



**AgEcon** SEARCH  
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

*The World's Largest Open Access Agricultural & Applied Economics Digital Library*

**This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.**

**Help ensure our sustainability.**

Give to AgEcon Search

AgEcon Search  
<http://ageconsearch.umn.edu>  
[aesearch@umn.edu](mailto:aesearch@umn.edu)

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

**MINISTRY OF AGRICULTURE AND  
RURAL DEVELOPMENT**

**Directorate of Economics**

**Research Paper Series**

**Representative Characteristics of Rural Households In  
Areas of Central and Southern Mozambique Affected by  
The 2000 Floods**

by

Rui Benfica,  
Pedro Arlindo  
Michael T. Weber  
David Tschirley

Research Report No. 40E  
March 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.

Sérgio Chitará  
National Director  
Directorate of Economics  
Ministry of Agriculture and Rural Development

## ACKNOWLEDGMENTS

The Directorate of Economics is undertaking collaborative research on food security with Michigan State University's Department of Agricultural Economics.

We wish to acknowledge the financial and substantive support of the Ministry of Agriculture and Rural Development of Mozambique and the United States Agency for International Development (USAID) in Maputo to complete food security research in Mozambique. Research support from the Bureau for Africa and the Bureau for Global Programs of USAID/Washington also made it possible for Michigan State University researchers to contribute to this research.

This timely study is possible because many people and organizations over the years have worked with the Ministry of Agriculture to collect and maintain a nationally representative data base on rural household characteristics and behavior-TIA (Trabalho de Inquerito Agrícola ao Sector Familiar em Mozambique). Although the data represent conditions during the cropping season of 1996, they are the most recent available and it is believed that they can provide a conservative indication of the social and economic conditions prevailing in these areas prior to the serious floods of early 2000. The intent of this timely report is to provide local Community, Government, NGO and Donor representatives basic descriptive information to assist in rehabilitation program and project design.

Rui Benfica and Pedro Arlindo are presently resident in East Lansing, Michigan where they are completing graduate degrees (PhD and MS) in the Department of Agricultural Economics at Michigan State University. They unselfishly contributed their time to complete the computer analysis and write-up for this report during their Spring Semester school vacation (March 5-11). Many thanks to them, and to Professors Michael Weber and David Tschirley.

Duncan Boughton  
Country Coordinator  
Department of Agricultural Economics  
Michigan State University

## **MADR/MSU RESEARCH TEAM MEMBERS**

Sérgio Chitará, National Director, Directorate of Economics

Ana Paula Manuel dos Santos, Research Associate and Head, Department of Policy  
Analysis

Higino Francisco De Marrule, Research Associate and Interim Head, Department of  
Statistics

Paulo Mole, Research Associate

Danilo Carimo Abdula, SIMA Coordinator

Simão C. Nhane, Technician and Senior Assistant SIMA Coordinator

Abel Custódio Frechaut, Junior Assistant SIMA Coordinator

Francisco Morais, SIMA Enumerator Trainer

Jaqueline Anselmo Massingue, MADR trainee Research and Agricultural Policy Analyst

Arlindo Rodrigues Miguel, MADR trainee Research and Agricultural Policy Analyst

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

Pedro Arlindo, Research Associate and MSU Graduate Research Assistant

Anabela Mabote, Research Associate and Ohio State University Graduate Research  
Assistant

Rui Benfica, MSU Graduate Research Assistant

Maria da Conceição Almeida, Administrative Assistant

Duncan Boughton, MSU Country Coordinator

Jan Low, MSU Policy Training Coordinator

Julie Howard, MSU Analyst

Donald Rose, MSU Analyst

David L. Tschirley, MSU Analyst

Michael T. Weber, MSU Analyst

## TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
1. INTRODUCTION .....	1
1.1. Objectives .....	1
1.2. Methods .....	1
2. TABULAR RESULTS .....	4

## LIST OF TABLES

<u>Table</u>		<u>Page</u>
Table 1.	Estimated Flood Areas and TIA Sample Areas .....	3
Table 2.	Rural Household Demographic Characteristics .....	5
Table 3a.	Food Crop Production and Marketing Behavior .....	6
Table 3b.	Cash Crop Production and Marketing Behavior .....	7
Table 3c.	Fruit Crop Production and Marketing Behavior .....	8
Table 3d.	Vegetable Crop Production and Marketing Behaviour .....	9
Table 4.	Household Land Holding Characteristics .....	10
Table 5.	Household Livestock Holding Characteristics .....	11
Table 6.	Household Income Diversification Characteristics .....	12
Table 7	Household Ownership of Basic Agricultural Implements .....	13
Table 8.	Household Tree Ownership Patterns .....	14

# 1. INTRODUCTION

## 1.1. Objectives

The worst floods in nearly 50 years in parts of Southern and Central Mozambique have resulted in death and serious damage to people, crops and livestock, as well as to rural housing, communication infrastructure and small and large-scale business assets of many kinds. As flood waters recede and immediate emergency needs are determined and increasingly met, local and national Government, as well as NGO and Donor organizations are turning attention to conceptualizing and designing longer-term rehabilitation program and projects. Systematic information about the rural population in the affected areas is needed to assist these efforts.

The primary objective of the report is to utilize an existing rural household data base to describe to the maximum extent possible key social and economic characteristics of smallholder farmers in the flood areas.

## 1.2. Methods

The Ministry of Agriculture and Rural Development completed for the 1995/96 agricultural season a survey of smallholder agriculture (some 3889 family sector households were interviewed). This data base is referred to as the TIA-96 Survey. It collected information about smallholder household demographic characteristics, production and marketing of smallholder household agricultural and livestock production, as well as land ownership and use, and participation of household members in farm and non-farm labor markets.<sup>1</sup> The TIA-96 random survey was undertaken in 60 of the 141 districts representing all ten Provinces of Mozambique.

---

<sup>1</sup> See NDAE Working Paper 27. Micro and Small Enterprises in Central and Northern Mozambique: Results of a 1996 Survey, September, 1997, downloadable at: <http://www.aec.msu.edu/agecon/fs2/mozambique/wps27.pdf> See also Benfica, Rui. An Analysis of the Contribution of Micro- and Small Enterprises to Rural Household Income in Central and Northern Mozambique. M.Sc. Thesis. March 1998, downloadable at: <http://www.aec.msu.edu/agecon/fs2/mozambique/Rui.pdf> See also "Smallholder Agriculture in Mozambique: Report from the 1996 Trabalho de Inquerito Agricola - TIA96." A report submitted to Department of Statistics, Directorate of Economics, MAP by MAP/MSU Food Security Project.).



In each district selected, 8 villages were in turn randomly selected, and then 8 households were interviewed in each village.

Table 1 displays a listing of the Provinces and Districts affected by the recent floods (as of March 8, 2000) developed by the World Food Program in cooperation with local officials. The table also indicates the Districts covered (and the number of smallholder households surveyed) during the TIA-96 survey. Comparing identified flooded areas and those sampled by TIA-96, there is an overlap of 10 out of a total of 22 Districts affected. For all Provinces except Manica, TIA-96 surveyed the Districts with the most flood affected population. For example Manhica District in Maputo Province has the most people affected and it was surveyed by TIA-96. The same holds true for Chokwe in Gaza Province, Guvuro District in Inhambane and Buzi District in Sofala.

Based on this degree of overlap, it was decided to utilize the TIA-96 data to try to characterize representative household resources and economic activities in flood areas affected in each Province. All descriptive results presented in Tables 2 to 8 are based on the sample size permitted by the data, and need to be used with caution. As shown in Table 1, the degrees of freedom are smallest for Inhambane (58 observations) and Manica (62 observations). But these are also the Provinces where the number of affected population are relatively small compared to the most affected locations. While larger sample sizes and good geographic coverage are always preferred, it appears that it is reasonable to use the TIA-96 data to gain an understanding of some of the key characteristics of affected rural households, especially for those Provinces where the TIA-96 sample size is larger.

Tables 2 to 8 contain estimates of provincial-level averages for many different variables, as the number of observations are considered too small to undertake useful analysis at the district-level. The tables also report estimates of overall averages for the entire flood affected area in Southern and Central parts of the country. These are based on a much larger number of observations, but are still limited by the geographical coverage of Districts covered by TIA-96 that were also flood affected.

**Table 1: Flooded Areas and TIA-96 Agricultural Survey Sampled Areas**

<b>Province and District</b>	<b>Total (Yr. 2000) Population*</b>	<b>Affected Population*</b>	<b>% of Affected Population*</b>	<b>Districts Covered in TIA-96</b>	<b>Number of HHs Surveyed by TIA-96</b>
<b>Maputo</b>					
Boane	66,481	10,000	15%		
Magude	36,148	10,000	28%	X	64
Manhica	133,566	72,000	54%	X	64
Maputo	1,018,938	50,000	5%		
Marracuene	45,954	40,000	87%		
Matutuine	37,949	10,000	26%		
Moamba	42,385	40,000	94%		
Namaacha	38,331	2,000	5%	X	64
<b>Gaza</b>					
Bilene	151,764	25,000	16%	X	64
Chibuto	166,536	40,000	24%	X	64
Chokwe	207,175	207,000	100%	X	64
Guija	63,048	20,000	32%		
Mabalane	27,892	4,000	14%		
Massingir	24,948	16,717	67%		
Xai-Xai	324,298	30,000	9%		
<b>Inhambane</b>					
Guvuro	30,368	20,000	66%	X	58
<b>Sofala</b>					
Buzi	146,777	70,000	48%	X	64
Chibabava	66,827	5,000	7%	X	63
Machanga	44,304	20,000	45%		
<b>Manica</b>					
Machaze	76,785	5,000	7%		
Mossurize	131,400	3,500	3%		
Sussundenga	107,860	7,000	6%	X	62

Source: \* Estimates of Flood Affected Areas - WFP, 03/08/00-Maputo

Estimates of household *averages* for different variables are clearly useful, but must also be used carefully. Flood rehabilitation program design needs to be aware of the range of needs and the likely significant differences present among the flood victims. To provide users with an indication of the degree of *variability* in the results for any given Province, many tables also report a breakdown of overall average results for all flood affected areas by tercile of household area cultivated.

As an example, in Table 4, households over the entire flood affected area are estimated to have cultivated some 2.4 hectares in 1996. But when examining this overall average of 2.4 hectares cultivated from the perspective of how much variability is there around this estimated mean value, the table also shows that households in the lowest area cultivated tercile cultivated only about .6 hectares, while those in the highest area cultivated tercile farmed in 1996 some 4.9 hectares. In other words, while the average household cultivated some 2.4 hectares, the bottom 33 percent of households cultivated only .6 hectares, while the top 33 percent of smallholders cultivated 4.9 hectares. Clearly it is important to keep this variation among households in mind when designing flood recovery initiatives.

## **TABULAR RESULTS**

**Table 2. Rural Household Demographic Characteristics**

Household demographic characteristics	By Province					For All Areas Sampled
	Maputo	Gaza	Inhambane	Sofala	Manica	
Household Size	6.0	7.0	7.0	5.5	7.4	6.4
<b>Gender Structure</b>	----- percent of households -----					
Female headed households	29	20	12	22	14	22
Female population	53	54	51	55	52	53
<b>Age Distribution - People per Age group...</b>	----- percent of members -----					
0 - 9 years old	25	23	20	30	34	26
10 - 19	27	26	22	26	29	26
20 - 29	16	16	25	18	15	17
30 - 39	9	10	14	8	7	9
40 - 49	9	8	9	8	8	8
50 - 59	7	7	5	6	4	6
60 years old or more	8	10	6	4	3	7
Dependency Ratio (<15 + >60)/(>14 & <61)	1.03	1.06	0.69	1.05	1.26	1.04
Have the Household ever moved? (% yes)	20	29	14	38	39	28

Source: *Trabalho de Inquerito Agrícola ao Sector Familiar em Mocambique, 1996*

**Table 3a. Food Crop Production and Marketing Behavior**

Household Food Crop Production and Marketing	By Province					For All Areas Sampled	By Tercile of HH Area Cultivated		
	Maputo	Gaza	Inhambane	Sofala	Manica		1	2	3
<b>Households that Harvested (all households)</b>						----- percent of households -----			
At least one Staple food crop	87	97	98	98	97	94	90	95	97
Maize	84	95	95	93	97	92	87	93	95
Rice	0	5	11	21	4	7	3	9	10
Cassava	8	40	10	30	11	23	17	22	30
Beans	39	72	48	42	41	51	41	54	58
Sorghum/Millet	1	1	75	70	54	27	15	29	38
Sweet Potato	8	13	2	6	16	9	9	10	10
Sesame	3	1	11	7	26	6	2	6	10
Peanuts	34	24	67	36	11	32	25	29	42
<b>Households that Marketed (all households)</b>						----- percent of households -----			
At least one Staple food crop	15	30	25	32	49	28	20	24	38
Maize	12	14	10	23	34	17	12	15	22
Rice	0	3	0	1	0	1	0	2	1
Cassava	3	8	0	4	1	4	4	3	6
Beans	0	11	0	11	7	7	7	5	8
Sorghum/Millet	0	0	3	1	9	1	0	0	3
Sweet Potato	1	3	0	1	3	2	2	1	2
Sesame	0	0	2	0	9	1	0	0	3
Peanuts	0	0	14	5	7	3	0	1	8
<b>Average Area Cultivated per Crop</b>						----- Area cultivated per household among those that harvested the crop -----			
Maize	1.49	1.80	2.02	1.44	2.49	1.73	0.49	1.18	3.40
Rice	0.41	1.70	0.80	0.76	0.48	0.86	0.32	0.78	1.16
Cassava	0.76	0.94	1.04	0.33	0.48	0.76	0.23	0.46	1.38
Beans (nhemba)	0.76	0.90	0.72	0.37	0.56	0.73	0.22	0.46	1.33
Sorghum/millet	0.37	0.77	1.41	1.22	2.06	1.41	0.38	0.88	2.32
Sweet Potato	0.60	0.35	0.00	0.28	0.57	0.48	0.14	0.33	1.01
Peanuts	0.70	0.99	1.08	0.38	0.77	0.78	0.22	0.55	1.35

Source: *Trabalho de Inquerito Agrícola ao Sector Familiar em Mocambique, 1996*

**Table 3b. Cash Crop Production and Marketing Behavior**

Household Cash Crop Production and Marketing	By Province					For All Areas Sampled	By Tercile of HH Area Cultivated		
	Maputo	Gaza	Inhambane	Sofala	Manica		1	2	3
<b>Households that Harvested</b> <b>(Among all Households)</b>	----- percent of households -----								
At least one cash crop	11	57	29	39	26	34	28	36	39
Cashew	10	51	19	32	0	27	23	29	28
Coconut	0	2	10	9	0	3	2	4	3
Cotton	0	0	3	2	2	1	0	0	2
Sunflower	0	0	0	2	8	1	0	1	2
Sugar cane	0	4	0	0	16	3	1	4	3
Mafurra	3	24	0	0	0	8	8	8	10
Tobacco	0	0	2	0	2	0	0	0	1
<b>Households that Marketed</b> <b>(Among all Households)</b>	----- percent of households -----								
At least one cash crop	2	34	7	17	2	15	12	16	18
Cashew	2	33	2	16	0	14	12	15	16
Coconut	0	1	0	1	0	0	0	0	1
Cotton	0	0	3	2	2	1	0	0	2
Sunflower	0	0	0	0	0	0	0	0	0
Sugar cane	0	0	0	0	0	0	0	0	0
Mafurra	0	3	0	0	0	1	1	1	0
Tobacco	0	0	3	0	0	0	0	0	0

Source: *Trabalho de Inquerito Agrícola ao Sector Familiar em Mocambique, 1996*

**Table 3c. Fruit Crop Production and Marketing Behavior**

Household Fruit Crop Production and Marketing	By Province					For All Areas Sampled	By Tercile of HH Area Cultivated		
	Maputo	Gaza	Inhambane	Sofala	Manica		1	2	3
<b>Households that Harvested</b> <b>(Among all Households)</b>	----- percent of households -----								
At least one fruit crop	23	59	22	50	68	44	39	43	49
Banana	4	10	2	5	32	8	5	9	11
Mango	18	37	19	46	53	33	29	32	37
Orange	3	16	0	5	13	8	7	9	8
Lemon	8	15	0	4	11	9	8	10	9
Grapefruit	1	6	0	3	2	3	1	3	4
Avocado	4	0	0	0	18	3	2	2	4
Papaya	5	15	3	11	18	10	9	10	11
Tangerine	1	7	3	1	6	3	3	3	4
Other	5	6	3	4	11	6	4	8	6
<b>Households that Marketed</b> <b>(Among all Households)</b>	----- percent of households -----								
At least one fruit crop	7	20	2	6	29	12	11	10	17
Banana	3	4	0	2	16	4	2	4	6
Mango	4	8	2	2	10	5	5	2	9
Orange	1	4	0	0	3	2	2	1	2
Lemon	1	6	0	0	0	2	3	2	1
Grapefruit	1	3	0	2	0	1	0	1	2
Avocado	1	0	0	0	5	1	1	0	1
Papaya	0	2	0	2	2	1	1	1	1
Tagerina	0	2	0	0	2	1	0	0	1
Other	1	0	0	0	3	1	1	0	0

Source: *Trabalho de Inquerito Agrícola ao Sector Familiar em Mocambique, 1996*

**Table 3d. Vegetable Crop Production and Marketing Behavior**

Household Vegetable Crop Production and Marketing	By Province					For All Areas Sampled	By Tercile of HH Area Cultivated		
	Maputo	Gaza	Inhambane	Sofala	Manica		1	2	3
<b>Households that Harvested</b> (Among all Households)	----- percent of households -----								
At least one Vegetable crop	8	17	14	20	66	20	13	20	27
Lettuce	3	8	0	2	6	4	4	5	3
"Couve"	4	6	3	4	41	8	4	10	10
Onion	4	6	7	7	17	7	5	7	9
Tomato	2	6	14	13	20	8	5	7	13
Pumpkin	2	2	5	3	14	4	1	3	6
Garlic	2	4	2	2	12	3	2	5	3
"Inhame"	0	0	0	0	23	2	0	2	5
Other Vegetables	1	1	2	4	23	4	1	4	6
<b>Households that Marketed</b> (Among all Households)	----- percent of households -----								
At least one Vegetable crop	3	8	10	6	44	10	6	10	13
Lettuce	2	3	0	0	5	2	3	1	1
"Couve"	1	2	0	3	27	4	2	4	6
Onion	1	3	3	3	12	3	3	3	4
Tomato	1	3	10	4	11	4	2	4	6
Pumpkin	0	0	0	1	0	0	0	0	0
Garlic	0	1	0	1	5	1	0	0	1
"Inhame"	0	0	0	0	14	1	0	2	2
Other Vegetables	1	0	0	0	16	2	1	2	2

Source: *Trabalho de Inquerito Agrícola ao Sector Familiar em Mocambique, 1996*



**Table 4. Household Land Holdings Characteristics**

	By Province					For All Areas Sampled	By Tercile of HH Area Cultivated		
	Maputo	Gaza	Inhambane	Sofala	Manica		1	2	3
<b>Mean Area Cultivated (hectares) per ...</b>									
Household	1.96	2.47	2.72	2.33	3.34	2.40	0.6	1.66	4.88
Person (per capita)	0.38	0.42	0.47	0.46	0.51	0.43	0.15	0.37	0.77
Labor adult equivalent	0.58	0.65	0.69	0.75	0.88	0.67	0.23	0.55	1.24
<b>Households with ... hectares</b>									
	----- percent of households -----								
0.00	3	0	2	1	0	1			
0.01 - 0.24	6	5	0	2	0	3			
0.25 - 0.49	13	2	9	2	2	6			
0.50 - 0.99	19	16	17	10	5	15			
1.00 - 1.99	27	28	17	39	29	29			
2.00 - 3.99	16	24	36	30	32	25			
4.00 - 9.99	14	25	16	14	26	19			
10.00 or more	2	1	3	2	6	2			
<b>Household Field Location and Area Cultivated</b>									
	----- percent of households -----								
Households with <u>at least one field in "Baixa"</u>	60	55	5	50	53	51	48	52	52
Households with <u>at least one field in "Alta"</u>	58	53	100	78	71	66	57	66	73
Households with <u>Fields in "Both Areas"</u>	22	8	5	29	24	18	9	19	25
	----- mean area per Household -----								
Mean HH Area Cultivated in "Zona Baixa" (ha)	1.56	2.16	1.48	1.47	2.56	1.84	0.57	1.26	3.61
Mean HH Area Cultivated in "Zona Alta" (ha)	1.71	2.45	2.65	2.04	2.79	2.22	0.58	1.47	4.11

Source: *Trabalho de Inquerito Agrícola ao Sector Familiar em Mocambique, 1996*

**Table 5. Household Livestock Holding Characteristics**

Livestock Ownership	By Province					For All Areas Sampled	By Tercile of HH Area Cultivated		
	Maputo	Gaza	Inhambane	Sofala	Manica		1	2	3
<b>Households with ...</b>	----- percent of households -----								
Cows	5	15	10	4	31	11	3	10	18
Goats	24	35	47	43	45	35	24	31	51
Lamb	2	2	2	0	2	1	0	0	4
Hogs	4	17	5	6	2	8	5	8	12
Chicken	55	56	86	89	77	67	59	69	74
Ducks	29	30	31	21	13	26	21	27	30
Other "birds"	1	3	0	2	5	2	0	2	3
Rabbits	1	12	0	0	0	4	3	4	5
Other animals	2	2	0	0	0	1	1	2	0
<b>Mean Number of Animals, Among Those</b>	----- mean number per household -----								
<b>Who Have ...</b>									
Cows	5	8	24	6	8	9	4	7	10
Goats	9	5	19	8	6	8	5	7	11
Lamb	2	11	1		10	7	0	5	8
Hogs	4	5	20	5	1	6	6	4	7
Chicken	10	11	16	16	17	13	9	12	17
Ducks	5	6	6	5	10	6	5	6	6
Other "birds"	60	26	-	6	10	21	5	28	20
Rabbit	17	6	-	-	-	7	5	7	9
Other animals	6	11	-	-	-	9	6	9	12

Source: *Trabalho de Inquerito Agrícola ao Sector Familiar em Mocambique, 1996*

**Table 6. Household Income Diversification Characteristics**

Household Income Diversification Strategies	By Province					For All Areas Sampled	By Tercile of HH Area Cultivated		
	Maputo	Gaza	Inhambane	Sofala	Manica		1	2	3
<b>Supply of Labor Off-household Farm</b>	----- percent of households -----								
Households selling labor off-hh farm	12	31	33	22	27	24	22	23	26
Primarily Farm Labor	6	13	18	11	8	11	15	9	9
Primarily Non-farm Labor	6	20	15	12	20	14	11	14	17
<b>Ownership of Off-farm Businesses</b>									
Households with non-farm business (%)	57	31	43	43	60	45	40	45	52
Mean number of off-farm businesses (among those who have at least one)	1.9	1.5	1.4	1.2	1.4	1.6	1.5	1.7	1.6
Businesses owned by women (%)	48	31	17	51	42	42	46	42	39
Businesses owned by men (%)	52	69	83	49	58	58	54	58	61
Mean age of businesses owners (all)	33	38	34	34	36	35	35	34	35
Mean age (female owners)	31	34	29	29	33	31	30	34	30
Mean age (male owners)	35	40	36	40	38	37	40	35	38

Source: *Trabalho de Inquerito Agrícola ao Sector Familiar, 1996*

**Table 7. Household Ownership of Basic Agricultural Implements**

Asset Ownership	By Province					For All Areas Sampled	By Tercile of HH area Cultivated		
	Maputo	Gaza	Inhambane	Sofala	Manica		1	2	3
<b>Households with ...</b>	----- percent of households -----								
Hoe	64	100	98	99	97	88	83	90	91
Axe	60	93	95	85	86	81	77	79	87
Machete	49	85	74	70	86	70	64	68	77
Shovel	30	72	16	9	23	37	32	35	43
Rake	16	57	21	6	17	27	21	27	32
Sickle	24	61	40	34	47	41	35	40	47
File	10	37	16	14	19	20	15	17	29
Harrow	13	38	24	2	39	22	11	23	32
<b>Mean Number Among Those Who Have ...</b>	----- mean number per household -----								
Hoe	3	4	5	4	4	4	3	4	5
Axe	2	2	3	1	2	2	2	2	2
Machete	1	1	2	1	2	1	1	1	1
Shovel	1	1	2	1	1	1	1	1	1
Rake	1	1	2	1	1	1	1	1	1
Sickle	1	2	2	2	2	2	1	2	2
File	1	1	1	2	2	1	1	1	2
Harrow	2	2	2	1	2	2	1	2	2

Source: *Trabalho de Inquerito Agrícola ao Sector Familiar em Mocambique, 1996*

**Table 8. Household Tree Ownership Patterns**

Household Tree Ownership	By Province					For All Areas Sampled	By Tercile of HH Area Cultivated		
	Maputo	Gaza	Inhambane	Sofala	Manica		1	2	3
<b>Households that Report Having Trees (Among all Households)</b>	----- percent of households -----								
At least one type of fruit tree	33	81	56	75	76	62	54	64	69
Cashew tree	12	60	47	63	2	39	31	43	44
Coconut tree	1	10	17	7	0	6	5	5	9
Mafurreira	4	37	2	0	0	13	13	11	14
Banana tree	4	14	3	6	32	10	3	13	14
Mango tree	20	43	29	65	68	41	33	44	47
Orange tree	6	22	7	7	24	13	11	14	14
Lemon tree	8	16	2	5	15	10	9	11	9
Grapefruit tree	1	7	2	5	3	4	1	4	6
Avocado pear tree	9	1	0	0	26	6	6	6	5
Papaya Tree	11	20	3	18	24	16	14	17	17
Tagerine Tree	1	11	7	2	10	6	5	5	7
Other Trees	8	12	7	6	11	9	7	9	11
<b>Mean Number of Trees per Household (Among Those that Have It)</b>	----- mean number per household -----								
Cashew tree	5	46	33	54	1	43	27	58	40
Coconut tree	2	9	21	21	0	15	5	13	21
Mafurreira	3	6	4	0	0	6	5	7	6
Banana tree	14	55	19	39	19	36	37	29	42
Mango tree	5	8	5	15	16	11	6	11	14
Orange tree	3	8	11	6	6	7	10	3	8
Lemon tree	3	4	2	3	3	3	3	4	3
Grapefruit tree	6	124	70	197	94	128	110	158	109
Avocado pear tree	4	7	0	0	4	4	4	3	5
Papaya Tree	5	8	7	12	2	8	4	6	12
Tagerine Tree	1	3	4	5	5	3	2	2	4

Source: Trabalho de Inquerito Agrícola ao Sector Familiar em Mocambique, 1996

## REFERENCES

1. NDAE Working Paper 27. Micro and Small Enterprises in Central and Northern Mozambique: Results of a 1996 Survey, September, 1997, downloadable at: <http://www.aec.msu.edu/agecon/fs2/mozambique/wps27.pdf>
2. "Smallholder Agriculture in Mozambique: Report from the 1996 Trabalho de Inquerito Agricola - TIA96." A report submitted to Department of Statistics, Directorate of Economics, MAP by MAP/MSU Food Security Project.
- 3, Benfica, Rui. An Analysis of the Contribution of Micro- and Small Enterprises to Rural Household Income in Central and Northern Mozambique. M.Sc. Thesis. March 1998, downloadable at: <http://www.aec.msu.edu/agecon/fs2/mozambique/Rui.pdf>

## 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 Inglês**), 24 de Fevereiro de 1993
8. Dengo, Maria Nita, "Household Expenditure Behavior and Consumption 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 Metodológicas, 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 in 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 Preferências dos Consumidores de Milho na Cidade de Maputo (**Traduzido do Inglês**), 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 Agrícola 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 Período 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 MADR's High- and Low-Input Maize Programs: 1997/98 Survey Results and Analysis. March 2000.