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SOCIO-ECONOMIC CONSTRAINTS TO MAIZE PRODUCTION IN ETHIOPIA*

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Abstract

Maize ranks first in production and yield among the main cereals in Ethiopia. Small farmers account for 86 per cent of total maize production; state farms and producer cooperatives produce the rest. Maize production grew at the rate of less than 3 per cent over the last 25 years, the major source of growth being expansion in area. Oxen are the main power source and few small farmers use inputs such as improved seeds and fertilizers. The principal socio-economic constraints limiting maize production are: unavailability of improved seeds and fertilizers; low maize prices; lack of draft power; inadequate credit and weaknesses in research and extension linkages. Due to high population growth rate, self sufficiency in maize is declining albeit slightly over the years. Hence addressing the limiting constraints to maize production will help in reversing this trend.

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Introduction

Ethiopia has a population of 47 million people and is estimated to be growing at 2.9 per cent per year. If the present trend continues, by the year 2000, Ethiopia will have a population of 65 to 67 million people. The economy depends heavily on agriculture. Agriculture contributes around 50 per cent of Ethiopia's Gross Domestic Product (GDP), absorbs 86 per cent of the population and generates over 90 per cent of the export earnings (DAONCCP, 1988). And its performance inevitably has a ripple effect on other sectors of the country's economy.

Ethiopia has a wide range of agro-climatic conditions. One can find arid and wet zones in different parts of the country. There is a wide variation in altitude, soils and temperature. The major cereals grown in Ethiopia are tef (Eragrostis tef), wheat, barley, maize and sorghum. Maize is a relatively recent introduction (16^{th} Century) but its cultivation has increased rapidly because of its high yield potential.

As is true of the cereal sector as a whole, the country's self-sufficiency in maize has been declining over the years. Consequently, maize is one of the four national priority crops, the others being wheat, sorghum and barley (Dejene et al., 1987). Substantial resources are being allocated to support research and extension in maize. This paper outlines the principal socio-economic constraints to maize production in Ethiopia paying particular attention to production technologies.

MAIZE PRODUCTION

In Ethiopia maize ranks first among the major cereals in production and yield per hectare and fourth in total area (table 1).

Table 1. Average area and production of five major cereals, 1979 -1986.

Crop	Area ('000 ha)	Rank	Production ('000 tons)	Rank	Yield/ha (tons)	Rank
Tef	1355	1	1150	2	0.85	5
Barley	864	3	974	4	1.13	3
Wheat	644	5	708	5	1.10	4
Maize	840	4	1331	1	1.58	1
Sorghum	882	2	1149	3	1.30	2

Source: Central Statistical Authority, 1987.

Maize is widely grown in the eastern, southern, central, south-western and western mid-altitude parts of the country. It is an important crop representing between 40 to 50 per cent of the total production of the western region (Ethiopian Mapping Authority, 1988).

Structure of Maize Production

Maize is produced under three types of conditions in Ethiopia; small farmers, producer cooperatives (collective farms) and state farms. Compared with the other two sectors, state farms use more modern production technologies such as improved seeds, commercial fertilizers, herbicides, tractors and combine harvesters.

Recent data on maize area and production indicate that small farmers cultivate 88 per cent of total maize area and produce 86 per cent of total maize produced in the main season (CSA, 1987). State farms account for six per cent of the area and ten per cent of production. Producer cooperatives contribute less than three per cent of maize area and production (table 2).

Table 2. Maize area, production and yield by type of farm, 1986/87.

Sector	Area ('000 ha)	Production ('000 ton)	Yield (ton/ha)
Main season (meher)			
Small farmers	887 (87.6)*	1467 (85.5)	1.65
State farms	61 (6.1)	171 (10)	2.77
Producer cooperatives	27 (2.6)	44 (2.5)	1.66
Minor season (belg)	37 (3.7)	34 (2.0)	0.91
TOTAL	1013 (100)	1753 (100)	

Source: Central Statistical Authority, 1987.

* Figures in parenthesis are percentages.

Maize Area, Production and Yield Trends

Table 3 shows annual growth rates for maize area, production and yield over various periods. For the 40 year period between 1948-50 and 1985-87 maize production in Ethiopia increased from about 0.16 million metric tons to 1.45 metric tons. The average production growth rate for that period was 5.8%.

Table 3. Maize area, production and yield annual growth rates (%).

Period	Area	Production	Yield
1948-50 to 1961-63	9.24	10.46	1.22
1961-63 to 1970-72	1.17	2.77	1.59
1970-72 to 1979-81	-1.29	2.90	4.19
1979-81 to 1985-87	0.86	2.50	1.65
1948-50 to 1985-87	3.53	5.80	2.27

Source: CIMMYT and FAO Tapes.

The major source of growth in maize production was through expansion in area which grew at 3.53 per cent annually. The growth in area was even more dramatic between 1948-50 to 1961-63, averaging 9.24 per cent annually over the period.

A large number of farmers have shown great interest in growing maize due to its high yield potential (Dejene et al., 1988) and the fact that it matures early for consumption relative to other food crops. However, as indicated in Table 3, from 1961-63 to 1985-87 growth in area under maize and hence growth in maize production has declined significantly. In fact there was a reduction in maize area between 1970-72 to 1979-81. There are many factors accounting for the decline in these growth rates. These include the droughts of 1974-75 and 1984; lack of oxen and seed in the years following the drought; unavailability of inputs; and high price of inputs.

The growth rate in maize production for the period between 1961-63 to 1985-87 has been on average less than the currently estimated population growth rate of 2.9 per cent per annum. But this is in keeping with the general picture of food production in Ethiopia. For instance, from 1973 to 1984 food production in Ethiopia grew by 2.1 per cent while the population growth rate was 2.9 per cent. The maize production growth rate over the same period was 1.5 per cent (DAONCCP, 1988). Hence maize production as well as food production in general is not keeping pace with population growth.

Table 1 shows that maize ranks first in yield per hectare relative to other cereals but this yield is still far below its potential. The growth rate in yield has been low as seen in Table 3 except for the period 1970-72 to 1979-81 when the growth rate on average was about 4% per annum mainly due to changes in the crop reporting system.

However, as shown in Table 4 the average maize yield in Ethiopia is high relative to most countries in Eastern and Southern Africa as well as Sub-saharan Africa. This has been mainly due to (1) the high yields realized by the state farms on average of 2.3 tons per hectare compared to 1.6 and 1.2 tons by the peasant and producers' cooperatives respectively, (2) favourable weather, and (3) concerted effort to promote the use of modern inputs in high potential areas where maize is a major crop. However, the yield is low relative to other developing countries. For the period 1983-87 it was on average 79% of the yield of other developing countries.

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Table 4. Maize area, yields in Ethiopia and selected countries of eastern and southern Africa, 1983-1987.

	Maize area 1983-87 (million ha)	Maize yield 1983-87 (t/ha)
ETHIOPIA	0.81	1.73
KENYA	1.50	1.55
TANZANIA	1.69	1.16
MALAWI	1.16	1.15
ZAMBIA	0.57	1.84
ZIMBABWE	1.30	1.27
SUB-SAHARAN AFRICA	13.76	1.15
DEVELOPING COUNTRIES	78.71	2.19

Source: CIMMYT and FAO tapes.

Maize Production Practices

Maize is produced mainly under rainfed conditions by small farmers using little or no purchased (modern) inputs. Farmers use rudimentary implements such as a wooden plow with a small metal tip - "maresha"; yoke, and shovels. Generally, irrigation is not used in maize production but farmers with access to irrigable land produce maize in the off-season either using open furrow irrigation or residual moisture on bottom fields. In distribution of fertilizer and seeds government gives priority to producer cooperatives and state farms. Thus state farms and producer cooperatives use more fertilizer and improved seeds than peasant farmers.

Table 5 shows data on cultivated areas by farmers in different regions of the country. Generally the area cultivated per farmer is small ranging from 0.7 to 3.5 ha. On average the maize share of cultivated areas ranges from

21 to 59 per cent in the main maize producing regions of the Western, Central and South western zones. In some highland areas with altitude of 2000 meters and above such as Bale and Gojam maize is a backyard crop and the area allocated to it is small.

Table 5. Area cultivated per household and maize share in different regions of Ethiopia.

Region		Major Crop	Total area cultivated per farm (ha)	Maize area per farm (ha)	% Maize area
Western	- Bako	Maize, Tef, Noug	1.5	0.75	50
	- Manna and Gomma	Coffee, Maize, "Enset"	0.7	0.15	21
	- Assendabo	Maize, Sorghum, Tef	2.5	1.4	56
Central	- Nazret	Maize, Tef, Sorghum	2.5	0.75	30
S.Western	- Sidama lowland	Maize, "Enset", H. Bean	1.18	0.70	59
	- Sidama highland	"Enset", Maize Coffee	0.78	0.28	36
	- Areka	Maize, "Enset", H. Bean	1.4	NA	NA
	- Sinana	Barley, Wheat, Emer wheat	2.5	NA	backyard crop
N.Western	- Adet	Tef, Barley, Maize	1.74	0.19	11
	Bahar Dar Zuria	F. Millet, Tef, Maize, Noug	3.5	0.75	21

Source: Various diagnostic survey reports, Institute of Agricultural Research: Data compiled from the years 1985 through 1988 depending on the report.

NA: Not Available

Maize production depends heavily on animals for draft power. Oxen are the main power sources. Most peasant farmers use a pair of oxen for land preparation, seed covering and cultivation commonly known as "Shilshalo".

Maize fields are plowed on average 2-3 times using local plow called "Maresha", drawn by a pair of oxen (Table 6). Many farmers lack oxen (Table 6); they obtain them from neighbors in exchange for labour, grain, and/or cash. Hoe is the major tool for maize land preparation in limited areas producing root crops.

State farms operate mechanized farms covering upto 15,000 ha. Thus state farms and a few producer cooperatives use tractors for maize land preparation and planting. Improved production technologies such as improved seeds, chemical fertilizers, herbicides and insecticides are widely used by the mechanized state farms. Insecticides are sprayed by aeroplanes. State farms out yield peasant farmers by 1/3 in cereal production. The majority of peasants who produce 86 per cent of the maize crop do not use these modern production technologies.

Improved maize varieties and hybrids are most commonly used by state farms, producer cooperatives and farmers around the research centers. Locally produced and imported hybrid seeds are used exclusively by the state farms. H-625 and CG4141 are produced locally and H622, H632 and H511 are imported. A survey done in the Bako area indicated that 40 per cent of individual farmers and all producer cooperatives grow improved maize varieties (Legesse et al., 1987). The improved varieties used by these farmers are usually mixed. In the Nazret area 67 per cent of farmers grow Katumani, an improved variety (Tilahun et al., 1987). However, the overwhelming majority of farmers who produce maize in Ethiopia use local varieties. They usually select seeds from their own fields at the time of harvesting.

Nationwide less than 10 per cent of farmers use chemical fertilizers although in some localities the figure is over 50 per cent (Table 7).

Table 6. Maize production practices in Ethiopia.

Region	Land Preparation		Variety[1]	Planting method	Weed. meth.	Harvest. method	% farmers having less than two oxen
	Method	Frequency of plowing					
Western - Bako	Oxen	2-3	local/ improv.	broadcast/ Row	hand/ oxen	dehusking/ stooking	65
- Manna and Gomma	Oxen	3-4	local/ improv.	broadcast	hand/ oxen	stooking	>50
- Asendabo	Oxen	4-5	NA	NA	NA	stooking	NA
Central - Nazret	Oxen	2-3	local/ improv.	broadcast	hand/ oxen	dehusking	37
S.Western - Sidama lowlands	Oxen	3	local/ improv.	broadcast	hand/ oxen	NA	NA
- Sidama highlands	Hoe	1	local/ improv.	NA	hand	NA	
- Areka	Oxen	3-5	NA	NA	NA	NA	96
- Sinana	Oxen	NA	local/ NA			NA	<50
N.Western - Adet	Oxen	NA	local/ improv.	broadcast	hand/ oxen	NA	68
- Bahar Dar Zuria	Oxen	NA	local/ improv.	broadcast/ Row	hand/ oxen	NA	35
State Farms	Tractor	1-2	improv.	Row	herb./ hand	combine harvester/ hand	not applicable

Source: Various survey reports.

NA: data not available.

[1]The proportion of farmers using improved variety is small and the improved varieties are mixed.

Table 7. Rate and percent of farmers using fertilizer on maize in Ethiopia.

Region		Farmers using fertilizer %	Average Rate kg/ha		Recommended rate kg/ha	
			N	P_2O_5	N	P_2O_5
Western	- Bako	23	10	25	41	46
	- Manna and Gomma					
	- Asendabo	>50	14-18	25-46	NA	NA
Central	- Nazret	0	0	0	NA	NA
S.Western	- Sidamo	32	2-9	6-23	69	92
	- Areka					
N.Western	- Bahar Dar Zuria	NA	10-18	23-46	NA	NA

NA = Not Available
Source: Various diagnostic survey reports.

Some farmers use farmyard manure to improve the fertility of their fields. Many farmers assign their most fertile fields to maize production (Legesse et al., 1987 and Aleligne et al., 1989). For example, farmers in the Adet and Bahar Dar areas grow maize around their houses, where the crops benefit from the application of manure and household refuse.

Weeding practices vary from area to area. Some farmers hoe their maize. In most locations farmers also cultivate with oxen one to three times. According to farmers oxen cultivation removes weeds, reduces lodging, and conserves moisture. It is done on both row planted and broadcast maize. Most farmers supplement shilshalo with slashing.

Maize Price and Market outlets

Small farmers and producer cooperatives (PCs) produce maize mainly for consumption. However, a substantial amount of maize is marketed by these groups to meet financial needs. In the Bako area, the amount marketed ranges from 40 to 50 per cent of total production per household (Franzel et al., 1989). State farms produce for the domestic market.

Maize is usually sold through three channels: First farmers sell their marketable surplus directly to consumers in open markets. Second, farmers sell to service cooperatives (SCs) on quota basis at fixed prices. SCs serve as agents of Agricultural Marketing Corporation (AMC) which buys maize for distribution to consumers in cities in grain form. Third, farmers sell to private traders who may market the maize locally or transport it to other areas of the country. The marketing channels for grain have shifted sharply in recent years. In 1982 service cooperatives handled 38% of grain marketed. In 1986/87, the volume handled by service cooperatives rose to 80% and the volume handled by private traders fell to 13% (Faught, 1988). Table 8 shows maize purchased by AMC over five years.

Table 8. Volume of maize purchased by AMC.

Year	Peasants	State Farms	Total	% of total		Maize as % of total cereals
				peasant	State Farm	
		(tons)				
1983/84	4275	7556	11831	36.1	63.9	28.9
1984/85	944	6545	7489	12.6	87.4	32.3
1985/86	2990	8210	11200	26.7	73.3	25.7
1986/87	5891	13630	19521	30.1	69.9	31.6
1987/88	8031	13017	21048	38.1	61.9	36.9

Source: AMC

AMC also purchases maize directly from State farms and PCs on quota basis. Quotas are set at national level and then distributed at different administrative levels: regional, district (Awraja) and sub-district (Wereda). The Wereda distributes its quota to SCs and Scs to PAs. Finally, PAs distribute their quotas to farmers. In the first years, quota implementation was a directive from the top based on national needs. Since 1985, however, a degree of flexibility and feed-back from the local level has been introduced in the assessment and distribution of quotas (Franzel et al., 1989).

Different criteria are used in allocating quotas. At the national level past AMC purchases and the planned level of purchase, crop production prospects, estimates of marketable surplus, size of administrative unit, and the number of households are taken into account. Beginning recently at the PA level, quotas are fixed based on perceived wealth of a household using such indicators as area cultivated, number of oxen owned and non-farm income.

The AMC price is fixed and uniform throughout the country and over seasons. The maize open market price differs from place to place and over seasons. It is determined by demand and supply relationships. In years of good production, as in 1987, the maize open market price approaches the official fixed price or falls below it. For example, following the huge maize harvest in 1987 in western Ethiopia, maize prices fell below the AMC producer price of 22 birr/100 kg and even below 15 birr for 100 kg of maize.

Maize is stored for consumption or for later sale in local stores, bags (sacks) and other containers. In some areas it is stored with cobs. The local stores vary in size, form and in materials from which they are made. Some of the local stores are made of stick and mud reinforced with tef straw and cow dung. Some are made of bamboo strips and other wooden materials. Underground pits are used to store maize mainly in the eastern part of the country. Maize seeds are stored in cobs in well aerated place or fumigated with smoke to control weevils. These kinds of storage result in substantial losses of maize due to weevils and rodents. Farmers in the Bako area reported 25 to 33 per cent loss in less than six months due to weevils (Legesse et al., 1989). Others have estimated 16 to 20 percent loss in maize grain stored for one year (Anonymous, 1987).

Recently many off-farm stores have been constructed by SCs, state farms, the Relief and Rehabilitation Commission and AMC. These stores have larger capacities than those used on-farm.

Maize Utilization

Maize has different uses in Ethiopia. It is used mainly for making "injera" (thin pancake-like bread), bread, porridge, and for malting and brewing. The green cob is roasted or cooked and the grain of the cob is eaten. The leaves are used as animal feed and the stalk, when dried, as firewood for cooking. Maize grain is not used for feed, except in rare instances.

Cereals provide 69% of the calories in the Ethiopian diet. Maize contributes 27% of these (CIMMYT, 1981). Maize is widely consumed in eastern, western and southern Ethiopia. It is mainly consumed in rural areas. Low income urban dwellers also consume maize because it is much cheaper than the highly preferred food crop, tef. Maize flour blended with 90 per cent wheat flour is used for bread making in urban areas. The use of maize for industrial purposes is not common but there is a plan to establish a plant which will process maize into oil, starch, and glucose (Ethiopian Food Corporation, Personal Communication).

Table 9 indicates the consumption of maize in Ethiopia over the last 25 years. The total consumption of maize over this period has more than doubled. The per capita maize consumption has also increased steadily over the same period. The annual growth rate in per capita maize consumption over the same period has been 0.74 per cent. There has been a major decline in the annual growth rate of per capita maize consumption over the last seven years mainly due to the drought of 1984-85 which resulted in substantial decline in production.

Table 9. Maize consumption and self-sufficiency in Ethiopia.

Period	Total maize consumption ('000 t)	Per capita maize cons. (kg)	Growth rate Per capita maize cons. (%)	Self sufficiency (%)
1961-63	691	27	--	100
1970-72	912	29	--	100
1979-81	1232	32	--	99
1985-87	1470	33	--	99
1961-63 to 1985-87	--	--	0.74	--
1961-63 to 1970-72	--	--	0.66	--
1970-72 to 1979-81	--	--	0.93	--
1979-81 to 1985-87	--	--	0.38	--

Source: CIMMYT and FAO Tapes.

At present maize is generally not a highly preferred food in Ethiopia. Even maize producers who consume maize as a staple food prefer to consume tef (Legesse et al., 1987). Inspite of this problem the growth rate of demand for maize is directly proportional to the population growth rate. Per capita income growth rate is another important factor which can potentially increase the demand for maize. However, given the zero growth rate for the 1965-1986 period (World Bank 1988), the demand for maize will be determined mainly by the population growth rate.

Ethiopia has remained fairly self-sufficient in maize consumption over the period 1961-63 to 1985-87. Maize consumption is bound to increase given the high rate of population growth especially in maize producing areas where it is a staple food.

SOCIOECONOMIC CONSTRAINTS FOR PEASANT FARMERS

The constraints discussed in this section concern peasant farmers who produce more than 86% of total maize production. These farmers face many constraints; this section focuses on socio-economic constraints. The principal constraints considered in this paper include unavailability of improved maize seeds and fertilizer, low maize prices, lack of draft power, inadequate credit and weaknesses in research and extension linkages. The constraints are not ranked in their order of importance because a major problem in one area might not have the same importance in another area.

Farmers' local varieties tend to be low yielding and in some areas are poorly adapted to the environment. A number of maize varieties have been released for commercial cultivation in different regions of the country. The total seed quantity of these varieties being multiplied by the Ethiopian Seed Corporation (ESC), research centers, and state farms is too small to satisfy the total demand (Benti et al., 1988). For all crops the amount of improved seeds produced in the country covers only 2 per cent of the cultivated land (DAONCCP, 1988). Besides, sometimes the small quantity of seed produced does not reach the farms on time. All improved seeds are distributed through the Ministry of Agriculture. The farmers find the price of improved seed prohibitive (66 Birr/100 kg). The ratio of improved maize seed price to maize price is 3:1. Given the unavailability of improved maize seed and its high price relative to maize price this discourages the planting of such seed by farmers. It is also reported that improved seed preferred by the farmers are not available (Faught, 1988). Hence, farmers prefer to grow local varieties. In

the Bako area about 60 per cent of farmers grow local varieties (Legesse et al., 1987).

Poor soil fertility is also a problem in most areas. Ethiopia does not produce chemical fertilizers and hence depends totally on imports. The amount imported depends on the share of foreign exchange allocated by the government, which is the sole importer of chemical fertilizers. Only 10 per cent of the farmers use chemical fertilizers and the ratio of total fertilizer to total cultivated area is less than 10 kg/ha which is very low compared to other countries (table 10). Data are not available concerning fertilizer use on maize but it is likely that these numbers are applicable to maize as well.

Table 10. Consumption of fertilizer in Ethiopia compared to other countries.

Country	Total kg/ha	K_2O kg/ha	N kg/ha	P_2O_5 kg/ha
Ethiopia	1.3	2.2	--	3.5
Kenya	13.4	21.3	2.9	37.6
Somalia	1.7	0.3	0.3	2.3
Sudan	6.7	--	--	6.7
South Africa	27.1	28.4	9.4	64.9
USA	53.2	23.5	27.7	104.4
USSR	44.3	27.8	26.7	98.8

Source: Awoke Aynalem and Hailu Gebre, 1986.

The distribution of fertilizer in the country is not efficient. In most cases fertilizer is not distributed in time for planting. This is especially a problem for maize since maize is planted early compared to other crops. For instance, in the Bako area this problem frequently occurs and farmers either delay their maize planting waiting for fertilizer arrival or plant without it.

Farmers complain that the fixed maize price which is 22 birr/100 kg is low. The low fixed price does not encourage farmers to purchase improved inputs to produce more maize. For instance, most farmers also find fertilizer prices to be too high when compared to the official maize selling price. The ratio of fertilizer (DAP) price to maize price is 4.7:1. For individual farmers on-farm maize fertilizer trials at 35 sites over the years 1984 to 1987 showed that assuming fixed AMC prices, fertilizer was profitable at only 3% of the sites. Using local market prices which are much higher fertilizer was profitable at 72% of the sites (Franzel et

al., 1989). Hence it would appear that raising official maize prices would encourage the use of fertilizers.

A shortage of power also limits maize production. About 70 per cent of farmers in Ethiopia do not have sufficient number of oxen required to pull the local plow, "maresha" (Awoke, 1988). Roger Hay (1988) also reported that 29% of all rural households do not own an ox for plowing, the majority own only one. Surveys undertaken by the Institute of Agricultural Research (IAR) in different regions of the country made similar observations. About 65 per cent of farmers in Bako area, 45 per cent in Adet and 37 per cent in Nazret areas have less than two oxen and hence face serious draft power shortages. This problem results in reduced area cultivated, untimely land preparation and planting. Poor seed bed preparation in turn, results in poor crop stand and high weed infestation.

Low cash income is considered a major limiting factor to maize production. The credit for developing maize production is insufficient. The Agricultural and Industrial Development Bank (AID Bank) extends credit to rural areas; loans to PAs are provided through well established and legally recognized service cooperatives. Producer cooperatives which are not legally recognized cannot receive loans. It thus excludes all the other service cooperatives, producer cooperatives which have not yet attained legal status (Awoke et al., 1987). Since the location of the AID Bank branches are usually not within the reach of farmers they are not encouraged to apply for loans. Loans are used for oxen, equipment purchase or for developing infrastructure like grain stores.

Nearly all fertilizer supplied to small farmers is sold on credit through their Peasant Associations (PAs). If more than 5 per cent of a PA's fertilizer debt is not repaid then credit is not extended to them the following year (personal communication with MOA staff). Moreover, farmers who are unable to settle their overdue debts on the previous year's loans are not allowed to receive a new loan (Awoke et al., 1987). If farmers have a poor season they can neither repay past loans nor obtain credit to allow them to increase production in the next season.

Weaknesses in research and extension programs are also problems limiting maize production. In recent years many measures have been taken to improve and make the research and extension systems effective. However, these systems are inadequate to develop appropriate technologies and make them available to producers. There is a lack of a strong and well coordinated research - extension linkage at the grass root level. For example, in some areas research and extension have contradictory recommendations. This has a negative effect on the dissemination of research findings.

Research Extension Liaison Committee (RELC) has already been established by the IAR to bridge this gap. It is hoped that RELC will strengthen the linkage between research and extension although the link is still weak.

Other socioeconomic constraints on maize production as identified through various surveys conducted by IAR's Farming Systems Research Teams include seasonal labour shortage and inadequate transportation and marketing facilities.

CONCLUSION

The growth in maize production in Ethiopia has been mainly due to growth in area under the crop. The growth in area has, however, declined substantially over the last 15 years and growth in production can now be expected to come mainly from increase in yields which are generally low.

The majority of maize producers are small farmers who as we have seen hardly use any of the well known yield increasing technologies. These technologies such as improved seeds and chemical fertilizers will have to be made available to farmers in a timely and affordable manner. Lack of draft power is also a major constraint to maize production. This constraint can be relaxed through provision of credit for the purchase of oxen.

Marketing infrastructure such as roads, transportation facilities and storage are essential for increasing maize production. At present the majority of peasant producers have limited access to these facilities. If peasant farmers are expected to increase their maize production through the adoption of modern technologies improvements in infrastructures will have to be coupled with a lucrative incentive structure. Most importantly, maize prices should be increased relative to inputs' prices. Sustained increase in maize production will arrest the slowly declining self-sufficiency in maize consumption.

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