especially for the districts with the highest levels of income poverty: 66 percent and 72 percent of poor households in Makoni and Chivi did not receive labour income. This could be because poor households prefer to concentrate on own-farm production over wage employment, in order to boost food security.¹⁰ Under these circumstances, the rural economy probably suffers from labour scarcity particularly during agricultural seasons. Poor people's non-labour market participation may be due to lack of employment opportunities, itself a result of low household incomes. There was more wage employment among the poor in Mutoko. There is also the possibility that, although poor households reported not receiving wage income, this may not be an indication that they did not participate in the labour market. They may have been employed but paid in kind and/or by reciprocal labour exchange. These two forms of payment are a rational response to growing inflation and remoteness induced by economic crisis.

As discussed above, rural households save not only in cash form, but also in the form of non-financial assets, particularly livestock. Table 5 shows the extent of livestock ownership among income-poor households.

¹⁰ Seventy percent of income-poor households had at least six months' supply of food, implying that they were food secure until the next harvest season.

Table 5: Livestock ownership structure (%) among the income poor

	Overall ownership	Makoni	Mutoko	Chivi
Cattle	58	29	28	43
Goats	48	32	22	46
Chickens	73	35	21	44

Note: Sheep, donkeys and pigs are excluded from the analysis, because only nine households in total (3+4+2, respectively) owned them.

Table 5 shows that income poverty does not preclude households from saving in the form of livestock. The ownership of livestock indicates the importance of inter-temporal choice among the poor, subject to the constraining circumstances that they face.

Livestock ownership in Table 5 illustrates how relative income poverty is. Failure to account for household wealth means some households classified as income poor on the basis of their consumption per capita may actually be better off. This is not surprising since, as Hoddinott (2006) found, households prefer to smooth assets rather than consumption. Thus, income-poor households' livestock ownership, especially cattle ownership, may be indicative of transitory rather than permanent poverty status, as they have the capability to recover in the future.

Ownership of chickens on such a significant scale has interesting implications for poverty, especially through the control of income raised from their sale. The data shows that of the 38 poor households that confirmed selling chickens, 71 percent stated that women made the decision to sell and also kept the money. Male heads of household tended to make decisions about the sale of cattle, including managing the expenditure of income. This outcome has interesting implications for poverty. The main type of livestock poor households are likely to own, especially for women, is chickens. There is scope to increase chicken rearing as a way of fighting income poverty, since, in most instances, women keep the sale proceeds and are also the main providers of food. However, the downside of large chicken projects is the likely food competition between people and the birds, implying that food-insecure households will be less likely to keep large flocks. In fact, 21 percent of the poor households that kept chickens did not have enough food supply to last them more than six months – a potential indication of their food insecurity, and hence inherent inability to benefit from a chicken-rearing programme to exit poverty. Such households are also likely to suffer from distress from sales of assets and livestock, although none such case was recorded in the data.

Given the high proportion of crop income in poor households' total income, one way of helping households to exit poverty is by raising agricultural production through the provision of affordable inputs and access to markets. Agricultural production is held back by many market failures, resolution of which should raise productivity and employment. Since poor people's main asset is their labour, few job opportunities and low wages cause them to be trapped in poverty. Revitalising agriculture creates low-cost jobs necessary in the fight against poverty. It also raises food security levels and reduces food competition between humans and their livestock. Job creation also plays an important distributive role, thus creating a more equal society. I further explore the determinants of employment in Section 6.

Having examined income poverty, which is generally transitory, I next explore asset poverty, which indicates structural poverty. If households lack a certain minimum quantity of capital, they lack the capacity and/or capabilities to work their ways out of poverty in the long run. Under such circumstances, government policies aimed at distributing productive assets to households (assets determined as such by local norms and values), maintaining good infrastructure, and economic stability, have the potential to significantly contribute to sustainable poverty reduction.¹¹

4.4 The asset threshold and poverty

As discussed above, rural households may be trapped in a low initial capital threshold, implying that they may lack adequate assets to build routes out of poverty. This relates to productive assets used in farming and in non-farm activities, as shown in Table 2. The households determined the appropriate minimum quantities of each. Land is not included on the asset list because all households, except one, had access to land, either by ownership or through renting, or both. This characterisation differs from Horrell and Krishnan's (2007) analysis, which looked at household land ownership and not access to it.

Table 6 shows the asset poverty structure. Since the minimum asset bundle was determined by households' ranking of assets, it was up to them to decide whether or not land is a critical asset for poverty reduction. It could be that, as mentioned above, households could easily obtain land from their chief or from the government's fast-track resettlement scheme, and so they did not include land on the critical assets list. Although the treatment of land here seems to contrast with what Jackson and Collier (1988) suggested (that land, even in dry and marginal areas, differentiates between the poor and the rich), all households agreed that land was the foundation of all their production, the basis of their presence in their present locations. As such, they focused on assets that they used, in their localities, to determine whether or not one was rich or poor. This implies that there are localised definitions of what constitutes poverty.

Table 6: Percentage prevalence of asset poverty (households lacking specified assets)

Asset name	Minimum quantity	Makoni		Mutoko		Chivi		All districts	
		ALL	Fem. h	ALL	Fem. h	ALL	Fem. h	ALL	Fem. h
House	1	33	25	41	18.8	41	30	38.3	25
Cattle	2	44	34.1	34	14.7	38	34.2	38.7	28.4
Plough	1	30	36.7	35	22.9	28	35.7	31	31.2
Hoes	4	0	0	0	0	0	0	0	0
Scotch-cart	1	61	31.1	73	17.8	65	32.3	66	26.6
Wheelbarrow	1	29	34.5	65	16.9	43	30.2	45.7	24.8
Weighted average		33	25.4	36.6	14.8	33.6	26.4	34.6	22.2
asset poverty		.6							

ALL – refers to both male- and female-headed households; Fem. h = female-headed households.

¹¹ The argument made here should not be confused with the central bank's ill-informed quasi-fiscal policies, under which the governor procured farm implements and distributed them to ruling party supporters and officials. Such activities, apart from worsening the plight of the real poor, through fanning hyper-inflation, were not informed by any real desire to help the poor, but by selfish self-enrichment of the then ruling party, using national resources.

The average asset poverty is weighted by the importance of each asset in the asset bundle. In line with Carter and Barrett (2006), it is possible to apply a modified Foster-Greer-Thorbecke poverty index to asset poverty analysis by replacing income variables with asset variables. This yields the following asset poverty formula:

$$P_{\alpha} = \frac{1}{N} \sum I\left(\frac{A_o - A_i}{A_o}\right)^{\alpha} \quad (5)$$

where A_o is the asset poverty line; A_i is household i 's asset stock; I equals unity if $A_i < A_o$ (that is, if household asset stock falls below the asset poverty line); N is sample size; and α equals zero in order to measure headcount structural poverty. Applying this formula to the data, with assets' importance in the household technology space weighted by the proportions of household rankings, and the same proportions used in developing the assets bundle, gives the result that 35 percent of the surveyed households were asset poor, confirming the result in Table 6 above.

Table 6 gives an indication of the extent of structural impoverishment in the three districts. It indicates the proportion of households with a high probability of remaining trapped in poverty for lack of productive assets. Of particular concern is the proportion of households lacking cattle in Makoni, given cattle's importance in the household wealth function. Lack of cattle probably means households suffered low productivity, due to lack of draught power.

The high number of households without scotch-carts means households probably faced transport constraints on and off their farms, more so given the decline in public transport provision during the study period. The situation was worst in Mutoko. Notwithstanding the imperfect substitutability of wheelbarrows for scotch-carts, the wide ownership of wheelbarrows indicates the low initial cost of the asset, as well as a reduction of the effect of the transport constraint – although the wheelbarrow has a lower loading capacity than a scotch-cart, and the latter requires animal power. In most instances, households that did not own cattle were most likely not to own a scotch-cart, because the latter is drawn by the former (53.1 percent of households with no cattle did not own a scotch-cart), thus compounding households' productivity constraints. Further, 37.1 percent of households with no cattle also did not own wheelbarrows, and these faced the most binding transport constraint.

Across districts, Table 6 shows that there was more asset poverty in Mutoko than in Makoni and Chivi districts. Since Mutoko and Makoni are rain-sufficient areas, the prevalence of asset poverty in Mutoko is worrisome, because it means households there faced the risk of long-term poverty despite their area's agricultural potential. In fact, the overall existence of asset poverty means that affected households are likely to be trapped in perpetual poverty. This implies that policy must be targeted at addressing the crippling effect of low asset ownership.

Looking at female-headed households alone, Table 6 shows that asset poverty was worst in Chivi (for house, cattle and scotch-cart), followed by Makoni (for wheelbarrow and plough). As asserted by Horrell and Krishnan (2007), the lack of assets may explain the low productivity among these households. Asset-poor households are also more likely to have access to smaller pieces of land than male-headed households. In Mutoko, there was a clear distinction between communal and

resettlement area households. The former had small pieces of land, all of which they cultivated, while the latter owned large pieces of land and cultivated a small fraction of it. Poverty was more prevalent and intense in the former than in the latter. This indicates that a gender-sensitive land redistribution policy has the potential to improve the poverty situation of female-headed households in communal areas.

The discussion above of income and asset poverty indicates short-term and long-term poverty respectively, but to different levels within and between districts. In Table 7 I compare the extent of poverty as measured by the two approaches.

Table 7: Comparison of savings and low capital threshold poverty traps

	Makoni	Mutoko	Chivi	Overall
Savings trap/income poverty	44%	28%	58%	43.3%
Low capital threshold trap/asset poverty	33.6%	36.6%	33.6%	34.6%

Table 7 shows that income poverty, which may be transitory, was highest in two of the three districts. In terms of the traps, the savings trap was worst in Chivi, while the asset threshold trap was worst in Mutoko. The table may be indicating inter-temporal choice of household investment: Makoni and Chivi households preferring to invest in productive assets (hence they were more income poor but less asset poor) and Mutoko households preferring to hold their wealth more as cash than as productive assets. Such behaviour is driven by livelihood options and market accessibility. The case of Mutoko's communal households may be cause for concern because there is a greater chance that, in the long run, more households there will to be trapped in poverty. Lack of adequate assets meant households were operating on a lower growth path. The table also indicates that there were different drivers of poverty in the studied areas. The drivers are analysed further below.

5. Drivers of rural poverty

As mentioned above, poverty increased in the 1990s. It was driven by macroeconomic instability, market failures, bad governance, political and economic violence against real and perceived opposition supporters, lack of investment, and lack of maintenance of infrastructure. The genesis of the crisis is traceable to 1997, when the government awarded unbudgeted for gratuities to former freedom fighters. This stoked inflation. Growing economic instability caused food riots in 1998. Fuel and foreign currency shortages emerged, and production plummeted across all sectors (Chiripanhura, 2008). Commitment to a foreign war in the Congo (formerly Zaire) in 1998, and corruption and political violence from 2000 onwards, weighed heavily on production. Drought (2002 to 2004), in combination with government-sanctioned commercial farm invasions, resulted in severe food shortages. The flow of remittances from the formal sector (including commercial farming) declined, thus adversely impacting on rural households' production, particularly the use of hybrid seeds and fertilisers. High input prices caused by shortages reduced productivity. The general economic problems and infrastructure decay resulted in transport providers withdrawing their vehicles from rural areas, thus reducing their links to the outside world. Lack of transport meant

households had problems accessing markets. The inevitable consequence of all this was increasing prevalence and intensity of poverty.

Examining the drivers of poverty at local level shows that food production declined significantly. All poor households had below-average maize productivity, and the worst outcome was for communal area households in Mutoko, where the poor's productivity was 41 percent below average. Outcomes were equally bad for female-headed households in cotton production (Horrell and Krishnan, 2007). The main cause of declining productivity in the late 1990s was lack of access to loan finance for agriculture, after the Agricultural Finance Corporation was transformed into a commercial bank that demanded collateral upfront. Households could not afford this, especially since they lacked title to their land. The situation was worst among female-headed households (Horrell and Krishnan, 2007), resulting in poverty growth.

The reforms instituted in the 1990s were meant to create market opportunities. Yet, for most people, and especially those in the rural economy, lack of access to resources (especially land and finance) meant they could not exploit market opportunities. In addition, the reforms and their outcomes were generally urban-biased. In places like Chivi, the situation was worsened by inhospitable climatic conditions and frequent outbreaks of anthrax and drought that pushed poverty up. The 2002–2004 drought killed many households' livestock, especially in the Region V areas of the district. Anthrax is a perennial problem in the district, and quarantine measures in place limited the movement of animals into and out of the area. This meant households received depressed prices for their livestock. Although there was no anthrax in the other two districts, one driver of poverty there was loss of livestock to rustlers feeding the urban population's demand for meat. The nearer an area was to an urban settlement, the worse the problem was. Loss of livestock resulted in loss of draught power, which also reduced productivity.

Poverty was also driven by lack of local job opportunities. Lack of inputs, drought and loss of livestock meant the household production possibility frontier was pushed inwards. For a given level of labour supply, the end result was under-employment and unemployment. As households grew poorer, it became more difficult for them to hire labour, and as more households sought local employment, the already low rural wages were pushed further down, making employment ineffective in reducing poverty.

Households' lack of access to adequate land also significantly increased poverty in communal areas. Land holding in all communal areas was low, with the situation worse in Chivi and Mutoko communal areas. In some areas of Mutoko, there were frequent clashes between villages over land. By 2002, the land redistribution (started in 2000) had done nothing to decongest communal areas, hence overcrowding persisted. Given that most communal area soils are sandy and exhausted, lack of fresh fields means persistent decline in productivity and hence poverty growth. The situation is not helped by larger-than-average household sizes among the poor across all districts, but especially in Chivi district. Although households probably benefited from scale economies in consumption, the thin spread of resources exposed members to the risk of poverty. Further, poor households tended to have fewer years of education across all districts. However, poor households in resettlement areas had above-average years of education. Education helps

households adopt and manage technical change. Such households had above-average use of extension services.

An examination of households' educational endowment indicates that there was a positive correlation between a lower endowment and poverty across all districts. There is chance that households with low education endowments invested less in the education of their children as well, pointing towards entrapment in poverty, as such children will probably fail to have the necessary skills for employment in high wage sectors. In the resettlement areas of Mutoko, poor households had above-average educational endowments, implying that there were other significant drivers of poverty among these households. Further, household income structure was an important indicator of poverty. Households with no remittance income were often poor, and were less likely to procure farm inputs and/or to afford their children's school fees.

Given these drivers of poverty across districts, it is imperative that different measures are implemented to tackle the different dimensions of poverty. Wide differences in income poverty imply the need to focus on income-generating activities, availing transport and infrastructure that allow access to markets, and job creation. I explore job creation further because of its superior qualities in distributing income. In addition, rural jobs are cheaper to create, given that the necessary technology to enhance productivity already exists. Employment is an effective instrument in the fight against poverty (Islam, 2006). And we know that over 37 percent of poor households had labour income (64 percent of which were in Mutoko communal areas); and that growth of non-farm income (of which labour income is an important component) means there is scope for non-farm employment promotion and growth. Non-farm employment is less risky compared to agricultural employment.

There are arguments that employment may be inappropriate for female-headed households because they may have no members in the labour market (Horrell and Krishnan, 2007), but it needs to be noted that rural households are not single occupation entities: they are ingenious and engage in a mixture of wage employment, own-farm production and some non-farm activities. It is the time allocation that differs, and if employment creation is targeted so that it is counter-cyclical to agricultural production, then even female-headed households will have a chance to engage in wage employment. An example is running public works programmes during the dry season, when households are usually idle. Even during the rainy season, female-headed households can engage in both own-farm production and working for cash in the local economy. For these reasons, employment constitutes an important ladder out of poverty. I therefore go on to examine the main determinants of household demand for labour in our study areas.

6. What determines household demand for labour?

There is merit in removing hurdles to labour demand as a strategy to address the poverty traps discussed above. In addition, the labour market is also an efficient medium for income distribution. Household labour demand is met internally and/or externally. Hired labour may be paid in cash and/or in kind. From our data, 33.7 percent of the households hired labour, employing a total of 677 people at different points during the productive season. Half the households paid cash for hired labour, and 60 percent of the households used reciprocal labour exchange in the production of their

main crop. Of the households that expressed interest in hiring labour the following year, 69 percent cited lack of money and/or credit (linked to the savings trap) as their main constraint, and 22 percent said they had adequate household labour. It is probable that, by removing the credit constraint, many households will get the chance to increase employment and productivity and, possibly, exit poverty.

The data tell us the extent of household demand for labour, but do not tell us the factors that influence the hiring decision. This requires the estimation of a labour demand function. Yet, although the data have the number of people that were employed, they do not have wage information, nor the number of hours worked. In addition, the employment data are unlikely to be correct, because the majority of households did not keep written records. Hence they probably under-reported employment levels, particularly because rural employment is largely task-based. The reported dichotomous data (on whether or not households hired labour) are thus subjected to further analysis by estimating a probit labour demand model to determine the probability of a household hiring labour (whether paid for in cash, kind or under reciprocal arrangements). Since I do not have wage data, I have to estimate implicit wages first and then use these in the estimation of the labour demand function.

Determination of implicit wages

Implicit wages are obtained from a household production function where the marginal product of labour is used to recover wages. A Cobb Douglas production function is used, because it has superior qualities over other formulations (e.g. it is easy to estimate and the results are directly interpretable as elasticities). Moreover, some formulations used in similar studies (e.g. the translog) produced inconclusive results (Abdulai and Regmi, 2000), and as reported by Jacoby (1993), the results of a Cobb Douglas function and other functional forms are qualitatively similar. The estimated production function is as follows:

$$\ln Y_j = \sum_{a=1}^n \alpha_a \ln X_{ja} + \sum_{b=1}^m \gamma_b Z_{jb} + \sum_{c=1}^l \lambda_c D_{jc} + e_j \quad (6)$$

Y_j is the value of household agricultural output. X_{ja} is a vector of farm inputs ranging from a to n ; Z_{jb} is a vector of household characteristics ranging from b to m ; and D_{jc} is a vector of dummy variables ranging from c to l . Farm inputs include land, fertilisers, pesticides and seeds. The cost of transport is not available in the data and is excluded from the analysis. Z_{jb} includes labour hours and education. Hired labour is captured by a dummy without distinguishing between male and female labourers, because of data limitations. A household's ability to hire labour depends on its initial wealth as well as social capital. The influence of geography is captured by dummies. Input quantities (except transport) are expected to cause output to increase.

The use of household hours in a production function is often criticised because of the huge measurement errors associated with self-reported working hours. This can be addressed by using the number of household adult equivalence members plus hired labour as a proxy explanatory variable. Our equivalence scale is one child equals half an adult, and those over 65 years are counted individually. Nonetheless, the proxy variable is also an underestimation of household labour usage, since there is no record of how many people were employed as casual labour, and for how long. Notwithstanding this, the results obtained using the proxy variable are not significantly

different from those obtained using the labour hours. Thus, the hours-based estimated production function is reported in Table 8.

Table 8: Household production function results

Dependent	Variable:	Log	Output
Standard errors			
Log of cultivated acreage		0.113**	(0.046)
Log quantity of fertilisers		0.112***	(0.025)
Log quantity of seeds		0.400***	(0.051)
Log quantity of pesticides		0.034**	(0.014)
Number of livestock (cattle and donkeys)		0.033***	(0.013)
Number of adults (15-65 years)		0.140***	(0.065)
Dummy for ownership of draught power		0.272**	(0.123)
Dummy for cash crop		0.408***	(0.133)
Dummy for plough ownership		0.238*	(0.121)
Constant		7.160***	(0.559)
Observations = 300	F (16, 281) = 23.33		R ² = 0.57
Econometric package: Stata version 9.2			

Insignificant controls include household hours, child hours, number of children below 15, average household years of education and age, and dummies for hired labour and location.

The results show that farm inputs have a significant impact on household agricultural income. Although the use of pesticides significantly affects output level, their usage is limited mainly to cash crop (cotton) production. Most households used hybrid seeds for their main crops, and this probably explains the high significance of seeds in influencing output. Households that own draught power (cattle and/or donkeys) produce more than those that do not. Plough ownership is also an important factor in determining timeliness of production. Land preparation with a plough is faster and less arduous than hand cultivation. Plough ownership also allows households to earn income from renting the ploughs to other households.

The size of household labour force is a significant determinant of productivity. Households dominated by children are likely to offer less productive hours than those with more adults, and households with high dependency ratios are most likely to be poor (CSO, 1998). This is not surprising, since agricultural production involves heavy work that children are unlikely to perform to the same extent as adults without jeopardising their physical development. In addition, the presence of very small children in the household reduces overall output through reduced female labour hours, notwithstanding the possibilities of combining childcare with other activities.

The dummy capturing cash crop production is very significant. Cash crops are labour- and capital-intensive and they fetch higher prices on the market, thereby rewarding the producers more than those producing food crops. Using the production function results, I next recover the implicit wages and incomes.

Recovery of the implicit wages and the estimation of shadow household income

The marginal productivity of household labour is used to recover the implicit wage rate from the production function using equation (7):

$$w_j = (\gamma_j \Gamma_j) / h_j \quad (7)$$

Γ_j represents household j 's predicted output. ψ is the estimated parameter for household labour hours, and h_j are the total labour hours. The household shadow income is estimated using equation (8):

$$\Omega_j^* = \Gamma_j + TR_j + \sum w_j h_j - \text{Input costs} \quad (8)$$

$w_j h_j$ is labour income from each individual in the household. TR_j represents household transfer income and other revenue generated from household activities. Input costs include the cost of fertilisers, seeds, chemicals, hiring of draught power and labour. As before, transport costs are not included, even though they may not be significant, because inputs can be purchased locally (though at a higher price), and output is mainly marketed locally as well.¹²

The probit labour demand function

The derived implicit wage and income enter the probit labour demand function as explanatory variables. The conjecture is that the probability that a household hires labour depends on household and district-specific characteristics. Since the main household variable is income (and its composition), I use shadow income (Equation 8) to represent net household income after controlling for production expenses. Better-off households are anticipated to have the capacity to hire labour, either to substitute for or to complement own labour. More importantly, those with higher proportions of non-farm income are anticipated to have a greater ability to hire labour. Hiring labour also depends on the recipient household's land per capita (land per labour force person) and the level of the implicit wage.

It is conjectured that households with own draught power may not require outside labour. Yet, by the same token, they are able to cultivate larger areas that, during weeding and harvesting time, may cause them to hire labour. In addition, the production of a cash crop determines whether a household should hire labour. Other household characteristics (average age, education, number of persons aged 15 to 65 years and dependency ratio) also influence the household's decision to hire labour.

The specified equation based on the variables above is as follows:

$$y_{i,j}^* = x_{1j} \beta + x_{2j} \psi + w_{1j} \lambda + u_j \quad (9)$$

¹² In some areas, the GMB is located close by, in others the GMB has collection points, and yet in others buyers come to the villages. Companies buying cotton may also offer transport to farmers.

where y_i^* is a dichotomous variable that equals unity if a household hires labour, and zero otherwise; x_1 is a vector of household characteristics; x_2 is a vector of district characteristics, and w_{1j} is an endogenous income variable, that is:

$$w_{1j} = z_j \Pi + e_j \quad (10)$$

where z_j is a vector of household and district characteristics and other variables that influence shadow income. Household income is the endogenous variable, because not only does it determine the probability of hiring labour, it is also determined by the extent to which a household hires labour.

Applying an ordinary least squares estimator to Equation (9) produces inconsistent and biased results. Thus, in addition to the transformation of some variables and assuming independence and normality of the error terms, one can apply an instrumental probit estimator to the equation. This estimator controls for the endogeneity of income. The estimation technique maximises the following log-likelihood function:

$$\ln L = \sum w_j \ln \phi(x_j, \beta) + \sum w_j \ln(1 - \phi(x_j, \beta)) \quad (11)$$

where Φ is the cumulative standard normal distribution; w_j are weights, x_j are the independent variables, and β the parameters. Estimating equation (9) gives the results in Table 9, with White's heteroscedasticity corrected standard errors. Instrument validity tests show that livestock and fertiliser can be used as instruments for income, thus reducing the bias inherent in the estimation technique (Murray, 2006). Further, treating the equation as linear, although improper, also proves the instruments to be valid.

The results show that household income, the proportion of non-farm income, household labour force, dependency ratio, age, and the dummies for draught power and districts have significant influence on the decision to hire labour. The marginal effects show how the variables influence the probability of a household hiring labour. Other control variables included, but which were insignificant, are land per capita, average years of education, shadow wages, and plough ownership.

Increasing household income, particularly the proportion of non-farm income, positively influences a household's decision to hire labour. The higher the variable(s), the higher the household probability of hiring labour. This implies that lack of savings and/or lack of access to credit reduce employment. In the sample, the income elasticity of the labour hiring decision is positive and high, showing that employment is a normal good in household decision-making, but is constrained by the prevalence of income poverty. Experiments with the results show that doubling income increases the probability of hiring labour by nine percent. Changing the composition of household income by increasing the proportion of non-farm income to 50 percent increases the probability of hiring by 10.5 percent. These results illustrate that transfers and remittances, which constitute the main sources of non-farm income, have a significant impact on household productivity and living standards. The results also support the conclusion that removing the rural credit constraint may be

Table 9: Instrumental variable probit model for hiring in labour

Dependent = household hires labour(=1)	Coefficients	Std. errors
	Marginal effects	
Constant	-5.895*** (0.887)	
Shadow household income	0.592*** (0.089)	0.224
Proportion of non-farm income	1.450*** (0.275)	0.549
Number of adults (15-65 years)	-0.993*** (0.256)	-0.376
Dependency ratio	-0.120* (0.071)	-0.045
Log average household age	0.014* (0.008)	0.005
Dummies: Draught power ownership	-0.309* (0.177)	-0.117
Makoni district	0.428** (0.176)	0.164
Chivi district	0.549*** (0.179)	0.211
Number of observations	300	
Wald Chi-square	89.99	
Wald test of exogeneity	14.94***	
Sargan statistic	6.66***	
Log pseudo-likelihood	-665.22	

*** Significance at 1%; ** Significance at 5%; * Significance at 10%.
Econometric package: Stata version 9.2

an important step towards promoting rural employment (Bryceson, 2002; Reardon et al., 2001). In this regard, savings and micro-credit schemes may be beneficial, especially to poor households, as a way of loosening the credit constraint. Savings mobilisation should, in the long run, allow households to acquire assets with which they can build routes out of poverty.

Agricultural income is very important in rural household budgets, and the significance of income in determining the probability of hiring labour indicates that raising agricultural productivity and incomes potentially creates a virtuous cycle that promotes local employment. Further, agricultural income plays a key role in providing initial capital for the establishment of non-farm enterprises, thus raising the level of non-farm employment.

The results rightly show that increasing the household labour force significantly reduces the probability of hiring labour. An experiment with the results shows that, on average, doubling the household labour force reduces the probability of hiring labour by 22 percent. This is a logical outcome, since, *ceteris paribus*, expanding the household labour force increases household self-sufficiency in labour demand. In addition, households generally have a preference for working on their own farms rather than seeking local wage employment – a view expressed by households in all districts, because they considered local wage employment to be demeaning. They preferred higher paying commercial farm employment to local casual work. Similar household behaviour was observed by Sender et al. (2006) in rural Mozambique, where local wage employment was the last resort, even for poor households. This implies that policies promoting rural employment need to take into account the fact that, apart from improving wages, people may need to be encouraged to change their mindsets and perceptions about local employment. Revitalisation of rural-based

mining, manufacturing and commercial agriculture can also help absorb the rural labour force, creating conditions for possible increase in returns to labour.

The age and dependency ratio coefficients have the expected signs, and have low significance to the labour hiring decision. A high dependency ratio reduces household labour force, and given the correlation between poverty and dependency, households with high dependency ratios are usually poor, and poor households usually lack assets and the means to hire labour. Instead, they are more likely to sell their own labour, signifying the importance of local employment opportunities if their impoverishment is to be reduced. After controlling for dependency ratio and other household characteristics, increasing household age increases the chances of the household hiring in labour. Older households are likely to have accumulated assets that allow them to become more productive and able to hire labour.

Ownership of draught power and location (district) variables has significant influence on the decision to hire labour. Households with draught power are able to use modern technology (ploughs, scotch-carts and cultivators) in production, which reduces the drudgery of land preparation and saves labour, thus allowing for possible occasional local wage employment. Draught power allows timely cultivation and planting. It increases cultivated area, thereby potentially creating employment opportunities during weeding and harvesting times. Households lacking draught power use hoes for land preparation, which is time-consuming and arduous, culminating in reduced cultivated areas. The drudgery and uncertainty of crop farming causes some households to diversify into non-farm activities, from which non-farm income is earned in increasing proportion.

The labour demand function shows that helping households to escape the savings trap has positive effects on local employment. The outcome is most effective if household non-farm income grows. Ownership of a minimum bundle of assets implies that, in the long run, households will be able to exit poverty. Given the results above, there is a chance to break the negative reinforcing linkages between the savings and low capital threshold traps through employment. There is also a chance to strengthen the positive linkages. Thus, tackling any one of the traps has the potential, in the long-term, to result in elimination of the other. Further, poverty may cause poor households to withdraw from the labour market, and lack of employment may mean households fail to pay for education and health requirements, thus plunging them into poverty. Under these circumstances, the best channel through which the negative linkages can be broken, on the basis of conditions existing in studied areas, is by promoting employment growth.

7. Conclusion

This paper has examined two poverty traps existing in three districts in Zimbabwe. They are the severest traps locking households in poverty, but they can be escaped from. It has shown that the two poverty traps operate both jointly and individually, and that they do explain poverty growth from the 1990s. I have argued that employment is a key route through which households can build ladders out of poverty, although the effectiveness of the strategy depends on geographical factors. Examination of the poverty structure has shown that income poverty is worst in Chivi, and among

female-headed households it is worst in Makoni. It is shown that there is lower poverty among resettled farmers, implying that there is scope for using land redistribution to fight poverty.

The paper argues that employment remains an effective way of fighting poverty, especially given that agricultural jobs are cheap to create, and that initial capital for most non-farm activities comes from agriculture. In agriculture, employment is held back by shortage of cash (linked to a savings trap) and drought. It is argued that increasing household access to credit should help increase local employment opportunities, and that the government must assist households to build asset portfolios through availing farm equipment, seeds and fertilisers, all of which were, during the survey period, largely out of reach for many households. However, the provision of inputs should be done for a fixed time period, so as to eliminate the inefficiencies associated with such policies. These strategies will only be effective if the government first establishes macroeconomic stability. This is something the government has failed to accomplish for more than ten years, yet it is necessary for the creation of opportunities that poor households can take advantage of.

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