

FOOD SECURITY FOR SOUTHERN AFRICA



Edited by
Mandivamba Rukuni and Carl K. Eicher

University of Zimbabwe UZ/MSU Food Security Project

FOOD SECURITY FOR SOUTHERN AFRICA

Edited by

NDIVAMBA RUKUNI AND CARL K. EICHER

February 1987

UZ/MSU Food Security Project
Department of Agricultural Economics
and Extension
University of Zimbabwe
P.O. Box MP 167
Harare, Zimbabwe
Telex: 4152 ZW
Telephone 303211 - Ext. 1574

10.	Household Grain Storage and Marketing in Surplus and Deficit Communal Farming Areas in Zimbabwe: Preliminary Findings J. Stanning	245
11.	Optimal Grain Pricing and Storage Policy in Controlled Agricultural Economies: Application to Zimbabwe Steve Buccola and Chrispen Sukume	292
PART IV:	NEEDED RESEARCH ON INCOME GENERATING ACTIVITIES AND HOUSEHOLD FOOD INSECURITY IN LOW RAINFALL AREAS IN SOUTHERN AFRICA	
	Introduction	
12.	Sorghum and Food Security in Southern Africa: Present and Future Research Priorities of Technical Scientists L. R. House	329
13.	Research on Sorghum and Wheat Flour Composites M.I. Gomez, M. Mutambenengwe and H. Moyo	341
14.	Sorghum and Household Food Security in Low Rainfall Areas of Zimbabwe: A Research Proposal C.B. Mbwanda	351
15.	Comments on the Sorghum Papers Kay Muir-Leresche	360
16.	The Oilseeds Subsector and Household Food Insecurity in Communal Farming Areas of Zimbabwe: A Preliminary Research Proposal Godfrey Mudimu	363

CHAPTER SIXTEEN

THE OILSEEDS SUBSECTOR AND HOUSEHOLD FOOD SECURITY IN THE COMMUNAL FARMING AREAS OF ZIMBABWE : A PRELIMINARY RESEARCH PROPOSAL

Godfrey D. Mudimu

BACKGROUND

The oilseeds sub-sector is composed of cottonseed, soyabeans, groundnuts, and sunflowers. The subsector is targeted for expansion following recent government measures aimed at discouraging maize and sorghum production. The aim is to reduce maize production by at least 50 percent in the 1986-87 season. The reason for the new policy of agricultural diversification is the high cost of storing the 2.1 million tonne maize stockpile (January, 1987) which is equivalent to three years' domestic sales of the Grain Marketing Board (GMB). The annual average storage cost of maize is approximately Z\$24 million in 1986-87 alone. Consequently farmers are being encouraged to diversify into alternative non-grain crops such as oilseeds.

Commercial farmers, plan to reduce maize area for the 1986/87 crop year by diversifying into soyabeans, sunflowers, groundnuts and to some extent cottonseed. The greatest expansion is expected in sunflowers in the 1986-87 season (Table 1).

Table 1: Zimbabwe - Estimated Area Expansion of Oilseed Crops for the 1986-87 Season

Crop	Area (ha)		Percent Expansion
	1985-86 (Actual)	1986-87 (Estimated)	
Soyabeans	42 000	50 000 - 55 000	19 - 31
Sunflowers	1 000	6 000	600
Groundnuts	2 200	3 500	59

Source: Financial Gazette, Harare, 16 September, 1986

Trend in Oilseeds Production and Marketing

The oilseeds sub-sector is important for the production of edible oils and fats, and oilmeals for livestock feeds. Total deliveries of oilseeds to official marketing channels increased by approximately 95 percent between 1971-72 and 1984-85 (Table 2). Prior to 1974-75 cottonseed and groundnuts accounted for up to 95 percent of total oilseed deliveries. Currently, cottonseed and soyabeans contributed 90-95 percent of total oilseeds supply. Since 1974-75 soyabean deliveries have increased by over 300 percent while cotton has increased by about 50 percent. Groundnut deliveries to the Grain Marketing Board (GMB) declined from 46 000 tonnes in 1976-77 to 11 000 tonnes in 1980-81 and 6 000 tonnes in 1984-85. Sunflower production is largely by communal and small-scale commercial farming sub-sectors and production has fallen since the late 1970s (Table 2). The fall in groundnuts and sunflower production has been attributed to low yields and producer prices, compared to grain crops, soyabean and cotton. Low groundnuts yields are attributed to a lack of appropriate production technologies, partly due to low priority in agricultural research in Zimbabwe.

The expansion in soyabean and cotton production since the early 1970s is attributed to favourable producer prices for the two crops relative to other crops, and improvement in production technologies that resulted in substantial yield increases (Tattersfield, 1982). Commercial farmers supply the bulk of the marketed oilseeds crops with the exception of sunflowers as shown in Table 3.

Trend in Edible Vegetable Oils Supply and Demand

Edible oils in Zimbabwe are expressed from cottonseed, soyabeans, sunflower seed, groundnuts and maize germ.

Table 2: Zimbabwe: Trends in Oilseeds Marketing, 1965-66 - 1985-86

Marketing ('000 tonnes)					
(Intake)					
YEAR	Cottonseed	Soyabeans	Groundnuts	Sunflower	TOTAL
1965-66	18.2	0.2	17.0	-	35.4
1966-67	26.6	0.2	32.1	-	58.9
1967-68	45.8	0.4	33.1	-	79.3
1968-69	57.2	1.7	11.5	-	70.4
1969-70	160.5	7.7	26.0	-	194.2
1970-71	99.0	7.4	11.6	-	118.0
1971-72	140.4	8.1	31.6	1.4	181.5
1972-73	170.7	8.5	81.2	1.3	261.7
1973-74	135.8	8.0	26.5	1.2	171.5
1974-75	164.7	19.1	44.4	3.4	231.6
1975-76	163.1	27.9	44.7	8.7	244.4
1976-77	131.6	44.8	46.6	23.4	246.4
1977-78	148.0	44.1	13.5	21.4	227.0
1978-79	173.9	69.7	17.7	5.6	266.9
1979-80	166.8	81.0	12.7	3.5	264.0
1980-81	182.0	93.6	17.4	8.1	301.1
1981-82	200.8	65.3	20.0	4.0	290.1
1982-83	157.7	84.3	15.9	3.8	261.7
1983-84	167.3	74.4	9.3	12.0	263.0
1984-85	250.1	89.8	5.7	9.0	354.6
1985-86	295.0	86.0	7.9	6.5	395.4

Source: 1) CSO (1986) and Muir-Leresche (1984).

Table 3: Zimbabwe: Commercial and Communal Farming Deliveries of oilseeds to the Grain Marketing Board, 1980-85.

Oilseed	Farming Sub-sector	Intake Year				
		80-81	81-82	82-83	83-84	84-85
('000 tonnes)						
Soyabeans	Commercial	88.5	61.5	83.7	73.7	89.0
	Communal	5.2	3.8	0.7	0.7	0.8
Groundnuts	Commercial	6.5	9.9	8.8	5.0	2.6
	Communal	5.0	3.1	1.6	0.6	0.8
Sunflower	Commercial	-	-	0.9	1.1	1.3
	Communal	-	-	3.8	10.6	7.7
Cotton	Commercial	117.4	99.3	105.3	107.9	138.7
	Communal	32.9	74.7	49.2	60.5	111.5

Source: Agricultural Marketing Authority (1986).

Prior to 1965, groundnuts contributed up to 90 percent of national oil expressing requirements. In 1983-84, cottonseed and soyabeans jointly accounted for 94 percent of the total oil extracted from oilseeds. Oil palm production in the Lowveld is expected to contribute up to ten percent of total edible oil supply at full production of the plantation in eight to ten years.

Domestic demand for edible oils increased from 21,000 tonnes in 1975-76 to 45,000 tonnes in 1982-83 and is currently estimated at 42,000 tonnes (COPA News, 1985). The rapid expansion in demand led to a five percent shortfall in supply in 1981-82, a 25 percent shortfall in 1982-83 and an estimated two to five percent shortfall in 1984-85 (COPA News, 1985). The shortfalls were met by imports and reduction in exports as well as oil extraction from maize.

The oilseed sub-sector presents a unique challenge to policy makers. Cottonseed has three joint products - lint, cottonseed meal and oil. Cotton lint is a valuable foreign exchange earner and a raw material for the textile industry. Cotton production, being labour intensive at harvesting, has employment, resource use and income distribution consequences. Groundnuts have the highest oil content and are a valuable protein source for human consumption. An increase in communal groundnuts production for oil extraction may have negative consequences for nutrition, particularly in the communal areas where groundnuts are an important source of protein for children. Soyabeans are a preferred raw material for oil extraction because of its high protein content. The protein content of soyabean meal is 46 percent compared to 40 percent for cotton, 33 percent for sunflower and 45 percent for groundnuts. Soyabean meal is valued more than groundnut meal because of its high oilmeal extraction rate which is 77 percent compared to 52 percent for groundnuts.

Currently, the oil expressing industry is giving higher priority to oilseed meal production and marketing, compared to edible oils. This is because the retail or consumer prices for edible oils are considered too low for a profitable return to investment in edible oil production and marketing (communication from a CFU meeting, Harare, May 1986).

The above discussion has highlighted the importance of substitution among crops in the oilseeds sub-sector and the need to understand the dynamics of the subsector rather than pursuing isolated studies of each commodity. Domestic demand for oilseeds crops depends on the demand for and production of vegetable oils, oilseed meals and cotton lint.

POLICY ISSUES FOR OILSEEDS

There are several key questions facing the oilseeds subsector. The prime question is how can the oilseeds sub-sector avoid over production after three to four seasons of expansion? To answer this question, an economic analysis is required of the short- and long-term impact of diversification on:

- i) farm profitability,
- ii) domestic resource use,
- iii) income distribution, and
- iv) food security.

Farm Profitability Effect

Farmers - commercial and communal - are concerned with the impact of diversification on farm profitability because of the risks involved in shifting resources to oilseeds. These arise from:

- a) lack of familiarity with oilseeds production practices because some farmers have not grown some of these crops before such as sunflowers and groundnuts,

- b) low returns associated with groundnuts and sunflowers because of low yields, and
- c) Uncertain future government policy with regard to crop prices, production quotas, etc.

Domestic Resource Use Effect

Since a number of joint products are obtained from oilseed crops, it is important to determine which crop or crop combination yields the best domestic resource use for production of each crop.

Income Distribution Effect

Income distribution effects of diversification need to be assessed to determine the relative impact of alternative policies on the different farming sub-sectors. It is hypothesized that government's perception of the relative impact of diversification on the different producer sub-sectors will influence government's policy formulation for the oilseeds sub-sector.

How the communal and commercial farming sub-sectors will benefit relative to each other will be determined by the contribution of each sub-sector to total output of each oilseeds crop. The ability of each farming sub-sector to expand production is a function of:

- a) farmers' resource endowments and
- b) availability of production technologies,
- c) institutional support (credit, extension, commodity pricing, transport services, etc.).
- d) policy environment

Food Security Effect

In the communal areas, the concern is, how will expansion of oilseeds influence household food security? Household food security is defined as the ability of a household to

maintain adequate, quantitatively and nutritionally, food supplies at all times. This can be achieved in two ways; 1) household food production and storage; and/or 2) purchasing from the market. Committing production resources to oilseeds may influence household food security as follows:

- a) A shift from grains - especially the staple food maize - may reduce household food availability.
- b) Diversifying resources to oilseeds which are essentially grown for cash may enhance cash availability for purchasing food.

The food security impact of diversification depends on (1) the capacity of communal farmers to expand oilseeds production and (2) the extent to which oilseeds crops contribute to household food security. These impacts will vary from area to area according to each area's comparative advantage in producing alternative oilseed crops. The governing factors are:

- i) land resource availability,
- ii) availability of appropriate production technologies for agro-ecological conditions,
- iii) institutional support and,
- iv) policy environment

Food security issues also differ with respect to each oilseeds crop. Groundnuts are an important protein source in the household diet in the communal areas. Therefore increased production may contribute to improved nutrition. However, production of groundnuts for sale may have a negative effect on nutrition at the farm household.

Cotton is an important cash crop for communal farmers who currently produce 40 to 50 percent of the total marketed output. Cotton expansion would increase communal farm income and the income of cotton pickers.

Sunflowers are an ideal insurance crop for (i) farming areas with short growing seasons; and (ii) when the onset

of rainfall is late for major crops and a substitution crop is needed.

It is therefore essential that the new oilseed diversitification policy take account of household food security issues in the communal areas.

Technological Change Issues

Technology plays a central role in all the issues outlined above. Groundnuts and sunflower yield levels in communal areas could be increased by an improvement in production technologies and extension service directed at these two crops (Makombe, Bernstein and Rohrbach, 1986)^{1/}. The policy issue is therefore what new technical packages are needed for oilseeds? There is a need to assess how technological improvements will affect oilseed production patterns in the short- and long-run; and what will be the impact on (i) farm profitability; (ii) household food availability; (iii) income distribution and (iv) level of aggregate oilseed output.

Export Market Potential

Zimbabwe's domestic market may not be able to absorb the output of the proposed expansion programme. Therefore, export markets for oilseeds products need to be investigated. The task is to assess Zimbabwe's comparative advantage in oilseed production and trade vis-a-vis other countries in the Preferential Trade Area (PTA) and the SADC regions. The study should determine whether the strategy should concentrate on exporting raw materials or processed products.

1/ Editor's note: See Chapter 8.

STUDY FOCUS AND OBJECTIVES

The study will focus on oilseed production in communal farming areas. The general objective is to analyse the economics of oilseed production in the communal areas in order to identify the linkages between policies, institutions and technology, and how they can be modified to influence oilseed production, income generation and food security among communal farmers. Four alternative oilseeds crops will be studied in order to determine the comparative advantage of each crop and which has the most favourable impact on income generation, employment and food security.

The specific objectives of this study are:

1. To describe past trends and the present state of the oilseeds subsector in SADCC with special emphasis on Zimbabwe.
2. To analyse the present role of oilseeds in meeting income and food security objectives of communal farmers.
3. To identify technical and institutional constraints on expanding oilseed production in the communal sub-sector.
4. To assess the potential of introducing new technical packages for the expansion of oilseeds in the communal areas.
5. To analyse needed policy changes to increase oilseed production income and household food security among communal farmers.

RESEARCH METHODOLOGY AND ANALYTICAL APPROACHES

A variety of analytical frameworks and research methods will be employed to meet the objectives. These are outlined below:

Overview of Oilseeds Subsector

The first objective will be met by a descriptive overview of the oilseeds subsector using the subsector analytical framework. A subsector is defined as the vertical set of activities in the production and distribution of a closely related set of commodities (Shaffer, 1973). For the oilseed subsector, the vertical system would be made up of producers; extension and research services; marketing structures; transport, storage and processing services; input supply activities; and consumers of oilseed products as well as the technical, economic, social and political environment in which production and consumption take place. This part of the study is interested in understanding the vertical and horizontal linkages that influence the performance of the oilseeds subsector.

Production Constraints, Technology and Food Security Assessment

For objectives two, three and four, both primary and secondary micro-level data will be collected on production, current technologies and household food security needs. Primary data will be obtained through a cross sectional survey. The sample for the survey will be drawn to represent communal farmers in all agro-ecological zones of the country, taking into account cost-effectiveness in data generation. Farm surveys in conjunction with formal discussions with extension and research personnel will be used to assess current production technologies and anticipated technological changes and their impact on food security and household income.

Different analytical techniques such as linear programming (LP), production functions, input-output analysis, and simulation can be used to address questions related to constraints and how they influence the farm system and implications of removing these constraints. The LP

technique can be used to determine the optimum mix of production activities that will maximise household income and food security. The following LP model is proposed:

$$\begin{aligned} \text{Max } Z &= f(x) = C \cdot X \\ \text{Subject to } X &> 0 \\ A \cdot X &> S \end{aligned}$$

Where Z = objective function to be maximized
 C = $m \times 1$ vector of net returns (over variable costs)
 X = $n \times 1$ vector of activity levels
 A = $m \times n$ matrix of input-output coefficients
 S = $m \times 1$ vector of constraints.

Household food security and income would be incorporated in the objective function. Activities would include oilseed crops, grain crops, production, storage, marketing, food purchasing and consumption levels and other income generating activities. Resource constraints to be incorporated are land, household storage working capital, family and non-family labour, etc. Food security constraints would be minimum protein and calorie requirement, timing of production, harvesting, storage/ marketing and purchasing. Input-output coefficients would be obtained from secondary and primary data. The LP technique can provide guidelines to identifying: (i) production constraints; (ii) effects of innovation; (iii) critical resources and their opportunity cost; (iv) income distribution; and (v) constraints on achieving household food security needs.

Studies by Stanning, Makombe and Rohrbach will be utilized as secondary data sources. Special attention will be paid to Makombe's ongoing M.Phil. study on the economics of groundnut production by communal farmers. Makombe's findings, including recommendations and issues for further research will be used to formulate specific research hypotheses.

Policy Issues

Policy implications for agricultural research, extension, commodity pricing and other policies will be drawn from the results obtained above.

STUDY DURATION

It is anticipated that the study will take about three to four years to complete. The crucial components of the study are (i) problem definition, literature review and specification of the analytical frameworks; (ii) analysis of constraints on oilseed production in the communal areas (iii) assessment of new technology; and (iv) analysis of policy options. A report on preliminary findings will be produced for each annual UZ Food Security Conference.

REFERENCES

- AGRICULTURAL MARKETING AUTHORITY, (1984). Economic Review of the Agricultural Industry of Zimbabwe. Harare, Government Printer.
- , (1986). Oilseeds Outlook and Situation Report, 1985-86. Harare, Government Printer.
- Grain Marketing Board, (1985). Reports and Accounts for the Year ended 31st March, 1985. Harare. Grain Marketing Board.
- Makombe, Godswill, Rick Bernstein and David Rohrbach (1986). "The Economics of Groundnut Production by Communal Farmers in Zimbabwe: Implications for Food Security Policy", Paper presented at the Second Annual University of Zimbabwe Food Security Conference, Nov. 9-13, Harare, Food Security Project, University of Zimbabwe.
- Modern Farming Publications Trust (1986). Commercial Agriculture in Zimbabwe 1984-85. Modern Farming Publications Trust, Harare.
- Muir-Leresche, K.A. (1984). "Crop Prices and Wage Policy in Light of Zimbabwe's Development Goals", Unpublished D. Phil Thesis, Harare, Department of Land Management, University of Zimbabwe.
- Shaffer, J.D. (1968). "Changing Orientation of Marketing Research", American Journal of Agricultural Economics 50: 1437-1453, Dec. 1968.
- Shaffer, James (1973). "On the Concept of Sub-Sector Studies", American Journal of Agricultural Economics, May, pp. 333-335.
- Tattersfield, J.R. (1982). "The Role of Research in Increasing Food Crop Potential in Zimbabwe", The Zimbabwe Science News 16(1):6.



This work is licensed under a
Creative Commons
Attribution – NonCommercial - NoDerivs 3.0 License.

To view a copy of the license please see:
<http://creativecommons.org/licenses/by-nc-nd/3.0/>

This is a download from the BLDS Digital Library on OpenDocs
<http://opendocs.ids.ac.uk/opendocs/>