

**Poverty Reducing Potential of Smallholder  
Agriculture in Zambia:  
Dualism and Dualism within Dualism**

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## Abbreviations

ACP	Agriculture Commercialization Programme
ADSP	Agricultural Development Support Project
ASIP	Agricultural Sector Investment Program
CEM	Country Economic Memorandum
CF	Conservation Farming
CIF	Cost, Insurance and Freight
CLUSA	Cooperative League of United States of America
CRMG	Commodity Risk Management Group (World Bank)
CSO	Central Statistics Organization
FHH	Female-Headed Household
FAO	Food and Agricultural Organization
FDI	Foreign Direct Investment
FRA	Food Reserve Agency
GRZ	Government of the Republic of Zambia
Ha	Hectare
HH	Household
HYV	High Yielding Variety
IDS	Institute for Development Studies
Kg	Kilogram
Km	Kilometer
LP	Linear Programming
MAC	Ministry of Agriculture and Cooperatives
MAFF	Ministry of Agriculture, Food, and Fisheries.
MHH	Male-Headed Household
Mt	Metric Tons
NGO	Non-governmental Organization
NORAD	Norwegian Agency for International Development
PHS	Population and Health Study
PRSP	Poverty Reduction Strategy Paper
PSIA	Poverty and Social Impact Assessment
P&VA	Poverty and Vulnerability Assessment
ROADSIP	Road Sector Investment Project
SME	Small and Medium Enterprise
USAID	United States Agency for International Development
WFP	World Food Programme
ZK	Zambian Kwacha

## 1) Introduction

### *Background*

The overwhelming majority of Zambia’s rural residents are considered “smallholder households” who derive most of their income from agriculture.<sup>1</sup> In general, there is a lack of non-farm, non-agricultural activities in rural Zambia (Milimo, Shilito, Brock, 2003; Skjonsberg, 2003). Thus, given the high rates of rural poverty and importance of agriculture to livelihoods of rural Zambians, poverty reduction strategies traditionally focus on improving income generation through agriculture.

Zambia’s recent Poverty Reduction Strategy Paper (PRSP), Country Assistance Strategy (CAS), and Country Economic Memorandum (CEM)<sup>2</sup> all view the agricultural sector as a potential engine for broad based rural growth and poverty reduction. There is optimism that a dynamic agricultural sector can lead to diversified production and exports, increased employment and income, and improved food security. This optimism vis-a-vis Zambia’s agricultural sector is based on the country’s abundant and underutilized land and water resources, and rural labor force (see box 1.1). The question is how to unleash this untapped potential.

#### **Box 1.1 Zambia is a Sleeping Agricultural Giant**

The recent CAS proclaims: “Zambia is a sleeping agricultural giant, with one of the best land and water endowments in Africa and an above average human resource base, even in the smallholder sector. Its comparatively huge agricultural potential in the smallholder agriculture and emerging commercial farm sector needs to be unleashed to tap not only into the limited domestic market, but also into the regional and international markets (World Bank, 2004b, p.19).” A recent report published by Harvard University echoes this sentiment stating: “The economy cannot grow and develop unless agriculture helps lead the way. No other sector has the potential to create employment, reach the majority of Zambia’s poor in such a direct way, or provide Zambia with the prospect of achieving regional development. Furthermore, the development of agriculture is the only activity that, under present and foreseeable conditions, has unlimited potential for Zambia. The potential for expanding output with known technology is enormous (McPherson, 2004, p.328-329).”

In order to stimulate broad-based agricultural growth a combination of policy reforms and investments have been recommended, such as reforms of land and fertilizer markets, and investments in roads and other infrastructure (World Bank, 2002a; 2004b;c). However, a recent review of policy reforms in several Sub-Saharan African countries, including Zambia, emphasizes that reforms need to be considered in the context of a broader rural development strategy. For example, the rural poor lack not only land and well-functioning input and output markets, but other productive resources that would allow them to respond to policies and investments that are aimed at stimulating agricultural growth. Issues such as market liberalization, addressing unequal land distribution, and the targeting of poor areas are complex; and simplistic solutions might actually harm the rural poor, especially in the short term (Jayne, *et al.*, 2001).

In particular, for broad-based rural development in Zambia it is essential to recognize bottlenecks to private sector development, such as: a) inadequate infrastructure, b) lack of public-private sector dialogue and cooperation, c) lack of a macroeconomic environment conducive to growth, d) inadequate provision of business services to the small and medium enterprise (SME) sector, and e) having a small domestic market and the need for export market orientation (NORAD, 2002; World Bank, 2004d;e). These bottlenecks, in addition to weak public institutions<sup>3</sup> and the lack of critical

<sup>1</sup> Income includes the imputed value of own-consumption and actual sales revenues.

<sup>2</sup> Zambia’s Poverty Reduction Strategy Paper (World Bank, 2002a), Country Assistance Strategy (World Bank, 2004b), and Country Economic Memorandum (World Bank, 2004c).

<sup>3</sup> Improving governance at the national, regional and local levels has been identified as a critical issue. This includes issues of “accountability, financial probity in public office and a civil service that builds capacity while increasing efficiency and equity (USAID, 2002, viii).”

public goods and services, can choke any attempts for the agricultural sector to be an engine of growth (USAID, 2002). See box 1.2.

**Box 1.2 Policy Reforms During the 1990s in Zambia: Lack of Private Sector Institutions to Replace Public Sector Institutions**

Major policy reforms were carried out during the 1990s in Zambia. This included dismantling of state institutions for marketing and distribution of agricultural outputs and inputs, the abolition of producer subsidies, the liberalization of trade in food items, and the introduction of market-determined input and output prices (see GRZ, 2001; World Bank, 2003b, p.64-66 for details). It was hoped that these policy shifts would benefit producers of all sizes, but this has not been the case (Jayne, et. al., 1999; SGS Zambia, 1999; Milimo, Shilito, and Brock, 2000). The absence of private service providers and structural constraints to entering agricultural input and output markets are a major source of ongoing market imperfection and uncertainty (Smale and Jayne, 2004). For example, Siegel and Alwang, 2004) observe that: “The absence of affordable transport and more dependable markets are interrelated, and make fertilizer reform *per se* a questionable exercise. How would the reform of fertilizer markets affect the price and availability of fertilizer? Access to fertilizer appears to be more important than its price. Improving transport and access to markets is necessary for improving rural welfare, but complementary investments in labor and financial markets are also required. New opportunities from higher value crops and conservation farming hold out some promise for smallholders, but high costs of entry and are a constraint.” It should be noted that “the growth of cash-crops during the structural adjustment period mainly benefited medium-scale households in specific areas of the country. Furthermore, these crops are relatively capital-intensive and require institutional structures that connect rural producers to urban and foreign markets (Thurlow and Wobst (2004). Also, it is important to note “The reforms of the early 1990s resulted in increased Foreign Direct Investment (FDI) and some diversification of agricultural production and agro-food exports. However, some of these earlier gains have not been sustained and Zambian agriculture and agribusiness continue to face continued competitiveness challenges. Addressing many of the policy based market distortions and infrastructure constraints facing the agribusiness sector will require macroeconomic, long term solutions ... (World Bank, 2004e, p.9).”

Although Zambia’s agricultural sector has significant untapped *potential*, it is characterized by structural problems and risks that constrain realization of this potential. This is especially true for the smallholder sector. Zambia’s smallholders, which account for over 90 percent of rural households<sup>4</sup>, face unique constraints and the smallholder sector is significantly different from both the emerging commercial farm sector (comprised of market-oriented smallholders) and the large scale commercial farming sector. Most significantly, the smallholder sector is characterized by a lack of market orientation (for inputs or outputs), with production primarily rain-fed and geared toward own-consumption.

The dualistic structure within the Zambian agricultural sector is increasingly being recognized (Siegel and Alwang, 2004; World Bank, 2004c), and also increasingly being considered when: a) formulating rural development strategies, b) selecting investment priorities, and c) designing projects (see for example, World Bank, 2004f, FAO, 2004; IFAD, 2004). There is even a vision of having “a role for expanded commercial farming existing side by side with small-scale farming, which can benefit from large farms through out-grower schemes (World Bank, 2004b, p.11).” The CEM (World Bank, 2004b) specifically recommends a two-pronged development strategy comprising of support for: a) raising the productivity of smallholder crop and livestock systems in a sustainable manner, and b) smallholder linkages to commercial agriculture through out-grower schemes.

Despite its potential, in a recent study of the poverty reducing potential of Zambia’s smallholder sector, Siegel and Alwang (2004) were not optimistic about the potential for agriculture-led poverty reduction for smallholders, especially in the short term. Siegel and Alwang (2004) claim that given current yields and the single-season cropping associated with rain-fed agriculture, smallholder agriculture can not be expected to make major contributions to rural poverty reduction. They conclude: “A major transformation is required for smallholders’ agricultural potential to become

<sup>4</sup> Almost all rural households in Zambia produce crops and/or have livestock for own-consumption. As will be pointed out in this paper, not all rural households who produce some crops and livestock should be considered “smallholders”.

agricultural reality. Large-scale investments are needed in research and extension, market and transport infrastructure, capacity-building for individual farmers and groups of farmers, and more. These investments require time to reach fruition. Policies to stimulate non-agricultural economic activities in rural areas should also be explored. Although high seasonal labor demands create bottlenecks at key times, there is an opportunity to spread labor more evenly through the year as a means to increase household incomes. In all cases, a more comprehensive and holistic approach to rural development is needed, not just an agricultural or commodity-specific strategy (Siegel and Alwang, 2004, p.iii).” Similarly, the CAS notes the need for an integrated approach to rural development to make a significant impact on poverty reduction (see World Bank, 2004b, p.19).<sup>5</sup>

Recognizing the dualism that exists within the agricultural sector is important. It is also important to recognize that Zambian smallholders are not a homogeneous and monolithic group, and that being a rural resident is not synonymous with being a smallholder. That is, not all rural households who produce some crops and livestock should be considered “smallholder farmers” when examining the potential of the agricultural sector. There are distinct differences in smallholder households’ asset portfolios (broadly defined to include productive, social and locational assets), income generating potential, livelihood strategies and well-being outcomes that need to be taken into account. See box 1.3, below, and annex 1 for details on the asset-based conceptual approach which helps guide this paper.

#### **Box 1.3 Asset –Based Approach: Assets-Context, Behavior and Outcomes**

The asset-based approach focuses attention on relationships between: *assets, context, behavior, and outcomes*. The *assets* of a household are broadly defined to include the productive, social and locational assets that determine the opportunity set of options for *livelihood strategies* (the household’s revealed behavior). These actions, in turn, determine *outcomes* in terms of household well-being. Of critical importance is the *context*, the policy and institutional milieu and the existence or absence of risks. The potential of assets to generate household well-being depends on the interface between assets and the policy/institutional and risk context. Thus policy reforms and the building and enhancement of assets need to be considered in tandem, and integrated with risk management strategies that maintain and protect assets. The asset-based approach is well-suited for understanding and analyzing rural poverty in Zambia because of the unequal distribution of assets among areas and households, high exposure to natural, economic and social risks, and the ongoing economic, political and institutional reforms taken place.

Furthermore, there seems to be a phenomena of “*dualism within dualism*”, whereby a significant proportion of rural residents, including “smallholders”, can not be expected to transform into market-oriented production units (in the short or even longer term), while others are, in fact, better positioned to be market oriented. However, the policy/institutional (e.g., major policy changes and weak public and private institutions) and risk (e.g., climatic, price, market, plant and animal diseases, and human illnesses) context has largely thwarted the process of commercialization for the vast majority of Zambian smallholders during the 1990s. Thus, even those smallholders with potential to be more market-oriented require significant assistance to make the transformation into emergent farmers.<sup>6</sup> Instead of a process of increased market orientation following policy reforms in the early 1990s, many smallholders have actually experienced an erosion of their asset bases, greater exposure to risks and increased vulnerability, and many have responded by decreasing, rather than increasing, their market orientation. The extreme challenges facing all of Zambia’s rural residents, including smallholders, since the early 1990s has masked, to some extent, the differences among households and erased some of the distinctions with the group referred to as “smallholders”. Whatever quantitative or qualitative

<sup>5</sup> The recent CAS notes that the PSIA, prepared to inform the CEM, concludes that there was need for an integrated approach to rural development to make a significant impact on rural poverty reduction.

<sup>6</sup> As Deininger and Olinto (2000) conclude: “this reinforces the importance of providing public goods, in addition to price policies, to bring about a sustained supply response ... much needs to be done to address non-price related constraints to agricultural production, generate and disseminate technology, and thus help rural producers make better use of the resources at their disposal.”

household data and poverty lines are used, there is evidence that the well-being of most Zambia's rural households did not improve over the 1990s (and for many rural households their perception is that well-being declined).<sup>7</sup> See box 1.4.

**Box 1.4 Perceptions that Poverty is Increasing**

Results from a recent rapid risk and vulnerability assessment carried out in several rural communities for the Poverty and Vulnerability Assessment (P&VA) indicate that respondents perceive poverty to be increasing since the 1990s because of changes in climatic conditions, an increase in morbidity and mortality (primarily due to the HIV/AIDS epidemic), and shifts in government policies that have placed agricultural inputs beyond the financial reach of most poor smallholders (Parker and Mwape, 2004).

*Objective of The Paper*

The objective of this paper is to examine the poverty-reducing potential of smallholder agriculture in Zambia, in light of the dualism within dualism that exists. As such, this paper is a follow-up to the paper by Siegel and Alwang (2004) that highlights the dualism between smallholders and commercial (emergent and large-scale) farmers, and the opportunities and constraints of smallholders. In this paper more attention will be devoted to examining the asset bases of smallholders (including their productive, social and locational assets) and risks they face, and to identify smallholder households that seem more or less likely to benefit from a rural development strategy based on increased market orientation. An important consideration is to try and identify where, and for whom, agriculture can generate sufficient surpluses to strengthen households' asset portfolios and lead to a virtuous cycle of sustainable poverty-reducing growth. Considering the heterogeneity of areas and households within areas in Zambia, there is a need for area- and household-specific rural development strategies, investment priorities and the design of project interventions. The sequencing of interventions is also critical, as is the need for improved risk management for all rural residents and improved social protection for the most vulnerable areas and households.

**This paper should be considered a “work-in-progress”** that will greatly benefit from the insights of other researchers and persons working in applied policy analysis in Zambia, along with insights from a wide range of stakeholders – including smallholders and other rural Zambians. Within the paper there are specific references to some of the information gaps that exist and need to be addressed.

**2) Structure of the Agricultural Sector: Dualism and Dualism Within Dualism**

The structure of Zambia's agricultural sector is dualistic with respect to technology, cultivation practices and market orientation, crops produced, locational factors such as agro-ecological conditions and proximity to transport and markets, and the distribution of land and other household assets (e.g., human capital and financial assets). In addition, policy incentives and investments in public infrastructure have contributed to the differentiation in crop and livestock enterprises among different types of farmers and areas of the country (Siegel and Alwang, 2004).<sup>8</sup>

The recent CEM points out that: “While the liberalization reforms of the early 1990s stimulated growth in agriculture generally, some 60-70 percent of smallholders have not benefited from this growth, primarily because they live far from markets where inputs can be obtained at reasonable costs and where output can be sold at a profit. Targeted programs are needed to reduce the isolation of

<sup>7</sup> See (Demombynes, 2004) for discussion about differences in the data and methods used to construct poverty lines.

<sup>8</sup> Dualism has been influenced by historical factors – which are beyond the scope of this paper (see Jensen, 1977).

these farmers and help them move from subsistence farming to more profitable market-oriented agriculture” (World Bank 2004c, p.36).”

Remoteness, however is only one of many factors that affect the capability of subsistence-oriented smallholders to transform into market-oriented farmers. Lack of confidence in markets is a critical factor (Deininger and Olinto, 2000; Fletcher, 2000). Market imperfections such as the undependable and untimely availability of inputs and basic consumption goods have undermined market confidence, leading to conservative decision-making.<sup>9</sup> Also, the lack of credit and insurance markets (or other risk management instruments) for smallholders slow the adoption of new technologies and/or new enterprise mixes. In addition, new technologies and crop enterprises often have relatively high initial investment costs, creating barriers to entry.<sup>10</sup> Furthermore, there is a pervasive lack of basic rural infrastructure and services. These problems are exacerbated by the low value of surpluses and savings generated by smallholder agriculture, which preclude new investments in improved technology; thereby maintaining a low-level equilibrium and perpetuating a cycle of poverty. As will be highlighted in section 3 of this paper, for many smallholders, the legacy of the 1990s has been a retreat into semi-subsistence rather than a move forward toward greater market orientation and commercialization.

### *Dualism Within the Agricultural Sector*

The overwhelming majority of Zambia’s agricultural producers are smallholders who use simple technologies (hand hoes and oxen) and cultivation practices (minimal purchased inputs such as hybrid seed or fertilizer). They mainly produce rain-fed maize, groundnuts, roots and tubers, primarily for own consumption on five or fewer hectares (see table 2.1). Most lack access to functioning input and output markets and support services. It is estimated that only 40 percent of smallholders sold crops during the 1999-2000 season (World Bank, 2003b). Productivity on smallholder farms tends to be relatively low.

At the other extreme are large scale commercial farms using modern inputs with access to global input and output marketing chains. In some cases, large commercial farms are vertically integrated with agro-processing (Francis, et al., 1997; World Bank, 2003b). More commercially oriented medium-sized (“emergent”) farmers use animal traction, hybrid seed and fertilizer to grow rain-fed crops. Some attempts are being made to introduce micro-irrigation for emergent farmers and some smallholders.

Emergent and larger-scale farmers use hired labor and contribute to national agricultural production and exports, but their relative small numbers and reliance on labor-saving technologies limit their poverty reducing potential. More empirical information is needed on the labor generation and linkages of emergent and larger scale commercial farmers to better assess the employment-generating potential of an expanded commercial farming sector. In addition, more needs to be known about rural labor markets and rural-urban labor markets, in general, to better understand how off-farm employment in agricultural and non-agricultural activities might contribute to poverty reduction among smallholders (White and Leavy, 2000).

Zambian producers can also be differentiated by the types of crops they produce. Smallholders tend to produce low-value-to-weight food staples, including about 60 percent of the country’s maize, 90

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<sup>9</sup> Many studies highlight the lack of timely inputs as a major constraint for smallholders (e.g., Gordon, 2000; Keyser, Helsop, and Abel, 2001; Milimo, Shilito, and Brock, 2000; Skjonsberg, 2003; Haggblade and Tembo, 2003). The GRZ’s “Agriculture Commercialization Programme” (ACP), which was designed to implement the agricultural component of the PRSP specifically notes problems with input and credit markets (GRZ, 2001, p.7).

<sup>10</sup> Because of high initial investment costs that serve as a barrier to entry, the means to entry is often through pilot projects that provide significant resources to small numbers of beneficiaries. Thus, a select few households might benefit, but the high costs can preclude the ability to replicate such initiatives over wider areas and numbers of households.



percent of sorghum, 85 percent of groundnuts and virtually all the cassava and other starchy staples (see table 2.2). Smallholders produce some higher-value cash crops, such as cotton, tobacco and paprika, and have small livestock, primarily poultry and pigs for home consumption. The differentiation of crops and livestock by producer type is largely a function of the higher capital requirements for higher-value enterprises, in addition to agro-ecological conditions and proximity to markets. Emergent and large-scale producers generally have better access to markets and infrastructure. Land tenure arrangements also differentiate producers and affect access to credit. Commercial farmers have title to lease state lands, while smallholders produce on lands under customary tenure. Customary land is distributed by chiefs, which can lead to more or less land access and security, depending on factors such as types of marriage/social organizational systems and ties, length of residence, and the integrity of chiefs.

There are many factors that constrain increased productivity and adoption of higher-value crops by Zambian smallholders. Deininger and Olinto (2000) highlight the following constraints, which they claim justifies a thorough assessment of the available technologies and extension messages being disseminated through public technical assistance, along with private providers and NGOs:

- 1) Purchased inputs and adoption of improved technology can be profitable, but non-price factors—such as **the lack of markets for timely buying and selling, and the lack of support services like credit and extension—hinder increased productivity.**
- 2) Under conditions of land abundance, **access to complementary productive assets is a key constraint on productivity**, the amount of land cultivated, the use of credit and purchased inputs, and adaptation to climatic risks.
- 3) **Constraints facing rural producers in Zambia are still related more to market access and the ability to obtain necessary inputs in a highly volatile economic environment** rather than application of more productive technology.

#### *Dualism Within the Smallholder Sector*

Dualism within Zambia’s smallholder sector is a function of: a) location-specific assets, and b) households’ productive and social assets. In addition, there are spatial and household specific differences in the policy/institutional (e.g., local institutions and customs) and risk context (e.g., exposure to drought or floods). As such, some rural households can be considered to be located in “high potential” or “low potential “ areas, and some households can be considered to have higher or lower potential based on their asset portfolios.

#### **Higher versus Lower Potential Areas: Locational Assets**

Crop and livestock patterns are influenced by agro-ecological zones and by the existence (absence) of accessible road infrastructure and markets. Zambia can be divided into three major agro-ecological zones (see table 2.3 and the map in figure 2.1).

Region II, follows an east-west path through the center of the country including most parts of Central, Southern, Eastern, and Lusaka Provinces has the most favorable agro-ecological conditions in terms of rainfall, soil quality, and absence of tse-tse fly that allow for a diverse mix of crop and livestock enterprises. Besides agro-ecological factors, another important locational factor is proximity to the “line-of-rail” and major urban centers and markets. The railroad line runs from copper mine areas in the Copperbelt to Southern Province. Most commercial farms are located close to the line-of-rail, whereas smallholders are mostly located in more remote areas with less favorable agro-ecological conditions. Because of its proximity to Lusaka and other urban centers, Region II has received more assistance from government, NGOs and donor organizations. Although maize is the staple crop, a wide variety of other crops are grown; including beans, groundnuts, sorghum, cassava, millet, sweet potato, sunflower, cotton, rice, tobacco, paprika and, to a growing extent, vegetables and fruits.

Region I, has drier conditions than Region II. Region I, which borders Zimbabwe, is one of Zambia's hottest, driest and poorest regions. It includes the valleys of the Zambezi and Luangwa rivers, where soils are sandy and fertility is poor. This region has experienced several serious droughts since the early 1990s. Region I also includes a major game management area, where farming households attempt to coexist with wildlife. Maize, sorghum, groundnuts, sunflowers and cowpeas are cultivated, and the fishing industry (though now in decline) has drawn many to the area. In addition to agriculture, some households produce mats and baskets made from reeds and sell the to middlemen who visit the area for this purpose.

Region III is a high-rainfall area in the north of the country, but the highly acidic soils need lime in addition to fertilizer. It includes the copper mines in the Copperbelt area, which is relatively urbanized. The decline of the copper industry has caused an unemployment problem in this area. Region III contains major river systems, such as the Luapula and Mansa rivers, as well as numerous lakes. The major crops produced are cassava, maize, groundnuts, millet, sorghum, beans and sweet potatoes; and small-scale fishing and fish-trading is also a source of income.

Average yields vary substantially among provinces. In general, yields are higher in Region II for most crops (and conditions for livestock are also more favorable). Higher yields are due to more favorable agro-ecological conditions and the fact that much of this zone is located along the "line-of-rail". Smallholder households in this area tend to have better access to infrastructure, higher use of inputs, and a higher share of medium- and large-sized farms using improved technologies.

About 40% of all rural households reside in Eastern and Northern Provinces (see table 2.4), and about 38% of the poor rural households reside in these Provinces (see table 2.4). However, Eastern Province contains about 23% of rural households and 18.1% of poor rural households and Northern Province contains about 16.6% of rural households and 20.8% of poor rural households. Thus, a higher share of rural households are non-poor in Eastern Province compared to Northern Province. Somewhat surprising is the fact that Central, Copperbelt and Lusaka Provinces all have higher shares of poor rural households than rural households, whereas in Luapula, Southern and Western Provinces have lower shares of poor rural households than rural households. More analysis is needed to explain these findings that indicate well-entrenched pockets of rural poverty in Northern, Central, Copperbelt and Lusaka Provinces.

Clearly, the distribution and use of land influences opportunities and performance in the agricultural sector. On average, rural households in Zambia have access to approximately three hectares of land (see table 2.4). This amount of land should allow households, in most areas, to produce enough food staples and other foods to cover consumption needs. Access to land and the quality of land, however, varies by Province and within Provinces (see box 2.1).



The lowest mean access to land is in Northwestern Province and the highest is in Central. Eastern and Southern Province have areas (notably near line-of-rail or towns) that are relatively densely populated and average land availability per household is often insufficient to cover food staple consumption needs. Although crops are produced by virtually all smallholder households, there are significant differences in livestock and poultry production in the spatial distribution of livestock and poultry – which are a function of agro-ecological conditions and access to markets. For example, in Northwestern Province, these factors result in relatively few households engaging in livestock or poultry production, compared to Southern and Eastern Provinces.

Eastern Province, known as the “maize basket,” is characterized by relatively more productive smallholders and widespread livestock production, and has higher population and less land abundance than other areas of the country. Northern Province (Region III) has higher rainfall and more humid conditions and problems with soil acidity and declining soil fertility.<sup>11</sup> Land is relatively abundant in Northern Province and shifting cultivation (e.g., slash and burn) has been widespread until recently, and is still the norm in some areas. Unlike other areas of Zambia, cassava (and not maize) is the major food staple. Conditions in Southern Province are fairly similar to Eastern Province (tradition of maize and livestock production), except for less rainfall. Southern Province contains the third most rural households and is of special interest because there are relatively abundant land and water resources. Southern Province is an area where cotton production has expanded in recent years, and there has been some growth in the number of emergent and commercial farmers. Western Province is the driest area of Zambia. Northwestern Province, in contrast, has high rainfall and conditions are more similar to Northern Province. Central and Lusaka Provinces have agro-ecological conditions similar to Eastern and Southern Provinces, and are located along the line-of-rail.

Access to markets, public transport, and key public services are important for broad-based growth. According to Demombynes (2004) there is little variation in median distances to markets and public transport by income quintiles. Access to public services (e.g., primary schools, post office, police station) by location and income group is mixed. The extent to which markets are accessible to rural households is also not clear. More than half of survey respondents report being within five kilometers of public transportation, but it is not possible to evaluate whether available transportation could serve to transport agricultural products to a market. The median distance to a food market is only 10 kilometers, but it is not clear to what extent these markets are integrated with the national economy. Median distances are relatively large for the nearest agricultural input markets (26 km) selling equipment and fertilizer needed for modern agriculture, a public phone (40 km), and a bank (46 km).

Zambia is a large landlocked country with unreliable and expensive access to ports (be they in Tanzania, Mozambique or South Africa). The lack of direct port access, the poor state of rural infrastructure, and the physical dispersion of smallholders all make the marketing of agricultural inputs and outputs expensive (Copestake, 1997; SGS Zambia, 1999; Keyser, Helsop and Abel, 2001; GRZ, 2002; Mwape, 2004). Furthermore, many rural roads are in bad condition and often not passable during the rainy season. Private traders therefore tend to concentrate their business to the line-of-rail and other main roads, leaving farmers in remote areas without reliable service. These factors contribute to high transaction costs and uncertainty about markets, and have a negative impact on Zambia’s competitiveness in international commodity markets. For example, farmgate prices of fertilizer can be double the CIF price in many areas of the country (Mwape, 2004). Poor transportation infrastructure not only limits the opportunities for expanding production, but also serves as a disincentive to do so because of the thin domestic markets.

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<sup>11</sup> Northern Province accounts for 20 percent of Zambia’s land area and about 14 percent of the population. The poverty rate is about 80 percent, and non-agricultural employment is virtually non-existent. Sheshami and others (2002) identified the major constraints on agricultural production in Northern Province as poor infrastructure and market integration, and the lack of irrigation, safe water and sanitation and credit.

To a large extent, past policies of pan-territorial pricing masked the problem of differential access to transport infrastructure and services in the country. Since elimination of pan-territorial pricing for fertilizer and maize, spatially differential prices of inputs and outputs have influenced the distribution of different cropping patterns and cultivation practices. Thus, it is not a surprise that there is presently a distinct spatial variation in the cost of living. For example, there are significant differences in provincial food prices (see figure 2.2). Food prices are highest in Lusaka and Northern Provinces and lowest in Eastern Province (Demombynes, 2004). These differences at the Provincial level (clearly there are large intra-province differences too) result from a combination of factors including agro-ecological potential, types of crops produced and marketing infrastructure, wealth and income levels of households in the Province. The profound differences in food costs between Northern and Eastern Provinces warrant more attention, especially because of the high food prices and high rural poverty rates in Northern Province despite the existence of abundant land and water resources.

One of the most important distinctions within rural areas is between remote and less remote areas (Thurlow and Wobst, 2004). GRZ has made some attempts to improve major roads (primary and secondary roads) and also has supported local and community efforts to improve and maintain tertiary rural roads (World Bank, 2004a). Under the Road Sector Investment Program (ROADSIP) over 1,400 km of trunk, main, district, urban, and feeder roads were rehabilitated, 6,400 km received periodic maintenance, and 1,500 of community roads were improved. ROADSIP has also been an important source of employment (World Bank, 2004a). However, with such a large country, there is still a long way to go to improve access to transport and markets for many rural Zambians. Improving access to transport and markets and lowering transport costs are key factors for improving market integration for staple food crops and higher value enterprises. The proposed Zambia Agricultural Development Support Project (World Bank, 2004f) contains a significant component for road construction. In addition, improved rural transport should help improve access to rural and urban labor markets, and thereby improving conditions for development of non-agricultural activities. Electrification, which is also lacking in most rural areas, is also essential for the development of value-added activities linked to agricultural production and for non-agricultural rural activities (NORAD, 2002).

### **Higher versus Lower Income Generating Household Assets**

A study by Jayne, et al (2001) helps identify some of the key household assets and livelihood strategies that differentiate between higher and lower potential rural households. See table 2.6 for a summary of household characteristics by land per capita and income per capita by land and income quartiles.

- a) On average, rural households have access to 2.8 hectares, but the distribution among households is very unequal. About a quarter of rural households have access to less than one hectare and more than half have access to less than two hectares.
- b) Comparing differences across income quartiles, differences in landholding size *per household* is less of a predictor of income than we might expect.
- c) A major difference by income of rural households is the value of livestock and other assets and the share of income they receive from business income.
- d) *Lower*-income rural households are more dependent on off-farm income. The lowest-income group also depends on remittances.
- e) Larger households, households with higher dependency ratios, and female-headed households tend to be poorer.
- f) The inequality among landholding size per household masks large differences in per capita landholding, because larger households with higher dependency ratios tend to have smaller household landholdings.
- g) Crop income accounts for more than 55 percent of income for all rural households, and crop income shares increase with landholding size and livestock holdings.

The recent poverty profile prepared for Zambia also identifies several key assets and livelihood strategies that differentiate between higher and lower potential rural households. The following

information on household assets comes from Demombynes (2004), unless otherwise noted.

### *Household Demographics*

Household size is highest among poorer households, averaging about 7.5 individuals, whereas households in the richest quintile, average about 5.5 individuals. Poorer households also tend to be headed by older individuals, with the median age of household heads in the poorest quintile being 45 years, compared to 37 for heads of the wealthiest rural households. There is a strong association between education levels of household heads and household consumption that is consistent across the distribution of income, with households in the top quintile having an average of one full year more of education than those in the next quintile. About 24% of rural households are female headed and female headship is highest among the very poorest households. The average rural Zambian lives in a household with 1.24 children (under age of 15) per adult, and the ratio is highest for the poorest households. The old-age dependency ratio is only 0.08 (above 64 years of age) and varies very little by quintile.<sup>12</sup> Nearly all rural Zambians live in multi-generational households. The richest rural households, which are smaller on average, are less likely to have three and more likely to have just one generation.

### *Housing Conditions and Basic Household Services*

There is marked difference between rich and poor households in the materials used for household roof and walls. Wealthier homes are more likely to have roofs made of iron or asbestos, rather than grass/straw. But even among those in the richest quintile nationally, 72 percent have grass or straw roofs. While there is diversity in the type of material used for walls, there is only slight differentiation between rich and poor. Homes of households in the wealthiest quintiles are slightly more likely to be made of concrete brick and less likely to be made of mud brick. Mud floors are found in the homes of most rural Zambians at all consumption levels. However, twenty-six percent of those in the wealthiest quintile have concrete floors, compared to 15 percent of those in the poorest quintile.

Only 38 percent of rural Zambians have access to a safe source of water: a water tap, a borehole, or a protected well. The remaining households rely on water taken directly from a river or lake, piped from a river or lake, or taken from an unprotected well. Even among the richest households, less than half have access to safe water. The majority of rural Zambians in all quintiles use either kerosene or diesel as their main source of lighting, and 14 percent report an open fire to be their main source of lighting. The overwhelming majority of rural households use firewood for cooking. Wealthier households are slightly more likely to use other fuels, chiefly charcoal. Two-thirds of rural residents use a pit latrine, and almost all others have no toilet facilities at all. There is no substantial variation by income quintile.

### *Health and Health Facilities*

Sixteen percent of rural Zambians reported an illness or injury within the previous two weeks of the survey. Wealthier rural Zambians are more likely to report both being sick or injured and seeing a health care provider. Half of those with an illness or injury consulted a health care provider, usually a government-run hospital, clinic, or health post. Eleven percent of those who consulted health care providers did so at a church mission institution. There is little differentiation by quintile for type of provider consulted.

### *Household Productive Assets*

Ownership of basic agricultural tools—an axe and hoe—are nearly universal among individuals in all quintiles, and 78 percent report owning a residential building. Most durable consumer goods are

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<sup>12</sup> The low old-age dependency ratios indicate a lack of elderly persons, in general, which is related to high mortality rates and low life expectancy.

owned by only a small fraction of households. Exceptions are a bicycle (owned by 41% overall), brazier (45%), non-electric iron (28%), and radio (39%). **What is most striking is that there are few assets with sharply differentiated ownership rates among rich and poor.** Assets that are owned by the households of at least five percent of individuals overall and are more likely to be held by the relatively rich are the following: crop sprayer, non-electric iron, radio, scotch cart, and television.

Interestingly, results from a recent rapid poverty and vulnerability assessment indicate that the issue of access to land was not raised as a factor in poverty, but the ability to acquire the inputs and, in many cases, labor needed to cultivate land was widely cited as the pivotal factor that separates the self-sufficient from the food deficient (Parker and Mwape, 2004).

In most areas virtually all farm labor is provided by household members. Labor markets are consequently thin (Mwape, 2003). Oxen use can help raise average yields and save labor at critical points in the cropping cycle. Such innovations can help smallholders plant more land without resorting to hired labor, or be constrained by household labor availability. Increasing land under production by smallholders is one of the keys for agricultural growth to be poverty reducing. Nationally, it is estimated that only about 25% of smallholders use oxen (Haggeblade and Tembo, 2003), but oxen are unevenly distributed throughout the country. For example, oxen use is virtually non-existent in Northern Province.

#### *Social Assets: Social Capital and Local Institutions*

Rural society in Zambia has a strong elements of mutual or collective social action in addition to their more individualized household pursuits (Skonsberg, 1994; Milimo and others, 2000). Extended family households are the norm in rural Zambia. Social capital can help households increase income through mutually beneficial livelihood activities and can reduce the vulnerability to some risks. The probability of being poor and the returns to household investment are higher for the poor than for the population at large. Furthermore it was found that increases in social capital have higher returns than increases in human capital. Social capital is also associated with increased access to credit and a resulting better ability to smooth income fluctuations. Access to credit is a key aspect to the management of the risk of income variability. Poor households are usually not able to provide collateral to obtain credit from formal lenders and often have to rely on local moneylenders or group credit. Households with more social capital tend to be better able to smooth consumption over time by borrowing and thus are likely to be better able to manage risk.

Local institutions in rural Zambia include many kinds of organizations and functions. These include: village level governance, accepted methods of community resource mobilization, social and mutual aid societies, security arrangements, asset management, conflict resolution councils, management committees for infrastructure and sector services, conflict and legal adjudication committees, agricultural and livestock cooperatives, tontines and savings federations, religious associations, burial societies, etc. But there are wide differences among villages with respect to the actual organizations functions that are available to households, and the quantity and quality of services offered. There are “wealthier” villages with a school, health clinic, grain banks, credit and savings clubs, with all-weather roads leading to highways. And “poor” villages that lack most if not all of the above. A proactive effort is required to provide “poor” villages with basic infrastructure and institutions and services, and the capacity to manage and maintain them.

#### *Livelihood Strategies*

Smallholder households at the top of the income distribution are slightly less likely to be engaged in agriculture; 71 percent of heads in the wealthiest quintile report farming as their main activity. Only nine percent of individuals live in households where the head is engaged mainly in wage work, with a smaller percentage among the poorest households. Many women are economically involved as “unpaid family labor.”

Ninety-three percent farm some land for food crops, **but there is wide variation in the amount of land farmed**. Only 14 percent farm any non-food crops, and the typical area devoted to non-food crops is small. The median non-food plot size among those who have some non-food land is 6 hectares. **Average total land worked varies little by quintile, but wealthier households average more than twice as much non-food cropland as the poorest households**. The smaller households in the wealthiest quintile also work twice as much total land *per capita* as the poorest households.

Most households in all quintiles grow at least some maize. Substantial fractions of households also grow cassava, millet, sweet potatoes, and ground nuts. **There is substantial differentiation in crop choices by rich and poor** for cassava, which is grown by half of the poorest households but just over a quarter of the wealthiest households. In contrast, hybrid maize is grown by 11 percent of the poorest households and 28 percent of the wealthiest households. The relatively few households with non-food crops, tend to be wealthier, and cotton and sunflower are dominant. Nine percent of those in the poorest quintile grow at least some non-food crops, compared to 14 percent overall. See table 2.7.<sup>13</sup>

Thus, in general, both Jayne, et al (2001) and Demombynes (2004) did not find significant differences between rural households with respect to their access to assets. However, there were subtle differences in household assets – especially demographic factors – that allow wealthier households to cultivate more land and produce higher-value and/or market-oriented crops. Within communities, the major differentiation between households seems to be manifested in the quality of their housing and basic housing services. In addition to these household-specific characteristics, it seems that area-specific factors such as area agricultural potential and access to markets that are the major factors that differentiate the economic potential of smallholder households. See box 2.2.

#### **Box 2.2 Classifying Rural Households**

In a recent survey of several rural areas in Zambia carried out for C-SAFE, distinct spatial and household differences were identified. A major conclusion was that: “Rural households have very few assets. In the survey, about 80% of households were classified as asset poor or very poor. Households with limited assets are vulnerable, not only because of their relative poverty, but also because they have few items to divest should they be forced to spend money on food or emergencies (C-SAFE, 2003, p.45).”

ecological regions in 2004 also found that, in general, Zambian villages were not characterized by wide differences in levels of wealth and most residents were described as “poor” to some degree (“better-off poor”, “poor”, and “very poor”). Even better-off households were viewed as vulnerable to falling into poverty. Actually, most of the wealthiest rural households were residing outside rural areas. As a result, “there are relatively few surplus households with enough resources to hire poorer neighbors or provide them with loans or other assistance in times of extreme need (Parker and Mwape, 2004, p.11).”

Parker and Mwape (2004) identify three broad types of poor rural households across all three agro-ecological regions, and emphasize that differentiated assistance strategies are needed both spatially and among households within a given area:

**Household Type #1: “Better-Off Poor Households”** with productive and social assets and located in more favorable agro-ecological zones, for whom the primary constraint on agricultural production and food self-sufficiency is the lack of affordable access to fertilizer, seed, and other inputs. The better-off households have oxen and implements (and some even have tractors). They are able to cultivate a larger area and, since households in this category can afford to buy inputs, they produce enough maize for home consumption and often can sell some surplus. Many households have a small shop in the

<sup>13</sup> These findings are also consistent with those reported earlier in table 2.2 for the shares of national production by type of producer.

community, and they sell or trade agricultural produce, fish, etc. outside the community. They usually employ members of other households to assist with planting, weeding and harvesting.

**Household Type #2:** “Moderate Poor Households” with some productive and social assets located in drought prone areas constrained by lack of water (or areas with too much water). Since irrigation systems are virtually non-existent; even if inputs were available, lack of water might constrain crop improvement schemes. These households are basically food secure, on average; but might experience occasional food shortages during the lean season, especially in drought years. They are likely to possess a hoe, for example, but rarely a plough and never oxen. Reliance on hand hoe agriculture limits the amount of land they can cultivate, but since they are able to farm, they are considered to have a reliable source of income. Also, some households have a member engaged in carpentry, brick-laying or bicycle repair, or making and selling mats or baskets.

**Household Type #3:** “Very Poor Households” lacking healthy adults capable of cultivation. These labor-deficient households (many of them HIV/AIDS affected) would not benefit from programs that improve access to inputs, or that require physical labor. The very poor not only lack the meager assets normally found in rural homes, they also lack some of the basic necessities of life. Food insecurity is a primary criterion of extreme poverty. They have no stored grain and may be forced to go without meals for a full day or for days. In addition, they do not have adequate clothing and may possess no bedding. They are housed in mud huts with thatched roofs. They are unable to educate their children due to their inability to meet minor expenses such as books and school supplies, uniforms, and fees charged by the local parent-teacher association. In some areas (such as the poorest areas of Region I), they do not own any livestock, while in slightly better-off areas (such as Region II), they might own a single goat or 2-3 chickens.

Based on the above discussion of dualism within dualism in the smallholder sector, we can observe that some rural households can be considered to be located in “high potential” or “low potential” areas<sup>14</sup>, and some households can be considered to have higher or lower potential based on their asset portfolios. In a very stylized manner, it is possible to generate a simple 2x2 typology of four types of smallholder households. See table 2.8 below for a presentation of a highly stylized typology of rural Zambian.

**Table 2.8 Classification of High/Low Potential Areas and Rural Households**

	Household (HH) Asset Portfolio		
		High	Low
<b>Location-Specific Assets</b> (agricultural potential and access to markets)	High	<b>High-High</b> “High Potential Area/ High Potential HHs”	<b>High-Low</b> “High Potential Area/ Low Potential HHs”
	Low	<b>Low-High</b> “Low Potential Area/ High Potential HHs”	<b>Low-Low</b> “Low Potential Area/ Low Potential HHs”

**Household Type A:** “High Potential Area/High Potential HHs”

➔ households mostly located in Zone II near line-of-rail, with ample labor/land and oxen

**Household Type B:** “High Potential Area/Low Potential HHs”

➔ households mostly located in Zone II near line-of-rail, with high dependency ratio, female-headed, not educated household head, and hand-hoe

<sup>14</sup> There is no systematic methodology or consistent set of variables used to map economic potential zones in rural areas. In general, at least two variables can be used to identify rural “economic potential zones”. For example, Pender and Hazell (2000) use two variables—one representing agricultural potential and the other representing access to infrastructure and markets-- to generate a classification of more and less favored areas. See also Alwang, Siegel, and Woodall-Gainey (2005).



**Household Type C:** “Low Potential Area/High Potential HHs”

→ households mostly located in zones I and III away from line-of-rail, with oxen and low dependency ratio

**Household Type D:** “Low Potential Area/Low Potential HHs”

→ households mostly located in Zones I and III away from line-of-rail, with high dependency ratio, female-headed, not educated household head, and hand-hoe

→ The key question is: What is the estimated share of total rural households in each of these groupings???

⇒ **WHAT MORE CAN BE SAID about the 4 HH types**

- ⇒ **Can we identify and map districts in Zones I, II, III and yes/no on line of rail and/or a major roadway. And then we could choose proxies for higher potential hhs, like land owned/cultivated, # of oxen, dependency ratios, land/per capita, ... thus creating a 1<sup>st</sup> approximation.....**
- ⇒ **To be followed up in Zambia during the consultations**

Clearly, the best candidates for market-oriented agricultural activities would be in HH Type A. Support services like finance and extension might be both necessary and sufficient conditions to a more dynamic agricultural sector. Households in HH Type B are located in areas with higher potential, but the households lack the requisite assets to take advantage of these conditions. Education and improved social protection would be essential for these households. For Type C households, there might be an incentive to migrate to areas where their assets can be better utilized. Whereas households in HH Type IV are candidates for social protection and special agricultural programs that deal with their missing assets and/or their risks.

A major empirical question is: to what extent can we identify, quantify, and locate the four highly stylized types of households characterized in box 2.1. (OR, are there different ways to disaggregate households and areas???) An integrated spatial-household analysis would be needed to “map” out the respective types of households. This is important for the design of spatially differentiated rural policies and for the targeting of rural investments and safety nets. For example, Siegel and Alwang (2004) note that: “model results indicate that smallholders with up to five hectares should not be ‘land constrained’ using prevalent technologies and household labor.” But which smallholder households actually have access to five hectares, and where are they located? There might be areas of the country, especially along the “line-of-rail,” with higher population densities and land constraints (e.g., Eastern Province). In such areas better-developed land and labor markets could influence cropping decisions and livelihood strategies.

The World Bank Rural Development Strategy (World Bank 2002c) and others (e.g., Ashley and Maxwell 2001) acknowledge that new approaches are needed to conceptualize, analyze and operationalize strategies and investments to promote poverty-reducing economic growth in rural areas. A central theme of this re-thinking of rural development strategies is that a more balanced and integrated multi-sectoral and spatial approach to rural development is needed. The heterogeneity of such factors as agro-ecological zones, access to infrastructure and services, climatic and environmental conditions, household assets (broadly defined) and livelihood strategies, formal and informal institutions within countries points to the need for more attention to sub-national areas and households within geographic areas. This requires improved geographic analyses that consider the heterogeneity of areas and households within areas. The need for area- and household-specific strategies adds to the complexity of formulating rural development strategies, investment priorities and the design of project interventions (see Siegel, 2005).

In the discussions above about dualism with the agricultural sector and dualism within the smallholder sector, issues related to risk and vulnerability have been repeatedly mentioned. Below we specifically

focus attention on risks and vulnerable areas and households, notably the differences among areas and households.

### **Major Risks Faced by Smallholders and Vulnerable Households**

Rural residents of Zambia, like those in other Sub-Saharan Africa countries, face a wide range of risks. Vulnerability to risks, or the probability that a given risk might push a household below some “minimum standard” or benchmark of well-being (e.g., below the poverty line or below some nutritional standard) is a function not only of the risk, but of the quantity and quality of a household’s assets (World Bank, 2001).

There are several concepts that can be used to consider vulnerability to risk (Siegel and others, 2003). *Susceptibility* is the probability that a household will experience a loss of well-being from a given event. For example, a malnourished individual is more susceptible to disease than a well-nourished individual. *Resilience* is the household’s ability to resist downward movements in well-being, and *sensitivity* is the extent to which the household’s asset base is prone to depletion following adjustments to risk. Reardon and Vosti (1995) point out that certain households that are not *consumption poor* in all years may, in fact, be *investment poor* because their asset base declines as they draw down their natural resource assets over time, as they are unable to generate sufficient surpluses to invest in protection, maintenance or enhancement of their assets. As such, income-generating potential declines over time, and there is no possibility for saving and investing in assets that could lead to improved livelihood strategies and outcomes. Indeed, it seems that most of Zambia’s rural households are investment poor, with a high susceptibility to multiple risks. Given their limited resilience to dealing with the multiple risks they face (and often dependent on infusions of food aid from external sources), this makes them sensitive to asset depletion. Thus, instead of a virtuous cycle of asset building and enhancement, investment poor households are either stuck in a low-level equilibrium or descend into a cycle of poverty.

Structural problems associated with dualism and dualism within dualism are exacerbated by numerous risks facing households in rural Zambia. Risks include weather- and price-related fluctuations in harvests and crop prices, human health risks that affect labor availability, illness and death of livestock, and plant diseases and pests. Smallholders tend to have greater exposure to risks and less ability to manage the risks. Also, it seems that smallholders have been exposed to more risks and have been more vulnerable to these risks since the beginning of the 1990s. Importantly, the extended household, Zambia’s traditional safety net, is eroding to the extent that many who experience shocks can no longer rely on its assistance mechanisms. Community organizations promoted by government, such as Village Committees and farmer’s cooperatives, do not compensate for this loss since they do not fill the same functions (Parker and Mwape, 2004).

In the past, price and institutional factors made maize production an economically viable activity for farmers throughout the country. Subsidized maize and fertilizer prices and pan-territorial pricing, maize-biased public agricultural research, extension and credit systems all contributed to maize being produced in areas not particularly suited for it. Past policies encouraged dependence on maize as a staple food and on government institutions for marketing, extension and credit. Over-cultivation led to decreasing soil fertility, natural resource degradation and inefficient use of human resources.

Deininger and Olinto (2000, p.3) note: “Producer subsidies for fertilizer led to the extension of maize cultivation into unsuitable areas which increased vulnerability to drought, distorted factor prices, and biased the direction of research away from high value export crops to staples with low profitability.”

Price and yield risks have undermined Zambia’s emerging liberalized fertilizer market and “efforts to increase fertilizer use on small farms are plagued with fundamental problems such as climatic risk, a dearth of technology packages that are farmer tested to be profitable and risk-decreasing, especially in less-favorable agro-climatic zones; lack of technical and management skills and information on application rates and agronomic methods to increase efficiency and profitability of fertilizer use; high transport costs; underdeveloped credit markets; and risky output markets. Sustainable strategies for

increasing fertilizer use must address these fundamental problems (Ruiske, *et al.*, 1997, p.3).” Because of widespread risk and uncertainty, many Zambian smallholders have retreated to semi-subsistence farming systems in recent years. Smallholders also face risks related to human illnesses, and diseases and pests that affect crops and livestock.

Uncertainty with respect to input and output markets influence smallholders’ decisions about crops, technology adoption, input use and productivity (Ruiske, *et al.*, 1997; Gordon, 2000). There is evidence that most smallholders practice a “safety-first” strategy to allocate household assets first to producing enough food staples for own consumption and only adopt a profit maximizing strategy once food requirements are fulfilled (see Alwang, Siegel, and Jorgensen, 1999). Thus, despite its low value, and the importance of shifting to higher-value crops, economic logic influences smallholder decisions to produce maize, primarily for home consumption. “The low value to weight ratio of maize adds to the profitability of producing for own or local consumption, while at the same time restricting opportunities for sale to urban consumers with good market access (Copesake, 1997, p.24).” As long as markets are poorly integrated and transaction costs high for low value food staples (like maize), in remote areas the costs of such staples is relatively high.<sup>15</sup> Furthermore, maize is a safer choice for risk-averse smallholders because it is a subsistence crop, a cash crop and a safety net (Parker and Mwape, 2004). Although maize is produced primarily for own-consumption, any surplus can be sold as a cash crop or, if an acceptable market price is not found, it can be stored and consumed during lean periods. Also, maize provides good quantities of fodder for livestock and can be eaten early (green) in the season if alternative food is not available. In contrast, markets for sorghum, cassava and millet are smaller and unpredictable; and perishable fresh vegetables and fruits must be sold at the going market price even if that price is low and does not cover costs of production and marketing. See box 2.3.

**Box 2.3 Food Insecurity Is Pervasive and Influences Livelihood Strategies**

A recent survey concludes: “Households in rural Zambia are very food insecure. Households in general expect that the current harvest will be about one-half of what they normally obtain through cropping activities. This trend is similar for every household type analyzed, and demonstrates that food security problems in Zambia are widespread and impact on many livelihoods (C-SAFE, 2003, p.46).”

**Major Sources of Risks and Vulnerability for Smallholders**

A recent study claims that there are three major risks for smallholders: a) droughts, b) macroeconomic shocks, and c) the HIV/AIDS pandemic – and that these risks are exacerbated by poor governance (GRZ, 2003). Below is a brief review of these risks and price risks and livestock and plant health risk – which are often related to climatic risks and/or macroeconomic shocks.

**Climatic Risks:**

Over 90% of smallholder crop production is rainfed<sup>16</sup>, so rainfall is a critical factor for selecting crops, their planting time, the timing and intensity of input and labor use, and subsequent yields. Yield risks from unpredictable rainfall are thus a major risk to smallholders. Since 1990, about three out of every 5 years have essentially been drought years in Zambia (Bwalya, 1999). Droughts occurred in 1991/2, 1994, 1995, 1997, 1999, 2000, 2001, and 2002 (World Bank, 2004c). Although not all the observed yield variability in staple grains can be attributed to weather, Figure 2.3 indicates significant variability in year-to-year yields for major cereals – at a national level.

<sup>15</sup> The level of regional and international market integration is low and has not increased over time. Transaction costs in these markets are still high, despite market liberalization (Loy and Wichern, 2000) .

<sup>16</sup> About 80-90% of all crop production in Zambia is rainfed (World Bank, 2004c).

It is important to note that the occurrence and impact of droughts is not equally distributed over the country. Southern and Western Provinces have been most severely impacted, but there are even differences within these Provinces and also areas in other Provinces that have suffered from droughts in recent years. See box 2.4 On the other hand, even if droughts are unevenly distributed through the country, there are national impacts. Also, droughts have impacts on risks related to prices, human health, livestock and plant diseases, etc. (GRZ, 2003).

**Box 2.4. Recent Droughts Affect Mostly Southern and Western Provinces, and other Areas Too**

In 1995, Zambia suffered a “moderate” drought, which caused a reduction in maize production of 30 percent below its trend average. The most affected areas were the Southern and Western provinces. (Devereux, 2000). During 2001-2002 prolonged dry spells in Southern and Western Zambia – in some areas the second or third period of dry spells in previous recent years – combined with excessive rains, which led to floods that destroyed crops in other areas, caused a serious shortfall in production in the 2000-01 season. The following cropping season a more extended drought affected larger parts of the country. Maize prices increased up to five times the five-year average and in some provinces (southern) maize was not available on the market. At the peak of the crises, 2.9 million persons (about one-fourth of Zambia’s total population) were estimated to be in need of food assistance. The worst affected areas were in the south (60% population in need of relief food) and valley districts, Eastern, Western, Central and Lusaka also affected). In contrast, 2004 is a bumper maize crop from a national perspective, but there is drought and yield shortfalls reported in parts of Western and Northwestern Provinces.

Sources: de Carlo (2005), FESWNET (2004)

Besides spatial differences in the exposure to climatic risks, there are differential impacts on households based on their assets and available risk management options. Filmer and Hammer (2000, p.5-6) note that: “Variability is both higher for poor people than for the non-poor, . . . , and more severe in its consequences. When people are already quite poor . . . any adverse variation can be very painful. . . . This adds a further dimension to the problem of poverty – insecurity and vulnerability.” Also important “are the multiple consequences of bad years. How people to deal with this sort of variation – what they do to see themselves through the hard times and what obstacles they face - are important issues for anti-poverty policy. Government might be able to help smooth conditions or remove some of these obstacles.”

Changing climatic and environmental conditions have been mentioned as major causes of increased poverty and vulnerability in recent participatory assessments (Skonsberg, 2003; Parker and Mwape, 2004). Furthermore, there is a perception that rainfall patterns are increasingly erratic; in some areas droughts are said to have become more common, while others there is a perception of more flooding. The impacts of climatic risks are increased by the deterioration in the quantity and quality and abundance of natural resources and environmental quality. As a consequence, many households that relied on common property natural resources in the past as a coping mechanism in times of crop failure can no longer do so. In addition, some areas report declining soil fertility and soil exhaustion. Many households in these areas are reverting to shifting cultivation (*chitimene*) – a well-known source of deforestation. Thus, there is a cycle of impoverishment and shrinking opportunities for poverty reduction (Parker and Mwape, 2004).

**Price Risks:**

Since market and trade liberalization in the 1990s, domestic commodity prices have been more closely linked to international commodity price markets. Prices of Zambia’s major commodity crops, including staple grains (e.g., maize) and export crops (e.g., cotton, coffee) have greatly fluctuated and experienced declining real price trends in international commodity markets recent years, and there is not much optimism for sustained commodity price increases in the near future, nor for greater price stability (FAO 2002; Dehn, Gilbert and Varangis, 2004).

However, international commodity price movements do not really “tell the story” of domestic commodity price risks. Poorly integrated markets along with continued and unpredictable government (and development agency and NGO) interventions in maize and fertilizer markets (e.g., through subsidies, imports, food aid) result in international commodity price movements that are not really so closely correlated to prices in domestic markets – especially in remote rural areas. For example, in 2004, maize prices were in general lower than in previous years because of a good harvest and carryover stocks from the previous season, some of which was purchased by the Food Reserve Agency (FRA) in response to lower harvests and higher maize prices in 2003 (FEWSNET, 2004).

In addition, Zambia has a small domestic market and these thin markets lead to highly volatile price changes, especially for perishables such as horticultural crops (fruits and vegetables). The small domestic market also necessitates an export market orientation and greater exposure to international commodity market fluctuations (World Bank, 2004d).

The inability to forecast prices of inputs and outputs is a major constraint to the expansion of private sector marketing activities and for the adoption of improved technologies by smallholders (World Bank, 2004e). Price uncertainty is exacerbated by the lack of dependable markets for inputs and outputs. Poorly functioning markets and price transmission mechanisms result in a cycle of price and market related risk.

### **Human Health Risks:**

The proliferation of HIV/AIDS has highlighted health risks and impacts on household labor and dependency ratios, but rural Zambians have long suffered from many illnesses, which affect labor availability, household composition and household production decisions. Research indicates that one in every four Zambian adults is HIV positive. The high incidence in rural areas has become more than a public health concern placing demands on limited household resources, exacerbating labor constraints, and lowering productivity (World Bank, 2003b; Pillai, Sunil, and Gupta, 2003).<sup>17</sup> See box 2.5.

#### **Box 2.5 HIV/AIDS, Women and Youth**

In rural Zambia, “Women and youth represent 70 percent of the agricultural labor force, but have access to few productive assets and are marginalized in decision-making process at the household and community levels. These gender and age differentials become more acute when productive resources are scarce, thus making female-headed and – increasingly – youth-headed households the most vulnerable of the poor (FAO 2003, p.14).”

The high prevalence of HIV/AIDS in Zambia has received quite a lot of attention. However, other illnesses such as malaria, cholera and tuberculosis are also important health risks for rural households (Lake, 2000). In addition, there is evidence that malnutrition increased during the 1990s. The WFP reports that, on average, about 50% of all Zambian children were malnourished during the 1990s (WFP, 2004). Although significant resources have been invested in rural schools and clinics infrastructure, education and health services remain deficient in most rural areas.

Another factor that is augmenting poverty for some households is the increase in illness and premature death that Zambia has experienced in the past decade. HIV/AIDS is one of the major causes of this, but many households have also lost productive members to other illnesses such as malaria, typhoid, cholera and TB. When a household is affected by HIV/AIDS or other chronic illness, their economic standing is eroded for a number of reasons. The most serious of these is the

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<sup>17</sup> In contrast, a recent paper by Mather and others (2004) claims that research indicates that HIV/AIDS affected households do not have more area planted to tubers compared to non-affected households and that labor constraints for HIV/AIDS sufferers was no different than for non-affected households.

loss of a breadwinner or laborer from the household, but even before this loss occurs, the cost of caring for a chronically ill family member can impoverish a household. There are heavy financial costs associated with providing for the treatment and nutritional needs of the patient, and the opportunity costs of nursing a sick individual for a period of months can rob the household of the time and labor of the only adult who is able to perform agricultural tasks. Even before the death of a breadwinner, therefore, fields may lie uncultivated and the households resources may be expended on drugs, transport to hospital, and fees for medical services. Cost-sharing mechanisms such as medical service fees at the hospital level were mentioned in some focus groups as factors that have led to greater poverty. (Parker and Mwape, 2004)

### **Risks to Livestock and and Plant Health:**

Oxen use and mechanization increased some since the early 1990s in Central and Eastern Provinces. But, oxen use has declined dramatically in Southern Province due to East Coast Corridor disease (FAO, 2002). Official agricultural census statistics indicate that draught animals numbers declined by 50 percent between 1994 and 2000. A similar decline was recorded for other types of livestock. Reasons include repeated droughts, spread of the tick-borne corridor disease and deterioration in the availability and affordability of veterinary care (Copesake, 1997). Possession of livestock is an indication of economic standing, a productive asset, and a cushion against the impact of catastrophic events. Threats to these assets, such as disease and theft, are on the increase; and loss of livestock is perceived as a major destabilizing shock for poor rural households (Parker and Mwape, 2004).

### **Macroeconomic shocks:**

Many of the core weaknesses of Zambian agribusiness lie outside its own confines, in the forms of weak overall infrastructure within the country, an unstable and unpredictable exchange rate, extremely high costs of finance, and weak capacity of government to address trade-related anomalies and problems (World Bank, 2003b, p.xiii). For example, throughout the past 15 years, Zambia has experienced macroeconomic instability (World Bank, 2002b). Also, its public institutions for agricultural development (such as the Ministry of Agriculture and Cooperatives (MAC)) are weak and fragmented (World Bank, 2002b). Macroeconomic instability and poor governance tend to exacerbate the negative impacts of the other risks discussed above, and the other risks tend to exacerbate macroeconomic shocks and highlight deficiencies in governance.

### *Risks and Vulnerability: results from a rapid risk and vulnerability assessment*

Facing drought risks and fluctuating yields, Zambian smallholders tend to: a) diversify income between farm and nonfarm and sources, b) diversify crops in terms of staggered plantings in different plots, and by planting different crops and varieties, c) hold livestock and food stock as precautionary savings, d) seek assistance from social networks within the village and among related clans and relatives in other villages, e) seek nonfarm employment in village or by migrating, and f) seek informal credit from moneylenders. However, when there are severe droughts – and “everyone” is affected, strategies based on self-insurance and informal safety nets tend to fail. To make matters worse, there is a tendency for: a) local interest rates from moneylenders to increase since many households are looking for credit, b) local wages to drop because of an excess supply of labor, and c) a decrease in livestock prices because of distress sales by many persons.

A participatory qualitative study of rural poverty and vulnerability was carried out by the World Bank, DFID, and their partners at the University of Zambia in January to March 2004. See Parker and Mwape (2004). The study addressed the persistent and dynamic aspects of poverty by examining factors that determine which households are chronically poor and why, and the factors, events, shocks and set-backs that drive vulnerable households into further destitution.

It was found that covariate shocks such as droughts, damage to crops by wildlife or pests, floods, etc. were mentioned most of often as the critical risks faced by rural households. Idiosyncratic shocks, however, particularly those resulting from diseases in humans and livestock, also trap households in poverty; and households described as the poorest were predominantly those that had lost labor power to HIV/AIDS, tuberculosis, cholera or other fatal illnesses. After experiencing serious shocks, some impoverished households have no recourse but to employ coping mechanisms that cause further damage to the economic well-being of the household and its potential to recover. Other ex post coping mechanisms damage the environment and deplete common property resources. Pressure on fragile environments and limited natural resources emerged as a significant factor in the increase of poverty and vulnerability. The rapid depletion of these natural resources removes a traditional safety net from the limited options of coping mechanisms available to the poor.

Rural Zambians are aware of the risks they face, and they have developed an array of risk management strategies and coping mechanisms. Households employ a range of defensive and preventive strategies to reduce the risk of destitution in the event of shocks, such as stockpiling grain, breeding small animals for sale, crop substitution, multiple plantings etc. Removing a child from school is considered to be a last resort coping mechanism. Risk reduction and risk mitigation strategies are generally found to be less destructive to long-term economic viability than ex post coping mechanisms (Parker and Mwape, 2004).

In many communities there seems to be less reliance on the extended household to provide assistance in times of trouble than in the past. In addition, some traditional extended family leveling and support mechanisms, such as communal meals, have broken down entirely. Voluntary labor sharing between related households can still be found, but it is being gradually replaced by *ganyu* arrangements. As part of the extended family tradition, Zambians have often fostered children from related households. This is usually done either to provide additional labor for the labor-deficient or to broaden opportunities for the child. For example, rural children sometimes join the households of their urban relatives in order to gain access to better schools and services. Sometimes this constitutes an investment by extended family members in a particularly promising child (who is expected to benefit the entire group after he becomes a successful adult). This tradition, too, is said to be on the decline. Families feel the need to concentrate scarce resources on the feeding and education of their own children, and they are less certain that their investment in nieces and nephews will be repaid. (Parker and Mwape, 2004).

These changes in informal risk management practices are commonly attributed to a generalized increase in poverty – as extended family members have fewer resources to spare for relatives experiencing economic stress. On the other hand, although poverty may have increased slightly in recent years, this increase has not been dramatic enough to bring about a significant social transformation. Other social dynamics might be taking place. For example, the rise of HIV/AIDS during the past two decades is certainly causing a serious strain on the extended family system, since the proportion of households in distress has grown in virtually all kin groups. Whatever the cause, there is evidence of an evolution in social norms in the direction of increasing investment in the nuclear family at the expense of the extended family. The sharing of surplus resources with other extended family households has been an important defining value among rural Zambians. Now, however, the rural poor have begun to complain that they cannot rely on relatives – even relatively well-off relatives living in urban areas - to offer any assistance beyond emotional support. It is unclear to what extent this represents a change in cultural norms and expectations, since urban unemployment and the collapse of the copper industry have eliminated many of the remittances that sustained rural extended families in the past. (Parker and Mwape, 2004).

#### *Approaches for Improving Risk Management*

There is a growing awareness that the poor can take actions that will prepare them effectively for unexpected set-backs, or, in some cases, prevent them from occurring (GRZ, 2003; Parker and Mwape, 2004). This is the principle underlying the World Bank's new "social risk management

(SRM) approach to managing risks (World Bank, 2001). It is important to focus attention on ex ante (i.e., risk reduction and mitigation) and ex post (i.e., risk coping) risk management instruments (see Bedokat and Tovo, 1999; Holzmann and Jorgensen, 2000). It has been suggested (Siegel and Alwang, 1999; Siegel, 2000; Skees and others, 2002) that to help poor rural households manage risks associated with low rainfall and crop failures there is a need for: a) more appropriate technologies and farming systems, b) formal “drought insurance”, c) improved access to non-farm employment opportunities (including public works) and micro-enterprises (through training and micro-credit), d) lowering barriers to migration and remittance flows, e) targeted safety nets to disadvantaged groups (e.g. elderly, infirm, widows, children attending school). In addition, it is important to provide: a) alternative sources of finance (credit and savings), b) alternative sources of employment, and c) improved access to distant livestock markets and/or alternative credit/labor market opportunities to prevent distress sales of livestock.

Weather-based index insurance is being considered as a substitute for traditional crop insurance (Skees and Barnett, 1999; Skees and others, 2002). At the present time, the World Bank’s Commodity Risk Management Group (CRMG) is investigating the possibility of piloting such insurance in Zambia. Weather-based index insurance uses objectively defined “trigger events” (e.g., rainfall, soil moisture) in an area to set contingent damage payments according to an index (contracts and indemnity payments are the same for all buyers per unit of insurance) rather than field- or household-specific damage and loss data. This discourages undesirable strategic behavior like moral hazard and cheating, avoids adverse selection problems, and lowers transaction costs of individual contracts and on-site inspections. It also makes the insurance instrument accessible to the broader rural population – all those who feel that their welfare is impacted by the risky events (including individuals, households, communities, institutions and associations, governments), which can be supplied by private firms. In fact, the same basic insurance product can be “packaged” for macro (e.g., catastrophe bonds), meso (e.g., to insure a micro-finance institution’s loan portfolio), and micro (e.g., loan insurance, rainfall lottery tickets) levels using the same “trigger events”.

### **3) Changes in the Smallholder Sector since the 1990s: Moving Toward or Away from Market Orientation?**

Performance of the agricultural sector in Zambia since reforms began in the early 1990s has been uneven. Reforms aimed at market and trade liberalization were expected to benefit smallholders, but evidence shows that the reforms harmed many rural households, particularly those in remote areas (Evans, 2001). In particular, the collapse of markets for credit and inputs that followed liberalization seriously harmed smallholders. Reductions in government expenditures on transport and communication infrastructure compounded the problem. The collapse of expenditures on transport and communications appears to have discouraged private sector involvement, and, as a result, many poor farmers were unable to exploit their agricultural potential (McCulloch, Baulch, and Cherel-Robson, 2000, p. 31-32).

Maize continues to dominate agriculture, but its relative importance has lessened as area planted to maize declined somewhat since the early 1990s. Fluctuating climatic conditions, especially recurring droughts, contribute to variable yields. The area planted to maize declined by more than total production did, which indicates that yields increased slightly over time. Patterns of production have shifted, but agricultural production is still concentrated in grains and staple foods. Major shifts into cassava have taken place. Cassava requires no purchased inputs and can produce good yields in a wide variety of soil-water conditions (including drought). Its flexible planting and harvesting calendar make it one of the easiest crops for labor-constrained households. There is some evidence from Zambia that HIV/AIDS affected households have shifted to cassava production (Nweke, Haggblade, and Zulu, 2004). Land planted to groundnuts (which are widely grown throughout the country and used for relish and oil extraction and have a relatively high value per weight), increased substantially between 1993 and 2002. However, production increases have not mirrored the increase in acreage. Sorghum and millet plantings (mostly done by smallholders) increased during the mid-1990s but



leveled off and even declined since. Sorghum, which performs well in drought-prone areas and stores well, is grown in many provinces, often inter-planted with local maize varieties. Land planted to sunflowers, which are produced for sale to oil processing plants, has fluctuated around a fairly constant level since 1997.

A major shift in crop production by smallholders was the significant increase in land planted to cotton (Boughton, *et al*, 2002). Much of the cotton production takes place using contract farming arrangements, whereby smallholders receive inputs on credit and extension assistance along with guaranteed output markets. Over the past few decades, cotton production by smallholders has gone through periods of expansion and contraction. Cotton production increased from 20,000 mt in 1994 to about 100,00 mt by 1998 and evened off at about 80,000 mt. Cotton planting is sensitive to prices; and unusually high international prices in 1998 preceded a spike in land planted and production in 1999. Cotton prices have continued to fluctuate in recent years and there is evidence of a long term decline in real prices (Baffes, 2004). There were significant increases in production of nontraditional exports such as horticulture and floriculture and coffee in recent years, mostly by commercial farmers. In most cases, commercial farmers and some emergent farmers have been the major producers of these nontraditional exports. A notable exception is paprika, which like cotton, has largely been produced by smallholders under outgrower (i.e., contract farming) arrangements. In most cases declining or stagnant international prices have constrained any significant increase in the value of agricultural exports or increased incomes for producers.

There is some evidence suggests that the private sector in Zambia can fill the void left by the public sector and that smallholders can adapt to new market conditions. Smallholder outgrower and contract farming schemes proliferated in the 1990s after the public marketing and agricultural finance systems were eliminated. This private-sector led initiative to fill the voids has certain appeal. In addition to cotton, schemes have been set up for tobacco, paprika, sugarcane, castor, and for seed production (Copestake, 1997; SGS Zambia Ltd., 1999; Keyser, Heslop, and Abel, 2001). However, some outgrower schemes are in danger of failing. A major problem is that Zambia's legal system does not protect or enforce buyers' contracts; instead it protects the rights of farmers not to honor their obligations. "Side selling" of outputs by smallholders is common<sup>18</sup>, as are the resulting high rates of loan delinquency and non-payment. Buyers have grown weary of such contractual arrangements and are either looking for other ways to encourage production and purchase crops or are simply pulling out of the business (SGS Zambia Ltd., 1999; Keyser, Helsop, and Abel, 2001; Boughton, *et al.*, 2002; Parker 2003). There is a pressing need for more technical assistance for smallholders to improve business skills and group formation so that they can better operate in the liberalized market economy.<sup>19</sup>

Many of the changes in the agricultural sector during the 1990s were the results of policy reforms, while others stem from external factors such as changing conditions in international commodity markets and recurring droughts. These changes have had differential impacts on technology adoption, enterprise mixes, profitability, and market orientation on different types of farmers (World Bank, 2003b). In many cases, there has been a transformation to more inward looking subsistence production, rather than increased outward market-orientation. The recent CEM makes the following observation about the transformation: "Because these crops are more resistant to drought, and require few purchased inputs to cultivate, this shift has helped many smallholder households become more

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<sup>18</sup> Side-selling is when contracted farmers do not sell their outputs to the provider of inputs on credit, as stipulated. Lonhro, the major private sector firm involved in contract farming for cotton, withdrew from Zambia in 1999 due to problems with high credit defaults and the lack of legal sanctions for defaulters (Boughton, *et al*, 2002). Dunavant Ltd. took over Lonhro's cotton business and instituted a new system called "Dunavant Distributor System", whereby independent agents contract with the company to receive inputs on credit and deliver them along with extension services to farmers. Agents' earnings are a function of credit recovery, so they have an incentive to provide quality inputs on time with extension and to have high yields and repayment rates (Boughton, *et. al.*, 2002).

<sup>19</sup> See Parker (2003) for an interesting, and humbling account, of attempts by CLUSA to organize smallholders.

food secure and less vulnerable to weather shocks and unreliable marketing agents” (World Bank, 2004c, p.36). However, although this retreat to low-input semi-subsistence agricultural production might lower the variability (or statistical variance) of production and the value of production, it has led to a lower average (or expected) value of production in many cases. This is not the way to reduce poverty or vulnerability. See box 3.1.

**Box 3.1 Smallholder Responses to Structural Adjustment and Shocks in the 1990s**

“An obvious policy implication ... is that diversification may be constrained not only by depressed markets arising from adjustment, but also by a failure to complete agro-service reforms for minor crops (eg. cotton) before liberalisation of the main cash crop (in this case maize). In the absence of new market opportunities, many farmers ... have been forced to use more labour intensive methods of production for self-consumption, with adverse effects on women and children's control of their time; and to encroach upon the livelihood activities of poorer households. Thus, while diversification from hybrid maize into cash crops may have adverse distributional effects, the distributional effects of reversion to subsistence may be even worse. This highlights the importance of providing the public goods and services (particularly improved feeder roads and health care facilities) to complement economic reform. Transitional safety measures are also crucial to protect farmers capital base during the period of transition, particularly in the face of other adverse shocks (Bangwe, 1997).

As part of the Poverty and Social Impact Analysis (PSIA) work carried out to inform the CEM several background studies of the smallholder sector were carried out, some more qualitative in nature and others more quantitative. The combination of the (qualitative) rapid assessment carried out in Kefa Village and (quantitative) smallholder model provide interesting insights that support each other and the storyline presented above. Both the Kefa Village study and smallholder model were carried out as updates of the 1994 Poverty Assessment, so that changes could be identified.

*Changes in Kefa: findings from a rapid participatory study*

A rapid participatory assessment was undertaken in Kefa Village located in Eastern Province (see Skjonsberg, 2003).<sup>20</sup> Major findings are presented below. These findings substantiate the storyline presented above on changes taking place in rural Zambia since the early 1990s. It was found that:

- a) Demise of the GRZ extension system that provided farmers with technical support, subsidized credit, seeds and fertilizer, and the lack of public or private sector to replace these services.
- b) Land issues tend to be debated, but land reform *per se* is not an issue for the community (only 25 percent of interviewed residents said they did not have enough land).
- c) Land is not equally distributed (advantaged groups include clan members, wealthier farmers and long-time residents).
- d) Soil fertility problems are increasing the need for fertilizer and improved seeds. However, farmers do not have cash or credit to buy improved seeds and fertilizer.
- e) Seeds and credit are sometimes available from agents of the cotton and tobacco buyers.
- f) Seeds and fertilizer are rarely available in a timely manner.
- g) On average, a household cultivates about 1 ha maize and 0.4 ha groundnuts, primarily for home consumption. The major binding constraint tends to be available household labor, not land.
- h) Livestock numbers, especially cattle, populations are declining due to drought and illness.
- i) Small livestock (e.g., chickens and goats) are gaining in importance.
- j) Water scarcity is a major problem.
- k) Lack of fertilizers is claimed to be the biggest problem. When people say that there is a “lack of fertilizer”, this includes the lack of suppliers and the high cost of fertilizer when available.

<sup>20</sup> For the World Bank’s 1994 Zambia Poverty Assessment, a background paper by Skjonsberg (1994) examined living conditions in a village in Eastern Province using a series of semi-structured interviews with residents. The 1994 paper was an update of an extensive study undertaken in the 1970s and documented in a book: “Change in an African Village: Kefa Speaks” (see Skjonsberg, 1979).

- l) GRZ programs for subsidized fertilizer do not reach Kefa farmers or reach them in insufficient quantities.
- m) Lack of fertilizer and water scarcity are driving cropping choices. Cotton production has increased because it needs less fertilizer and water, and because agents for cotton processors tend to provide advances of inputs and guaranteed markets)
- n) There is also a lack of output markets. “One big problem that we all have is where to sell our produce. There is no market so instead we just have to sell it one by one.”
- o) Increased problems with malaria, HIV/AIDS, and orphans.
- p) Increased dependence on assistance from donors and NGOs (church groups).
- q) Persistence of beliefs in witchcraft and fatalistic attitudes.

The findings from Kefa Village indicate that there are many factors that influence the opportunities and constraints faced by smallholders, including important social and cultural factors. Also, it is apparent that for most households, conditions worsened over time. Results from the more recent rapid poverty and vulnerability assessment (see Parker and Mwape) are very consistent with the findings at Kefa Village.

#### *Results from the Updated Zambia Smallholder Model*

A single-period linear programming (LP) model of smallholder households in rural Zambia was used to examine potential impacts on land and labor use, and income-generation of suggested land tenure reforms, changes in fertilizer policy, and infrastructure investments, and also impacts of HIV/AIDS (see Siegel and Alwang, 2004).<sup>21</sup> Major findings include:

- a) Because of a “safety-first” objective function, smallholders’ primary objective is to produce their own staple foods for home consumption, especially in remote areas. These food security concerns and subsequent livelihood strategies imply a significant (real and opportunity) cost to smallholders and sub-optimal use of assets.
- b) Using hoes and oxen, smallholder households can only cultivate about two to four hectares of land, respectively, before household labor constraints become binding. Increased access to land would therefore not benefit most households unless hired labor became available at a relatively low cost. Labor-saving technology may substitute for labor and allow for improved labor allocation.
- c) Technologies such as conservation farming can help spread out labor demand more evenly though the year. However, the “entry costs” of such technologies may be prohibitively expensive for the majority of resource-poor smallholders.
- d) Higher official market prices for fertilizer and lower prices for maize have made hybrid maize production less economically attractive for smallholders. Lower maize/fertilizer ratios and the continued lack of dependable input supplies have slowed the adoption of improved technologies and encouraged a “retreat” to semi-subsistence farming, especially in remote areas.
- e) For most smallholders, there are relatively low returns to farming—less than \$1 per person per day. This low return to labor makes it difficult to generate surpluses that could be saved or invested in improved technologies, and thus contributes to a cycle of poverty.
- f) Market liberalization and commercialization increases the need for cash, other liquid assets, or credit. The scarce amounts of cash available and the high returns to cash suggest that demand for credit will likely be robust and the returns relatively high.

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<sup>21</sup> The smallholder model is an update of Alwang and Siegel (1994) and Alwang, Siegel and Jorgensen (1996). The model has an *objective function*, *model activities*, and *constraints* for different resources, with labor disaggregated by month, over a one-year period. The model maximizes returns from agricultural production given fixed assets, subject to the available technologies and technical constraints. The model only considered labor income from on-farm agricultural activities, assumed to be carried out only household members.

- g) Improved infrastructure should, in theory, lower transport and transaction costs, and increase the commercial orientation of smallholders. However, lower costs might not compensate for the decline in output prices and rise in input costs that smallholders have faced over time.
- h) Remoteness leads to less land under cultivation, lower returns per household member and lower returns to land. Improved transport should benefit remote households and encourage more intensive and extensive utilization of land, and higher income-earning potential.
- i) Improved infrastructure increases confidence in markets. Such confidence could, over time, reduce the tendency of smallholders to allocate scarce resources to production of staple foods for own consumption. The combination of less remoteness and increased confidence in the market can lead to significant improvements in household well-being. The food security constraint severely lowers household returns, and its “removal” should allow smallholders to produce higher-value crops instead of traditional low-value staple crops. Over time, these households might adopt improved technologies and possibly increase their demand for land.
- j) HIV/AIDS and other serious illnesses will likely continue to negatively impact household welfare. Labor reductions lead to less land under cultivation and more staple foods as a share of total crops. Purchased inputs increase as a share of the total value of production, indicating some substitution of purchased inputs for scarce labor.

These results are consistent with the 1994 smallholder model results (see Alwang and Siegel, 1994) that: a) access to land was not a binding constraint for households; labor constraints were binding, b) oxen (and implicitly other labor-saving) technology reduced labor constraints and led to more output per hectare and brought more land into production, c) with oxen cultivation the maximum land used by the typical household was about 4 hectares, compared to about 2 ha with hand hoe cultivation, d) more remote households were assumed to be adversely affected by market liberalization because of increased transport costs, while those with better access to infrastructure and close to markets saw their well being improve, and e) most smallholder households were more adversely affected by late and irregular access to hybrid maize seed and agricultural chemicals than they were by increased prices of such inputs.

*Land versus Labor Constraints and the Role of Technology – Smallholder Model 2004 Results*

Increasing returns from increased land availability depends on the technology used. Access to oxen is associated with a higher marginal return to increased land, while the marginal value of additional land under cultivation land is lower (but still positive) for hand-hoe technologies. Oxen use is still quite limited, due to the high price of buying and keeping oxen, along with other factors. Oxen rental markets require adequate cash on hand at the beginning of the growing season; anecdotal evidence shows that seasonal credit for up-front farming operations is limited. Returns to hand-hoe smallholders of maize also increase with landholding size, to a maximum of about 2-3 hectares per household. The food-security constraint substantially lowers net returns at all production levels. More confidence in the ability of food markets to provide minimum food needs will improve conditions (by a substantial amount) among smallholders, regardless of the technology used. However, in most cases and for most households, cultivating 2-3 hectares of rain-fed maize using is insufficient to cover a household’s food and non-food consumption needs.

*Model results suggest that allocating more land to smallholders without addressing the labor constraints will have no real impact on their ability to increase production.* Allocations of more than five hectares will lead to under-utilized land unless either labor markets can be created (although the demand for labor is not likely to be strong, since current conditions in agricultural labor markets suggest few transactions take place) or labor saving technologies can be introduced. Additional labor can substantially increase the amount of land planted in both cases; such an innovation could put, however, exert increased pressure on the land base. Oxen cultivation, while reducing labor constraints and allowing more land to be farmed, is also associated with greater returns to labor, and increased labor use. The increased labor available for weeding and harvesting leads to increased household returns.

*There tends to be an oversupply of labor, except during certain peak periods of land preparation and harvest*, thus there is a considerable supply of off-farm labor in areas where there is only a single rain-fed crop grown per year, especially drought-prone areas. Seasonal migration is an important risk management strategy for the rural poor in response to a variety of risks. For example, many rural poor look for seasonal work outside their home area when there is a drought or some other nature related risk that affects the household and the community. Some members of poor households migrate to find additional employment and income to help mitigate the impacts of health risks on household income and expenditures.

Thus, from the above discussion of results of the smallholder model, and consistent with findings other studies is that the key to unleashing smallholder agriculture in Zambia is improving the efficiency and intensity of household labor in order to expand the amount of land under production. In addition, it is important to identify farming systems – farm and off-farm agricultural (crops and livestock) and non-agricultural activities that are based on a more even spread of labor throughout the year. Improved efficiency in land preparation using oxen or tractors and improved water management through conservation and/or irrigation is also key.

#### **4) Potential for Moving into Higher Value Crop Activities and Conservation Farming**

Traditional smallholder crops in Zambia such as local maize, groundnuts and cotton tend to have low input costs, but also relatively low returns. Given the lack of dependable input and output markets and high prices of inputs relative to outputs, the low-input low-return strategy is an economically rational strategy for smallholders, especially those located in remote areas. In many cases, labor and credit constraints dominate land constraints. Suitable farming systems must be identified depending on location-specific agro-ecological conditions, access to infrastructure and markets, and socioeconomic conditions.

Crops grown on relatively small landholdings, while contributing to food security and supplementing family income, can not be expected to make substantial contributions to poverty reduction. An alternative is clearly needed. On the other hand, higher-valued crops might yield higher returns, but also do not necessarily provide enough income by themselves to reduce poverty much (especially considering when extra labor and cash requirements needed to obtain higher returns).

Some smallholders have participated in out-grower schemes and others have reverted to indigenous crops because they lack the inputs or water required for maize cultivation. The majority of smallholders, however, are risk-averse and firmly committed to production of staple crops primarily for own-consumption. Due to lack of access to markets and market price instability, the poor tend to view crop diversification as likely to increase the vulnerability of their households. Private sector initiatives, particularly outgrower schemes (and contract farming), have been popular with smallholders when and where they have been available (mainly in agro-ecological Region II). Private traders and middle-men were less favorably assessed by participants in the survey, but they provide the only access to markets for most poor cultivators (Parker and Mwape, 2004).

Outgrower schemes can offer a solution to the problems of securing inputs and market access. At least for some crops in some areas and for some types of producers. A recent report by DFID concludes that: “Outgrower schemes could never cover the main food and industrial grain, legume, and oil seed crops on a large scale, and so are often not relevant for the large mass of poorer smallholders. Despite the many exciting trends in this area, it must be remembered that the poorest producers face such daunting livelihood challenges that they will be unable and unwilling to participate in the higher risk, specialized, input-intensive technologies required for much cash crop production (DFID, 2002, p.18).” Furthermore, most outgrower schemes are limited to more favorable agro-ecological regions with good access to roads and airports. “For example, Zambia’s largest

horticultural exporter Agriflora is only able to take on outgrowers within a 50km radius of its Lusaka operations (DFID, 2002, p.14).

#### Higher Value Crop Activities

Most traditional smallholder crops, such as local maize, groundnuts and cotton, might have low input costs, but they also have relatively low returns to labor. The smallholder models presented by Siegel and Alwang (2004) show net returns of \$0.29 per person per day with hand-hoe technologies and \$1.06 per person per day with oxen technology, far below the internationally accepted minimums of \$1 per person per day.<sup>22</sup> Likewise, detailed financial analyses of returns to different smallholder crops by Keyser (2002) indicate very low returns to labor.

Budgets from Keyser (2002) for commercially oriented emergent and large-scale farmers show higher returns, but initial investments and the operating costs for such enterprises require substantial outlays. Higher-value crops like paprika and tobacco have higher cash input and labor demands. Furthermore, many crops experienced stagnant or falling prices from 1994 to 2001, while input costs tended to rise. In any case, returns to labor have remained low and in many cases declined, even in cases where there might have been improvements in yields. High cash and labor requirements are a major constraint for smallholders.

Paprika is an example of a non-traditional higher value crop. It was first introduced into Zambia in the early 1990s and quickly developed as a smallholder crop and important agricultural export. Development of this sector was only possible due to investment decisions made by a few entrepreneurs. These entrepreneurs identified a specific market potential and made long-term investments to sustain their operations. This has required substantial investments in farmer extension, input supply, marketing support, laboratory equipment, processing facilities, construction of rural depots and negotiation with potential buyers around the world. Opportunities in other areas exist, but success still depends on individual entrepreneurs who are willing to respond to market signals and accept the risk and high cost of investing in new areas (Keyser, Helsop, Abel, 1999, p. 39-40). Producers have experienced declining returns to labor despite improvements in average yields. These are not good omens for increasing paprika production.

Keyser (2002) and Mwape (2003) claim that commercial agricultural producers in Zambia can attain higher yields than small-scale producers. Higher returns per hectare, combined with the fact that these returns are spread over more hectares demonstrate that farming can be a profitable enterprise. Attainment of “commercial” status requires knowledge of advanced farming techniques and business and financial management skills. Financial barriers to entry can be daunting, and the combination of huge outlays, the need to spread investments over large land areas and the technical skill required to produce and market at a commercial level creates a substantial barrier to entry into commercial farming. Even a smaller-scale commercial maize farmer require substantial financial resources: a basic, small-scale commercial farmer with a single 60-horsepower tractor and basic cultivation implements (plows, harrows, cultivators, fertilizer spreader and maize sheller) would incur more than \$100,000 in fixed investments. “The realistic potential for poor people to diversify out of maize must be put in the context with the discussion above – in terms of access to the necessary marketing and service infrastructure, appropriate soil and ecological conditions and the potential for irrigation (DFID, 2002, p.14).”.

#### Conservation Farming

Conservation farming (CF) in Zambia is a locally adopted variant of traditional minimum tillage technologies adopted in many parts of Sub-Saharan Africa (Bwalya, 1999; Haggblade and Tembo, 2003). CF has gained popularity in the 1990s in response to market liberalization and the perceived needs to increase fertilizer efficiency, better conserve and manage water resources, increase productivity, and also to spread labor more evenly over the year. As applied in Zambia, CF involves a package of several key practices: dry-season land preparation using minimum tillage (rather than

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<sup>22</sup> Even when using relatively optimistic assumptions about maize yields in both cases.

plowing after the first rains), crop residue retention (instead of burning), seed and fertilizer application in fixed planting stations (rather than spreading), and nitrogen fixing crop rotations and fallows (rather than continuous production of crops such as maize and cotton). CF technologies and implements have been developed for hand-hoe and oxen land preparation. It is important to note that minimum tillage is not synonymous with “low-input” agricultural production. In many cases there is need for increased labor and outlays on improved seeds and fertilizers. This is a reason behind the fact that the highest adoption rates of CF in Zambia have actually been by commercial and emergent farmers.

In 1998, MACO officially formally accepted CF as an official policy of GRZ, and increased promotion efforts. One of the emerging “success stories” has been the adoption of CF by many smallholder cotton producers participating in the outgrower “Dunavant Distributor System”. In fact, there is evidence that “CF farmers often receive extra extension support as well as input packages of high-yielding variety (HYV) seeds and fertilizers to which most conventional farmers have not had access in the decade and a half following the collapse of Zambia’s input supply and credit systems. Even under conventional tillage, higher fertilizer and HYV seed use will increase output (Haggeblade and Tembo, 2003, p.3).” Thus, it has been difficult to assess the impacts of changes in tillage practices alone versus the package of different tillage practices and use of improved inputs and increased input use. A recent review of CF in Zambia (see Haggeblade and Tembo, 2003) notes that it is hard to estimate the number of smallholders that have adopted CF, because many adopt some components and not others. Haggeblade and Tembo (2003, p.80) estimate that “between 20,000 and 75,000 Zambian farmers currently benefit from increased yield and incomes under conservation farming.” Although some donors and NGOs advocate conservation tillage, “little published data is yet available on the economics of conservation tillage compared to alternatives... More research is also needed into intra-household effects of adopting conservation tillage technology, given that non-plowing field operations are generally carried out by women and children (Copesake, 1997, p.31).” More information is needed about conservation farming to assess its benefits and costs in the smallholder household farming system.

Two newly proposed projects, FAO’s proposed Smallholder Agricultural Production and Marketing Support Project (FAO, 2004) and the World Bank’s Agricultural Development Support Project for Smallholders (World Bank, 2004f) are both attempting to build on the positive aspects and lessons learned from outgrower schemes and the movement into higher value crop activities, and from the adoption of conservation farming.

Considering results of the smallholder model and the potential for higher-value crops and conservation farming, Siegel and Alwang (2004, p.30) conclude: “Model results and additional analysis indicate that many smallholders are trapped in a “low-level equilibrium.” Breaking out of this trap will require adopting new technologies and cropping patterns, relatively large investments in fixed assets and working capital. Additional modeling of smallholder adoption of technologies, and subsequent returns from adoption would be beneficial. This line of research will be more fruitful than focusing on how smallholders can survive using existing technologies and cropping patterns. More research needs to be carried out to investigate the economics of adopting higher value crops and/or for the adoption of conservation farming for staple and higher value crops. There is a need to explicitly incorporate risks (e.g., climate and price risks) into the modeling of smallholder agriculture and to better understand how the existence or absence of risks and risk management instruments impact the transformation from subsistence-oriented smallholders to market-oriented emergent farmers.”

Thus, smallholder agriculture has some potential in Zambia, but faces major constraints. A key priority to benefit poor producers should be labor-saving technologies and better-functioning input and output markets. Access to credit is also important because movement to higher-productivity farming systems usually requires increased investments in inputs and working capital. Capacity building and extension services are also critical. Remoteness is a problem that can be overcome through investments in infrastructure, but complementary assets are lacking in low-productivity remote areas. Deeply rooted Structural problems further exacerbate the problem. Issues such as land reform, liberalization of fertilizer markets, and improving infrastructure need to be part of a broader

rural development strategy. The rural poor lack not only land, but other productive resources that would allow them to respond to policies and investments that are aimed at stimulating agricultural growth. Recent innovations in contract farming and conservation farming for smallholders point to the potential when a more holistic technology-technical assistance-credit-marketing approach is adopted. Improved transportation, communication and storage infrastructure are all needed to assure timely access and minimal transaction costs for inputs and outputs. Aggregated smallholder activities, to reap economies of scale, lower transaction costs and improve bargaining power with the private sector are also critical; including formation of cooperatives, and participation in outgrower schemes.

Risks affect all rural households. There is a need to coordinate formal and informal rural risk management and social assistance strategies at household, community, regional, national and international levels. As such, it is important to seek out instruments that not only deal with short-term risks and vulnerability, but that also provide an impetus to longer-term improvements in incomes and other measures of well-being by strengthening the asset bases of poor households and communities. This requires an integrated rural risk management approach (Siegel, 2000; World Bank, 2001; Varangis, Larson, Anderson, 2002).

There is a need for appropriate technologies and farming systems that are suited to diverse agro-ecological conditions, with technological innovations to increase labor productivity, and that are financially and ecologically sustainable. To help smallholders, it is important that research and extension also address natural resource management issues (e.g., environmental sustainability), and to also provide technical assistance about prices, markets and business practices so that smallholders can better participate in domestic and international markets. It is also important for research and extension to provide technical assistance with respect to food consumption (e.g., nutrition, food preparation, improving energy efficiency and lowering pollution for cooking), and activities linked agricultural activities (e.g., activities involved in input and output supply), and non-agricultural activities (e.g., crafts and small enterprises). This requires a holistic “rural household approach” to research and extension.

## **5) Summary and Conclusions**

Zambia’s agricultural sector has significant untapped *potential*, but it is characterized by structural problems and risks that constrain realization of this potential. This is especially true for the smallholder sector. The dualistic structure within the *Zambian* agricultural sector is increasingly being recognized, and also increasingly being considered when formulating rural development strategies, the selection of priority investments and the design of projects. Recognizing the dualism within the agricultural sector is important. It is also important to recognize that *Zambian* smallholders are not a homogeneous and monolithic group and that being a rural resident is not synonymous with being a smallholder.

There are distinct differences in smallholder households’ asset portfolios (broadly defined to include productive, social and locational assets) and income generating potential that need to be taken into account. Thus, there seems to be a phenomena of “*dualism within dualism*”, whereby a significant proportion of *Zambian* smallholders can not be expected to transform into market-oriented production units (in the short or even longer term), while other smallholders are, in fact, better positioned to be market oriented. In all cases, however, the policy/institutional (e.g., major policy changes and weak public and private institutions) and risks (e.g., climatic, price, market, plant and animal diseases, and human illnesses) context has largely thwarted the process of commercialization for the vast majority of *Zambian* smallholders during the 1990s. Thus, even smallholders with potential to be more market-oriented require significant assistance to make the transformation into emergent farmers. Furthermore, instead of a process of increased market orientation following policy reforms in the early 1990s, many smallholders have actually experienced an erosion of their asset bases, greater



exposure to risks and increased vulnerability, and have responded by decreasing rather than increasing their market orientation.

Rural Zambia is characterized by rather distinct spatial differences in conditions affecting economic growth and poverty reduction. The differentiated spatial distribution of economic potential (based on agro-ecological conditions and access to markets) implies the need for differentiated rural strategies according to an area's specific assets, markets and institutions. However, area economic potential does not automatically translate into greater household prospects for improved well being, as evidenced by pockets of rural poverty in Central, Lusaka and Copperbelt Provinces. Considering the heterogeneity of areas and households within areas in Zambia, there is a need for area- and household-specific rural development strategies, investment priorities and the design of project interventions. The sequencing of interventions is also critical, as is the need for improved risk management for all rural residents; including improved social protection for the most vulnerable areas and households.

Investments in agricultural technology or credit or rural roads need complementary investments for the impacts to have a poverty-reducing impact. Asset complementarities reinforce the need for multi-sectoral investments. These investments should be designed according to specific needs of regions, sub-regions and households residing within them. Ideally prioritization of investments would be carried out in a demand-driven manner at the community level. In addition, publicly provided assets need to be complemented with more private, productive ones. Mechanisms should be designed to stimulate strengthening of private assets to complement public goods. For example, education might be complemented with vocational training, resources for business start-ups (including access to credit), and mechanisms for creating producer organizations.

The lack of intangible assets such as social capital, information about markets and opportunities, access to public services are major constraints to broad-based growth, depending on the area and development strategy in question. Information about markets, opportunities and productive technologies has public good attributes. Community organizations can be an effective means of organizing producers to meet stringent production requirements for non-traditional agricultural exports and for handicraft production and marketing. The potential for similar organizations to effect public action in other arenas should also be explored.

To improve growth prospects, productive investments should be targeted toward higher-potential areas and should complement existing area comparative advantages. The World Bank's proposed Zambia Agricultural Development Support Project (ADSP) takes this approach. However, productive investments should be paired with targeted efforts to help disadvantaged households participate in rural areas. Barriers such as limited education, poor access to markets, small holdings of low-productivity agricultural lands, etc. need, however, to be addressed through concerted public action.

The high reliance of rural households on agricultural and related income means that any strategy will have to build on the agricultural sector. Forward and backward linkages associated with agricultural production and marketing can be a strong source of broad-based growth. Past performance of the sector has been inconsistent, but several bright spots exist, including non-traditional exports. As with other strategies, an agricultural strategy needs to be differentiated across space.

Broad-based agricultural growth is constrained by absence of technologies for labor productivity enhancements, poorly functioning input and output markets, weak institutions for technical assistance and broader information about markets, degradation of natural resources such as water and soil fertility, and others. The extent to which agricultural growth will lower rural poverty depends on how these critical shortcomings are addressed. Spatial heterogeneity clearly indicates that the agricultural strategy that is most appropriate for Region II is different from the strategy for Regions I and II

Natural resource management is often treated separately in policy discussions from more specific agricultural programs. However, natural resource management is closely linked to agricultural

productivity. Without environmental improvements, agricultural growth will be limited, especially in areas of higher population density. Management of common resources requires group participation and agreement. Agricultural development projects can be designed to stimulate group formation for production and marketing; the same group structures could be exploited to promote community-based natural resource management. Natural resource management is broader in scope than agricultural projects and could be incorporated into efforts to support governance and decentralization.

#### *Social Protection for Low Potential Areas and Households*

For low potential areas characterized by poor soils and chronic water deficits, there is a need to be realistic about expectations from the agricultural sector. There is a need to identify regions, communities and households with extremely limited prospects for directly benefiting from economic growth and that are vulnerable to major risks. Large-scale water management systems might benefit these areas in the medium to longer term, but in the short term smallholders should be encouraged to adopt appropriate water efficient and drought resistant farming systems that combine crop and livestock production. Clearly in these areas rural communities need to develop plans for sustainable natural resource management. Different types of investments, institutions and instruments are needed to assist the poorest. Thus, it is important to identify the rural population whose asset bases prevent them from being able to take advantage of growth opportunities and will depend, to a large extent, on transfers and other types of assistance (e.g., elderly, infirm, disabled).

For low potential households that lack a healthy adult capable of contributing labor for farming activities (usually as a result of HIV/AIDS or other illness shocks), there is a need for direct nutritional assistance, especially for children, and other types of social protection programs over an extended period. For example, the World Food Programme's (WFP) "Food for Assets" program provides school-feeding, supplementary feeding and support to HIV/AIDS affected households with the overall objective of strengthening the capacity of hungry poor families to meet their food needs and withstand economic shocks and natural disasters. In contrast, households with healthy laborers might be through a program that provides inputs or cash to smallholders in payment for part-time or temporary labor on rural infrastructure (Parker and Mwape, 2004).

#### *The Dynamics of Change: Moving Forward and not Backsliding*

Market and trade liberalization during the 1990s created new opportunities for Zambian farmers. But it also led to many new challenges and revealed the . More realistic expectations about the possibilities for smallholder transformation are needed. As Whiteside (1998, p.1) noted: "Donors and governments need to recognize that to achieve sustainable increases in agricultural productivity will take decades, not years." Improved research and extension based on the assets held by smallholders and the new policy regime are needed, including a "basket of choices" that consider smallholder farming systems and off-farm opportunities. Investments in transport and communication infrastructure can help lower transaction costs.

There is need for short-term interventions to help poor smallholders make this transformation, since the constraints they face will take time to overcome. Targeted short-term interventions for rural poverty reduction and social protection, such as public works, soil fertility improvements, and other forms of safety nets and social funds are options. Market and trade liberalization in Zambia were unsuccessful because of the hasty elimination of the public marketing systems, private-sector weaknesses, inappropriate incentive structures, and the lack of infrastructure in rural areas. Furthermore, rural Zambians who had become dependent on public-sector marketing systems did not have the requisite human and social capital to deal with the new realities.

As noted in a recent publication by the Institute for Development Studies (IDS, 2003, 22-24) "... making the playing field more level is an important prerequisite for effective pro-poor policies.... It is important to look at how the poor markets, and gain the capacity to engage with some strength in markets, important contributing factors highlighted by the case studies include: access to capital,

gaining new skills (from marketing to business experience), building social and commercial networks, the existence of NGO ‘facilitators,’ and logistical support (from roads to mobile phones. Thus, overall, adding a pro-poor component to market oriented policies is not an easy game. Markets are highly politicized, the playing field is uneven, and, without regulation and protection, poor communities are vulnerable to potential exploitation. Without attention to improving the capacity of poor people to engage in markets – through active state support and redistributive measures – the ideals of ‘pro-poor growth’ and ‘private sector partnership’ for development will remain more rhetorical gloss than reality.” This points to the need for a more comprehensive and holistic approach to rural development is needed, not just an agricultural or commodity-specific strategy. It is also critical to consider the dualistic nature of the agricultural sector, and possibility to think in terms of specific smallholder strategies.

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**Table 2.1: Typology of Agricultural Producers in Zambia**

	Approx. # of Producers	Approx Farm Size	Technology, Cultivation Practice	Market Orientation	Location	Major Constraints
Small-Scale Producers	800,000 hhs	< 5ha (with majority cultivating 2 or less ha of rain-fed land)	Hand hoe, minimal inputs, household labor	Staple foods, primarily home consumption	Entire country	Remoteness, seasonal labor constraints, lack of input and output markets
Emergent Farmers	50,000 hhs	5 - 20 ha	Oxen, hybrid seed and fertilizer, few with irrigation, mostly household labor	Staple foods and cash crops, primarily market orientation	Mostly line-of-rail (Central, Lusaka, Southern Provinces), some Eastern, Western Provinces	Seasonal labor constraints, lack of credit, weak market information
Large-Scale Commercial Farms	700 farms	50 - 150ha	Tractors, hybrid seed, fertilizer, some irrigation, modern mang., hired labor	Maize and cash crops	Mostly Central, Lusaka, Southern Provinces	High cost of credit, indebtedness
Large Corporate Operations	10 farms	1000+ ha	High mechanization, irrigation, modern mang., hired labor	Maize, cash crops, vertical integration	Mostly Central, Lusaka, Southern Provinces	Uncertain policy environment

Source: Siegel and Alwang (2004).

**Table 2.2: Estimated Shares (percent) of Zambian National Agricultural Production by Type of Producers**

	Small-Scale (%)	Emergent (%)	Commercial (%)	Corporate (%)
Maize	60	15	25	
Sorghum	90	8	2	
Soybean	20	10	70	
Wheat	5		30	45
Groundnuts	85	10	5	
Cotton	98		2	
Coffee	5		45	50
Sugarcane	40		60	
Tobacco	60		40	
Milk	20		30	50
Poultry	10	20	20	50

Source: World Bank (2003b, p.67)

**Table 2.3: Major Agro-Ecological Zones of Zambia and Agricultural Potential**

	Provinces Covered	Rainfall	Soil Quality, Agricultural Potential	Growing Season	Major Agricultural Activities	Agricultural Potential	
						Crop Potential	Livestock Potential
Region I	Southern parts of Western and Southern Province	600-800mm	Soils: Shallow Sands	80-120 days	Maize limited by rainfall. Sorghum, millet, sunflower, cassava, cotton, tobacco. Livestock limited by tse-tse fly.	Poor	Limited by existence of tse-tse fly and trypanosomiasis
Region II	Most parts of Central, Eastern, Lusaka, Southern Provinces	800-1000mm	Soils: Moderately leached sandy loams	100-140 days	Maize, groundnuts, and wide range of crops and livestock.	Good	Absence of tse-tse fly and trypanosomiasis
Region III	Northern, Luapala, Copperbelt, Northwestern Provinces	1100-1700mm	Leached and acidic sands	120-150 days	Maize, bananas, coffee, tea. Limited by high acid soils.	Moderate	Limited by existence of tse-tse fly and trypanosomiasis

Adapted from: Siegel and Alwang (2004).

**Table 2.4: Distribution of Rural Households, Poor Rural Households, Land per Household and Agricultural Activities, by Province**

Province	Number of Rural Households	% Share of Rural Households	% Share of Poor Rural Households	Ha per Household	% Households Engaged in		
					Crops	Livestock	Poultry
Central	70916	8.7	11.1	3.23	94.3	29.1	80.7
Copperbelt	34540	4.3	5.6	3.18	99.4	18.0	67.7
Eastern	188592	23.0	18.1	2.20	98.9	45.4	67.7
Luapula	106661	13.1	11.1	2.61	98.1	17.9	62.9
Lusaka	17265	2.1	4.2	1.98	100	22.4	62.2
Northern	136538	16.6	20.8	6.54	97.6	28.5	67.4
Northwestern	50379	6.1	8.3	1.70	99.4	17.6	48.0
Southern	110810	13.5	12.5	2.40	94.9	48.7	84.4
Western	102743	12.6	8.3	1.75	99.5	18.7	64.6
<b>Zambia</b>	<b>818445</b>	<b>100.0</b>	<b>100.0</b>	<b>3.05</b>	<b>97.8</b>	<b>31.3</b>	<b>68.6</b>

Source: CSO [2001], Preliminary Report of Census 2000, 1999/2000 PHS Data, p.15.

Note: % Share of Poor Households is from Demombynes (2004), table 5.

**Table 2.5: Major Smallholder Crops in Zambia 2000 – 2002 and Distribution by Province**

Crop	Average Area Harvested (ha)	Major Producing Provinces and National Share of Production (%)		
Maize	500,000	Eastern (32%)	Southern (29%)	Central plus Copperbelt (22%)
Cassava	165,000	Northern (50%)	Luapula (37%)	
Groundnuts	135,000	Eastern (32%)	Northern (20%)	Southern (14%)
Millet	65,000	Northern (56%)	Western (18%)	Eastern plus Central (17%)
Seed cotton	55,000	Eastern (64%)	Northern (4%)	Southern (3%)
Mixed beans*	45,000	*	*	*
Sorghum	35,000	Northern (21%)	Southern (19%)	Central & Western (14% each)
Sunflower Seed	18,000	Eastern (32%)	Central (16%)	Southern (12%), Northern (5%)
Sweet Potato*	3,500	*	*	*

Notes: Numbers are rounded-off approximations.

\* Mixed beans and sweet potato are grown in all provinces, land cultivated unknown..

Sources: Government of Zambia (2000); FAO-Agstats (website)

**Table 2.6: Characteristics of Rural Households by Land Per Capita and by Income Per Capita**  
(data by land quartile in regular print, data by income quartile in bold print)

	Average	Quartile			
		1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>
HH land access (ha)	2.81	0.79	1.61	2.68	6.16
	<b>2.76</b>	<b>2.27</b>	<b>2.65</b>	<b>2.99</b>	<b>3.12</b>
HH members (#)	5.78	6.79	6.11	5.55	4.69
	<b>5.9</b>	<b>6.3</b>	<b>6.0</b>	<b>5.8</b>	<b>5.3</b>
HH per capita land access (ha)	0.58	0.12	0.26	0.49	1.46
	<b>0.56</b>	<b>0.42</b>	<b>0.48</b>	<b>0.58</b>	<b>0.75</b>
Female headed HHs (%)	23.8	27.7	22.6	21.8	22.1
	<b>24</b>	<b>31</b>	<b>28</b>	<b>19</b>	<b>17</b>
# adults in HH	3.16	3.58	3.25	3.07	2.73
	<b>3.24</b>	<b>3.34</b>	<b>3.25</b>	<b>3.25</b>	<b>3.12</b>
Per capita land rented (ha)	0.21	0.10	0.17	0.29	0.51
	-	-	-	-	-
Per Capita Income (\$ 2000)	62.9	48.2	53.3	65.9	84.2
	<b>57.1</b>	<b>8.4</b>	<b>23.6</b>	<b>47.8</b>	<b>151.0</b>
Crop income Share (%)	67.2	57.2	69.5	69.2	72.8
	<b>69.3</b>	<b>75.7</b>	<b>75.7</b>	<b>72.8</b>	<b>53.2</b>
Livestock Income Share (%)	4.4	4.3	4.8	4.2	4.3
	<b>3.4</b>	<b>3.0</b>	<b>3.0</b>	<b>3.9</b>	<b>3.8</b>
Off-farm Income Share (%)	28.4	38.5	25.7	26.6	22.9
	<b>27.3</b>	<b>21.3</b>	<b>21.3</b>	<b>23.7</b>	<b>43.0</b>
<i>Of which:</i>					
Remittances (%)	5.2	5.5	4.3	4.8	6.0
	<b>5.7</b>	<b>10.7</b>	<b>5.9</b>	<b>3.7</b>	<b>2.9</b>
Business Income (%)	13.8	16.4	12.6	14.0	12.3
	<b>14.8</b>	<b>8.7</b>	<b>12.7</b>	<b>14.3</b>	<b>23.0</b>
Salary, Wage Income (%)	6.7	11.6	6.3	5.6	3.5
	<b>6.1</b>	<b>1.6</b>	<b>2.3</b>	<b>5.0</b>	<b>15.0</b>
Ag Wage Labor (%)	2.7	5.0	2.4	2.2	1.1
	<b>2.4</b>	<b>29.4</b>	<b>21.0</b>	<b>1.7</b>	<b>3.1</b>
Small farm wage (%)	1.3	2.1	1.3	0.9	0.7
	<b>1.3</b>	<b>2.6</b>	<b>1.3</b>	<b>0.8</b>	<b>0.7</b>
Large farm wage (%)	1.4	2.9	1.1	1.3	0.4
	<b>1.0</b>	<b>0.1</b>	<b>0.4</b>	<b>1.0</b>	<b>2.5</b>
Value of Livestock and Equipment per capita (\$ 2000)	39.3	24.9	37.5	39.0	54.6
	<b>38.5</b>	<b>13.7</b>	<b>23.5</b>	<b>37.0</b>	<b>75.8</b>

Sources: The data are from two linked surveys undertaken in the 1999/2000 crop year by CSO. The CSO Post-Harvest Survey contains over 6,000 households. The data are mostly for smallholders, with some medium-scale farmers, but no large farmers. See Jayne, *et al* (2001, p.25 and p.36)

Table 2.7

**Crops by Quintile, Rural Households**  
**Percentages of Households Growing Each Crop**

	Quintile of National Distribution					
	All	Poorest 20%	2	3	4	Richest 20%
<i>At least one food crop</i>	94	96	95	93	88	93
Local maize	59	54	63	64	62	53
Hybrid maize	20	11	16	19	22	28
Cassava	37	49	42	37	32	27
Millet	15	22	18	15	12	11
Rice	5	4	5	3	5	7
Mixed beans	14	16	16	15	14	11
Soya beans	2	3	3	3	2	2
Sweet potatoes	30	30	34	31	29	26
Irish potatoes	2	2	2	1	1	1
Groundnuts	39	38	43	46	38	31
Sorghum	8	8	9	6	8	8
<i>At least one non-food crop</i>	14	9	14	17	15	13
Cotton	9	7	7	11	10	9
Tobacco	1	1	2	2	1	1
Sunflower	4	3	5	6	4	4
Paprika	0	0	0	0	0	1
Flowers	0	0	0	0	0	0

Figure 2.1 Map of Zambia's Agro-ecological Zones (from Parker and Mwape, 2004)

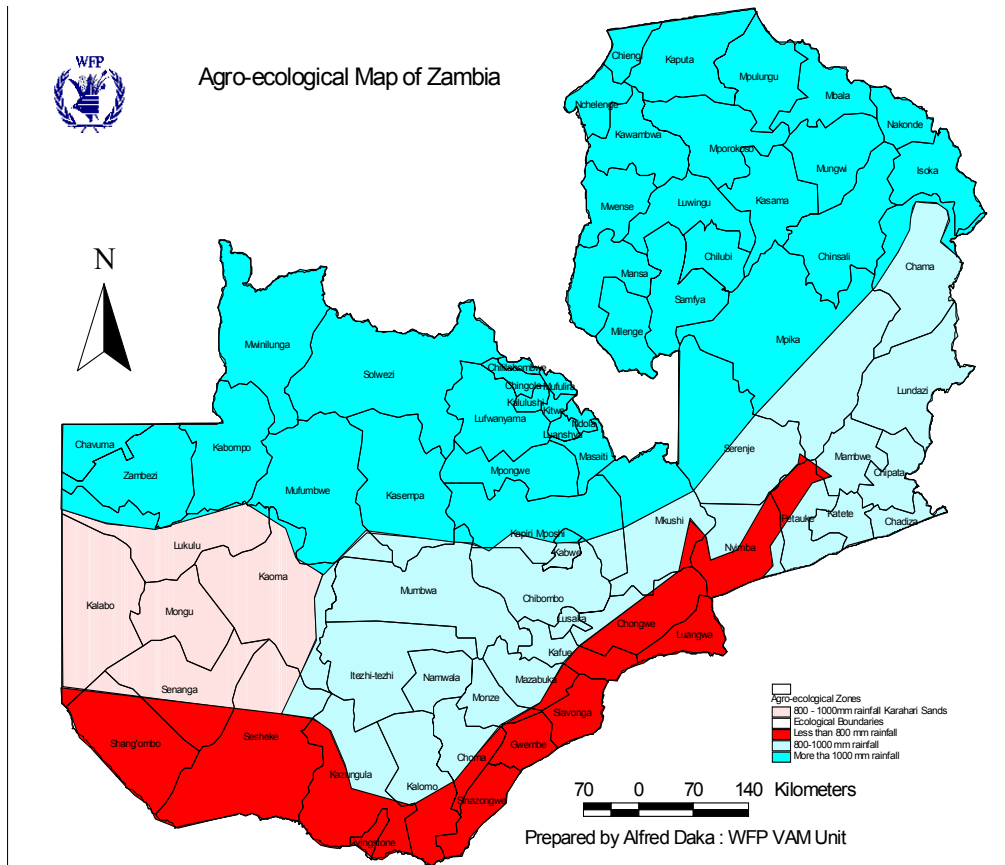
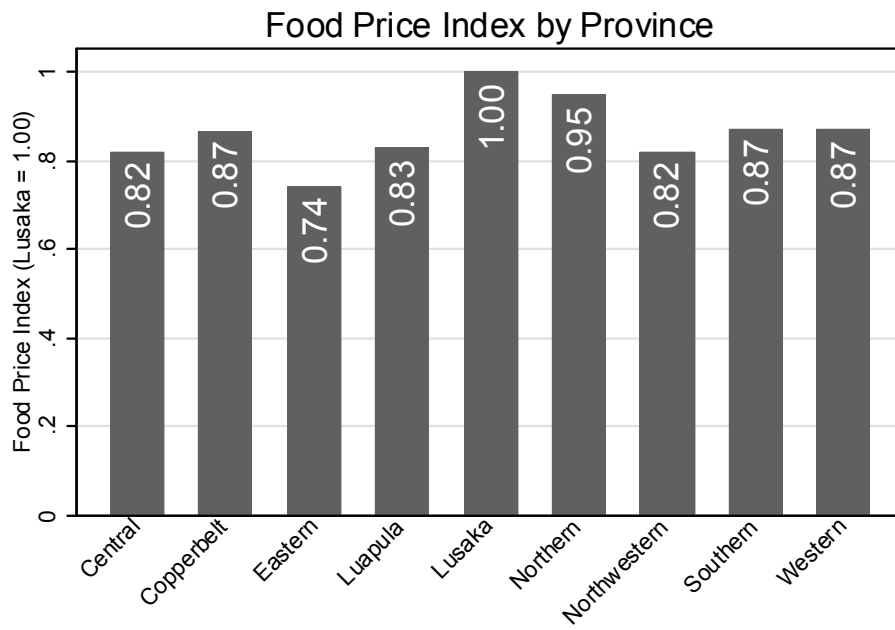


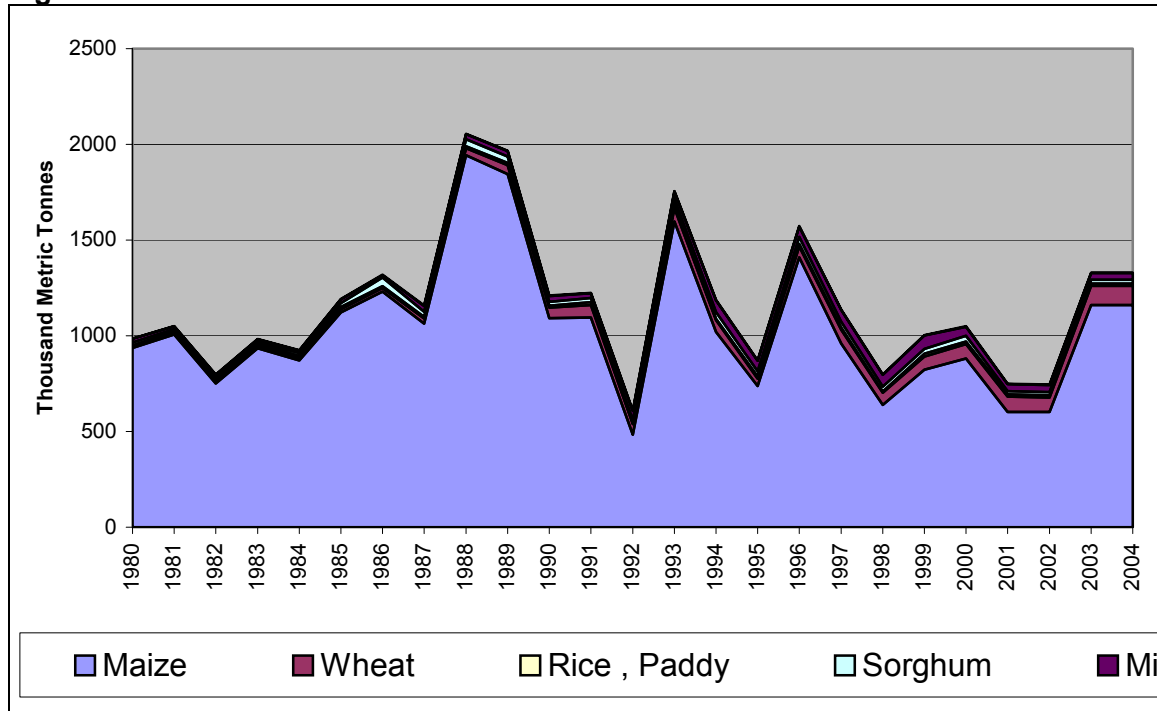


Figure 2.2



Source: Demombynes (2004).

Figure 3.2: Total Cereal Production in Zambia - 1980-2004



Source: FAOSTAT (from del Carlo, 2005)

So

## ANNEX 1: The Asset-Based Conceptual Framework<sup>23</sup>

Below is a brief overview of the asset-based conceptual framework and its components. The asset-based conceptual framework includes: *assets* that households can access (productive, social, location-specific), the *context* (policies, institutions and risks), household behavior (or *livelihood strategies*), and *outcomes* (measures of household well-being). Household and community decisions determine outcomes such as household well-being, environmental preservation, and community prosperity. The potential for assets to generate household well-being depends on the asset-context interface. That is, policy and institutional reforms and the building and enhancement of assets need to be considered in tandem, along with the management of risks and the maintenance and protection of assets. See figure A.1.

A household's **assets** consist of the stock of productive, social, and location-specific resources used to generate well-being. See box, below for types of assets. Household assets are drawn from individual, household, community, and national and global levels. Assets include human factors such as age, education and family structure; natural capital; physical capital such as land, equipment, and housing; financial assets; location-specific factors such as access to infrastructure and social services; and social, political, and institutional assets that include social and political networks and the extent of social and political inclusion/exclusion. According to the asset-based conceptual framework, the poor are "asset-poor," have limited assets, hold assets with low welfare-generating potential, and/or are unable to exploit their assets effectively (e.g. due to a lack of well-defined and enforceable property or human rights).

### Types of Assets

*Natural assets* include the quantity and quality of land, water and forest resources, agro-ecological conditions (elevation, slope, climatic factors), and soil conservation investments. *Physical assets* include non-land physical assets such as livestock, machinery and equipment, the household's dwelling and other buildings, and community infrastructure. *Human assets* include size and composition of the household, education levels, training and technical assistance received, and ethnicity. *Financial assets* include savings, credit, transfers (remittances and other cash transfers), and liquid stocks. *Social and political assets* include membership in various types of organizations, participation in collective action, social and political networks and social inclusion, voting rights, and participation in community, local and national elections. *Location-specific assets* are related to the geographical location of the household and include access to population centers, markets, roads and public services, and population density.

Interface with household assets and determine their value, are known as the context.

The **context** in which households operate helps determine the welfare-generating potential of assets and prospects for improved well-being. The political, legal, and regulatory contexts affect how household assets are managed. Exposure to risk is also a part of the context. Risk has both an intrinsic and instrumental cost. Risk creates fluctuations in consumption and lowers household well-being. The instrumental cost of risk is due to its impact on household responses. The costs of risk management include lower growth due to risk-avoidance behavior and risk-reducing activities, and costs associated with coping activities. Domestic and international policies, institutions and markets, and forces of nature shape the context. In response, households allocate their assets and select livelihood strategies to manage risks associated with the prevailing context. In most cases, elements of the context are exogenous to household decision-making. However, household decision-making with respect to which assets to hold and how to allocate them, depend on the asset-context and well-being objectives.

The opportunity set for households to achieve different levels of well-being depends on the interface between assets and the prevailing context. Strategic management of asset portfolios to achieve well-being defines a household's **behavior** or **livelihood strategies**. Livelihood strategies refer to activities such as land and labor use decisions, investments in education, migration, participation in

<sup>23</sup> Source: Siegel (2005), Siegel and Alwang (1999).

social capital building and other assets. Asset holdings determine the ability to undertake a given enterprise and the productivity of resources allocated to that enterprise, while the potential returns depend also on the context. Livelihood strategies include a range of on- and off-farm agricultural and non-agricultural activities.

Ultimately, we are concerned with outcomes that reflect household well-being and prospects for growth over time. The asset-based conceptual framework leads us to consider a variety of measures of household well-being and to use both quantitative and qualitative analyses to capture the complex relationships between assets, context, livelihood strategies and household well-being. In addition to levels and changes in income and consumption, poor rural households are concerned about food security, health status, vulnerability to different risks, empowerment and self-esteem, participation in community affairs, environmental quality, hopefulness toward the future, and others.

Figure A.1: Schematic Presentation of the Asset-based Approach: Asset-Context-Behavior-Outcomes

