MINISTRY OF AGRICULTURE AND RURAL DEVELOPMENT

Directorate of Economics

Research Paper Series

Smallholder Agriculture, Wage Labour, and Rural Poverty Alleviation in Mozambique:What does the Evidence Tell Us?

by

David Tschirley and Rui Benfica

Research Report No. 41
November 2000

Republic of Mozambique

DIRECTORATE OF ECONOMICS

Research Paper Series

The Directorate of Economics of the Ministry of Agriculture and Rural Development maintains two publication series for research on food security issues. Publications under the *Flash* series are short (3-4 pages), carefully focused reports designed to provide timely research results on issues of great interest. Publications under the Research Paper series are designed to provide longer, more in-depth treatment of food security issues. The preparation of *Flash* reports and Research Reports, and their discussion with those who design and influence programs and policies in Mozambique, is an important step in the Directorates's overall analysis and planning mission.

Comments and suggestions from interested users on reports under each of these series help identify additional questions for consideration in later data analysis and report writing, and in the design of further research activities. Users of these reports are encouraged to submit comments and inform us of on-going information and analysis needs.

Carlos Mucavele
National Director
Directorate of Economics
Ministry of Agriculture and Rural Development

ACKNOWLEDGMENTS

MADER/MSU RESEARCH TEAM MEMBERS

Carlos Mucavele, National Director, Directorate of Economics

Danilo Carimo Abdula, SIMA Coordinator

Rafael Achicala, SIMA Technician

Simão C. Nhane, SIMA Technician

Jaquelino Anselmo Massingue, MADER trainee Research and Agricultural Policy
      Analyst

Arlindo Rodrigues Miguel, MADER trainee Research and Agricultural Policy Analyst

Raúl Óscar R. Pitoro, MADER trainee Research and Agricultural Policy Analyst

Pedro Arlindo, Research Associate

Anabela Mabote, Research Associate

Ana Paula Manuel Santos, Research Associate

Higino Francisco De Marrule, Research Associate

Paulo Mole, Research Associate

Maria da Conceição Almeida, Administrative Assistant

Francisco Morais, Assistant

Abel Custódio Frechaut, Assistant

Duncan Boughton, MSU Country Coordinator

Jan Low, MSU Analyst

Julie Howard, MSU Analyst

Cynthia Donovan, MSU Analyst

David L. Tschirley, MSU Analyst

Michael T. Weber, MSU Analyst

TABLE OF CONTENTS

LIST OF TABLES

Smallholder Agriculture, Wage Labour, and Rural Poverty Alleviation in Mozambique:What does the Evidence Tell Us?

David L. Tschirley
Rui Benfica

ABSTRACT

This paper challenges the conclusions of earlier writers regarding the roles of smallholder agriculture, commercial agriculture, and wage labour in rural poverty alleviation in Mozambique. We review literature from across Sub-Saharan Africa and use recently collected household level data sets to place Mozambique within this literature. Results show that, as in the rest of SSA, wage labour earnings are concentrated among the best-off rural smallholders; these earnings increase income inequality rather than reducing it. Results also suggest that the same set of households, who are substantially better-off than others, has tended to gain and maintain access to the "high-wage" end of the labour market over time. Key determinants of access to "high-wage" labour are levels of education and previously accumulated household wealth. Income from wage labour plays a key role lifting out of relative poverty those female-headed households that can obtain it, yet only about one in five such households earns wage income. We stress that the rural development question in Mozambique, and elsewhere in SSA, should not be framed as an artificial choice between promoting wage labour opportunities *or* commercial agriculture *or* smallholder agriculture. The issue is what mix of approaches is needed to develop a diversified rural economy with growing total incomes, improving food security, and rapid reductions in poverty. We suggest that commercial agriculture and increased rural wage labour are important components in any such strategy, but that this strategy will fail without substantial and sustained increases in the productivity and profitability of smallholder agriculture.

I. INTRODUCTION

Third World poverty has once again caught the attention of the Western world. Poverty alleviation is now on the top of the agenda for nearly all multilateral and bilateral donor agencies. The World Bank's *Country Strategy Paper* has been replaced with a *Poverty Reduction Strategy Paper*, and its much anticipated and debated World Development Report 2000/1 focuses on attacking poverty. The controversy surrounding this report, and the draft report itself, suggest that there is little agreement within the Bank about what strategies to adopt in fighting poverty.[1] At the same time, disparate but increasingly vocal and influential groups have arisen to strongly criticize the Bank and other "Bretton Woods Institutions" (especially the IMF and WTO) for perpetuating poverty rather than reducing it. While these controversies are perhaps not surprising, given the enormity of the topic and the historical and political baggage it carries, they underscore the difficulties facing Developing Country governments and civil society as they try to develop coherent strategies to reduce poverty.

Given the large share of agriculture in the economies of nearly all non-oil exporting Developing Countries, a key decision that they and their donors all face is how high a priority to accord agriculture. Beyond this sectoral decision, countries must decide how to prioritize within the agricultural sector between smallholders, medium- and larger-scale farmers, and ag industry. Though Agricultural Economists have for four decades argued the importance of investment in agriculture for the *structural transformation* of the economy and thus, by implication, for poverty reduction (Johnston and Mellor, 1961; Nicholls, 1964; Johnston, 1970; Timmer, 1988), governments and donors have not been easy to convince. Agriculture's share in total bilateral aid flows from OECD countries fell from 13.2% in 1987 to 7.3% in 1998, continuing a secular trend which started earlier (Kruger, et al., 1989, p. 100; OECD, 2000). Many Developing Country governments, faced with urgent demands from many sectors, and often given to a continuing view that agriculture is a passive sector from which resources need to be extracted[2], invest more heavily in industry and physical and social infrastructure than in agriculture. Even when the need for investment in agriculture is appreciated, the difficulties of investing seriously in *smallholder* agriculture - physical isolation, generally poor organization, low levels of education - are daunting and often lead to a focus on medium-scale agriculture and ag industry rather than on the smallholder sector. A common conviction that the way out of poverty for rural households is through off-farm activities, including migration, and not smallholder agriculture, reinforces this tendency (see Reardon, et al, 1999, Haggblade, et al, 1989, and de Janvry and Sadoulet, 1999, for perspectives on this issue).

Mozambique is one country that has bucked this trend. Since ending its 15 year civil war in 1992 and holding successful democratic elections in 1994, the country has transformed its approach to economic development. After a more than decade-long experiment with state-led Socialist models, the country began in 1987 to liberalise its economy in line with standard World Bank/IMF stabilization and structural adjustment recommendations. The pace of liberalization picked-up with the end of the war in late 1992 and the 1994 elections; in agriculture, the country has now eliminated nearly all fixed prices, slashed support to the cereals marketing parastatal, and ended restrictions on external trade for most commodities.[3] The country's macroeconomic performance during the liberalization period has been exceptional, with low and stable inflation, falling interest rates, and some of the highest economic growth rates in Africa. Yet this growth started from an extremely low base[4] and occurred during the first peaceful period in 15 years,

1

making it difficult to determine the relationship between the growth and the new economic policies that the country has pursued.

The abandonment of the Socialist development model included the dissolution of large-scale state farms, and a renewed emphasis on development of the smallholder sector. State and donor investments in agriculture go almost entirely to improving services for this sector, and many large-scale private investments have been approved because they will partner directly with smallholders, typically as outgrowers of cash crops. Cotton outgrower schemes in Nampula, Cabo Delgado and Zambêzia provinces are the best known but not the only examples of large private capital being enlisted in the cause of the smallholder sector.

In an earlier issue of *Journal of Modern African Studies*, Christopher Cramer and Nicola Pontara ('... what's missing from the debate?' 1998) strongly criticise what they consider this undue emphasis on smallholders, both in the academic literature on Mozambique and in the country's rural development and poverty alleviation strategy. CP suggest that this strategy should instead focus on 'the expansion of private sector agriculture ... including those with perhaps only 10 hectares and up ... and large and high-profile commercial enterprises ...' (p 138). Throughout their paper, they highlight the key role that they claim wage labour and rural-rural migration play in the income strategies of the poorest (especially female-headed) rural households, and suggest that growth in these off-farm opportunities will be a prime determinant of the rate of rural income growth and poverty reduction. According to CP, '... failure to pay sufficient analytical and policy attention to rural wage employment and rural-rural migration could have severe consequences for the most vulnerable segments of Mozambican society, especially those with least chance of reproducing their families without access to off-farm labour income' (p. 104).

CP raise important issues regarding the relative emphases in Mozambique's development strategy. They are correct in pointing out that research has cast little light on the role of wage labour in rural income strategies; we know of no empirical study that has explicitly focussed on the issue. Indeed, the paucity of empirical data in CP's own paper suggests strongly that this area requires greater analytical attention. Their criticism of perhaps the central tenet of Mozambique's development strategy - that rural development and poverty alleviation require a dramatically more productive smallholder sector - also demands a measured response from anyone interested in the future of Mozambique. The abundance of rural household level data in Mozambique means that this response can, and indeed must, be based on solid empirical knowledge of the rural economy.

It is our contention that both CP's empirical assessment and their policy recommendations are deeply flawed. Specifically, we contend that their argument to focus agricultural development efforts exclusively on larger (by Mozambican standards) farmers while relying on wage labour to pull the rest of the rural population out of poverty ignores at least three key facts:

1.   The broad empirical findings throughout rural Africa (including Mozambique) that poor farm households have least access to high paying wage labour, so that off-farm incomes tend to increase income inequality; and the long period of time it will take to change the conditions that create this relationship,

2.	The widely recognized linkages between farm and non-farm growth in rural areas of Africa, and the difficulty of spurring non-farm growth without a dynamic agriculture, and

3.	The very large proportion of the rural population that would be excluded from an agricultural development strategy which focuses only on households with more than 10 ha,

The next three sections of this paper will examine each of these issues. Section II will review the empirical literature on the relationship at the household level between off-farm income and total income, and will use data from Mozambique to show how it fits into these findings. Section III will do the same for the issue of farm/non-farm growth linkages. Finally, section IV will present information on the distribution of land holdings in Mozambique to show what proportion of the rural population would be excluded from an agricultural development strategy that focuses on households with more than 10 ha. We will close with suggestions that we hope will provide a more balanced and empirically valid set of guidelines for evaluating Mozambique's rural development and poverty alleviation strategies.

Data for the analysis come from a survey of 960 rural households carried out by Michigan State University in collaboration with NGOs working in the provinces of Nampula, Zambêzia, Sofala and Manica. The survey instrument included information on household demographics, all economic activities of the household (allowing calculations of household income and all its components), market behavior including purchases and sales, and household assets. The sample was designed to be representative of all of Nampula and Zambêzia, and northern Sofala and Manica. Results should thus be taken as representative of the centre and northern regions of the country, but *not* of the southern region, which has vastly different agroecological and socio-economic characteristics. See Tschirley et al. 1999 for more detail on the survey methodology.

II. RURAL WAGE LABOUR MARKETS AND INCOME INEQUALITY

Can wage labour be relied upon to help pull the poorest segments of rural Mozambican society out of poverty? In two reviews of findings in 18 countries of SSA, Reardon (1997) and Reardon et al. (1999) find strong evidence of a positive relationship between total household income and the level and income share of off-farm earnings. They conclude that better-off households in SSA generally have better access to off-farm earnings and that these earnings therefore increase income inequality rather than reduce it. These findings contrast with Latin America, where a negative relationship is most common (poor households tend to rely more on the wage labour market than better-off households), and Asia, where evidence is mixed.

Previous findings in Mozambique are consistent with the picture for the rest of SSA. In a 1991 survey of 343 households in three districts of Nampula province, Tschirley and Weber (1994) found that both the absolute value and the income share of off-farm earnings increased with total household income in all three districts. Data from a 1994/95 study of over 500 households in intensive cotton growing areas of Nampula and Cabo Delgado provinces found that wage labour earnings of households in the upper per capita income tercile were more than double those of the lowest tercile households, though the income share was somewhat higher in the lowest tercile.[5] This result obtained despite the fact that upper tercile households were nearly three times as likely to produce cotton, a crop which competes directly with wage labour opportunities due to

its own high labour requirements. Despite this, and despite upper income households having slightly fewer adult members, these households earned more money in wage labour than did their low income neighbours.

We update the place of Mozambique in this debate by presenting empirical information from 1998 on three issues: 1) who engages in rural wage labour and how are they different from households that do not earn such income?, 2) what types of wage labour are most common and what are the characteristics of each type? and 3) what is the relationship between wage labour income and total household income and wealth? Findings strongly suggest that wage-earning households are better-off than non-wage households, and that the same households tend repeatedly to gain access to the high-wage end of of the labour market. These empirical patterns suggest that it will be very difficult to use wage labour markets as a policy tool to alleviate poverty.

Who engages in wage labour?

Roughly one-quarter of surveyed households in 1998 had at least one member that earned income through wage labour (Table 1). Households earning such income tended to be of larger size, were slightly less likely to be female-headed, and generally attained higher levels of education than households that did not report earning any wage income. Wage earning households held and cultivated similar amounts of land compared to non-wage households, but produced a greater value of food crops, and were nearly 50% more likely to also produce cash crops (though the value of production among those producing was less than among non-wage households).[6] Wage-earning households were also somewhat more likely to engage in self-employment activities (micro-enterprises) than were non-wage households, though as in the case of cash crops, those earning income from self employment earned less than did non-wage households who also engaged in such activities. Overall, wage earnings households achieved total per capita incomes 55% above non-wage households.

These results suggest that wage-earning households are better-off than non-wage households, but it is not clear whether this difference is specific to the year in which the data were collected (wage-earning households had higher incomes *because they happened to earn these wages*), or whether longer-term factors are at work. This is a key issue which will be returned to later in this section.

Types and characteristics of wage labour

Table 2 presents selected indicators by the type of wage work and the location of that work. Work is classified as "migratory" if it occurred outside the worker's own village. The four broad classifications of type of work are 1) on a smallholder farm, 2) on the farm of a *privado*, a Portuguese term indicating a private commercial farmer, 3) on a company farm (e.g., on the fields where cotton companies engage in their own direct production of cotton), and 4) non-agricultural. This final category includes over 20 different activities, but is dominated by masonry and house construction (25%), government service (21%), and teaching (13%). For each combination of type and location of work, the table presents the % of reported labour events[7], the average total earnings during the event, its average duration, and the percent of total wage earnings across all households which accrued to this labour.

Table 1.   Selected Indicators by Wage-earning and Non-wage Earning Rural Households in Central and Northern Mozambique, 1998

Indicator	Households earning wage income	Households *not* earning wage income
% of population	23.2	76.8
Demographics & Education		
Household size	5.6	4.7
% female-headed households	5.1	7.4
% adult females completing EP2[1]	15.7	9.6
% adult males completing EP2[1]	32.6	26.7
% school-age children attending school	62.0	56.0
Agriculture		
Total land holdings, ha	2.7	2.5
Cultivated land, ha	2	1.8
% producing food crops	100.0	100.0
Value of food crop production among those producing (US$)[2]	83.27	71.87
% producing cash crops	29.2	20.3
Value of cash crop production among those producing (US$)	50.94	70.42
Non-farm and Total Income		
% operating a microenterprise	32.3	25.8
Net earnings among those operating an MSE (US$)	60.53	84.09
Per capita income (US$)	70.65	45.53

[1] "Escola primária de segunda classe" - second grade of primary school
[2] All monetary values were first reported in meticais, then converted to US$ at the mean parallel market exchange rate for the period of recall of the survey.

Table 2. Selected Indicators by Type and Location of Wage Labour among Rural Households in Central and Northern Mozambique, 1998

| Type of wage work | Location of wage work | | | | Total |
| | In the village | Outside the village ("migratory") | | | |
		In the province	Outside the province	Outside the country	
Smallholder farm					
% of observations	53.2	6.7	0.8	0.6	61.3
Mean total wage earnings (US$)	24.47	10.86	7.36	69.92	23.06
Mean duration of wage work (days)	21	11	9	87	20
% of total wage earnings	13.9	0.8	0.06	0.4	15.1
Privado farm					
% of observations	5.5	1.5	0.2	0.0	7.3
Mean total wage earnings (US$)	30.61	88.47	36.65	---	43.90
Mean duration of wage work (days)	30	110	27	---	48
% of total wage earnings	1.8	1.4	0.08	0.0	3.4
Company farm					
% of observations	1.2	1.7	0.0	0.1	3.0
Mean total wage earnings (US$)	60.21	493.82	---	98.32	300.96
Mean duration of wage work (days)	69	279	---	125	186
% of total wage earnings	0.8	9.0	0.0	0.1	9.8
Non-agricultural					
% of observations	13.1	13.1	2.0	0.1	28.4
Mean total wage earnings (US$)	249.19	221.05	246.92	185.46	235.71
Mean duration of wage work (days)	189	176	179	137	182
% of total wage earnings	35.0	31.0	5.3	0.2	71.7
Total					
% of observations	73.1	23.1	3.0	0.8	100.0
Mean total wage earnings (US$)	66	171	170	89	93.40
Mean duration of wage work (days)	53	131	124	97	73
% of total wage earnings	51.7	42.3	5.5	0.8	100.0

Several generalizations can be drawn from the table. First, the local farm labour market is the most frequent source of wage employment for rural households, and work on neighboring smallholder farms is, by far, the most common in this category. Nearly three-quarters of all labour events were non-migratory, occurring in the worker's own village, and over half occurred on a neighbouring smallholder farm within the worker's village. Second, work on smallholder farms was generally of short duration (unless it occurred outside the country), and therefore resulted in low total earnings for the worker. Overall, each labour event on smallholder farms lasted only 20 days and earned about US$23. Third, despite these low mean earnings, the high frequency of work on other smallholder farms means that it is the largest source of total agricultural wage labour earnings for smallholders; it generates nearly five times the earnings of work on privado farms, and more than 50% more earnings than work on company farms. Finally, non-agricultural work regardless of location, generally was of much greater duration and earned the worker far higher wages than agricultural work. Migratory work lasted on average from three to over four months, and earned the worker between US$89 and US$171, depending on location. Non-agricultural labour lasted on average about six months, and earned the worker over US$235. As a result of these patterns - frequent labour events lasting a short time in the local farm labour market, much less frequent non-agricultural and migratory labour events

lasting much longer - non-agricultural and migratory labour accounted for disproportionate shares of total wage earnings. Though representing only 28% of all labour events, non-agricultural labour earned nearly 72% of all wages, while migratory labour earned nearly half of all wages despite accounting for only 27% of all labour events.

Both of these results must be considered surprising. Northern Mozambique had some tradition of migratory labour, principally in tea plantations in northern Zambêzia and sugar plantations in Sofala. Yet these labour opportunities disappeared over the course of the civil war, and in any event the tradition of migratory labour was much weaker than in the centre and, especially, the south, where Beira, Maputo, and South African mines attracted thousands of seasonal and longer-term workers from rural areas. Few if any studies have addressed rural labour markets in Mozambique, but the conventional wisdom seems to be that such markets are dominantly agricultural. While this is true in terms of the number of labour events, it is clearly not true in terms of the total amount of time worked and total money earned.

Labour income and total household income and wealth

Table 1 suggested that wage-earning rural households were better-off than non-wage households. Tables 3 and 4 strengthen this conclusion. Most importantly, they suggest that the differences between wage-earning and non-wage earning households are related to wealth as much as to income, and thus are of a structural as opposed to a merely transitory nature.

Examining first the gender of the head of household[8] (Table 3), we see that male-headed households are slightly more likely to earn wage income than female-headed households, and earn more on average from this work.[9] However, per capita incomes among wage-earning female-headed households are nearly identical to incomes among wage-earning male-headed households. This contrasts sharply with the wide income gap between female- and male-headed households over the entire sample. The finding suggests that wage labour is of great importance for those female-headed households that can obtain it, allowing them to close the gap with male-headed wage-earning households and to surpass (by nearly 40%) the incomes of the average male-headed household. Yet the fact remains that only about one in five female-headed households was able to earn wage income.

Regardless of the gender of the household head, households in the upper per capita income tercile[10] are three times more likely to earn wage income than those in the lowest tercile, and earn on average about 15 times more than the lowest income households. Even as a percent of total income, wage labour is most important for higher income households: the share of wage income in total income among upper tercile households is more than double the share in the lowest tercile. These results show clearly that wage labour income is strongly concentrated among high income households.

However, it is not clear from these results whether the higher incomes of wage earnings households during the recall period of the survey were a result simply of their having earned wage income during that time, or whether other characteristics of well-off households drive their greater success in the wage labour market. In other words, do the patterns in Table 3 represent a transitory phenomenon or are they driven by structural conditions which continuously give better-off households greater access to the wage labour market, especially to the high-wage end

Table 3. Selected Wage Labour Indicators by Gender of Household Head and by Per capita Income Tercile

Indicator	Female Headed HHs	Male Headed HHs	Per capita income terciles			Total
			1 (lowest)	2	3 (highest)	
% of HHs earning wage income	19.7	23.5	11.4	24.2	34.1	23.2
Total wage earnings, among those earning	101.59	135.09	15.68	42.60	236.17	133.08
Total per capita income						
HHs earning wage income	70.42	70.66	13.01	33.26	116.30	70.65
All HHs	44.08	51.92	12.36	33.26	108.37	51.37
Wage earnings as % of total per capita income						
HHs earning wage income	29.1	31.2	20.4	20.6	42.8	31.4
All HHs	5.7	7.4	2.3	5.0	14.6	7.3

of that market? If the latter case obtains, then it becomes much more challenging to use wage labour markets as a policy tool to alleviate poverty.

Table 4 suggests that structural conditions are at least partially at work in creating this differential access to labour markets. Income from agricultural activities is similar for households accessing the high-wage end of the labour market (non-agricultural labour and work on company farms) and those accessing only the low-wage end (smallholder and *privado* farms). Households in the high-wage end of the market purchased about twice as many consumer goods during the week prior to the survey compared to households in the low-wage end, but this is consistent with their higher total per capita incomes and does not suggest structural factors at work. The key results are found in the wealth indicators. High-wage households own about twice as many types of household goods, and are about 100 times more likely to have a cement floor and 30 times more likely to have a metal roof in their home, compared to low-wage households.[11] Even non-wage households were more likely to have cement floors and metal roofs than were low-wage households. High-wage households report holding slightly more land than low-wage and non-wage households, though reported cultivated areas are comparable. Ownership of farm implements and of livestock is also comparable between the two groups.

On balance, these results suggest that the total income differentials observed during 1998 between low-wage and high-wage households are driven by differences in off-farm earnings, and have persisted over some years, allowing high-wage households to increase their level of wealth over that time, compared to non-wage and low-wage households. In other words, the evidence suggests that the same set of households has been able to access the better-paying jobs over some time, leading to persistent differences in incomes and thus in accumulated wealth. If this pattern continues, and especially if agricultural productivity is stagnant in the smallholder sector, income inequality will increase over time, driven in large measure by the rural wage labour market. This has important implications for policy, which will be returned to in a later section.

Table 4. Wealth and Income Indicators of Rural Households in Central and Northern Mozambique, by Type of Wage Labour, 1998

Indicator	Type of wage labour earned				
	None	Low wage		High wage	
		Smallholder farm only[1]	Privado farm[2]	Company farm[3]	Non-agricultural[4]
Percent of households	76.3	12.9	1.8	0.6	8.3
Mean total wage earnings (US$)	0	36.14	63.79	484.13	263.22
Income indicators					
Per capita total income (US$)	45.57	52.32	45.06	93.47	101.09
Per capita agricultural income (US$)	40.55	42.03	31.49	39.42	42.41
Number of consumer goods purchased during the past week[8]	2.1	2	1.9	3	3.9
Wealth indicators					
Number of types of household goods owned[5]	2.5	1.8	2.1	4.2	3.8
Percent with cement floor in home	1.7	0.07	0	0	7
Percent with metal roof	1.5	0.1	0.5	0	2.9
Number of types of farm implements owned[6]	2.9	3	3.4	4	3.1
Total land holdings, ha	2.5	2.5	2	3.3	2.9
Cultivated land, ha	1.8	2	1.5	2.6	2
Number of types of livestock owned[7]	0.9	1.2	0.8	1.2	1

Notes: 1) Households with wage income only from smallholder farms, 2) households with wage income from privado farm but not from company farm or non-agricultural source, 3) households with wage income from company farm but not from non-agricultural source, 4) any household with wage income from a non-agricultural source, regardless of other wage income sources, 5) from a list of 12 household goods, 6) from a list of 10 types of farm implements, 7) from a list of seven types of livestock, 8) from a list 17 potential items for purchase.

Interestingly, the fact that high-wage households do not own more livestock nor more farm implements suggests that these households are not generally investing their wage earnings in agriculture. This is perhaps not surprising, given the state of smallholder agriculture in most of Mozambique, with poor marketing infrastructure, extremely limited access to inputs, almost no animal traction in the most productive areas (due to Tsetse fly infestation), and yields that consequently are among the lowest in SSA (Jeje et al. 1999). These findings are, however, contrary to those found in many other SSA countries (Reardon et al. 1994), and deserve further attention to determine whether this pattern can be widely generalized or if there are important exceptions where high-wage rural households *are* investing their earnings in agriculture.

III. FARM/NON-FARM LINKAGES AND THE DETERMINANTS OF WAGE LABOUR EARNINGS

Reardon (1997) and Reardon et al. (1999) discuss the factors that may determine the observed level of off-farm income relative to farm income in Africa, Asia, and Latin America. Haggblade, et al. (1989) discuss the related but more general issue of the determinants of growth in the rural nonfarm economy. We summarize here the most relevant factors, and relate them to conditions in Mozambique.

Zone level determinants

At the level of agroecological zone, two related factors are most important in explaining the level and share of off-farm earnings: the profitability and productivity of agriculture, and the density of population and infrastructure.

Productivity and profitability of agriculture

More profitable and productive agricultural areas generate more off-farm income opportunities, and tend to have less wage-driven income inequality. It is widely recognized in the development literature that the vast majority of wage- and self-employment labour in rural areas is strongly linked to agriculture (Haggblade, et al. 1989; Hazell and Hojjati 1995; Liedholm and Mead 1993; Timmer 1994; Benfica 1998). At least three types of linkages are important.[12]

- ▸ Consumption linkages are based on the fact that most rural enterprises depend on local demand for their products. As a result, the market for the products of rural enterprises - and their contribution to employment growth - will increase very slowly, if at all, without growing incomes in rural areas. While this income growth can come from the farm and nonfarm sectors, in the early stages this growth must be launched by increasing agricultural incomes.

- ▸ Forward linkages emerge when rural enterprises depend on agricultural goods as inputs for their business. Food processing enterprises are a typical example. If there are not steady productivity gains at the farm level, the cost of these inputs will rise relative to other goods in the economy, choking-off growth by these enterprises and reducing their contribution to employment growth.

- ▸ Direct employment linkages exist when local farms hire labour. Table 2 showed that 61% of all labour events in Mozambique in 1998 were on smallholder farms, and that these generated far more income for fellow smallholders than did work on privado or company farms. Thus, growth in this important source of current rural employment depends directly on growth in smallholder agriculture.

Increasing productivity in agriculture also allows the sector as a whole to release labour to the industrial and service sectors, a key feature of agricultural transformation throughout the world (Timmer 1988; Mellor 1986). As agricultural productivity grows, the prices of agricultural products fall relative to those of industrial and service products. These falling relative agricultural prices unleash two effects. First, they increase demand for agricultural products and spur further growth in the sector. Second, they draw less productive farmers (and grown sons

and daughters of productive farmers) out of the agricultural sector and into the industrial and service sectors, as these farmers compare the relative returns in the sectors and decide that they can increase their earnings by leaving agriculture. The key insight in this process is that this release of labour to other sectors does not occur without increases in agricultural productivity.

Timmer (1995) and Dawe (1995) make a strong argument for the importance of a dynamic agriculture in spurring general economic growth and poverty reduction through its effect on human capital. In a review of growth and poverty reduction in 70 countries, they find that "rural human capital is much more important than non-rural human capital in explaining differential growth rates in per capita incomes" (Timmer 1995: p. 465). This human capital can be spurred by direct investments in education and training, but Dawe asserts that:

> '... getting agriculture moving can also make an important contribution in this area. It is an extraordinarily difficult task to manage a group of individuals in a way that maximizes output, and it takes a long time for a country to produce people capable of performing this task ... Learning how to manage hired (or even family) workers to maximize output on a farm provides an invaluable stepping stone for a society learning how to manage workers in a manufacturing environment. To move from a stagnant agriculture, in which little production is for the market and little management of workers is required, directly to a dynamic manufacturing sector, which by necessity employs more workers in a given production unit, is almost inconceivable.' (Dawe 1995).

There is also a direct link between human capital and the level of wages that a rural resident can earn, since the highest paying jobs in rural areas, as anywhere, are high skill jobs. A stagnant smallholder agricultural sector will not be capable of generating these skills among many rural residents, for two reasons. First, a stagnant agriculture will engender much less of the learning-by-doing that Dawe emphasizes. Second, poor smallholders mired in unproductive agriculture will not generate the profits nor the spare time needed to invest in formal education.

From a wide range of perspectives, then, it seems clear that a growing agriculture is the foundation on which growth in the rural nonfarm sector can occur. This statement is most true in the most rural economies, and is the reason for the different patterns found in SSA (with much higher proportions of its population in rural areas and working in agriculture) compared to Latin America and Asia. Mozambique, which is heavily rural and agricultural even by SSA standards, is no exception.

Densities of infra-structure and population

Wage earning opportunities are clearly greater in areas with high densities of population and infrastructure. Haggblade, et al. (1989) found this pattern to hold strongly in Asia and in Nigeria, and Reardon (1997) and Reardon et al. (1999) find it also in their review of studies in Africa. Population density increases the return to investment in physical infrastructure, so the two densities tend to be highly correlated. Physical infrastructure in turn reduces transactions costs and allows greater resource mobility, with investment flowing to the highest returning sectors. These cost reductions also allow the exploitation of resources previously too costly to access, further fueling growth. A given investment in educational facilities yields a higher return in areas of high population density, thus tending to increase the supply of formal

11

education in such areas. To the extent that rural residents have the incomes and spare time to take advantage of these opportunities (both of which will be enhanced by a more productive agriculture), the resulting increase in human capital will also fuel development of the nonfarm economy.

This dynamic helps explain the greater share of off-farm income in total income in Latin America and, especially, Asia, both of which have much higher population densities than SSA. Mozambique has one of the lowest population densities within SSA (Marrule 1998), and rural infrastructure, especially roads and schools, is notoriously poor. While infrastructure can be expected to improve as the country grows and continues to enjoy peace, such change will occur only over a relatively long period of time.

Household Level Determinants

Within a given geographical area, the level of nonfarm earnings will vary greatly over households. Thus, even in areas with high population densities and relatively good physical infra-structure, the question remains of how to ensure that the poorest rural residents can increase their access to the high end of the wage labour market over time. This brings us to issues of the household level determinants of nonfarm earnings.

Table 1 showed that larger households, households with more educated adults (adults having completed *escola primária 2*), and female-headed households were more likely to earn wage income than were other households. Table 4 indicated that wealthier households were more likely to earn wage income, and especially to access the high-wage end of the labour market. These results are suggestive, but suffer from the fact that some of the variables are correlated with each other, making it difficult to sort-out which factors are truly important. For example, households with a larger number of educated adults will tend, on average, to be larger than households with a smaller number of educated adults. This correlation makes it difficult to determine whether it is the level of education, *per se*, or household size, or both, that are actually affecting the household's access to wage labour.

To isolate the effects of the different variables which could potentially be affecting the household's access to wage labour, we conducted a simple econometric analysis which tested the individual contributions of a series of variables to the probability that the household had gained access to the high-wage end of the labour market during the past year.[13] We hypothesized that household educational attainment and previously generated household wealth would both increase this probability. We also controlled for selected household demographic variables. Full results are reported in Appendix A. The analysis provides a number of insights. First, higher levels of education, especially the number of adult males completing EP2, strongly increases the likelihood of the household gaining high-wage employment. Second, wealthier households have a much greater probability of gaining high-wage employment than do poorer households. Third, agricultural assets (as measured by the number of fields the household claims) does not affect this probability. These three results reinforce conclusions tentatively advanced on the basis of Tables 1 through 4, that more educated households and households with more wealth have better access to the high-wage end of the labour market.

Two further results help clarify information in the tables. First, increasing the household's size without adding more educated adults *decreases* the probability of high-wage employment. This

suggests that the high-wage employment found in this sample was not generally remunerative enough to counteract the effects of large margins between purchase prices and sales prices of food in rural markets. These large margins increase the wage rate that is required before it makes economic sense for a rural resident to obtain food through wage labour and cash purchases instead of direct production.[14] Finally, female-headed households *of similar size to male-headed households* are no less likely to obtain high-wage employment. Of course, most female-headed households are much smaller and, on average, are somewhat less likely to obtain such employment.

Summarizing the discussion of wage labour earnings and household wealth, we have shown that:

▸ Households earning high-wage income during the survey period are wealthier than those that did not.
▸ This wealth is not strongly reflected in greater land holdings nor in higher agricultural income, thus suggesting that it came from regular high-wage employment in the past.
▸ This result implies that households that did *not* gain such employment during the survey period (and who are poorer than those that did) were not likely to have had such income in the past.
▸ In other words, the data suggest that the same set of households has tended to gain and maintain access to high-wage labour income over time.
▸ These past earnings are not typically invested in agriculture.
▸ Finally, higher levels of education greatly increase a household's access to high-wage jobs.

IV. THE STRUCTURE OF LAND HOLDINGS IN RURAL AREAS OF MOZAMBIQUE: WHO WOULD BE LEFT OUT BY FOCUSING ON FARMS WITH MORE THAN 10 HA?

Before closing, we highlight the stark fact that nearly every rural resident of Mozambique would be left out of any direct impact from a development strategy that focuses, as CP suggest, on 'the expansion of private sector agriculture ... including those with perhaps only 10 hectares and up ... and large and high-profile commercial enterprises ...' (p 138). Using data from a nationally representative sample in 1996, Table 5 shows that 93% of all rural households hold less than 10 ha, and over 99% of all "smallholder" household hold less than this amount. It is a misnomer to call any strategy that excludes these households "an agricultural development strategy". Such an approach would consign these households, nearly all rural residents, to a stagnant, semi-subsistence agriculture and *force* them to rely on off-farm income to ensure their survival.

Table 5. Structure of Land Holdings in Mozambique

Sector	Area (thousand hectares)	Shares
Entire Rural Sector		--- % of land ---
< 10 hectares	44843431212224850000000	93
>= 10 hectares		7
Commercial Farms		
Large 'Smallholders'		
Total		100
Smallholder Sector Only		--- % of hhs ---
< 10 hectares (2,558,000 hhs)		99.3
>= 10 hectares (18,000 hhs)		0.7

Source: Smallholder data from TIA/96 ("Resultados Revisados, 3/98") ;
Commercial Sector data from MAP/DE ("Estatisticas Agrarias, 1996").

V. CONCLUSIONS AND POLICY IMPLICATIONS

We have shown in this study that rural areas of central and northern Mozambique are much like rural areas in the rest of SSA with regard to the distribution of wage labour income: it is most concentrated among higher income households, both in total value and as a share of total income, and the reasons for this pattern are structural in nature and thus not easily addressed in the short-run. We have also argued, based on extensive research throughout the developing world, that the nonfarm economy will grow faster, and will distribute its income more equally, the more profitable and productive is smallholder agriculture. Finally, we have shown that well over 90% of rural residents control less than 10 ha of land, and have argued that any agricultural development strategy which ignores them will condemn rural Mozambique to a stagnant agriculture, a moribund nonfarm economy, and continuing high rates of extreme poverty.

Wage labour income is clearly important for those households that earn it. This is especially striking in the case of the 20% of female-headed households whose wage earnings allowed them to raise their incomes well beyond average and to parity with male-headed wage earning households. Yet even the "high-wage" households in our sample must be considered poor by any objective standard, and only their wage labour raised them out of the even more extreme poverty of their neighbours.

The importance of wage labour will only grow in rural Mozambique over time, as population densities increase, as physical infra-structure is improved, and as rural towns grow and become providers of services and centres of demand for rural areas. Yet the rate and structure of this growth can be influenced by policy, and both will have profound effects on the rate of rural poverty alleviation.

The most obvious policy "lever" suggested by this study to increase the access of the poor to wage labour is rural formal education. By increasing the literacy and related skills of the rural

population, education will give a greater share of that population access to the high-wage end of the rural and migratory labour market. How investment in education takes place is important in terms of its distributional effects. Handa and Simler (1999) find that geographically targeted expansion of the supply of primary education (building more schools in villages that currently do not have them) is the most efficient means, in an economic cost-benefit framework, of attaining the country's educational goals. They suggest also that such an approach is most consistent with the prevalent "political philosophy which stresses equity of educational opportunity, including reaching into remote areas that are typically at the fringes of government service provision" (p. 17).

Findings in this paper suggest that increasing the supply of education in this way could help level the playing field in terms of access to high-wage employment. Yet a key determinant of the *demand* for schooling is household income (World Bank, 2000),[15] and in a rural economy such as Mozambique's the bulk of that income for the great majority of households comes now, and will continue to come for some time, from agriculture (see Table 3). Rural Mozambicans, the vast majority of whom are smallholders, will require growing incomes from agriculture (and other sources) if an educational policy focused on increasing the availability of schooling is to be effective.

Cramer and Pontara suggest that investment in commercial agriculture and in "high-profile commercial enterprises" in rural areas should be prioritized in Mozambique's rural development and poverty alleviation strategies. Indeed, such investments have significantly improved the incomes and food security of many rural residents in Mozambique.[16] Yet their importance for the smallholder sector lies less in the direct employment they offer than in the assistance they provide for the production and marketing of cash crops. For example, the Lomaco cotton growing operation in Montepuez district of Cabo Delgado province (immediately north of Nampula province and within the same 'cotton belt') employs 650 full-time workers and 1,500 seasonal laborers, while providing inputs on credit and purchasing the cotton production of 62,200 farm households in 1998/99. Total remuneration to all full-time workers is about US$657,000, while the group of seasonal laborers earn about US$411,000. At average prices, yields, and area planted over the past 5 years, total annual profits to the smallholder cotton growers are about US$4.3 million. While the increased wage labour opportunities are important and beneficial, clearly the most important effect of these investments is to increase the profitability of smallholder agriculture.

CP sound an important warning regarding the potential cost of attempting to secure 'highly productive smallholder farming across the whole of the country' (p. 137), and suggest that policy makers and donors need to look carefully at the marginal benefit of each investment dollar across various sectors. Yet government and donors have, in fact, adopted a diversified approach to rural development. Most support for smallholder agriculture goes to the zones with greatest agro-ecological potential; large amounts of donor support go to training and support for micro-enterprises; the government has been quite receptive to large-scale private investment in agriculture; and it has been increasingly willing to target its extension assistance more carefully and to stretch these resources through collaboration with the private sector.

The rural development question in Mozambique should not be framed as an artificial choice between promoting wage labour opportunities *or* commercial agriculture *or* smallholder agriculture. The issue is what mix of approaches is needed to develop a diversified rural

economy with growing total incomes, improving food security, and rapid reductions in poverty. We suggest that, while commercial agriculture and increased rural wage labour are important components in any such strategy, this strategy will fail without substantial and sustained increases in the productivity and profitability of smallholder agriculture.

Appendix A

Dependent Variable: 0 (did not earn high-wage labour income) or 1 (did earn high-wage labour income.

Independent variables:

nomale	indicates female-headed household by "no adult male present" definition
nmem	number of resident members in household
ep2male	male head of household completed ep2
ep2fem	female spouse or head of household completed ep2
epchild	number of children who completed ep2
nmach	number of fields the household cultivated
nbens	number of types of household goods household owns
chaocim	0 (household did not have cement floor) or 1 (household did have cement floor)
zinco	0 (household did not have metal roof) or 1 (household did have metal roof)
cons	is the regression constant term

```
Logit estimates                             Number of obs   =       342
                                            Wald chi2(9)    =     39.22
                                            Prob > chi2     =    0.0000
Log likelihood = -180.31271                 Pseudo R2       =    0.2057
------------------------------------------------------------------------
             |              Robust
    highwage |    Coef.    Std. Err.     z     P>|z|   [95% Conf. Interval]
-------------+----------------------------------------------------------
      nomale |  .0602256   .7054477    0.085   0.932   -1.322426   1.442878
        nmem | -.1760064   .1059161   -1.662   0.097    -.383598   .0315853
     ep2male |  .6148478   .3379187    1.820   0.069   -.0474606   1.277156
      ep2fem | -.1420751   .3704404   -0.384   0.701   -.8681249   .5839747
     epchild | -.0906005   .1870816   -0.484   0.628   -.4572736   .2760726
       nmach |  .0509351   .1067166    0.477   0.633   -.1582255   .2600957
       nbens |  .5256301   .1164984    4.512   0.000    .2972976   .7539627
     chaocim |   3.15286   1.353578    2.329   0.020    .4998959   5.805825
       zinco |  2.392779   1.262696    1.895   0.058   -.0820598   4.867618
       _cons | -1.487195   .5439147   -2.734   0.006   -2.553248   -.421142
------------------------------------------------------------------------


Probit estimates                            Number of obs   =       342
                                            Wald chi2(9)    =     44.60
                                            Prob > chi2     =    0.0000
Log likelihood = -181.37134                 Pseudo R2       =    0.2011
------------------------------------------------------------------------
             |              Robust
    highwage |    Coef.    Std. Err.     z     P>|z|   [95% Conf. Interval]
-------------+----------------------------------------------------------
      nomale |  .0290042   .4101245    0.071   0.944    -.774825   .8328335
        nmem |  -.103515   .0593115   -1.745   0.081   -.2197633   .0127333
     ep2male |  .3496309   .1985957    1.761   0.078   -.0396095   .7388714
      ep2fem | -.0993539    .219683   -0.452   0.651   -.5299247   .3312169
     epchild | -.0410058   .1091799   -0.376   0.707   -.2549945   .1729828
       nmach |  .0357387    .060251    0.593   0.553   -.0823512   .1538285
       nbens |  .3045553   .0636634    4.784   0.000    .1797774   .4293332
     chaocim |  1.298908   .6961628    1.866   0.062   -.0655461   2.663362
       zinco |  .9767469   .8075342    1.210   0.226    -.605991   2.559485
       _cons | -.8869202   .3160692   -2.806   0.005   -1.506405   -.2674359
------------------------------------------------------------------------
```

REFERENCES

Benfica, Rui 1997. 'Micro and Small Enterprises in Central and Northern Mozambique: Results of a 1996 Survey'. Research Report No. 27, MAP/MSU Food Security Project, Ministry of Agriculture and Fisheries, Maputo.

Cramer, Christopher and Nicola Pontara 1998. 'Rural poverty and poverty alleviation in Mozambique: what's missing from the debate?', *The Journal of Modern African Studies,* 36, 1:101-138.

Dawe, D. 1995. Personal communication to Peter Timmer, quoted in Timmer 1995.

Haggblade, S., P. Hazell and J. Brown 1989. 'Farm-non-farm linkages in rural sub-Saharan Africa'. *World Development*, 17, 8:1173-1202.

Handa, Sudhanshu and Kenneth R. Simler 1999. 'Quality or quantity? The supply side determinants of primary schooling in a poor rural economy'. International Food Policy Research Institute, mimeo.

Hazell, P. and B. Hojjati 1995. 'Farm-non-farm growth linkages in Zambia'. *Journal of African Economies*, 4, 3:406-435.

Jayne, T.S. (1992). 'Do High Food Marketing Costs Constrain Cash Crop Production? Evidence from Zimbabwe". *Economic Development and Cultural Change*, 42, 2:387-402.

Jeje, José Jaime Clementina Machungo, Julie Howard, Paul Strasberg, David Tschirley, Eric Crawford, and Michael Weber 1998. 'What Makes Agricultural Intensification Profitable for Mozambican Smallholders? An Appraisal of the Inputs Subsector and the 1996/97 DNER/SG2000 Program, Volume II: Main Report'. Research Report No. 32, MAP/MSU Food Security Project, Ministry of Agriculture and Fisheries, Maputo.

Johnston, Bruce, 1970. "Agriculture and Structural Transformation in Developing Countries: A Survey of Research." *Journal of Economic Literature*, 3, 2:364-404.

Johnston, Bruce and John Mellor, 1961. "The Role of Agriculture in Economic Development", *American Economic Review*, 51, 4:566-93.

Kruger, Anne O., Constantine Michalopoulos and Vernon W. Ruttan, 1989. *Aid and Development*, Johns Hopkins University Press, Baltimore.

Liedholm, C. and D. Mead 1993. 'The structure and growth of microenterprises in Southern and Eastern Africa: evidence from recent surveys'. GEMINI Project Working Paper 36. Development Alternatives, Inc., Bethesda, MD.

Marrule, Higino 1998. M.S. Thesis

Mellor, John 1986. 'Agriculture on the road to industrialization', in Lewis John P. and Valeriana Kallab, Eds., *Development Strategies Reconsidered*, Transaction Books, New Brunswick, NJ. Reprinted in Eicher, Carl K. and John M. Staatz, *Agricultural Development in the Third World*, 3rd Edition. Johns Hopkins University Press, Baltimore.

Nicholls, William, 1964. "The Place of Agriculture in Economic Developmen," in *Agriculture in Economic Development*, edited by Carl K. Eicher and Lawrence Witt, 11-44. New York: McGraw-Hill.

OECD, 2000. "Table 19. Aid by Major Purposes, 1998", *www.oecd.org/dac/htm/dacstats.htm*.

Pitcher, Anne 1999. 'What's missing from "what's missing"? A reply to C. Cramer and N. Pontara, "Rural poverty and poverty alleviation in Mozambique: What's missing from the debate?" '. *The Journal of Modern African Studies,* ???

Reardon, Thomas, Eric Crawford and Valerie Kelly 1994. 'Links between nonfarm income and farm investments in African households: adding the capital market perspective'. *American Journal of Agricultural Economics*, 76, 5:1172-1176.

Reardon, Thomas 1997. 'Using evidence of household income diversification to inform study of the rural nonfarm labor market in Africa'. *World Development*, 25,5:735-747.

Reardon, Thomas, J. Edward Taylor, Kostas Stamoulis, Peter Lanjouw, Arsenio Balisacan 1999. 'Effects of nonfarm employment on rural income inequality in developing countries: an investment perspective'. *Journal of Agricultural Economics*, September 1999.

Rose, Donald, Paul Strasberg, Jaime Jeje, and David Tschirley 1998. 'Household Food Consumption in Mozambique: A Case Study in Three Northern Districts' Research Report No. 33, MAP/MSU Food Security Project, Ministry of Agriculture and Fisheries, Maputo.

Strasberg, Paul 1997. 'Smallholder cash-cropping, food-cropping and food security in northern Mozambique', unpublished Ph.D. dissertation, Michigan State University Department of Agricultural Economics.

Timmer, Peter C. 1988. 'The Agricultural Transformation', in H. Chenery and T. N. Srinavasan, eds., *Handbook of Development Eocnomics*, Elsevier Science Publishers, Amsterdam. Reprinted in Eicher, Carl K. and John M. Staatz, *Agricultural Development in the Third World*, 3rd Edition. Johns Hopkins University Press, Baltimore.

Timmer, Peter C. 1995. 'Getting agriculture moving: do markets provide the right signals?' *Food Policy*, 20, 5:455-472.

Tschirley, David, Donald Rose and Higino Marrule 1999. 'A Methodology for Estimating Household Income in Rural Mozambique Using Easy-to-Collect Proxy Variables: Technical Report for USAID-Funded NGOs'. Mimeo. MAP/MSU Food Security Project, Maputo.

Tschirley, David and Michael T. Weber 1994. 'Food security strategies under extremely adverse conditions: the determinants of household income and consumption in rural Mozambique'. *World Development*, 22, 2:159-173.

World Bank, 2000. "World Development Report 2000/1: Attacking Poverty (Consultation Draft)". World Bank, Washington D.C.

ENDNOTES

1. Ravi Kanbur, the former lead author of the report, resigned in June amidst great controversy regarding the themes being stressed in the report. Regarding the Consultation Draft of the report itself, key chapters such as Chapter 2 (The Causes of Poverty and a Framework for Action) and Chapter 7 (Building Up Assets) never use the word "smallholder" or "small farmer", while another chapter (Chapter 8, Making Markets Work for the Poor) discusses smallholder agriculture at great length.

2. This view was first propounded by development economists (Lewis, 1954; Presbisch, 1959; Hirschman, 1958) and continues to influence decisions in many Ministries of Finance in Third World Countries.

3. Cotton continues to have fixed producer prices, and cashew is the principal exception to the liberalization of external trade.

4. Mozambique was listed by the World Bank as the poorest country in the world in the early 1990s.

5. Results calculated by authors; see Strasberg (1997) for more detail on the survey and other analytical results.

6. The distinction between cash and food crops is necessarily somewhat arbitrary. In this paper we have classified eight basic staples as food crops: maize, sorghum, millet, cassava, rice, groundnuts, all beans, and sweet potato. All other crops are classified as cash crops.

7. A "labour event" is any incident of continuous wage labour as reported by the respondent. Examples range from a single day weeding a neighbouring smallholder's field, to full-time work as a teacher. One household member could report multiple labour events during the period of reference of the survey.

8. Female-headed households are defined as those self-declaring as female-headed plus those with no resident adult male over the age of 17.

9. CP suggested on the basis of a sample of 12 households in one district of the south, that wage labour income was the most important source of income for female-headed households.

10. To create terciles, calculated household income is first ordered from lowest to highest, then the households are divided into three groups of equal size. Thus, the first one-third of households have the lowest mean income, the second one-third is the middle-income group, and the final one-third has the highest mean income.

11. Note that the "Company farm" column is based on only six observations, and must therefore be interpreted with care.

12. Production linkages are a fourth linkage based on rural enterprises producing inputs for the agricultural production process. Such linkages are found to be very small in SSA (Haggblade, et al. 1989).

13. The definition of the high-wage end of the wage market is the same as that used in the "high-wage" column in Table 4. The dependent variable was a binary variable taking on the value of zero if the household had no income from the high wage end of the labour market, and one if it did. Variables hypothesized to affect the probability of a household obtaining high-wage labour income were female-headedness, household size, three educational variables (number of adult males completing EP2, number of adult females completing EP2, and percent of school-aged children attending school), one agricultural wealth variable (number of fields "owned"), and three other wealth variables (number of household goods owned, whether the household had a cement floor in their home, and whether the home had a metal roof). Household size, EP2 for males, and all three 'other' wealth variables were significant at $P<=0.10$. Both logit and probit techniques were tested, and gave virtually identical results. Complete regression results are in Appendix A.

14. See Jayne (1992) for a treatment of this issue in Zimbabwe.

15. Parental literacy and grade attainment are also important determinants of child school enrollment and grade attainment.

16. Strasberg (1997) has shown that cotton growing in Cabo Delgado and Nampula provinces contributes significantly and positively to household income, food production, and food security. Rose et al. (1998) show that cash cropping in general, and cotton growing specifically, are positively associated with calorie intake.

NDAE Working Papers

1.   Informing the Process of Agricultural Market Reform in Mozambique: A Progress Report, October 1990

2.   A Pilot Agricultural Market Information and Analysis System in Mozambique: Concepts and Methods.

3.   Inquérito ao Sector Familiar da Província de Nampula: Observações Metodológicas, 9 de Novembro de 1991

3E.   A Socio-Economic Survey of the Smallholder Sector in The Province of Nampula: Research Methods (**translated from Portuguese**), January 1992

4.   Inquérito ao Sector Familiar da Província de Nampula: Comercialização Agrícola, 30 de Janeiro de 1992

4E.   A Socio-Economic Survey in The Province of Nampula: Agricultural Marketing in the Smallholder Sector (**translated from Portuguese**), January 1992

5.   Inquérito ao Sector Familiar da Província de Nampula: O Algodão na Economia Camponesa, 9 de Novembro de 1991

5E.   A Socio-Economic Survey in The Province of Nampula: Cotton in the Smallholder Economy (**translated from Portuguese**), January 1992

6.   The Determinants of Household Income and Consumption in Rural Nampula Province: Implications for Food Security and Agricultural Policy Reform, August 1992

6P.   Determinantes do Rendimento e Consumo Familiar nas Zonas Rurais da Província de Nampula: Implicações para a Segurança Alimentar e as Reformas de Política Agrária (**Traduzido do Inglés**), 24 de Fevereiro de 1993

8.   Dengo, Maria Nita, "Household Expenditure Behavior and Consumptio Growth Linkages in Rural Nampula Province, Mozambique", M.Sc. Thesis, Dept. of Agricultural Economics, Michigan State University (**Reprint**), December 18 1992

9.   The Maputo Market Study: Research Methods, March 8 1993

9P.   O Estudo do Mercado de Maputo: Observações Metodólogicas, 1 de Junho de 1993

10.   The Organization, Behavior, and Performance of the Informal Food Marketing System, May 28 1993

12.   The Pricing and Distribution of Yellow Maize Food Aid n Mozambique: An Analysis of Alternatives, October 18 1993

14.   Liedholm, Carl and Donald Mead, "Small-scale Enterprises: a Profile", in Economic Impact: A Quarterly Review of World Economics, no. 63 (**Reprint**)

14P.   Liedholm, Carl and Donald Mead, "Pequenas Empresas: Um Perfil", em Economic Impact: A Quarterly Review of World Economics, no. 63 (**Reprint, translated from English**)

15.   Mini-SIMA e Análises Específicas: Um Ensaio Aplicado aos Mercados de Maputo, 15 de Julho de 1993

16.   The Evolution of the Rural Economy in Post-War Mozambique: Insights from a Rapid Appraisal in Monapo District of Nampula Province

17.   Padrões de Distribuição de Terras no Sector Familiar em Moçambique: A Similaridade entre duas Pesquisas Distintas e as Implicações para a Definição de Políticas, May 1994

18.   Who Eats Yellow Maize? Some Preliminary Results from a Survey of Consumer Maize Preferences in Maputo, October 1994

18P.   Quem Come Milho Amarelo? Alguns Resultados Preliminares de um Inquérito sobre as Prefencias dos Consumidores de Milho na Cidade de Maputo (**Traduzido do Inglés**), 10 de Novembro de 1994

19.   Diagnóstico da Estrutura, Comportamento, e Desempenho dos Mercados Alimentares de Moçambique, 4 de Julho de 1995

20.   Inquérito ao Sector Moageiro de Pequena Escala em Moçambique: Observações Metodológicas, 30 de Janeiro de 1995

21.   O Sector da Castanha de Caju - Lucros Potenciais Perdidos por Africa? (**Reimpressão**), Novembro de 1995

22.   Smallholder Cash Cropping, Food Cropping and Food Security in Northern Mozambique: Research Methods, March 1996

22P.   Culturas de Rendimento, Culturas Alimentares e a Segurança Alimentar do Sector Familiar no Norte de Moçambique: Métodos do Estudo, Novembro de 1996

23.   Plan of Activities for Food Security Research Project, September 1995 through August 1997, 1996

24.   Strasberg, Paul, "Smallholder Cash-Cropping, Food-Cropping and Food Security in Northern Mozambique", Ph.D.Dissertation, Dept. of Agricultural Economics, Michigan State University (**Reprint**), May 1997

25.   Smallholder Cash-Cropping, Food-Cropping and Food Security in Northern Mozambique: Summary, Conclusions, and Policy Recommendations, June 1997

26.   Agricultural Market Information for Family Farms in Mozambique, June 1997

26P.   Informação de Mercado Agricola para o Sector Familiar em Moçambique, Junho 1997

27.   Micro and Small Enterprises in Central and Northern Mozambique: Results of a 1996 Survey, September, 1997.

27P.   Micro e Pequenas Empresas no Centro e Norte de Moçambique: Resultados do Inquerito Realizado em 1996, Setembro de 1997.

28.   Desafios Para Garantir a Concorrência e Reduzir os Custos no Sistema Alimentar de Moçambique, 12 de Maio de 1998.

29.   Planning for Drought in Mozambique: Balancing the Roles of Food Aid and Food Markets, May 14, 1998

30.   Séries Históricas dos Preços de Grão de Milho Branco e suas Tendências Reais em Alguns Mercados do País, 18 de Maio de 1998.

31.   What Makes Agricultural Intensification Profitable for Mozambican Smallholders? An Appraisal of the Inputs Subsector and the 1996/97 DNER/SG2000 Program, Volume I: Summary, October, 1998.

32.   What Makes Agricultural Intensification Profitable for Mozambican Smallholders? An Appraisal of the Inputs Subsector and the 1996/97 DNER/SG2000 Program, Volume II: Main Report, October, 1998.

33.   Household Food Consumption in Mozambique: A Case Study in Three Northern Districts, February, 1999.

34.   The Effects of Maize Trade with Malawi on Price Levels in Mozambique: Implications for Trade and Development Policy, November,1999.

35.   Séries Históricas dos Preços de Grão de Milho Branco e Suas Tendências Reais em Alguns Mercados do País no Periódo Compreendido Entre Abril 1993 e Setembro 1999, November, 1999.

36.   A Simplified Method for Assessing Dietary Adequacy in Mozambique. January, 2000.

37.   Implementing A Simplified Method for Assessing Dietary Adequacy in Mozambique: A User's Manual. January, 2000.

38.   A Methodology for Estimating Household Income in Rural Mozambique Using Easy-to-Collect Proxy Variables. February, 2000.

39.   Comparing Yields and Profitability in MADER's High- and Low-Input Maize Programs: 1997/98 Survey Results and Analysis. Julie Howard, José Jaime Jeje, Valerie Kelly and Duncan Boughton. March, 2000

40.   Representative Characteristics of Rural Households in Areas of Central and Southern Mozambique Affected by the 2000 Floods. March, 2000.

40P.   Características dos Agregados Familiares Rurais nas Zonas Afectadas pelas Cheias do Ano 2000 no Centro e Sul de Moçambique. March, 2000