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LIMA AND WOMEN FARMERS IN ZAMBIA

by

Heather Jane Baser

c 1987 by H.J. Baser

A thesis submitted to the Faculty of
Graduate Studies and Research in partial
fulfillment of the requirements for the degree of
Master of Arts
in International Affairs

The Norman Paterson School of International Affairs

Carleton University

Ottawa, Ontario

Canada

November, 1987

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The undersigned hereby recommend to the Faculty of
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the degree of Master of Arts.

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ABSTRACT

The basis of the message disseminated by the Zambian agriculture extension services is a series of standardized measures for the application of seeds and fertilizers based on a lima measure of land or one quarter of a hectare. This thesis looks at the impact of these so-called Lima recommendations on women farmers using Norman Girvan's three categories of technology: organizational, production and consumption [1983, 14-21]. The conclusion is that all three categories of the technology are inappropriate for most women. The consumption technology, primarily hybrid maize, requires a production technology (information and physical resources) to which women seldom have access because of the ownership structure and the social relations of production of the society (organizational technology). Greater access to the resources required for increased productivity will only come with improved social and legal status for women. Effecting changes in this status is thus a crucial development issue.

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Z A M B I A
AGRICULTURAL RESEARCH & EXTENSION PROJECT
AGRICULTURAL EXTENSION DEVELOPMENT
PROJECT AREA 2

MAP 2

Source: Smith:1984, 1-14

MAP 3

NORTHERN PROVINCE

ACRONYMS & ABBREVIATIONS

ADB	Agricultural Development Bank
CF	Contact Farmer
CUSA	Credit Union and Savings Association of Zambia
DANIDA	Danish International Development Agency
EPAD	Eastern Province Agricultural Development
FAO	Food and Agriculture Organization
FINNIDA	Finnish International Development Agency
GTZ	German Technical Assistance to Zambia, Federal Republic of Germany
IRDP	Integrated Rural Development Programme
LPO	Local Purchase Order
NFLP	National Fertilizer Loan Programme
NORAD	Norwegian Agency for International Development
MAWD	Ministry of Agriculture and Water Development
PPU	Provincial Planning Unit
SIDA	Swedish International Development Agency
UNZA	University of Zambia
VAP	Village Agricultural Programme (NORAD)
ZARD	Zambia Association for Research and Development
ZCF	Zambia Cooperative Foundation

INTRODUCTION

Smallholder agriculture has traditionally received little attention from government planners in Africa and has benefited from very limited funding. At the same time, the sector offers considerable potential under the right conditions for increased production, a fact aptly demonstrated in Zimbabwe where small farmers increased their marketed production from a maximum of 80,000 tons before independence to 400,000 tons in 1984 [AED:1985]. One of the most limiting factors to increased agricultural productivity from the smallholder sector in most African countries is the lack of appropriate new farming technologies. In spite of growing recognition of this need, little work has been done on developing and disseminating technologies for small farmers. The Zambian Department of Agriculture has developed a series of farming recommendations for a variety of crops grown by small farmers. The extension programme promoting these recommendations, known as Lima after the measure of land on which it is based, has attracted the attention and support of numerous international organizations because of the novelty of its volume-based approach. The rate of adoption of the technology has, however, been lower than expected and the production of participating farmers not always high enough to pay the

costs of the additional inputs required. Since women perform more than half of the agricultural labour in subsistence and small-scale commercial households in Zambia, one major study of the technology has recognized that improving the rate of diffusion of the technology will depend on involving them [Eklund:1985].

This paper will explore this proposition by looking at women's participation in Lima, focussing particularly on the following questions:

- 1) To what extent do women have access to the Lima recommendations? To accessory services such as credit and marketing?
- 2) To what extent do they adopt the Lima message? If they make modifications, what are they?
- 3) What are the characteristics of both those women farmers who do adopt the technology and those who do not with emphasis on family status, resource endowments, and economic class?
- 4) What appears to be the impact on production of women who do adopt Lima messages? (An accurate measurement of impact is only possible if detailed studies were carried out prior to the introduction of the Lima programme. Even when such studies are available, factors such as climate and availability of inputs must also be considered).

The main argument of this paper is that Lima's failure to attract women farmers is the result of a top-down development model which fails to take into account the social and resource constraints of these farmers.

The thesis consists of five chapters. The first provides the theoretical framework for the analysis of agricultural extension to women farmers. It draws on three main bodies of theoretical literature: technology transfer, agricultural extension, and women in development. It

assesses why most agricultural extension programs have not responded to the needs of women farmers in Africa and discusses how these needs differ from those of male farmers. An alternative extension model to the commonly used top-down approach is proposed. The second chapter provides an historical overview of Zambian agriculture and the role that women play in it. One of the most important themes is the evolution of commercial agriculture and its impact on women's roles as well as on their status within the household and in the broader society. Another important issue is the extent to which the bureaucracy is committed to the egalitarian ideals of Zambian humanism and to the reduction of rural/urban income disparities. The third chapter reviews the development of the Lima recommendations and how they have been promoted. It also provides an overview of some of the broad problems Lima has encountered. The fourth chapter looks at the extent to which women adopt the Lima technologies and the constraints they face to adoption. The results of this author's interviews with women farmers in two areas of Zambia are analyzed and related to the findings of surveys from other studies. The final section makes some suggestions about how Lima can better meet the needs of women farmers but also assesses the potential for adoption given the present socio-political and economic situation in Zambia.

CHAPTER ONE

THEORETICAL FRAMEWORK

A. INTRODUCTION

The purpose of this chapter is to provide the theoretical framework against which the role of women in Zambian agriculture and, more particularly, in Lima activities will be reviewed. Because Lima is an attempt to transfer new technology to farmers, the literature on technology transfer is relevant. Since the Lima technology is disseminated mainly through the agricultural extension system, it is also important to look at how extension services have developed and the philosophies behind them. Finally, the growing body of literature on women's roles in society in general and in agriculture specifically provides a foundation from which to understand the situation of Zambian women.

B. CONCEPTS OF TECHNOLOGICAL DEVELOPMENT AND TRANSFER

Since agricultural extension is primarily a means of promoting technological change, let us first define

technology. Ilse Schumacher, Jennifer Sebsted and Mayra Buvinic [1980, 7] define it as

"knowledge composed of two dimensions, one which involves the technical inputs to production (i.e. equipment, material, hardware); the other is the ability to effectively utilize and adapt these inputs in the process of production".

It is never constant and evolves continuously with new or improved products, materials and ideas. Within this broad definition of technology, Norman Girvan [1983, 14-21] distinguishes three categories. The first is production technology which includes the materials, the tools and the skills required to produce a given product. Girvan's second category is consumption technology which refers primarily to the choice of what to produce. It includes the methods by which specific functional needs or demands such as food and transport are satisfied and especially the specific products that are used to satisfy such needs. The third and final category is organizational technology which refers to the organization of production including the scale of production and the ownership structure as well as the structure of the social relations of production associated with particular production and consumption technologies.

Looking at diffusion of technology from the point of view of the user, it is generally conceded [P. Oakley and C. Garforth:1985, FAO:1985 and B. E. Swanson, N. Roling and J. Jiggins:1985] that there are five different stages which an individual passes through before adopting a technology. The

first stage is awareness of the existence of a new technology. Secondly, the individual must have sufficient interest to seek more information and, thirdly, to evaluate the probable impacts of the technology. He/she may then conduct a small-scale trial which, if successful, is followed by the last phase, incorporation of the idea into his/her usual practices.

From a social point of view, "technology transfer" is the important concept especially in reference to development and technology policy. It refers to the transfer to and integration into a new environment of an outside technology. To be truly effective and integrated, technology transfer must consist of three aspects:

- 1) the transfer of materials or techniques. In the agriculture sector, this would include the appropriate¹ choice of both crops (consumption technology) and of farming methodology (production technology).

- 2) the transfer of design; for example, in the agricultural context, the adoption of an organizational structure for extension and peripheral services which meets the needs of the majority of farmers.

¹ Mary Anderson (1984 page 68) suggests that appropriateness "implies a link to some external factor and a judgement about correctness in relation to something else such as resources, goals or values. Furthermore, scale, complexity and expense are not always positively correlated."

3) the transfer to users of the technology of the capacity or skills to find indigenous solutions to problems related to it.

The organizational context is an important factor in determining to what extent the capacity or skills to find local solutions are transferred. All too often, as Girvan points out, skills are not transferred with capital equipment. This is especially true with reference to flows of technology between the developed and developing countries but may also pertain in the case of flows between different classes within the same society. In these cases, technology may be inserted into existing structures without being understood, such as when international organizations supply equipment without training the users in its maintenance. It is used only until it falls into disrepair. In contrast, effective technology transfer includes more than the introduction of production techniques and concern about their appropriateness to the situation at hand. It takes into account the structure of the broader social and political systems as well as of the narrower institutional context which determines who has access to technology and with what consequences.

But technology comes not only from outside a society as implied above. Martin Bell [1979, 45] refers to indigenous technical knowledge which he defines as "technical knowledge rooted and embedded in specific social groups" or

"technical knowledge (which) must be not merely present within the given socio-economic and spatial boundaries, but also an active component of the culture of the social group concerned, being stored, communicated, and used by its members to serve some purpose in relation to productive activity within the society".

Though agricultural extension has traditionally concerned itself, as we will see in the next section, with exogenous knowledge, increasingly new approaches are being developed which take indigenous technical knowledge more into account. Let us first look, however, at traditional extension approaches.

C. AGRICULTURAL EXTENSION

One of the most important methods by which farmers are encouraged to incorporate new ideas into their cropping practices is through government extension services. Traditionally, extension has not been concerned with generating knowledge; this has been done in specialized institutions such as research stations and agricultural colleges and universities which have provided the information to the extension services for dissemination. Instead, it has been seen as "the process by which knowledge is communicated, in a variety of ways, to the farm family" to use the definition adopted by P. Oakley and C. Garforth in the F.A.O. Guide to Extension [1985, 8]. As such, it is an activity occurring over a period of time with the message

being presented a number of times rather than being a single event. Daniel Benor, James Harrison and Michael Baxter of the World Bank [1984, 7] suggest three main objectives for extension: to help farmers benefit from research findings and technological advances, to assist them in adjusting to seasonal and economic conditions and to help them use support services to increase their productivity and income. Oakley and Garforth [1985, 11-12], on the other hand, propose broader and more participatory goals: to transfer knowledge and skills to farmers, to provide advice and information to assist farmers in making decisions, to help develop farmers' organizations, and to assist farmers in developing their self confidence and their decision-making capacities. Both of these definitions presuppose, however, that the outside agent will organize the choice and transfer of the technology. Before looking at alternatives to this approach, let us look at the history of agricultural extension which, at least in the Third World, has usually been built around the principle of the imposition of outside technology, without necessarily the real transfer as described above. We will also look at some of the communication strategies extension used to attain the goals defined above by Oakley and Garforth and Benor et al.

Extension is often neglected. There are several reasons for this. Firstly, it is difficult to directly link poor performance in the agriculture sector with the lack of

extension. Furthermore, because the role of extension is usually catalytic rather than directly productive, its impact is difficult to quantify². Secondly, extension is one of the most complex activities for a government to organize and administer. Because extension workers are scattered and often isolated, it is difficult to monitor their work or to limit it to one role. Extension is also expensive to provide especially if there is a genuine attempt being made to reach all the farmers of an area rather than just a few elite.

The structure of agricultural extension in most developing countries was modeled after systems in Western Europe and North America and was designed to increase the supply of primary agricultural commodities such as coffee, tea, rubber, sugar and cocoa to the developed countries. This raised two problems. Firstly, the neglect of foodcrops resulted in a relative decline in productivity in this sector. Secondly, the often heavy-handed approach used by the extension services left a legacy of mistrust. Marguerite Berger, Virginia DeLancey and Amy Mellencamp [1984, 22] note that the emphasis was often on regulation and supervision

² The World Bank has found a positive correlation between extension and productivity in its work in Haryana, India [The Impact of Agricultural Extension A Case Study of the Training and Visit System in Haryana, India. Gershon Feder, Lawrence Lau, and Roger Slade. 1985]. Jean M. Due, Naftali Mollel and Violet Malone [1986] also found a significant and positive correlation between maize yields and the number of extension visits to women in the Tanga region of Tanzania.

with direction, persuasion and even coercion being used to meet given targets. Carl Eicher and Doyle Baker [1982, 151] note further that extension agents were often responsible for collecting taxes and for enforcing rules regarding land conservation, prohibitions on growing certain crops and facilitating the recruitment of "forced" labour for roads, mines and plantations. With independence, many extension services were revised to a "community development" or "animation rurale" approach - an approach which stressed more generalized export production but did not exclude food crops as did the old colonial systems. As this approach was both time-consuming and costly, it met only limited success and has been modified.

Today there are a wide variety of extension approaches in use. They can be either crop specific or designed to provide information about various crops and problems. Information can be channeled through several different institutional structures including general, government sponsored extension services, crop specific agencies, integrated rural development projects and commercial establishments. They can also use a number of different communication strategies. Let us look generally at those communication strategies which will be most relevant when we analyze the Zambian extension services in later chapters.

Individual or face-to-face methods of extension are probably the most common approach used in both developing

and developed countries. The extension agent meets the farmer in his or her home, on the farm or in the agent's office to provide information or advice. Individual contacts can be a powerful instrument in helping farmers through difficult decisions and in getting them to participate in extension activities. Such visits, especially those to the farm, are, however, very time consuming with resulting cost implications.

To reduce costs and to provide wider coverage, various methods of extension directed towards groups have been developed. The most common approach is a meeting between the extension agent and a group of farmers, usually ones with similar problems. Another frequently used approach is the demonstration. The method demonstration is a step-by-step lesson on how to carry out a procedure known in general terms to the farmers concerned. The result demonstration, on the other hand, is designed more as an introduction to a new crop or practice. Its impact extends beyond the few minutes when the extension agent gives his or her explanation of the results because passing farmers can see the crops grown and monitor their progress during the whole growing season. Yet another group approach is the field day, a large-scale, usually informal, demonstration. The purpose is to introduce a new idea or crop and to stimulate as much interest in it as possible among farmers. The final group extension approach relevant to this paper is the courses for farmers

usually lasting from a few days to several weeks offered through farmer training centres.

In terms of communication strategies with groups, this paper will look at three main approaches: first, the contact farmer system and its derivative, the Training and Visit scheme; second, farming systems; and third, research, development, production (RDP) as defined by the International Development Research Centre. The contact farmer system is probably the best known of these. The extension agent works through contact farmers who are usually "progressive farmers", that is, those deemed most willing to adopt innovations. These are assumed, in turn, to diffuse to other farmers through local channels of communication.

The contact farmer system is based on the theory of diffusion of innovations which assumes that

"the dissemination of information is the basic sociological process leading to agricultural productivity through the adoption of new and/or improved farm practices" [Monu:1982, 118].

According to this model, new ideas are initially adopted by a highly innovative group of farmers whose financial status allows them to take risks and from whom information is spread to other farmers in the area.

The diffusion of innovations model suffers from a number of inadequacies largely related to the fact that it ignores the organizational side of technology. It emphasizes, often to the neglect of other factors, the acquisition of knowledge as the basic process by which

agricultural modernization occurs. This can result in too much attention to the ignorance of the farmer and not enough to general economic conditions or to the resource endowments of individual farmers and their impact on the adoption of a given technique. The emphasis on communication channels can also lead to the neglect of community norms such as leadership structures which restrict access to inputs. The impact of such economic and institutional factors may be a more important limiting factor to the adoption of technology by small farmers than the reason given by many researchers, that small farmers are reluctant to innovate because failure could mean disaster in an already marginal environment. Monu found that small farmers in Nigeria adopted new technology as quickly as larger, wealthier ones when equal opportunities were available. His conclusion complements John Mellor's [1967, 50] statement that farmers are efficient

"as individual decision-makers operating within the environment they face. The inefficiency lies with society's allocation of resources - its failure to take the steps necessary to provide an environment in which the peasant can be more productive."

By assuming that innovations are first adopted by richer farmers, the diffusion of innovations model justifies biasing services towards wealthier farmers from whom information about new technology is to trickle down to the majority. There are a number of reasons, however, why

innovations may not trickle down from these wealthier farmers to poorer ones. First, information received directly is more precise than that received second hand. Second, "non-progressive" farmers do not necessarily seek information from "progressive" farmers. Such non-transfer of information may be because of communication barriers created by the social and economic differences between them. It may also be a result of a recognition that technology is not always scale-neutral and that the innovations suitable for "progressive" farmers, who usually own larger average farms, may not be suitable for smaller farmers who have different factors of production. Indeed, Erasmus Monu [1982] found in Nigeria that farmers were more likely to seek information from other sources than "progressive" farmers. Finally, by the time innovations sift down to the majority of farmers, the progressive farmers have already reaped windfall profits from increased production, as a result of subsidized inputs. This in turn increases existing income disparities.

The World Bank has tried to solve some of the problems in the contact farmer approach by developing its version of the system, the Training and Visit System (T and V). The key to T and V is still the contact farmer who assists the extension agent in organizing meetings. This farmer should, however, be chosen because of the similarity between his/her farming characteristics and those of the majority of farmers in the area rather than, as under the old contact farmer

system, because of his/her "progressiveness". The chances of disseminating innovations to similar farmers should therefore be enhanced. In addition, T and V embodies a number of tenets which result in more structure than exists in the simple contact farmer approach. These include: fixed, regular visits to farmers' fields by all extension staff; primacy of subject matter specialists; strong, two-way linkages between farmers, extension and research; extension staff to concentrate on extension only; frequent, regular training of all extension staff; and development of specific, relevant production recommendations to be taught to farmers. The extension worker is to divide his/her area into sectors and to establish a regular schedule of visits to them in order to conduct meetings on prearranged topics. Visits to individual farmers with specific problems should normally follow.

Despite some positive features, such as more training for extension agents, improved methodology for supervision of the activities of such agents and making village-level agents responsible for extension only, T and V has a number of limitations. Most African countries, for example, do not have the required level of trained manpower and the transport and communication infrastructure needed to meet the schedules laid down. Although T and V contact farmers are not supposed to be more wealthy than others, Berger et al. [1984, 42] imply that they are nonetheless usually more

politically influential, a category which normally excludes poorer farmers, especially women. The fact that T and V has not been successful in responding to the needs of women farmers has been recognized even by the originator of the approach, Daniel Benor. In his joint work with Michael Baxter [1984, 172-3], he suggests that it is difficult in some societies for agriculture extension agents, especially if they are male, to interact with farm women and that, in any event, the role of the male family member in decision making still requires information to flow to men. He also notes the dominant role of men in determining the directions of extension services and that extension management does not always see the need to reach women. Thus, although T and V has resolved some of the problems of the contact farmer approach, it still suffers from a number of serious limitations especially where women farmers are concerned.

An alternative extension approach to the individual and group contacts described above is the provision of information through large-scale approaches such as local voluntary organizations, mobilization campaigns or mass media. Media campaigns through radio and television are often effective ways of increasing awareness of a new technology. The later stages of the adoption process such as reinforcing the information disseminated or providing answers to specific questions do not, on the other hand, easily lend themselves to this approach and are usually

facilitated through another channel. Volunteer associations may provide this follow up but they are often administratively cumbersome and time consuming, with higher costs as a result. Cooperatives also often serve as channels for information. Women's participation is limited, however, because membership is usually open only to heads of households, a status usually bestowed on females only when they are divorced or widowed. Nonetheless, some women's organizations have been successful in securing agricultural services although there is a danger of weakening groups not set up for agricultural purposes by grafting onto them activities in which the majority of members show little if any interest. As Berger et al. [1984, 51] point out, the domination of women's groups by high status members may also result in poorer women being excluded from services. In summary, although large-scale approaches offer some potential for reaching the masses of farmers, they are not necessarily inexpensive nor immune to the same social pressures which skew general government extension programs towards wealthier farmers.

The above discussion has focussed primarily on communication strategies. It has only hinted at the issue of control of the communication process, Girvan's category of organizational technology. Most extension services are established on a top-down model. A centralized authority decides what is most appropriate and the program is

developed accordingly, all too often being standardized throughout a given country. Dissemination of information goes in one direction only, down. There is little, if any, consultation with farmers to determine what their perceived needs are. The assumption is that technology can only be transferred from a "more advanced" civilization to a "less advanced" one with these civilizations often being simply social classes within a society.

But as UNICEF ³ [cited by Thomson:1981, 198] points out:

"To be fully appropriate, a technology should, ideally, grow from within the society rather than be imposed from without."

This suggests the development "from below" model as conceptualized by Walter Stohr and D. F. R. Taylor. This approach "considers development to be based primarily on full mobilization of their (territorial) natural, human and institutional resources" (Stohr and Taylor:1981, 64) with the basic objective being the satisfaction of the basic needs of the inhabitants of the area. Whereas development "from above" assumes that a few select agents are the source of initiatives for the rest of the population and that they can and will conceptualize social, cultural, economic and

³ UNICEF/Central Bureau of Statistics. Situation analysis of children and women in Kenya, Vol. 3, The roles and situation of children. Nairobi. 1984

political developments which are suitable for all ⁴, development "from below" provides scope for different "concepts of development depending on the natural and social environment of different communities and (for) the development over time of specific cultural and institutional conditions." [Stohr:1981, 44]. Decentralization of authority and community participation in decision making are key features of development "from below".

An alternative to development "from above" in terms of participation of the concerned population is farming systems research (FSR). The International Maize and Wheat Improvement Centre (CIMMYT) manual Planning Technologies Appropriate to Farmers: Concepts and Procedures [1980, 12], which is widely used by organizations involved in FSR throughout the world, defines a farming system as

"the totality of production and consumption decisions of the farm-household, including the choice of crop, livestock and off-farm enterprises, and food consumed by the household".

In the FSR approach, the farmer rather than the crop is the focus in a process normally consisting of the following steps:

- 1) conduct informal reconnaissance surveys of farmers to identify their problems and constraints in achieving

⁴ Robert Chambers and B. P. Ghildyal call this the Transfer of Technology (TOT) model, the ingrained thinking of many professions and disciplines that power, prestige and professional skills are concentrated in well-informed cores or centres.

their multiple goals;

2) conduct on-farm trials of promising techniques and varieties;

3) analyze results of farm trials in several locations and evaluate the economics of promising interventions;

4) assess the experiences of farmers in using the recommended practices and varieties; and

5) extend promising interventions to a broader group of farmers [Eicher and Baker:1982, 159].

The approach recognizes the differences in the circumstances of farmers and the fact that these can influence decisions on choice of technology. Because it would be impossibly expensive, however, to develop a research programme to solve the problems of each and every individual farmer, CIMMYT [1980, 13] suggests classifying farmers with similar circumstances, for whom it is possible to make more or less the same recommendations, into "recommendation domains".

Although the CIMMYT approach has made substantial progress in reorienting research and extension towards problems identified by farmers, as opposed to those identified by researchers, Fiona Thomson [1981, 192] points out that it has also relied heavily on the use of outside experts. As such, FSR is not the farmer-directed approach that development "from below" would encourage. In addition, as Christina Gladwin, Robert Zabawa and David Zimet [1982, 27] note, "the goal of direct and creative farmer

participation has been elusive", thus reducing the opportunities to build on indigenous technical knowledge and to promote the adaptation or improvement of existing production systems by those operating the systems. Adapting outside solutions to solve local problems is still the emphasis rather than incorporating knowledge from outside a society to reinforce existing capabilities.

In recognition of such shortcomings, the International Development Research Centre (IDRC) in its publication Coming Full Circle [Matlon et al.:1984] proposes a modification to the farming systems approach. In the introduction to this book, R. Tourte [1984, 12] suggests that the system be called RDP - research, development, production - and that farmers be involved:

"first, in diagnosing the problems, second, in designing technical improvements, and, third, in using and evaluating the innovations".

He further suggests that each phase will require different methods with adoption, extension and adaptation involving

"close personal cooperation between researchers, farmers and extension personnel in both real and controlled environments to generate innovations adapted to the various types of landscape and production that exist" [1986, 13].

Furthermore, farmer-partners would be selected "who are representative and with whom innovations will be negotiated" [Tourte:1986, 13]. The implication here is that the participation of farmers in the development of technology would give them some control over the final form of that

technology. Despite the emphasis on involvement of farmers and on understanding their problems, even the IDRC approach makes no specific reference to the fact that women farmers face particular constraints because of their gender. As Mackenzie [1986, 3] points out, the sex/gender system is a significant key to the accurate analysis of the socioeconomic reality of farmers. Since that reality in turn affects to what extent women can and do adopt and adapt technology, let us look at their situation in more detail.

D. WOMEN AND AGRICULTURAL TECHNOLOGY

In the first section of this chapter, we defined three different kinds of technology: production, consumption and organizational. Let us now look at each of these and its impact on gender, starting with organizational technology.

For women farmers, the key factor governing how they organize their agricultural production is their almost universal responsibility for the reproduction of the labour force which Lourdes Beneria [1979, 205] defines as:

"not only the daily maintenance of workers and potential labour, but also "the allocation of agents to positions within the labour force". That is, while biological reproduction refers strictly to the physical development of human beings, the reproduction of the labour force refers to the process by which they become workers. Schooling, for example, is an important factor in the reproduction of the labour force. In a rural society, the transmission of agricultural and other required skills from one generation to the next is a fundamental aspect of the process by

which the rural labour force is reproduced."

Ann Whitehead [1984, 93] contends that women's roles in these activities are governed by the "conjugal contract" or the implicit and cultural terms on which husbands and wives exchange goods, income and services, including labour. This contract is the basis both for marriage and for the household as a collectivity concerned with the daily maintenance of its members.

Reproductive activities are the most culturally consistent roles assigned to women in a division of labour by gender.⁵ Women's irreplaceable biological role which has become associated with childcare and other domestic tasks is the primary justification for this division of labour. As Beneria [1979, 210] notes, it has been the "root of the separation between women's primary sphere of concentration and that of men". At the same time, the distinction between reproductive and productive activities in subsistence economies is unclear and domestic work includes many tasks geared to consumption within the household. Women's participation in agricultural tasks and marketing activities is, for example, often an offshoot of their domestic reproductive activities. In many African ethnic groups nearly all the tasks associated with food production except land clearing are left to women. Men are usually responsible

⁵ Gender refers to the socially defined roles assigned to the sexes as opposed to those biologically defined.

for land preparation, house building and cash cropping although for the latter they rely heavily on women's labour for planting, weeding and harvesting. It is the activities involved in domestic work where the sexual division of labour is most rigid, probably, as Maureen Mackintosh [1984, 13] suggests, because these tasks are most crucial to the perpetuation of existing forms of the relations of marriage, procreation and filiation. This is what she calls "human reproduction" or:

"the relations of marriage and kinship in a society, or, put more broadly, those relations which circumscribe and determine the operation of fertility and sexuality, and construct the context for the bearing, care and socialization of children" [1984, 11/12].

The conjugal contract is part of the structure governing human reproduction and is one of the major factors in determining the power relationships in a household, usually in such a way as to incorporate male dominance and control of women's sexuality. It is through such mechanisms that gender subordination is embedded in the sexual division of labour.

The sexual division of labour goes beyond the division of tasks and governs the division of benefits as well. Ann Whitehead points out:

"By the sexual division of labour is meant not merely a list of men's jobs and women's jobs, nor indeed a set of cultural values about the suitability of various activities to the gender categories, but rather a system of allocating the labour of the sexes to activities, and highly importantly, a system of distributing the products

of these activities." [1981, 95].

Because of the division of labour and the conjugal contract which underlies it, the work done by men and women is non-comparable in the sense that one is considered to have more value than the other. Thus, she contends that "products are not distributed on the basis of the relative labour input into production" [1981, 115]. Rather it is the conjugal contract which largely determines how much control women have over household resources and whether they are able to keep the resources they produce or not.

Mackenzie [1986, 75-77] refines the issue of relations of power between men and women by suggesting a number of other factors which can condition them over time, some of which will be discussed later in this paper. Important here is the concept of "the centrality of sex-differentiated economic activities to society as a whole" [1986, 54⁶]. In many societies, the social value of the labour input of one gender or the other is a function of its value in the market. The introduction of cash crops has tended to result in an economic value being fixed to the labour of the men involved and in control whereas no such value was ascribed to the labour of the women which then became less "strategically indispensable".

⁶ Mackenzie draws this concept and the terminology of "strategic indispensability" used below from R. L. Blumberg [1978] Stratification, socioeconomic and sexual inequality published by W. C. Brown in Dubuque, Iowa.

We might well ask what the link is between the adoption of technology and the above discussion on the ties between women's role in reproduction, the sexual division of labour and the dominance/subordination relationship between the sexes. As Girvan [1983, 19] has noted,

"One error that is frequently made by science and technology policy-makers, engineers, economists, etc., is to neglect the relationships that must exist between technology, power-relations and economic organization and the way in which these condition the socio-economic effects that result from the adoption of particular technologies."

Firstly, as we have seen from the above discussion, power relations do not favour women at the household level. On the other hand, planners have traditionally assumed that what is good for the household is good for each of its members and that the male household head has the interests of his family in mind in all situations. The evidence contradicts this assumption, however, while providing some insights into how women make decisions on technology within their households. In the first place, the interests and capabilities of all members of a household are not homogeneous and may, in fact, be contradictory. They may thus have different objectives and may respond to different incentives. Thus, Mary Burfisher and Nadine Horenstein [1983] suggest that Tiv women are less willing than men to adopt the technologies promoted by an integrated agricultural development project in central Nigeria because of the requirements for increased labour which, in turn, take away from their other household

responsibilities. The interest shown in carrying out a particular activity also often depends on the level of incentives offered. In Northern Cameroon, Christine Jones [1983] found, for example, that expected benefits affected whether women allocated their labour to transplanting their husband's rice or to tending their own sorghum crops. The second factor undermining the ideology of the household good is the separation of the incomes of men and women in African households and their allocation to uses. Women tend to take more responsibility for family nutrition and health whereas men spend their incomes more on consumer goods, entertainment and prestige items. An increase in general household incomes, especially if it is controlled by a male, does not necessarily mean an improvement, for example, in the nutritional level of the family. Indeed, a 1985 study by the Integrated Rural Development Project in Mpika, Zambia involving two visits to each of 205 households in the districts of Serenji, Mpika and Chinsali in Central and Northern Provinces found declining household nutritional status with increasing farmer commercialization. Even where caloric intake increases with improvements in family income, there is no guarantee that the additional food will be shared equally. Hence, in an International Food Policy Research Institute survey of 167 sugar farmers in Nyanza Province in the southwest part of Kenya, Eileen Kennedy [1986, 9.18] found that household calories were not strong

predictors of child or mother's nutritional status. This example and the others cited in this paragraph indicate that the interests of different household members can conflict and that power relationships often determine whose interests are given priority.

In terms of the adoption of technology, the second major issue for women is their position in society. Their subservient role in the household in most cultures is carried over into the broader societies in which they live. As Claire Robertson and Iris Berger [1986, 14] point out, gender is a relevant social category although its impact is difficult to define:

"while class ⁷ position mediates the experience of gender, gender is an important determinant of class position, a relationship largely responsible for the high level of difficulty encountered in defining gender-class relations."

They suggest that access to critical resources may be a useful way to determine women's relationship to the means of production and thus their class position. In this regard, what is important is less ownership of resources than control over them and who can use them. Although, as noted above, the conjugal contract limits how much control women have within the family, association with a man often allows access to resources which a single woman alone may not have

⁷ Staudt (1985 page 214) defines class as "a set of persons who stand in a similar position with respect to some form of power, privilege or prestige."

and may thus offer a higher standard of living and higher class position. To again quote Robertson and Berger [1986, 17],

"autonomous class position too often means lower-class position because of women's limited access to economic resources."

On the other hand, Staudt [1986, 198] cautions against subsuming women into class rankings based strictly on male status because resources are not generally pooled within households and women cannot normally draw on those of their husbands. A high degree of marital instability also means uncertainty in relationships.

Women's status is also affected by their participation in social institutions. Staudt [1986, 198] contends that female solidarity organizations can affect women's status although the impact of these organizations is more in terms of status for the individual than general economic or social gains for women as a group. It is also important that women participate in the central institutions of society⁸ because, as Mackenzie [1986, 75] notes, the nature of gender participation in these institutions is one of the factors determining power relations between men and women. On the other hand, says Staudt, elite women may work politically to advance the interests of their class more than of their

⁸ Schlegel [1977, 19] defines a central institution "as one that establishes priorities in the allocation of time, goods and personnel, and legitimizes motivation and justification for action".

gender. She sees most hope for change in women's economic conditions through gender-based class consciousness based on female self-sufficiency, such as among exploited factory workers. Robertson and Berger [1986, 20] similarly suggest that female solidarity can play a strong role in promoting class action for women not in wage-earning positions.

The low status bestowed on women in most societies helps to make them "invisible" to policy makers and planners: their roles as productive members of society are not recognized and are ignored in much research and data collection, in developing programmes and in implementing them. Meeting the technological or other needs of women becomes a low social and economic priority because its importance is unrecognized.

Invisibility takes two main forms. The first is the cultural bias which tends to stereotype women into certain activities, often incorrectly. Probably the best example of this is the assumption in much agricultural planning, despite contradicting feminist literature, either that all farmers are men or that the sex of farmers is irrelevant [Fortmann:1981, 205]. This assumption contributes to often limited access for women to the factors of production such as land. Their plots are usually smaller than those of men. Even in countries like Zambia where large areas of land are as yet uncultivated, the Zambia Association for Research and Development (ZARD) suggests that women tend to be allocated

land that is more remote, less well serviced and less fertile [1985, 86]. In addition, occupation of land is usually on the basis of usufructuary rights rather than legal title. The second form of invisibility is economic, resulting from a definition of "production" which excludes much of the work carried out by women, especially those in the subsistence agricultural sector in most Third World countries, from the calculations of domestic productivity and other national economic indicators. For economists, "production" is normally associated with generating goods and services for the market and excludes the reproductive activities discussed above. Such a definition of production raises certain anomalies and the distinction between it and reproduction is probably artificial.⁹ As Kathleen Cloud [1985, 22] writes:

"Without a definition of output that includes all the productive uses of household time, it is impossible to understand correctly the opportunity costs of members' time, and the underlying rationality of the tradeoffs they make in allocating their time and other productive resources among activities".

In the agriculture sector more specifically, she suggests that the definition of production should include the entire agricultural-human system required to make crop production

⁹ Note for example that the work of a wife in preparing meals for her husband in the field and transporting them to him is not considered to be an economic activity, but if the same man were to purchase meals from a woman other than his wife, his action would be counted as a contribution to gross national product.

possible.

The phenomenon of invisibility contributes to two other tendencies relevant to this paper. The first is the gross under-enumeration of women's roles in data collection. The second, which is linked to this issue of statistical visibility, is the paucity of services to which women have access to assist them in their productive roles. In their review of various studies on African extension programs, Berger et al. [1984] show, for example, that male heads of household and farmers with access to basic services are the main beneficiaries of such programs [Staudt:1985, Fortmann:1982, Muntamba:1982]. But failure to provide services to those who do the work (which, in the agriculture sector, is often women) may have serious negative effects on the results of the activities concerned. Thus, in Bangladesh, where the results from the introduction of high yielding rice were disappointing, it was found that the women who were normally responsible for selecting the seeds were choosing the wrong ones because the relevant extension recommendations were directed only to men and the information was not trickling down to their wives [FAO:1983]. Women lacked the social and political status necessary to be the foci of extension programmes.

The above discussion has focussed on how social relations are organized and their impact on women's ability to access technology. But access to technology is not

enough. Unless the technology in question responds to the needs of the group to which it is directed, acceptance rates are likely to be low. Let us then turn to the impact of women's productive roles on their choice of consumption technology.

We discussed above how women are almost universally responsible for reproduction of the labour force. It can thus be expected that their primary concern in the agricultural sector will be provision of food for the family. Even when they are involved in cash cropping, because they do not usually control the resulting income, they are likely to be more interested in ensuring the continuity and reliability of food crops, which remain under their control, than in maximizing profit from sales. They may thus give higher priority to the storage qualities of a crop than to its yield. Choice of crops is also affected by the fact that most women do not sell agricultural produce. Their response to changes in market prices for crops is likely to be less marked than that of men who tend to be more integrated into the capitalist system.

The choice of consumption technology affects the production technology which has to be used. As Girvan [1983, 17] points out,

"the more narrowly a product is defined in the selection of a specific consumption technology to satisfy a given need or demand, then the more narrow will be the range of possible production technologies."

Thus, in an agricultural economy based on one crop, government services tend to revolve around the production requirements of that crop. On the other hand, if a development strategy aims to bring domestic/regional production in line with domestic/regional consumption, the range of consumption technologies available and encouraged by government services would normally be broader and would reflect locally available resources. The range of production technologies would also be greater. Although it is generally recognized that the production technologies used by women are inadequate to substantially increase crop yields, the reasons for this inadequacy are not as widely recognized. In order to better understand why, let us analyze the impact of gender on the four sub-elements of production technology, as Girvan [1983] defines them. The first element is "the knowledge about and the skills associated with both the abstract and the material elements of production" [1983, 15]. As noted earlier in this chapter, extension services were originally established in Africa by the colonial powers as a means to promote export crops. This emphasis has continued in many of them to the present day with research and extension providing technical packages or proven innovative methods primarily, if not exclusively, for cash crops. As a result, the technical packages available for traditional food crops is probably weaker than those for cash crops [Berger:1984, 18]. Because most female farmers

concentrate on food crops rather than cash crops, the information available to assist them is thus limited. Not only are information packages suitable for the consumption technology women generally choose weak, but female farmers are not always given the chance to acquire the knowledge which is available. This brings us then to Girvan's second sub-element [1983, 15] in production technology, "the people possessing the knowledge and the skills". Although women are knowledgeable about a broad range of consumption technologies by virtue of their experience with a variety of subsistence crops, their opportunities to learn about new technologies to increase the efficiency of their production are often limited. Firstly, illiteracy rates among female farmers tend to be higher than among male farmers. USAID [1984, 62] notes, for example, that where figures are available, literacy rates for rural women vary between 10% and 70% of those for men. Illiterate farmers tend to have more difficulty using purchased inputs because the instructions are often available only in writing or in a limited number of languages. Secondly, education levels among rural women also tend to be lower than for men. It is generally accepted, however, that education improves the abilities of farmers to make accurate agricultural decisions and to innovate. Thirdly and finally, as we noted when discussing both the issue of invisibility and the T and V system, women usually have less access to extension services

than men. In this regard, female-headed households ¹⁰ are particularly disadvantaged despite the fact that they represent both a high percentage of total households and a disproportionate percentage of the poorest households in most African countries. Women who share the responsibility for agricultural production with another household member (usually their husbands) tend to have better access to services if only because contact is made via their husbands. On the other hand, it cannot be assumed that women not present at the visit of an extension agent will receive relevant information from their husbands. Fortmann [1982] showed that women farm partners in Tanzania often did not receive accurate agricultural information from their husbands. This failure to pass on information is probably most true where men's and women's roles are quite separate and men take little interest in the work of women.

The third aspect of production technology as defined

¹⁰ For the purposes of this paper, a household will be defined as a group of people living together in a common residence and cooking and eating under one roof, the definition used by the 1980 Census in Zambia. A household head will be defined as the senior member of the household resident on the holding or returning frequently, the definition used by Mackenzie (1986 page 447 but citing The Integrated Rural Surveys 1976-1979: Basic Report [1981], Central Bureau of Statistics, Government Printer, Nairobi). Where there is a husband, he would be considered head of the household. A female-headed household is then one headed either a) by a woman in the absence of a male such as through divorce, widowhood or, more rarely because of the difficulties for single women to control land, spinsterhood; or b) by a woman whose husband is absent from the holding for a relatively long period of time.

by Girvan [1983, 15] is "the physical and chemical processes of production". Of these, physical processes or the extraction and processing of natural materials are the relevant concept here. The usual bias in the Third World towards large-scale farmers [Berger et al.:1984, 2] encourages the development of technical packages oriented towards capital-intensive agriculture. The small-scale and poorer farmers into which category most women fall have neither the power to change that orientation nor the means to adopt the techniques promoted. This leads us to Girvan's final point [1983, 15]: "the materials, tools, implements, and machines that are associated with these processes". Women's access to the physical resources necessary for agricultural production is often very limited. The problem of access to land was mentioned above. In addition, women usually suffer from a chronic shortage of cash to purchase both basic tools and recurrent inputs such as fertilizers and seeds. Because household responsibilities usually prevent rural women from taking up paid employment, their opportunities to earn income are even more constrained than those of men. In addition, the separation of income noted above restricts women's opportunities to draw on income earned by their husbands. Berger et al. [1984] point out that membership in agricultural organizations such as cooperatives which often provide both credit and inputs tends to be restricted to farmers with registered land or

who are designated as heads of households. Women often do not qualify. Even where they do belong, they often cannot meet the requirements for collateral to guarantee loans. The result of all of this is exemplified by Staudt's findings [1975/76] in Kenya that women would not have been able to adopt many of the technologies recommended by the extension services (even if they had had access to these services) because of the cash requirements. The effect on women of lack of access to income is exacerbated by lack of timely access to farming implements. Because these usually belong to the household with their control being spelled out by the conjugal contract and being primarily a male responsibility, men normally ~~have~~ first priority for their use and women may not have the opportunity to use them until well into the growing season.

Labour can sometimes substitute for lack of tools and machines, but here women are constrained by both the limited amount of free time which they have at their disposal and the nature of that time. In terms of the quantity of time, their domestic activities tend to be very time consuming and, in combination with agricultural activities, result in long days. Most time budget studies done on women in Africa show, for example, that they already work long hours and often several hours a day longer than the men in their households [Berger et al.:1984, 44]. Despite such studies, extension programmes often promote technologies which call

for increased labour inputs on tasks which have been traditionally assigned to women [Berger et al.:1984, 14]. These can often be accommodated only at the expense of existing commitments or if labour-enhancing or labour-saving devices are introduced. In terms of the nature of women's time, Janice Jiggins [1984, 227] points out that the multiplicity of their roles results in a management capacity that is discontinuous, variable in intensity and subject to interference:

"The multiplicity and precise local mix which different categories of women combine, affect both the form of their participation and the type of activity that they are easily able to take up".

E. CONCLUSIONS

By using a political economy approach, this chapter gives some insights into why the productivity levels between men and women farmers in the Third World are often widening. Because women's social status renders them "invisible" to policy makers and planners, governments tend to adopt technology which ignores women's needs on all levels- consumption, production and organizational. The resulting programmes direct assistance to males in the often mistaken belief that these same men will consider the interests of all members of their families and that they will pass on

information about new technologies. Not only do these assumptions often prove false but the emphasis on the male role may decrease the social value of traditional female activities and production. In the agriculture sector, this can mean neglect of women's crops in favour of those associated more with men and can result in declining female production levels, at least in relative terms. The question of women's power relative to that of men thus becomes a crucial issue. At the household level, increasing male involvement in cash cropping results in monetarization of their labour inputs and reduces the strategic importance of women's inputs. Though this does not necessarily mean that their total time involvement is lessened and indeed the opposite may be true, women's bargaining position is often weakened and, with it, their ability to negotiate access to the labour, family tools and income for purchased inputs needed for increased production. On the level of society in general, their power or lack of it to shape the orientation of government policies and programmes affects the broad allocation of resources between subsistence agriculture and cash cropping and the narrower allocation of such benefits as loans and services between small and large farmers and males and females.

This paper will apply the general theoretical concepts outlined above to the Zambian situation with particular reference to the Lima crop extension recommendations

• ostensibly developed for small farmers. It will assess the extent to which this programme has taken into account the particular interests and constraints of Zambian women farmers and what impact it has had on these farmers. It will look at some of the specific factors restricting women's access to technology in that country and the extent to which female farmers risk disaster because of these constraints (see page 13). The issue of women's willingness to innovate when constraints are reduced is also discussed. In terms of organizational technology, the focus will be on the social and economic situation of Zambian women in general and the extent to which they suffer from "invisibility". The paper then discusses the impact of this invisibility on women's roles in the agricultural sector and how it reduces the productivity of female farmers. In terms of consumption technology, it will look at the relevance of Lima to the primarily subsistence roles of women farmers. And finally it will turn to production technology and the extent to which women have the opportunity to have access to the knowledge, tools and techniques to implement new technologies. Some specific issues will be addressed, for example, the impact of T and V on women and to what extent labour is a constraint to increasing production. The impact of education on adoption rates of new technology will also be addressed.

Let us now turn to the history of Zambian agriculture and how it has set the stage for present social, cultural

and economic conditions as they affect women farmers.

CHAPTER TWO

A POLITICAL HISTORY OF ZAMBIAN AGRICULTURE

A. AN HISTORICAL REVIEW

Independent since 1964, Zambia is a former British colony landlocked among Malawi and Mozambique on the East, Zimbabwe and Namibia on the South, Angola on the East, and Zaire and Tanzania on the North. Its land base of 750,000 square kilometers is sparsely populated with about 6.3 million people of whom forty-three percent live in an urbanized zone along the 'line-of-rail' (railway) between Livingstone and the Copperbelt. Although about 60% of the total population depends on agriculture for its livelihood, the sector contributes less than 20% to the Gross Domestic Product, a contribution generally considered to be substantially below its potential. The country has vast unexploited areas with the World Bank [1986, 1] estimating that only about 20% of 60 million hectares of arable land is presently cultivated despite favorable climatic conditions for a wide range of crops. Productivity is also low with the average subsistence farmer producing only about 1.9 tons of maize per hectare. In addition, growth in agricultural output at 2.4% per annum over the last two decades has not

kept up, with population increases of over 3% [World Bank:1986, 3]. The result has been recurrent food shortages. Although in Zambia, as in many countries, low productivity is the result of a number of factors, the basic problem would appear to be long-standing neglect of the agricultural sector rooted in the historical development of the country. Let us turn now to that history.

Despite the journeys of David Livingstone which started in 1841 and continued for one quarter of a century [Davidson:1972, 276], the British really triumphed militarily and made their presence felt in the area then known as Northern Rhodesia and now known as Zambia only towards the end of the nineteenth century. The first step in establishing firm control was in 1893 when the British South Africa (BSA) Company, which had in 1891 received a charter from the Imperial Government for the area south of Lake Tanganyika, smashed the Matabele warrior state based in Bulawayo, Southern Rhodesia or now Zimbabwe [Gann:1964, 71]. This freed up British resources to conquer areas to the north of the Zambezi River, the border between Northern and Southern Rhodesia. By 1899, the Bemba in the northern part of the country had been brought under European rule with minimal bloodshed as a result of the influence of a Catholic father from the society of the White Fathers [Gann:1962, 85]. In Barotseland, now known as Western Province, the chief of the Lozi sought and received protectorate status

through the peaceful signing of a series of treaties with the BSA Company. They remained in effect until 1924 when they were replaced by direct crown rule [Van Horn:1977, 157]. In the area of Fort Jameson, which is now Chipata in Eastern Province, British troops smashed the Ngoni in 1898 on behalf of the company holding the concession for that area, the North Charterland Company [Gann:1962, 88-9].

In order to serve the profit motivation of both the chartered companies and of Britain itself, the country was forced to take on the primary role of a labour supply area for the mines and the secondary one as a white settler area. The BSA Company and the North Charterland Company were interested in exploiting what was believed to be the substantial mineral potential¹ of the areas under their control, a belief proved erroneous in the latter case. Although they were given far-reaching powers of government in their respective areas [Davidson:1972, 285], they made few investments directed to the development of the country¹. On the other hand, to encourage the development of a supply of cheap labour, the chartered companies adopted the South African system of money taxes, the non-payment of which often resulted in prison labour [Davidson:1972, 286].

¹ Even under Crown rule, the revenue extracted from the colony was considerably more than the expenditures made on it. Laurel Van Horn (1977 page 159) notes, for example, that the total revenue from Barotseland in 1925/6 was 22,083 pounds but the total administrative expenditures were only 3,839 pounds.

In 1901, for example, the North Charterland Company imposed in the Fort Jameson area hut or poll taxes of three shillings per male and a similar amount for each wife after the first [Smith:1984, 2-9]. Such taxes were designed to force the Africans to seek paid employment either in the mines or on the farms of white settlers. Since the wages for farm work were very low ² many Africans preferred to migrate to the mines. Smith (1984, 2-10) estimates that as much as 50% to 70% of the male labour force may have left the area, probably primarily for the mines of Southern Rhodesia and South Africa where wages were 50% to 60% higher.

This massive migration brought changes to the division of labour in agriculture. Prior to the arrival in Zambia of the Europeans, the usual system of agriculture was a form of bush fallow involving the clearing and cultivation of extensive areas which were abandoned when fertility declined. Although there were some variations in the division of labour from one part of the country to another, both men and women performed specific tasks within the agricultural cycle, with men being responsible primarily for land preparation, including clearing the land, building mounds where they were used, and turning the fresh soil. Women then did the subsequent tilling, planting, weeding, harvesting (although with male assistance) and transporting

² In 1904, white settlers in the area now known as Eastern Province paid wages of three shillings for 30 working days.

of produce into storage [Muntemba:1982, 37]. Men were also responsible for hunting, fishing, smelting and inter-regional trade. Although the bulk of the agricultural tasks fell to women, male labour was nonetheless very important for tree clearing. When men migrated to earn money to pay taxes, the women were left with sole responsibility for the family plots. It is likely that women left alone reduced the frequency of land rotation resulting in the breakdown of shifting cultivation and consequent overcropping [Muntemba:1982, 40 and Cliffe:1979, 155].

European settlement also restricted the opportunities to practice bush fallow agriculture. By the early 1900's, whites had begun to settle in the area then known as Northern Rhodesia, particularly in the fertile south-central areas. Although their numbers were small in comparison with settlement in Southern Rhodesia, by 1919, 250 whites controlled large tracts of land along the line-of-rail [Muntemba:1982, 38]. As Muntemba [1982, 38] notes, "Settler lands almost always coincided with the previously more densely populated areas because of the soil's higher fertility".

The Africans either were paid compensation for their land, this amounting to from one to two pounds per hut and eight to ten shillings per cultivated acre [Gann:1962, 135], or they became tenants with the men being obliged to work at least two months a year for their white landlords [Muntemba:

1982, 38]. Not only were men obliged to labour for two months but, as Muntamba [1982, 39] notes, they often signed on for longer periods as wage labourers in order to earn money to pay their taxes. Again, women were left to handle the bulk of the agricultural tasks and were less able to continue extensive cultivation methods.

In the Fort Jameson area, the situation was different because the region, with as many as 140 people per square mile [Gann:1964,135], was well populated before the arrival of the Europeans. Since the mid-1850's, the dominant Ngonis had exacted tribute from neighbouring ethnic groups, thus helping them to support larger numbers of people than would otherwise have been the case. As a result of white pressure, a native reserve was established in 1904 but the majority of Africans did not choose to move and were not forced to do so [Gann 1964, 135]. It was only from 1928-29 on that the Colonial Office enforced, particularly in the Fort Jameson area, a land policy of reserves for Africans and crown lands reserved for towns, mineral development and actual or anticipated white settlement. Africans were forced to move onto the reserves set aside for them, which soon became overpopulated. By 1941, for example, Smith [1984, 2-16] says that the carrying capacity using extensive agricultural systems of the part of the Ngoni reserve set aside for the Paramount Chief was exceeded by five times. Abandoning of the bush fallow system was necessary to avoid serious soil

deterioration.

By the late 1920's, the mining sector was becoming increasingly important and involved large numbers of labourers. In order to provide the growing urban population and particularly the employees of the mines with relatively cheap food, the government adopted a policy of low food prices [Royal Tropical Institute:1983, 6]. Agriculture was thus seen to be in the service of the copper industry. Maize, the main output of the large-scale commercial farms which were mostly European-owned, was given priority over the more traditional staples of sorghum, millets or cassava [Royal Tropical Institute:1983, 11]. At first, production by African farmers was not encouraged. Indeed, during the depression of the 1930's, to ensure that African producers did not take up an increasing share of the limited market, the monopoly Maize Control Board paid lower prices to African farmers than to Europeans [Keller, Phiri, and Milimo: 1987, 3]. During the Second World War, the situation changed and the reserves were pressured into supplying maize for the market. They were, however, given no government assistance in doing so until after the war. Then, as Muntemba [1982, 41] notes, only men received it, despite women's role in agriculture and the high proportion of women in many rural areas ³. Assistance was further concentrated

³ Even today, there are a disproportionate number of women and old people in the rural areas. At least one-third of rural households are female-headed, with this figure

on a few farmers, generally the larger ones, in the south-central and eastern parts of the country. Commodity production from these favoured areas increased substantially during the period between the end of the Second World War and Independence in 1964 with African farmers providing increasing quantities of maize for the market. In Eastern Province, Smith [1984, 2-26] notes that production of maize increased from 20,000 to 30,000 200-pound bags in 1927 valued at 7s. each to 146,000 bags in 1956 with a value of 16s. each. On the other hand, the less favoured or "non-producing" regions continued to be viewed primarily as labour reserves despite some half-hearted attempts to develop government rural development projects [Muntemba: 1982, 44]. Migration from these areas, says Muntemba (1982, 44), brought further changes in the agricultural systems in use, often forcing the women remaining behind to turn to the production of less labour-intensive but also less nutritious foods. Given colonial policies, it is not surprising that three different systems of agriculture had become quite evident by 1964: large-scale European concentrated along the line of rail, subsistence production which dominated the other areas, and small-scale commercial African cultivation located mainly in the provinces dominated by European settlement.

going as high as 52% in Chilubi District in Northern Province, one of the labour supply areas (Geisler et al 1985 page 7). These households also tend to be among the poorest.

It should be noted at this point that, not only did the colonial powers favour men in the provision of agricultural services, but only men were allowed to occupy roles in the "modern" sector. The Eurocentric view of women was as homemakers and, although this was not in keeping with the traditional role of Zambian women, it was this assumption which guided the colonial authorities. Bonnie Keller [1984, 1] points out, for example, that unskilled jobs in the mining sector and on white commercial farms were for men and women were prohibited from moving to the urbanized line-of-rail. By the late 1940's, she writes, the mining companies did allow some families to settle in the mining compounds but wage labour, including domestic service, was still reserved for men.

The political elite brought to power with Independence espoused a desire to improve the living standards of the poor and to promote development, which was seen in terms of producing goods and services, particularly through cooperatives [Scarritt 1979, 17]. To these basic tenets of "humanism" or Zambia's version of socialism were added subsequently other principles designed to convert Zambian society from the capitalist economy that it had become over the course of the colonial period to a socialist society concerned with equality. The nationalization of the wholesale and resale trade, mining, manufacturing, and some financial institutions was accelerated with most of them

being turned over to parastatal organizations. Some initial administrative decentralization was followed in the early seventies by a massive move towards organization of the rural population, ostensibly to encourage participation in both the political process and in rural production [Ollawa: 1978, 115]. (We will return to the objectives of decentralization later in this chapter.) Attempts to redistribute wealth to the rural areas were also made through multi-faceted rural development programmes although none were initially directed at correcting the inherited disabilities of rural women [Keller 1984, 2]. The main venue for development of the rural areas was, however, to be the spinoffs from the massive investments in the heavy industrial sector which were expected to generate high economic growth rates and in turn eliminate poverty, provide employment and reduce rural/urban income disparities [Ollawa 1978, 104]. As such, agriculture played a distinctly secondary role to the maintenance and growth of the copper industry.

While the decline of copper prices in the mid-1970's demonstrated the fragility of that industry, even without such a crisis, there are indications that the economic strategy espoused would not have succeeded in reducing rural/urban disparities. As Ollawa [1978, 107] points out, the Zambian economy "lacks the dynamic capacity to link up development in the modern sector with rural transformation".

Because economic activities including infrastructural development have been overwhelmingly skewed to the maintenance and growth of the copper industry, agriculture, the mainstay of the majority of the population, has been neglected. Kenneth Good [1986, 276] estimates that investments in agriculture during the five years of the Second National Development Plan (1972-76] were less than 5.5% of total government expenditures. Real government expenditures in agriculture have also been falling since 1969 [Smith:1984, 2-44]. This lack of investment combined with inefficiency rooted in general political neglect has eroded the infrastructural system so that it is now inadequate to support even present agricultural production, not to speak of an increase. The marketing and input distribution system, for example, is inefficient ⁴, the credit delivery and recovery system poor, and the research and extension services weak [World Bank:1986, 3]. The inefficiencies of the system probably fall most heavily on the smaller farmers and hence disproportionately on women because, as Good [1986, 275] points out, they are usually widely scattered in remote areas and thus more difficult to

⁴ According to Good (1986 page 258), between 560,000 and 770,000 bags of maize or 5-10% of the total amount marketed are lost annually in Zambia through poor marketing and storage arrangements. The 1985 marketing season was a particularly shocking example of mismanagement. In October, 1985, some six months after the harvest and just before the beginning of the rains, only five million bags had been collected with about 2.5 million not yet in storage (Ibid. page 273).

reach.

The limited expenditures made in the agricultural sector have favoured and continue to favour large-scale commercial production [Ollawa:1978, 114]. Effective structures to help the small farmer have not been put in place, this in spite of the fact that production costs are higher among large farmers than small ⁵. The subsistence sector has been virtually ignored resulting in extreme dualism: about 460,000 farmers of a total of 600,000 are engaged almost entirely in subsistence production. Farmers in this category cultivate less than one hectare. They use tools and cropping practices which have changed little for generations and produce for their own consumption, with only occasional marketable surpluses. Depending on the area, they produce mainly maize, sorghum, millets ⁶ and cassava. At the other end of the scale is a small but highly-mechanized group of about 800 commercial farmers, mainly white males, who produce about 40% of the marketed maize and 55% of the

⁵ A 1987 MAWD paper on pricing shows input costs per bag of hybrid maize to be k91.53 for mechanized farmers versus k70.65 for farmers using oxen (1987 tables). The difference is as a result of the heavy reliance of the former on imported inputs and is likely to grow as a result of the recent devaluations of the kwacha from about 2 to the U.S. dollar in October 1985 to 8 to the U.S. dollar in May 1987. In the interim, it had been as low as 21 to the U. S. dollar.

⁶ There are two main kinds of millet grown in Zambia, bulrush and finger.

other marketed agricultural products. In between these two extremes are the market-oriented smallholders, the so-called emergent farmers who comprise about 125,000 households. They cultivate an average of three hectares, using mainly hand tools and family labour, but they also employ oxen or hire tractors and apply modest amounts of purchased inputs, especially fertilizers. They market mainly cereals, especially maize. Table 1 shows the characteristics of each category of farmer. The majority of women who farm, both married and unmarried, fall into the two lowest production categories [Keller, Phiri and Milimo:1986, 11].

It is important at this point to note the role of women in Zambian agriculture. As in pre-colonial days, Zambian agriculture continues to be characterized by divisions of labour according to gender⁷. Table 2.2 provides a generalized view of this division of labour but variations occur with such changes as ethnic group, religion and marital status. Everywhere, however, the heaviest burden of agricultural labour tends to fall on women. A study by Jean Due [1985] on labour inputs showed that, in Mpika in Northern Province, Mazabuka in Southern Province and Mumbwa in Central Province, women spent an average of 6.6 hours a day on farming, whereas men spent only 5.7 hours on the average. In these areas, women contribute 53% of the total

⁷ Gender refers to concepts of men's and women's roles which are based on cultural norms, rather than on innate biological differences.

TABLE 2.1
MAIN DISTINGUISHING FEATURES AMONG CATEGORIES OF FARMERS *

Category	Traditional	Small-Scale Commercial	Medium-Scale Commercial	Large-Scale Commercial
1. Main Starch Staple	- Sorghum - Millets - Maize - Cassava	- Maize - Millets - Sorghum - Cassava	- Maize	- Maize
2. Main Inputs Purchased	- None	- Fertilizer - Seed - Pesticide	- Fertilizer - Seed - Pesticide - Herbicide	- Fertilizer - Seed - Pesticide - Herbicide
3. Main Source of Cash	- Occasional food surplus sale - Fishing - Beer - Charcoal	- Deliberate production of cash crop surplus for sale - Sale of livestock and dairy produce	- Deliberate production of cash crop surplus for sale - Sales of livestock and dairy produce	- Deliberate production of cash crop surplus for sale - Sales of livestock and dairy products
4. Production of New Cash Crops	- None	- Some	- Some	- Some
5. Power Source	- Hand - Possibly one or two oxen	- Hand and one or two pairs of oxen and oxen hire - Possibly tractor hire	- Several teams of oxen - Tractor hire and possibly tractor ownership (inefficient use)	- Tractor ownership - Possibly some oxen
6. Hiring of Labour	- Family and communal	- Family, communal and casual	- Family, casual and possibly permanent	- Permanent and casual
7. Size of Farm (Hectares)	- less than one hectare	- 1 to 10 hectares	- 10 to 40 hectares	- 40 hectares and over
8. Number of Farmers	- 457,940 farmers	- 131,810 farmers	- 21,570 farmers	- 790 farmers

* From Food Strategy, Annex, Agricultural Research in Zambia, September, 1981. MAWD with some modifications based on Keller and Phiri, 1986 page 2.

* New cash crops = cotton, sunflower, soybean, tobacco, rice and wheat

TABLE 2.2
DISTRIBUTION OF TASKS
BETWEEN MEN, WOMEN AND CHILDREN
IN RURAL HOUSEHOLDS IN ZAMBIA ¹⁰

<u>TASK</u>	<u>MEN</u>	<u>WOMEN</u>	<u>CHILDREN</u>
<u>Household</u>			
Food preparation		x	
Washing		x	x
Cleaning of house		x	x
Fetching water		x	
Collecting firewood		x	x
Baby care		x	x
Producing utensils	x		
House construction/upkeep	x		
Wood chopping	x	x	
Machine repair	x		
Other (specify)			
<u>Agriculture/Livestock</u>			
Bush clearing	x		
Land/seedbed preparation		x	x
Sowing/planting		x	x
Pesticides	x	x	
Weeding		x	x
Thinning		x	x
Harvesting	x	x	
Threshing	x	x	
Transport	x		
Herding (cattle, goats, etc.)	x		x
Collecting fodder	x		x
Milking	x		
Fishing	x		x
Hunting	x		
Collecting larvae, etc.		x	
Irrigation	x		
Cleaning of vegetables for sale		x	x
Sacking	x	x	
Storage construction	x		
Storage		x	
<u>Marketing</u>			
Transport	x	x	
Sitting at market place		x	x
Picking up seeds and inputs	x		
Delivery of crops at storage site	x	x	
<u>Social and Religious</u>			
Attend wedding/funerals			
Participate in religious ceremonies	x	x	
Gather to discuss	x	x	
Participate in Committees/Councils/etc.	x		

¹⁰ Taken from FAO, Zambia Women in the Food System in Africa.
Rome: FAO Field Document No. 1, GCPIRAF/193/NOR, November, 1984.

hours of labour, while men contribute 47%. This skewing of effort is even more marked during the farming season, when women average 8.5 hours of labour a day, whereas men put in only 7.4 hours. The same study shows that women also spend an average of 4.1 hours a day in household activities, with men spending only .4 hours. Two studies by the Integrated Rural Development Project in Mpika, Northern Province [No. 6, 35 and No. 10, 48] show a similar trend with wives providing more labour than male household heads. In Chinsali District [IRDP No. 10, 48], the difference was 30%. In a paper presented in 1984 and cited by the Zambian Association for Research and Development [1985, 53] at the Government Consultation on the Role of Women in Food Production and Food Security, held in Harare, Zimbabwe, Margarita Sjostrom, who was at the same time the Women's Development Officer with the Ministry of Agriculture, estimated that women perform 60% to 80% of the labour required for the production of food crops in Zambia. Her statistics are probably based on a broader definition of agriculture than that used by Due, one which likely takes into account many of the support functions of agriculture, such as the preparation of meals and their transportation to the field, the processing of crops for storage or sale, and so on. The traditional definition stresses fieldwork and therefore excludes these essential functions. Regardless of the definition used, however, women's role in agriculture in Zambia is signi-

ficant and their labour inputs greater than those of men.

Another factor undermining the humanist strategy espoused above and its goal of reducing rural/urban disparities is the lack of motivation of the ruling elite which is primarily an urban-based bureaucracy. As a result of the historical development of the formal sector which was based on employment in the mines for men only, this elite is also primarily male. James Scarritt [1979, 17] contends that, from the time of independence, prestige was an important concept and was reflected in elite values and norms. The great gap between rich and poor was to be narrowed by bringing up the bottom, not by equalizing across the board. Despite the enactment of a leadership code restricting the participation of a variety of leaders in private economic activities, Ollawa later [1978, 120] points out a "ruling class ambivalence towards the value system inherent in the official ideology of humanism" and Nelson Richards [1981/2, 146] identifies the "unwillingness on the part of its (the ruling party) members to reject genuinely elitist values." Since improving the standard of living of the rural population would mean some eroding of the privileged position of the elite, its preference, as Richards [1981/2, 160] suggests, is to create a rural gentry with interests similar to its own. Agricultural policies today strongly reflect the interests of this elite rather than of the majority of the farmers. The nation-wide emphasis on maize

as the staple foodstuff is a case in point. Heavy subsidization to keep the cost of maize in the urban areas low has encouraged its production and consumption in areas such as Luapula, Northern and North-Western Provinces, as well as in parts of Southern Province, where comparative advantage would favour other crops. The Food Strategy Study Farm Management Annex [1981, 71] suggests that were facilities available, farmers in these areas could undertake commercial production of sorghum, millets and cassava at less risk and with more profit than cash-cropping of maize. Since providing such facilities would require resources to be redirected from maize production, with possible implications either for the security or the cost of the urban food supply, it is not surprising that the controlling elite does not encourage such a change. In addition, these crops are mainly cultivated by women and, as such, do not attract much notice from the male elite policy makers.

Not only is the question of the motivation of the ruling elite to reducing rural/urban disparities at issue but there is also conflict as to how best to achieve that goal. Charles Elliott [1983, 163] identifies two ideological camps with different approaches on the question of how to promote rural development. The first espouses a technocratic view of rural development, emphasizing maximization of agricultural output and ensuring the efficient use of scarce resources, particularly government resources. Dominated by

variants of neo-classical economics, this approach is concerned to ensure that agriculture fulfills certain structural roles within a national strategy of economic development. The second camp is more concerned with the ideological issues surrounding the political economy of agriculture and how it relates to humanism. It is uneasy that a relatively small group of more prosperous farmers has come to dominate the agricultural institutions designed to serve the community and wishes to avoid the exclusion of subsistence farmers from the process of growth and development. The contrasting views of these two camps and the rises and falls in their respective positions of power and influence have been reflected in the diverse policies adopted by the Zambian Government over time. Under the First National Development Plan (1966-1971), the emphasis was on economy of scale through cooperative peasant production, a policy in keeping with humanist ideals but which Smith [1984, 2-51] suggests had to be imposed by President Kaunda on an unwilling party. He further contends that the subsequent abdication of responsibility by the party may have encouraged the failure in 1970 of the cooperative movement. The Second National Development Plan shifted the focus to the individual family farm but the decline in maize output to below self-sufficiency after 1978 resulted in the Third National Development Plan (1979-83) calling for the creation of state farms and turning away from the individual

peasant farmer.

The conflict evident in these shifts at broad policy levels has also been felt at the level of programme implementation. Although official policy may encourage a given approach, the commitment in terms of funding is not necessarily made available. Elliott [1983, 169] contends that "the way in which the various agencies of rural development have coped with the confusion has made at least some elements of the rural poor more, rather than less, vulnerable to the fundamental pressures to which they are subject. A case in point is the government's exhortations to subsistence households and to small-scale commercial farmers to increase their production of maize without providing them with the tools to do so. Only a small percentage of the credit available has been allocated to poorer farmers [Elliott:1983, 170] and extension services have been operated under an "efficiency algorithm reflected in instructions to extension officers to identify the most promising farmers and to concentrate on them" [Elliott:1983, 173]. Women have been especially neglected in terms of services. A 1975 survey of farmers who had received formal training from the extension service found, for example, that only 16% were women [Phiri 1985, 44]. According to Florence Chenoweth [1987, 15), only 266 or 7% of 3810 farmers similarly trained in 1986 were women. In general, as Smith points out, there seems to be a lack of confidence in small

farmers and in their ability to meet the nation's maize requirements [1984, 2-93], despite the fact that the majority of the production is now supplied by what Good [1986, 284] calls the poor and middle peasantry. This is a major change in production patterns from the past when the large-scale commercial farmers produced almost all of the country's maize.

This lack of confidence in the ability of the rural population is also evident in the attitudes of the bureaucracy towards decentralization. Ollawa [1978, 119] summarizes these attitudes as follows:

"Despite their public profession to mass participation most top party functionaries and bureaucratic officials at the provincial and district levels have often viewed the whole question of transferring power to the masses with serious misgivings. There are those who see increased mass participation as an attempt to erode their decision-making power and by extension their social status at the local level. There are others who feel that the masses are not sufficiently informed about the issues in question to make the necessary decisions."

So little commitment do many highly placed individuals have to the principle of decentralization that they bypass existing local level development structures in pursuit of their own interests [Richards:1981/2, 146]. Ollawa [1978, 121] further goes on to suggest that participatory democracy for the party is

"not defined in terms of shared influence the masses can wield in determining policy formulation on rural development, but is measured by the extent to which the regime members can mobilize the masses in support of party/government policies

and development objectives."

Decentralization is a guise for co-opting the peasants to carry out the goals of the elite, not to encourage them to shape their own destiny. For women, participation in even this limited form of decentralization is limited as a result of the male dominance of political structures at the village and district level.

B. SUMMARY

The above chapter has demonstrated how, to quote Basil Davidson [1972, 286]:

"Methods of rule which imposed the need for money began to undermine traditional economies of subsistence where money had little or no place".

The introduction of a system of taxation in Northern Rhodesian society, which had had little if any previous requirements for cash, created a need for income among the African population. This generally came either from wage employment or from cash cropping. Since in the Eurocentric view, only men were real farmers, it was men who were encouraged to produce the main crop of interest to the white economy, maize, and to whom services such as credit and marketing were directed. The traditional crops which had little, if any, monetary value were essentially ignored and with them women's role in their production. Men's labour was monetarized as a result of the receipt of the money from the sale of produce. Women who had no similar source of income

found that their bargaining position in the household was weakened and they were forced increasingly to provide labour for cash crops controlled by their husbands. At the same time, women were obliged to continue their subsistence agricultural activities in order to feed their families but, with little cash to pay for improved tools or inputs, their farming techniques evolved less quickly than those of men. Growing disparities between commercial farmers and subsistence cultivators, the group dominated by women, became evident. It was thus through a combination of gender relations and class formation resulting from the commercialization of agriculture that women's status was lowered. With this lower status came a lack of self-confidence for most women which contributes, as we will see in later chapters, to a general reluctance on their part to make decisions, including the decision to try a new technology [personal communication with an officer of the Eastern Province Planning Unit, January 1987].

The other choice open to the African population after the imposition of the poll tax, that of wage labour, also had negative impacts on women's roles. Female-headed households, which were increasing in number because of migration, were generally entirely excluded from the commercial system. Also when men migrated, women were forced to take on more and more responsibilities in the agricultural sector, hence modifying the division of labour.

Where sufficient labour was not available to clear the extensive areas of land required under the bush fallow system, women either used the same piece of land for longer periods with resulting declining fertility or switched to less labour-intensive crops such as cassava.

Despite the professed objective of the ruling United National Independence Party to reduce rural/urban disparities, Independence did not bring major improvements to the living standards of the rural population which was considered to be the most relatively deprived social group in Zambia [Ollawa:1978, 101]. The elite was more interested in maintaining its own position than in redistributing wealth to a rural populace with which it had little in common [Richards:1981/2, 160]. This pre-dominantly male elite had even less interest in the plight of women farmers who, in the eyes of government planners, were not considered productive members of the society ¹¹.

With this rather pessimistic background, let us look at the Lima recommendations, how they fit into the political-economic situation of Zambia and, within that context, their impact on women.

¹¹ Gisela Geisler, Bonnie Keller and Pia Chuzu (1985 page 8) note that the 1980 population census classifies as 'economically active' only those who work in the formal sector, those who are looking for work or the self-employed. It therefore excludes and ignores the contribution of those engaged in subsistence production, petty vending, piece work, etc. In Northern Province only 22% of the adult women as compared to 52% of the adult men were classified as 'working'.

CHAPTER THREE

LIMA - ITS DEVELOPMENT AND IMPLEMENTATION

A. THE LIMA CONCEPT

As mentioned above, the main agricultural thrust of the Third National Development Plan (1978-1983) was to increase maize output which had dropped in the last years of the Second Plan. Although the plan took a primarily technocratic approach to achieving this goal, it also announced a new extension thrust for small farmers, probably to appease the humanist ideological camp. This thrust was a series of extension recommendations based on a lima¹ measure of 2,500 square meters or one quarter of a hectare. Some of these so-called lima recommendations had been in existence since 1977 or 1978, developed, according to J. K. McPhillips [1984, 1], in response to the recognition that almost all of the growth in the use of fertilizers since Independence could be attributed to small-scale farmers but that many of these farmers were not using their inputs efficiently. The recommendations covered a number of mainly cash crops but emphasis was particularly on hybrid maize which, because of

¹. The term "lima" is derived from the verb "ku-lima," to hoe a field, to plough or to cultivate.

its high-yielding qualities ², was seen as having tremendous potential to increase the country's food self-sufficiency. (See Annex D for the detailed recommendations for Eastern Province.)

These Lima recommendations or messages attracted much international attention because of their innovativeness and their perceived potential for increasing the productivity of small-scale farmers whose returns on both land and labour are very low. They provide farmers with a more scientific basis for applying fertilizers and spacing plants than the traditional method of broadcasting and use a measuring system based on volume which is more culturally acceptable in Africa than weight. A wide variety of programmes have either been built around or have incorporated the Lima recommendations. These often involve not only the messages as such but improvements to the system for diffusing information to farmers, training for agricultural extension agents and credit to pay for the fertilizer and seed which are an integral part of the Lima recommendations. For the purpose of this thesis, the activities revolving around these recommendations will be referred to as Lima.

On first thought, we might believe that a shift to

² On the basis of observed results at the farm level, Smith (1984 page 1-3) contends that correctly fertilised hybrid maize yields approximately twice as much as correctly fertilized traditional varieties of maize. Experimental station results show a much higher ratio of hybrid to local yields in the order of 4:1.

hybrid maize would be quite minor for farmers already producing a local variety, as has long been the case in much of southern and eastern Zambia. The differences in production techniques are, however, quite substantial. Firstly, hybrid requires purchased inputs whereas local maize does not. Fertilizers must be used on hybrid in order to ensure reasonable yields, with even a delay causing yield losses of four to eight bags per hectare [EPAD:1985, 11]. Indeed, in some areas, extension agents recommend against planting hybrid if fertilizers are not available [Uprichard:1987, 21]. In addition, whereas local maize can be regenerated from the previous year's crop, hybrid cannot be without a major loss in yields. Secondly, because hybrid can be stored only three months on the cob and because its taste is considered inferior to that of local maize, it is normally grown only as a cash crop³. As a result, it is an additional crop, not a substitute for one of the traditional foods. Thirdly, hybrid requires more careful cropping techniques, especially weeding, to ensure good yields. Since fertilizers generate growth, there are also more weeds to remove. The result is a greater workload. In The Lima Crop Evaluation Programme, Strategy and Indicative Plan 1986-90 [1985, 35], Per Eklund indicates that the average number of persondays of labour applied to unfertilized maize was 87.

³ Milled hybrid maize is sold primarily in the urban areas.

For fertilized local maize, this increased to 111 and for fertilized hybrid maize, to 135. The increased labour commitment is thus 22% to change from fertilized local maize to fertilized hybrid maize but 55% to change from unfertilized local maize to fertilized hybrid maize. Because of the division of labour (see Chapter II), the burden of this extra work would fall mainly on women. In addition, Smith [1984, 22] found that there was a learning period of up to five years in order to master the techniques of hybrid maize and that the initial addition of the extra crop tended to decrease local maize yield because of the difficulties of juggling labour requirements. The result was that the most successful producers were those with additional sources of income permitting them to survive the learning period by hiring extra labour. Fourthly, while local maize is often intercropped with another food crop, the fact that this is rarely done with hybrid maize reduces food production and increases the minimum yield required to break even. In summary, the production of hybrid maize requires important changes in approach for small farmers, changes which this paper contends create special constraints for women farmers. These will be discussed in detail in Chapter Four.

B. IMPLEMENTATION OF LIMA

In most areas, Lima technologies form the basis of the message disseminated by the Extension Branch of the Department of Agriculture. This Branch is headed by an Assistant Director, supported by seven Subject Matter Specialists (SMSs) in animal, crop husbandry, horticulture, training, tobacco, youth services and home economics (see Table 3.1 for Organization). Each of the nine provinces has a Provincial Agricultural Officer (PAO) responsible for extension activities in that area, who is supported by provincial subject matter specialists. Below the PAO are District Agricultural Officers, who operate through Block Supervisors and Camp Extension Workers. These latter can be agricultural assistants who deal mainly with cropping methods, or home economics agents who work mainly through women's clubs to promote improved family nutrition as well as income-generating activities for women. There are about 2,400 staff in the extension service, excluding administrative personnel, with about 1,250 at the block and camp levels. Of these 9.6% are female [Safilios-Rothschild: 1985, 33]. The average staff-farmer ratio is 1 to 600, but this varies from 1 to 200 to 1 to 1,500, depending on population density, farming systems and the perception of agricultural potential of different areas and camp levels [World Bank: 1986, 7]. About two-thirds of these staff have

post secondary education, either a 3-year diploma from the Natural Resources Development College or a 2-year certificate from either the Monze or the Mpika College of Agriculture. In-service training is provided mainly through eight provincial Farm Institutes. In addition, most districts have Farmer Training Centres (FTCs), built to provide residential and day training courses to farmers. These are falling into disuse, with the trend now being to train farmers in their own village surroundings. This is in keeping with the World Bank Training and Visit Scheme (T & V), which Zambia has decided to adopt as the model for its extension services but has not yet implemented in all parts of the country. The World Bank and the International Fund for Agricultural Development (IFAD) have been assisting Eastern, North Western and Southern Provinces to convert to the T & V system for the last five years, and will shortly be starting a US\$60 million programme to expand the system to parts of Northern, Central and Lusaka Provinces.

The Home Economics Section of the Extension Branch also provides assistance to some Lima activities. In the past, this group has emphasized training for women in food handling and preparation, nutrition and hygiene, childcare, etc.

TABLE 3.1
GENERAL ORGANIZATIONAL CHART OF
THE ZAMBIAN DEPARTMENT OF AGRICULTURE AND WATER DEVELOPMENT (MAWD)

NOTE: 55 Districts, 220 Block, 600+ Camps
 1 District = $\pm$ 4 Blocks
 1 Block = $\pm$ 3 Camps

FROM: Hurlrich [1985, 107] 1

More recently, it has reoriented its activities to teach agricultural production skills

"related to improved household food security, with emphasis on the relationship between food production and the nation's nutrition requirements, and provision to rural women of equal opportunities (such as credit) in order for them to participate in rural and agricultural development" [Keller, Phiri and Milimo:1987, 18].

The home economics workers in the field do not always reflect this change in policy. The most important programme run by the Home Economics Section reflecting the new policy is the Women's Participation in Rural Development which has assisted over 2000 women to adopt new farming methods in keeping with the Lima recommendations. Despite the significance of programmes like this, the Home Economics group has low status in the Department of Agriculture and its staff are not always well integrated.

The technical messages disseminated by the extension services are developed and adapted by the Research Branch of the Department of Agriculture. Research programmes are organized on an inter-disciplinary basis and consist of Commodity Research Teams (CRTs) for on-station research such as plant breeding, variety screening and pest and disease control; Adaptive Research Planning Teams (ARPTs) for field trials under farmer-specific conditions; and Specialist Research teams (SRTs), also for on-station research in specific areas such as weed control and cropping systems [World Bank:1986, 6]. The ARPTs operate on a provincial

basis and usually consist of an agronomist, an economist and a sociologist. These teams use the CIMMYT farming systems approach of determining areas with similar farming characteristics, identifying farmers' constraints and possible solutions and testing and refining recommendations from research stations to reflect farmer-specific constraints and conditions. They then work through Research-Extension Liaison Officers to release for wider dissemination those research recommendations found to be acceptable. Staff from both the Research and Extension Branches are involved in various ARPT activities, thus generating feedback information on specific farming conditions for further research by the CRTs. Although ARPTs are expected to integrate gender considerations into their activities, the extent to which this has been done to date is limited.

Because Lima emphasizes external inputs, especially fertilizers, credit is an important adjunct although it was not recognized when the concept was first introduced. Many international organizations are providing funds for loans to small farmers although several did not include such financing in their original programmes. The usual channel for these is through the Zambia Cooperation Federation (ZCF) Finance Services, which has two main programmes to support farmers: the Peoples' Participation Programme (PPP) and the Cooperative Credit Scheme (CCS) with the latter receiving

the bulk of the funds. Depending on the province, PPP loans are either exclusively or primarily for women. They are group loans and require membership in a primary society although not share ownership. Membership costs k2.5. CCS loans, on the other hand, are only offered to paid-up shareholders with a share costing k20. For both PPP and CCS, loans are in the form of inputs of seed (normally maize) and fertilizers and are supposed to be coupled with training in cooperatives. The ZCF lends to provincial cooperative unions which issue local purchase orders (LPOs) redeemable at local cooperatives or primary societies, as they are called to distinguish them from the provincial cooperative unions. Farmers are liable for the full loan once they accept the LPOs even if the inputs are not available. (This policy penalizes the farmers for the inefficiencies of the delivery system and indicates the strength of a bureaucracy which can avoid the penalties of mistakes for which it is partly responsible.) The loans are seasonal and are repaid through deductions from the value of produce marketed through the primary societies. The repayment rate is high, 89% in 83/84. Indeed, ZCF will not refinance primary societies with repayment rates below 93%.

The Agricultural Finance Corporation (AFC) also provides financing for farmers. AFC offers both short-term loans for agricultural inputs, these being repayable within one year, and medium-term loans for the purchase of

tractors, farm implements and other equipment, these being spread over two to five years. AFC loans are scaled to the size of the farmer with small-scale farmers (defined as up to 40 hectares ⁴) receiving in 1985 K 359 per hectare and commercial farmers up to K 1,016 [Geisler, Keller and Chuzu: 1985, 28]. (The amount of money loaned is adjusted each year in accordance with inflation.) Funds come from bank borrowings and previous loan recoveries. Although there is no official discrimination against female farmers, loan procedures often act to restrict the participation of women. Applicants should have both cash cropping experience and collateral to back their borrowing, neither of which most women have. Loan procedures are long and, require both considerable time and knowledge of the system, again areas where women are disadvantaged. Keller et al. also [1987, 21] note that married women must have their husband's consent to apply for loans and single women must prove they are single. The result of all this is that women represented only 8% of the loanees between 1970 and 1985 [Geisler, Keller and Chuzu: 1985, 29] ⁵.

Applicants are assessed for cropping experience by the

⁴ AFC defines "small-scale" as up to 40 hectares. The Food Sector Study (see Table 1, Chapter one), on the other hand, classifies farmers with 10 to 40 hectares as medium-scale commercial and those with 40 and more as large-scale commercial farmers.

⁵ Although their text says 8.6%, the figures given suggest 10.5% (2,344 female loanees of a total of 27,187).

Department of Agriculture through its agricultural assistants. Although repayment is through the primary societies, responsibility for pursuing delinquent recipients often falls to the agricultural assistants. The conflict which this creates with extension activities is one of the reasons for AFC's low repayment rate, e.g., 10% in Northern Province, 38% in Central Province, 54% in Luapula and 69% in Southern.

The Agricultural Development Bank (ADB) is yet another agricultural credit organization. It is new and not yet established in all areas. It is also in the process of being joined with AFC to make the Lima Bank. ADB loans are managed by loan officers who establish groups of contact farmers which each member of the group receiving credit in the form of inputs and sometimes money for hiring labour and services such as plowing.

It is generally considered that farmers move up the scale in terms of loans with PPP credits loans being for the least commercialized and AFC/ADB loans for the most commercialized. This is reflected in interest rates which in 1986/87 were 16% at the lower levels and 25 to 29% for AFC. Although, as mentioned in Chapter Two, the bulk of the farmers are in the subsistence and small-scale commercial categories, the bulk of loan funds are provided to AFC rather than to ZCF.

In 1986/87, the U.S. government provided 80 million

2

MicroD

kwacha for loans for farmers of which 60 million went into a Rural Agricultural Credit Scheme. These funds are being administered by ZCF Finance Services and the Central Credit Union, of the Credit Union and Savings Association of Zambia (CUSA). All loans are in the input packages of fertilizer and seeds for growing maize, sorghum and rice. They are repayable at the end of the season, normally through deductions from the sale of the loanee's crops. The programme was approved so late that many officials interviewed were concerned that the credit was not being well used and that the repayment rate may be very low.

It would be appropriate at this point to look at availability of credit for women. In the past, women's access to credit has been limited with only a small number of women applying or receiving loans, most of them female heads of households. As noted above, sometimes this is as a result of bureaucratic restrictions; in other cases, it is policy based. Safilios-Rothschild [1985] notes that, since much credit is funnelled through the cooperative movement, women's access to loans is closely linked to their participation. These organizations have been traditionally male-dominated and have often restricted membership to one family member; normally the male. In her survey "Women in Agricultural Societies in Eastern Cooperative Union", Annette Kanstrup [1987] found that 17% of the total membership of the 80 primary societies belonging to the

Eastern Cooperative Union was female though, not all of these were shareholders [cited by Keller in letter, July 1987]. Only 12% of CCS loanees in 1985/6 were women. Where women have received loans their repayment rates have been good, normally higher than for men (see Table 3.2 taken from Susan Hurlrich's report).

C. PROBLEMS WITH LIMA

Despite its apparent promise, Lima has been severely criticized. Firstly, the commitment of the government to the programme can be questioned. Smith [1984, 2-89] points out, for example, that the Department of Agriculture received no extra funding to carry out the programme in 1980, a year after it was officially launched. Funding has come primarily from foreign donors who have "adopted" specific areas of the country and have superimposed their own objectives on Lima. Just as with many aid programmes in Zambia [Smith and Wood: 1984], Lima has received little direction from the government, a fact obvious from the lack of homogeneity in its application throughout the country. As Table 3.3 demonstrates, the objectives defined by different donors vary from the very general goal of the National Fertilizer Loan Programme (NFLP), which is to disseminate information to all farmers, to the much more focussed goals of many of the IRDPs which direct their assistance to farmers with

TABLE 3.2

GENERAL AND FEMALE RECOVERY RATES
ON AGRICULTURAL LOANS, 1982/83 - 1984/85

I. Loans from Institutions:	Total Number of Loans Made	Recovery Rate %		
		1982/83	1983/84	1984/85
Zambia Cooperative Foundation (ZCF)	—		89 ^a	
Agricultural Finance Company (AFC)		44 ^b	42 ^b	85 ^b

- a. Represents the highest recovery rate to date in the history of the ZCF.
- b. Recovery rate of the total outstanding amount for each year was 19%, 17% and 33% respectively, bringing the total recovery rate for each period to 55%, 52% and 90% respectively. The 85% rate for 1984/85, however, seems high and was reported in one source as only 60%.

II. Loans to Females:	Total Number of Loans Made	Recovery Rate (%)		
		1982/83	1983/84	1984/85
Southern Province (1983/84)	240 ^a	92		
Central Province (1983/84)	140 ^a	80		
Lusaka Province (1983/84)	140 ^a	10 ^b		
Northern Province: (Choma District, 1982/83)	18 ^c	87		
(Kasama District, 1984/85)	38 ^d		85-90	
PPP & CADRW earmarked funds from FAO ^e				low

- a. Loans financed by MAWD, with SIDA funds, made to members of Women's Groups for poultry-rearing and sunflower and maize production.
- b. Low recovery rate in Lusaka Province was due to lack of supervision from provincial ZCF/FS officials and, for some loanees, the drought.
- c. Loans to Lima groups, made via ZCF/FS (Finance Services).
- d. These 38 loanees include 10 married women. Loans came from Revolving Credit Funds via ZCF/FS. The recovery rate is an estimation only.
- e. PPP = People's Participation Programme.
 CADRW = Community Action for Disadvantaged Rural Women.
 In 1983/84, earmarked funds totalled US \$30,000. The low recovery rate for 1984/85 was due to drought in Western Province, though for 1986/87 it is estimated there will be a 75% to 85% recovery rate.

FROM: Hurlich [1985, 214].

limited resources. The emphasis donors place on integrating women also varies. This is, for example, a major objective for the Swedish International Development Authority (SIDA) but is not a major issue for the FAO or the British.

Partly as a result of the lack of government commitment, partly because of general inefficiencies in the infrastructural system, the implementation of Lima has encountered logistical problems. Late arrival of fertilizers and seed has been a recurrent problem. Joachim Ziche [1987], whose survey of 284 farmers is the most extensive study done to date of Lima but whose data are not yet fully analyzed, found that one third to one half of farmers did not get their fertilizers on time and, even when they did, the quality was often poor. He also found that credit arrived late for 40 to 50% of its recipients. Late collection of the crop and payment of farmers for it by the cooperatives is a serious problem with Good [1986, 270] noting that many, if not most farmers, remained unpaid at the end of July 1986. Equipment has also proven to be a problem. Three devices were developed to assist farmers to follow the Lima recommendations: 1) a 25-meter rope with a knot at each meter to measure fields; 2) a 500-gram beaker for measuring fertilizer; and 3) a 20-gram cup for measuring seeds. These devices are often not available and other less precise measuring techniques are used [Eklund:1985, 22]. Extension agents are also supposed to use demonstrations as a basic

TABLE 3.3

OBJECTIVES OF SOME LIMA-RELATED ACTIVITIES *

Programme	Year Begun	Donor	Objectives	Emphasis	Activities
Lima Crop Extension Programme	1980	SIDA, through the Agricultural Sector Support Programme	To improve the basic crop operations of smaller farmers.	General agricultural functions and all geographic areas.	From the beginning, included extensive training and extension programmes; services from depots and credits for marketing were added later.
National Fertilizer Loan Programme	1983-1984	FAO	To allow extension workers and farmers to observe and evaluate yield effects of different management and fertilizer applications	Farmers in general.	Provides free fertilizers and seeds to selected "contact farmers" for demonstrations.
IRDs (7 in 7 different provinces)	various years	British, Swedes, Germans (depending on area)	To assist farmers to raise production and to enter the cash economy.	Farmers with limited resource endowments.	Supervision and provision of credit for one to two limas per farmer.
Lima Crop Extension Programme	1981	SIDA, Barclay's Bank, FINNIDA	To raise production and income through the Lima concept, improved farmer contact and in-service training.	Small farmers in Luapala Province.	
Women's Participation in Rural Development Programme	1982	SIDA	To improve patterns of food consumption & nutrition standards. To provide equal opportunities for women to participate in all aspects of agricultural and rural development programmes.	Rural women, in order to make them economically self-sufficient through income-generating activities.	Cash crop and poultry production.

* Based on Eklund 1984, Chivumboko 1984 and Sjöström 1985.

teaching tool, but they have not established them in either the numbers or with the success originally hoped.

The extent to which the technology promoted is suitable for small farmers must also be questioned. The World Bank [1986, 8] described it as "scaled-down technical packages for commercially-oriented, capital-intensive farming...", largely because of its emphasis on the production of hybrid maize requiring costly inputs of seed and fertilizer. Per Eklund in his report The Lima Crop Extension Programme Evaluation, Strategy and Indicative Plan 1986-90 [1985, 1] contends that the risk ⁶ associated with hybrid maize is too high to encourage extensive adoption among the 450,000 smallholder farmers who represent three quarters of the Zambian farming population. It is thus not surprising that Ziche [1987, 4] found that few of the farmers interviewed for his survey had adopted the recommended agricultural practices. Eklund's survey [1985] also suggests that the value of the increased productivity of farmers adopting the Lima technologies has not always covered the costs of these inputs ⁷ and that, at actual yield levels, the returns on

⁶ The risk here is that the increase in yields of hybrid maize will not be sufficient to cover increased costs of inputs.

⁷ Recognition of this fact was one of the factors leading to the development of the Lima ladder, a series of graduated recommendations calling for increasing levels of inputs as farmers move up the ladder, which implies both increased knowledge and greater commercialization.

person-days of labour have in fact been higher for non-Lima farmers using traditional methods and growing local maize, than for farmers using the Lima recommendations to grow hybrid maize.⁸ It appears likely that this finding may be less valid in some areas than in others. In the Kalunga area south of Chipata in Eastern Province, for example, yields of 28 bags per hectare were the norm in 1985/86 with 42 being the average [Smith letter May 1987].

D. CONCLUSIONS

While lima was ostensibly developed to assist small farmers, the smallest farmers, those normally classified as subsistence, do not appear to participate. Even among farmers who would be classed as small-scale commercial, the participation rate would seem to be low. Although the main reason seems to be the inappropriateness of the technology, the inefficiencies of the government system also seem to fall more heavily on the smaller, more isolated farmers wishing to move into commercial production than on the larger, more established and politically powerful ones. Good [1986, 275] contends, for example, that in 1985

⁸ Some of the reasons for this are discussed in Chapter Four when dealing with the constraints for women to increasing productivity. The long learning period and the sensitivity of hybrid maize to timely fertilizer application are noteworthy.

"the burden of the state's mismanagement fell most heavily on the small peasant farms - almost 90% of all rural households - which were usually scattered in remote areas, and it was their maize that was in most danger of being uncollected by the agencies."

Since women are concentrated disproportionately in the subsistence and small-scale commercial categories of farmers, let us look specifically at what impact Lima has on them.

CHAPTER FOUR

LIMA AND WOMEN

A. GENERAL IMPACT

As we have seen from the above chapter, small farmers in general do not usually participate in Lima activities. Since women usually farm on a small scale rather than a large, this chapter will assess

1. the impact of Lima on women, including the extent to which the generalization about low participation by small farmers applies to them and what characterizes the women farmers who do participate, and
2. the specific constraints which women face to increasing their agricultural production through programmes such as Lima.

According to the MAWD paper on maize pricing [1987, 4], the return on fertilizer should be about five to one, that is about five kilos of maize will be produced from each additional kilo of fertilizer. This, however, depends on correct application. From an economic point of view, it is important that farmers use the correct amounts and at the most appropriate times in the growing cycle. It is also important that they follow the cropping techniques recommended for fertilizer application, the main ones being:

1. measurement of fertilizers,
2. timing of application; i.e., usually within 10 to 15 days of germination but there is some variation among regions, and
3. placement of fertilizers; i.e., in a hole at the base of the plant.

For a farmer to have successfully adopted Lima, she/he would have had to receive a yield that exceeded that of the crop replaced by a margin sufficient to repay all input costs and to pay the farmer at least the equivalent for her/his labour of what she/he would have earned in other employment. (In the case of women farmers, the only other likely source of employment would be piecework or day labour.) Since many programmes stress involving small farmers in cash cropping, one factor in assessing these activities would be the level of participation of subsistence farmers and the success of these farmers in shifting from subsistence to commercial production according to the above definition.

Several general studies have been carried out on the impact of the Lima programmes funded by different donors throughout the country. In Chilubi, for example, the SIDA-supported IRDP has since 1983/4 provided so-called Lima loans to farmers interested in producing rice and maize. That first year, 160 farmers received assistance and in 1984/5, 267. In Kabompo District, the German-supported IRDP provides loans to farmers for maize production. In Eastern

Province, the SIDA-supported IRDP provided credits for several years for loans for both local and hybrid maize production, including some funds specifically designated for the use of women. This programme was discontinued in 1985 as a result of a major change in orientation of the IRDP. The National Fertilizer Loan Programme (NFLP) funded by FAO provides fertilizers and seeds to selected "contact farmers" who are expected to demonstrate to other farmers the growing of maize following the Lima recommendations. In 1983/4, a total of 1300 plots were set up in eight different provinces under this programme [Eklund:1985, 12] although by 1986 this had decreased to 600 demonstrations in two provinces, Northern and Central [MAWD official, October 1986]. And finally, FINNIDA has provided assistance for a loan programme in Luapula Province.

Despite the fact that female-headed households represent about one third of all rural Zambian households and as much as 50% in some districts, few female heads of households received assistance except where funds were specifically earmarked for women, such as in Eastern Province (see Table 4.1). In most areas, the percentage of women participating in the programmes studied was substantially lower than that of men. Given their greater labour contribution, the result was a disproportionately low percentage of the benefits of programmes going to those individuals who contribute the larger portion of the labour.

Table 4.1Participation of Women In Lima Programmes

Area	Donor	Participation of Women	Female-Headed Households in Area
Chilubi, NP ¹	(IRDP)	37% ²	52.0 ³
Kabompo, NWP	(IRDP)	31% ⁴	29.0 ⁵
EP	(IRDP)	36% ⁶	39.0 ⁷
Petauke, EP	(IRDP, NFLP)	29% ⁸	40.4 ⁹
Luwingu, NP	(NFLP)	0%	38.0 ¹⁰
Mwinilunga, NWP	(NFLP)	50%	32.8 ¹¹
Mwense, Luapula	(FINNIDA)	14%	40.2
Kawambwa, Luapula	(FINNIDA)	33%	33.6

¹ Abbreviations: NP - Northern Province
 EP - Eastern Province
 WP - Western Province
 NWP - North Western Province

² Bumbila and Sapulemi:1984, 4.

³ Geisler et al.:1985, 7.

⁴ Sjostrom:1984, 6.

⁵ Safilios-Rothschild:1985, Table 12.

⁶ Sjostrom:1984, 4.

⁷ Keller and Phiri:1986, 5.

⁸ This figure and the four immediately below are all taken from Eklund [1985, 15].

⁹ Safilios-Rothschild:1985, 9.

¹⁰ Geisler et al.:1985, 7.

¹¹ This figure and the two listed immediately below are taken from Safilios-Rothschild [1985, Table 12].

Most of the women involved in Lima activities are also not subsistence farmers. Oppen et al. [1983, 26] had found, for example, that most farmers had other sources of income and did not rely on their Lima activities for their main income. In Chilubi, where the participation rate of women at 36% was higher than for many other programmes, 73% of the farmers chosen in 1984/85 had previously made commercial sales, sometimes quite substantial ones, and many had had IRDP subsidies the previous year. This was in spite of the objective of the donor IRDP of assisting farmers with no experience in commercial production. Similarly, the participants in some of the specifically women's programmes have often been predominantly relatively well-to-do farmers. In 1984, for example, Alifeyo Chilivumbo and Joyce Kanyangwa found that 70% of 290 Southern and Central Province recipients of loans under the Women's Participation in Rural Development Project were relatively wealthy with 43% having harvested in excess of one hundred bags of maize the previous year. The target population was, however, "women from the poor segment of the society" [Chilivumbo:1984, 5]. In her study of the IRDP credit scheme in Eastern Province, Rosemary Lesa [forthcoming] found that a high percentage of the loans had gone to the wives of local officials such as teachers, medical assistants and agricultural assistants who often had other sources of income which could have been used to pay for inputs. Only about 25% of the loans went to

female headed households although the programme was to be solely oriented towards this group. The fact that in all three of these programmes the objectives established of assisting poorer farmers were disregarded may reflect on the commitment of the bureaucracy to the ideals of equality espoused by humanism.

B. CONSTRAINTS TO WOMEN'S PARTICIPATION IN LIMA

Let us now look at why women's participation in Lima is lower than that of men and why those women farmers who do receive Lima loans tend to be already involved in commercial production. In this regard, the prime assessment tools will be:

1. the results of surveys carried out by this author in early 1987 in two regions:
 - a) the Kalunga area south of Chipata in Eastern Province, and
 - b) in four districts in Northern Province; and,
2. results of surveys by other authors.

Since circumstances obliged this author to carry out her surveys in these two areas using quite different sampling techniques and, to a certain extent, different questions, each will be covered separately with other surveys being referenced where appropriate. Conclusions will then be drawn

at the end. Let us turn first to the results from Eastern Province. (See Annex A for more information on methodology.)

I. EASTERN PROVINCE

a) Structure of Survey

Discussions with farmers were carried out in seven villages surrounding the agricultural camp or local extension headquarters at Kalunga in Chief Sairi's region, 30 kilometers south of Chipata in Eastern Province. In addition, interviews were held with two farmers from the settlement area near Chipata, a former white colonial reserve opened to black African farmers only in the early 1970's. The Kalunga area was chosen because a Canadian professor at the University of Zambia (UNZA), Dr. Bruce Smith, has done extensive research on technological change in agriculture in this area since 1979. The work he has done provides baseline data for this study focusing on women. The large-scale commercial farmers from the settlement area were chosen to provide a contrast with the predominantly subsistence and small-scale commercial farmers of the Kalunga area.

In the Kalunga area, the survey team contacted most of the female heads of households in six villages, excluding only many of the older, less active women and those ill or absent. It also interviewed two women from a seventh village to which time did not permit a return visit. The headman of

each village was asked to identify the "single, independent women." In all villages, the names provided included only widows, divorcees and never-married single women, i.e., de jure (legal) female-headed households. It thus excluded both de facto female-headed households (ones where the husband is absent for long periods of time and the woman is effectively alone), and polygamous households where women have independent farms. Despite these exceptions, in the four villages (Kasauka, Kawaza, Bandawe and Sunguni Jere) where the headmen were able to supply both numbers of total households and lists of those headed by women, the de jure female-headed households represented 35% of the total, a figure which is close to the 39% cited by Bonnie Keller and Elizabeth Phiri in their paper on extension services [1986, 5]. It should be noted, however, that 3 of the 43 women interviewed probably do not meet the definition of a female head of household given in Chapter One. Although they cultivate their own fields, they live with their parents.

The sample chosen from the Kalunga area provides a cross-section of women of varying means, living in villages of different economic status. Because the sample was not random, however, the results of the survey must be regarded as indicative of a trend, rather than as providing mathematically-verifiable averages. In addition, the interview was divided into two sections, with the questions in the second being asked only of the most commercially-

active women who had some knowledge of the subjects being questioned. (See Annex B for a copy of the questionnaire used.) As a result, answers for all questions are not available for all women. In addition, some women could or would not give a clear reply to some questions.

b) Characteristics of the Region

Before looking at the results of the survey, it is useful to bear in mind some characteristics of the area which affect the adoption of technology. In this regard, let us return to Girvan's three categories of technology.

In the context of organizational technology, three factors are particularly noteworthy. Firstly, the major ethnic group of the area, the Ngoni, is patrilocal and patrilineal. In the patrilocal system, women are separated from their patrilineal kin groups on marriage and are dependent on their husbands and in-laws for resources. On divorce or widowhood, however, they return to their native villages and must rely for land on their kin, with whom their ties have often been weakened by absence. As indicated in Chapter Two, Eastern Province has had a high population density since the 1800's and there is considerable pressure on land especially in more populated and serviced areas. According to Smith [1984, 1-16], there is no free land in the Kalunga area which village headmen can allocate to newcomers. It is not surprising then that, in Chief Sairi's

region, land disputes are increasing in number, especially as a result of the return from the urban areas of several larger farmers who, by reclaiming their traditional lands, are displacing other farmers who have been cultivating them in the interim. The specific impact of the patrilocal system combined with increasing pressures on land will be discussed later in this chapter. Secondly, migration of males from the area has been a long-standing phenomenon. The result is a high ratio of women to men, as high as 10 to 8 in the Kalunga area according to Smith's findings in 1979-80 [1984, 1-17], and a certain self-sufficiency on the part of women who have gradually reduced their reliance on men. Women tend therefore to farm their own fields quite independently of men. The third factor which affects organizational technology is the layout of villages in the area. Villages consist of 15 to 50 dwellings, mainly adobe with thatched roofs although some are brick with tin roofs. The dwellings are set closely together with fields beyond the perimeter of the settlement at a distance of no more than thirty minutes walk. One village is generally no further away than one or two kilometers from the next. Thus the seven villages visited were within a radius of 4 to 5 kilometers of the agricultural camp at Kalunga or within reasonable distances for the agricultural assistants, most of whom had bicycles. (The female agricultural assistant did not.) Some of the villages are on the main road which is passable throughout

the year while others are off it by one or two kilometers along dirt paths. The condition of the roads would suggest that it is feasible for the extension agents to visit most of these villages regularly.

In terms of consumption technology, the staple food in Eastern Province has long been maize but hybrid has made substantial inroads in recent years and is now widely grown. Smith [letter May 1987] notes that the average production of hybrid in the Kalunga area has increased from 9 bags per farmer in 1970 to 110 in 1980. The result is a growing number of small-scale commercial producers who now represent 24% of all the farmers in the area. This compares, for example, to 14% in Northern Province. (See Annex E, Tables 1 to 5 for more information from both Eastern and Northern Provinces on the number of farm units per category of farmer, the size of acreage cropped, the, crop mix per category and the per capita consumption of different kinds of flour.) Because of its commercial potential, the World Bank chose Eastern Province as the site of a large programme to upgrade agricultural extension and research services. This Eastern Province Agricultural Development Project (EPAD) has been in operation since 1981 and has reorganized the extension services along the lines of the T and V system discussed in Chapter One.

Production technology in Eastern Province is characterized by dualism. The traditional farmers are still

largely hoe cultivators while those in the small- to large-scale commercial categories are predominantly oxen cultivators. The development of this comparatively large commercial group has been facilitated by the history of the area. The heavy population density mentioned above long ago forced the abandonment of the bush fallow system and the adoption of an intensive agricultural system which requires fertilizers to maintain yield levels. In the Kalunga area, for example, the overutilized soils must be fertilized to produce reasonable yields of even local maize. Because Eastern Province is cut by the main east-west road to Malawi and is thus on major supply routes, agricultural inputs are more readily available than in more isolated parts of the country. Maintenance of an input-intensive agricultural system is thus easier here than in Northern Province. Other infrastructure is also stronger. Collection of harvested produce is, for example, more reliable than in many other parts of the country. Credit has also been more available in the past in Eastern Province than in Northern Province with the first receiving twice as much as the second in 1983/84: 9.6 million Kwacha for 113,200 households versus 4.8 million for 111,490 households. Smith notes that 15.7% of the farmers in the villages he surveyed received credit in 1986, compared to 25% in 1980 [Smith:1987, 5]. As early as 1970,

Hedlund ¹² found 18% of farmers using credit in the areas of two chiefs in Eastern Province [cited by Smith, 1987, 5]. By contrast, less than 10% of farmers in Northern Province received credit in 1983/4 ¹³. The final point which has affected production technology in the Kalunga area is the Ngoni tradition of keeping cattle. The people of the area are thus familiar with animal husbandry techniques and have adapted easily to the use of ploughs. This has made large-scale agriculture more feasible than it is in Northern Province where, in most areas, there is no tradition of animal husbandry.

c) Survey Results

i) Characteristics of Women Interviewed

In the Kalunga area, the women interviewed were all active farmers although only 33% indicated that farming was their main source of income (see Table 4.2). Only four said they sold more than ten bags of maize and one, more than 100, while most of the remainder had no cash sales in the previous year. For these women, their cash is derived mainly from sales of consumer goods, beer or their own labour.

¹² H. Hedlund. Small Farm Development on the Periphery: A Study of Two Chief's Areas. Lusaka: University of Zambia, Rural Development Studies Bureau. 1980.

¹³ The ZCF Activity Plan for 1985 indicates that ZCF loaned to 1,717 farmers and AFC to 8,264 for a total of 9,981 out of 111,340 households. Because many households have more than one farmer, the actual number of farmers would be higher than the number of households.

Table 4.2Primary Sources of Income for Women Farmers in Kalunga Area

Primary Sources of Income	% of Women	No. of Women
Farming	33	14
Labouring	17	7
Retail sales	14	6
Brewing of alcohol	17	7
Remittances	14	6
Knitting	2	1
No income-subsistence	4	2

ii) Women's Opportunities to Learn about Lima

Even in the Kalunga area where maize is a long-established crop, the adoption of hybrid is a change in consumption technology necessitating a change in cropping techniques or production technology. To effect such a change women must have the opportunity to learn about the new technology. A farmer can learn about the Lima recommendations either through contact with the extension service, from other individuals who are familiar with them and can explain them accurately or through self instruction. Since the illiteracy rate among women in Zambia is 65% (compared to 39% for men) [CUSO:1982, 4], the opportunities for the latter are likely to be limited for the majority of rural women. In this same vein; it is interesting to note that among the farmers in this sample using fertilizers, the average education level was 2.4 years. Among those not using fertilizer, none indicated any formal education. Chilivumbo and Kanyangwa [1984] similarly found that the level of education was comparatively high among the women

participating in the Women's Participation in Rural Development project with 55% having five to seven years of education.

The opportunities for women to learn about Lima through the extension services would also appear limited. Only about 5% [EPAD 1986b] of the contact farmers in Eastern Province are female. In the area covered by the agricultural camp at Kalunga, 8 of 96 contact farmers were women. Among the general farming population, only 2 women, both contact farmers, or 4% of those questioned had had individual contact with an agricultural assistant and one said this was not recent (see Table 4.3a). Only 14% knew the name of the extension agent for the area (see Table 4.3b).

Table 4.3

Contact with Extension Agent

- a) The last time the extension agent visited, did he or she make contact with you or your family?

No. of Replies	With Farmer	With Family	No Contact
43	2 (4%)	1 (2%)	40 (94%)

- b) What is the name of the extension agent for your area?

No. of Replies	Know Name	Do Not Know Name
43	6 (14%)	37 (86%)

Some women knew so little about the extension service that

they gave the name of credit officers and other officials instead of the extension agents or agricultural assistants, as they are called at the local or camp level. Such lack of recognition is not surprising under the T and V system which encourages the extension agent to deal with only a few farmers but the resulting unfamiliarity imposes a communications barrier for female farmers who often lack the self-confidence to approach someone they do not know. Twenty-four percent had attended the most recent extension meeting in their area and an additional 12% mentioned having attended past meetings (see Table 4.4).

Table 4.4

Attendance at Extension Meetings

Did you attend the last meeting called by the extension agent?

No. of Replies	Yes	No	Attended Past Meetings
25	6 (24%)	16 (64%)	3 (12%)

Several farmers did not know that such meetings were being held. Others felt that meetings, which were often held at the Kalunga Farmer Training Centre, were too far away or that such sessions were only open to male farmers or even to contact farmers. The extension agent for the villages surveyed confirmed that most contact farmers did not encourage their fellow farmers to attend meetings.

Only about one third of the women questioned considered

the extension service to be their most important source of information on farming techniques (see Table 4.5).

Table 4.5

Information Sources

What is your major source of information on new cropping techniques, marketing and credit (relatives, neighbours, extension agent, etc.)?

No. of Replies	Extension Agent	Other Farmers	No Source	Other Replies
32	11 (34%)	11 (34%)	5 (16%)	3 (9%)

Three of those saying that their prime source of information was not the extension service volunteered their opinions that extension advice was applicable only to those who were cash cropping or who had received credit and can therefore afford fertilizers.

Despite the bias of the extension message in favour of commercial farmers, the three largest women farmers interviewed in Eastern Province, one in Kasauka Village and two in the Chipata area, have no contact with the extension agents and are, in fact, rather critical of their service. Two of the three specifically mentioned that they felt the agricultural assistants did not wish to deal with women.

In terms of the third and final method for farmers to learn about Lima, through contact with knowledgeable farmers, the opportunities would again appear limited. The most knowledgeable farmers or those most able to pass on information, at least in theory, should be those who have

the most frequent contact with extension agents. Under the T and V system, this is the contact farmer. Fifty-two percent of women did not know any of the contact farmers in their villages (see Table 4.6). The remaining 48% included two women who are themselves contact farmers.

Table 4.6

Knowledge of Contact Farmer

Do you know the contact farmer in your area? What is his or her name?

No. of Replies	Know Name	Do Not Know Name
21	10 (48%)	11 (52%)

Even when non-contact farmers know the contact farmers of the area, they claim not to be getting information from these farmers. There would appear to be a number of reasons for this. Firstly, farmers are busy people, particularly during the farming season which is also the season when other farmers need advice most. Secondly, contact farmers value their individual relationships with the extension service and tend to guard the information gained from them jealously [personal communication with a Ministry of Agriculture official, February 1987]. Thirdly, as EPAD [1986b] notes, rivalries often make villagers doubt the information from contact farmers, even when it is offered.

In addition to the lack of information flow from contact farmers to female heads of households, the latter

would not appear to be getting much information from male relatives. None of the women questioned admitted to receiving advice from her male relatives (see Table 4.7).

Table 4.7

Numbers of Women Receiving Advice from Male Relatives

Do any of your male relatives discuss with you the advice provided by the extension agents?

No. of Replies	Yes	No
7	0 (0%)	7 (100%)

The weak links between female heads of households and their patrilineal kin, as mentioned above, may be the reason for this. They may also account for the fact that the survey team met at least six apparently destitute women who seemed to be completely without family support.

In terms of the organization of the technology transfer process, many authors [Benor and Baxter:1984 and Berger et al.:1984] have suggested that one way of increasing the contact between women and extension services is by increasing the number of female extension agents. The survey team, therefore, asked the women who had had some contact with the extension services whether or not they preferred a female extension agent. While 28% indicated a preference for females, the remainder had no sexual preference (see Table 4.8). The competence of the individual was seen as being more important than the sex.

Table 4.8
Preference for Sex of Extension Agent

Do you prefer to deal with a male or female extension agent?

No. of Replies	Preference for Female	No Sexual Preference
18	5 (28%)	13 (72%)

In the Zambian context, this finding should be seen as positive since the relatively low representation of women in the existing extension community is unlikely to change significantly in the near future. Most of the extension agents contacted during the course of this survey indicated, however, either in words or actions, that they have little contact with women. This reinforces the recommendations made in studies such as those by Geisler, Keller and Chuzu [1985], and Keller and Phiri [1986], that male extension agents must be sensitized to gender issues and must be trained about the role of women in agriculture and how to approach them.

Another solution proposed to improve women's access to extension, also in the realm of organization of technology transfer, is to increase the number of female contact farmers. Half of the women questioned did indicate such a preference although, for the remainder, the sex again made no difference (see Table 4.9). The women preferring female contact farmers often felt that they would be able to speak

more freely with them than with men.

Table 4.9

Preference for Sex of Contact Farmer

Would you prefer to deal with a male or female contact farmer?

No. of Replies	Preference for Female	No Sexual Preference
12	6 (50%)	6 (50%)

For a limited view of what impact female contact farmers might have, let us look at two examples in Eastern Province. The first woman is a widow of 53 who sold 35 bags of hybrid maize and two bags of soybeans in 1985/86. Although several women said they did not get advice from her, when the survey team went into her village, the other women seemed proud to point her out as a contact farmer. In addition, several other facts suggest that, while she may not be providing a great deal of direct advice, she is having a demonstration effect. Firstly, excluding the two contact farmers, six of the eight women in the sample who could name the contact farmers in their villages were in this woman's village and named her. Secondly, the degree to which extension advice on fertilizer was being followed was high: all the women questioned in that village about the use of fertilizer indicated they used it, or will do so in 1986/87, or have in the past (compared to 79% of the overall Kalunga sample, as

noted below.) Finally, among the 43 women interviewed in the Kalunga area, only four grew soybeans, of which two were contact farmers and two were in the village of the contact farmer mentioned, one being her mother. (Soybeans are one of the alternative crops being promoted by the extension services.)

Unfortunately, the impact of the second contact farmer cannot be said to be as positive as that of the woman cited above. A woman of 28 in a village where most of the other female heads-of-households were considerably older, this contact farmer complained that only the women farmers poorer than she, or on her same level, would listen to her. She further complained that men would not listen to her at all. Despite the fact that she was intelligent and knowledgeable about farming methods, she may not have been a good choice for a contact farmer in that village, either because of her relatively young age or because of the fact that she was only an average farmer who may not have commanded the same respect as a more prosperous farmer.

Although women in this area were not asked specifically whether they would be interested in being contact farmers, several voiced an opinion. While such replies could not be taken as representative of the area and may well be skewed by the interests of the respondents, it was interesting nonetheless that 6 women wanted to be contact farmers (CF) in addition to two who presently are. Two volunteered that

the role would not interest them. All of the women interested had already used fertilizer that season or were planning to do so. Only one would be considered as a small-scale commercial farmer with the others falling into the category of subsistence farmers. The education level of those interested in being contact farmers was higher than the average of the sample: 3.9 years versus 2.1 years of formal schooling (see Table 4.10). The number of dependents among farmers interested in being contact farmers was somewhat lower than among the average, 1.3 versus 1.6. The average number of workers was also lower, 1.5 versus 2.0.

Table 4.10

Interest in Being a Contact Farmer

	Those willing to be CFs	Those unwilling to be CFs
Educational level	3.9 years	2.1 years
No. of dependents	1.3	1.6
No. of workers	1.5	2.0
No. of dependents per worker	1.2	1.3

The rationale for being interested in the role of contact farmer may be related to the fact that, according to EPAD [1986 Report Summary], contact farmers in Eastern Province receive five times as much credit as non-contact farmers.

A slim majority of women did not think that men would be receptive to advice from women contact farmers (see Table 4.11).

Table 4.11Would Men Take Advice From a Woman Contact Farmer?

No. of Replies	Yes	No
13	6 (46%)	7 (54%)

iii) Constraints to Adopting Lima

Even if women learn about the Lima recommendations, only a few are likely to implement them. Firstly, as mentioned in Chapter Three, the shift to hybrid maize requires important changes in farming practices. Most of the women interviewed in the Kalunga area did not appear particularly self-confident. It was evident in the shyness which seemed to be the reason behind any expressed preference for dealing with female extension agents and contact farmers. This lack of self-confidence is not surprising given the social role of women described in Chapter Two, but it would appear, nonetheless, to be an impediment to taking decisions and risks such as those implied in the adoption of new technology. Secondly, hybrid maize requires a different production technology than most women have used in the past and thus either different or additional inputs. The first of these is land.

Because maize is normally an additional crop, it requires more land. As mentioned above, land is becoming increasingly scarce in this area. Although not always mentioned in reply to the question about constraints to

production, the issue of land was raised frequently in the course of the interviews. Seven women specifically mentioned either lack of adequate land or poor quality of land as problems. Two of these plus two others indicated that they are farming borrowed land, indicating a degree of insecurity of tenure. Of these nine different women, three were widows who returned to their paternal villages and to a lowered standard of living on the death of their spouses because the family land was seized by the husbands' relatives.

Most of the women interviewed had not had their fields measured so their estimates of areas cropped must be regarded as indicative, rather than exact. These estimates do, nonetheless, provide some basis for comparison with other statistics. Women would appear to cultivate considerably less land than the provincial average, with the traditional farmers questioned having average cultivated areas of 4.7 limas versus 7.6 limas for Eastern Province as a whole. The average among all farmers questioned was 8.7 limas versus Smith's findings of 10.4 limas [1980, 1-18]. The fact that 14 of 23 women farmed one hectare or less makes the disparity even more marked.

Inputs or access to the "physical processes" of production technology [Girvan:1983, 36] is yet another problem for women farmers interested in following the Lima recommendations. As Table 4.12 indicates, 73% of the women questioned cited the availability and cost of fertilizers as

a constraining factor for them in increasing production.

Table 4.12

Major Constraints to Increased Crop Production

What do you consider to be the major constraint to increasing production of crops for sale?

No. of Replies	Fertilizers	Money for Labour	Ploughing
33	24 (73%)	11 (33%)	8 (24%)

N.B. Some farmers cited more than one constraint.

The fact that fertilizers were cited as the most important constraint is in keeping with Smith's contention that their introduction has changed the nature of peasant production and that purchased inputs are now the major constraint to increased production. The additional fact that 65% of the women in this sample use fertilizers as opposed to 93% of the general population in the villages studied by Smith [1987, 5] suggests that the impact of their introduction is less for women than for men. One of the reasons is that women generally have less opportunity than men to earn income and thus to buy inputs. Credit is thus very important to them. More than one third of the women in this study using fertilizers seemed to depend on credit to buy them (see Table 4.13). By comparison, only one of six farmers using fertilizers in Smith's study [1987, 5] depended on

credit to finance them ¹⁴

Table 4.13

Credit and Fertilizer Use

Number ¹⁴ of women questioned	34
Number of women who:	
. had had credit approved for 1986/7	8 (23%)
. had used fertilizers at time of survey	17 (50%)
. had credit but were awaiting inputs	5 (15%)
Total number likely to use fertilizers in 1986/7	22 (65%)
Credit recipients as % of fertilizer users	36
(8 of 22)	

Although not specifically questioned on how much fertilizer they used, many of the non-credit recipients indicated that they employed quantities which were substantially below the recommended requirements. Nonetheless, there were three women who made commercial sales ranging from 20 to 41 bags of maize a year who indicated that they had never received credit. All three were widows over the age of 50.

As indicated in Chapter Two, Zambian women have traditionally received less credit than men. Among the female farmers interviewed in Kalunga for this study, Table 4.14b indicates that 19% received credit in 1986/7, compared to 29% of farmers interviewed in Smith's review of neighbouring villages [letter May 1987]. The disparity has been even higher in the past with only 12% of those interviewed ever having received a loan prior to this last

¹⁴ The percentage of farmers receiving credit was 15.7%; the percentage using fertilizer was 93%.

season (see Table 4.14a) whereas Smith [1987, 5] had found that 15.9% of the general population of neighbouring villages had received credit in 1985/6 ¹⁵

Table 4.14

Women Receiving Credit

a) Have you ever taken out a loan?

No. of Replies	Yes, prior to 1986/7	No, prior to 1986/7
43	5 (12%)	38 (88%)

b) Did you take a loan this year?

No. of Replies	Those Receiving Credit	Those not Receiving Credit
43	8 (19%)	35 (81%)

Since membership in a primary society is a prerequisite to obtaining loans through the provincial cooperative unions, let us look at the level of women's membership. In general this is low. Among the women interviewed, 30% belonged to the primary society (see Table 4.15).

¹⁵ Availability of credit for women may be improving under the Rural Agricultural Credit Scheme. The Khova (Kalunga) Primary Society, for example, directed 110 (or 30%) of its 366 loans in 1986/7 to women. (personal communication with an officer of the Khova Society, January, 1987).

Table 4.15

Membership in Cooperative/Primary Society

Do you belong to a cooperative or primary society?

No. of Replies	Members	Not Members
23	7 (30%)	16 (70%)

Three women were openly critical of how the local primary society, Khova, works. It has indeed had problems. Lending from the Provincial Cooperative Union was suspended for six years because of the non-repayment of debt in the late 1970s¹⁶. It is possible that the inactivity of the society has discouraged membership.

Receiving credit does not guarantee that the required inputs will be available in time to apply them at the recommended points in the cropping cycle. Credit through official Zambian channels is often issued late. Fertilizers also have been in short supply in recent years with the bulk of the supplies arriving well after the beginning of the crop season. The farmers with ready cash often purchase their supplies from the limited deliveries made early in the season. The farmers who cannot purchase then may have to wait until the next delivery which is often well into the season when the effect of fertilizer application is much

¹⁶ All of the 19 defaulters were male. The women loanees had repaid their loans (personal communication with an officer of the Khova Primary Society, January 1987).

reduced. Credit recipients often fall into this latter category. Thus, of the eight women for whom credit had been approved for the 1986/7 season, five were still awaiting inputs at the time of the survey (see Table 4.12). The late arrival of inputs has repercussions on more than the production levels we have already noted. The case of one farmer demonstrates another impact. Last year she received a credit voucher for 16 bags of fertilizer of which only 8 arrived before the end of the growing season. Because of the lack of adequate inputs, her crop was poor. In addition, although she did not receive the full value of the loan, she is being required to repay the whole amount. It is possible that such bureaucratic arbitrariness contributes to the fact that at least six women (four of whom are not fertilizer-users) expressed real fear of loans. They feared the repercussions of possible non-payment and believed they might be arrested or taken to court. Even though the cases of such harassment would appear to be extremely rare, they have created fear among some women. This did not, as we will see, appear to be the case in Northern Province.

Even when women are able to acquire adequate land and purchase the required inputs, they may have difficulties using them effectively because of lack of adequate tools and equipment, again production technology. Such shortages present problems in two areas: firstly, in transporting both inputs from supply depots to fields and harvested crop back

to the depots and, secondly, 'in the cropping activities themselves. In terms of cropping operations, in the Kalunga area, 84% of the women interviewed indicated that they had insufficient tools to carry out their farming operations (see Table 4.16a). Many farmers did not even have enough hoes to till their fields, not to mention more costly equipment. Among a more limited sample of 20 of the women who indicated that they did not have enough tools ¹⁷, 15 of them or 75% hired and/or borrowed equipment (see Table 4.16b and c).

Table 4.16

Access to Tools

a) Do you have access to all the tools you need?

No. of Replies	Yes	No
31	5 (16%)	26 (84%)

b) Do you borrow any tools?

No. of Replies	Yes	No
20	13 (65%)	7 (35%)

c) Do you hire any tools?

No. of Replies	Yes ¹⁸	No
20	4 (20%)	16 (80%)

N.B. Since some farmers both borrowed and rented equipment,

¹⁷ Information was incomplete for the remaining six.

¹⁸ This was always ox-drawn ploughs and the labour to handle them. Social norms in this area frown on women using oxen.

the total of the "yes" replies to questions b and c above exceeds the 71% total figure for those hiring and borrowing equipment.

Although borrowing or hiring of equipment would appear to solve the problem of equipment shortages, this was not necessarily so. Three women complained that they could not get tools when they needed them, with resulting delays in their cropping schedules.¹⁹ Muntemba [1982, 43] has similarly found that women often could not plant their vegetable crops until nearly the end of the rainy season because the tools were not available.

In terms of utilization of oxen, 6% of the women questioned in the Kalunga area had oxen of their own and another 26% borrowed or hired them. The total of 32% using oxen compares to the 60.9% rate of oxenization found by Smith for a neighbouring area [1987, 5].

Where transport is concerned, even when a village has a supply depot, an individual farmer's fields may be one or more kilometers distant. Without some mechanical means of transport such as bicycles, wheelbarrows or ox-carts, movement of inputs and of crop is an onerous task. No women indicated owning any of these devices.

¹⁹ Eklund [1985, 36] estimates that for every day that planting is delayed beyond the arrival of the rains, there is a 1% to 2% loss in yields.

iv) Constraints to Effective Implementation of Lima

Shortage of labour, especially at peak periods, is yet another problem for women wanting to implement the Lima recommendations. Labour shortage will be defined here as insufficient hours in a given period to carry out the tasks which are expected of the individual. In the case of Zambian women, these tasks would include both reproductive activities and sufficient food production to assure minimal nutritional levels for their families. The emphasis is thus on availability of time to carry out other activities such as production for the market. This definition contrasts with that provided by Collinson as cited by Smith [1987, 9]: "Land and off-season labour is not fully utilized because land planted is limited by peak season labour availability". This definition ignores at least two factors of relevance to this paper. Firstly, it is not only the extensiveness of agricultural activities which determines total production but also the intensity of operations, as we will see in the next paragraph. Secondly, most studies suggest that Zambian women are fully occupied throughout the year with average working days of 11 hours (see Chapter Two).

EPAD [1985, 11] suggests that two weeding be done between 10 and 30 days after emergence of the maize plants. As mentioned previously, failure to weed on time can decrease yields by as much as 25%. Since weeding is primarily a female activity and should be done in the

already busy December-to-January period, women often face conflicts between the requirements of maize and subsistence crops. In the Chilivumbo and Kanyangwa survey in Central and Southern Provinces [1985, 17], for example, 55% of the farmers experienced conflict in allocation of labour, particularly for planting and weeding. Smith [1984], as cited above, also pointed out the relationship between successful hybrid maize production and the ability to hire additional labour to ease labour conflicts between crops. Since female-headed households tend to be smaller than those headed by men [Geisler et al.:1985, 37], with one working adult being the norm, it could be expected that they would find participation in Lima particularly difficult. Similarly it appears as if women with small children are less likely to participate [Chilivumbo 1984, 31], probably because of the pressures on their time.

Because of the increased demands for labour that hybrid maize following the Lima recommendations implies, the survey team asked farmers if they had adequate labour for their present activities. Seventy-five percent of those questioned indicated that they did not have enough (see Table 4.17). Only six indicated that they hired labour, a figure which is consistent with Smith's findings [1987, 5] that 25.7% of the farmers in the villages he surveyed hired labour. Of those not hiring labour, six volunteered the information that lack of money for paying workers was the constraint.

Table 4.17Family Labour Supply

Are there enough available members in your family to get your family's crops planted, weeded, harvested on time?

No. of Replies	Yes	No
24	6 (25%)	18 (75%)

The need was there but the means was not. This conclusion was reinforced by the information supplied about fallow land. Although not specifically asked, 63% of the women who volunteered a reason for having fallow land cited lack of labour or oxen as the reason (see Table 4.18).

Table 4.18Reasons for Fallow Land

No. of Women	Lack of Labour	Lack of Oxen	Lack of Inputs	Other Reasons
11	5 (45%)	2 (18%)	5 (45%)	2 (18%)

N.B. Some farmers gave more than one reason.

Women saw the use of oxen as a means to lighten their labour.

Yet another observation suggesting that labour is a constraint for women interested in adopting the Lima recommendations comes from a comparison of the number of workers in households using fertilizers versus those not using them. In the households of the women interviewed and using fertilizers, the average number of workers was 2.3

(see Table 4.19). Among non-fertilizer-using households, it was 1.1. The difference in availability of labour is even more striking for households growing maize. The average number of workers in the households of the seven women in this sample growing hybrid was 4.3 as compared to 2 for all the other households. In addition, six of the seven were using oxen.

The two farmers in the settlement area also had more workers than the average, one having six, the other five. These findings are in keeping with those of Oppen et al. [1983] in North Western Province where the average size of Lima households was higher than that of non-Lima households.

Table 4.19

Labour Availability and Adoption of Technology

Type of Household	Number	Number of Workers
Using fertilizers	22 (65%)	2.3
Not using fertilizers	12 (35%)	1.1
Growing hybrid	7 (16%)	4.3
Not growing hybrid	36 (84%)	2.0

From one point of view, fertilizer can be seen as a labour-saving device - for a given number of bags of production, a farmer can theoretically plant a smaller area when using fertilizer than without because the yield per hectare is higher. The associated operations of hoeing, planting and weeding are thus less. For most women, however, using fertilizer is a means of increasing production, not

decreasing cropped hectarage. Indeed the risk associated with using the lima technology would suggest that, at least until the farmer is well established, he/she would be unwise to reduce the area planted.

Let us return to the criteria for determining adoption rates given at the beginning of this chapter and look at the results of the constraints described in this section on the level of adoption of the Lima consumption technology in the Kalunga area. Only 16% of the women questioned in the Kalunga area indicated that they were growing hybrid maize (see Table 4.19 above). This compares with 54.6% of the farmers in the neighbouring villages surveyed by Smith [1987, 5]. Fifty percent of women questioned had used some fertilizer at the time of the survey in mid-January (see Table 4.13). Of those who had not used fertilizers by mid-January, 33% indicated that they would be using them once they arrived. Assuming that all of the women who were planning to use fertilizers actually did, the utilization rate among women questioned would have been 65% (see Table 4.13). It should be noted, however, that fertilizers should have been applied in December for optimal productivity²⁰ and already one woman had returned her local purchase order because she felt that it was too late to usefully apply

²⁰ The Lima Crop Memo [1985, 12] estimates that the application of urea fertilizer 6 to 7 weeks after the emergence of the plants, rather than 10 to 15 days as recommended, can reduce yields by as much as 5 to 6 bags a lima.

fertilizers for that cropping season. In terms of following the advice of the extension service, 67% of the women questioned about their fertilizer use, past, present or future, measured inputs, either using matchboxes or their cupped hands, and followed the recommended practices for applying them (see Table 4.20).

Table 4.20

Measurement of Seed/Fertilizer

Do you measure the amount of seed and fertilizer you apply?

No. of Replies	Yes	No
15	10 (67%)	5 (33%)

Among the women not following recommendations, the most common reason seemed to be lack of knowledge. Others suggested that measuring was too time-consuming, as was digging holes to put the fertilizer close to the base of the plant.

II. NORTHERN PROVINCE

a) Structure of Survey

The survey for Northern Province was organized very differently from that of Eastern Province. The Northern Province Provincial Agricultural Officer, who is both very interested in and knowledgeable about the constraints facing women farmers, requested that two villages in each of four

districts be surveyed, one village which had received support from an external donor and one which had not. The four districts identified were Mbala and Kasama, which are relatively prosperous, and Luwingu and Chilubi which are considerably less so. There are three main donor-financed agricultural projects in the identified districts. The Village Agricultural Programme (VAP), funded by NORAD, the Norwegian aid organization, initiates and implements agricultural, water and building projects in villages in Kasama and Mbala Districts. The Integrated Rural Development Programme (IRDP), funded by the Swedish International Development Authority (SIDA), is active in Chilubi and Luwingu Districts. It has traditionally implemented a range of rural development projects, but is now shifting to playing the role of catalyst to District Councils who implement their own projects. Finally, the SIDA-Lima Programme provides free fertilizers and seeds to selected farmers in districts throughout the province for crop demonstrations at village levels.

As a result of discussions with Department of Agriculture staff and officials involved in these programmes, the survey team identified the following villages:

- . Mbala District: Malupenga/Malito - received free inputs
from VAP in 1984-85
Mpangankula - no VAP assistance
- . Kasama District: Chafwa - on-going VAP credit

- scheme for women only
- Lafaelo Mubanga - no VAP assistance
- . Luwingu District: Kalalanda - on-going IRDP demonstra-
tions for maize and rice
- Kalabwansai - no on-going demonstrations
- . Chilubi District: Saili - on-going SIDA Lima demonstra-
tions
- Chibale - no on-going demonstrations

Arrangements to visit villages were made through the agricultural assistants responsible for the areas in question, although the extension staff were not present for the interviews. In all cases, these were villages known to the assistants and fairly accessible. For that reason, they are probably not typical of the districts as a whole. The camps were asked to provide lists of the female-headed households. (Some married women were also interviewed, particularly in groups.) The small number of women included in the lists provided compared to the known percentages of female-headed households in the districts concerned suggested that the lists were incomplete. In some cases, alternate approaches assured a random sample. In Lafaelo Mubanga, Kalalanda and Kalabwansai, for example, the village headmen convoked all the women and the survey team was able to choose randomly. In Mpangankula, a counsellor to the headman was able, with the help of some of the village women, to provide a list of the female heads of households. In Chafwa and Malupenga/Malito, the sample was a random choice of the women who had received assistance from VAP. The least representative villages are probably Saili and

Chibale in Luwingu District. In the first, the extension services had arranged a number of interviews before the arrival of the team. When it became obvious that the women chosen were not representative of the provincial average in educational levels, ages or economic status, the team tried to identify other women. Given the short time available, this was successful only to a degree. In Chibale, the women interviewed were all members of a women's club. Again their ages, educational levels and socio-economic status suggest that they were not particularly representative. Despite the lack of randomness of the sample, it does provide the opportunity to compare the problems and the approaches to solving them, of a comparatively-advantaged group with the generally less-advantaged women in other villages. Although the findings cannot, for the reasons given, be regarded as conclusive, it should be noted that other studies have also had difficulties establishing a scientific sample ²¹ Before looking at the results of these interviews, it would be useful to review, as we did for Eastern Province, some of the factors affecting the adoption of technology.

b) Characteristics of the Region

Firstly, in terms of organizational technology, the most important factor in Northern Province is the sparsity

²¹ In Ziche's sample, 50% of the non-contact farmers had received credit, a figure which is considerably above the average for the province.

of population. This is Zambia's largest province, with an area of 147,510 square kilometers, or about one-fifth of the whole country, but with only 11.9% of the total population. The population density of 4.6 persons per square kilometre is thus substantially lower than the national average of 7.5. Although the province has the largest rural population of any in Zambia, the settlements are widely dispersed and there is still much unallocated land. Because of the vast distances, provision of services is difficult and costly. Infrastructure such as roads is very poor and other services weak. ZCF [1985], for example, reported only 57 primary societies in Northern Province compared to 80 in Eastern Province. AFC has no facilities at all in Chilubi and Luwingu Districts. This paucity of services is a limiting factor on the distribution of credit. Another important factor in terms of organizational technology is the fact that the two major ethnic groups in the areas visited - the Bemba in the central part of the province and the Bisa in the south - are matrilineal and matrilocal. Under matrilineality and matrilocality, women traditionally stay in their native villages after marriage, where they have access to such resources as land and labour, and where they play an important role in resource allocation and decision-making. Access to land is thus not the problem that it is in Eastern Province. Although the penetration of capitalism has somewhat eroded the traditional kinship and residential

system, women in matrilineal/matrilocal societies can still call on their matrikin for assistance more than in patrilocl societies. We will see later the effect of this, for example, on information flow among farmers. The third important factor in terms of organizational technology is the role of the province as "a colonial labour reserve" for the Copperbelt, to cite Geisler, Keller and Chuzu [1985, 5]. Women were left behind to carry out subsistence cultivation. Although migration has decreased substantially in recent years, the percentage of female-headed households is still extremely high (37%). By district visited, it is [Geisler et al.:1985, 7]:

Table 4.21

Female-headed Households

District	% Male-Headed Households	% Female-Headed ²² Households
Kasama	63	37
Luwingu	62	38
Mbala	65	35
Chilubi	48	52

There are several factors which affect the production technology used in Northern Province. Firstly, because the soils are generally heavily leached and acidic, with low inherent fertility and a light texture, prolonged

²² The 1980 Census, on which these figures are based, defines a household as a group of people living together in a common residence and cooking and eating under one roof. The figures for female-headed households thus include polygamous households where wives have separate huts.

cultivation causes them to lose their organic content and physical structure quickly. Intensive agricultural systems therefore require careful management. The area is characterized for the most part by the extensive chitemene system rather than by intensive agricultural practices. Chitemene is a type of shifting axe and hoe cultivation. The men cut down the branches of trees, then the women drag and pile them in a circle which is burned just before the rains begin. Crops such as finger-millet, beans and groundnuts are planted in the ashes which help to neutralize the high acidity of the soils. The land is used for about seven years when it is abandoned and a new area cleared. Although the government is actively trying to discourage chitemene because the natural vegetation cannot keep pace with the resulting deforestation, it is still used extensively, especially for finger millet. The second factor affecting production technology is that neither the Bisa nor the Bemba have a tradition of cattle. Although oxen are being introduced, cultivation is predominantly by hoe and ploughs are still very little used. In all of Chilubi, for example, the most remote and the poorest of the four districts visited, there are only five farmers using oxen.

In terms of consumption technology, the main crops are cassava, sorghum and millets, beans, sweet potatoes, rice, maize and groundnuts. Although maize has not been a staple crop until recently, production in Northern Province

increased by 400% over the four marketing seasons up to August 1985 [IRDP No.13, 45], the largest growth in the production of maize of any province. It is now the main cash crop, although rice, beans, groundnuts and coffee are also marketed in varying degrees depending on the area. According to the IRDP [No. 13, 46], much of the increase in the sales of maize comes from new farmers entering the market for the first time. The increasing popularity of maize has resulted in some shift in consumption patterns away from traditional foodstuffs to maize although the average per capita consumption of sorghum and millets in 1980 at 54 kg and of cassava at 50 kg still exceeded that of maize at 33.6 kg. (see Annex B, Table 4).

Let us look now at the villages visited in Northern Province. Kalalanda and Kalabwansai in Chilubi District are fishing and farming villages, one about 8 kilometers from Matipa, the other about 15 kilometers along a good road built by the IRDP. In 1982/83, the IRDP provided many farmers in the area with fertilizers and rice seeds. In 1986/7, it sponsored demonstration plots for maize and rice in Kalalanda, but none in Kalabwansai.

The villages chosen in Kasama West were Chafwa and Lafaelo Mubanga, which are about 10 and 20 kilometers respectively north of Kasama, along a poor but passable road. In 1985, VAP implemented a pilot programme in Chafwa and Milambo, another village in the same area, whereby a

two-year soft loan was offered to 26 women (17 in Chafwa, 9 in Milambo), most of whom had no previous involvement with commercial agriculture. Maize was planted the first year and soybeans the second. The loan is to be repaid when the soybeans are harvested in 1987. By contrast, the village of Lafaelo Mubanga has received no donor assistance in agriculture. Most farmers in the village are involved in commercial agriculture and many also "do piecework", i.e., they provide casual labour to the neighbouring coffee estate. The extension service has established demonstration plots in the village for millet, maize and soybeans.

In Mbala District, the villages visited were all along the main paved road from Kasama to Mbala. Selected farmers in Malupenga/Malito had received free inputs from VAP in 1982/83, whereas Mpangankula has not. As of 1986, VAP is providing loans of inputs rather than grants, a change which many villagers seemed to resent. As a result, there was some antagonism against the organization.

In Luwingu District, the village of Saili is about 2 kilometers west of the town of Luwingu, whereas Chibale is about 7 kilometers east along the road to Kasama. There are eight crop demonstrations in Saili this year sponsored by the SIDA Lima Programme, but none in Chibale. Some of these are for newly-developed composite maize varieties which do not require purchased seed every year.

c) Survey Results

i) Characteristics of Women Interviewed

The survey team interviewed 49 women, predominantly female heads of households, in eight villages plus had discussions with three groups of married women. A copy of the questionnaire used is attached as Annex C. The same interview questionnaire was used for all farmers although, when a woman indicated that she had no knowledge of a particular subject such as contact farmers, she was not asked to reply to each specific question related to it. Of the 49 women, all indicated that farming was their main activity and 80% gave farming as their prime income generator, while the remainder indicated beer-brewing (see Table 4.22).

Table 4.22Sources of Revenue

No. of Replies	Farming	Beer Brewing
49	39 (80%)	10 (20%)

Eighty-eight percent sold some agricultural produce, with twelve selling at least ten bags of rice or maize (see Table 4.23).

Table 4.23

Agricultural Sales

No. of Replies	No Sales	Up to 10 Bags	Over 10 Bags
49	6 (12%)	31 (63%)	12 (25%)

11) Women's Opportunities to Learn about Lima

The consumption technology promoted by Lima, mainly hybrid maize, implies a greater change in production technology for farmers in Northern Province, where maize has been introduced relatively recently, than for those in Eastern Province. Farmers not only have a wider information gap in Northern Province but fewer opportunities to learn from neighbours who are less likely to be producing the crop. Direct access to information from the extension services is thus likely to be an even more important factor in promoting the adoption of the new technology than in Eastern Province. In terms of opportunities to learn about the Lima recommendations, although only 14% knew the name of the extension agent (see Table 4.24a), 31% of the women interviewed had attended the last meeting held by the extension services ²³ (see Table 4.24b). An extension agent had made recent contact directly with 22% of the women and

²³ This difference may be because the extension meetings are often chaired by the block supervisor and the individual agent does not always play an active role.

with the families of another 24% (see Table 4.24c). In total, 45% of the women interviewed had visited demonstrations set up by the extension agents although the percentage was higher -- 59% -- in villages where demonstrations were located. Of those who had made such visits, 86% claimed to find them useful (see Table 4.24e).

Table 4.24

Contact with Extension Agent

a) What is the name of the extension agent for your area?

No. of Replies	Knew Name	Did Not Know Name
43	6 (14%)	37 (86%)

b) Did you attend the last meeting called by the extension agent?

No. of Replies	Yes	No
49	15 (31%)	34 (69%)

c) The last time the extension agent visited your area, did he or she talk to you or your family?

No. of Replies	With Farmer	With Family	No Contact
49	11 (22%)	12 (24%)	26 (53%)

d) Do you visit any demonstration plots?

No. of Replies	Yes	No
49	22 (45%)	27 (55%)

e) Did you find them useful?

No. of Replies	Yes	No
22	19 (86%)	3 (14%)

This level of contact between women and the extension services was much higher than it had been among those interviewed in the Kalunga area. This may be a function of the higher class standing of these women resulting from better than average commercial sales ²⁴. The method of extension contact may also be a factor. The T and V system is not yet fully functional in Northern Province and contact farmers serve more as a mechanism for setting up meetings open to the whole village than as an exclusive channel for information as in Eastern Province. Women thus had more opportunity to have direct contact with the agent. The advice of the agents was also less exclusively oriented towards cash crops with demonstrations having been established in at least two villages to encourage farmers to grow finger millet on permanent fields, rather than using chitemene. Advice on cash cropping touched not only on maize but on rice as well.

This higher level of contact may be responsible for the difference in attitude among the women in the Northern Province sample as opposed to those interviewed in the Kalunga area. Sixty-seven percent of the women in Northern Province saw the extension services as being their major source of information on agricultural techniques (see Table 4.25a) and an overwhelming majority of 85% felt that

²⁴ Northern Province has only about 15,000 commercial farmers of a total of 110,000 farming households, or 14%.

extension advice was more relevant than that from other sources (see Table 4.25b). Those who did not saw the extension services as primarily promoting cash crops, which seems to be only partially correct given the existence of the millet demonstrations mentioned above.

Table 4.25

Information Sources

- a) What is your major source of information on new cropping techniques, marketing and credit (relatives, other villagers, people in town, extension services)?

No. of Replies	Extension Services	Relatives	Others
39	26 (67%)	9 (23%)	4 (10%)

- b) What do you find easiest to use, the advice from the extension agent or that from other sources?

No. of Replies	Extension Services	Other Sources
39	33 (85%)	6 (15%)

The women interviewed in Northern Province also appeared to get more information from male relatives than did those in

Table 4.26

Number of Women Receiving Advice from Male Relatives

Do any of your male relatives discuss with you the advice provided by the extension agent?

No. of Replies	Yes	No
37	20 (54%)	17 (46%)

the Kalunga area. Fifty-four percent claimed to receive such information, probably as a result of stronger matrikin links in the matrilocal areas (see Table 4.26).

Presently 8.9% of contact farmers in Northern Province are women [Uprichard:1987, 7]. Despite the relatively high involvement in commercial agriculture of the women surveyed, which, it might be assumed, would also coincide with a somewhat higher level of self-confidence, only 25% had any interest in being contact farmers (see Table 4.27).

Table 4.27

Would You Want to be a Contact Farmer?

No. of Replies	Yes	No
20	5 (25%)	15 (75%) (10 = fertilizer users) (5 = non-users)

The women willing to be contact farmers showed some distinct characteristics in Northern Province. Firstly, they were all presently fertilizer users whereas one third of those replying no were not using fertilizers (see Table 4.28). They all sold some produce with three out of five selling in excess of ten bags. They had an average educational level which was distinctly higher than that of the other group, 5.2 years of formal schooling versus 2.6 years. It was also higher than the average for fertilizer users in general at 4.1 years. They had fewer dependents and slightly more

workers in their households than did the farmers who were not interested. It is thus not surprising that the most common reason for not wanting to be a contact farmer was lack of time. Constraints on mobility were also important. Those who were interested saw it as an opportunity to learn more or to express their views.

Table 4.28

Willingness to be Contact Farmers

	Those willing to be CFs	Those unwilling to be CFs
Educational level	5.2 years	2.6 years
No. of dependents	3.4	3.9
No. of workers	3.0	2.8
No. of dependents per worker	1.1	1.4

Despite this comparative reluctance to undertake the role of contact farmer, most women seemed to feel that other women would be prepared to be contact farmers (see Table 4.29a). They also felt that men would take advice from them (see Table 4.29b).

Table 4.29

Interest in Being Contact Farmers and Influence of Role

a) Do you think that women would want to be contact farmers?

No. of Replies	Yes	No
15	9 (67%)	6 (33%)

b) Would men take advice from a women?

No. of Replies	Yes	No
16	12 (75%)	4 (25%)

In terms of interest in the contact farmer system, it is useful to look at the few married women in the sample. The survey team interviewed eight married women in Northern Province, of which two were de facto heads of households. All of the remaining six had some commercial sales, with four of them selling ten bags of maize or more a year. All claimed to use the practices recommended by the extension services. Four of the six had either had contact recently with the extension agent or their families had. Despite these indicators of a relatively high involvement with the market economy and supporting services, none of these women were interested in being contact farmers. Most did not even want to be involved in identifying the contact farmers for their villages. In this regard, the married women seemed to be even less willing to assert themselves on such an issue than did the single women.

Because the T and V system has not yet been implemented throughout Northern Province, contact farmers have not been identified in all villages. In the six villages where these contacts have been named, 49% of the women interviewed knew them (see Table 4.30a). There was no distinct preference among farmers for one sex or the other of contact farmer, with 45% saying they preferred a female, 25% a male and 30%

either (see Table 4.30b).

Table 4.30

Knowledge of Contact Farmers and Preference for Sex

a) Do you know the contact farmer in your area?

No of Replies	Knew CF	Did Not Know CF
29	14 (49%)	15 (51%)

b) Would you prefer a male or female contact farmer?

No. of Replies	Female	Male	No Preference
20	9 (45%)	5 (25%)	6 (30%)

Those who preferred a male unanimously saw them as being more active than women. This probably reflects social stereotypes which dictate that it is the men rather than the women who assume the roles involving active social contacts. Where women were preferred, it was because the farmers interviewed felt that they could speak more freely to them. Of the women preferring female contact farmers, 71% were interested in being involved in choosing such farmers (see Table 4.31). Of those preferring male contact farmers, 80% were willing to participate.

Table 4.31Interest in Being Involved in Choosing Contact Farmers

Would you like to be involved in the choice of contact farmers for your area?

	Yes	No
Prefer male CF	4 (80%)	1 (20%)
Prefer female CF	5 (71%)	2 (29%)
No preference	2 (34%)	4 (66%)

iii) Constraints to Adopting Lima

Many of the constraints women in Northern Province face to implementing the Lima recommendations are similar to those faced by the farmers in the Kalunga area. Even among the admittedly unrepresentative group of women surveyed, few had ever received credit (see Table 4.32). Apart from the women in Chafwa village who were interviewed specifically because they were part of the VAP loan programme, only 11% of the remaining women had received credit.

Table 4.32Women Receiving Credit

Did you apply for credit this past year? Was your application approved? Have you ever taken a loan in past?

No. of Replies	Applied	Approved	Previous Loan
44	7 (16%)	5 (11%)	3 (68%)

N.B. Two of the women who received loans this year had received them in previous years.

Interest in credit was very high. Perhaps because, prior to this year, there has been little credit to go into Northern Province, many of the women who had never received loans seemed to regard them as being the solution to their production problems and did not recognize that the receipt of a loan was only one component of a package intended to increase production. The error in this thinking was illustrated by the experience of several married women in Kalabwansai, Kalalanda and Chibale, who had received loans this year for the first time. Many of them complained that the late arrival of fertilizer was ruining their crops.

Although more married women than single were getting loans in these villages, several women complained that their husbands were taking loans for the land cultivated by the women. The men would then market the produce and keep most of the proceeds. Not surprisingly, these women wanted credit in their own names.

One of the reasons for the low number of women receiving credit is their lack of membership in cooperatives. In Northern Province, only 20.4% of the members of the Northern Cooperative Union were women in 1986 [personal communication with an officer of the Provincial Planning Unit, February 1987]. In the present survey of more-commercialised-than-average farmers, 32% were members of primary societies (see Table 4.33).

Table 4.33Membership in Cooperative/Primary Society

Do you belong to a cooperative or a primary society?

No. of Replies	Yes	No
47	15 (32%)	32 (68%)

Despite a level of membership higher than the average, few of the women in the sample seemed to know what the societies do. Eleven of the non-members saw no reason to join. Four cited the fee as a deterrent, but all of these lived in the village of Lafaelo Mabanga. Had they wished to join the society, they could not have since it already has too many members and is not accepting more. Other women wrongly felt that they would get cheaper inputs by being members of the society or that it would provide them with information on agricultural practices.

iv) Constraints to Effective Implementation of Lima

Although land was not a constraint in Northern Province as it was in the Kalunga area, women did face other problems in trying to use the Lima recommendations. Labour was a major one. Sixty-five percent of the women interviewed indicated that they did not have enough labour to complete their farming operations on time (see Table 4.34). Of these, 66% hired labour, payment often being in the form of beer brewed by the women.

Table 4.34Family Labour Supply

Are there enough available members in your family to get your family's crops planted/weeded/harvested on time?

No. of Replies	Yes	No
48	17 (35%)	31 (65%)

Twenty-nine percent of women specifically mentioned labour or lack of money to pay labour as a constraint to increasing their farming operations (see Table 4.35a) and 51% of the women with fallow land indicated insufficient labour as the reason for not cultivating it (see Table 4.35c).

Table 4.35Major Constraints to Increased Food/Crop Production

- a) What do you consider to be the major constraints to increasing food production in your family?
to increasing production of crops for sale?

No. of Replies	Inputs	Labour	Money	Others
49	31 (63%)	14 (29%)	9 (18%)	6 (12%)

N.B. Some farmers listed more than one constraint.

- b) Do you have land in fallow?

No. of Replies	Yes	No
47	40	7

- c) Why is it in fallow?

No. of Replies	Lack of Labour	No Inputs	Other Reasons
35	18 (42%)	21 (60%)	4 (11%)

N.B. Some farmers gave more than one reason.

As in the Kalunga area, comparisons of the size of households among different kinds of farming systems suggests that lack of labour constrains the adoption of the Lima recommendations. Among households of farmers using fertilizers in Northern Province, the average number of workers was 3, whereas it was 1.7 in non-fertilizer-using households (see Table 4.36). The households growing maize also had more workers, an average of 3.0 compared to 1.8. In addition, of the 14 farmers who complained of labour shortages (see Table 4.32), all except one were growing local or hybrid maize rather than the traditional crops of this area. The average number of workers in their households was 2.0, notably less than the average for other maize growers. Conversely, the average number of workers in those households selling ten bags and more was 4.7 whereas the average among those selling little or nothing was 2.1.

Table 4.36

Labour and Adoption of Technology

Type of Household	No. of Households	No. of Workers
Using fertilizer	37	3.0
Not using fertilizer	12	1.7
Growing hybrid	20	3.0
Growing local maize	13	2.3
Growing composite maize	3	4.6
Growing crops other than maize	13	1.8
Selling 10 bags+	12	4.7
Selling little	37	2.1

Equipment was another constraint for women. Eighty-three percent of the women interviewed said that they did

not have enough equipment to carry out their farming operations (see Table 4.37a). Of these, 51% borrowed equipment, particularly axes, hoes and wheelbarrows (see Table 4.37b). Only 8% hired equipment (see Table 4.37c).

Table 4.37

Access to Tools

a) Do you have access to all the tools you need?

No. of Replies	Yes	No
47	8 (17%)	39 (83%)

b) Do you borrow any tools?

No. of Replies	Yes	No
39	20 (51%)	19 (49%)

c) Do you hire any tools?

No. of Replies	Yes	No
39	3 (8%)	36 (92%)

None of the women interviewed was using oxen and only one, a tractor and that belonged to her family. All the rest were purely hoe cultivators. Although there are a number of ox-training programmes which are trying to overcome traditional lack of knowledge about draught animals, the women interviewed in this survey seemed to be little influenced by these programmes, with only two suggesting oxen as a means of increasing their production.

As a result of a suggestion by the Provincial Agricultural Officer, the research team included a question

specifically on transportation in the questionnaire used for Northern Province. Most women found the transportation of inputs from distribution depots to farms difficult, a finding similar to that of Oppen et al. [1983, 60] in North Western Province, and suggested that transport be provided (see Table 4.38). This transportation problem is particularly severe in villages where there is no local depot and the nearest source of supply may be 10 to 15 kilometers away. It is also true, however, even where there are local depots since one village may be spread out over a large area and a woman may have to carry seed, fertilizers and harvested crop two, three or more kilometers to or from her own field. Several women indicated a desire for wheelbarrows to ease this task.

Table 4.38

Improving Transport of Inputs

What improvement would you suggest in the marketing point for inputs - seed, fertilizers, etc.?

No. of Replies	Provision of Transport	Build local Shed
17	15 (88%)	2 (12%)

As we did for the Kalunga survey, let us look at the rate of adoption of the technology. As might be expected when the degree of their commercialization was considered, a high percentage of women in this group - 74% - used fertilizers. All but 11% of the fertilizer users claimed to

be using them according to the extension recommendations. Most of those using them in quantities close to the Lima recommendations were, however, recipients of credit. Four of five of this year's credit recipients indicated that they or their families had had contact with the extension services. In addition, of those following the recommendations, 61% either had had contact with the extension services or their families had (see Table 4.39a). Furthermore, 87% of those who attended the last extension meeting were fertilizer users (see Table 4.39b). The fertilizer users also had distinctly higher educational levels than non-fertilizer users, 4.1 years of formal schooling versus 1.6.

Table 4.39

Extension Contact and Adoption of Technology

a) Farmers following recommended practices = 32.
Of these:

- . 9 (28%) had had direct contact with the extension services,
- . 10 (31%) had had indirect contact through their families,
- . 13 (40%) had no contact.

average educational levels = 4.1 years

b) Farmers attending the last extension meeting = 15.
Of these:

- . 13 (87%) use fertilizers,
- . 2 (13%) do not.

These findings would suggest that the comparatively high

level of contact among the women interviewed and the extension services was influencing farming techniques. This is an important observation, given the reluctance of the extension services mentioned in Chapter Two to deal with women because they believe them to be unreceptive to advice (see EPADa 1986).

v) Comparison of Assisted and Unassisted Villages in Northern Province

Although the sample was small and the results must therefore be looked upon with a certain amount of caution, this survey did identify some notable differences between the responses of women from the villages which had received assistance through donor-supported projects and those from villages which had not. In terms of use of fertilizers, in the three districts where the samples seem fairly reliable (excluding Luwingu), women in assisted villages used fertilizers more than those in unassisted villages (see Table 4.40).

Table 4.40

Ratio of Women Using Fertilizers to Those not Using Them

	Kasama	Mbala	Chilubi
Assisted Villages	6:6 = 100%	8:8 = 100%	4:6 = 66%
Unassisted Villages	5:8 = 62%	2:5 = 40%	1:5 = 20%

All but one woman (5.6%) in the assisted villages appeared

to be following extension advice on measuring of fertilizers and the timing of their use. In unassisted villages, three of eight (38%) were not.

In two of three districts where the sample is reliable, fewer women in assisted villages complained of inadequate tools than women in unassisted villages. Nonetheless, the vast majority of women still indicated that shortages of tools was a problem (see Table 4.41).

Table 4.41

Women with Inadequate Tools

	Kasama	Mbala	Chilubi
Assisted Villages	3:4 = 75%	5:8 = 62%	5:6 = 83%
Unassisted Villages	8:8 = 100%	5:5 = 100%	2:4 = 50%

Women in assisted villages were more involved in production for the market than those in unassisted villages (see Table 4.41).

Table 4.42

Average Number of Bags Marketed
of Maize, Rice, Soybeans, Groundnuts or Beans

	Kasama	Mbala	Chilubi
Assisted Villages	2	7	3
Unassisted Villages	<1	<1	1+

Although women in assisted villages do not seem to know

the name of the extension agent more than those in unassisted villages (see Table 4.43), in two of three districts, there was more contact in the assisted villages between extension agents and either the women directly or their families (see Table 4.44).

Table 4.43

Ratio of Women Knowing the Extension
Agent's Name To Those Not Knowing It

	Kasama	Mbala	Chilubi
Assisted Villages	6:6 = 100%	6:8 = 75%	3:6 = 50%
Unassisted Villages	5:8 = 62%	5:5 = 100%	2:5 = 40%

Table 4.44

Contact between Extension Agents
and Women Farmers and their Families

	Kasama	Mbala	Chilubi
Assisted Villages	4:5 = 80%	5:8 = 62%	1:6 = 16%
Unassisted Villages	2:8 = 25%	2:5 = 40%	2:5 = 40%

Women in the assisted villages also seemed to look to the agent as the source of agricultural information more than did those in unassisted village (see Table 4.45).

Table 4.45

Number of women who Consider Extension Agents
to be Their Major Source of Agricultural Information

	Kasama	Mbala	Chilubi
Assisted Villages	4:5 = 80%	6:7 = 85%	3:6 = 50%
Unassisted Villages	4:8 = 50%	4:5 = 80%	1:4 = 25%

In assisted villages, women farmers are more likely to be members of primary societies than in unassisted villages (see Table 4.46).

Table 4.46

Number of Women who are Members of Primary Societies

	Kasama	Mbala	Chilubi	Luwingu
Assisted Villages	4:5 = 80%	4:8 = 50%	2:5 = 40%	4:7 = 57%
Unassisted Villages	0:8 = 0%	1:5 = 20%	0:5 = 0%	0:4 = 0%

In Kasama District where there were demonstration plots in both the assisted and unassisted villages, women in Chafwa were more likely to have visited demonstration plots than those from Lafaelo Mubanga: 4 of 5 versus 2 of 8. In the other districts, there were no demonstrations in the unassisted villages, so the figures may not be meaningful (see Table 4.47).

Table 4.47Ratio of Women Visiting/Not Visiting Plots

	Kasama	Mbala	Luwingu	Chilubi
Assisted Villages	5 = 80%	4:8 = 50%	4:7 = 57%	3:6 = 50%
Non-assisted Villages	2:8 = 25%	0:5* = 0%	1:5* = 20%	1:5* = 20%

* No plots in villages concerned.

The above results would suggest that the donor-assisted projects in the four districts visited have had some success in encouraging women both to adopt the cropping techniques recommended by the extension service and to produce for the market. These results are probably related to generally higher levels of extension contact with women farmers in the assisted villages as opposed to the non-assisted villages.

III. SUMMARY OF THE RESULTS OF THE TWO PROVINCES

The above review suggests that women often encounter difficulties on all three levels of technology where Lima is concerned.

The organization of the technology transfer process with its emphasis on contact farmers does not encourage the participation of women who do not usually have enough social status to be chosen for such a role or even enough self-confidence to readily participate in the choice. As noted, there are few women contact farmers in either Northern or

Eastern Province. Similarly low percentages apply to other areas as well, with the average for the whole country being 3% [Safilios-Rothschild:1985, 19]. This is in spite of a note in April 1985 from the Director of Agriculture to all extension staff directing that 50% of all contact farmers be female [Hurlich:1986, 230]. By channelling all information through contact farmers, the T and V system may further reduce women's chances, and indeed the chances of the majority of ordinary farmers, of receiving information on new technologies. This is because the information flow from contact farmers to non-contact farmers appears to be limited. A 1986 report done for the World Bank in Eastern Province [EPAD a] questions, for example, the extent to which information flows between contact farmers and non-contact farmers in general. The results of the present survey in Northern Province where women seem to have considerably more contact with the extension agents and more respect for their advice may be useful in this context. Contact farmers, where they exist, are not the exclusive venues for information dissemination as in Eastern Province. The fact that whole villages are invited to extension meetings may create an atmosphere of openness so that women are more willing to come forward to seek advice. The results of both the EPAD study and the present one would suggest that the Eastern Province role of contact farmers as the almost sole recipients of extension information may not be

to the benefit of the majority of farmers and that such a role needs to be rethought. An alternative is the functions which they assume in Northern Province, i.e., mainly organization of meetings and of demonstrations.

The examples of the two female contact farmers in Eastern Province raise the issue of the criteria by which such farmers are chosen and by whom. In Eastern Province, contact farmers were chosen by village headmen in consultation with the extension agents. There does not appear to be any pressure from the office of the Provincial Agricultural Officer to choose women. Since the agricultural assistant responsible for the villages visited indicated that he felt that women did not follow extension advice very well, it could be expected that he would not encourage headmen to identify women. In Northern Province, according to the extension agents, contact farmers are chosen by village meetings [Uprichard 1987, 10]. Since women do not generally play an active role in such meetings, it is not surprising that they are not chosen as contact farmers. In addition, there is probably little encouragement from extension agents who, according to Uprichard [1987, 10], feel that existing contact farmers are representative of farmers in their agricultural camps. This is in spite of the low representation of women and the considerable emphasis being placed on the issue both by the Provincial Agricultural Officer and by his training staff.

The results of this survey suggest that increasing the number of female contact farmers will require encouragement not only of the extension agents but of women farmers themselves. The women who seem most willing to be contact farmers in both areas seemed to be those who:

- a) had higher than average educational levels,
- b) were already using some of the technology recommended by the extension services,
- c) had a lower dependent to worker ratio thus giving the farmer more free time,
- d) were single rather than married.

In Northern Province, women who had had some commercial sales also seemed more interested in assuming the contact farmer role than non-commercialised farmers. That this was not the case in the Kalunga area may reflect on the more obvious benefits of the role in the latter area. Nonetheless, the majority of the relatively commercialised farmers interviewed in Northern Province were reluctant to take on the responsibility, suggesting that farmers need to be better informed, particularly about the tangible benefits of involvement.

The consumption technology promoted by Lima also often presents problems for women because it requires a major change in cropping practices from those used in the production of food crops, including major increases in time commitments. Thus knowledge about the Lima recommendations

does not guarantee that women will be able to implement them. The change in cropping techniques is likely to be attempted only by the best endowed and the most determined farmers. Few women fall into either category, the first as a result of a combination of economic and social factors, the second as a result of the subservient role they have been assigned. This lack of self-confidence was evident among many of the women interviewed for this study in both areas.

Another aspect of social organization, the control over land, can also affect women's ability to adopt the Lima recommendations. Where land is relatively scarce, women would appear to have more difficulties acquiring it than men. In the Kalunga area, for example, some of the farmers interviewed were not able to secure either adequate quantities nor quality of land. Shimwaayi Muntemba's findings [1982, 45] that 70% of plaintiffs in a survey of land cases in south-central Zambia were women also suggest that these disputes are affecting women more than men. In other areas, even though land may be available, women are not always able to clear it because male family labour is normally available only for subsistence fields. In North Western Province, for example, Oppen et al. [1983, 62 and 138] identified the lack of cleared land as a constraint for women interested in Lima. This same report [1983, 138] also identified land tenure as a problem for married women. Although they carry out the bulk of the agricultural tasks

in their households, the land is usually allocated to the husband who frequently will not allow it to be used as the collateral required for loans.

Even if women learn about the Lima recommendations and have adequate land, the survey results suggest that they face problems of availability of the required production technology. Credit for inputs is, for example, less available for female farmers than for males. Women are even more disadvantaged than most male farmers in terms of the farming equipment at their disposal. In addition, the results from both the Kalunga area and from Northern Province suggest that lack of adequate labour constrains the adoption by women of the Lima recommendations. There is, for example, a strong correlation between the degree of adoption of the farming practices recommended by Lima and the size of the family labour force. The more commercialised farmers also tend to be those with more working family members. Yet another factor constraining women's effective participation in Lima is the limited advice provided them by the extension services after planting, i. e., after the decision to change technology has been made. Among the women interviewed both in the Kalunga area and in Northern Province, it was only the minority who had had either met directly with an extension agent or attended a recent meeting. Although it is likely that farmers receiving loans are more favoured than non-recipients, some loan programmes for women have suffered

because participating farmers have not received sufficient advice on implementing the new techniques which Lima promotes. Lesa [forthcoming] identified this as a problem, for example, in the Eastern Province IRDP loan scheme.

The contrast between the organizational technology of the Kalunga area and of Northern Province deserves special comment. The matrilocal nature of the society in Northern Province seems to have created conditions whereby women have access to at least the knowledge aspect of production technology more easily than in the Kalunga area. Information flow from male relatives to female farmers is, for example, markedly better among the women surveyed in Northern Province than in Eastern Province. The female farmers in the areas visited in Northern Province also have more contact with extension agents, probably in part because of the greater autonomy women in matrilineal societies enjoy and the resulting fewer social constraints restricting contacts between them and men.

The above constraints to involvement in Lima act as a funnel with potential participants being eliminated at each step so that the number of farmers actually receiving inputs is a fraction of the total population. Even among these farmers, constraints on labour and on tools and equipment as well as limited technical support from the extension services may reduce the extent to which the recommendations can be followed.

Figure 4.1The Effect of Constraints on Women's Participation

all
 women farmers those who learn about Lima those with money for inputs those who receive inputs those using them correctly

The end of the funnel thus represents the small percentage of farmers who do succeed in increasing their production enough to pay off their investment costs. Let us then look at these costs.

IV. COSTS OF PARTICIPATION IN LIMA

To follow the standard Lima recommendations for hybrid maize - fresh seed every year, 50 kilos of basal fertilizer per lima and 50 kilos of top dressing - the 1986/87 costs would be:

seed	22k
1 basal fertilizer	74k
1 top-dressing (urea)	60k
	<u>156k</u>
Interest at 16% would add	27k
for a total cost of inputs of	<u>183k</u>

If the crop is planted, fertilized and weeded as recommended, the theoretical returns per lima are:

7 bags maize @ 78k	546k
Subtracting the cost of inputs at	<u>183k</u>
leaves a theoretical profit of:	363k

The break-even point would be a yield of about 2.5 bags per lima, a figure that would be slightly higher if labour or equipment were hired to carry out tasks related to the Lima recommendations such as additional weeding or transport of inputs or of additional harvested crops. The experience of many programmes would suggest that achieving this return is far from guaranteed and that breaking even largely depends on the extent to which the organizational, consumption and production technologies available are appropriate both to the area and to the conditions of the adopting farmers. The following three examples illustrate this.

V. SUCCESS RATE OF FEMALE LIMA PARTICIPANTS

The Eastern Province IRDP loan programme mentioned earlier in this chapter was intended to be a three-year programme to encourage women to switch from subsistence agriculture to cash cropping in three steps. Because of a change in the orientation of the IRDP, it was cancelled after the first year when it had provided inputs in the form of either fertilizers for local maize or seed for groundnuts. Since these are the most common subsistence crops of the area, the consumption technology did not

present problems. Similarly, the physical processes of production technology - hoe cultivation - were familiar to the participants. It was the materials aspect of production technology which posed difficulties. The late arrival of inputs reduced potential yields so that only 26% of the women indicated that they had been able to produce more as a result of their loans. Thirty-one percent indicated that they had produced less after receiving the loan than before. The majority of farmers claimed that they were worse off than before receiving assistance because they now have outstanding loans without increased production to repay them. The organizational technology also posed problems. The choice of participants was determined by the elitist preferences of the ruling minority rather than on any defined basis of need or merit. The result of the poor choice of participants and the late delivery of inputs was an extremely low repayment rate of 24% across the three districts although it was 55% in Lundazi, the one area where support from the extension services appeared to be strong.

The Northern Province Village Agricultural Programme (VAP), funded by NORAD, has provided credit to 49 women in four villages in Northern Province, two in Kasama District and two in Mporokoso. One of the criteria for selection was that the women had had no prior commercial experience. They were also required to pay an initial fee of k20 and to have two guarantors sign for them. The programme provided inputs

resulted in excellent rates of increase in production among all the participating societies, but have been especially impressive for Mupona: from 9 bags per hectare to 34 in one year of operation [personal communication with an officer from MAWD, January 1987]. The fact that this society achieved production levels equivalent to the average of the other societies but in half the time - one year rather than two - makes the results even more impressive. The organizational technology in terms of the arrival of inputs and dissemination of advice by the extension services was good.

Table 4.48

Production Results from FAO/DANIDA Pilot Credit Scheme

Society	Average Yield per Hectare Maize - 90 k bags	
	1984/85	1985/86
CENTRAL PROVINCE:		
Chikina	20	40
Lukemba	28	33
Kasokota	27	33
Mupona	<u>9</u> *	<u>34</u>
AVERAGE:	24	35
NORTHERN PROVINCE:		
Mpimbe	26	28
Lufila	17	31
Kalibunga	25	<u>37</u>
AVERAGE:	24	30
<u>OVERALL AVERAGE:</u>		<u>33.7</u>

* no assistance provided

Source: MAWD, Department of Agriculture

The consumption technology was also appropriate both in

terms of soil and climatic conditions. In addition, since maize has long been produced in the Mumbwa area, the women involved in the loan programme would have already had some knowledge of its production through indirect exposure.

All these programmes received some form of outside assistance which tends to encourage farmers to adopt technology without full regard to the economics of a non-assisted situation. Eklund [1985, 38] suggests, for example, that the real risk of Lima is so high that, without such incentives as free inputs or cheap credit, the minimum economic return needed to convince farmers to shift from local to hybrid maize production using the recommended 400 kgs. of fertilizer per hectare is eight bags per lima or 32 bags per hectare. While this yield is significantly more than the average yield of 26 bags for oxen farmers cited by a MAWD paper on maize pricing [1987], it is still less than the average yields of 35 bags from the farmers interviewed by Smith [1987, 5] in the Kalunga area.

C. CONCLUSIONS

The above review indicates the importance of considering all three categories of technology when assessing the appropriateness of Lima. In most cases the combination of these categories makes Lima too risky to attempt. On the other hand, women can make good economic

returns following the Lima recommendations if conditions are right. Some of the desired conditions would appear to be:

1. under consumption technology, where maize is an appropriate crop in terms of the soil conditions and climate of the area, where there is already sufficient knowledge of the crop that women can learn from other farmers and where adequate labour is available to carry out the additional operations required;
2. under organizational technology, when women are able to control sufficient land to accommodate an extra crop, when they have a genuine interest in farming and sufficient self-confidence to be able to undertake a new technology, when they have some other source of income to act as a buffer in case of failure, and when they get timely information on cropping practices and advice on solving problems, usually from the extension services; and
3. under production technology, when the women concerned have the means to buy fertilizers, when such inputs arrive before they are required in the cropping cycle, when farmers have sufficient labour in their households to carry out the extra work required by the Lima recommendations, and when they have adequate tools available to facilitate their work.

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS FOR CHANGE

As noted in Chapter Two, women provide the bulk of the labour in the agricultural sector, both subsistence and small-scale commercial. Although most Lima activities are supposed to be directed towards these groups, the previous chapters have identified some major constraints which inhibit them and particularly the women farmers within them from using the technology recommended. The result is that the conditions outlined in the previous chapter under which women can succeed at Lima are so difficult as to be rarely met. This suggests an inappropriate technology, an inappropriateness evident in all three categories.

In terms of consumption technology, because Lima is predominantly an extension programme to promote the commercial production of maize, women producing cassava, millets and sorghum are faced with particularly major and costly changes to production. Despite the introduction of the Lima ladder mentioned in the previous chapter, the emphasis continues to be on maize which is still an entirely new crop for farmers in many parts of the country. Even for those who have experience with local maize, the changes in techniques are time consuming to learn and expensive to implement. And as we have seen both from the survey carried

out by this author and the work by other researchers, women often face severe constraints on all aspects of the production technology required by Lima, from learning about the technology to being able to acquire the tools and inputs needed to use it effectively. Finally, organizational technology in terms of power relations between men and women both in the household and at a broader societal level allows women little control over the benefits of the fruits of their labour and their weak position in society makes it possible for the ruling elite to disregard their needs.

There is evidence, nonetheless, that those female farmers in areas where maize is an appropriate crop who are able to acquire the production technology have had notable successes despite the hostile organizational environment. We can only assume that, were the organizational climate more hospitable, substantially greater productivity would be likely.

Even when women do succeed with Lima, however, they are the recipients of the techniques of the technology but are usually neither involved in its development nor in the organization of its diffusion. The emphasis is only on the transfer of the techniques and not on the transfer of the design of the technology nor on the capacity to solve one's own problems. Agricultural technology in Zambia is developed mainly through the male-dominated research stations and there is comparatively little field work done and even less

that is oriented towards some of the constraints that women face as identified in the previous chapter. The extension service is not in a position to provide information about these constraints to the research staff because they have little contact with female farmers. In addition, the men who occupy almost all the higher echelon positions in the extension service give, with a few exceptions, scant attention to the problems of women farmers. Women are thus the objects of the diffusion process at best, almost never participants. Because of their lack of involvement in the process, women's indigenous capacities, particularly those relating to the traditional crops of cassava, sorghum and millets, are not enhanced but are instead shunted aside in favour of exogenous technology. Because of this lack of involvement, there is also little transfer of the capacity to find indigenous solutions to agricultural problems.

Let us look at some changes which might make Lima responsive to the needs of more women.

The constraints for women in the area of production technology would require action on a number of fronts. Firstly, women need more opportunities to learn about Lima. The direct information flow would have to come by greater contact with the extension services. In areas where the T and V system functions, this implies the identification of a greater number of female contact farmers. Since the social position of women means that they are unlikely to be chosen

by open village meetings in numbers proportionate to their share of the population, extension agents will have to find other means to identify them such as through meetings of women themselves or through headmen. It is not enough, however, just to identify women contact farmers. The women chosen must have sufficient status in the village that they command the respect at least of other female farmers. This probably means choosing those whose production levels are sufficiently high that they set something of an example. Since many women seem hesitant to put themselves into such a public position, choosing women who have already had commercial experience and thus some dealings with public organizations may help to address this problem as well. The extension service would probably have to define to these women the benefits they might expect from such participation in order to convince them that the time commitment is worthwhile. Uprichard [1987] suggests rotating contact farmers on an annual basis. It might indeed be easier to convince farmers to make a one-year commitment than one of a longer term. Designating a group of women as the contact may also decrease the workload for any one woman while increasing self-confidence through group support. It would relieve many of the social constraints that male extension agents face in dealing with female farmers, particularly

married women ¹. Increasing the number of contact farmers from the present twelve in most areas to twenty would also reduce the expectations on any one contact farmer in terms of visiting non-contact farmers.

Increasing the contact between extension agents and women farmers would not only provide more information to women but it would also provide information on women's problems for extension agents to pass on to researchers. This information would enable them to develop cropping recommendations which better take into account the needs of women farmers. Given the important role of women in the agricultural sector, the development of complete "recommendation domains" to address the needs of women with different resource capabilities would appear to be a priority (see Chapter One, page 20). This would, however, require the strengthening of research teams with personnel knowledgeable about the impact of gender on choices of agricultural technology. Despite their importance, these steps still fall short of the major reorientation in approach proposed by IDRC which proposes involving farmers in all phases of technology development from problem identification through the design phase to the use and evaluation of innovations. Without such creative and controlling involvement of farmers, including women cultivators, the

¹ There is considerable controversy about whether this is really a problem or just an excuse for men to avoid this task.

top-down approach which characterizes the present Zambian agricultural extension service will continue.

Because it would be unrealistic for all women farmers or, in fact, all farmers to have a privileged one-on-one contact with an extension agent, group methods such as meetings must be encouraged. It is important to increase women's attendance at such meetings and to encourage them rather than discourage as appears to be the case at least in some areas like Kalunga. Such meetings would have to be broadly announced and chaired in such a way as to encourage participation of both men and women. The responsibilities of contact farmers also need to be clarified and these farmers encouraged to help others more frequently.

The high correlation between education and adoption of fertilizers in both the Kalunga area and in Northern Province suggests an important role for education in increasing the receptivity of farmers to new technology. Since women provide the bulk of the agricultural labour, it is important that girls should be educated as much as boys.

The second area of production technology requiring attention is land. District Agricultural Officers sit on the land allocation committees for settlement areas in their areas. MAWD should try to sensitize them to the discrimination some women have faced in the past when trying to acquire land and the economic impact of this. In non-settlement areas where land is allocated through channels

such as village headmen, area chiefs and district councils, these male-dominated positions and organizations are unlikely to be receptive to the needs of women unless there is effective leadership from senior politicians. The proposed inheritance law suggests that such leadership is not likely to come from Parliament. Although the proposal provides for somewhat more protection for widows than is presently the case by assuring them 20% of the family property on death of an intestate spouse, it falls far short of recognizing women as equal partners in farming operations.

The third area of production technology requiring attention if women are to be better integrated into Lima activities is credit. Earmarking of credit for female farmers seems to have succeeded in the past in ensuring women in some areas more equal credit and some organizations are now doing this. NORAD has, for example, written into its agreement with ZCF in Northern Province that a minimum of 40% of the loan funds are to go to women farmers. The IRDP (NP) has set no such quota, but is actively encouraging loans to women. Since the most frequent channel for loans for small farmers is via the cooperatives, programmes to encourage female participation such as those run by the Cooperative Unions in both Eastern and Northern Provinces are important.

But credit for inputs alone does not solve all the

constraints that women face. Credit must firstly be supported with knowledgeable staff to provide farmers with technical advice and to supervise loan repayments. We have already seen that women get limited support from the extension services. To provide credit for unfamiliar crops without extension support may encourage neglect of food crops. If the harvests of these women do not generate sufficient income to feed their families, they may be discouraged from taking risks in future. Furthermore, many women, fearing reprisals if they do not repay loans, make extraordinary efforts to do so ². This may put the nutritional standards of their families at risk in times of poor crops. The problem of lack of support is likely to become especially severe in Northern Province where credit is projected to increase to k38 million by 1988 and is likely to put pressures on the already weak infrastructure. Since in 1986/87, 38.4% of the applicants for loans in Northern Province were women ³, (personal communication with an officer of the Provincial Planning Unit, February 1987), it is highly likely that women will be faced with serious problems, especially given their low level of past experience with both cash cropping and credit. Strengthening

² The survey team came across at least three women who had received credit in previous years who had used the entire resulting crop to repay their loans.

³ The percentage of recipients is unlikely to be much different.

the credit support infrastructure, particularly for women, must be a priority.

The second problem with credit is that it normally covers only fertilizers and seeds, not the other inputs which women often require, such as labour and tools. Consideration should be given to expanding credit programmes to include assistance for hiring labour and equipment. The Agricultural Development Bank already provides the former kind of assistance to some farmers and its experience could provide some insights for the cooperative unions. Loan programmes could also be extended to provide limited funds for essential equipment such as hoes and perhaps wheelbarrows and, again as ADB is doing, for plowing, especially in areas where oxen are readily available.

The third problem with most credit programmes is that the term would appear to be too short to provide many women with the time to master a new crop. Two or even three-year credit would seem more appropriate in high-risk situations, especially where women have little previous knowledge of the crop in question. In this regard, the VAP women's programme in Northern Province may provide a useful model.

The fourth element of production technology is access to tools and equipment. Some projects already address this problem, e.g., VAP which is providing hoes at a cost of k3. The formation of cooperatives to provide timely ox-ploughing to women should be encouraged. Such cooperatives could also

female voice of the United National Independence Party. It is not a movement pushing for women's rights. In addition, the lack of coordination and homogeneity among the different programmes relating to women is inefficient in its dispersal of efforts. It does not provide the required focus to pressure for policy changes. The lack of concern for women in the Lima recommendations is linked to their lack of control over organizational technology in general and over Lima's in particular. Thus, even if there were such a major change in direction as to favour cassava, millets or sorghum over maize in the areas where they are the traditional crops, there is no guarantee that women would receive a proportionate share of the benefits. Their social position is such that it is likely that the advantages of such a change would accrue to the largely male economic elite. Only when women have genuine equality in society will they be given opportunities to benefit from government programmes on an equal basis with men. This will require a major change in attitudes towards women including changes in both statutory and customary law.⁵ Until they come, however, productivity in the agricultural sector will suffer because those doing the bulk of the work will not have the tools to increase their efficiency. Programmes such as Lima will continue to benefit only the minority.

⁵ Customary law treats women as perpetual dependents who must, for example, have the consent of relatives before marriage (ZARD:1985, 61).

rent other equipment such as wheelbarrows to farmers.

The final aspect of production technology is the issue of labour. Labour constraints reduce women's potential for increased productivity. We have seen in the previous chapter, for example, that it is farmers with more household workers who are both more likely to adopt hybrid maize and to market more produce in general. The resolution of the labour constraint faced by many women farmers requires more attention from both researchers and policy makers. In Luapula, work is being done on the development of ground cover to discourage the growth of weeds and therefore lighten this task. More Adaptive Research Planning Teams should give priority to such problems.

In planning changes to Lima, it is important to avoid subsidizing farmers for inefficient allocations of resources which are not sustainable once the assistance is removed. The dramatic increases in the availability of Lima credit in many parts of the country may already be skewing economic decisions in favour of crops, particularly hybrid maize, which would not otherwise be financially attractive. This brings us to the question of consumption technology. In areas such as the North of Zambia where the long-term viability of maize production can be seriously questioned, the promotion by the extension services of traditional crops would be more appropriate. Since these crops are primarily the responsibility of women, such a change in policy should

directly benefit them. It would, however, mean a major shift in the outlook of the urban-based elite and would require clear-cut policy direction. The prospects for this direction appear slim as the conflicts in policy orientation discussed in Chapter Two continue and generate contradictory objectives and actions. On the one hand, for example, Keller and Phiri [1986, 3] note that the Agricultural Submission to the Fourth National Development Plan ⁴ indicates that "preferential treatment (will be given) to small-scale farmers (undefined), in line with their greater numbers" in order to achieve self-sufficiency and expand exports. On the other hand, Kenneth Good [1986, 279] points out that the government's Guidelines for the formulation of the Fourth National Development Plan (1987 on) refers to "acceleration of the pace of development of large scale farming". With this objective in mind, the Minister of Agriculture has called on private investors to enter into joint agricultural projects with the state [Good:1986, 280]. In addition, Zambia's heavy debt has made it vulnerable to pressure from the international community for policies more aligned with a free market approach.

Rural women are not organized to push for the kinds of changes that would benefit them. There is no effective women's organization that speaks for non-elite women and the biggest group, the Women's League, is nothing more than the

⁴ MAWD Planning Division, July 1986, page 1.

female voice of the United National Independence Party. It is not a movement pushing for women's rights. In addition, the lack of coordination and homogeneity among the different programmes relating to women is inefficient in its dispersal of efforts. It does not provide the required focus to pressure for policy changes. The lack of concern for women in the Lima recommendations is linked to their lack of control over organizational technology in general and over Lima's in particular. Thus, even if there were such a major change in direction as to favour cassava, millets or sorghum over maize in the areas where they are the traditional crops, there is no guarantee that women would receive a proportionate share of the benefits. Their social position is such that it is likely that the advantages of such a change would accrue to the largely male economic elite. Only when women have genuine equality in society will they be given opportunities to benefit from government programmes on an equal basis with men. This will require a major change in attitudes towards women including changes in both statutory and customary law.⁵ Until they come, however, productivity in the agricultural sector will suffer because those doing the bulk of the work will not have the tools to increase their efficiency. Programmes such as Lima will continue to benefit only the minority.

⁵ Customary law treats women as perpetual dependents who must, for example, have the consent of relatives before marriage (ZARD:1985, 61).

ANNEX A - METHODOLOGY

The discussions with farmers were carried out in two regions: firstly, seven villages in the micro-area surrounding the agricultural camp at Kalunga in the region of Chief Sairi, 30 kilometres south of the town of Chipata in Eastern Province; and secondly, in four districts in Northern Province. In both cases, interviews with farmers were based on questionnaires (see Annex B and C) which were administered by researchers who spoke the languages of the areas visited. In the Kalunga area, the interviewers were two female and one male student from the fifth year of the agriculture programme at the University of Zambia (UNZA), Ms. Lomthunzi Jere and Ms. Evangelista Meti and Mr. Harry Ngoma. In the North, the interviewers were two female secondary school graduates, identified and trained in interviewing techniques by the Rural Development Studies Bureau of the University of Zambia. Their names were Mavis Chishala and Fostina Chalwe.

Sometimes the interview team went to the homes of women pre-identified by the headmen of the village. In other cases, the headmen called groups of women to central meeting spots. The author was available in the area when interviews were being carried out but, because two were often being held simultaneously, did not sit continuously with the interviewers. Usually, the interviewers made notes as they talked to the women but in some cases the interviews were taped and notes taken from them subsequently. The author would review the notes before leaving the village but discrepancies were not always apparent at that time. This accounts for some variations in the size of the sample.

ANNEX B

Questionnaire used in Eastern Province

The Impact of Resource Constraints on the Adoption of Technology Promoted by the Lima Program

1. Basic data

Date of interview

Interviewed by

Province

District

Village

2. Socio-economic data on farmer interviewed

Name

Marital status

Age

Number of family members working on the farm /number of
children /ages

Educational level

Literacy of farmer and/or family members

Main source of family income

Other sources of income

Quantity of land under woman's cultivation

Is woman sole support of her family?

Does she consider herself to be the head of the household?

Socio-economic status. To be estimated mainly from such
visual signs as the quality of roofs, the woman's or her
family's apparent health status, the number of livestock
belonging to the household, the size and condition of the
house, the number of household implements being used both in
the fields and in the kitchen, etc. (Please note specific
items.) Also the following questions:

Did you buy mealie meal last year?

For how many months?

Do you hire labour? For what purpose? How often? How do you
pay them?

Do you buy fertilizers?

How do you pay for them?

Overall rating: above average, average, poor. In exceptional
cases, wealthy and very poor may also be used.

2. Access to extension services

What is your major source of information on new cropping techniques, marketing or credit (relatives, neighbours, extension agent, etc.)

What is the name of the extension agent for your area?

How often has he/she or any other government extension agent visited your area in the last year?

When was the last time?

This last time, did he/she make contact with you or your family?

What was the prime method by which he/she contacted farmers - on an individual basis, group meetings, etc.?

Is this his/her usual methodology?

3. Access to credit

Have you ever taken out a loan?

Have any of your relatives? Source?

How did you pay it back?

Did you take one this year?

Source?

Have you ever applied for a loan and been refused?

Why?

How did you get to know about loan programs?

How many loans have you had over the last five years?

What do you consider to be the major problems in reference to taking out loans?

4. (for interviewers) Some comments on the personality of the woman

Women's Perceptions of their Resource Constraints

1. Constraints to production

What do you consider to be the major constraints to increasing food production in your family? To increasing production of crops for sale? What solutions do you see for these problems? Have you tried any of them? If so, how did they work? If not, why not?

Are there enough available members in your family to get your family's crops planted/ weeded/ harvested on time? If not, do you hire extra labour? If not, why not? Would you be able to get enough labour if you wanted to expand the area cultivated or to grow different crops?

Do you have access to enough land to feed your family? To grow what you would like to grow? Where did you get it? Is it fertile?

What equipment do you own and how many do you have of each?

- axe
- hoe
- axe and accessories
- oxen
- wheelbarrow
- harrow
- ridger
- cultivator
- other

Do you have access to all the tools you need? If not, why not? What are you lacking? Do you have access to tools when you need them? If not, why not? Do you borrow any of these tools and, if so, how often? Do you hire any of these and for what purpose? If so, from what source, for how long and for which crops? How much does it cost?

What other inputs do you use?

- fertilizers
- seeds
- pesticides
- other

Do you use the quantities you feel are necessary? If not, why not? Where do you get them? How do you pay for them?

2. Contact with extension agent

(For areas where the extension agent deals mainly with groups)

Did you attend the last meeting called by the extension agent? If not, why not? If you did attend, did you speak?

Who did most of the talking? Why? What would encourage you to speak more freely or to ask more questions?

Would you like an extension agent to visit your area more often? Why?

Would you prefer to deal with a male or a female extension agent? Why?

If answer suggests an agent of a different sex than that of the present agent) What would you discuss with a male/female agent that you do not discuss now?

3. Role of contact farmers

(If the contact farmer system is used in that area)

Do you know the contact farmer in your area? What is his/her name? Has he/she helped you in any way? What?

Would you prefer a male or a female contact farmer? Why? Which would other women prefer? Again, why? Would men take advice from a woman? Do you think that women would want to or should be contact farmers? Explain answer.

4. Content of extension message

What did the extension agent talk about during his/her last visit? What does he/she usually discuss? Do most people apply the advice given? If not, why not? Do you apply it? If not, why not? Does the information given help you to solve some of your most serious problems? What are they?

Do you use the recommendations on how to plant and fertilize on a measured lima? Do you measure the amount of seed and fertilizer you apply? If so, how? If so, do you think that this approach has had any impact on your family's production? On yours? If you do not measure, why not?

5. Alternate sources of information

Which do you find easiest to use, the advice from the extension agent or that from other sources? Why?

Do any of your male relatives discuss with you the advice provided by the extension agent? If so, how often? Did they the last time the agent visited? What did they tell you? Did you follow that advice? Why or why not?

6. Participation in cooperatives

Do you belong to a cooperative or a primary society? If not, why not? If so, what benefits do you get from it?

ANNEX C

Questionnaire used in Northern Province

The Impact of Resource Constraints on the Adoption of Technology Promoted by the Lima Program

1. Date and Location

Date of interview

Interviewed by

Province

District

Village

2. Socio-economic data on farmer interviewed

What is your name? (crosscheck against registration card)

Are you married, divorced or single?

How old are you? (refer to registration card)

How many people are working on your farm?

How many people do you support?

What are the ages of the children?

Are you the only person supporting them?

If not, from whom do you get support?

Have you been to school?

If so, what level did you complete?

Are you able to read?

What is the main source of income for your family?

What are your other sources of income?

What activity takes the most time for you over the year?
(food preparation, farming, beer brewing, sewing, etc.)?

3. Cropping methods

What crops do you grow? (including garden)

How much of each do you sell every year?

To whom do you sell?

Do you use fertilizers?

If so, what kind? How much?

When do you apply them? (at planting, after germination,
other?)

How do you pay for any fertilizers used?

Do you measure fertilizers?

If so, how?

4. Constraints to production

What do you consider to be the major constraints to
increasing food production in your family?

To increasing production of crops for sale?

What solutions do you see for these problems?

Have you tried any of them?

If so, how did they work?

If not, why not?

Are there enough available members in your family to get your family's crops planted/weeded/harvested on time?

If not, do you hire extra labour?

How do you pay for labour (in cash, in kind)?

How much do you pay labourers on an annual basis?

If you do not hire labour, why not?

Would you be able to get enough labour if you wanted to expand the area cultivated or to grow different crops?

Do you have access to enough land to feed your family?

To grow what you would like to grow?

How much land do you cultivate?

Do you have land in fallow?

If so, how much?

Why is it in fallow?

How did you acquire your land?

Do you feel secure with it?

What equipment do you own and how many do you have of each?

axe

hoe

axe and accessories

oxen

wheelbarrow

harrow

ridger

cultivator

other

Do you have access to all the tools you need?

If not, why not? What are you lacking?

Do you have access to tools when you need them?

If not, why not? Do you borrow any of these tools and, if so, how often?

Do you hire any of these and for what purpose?

If so, from what source, for how long and for which crops?

How much does it cost?

What other inputs do you use?

seeds

pesticides

other

Do you use the quantities you feel are necessary?

If not, why not?

Where do you get them?

How do you pay for them?

Is the marketing point for inputs - seed, fertilizer, etc. - convenient?

What improvements would you suggest?

5. Access to extension services

What is your major source of information on new cropping techniques, marketing or credit (relatives, other villagers, people in town, extension services)?

What is the name of the extension agent for your area?

How often has he/she or any other government extension agent visited your area in the last year?

When was the last time?

This last time, did he/she talk to you or your family?

What was the prime method by which he/she contacted farmers - on an individual basis, group meetings, etc.?

Is this his/her usual methodology?

Do you know of any demonstration plots in your area?

Do you visit them?

What do you think of the practices shown?

6. Access to credit

Did you apply for credit this past year?

Was your application approved?

For how much?

Who assisted you to get this loan?

Have you taken up the loan? What organization supplied the funds?

Have you ever taken a loan in past?

How did you pay it back?

When you paid it back, did you still have sufficient food to feed your family for the year?

7. Socio-economic status

Do you buy mealie meal during the year?

If so, for how long a period?

How many livestock do you have?

What kind of tools do you have and how many?

For interviewer: Also take into account the replies to the above questions and such visual signs as the size and condition of the house especially the kind and condition of the roof, her or her family's apparent health status, the number and condition of household implements, etc. (Please note specific items.)

Overall rating: above average, average, poor. In exceptional cases, wealthy and very poor may also be used.

8. For interviewer: General assessment of the woman - personality, productive capacity, etc.

Additional Information on Access to Extension Services

1. Contact with extension agent

(For areas where the extension agent deals mainly with groups)

Did you attend the last meeting called by the extension agent?

If not, why not?

If you did attend, did you speak?

Who did most of the talking?

Why?

What would encourage you to speak more freely or to ask more questions?

Would you like an extension agent to visit your area more often? Why?

Would you prefer to deal with a male or a female extension agent? Why?

(If answer suggests an agent of a different sex than that of the present agent): What would you discuss with a male/female agent that you do not discuss now?

2. Role of contact farmers

(If the contact farmer system is used in that area)

Do you know the contact farmer in your area?

What is his/her name?

Has he/she helped you in any way?

What?

Would you prefer a male or a female contact farmer?

Why? Which would other women prefer?

Again, why?

Would men take advice from a woman?

Do you think that women would want to or should be contact farmers?

How do you think contact farmers should be chosen? Explain answer.

Would you like to be involved in the choice of the contact farmers for your area?

Would you want to be a contact farmer?

Why or why not?

3. Content of extension message

What did the extension agent talk about during his/her last visit?

What does he/she usually discuss?

Do most people apply the advice given?

If not, why not?

Do you apply it?

If not, why not?

Does the information given help you to solve some of your most serious problems?

What are they?

Do you think that the advice provided has had any impact on your family's production?

4. Alternate sources of information

Which do you find easiest to use, the advice from the extension agent or that from other sources?

Why?

Do any of your male relatives discuss with you the advice provided by the extension agent?

If so, how often?

Did they the last time the agent visited?

What did they tell you? Did you follow that advice?

Why or why not?

5. Participation in cooperatives

Do you belong to a cooperative or a primary society?

If not, why not?

If so, what benefits do you get from it?

Information on Soybean Production

(questions to be asked only of those farmers who grow soybeans)

Why do you grow soybeans?

For how many years have you grown soybeans?

What crop did you reduce in order to grow soybeans?

Why did you replace or reduce that crop?

How did you learn about soybeans?

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ANNEX E - STATISTICS

Table 1

Number of Farm Units by Category and by Province - 1980 & 1990 *

	<u>Category of Farmer</u>							
	<u>Large-Scale Commercial</u>		<u>Medium-Scale Commercial</u>		<u>Small-Scale Commercial</u>		<u>Traditional</u>	
	1980	1990	1980	1990	1980	1990	1980	1990
Eastern	20	26	3,110	3,958	27,390	48,280	82,680	82,680
Northern	--	--	150	168	14,940	26,216	96,400	96,400

Table 2

Total Hectarage by Category and by Province - 1980 **

	<u>Category of Hectarage</u>				
	<u>Large-Scale Commercial</u>	<u>Medium-Scale Commercial</u>	<u>Small-Scale Commercial</u>	<u>Traditional</u>	<u>TOTAL</u>
Eastern	1,059	13,011	74,695	155,965	244,730
Northern	---	1,893	85,396	233,860	321,149

Table 3

Average Cropped Hectarages - 1980 ***

	<u>Category of Hectarage</u>			
	<u>Large-Scale Commercial</u>	<u>Medium-Scale Commercial</u>	<u>Small-Scale Commercial</u>	<u>Traditional</u>
Eastern	75.6	4.2	2.7	1.9
Northern	---	12.6	5.7	2.4

* From Food Strategy, Table 4a.** From Food Strategy, Table 7.*** From Food Strategy, Table 8.

ANNEX E - STATISTICS

Table 4

Crop Mix - 1980 - Percentage Shares by Categories of Farmers

	Maize	Cassava	Sorghum/ Millet	Rice	Wheat	Pulses	Groundnuts	Soybeans
<u>EASTERN PROVINCE:</u>								
Large-Scale Commercial:	80						x	7
Medium-Scale Commercial:	68		3	x		x	3	1
Small-Scale Commercial:	71		11	.2		3	6	
Traditional:	84	x	9	x		x	4	
<u>NORTHERN PROVINCE:</u>								
Medium-Scale Commercial:	51		13	x	26	5	x	
Small-Scale Commercial:	31	16	32	3		13	4	
Traditional:	29	20	39	x		7	4	

x = less than 2%

The production of soybeans has increased dramatically since 1980 and Northern Province is now the largest producer.

* From Food Strategy, Table 9.

ANNEX E

Table 5

Consumption of Flour from Cereal Grains and Cassava
for Eastern and Northern Provinces *

	<u>EASTERN</u>	<u>NORTHERN</u>
1980 per capita consumption of:		
1) <u>Maize:</u>		
Average	139.5 kg	44.3 kg
Rural	143.2 kg	33.6 kg
2) <u>Sorghum/Millet:</u>		
Average	5.9 kg	44.7 kg
Rural	6.5 kg	54.0 kg
3) <u>Cassava:</u>		
Average	0.6 kg	41.5 kg
Rural	0.6 kg	50.0 kg
4) <u>Rice:</u>		
Rural	1.1 kg	1.2 kg
5) <u>Groundnuts:</u>		
(Rural)	8.0 kg	5.0 kg

* From Food Strategy, Table 5.

ANNEX E - STATISTICS

Table 4

Crop Mix - 1980 - Percentage Shared by Categories of Farmers.

	Maize	Cassava	Sorghum/ Millet	Rice	Wheat	Pulses	Groundnuts	Soybeans
<u>EASTERN PROVINCE:</u>								
Large-Scale Commercial:	80						x	7
Medium-Scale Commercial:	68		3	x		x	3	1
Small-Scale Commercial:	71		11	2		3	6	
Traditional:	84	x	9	x		x	4	
<u>NORTHERN PROVINCE:</u>								
Medium-Scale Commercial:	51		13	x	26	5	x	
Small-Scale Commercial:	31	16	32	3		13	4	
Traditional:	29	20	39	x		7	4	

x = less than 2%

The production of soybeans has increased dramatically since 1980 and Northern Province is now the largest producer.

* From Food Strategy, Table 9.

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