MASTER LAND USE PLAN

ETHIOPIA

ANNEX 3

REGIONAL PROFILES OF LAND USE

AND CROP, LIVESTOCK AND FUELWOOD PRODUCTION

Report prepared for
the Government of the Peoples
Democratic Republic of Ethiopia

based on the work
of
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UNITED NATIONS DEVELOPMENT PROGRAMME
FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

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This technical report is one of series of reports prepared during the course of the projects identified on the title page. The conclusions and recommendations given in the report are those considered appropriate at the time of its preparation. They may be modified in the light of further knowledge gained at subsequent stages of the project.

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AKNOWLEDGEMENTS

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TABLE OF CONVERSION FACTORS

2.07 ETHIOPIAN BIRR = 1.00 US DOLLAR

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1. INTRODUCTION

1.1 Background

This report is of a series of annexes to the Master Land Use Plan (MLUP) designed mainly for the use of higher level decision makers and planners. It provides Regional and Awraja level information on land use and land resources in Ethiopia, but translates the original information into a graphic format for ease of comprehension. This objective is specifically requested in the terms of reference of the MLUP.

1.2 Content and structure of this report

The report is divided into 6 sectors as follows:

- current land cover

- area under major crops

- crop yields

- TLU and consumable dry matter

- current forage availability

- projected fuelwood availability

In the first three sections, existing data on land cover from the FAO/UNDP Assistance to Land Use Planning project (FAO 1984b) and Ministry of Agriculture surveys of crop production in Ethiopia have been converted into bar graphs and presented on a Region/Awraja basis. These provide a profile of the land cover and crop production characteristics in each administrative unit. The last three sections of the annex provide estimates of the current state of livestock and forage resources and fuelwood availability in each Region/Awraja, again using Ministry of Agriculture surveys on livestock and the land cover data available in the LUPRD. A complete description of forage production estimation are detailed in Technical Report 3 of the MLUP, Rangeland/Livestock Consultancy.

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2. CURRENT LAND COVER

2.1 General

The percentage distribution of the 12 major land cover types is presented in this section of the report. The data are derived from Technical Report 3, Land Use Production Reigons and Farming Systems Inventory, of the FAO/UNDP Assistance to Land Use Project. A total of 31 land cover subdivisions is used in the orginal legend of the 1:1,000,000 scale Land Use and Land Cover map of Ethiopia attached to the ETH/78/003 Technical Report 3. The 12 classes used in the current graphic presentation, however, provide sufficient differentiation between classes for most regional and national planning purposes.

2.2 Description of land cover classes

The legend which appears at the bottom of each of the bar charts is explained as follows:

Legend symbol	Description
CI	Intensively cultivated land
CM	Moderately cultivated land
AA	Afro-alpine vegetation
FO	Forest
WO	Woodland
RI	Riparian (Riverine) woodland and bushland
BU	Bushland
SH	Shrubland
GR	Grassland
WE	Wetland (swamp and marsh)
BA	Bareland (sand, saltflats and rock), some scattered vegetation

For a full description of these classes, beyond a layman's understanding of the terms, refer to Technical Report 3 of the ETH/78/003 Assistance to land use planning project.

3. AREA UNDER MAJOR CROPS

3.1 General

Information on the area cultivated to the various major crops in Ethiopia is presented in this section of the report. Data are derived from the MoA sample surveys (1982/83). These are the only countrywide data on an Awraja basis, but unfortunately are only representative for one production year. Some additional caution in extrapolating from these results is required as they involve conversion from local to metric measures, a potential source of error. The length of the bars, measured on the y-axis, indicate the area grown to a particular crop. Where the bars in the chart extend to the top of the y-axis, it indicates that the area cultivated to the crop in question exceeds 70,000 hectares. Since few Awrajas display this characteristic for any crop, the upper limit of 70,000 ha was chosen to maintain sensitivity on the y-scale for crops occupying small areas.

3.2 The legend of the bar charts

The following is a list of the crops and the symbols representing them in the charts:

Symbol	Crop type
Te	Tef (_Eragrostis abyssinica_)
Ba	Barley
Wh	Wheat
Ma	Maize
So	Sorghum
Mi	Millet
Tu	Tubers
Pu	Pulses
Oi	Oilseeds
Fa	Fallow
Co	Coffee
En	Enset (_Ensete ventricosum_)
Ch	Chat (_Catha edulis_)

4.   CROP YIELDS

4.1   General

Estimates of the yields of major crops in each Awraja of the country
are shown in the charts included in this section of the report. Yields
are estimated from production and area data tabulated in the MoA sample
surveys (MoA 1982/83). These data are for one cropping year only and
caution should therefore be excercised in extrapolating from them as
inter-seasonal variations in moisture, for example, can considerably
alter yields in some areas of the country. Notwithstanding this
limitation, the data are the only indicative yield estimates available
for all major crops in Ethiopia on an Awraja basis. Regional data only
are available from the CSO surveys conducted each year over the past 15
years. Where the bars on the charts exceed the top of the y-axis, this
indicates that the crop yield is over 30 quintals/ha. An upper limit
of 30 was chosen to maintain sensitivity on the y-scale for crops with
much lower yields.

4.2   The legend of the bar charts

The following symbols are used to indicate the crops for which yields
are estimated:

Symbol	Crop
Te	Tef (_Eragrostis abyssinica_)
Ba	Barley
Wh	Wheat
Ma	Sorghum
Mi	Millet
Tu	Tubers
Pu	Pulses
Oi	Oilseeds
Co	Coffee
En	Enset (_Ensete ventricosum_)

5. TLU AND CONSUMABLE DRY MATTER

5.1 General

The charts contained in this section of the report were compiled from two sources. In the first instance, livestock numbers were converted to TLU (Total Livestock Units) using data from MoA surveys (MoA 1983). Secondly, the total available dry matter was calculated for each Awraja of the country from the data contained in the Land Use and Land Cover map of Ethiopia (FAO 1984c). Optimal annual production for each land cover and land use type indicated on this map was calculated using conversion factors shown in Table 1, discounted according to the environmental characteristics in each Awraja and summed. The results for the natural vegetation component of the dry matter production are shown in Table 2. Complete estimation of dry matter includes the component from crop residues and aftermath grazing on cropland. The total estimated dry matter available annually is shown in MLUP Technical Report 3, Livestock and Rangeland Resources. The total consumable dry matter is the value shown in the charts in this section of Annex 3. Since both TLU and total consumable dry matter are quoted in units of millions, it was possible to indicate both on the same chart for comparison of the relative feed availability between Awrajas.

TABLE 1

FACTORS USED IN THE ESTIMATION OF OPTIMAL DRY MATTER PRODUCTION FROM NATURAL VEGETATION

Code	Vegetation Type	Dry Matter Production (kg/ha/ann)	Code	Vegetation Type	Dry Matter Production (kg/ha/ann)
2.1	State farm (fallow)	4.5	9.1	Open grassland	4.5
2.2	Int. cult. (fallow)	4.5	9.2	Bush/Shr grassland	2.9
2.3	Mod. cult. (fallow)	1.8	9.3	Wooded grassland	3.5
2.4	Perennial cult.	1.5	10.1a	Per. swamp	1.4
3	Afro-alpine vegn.	1.3	10.1b	Per. marsh	4.5
4.1	Conif. high forest	0.5	10.2a	Seasonal swamp	1.4
4.2	Mixed high forest	0.5	10.2b	Seasonal marsh	4.5
4.3	Disturbed forest	1.0	11.1	Exposed rock	0.1
5.1	Dense woodland	0.7	11.2	Salt flats	0.0
5.2	Woodland	1.9	11.3	Expos.sand & soil	0.5
5.3	Euc. woodland	0.1	11.4	As above with scrub and grass vegetation	1.0
6	Riparian wood/bush	1.9			
7.1	Dense bushland	0.5	11.5	Expos. rock with scattered scrub & grass vegetation	1.0
7.2	Bushland	1.8			
7.3	Lowland bamboo	0.6			
8.1	Dense shrubland	0.7	12	Water bodies	0.0
8.2	Shrubland	1.6			

TABLE 2. FACTORS USED TO ESTIMATE PERCENT REDUCTION
          IN OPTIMUM DRY MATTER PRODUCTION OF NATURAL
          VEGETATION ACCORDING TO AGROECOLOGICAL CONDITIONS

	Altitude (m)				
	<2000	2,500 2,000	3,000 2,500	>3000	
Slopes		Percent of Optimum Dry Matter Production			Rainfall (mm)
Upper > 30% & non- arable	0.42 0.31 0.17 0.06 0.01	0.29	0.24	0.18	>900 900-700 700-400 400-100 <100
Middle 2-30%	0.71 0.48 0.20 0.07 0.01	0.48	0.31	0.25	>900 900-700 700-400 400-100 <100
Bottom- lands	1.00 0.78 0.17 0.06 0.01	0.78	0.71	0.31	>900 900-700 700-400 400-100 <100

6. CURRENT FORAGE AVAILABILITY

6.1 General

The charts in this section of the report use the data compiled for the previous section. However, these charts estimate the current availability of forage using a comparison between the available dry matter and demand for forage in each Awraja. The demand for forage was calculated on the basis of 2% of the liveweight of the average TLU being required for maintenance. Further details of livestock feed requirements are provided in MLUP Technical Report 3.

6.2 How to use the charts in this section

The y-axis of the bar charts is divided in the centre to indicate +100% or -100% surplus forage to demand. If an Awraja is overstocked with livestock relative to the current forage availability, the percent surplus will be negative. The degree to which it is overstocked is gauged from the size of the negative percentage. The more negative the percent, the greater the degree of overstocking. Conversely, understocked Awrajas will have positive values of forage availability, judged by the bar graphs lying above zero on the y-axis, ie on the positive side of the dividing line.

7. PROJECTED FUELWOOD AVAILABILITY

7.1 General

Projected fuelwood availability is estimated for each Region/Awraja in Ethiopia and presented in graphic form in this annex. It is estimated that fuel usage is 1.3 m³/caput/annum in Ethiopia (World Bank 1984) of which, for the purposes of the current analysis, 0.5 m³/caput/annum is assumed to come from sources other than wood. For example, in many areas of the country dried cattle dung and crop residues, such as sorghum roots, are used to supplement fuel requirements. From this base, the projected requirements of the estimated population in 1985, 1995 and 2010 were able to be calculated.

The demand for fuelwood is, of course, only one half of the equation. It is also necessary to estimate the production of woody biomass suitable for fuel from natural vegetation in the country. This was achieved using the Land Use and Land Cover map of Ethiopia (FAO 1984) and conversion factors (AACM 1987) to estimate annual per hectare production of the variety of vegetation occuring throughout the country. The conversion factors used to estimate per ha production are shown in Table 3. The availability of fuelwood is estimated from:

$$FUELWOOD\ AVAILABILIY = ANNUAL\ PRODUCTION - ANNUAL\ DEMAND$$

The figures used to estimate the annual fuelwood production do not include that coming from closed high forest. This is a sparse resource that requires protection and management and so it was not included in the figures used to estimate fuelwood availability in those Awrajas where it occurs. The figures are, however, included in Table 4, which summarizes the total fuelwood production by land cover type and Awraja.

7.2 How to use the charts of fuelwood availability

The charts in this section of the report also use a positive/negative system to indicate whether the annual fuelwood supply is, or will be in 1995 and 2010, surplus to the requirements of a particular Awraja population. Remembering that Awrajas with significant areas of closed high forest are assumed not to have access to these forest areas independent of Government supervision.

The y-axis is thus subdivided from +1,000,000 m³/annum to -1,000,000 m³/annum, indicating a surplus or deficit in estimated availability. The length of each bar in the charts is proportional to the supply or deficit of fuelwood in each Awraja, in each of the three projected years. Bars lying above zero on the y-axis thus indicate a surplus to requirements, those below this half-way mark indicate a deficit in availability.

TABLE 3

FACTORS USED TO ESTIMATE ANNUAL FUELWOOD PRODUCTION
FOR DIFFERENT NATURAL VEGETATION AND LAND USE TYPES

Code*	Vegetation/Land Use Type	Fuelwood regeneration (m³/hectare/annum)
2.2	Intensive cultivation	
2.3	Moderate cultivation	0.1
2.4	Perennial crop cultivation	0.3
3	Afro-alpine vegetation	0.0
4.1	Dense coniferous forest	3.0
4.2	Dense mixed forest	2.0
4.3	Disturbed high forest	2.0
5.1	Dense woodland	0.9
5.2	Woodland	0.3
5.3	Eucalyptus woodland	15.0
6	Riparian woodland & bushland	0.9
7.1	Dense bushland	0.5
7.2	Bushland	0.3
7.3	Lowland bamboo bushland	0.1
8.1	Dense shrubland	0.2
8.2	Shrubland	0.1
9.1	Open grassland	0.05
9.2	Bushed/shrubed grassland	0.1
9.3	Wooded grassland	0.3
10.1a	Perennial swamp	0.1
10.1b	Perennial marsh	0.0
10.2a	Seasonal swamp	0.1
10.2b	Seasonal marsh	0.0
11.1	Exposed rock surface	0.005
11.2	Salt flats	0.0
11.3	Exposed sand and soil surface	0.0
11.4	Exposed sand and soil surface with scattered scrub and grass vegetation	0.005
11.5	Exposed rock surface with scattered seasonal scrub and grass vegetation	0.005
12	Water bodies	0.0

* For a full description of the vegetation and land use types described, reference should be made to: FAO/UNDP Assistance to Land Use Planning, Technical Rep. 3, 1984.

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CURRENT LAND COVER

CURRENT LAND COVER

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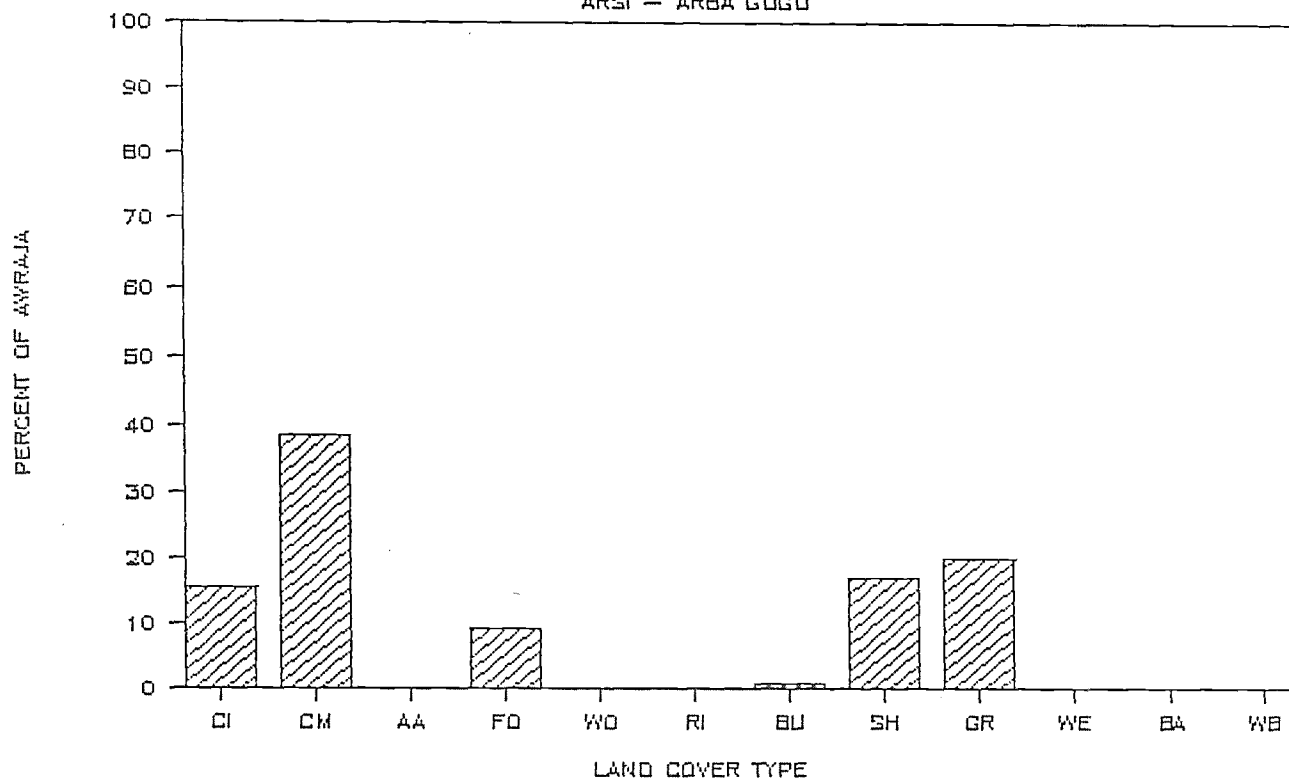
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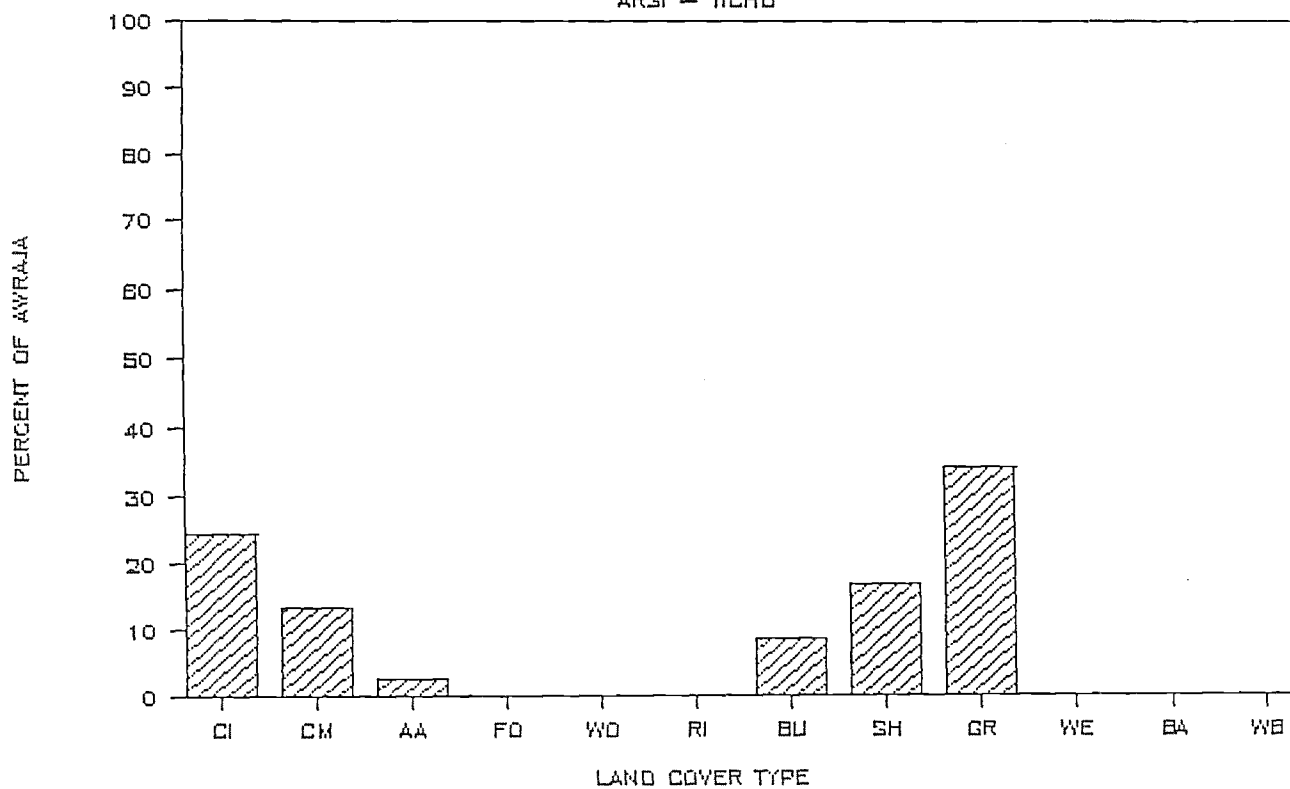
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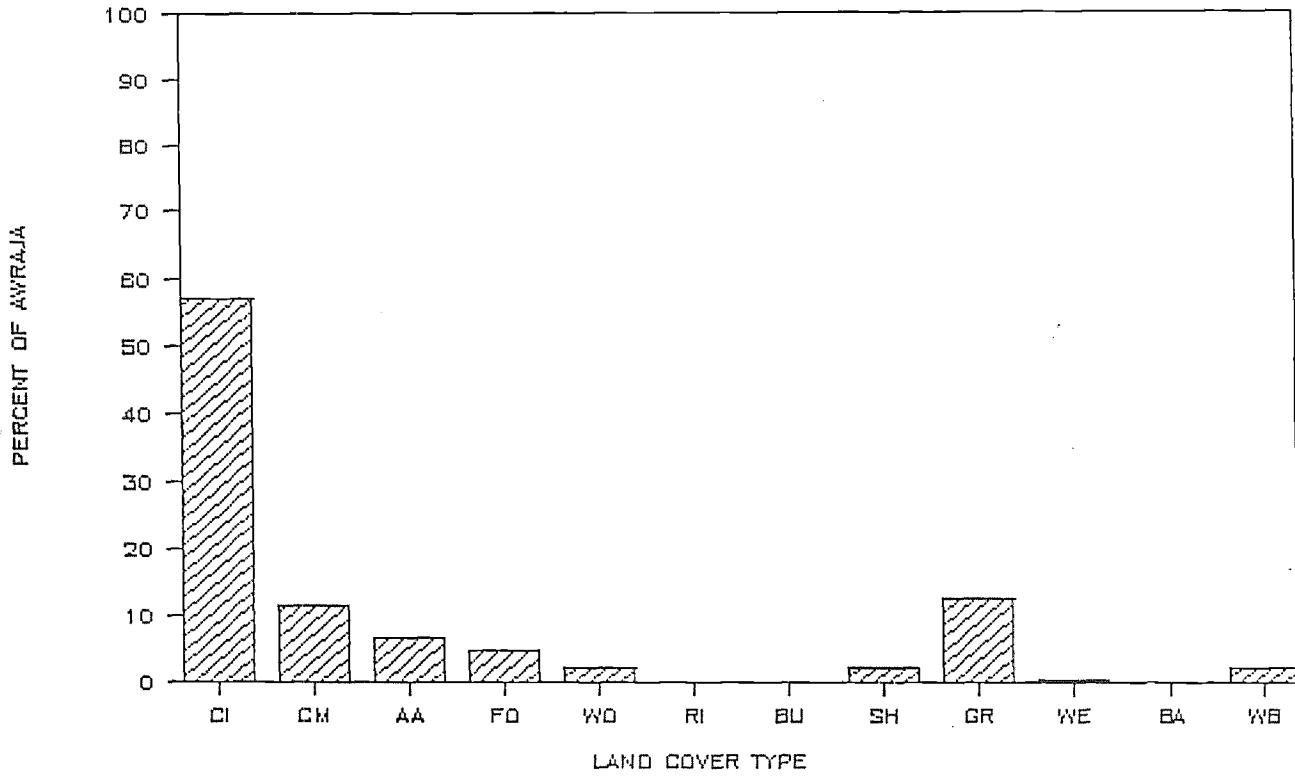
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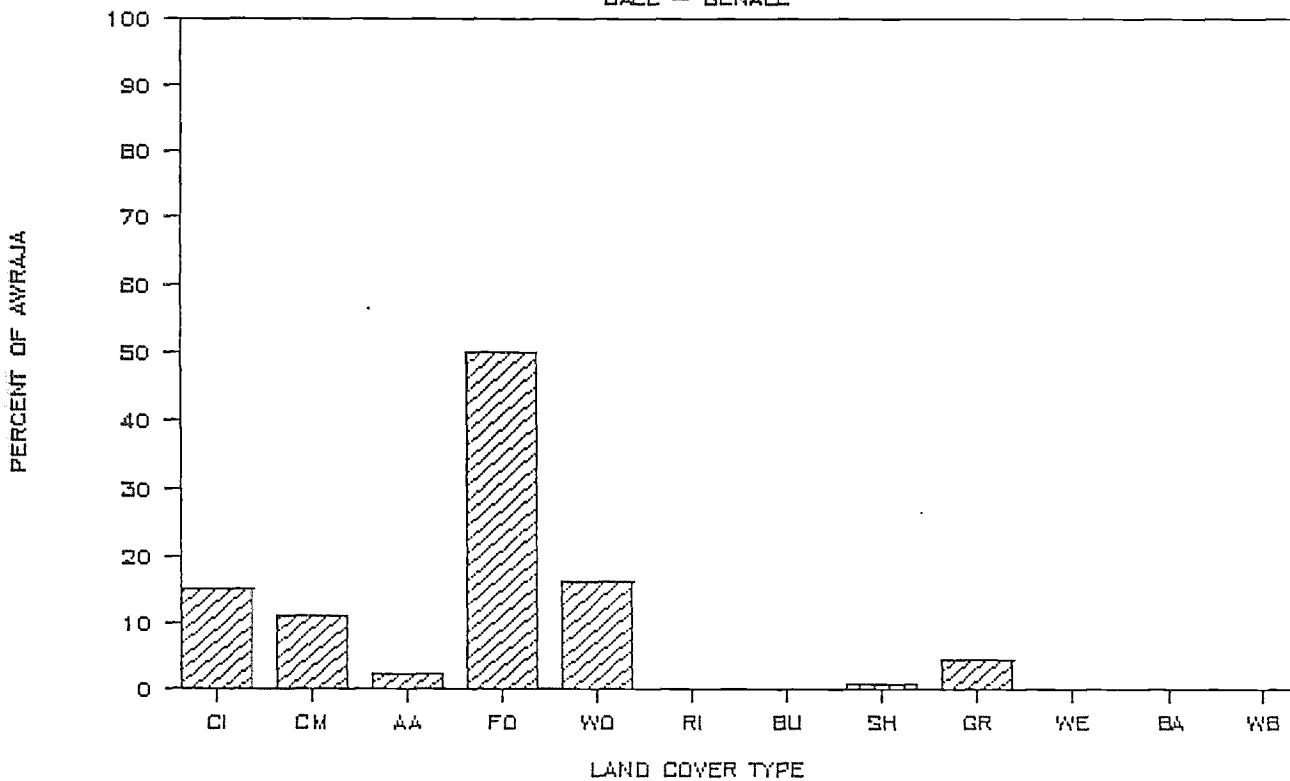
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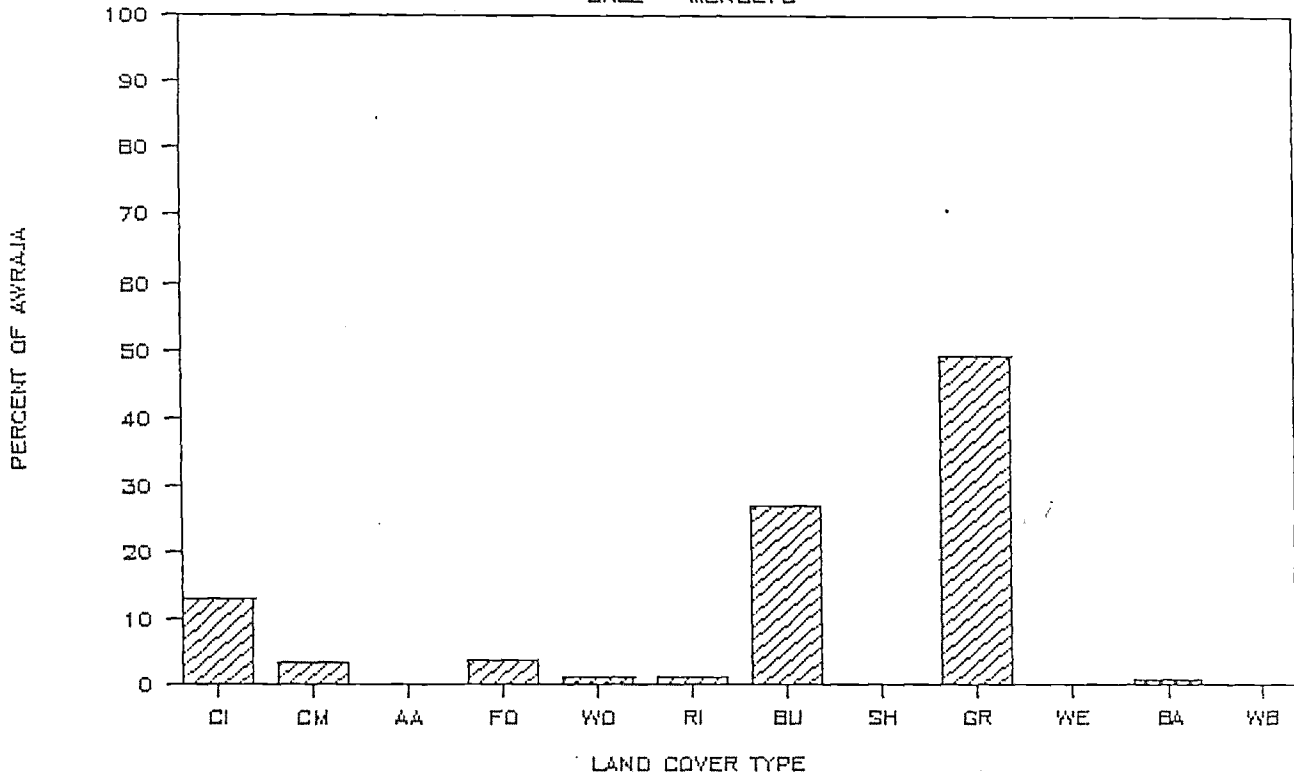
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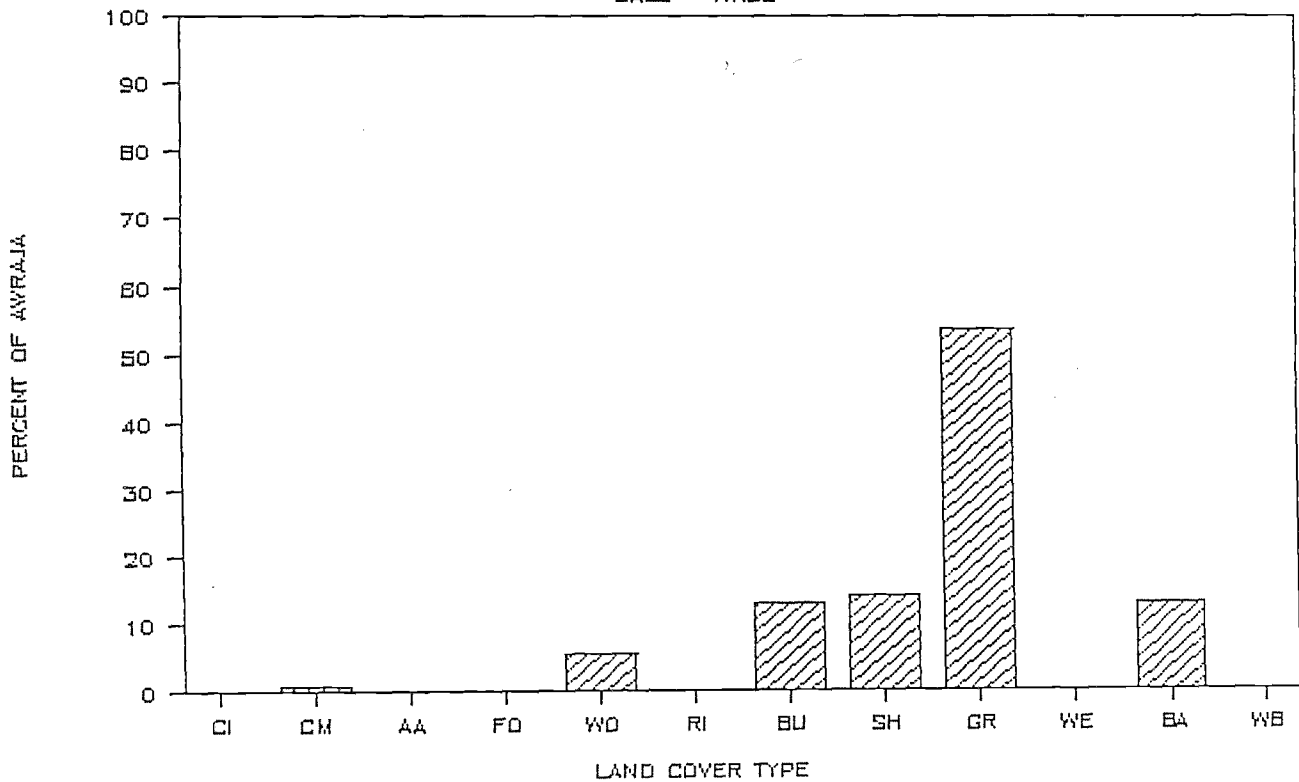
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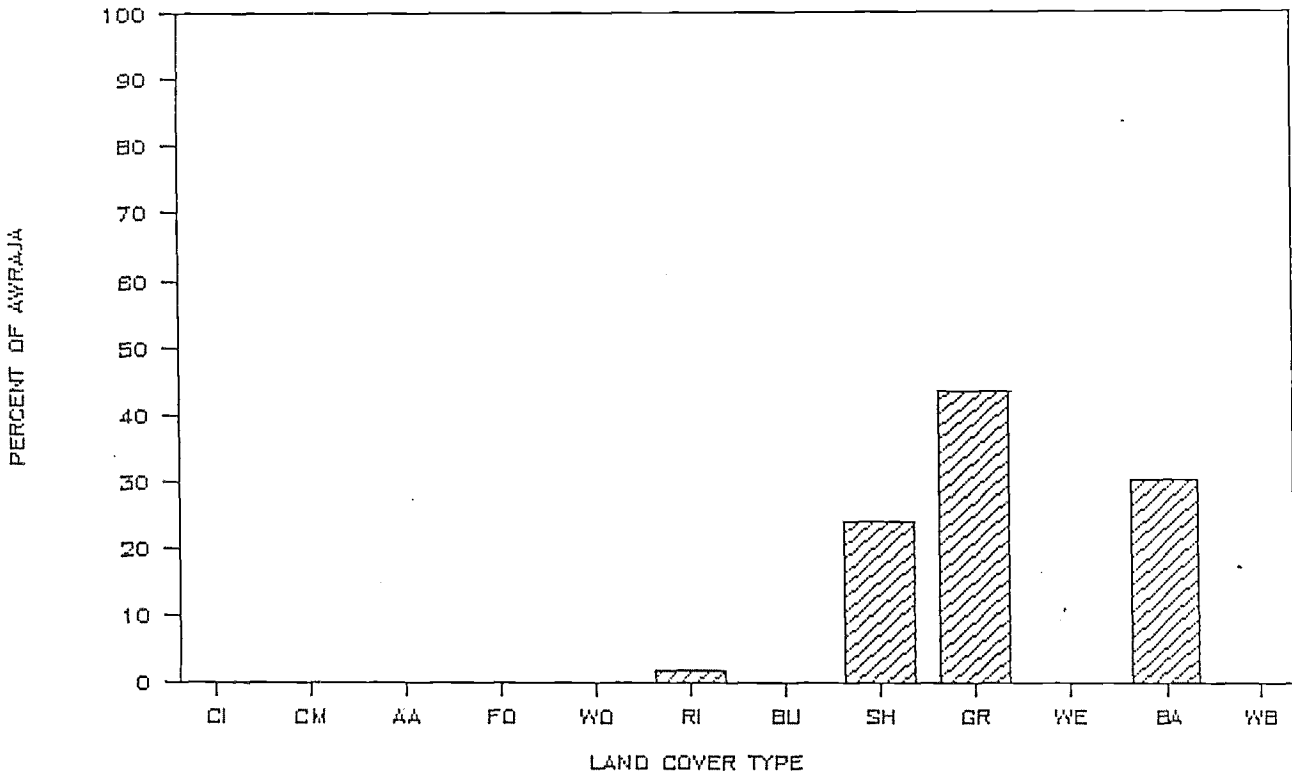
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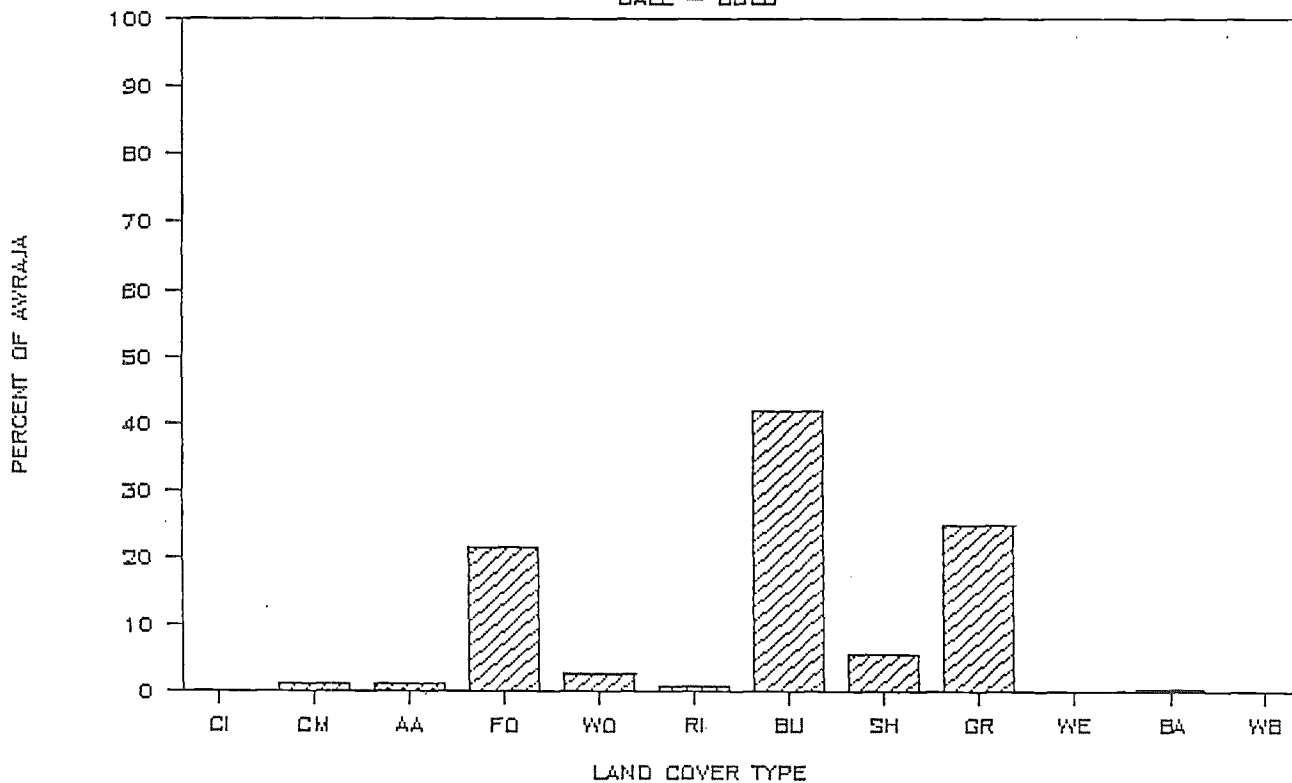
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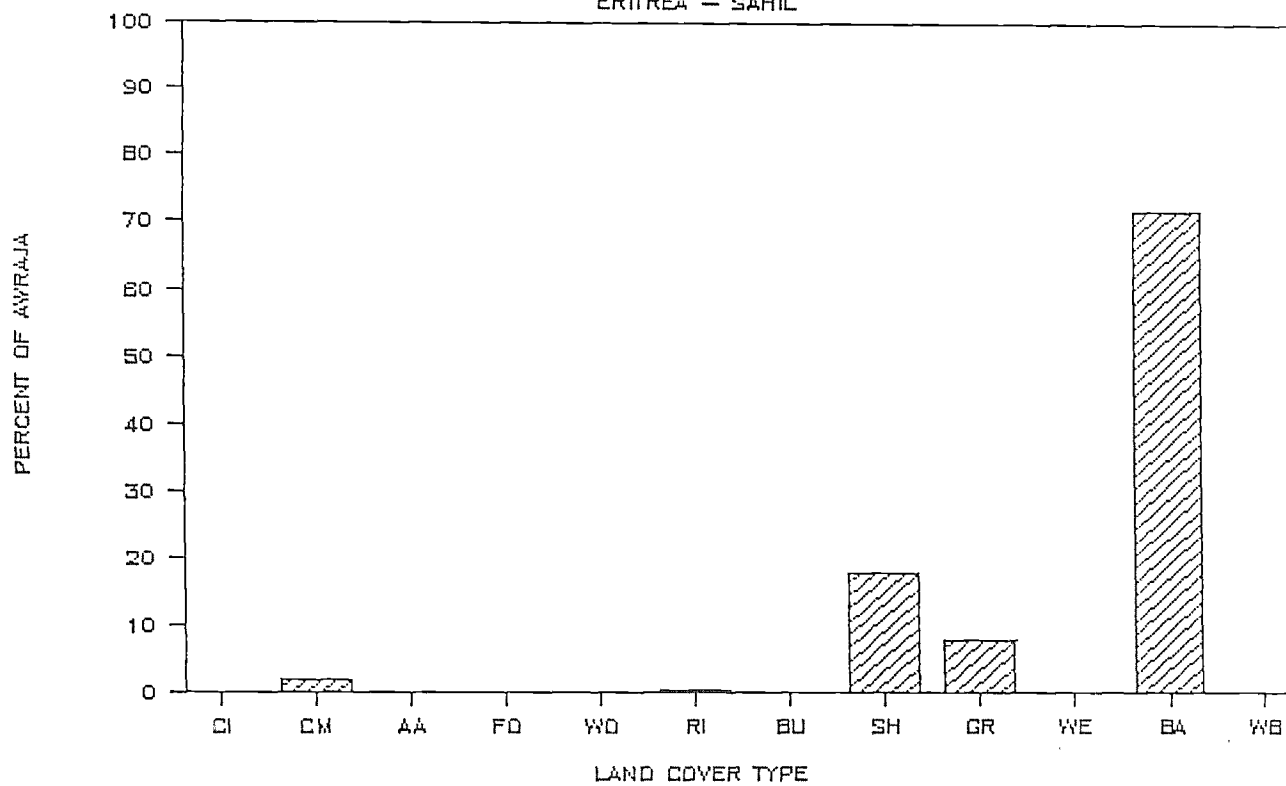
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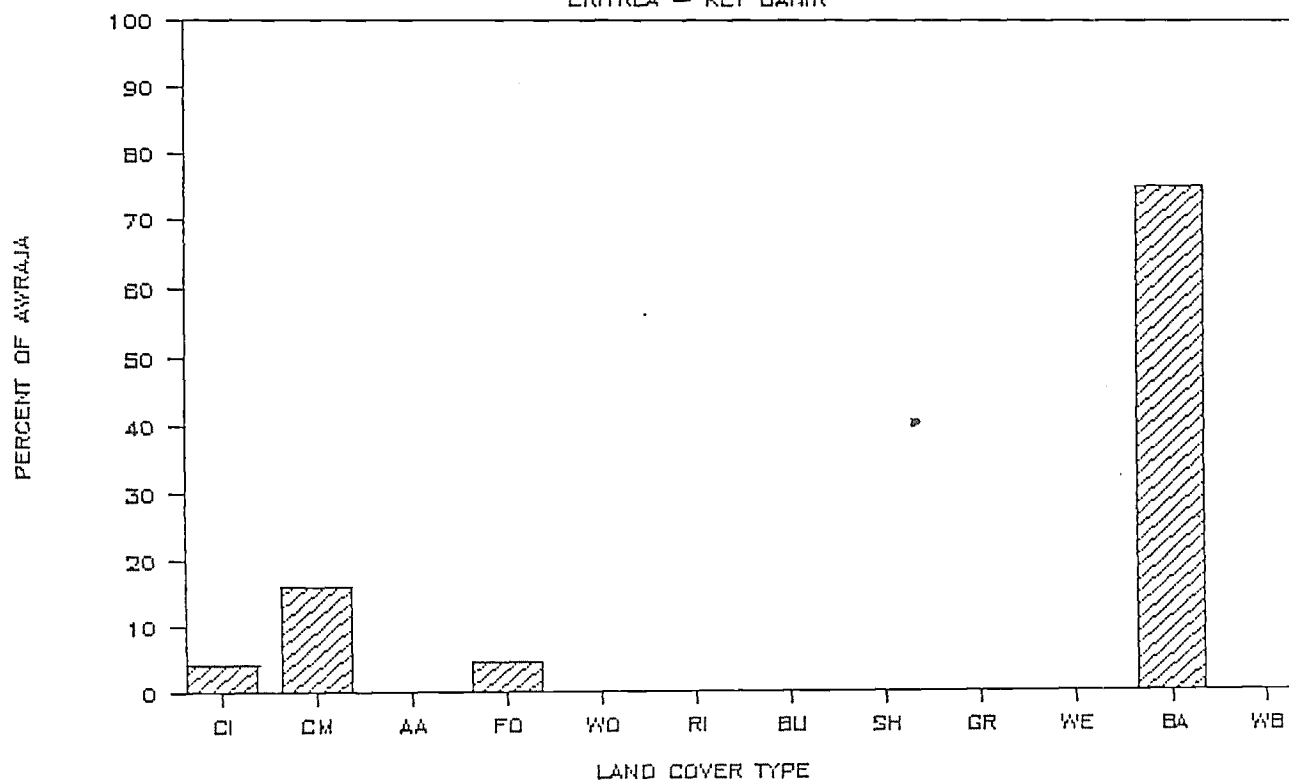
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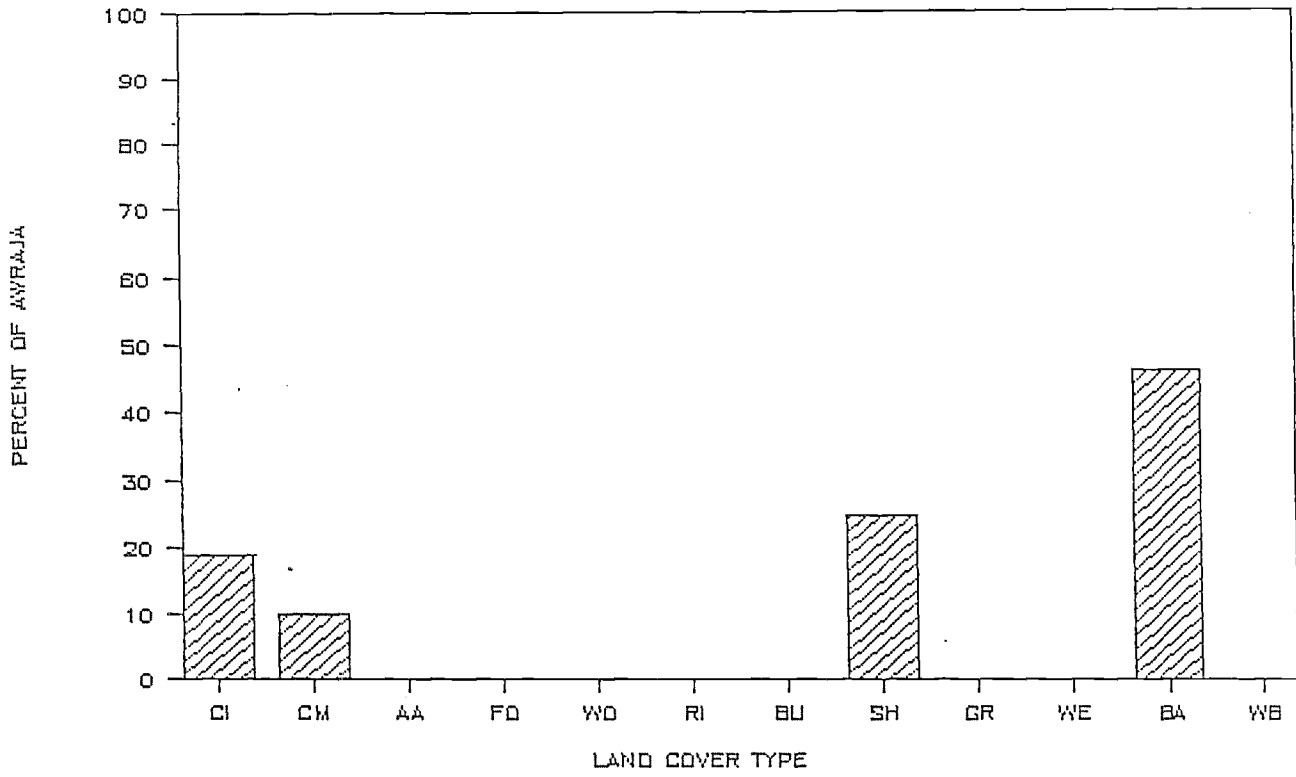
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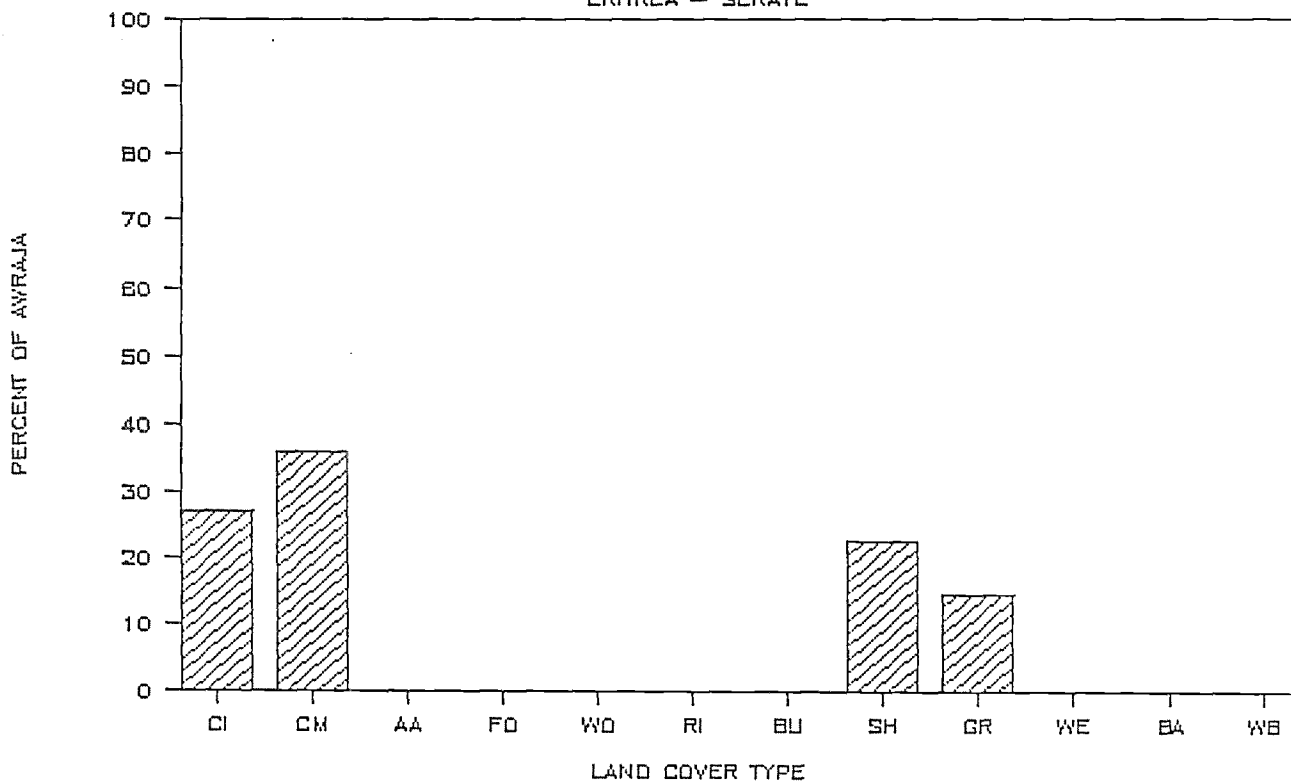
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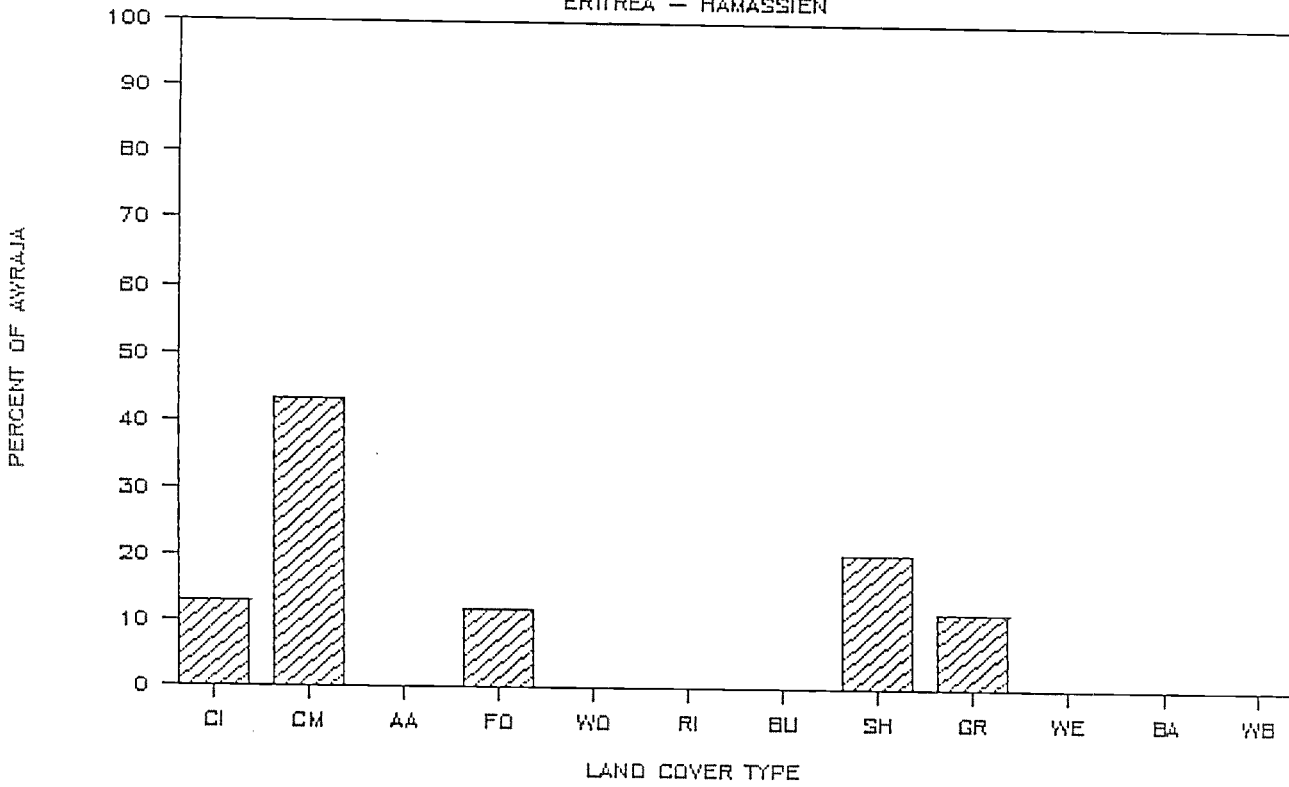
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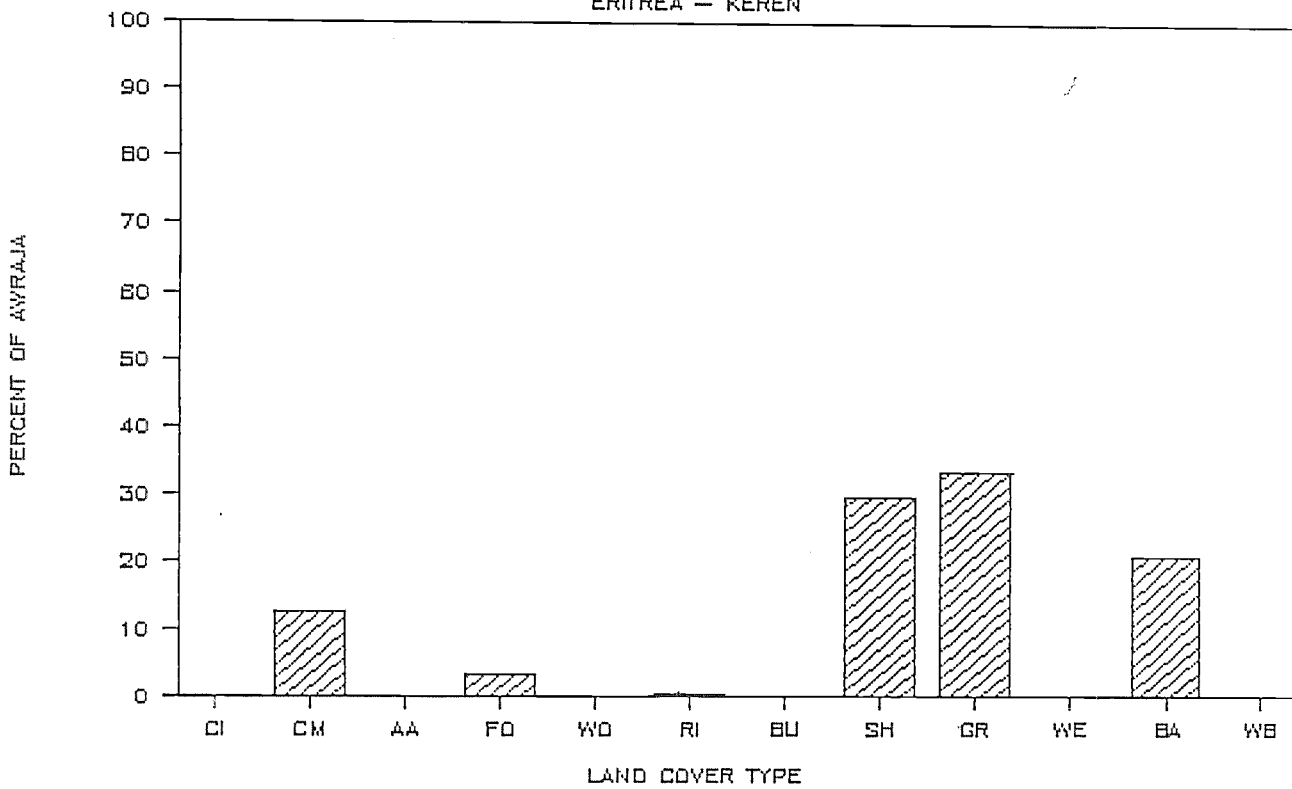
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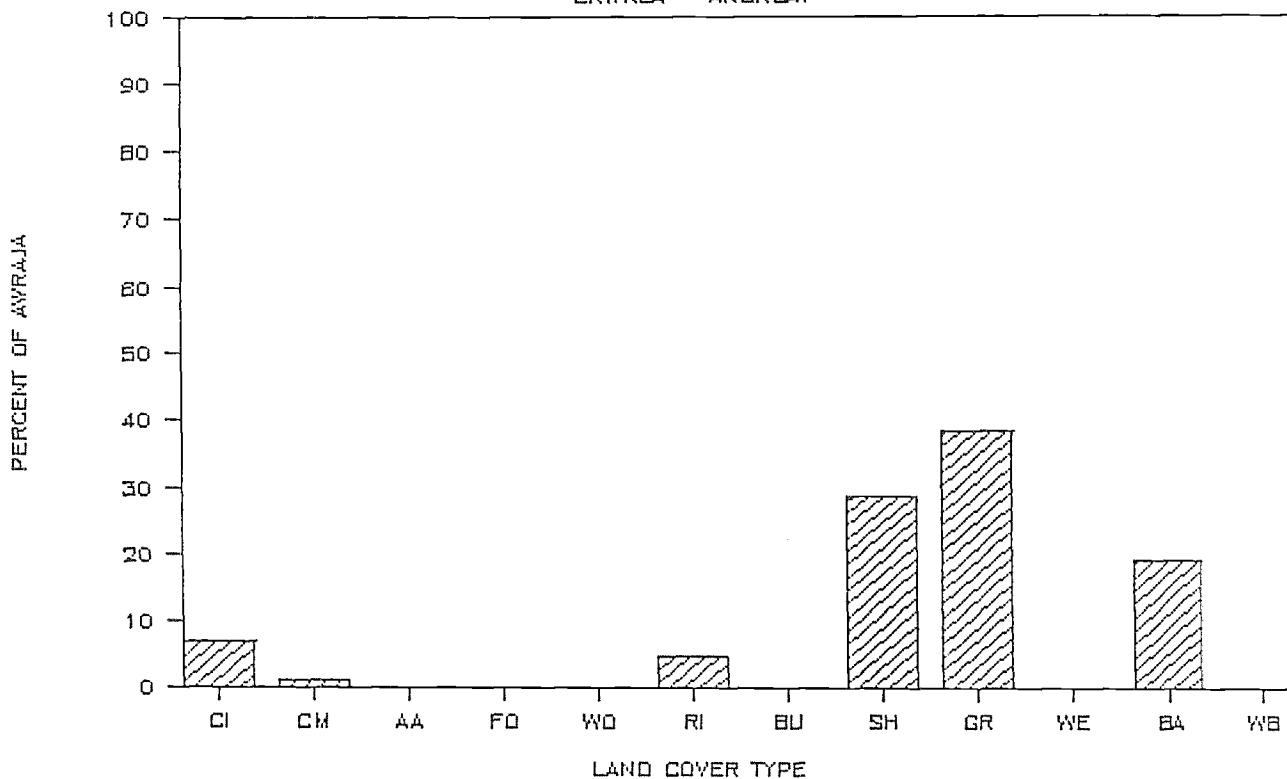
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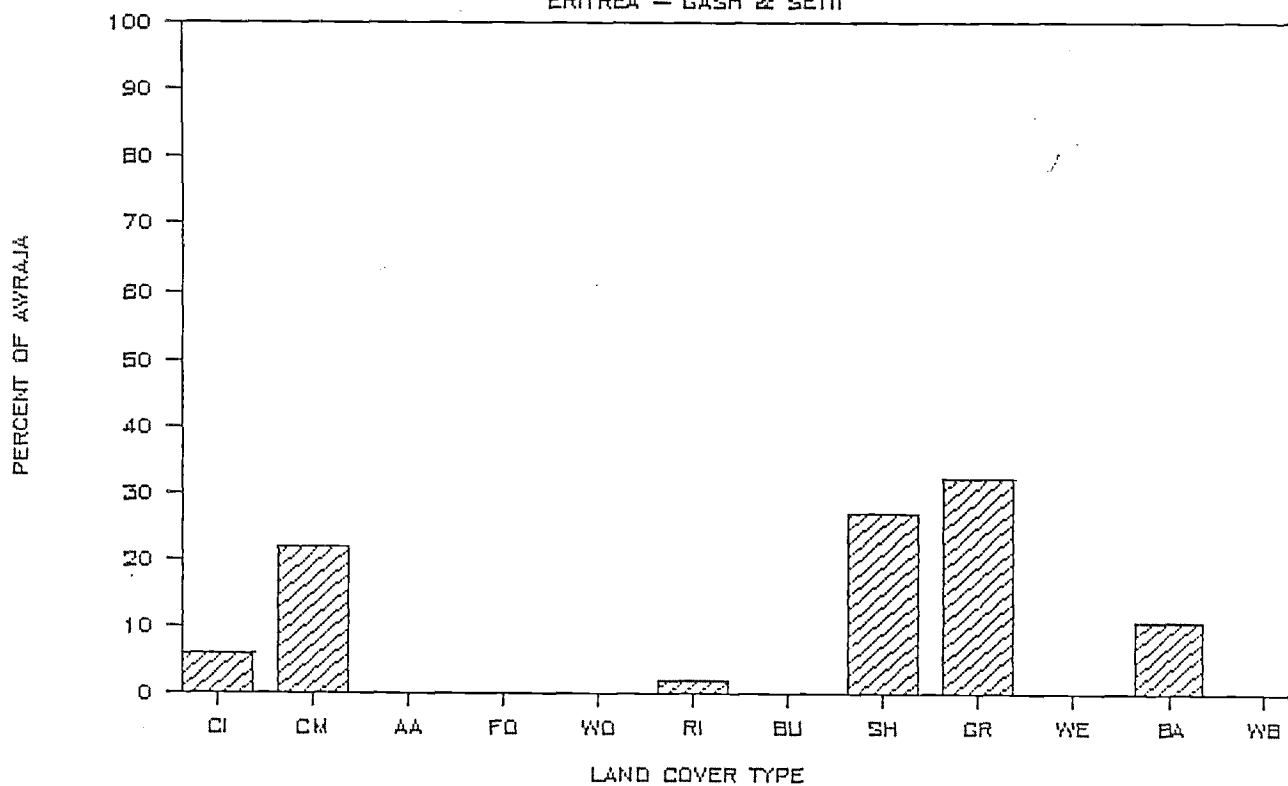
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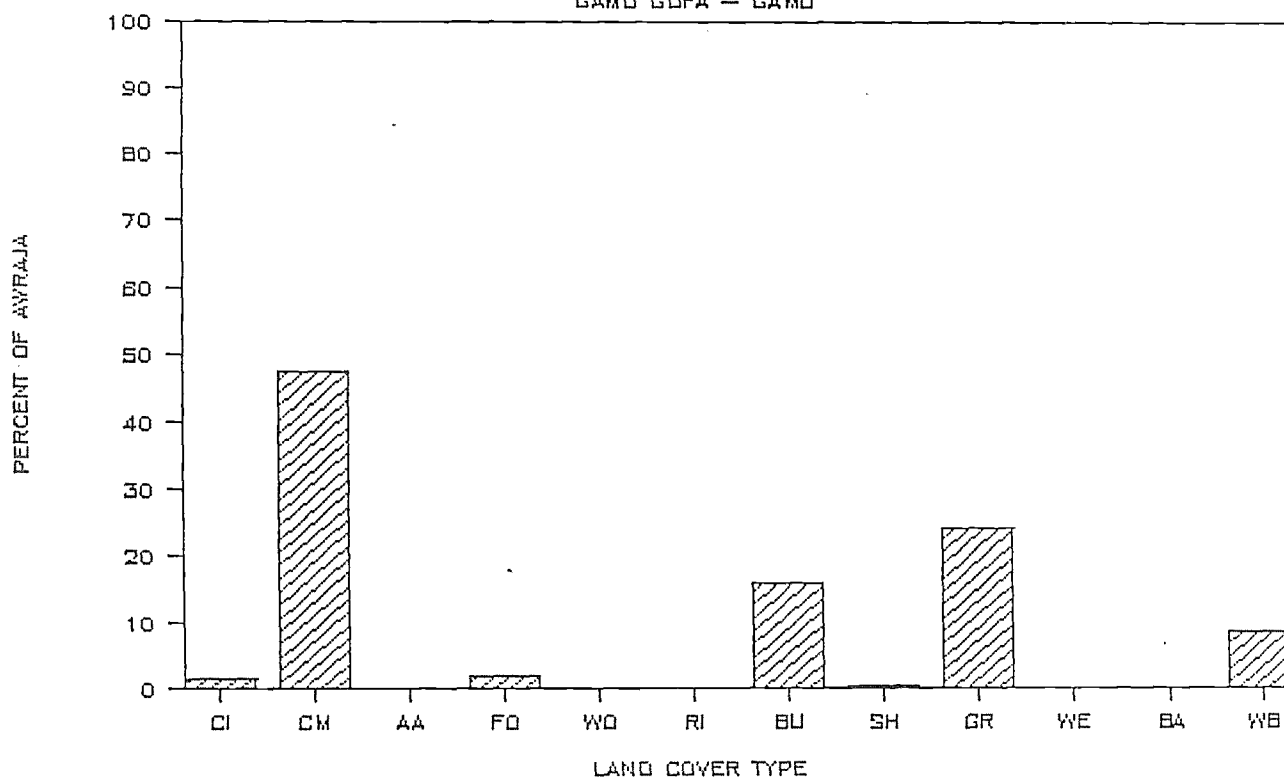
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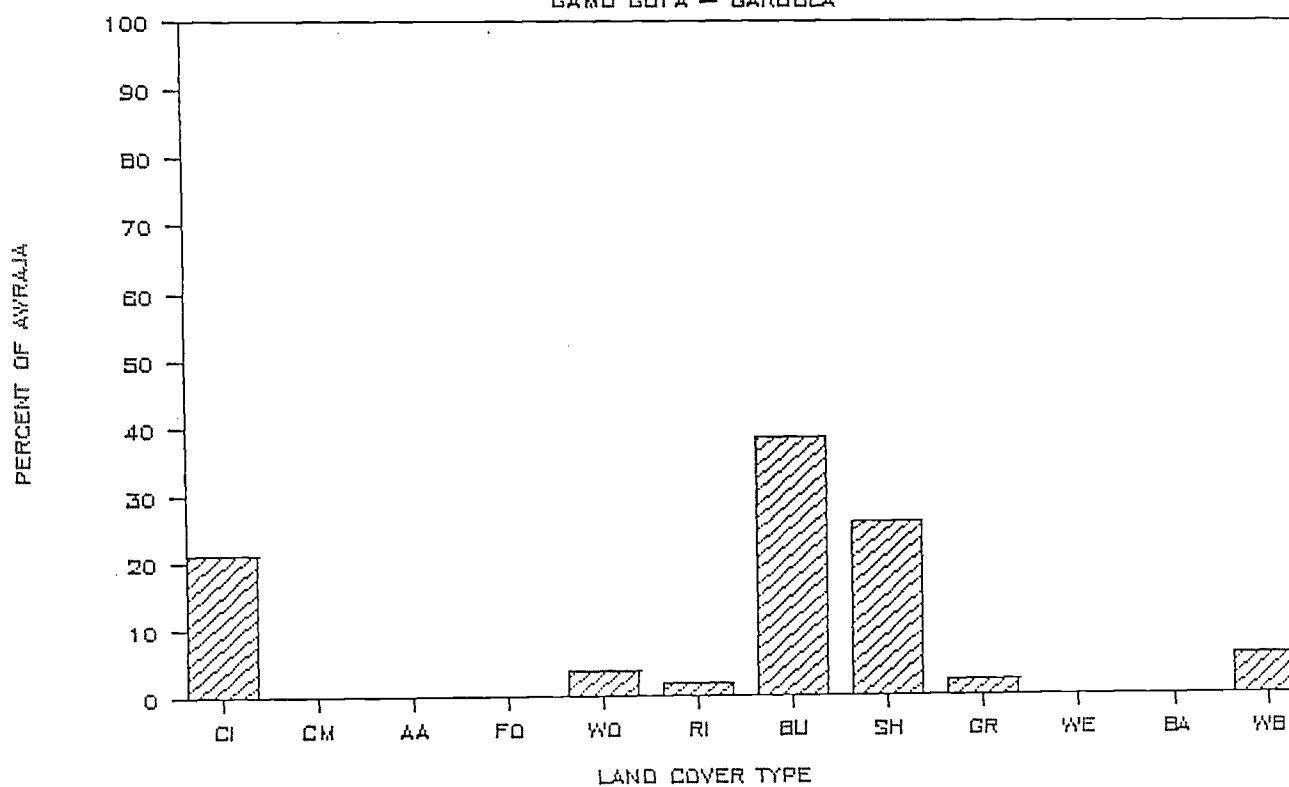
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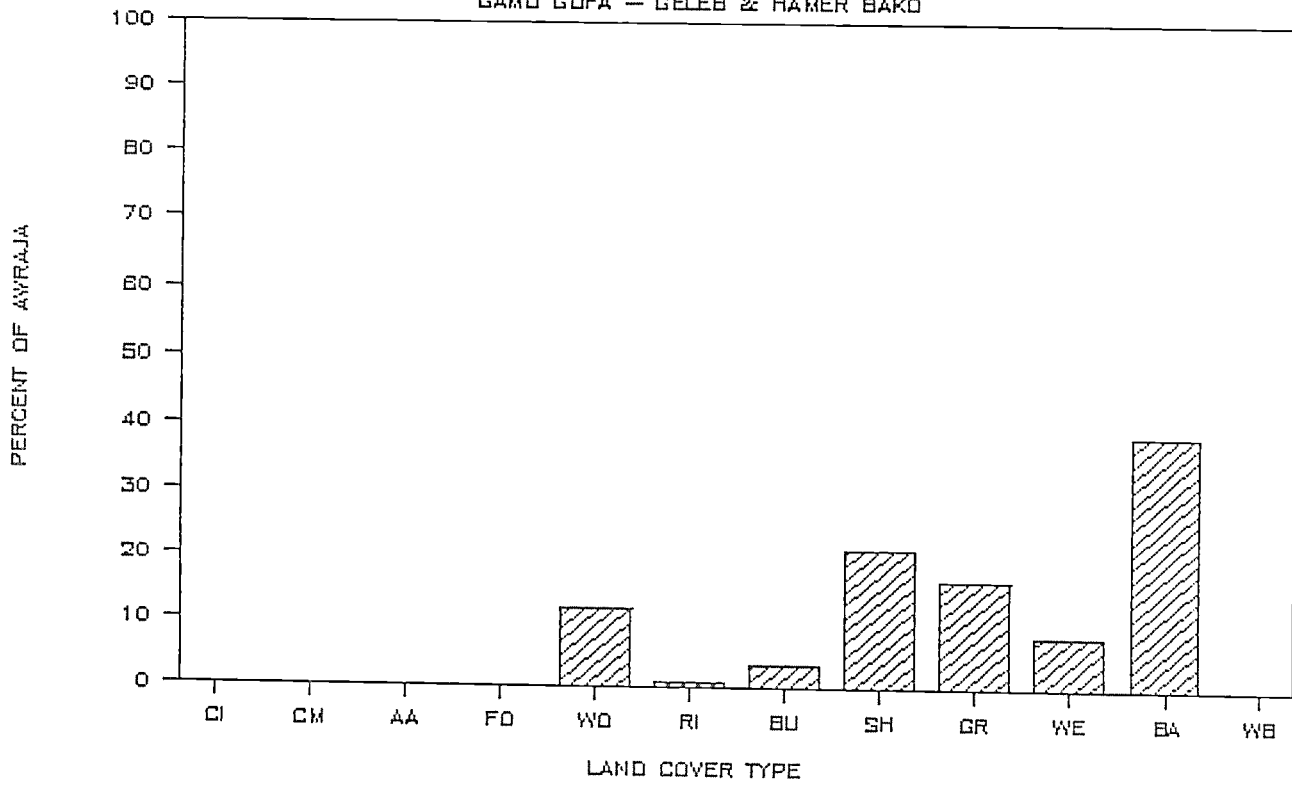
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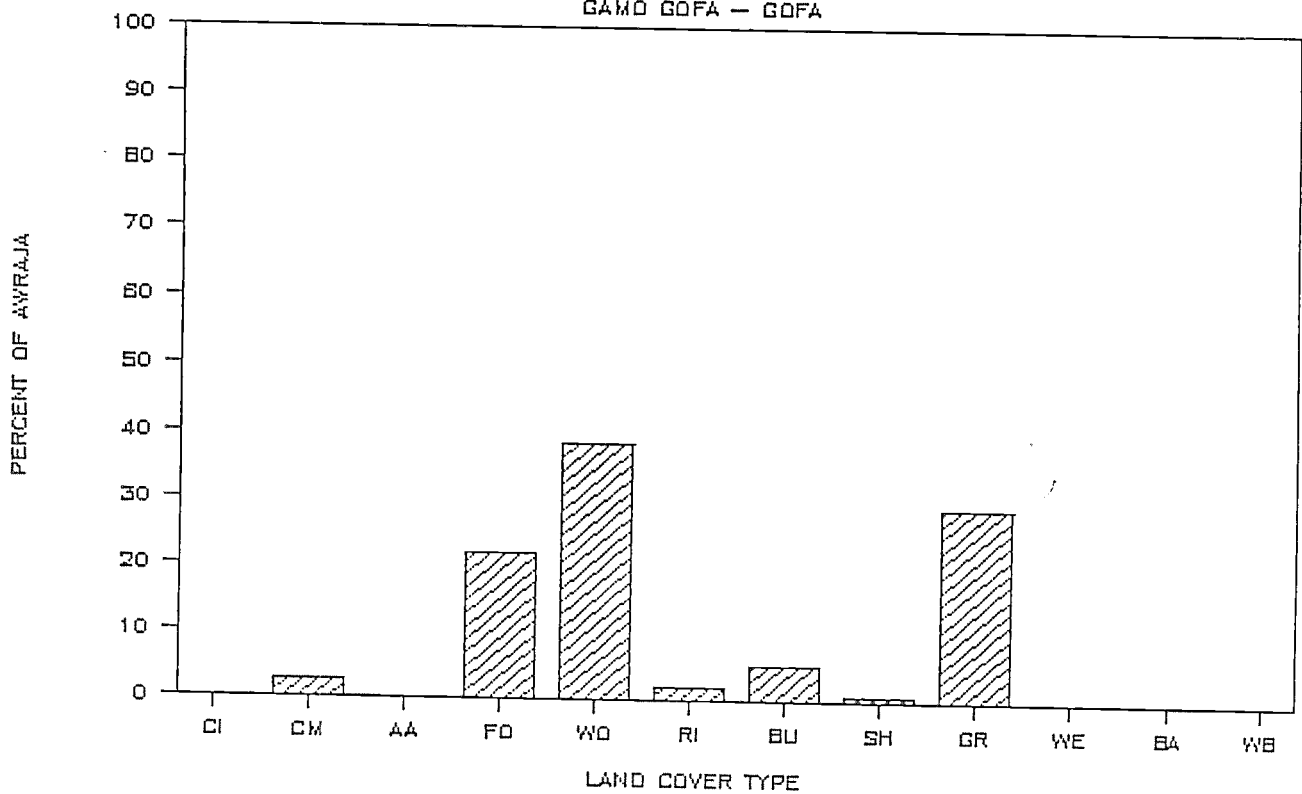
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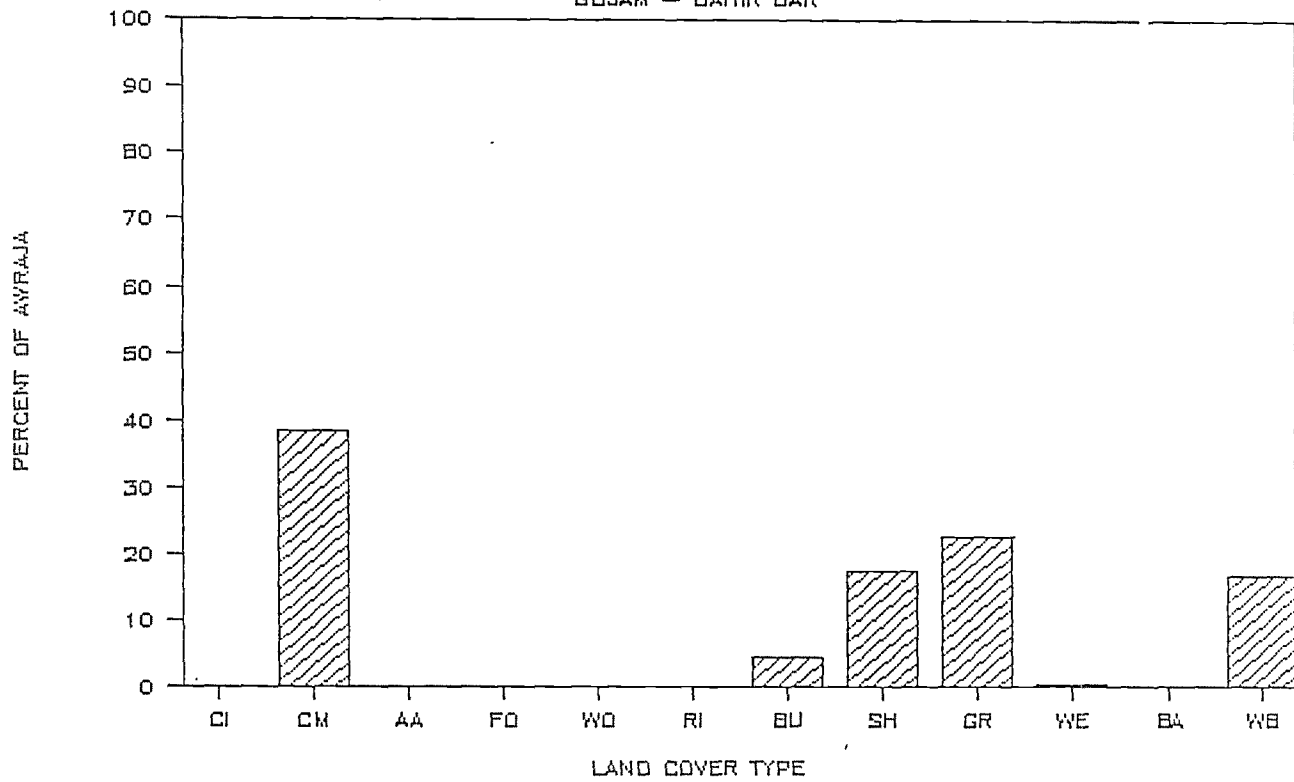
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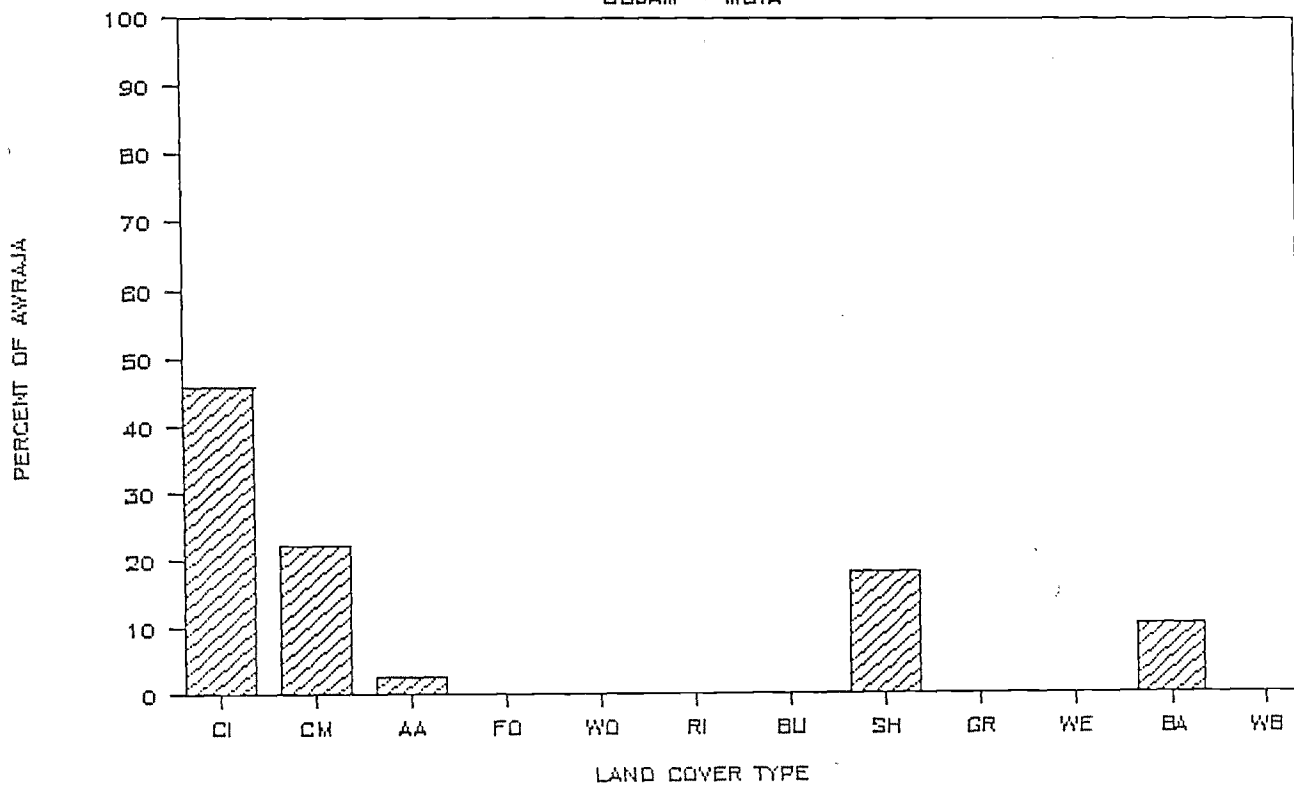
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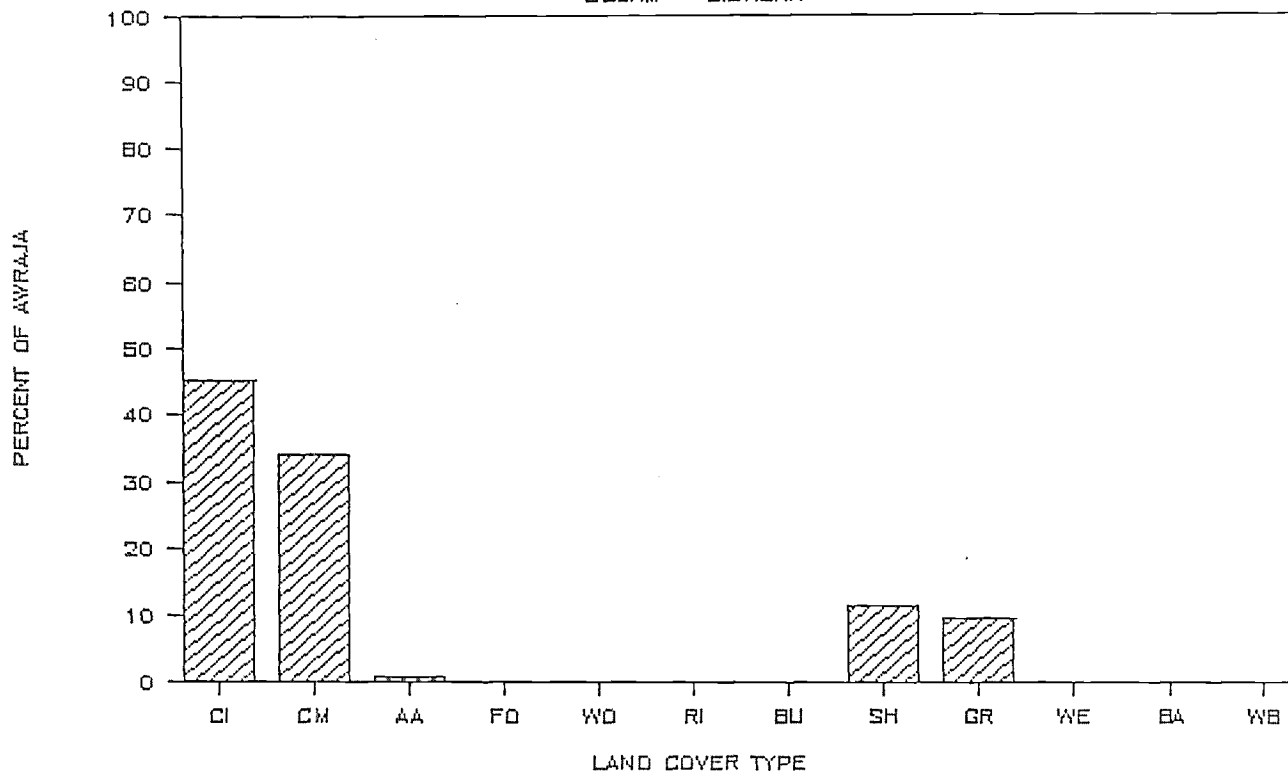
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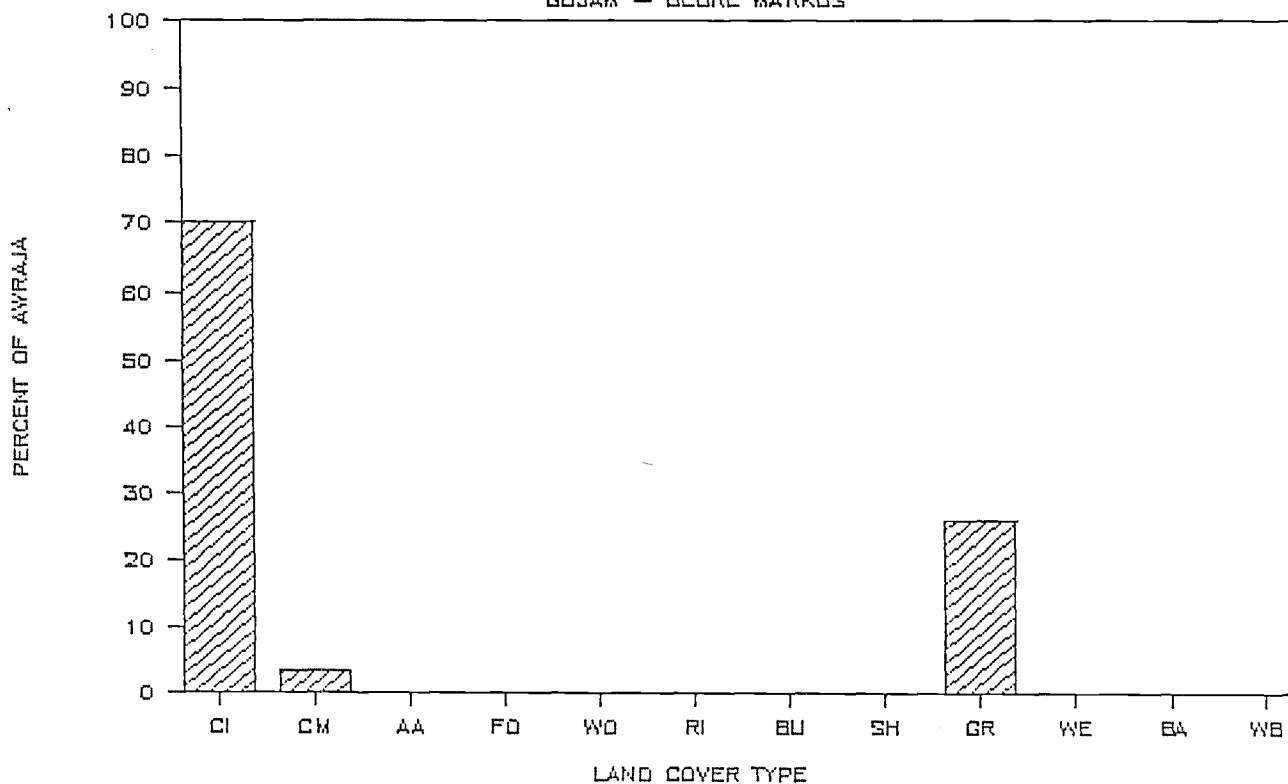
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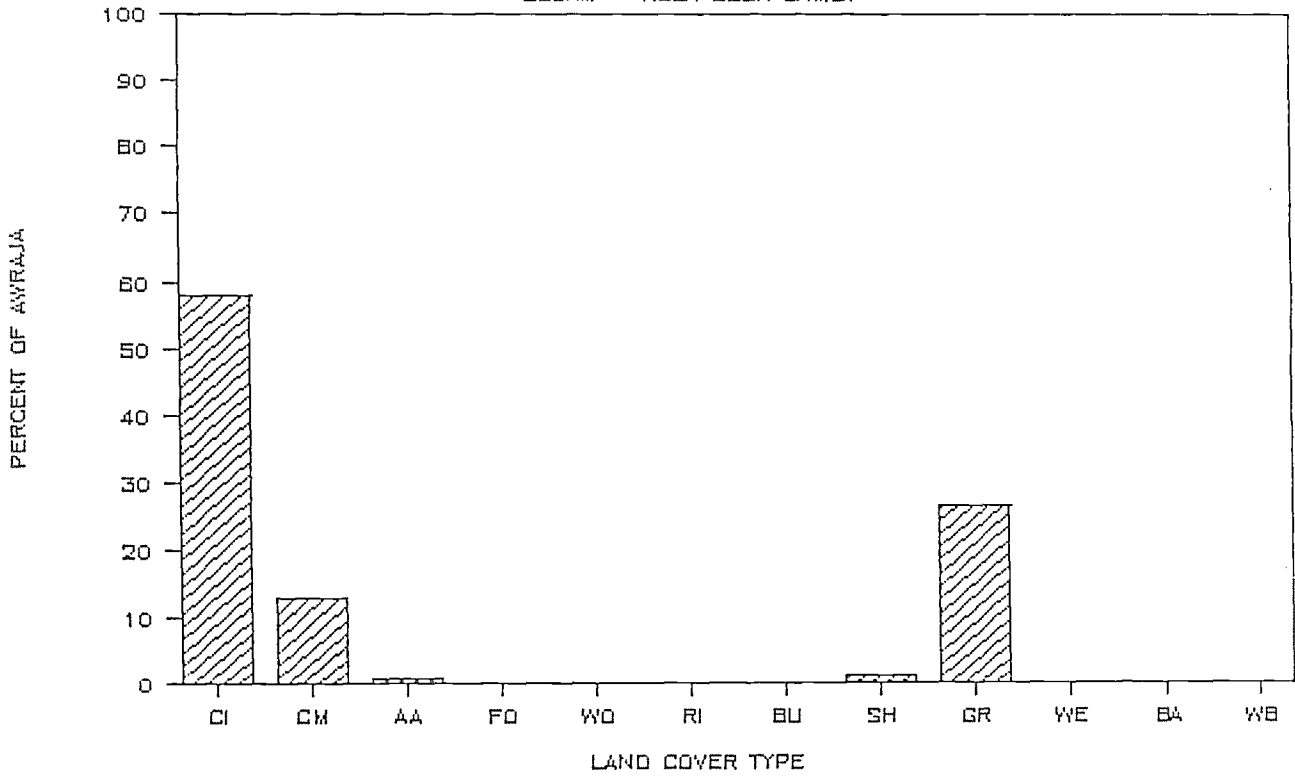
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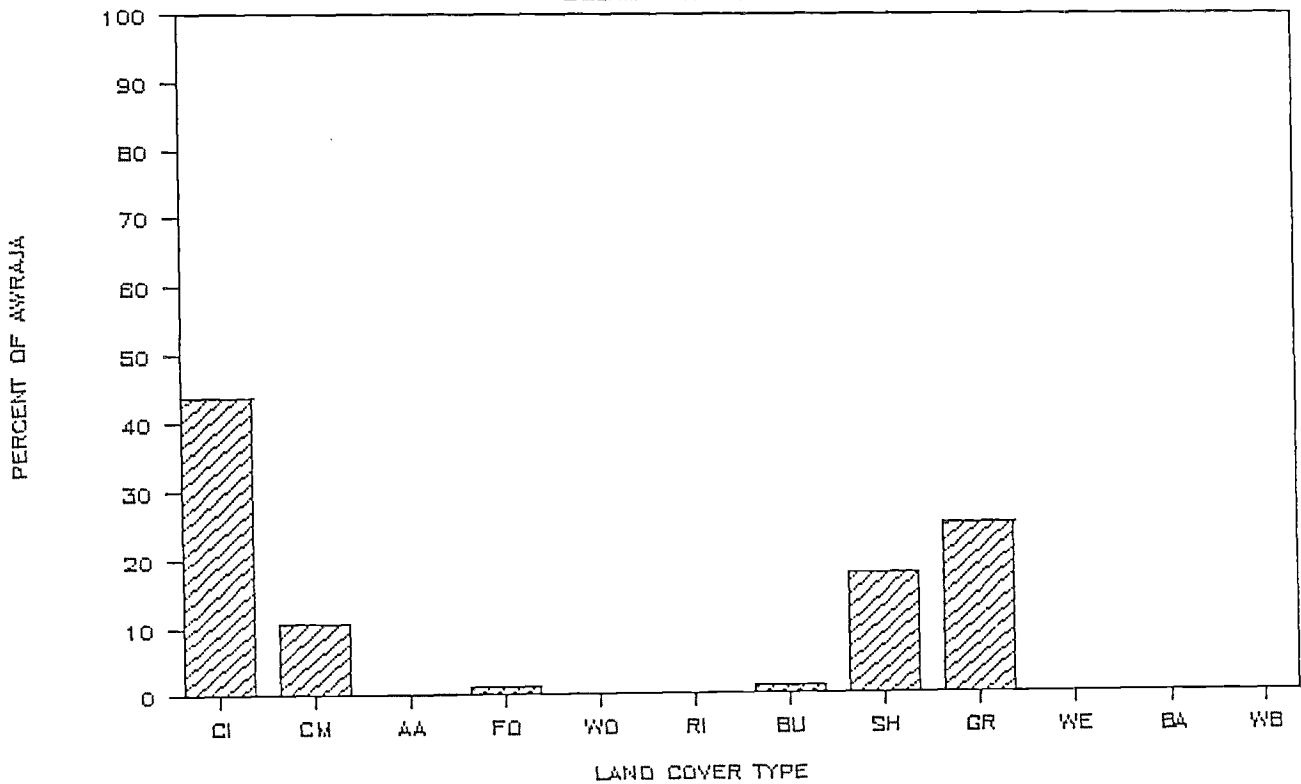
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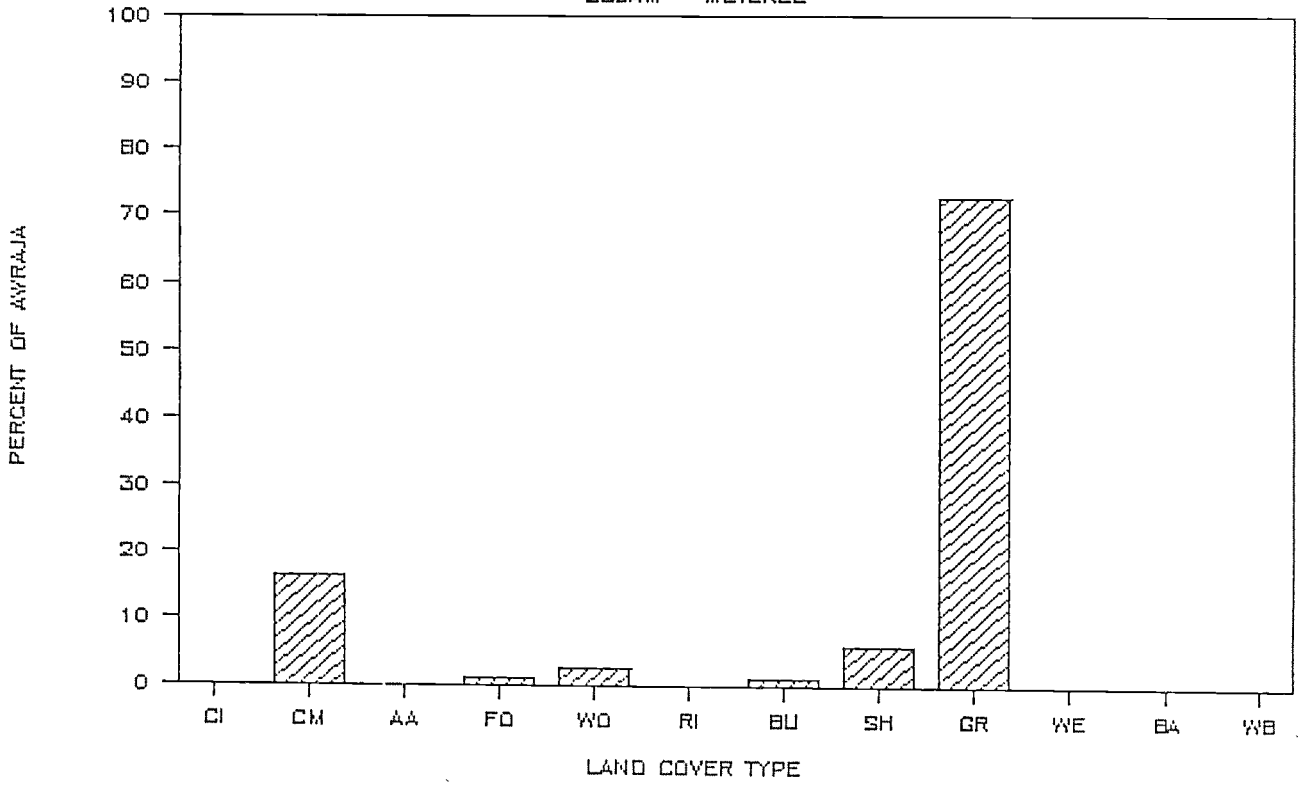
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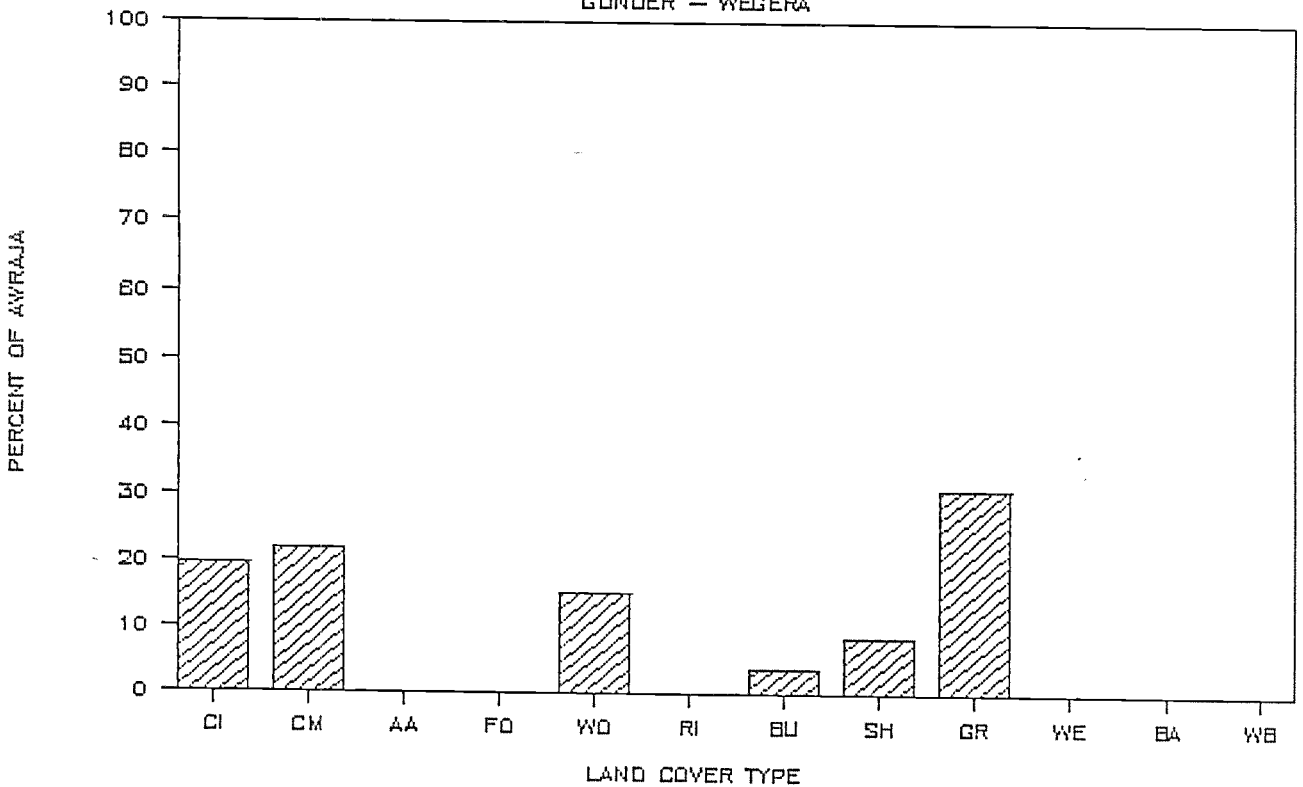
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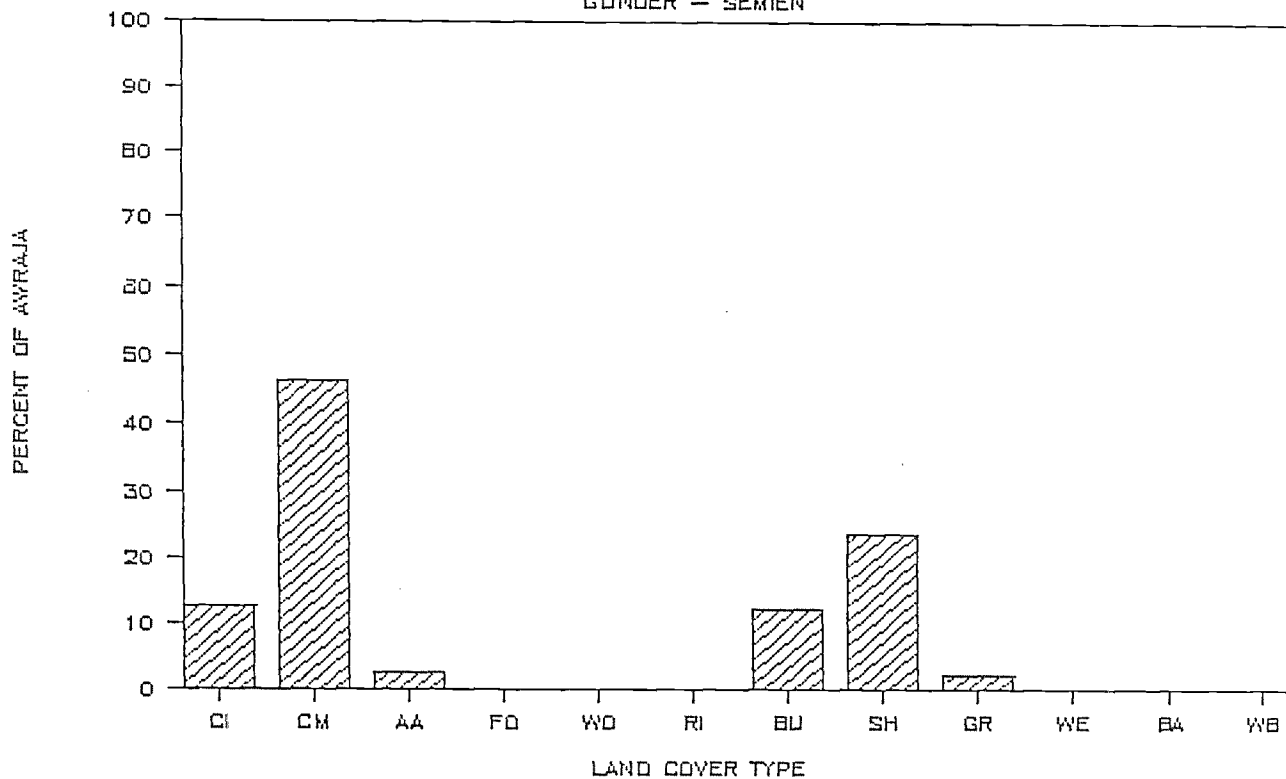
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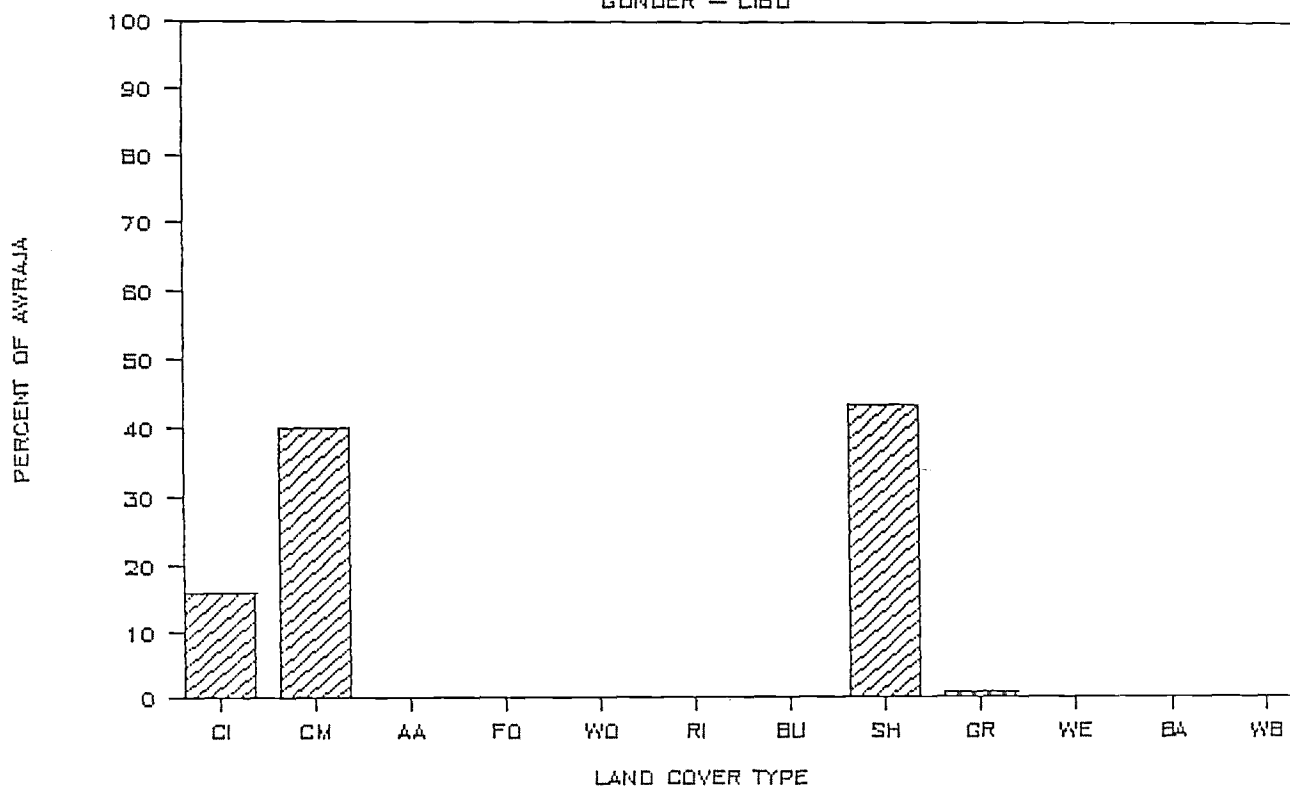
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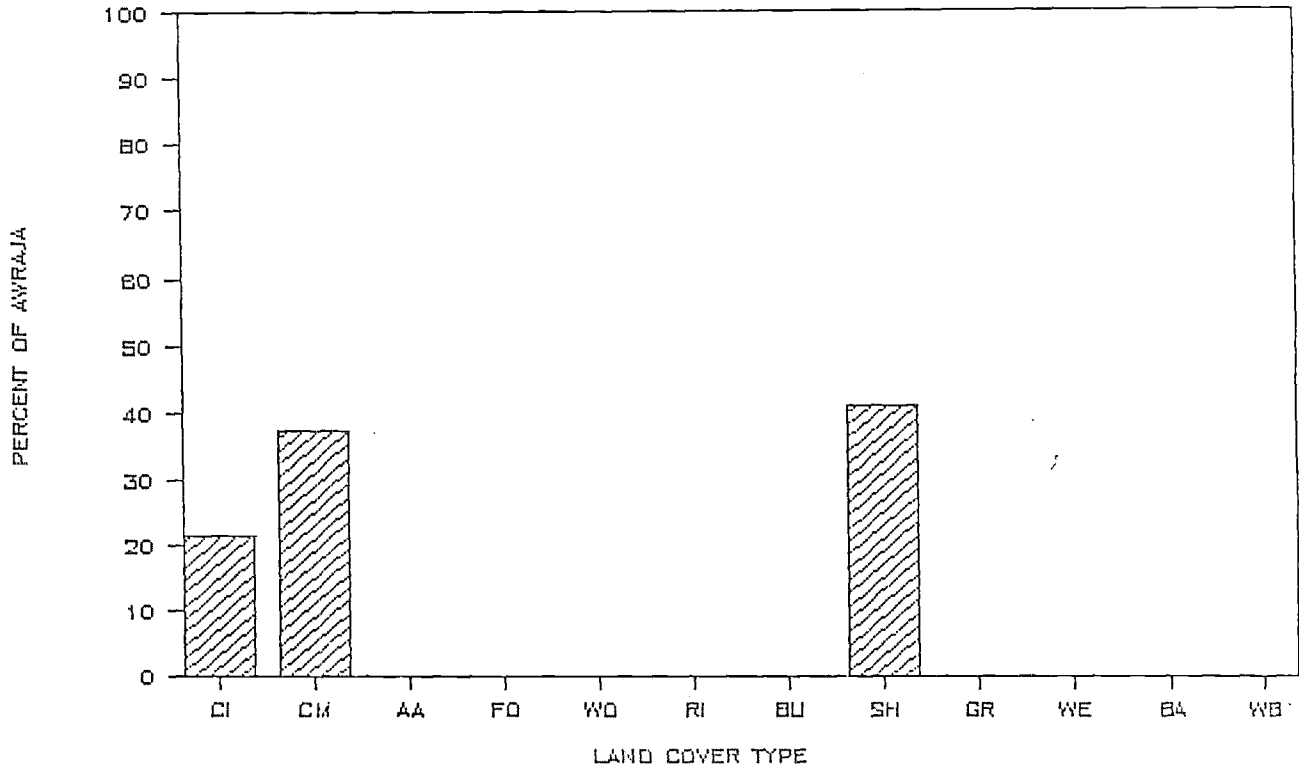
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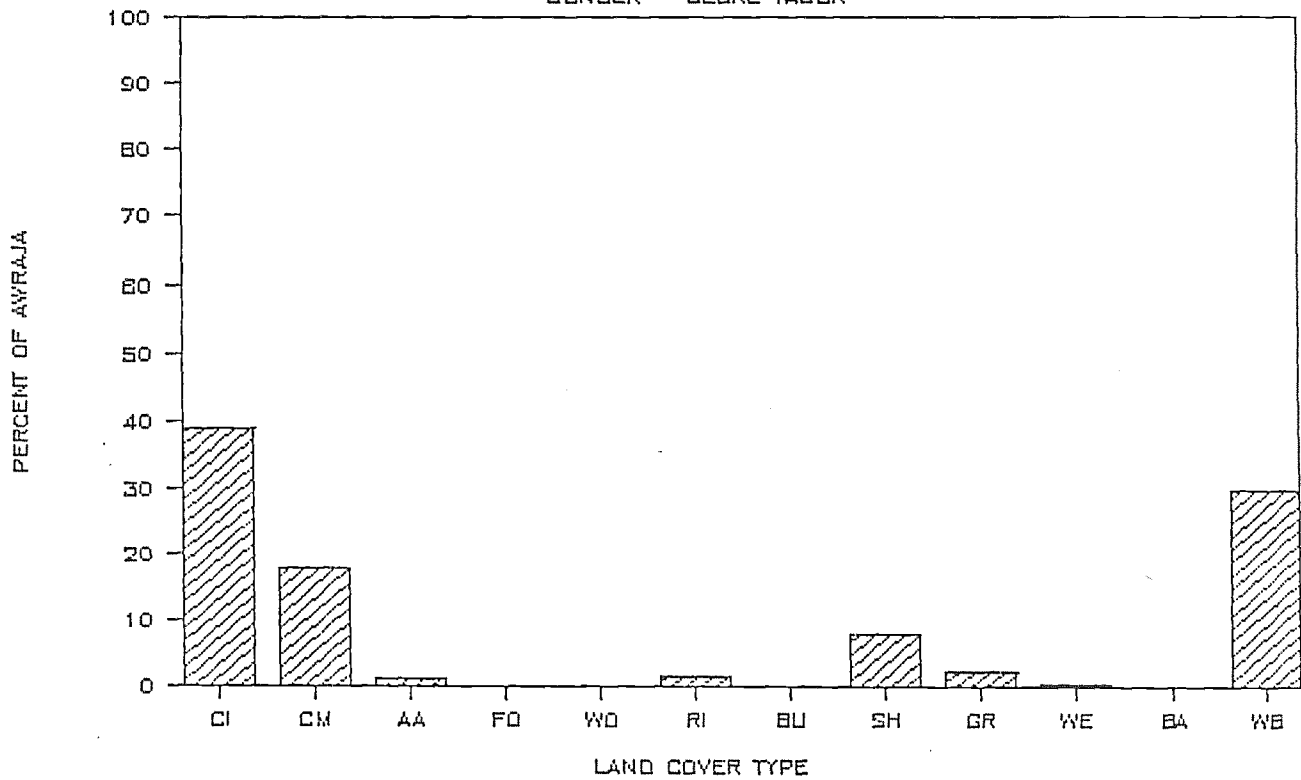
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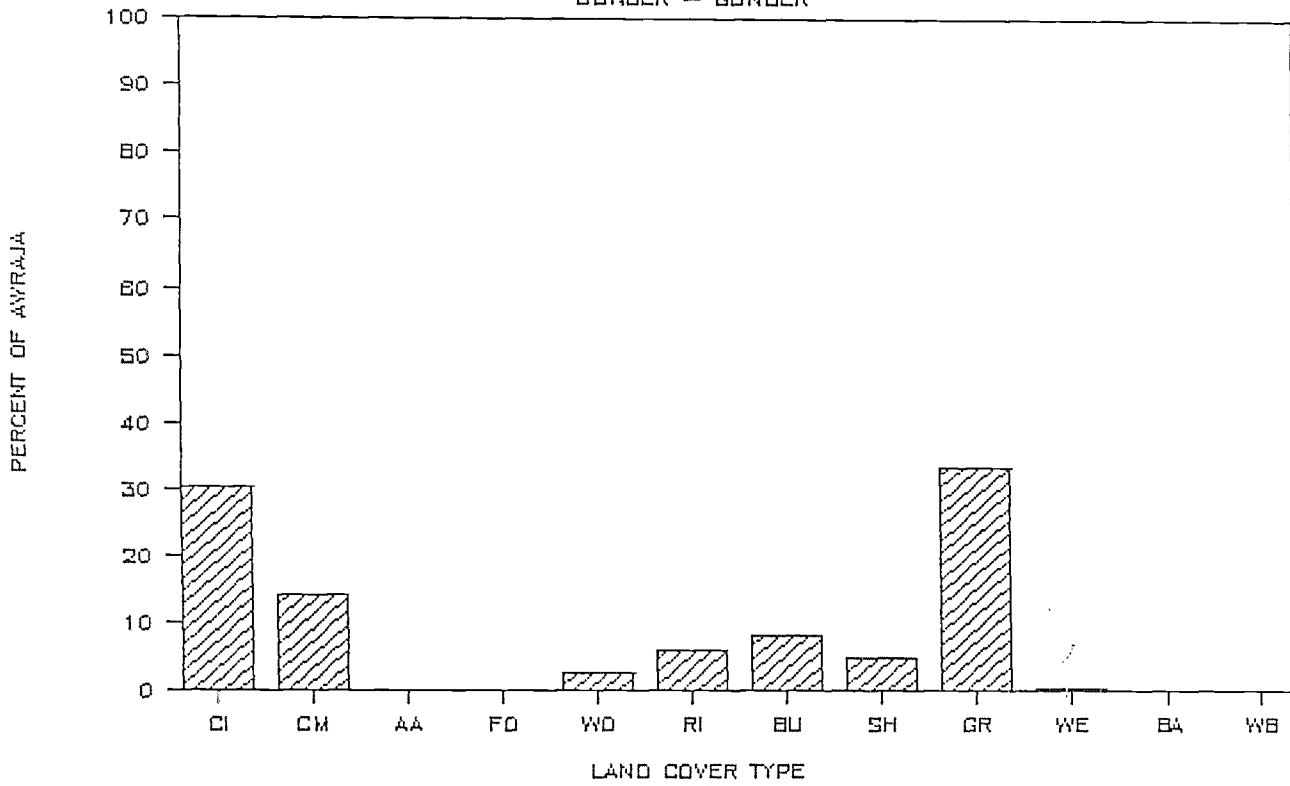
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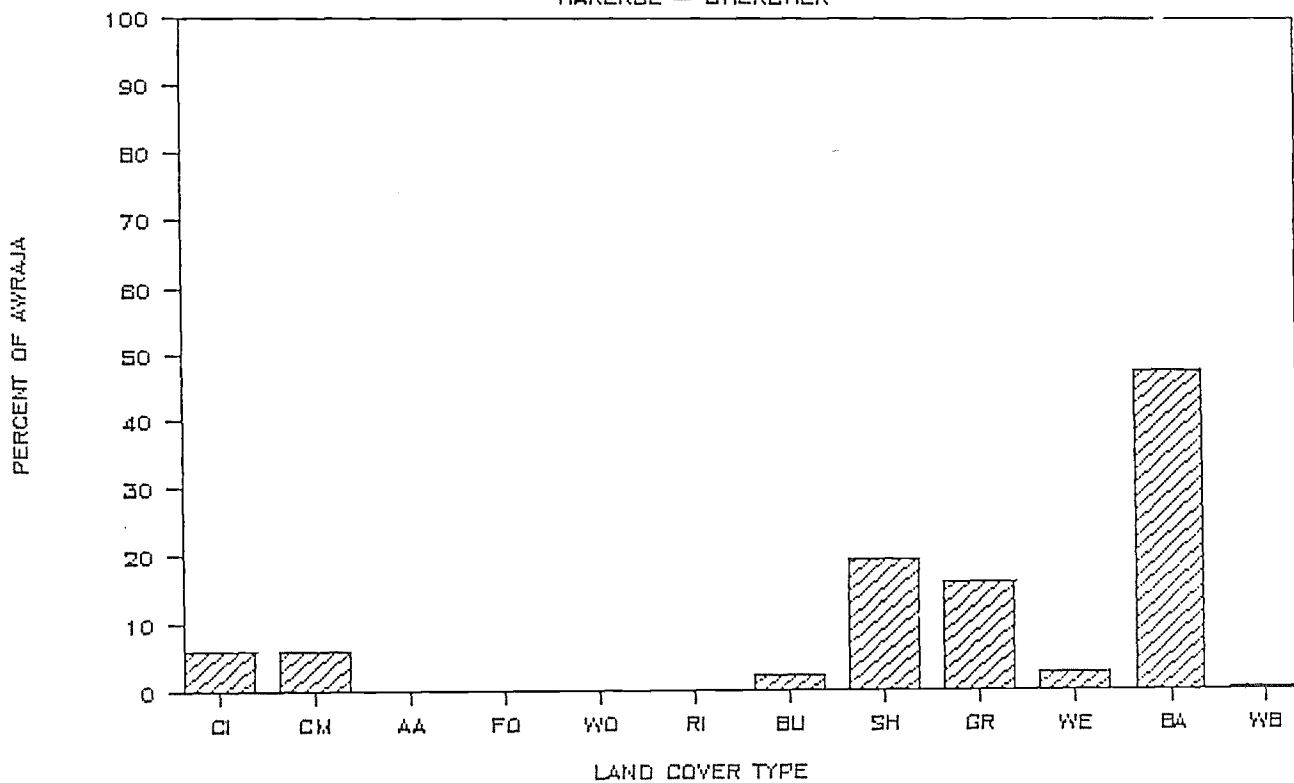
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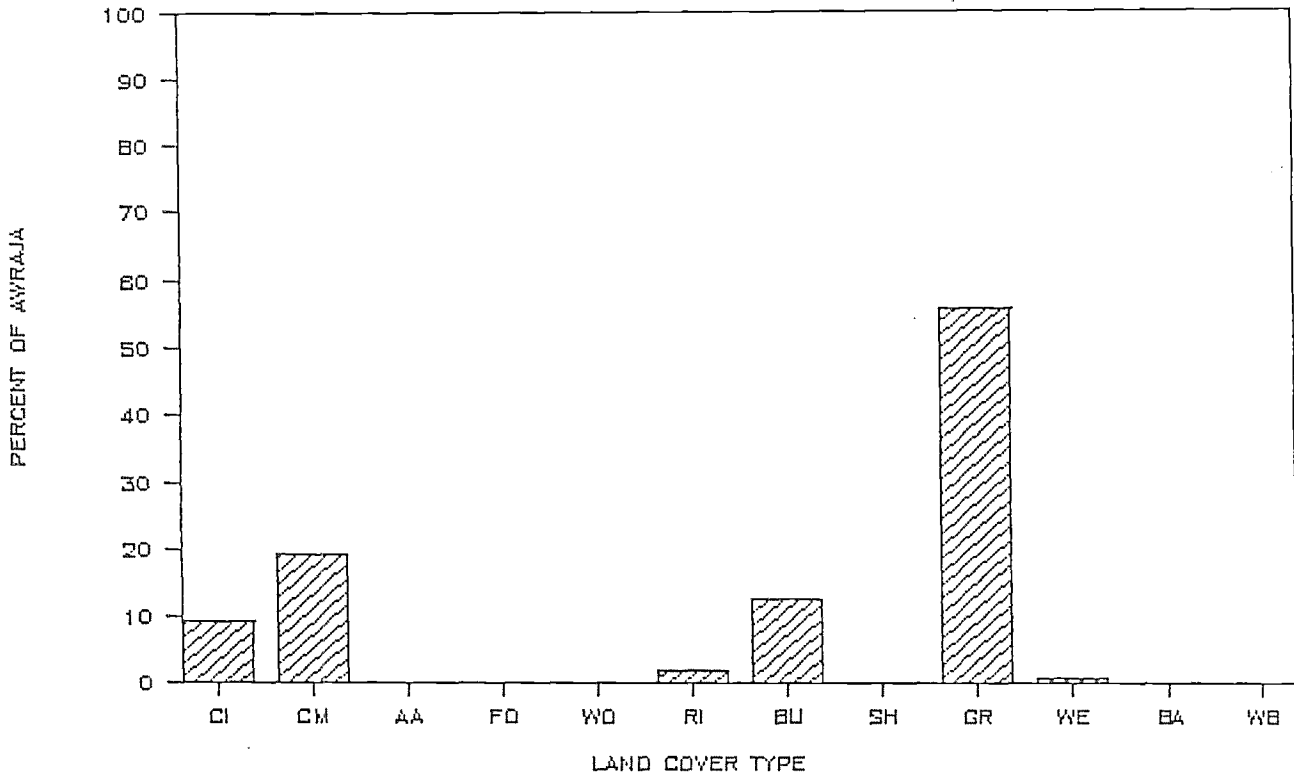
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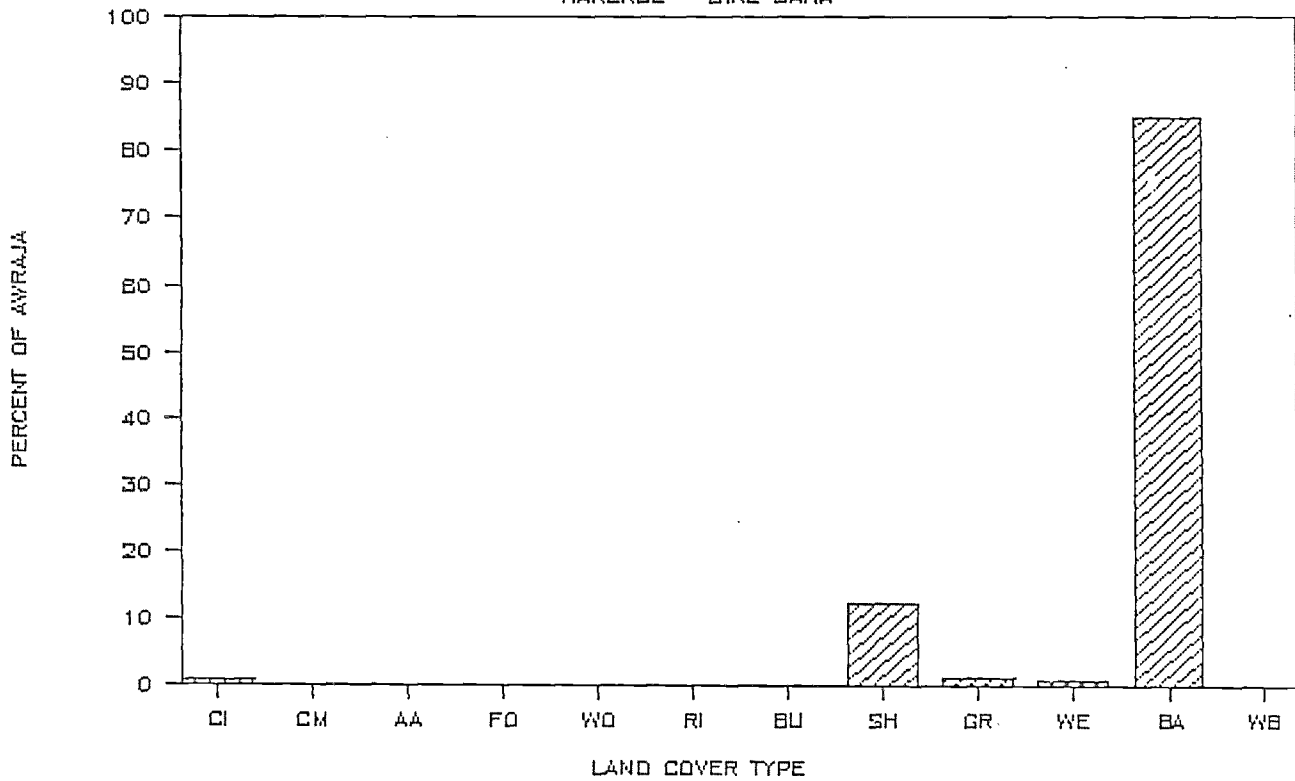
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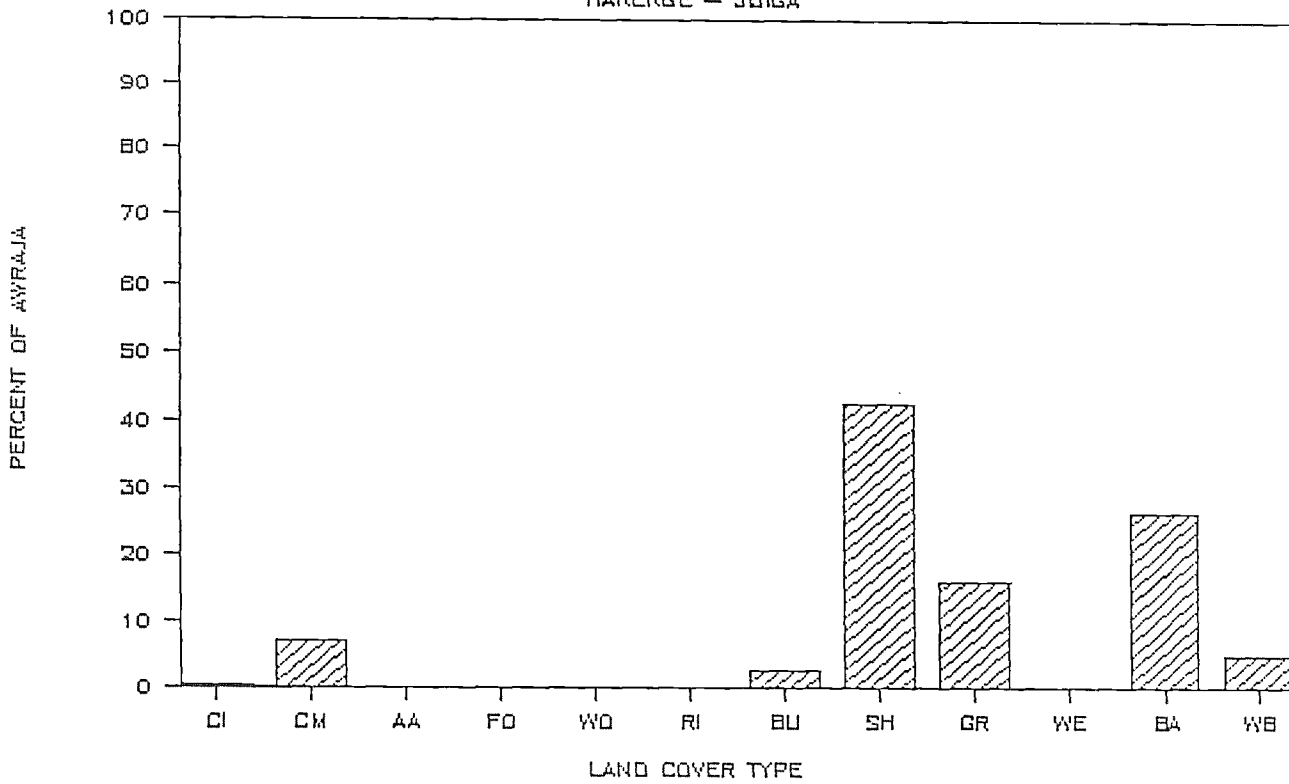
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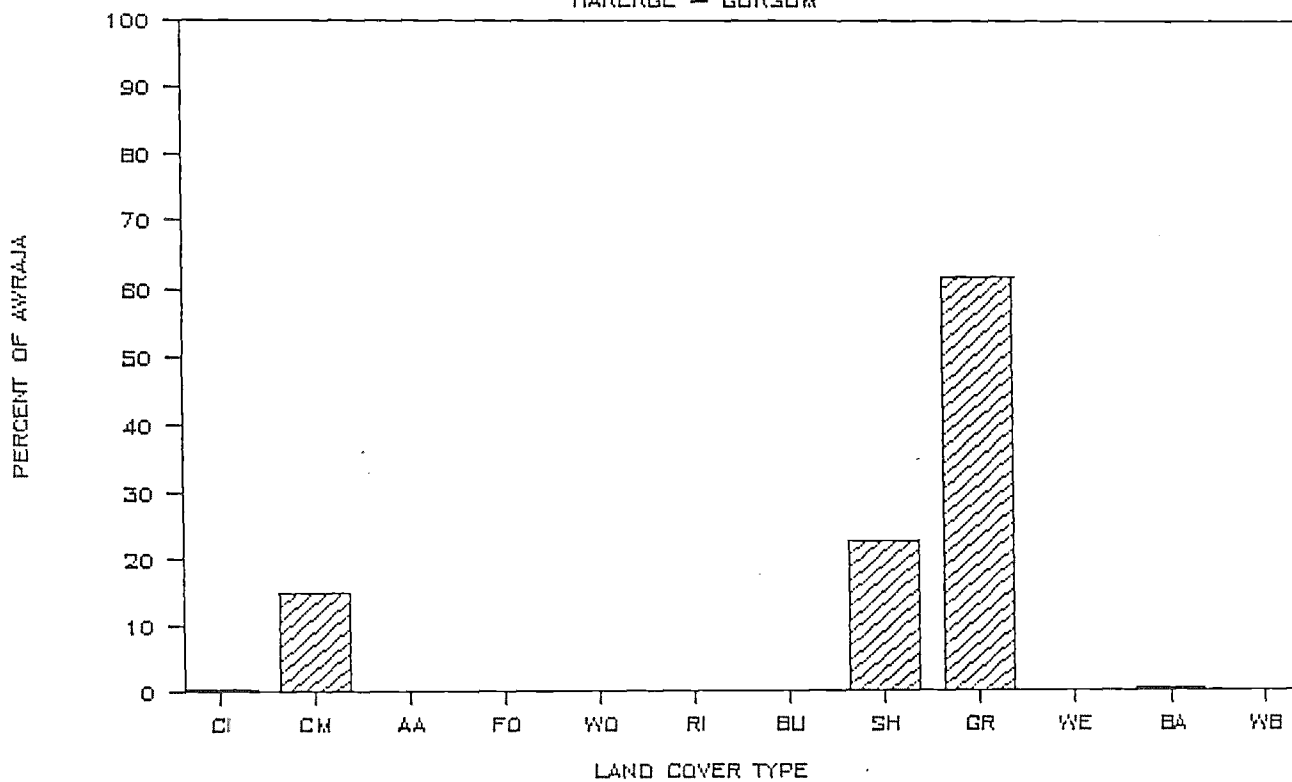
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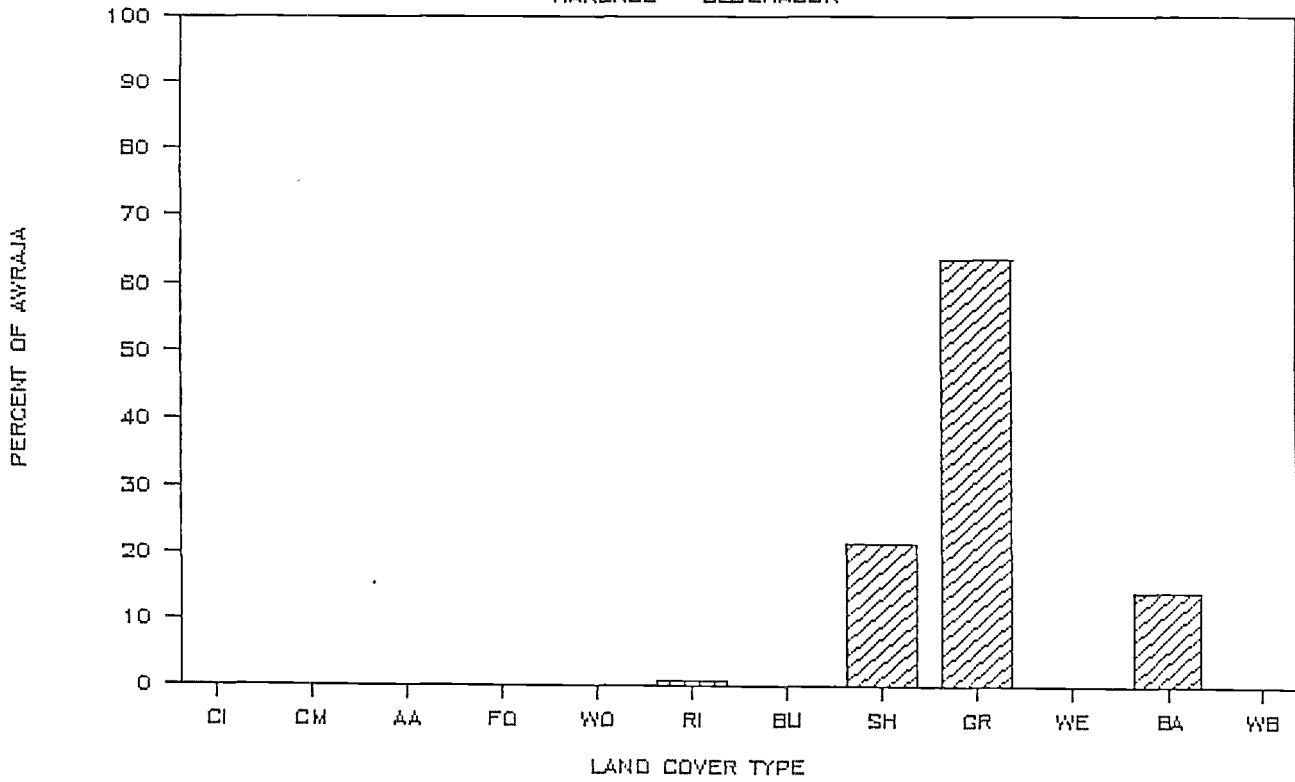
CURRENT LAND COVER
HARERGE — WELWEL & WARDER
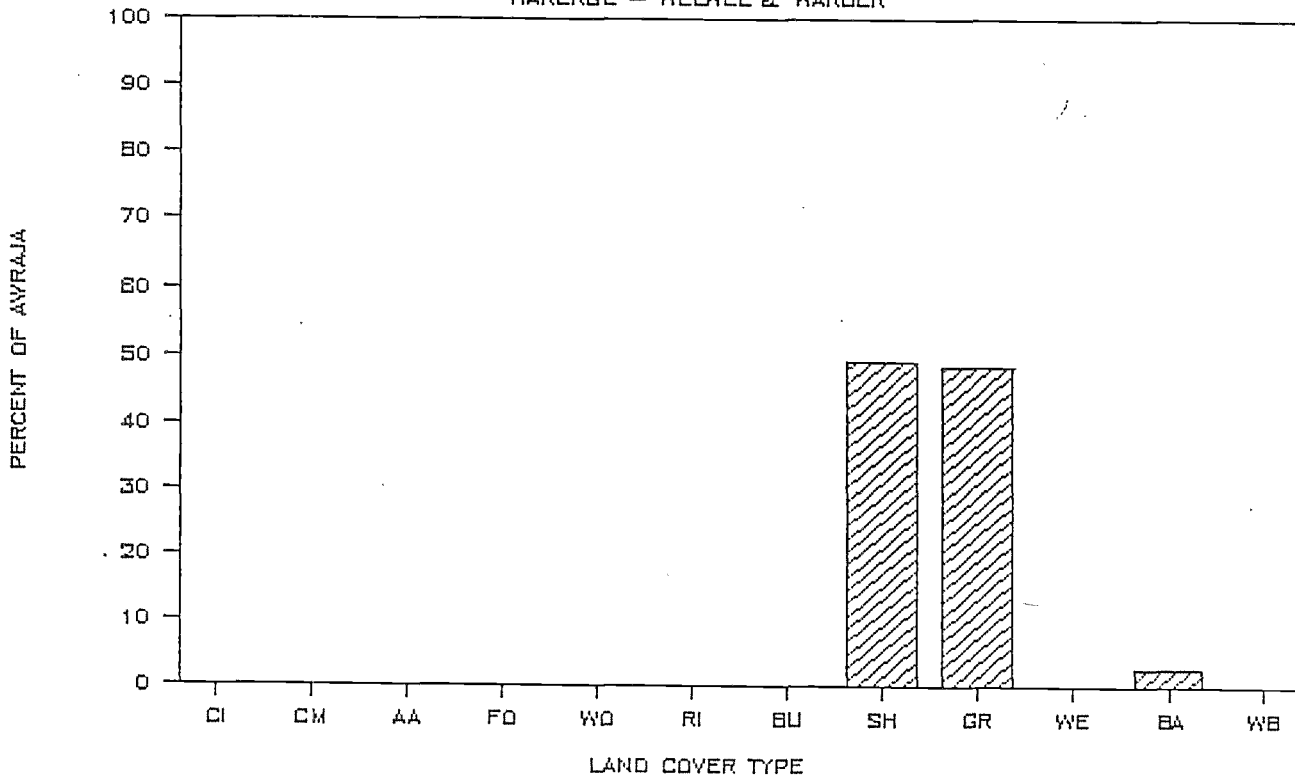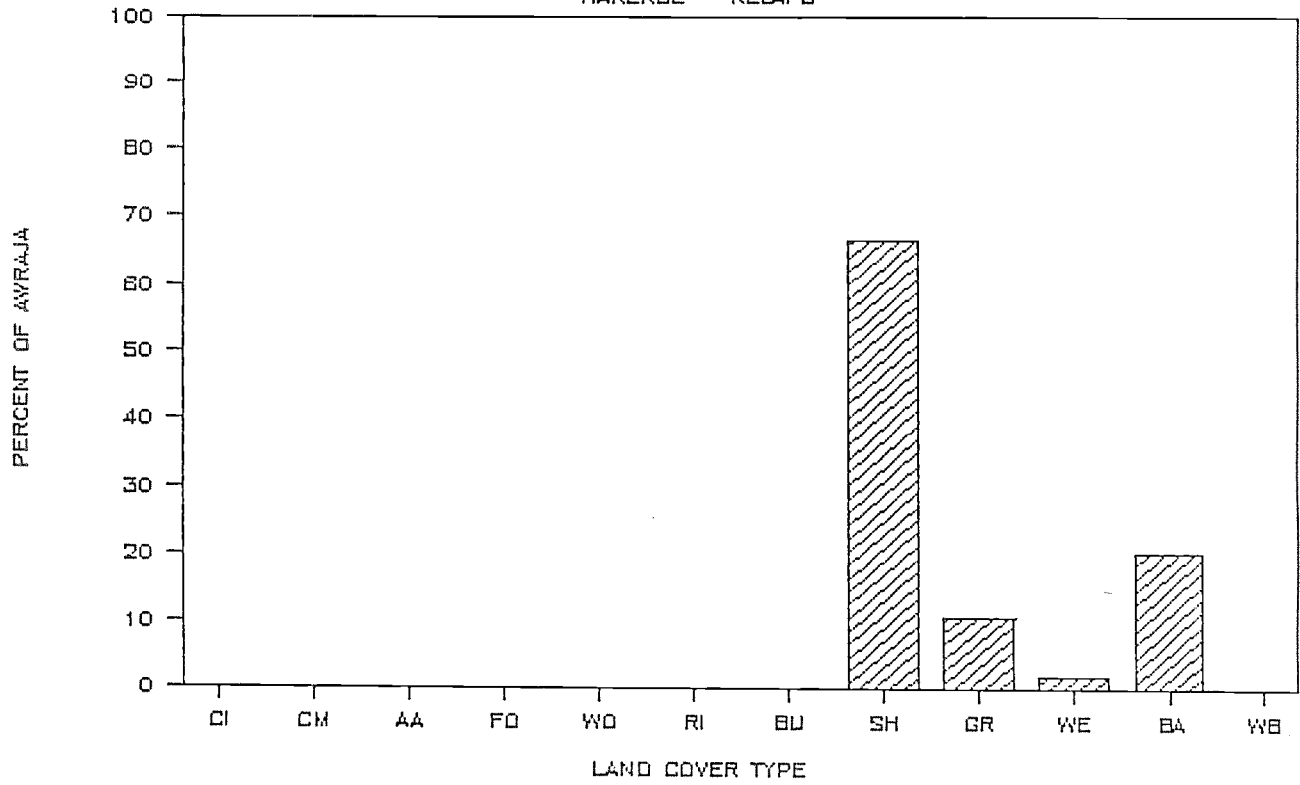
CURRENT LAND COVER

HARERGE — GODE
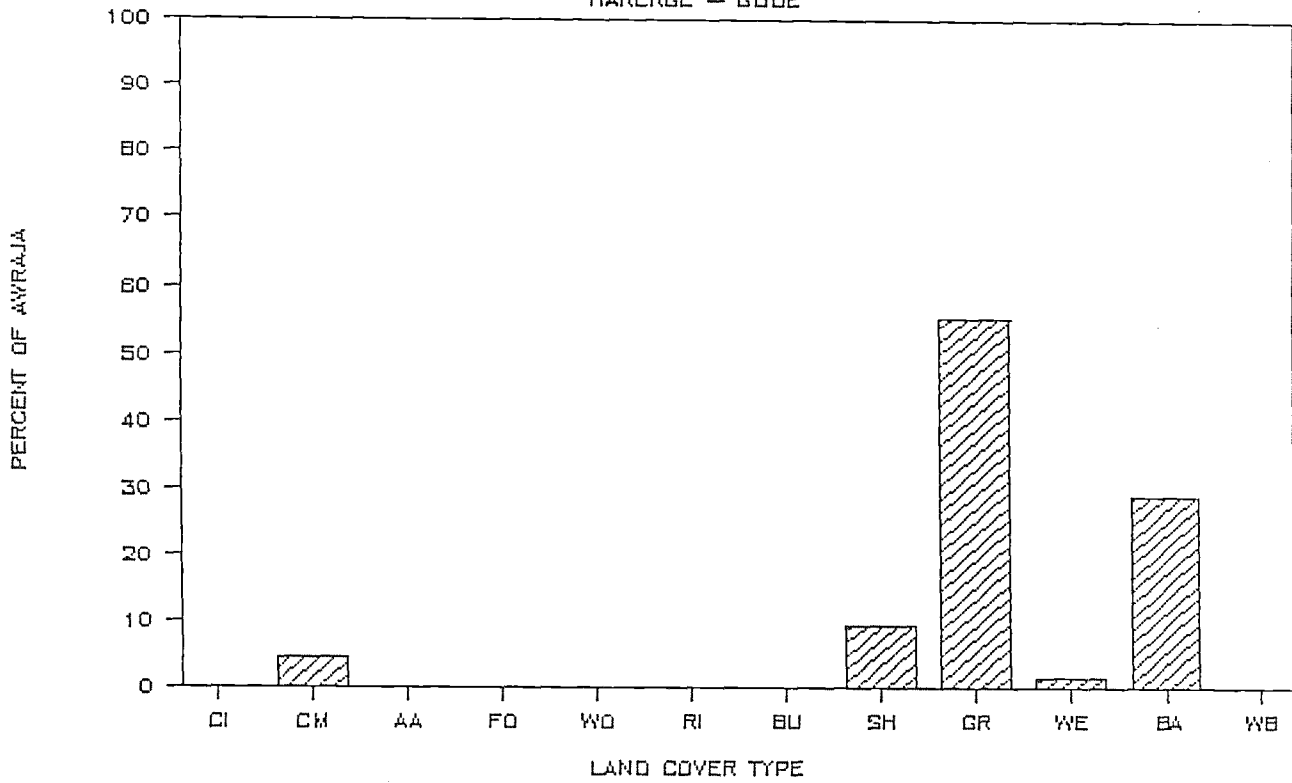
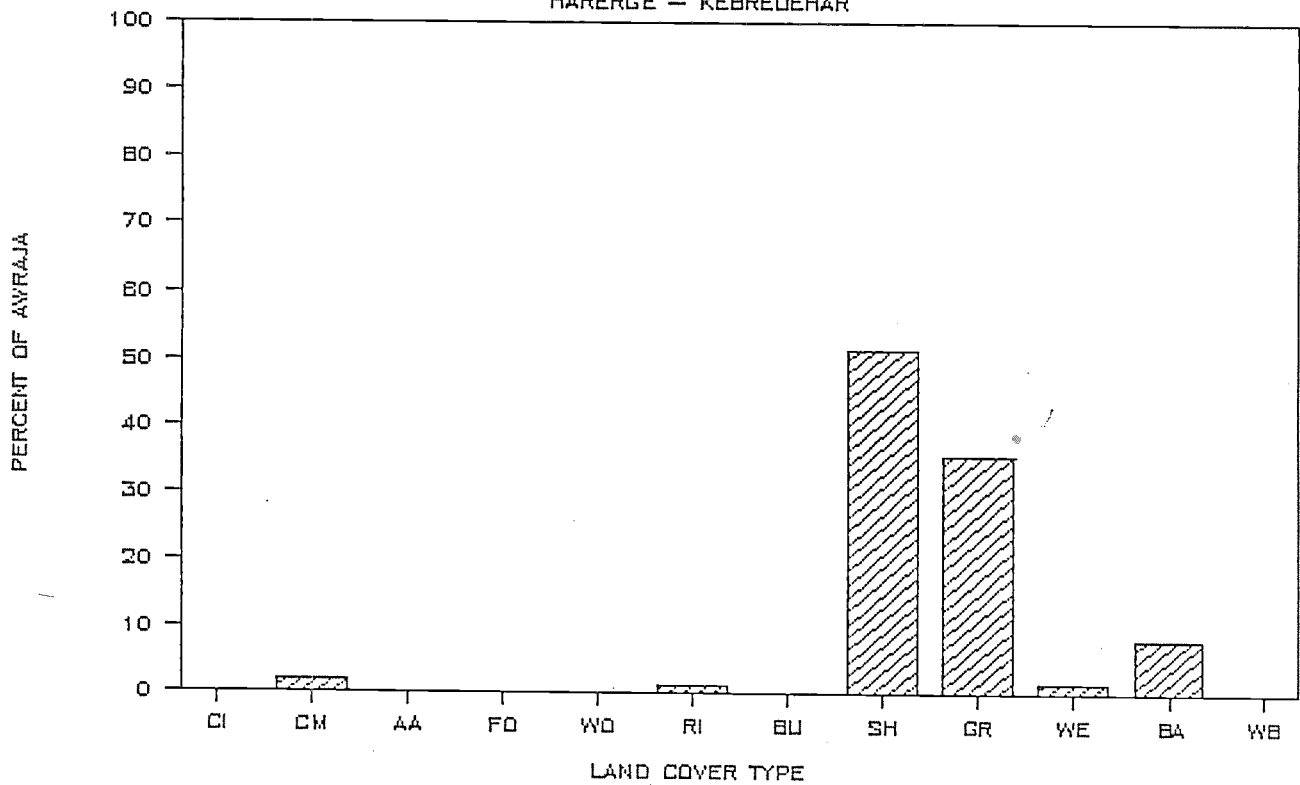# CURRENT LAND COVER

HARERGE — GARA MULETA
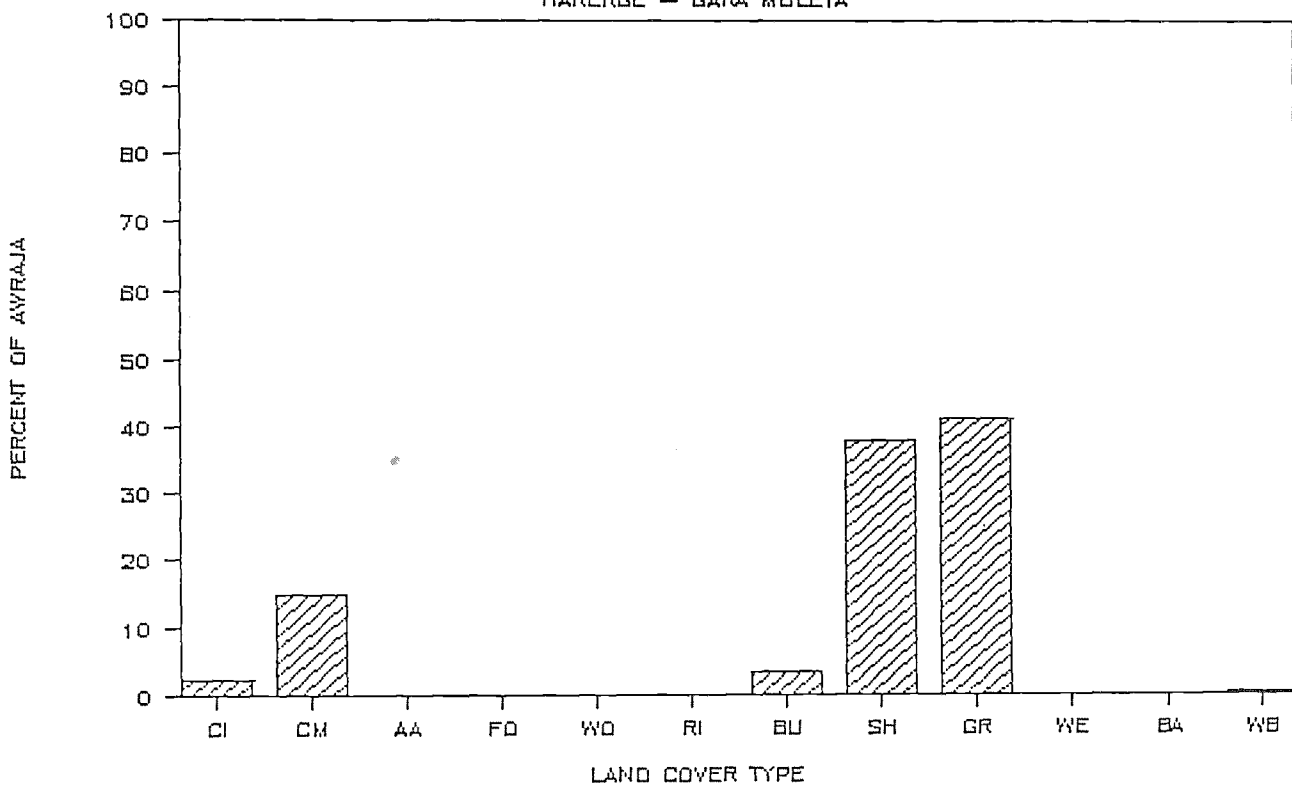
CURRENT LAND COVER
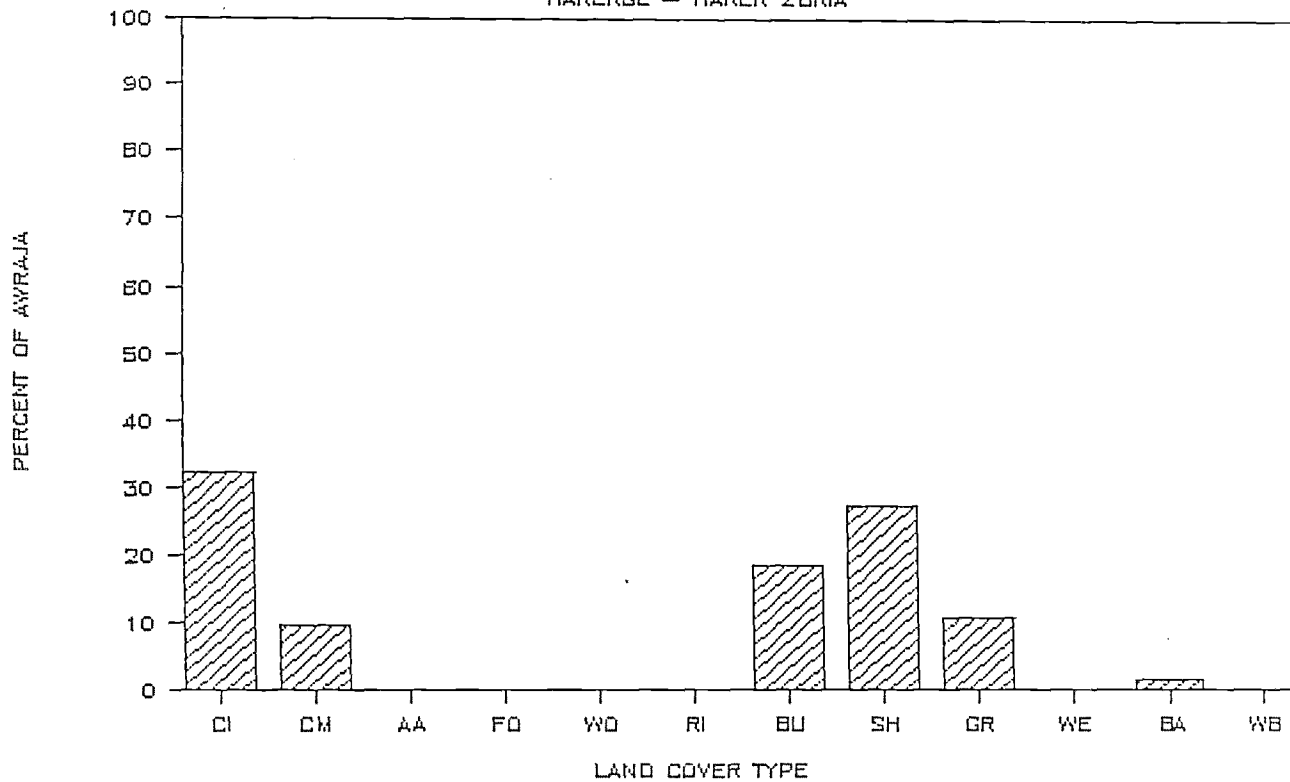## HARERGE — KELAFO

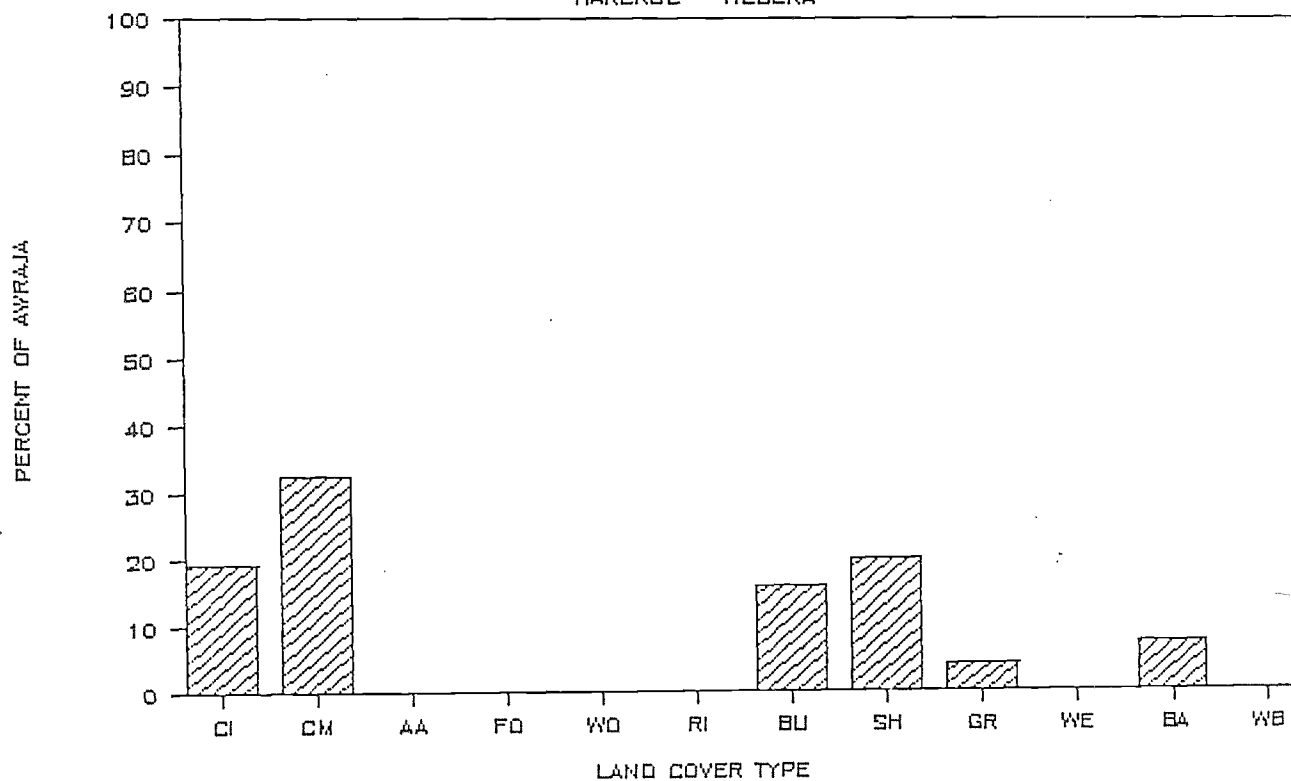# CURRENT LAND COVER
HARERGE — KEBREDEHAR

CURRENT LAND COVER
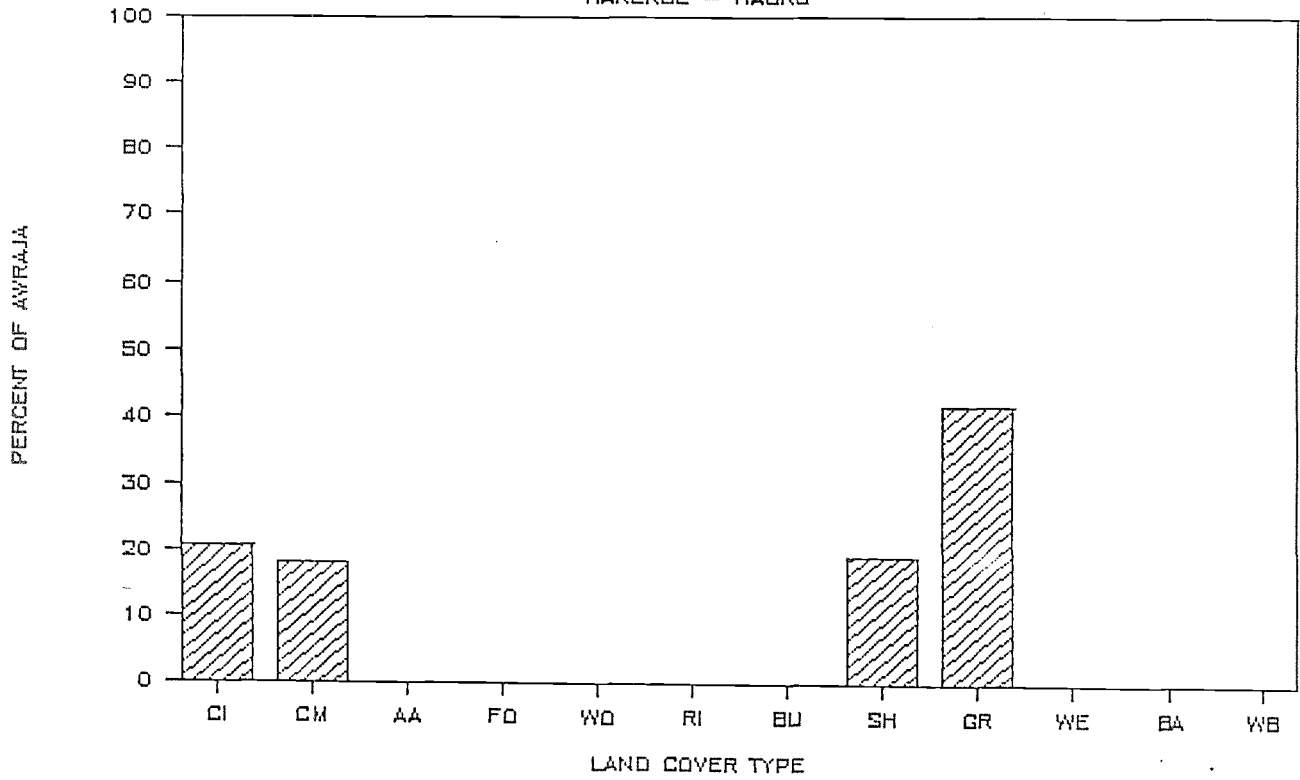## HARERGE — HARER ZURIA
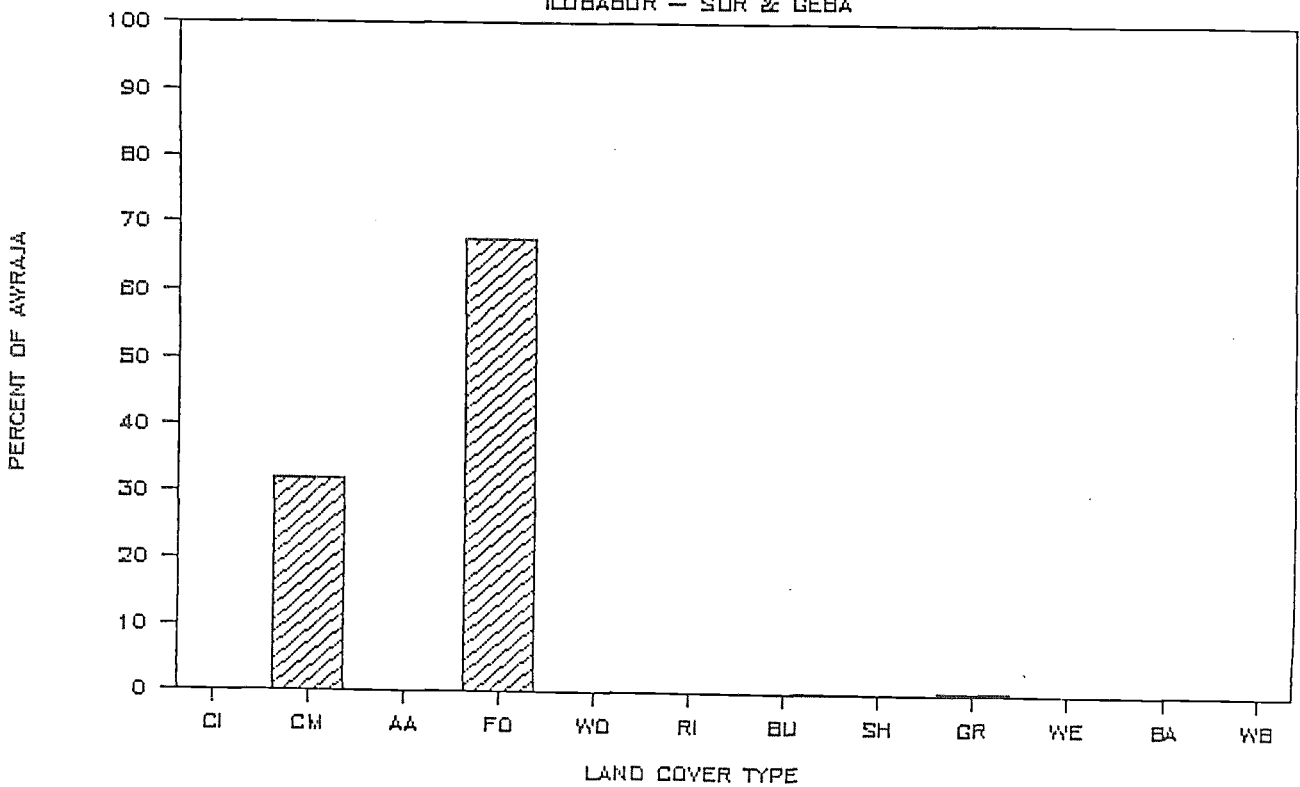

CURRENT LAND COVER
HARERGE — WEBERA

CURRENT LAND COVER
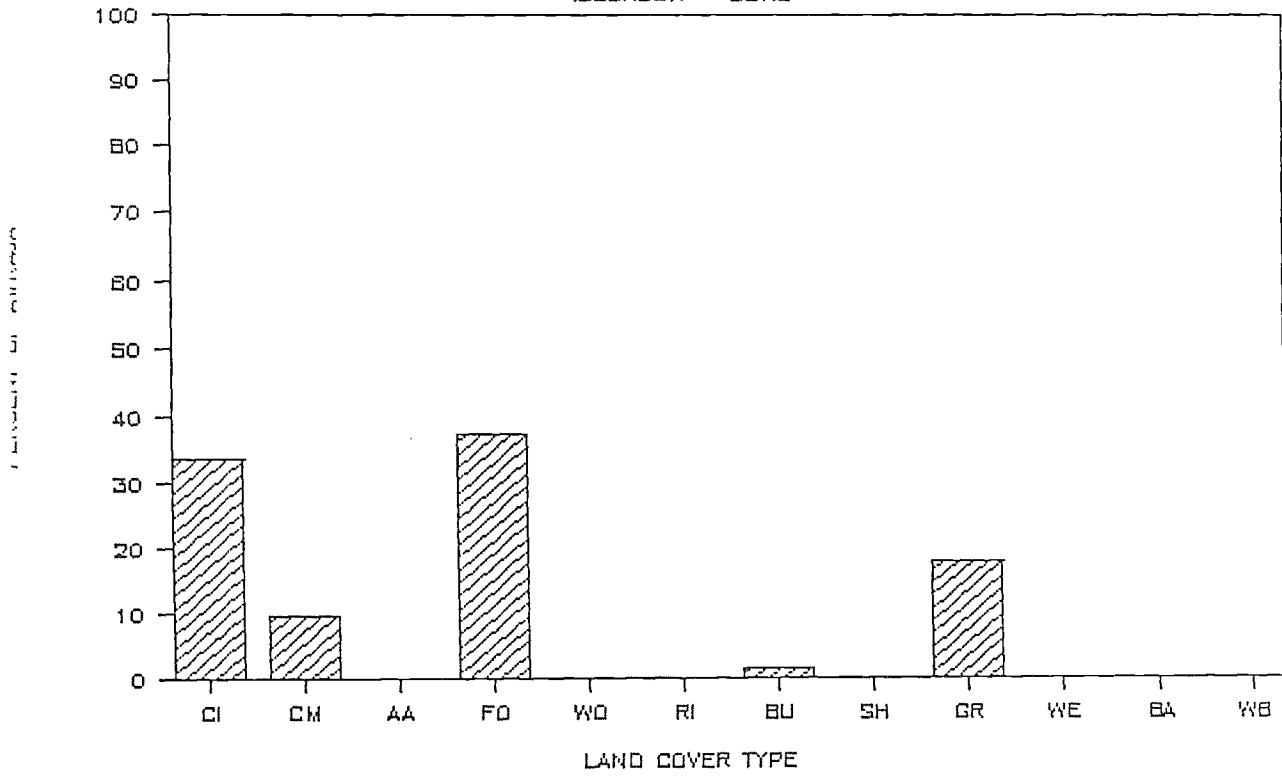## HARERGE — HABRO

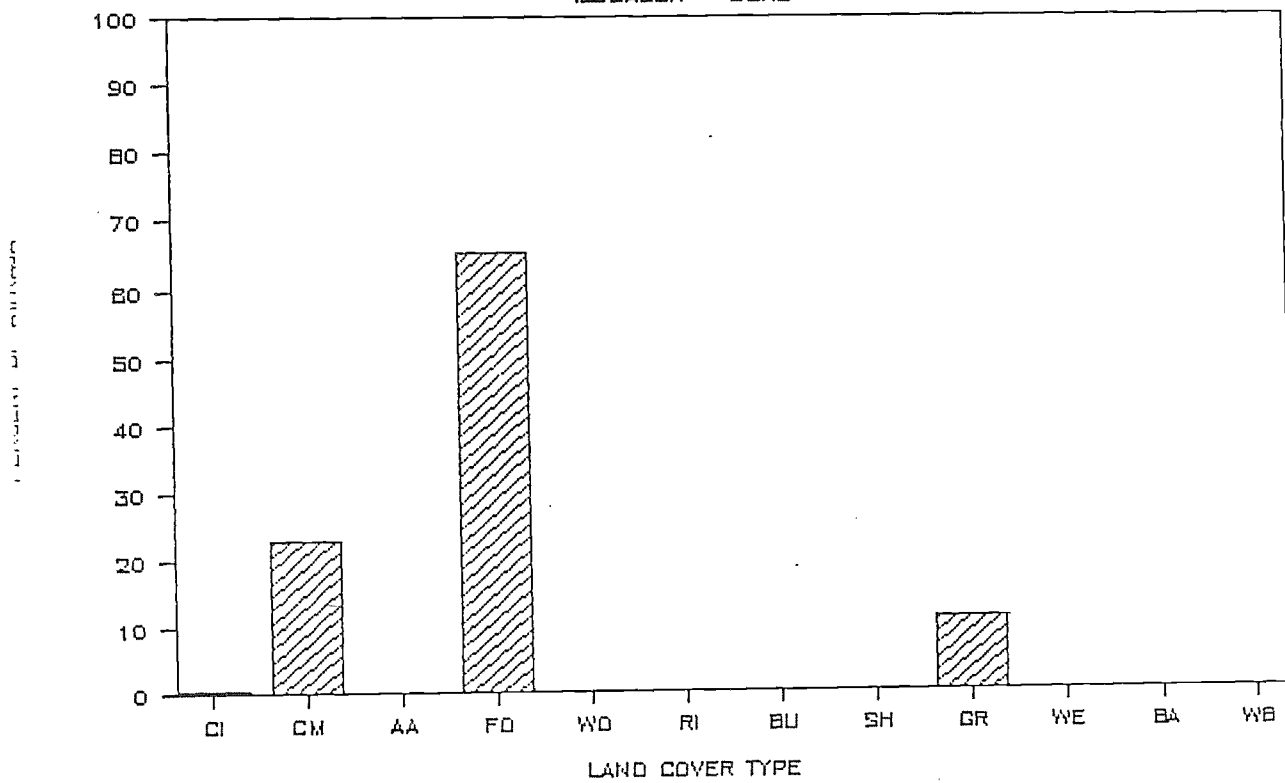# CURRENT LAND COVER
ILUBABOR — SOR & GEBA

CURRENT LAND COVER
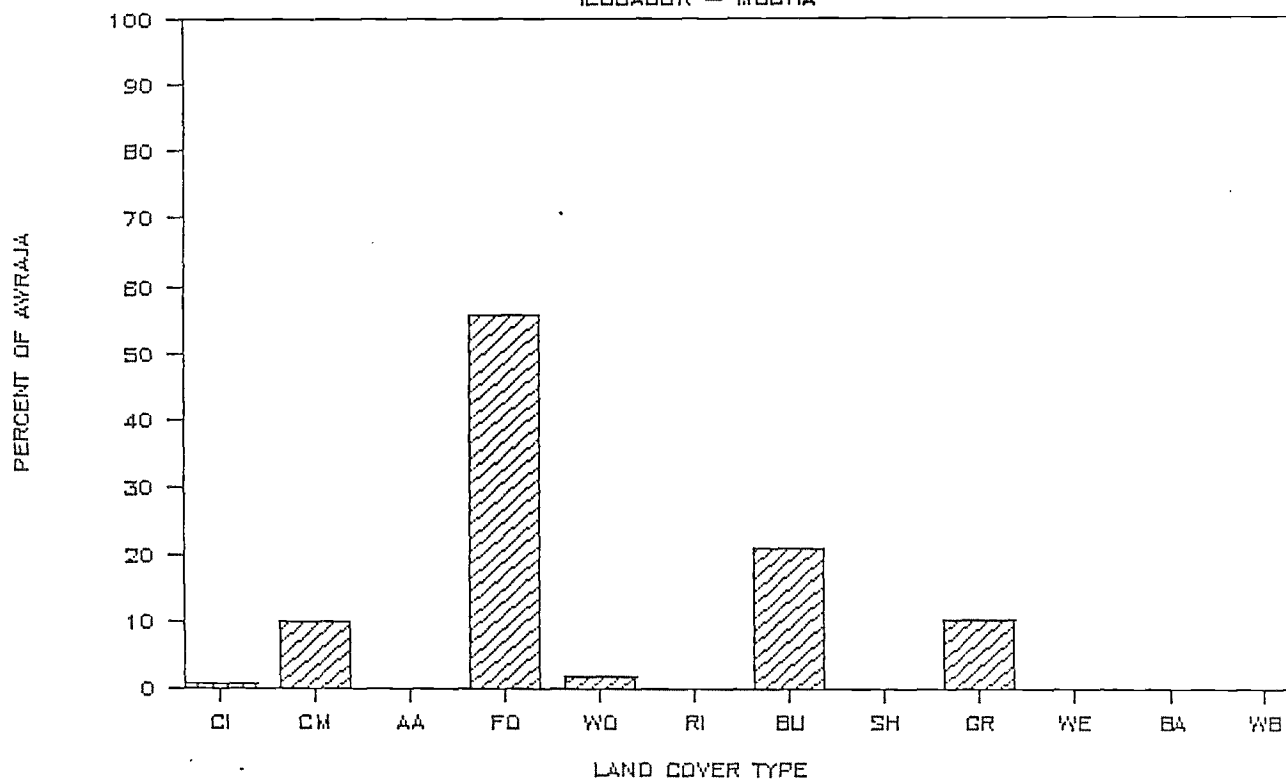ILUBABOR — BUNO

CURRENT LAND COVER
ILUBABOR — GORE

CURRENT LAND COVER
ILUBABOR — MOCHA

CURRENT LAND COVER
ILUBABOR — GAMBELA
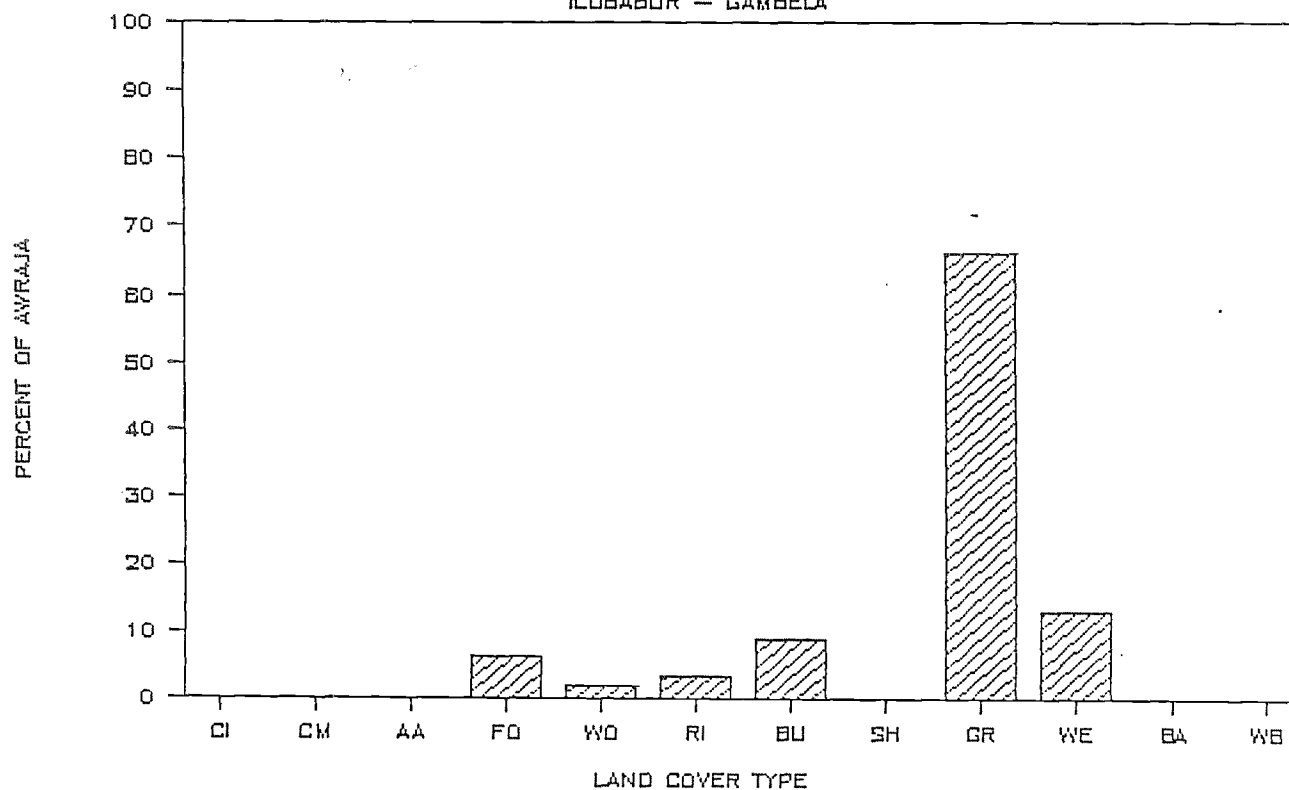
CURRENT LAND COVER

KEFA — UMU
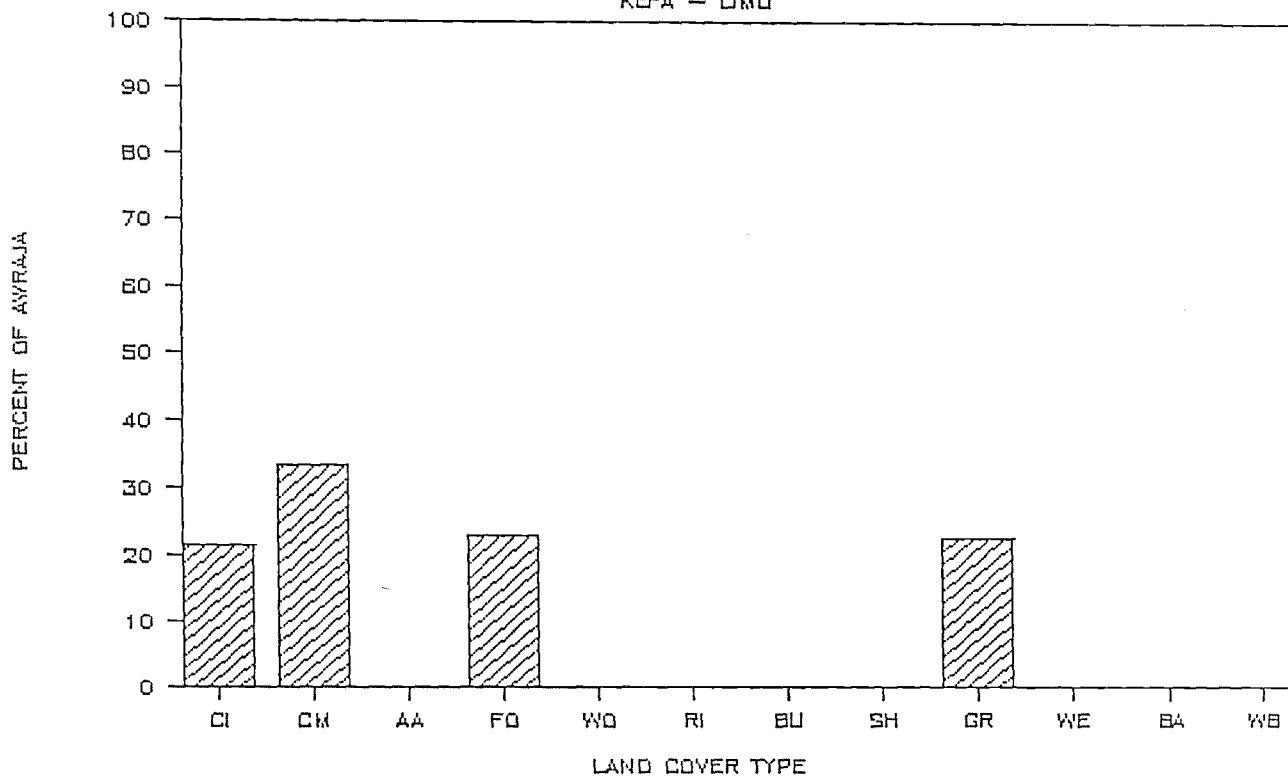
CURRENT LAND COVER

KEFA — JIMA
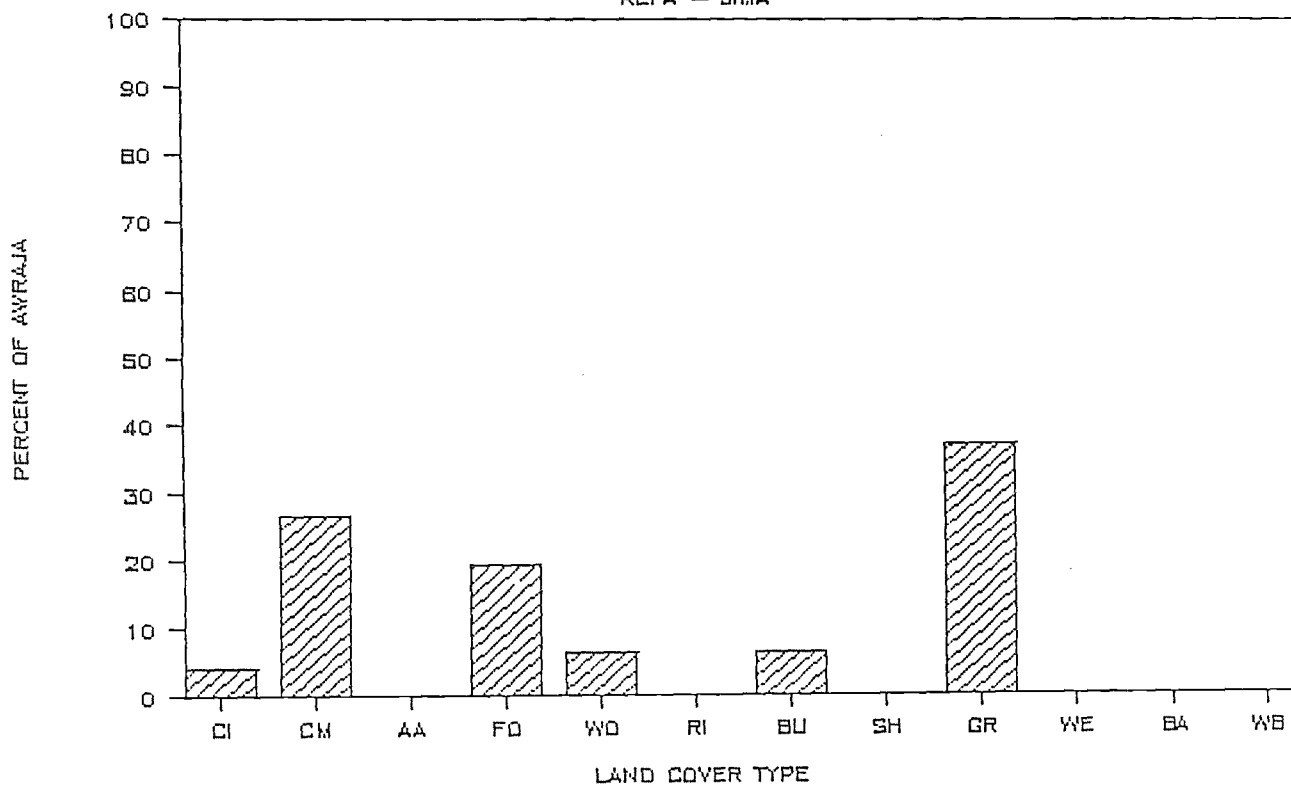
CURRENT LAND COVER

KEFA — KULO KONTA
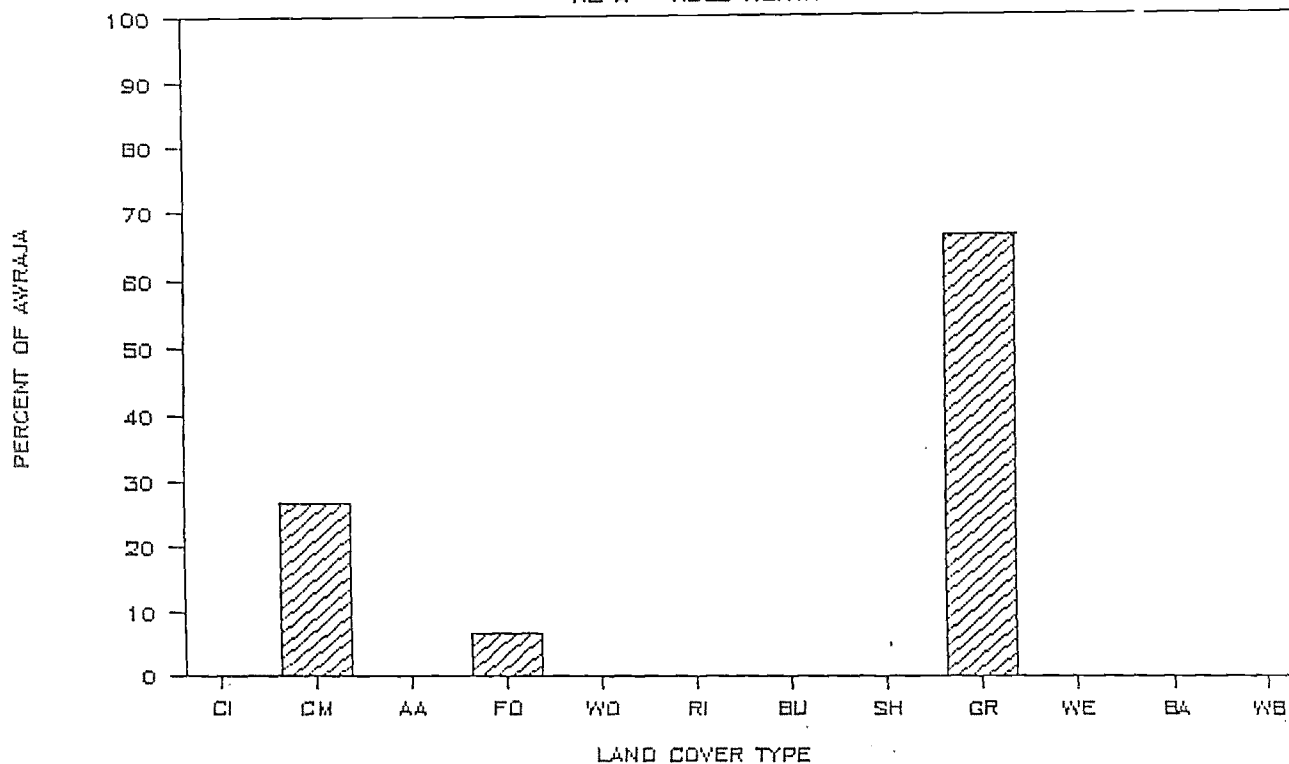
CURRENT LAND COVER

KEFA — KEFA
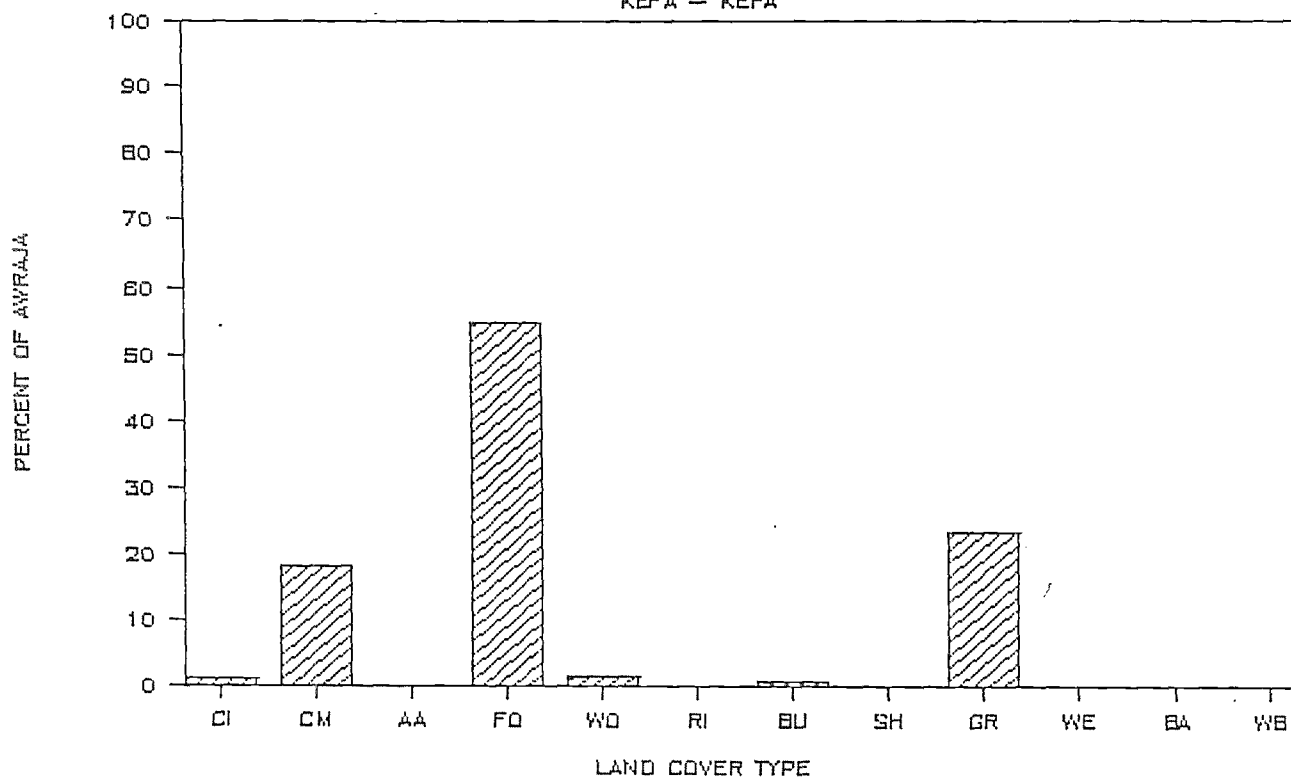
CURRENT LAND COVER

KEFA — MAJI & GOLDIYA

PERCENT OF AWRAJA (y-axis, 0 to 100)

LAND COVER TYPE (x-axis: CI, CM, AA, FO, WO, RI, BU, SH, GR, WE, BA, WB)
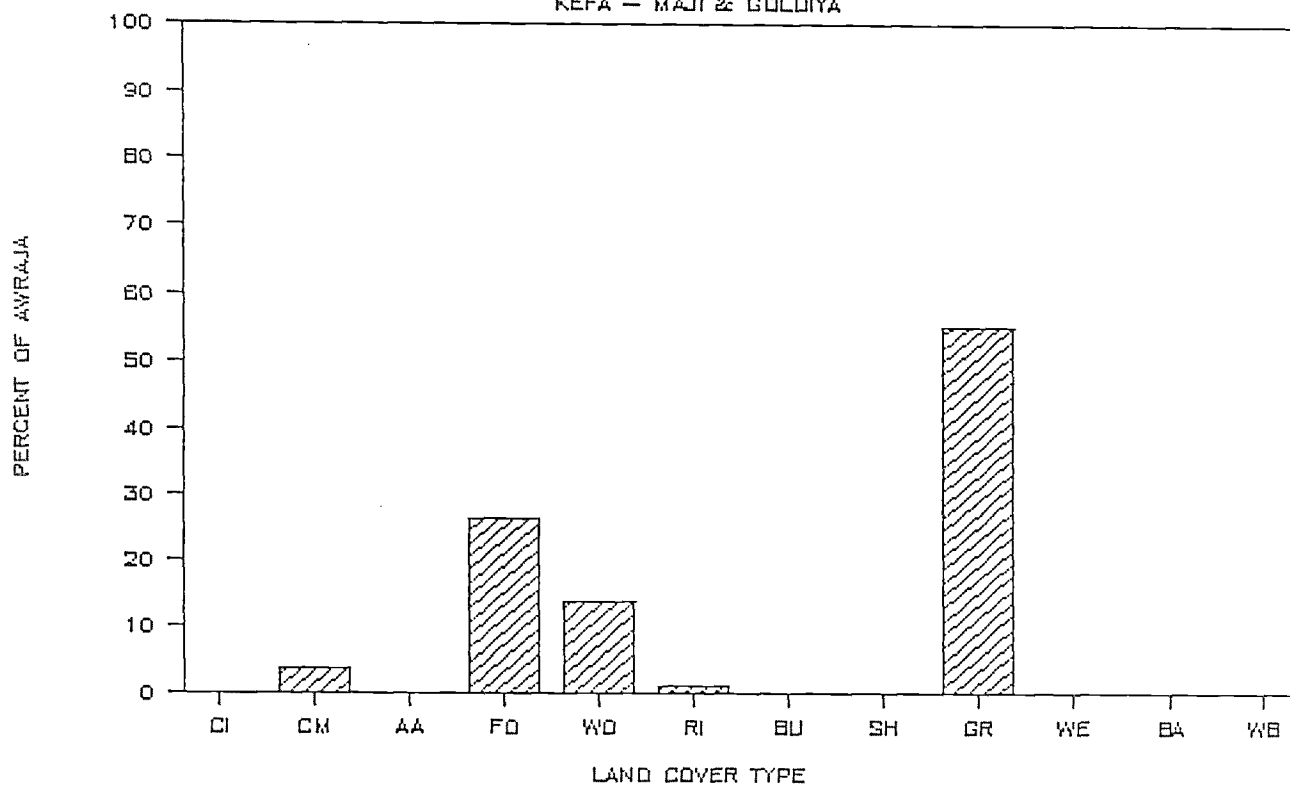
CURRENT LAND COVER

KEFA — GIMIRA

PERCENT OF AWRAJA (y-axis, 0 to 100)

LAND COVER TYPE (x-axis: CI, CM, AA, FO, WO, RI, BU, SH, GR, WE, BA, WB)
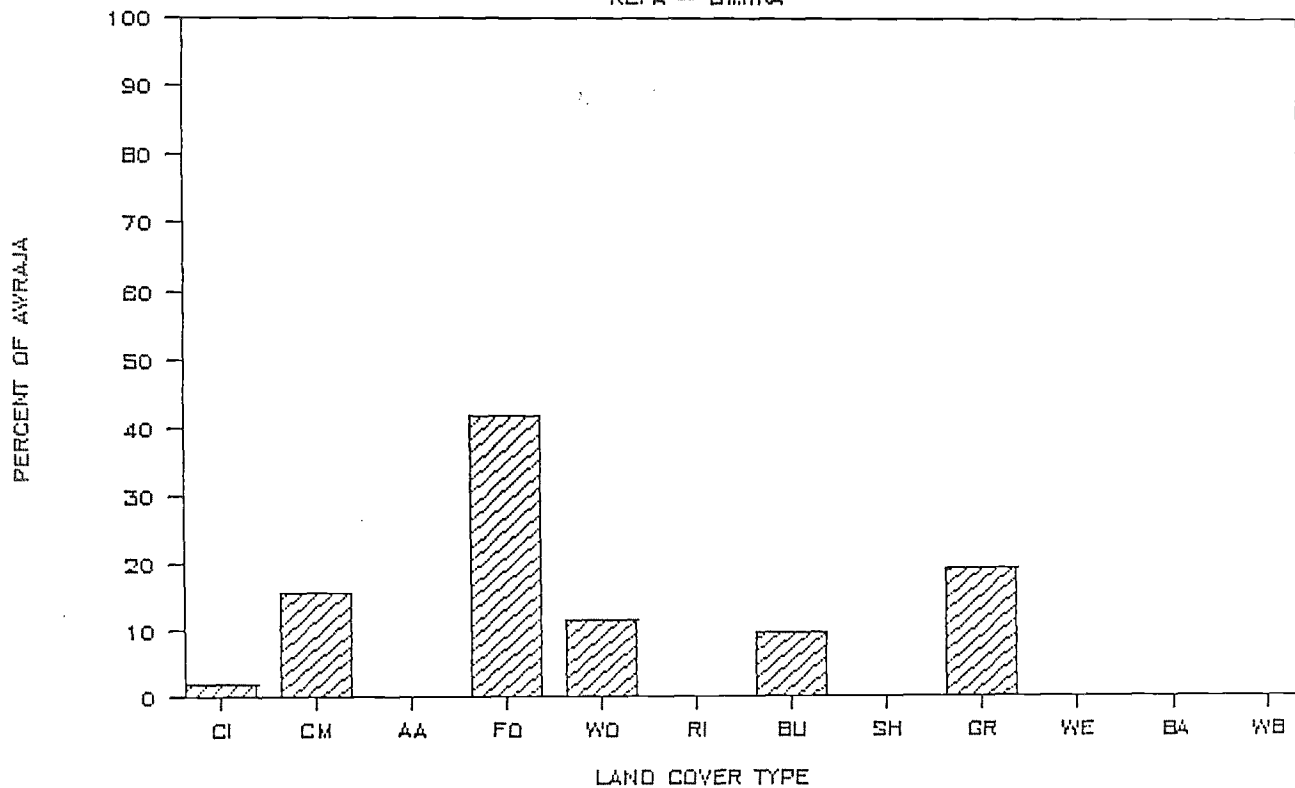
CURRENT LAND COVER
SHEWA — MERHABETE
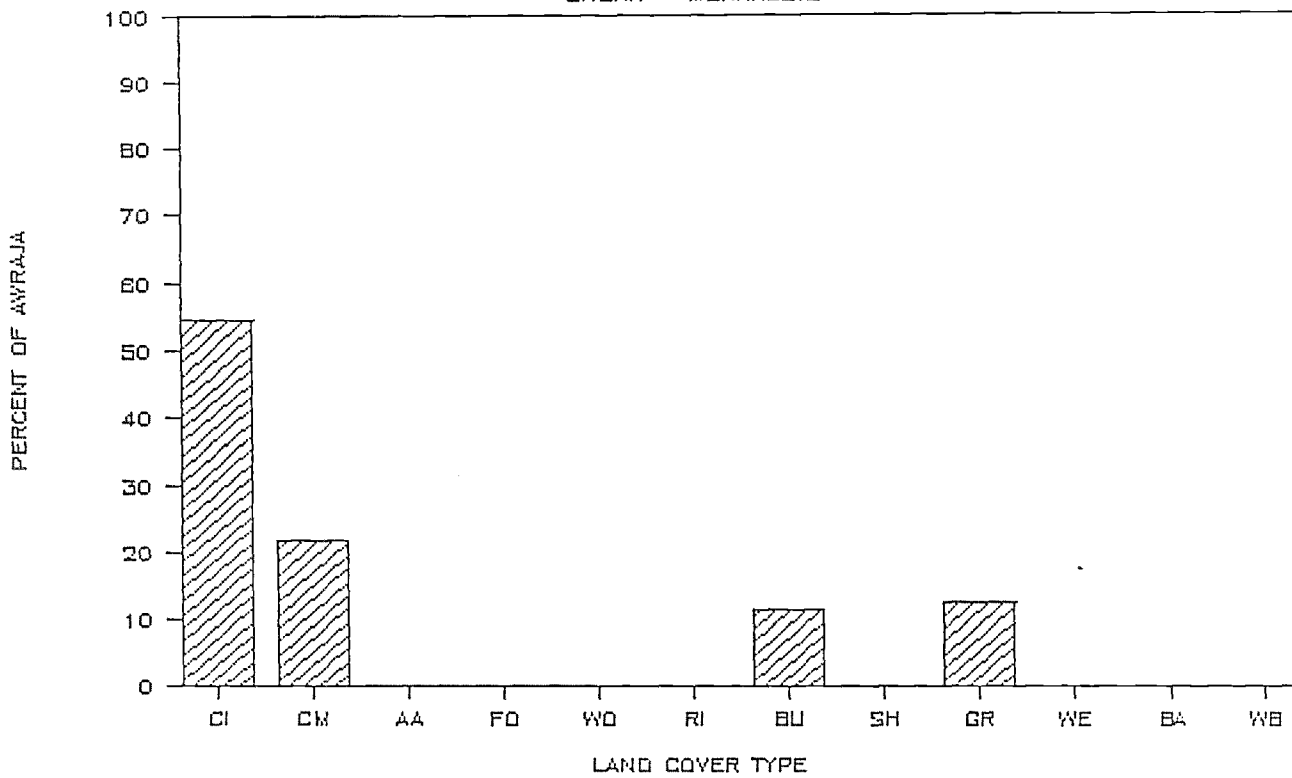
CURRENT LAND COVER
SHEWA — MENZ & GISHE
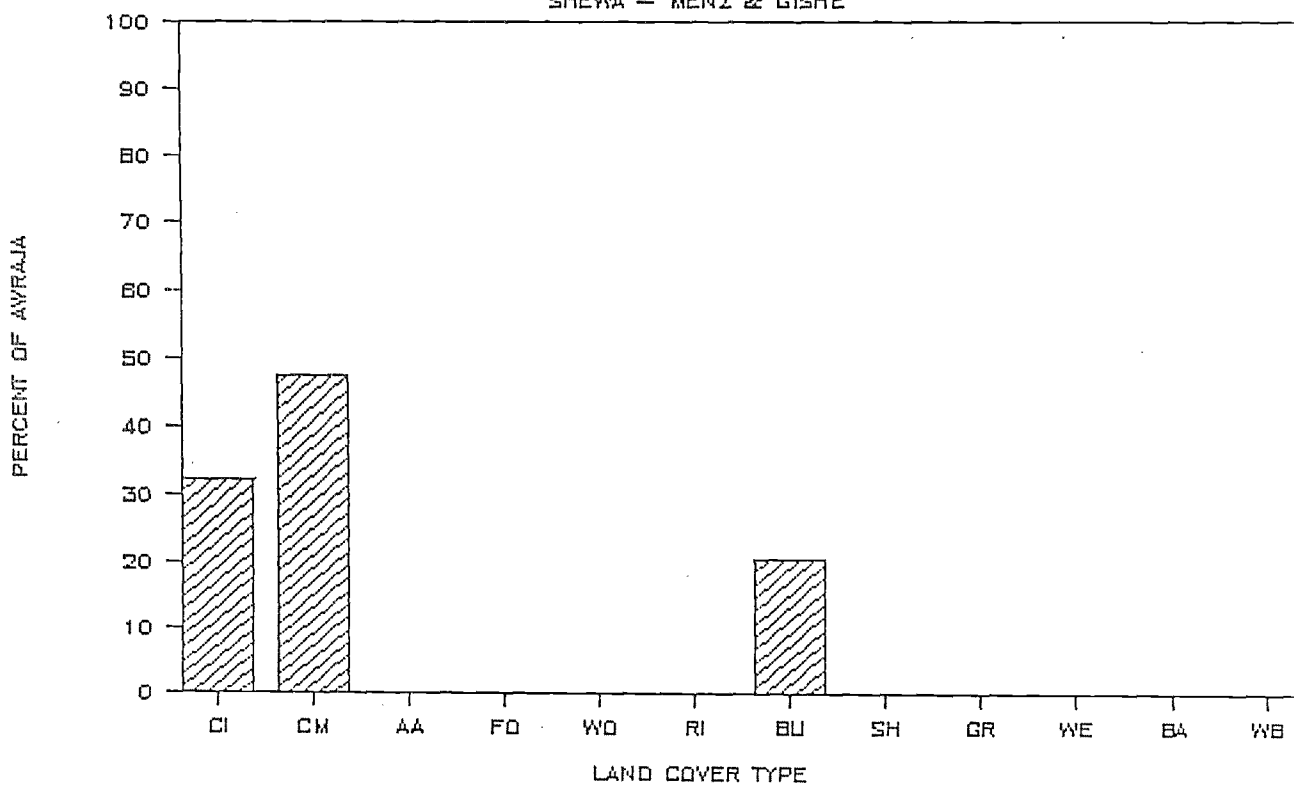
CURRENT LAND COVER
SHEWA — YIFAT & TIMUGA
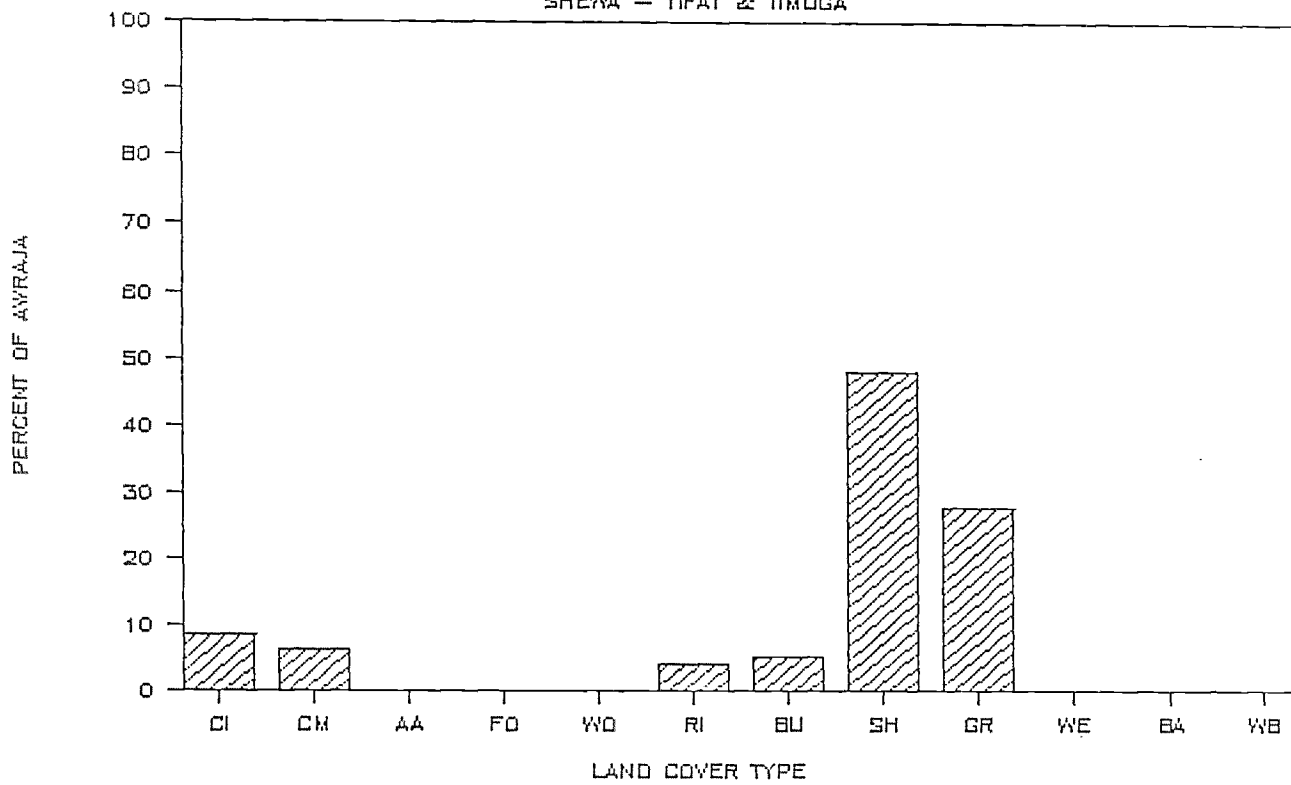
CURRENT LAND COVER
SHEWA — TEGULET & BULGA
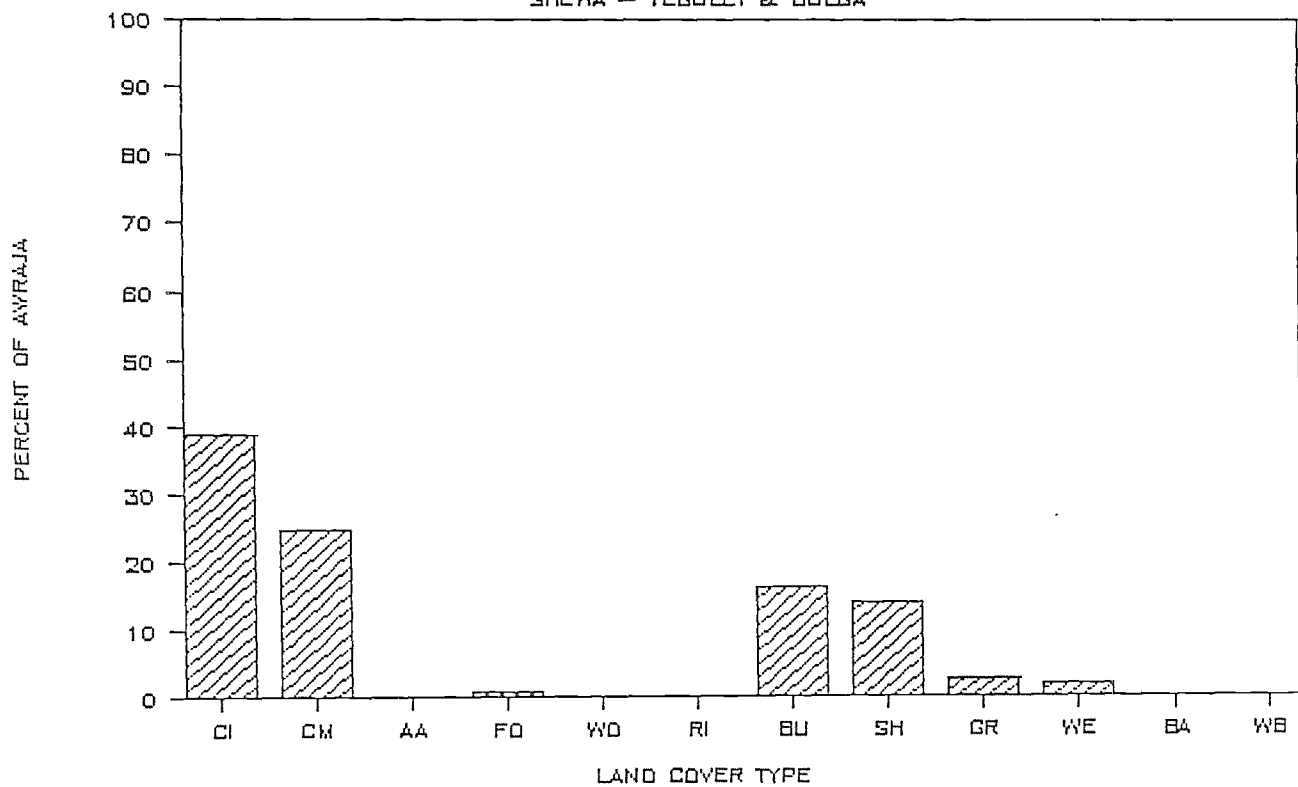
CURRENT LAND COVER
SHEWA — YERER & KEREYU
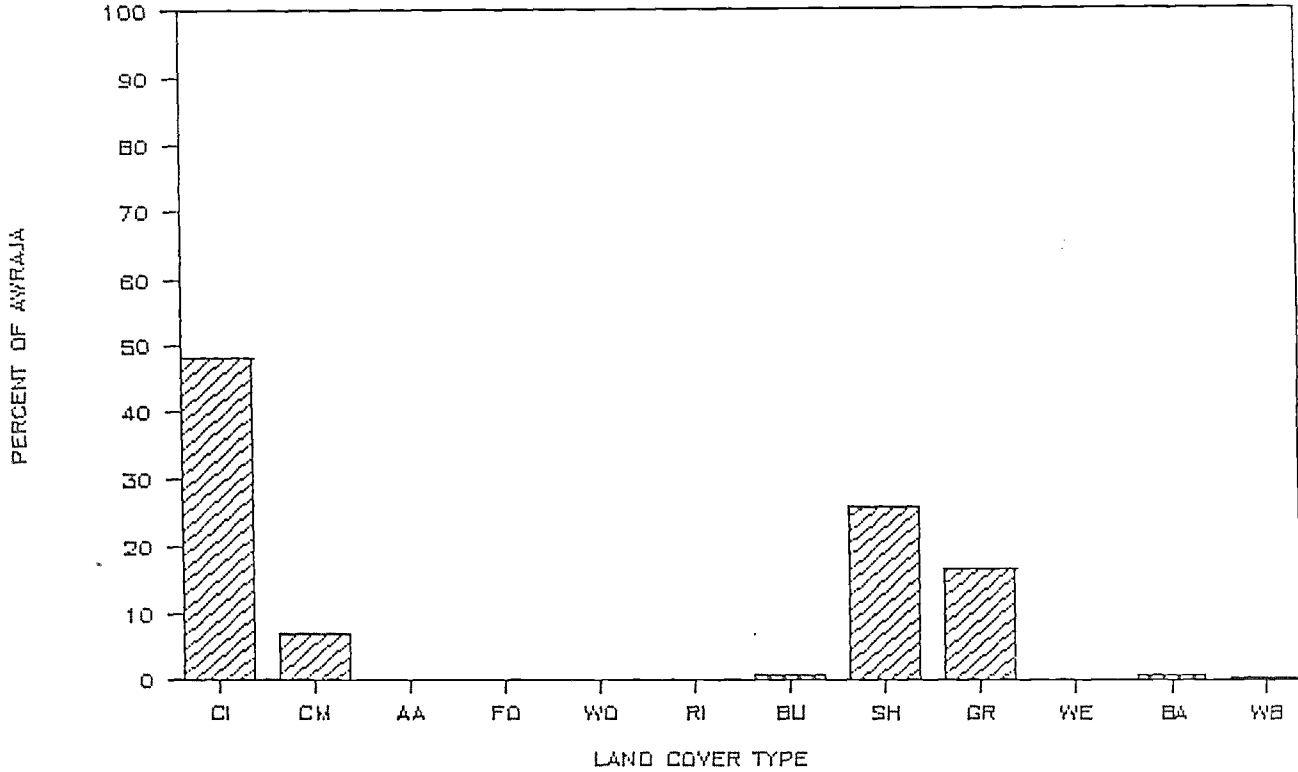
CURRENT LAND COVER
SHEWA — HAIKOTCH & BUTAJIRA
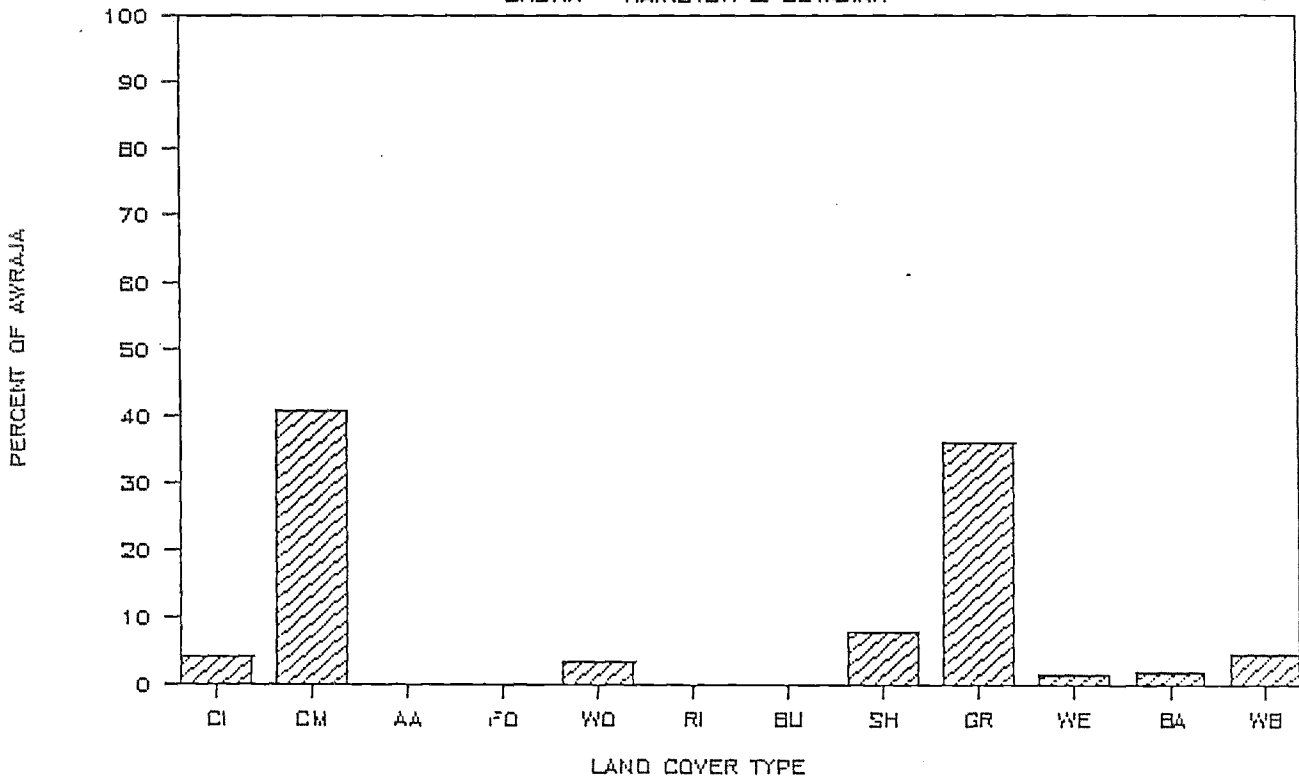
CURRENT LAND COVER
SHEWA — KEMBATA & HADIYA
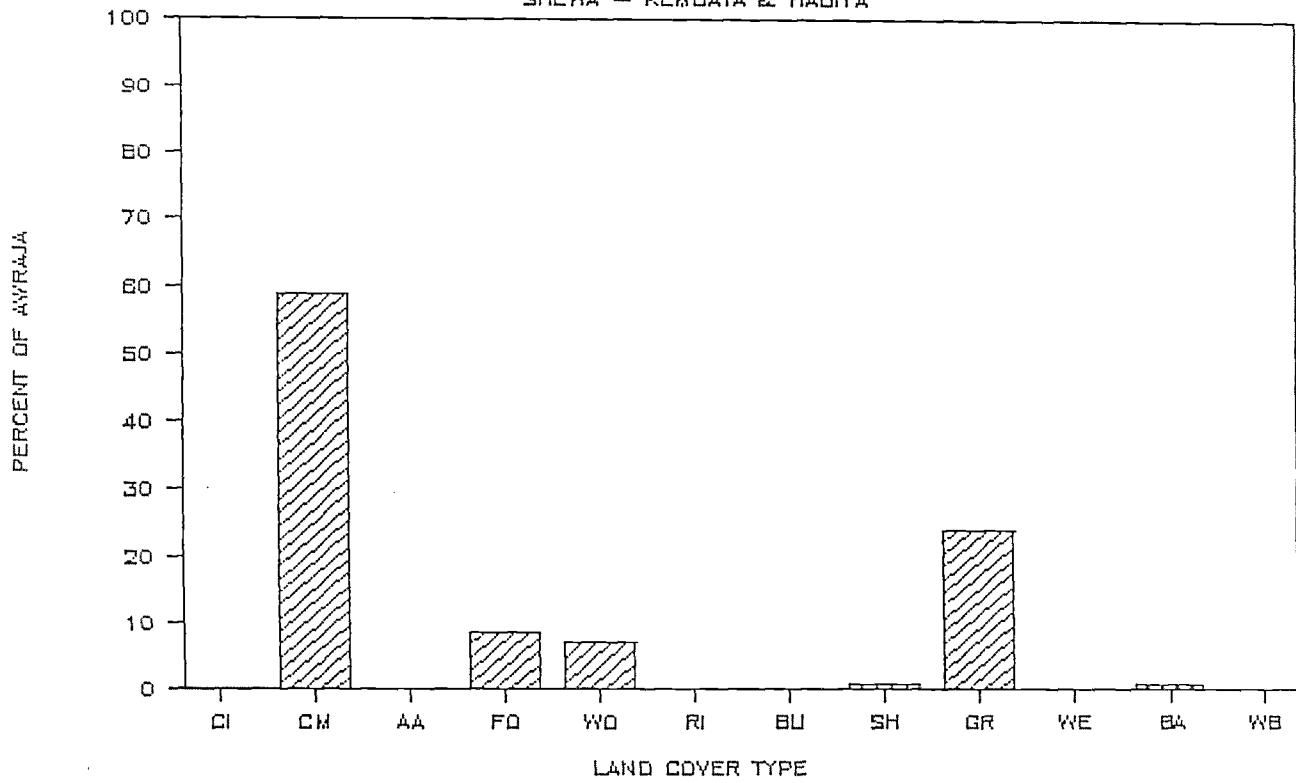
CURRENT LAND COVER
SHEWA — CHEBO & GURAGIE
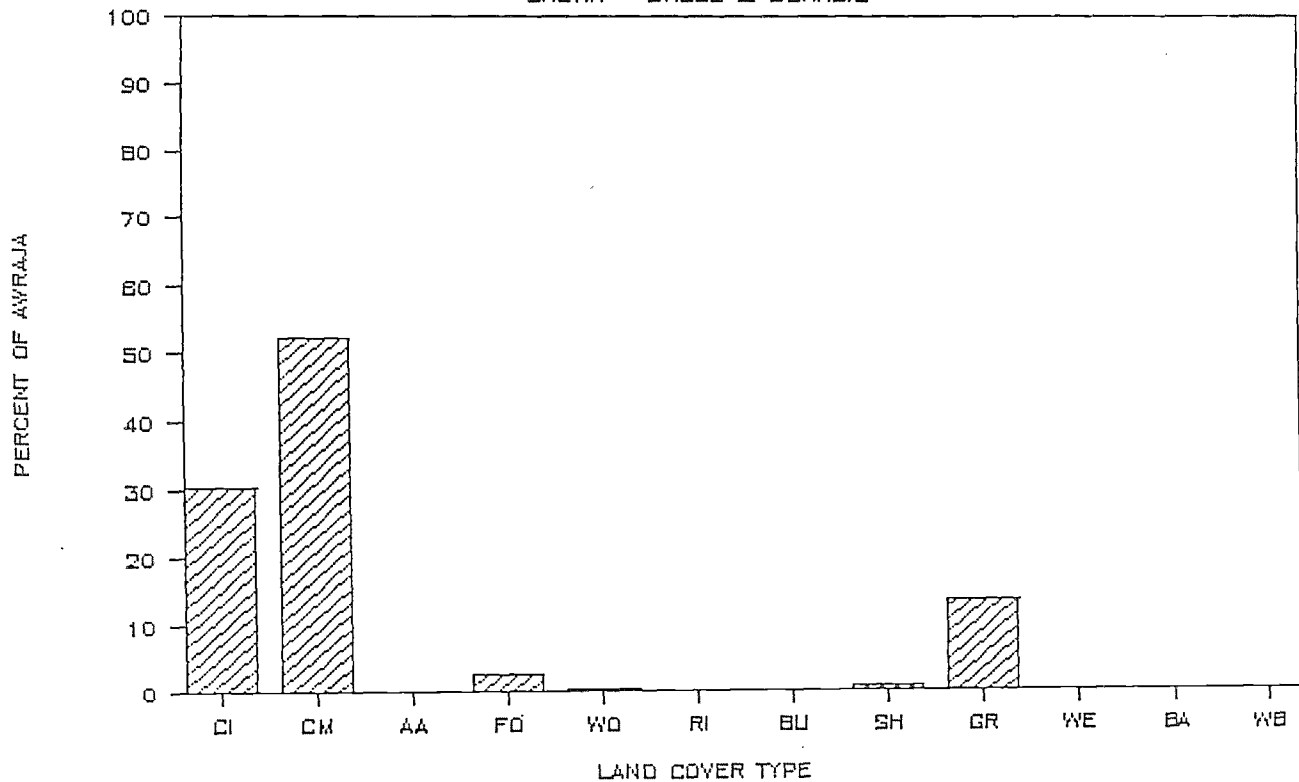
CURRENT LAND COVER

SHEWA — MENAGESHA
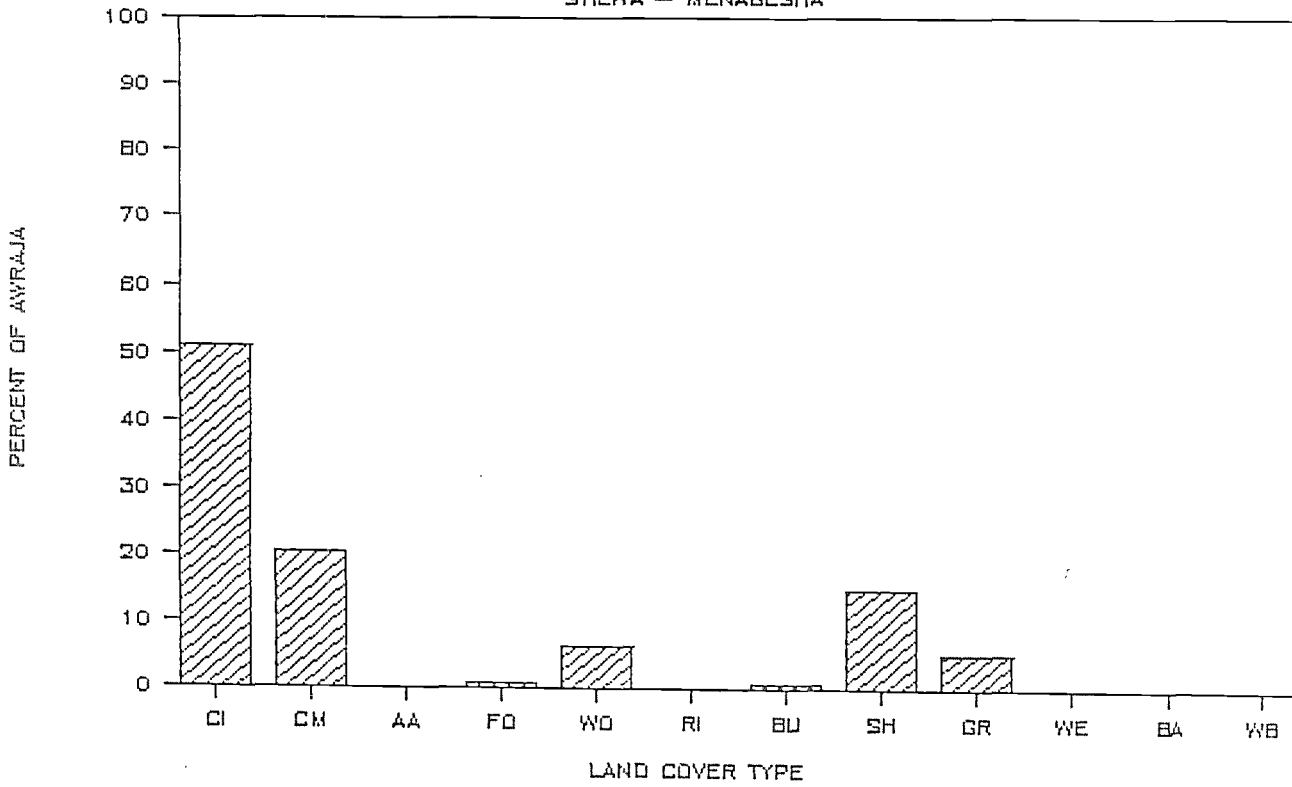
CURRENT LAND COVER

SHEWA — JIBAT & MECHA
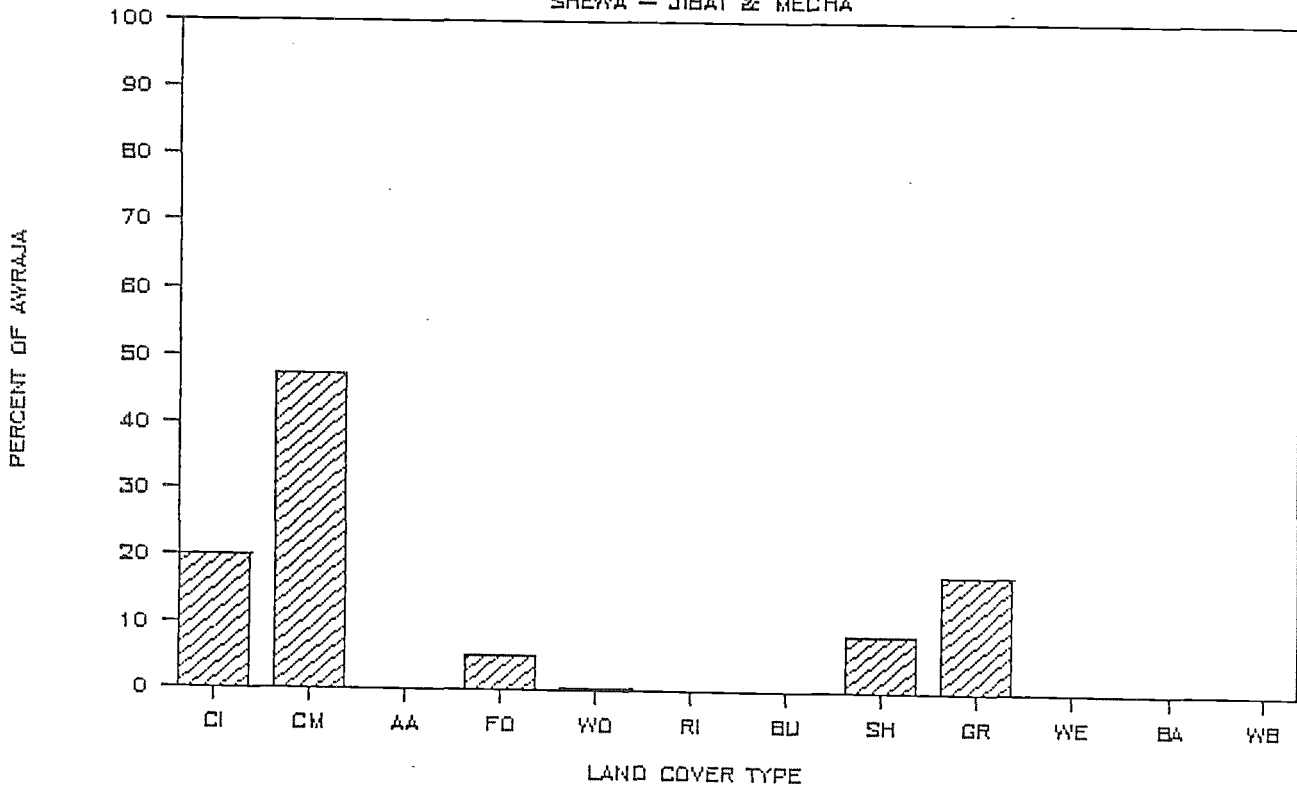
CURRENT LAND COVER
SIDAMO — WELAYITA
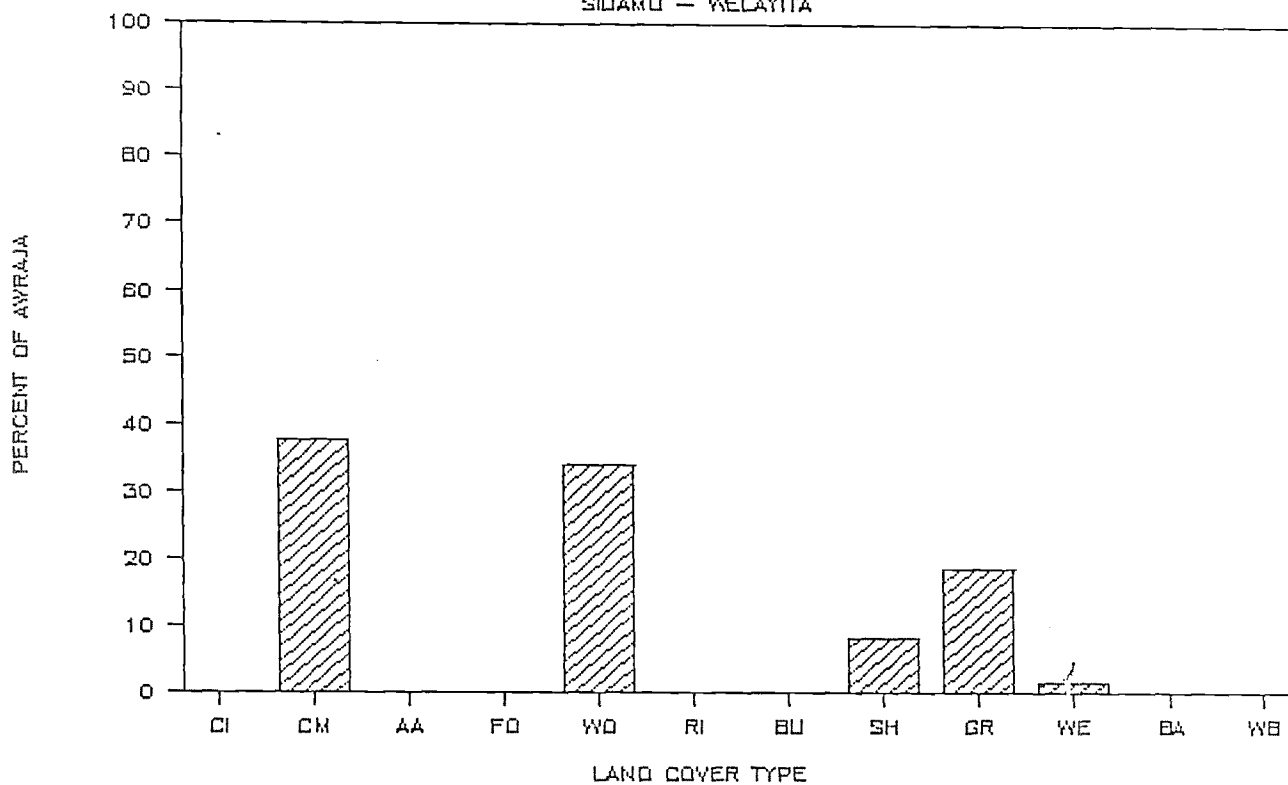
CURRENT LAND COVER
SHEWA — SELALE
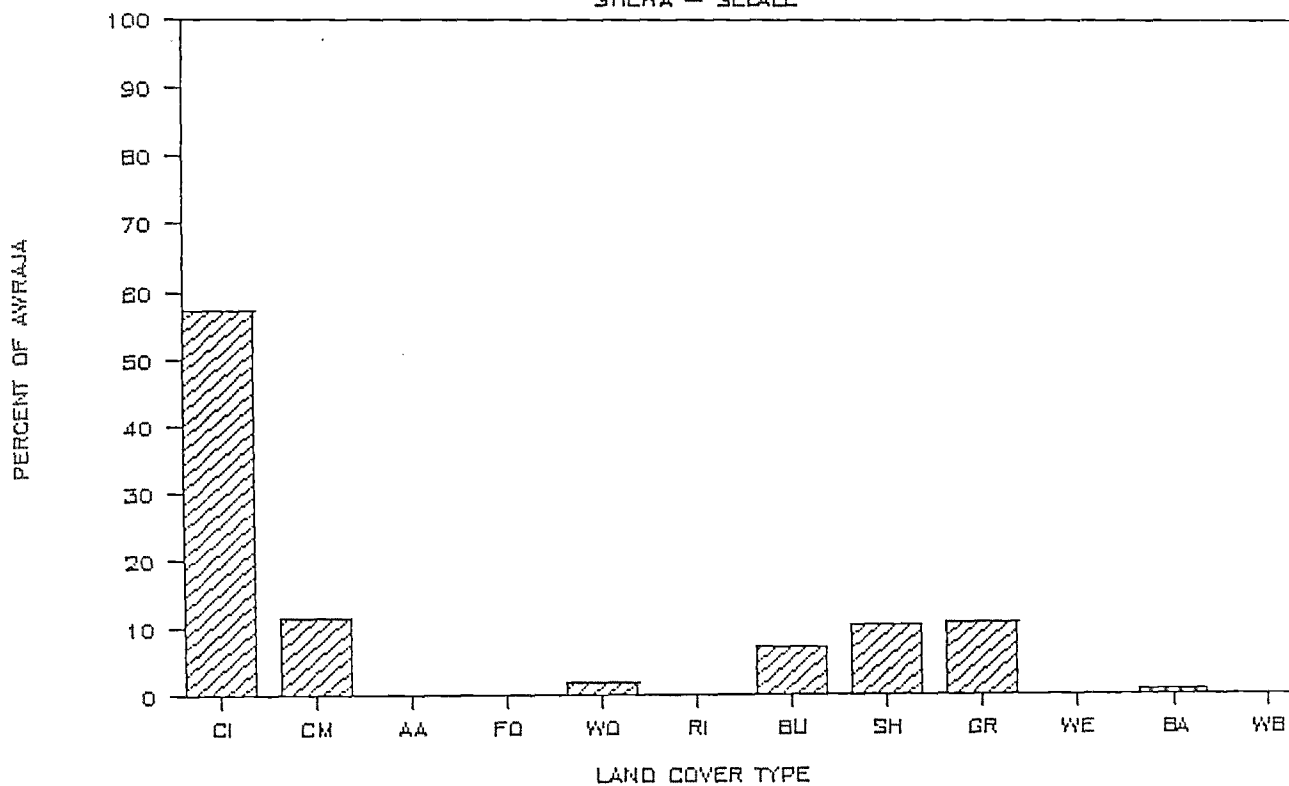
CURRENT LAND COVER
SIDAMO — SIDAMA
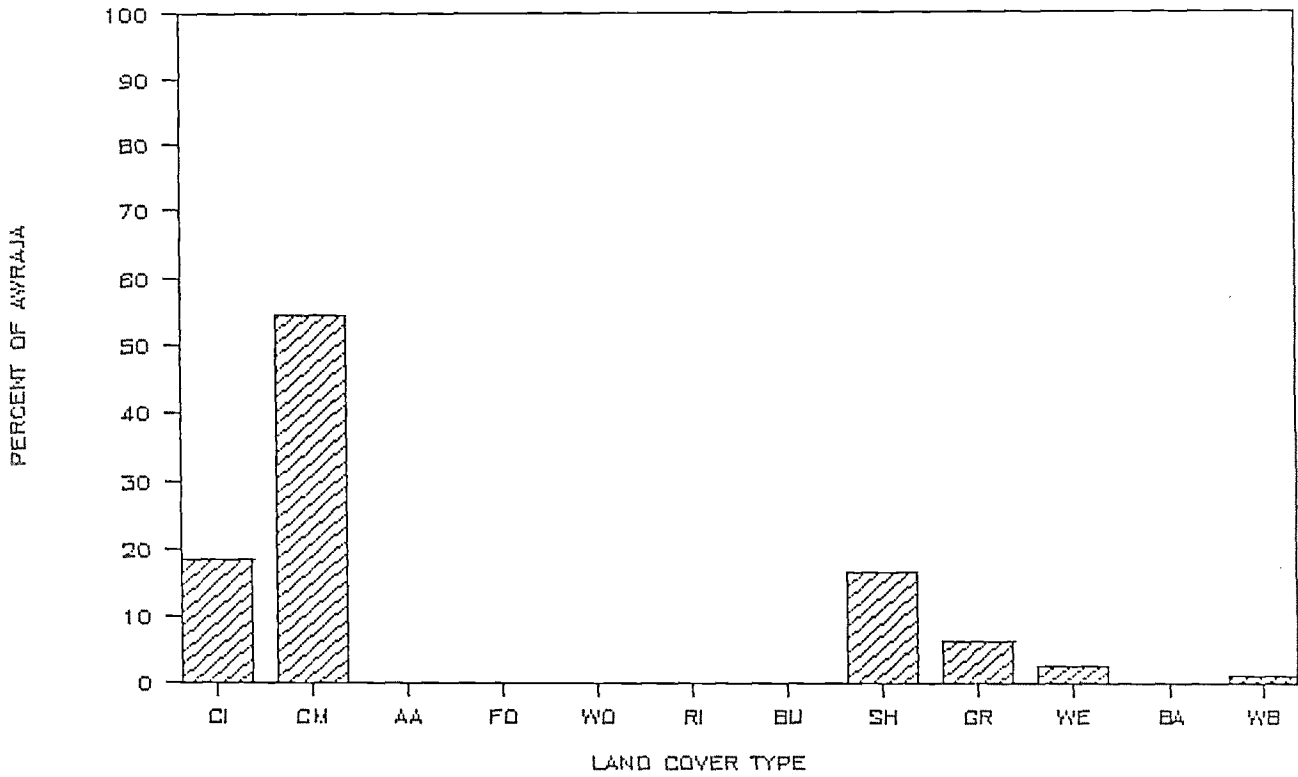
CURRENT LAND COVER
SIDAMO — JEM JEM
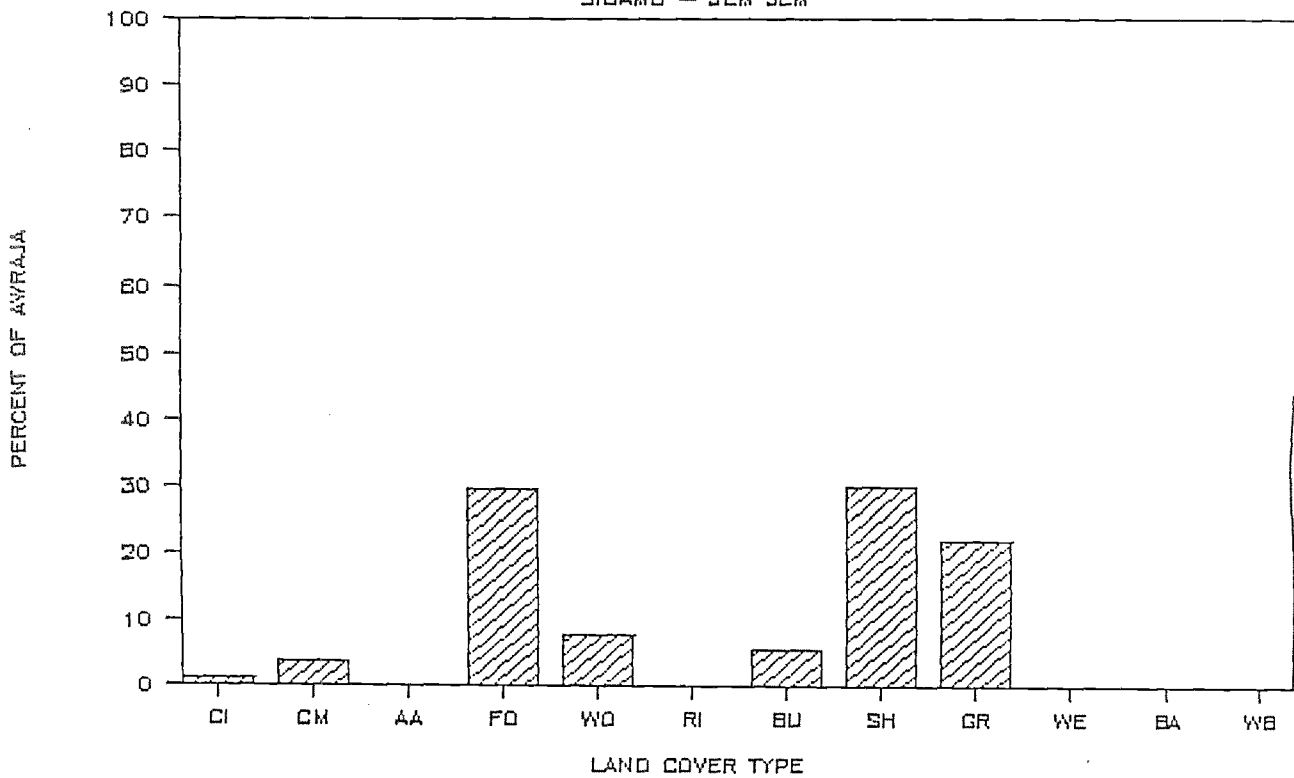
CURRENT LAND COVER
SIDAMO — BORENA
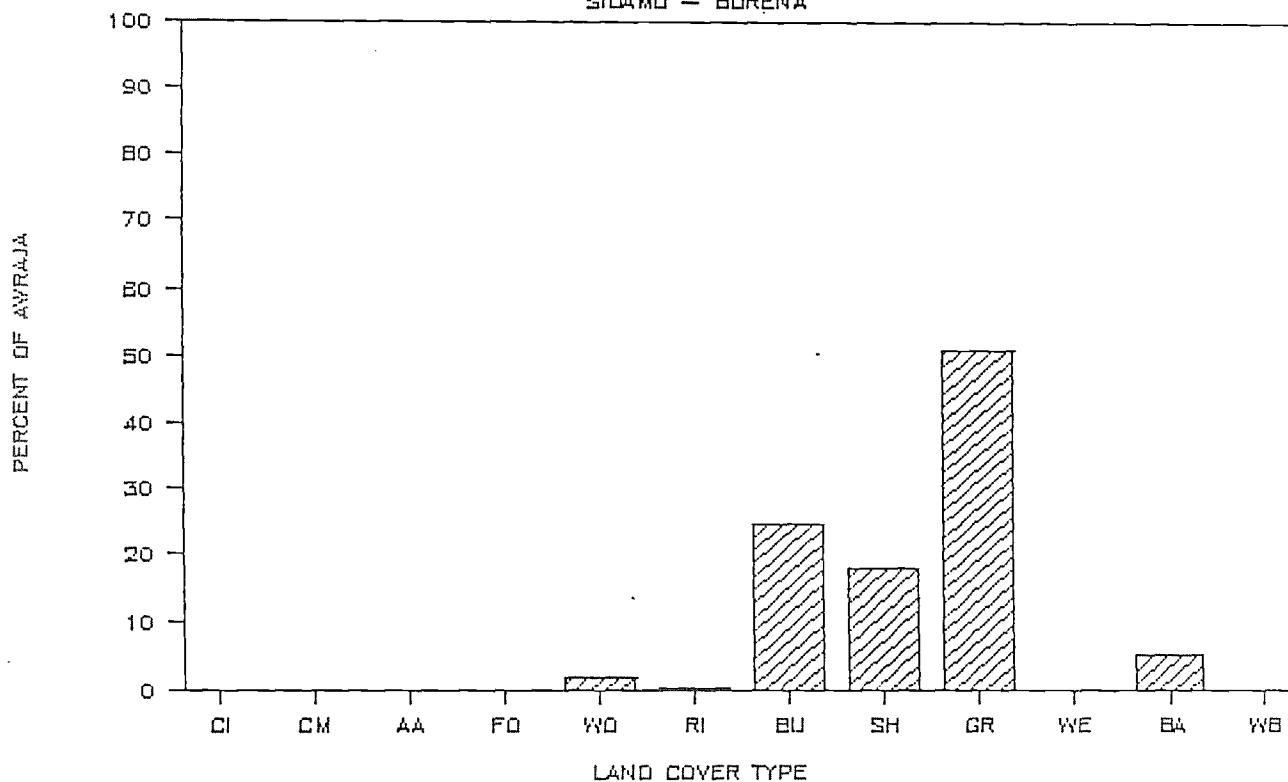
CURRENT LAND COVER
SIDAMO — ARERO
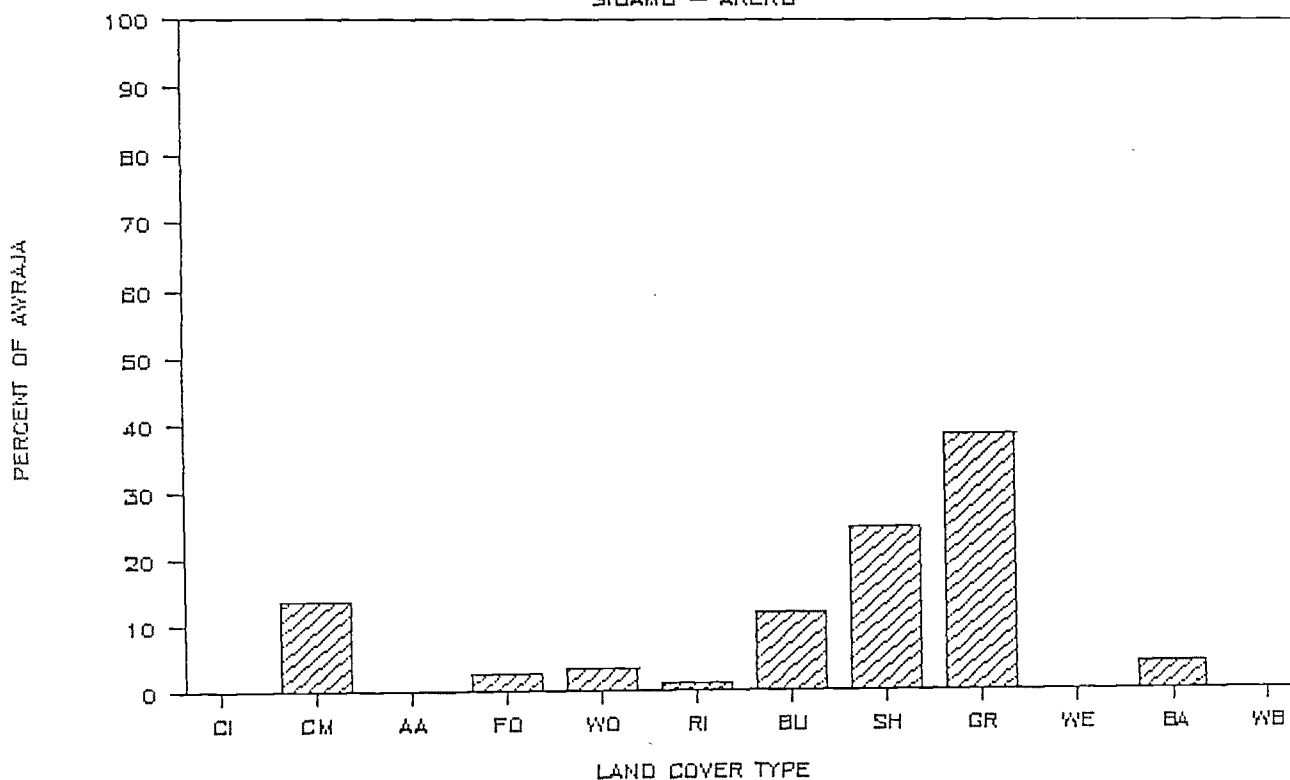
CURRENT LAND COVER

SIDAMO — GEDIO
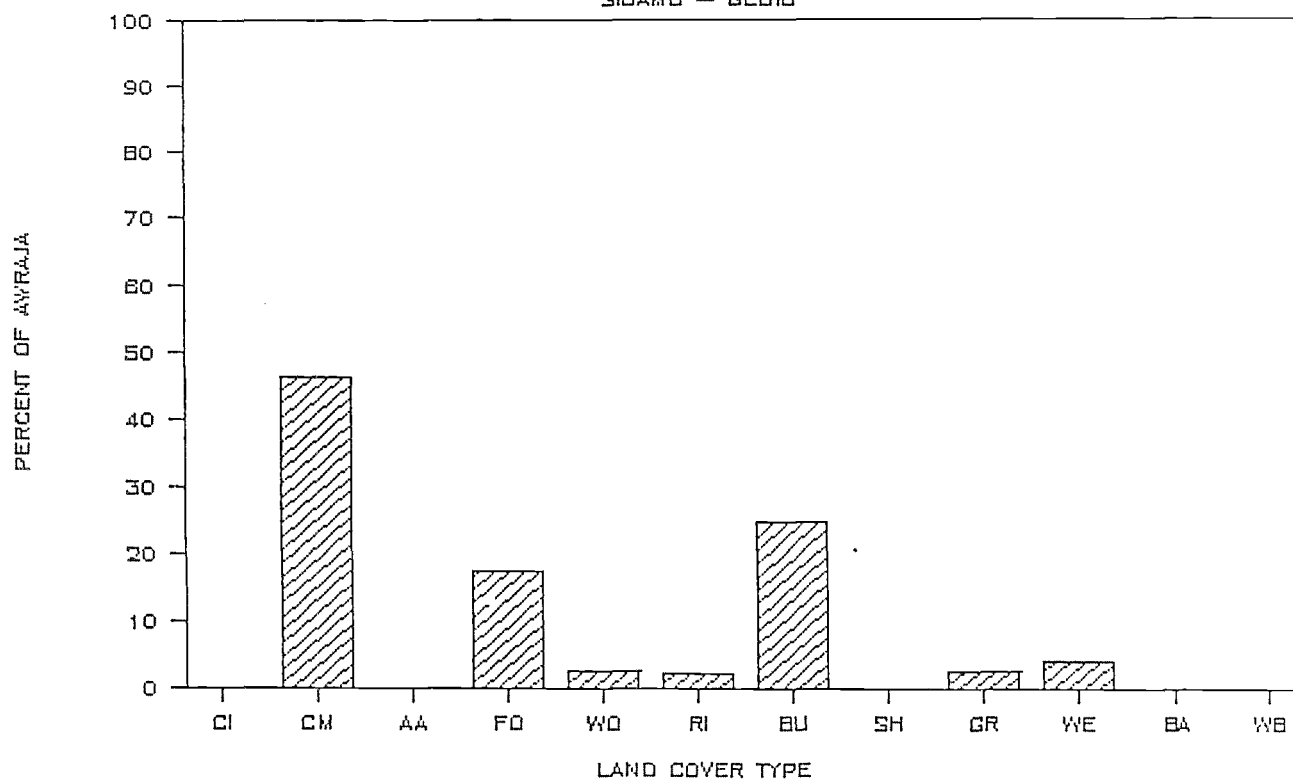
CURRENT LAND COVER

TIGRAY — ADWA
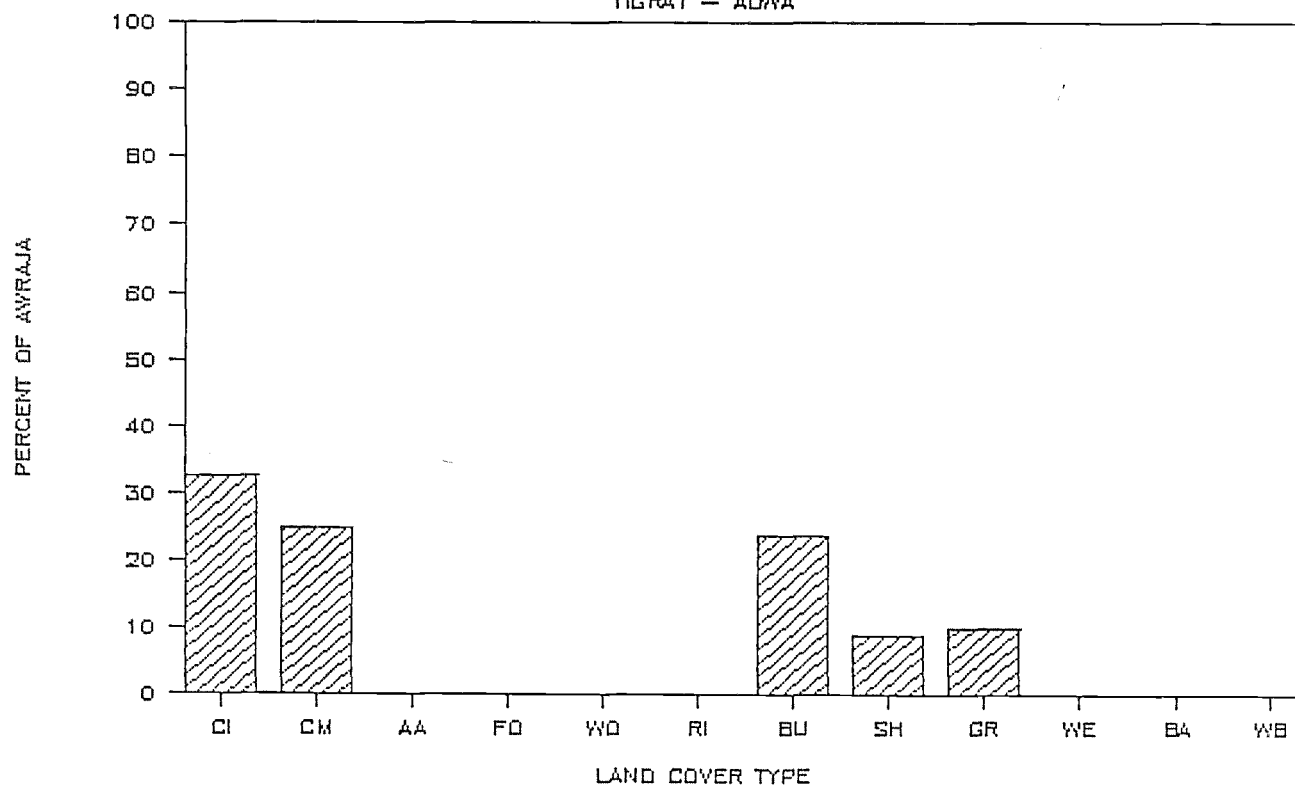
CURRENT LAND COVER
TIGRAY — AGAME
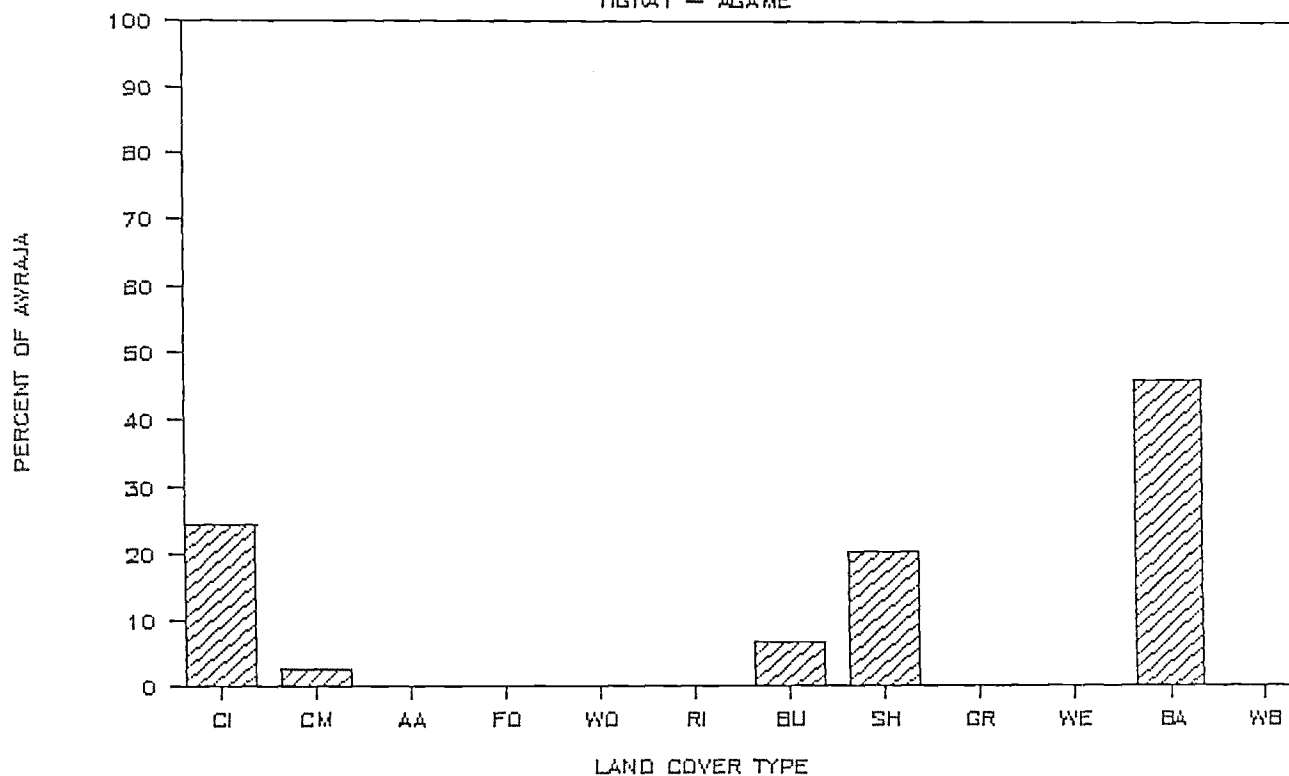
CURRENT LAND COVER
TIGRAY — HULET AWLALO
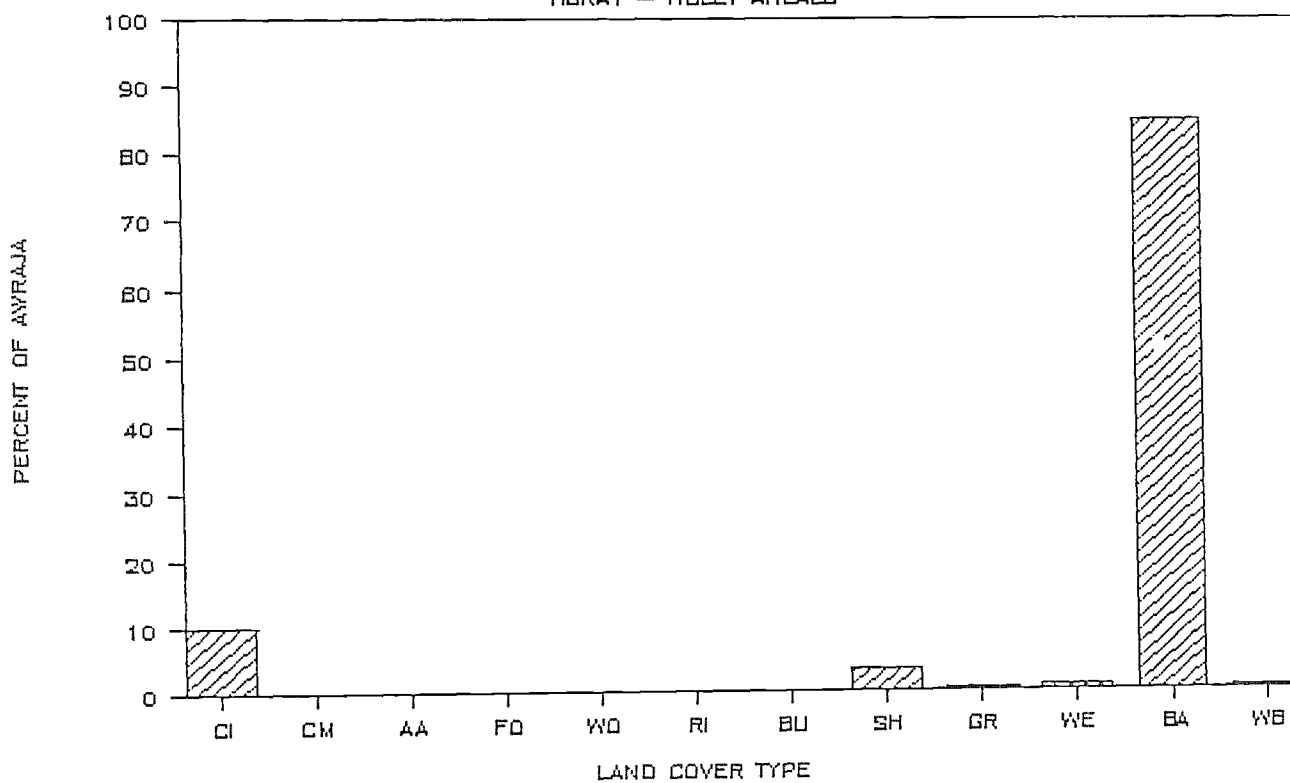
CURRENT LAND COVER
TIGRAY — ENDERTA
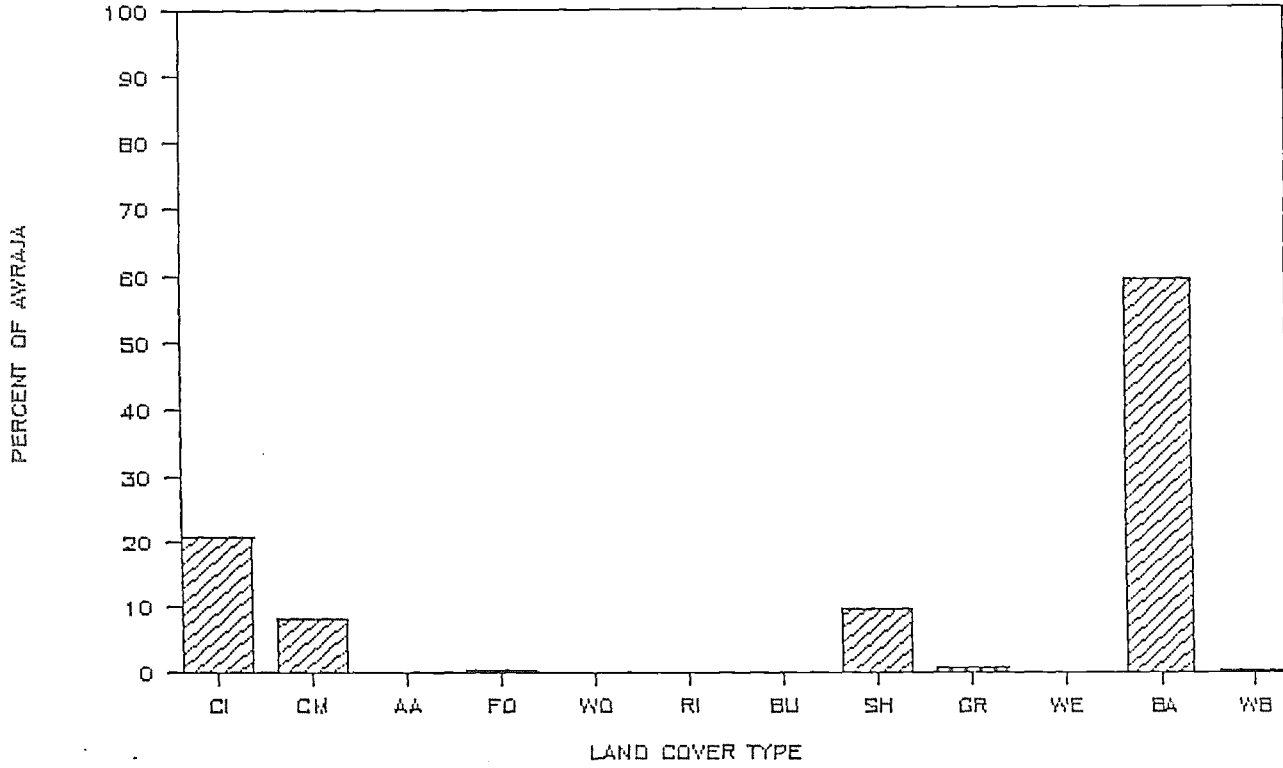
CURRENT LAND COVER
TIGRAY — RAYA & AZEBO
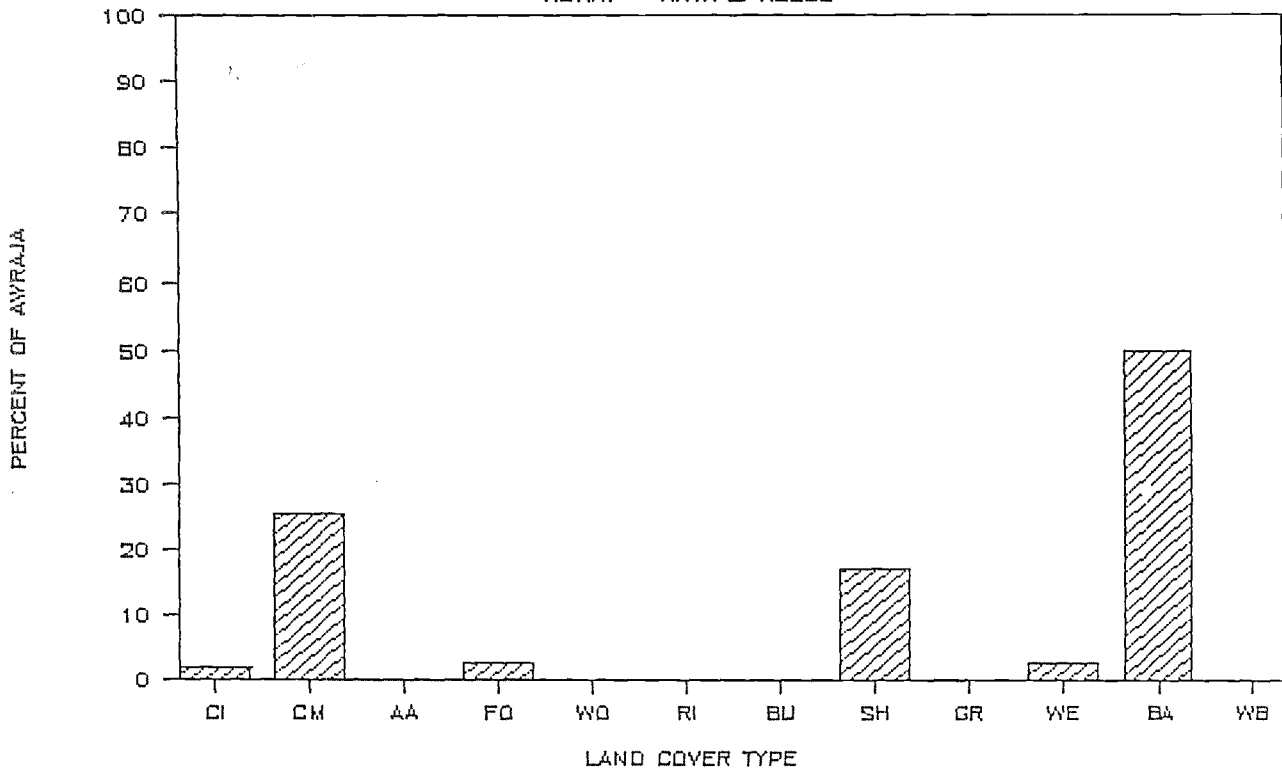
CURRENT LAND COVER
TIGRAY — TEMBIEN
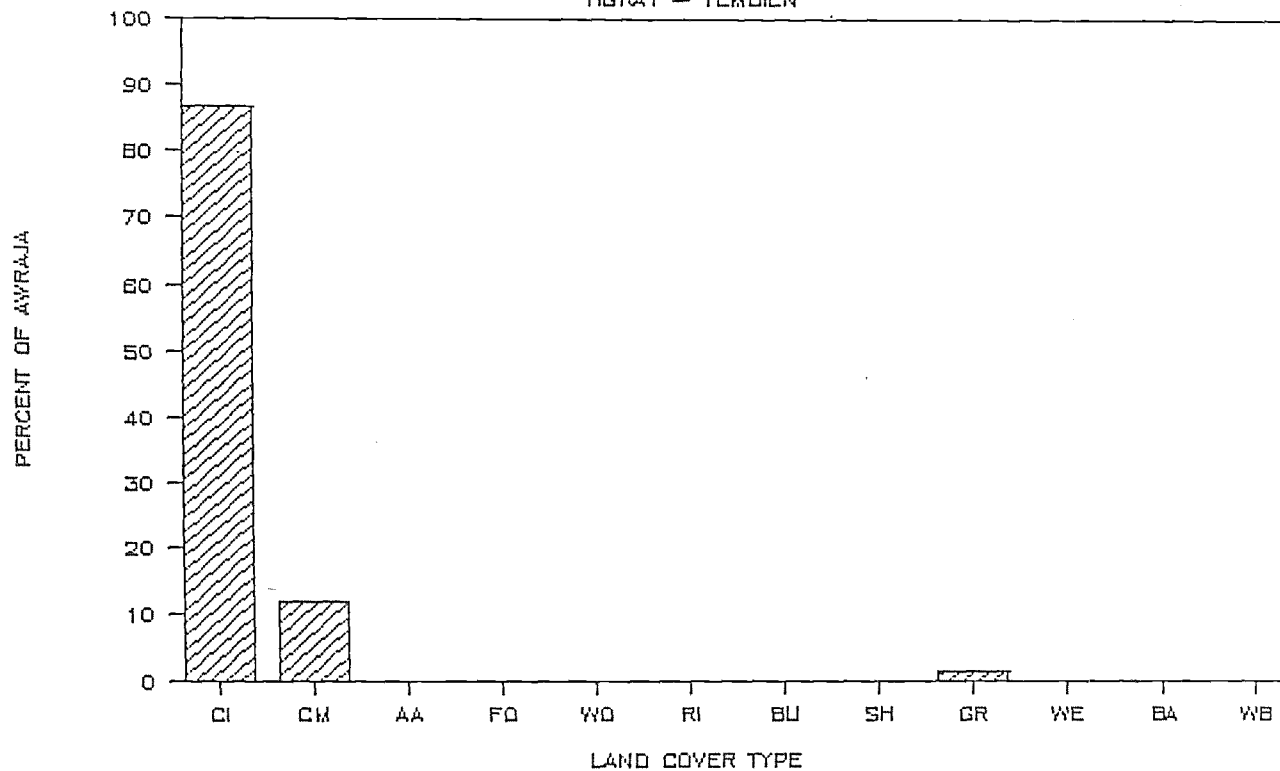
CURRENT LAND COVER
TIGRAY — AXUM
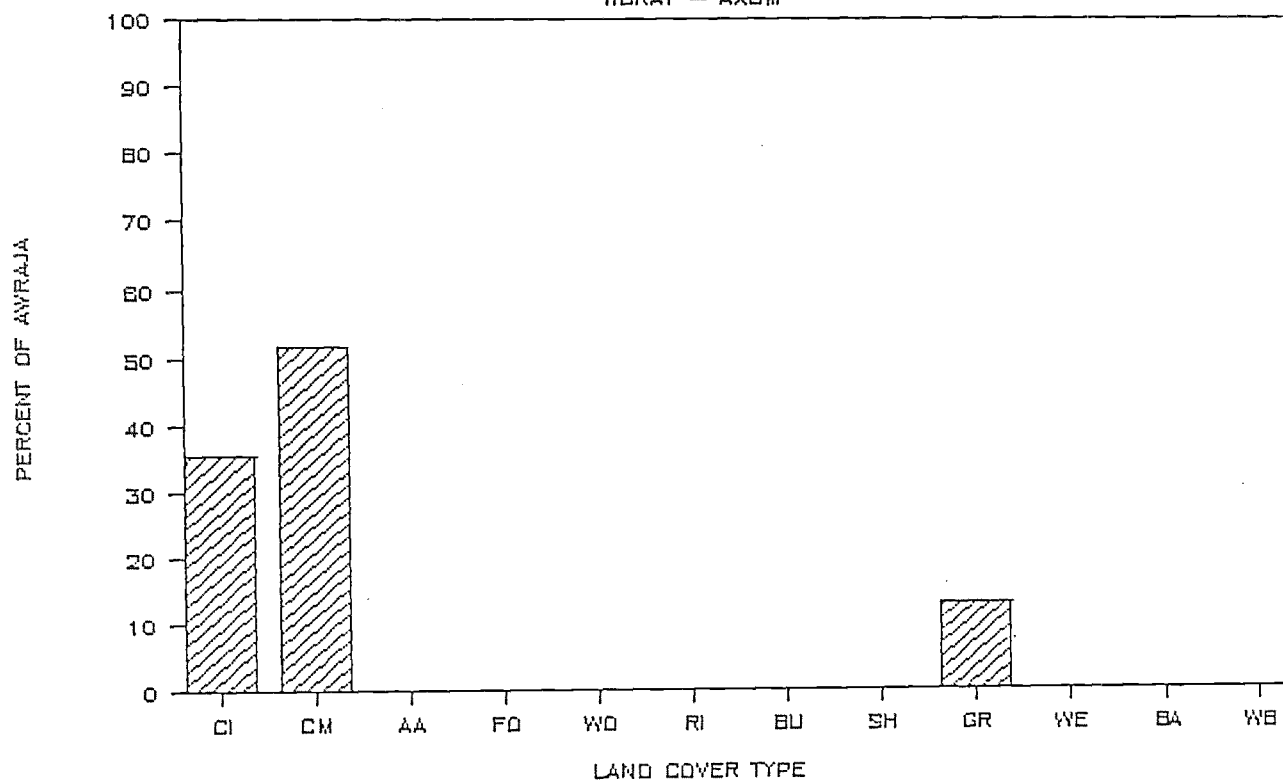
CURRENT LAND COVER
TIGRAY — SHIRE
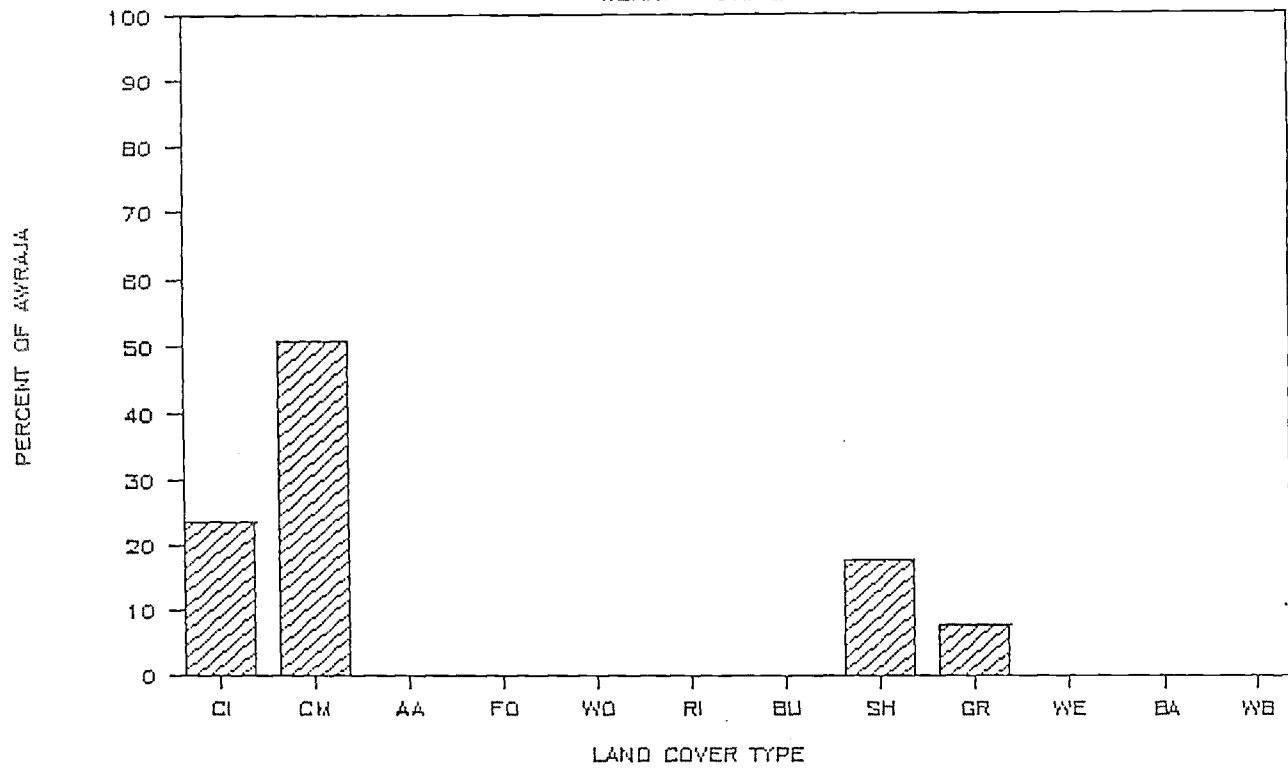
CURRENT LAND COVER
WELEGA — NEKEMTE

CURRENT LAND COVER
WELEGA — ARJO

PERCENT OF AWRAJA

LAND COVER TYPE

CI CM AA FO WO RI BU SH GR WE BA WB

CURRENT LAND COVER
WELEGA — GIMBI

PERCENT OF AWRAJA

LAND COVER TYPE

CI CM AA FO WO RI BU SH GR WE BA WB
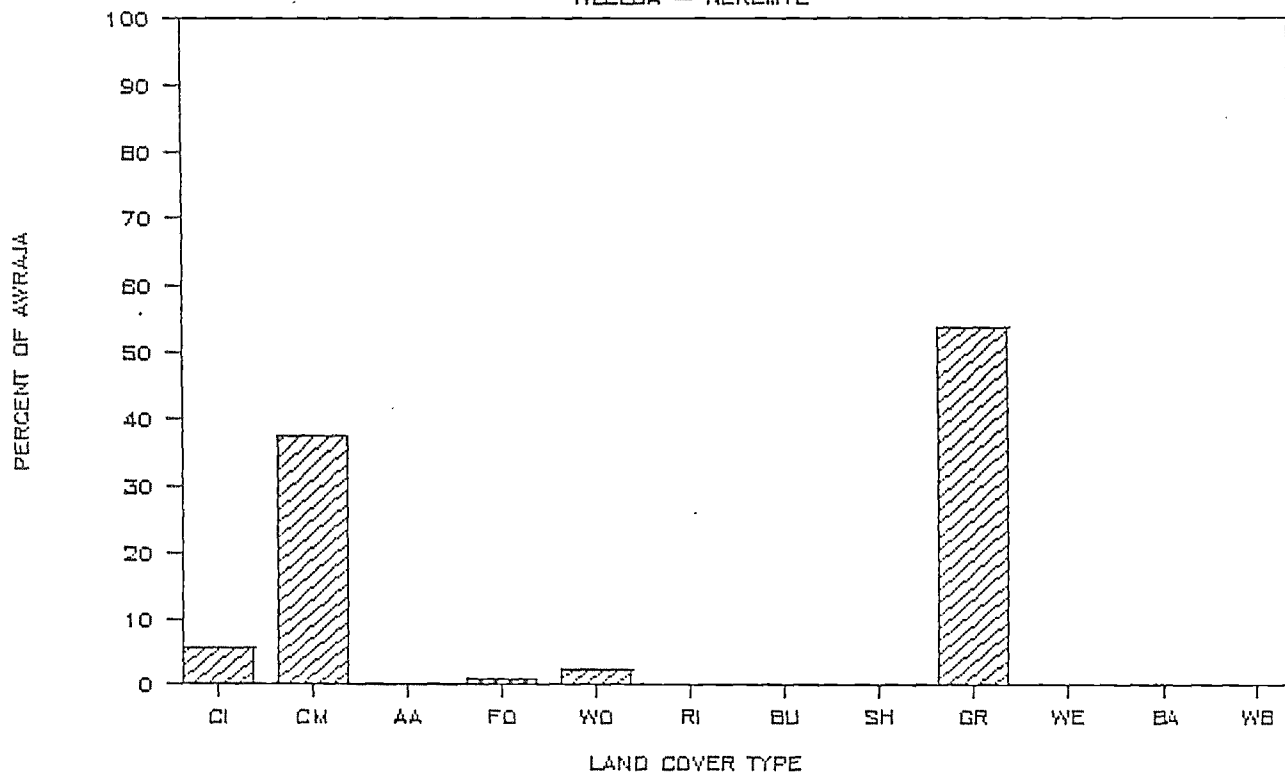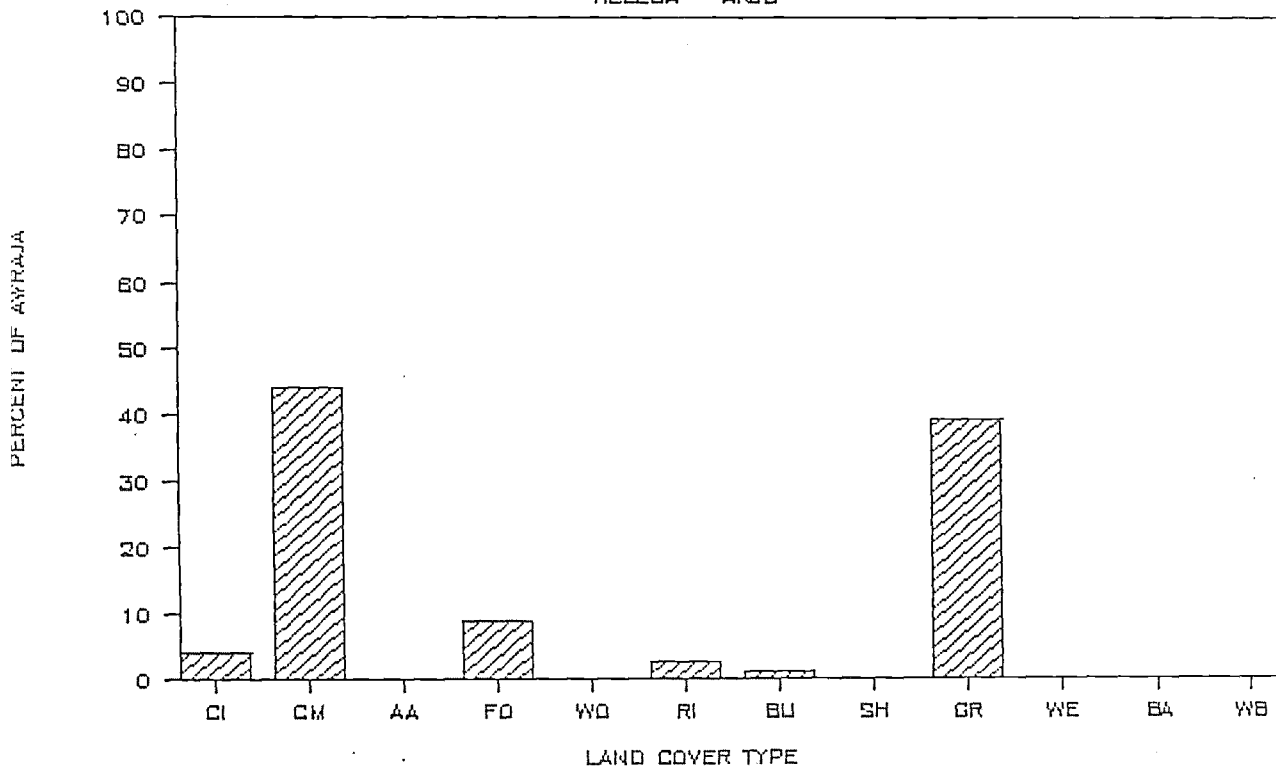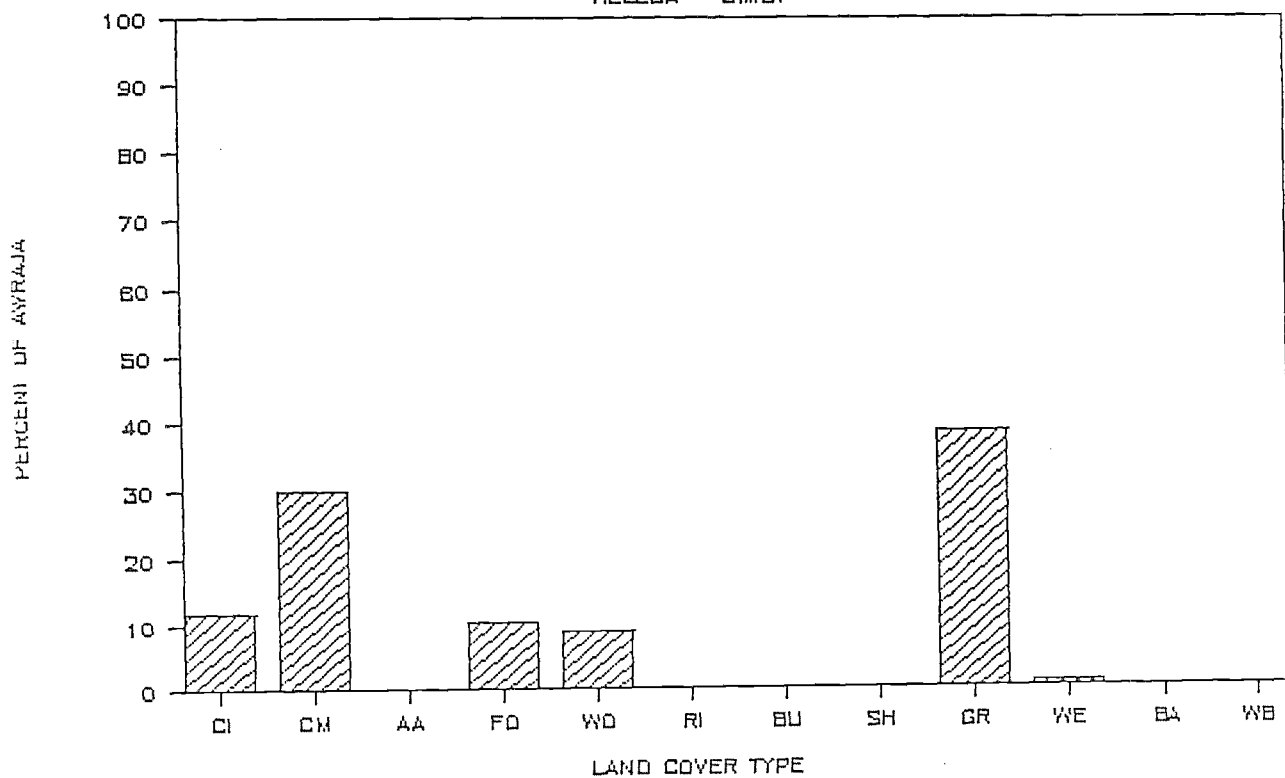
CURRENT LAND COVER
WELEGA — HORO GUDURU
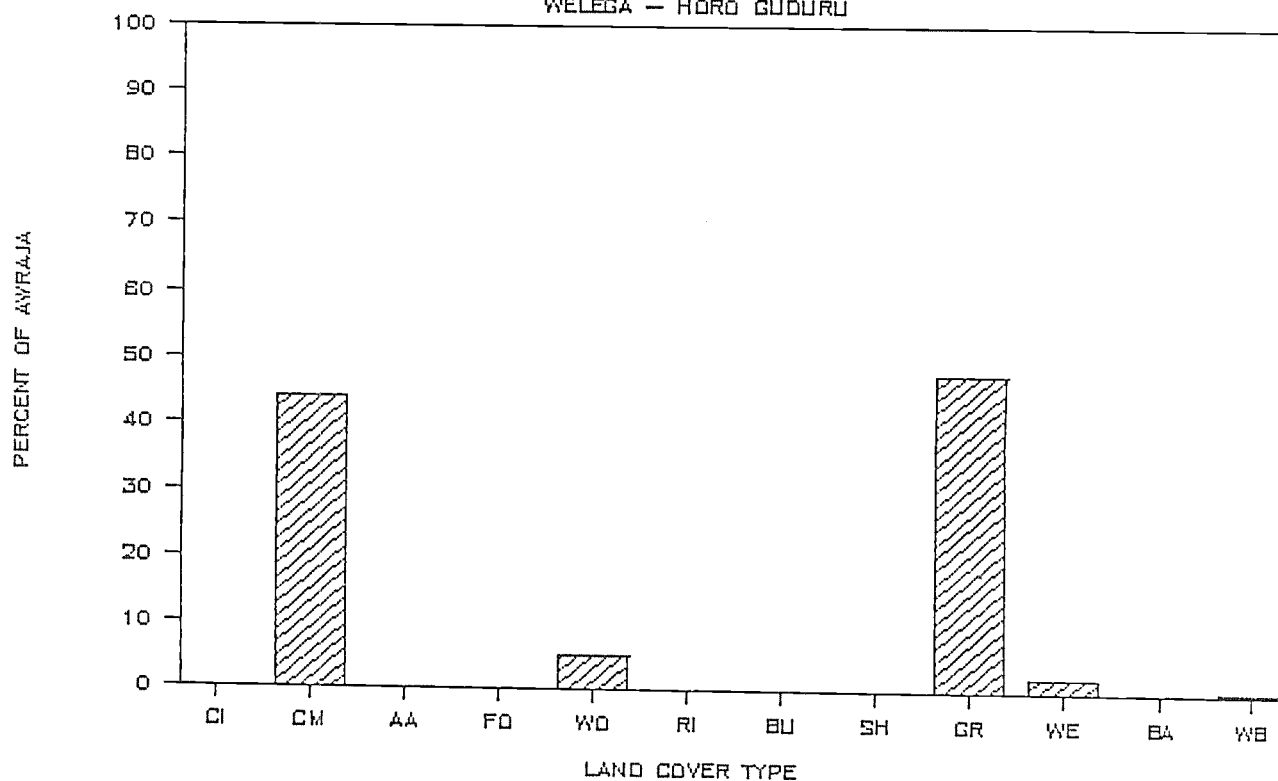
CURRENT LAND COVER
WELEGA — KELEM
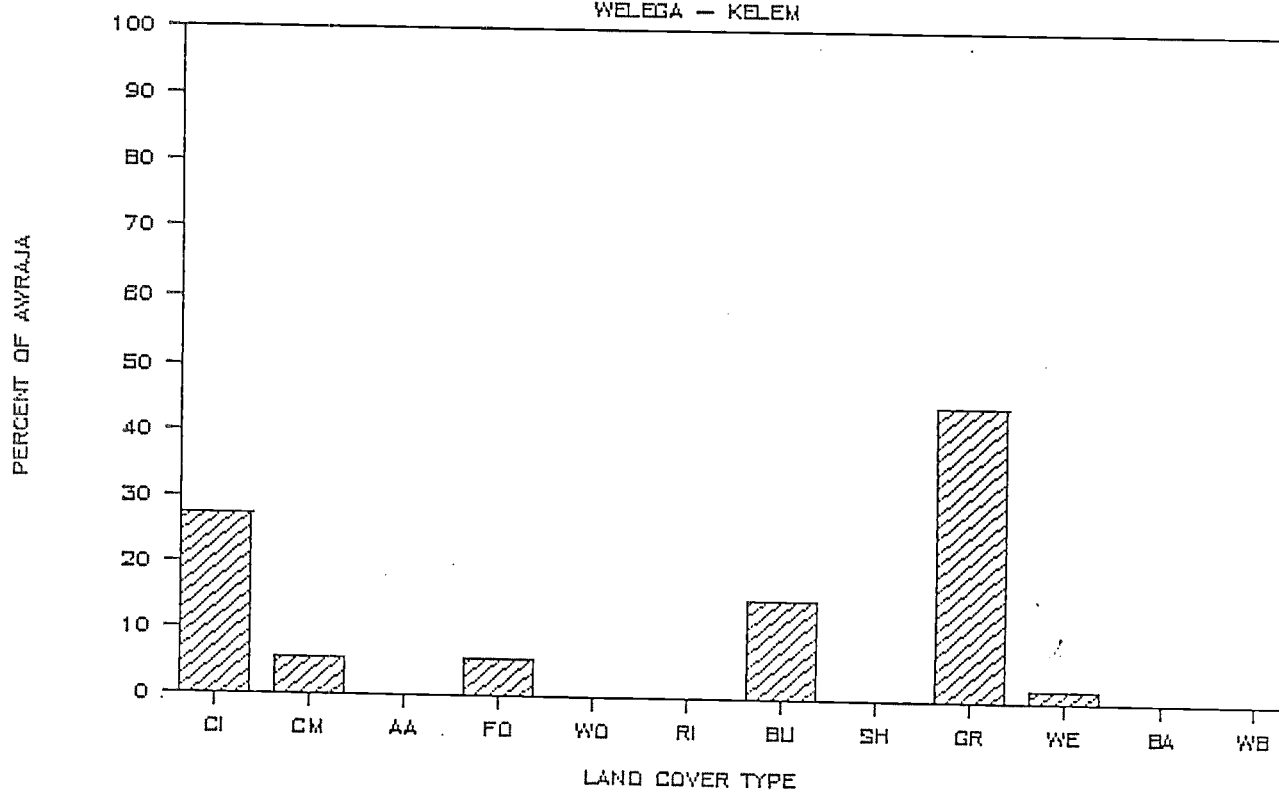
CURRENT LAND COVER
WELEGA — ASOSA
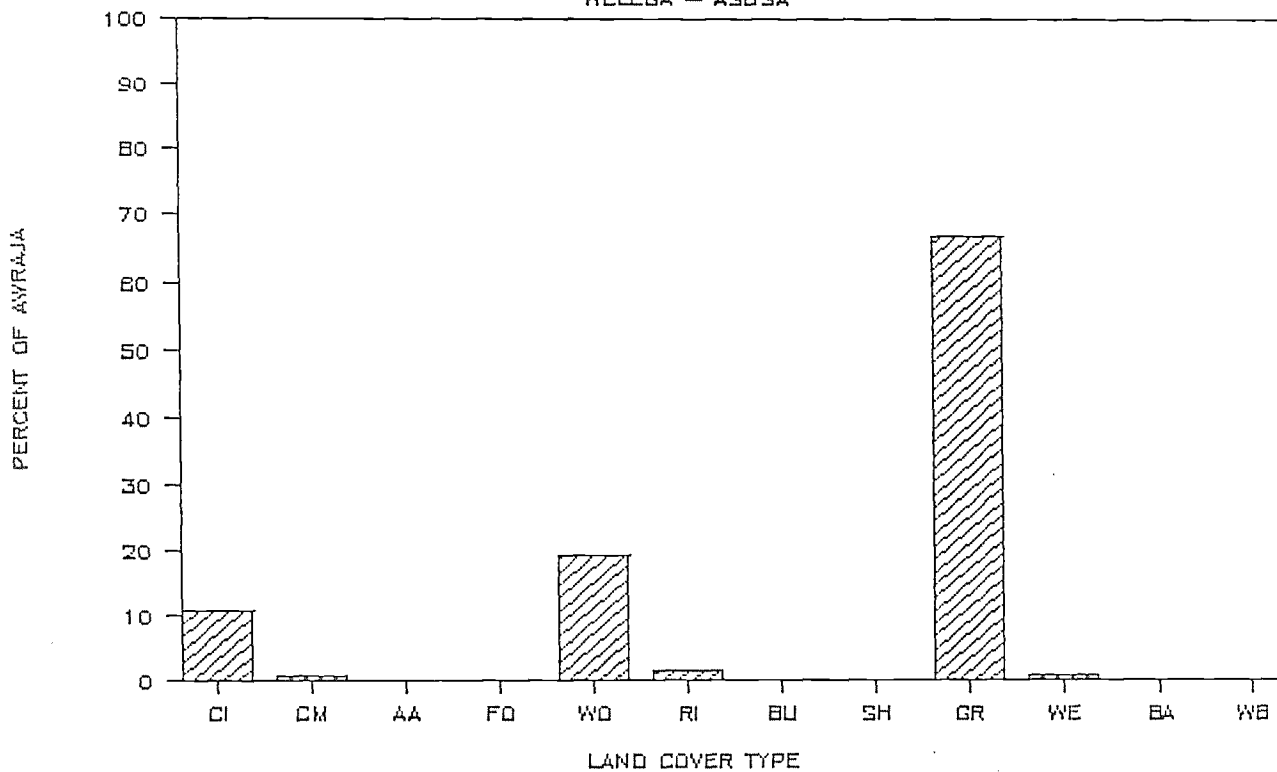
CURRENT LAND COVER
WELO — RAYA & KOBO
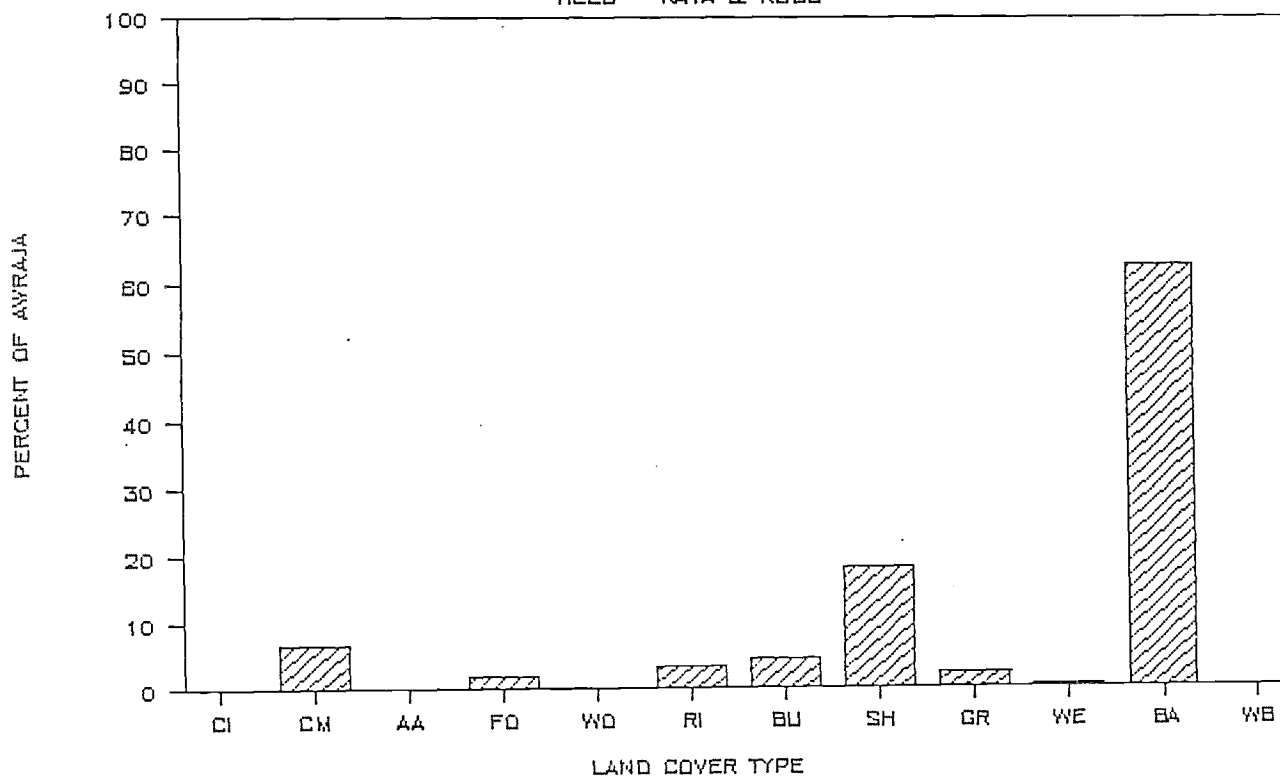
CURRENT LAND COVER
WELO — YEYU
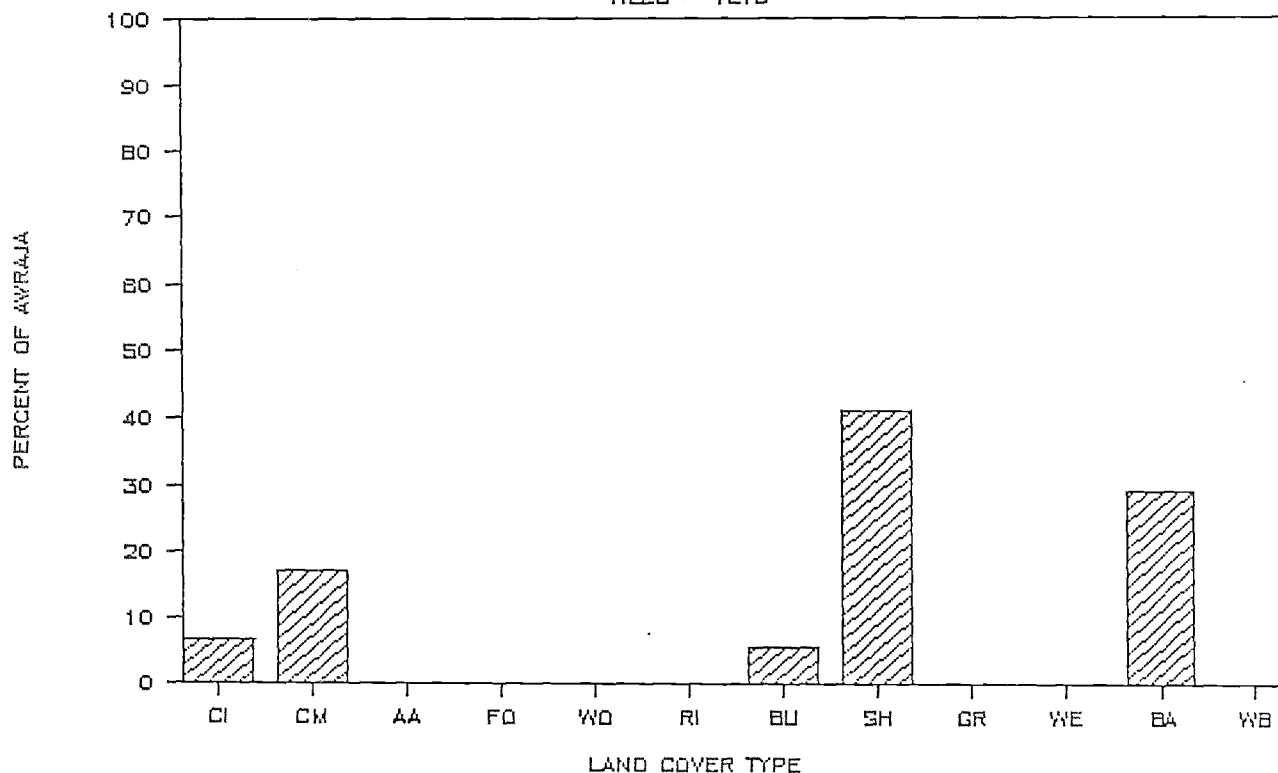
CURRENT LAND COVER
WELO — AMBASEL
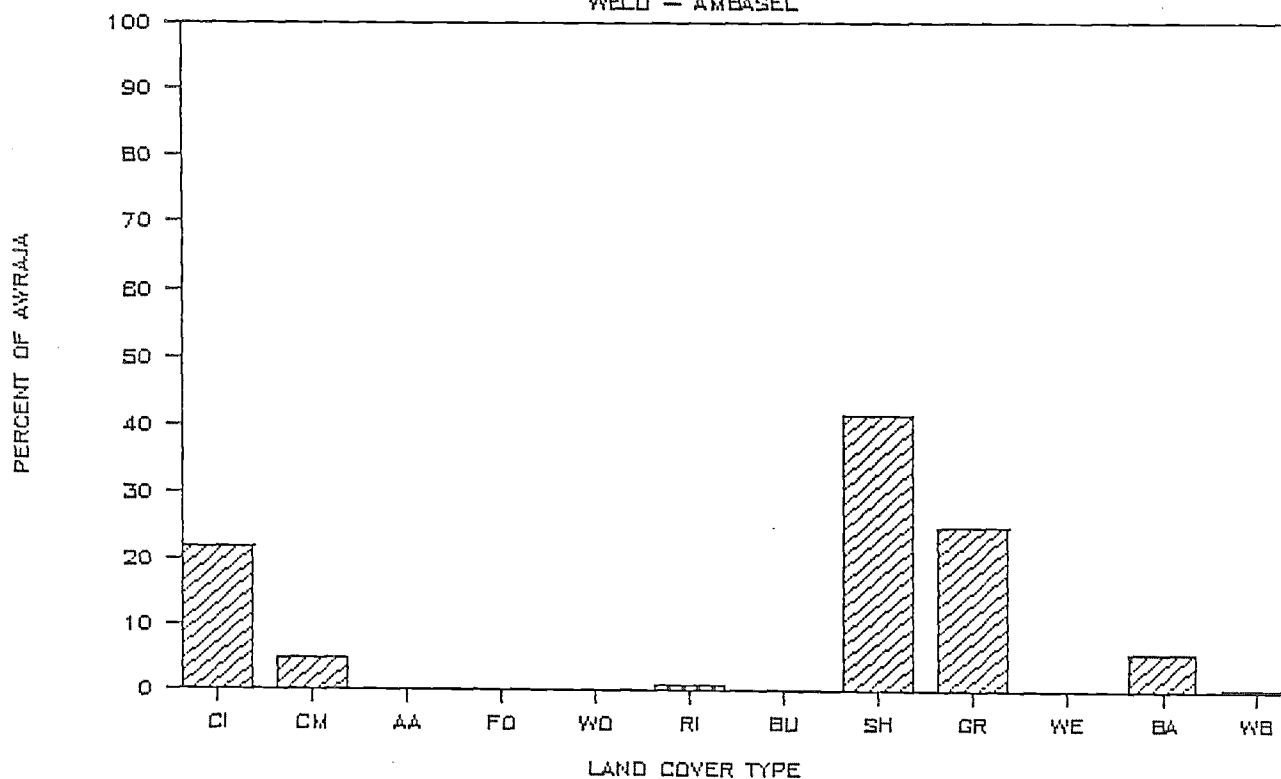
CURRENT LAND COVER

WELO — AWSA

CURRENT LAND COVER

WELO — KALU
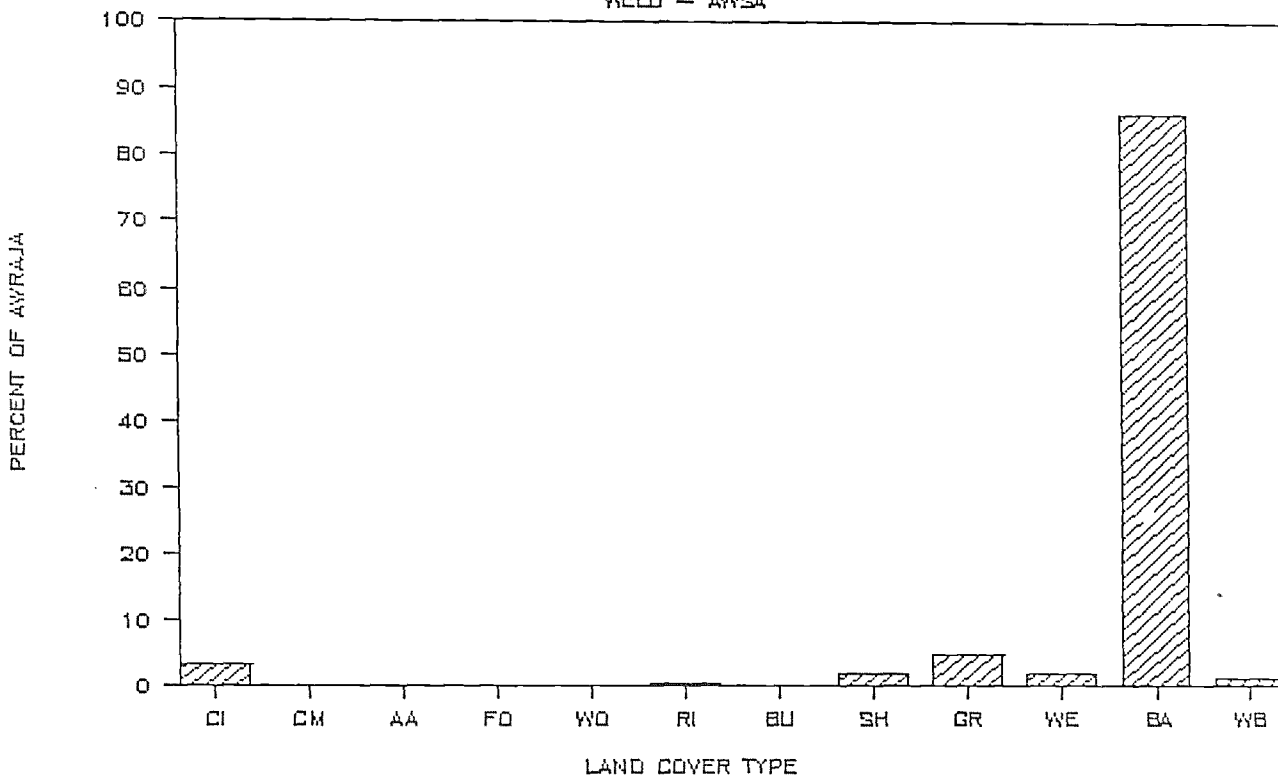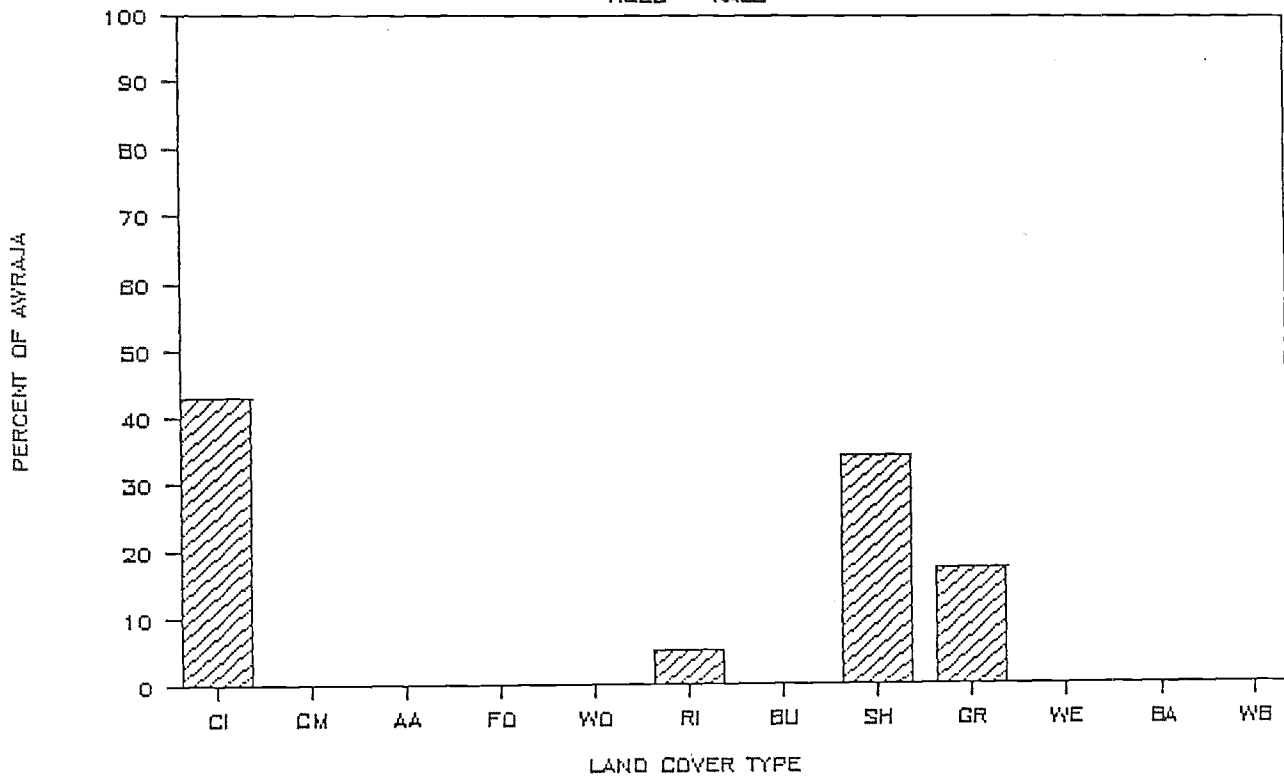
CURRENT LAND COVER

WELO — DESIE ZURIA
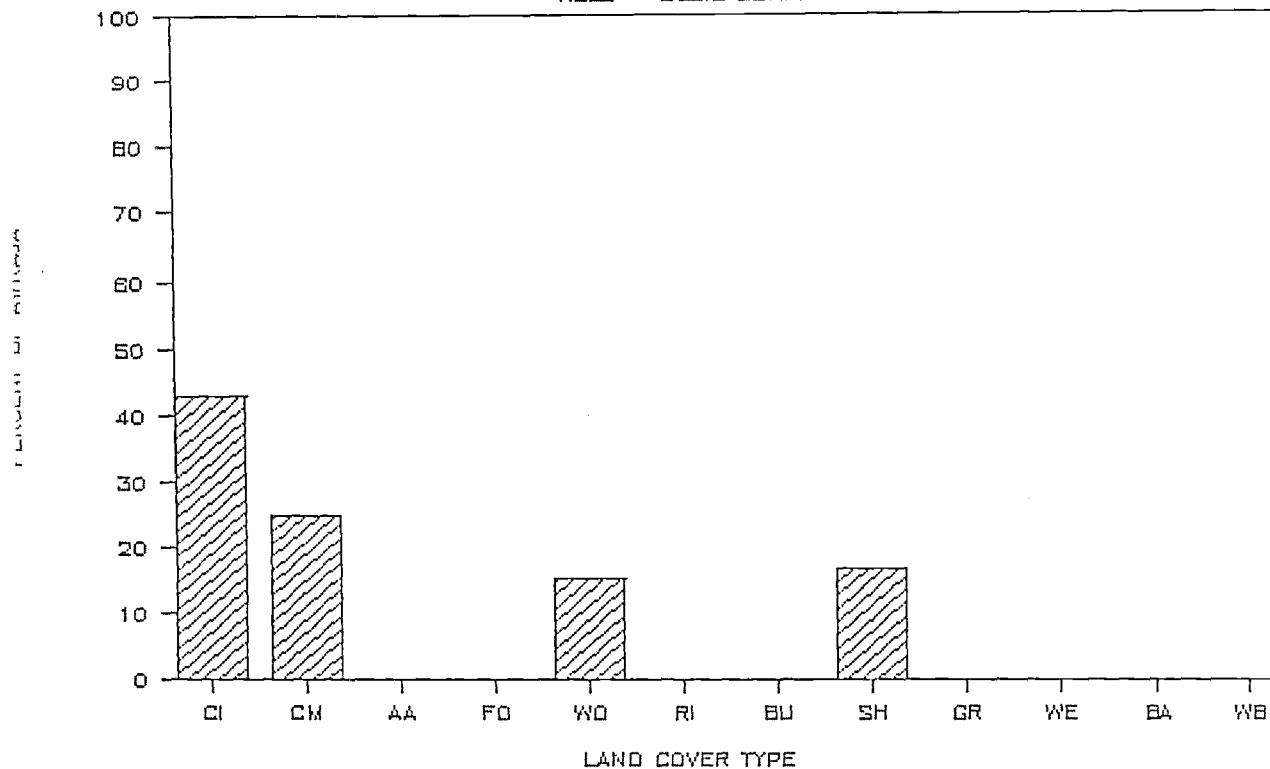
CURRENT LAND COVER

WELO — WEREILU
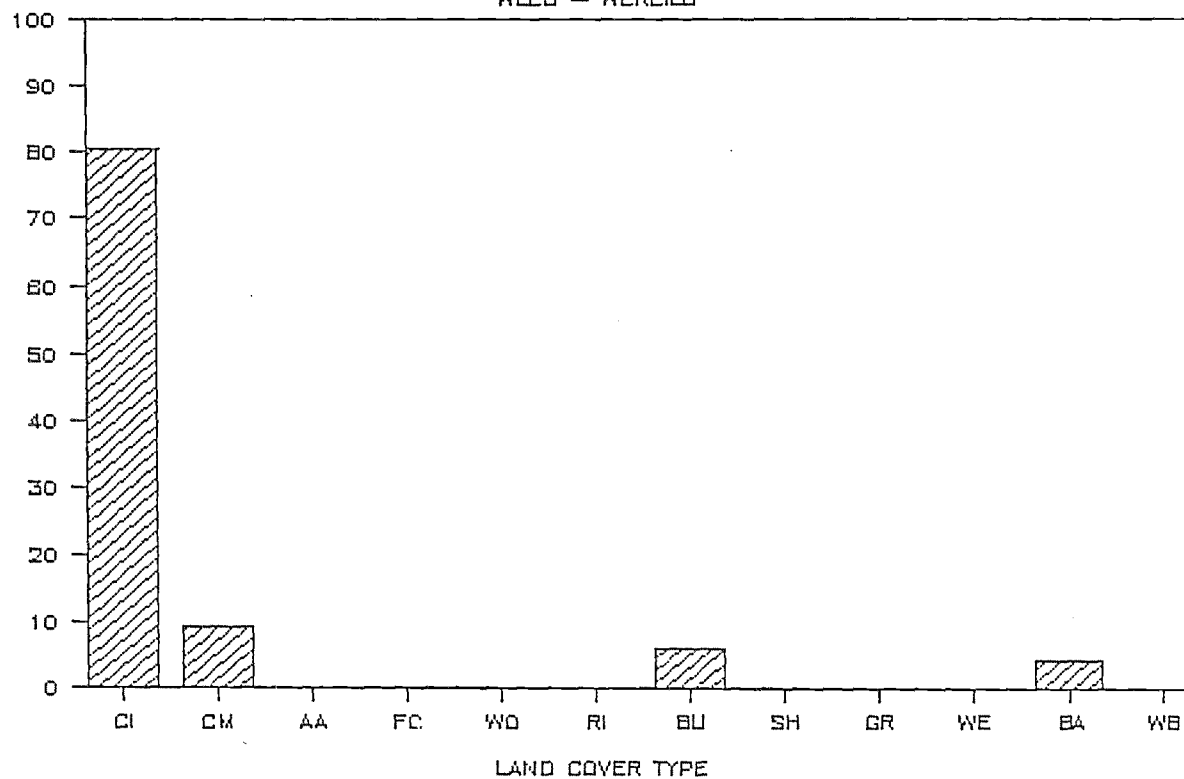
CURRENT LAND COVER
WELD — BORENA
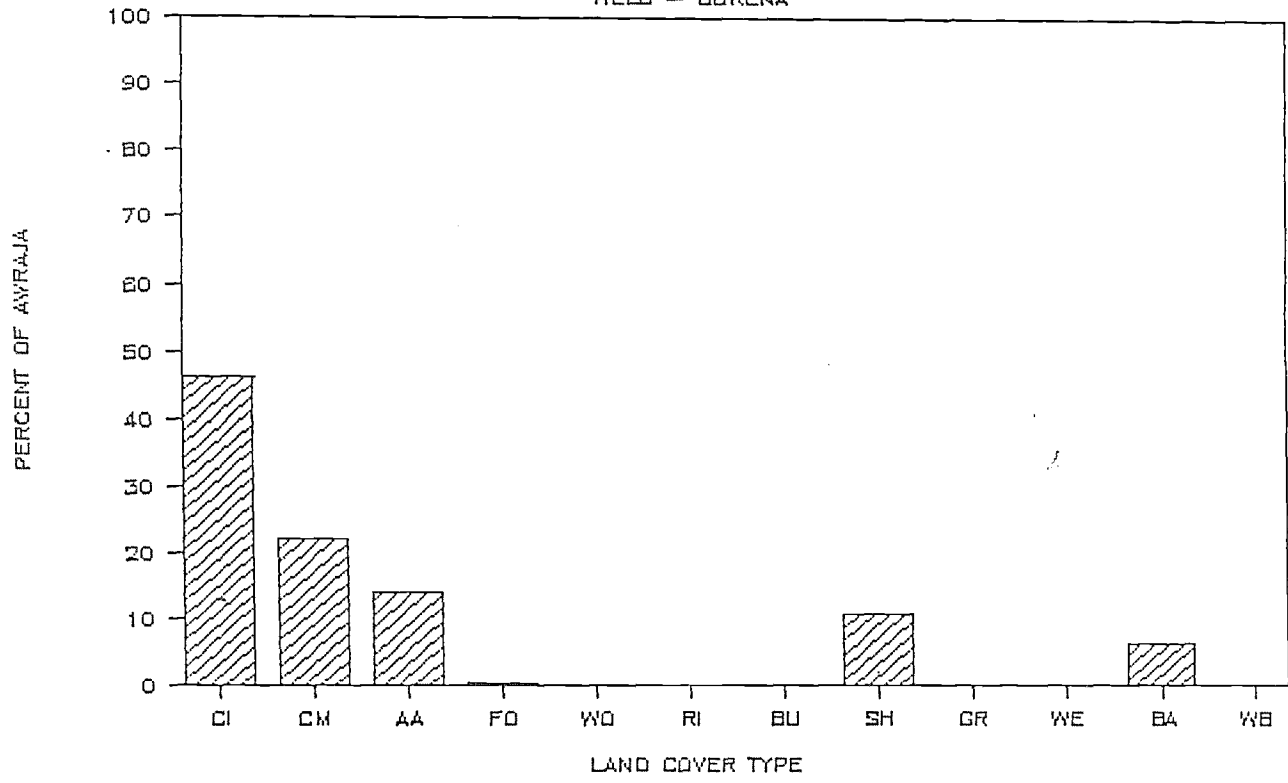
CURRENT LAND COVER
WELD — WEREHIMENO
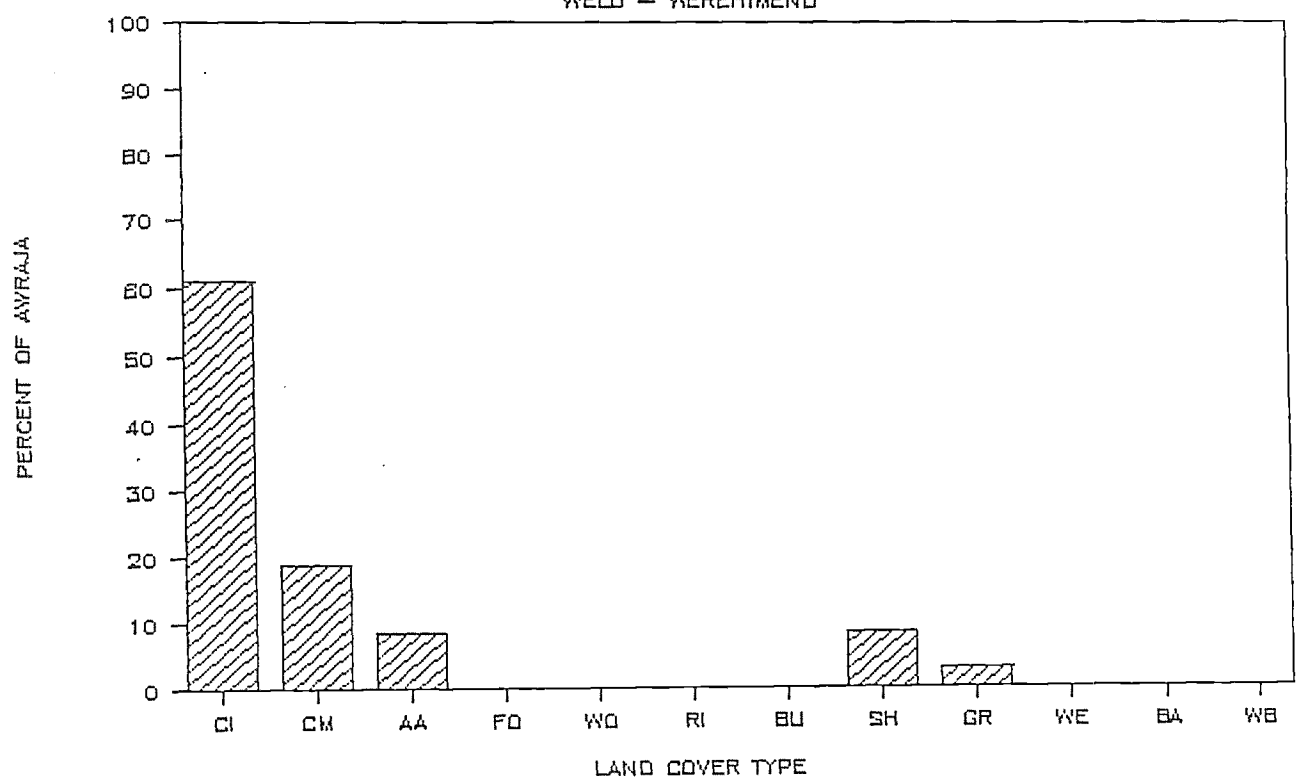
CURRENT LAND COVER
WELO — WADLA DELANTA
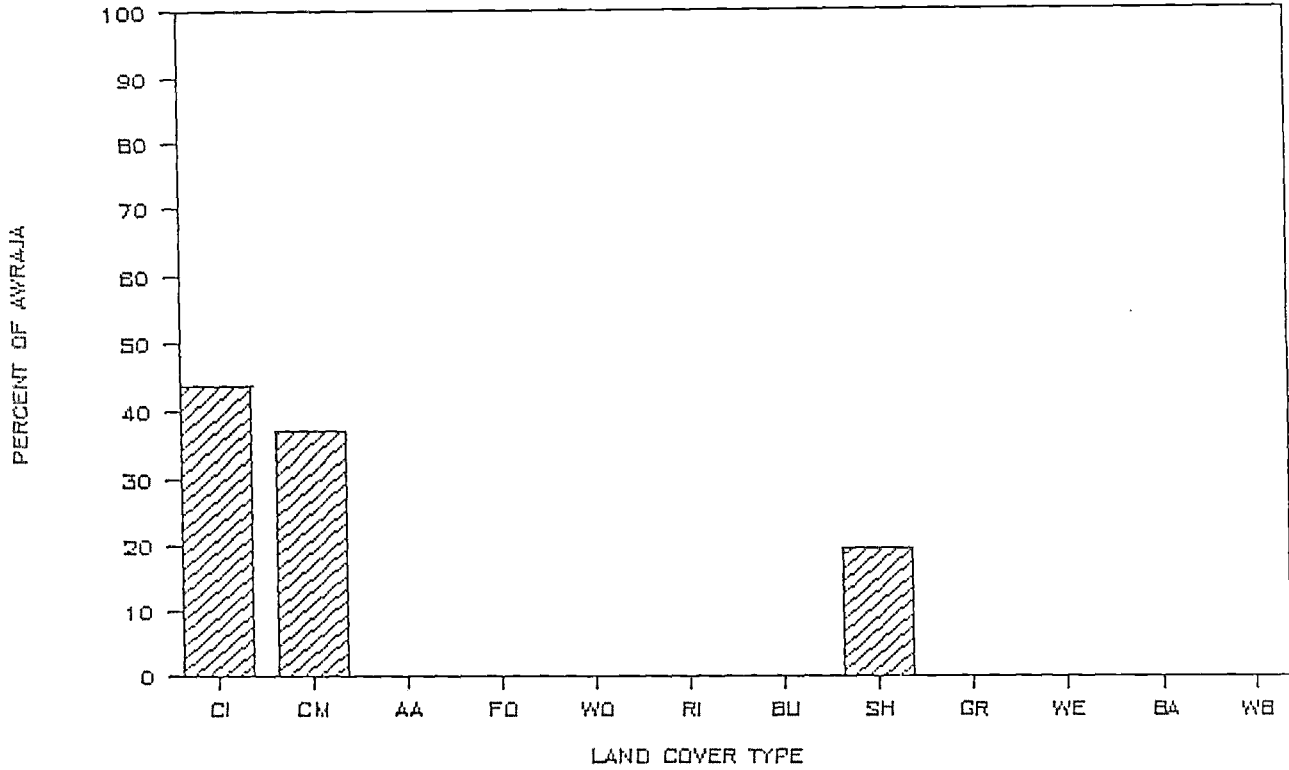
CURRENT LAND COVER
WELO — LASTA
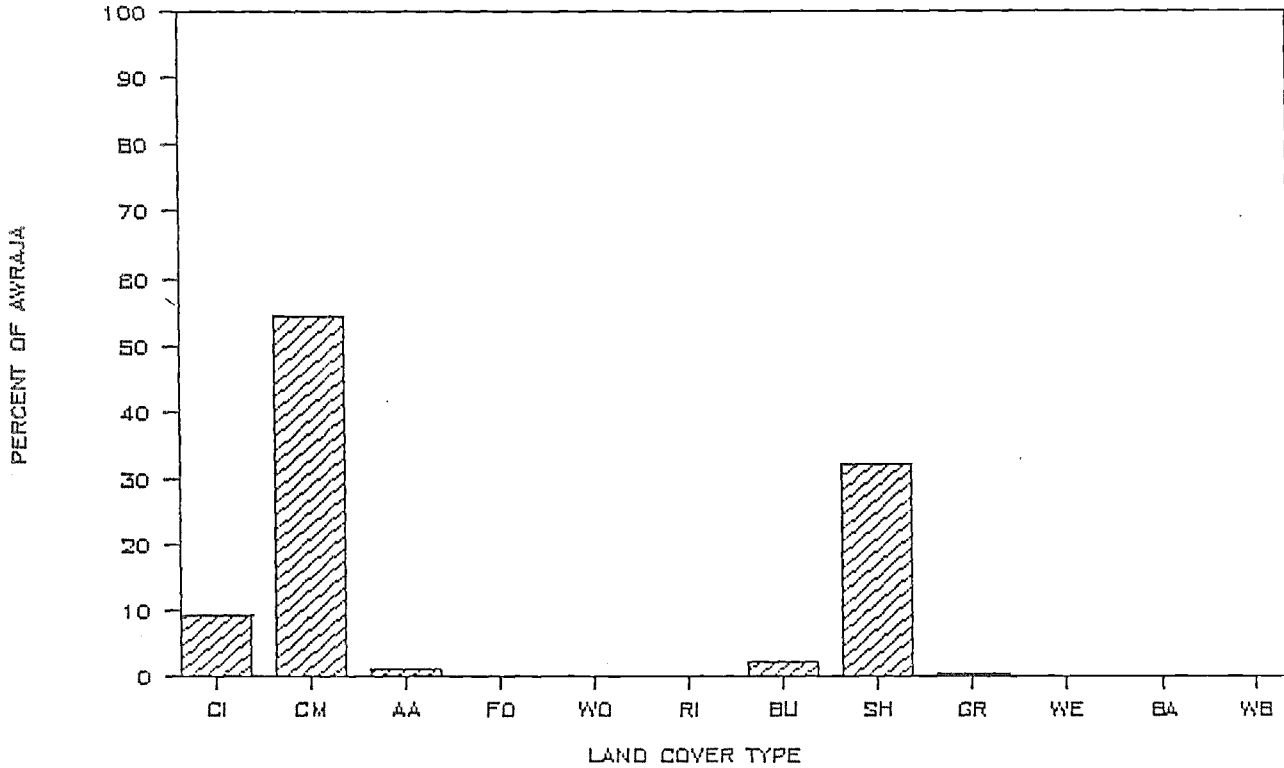
CURRENT LAND COVER

WELO — WAG
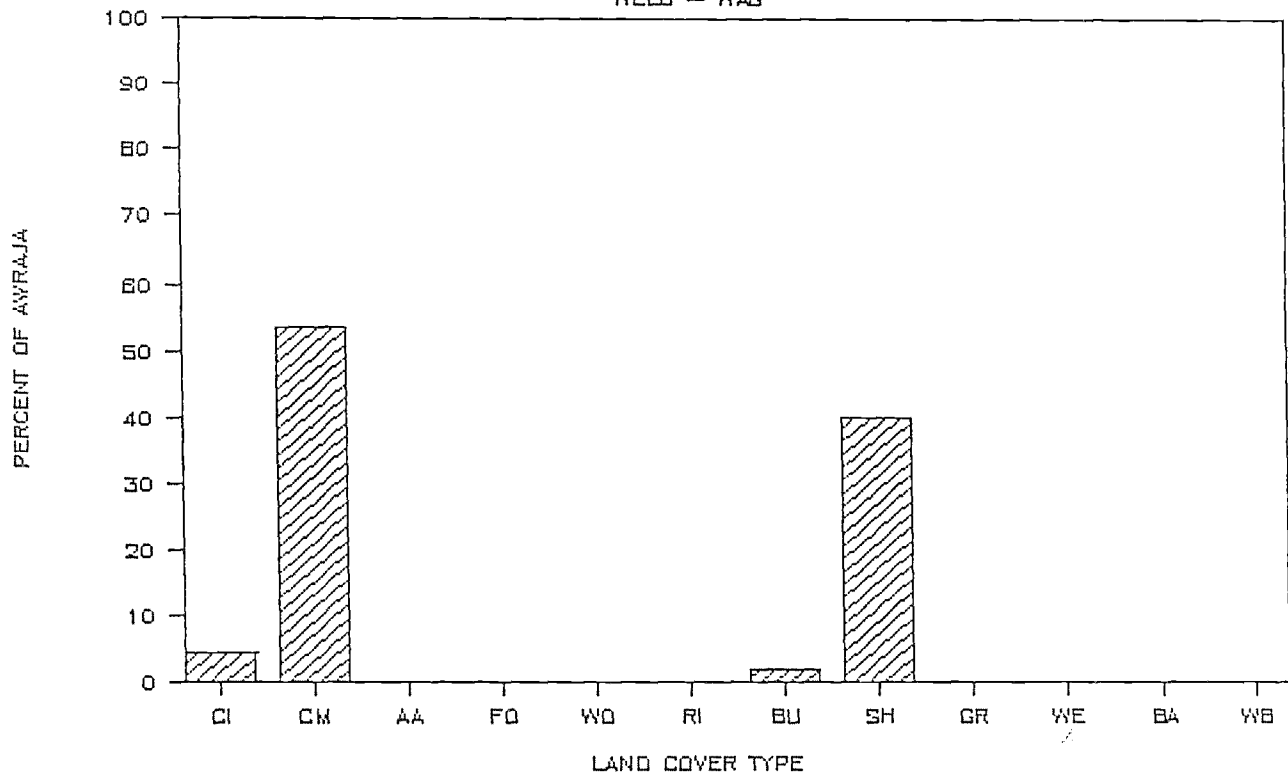
CURRENT LAND COVER

ASEB
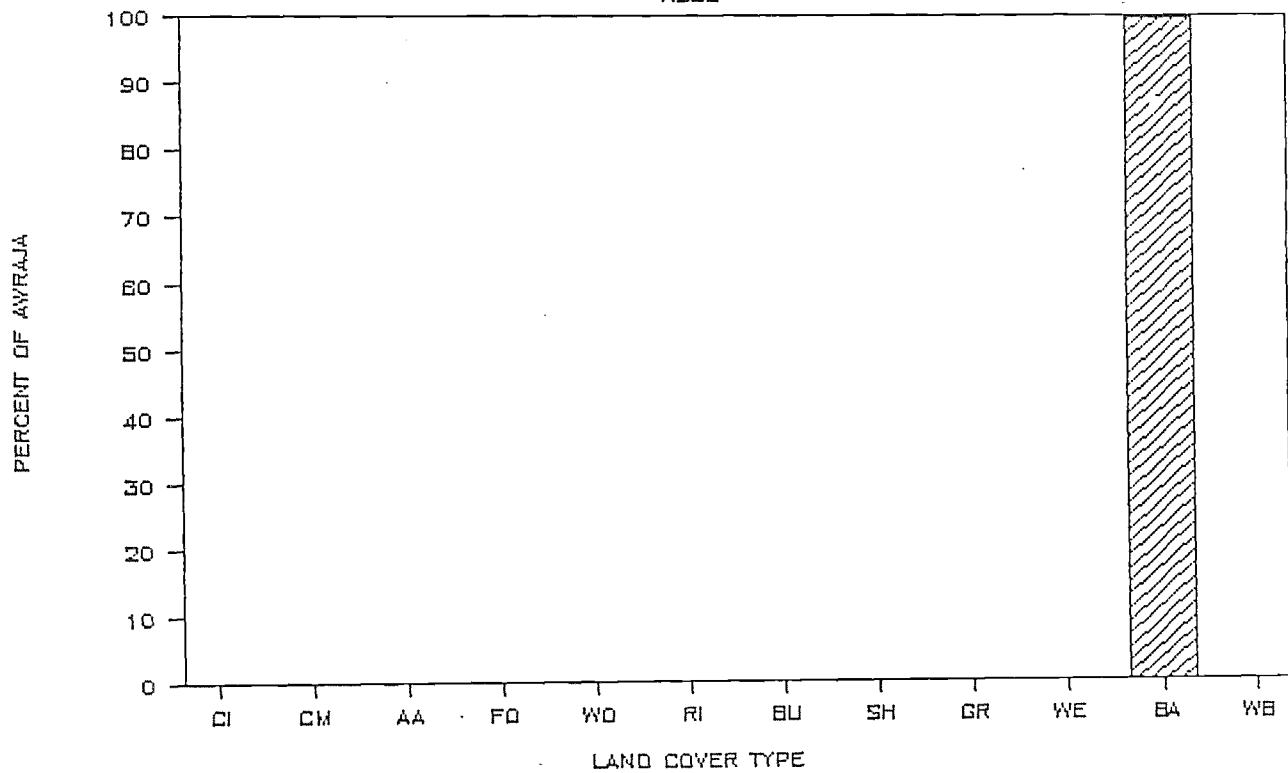
AREA UNDER MAJOR CROPS

AREA UNDER MAJOR CROPS
ARSI — ARBA GUGU
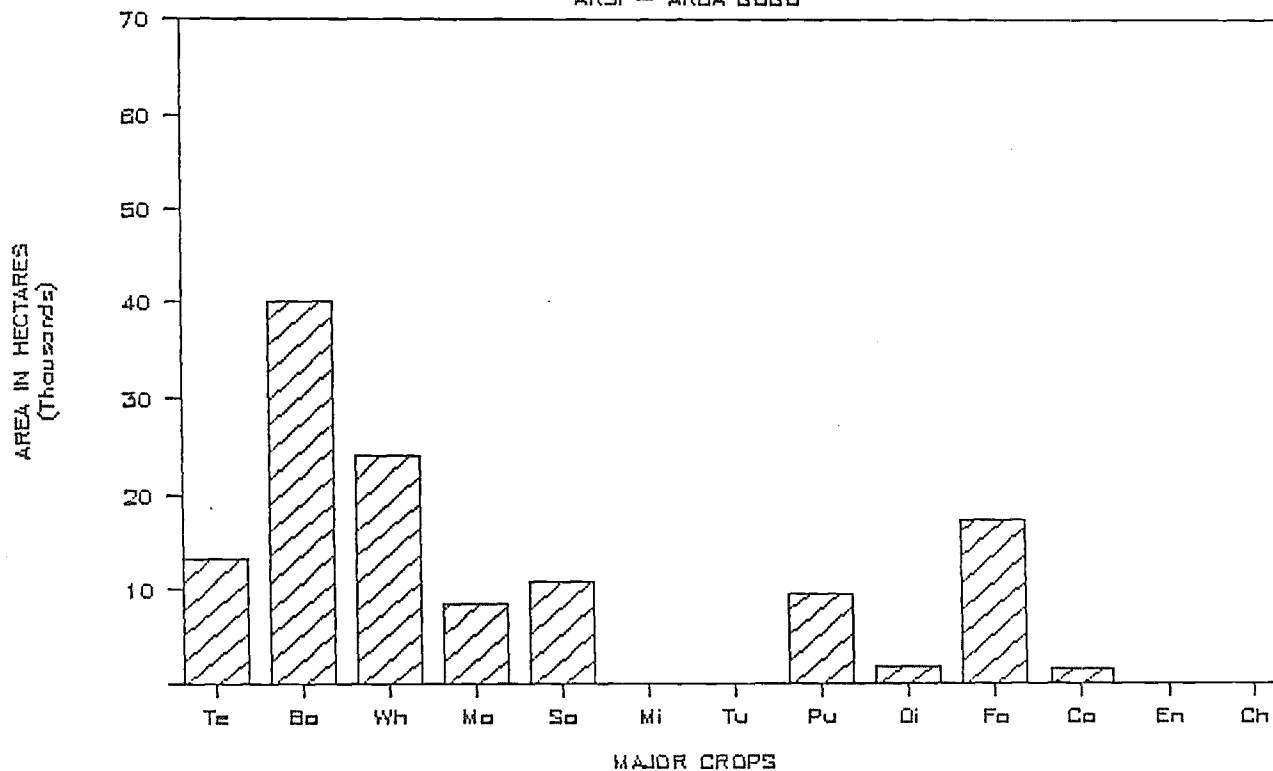
AREA UNDER MAJOR CROPS
ARSI — TICHO
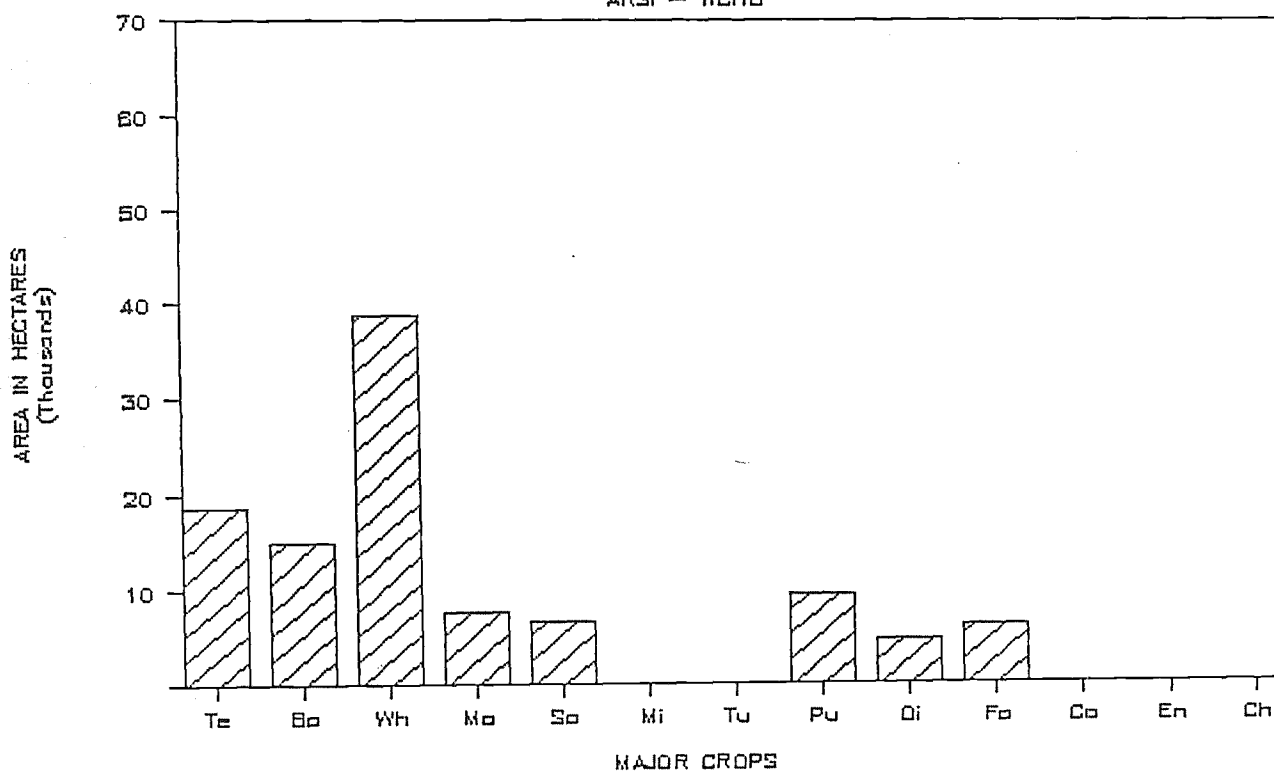
AREA UNDER MAJOR CROPS

ARSI — CHILALO
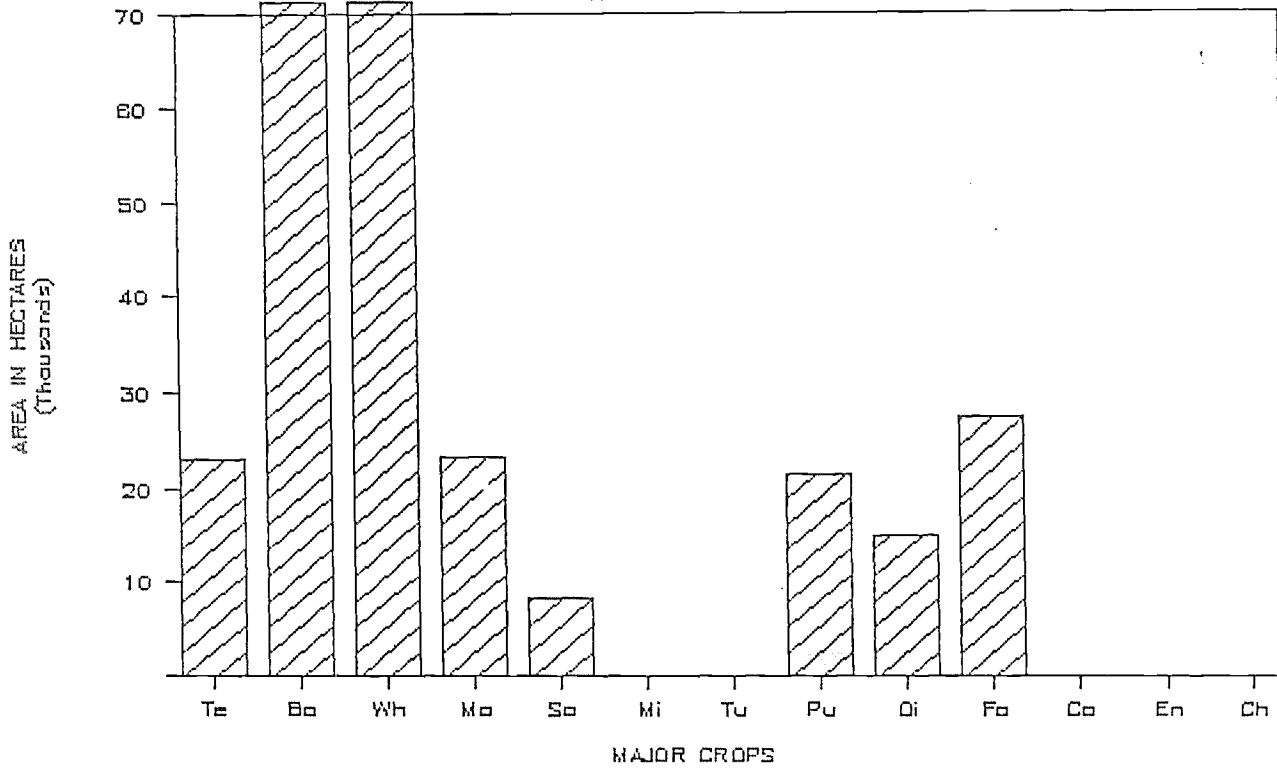
AREA UNDER MAJOR CROPS

BALE — GENALE
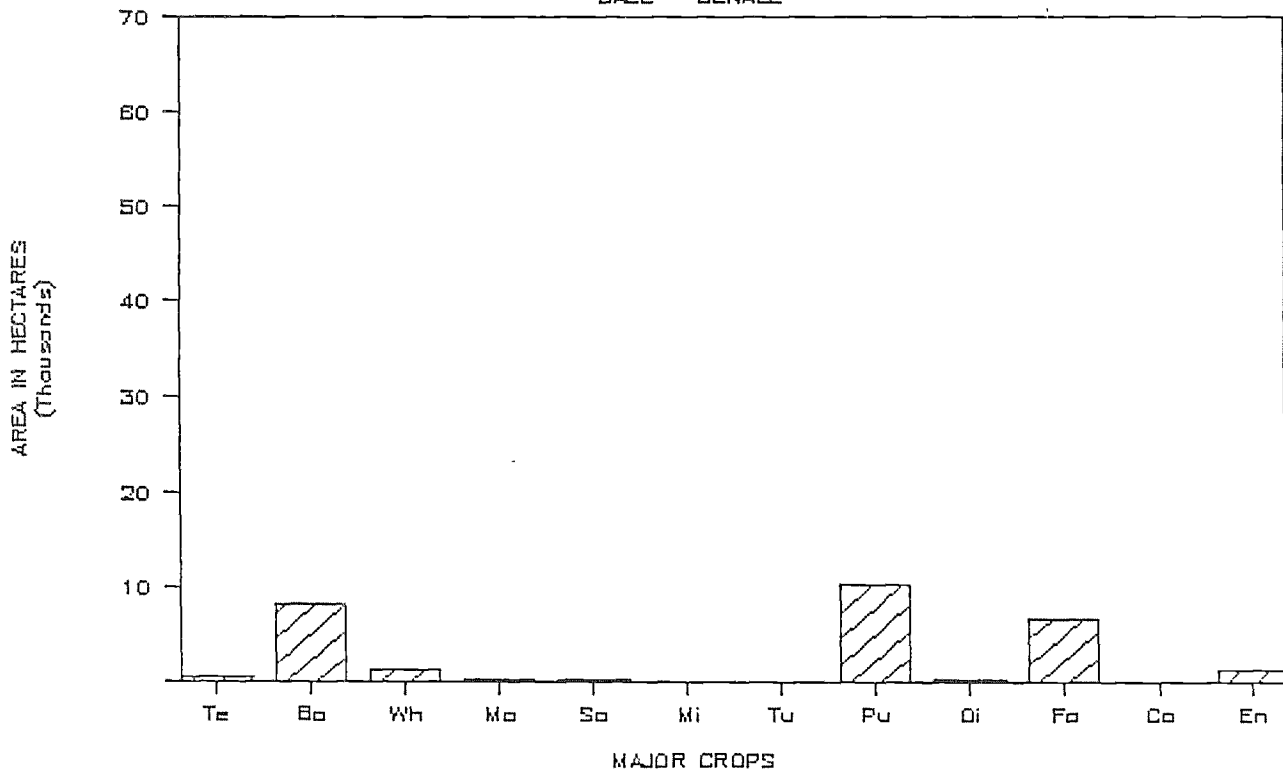
AREA UNDER MAJOR CROPS

BALE — MENDEYO
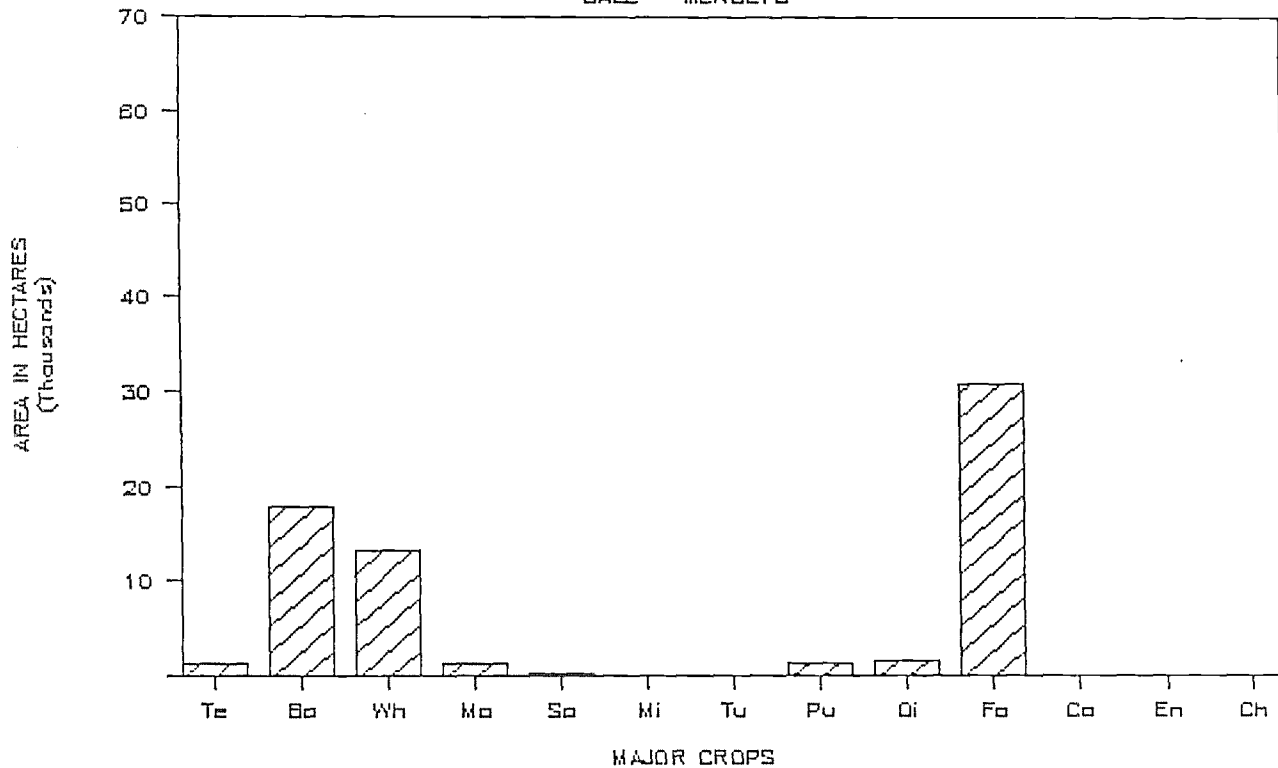
AREA UNDER MAJOR CROPS

BALE — WABE
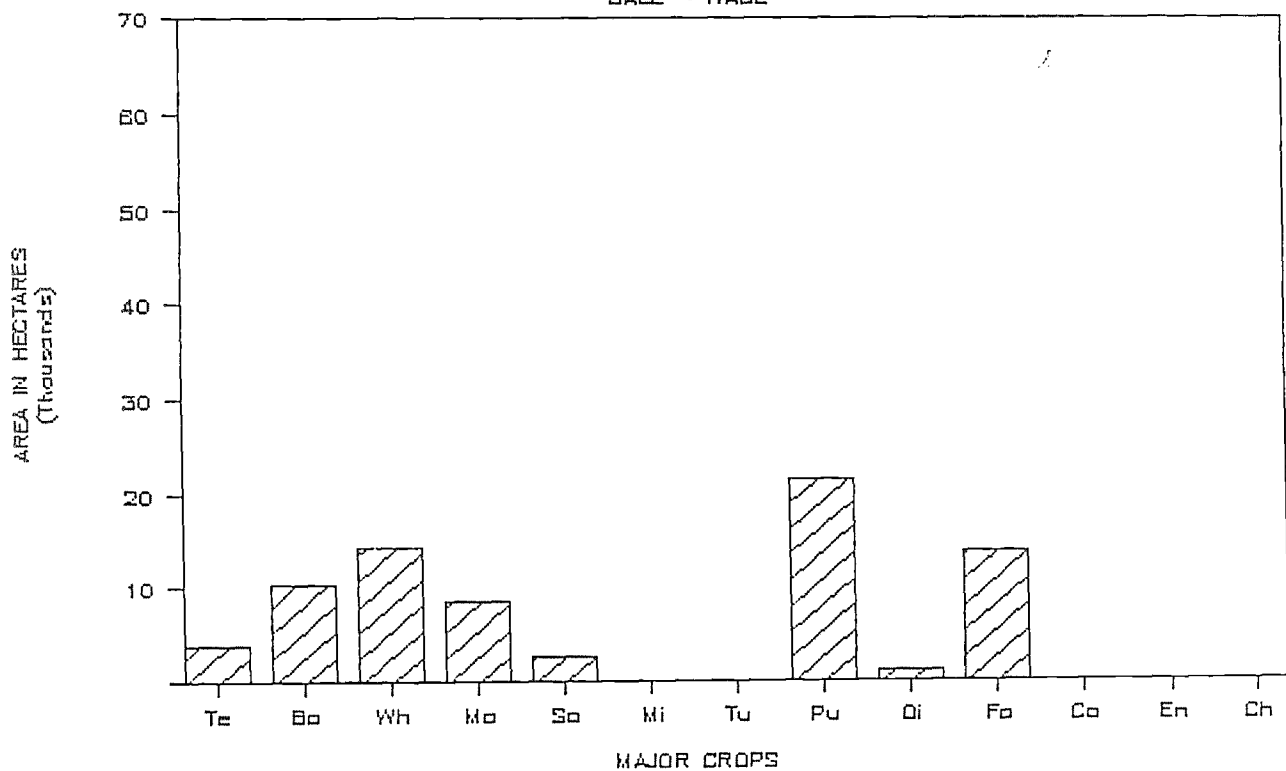
AREA UNDER MAJOR CROPS

BALE — ELKERE
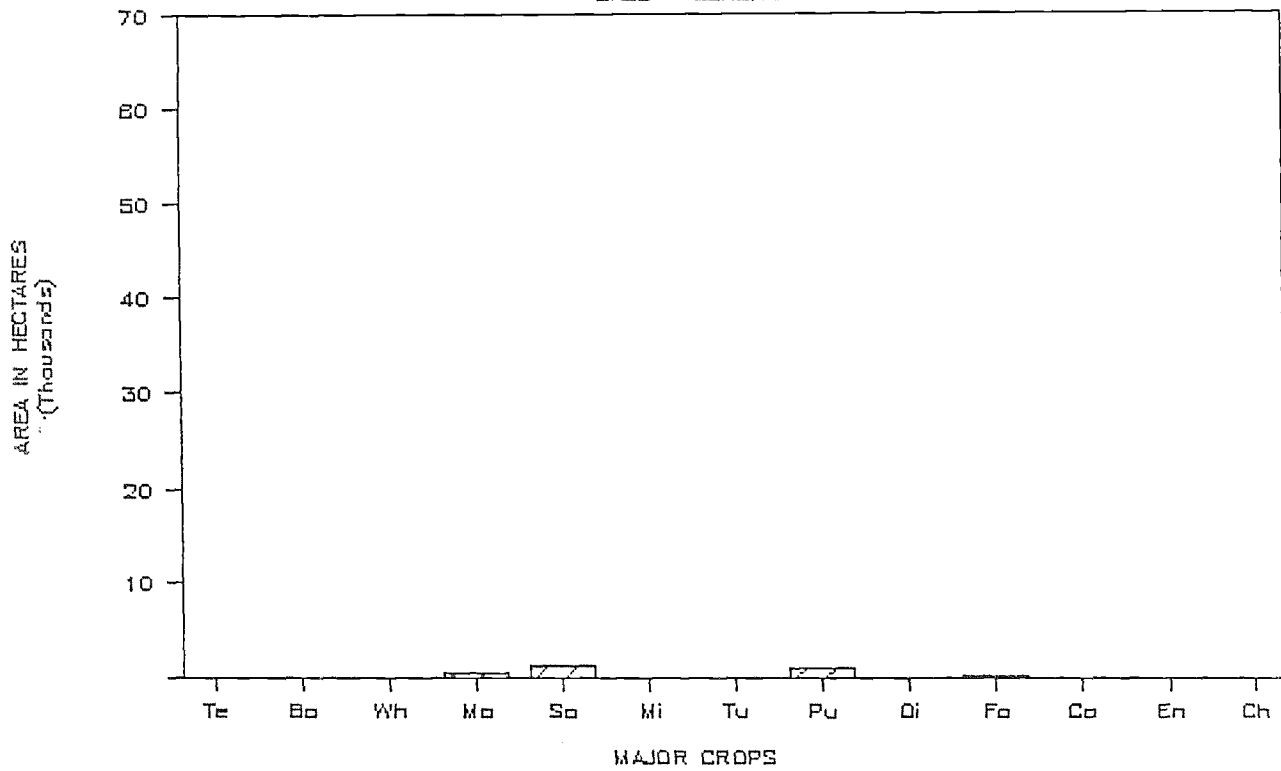
AREA UNDER MAJOR CROPS

BALE — DOLO
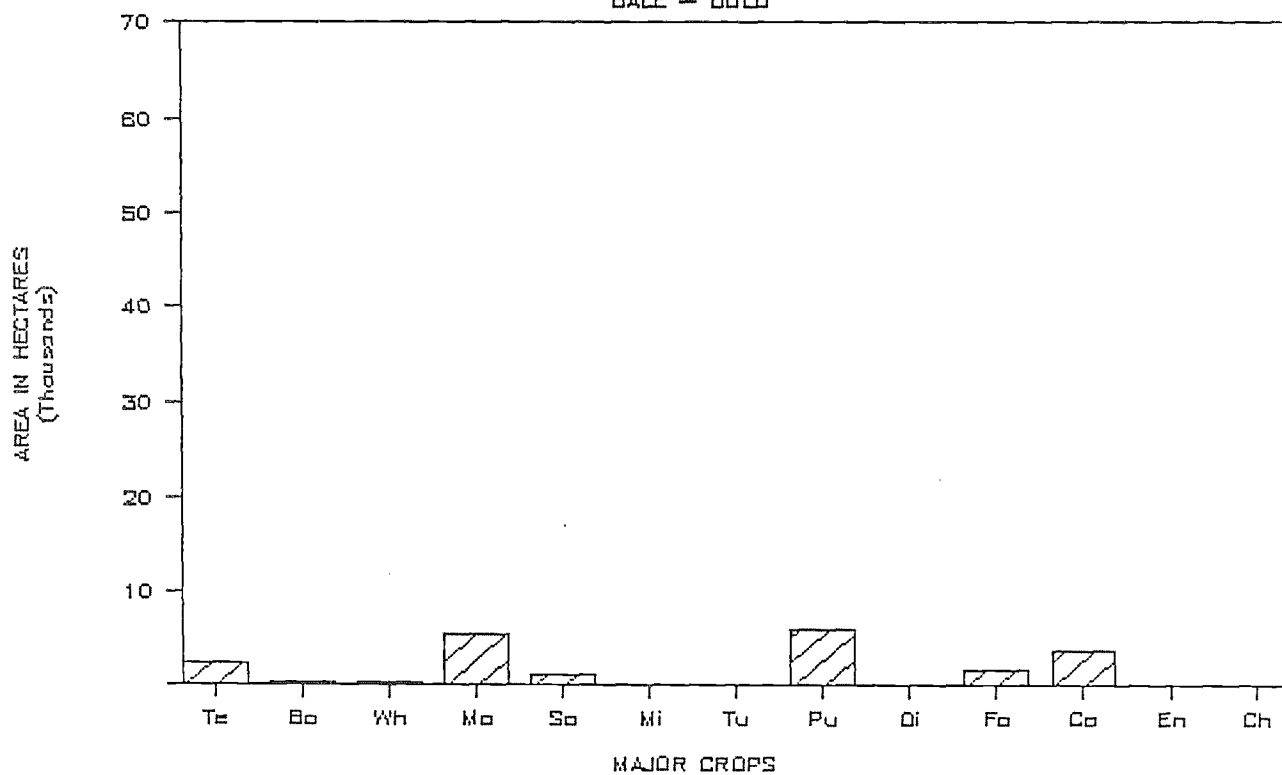
AREA UNDER MAJOR CROPS

GAMO GOFA — GAMO
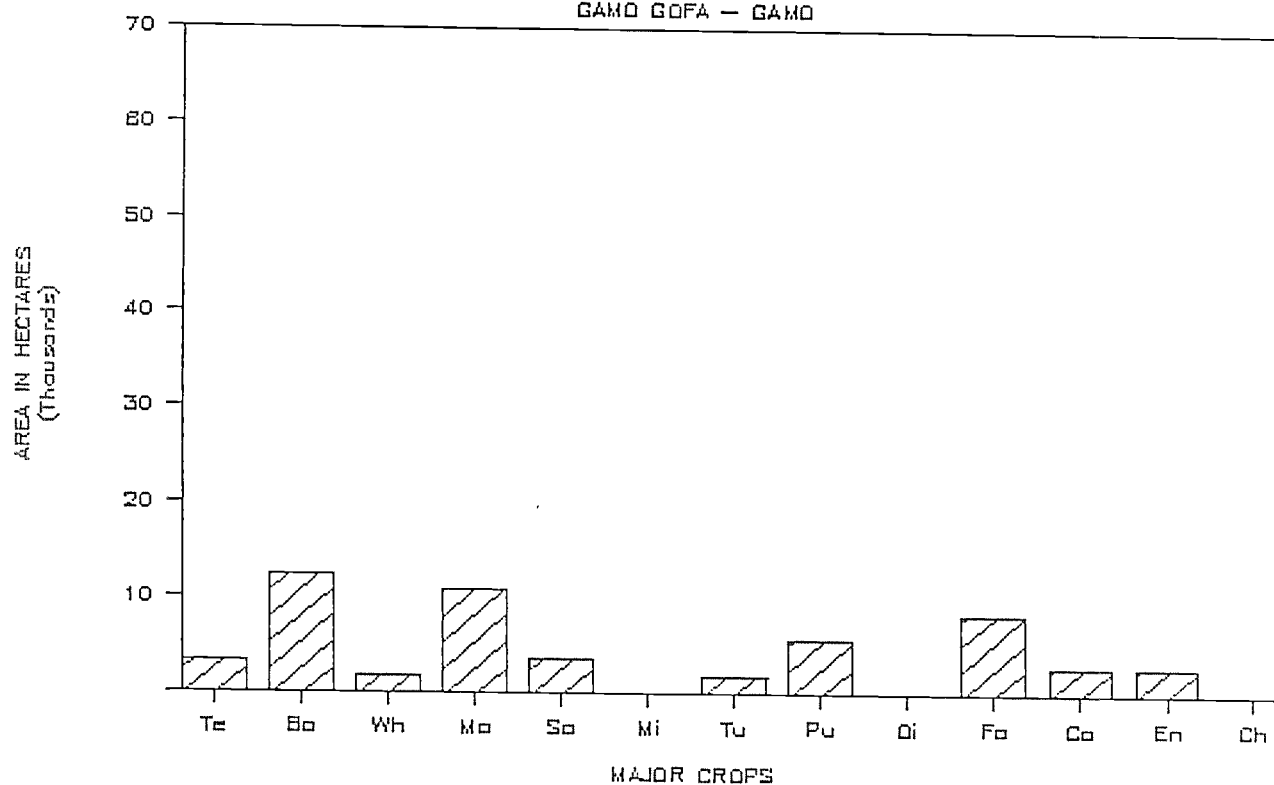
AREA UNDER MAJOR CROPS

GAMO GOFA — GARDULA
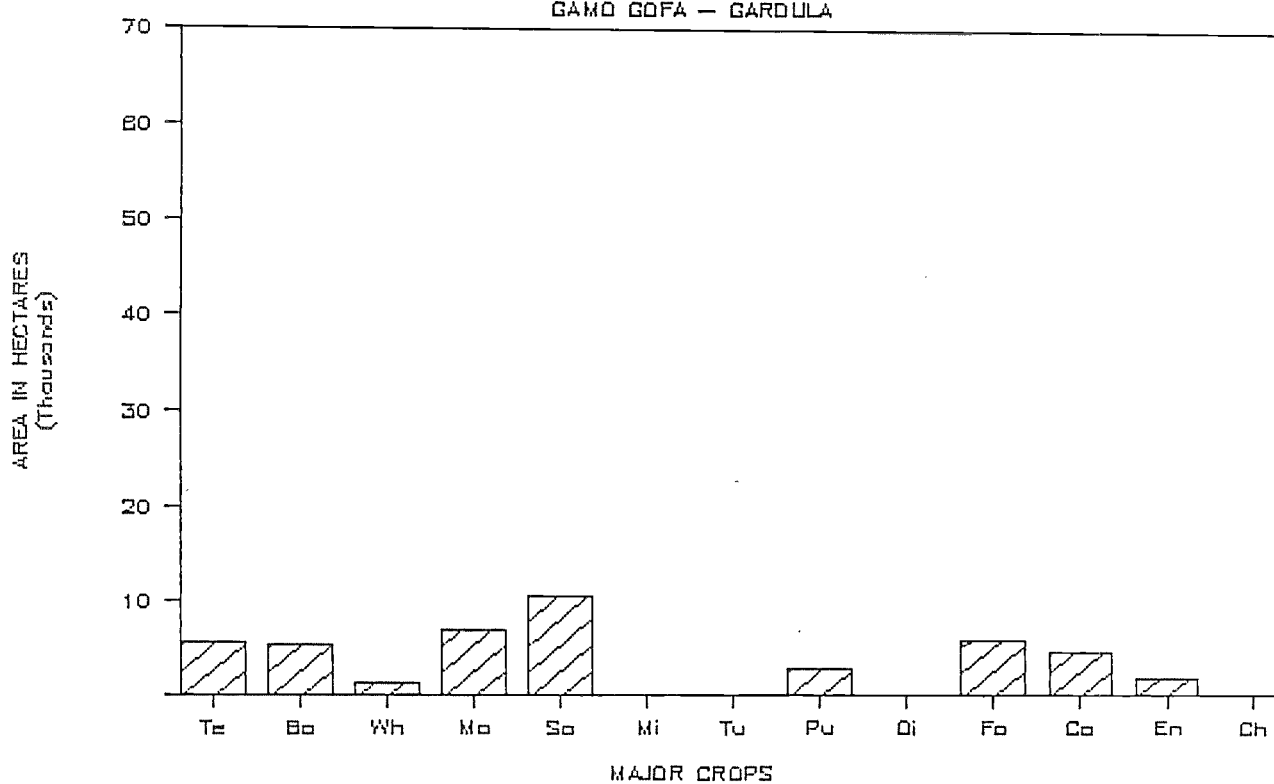
AREA UNDER MAJOR CROPS

GAMO GOFA — GELEB & HAMER BAKO
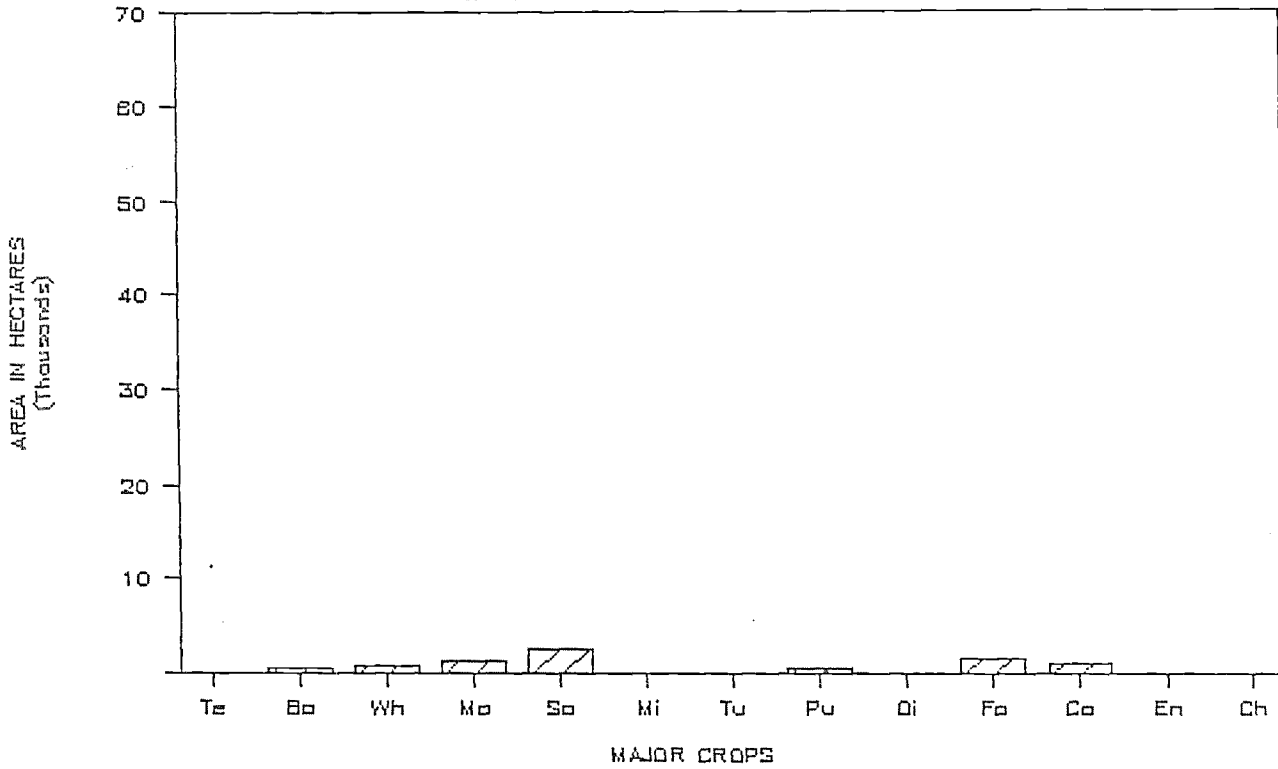
AREA UNDER MAJOR CROPS

GAMO GOFA — GOFA
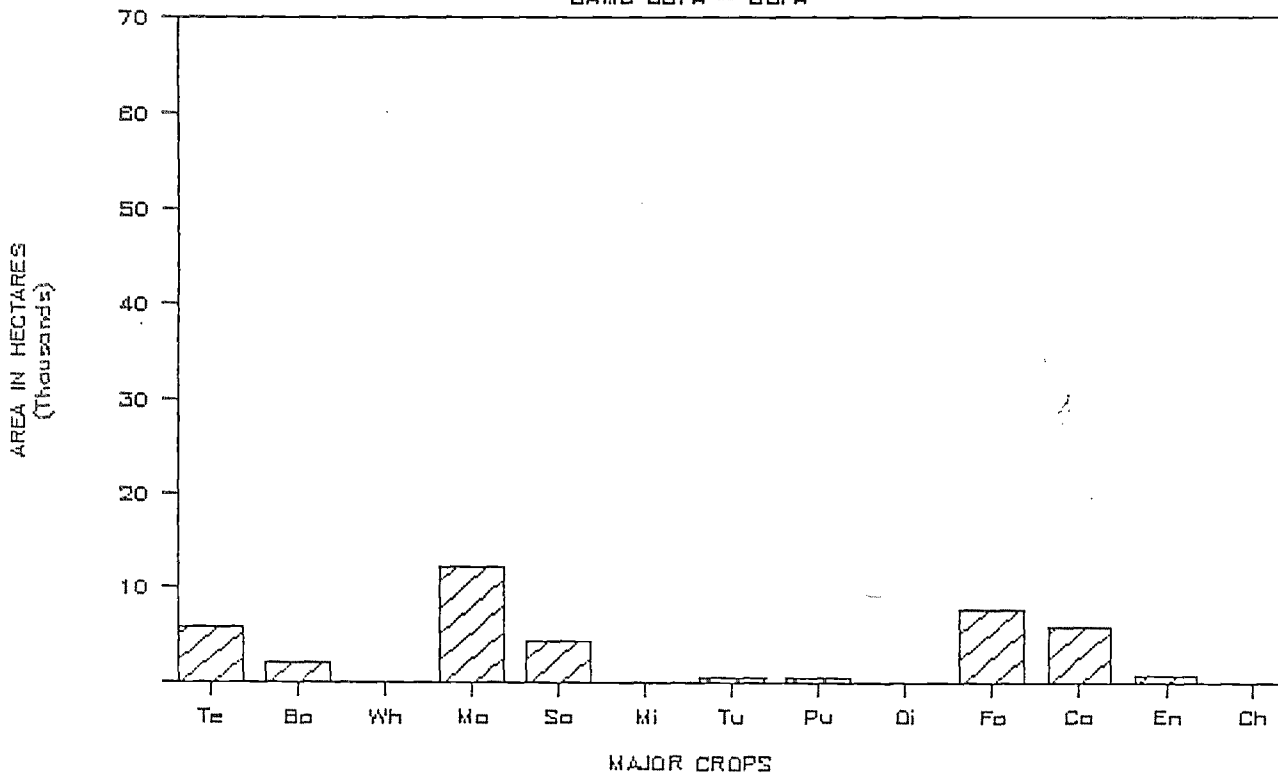
AREA UNDER MAJOR CROPS

GOJAM — BAHIR DAR
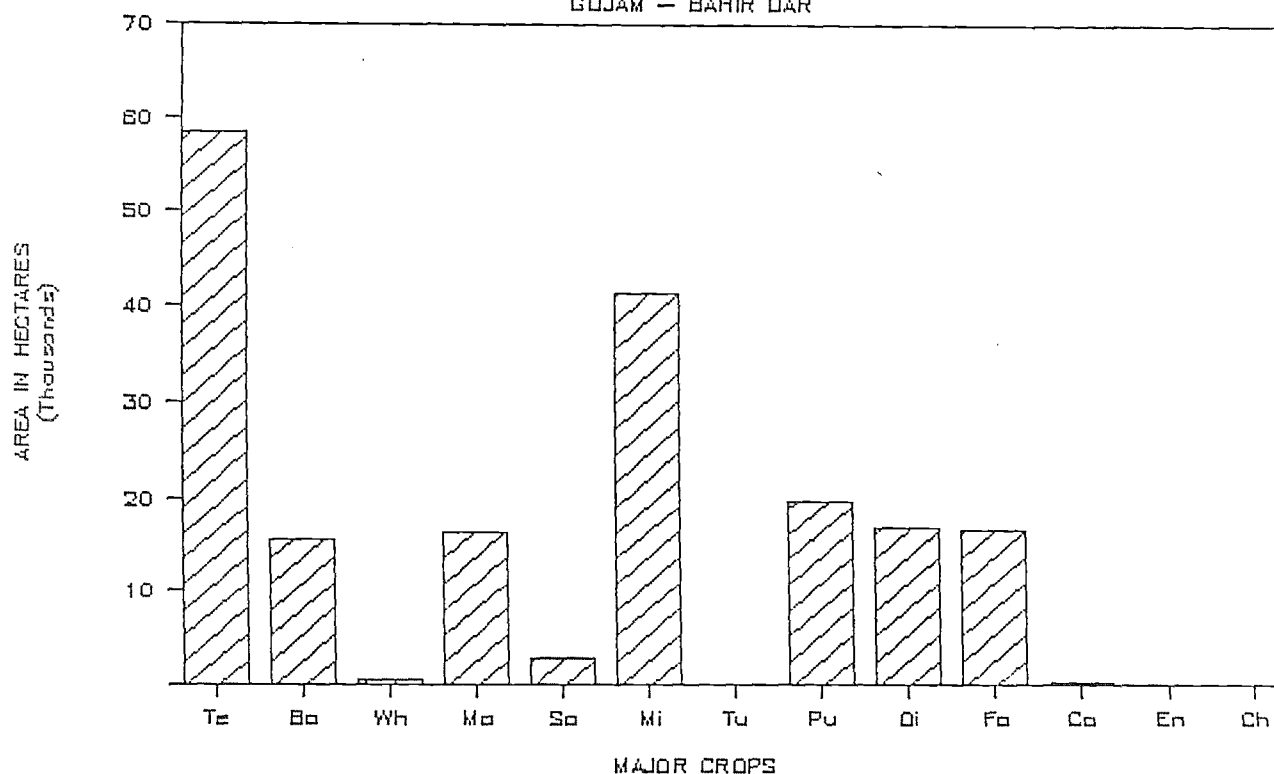
AREA UNDER MAJOR CROPS

GOJAM — MOTA
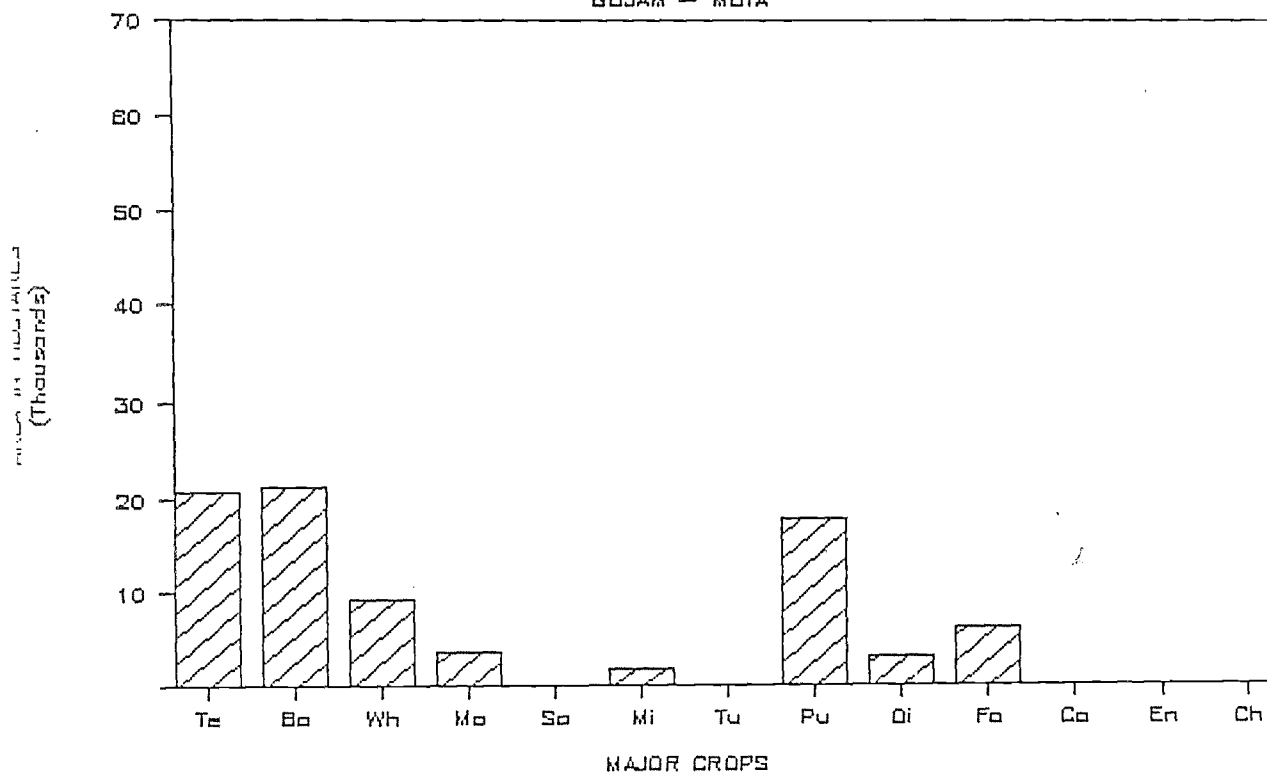
AREA UNDER MAJOR CROPS

GOJAM — BICHENA
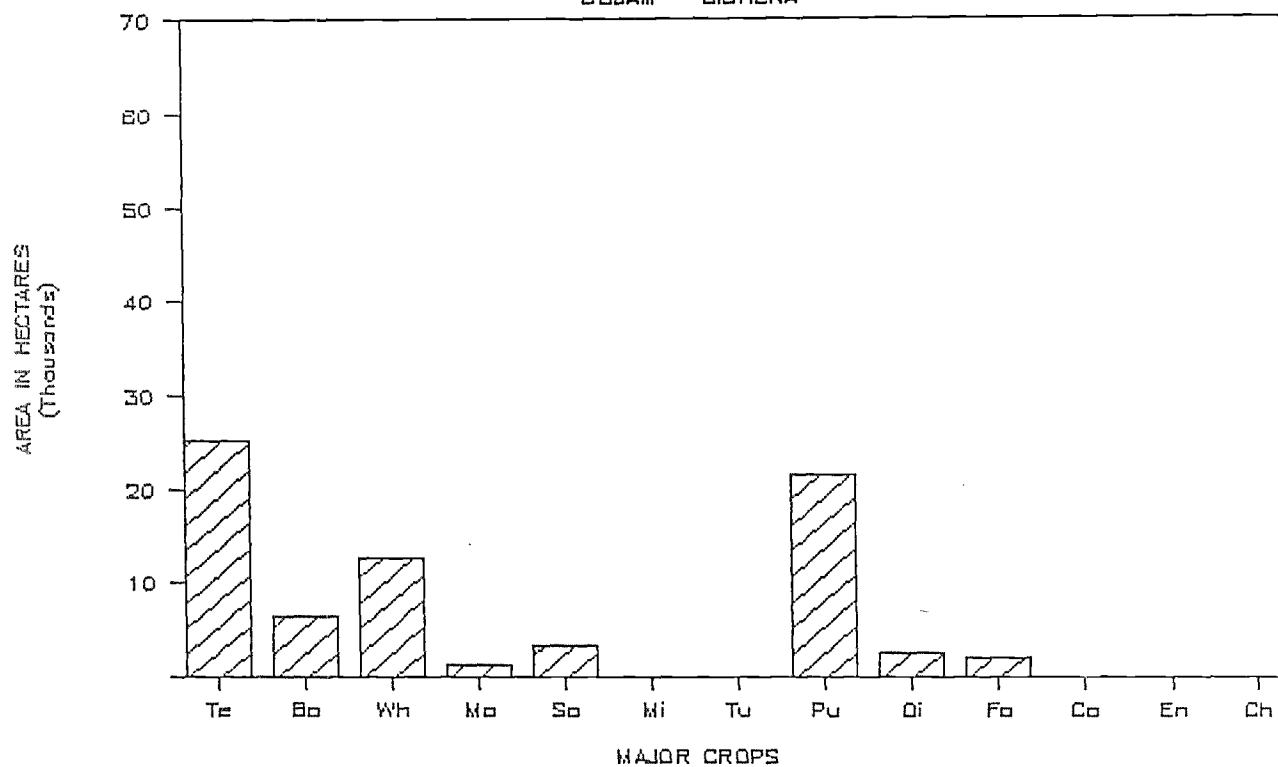
AREA UNDER MAJOR CROPS

GOJAM — DEBRE MARKOS
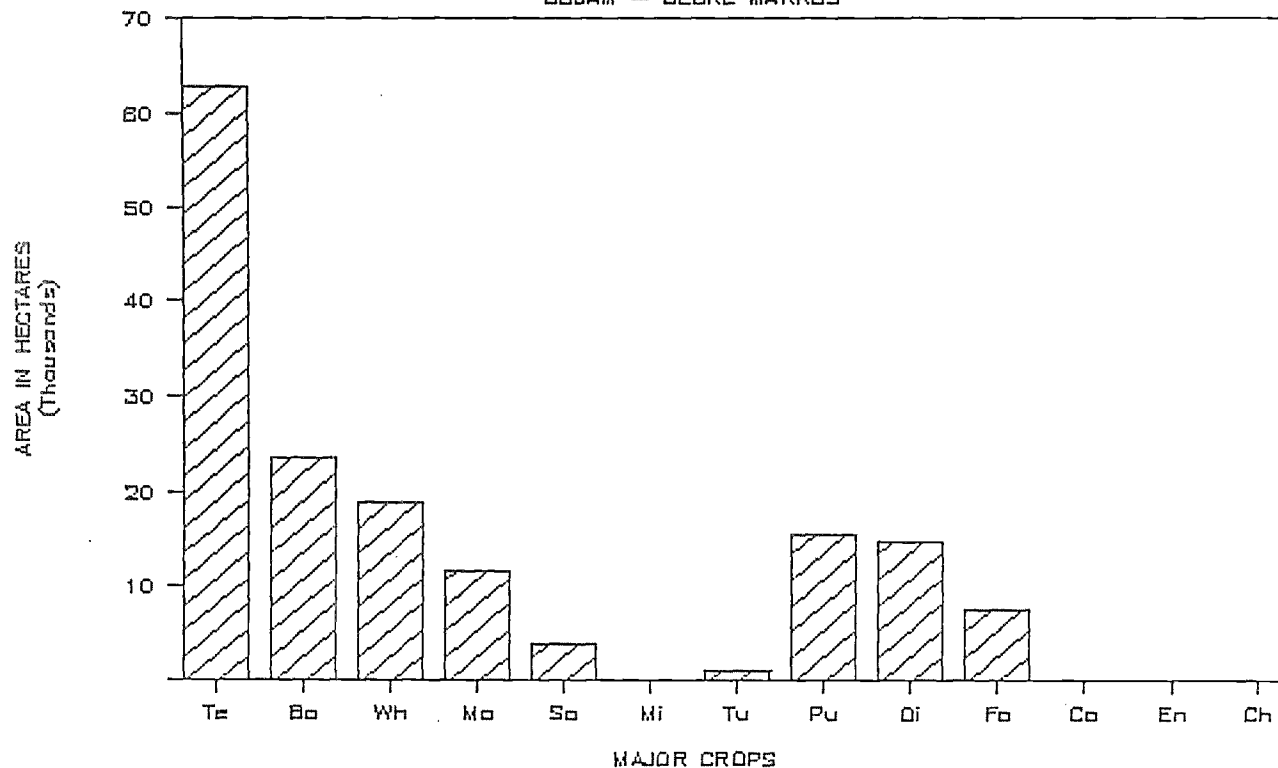
AREA UNDER MAJOR CROPS

GOJAM — KOLA DEGA DAMOT

AREA IN HECTARES (Thousands)
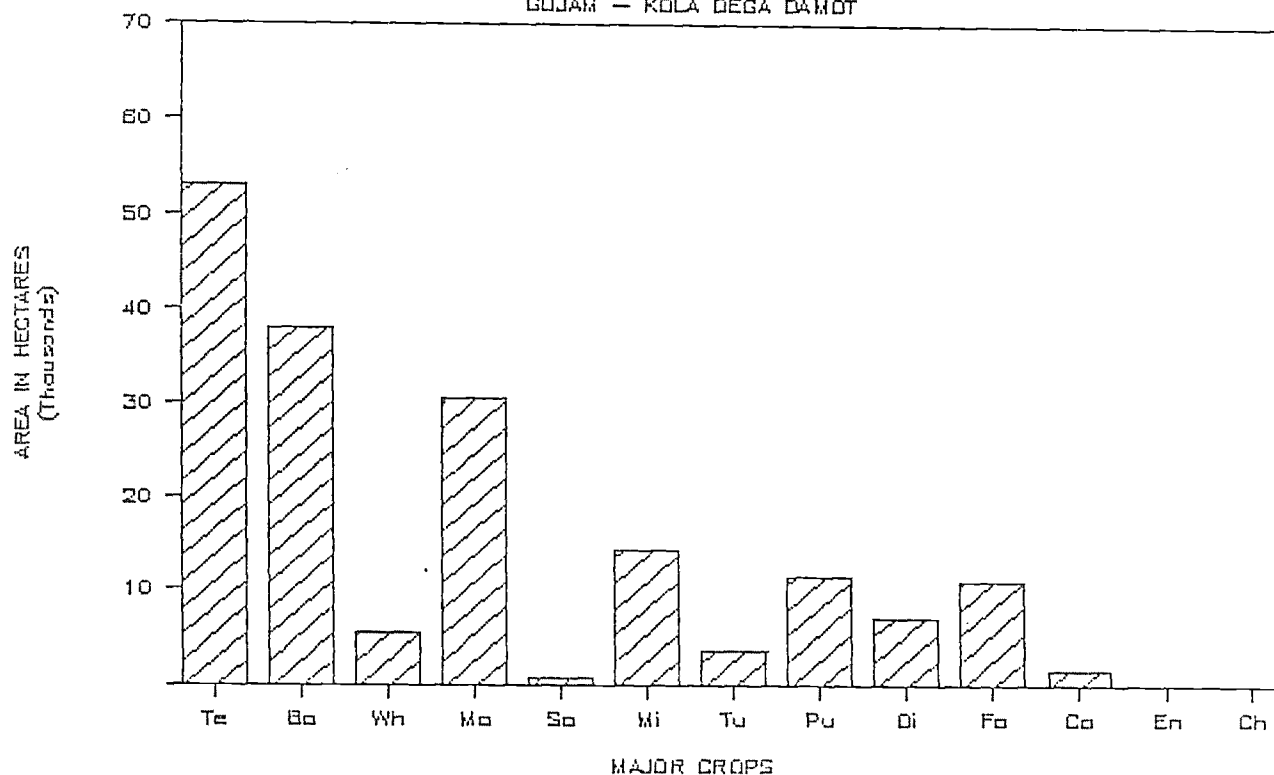
MAJOR CROPS

AREA UNDER MAJOR CROPS

GOJAM — AGEW MIDIR

AREA IN HECTARES (Thousands)
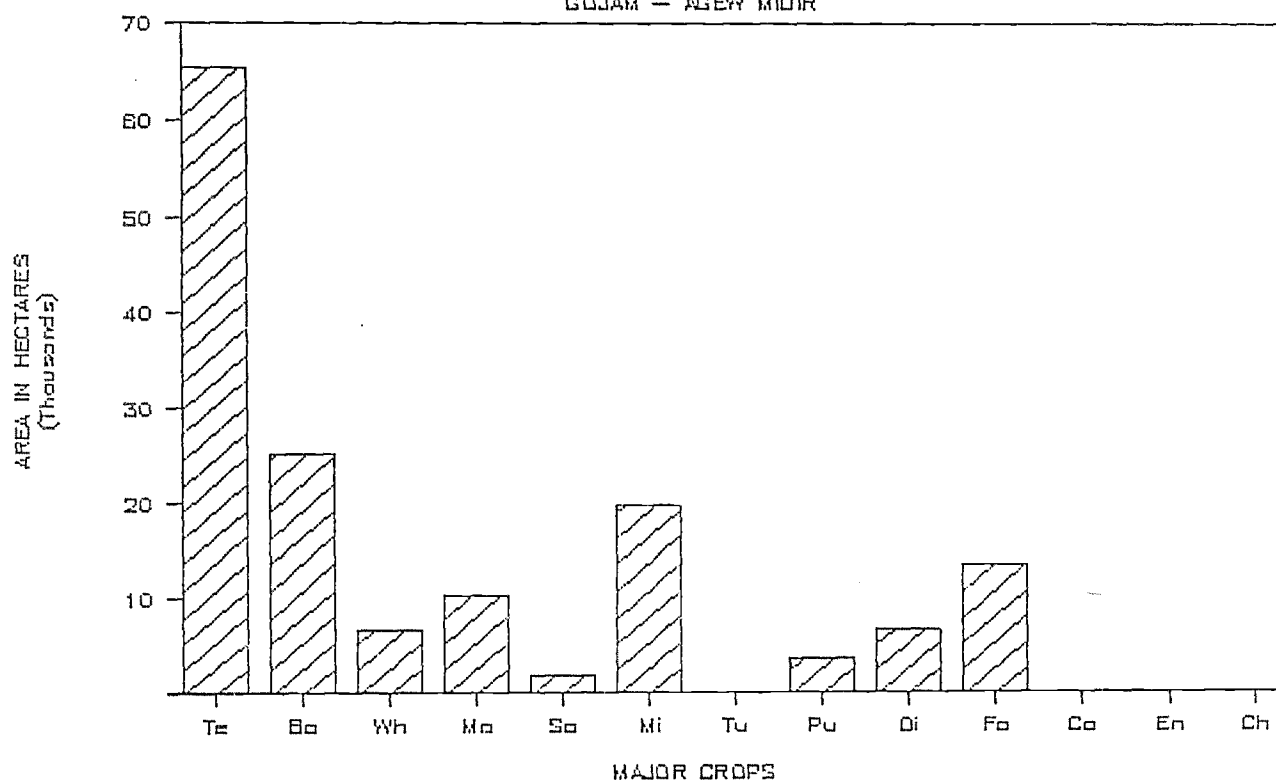
MAJOR CROPS

AREA UNDER MAJOR CROPS
GOJAM — METEKEL
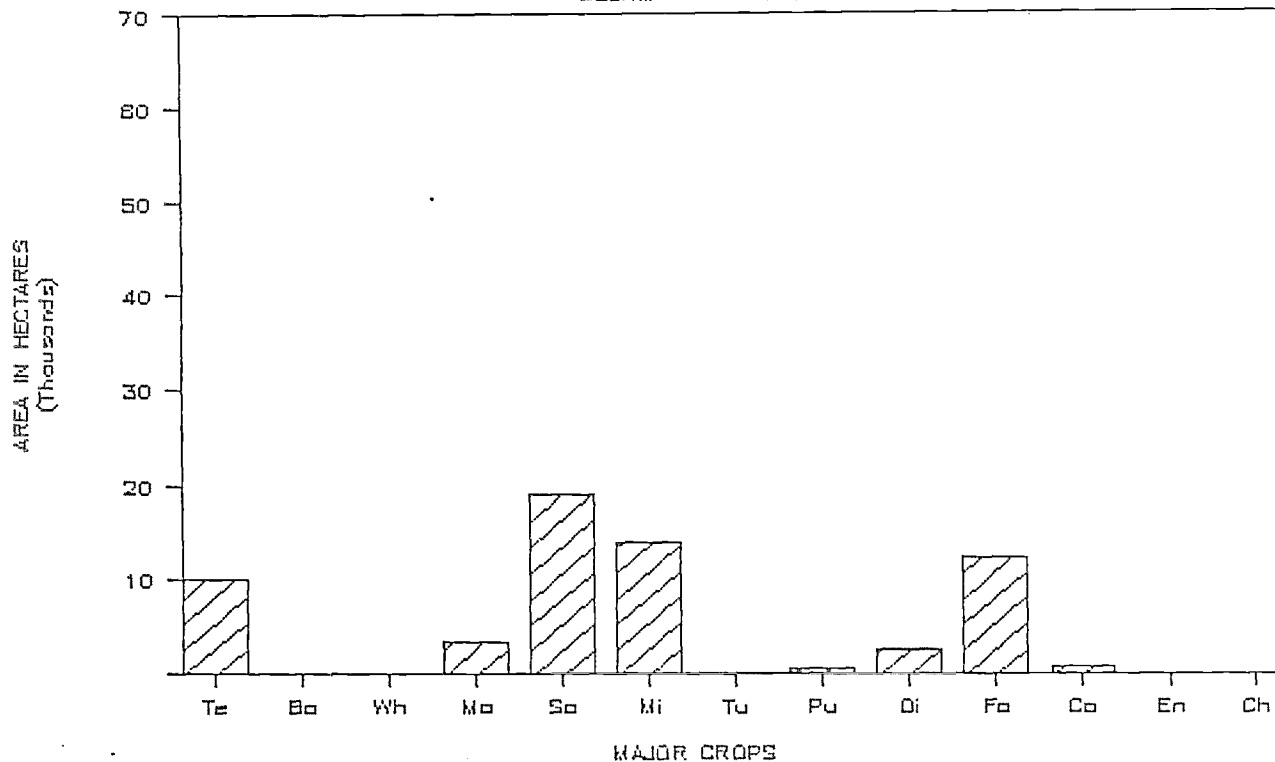
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GONDER — WEGERA
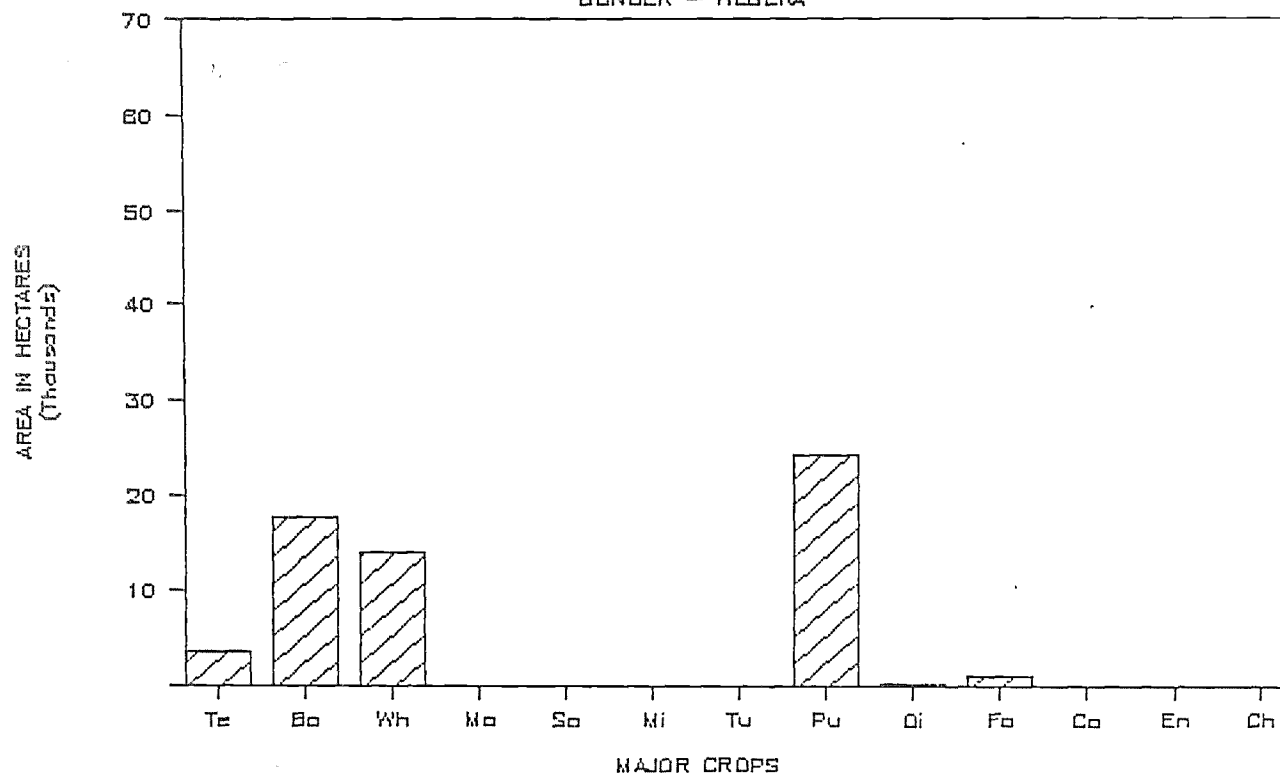
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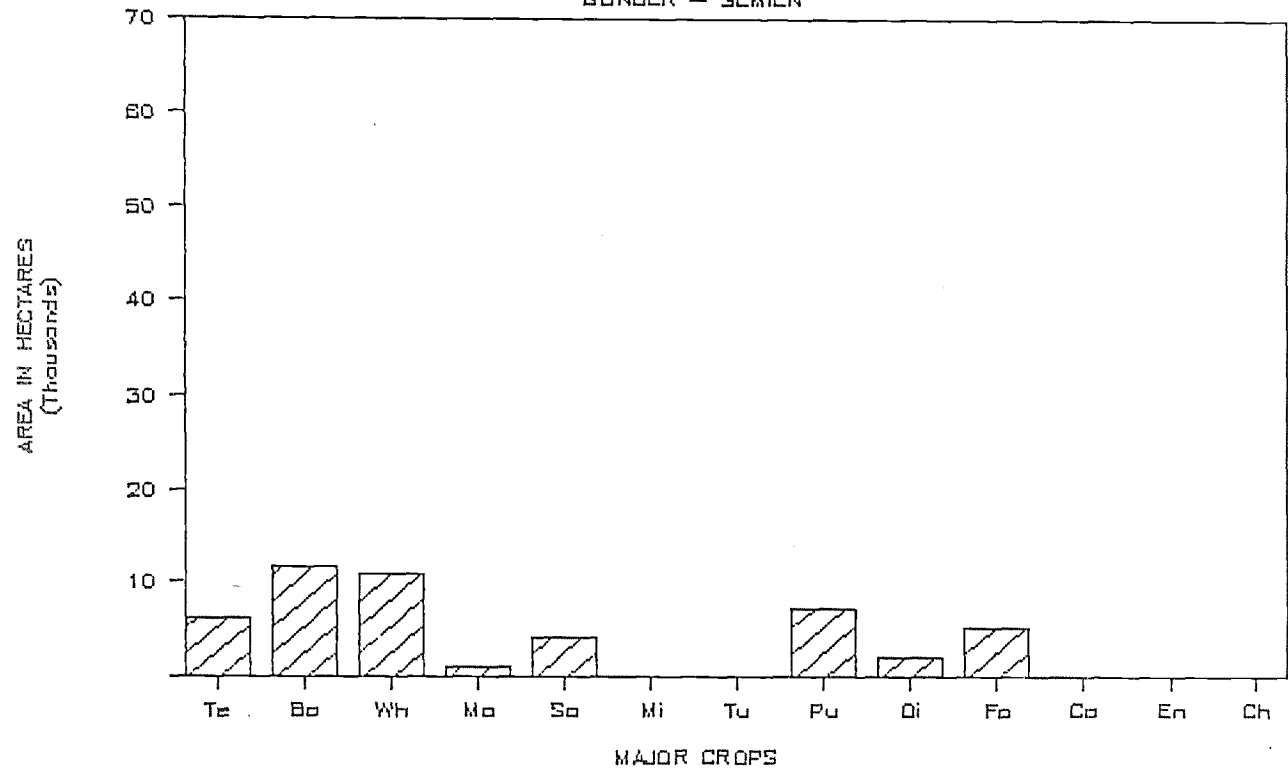
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GONDER — LIBO
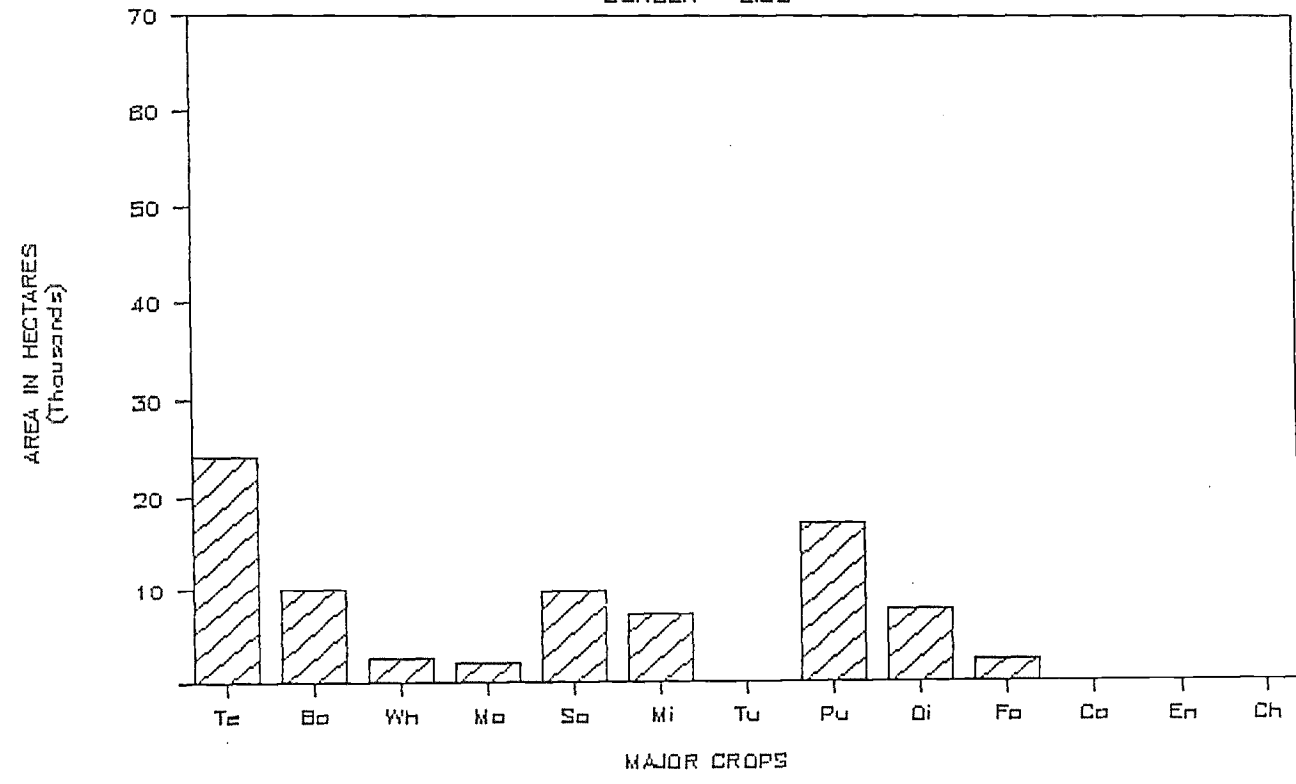
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GONDER — GAYINT
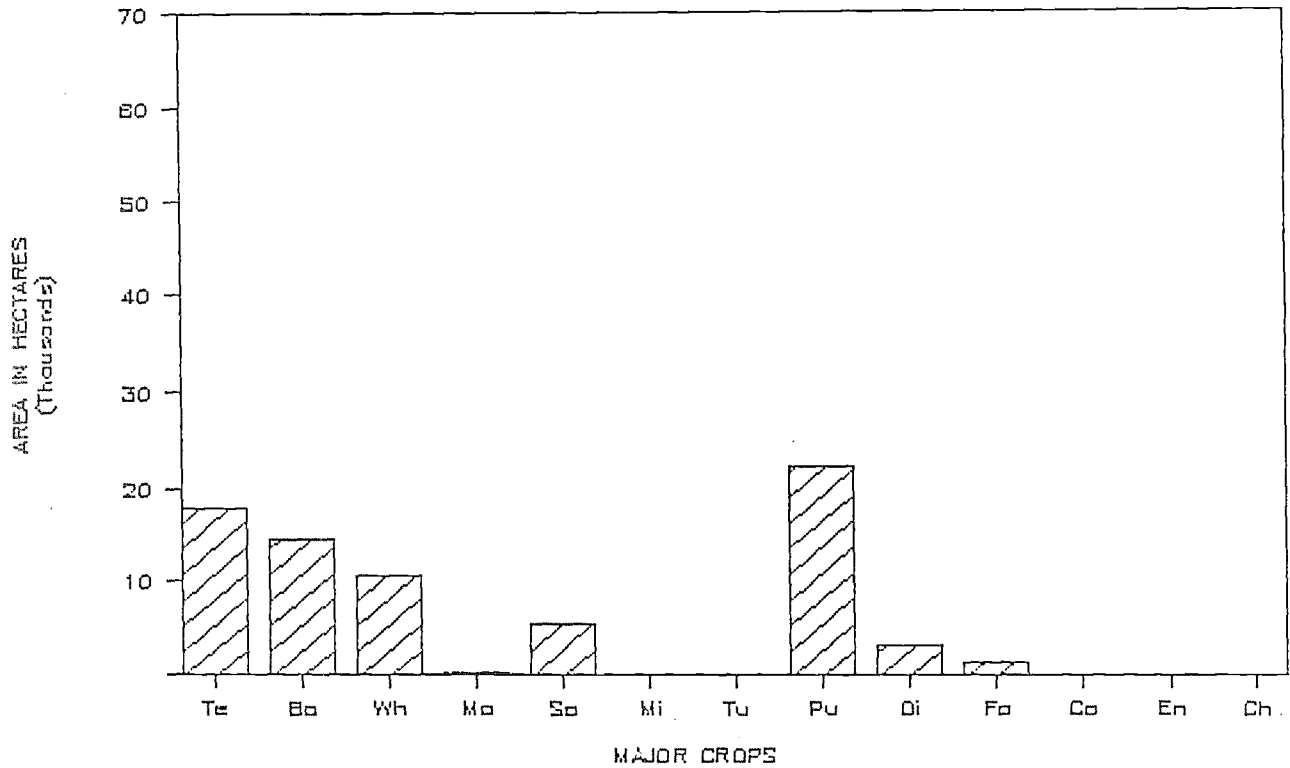
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GONDER — DEBRE TABOR
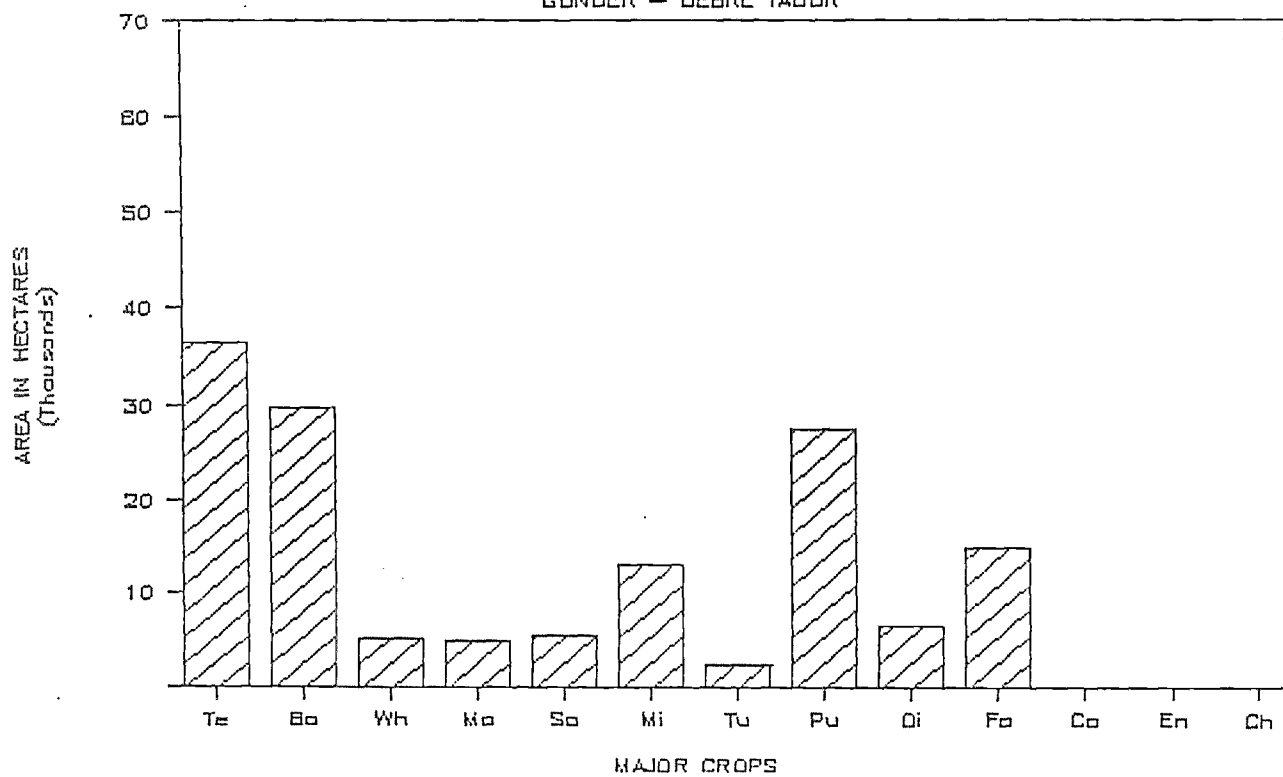
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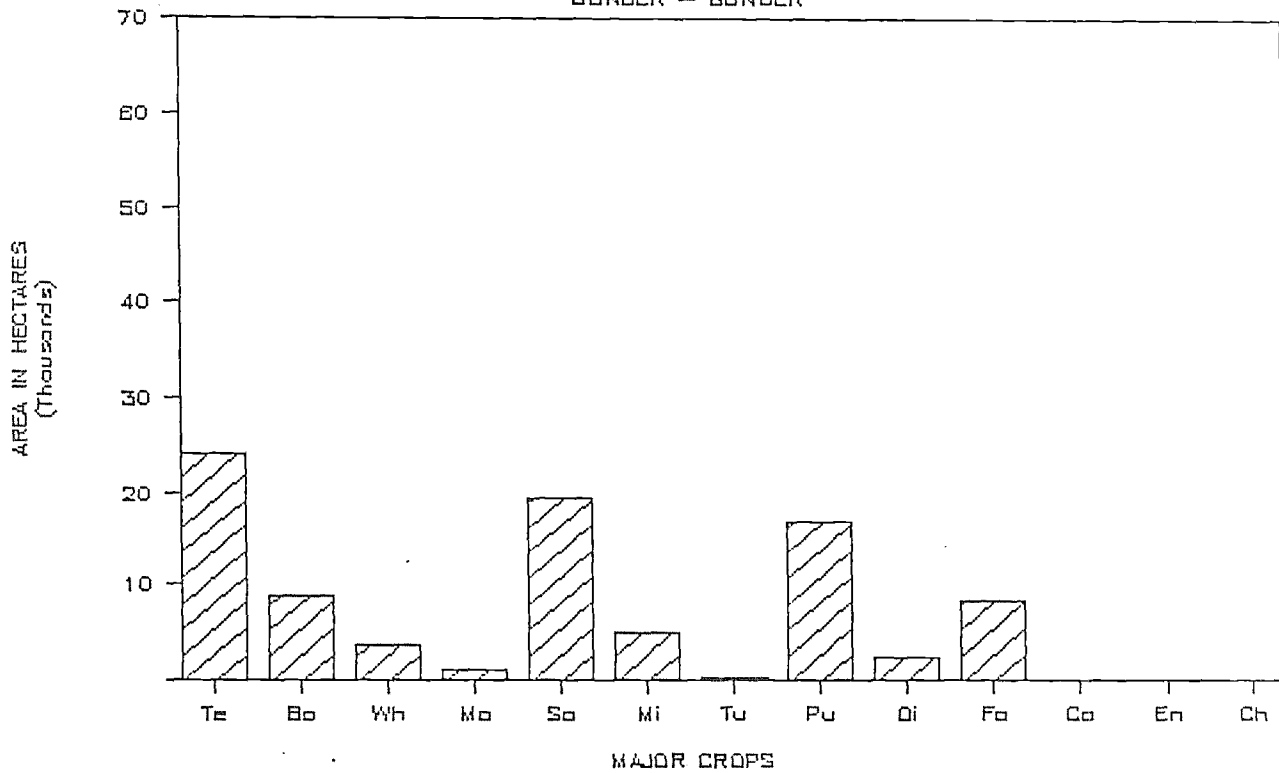
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GONDER — CHILGA
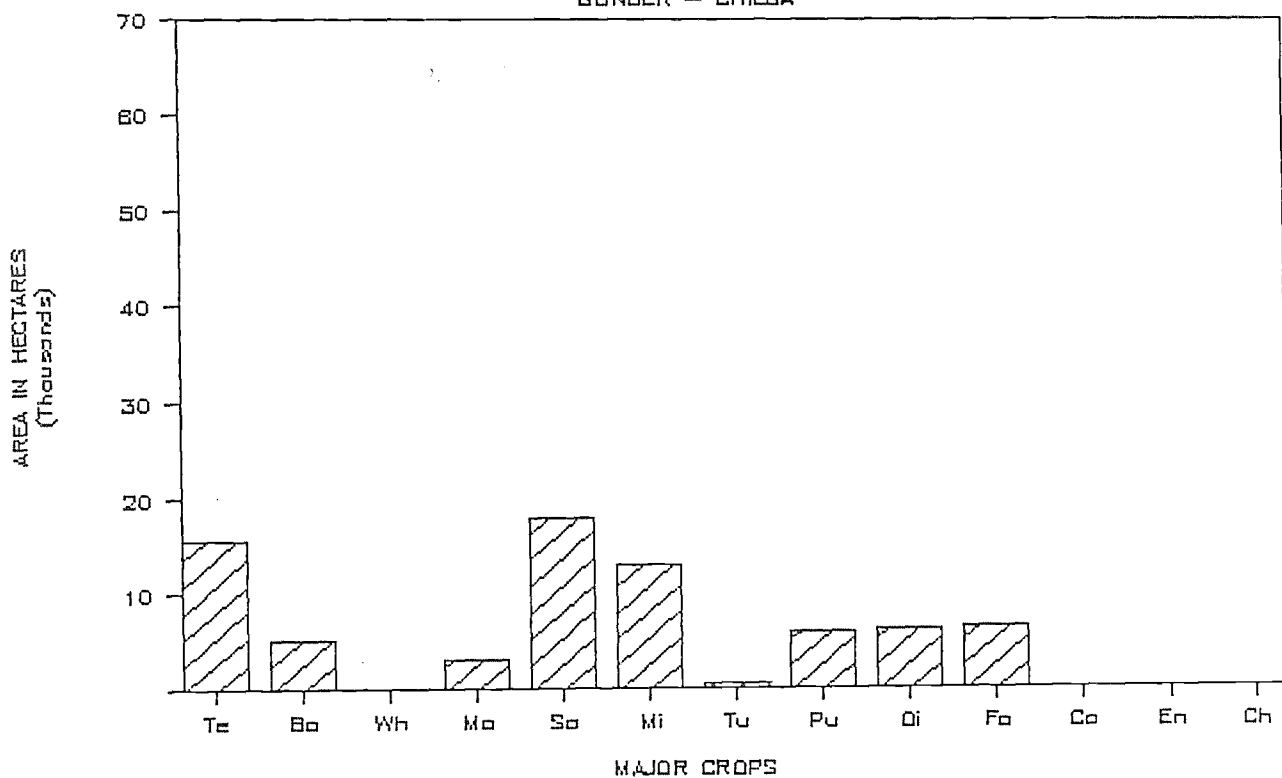
AREA UNDER MAJOR CROPS

HARERGE — CHERCHER
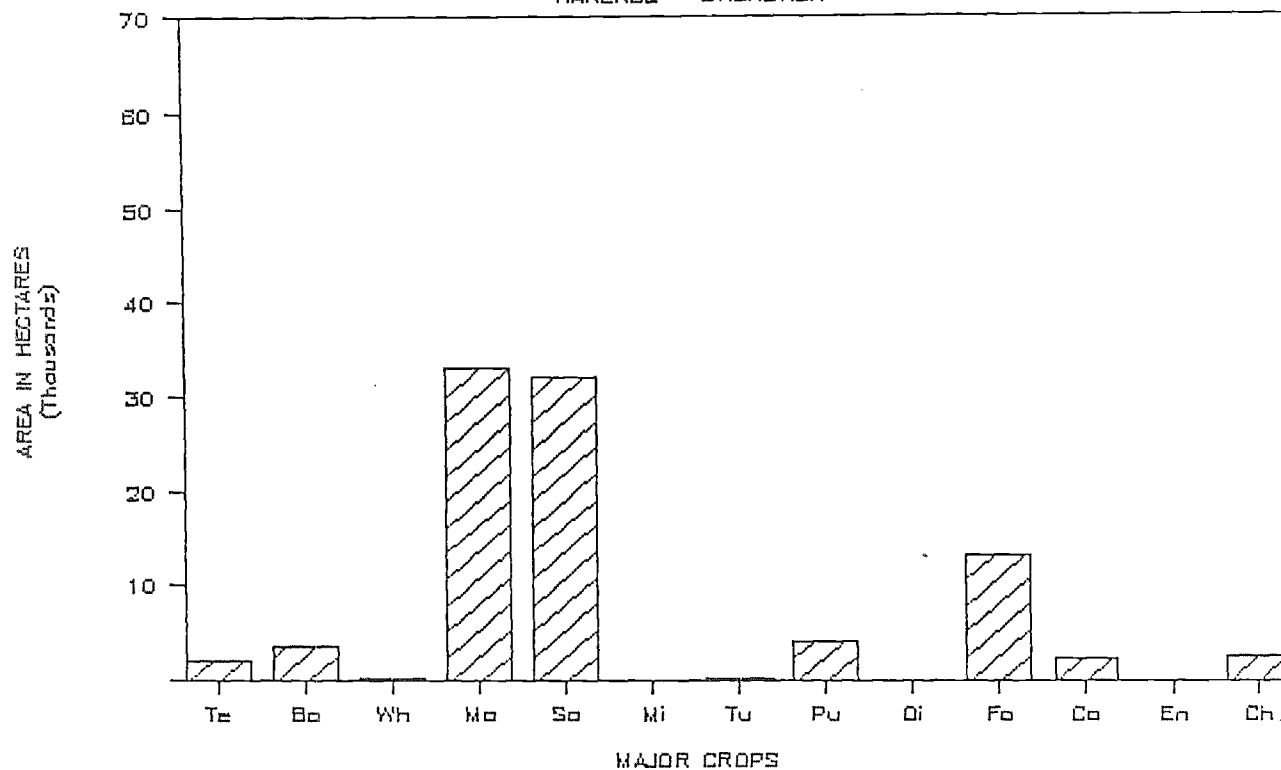
AREA UNDER MAJOR CROPS

HARERGE — DIRE DAWA
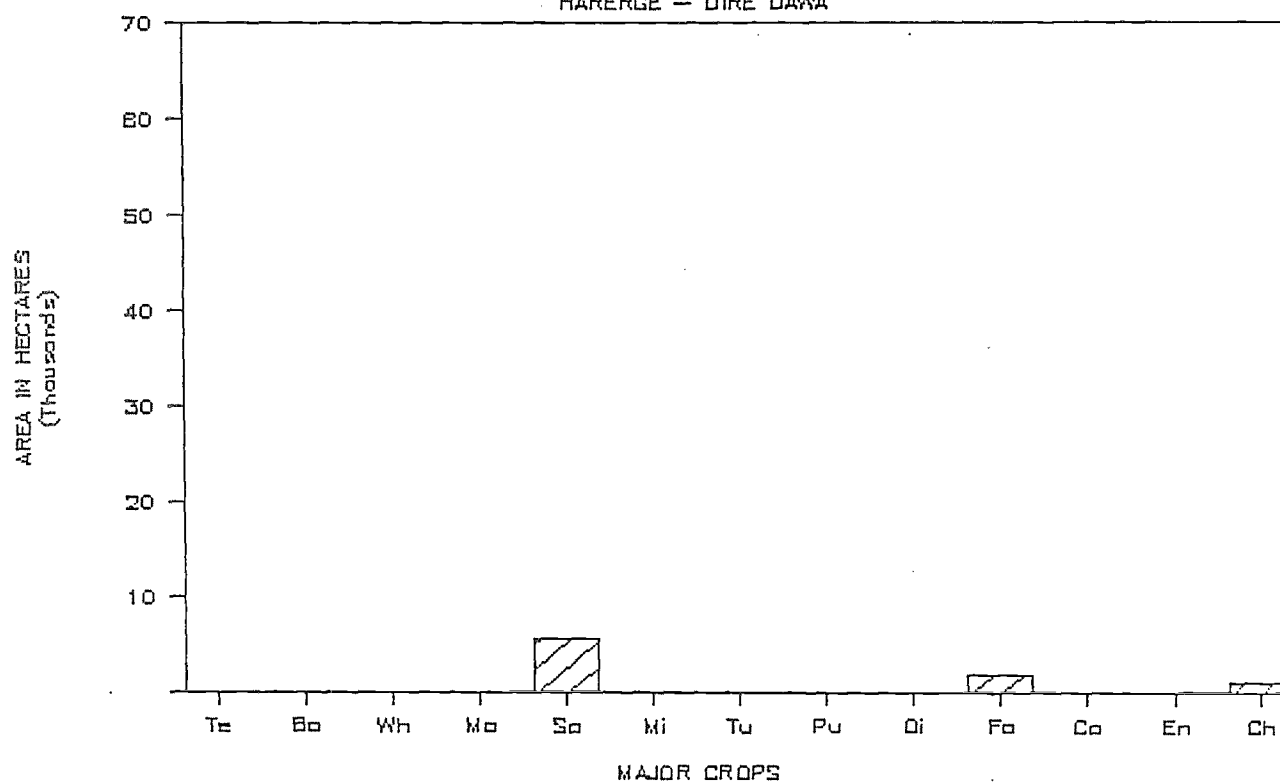
AREA UNDER MAJOR CROPS

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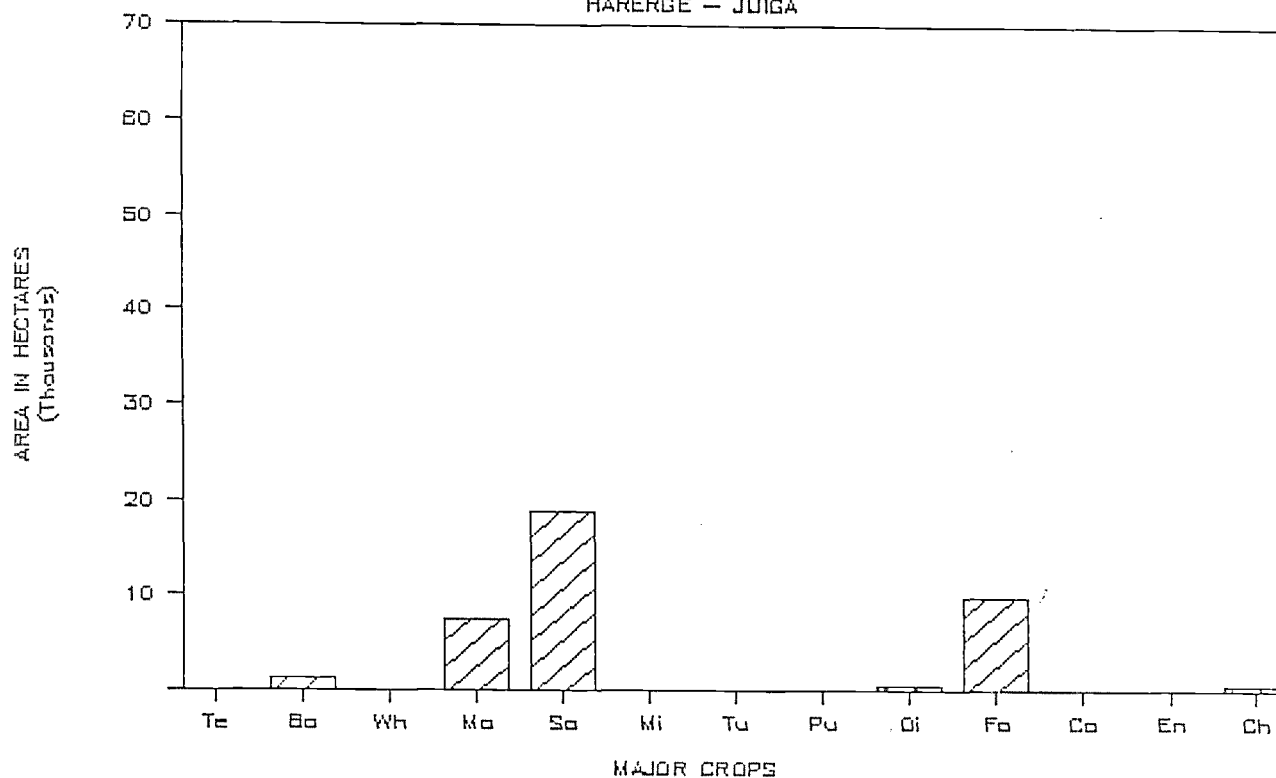
AREA UNDER MAJOR CROPS

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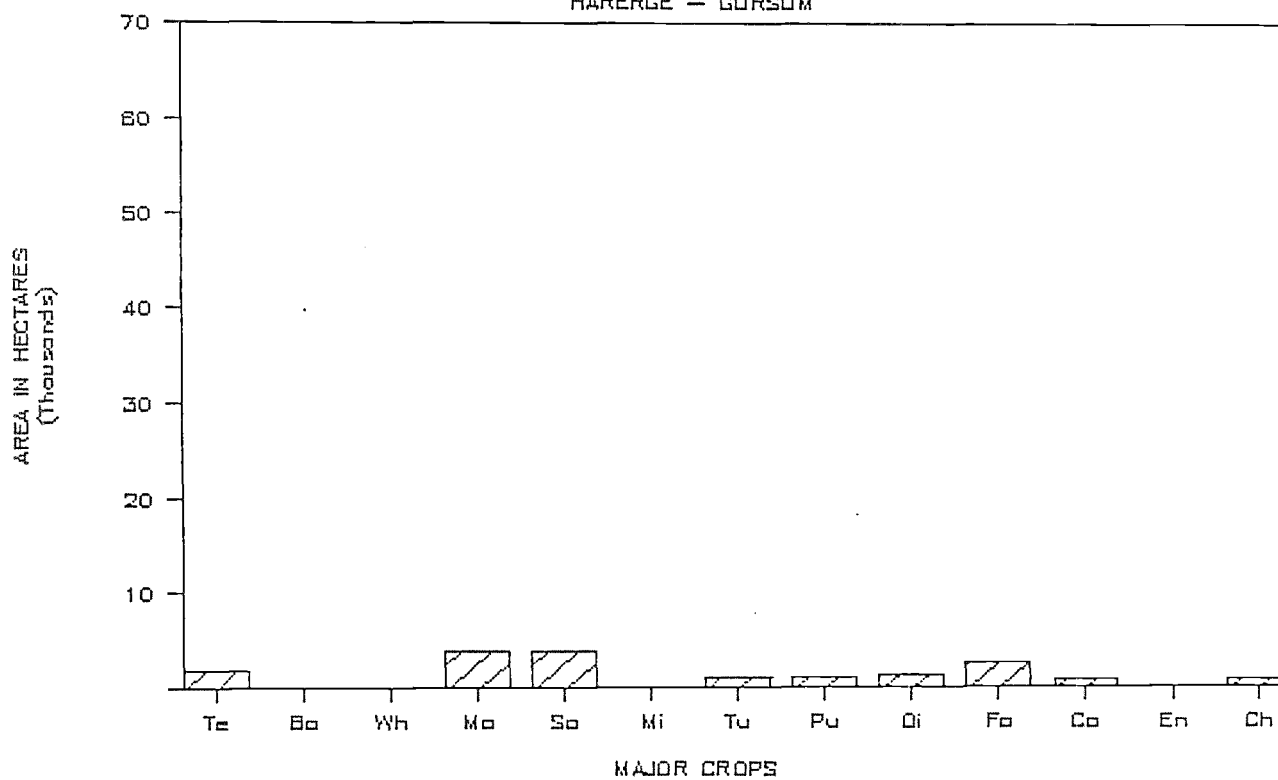
AREA UNDER MAJOR CROPS
HARERGE — GARA MULETA
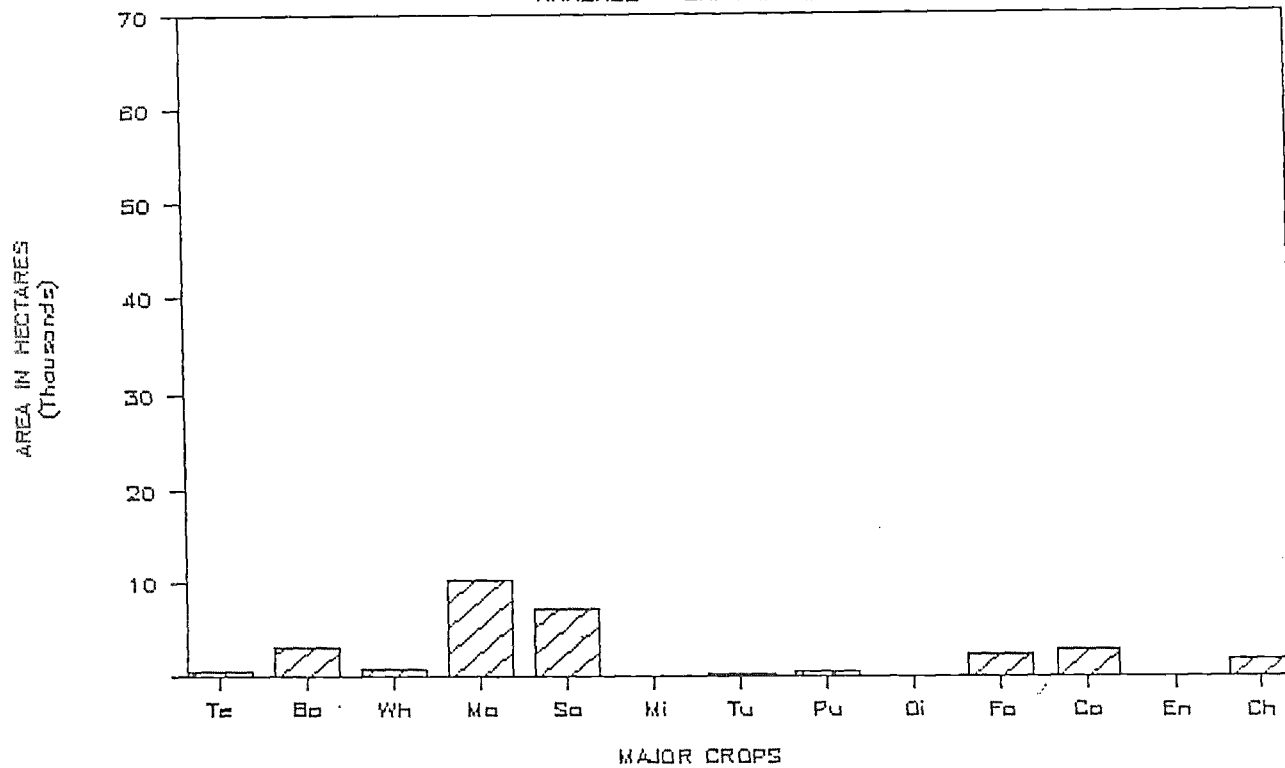
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HARERGE — HARER ZURIA
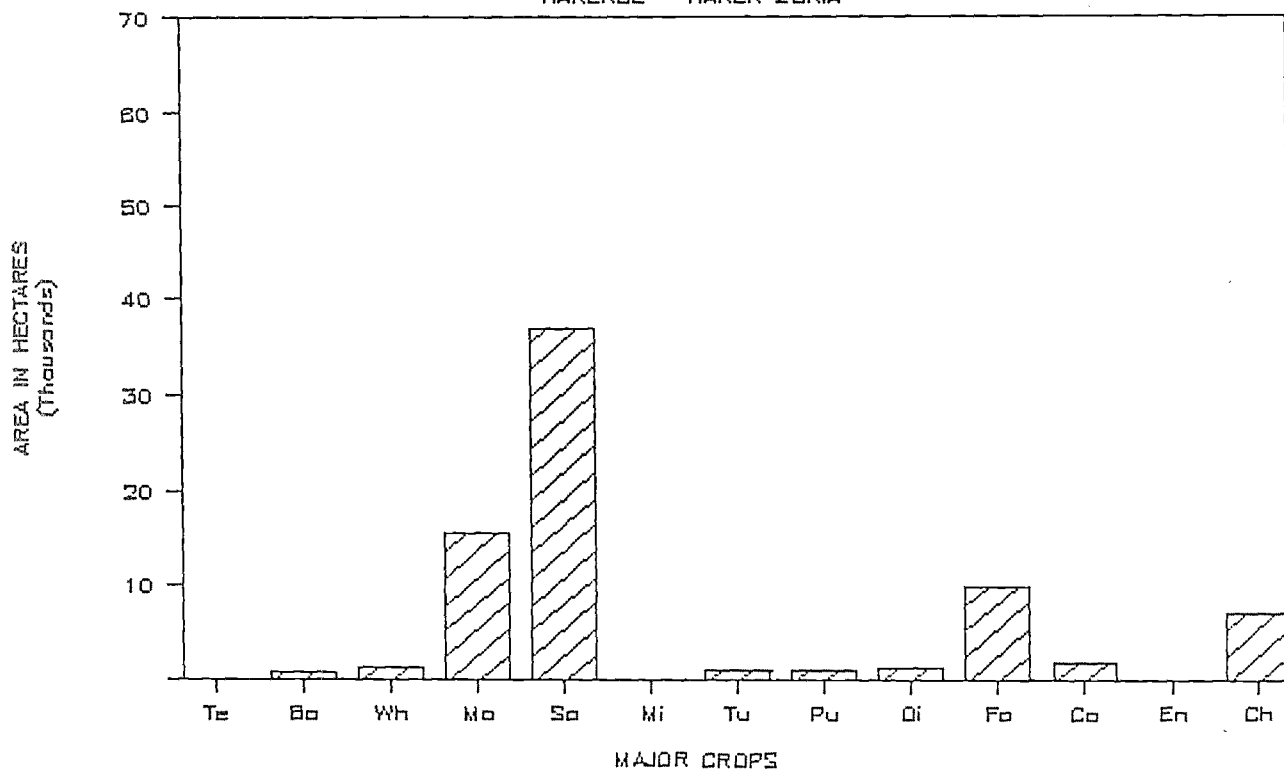
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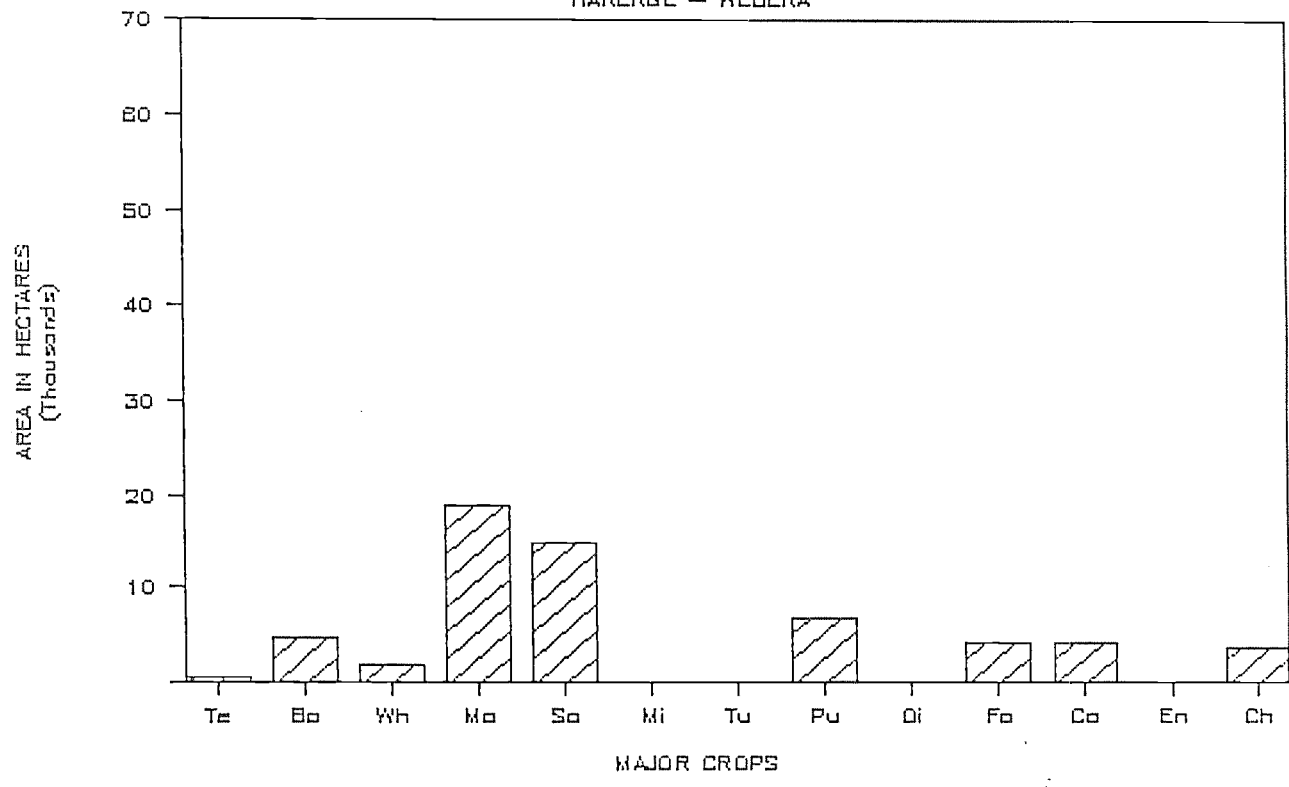
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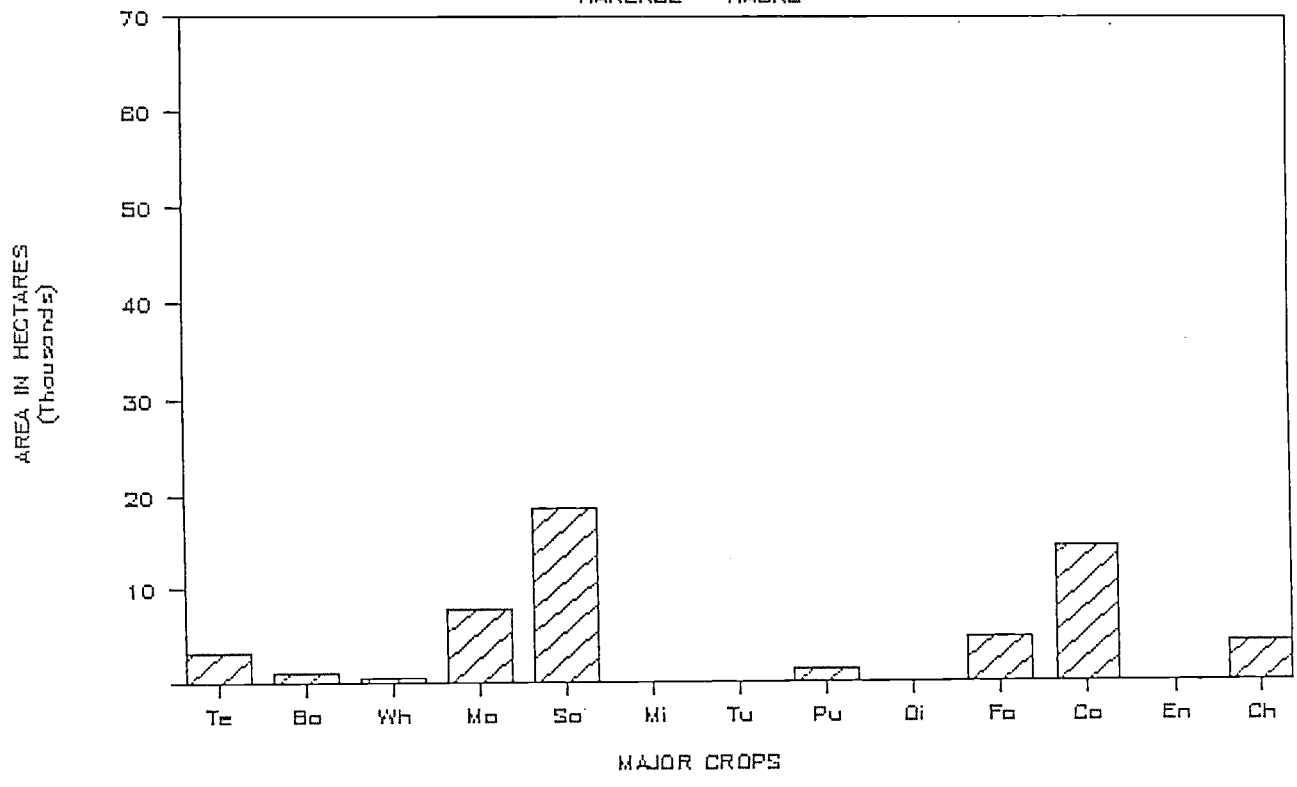
AREA UNDER MAJOR CROPS

ILUBABOR — SOR & GEBA
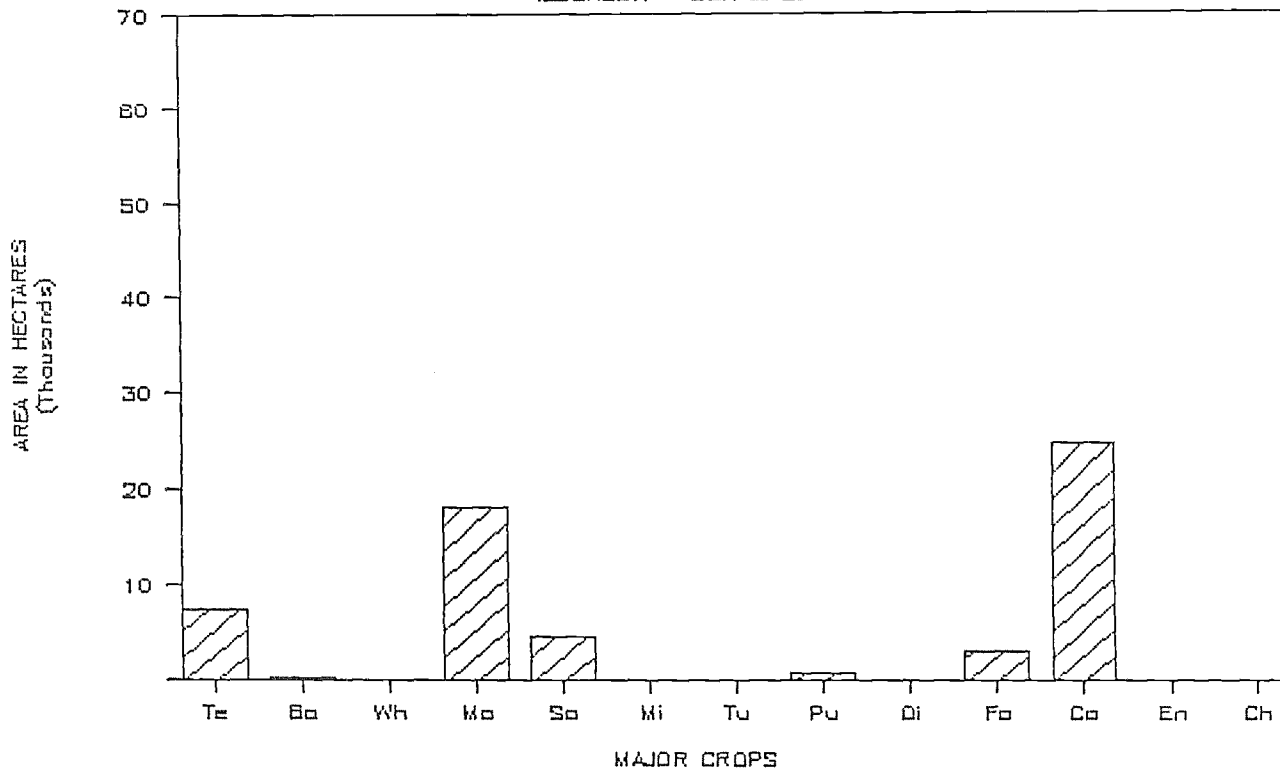
AREA UNDER MAJOR CROPS

ILUBABOR — BUNO
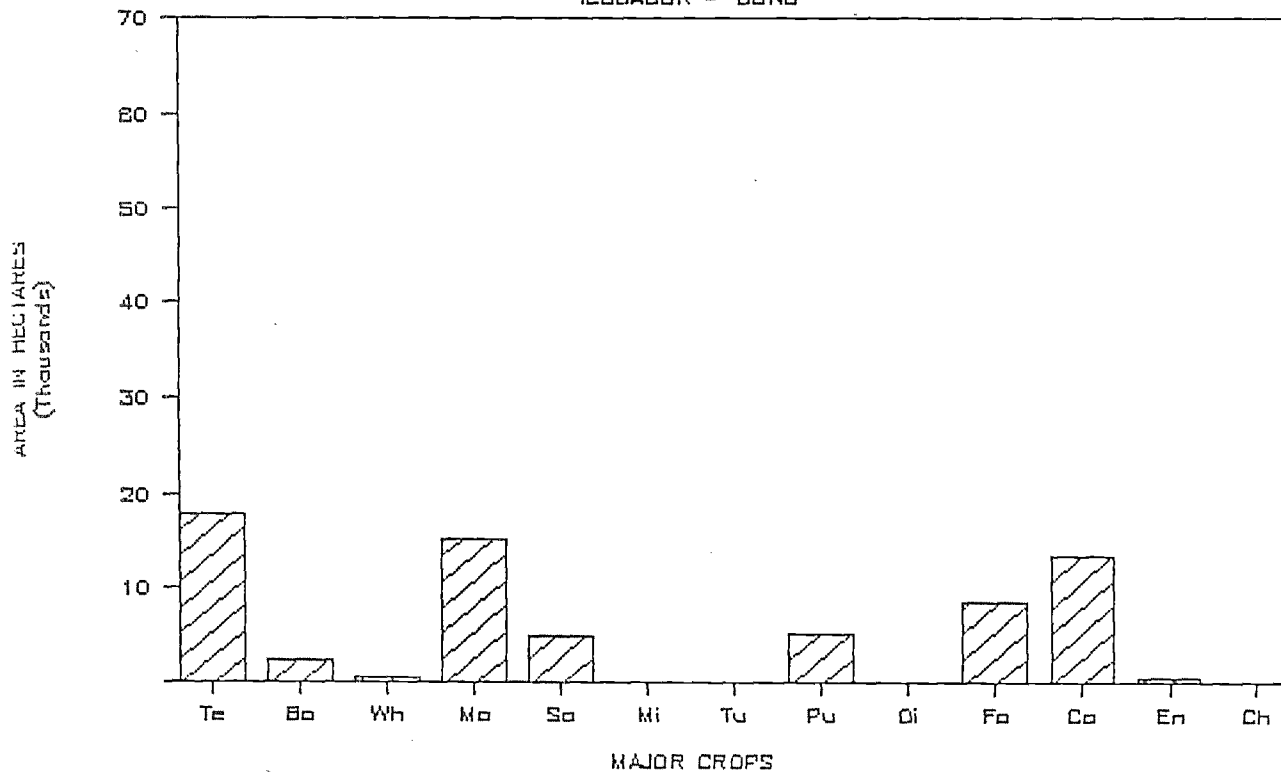
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ILUBABOR — GORE
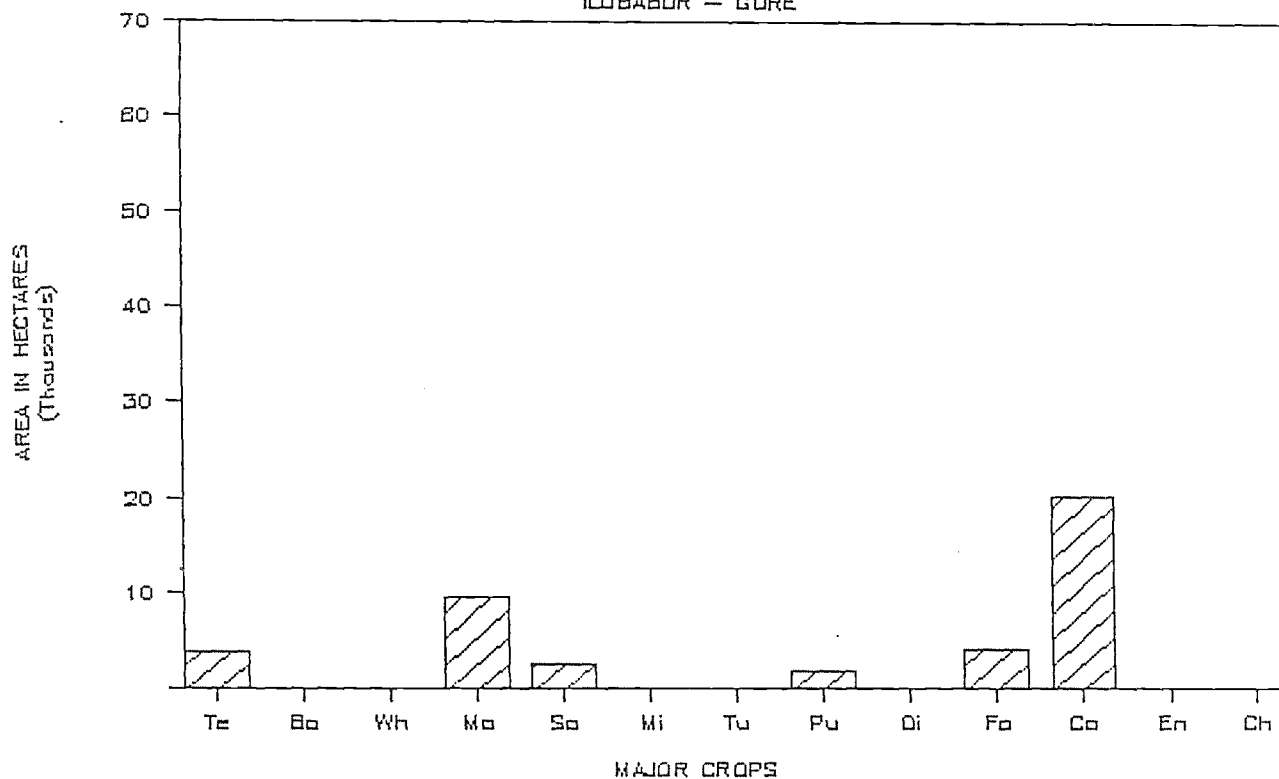
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ILUBABOR — MOCHA
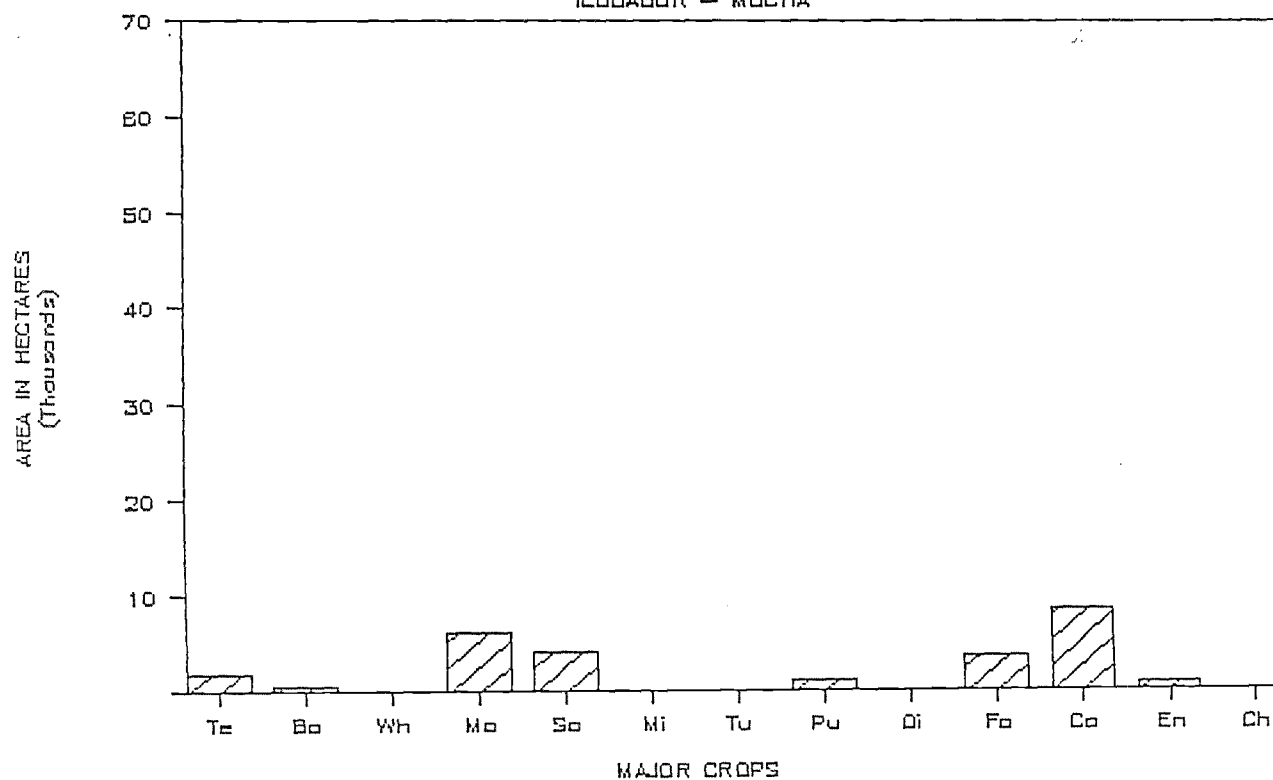
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ILUBABOR — GAMBELA
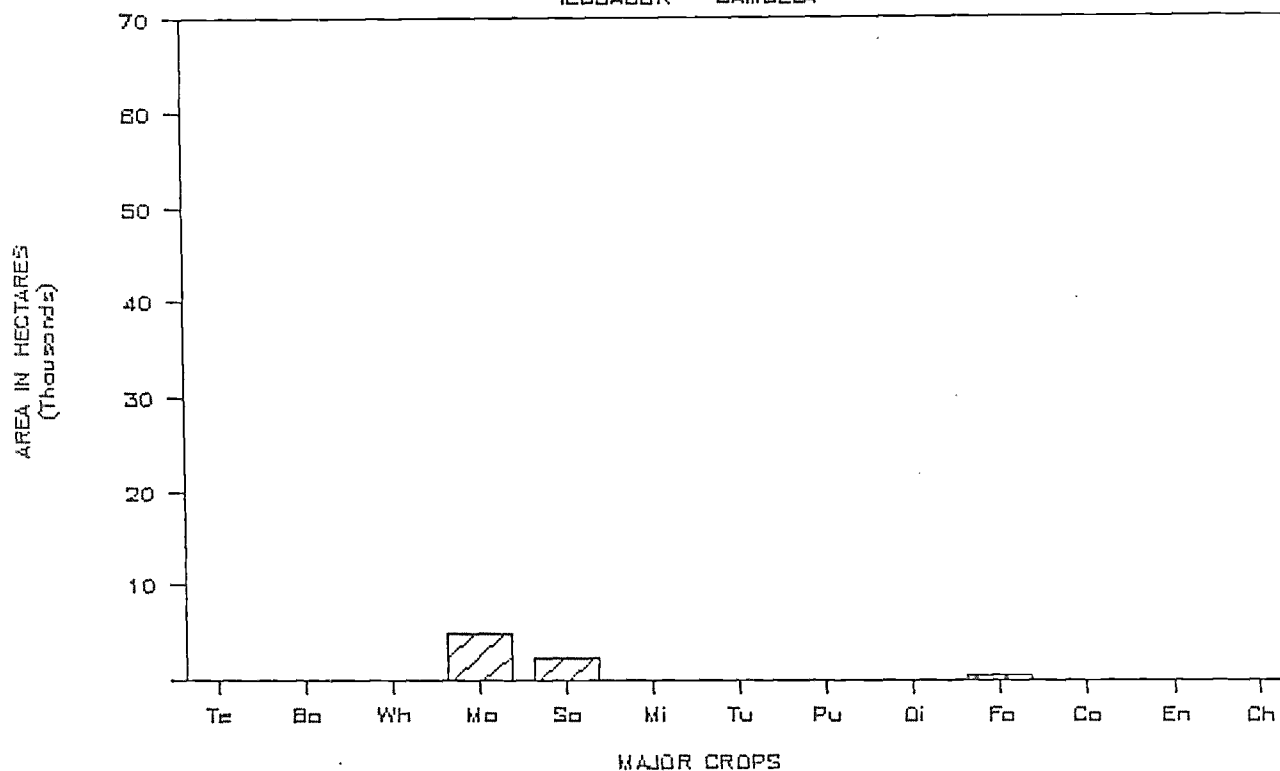
AREA UNDER MAJOR CROPS
KEFA — UMU
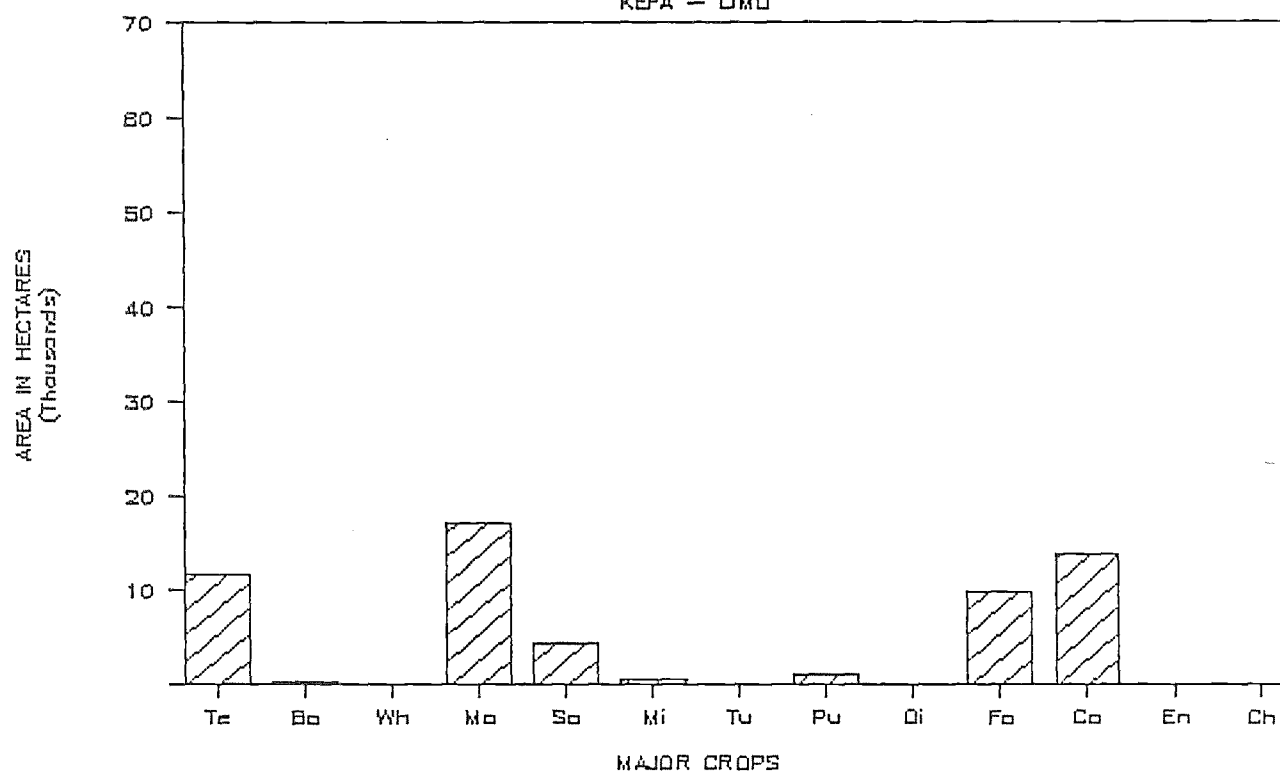
AREA UNDER MAJOR CROPS

KEFA — JIMA
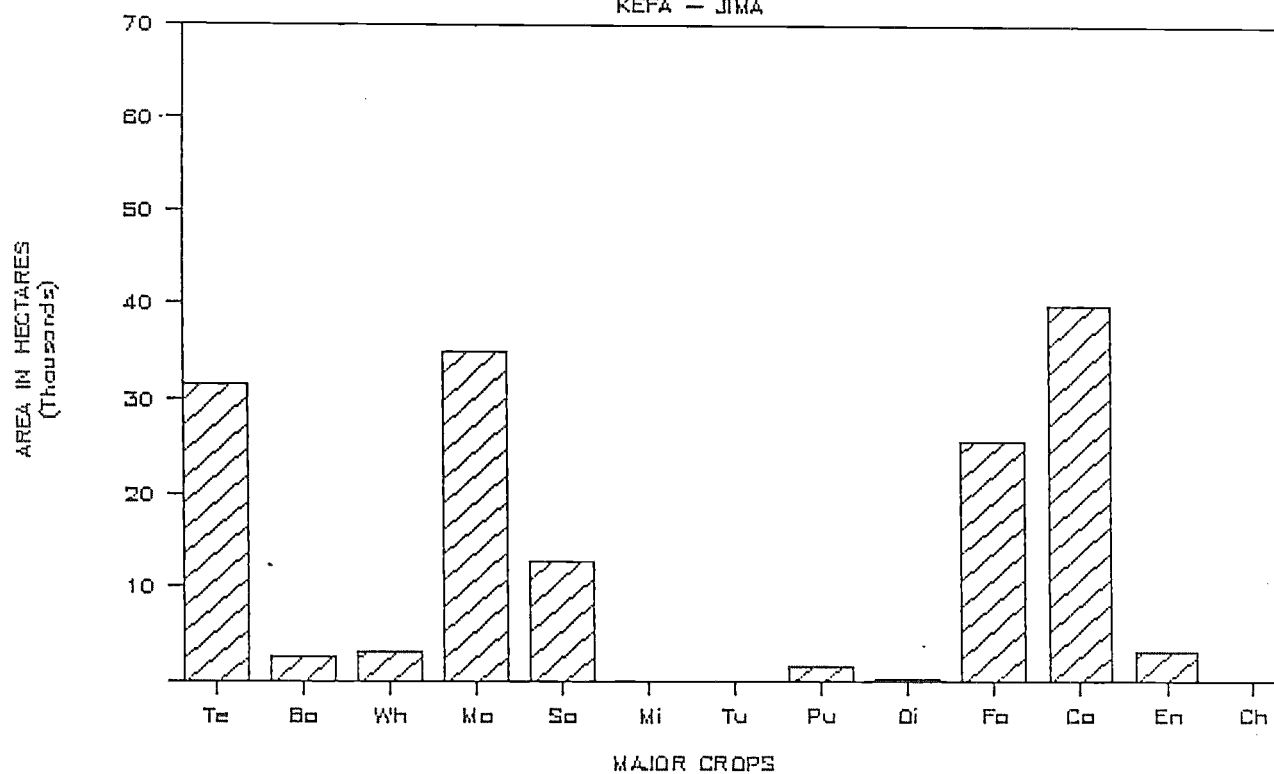
AREA UNDER MAJOR CROPS

KEFA — KULO KONTA
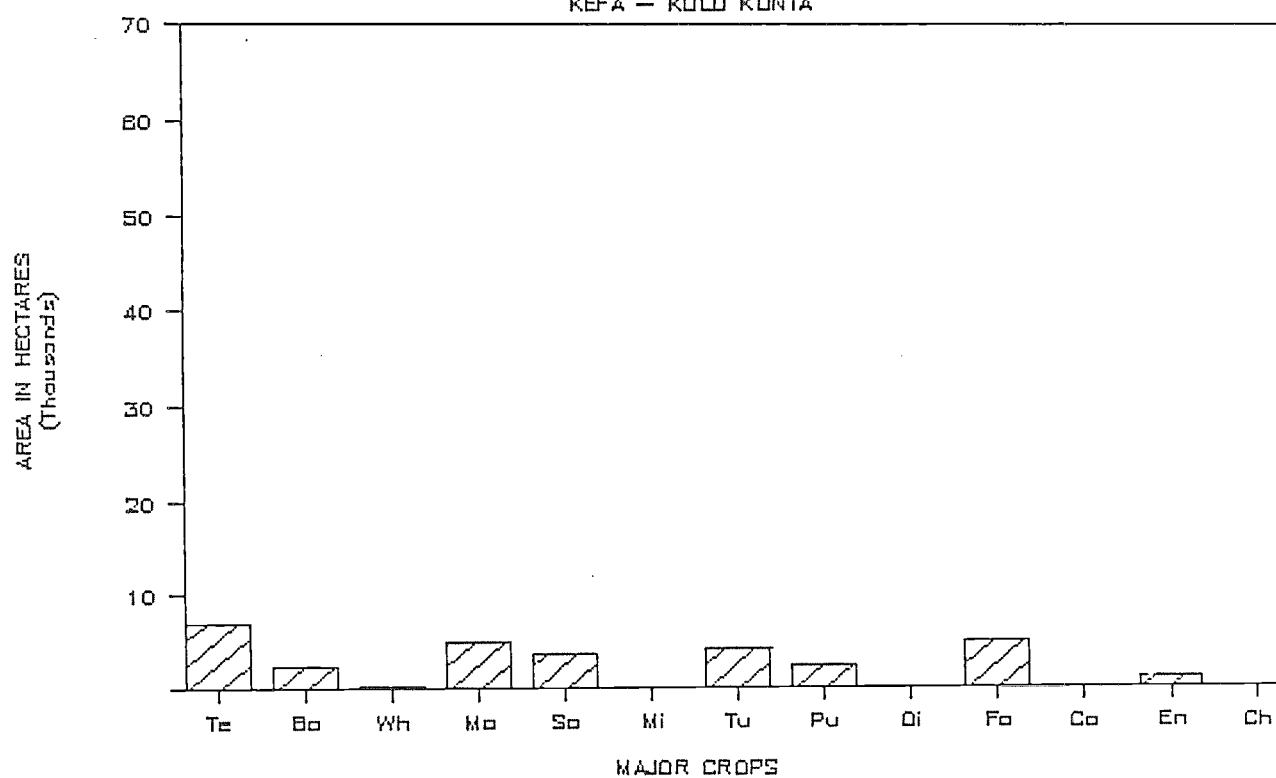
AREA UNDER MAJOR CROPS

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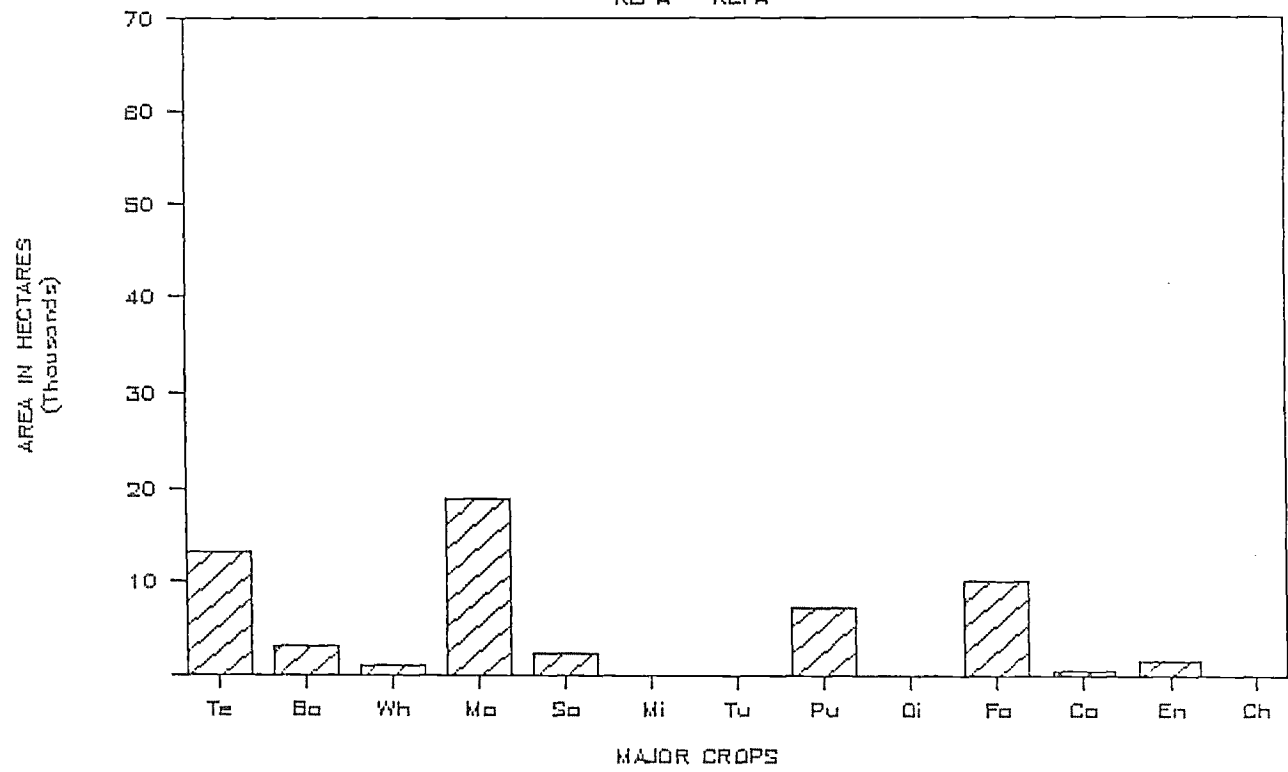
AREA UNDER MAJOR CROPS

KEFA — MAJI
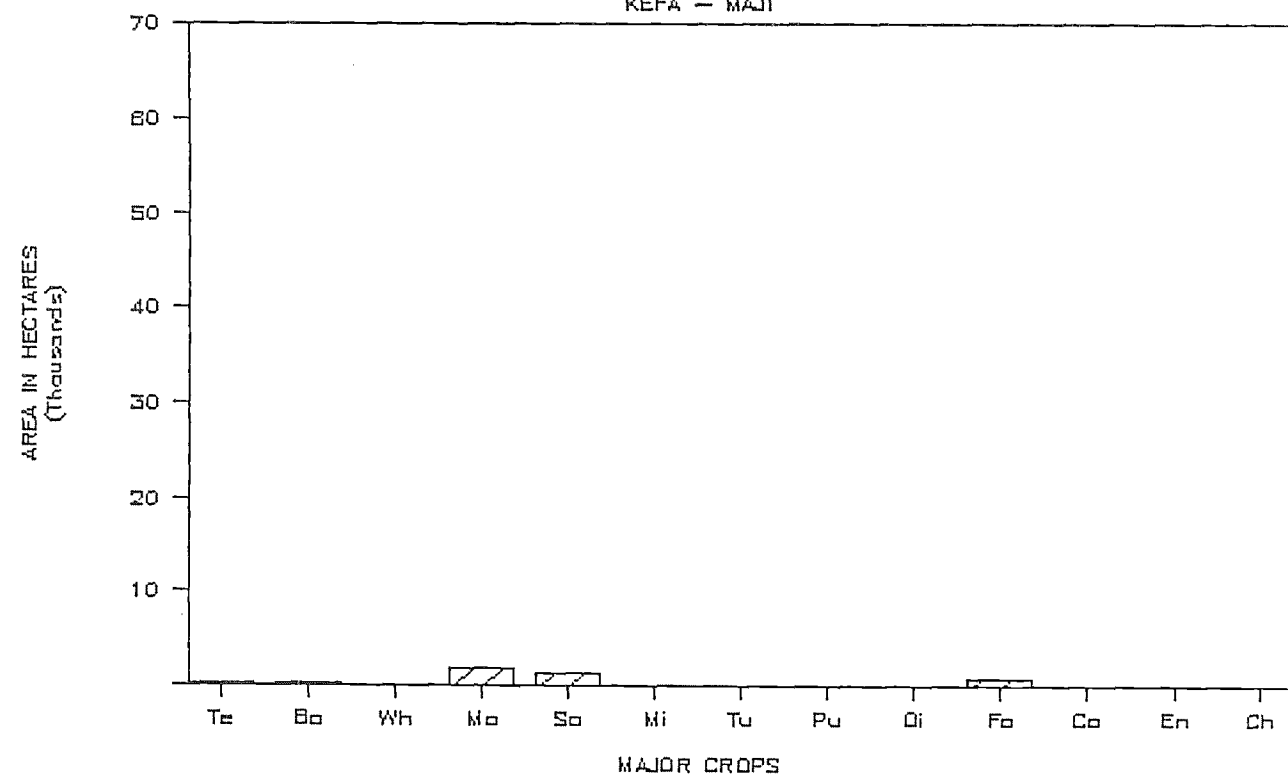
AREA UNDER MAJOR CROPS

KEFA — GIMIRA
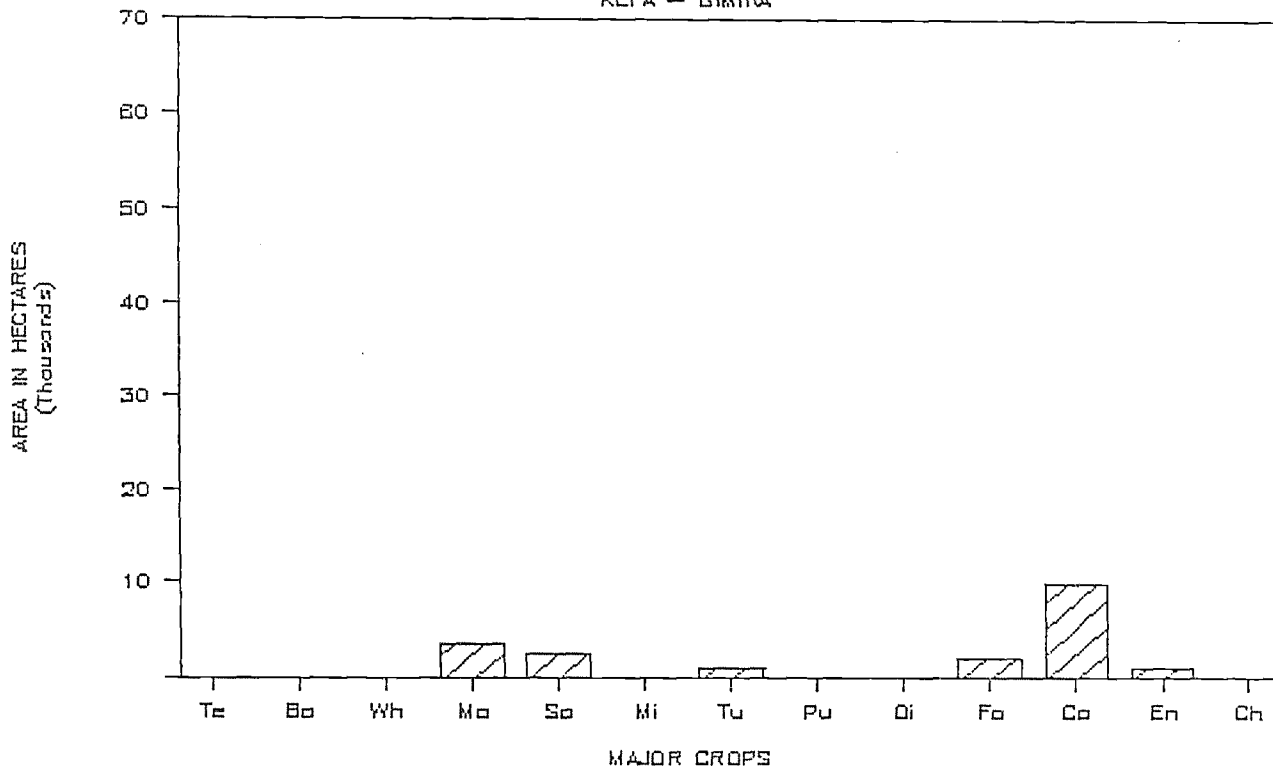
AREA UNDER MAJOR CROPS

SHEWA — MERHABETE
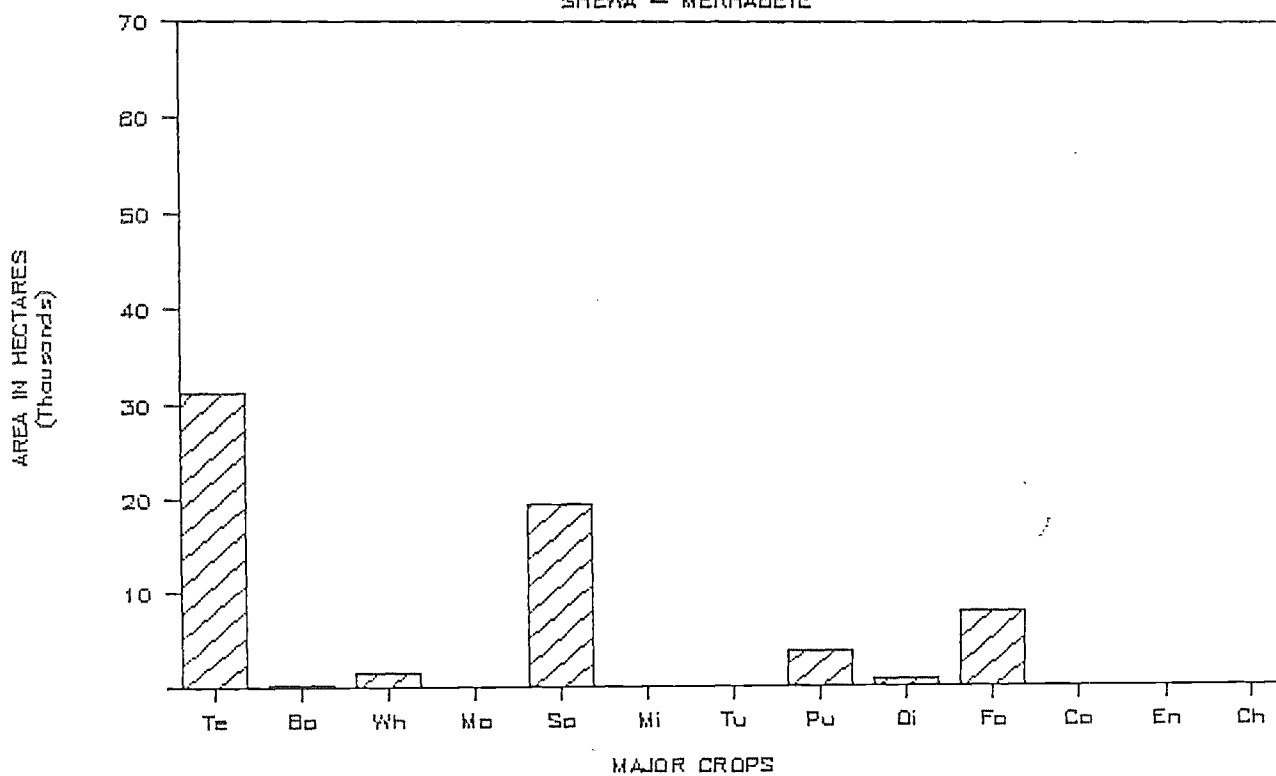
AREA UNDER MAJOR CROPS
SHEWA — MENZ & GISHE
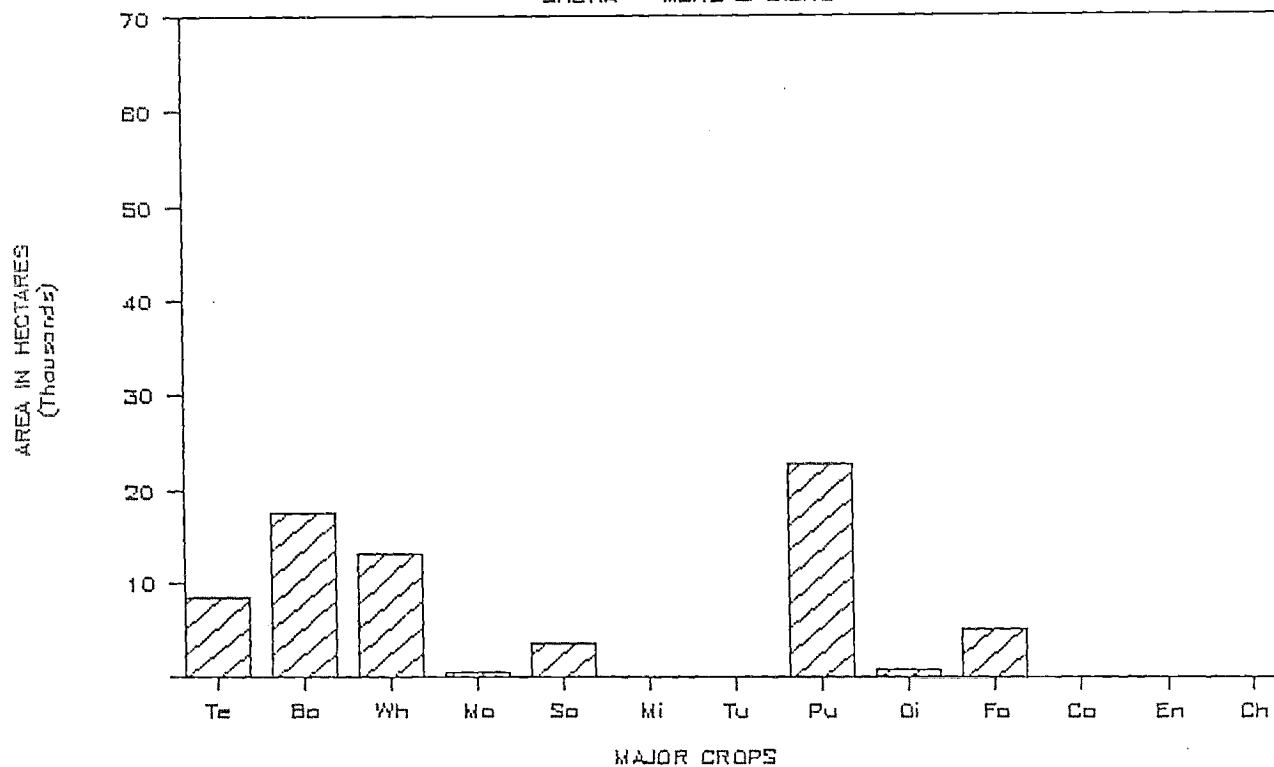
AREA UNDER MAJOR CROPS
SHEWA — YIFAT & TIMUGA
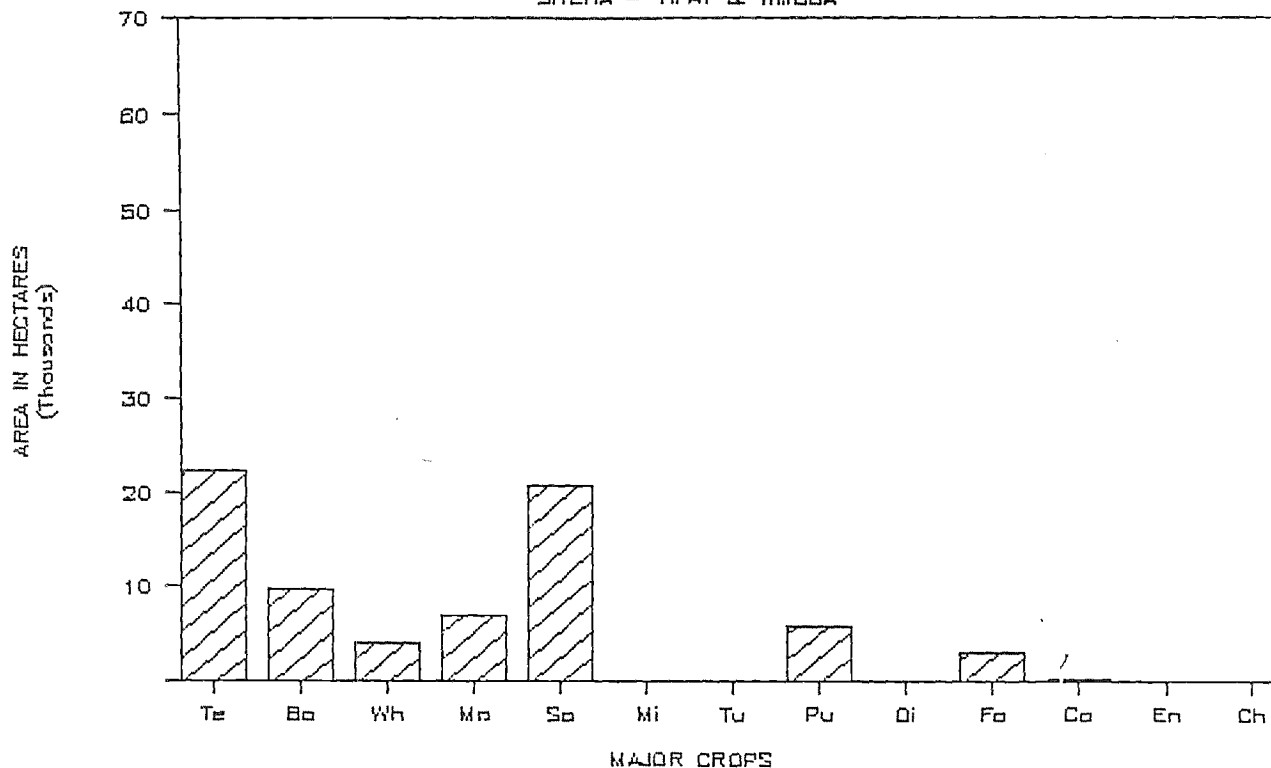
AREA UNDER MAJOR CROPS

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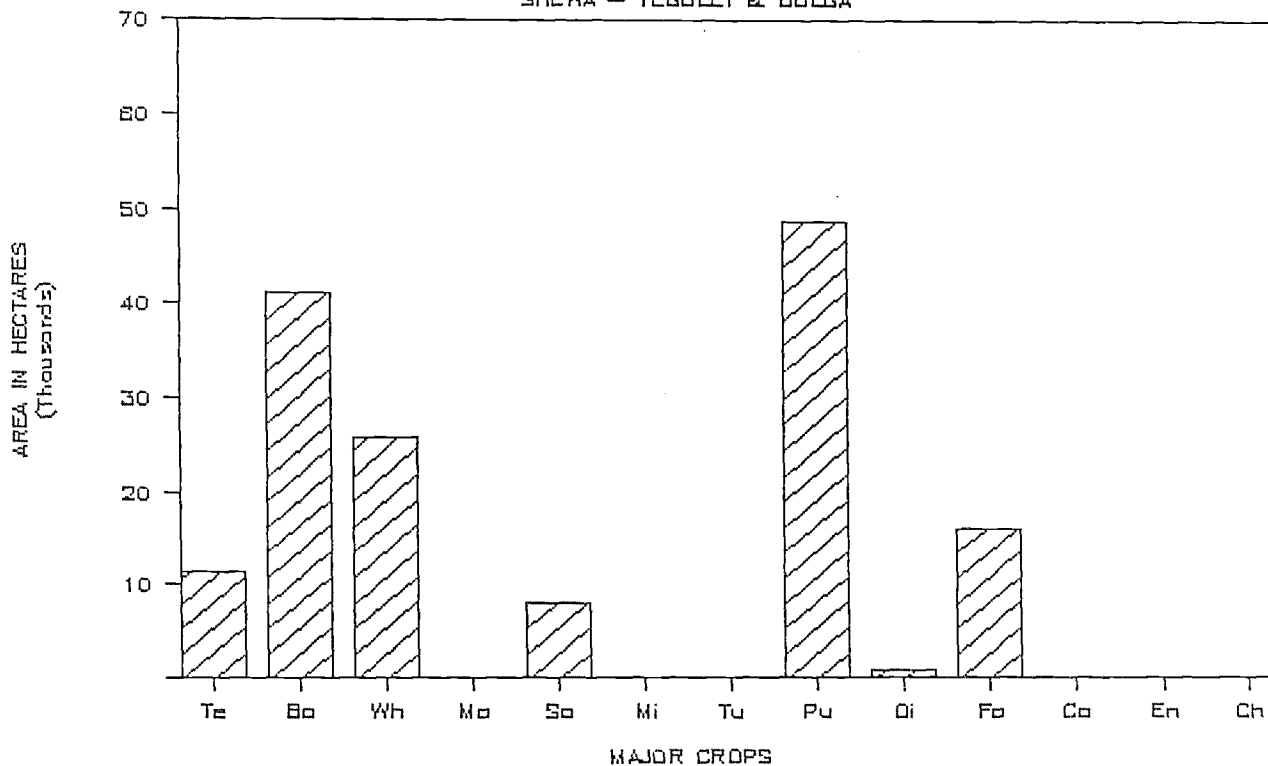
AREA UNDER MAJOR CROPS

SHEWA — YERER & KEREYU
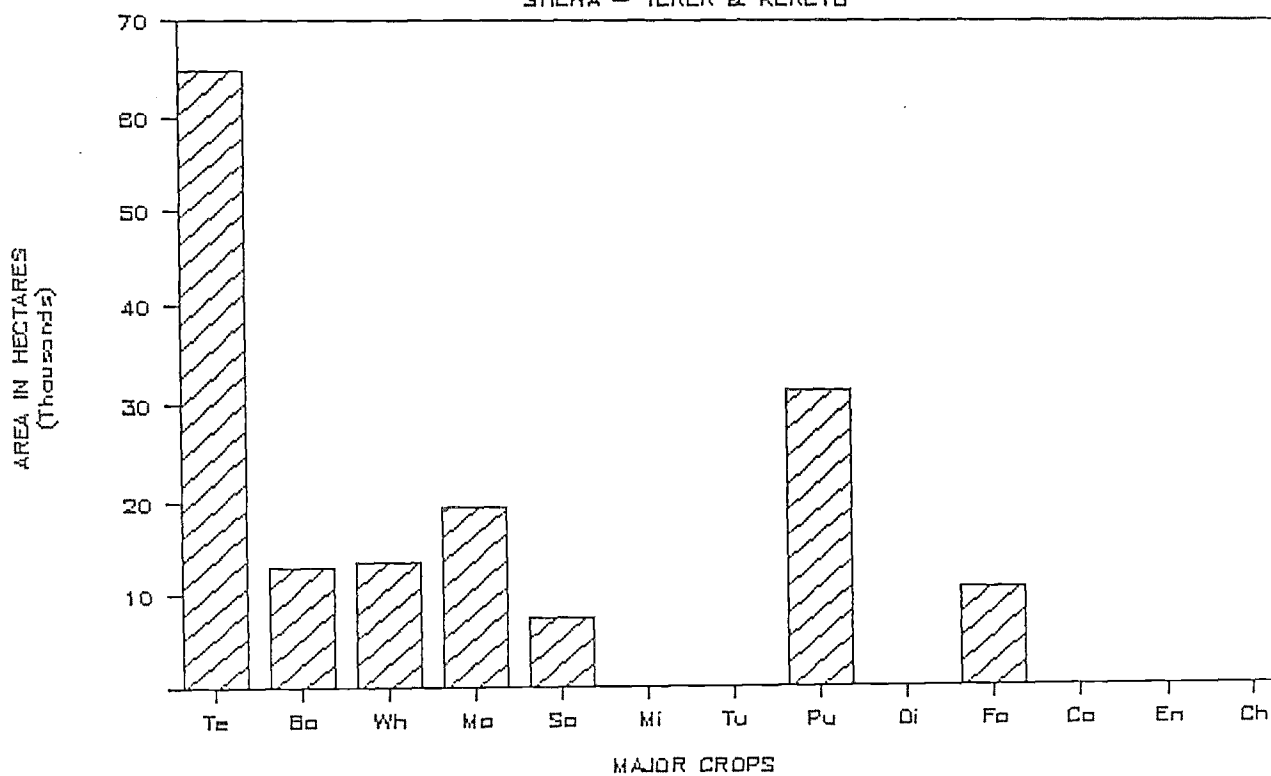
AREA UNDER MAJOR CROPS
SHEWA — HAIKOTCH & BUTAJIRA

AREA IN HECTARES (Thousands)
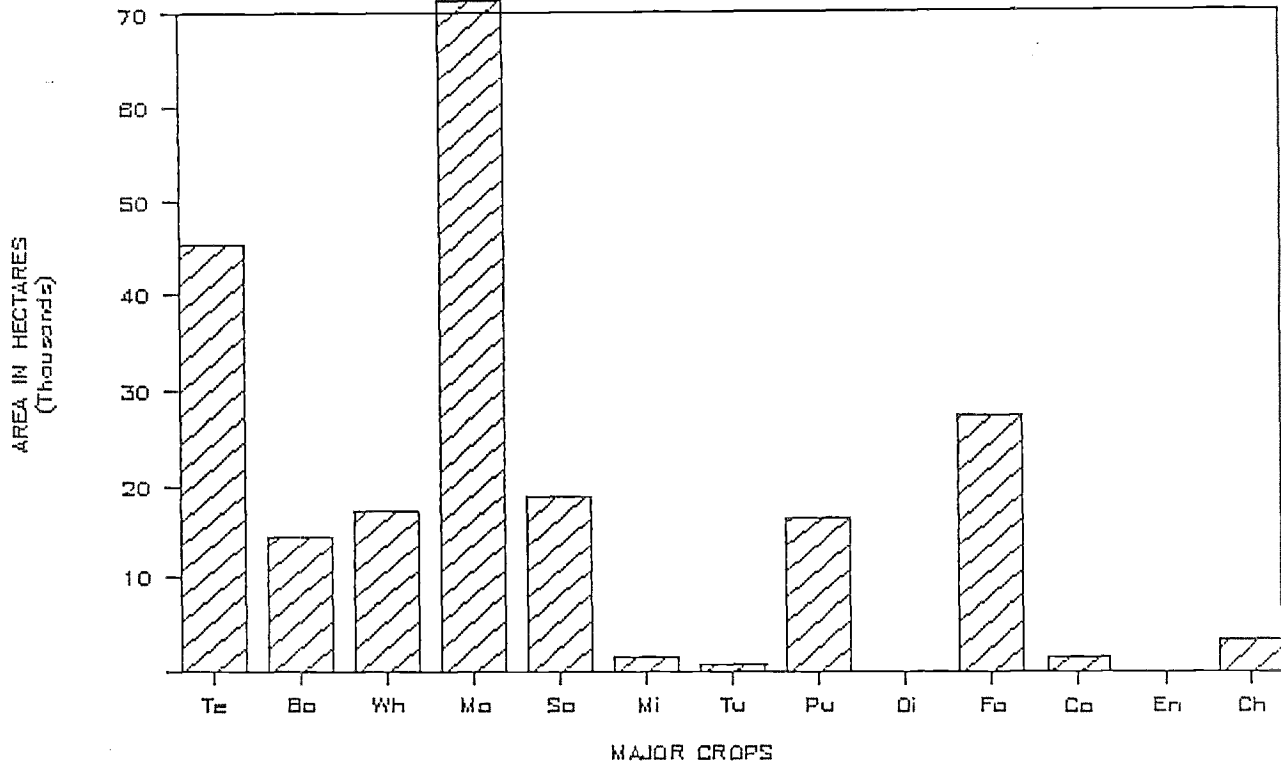
MAJOR CROPS

AREA UNDER MAJOR CROPS
SHEWA — KEMBATA & HADIYA

AREA IN HECTARES (Thousands)
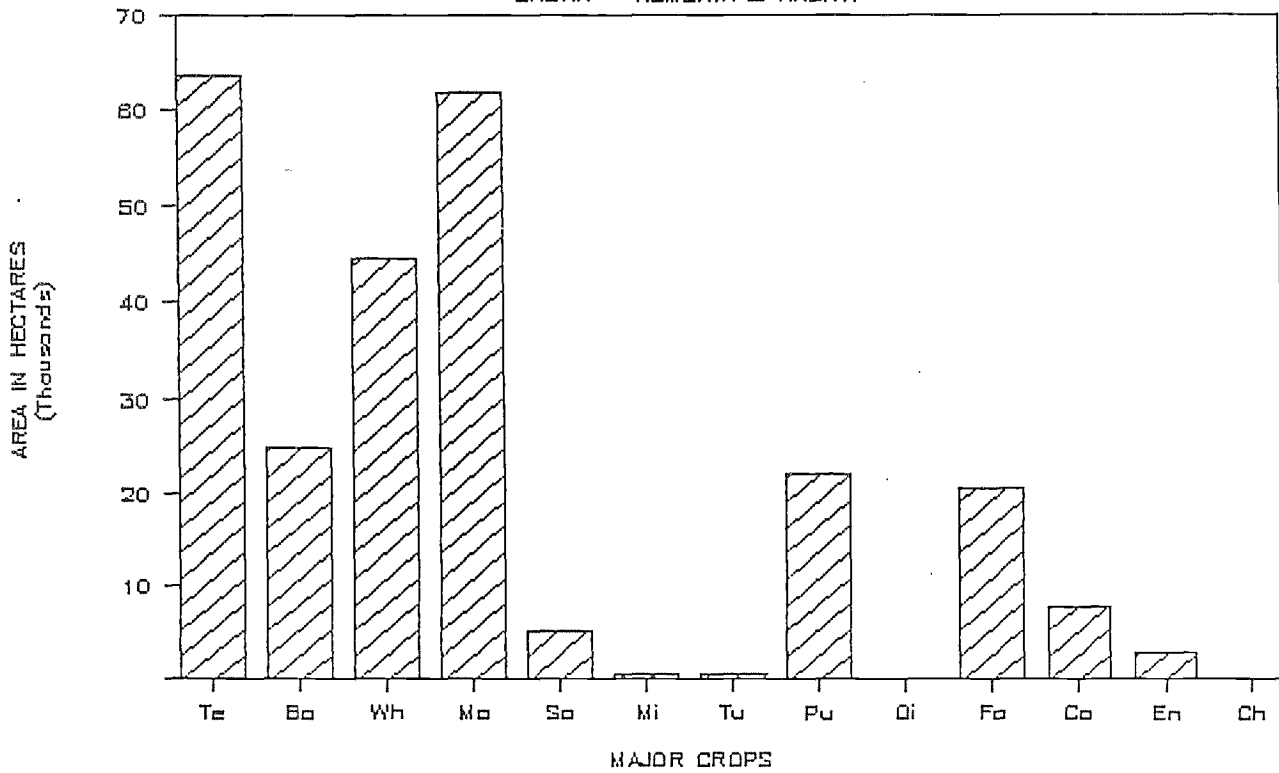
MAJOR CROPS

AREA UNDER MAJOR CROPS

SHEWA — CHEBO & GURAGIE
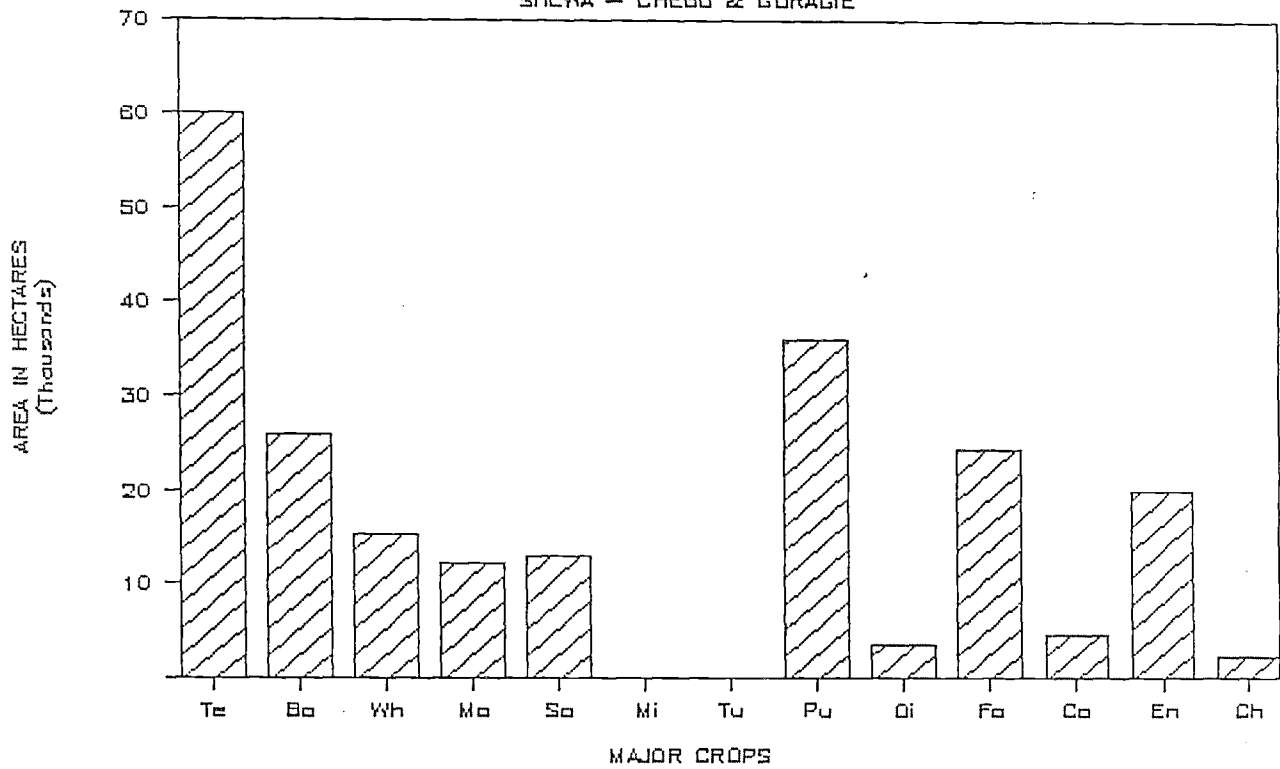
AREA UNDER MAJOR CROPS

SHEWA — MENAGESHA
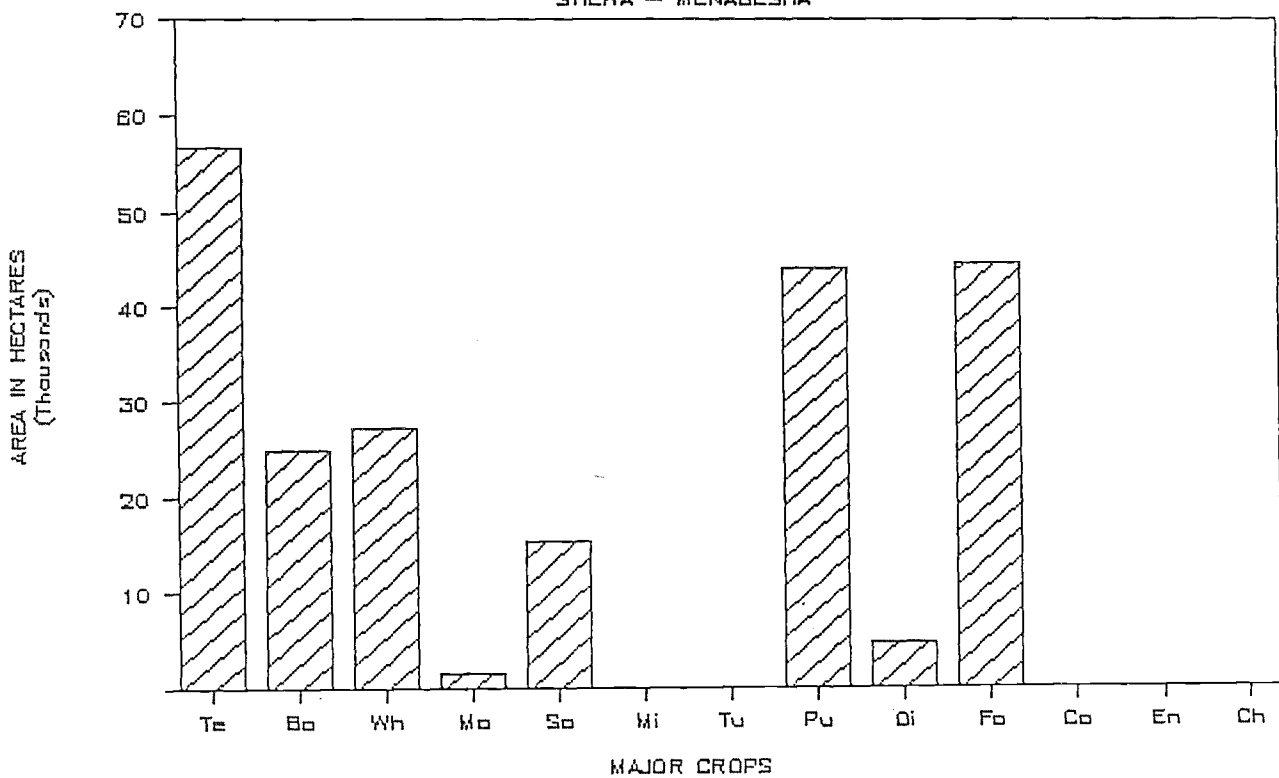
AREA UNDER MAJOR CROPS
SHEWA — JIBAT & MECHA

AREA IN HECTARES (Thousands) vs MAJOR CROPS (Te, Bo, Wh, Mo, So, Mi, Tu, Pu, Oi, Fo, Co, En, Ch)
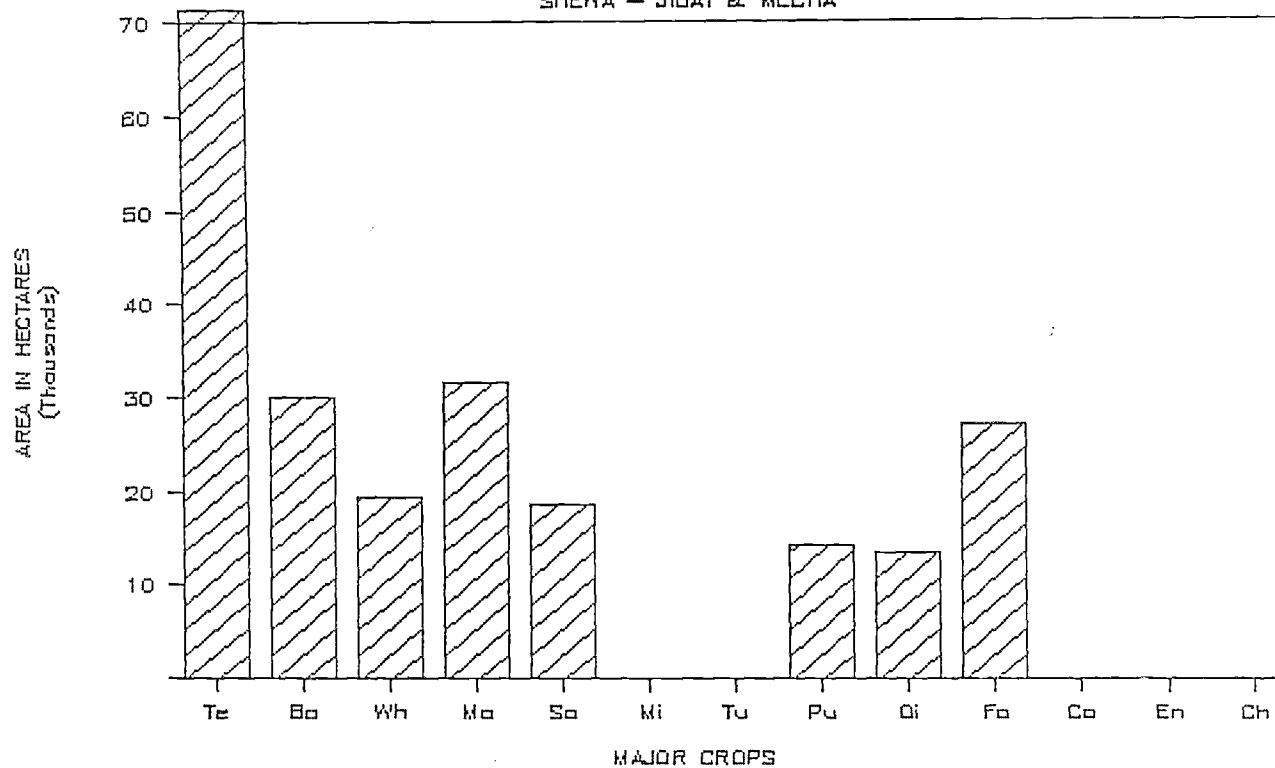
AREA UNDER MAJOR CROPS
SHEWA — SELALE

AREA IN HECTARES (Thousands) vs MAJOR CROPS (Te, Bo, Wh, Mo, So, Mi, Tu, Pu, Oi, Fo, Co, En, Ch)
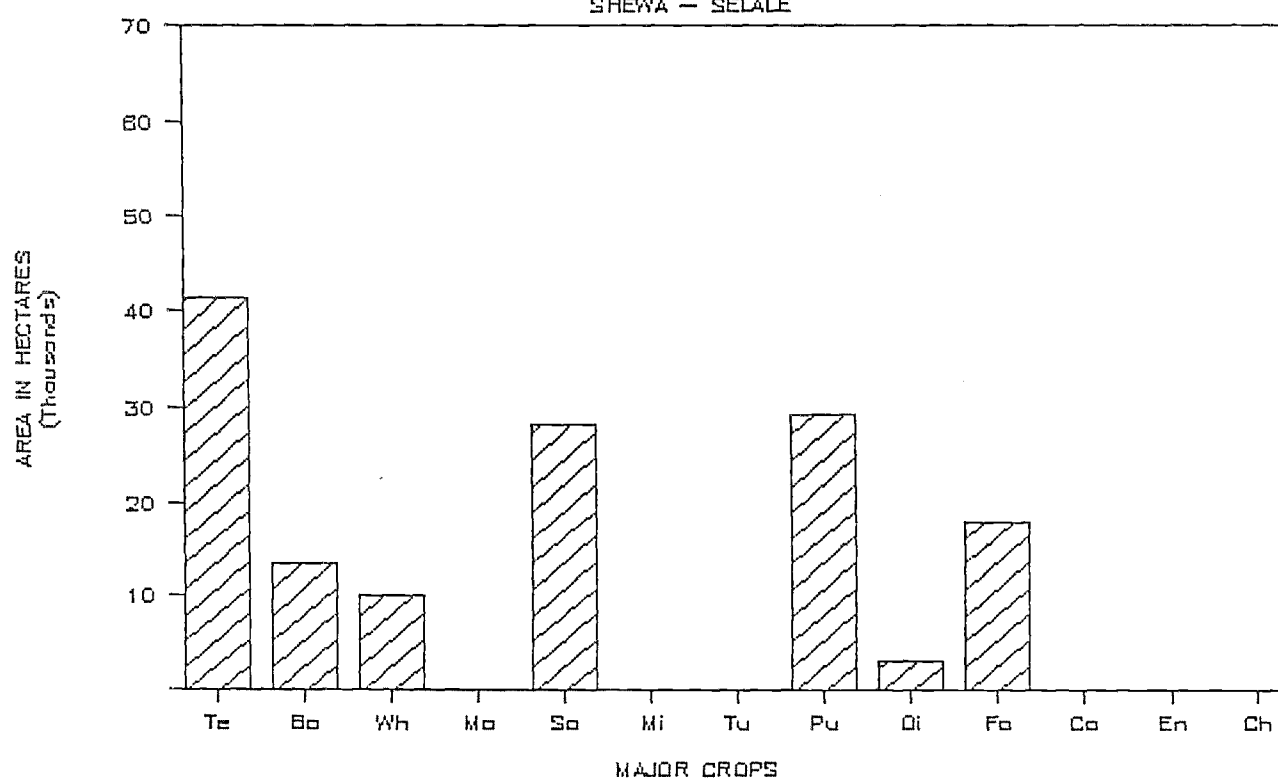
AREA UNDER MAJOR CROPS
SIDAMO — WELAYITA
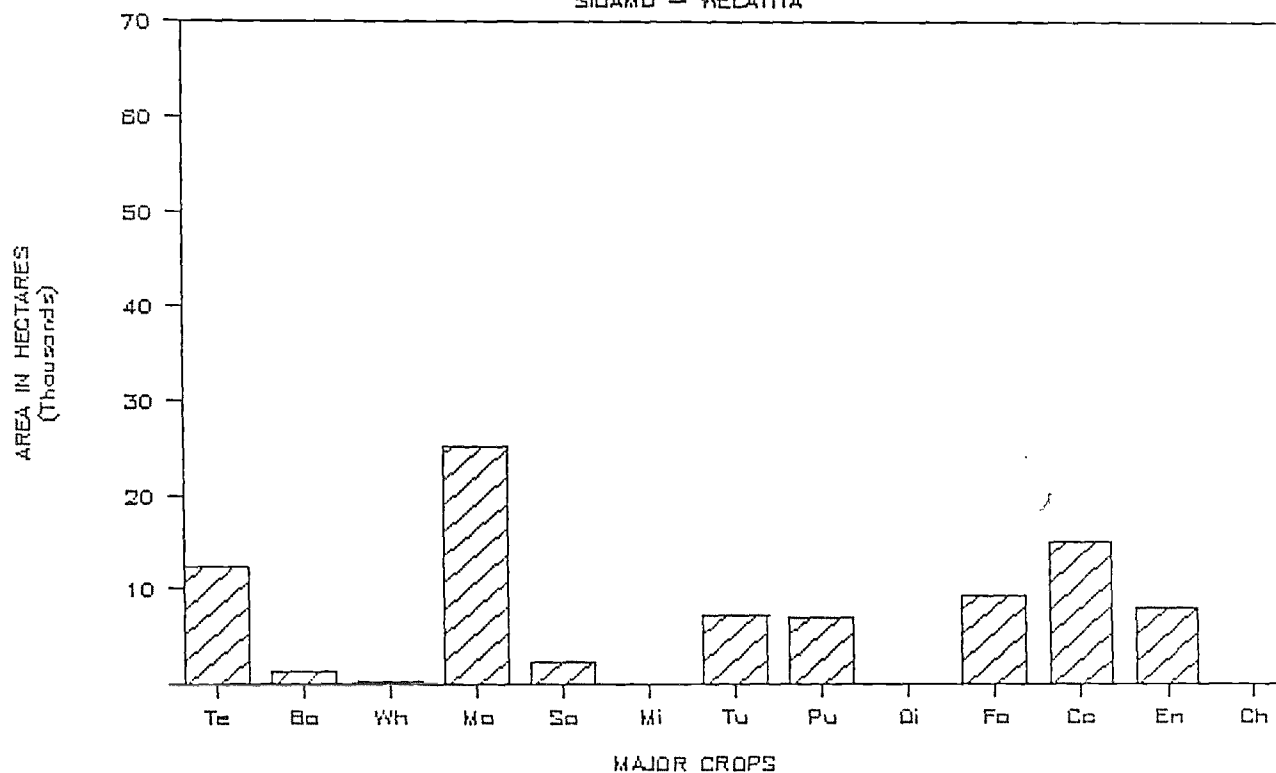
AREA UNDER MAJOR CROPS
SIDAMO — SIDAMA
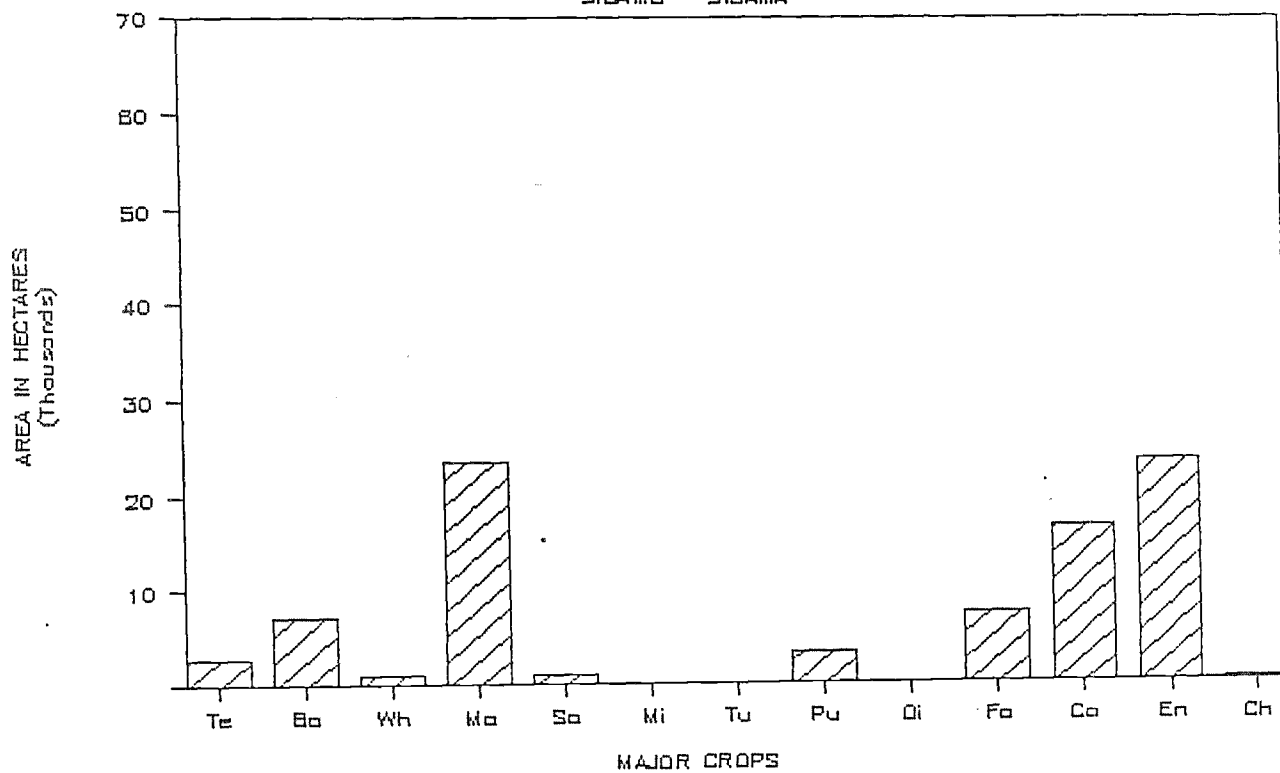
AREA UNDER MAJOR CROPS

SIDAMO — JEM JEM
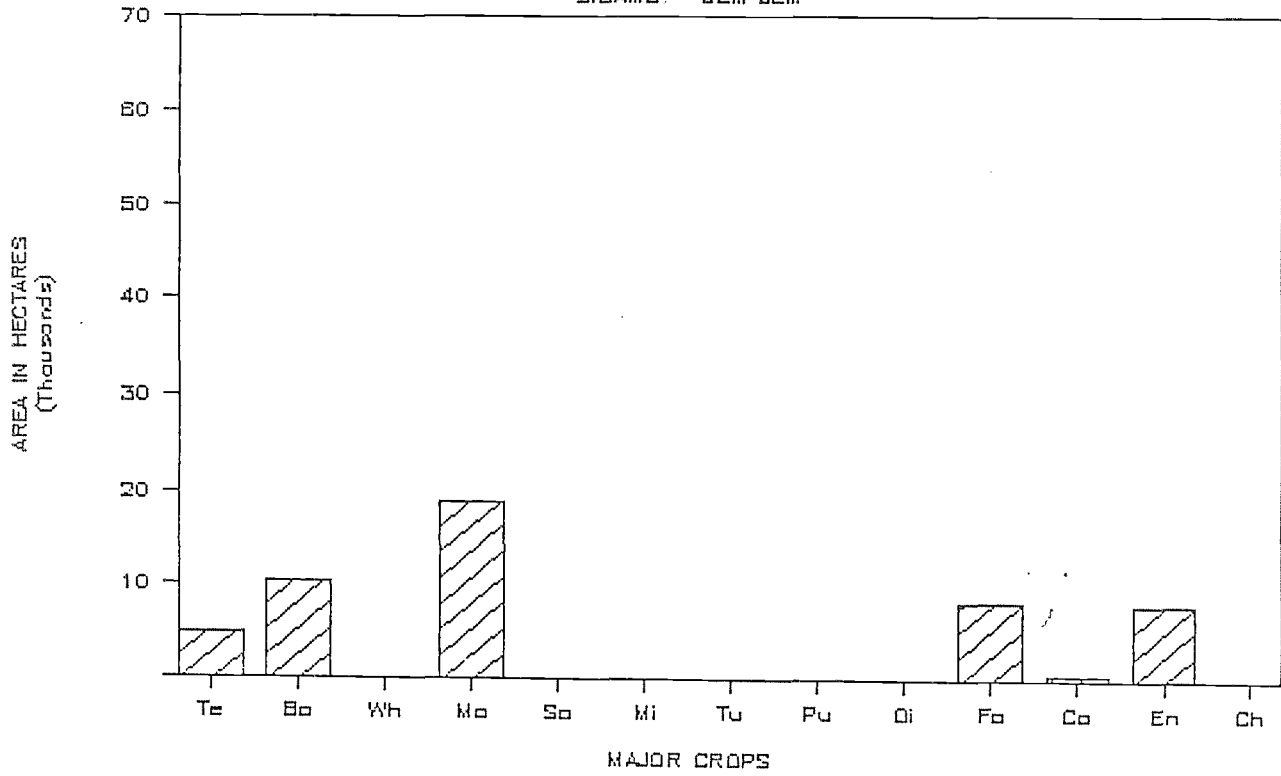
AREA UNDER MAJOR CROPS

SIDAMO — BORENA
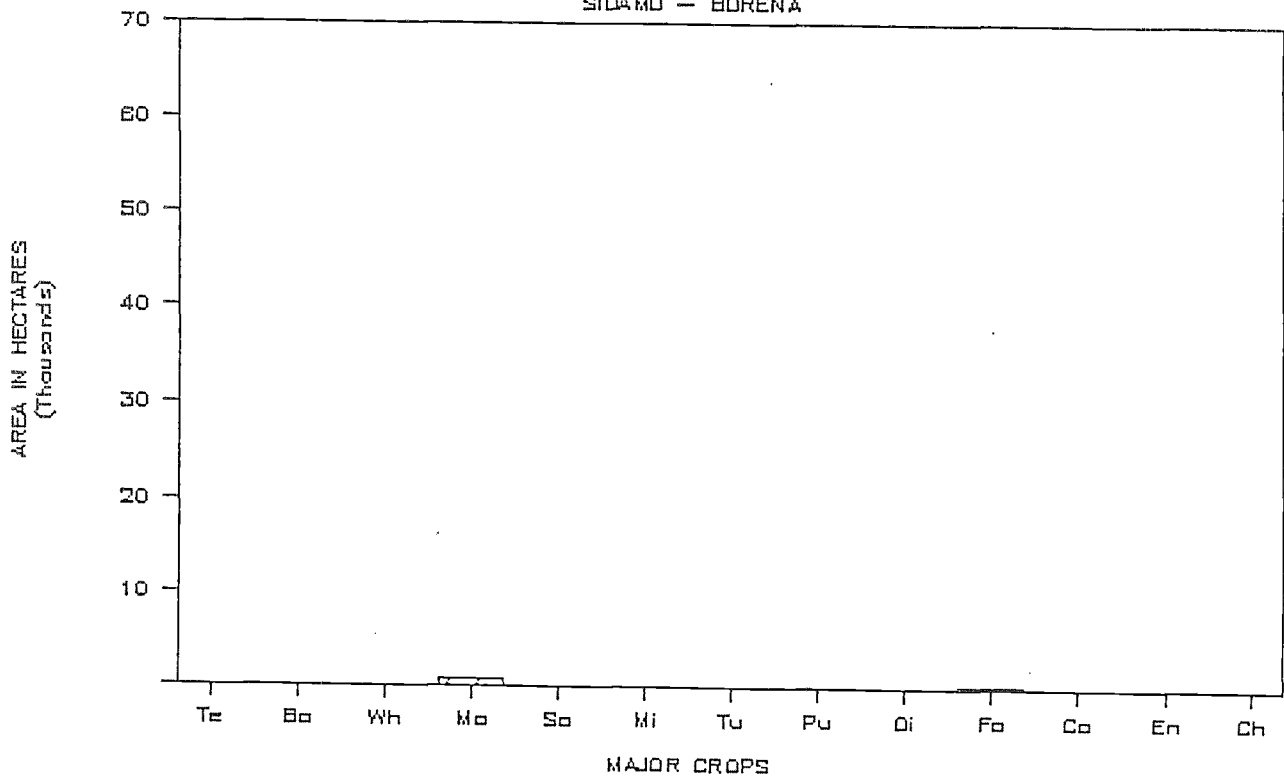
AREA UNDER MAJOR CROPS

SIDAMO — ARERO
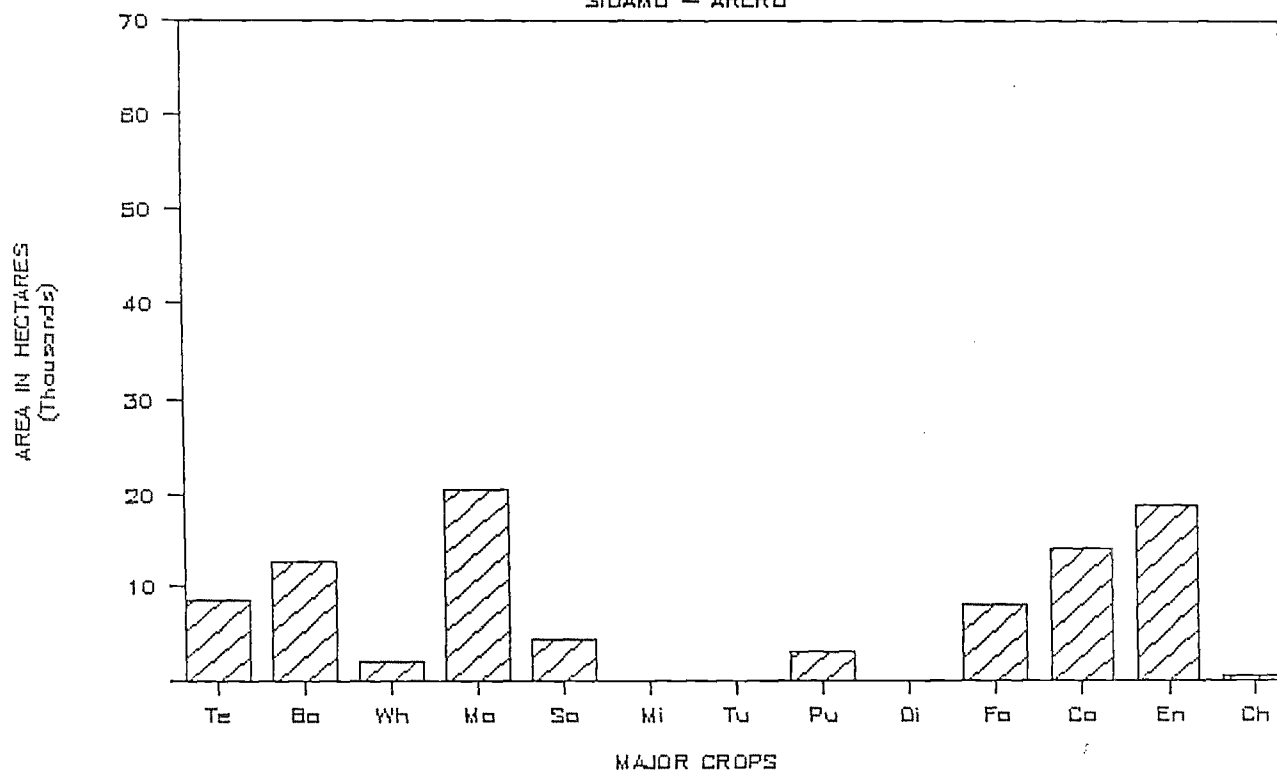
AREA UNDER MAJOR CROPS

SIDAMO — GEDIO
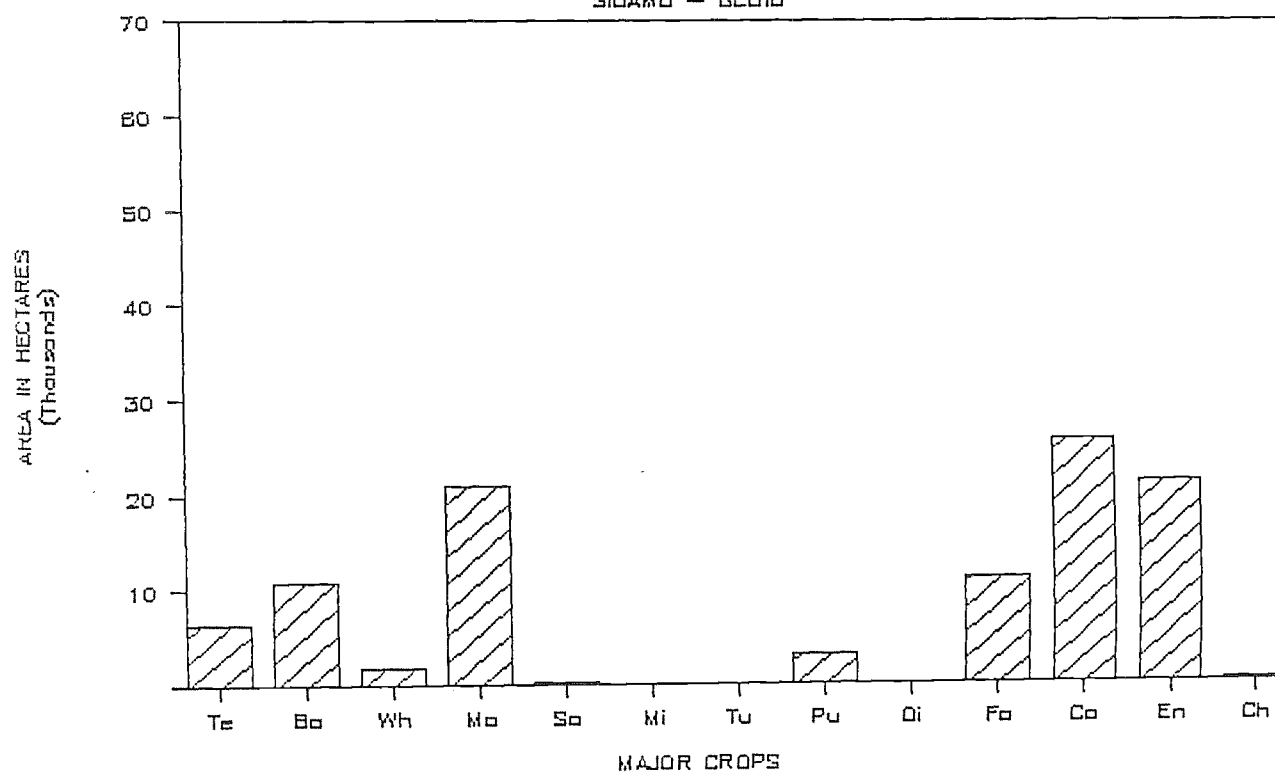
AREA UNDER MAJOR CROPS
WELEGA — HORO GUDURU
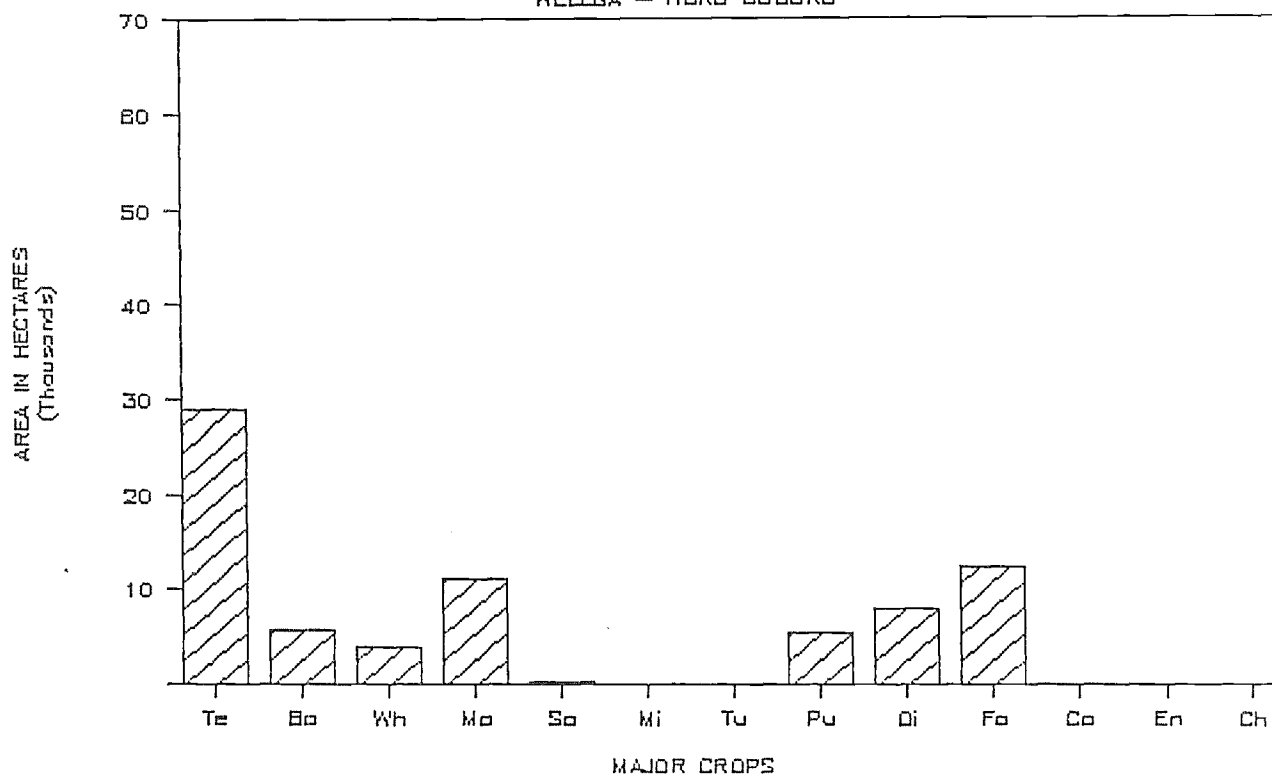
AREA UNDER MAJOR CROPS
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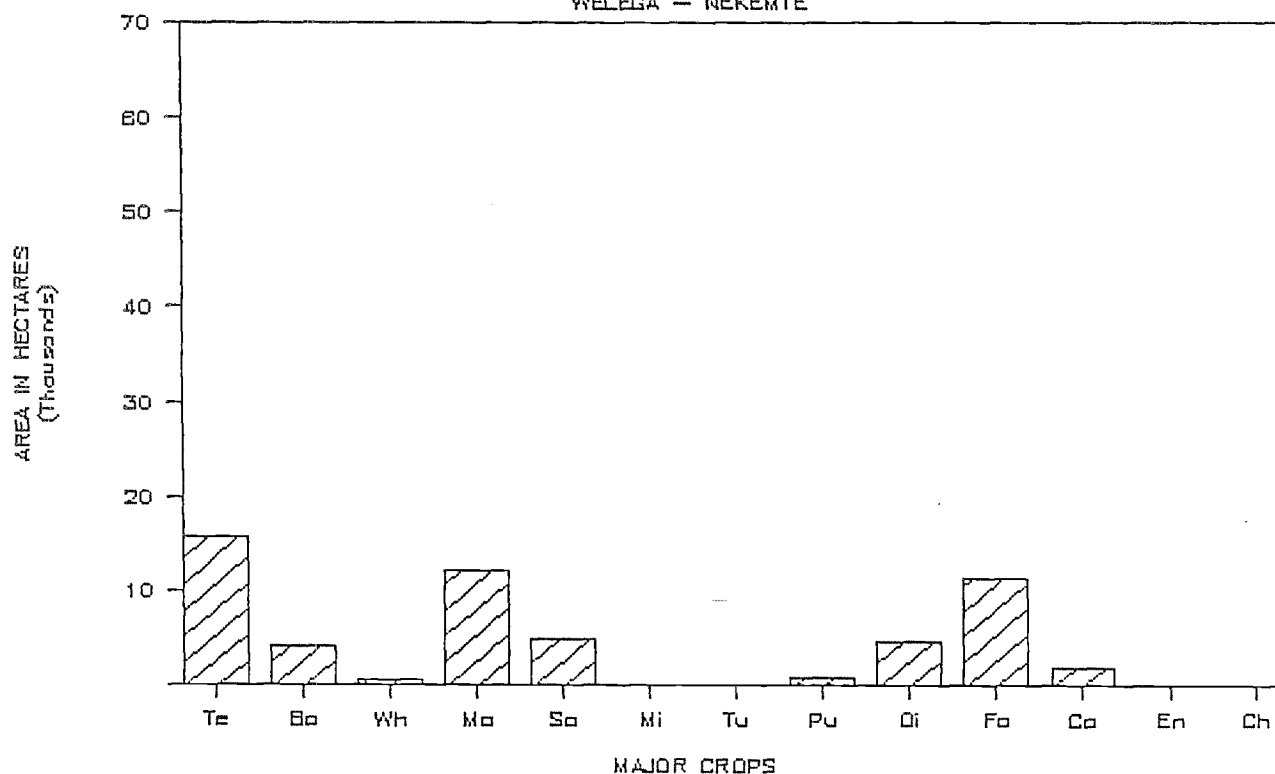
AREA UNDER MAJOR CROPS

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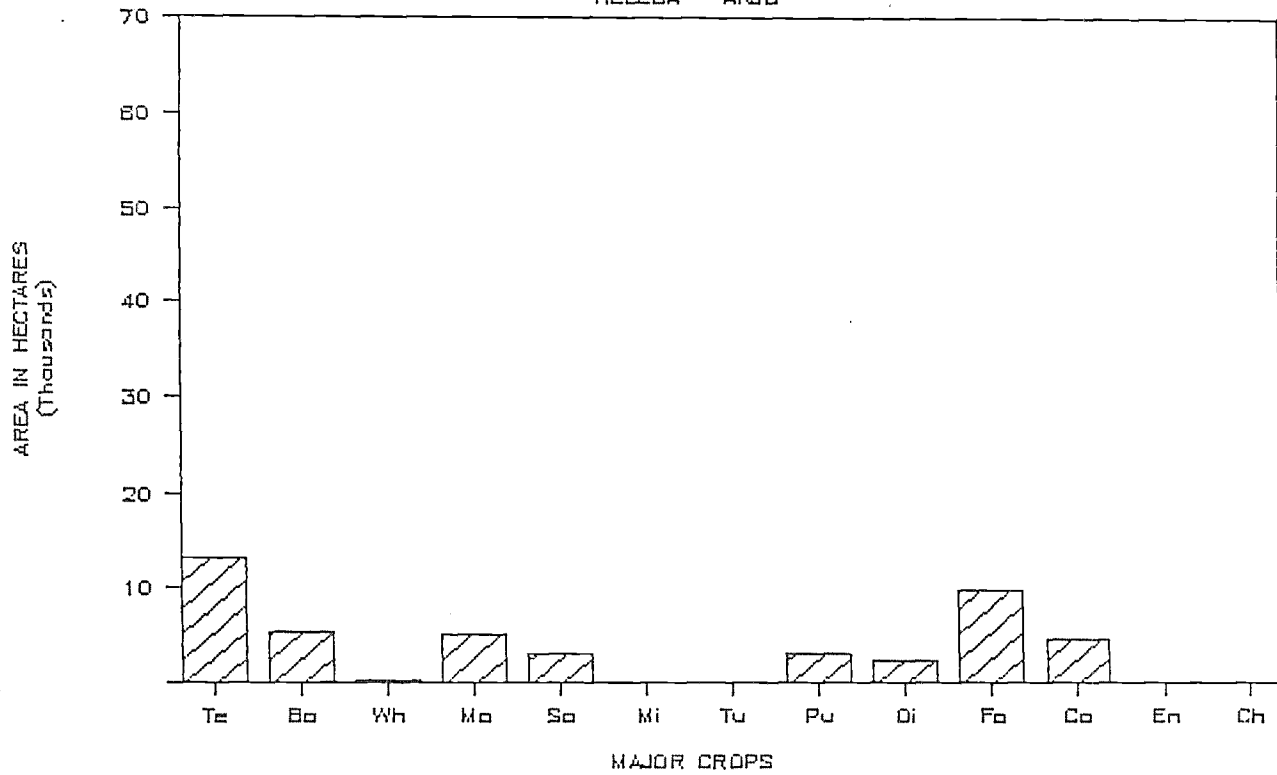
AREA UNDER MAJOR CROPS

WELEGA — GIMBI
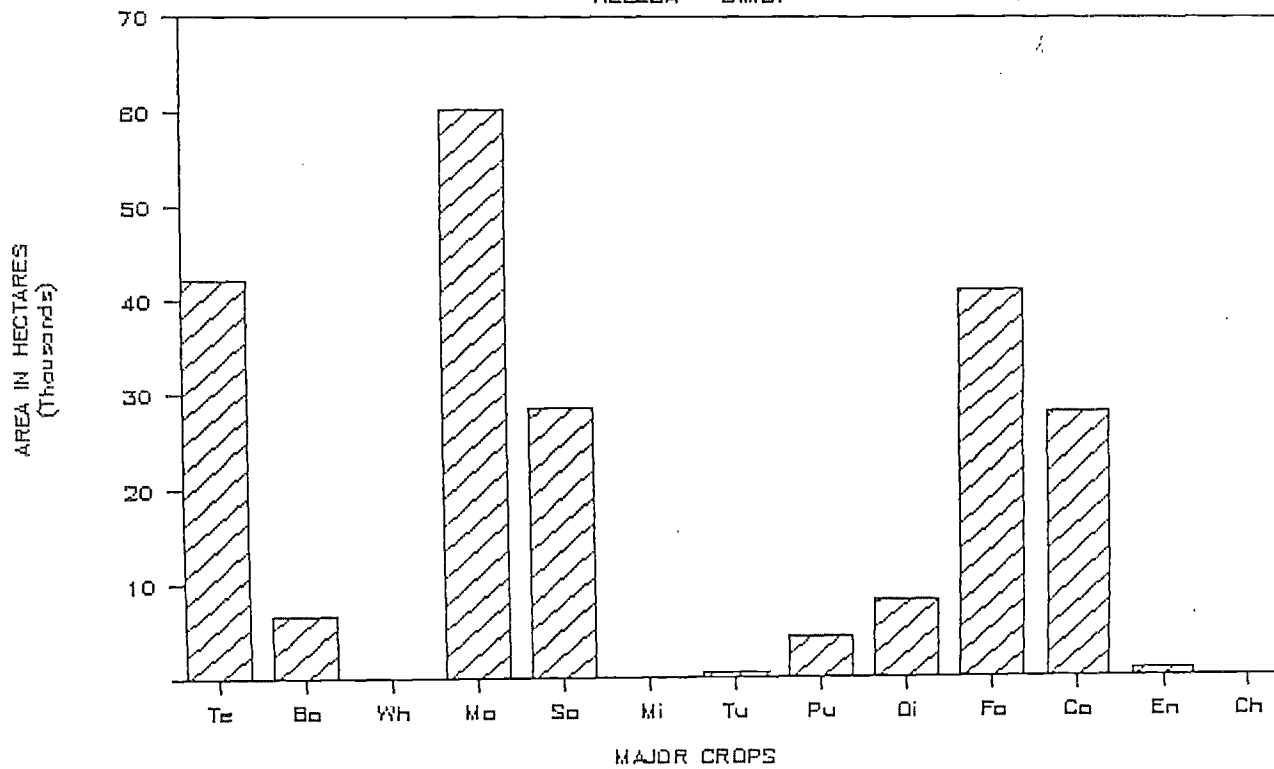
AREA UNDER MAJOR CROPS

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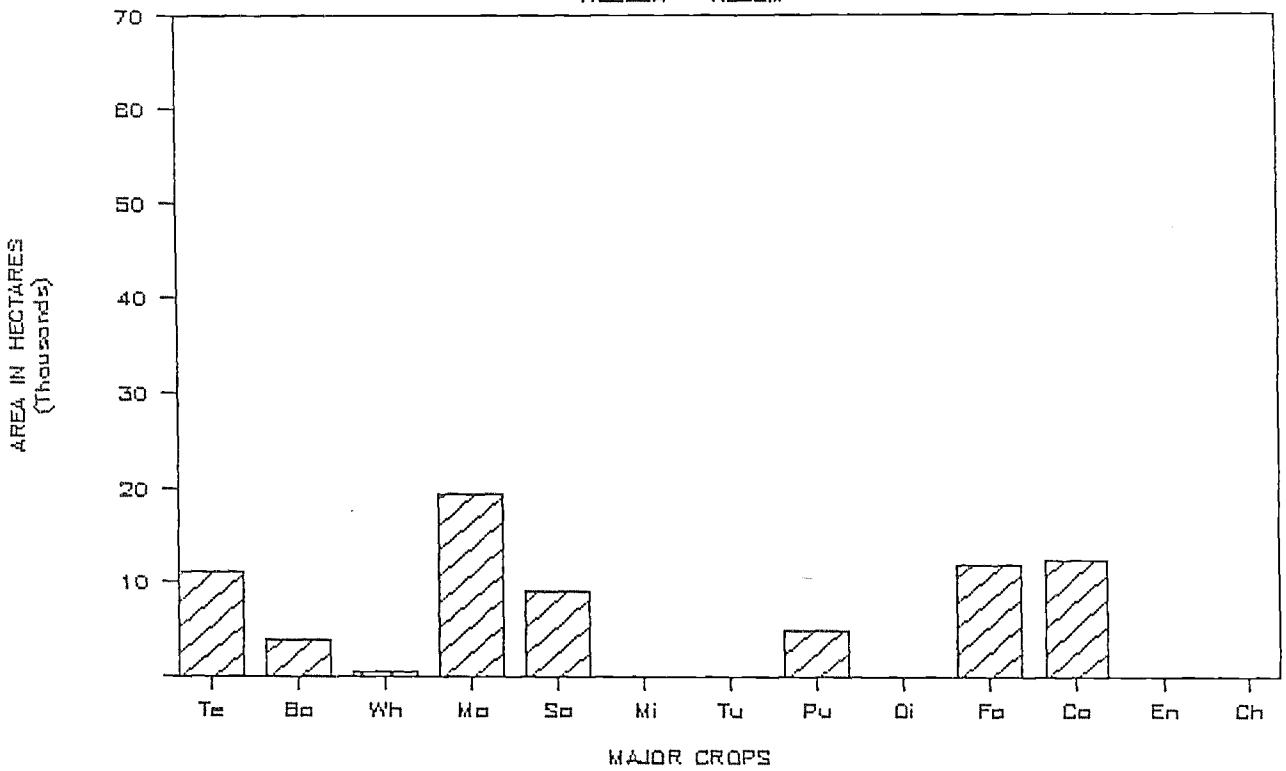
AREA UNDER MAJOR CROPS

WELEGA — ASOSA
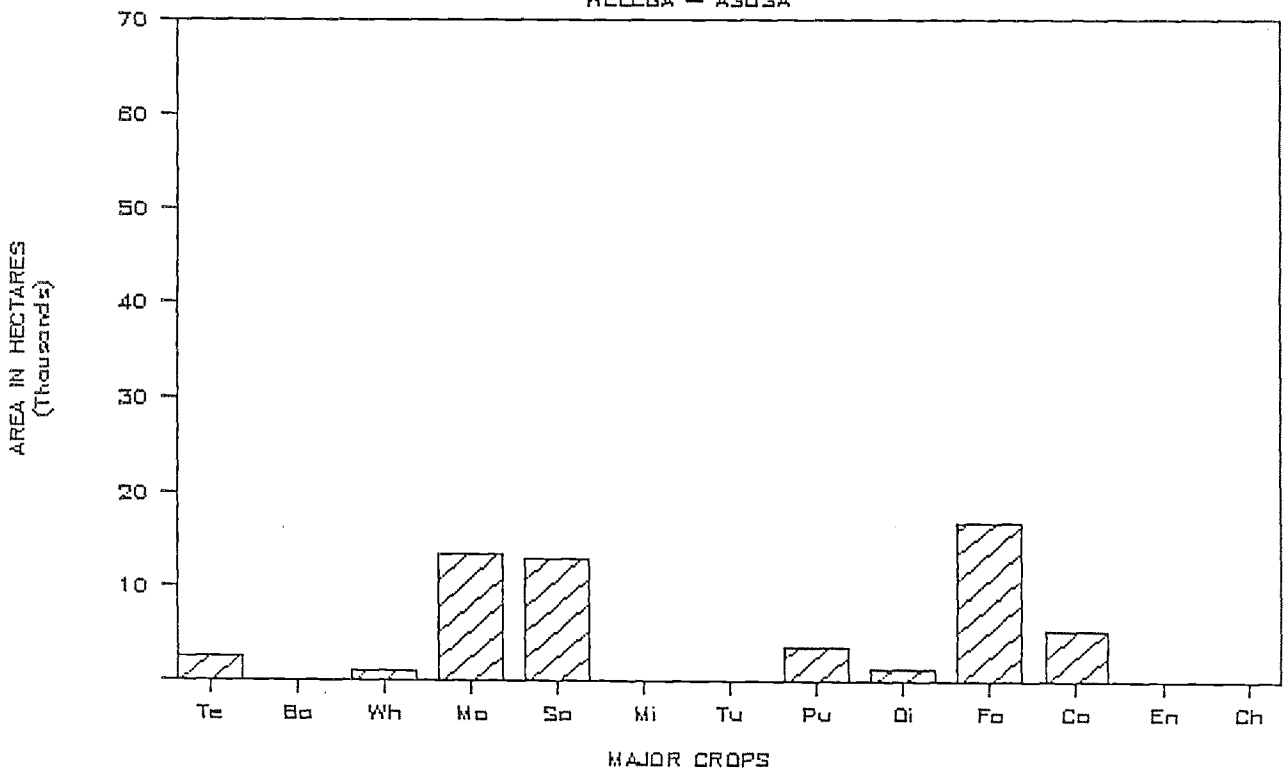
AREA UNDER MAJOR CROPS
WELO — RAYA & KOBO, LASTA, WAG
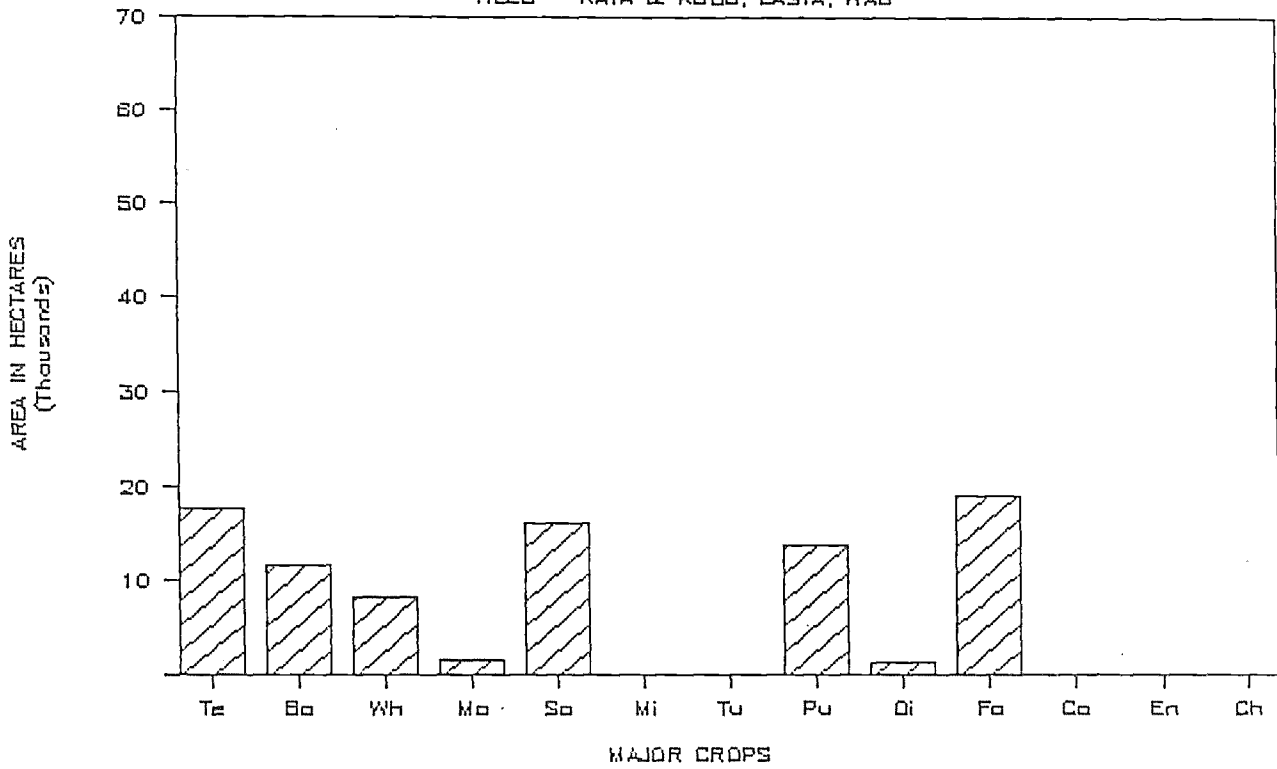
AREA UNDER MAJOR CROPS
WELO — YEYU
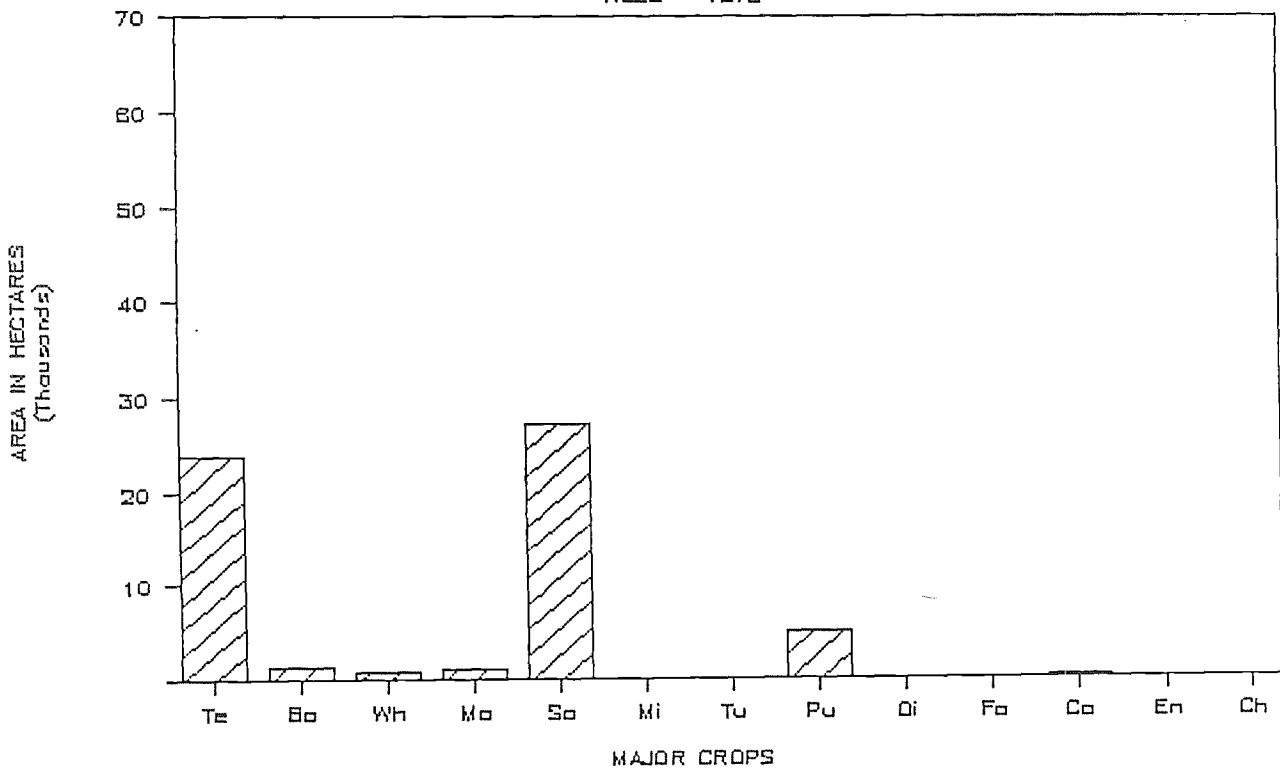
AREA UNDER MAJOR CROPS

WELD — AMBASEL
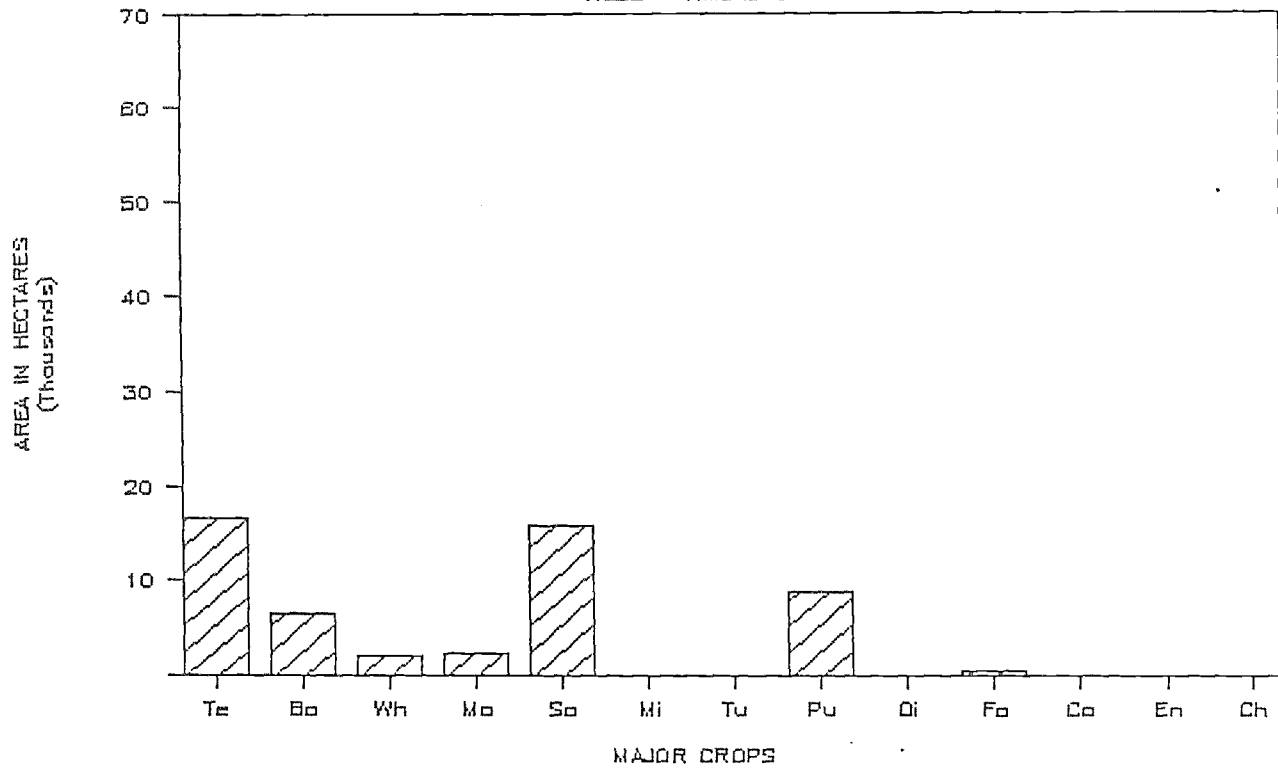
AREA UNDER MAJOR CROPS

WELD — AWSA
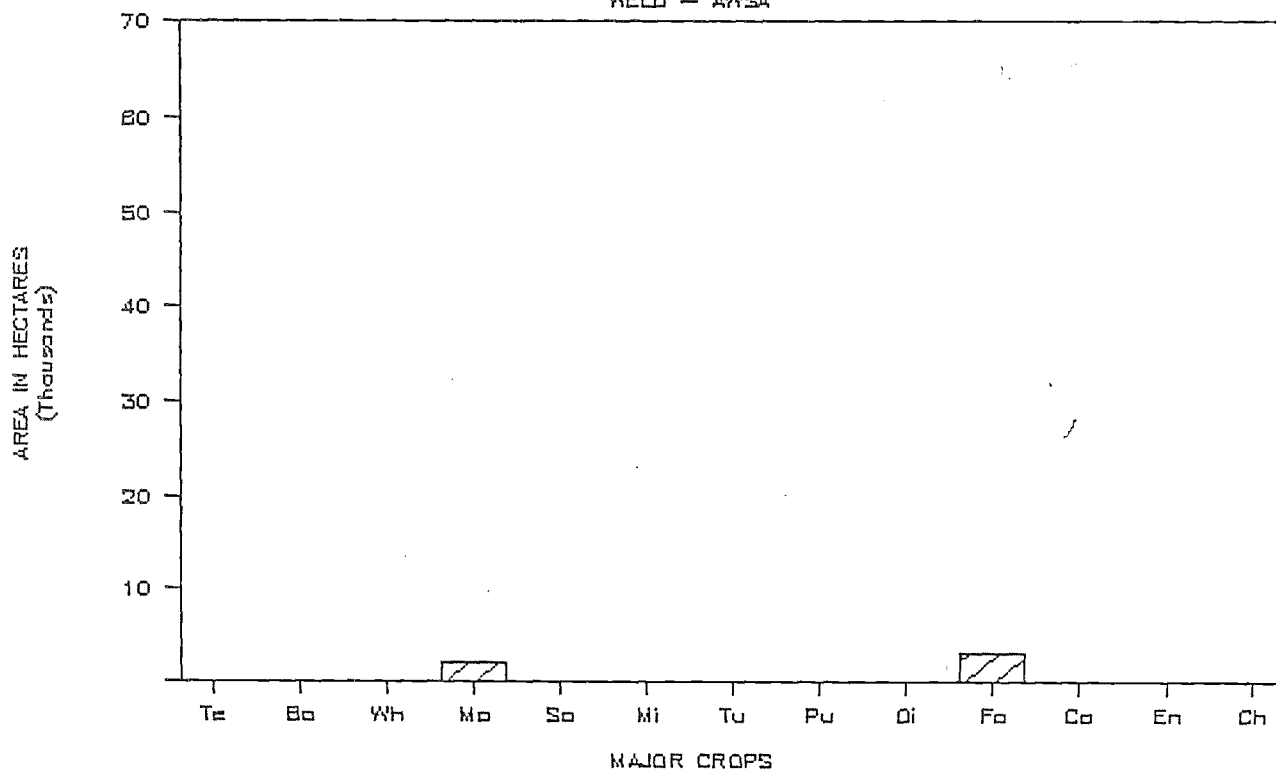
AREA UNDER MAJOR CROPS
WELO — KALU
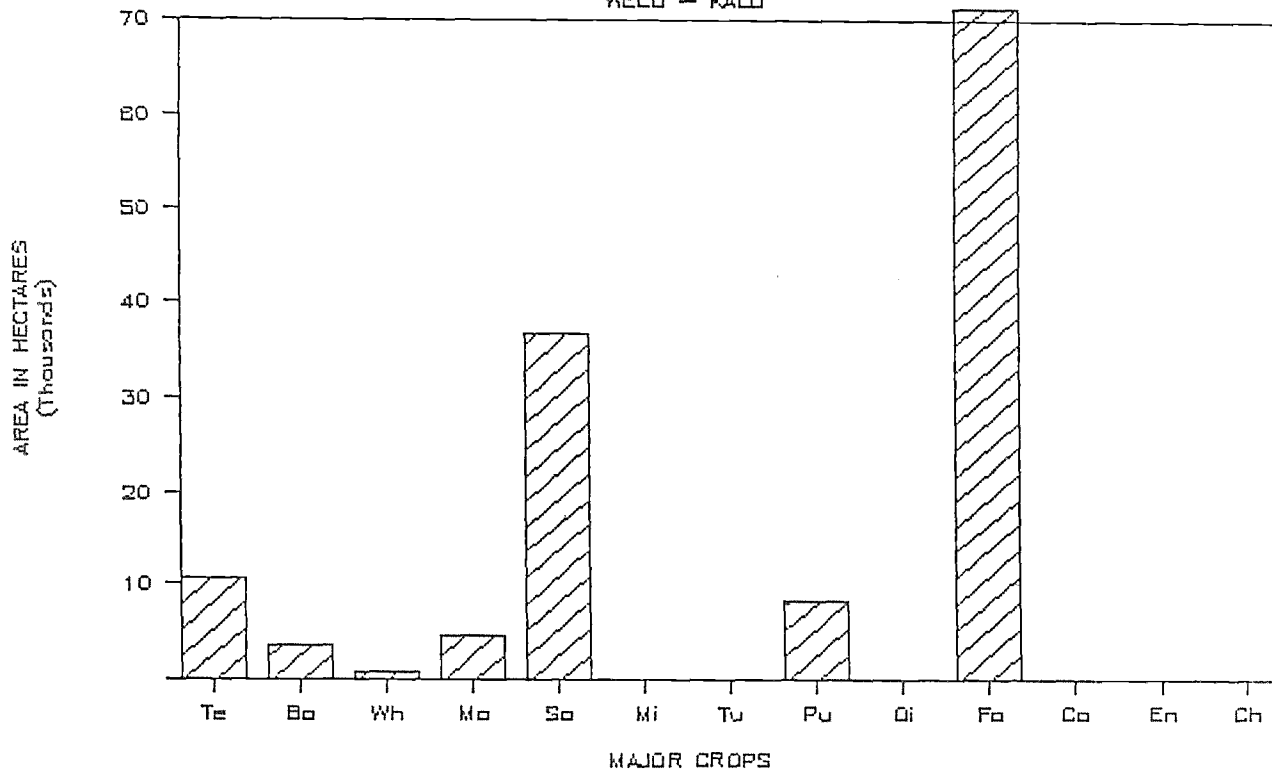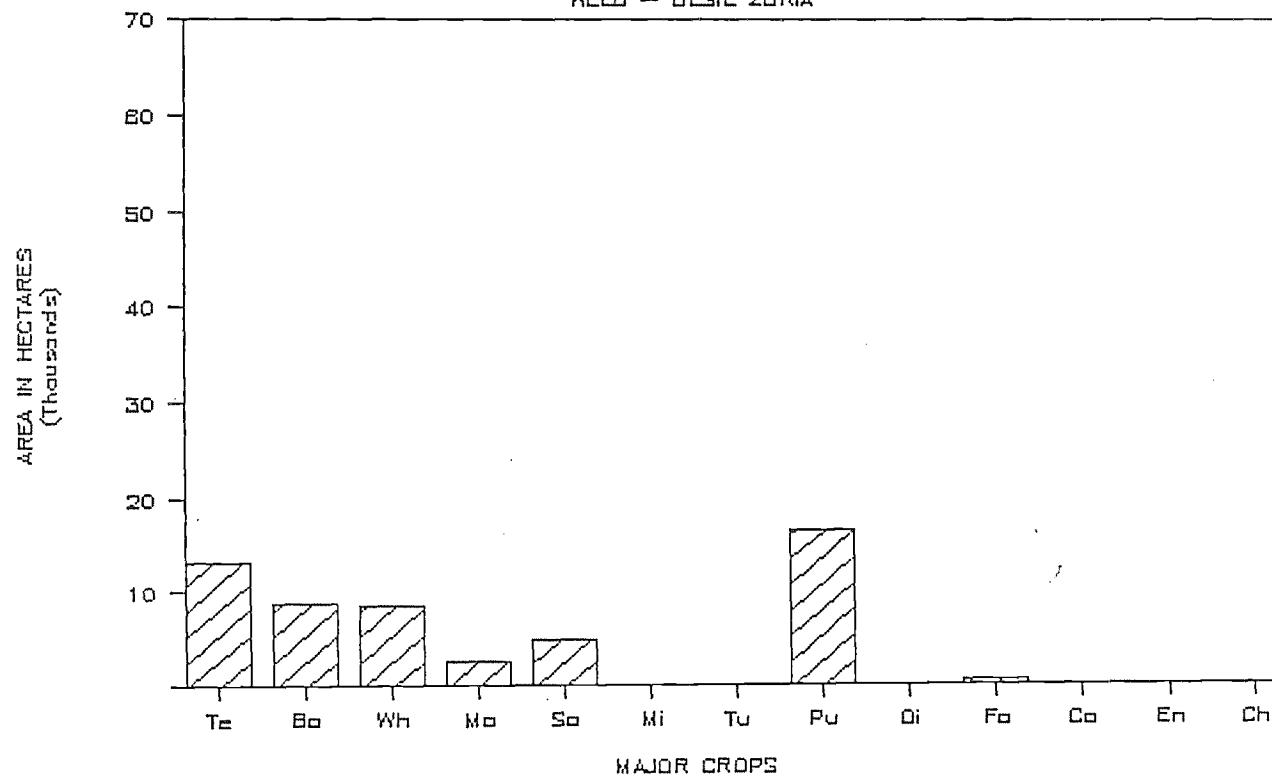
AREA UNDER MAJOR CROPS
WELO — DESIE ZURIA

AREA UNDER MAJOR CROPS
WELO — WEREILU
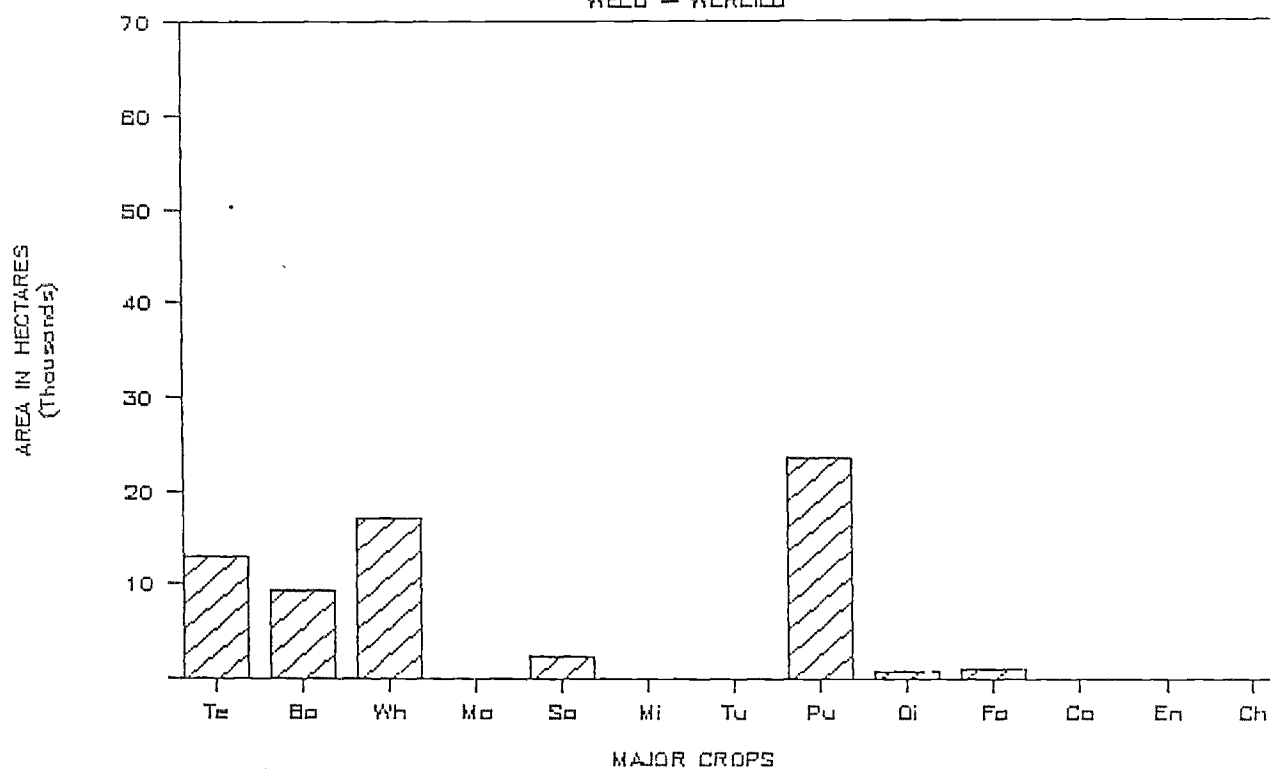
AREA UNDER MAJOR CROPS
WELO — BORENA
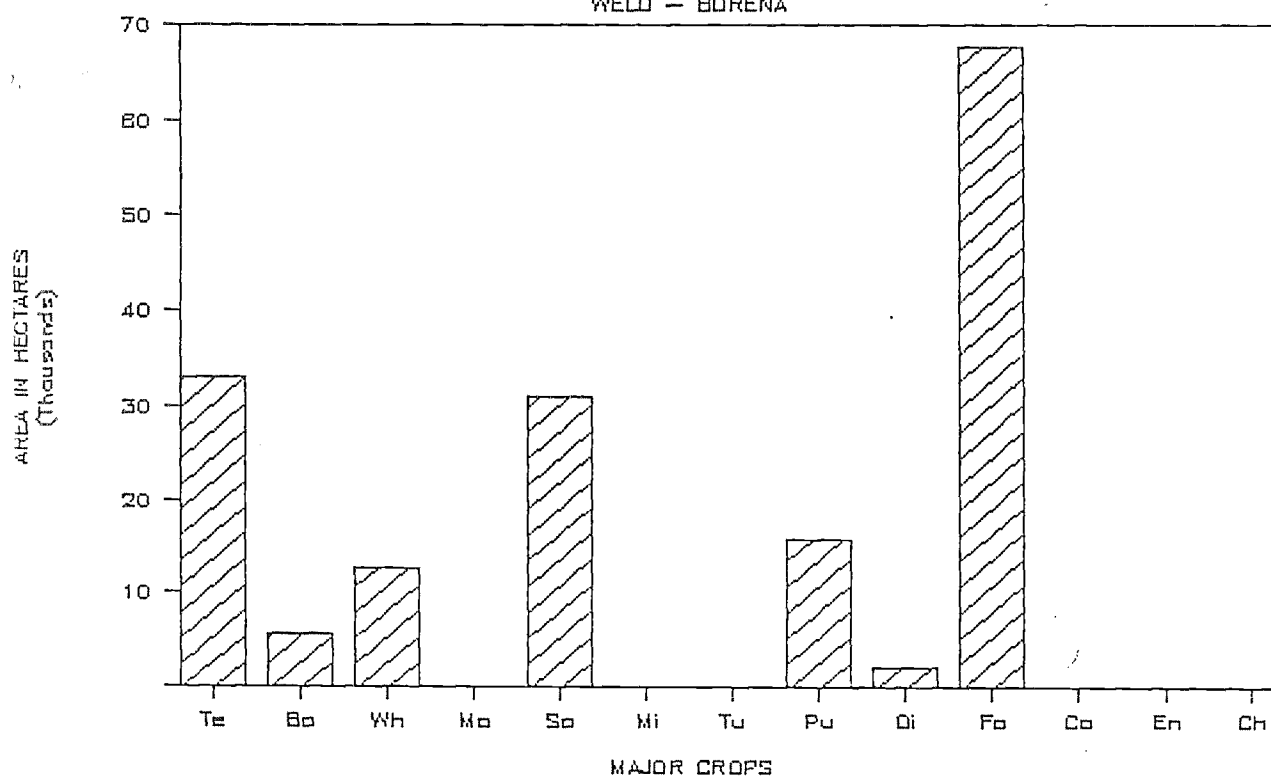
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WELO — WEREHIMENO
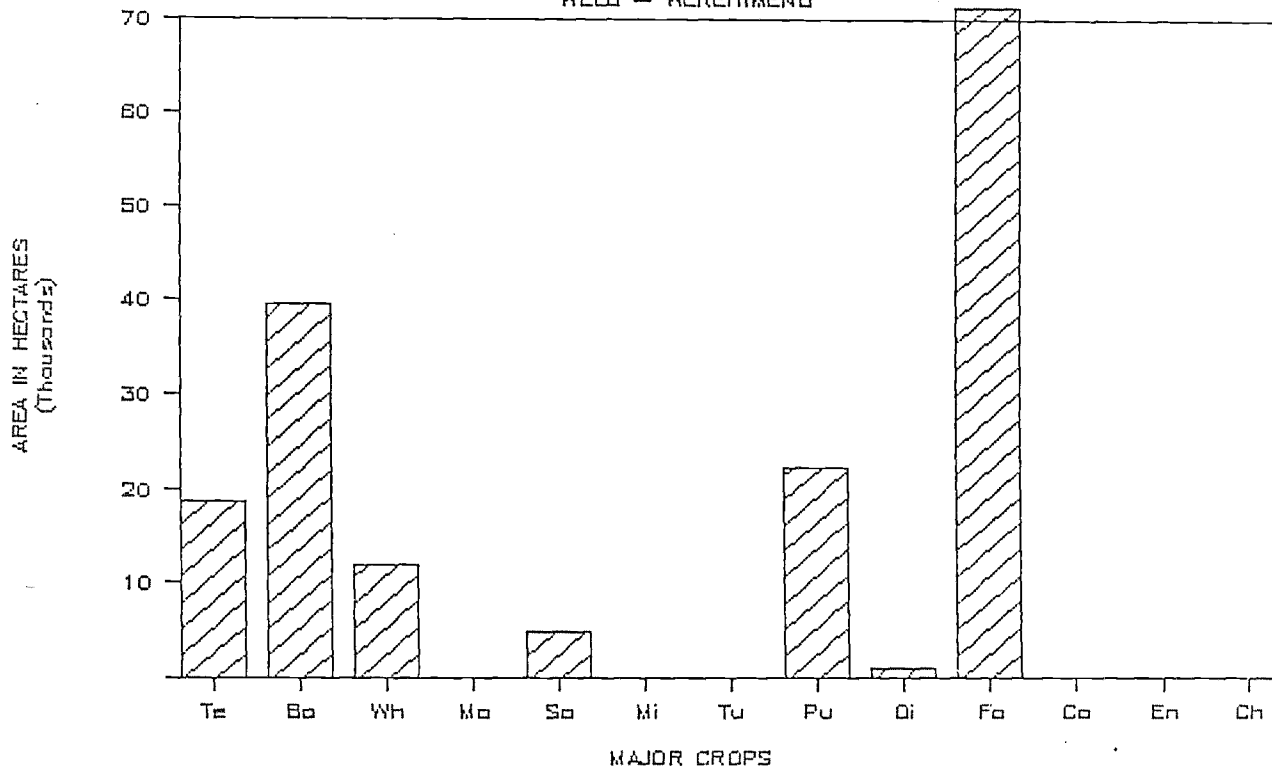
AREA UNDER MAJOR CROPS
WELO — WADLA DELANTA
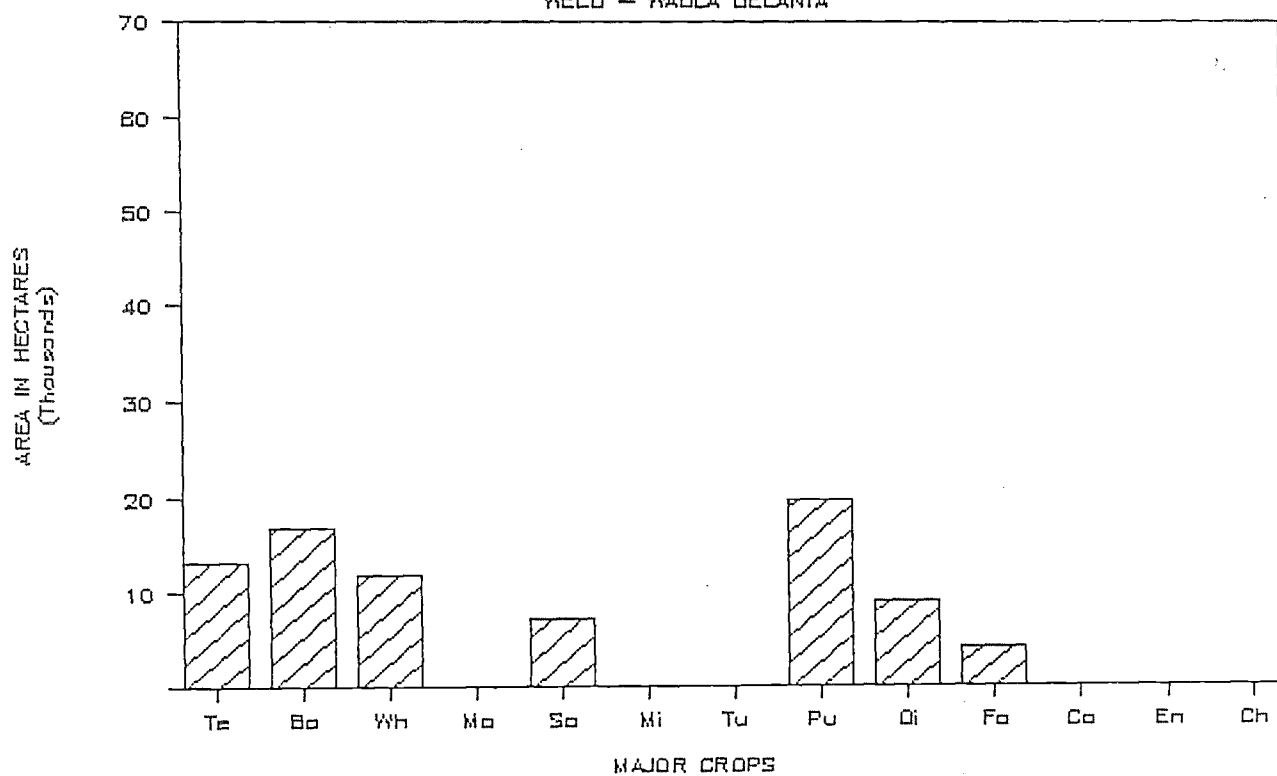
CROP YIELDS

CROP YIELDS
ARSI — ARBA GUGU
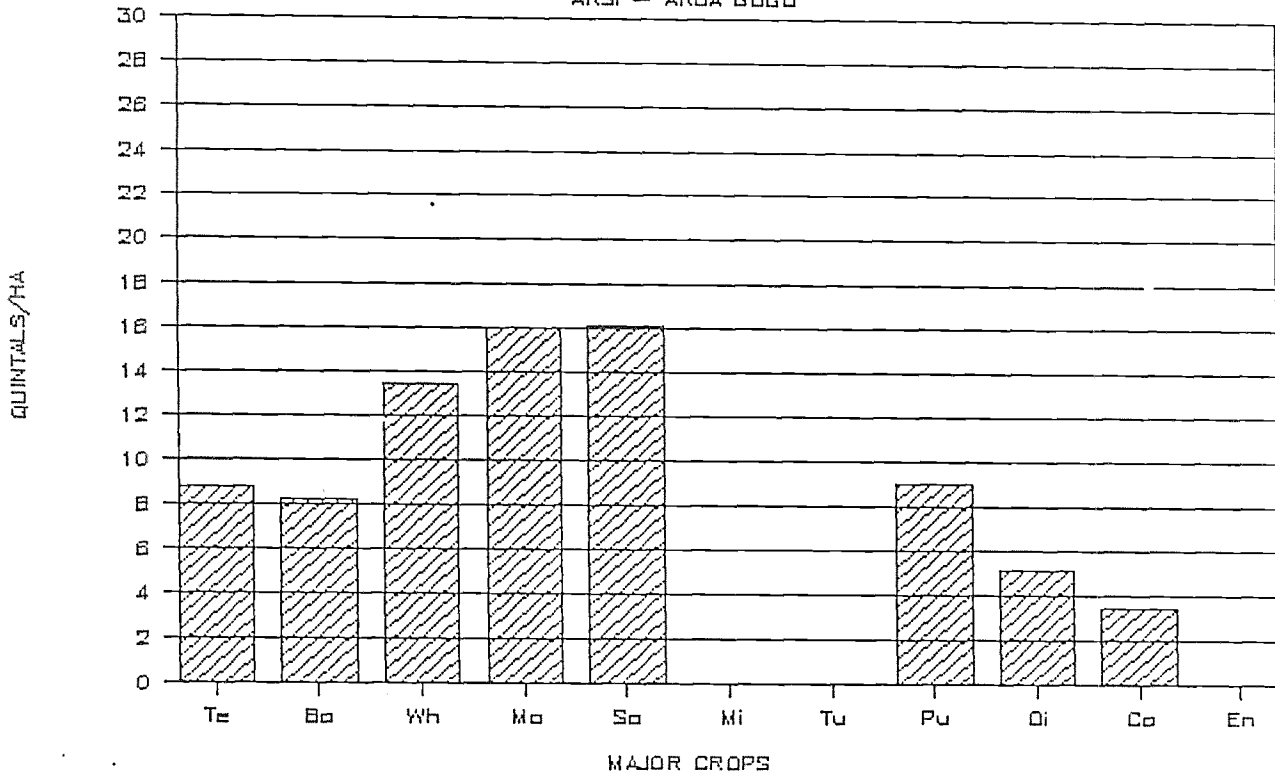
CROP YIELDS
ARSI — TICHO
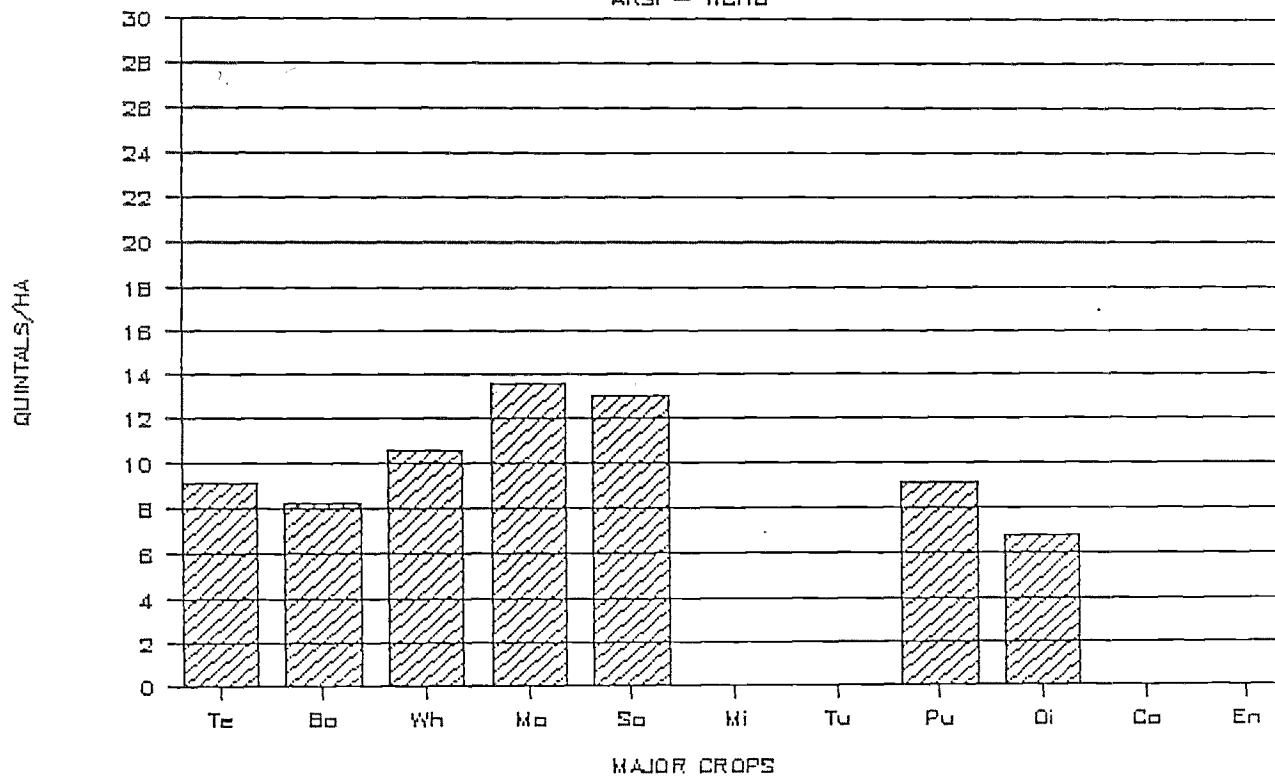
CROP YIELDS
ARSI — CHILALO
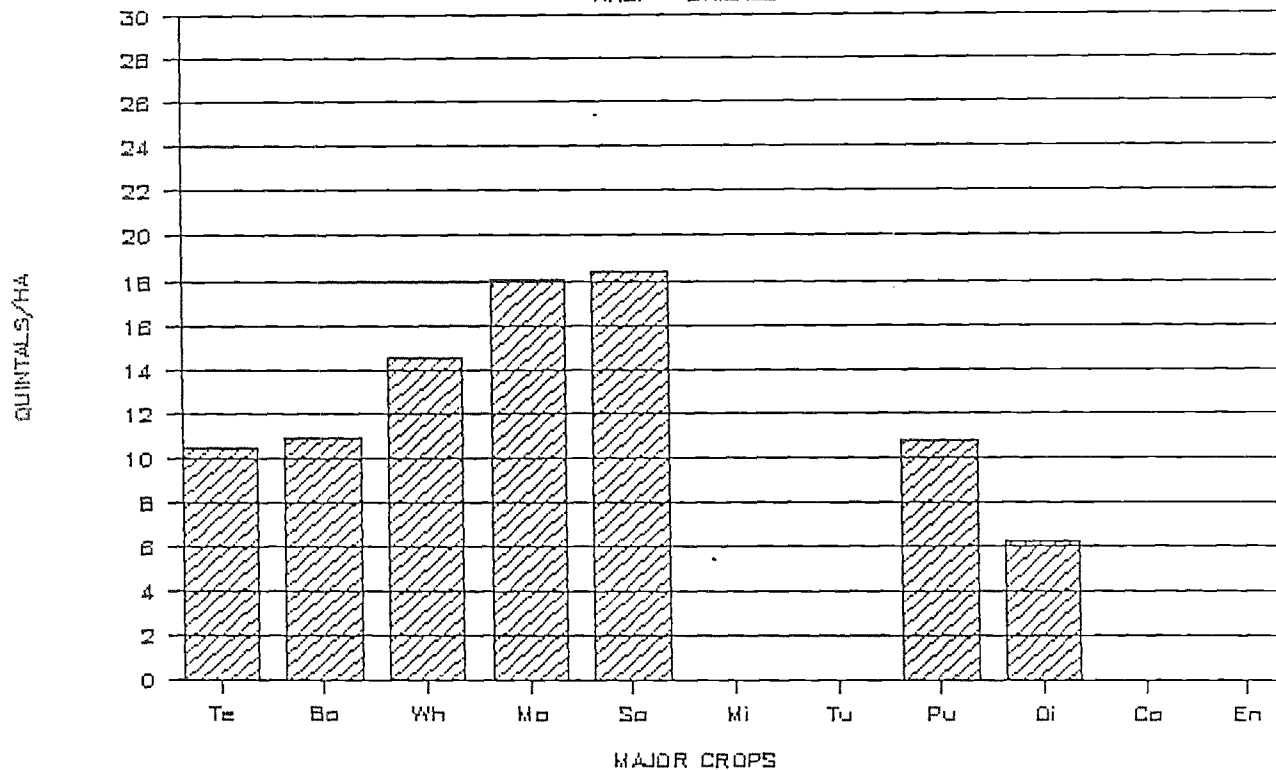
CROP YIELDS
BALE — GENALE
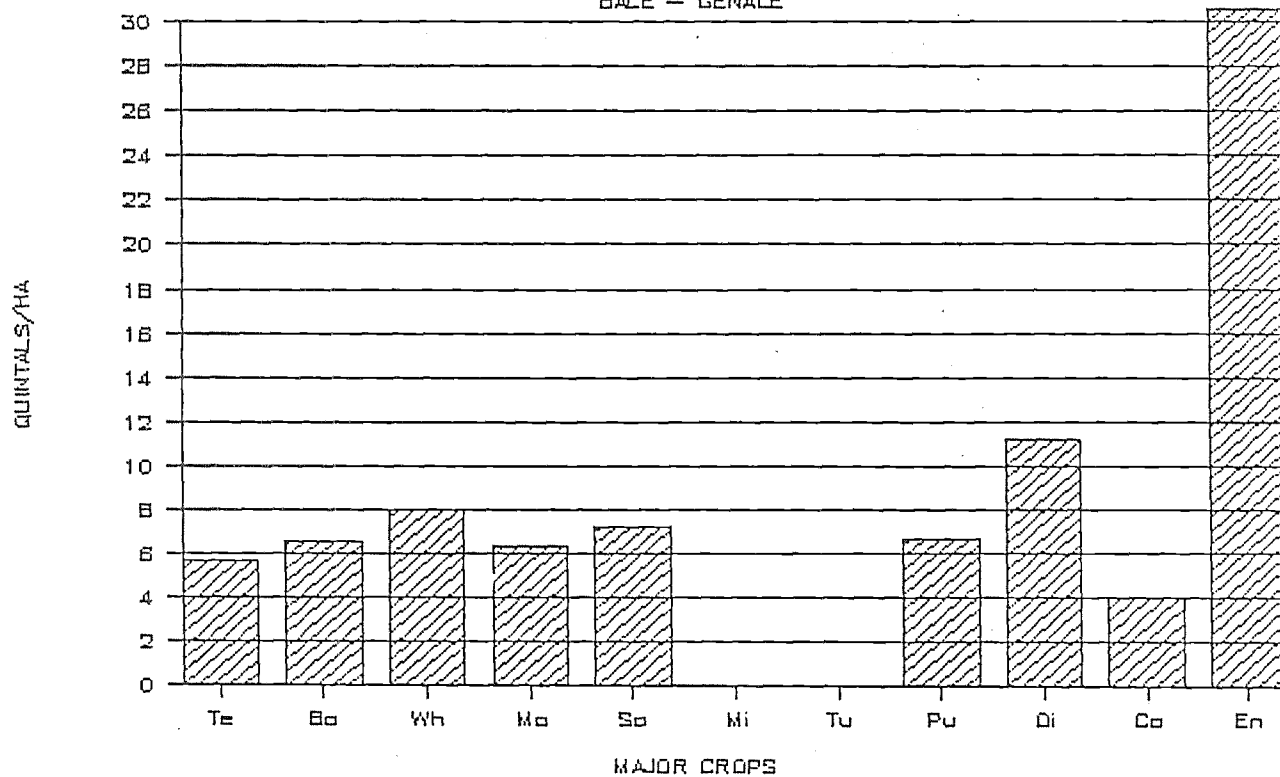
CROP YIELDS

BALE — MENDEYO
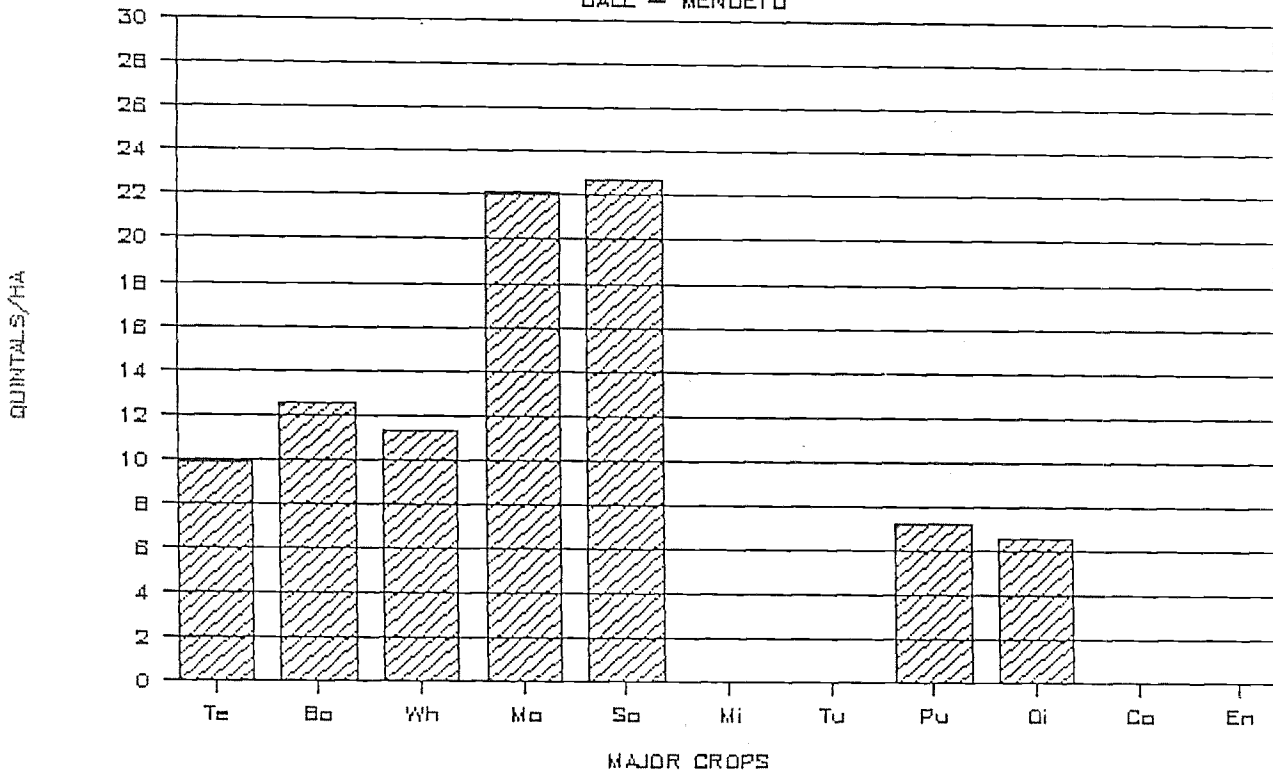
CROP YIELDS

BALE — WABE
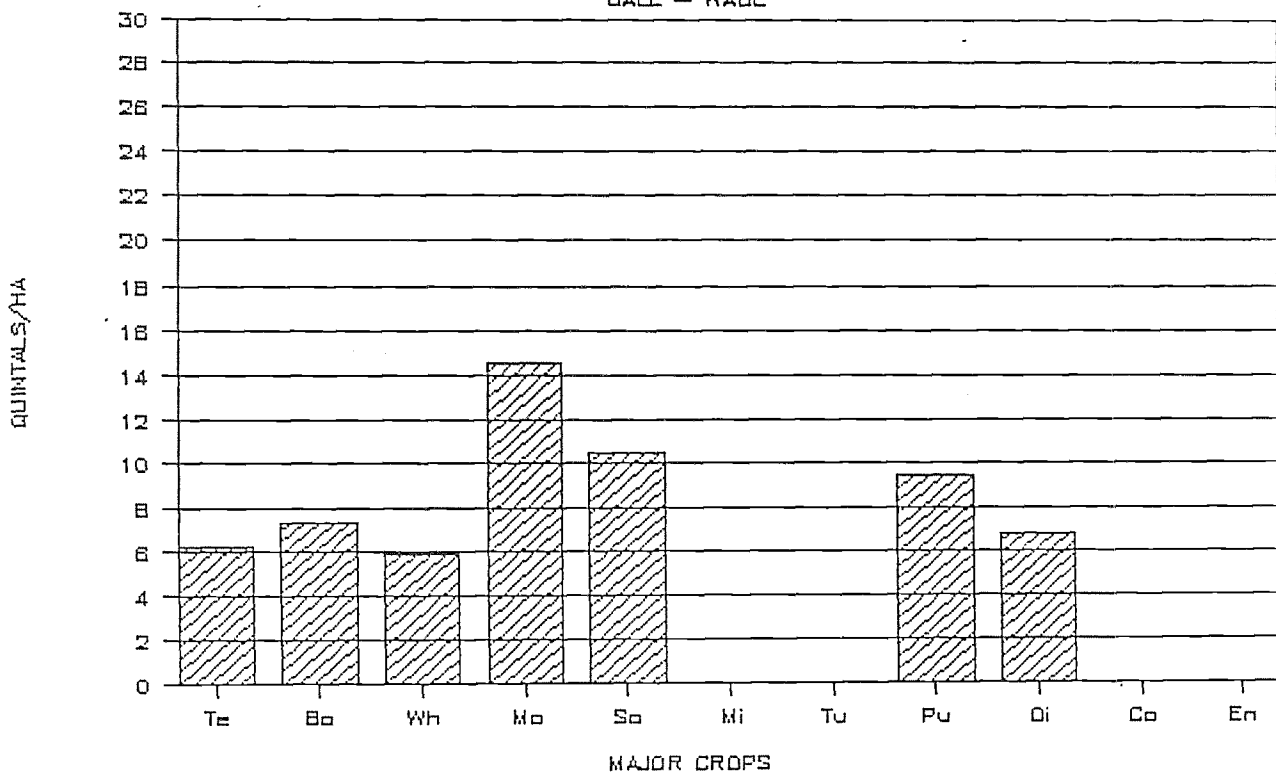
CROP YIELDS
BALE — ELKERE
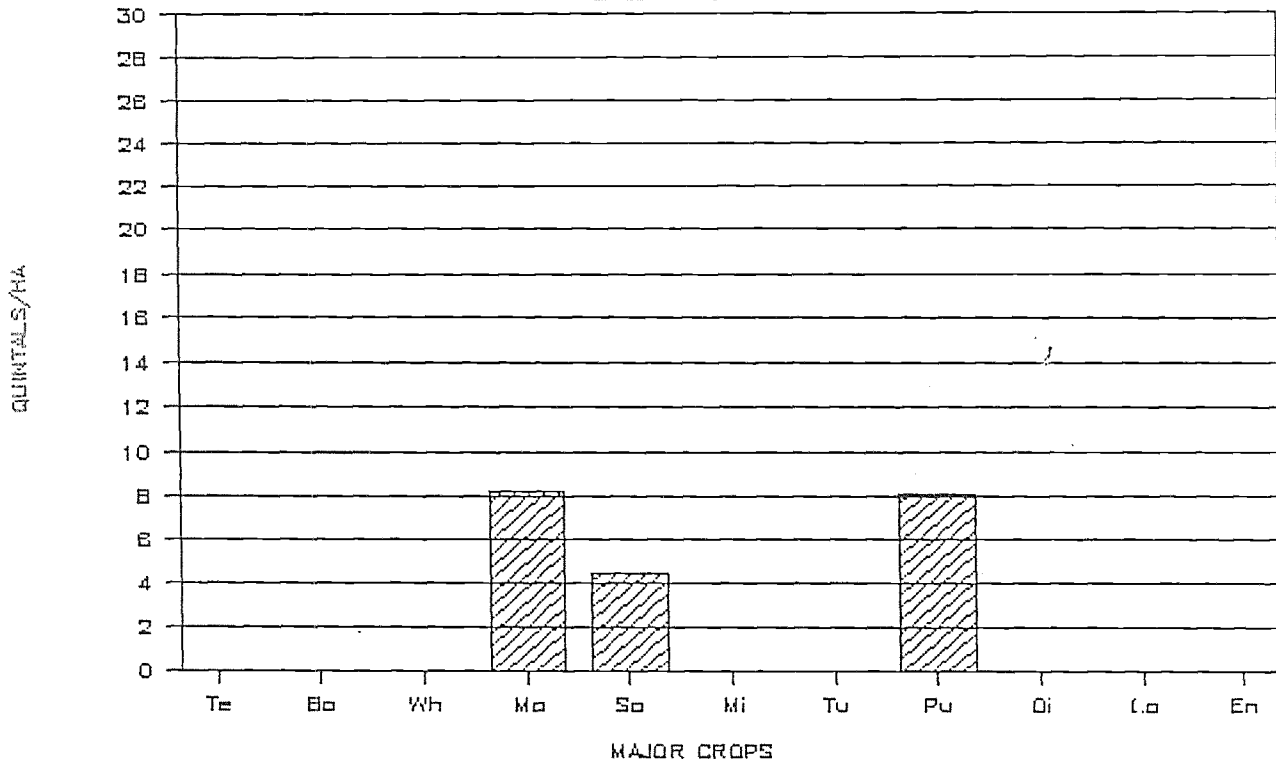
CROP YIELDS
BALE — DOLO
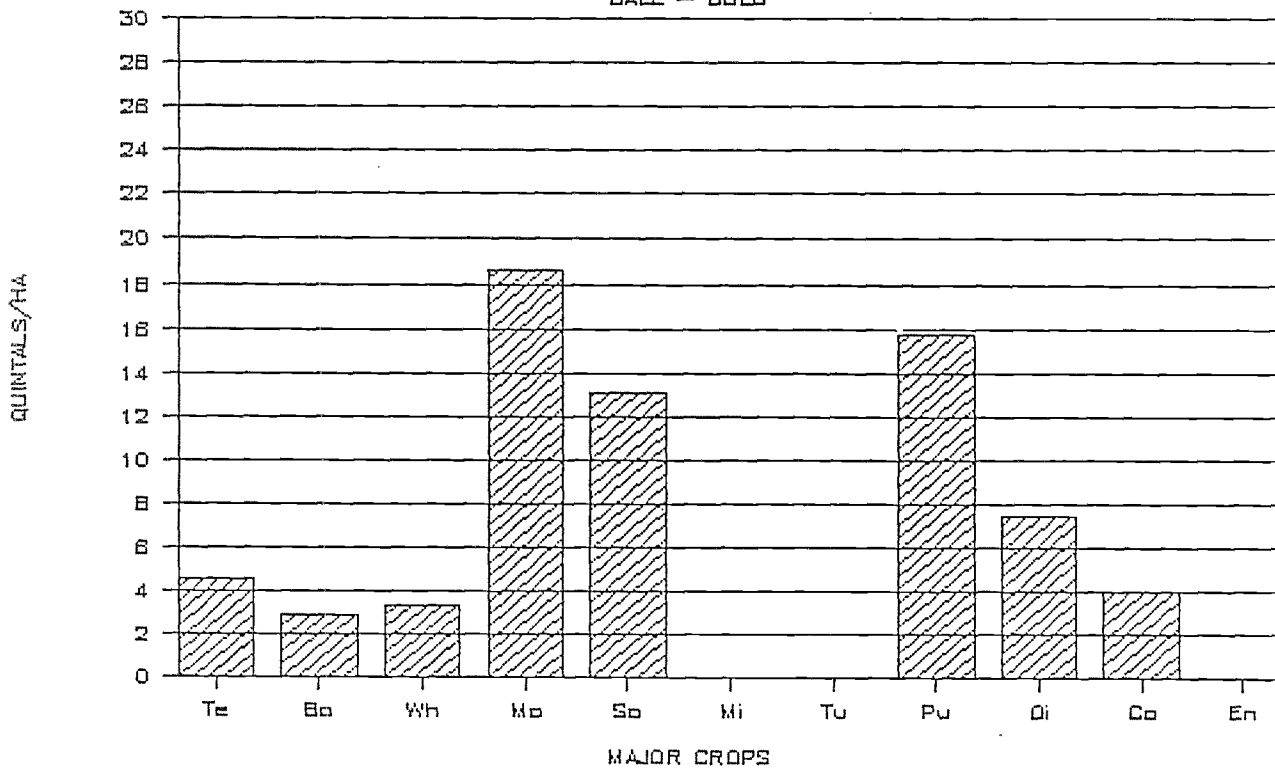
CROP YIELDS

ERITREA
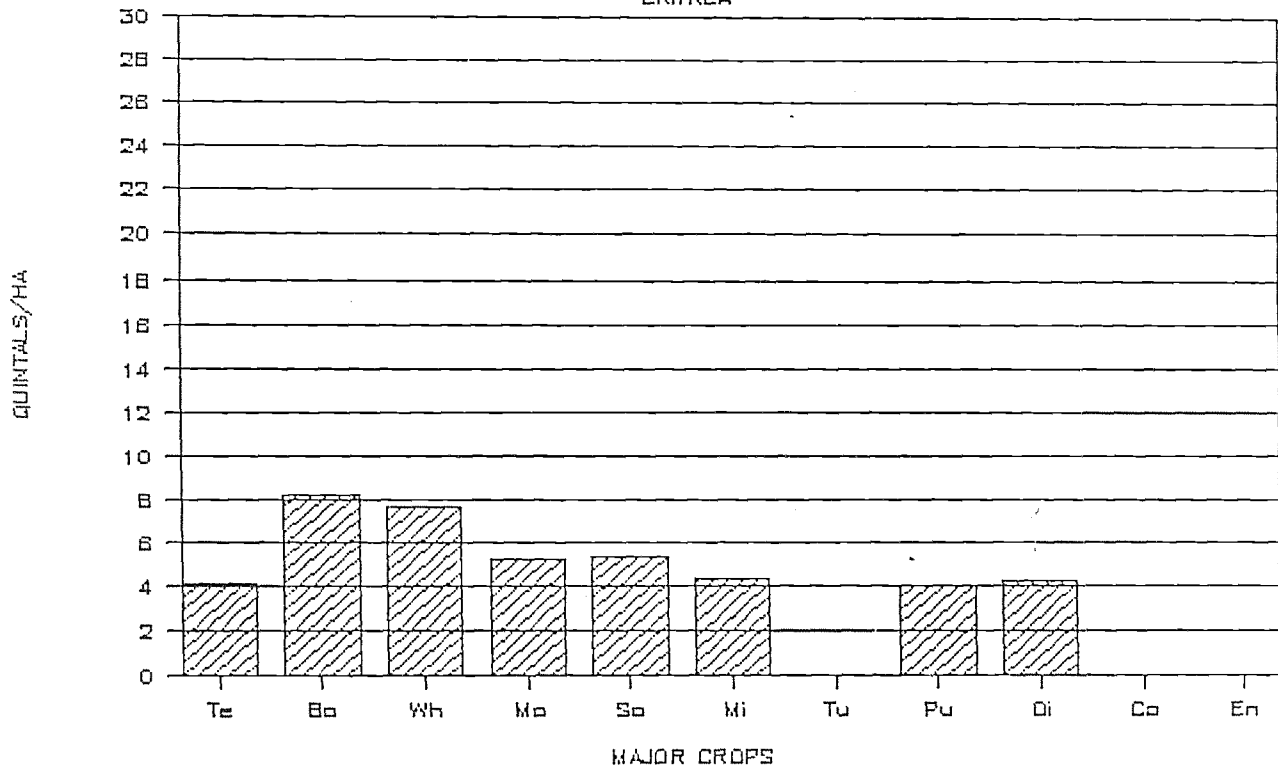
CROP YIELDS

GAMO GOFA — GAMO
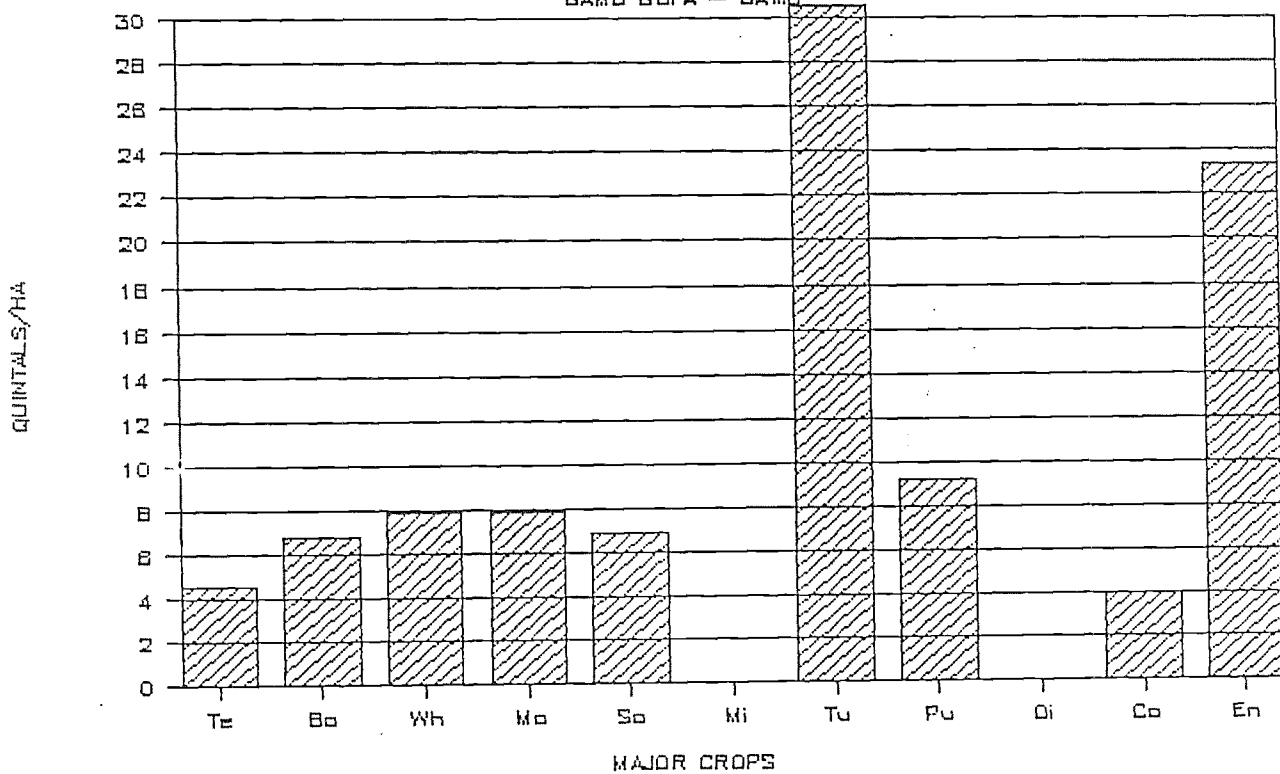
CROP YIELDS
GAMO GOFA — GARDULA
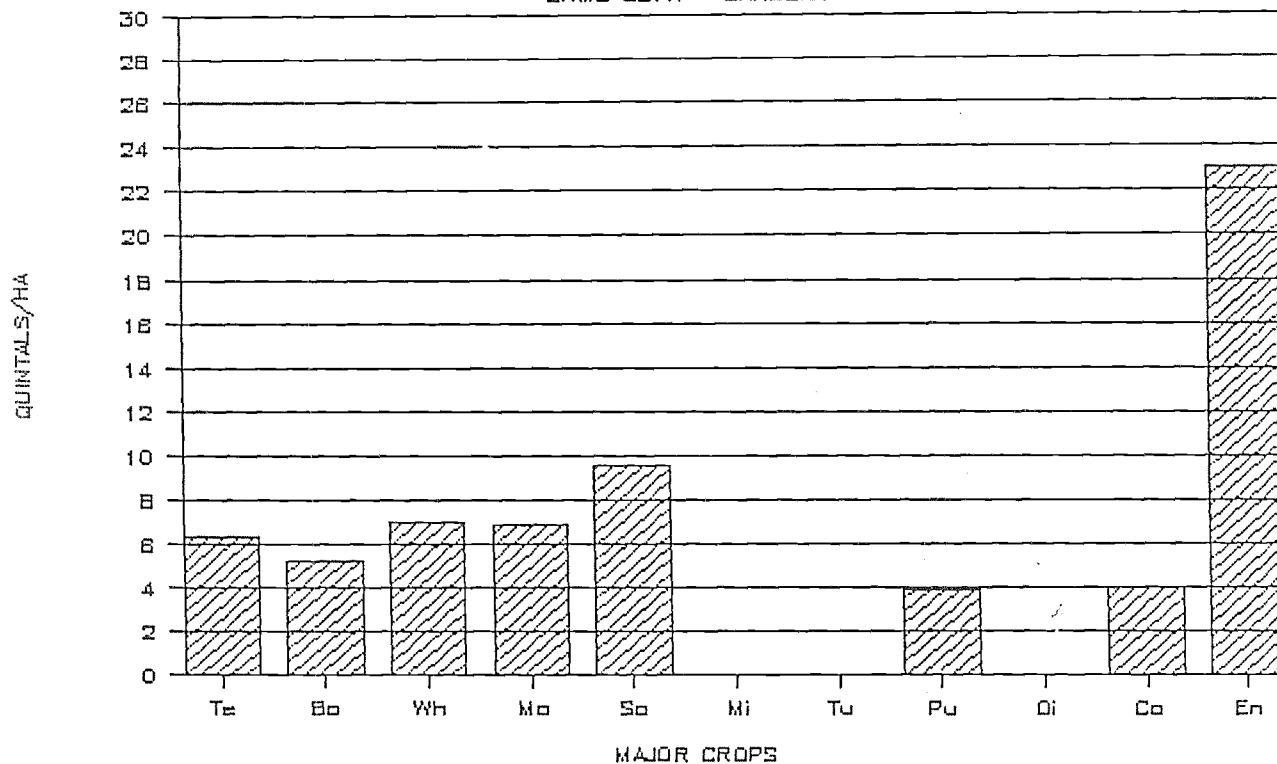
CROP YIELDS
GAMO GOFA — GELEB & HAMER BAKO
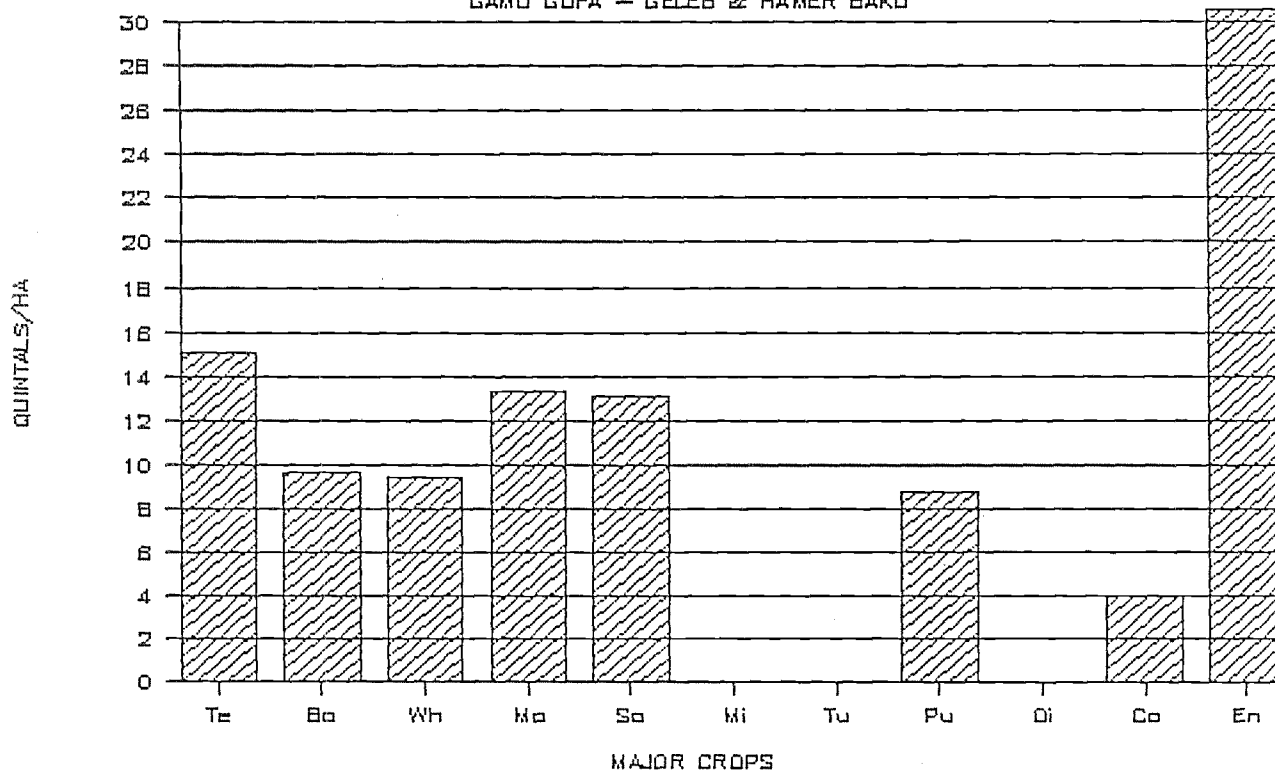
CROP YIELDS

GAMO GOFA — GOFA

QUINTALS/HA

MAJOR CROPS
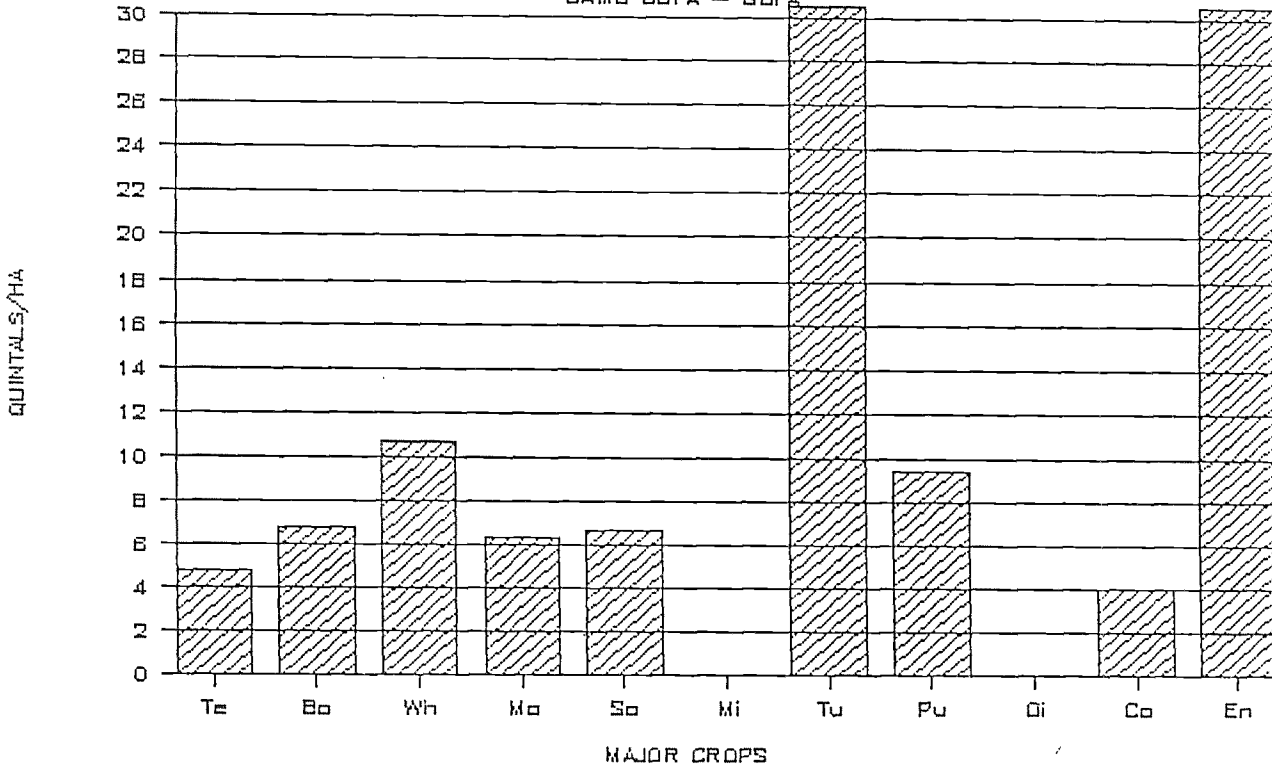
CROP YIELDS

GOJAM — BAHIR DAR

QUINTALS/HA

MAJOR CROPS
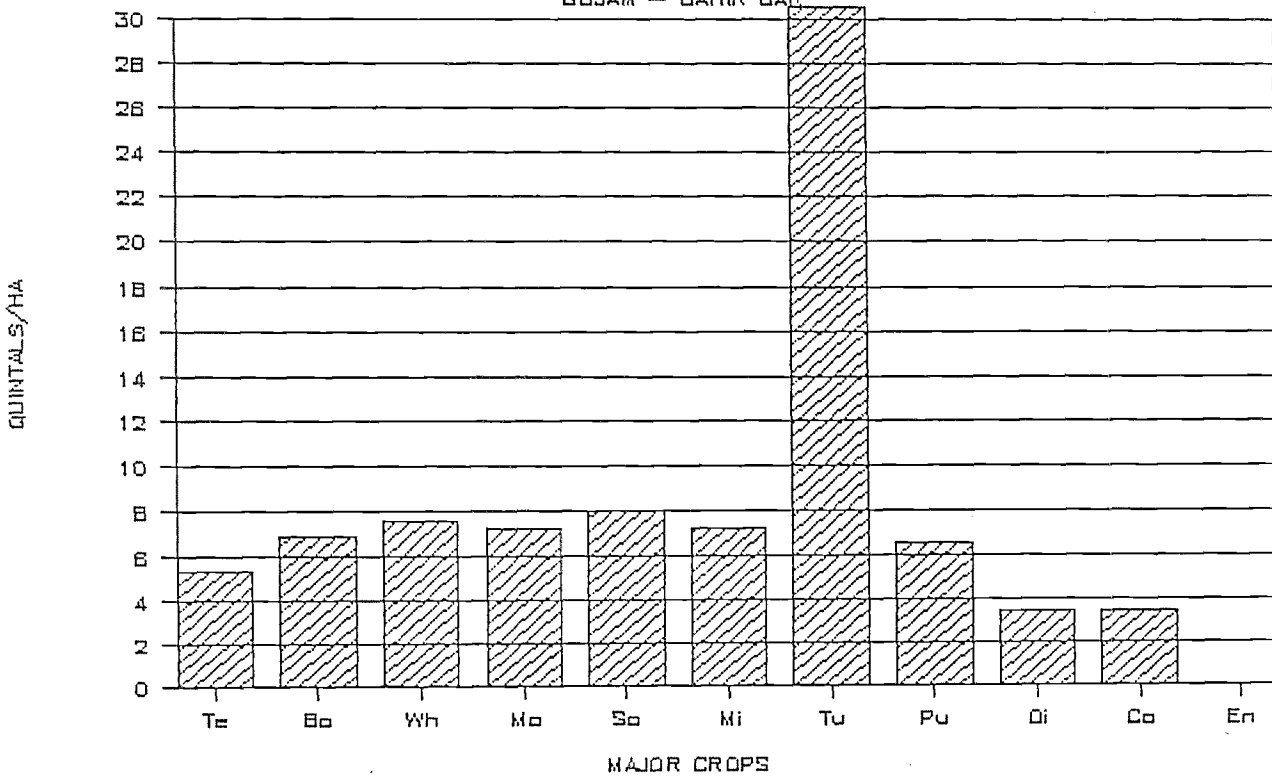
CROP YIELDS

GOJAM — MOTA
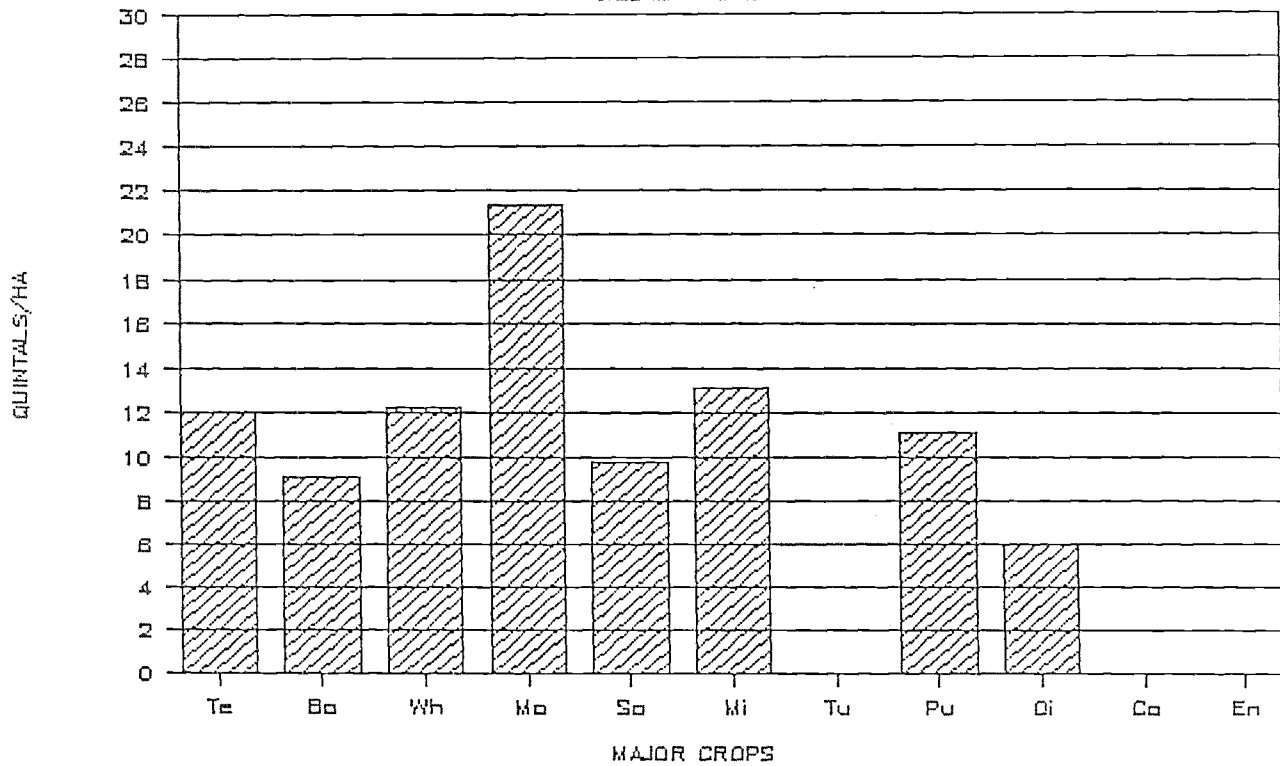
CROP YIELDS

GOJAM — BICHENA
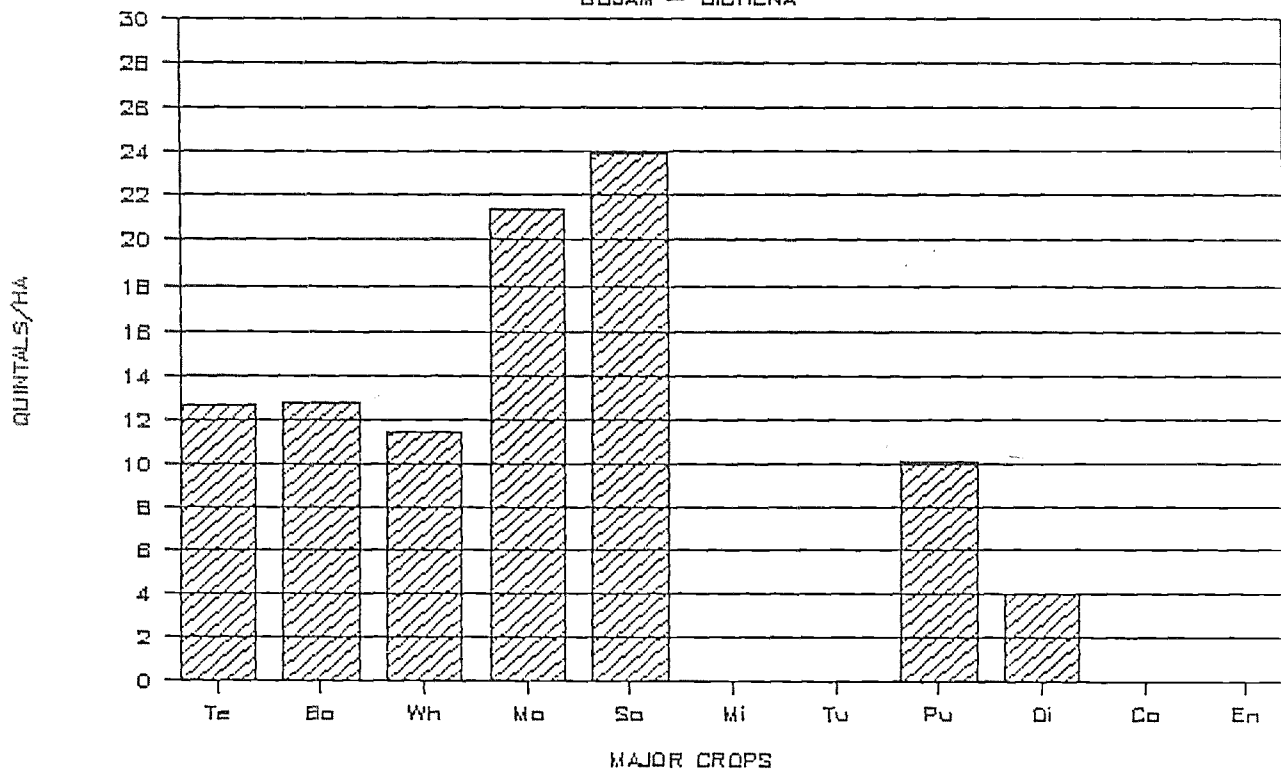
CROP YIELDS

GOJAM — DEBRE MARKOS
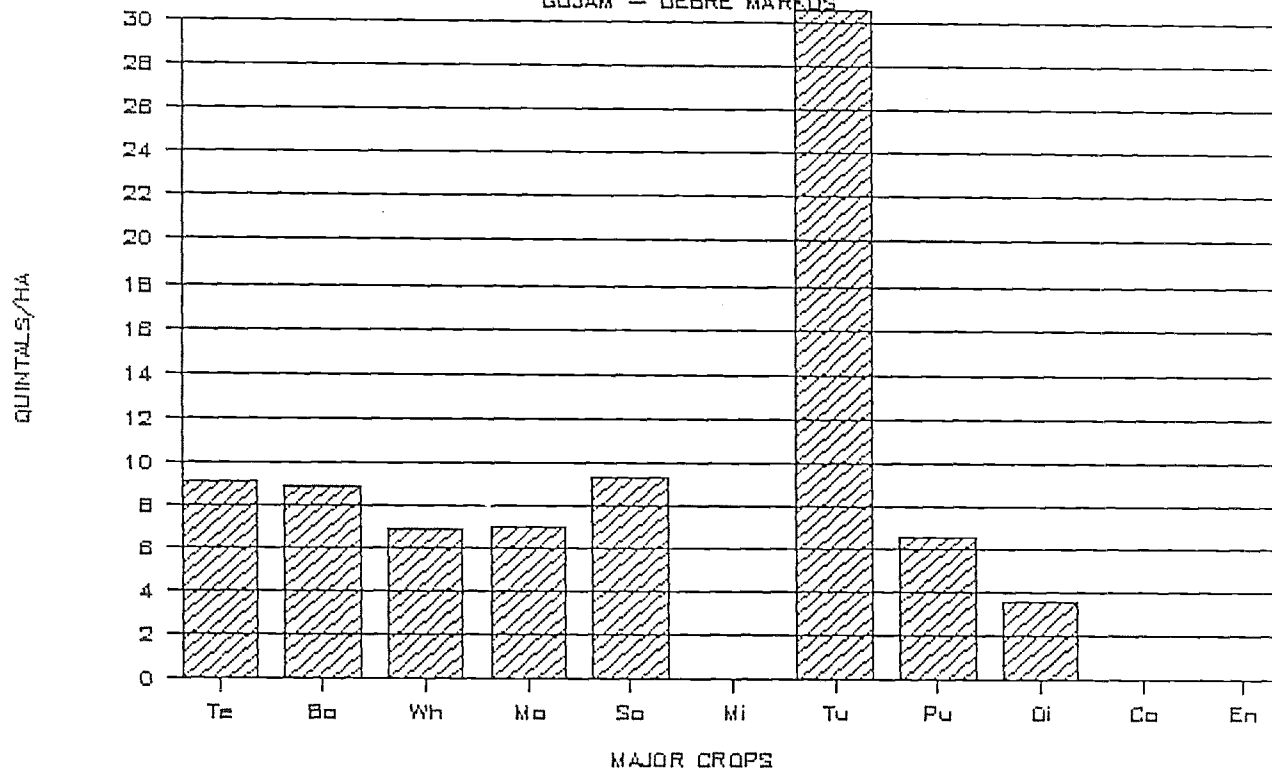
CROP YIELDS

GOJAM — AGEW MIDIR
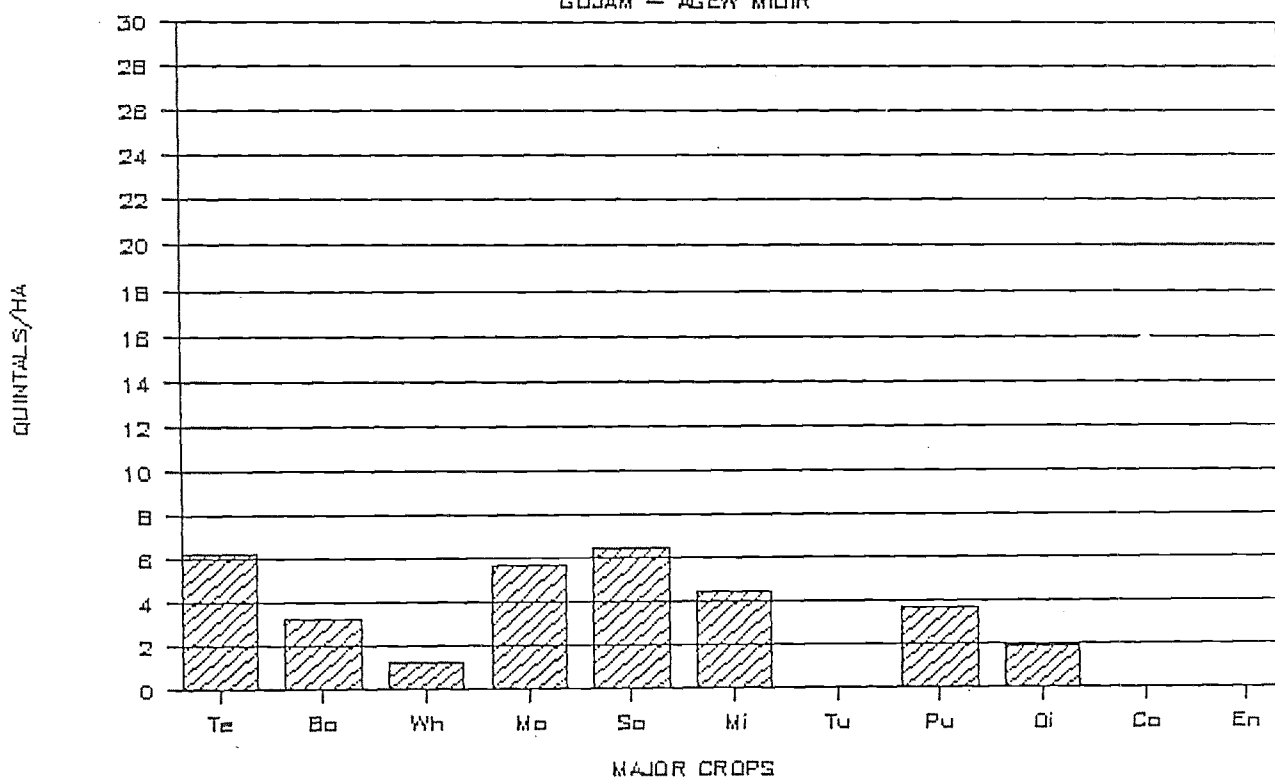
CROP YIELDS
GOJAM — AGEW MIDIR
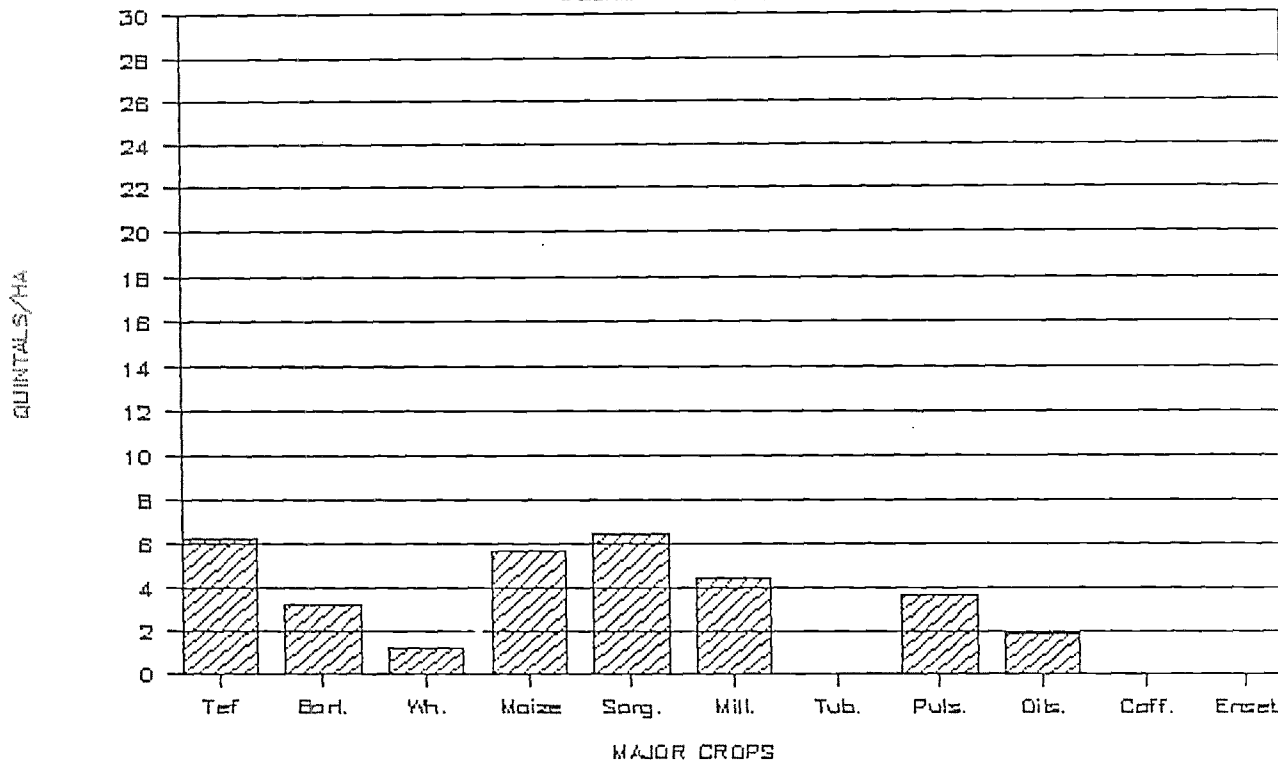
CROP YIELDS
GOJAM — METEKEL
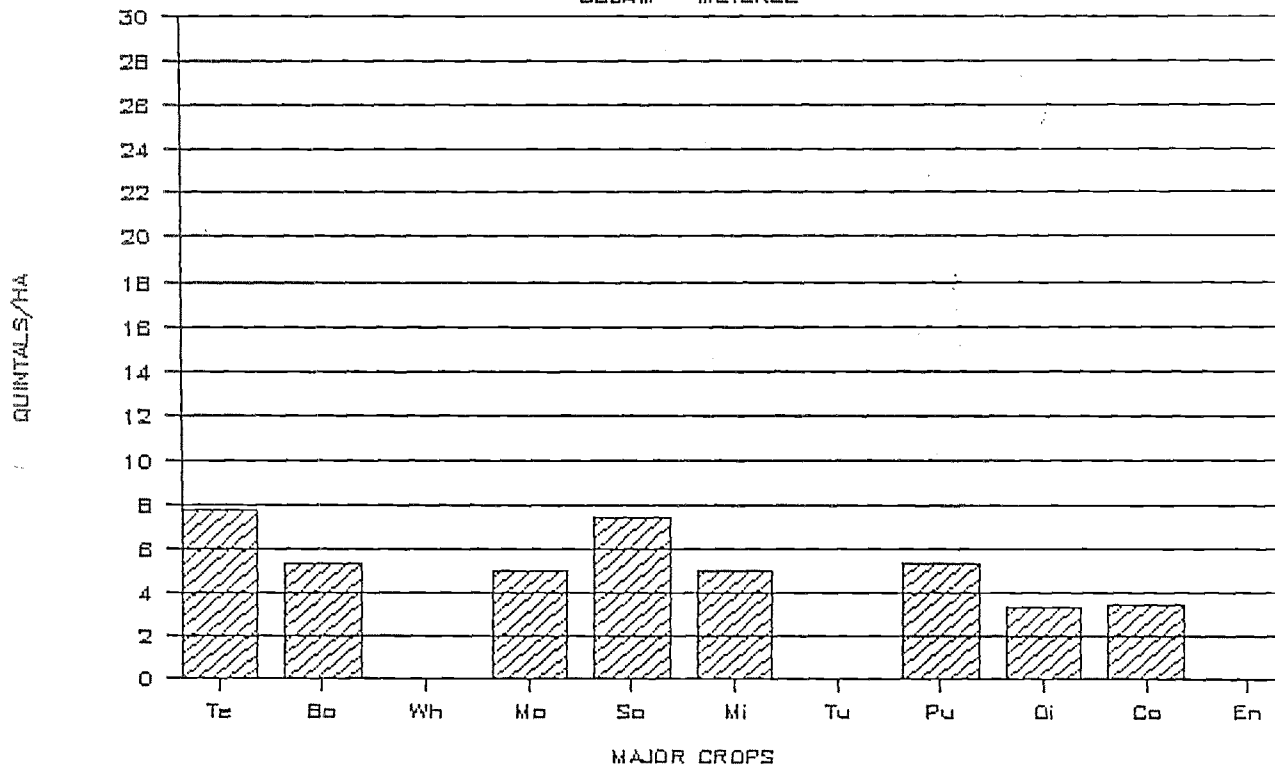
CROP YIELDS
GONDER — WEGERA
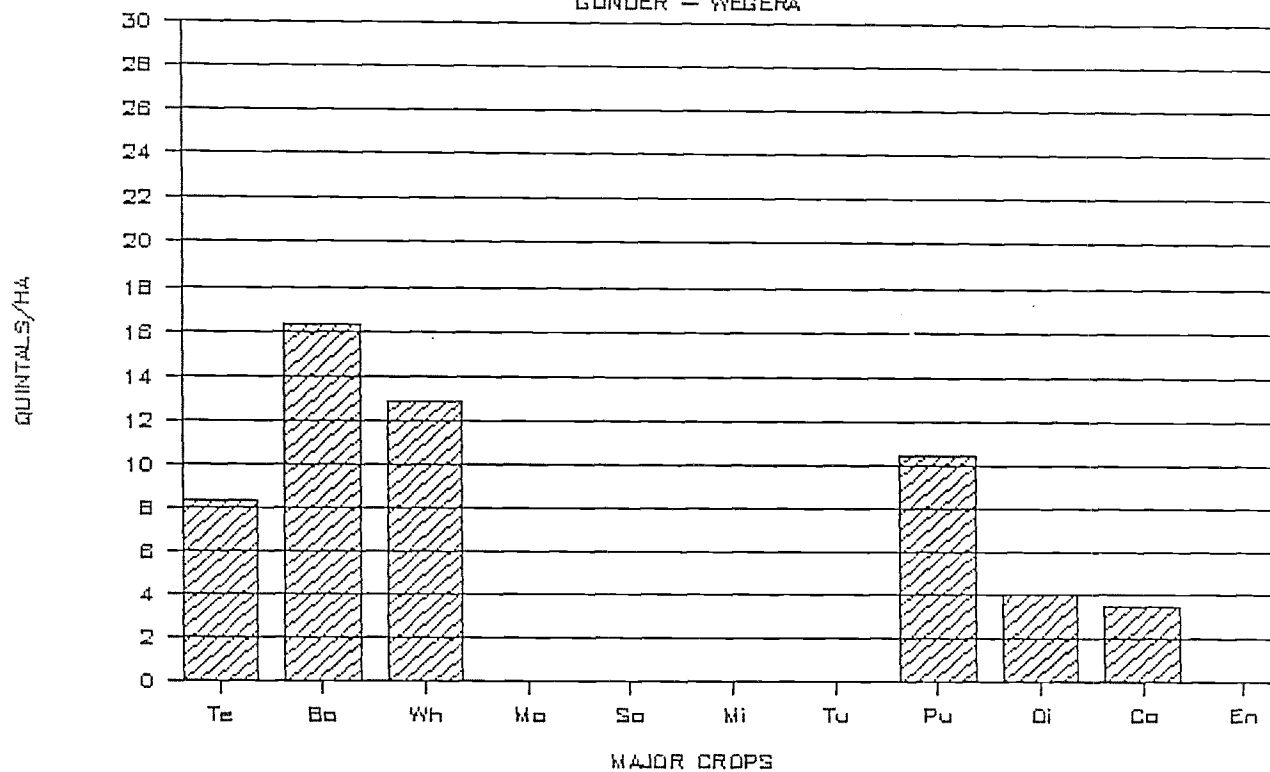
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GONDER — SEMIEN
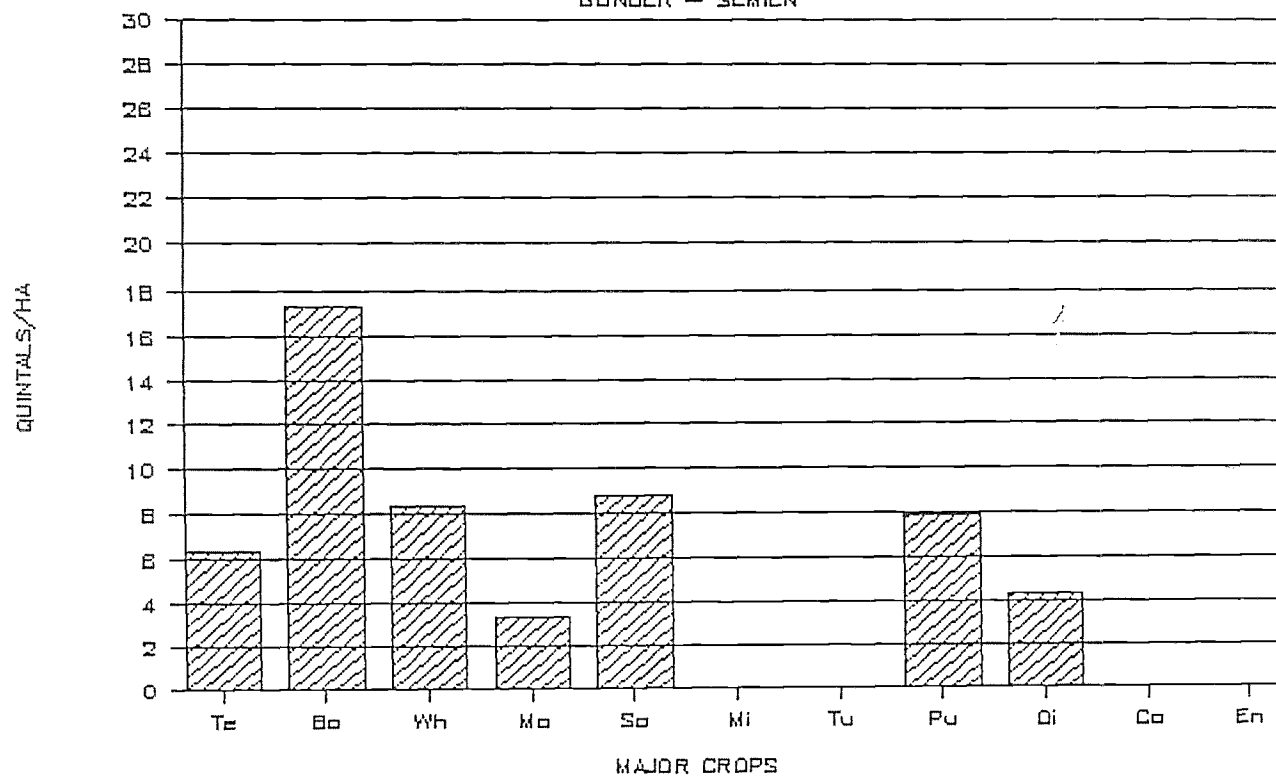
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GONDER — LIBO
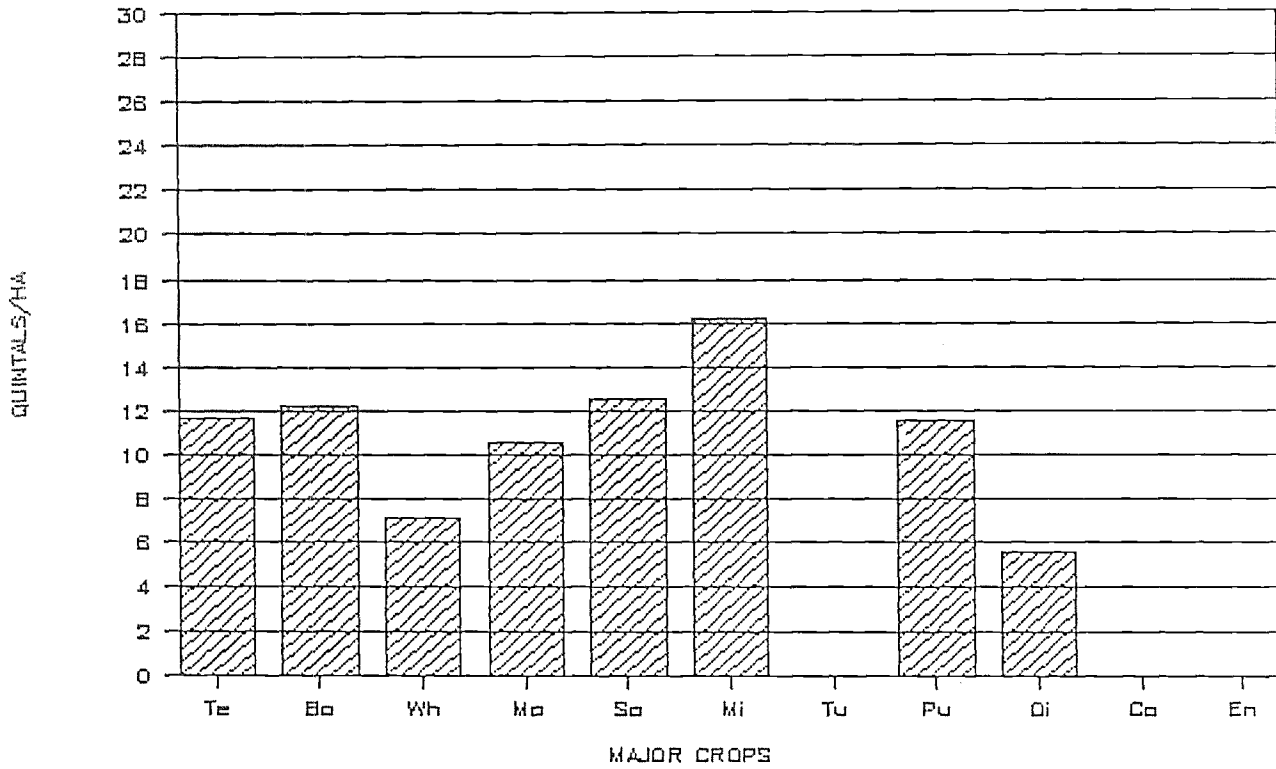
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GONDER — GAYINT
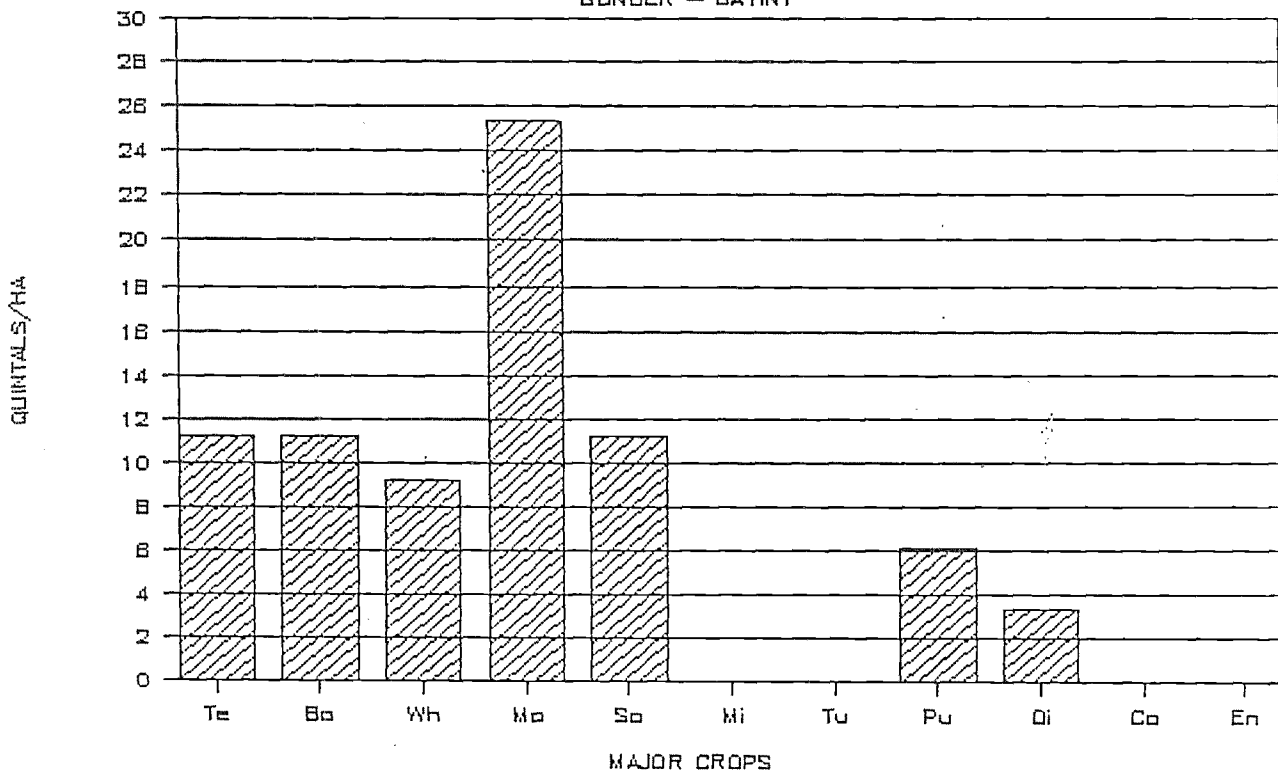
CROP YIELDS
GONDER — DEBRE TABOR

MAJOR CROPS
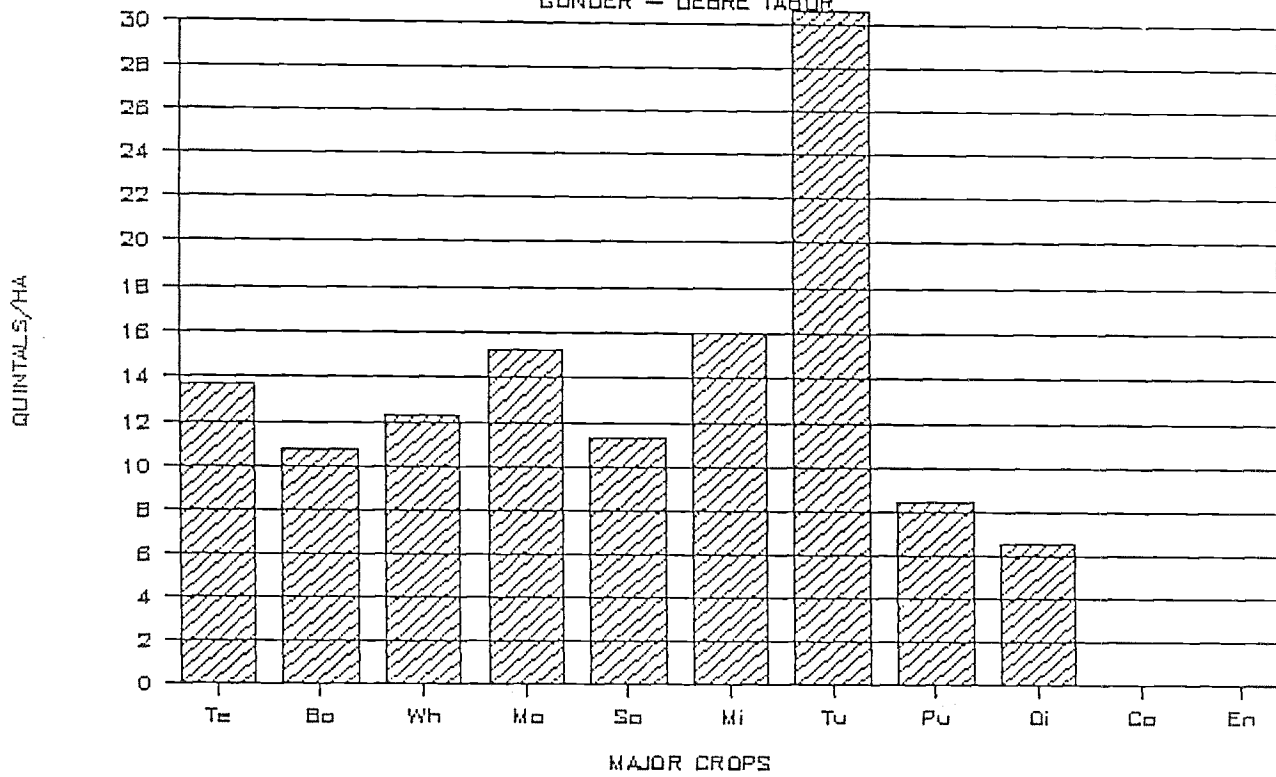
CROP YIELDS
GONDER — GONDER

MAJOR CROPS
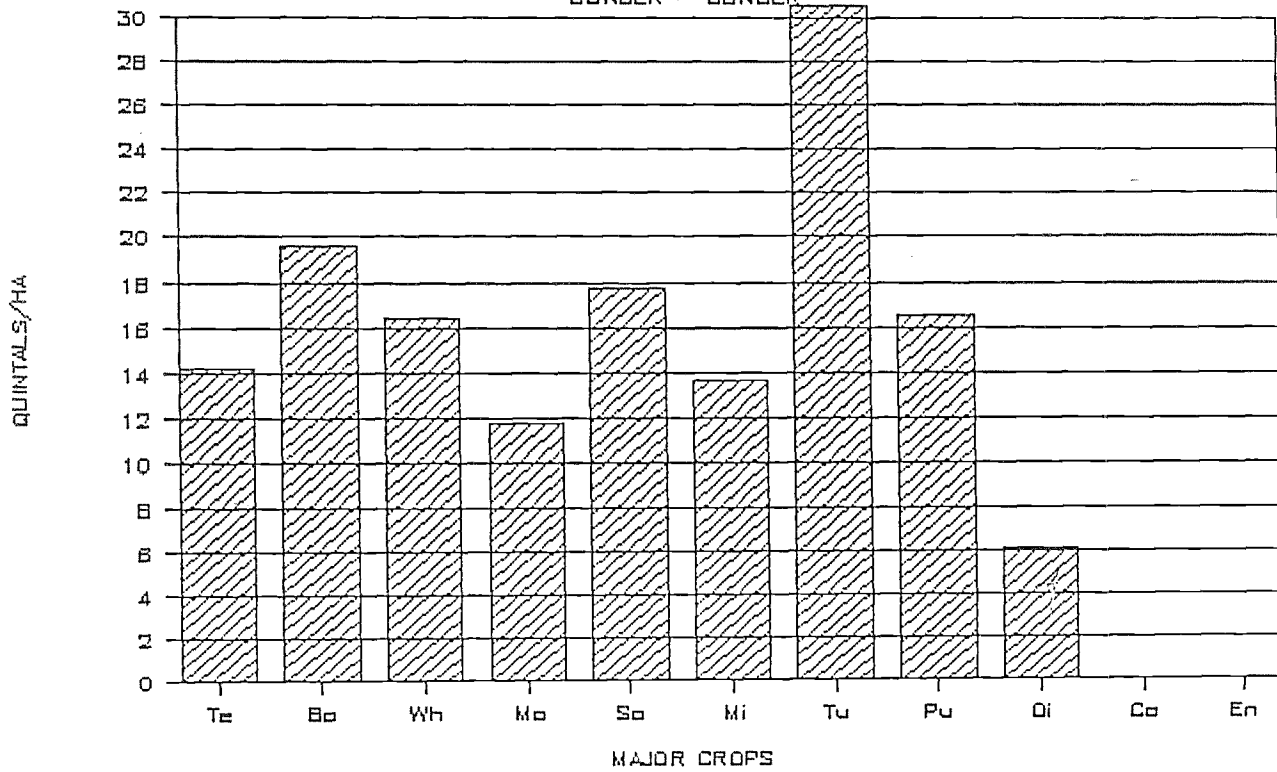
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GONDER — CHILGA
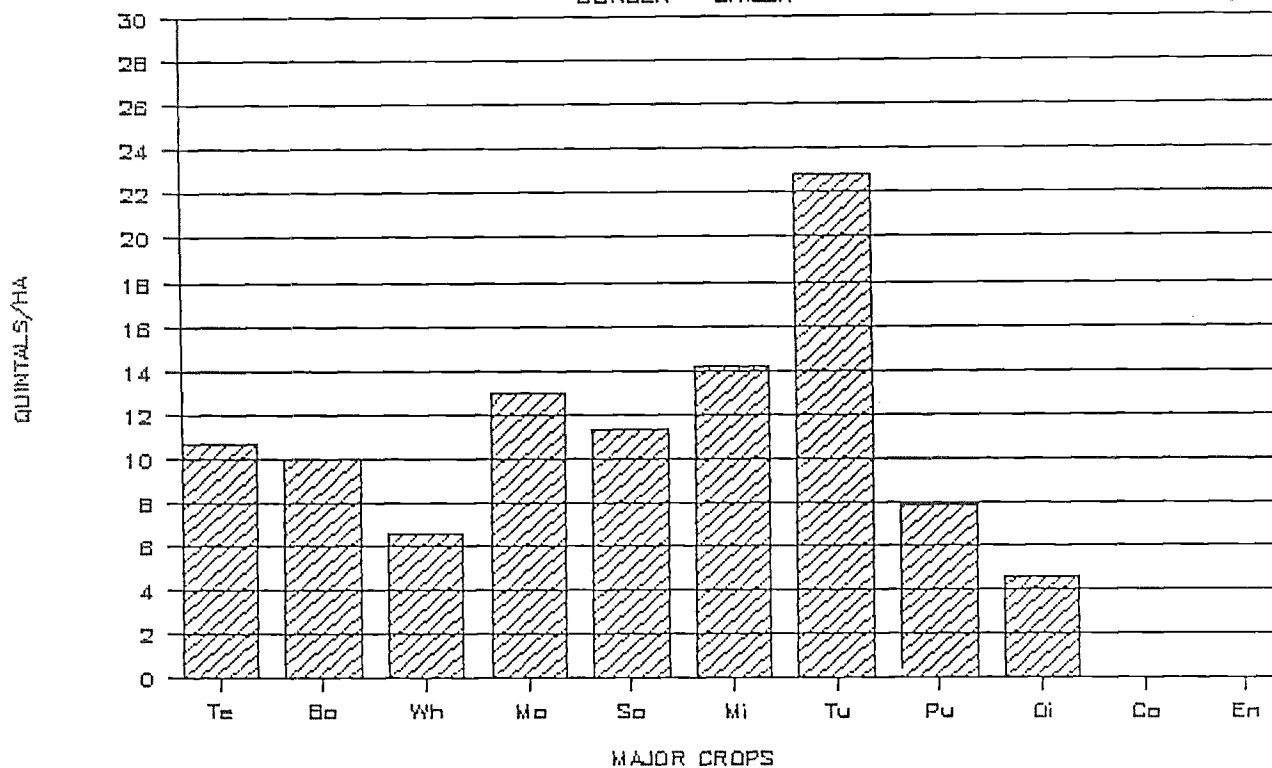
CROP YIELDS
HARERGE — CHERCHER
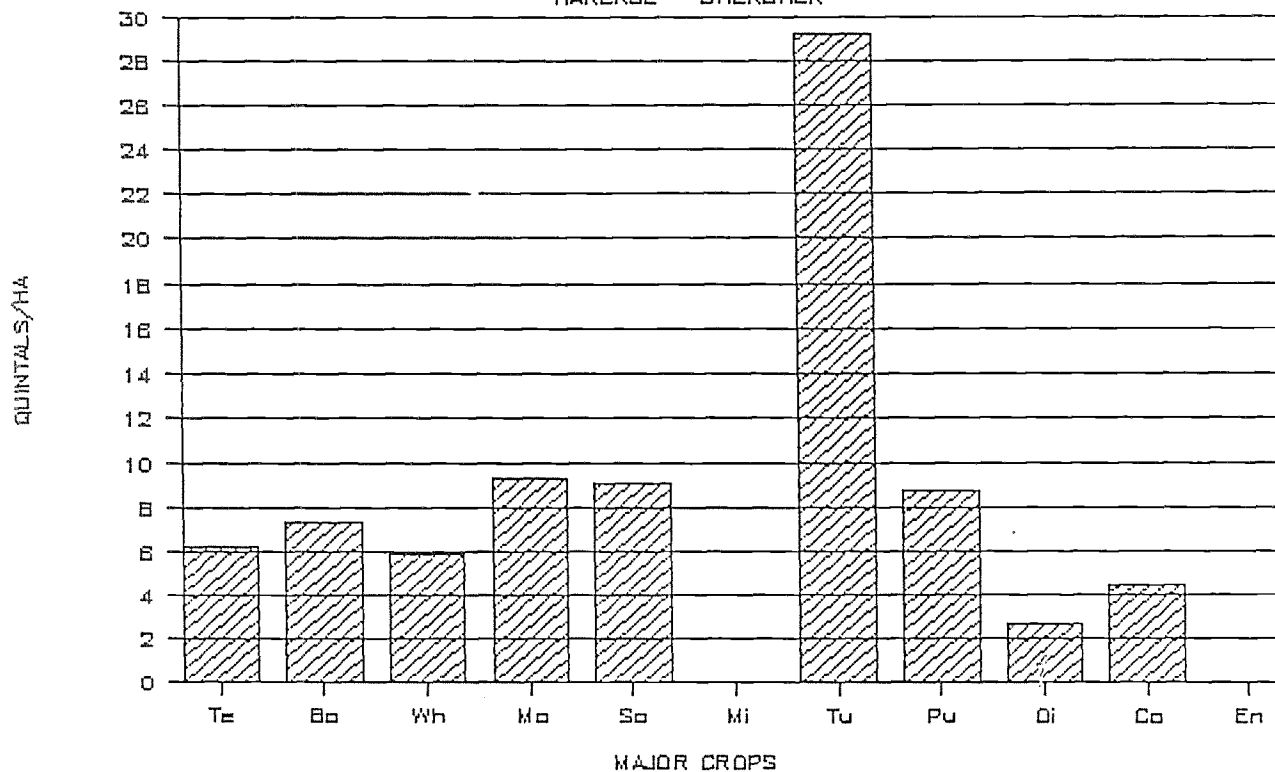
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HARERGE — JUIGA
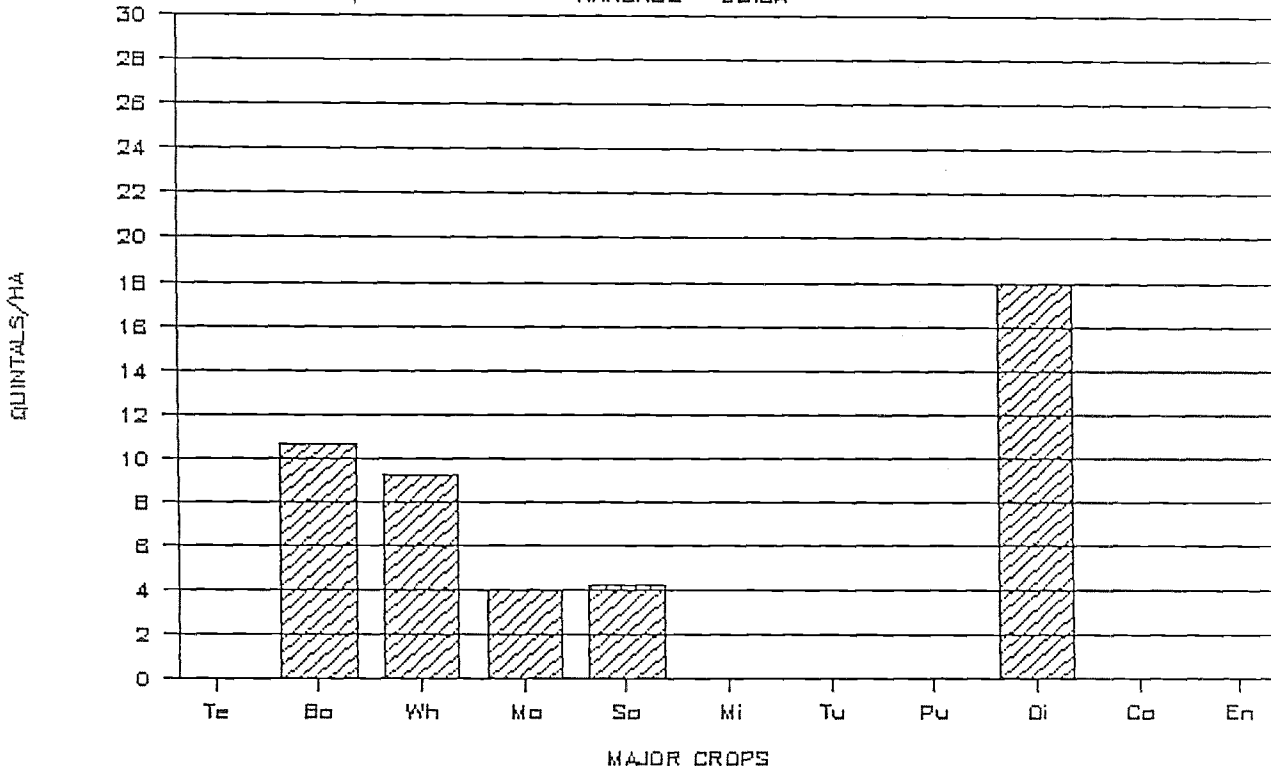
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HARERGE — GURSUM
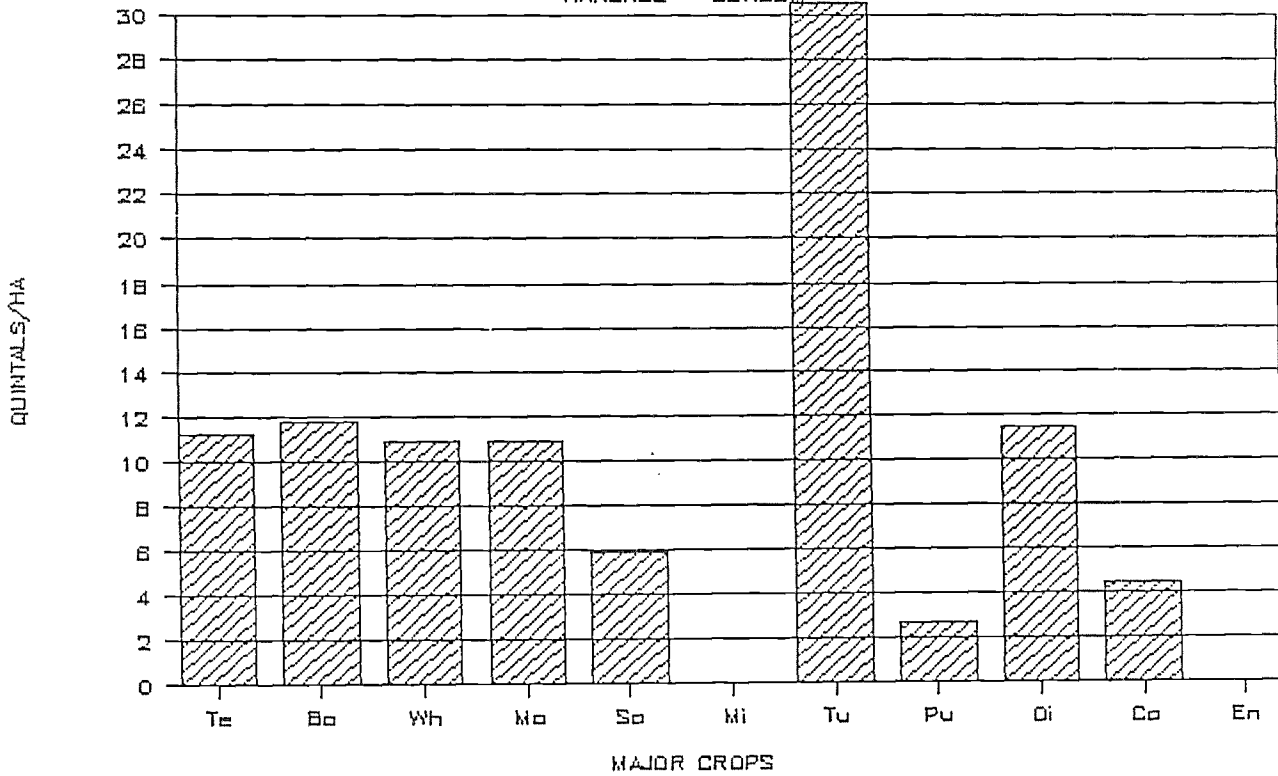
CROP YIELDS

HARERGE — GARA MULETA

QUINTALS/HA

MAJOR CROPS
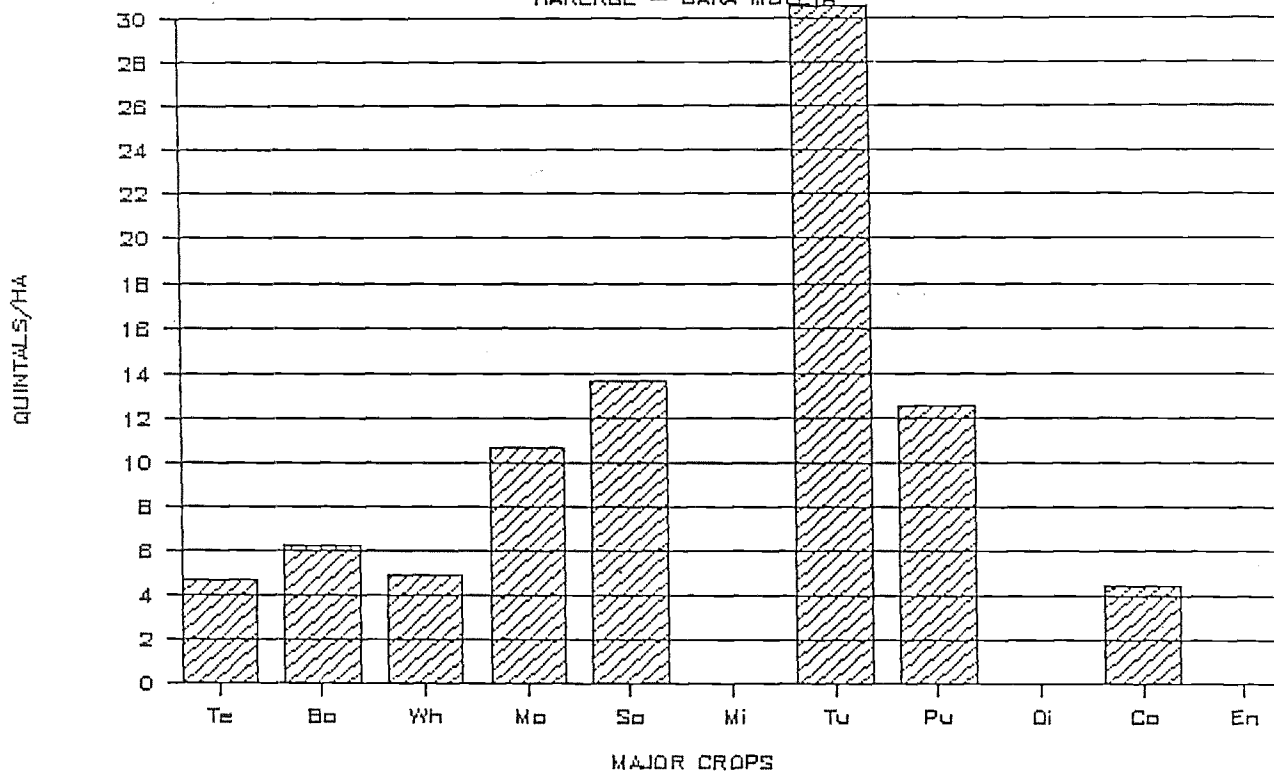
CROP YIELDS

HARERGE — HARER ZURIA

QUINTALS/HA

MAJOR CROPS
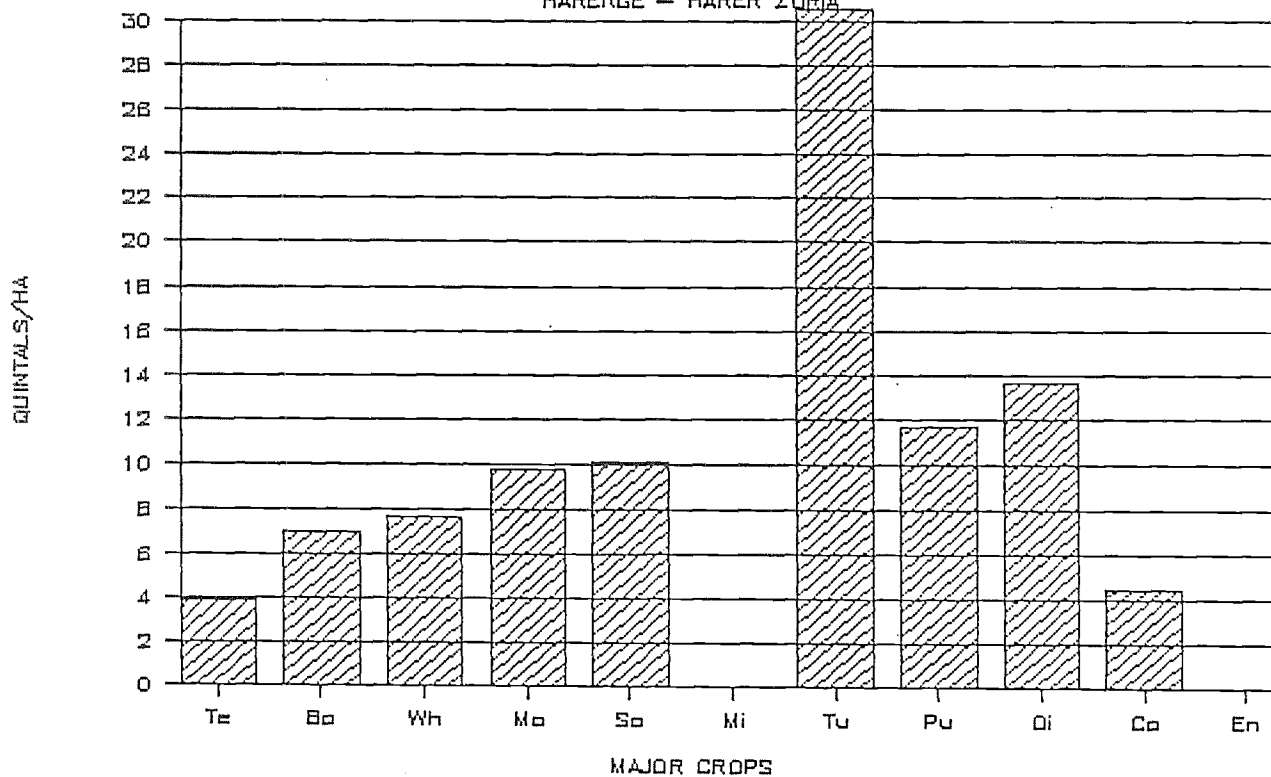
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HARERGE — WEBERA
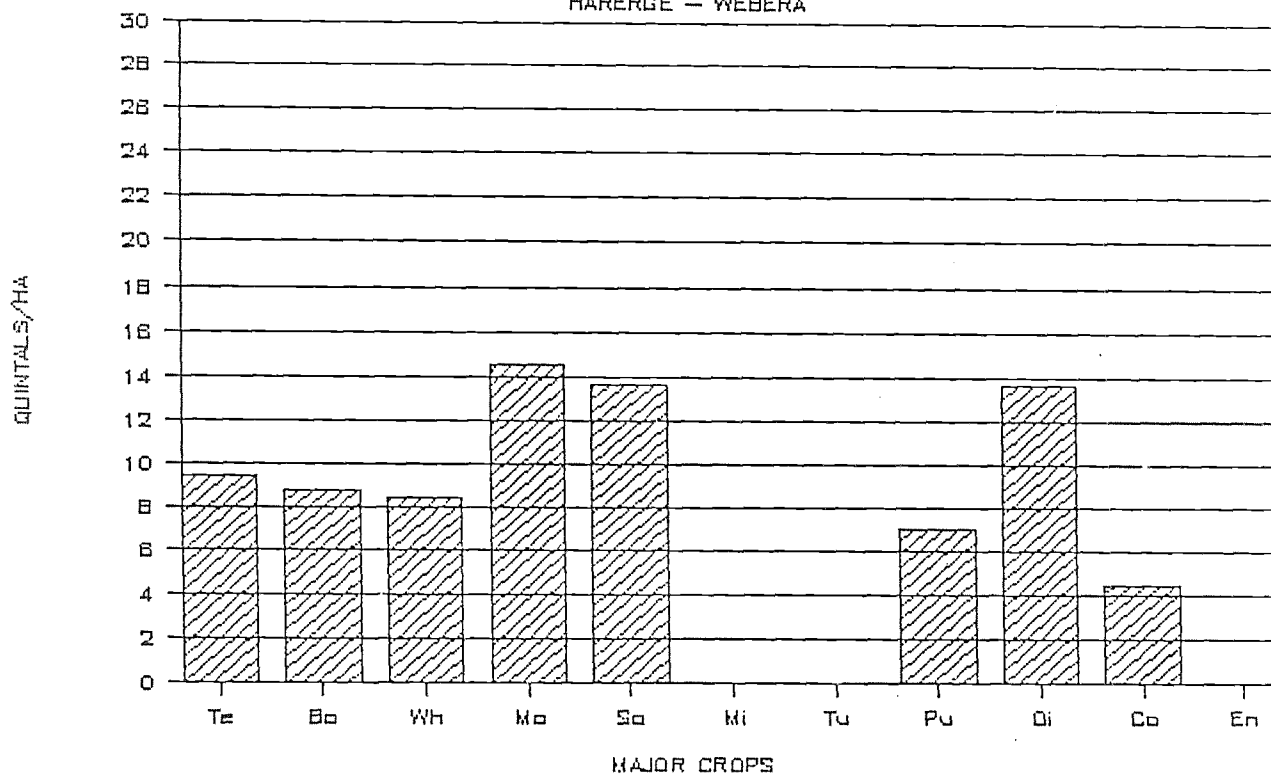
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HARERGE — HABRO
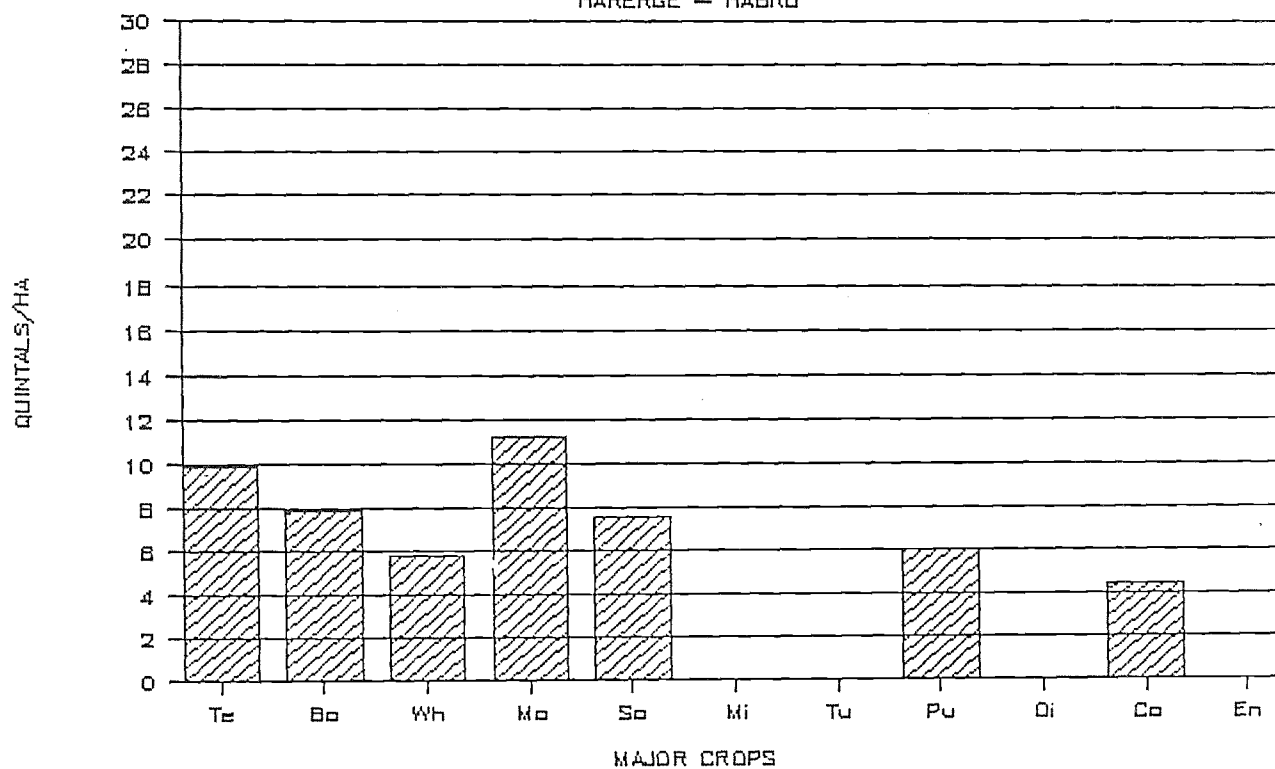
CROP YIELDS
ILUBABOR — SOR & GEBA
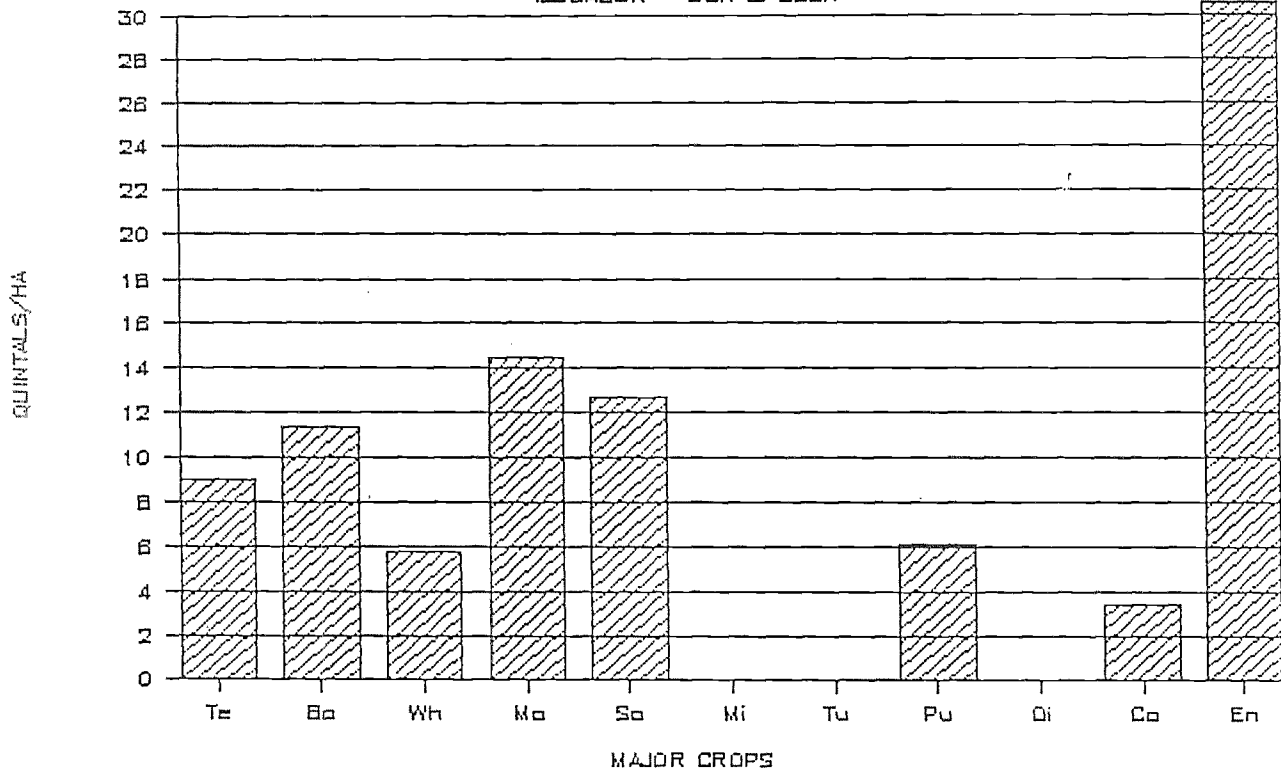
CROP YIELDS
ILUBABOR — BUNO

CROP YIELDS
ILUBABOR — GORE

Bar chart showing QUINTALS/HA (y-axis, 0 to 30) versus MAJOR CROPS (x-axis: Te, Bo, Wh, Mo, So, Mi, Tu, Pu, Oi, Co, En). Approximate values: Te ≈ 6, Bo ≈ 7.5, Mo ≈ 12.5, So ≈ 14, Pu ≈ 6.5, Oi ≈ 2.5, Co ≈ 3.5.

CROP YIELDS
ILUBABOR — MOCHA

Bar chart showing QUINTALS/HA (y-axis, 0 to 30) versus MAJOR CROPS (x-axis: Te, Bo, Wh, Mo, So, Mi, Tu, Pu, Oi, Co, En). Approximate values: Te ≈ 7, Bo ≈ 8.5, Wh ≈ 8, Mo ≈ 16.5, So ≈ 7.5, Pu ≈ 6.5, Co ≈ 4, En ≈ 30+.
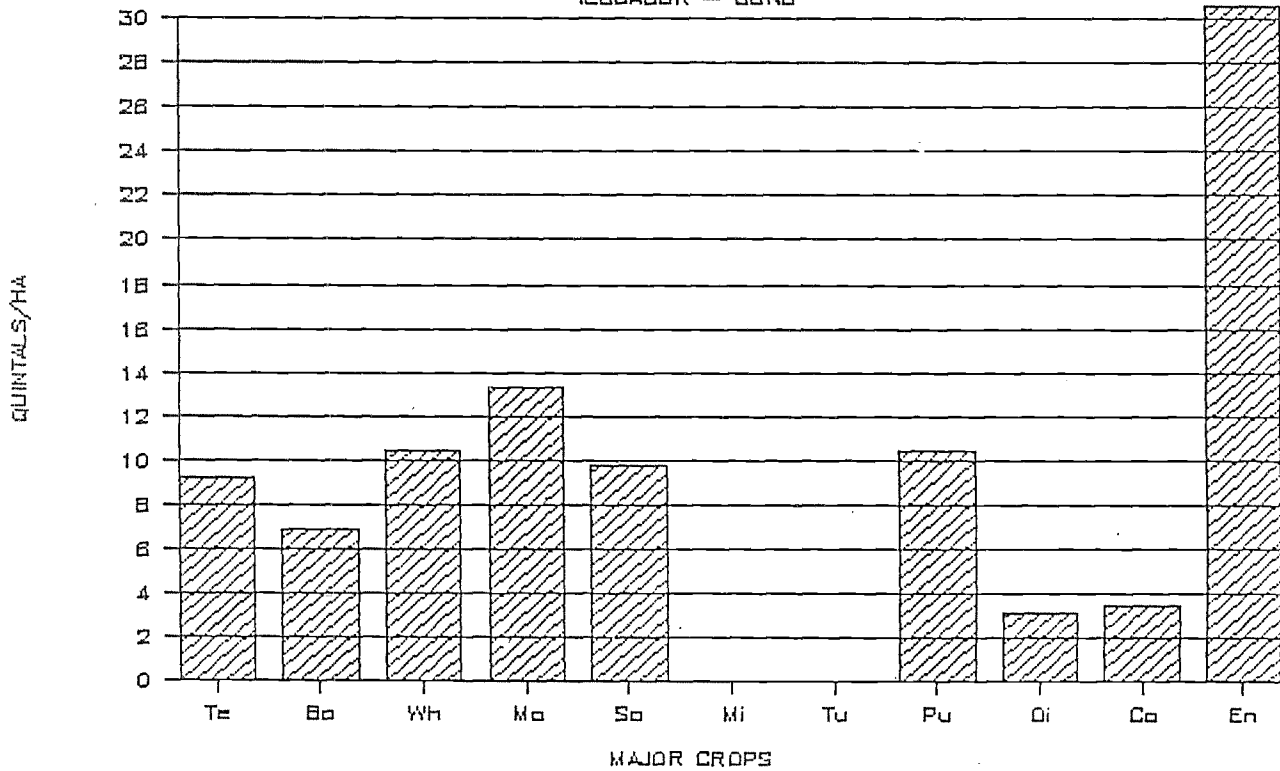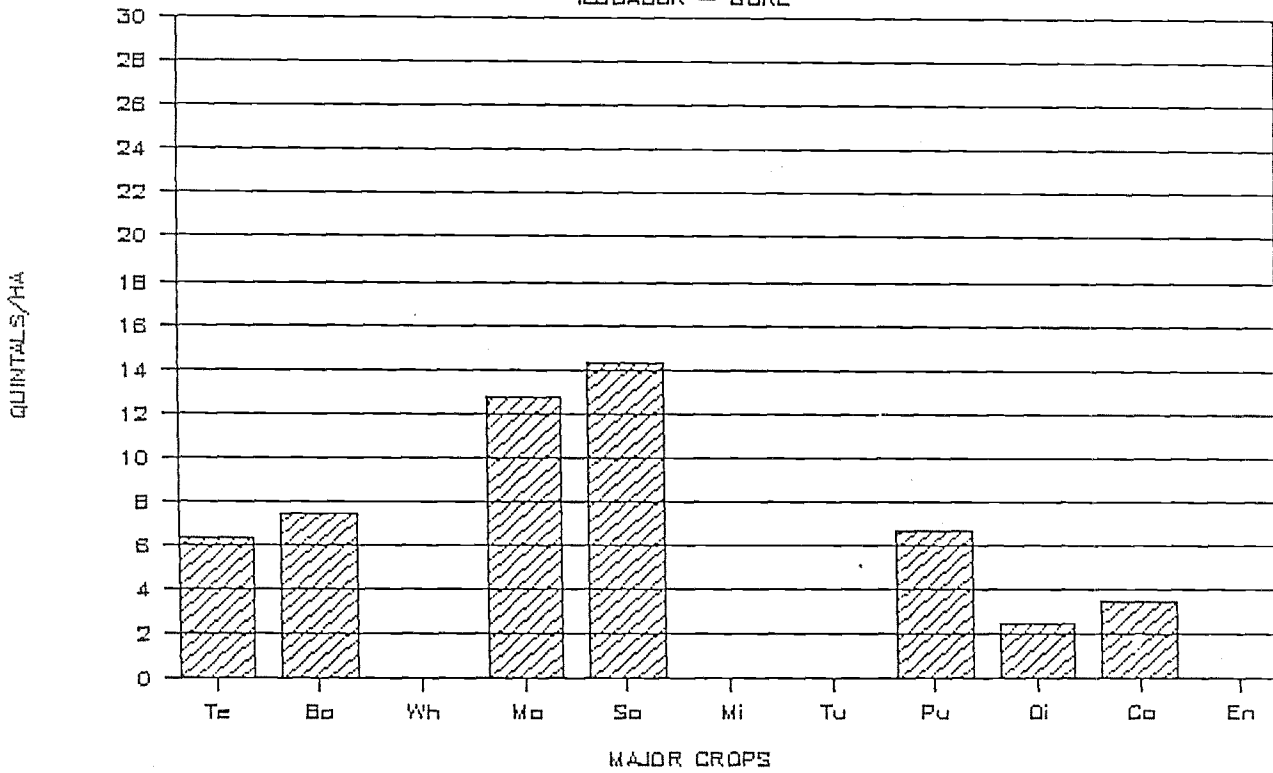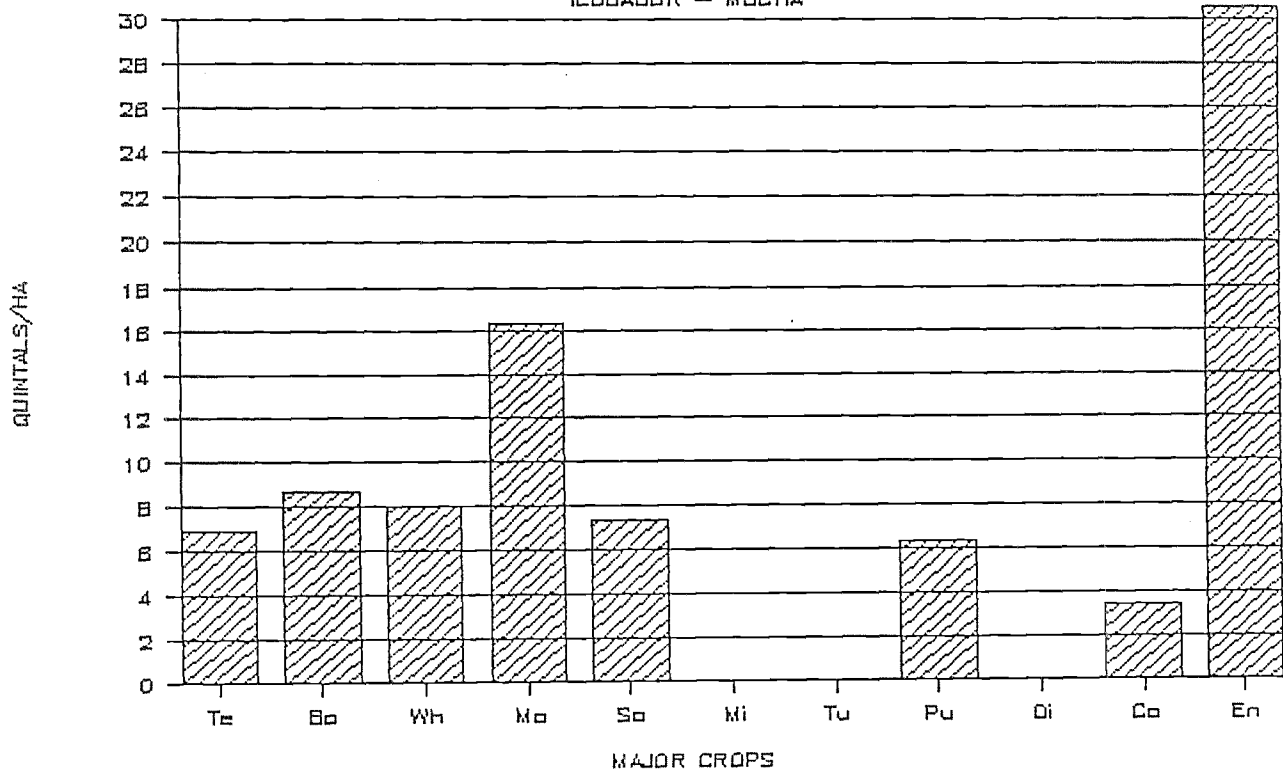
CROP YIELDS
ILUBABOR — GAMBELA

MAJOR CROPS

CROP YIELDS
KEFA — LIMU

MAJOR CROPS
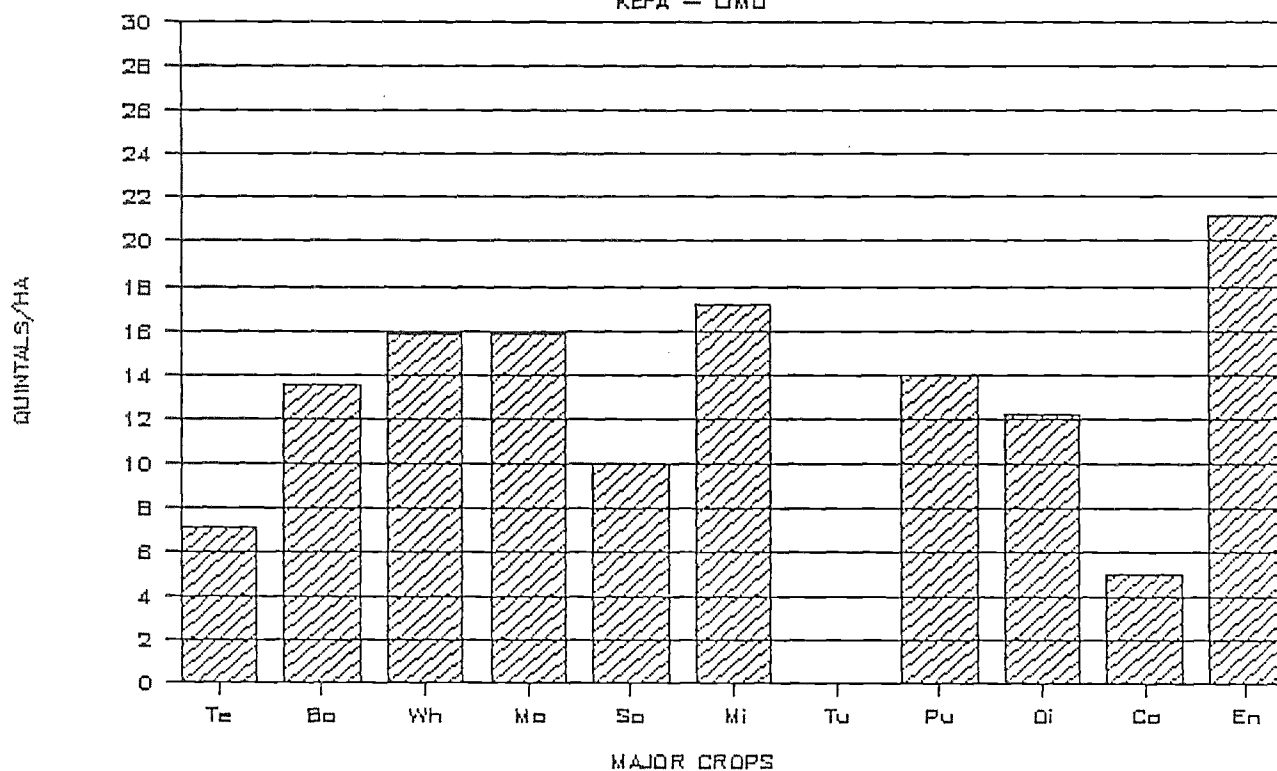
CROP YIELDS
KEFA — JIMA

QUINTALS/HA

MAJOR CROPS
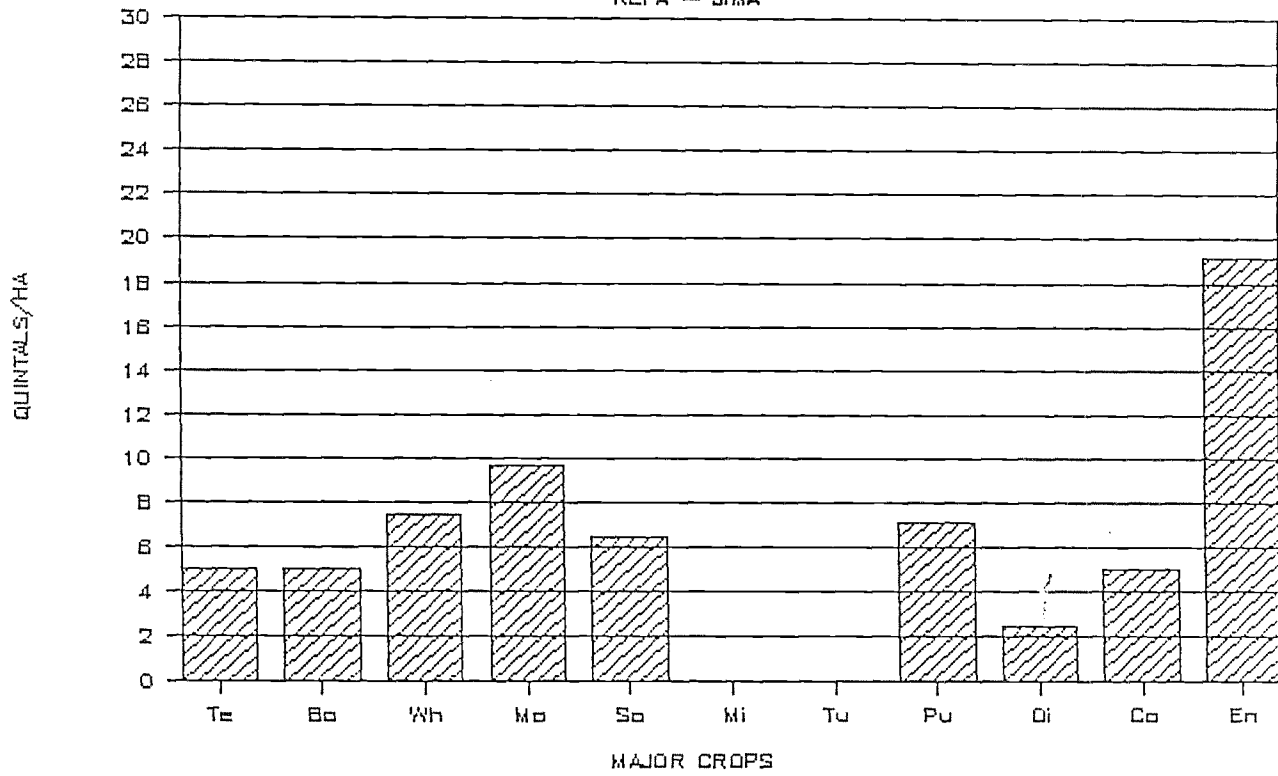
CROP YIELDS
KEFA — KULO KONTA

QUINTALS/HA

MAJOR CROPS
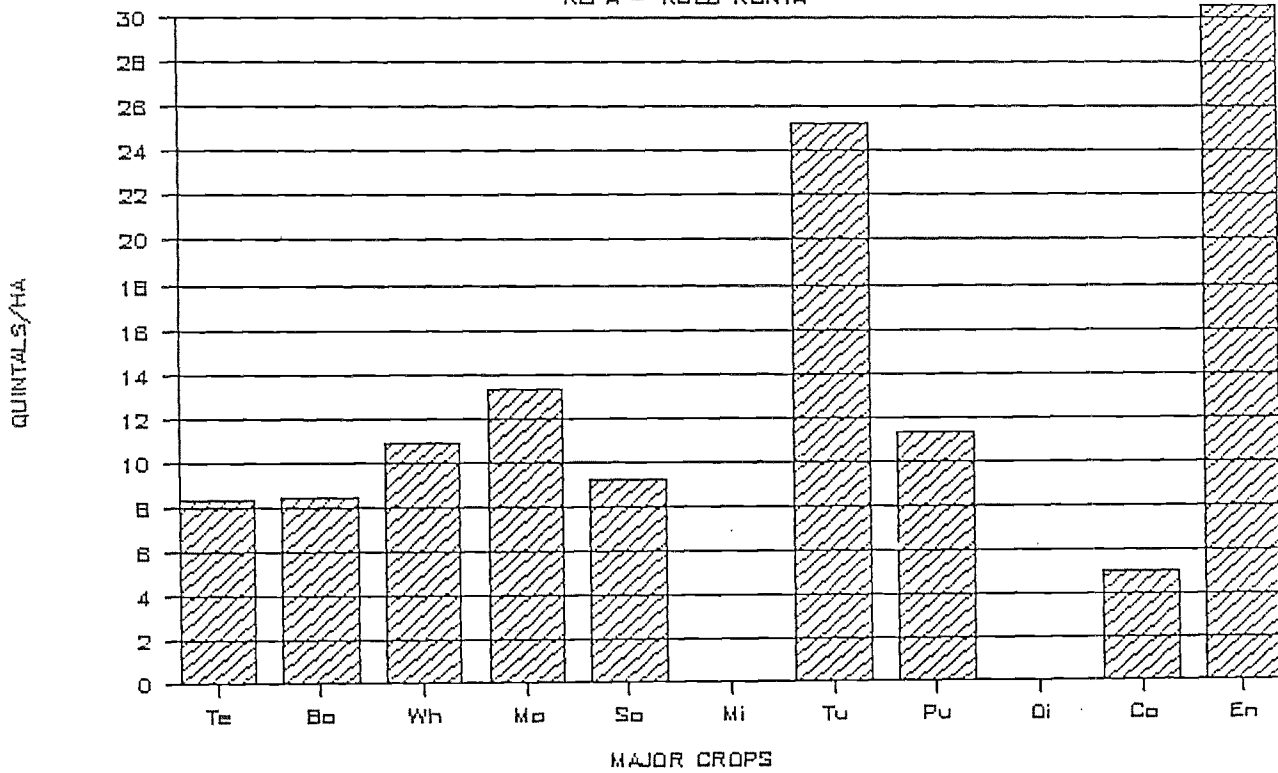
CROP YIELDS
KEFA — KEFA
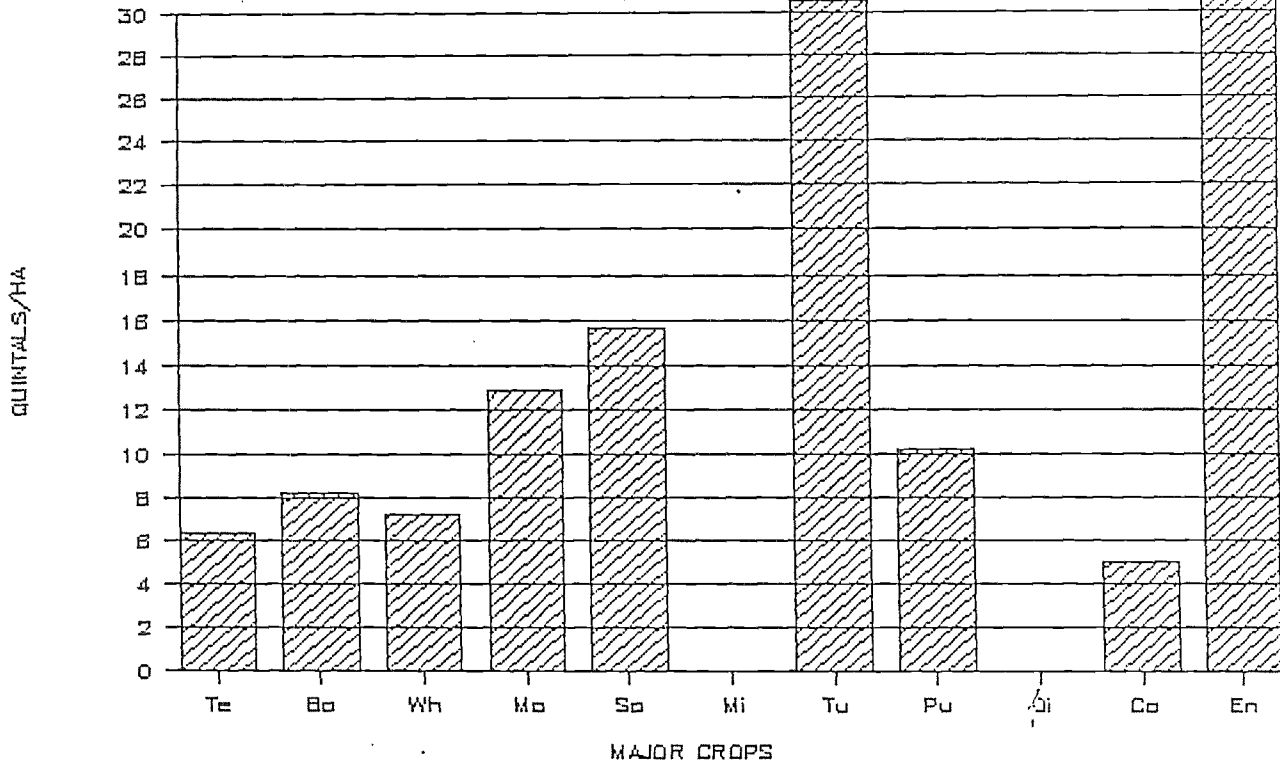
CROP YIELDS
KEFA — MAJI
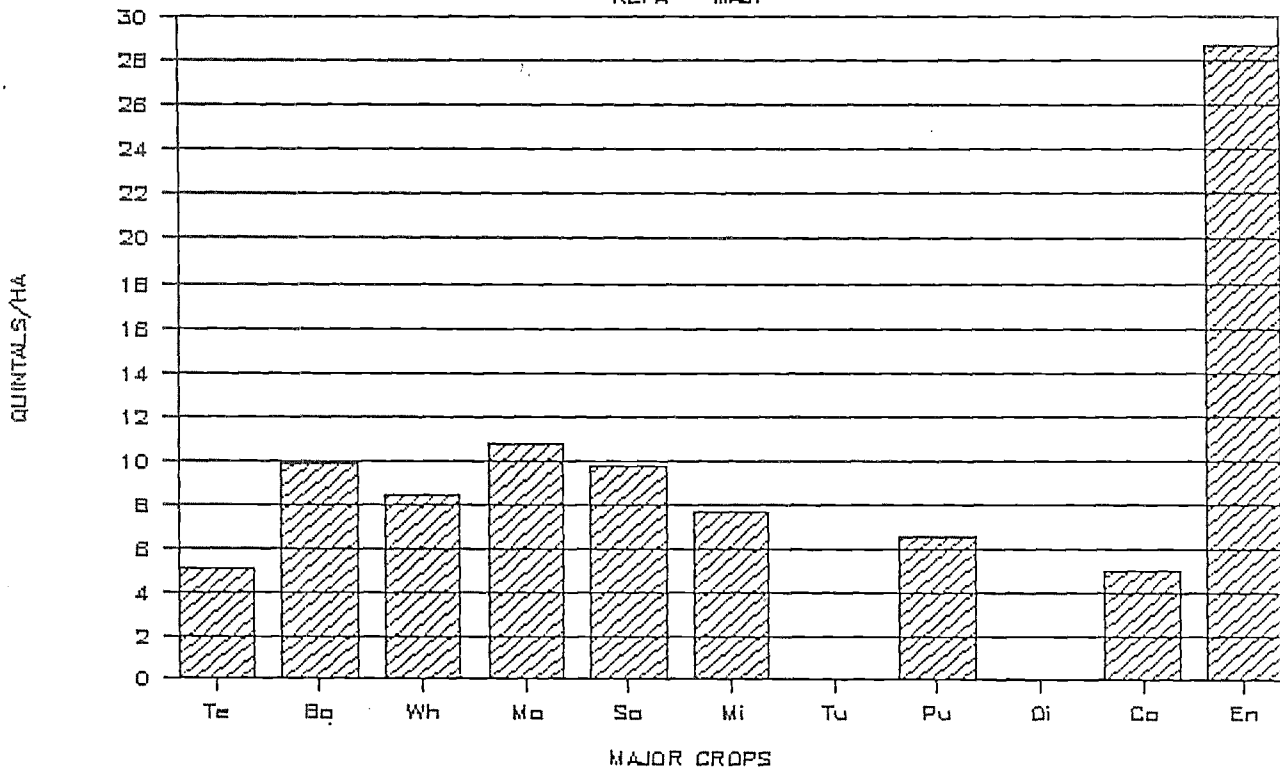
CROP YIELDS
KEFA — GIMIRA
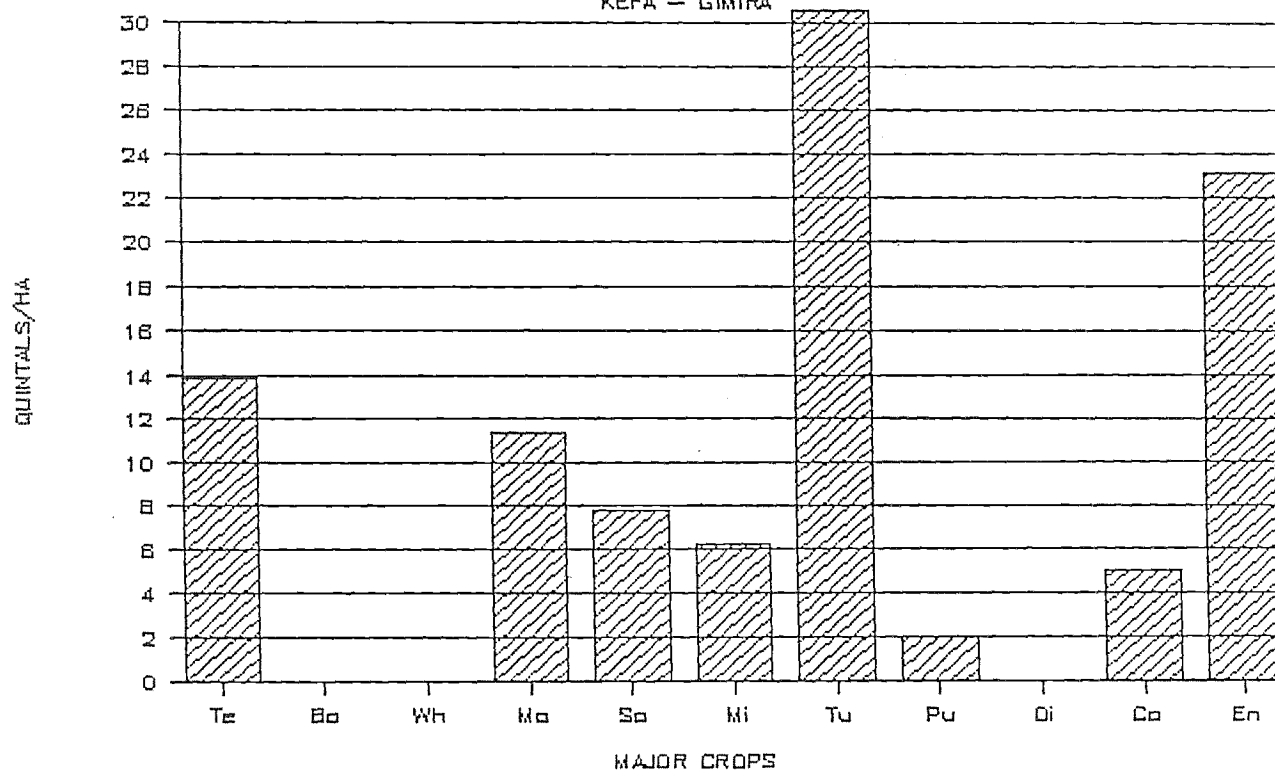
CROP YIELDS
SHEWA — MERHABETE
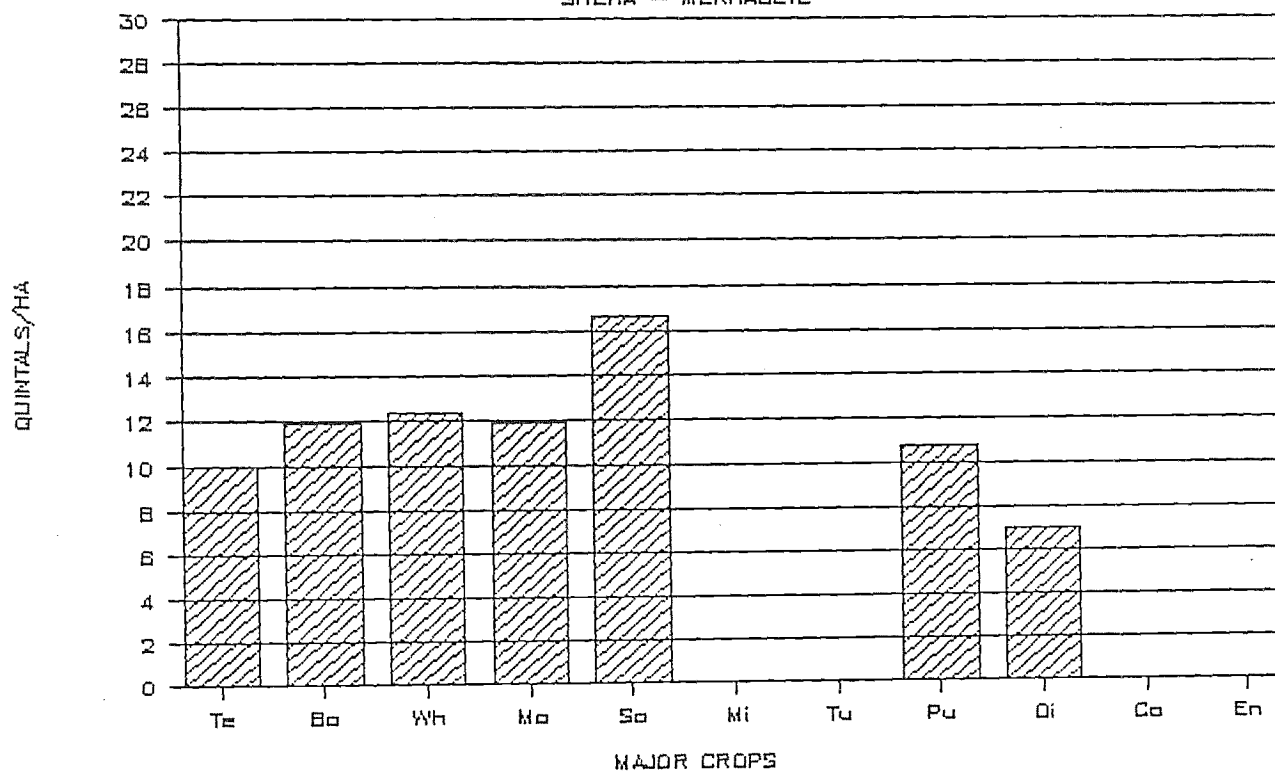
CROP YIELDS
SHEWA — MENZ & GISH
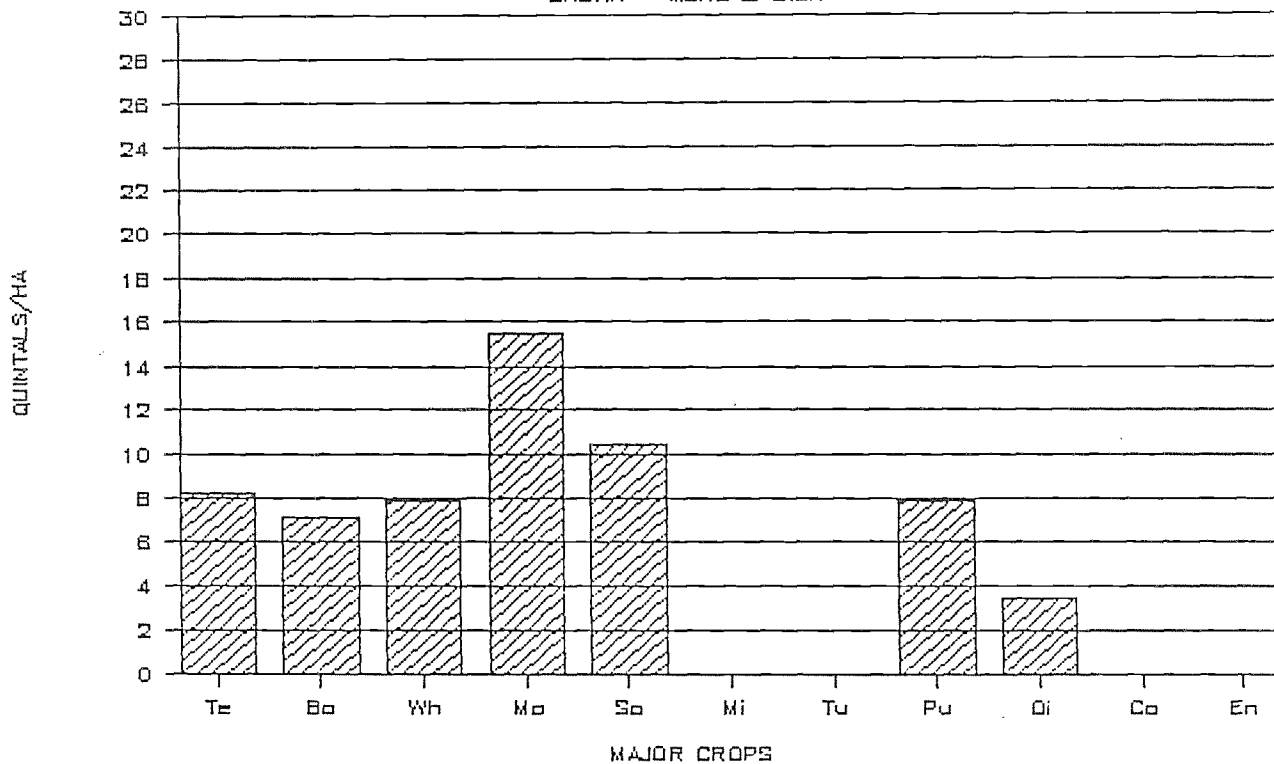
CROP YIELDS
SHEWA — YIFAT & TIMUGA
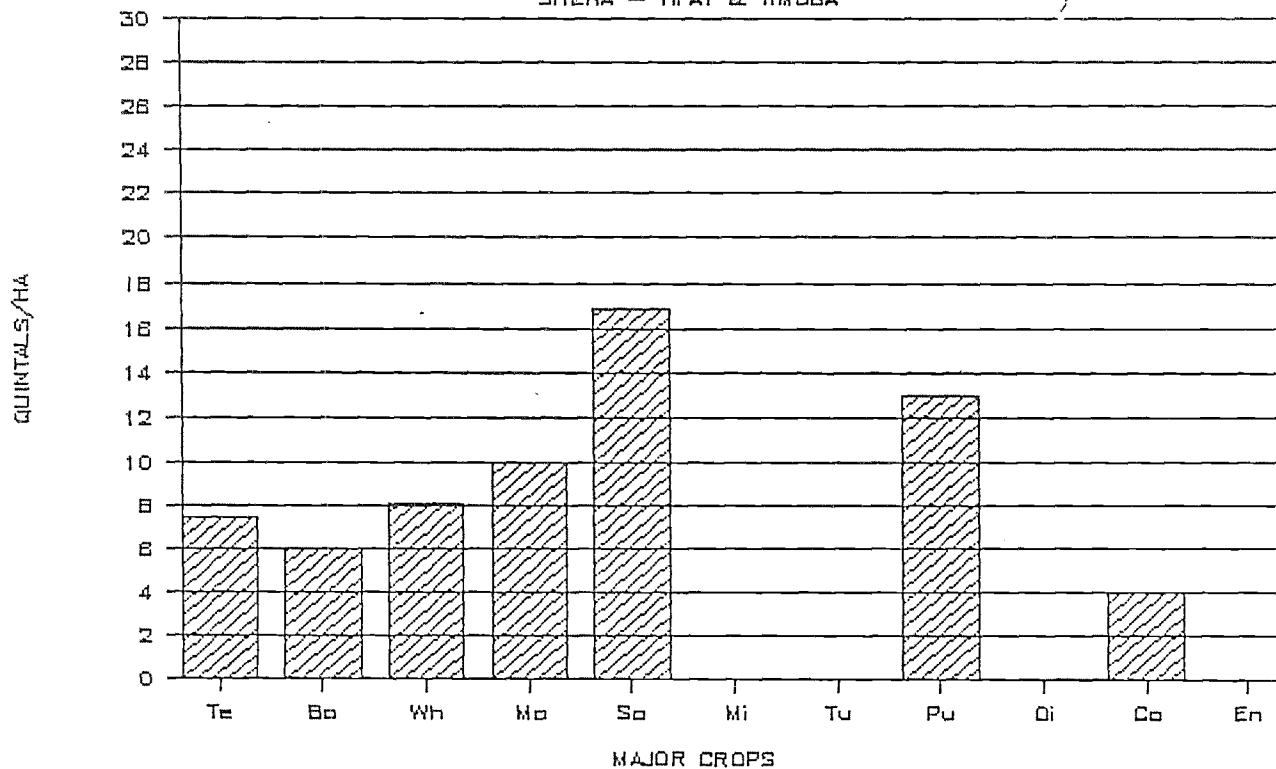
CROP YIELDS
SHEWA — TEGULET & BULGA
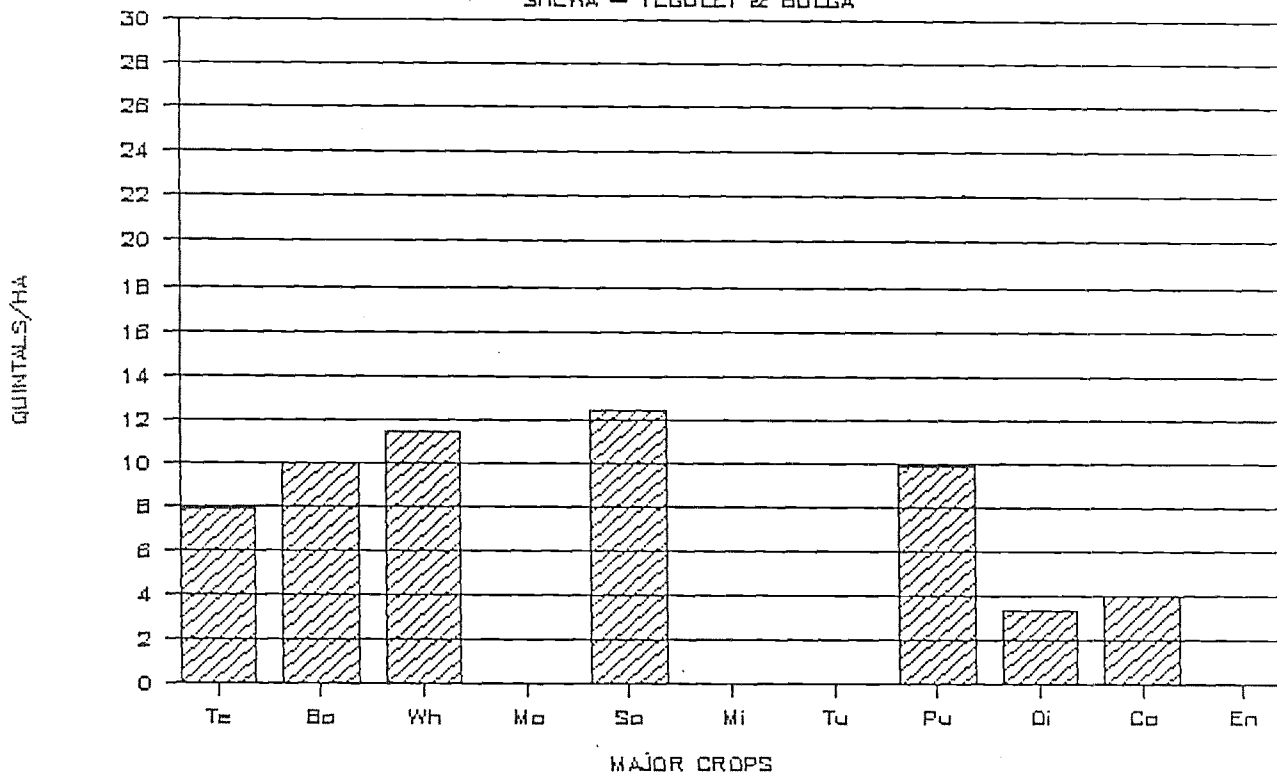
CROP YIELDS
SHEWA — YERER & KEREYU
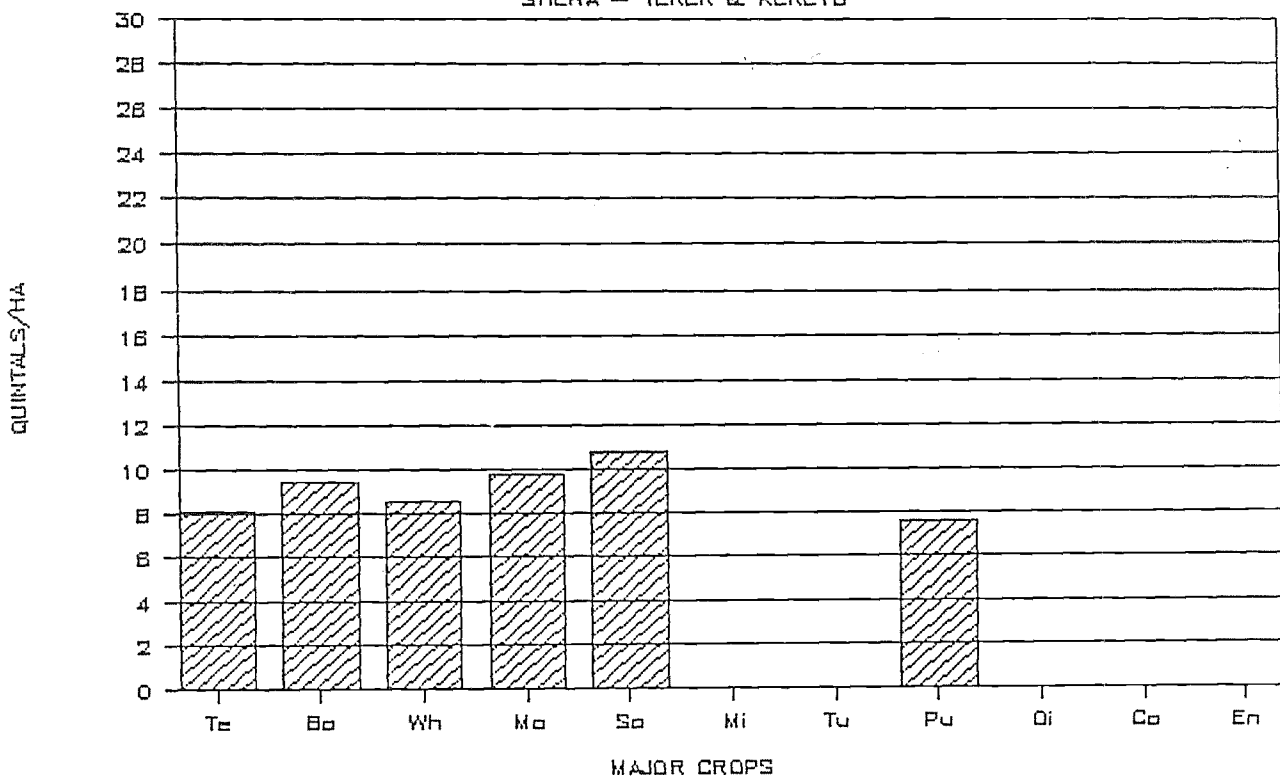
CROP YIELDS

SHEWA — HAIKOTCH & BUTAJIRA

QUINTALS/HA

MAJOR CROPS
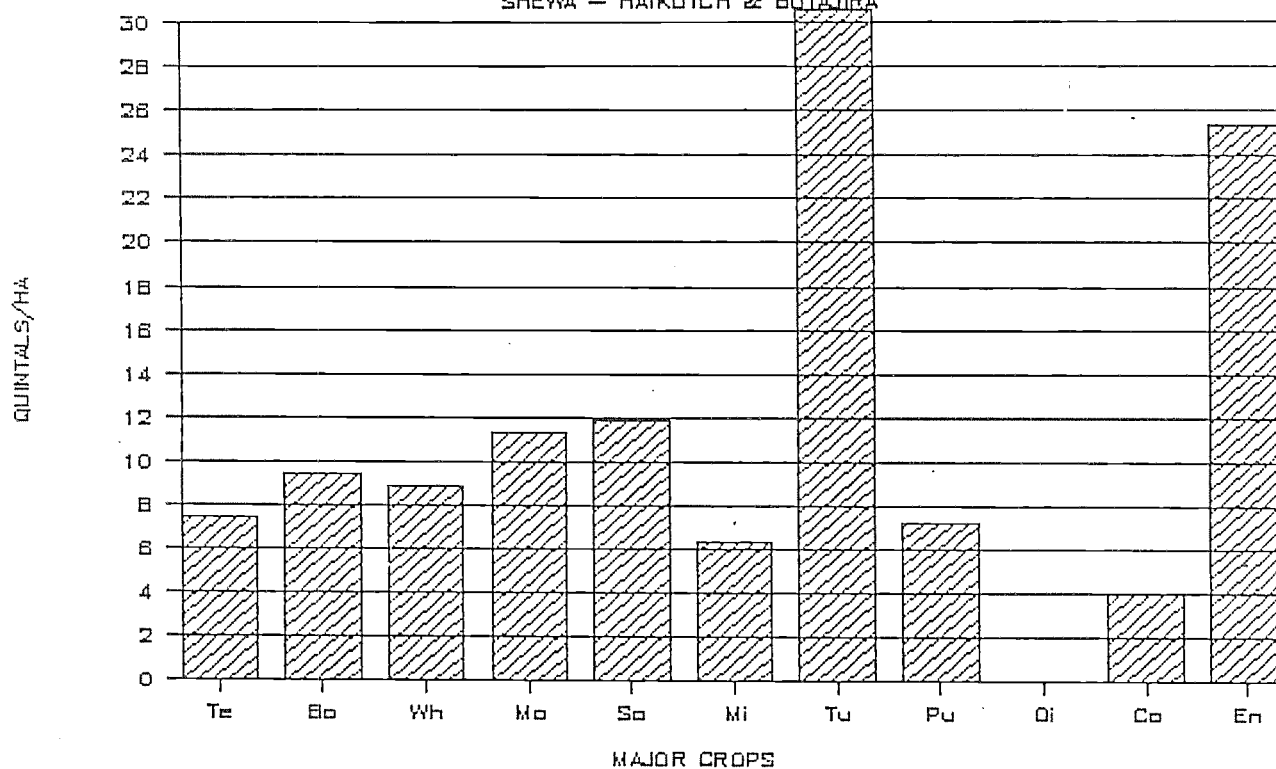
CROP YIELDS

SHEWA — KEMBATA & HADIYA

QUINTALS/HA

MAJOR CROPS
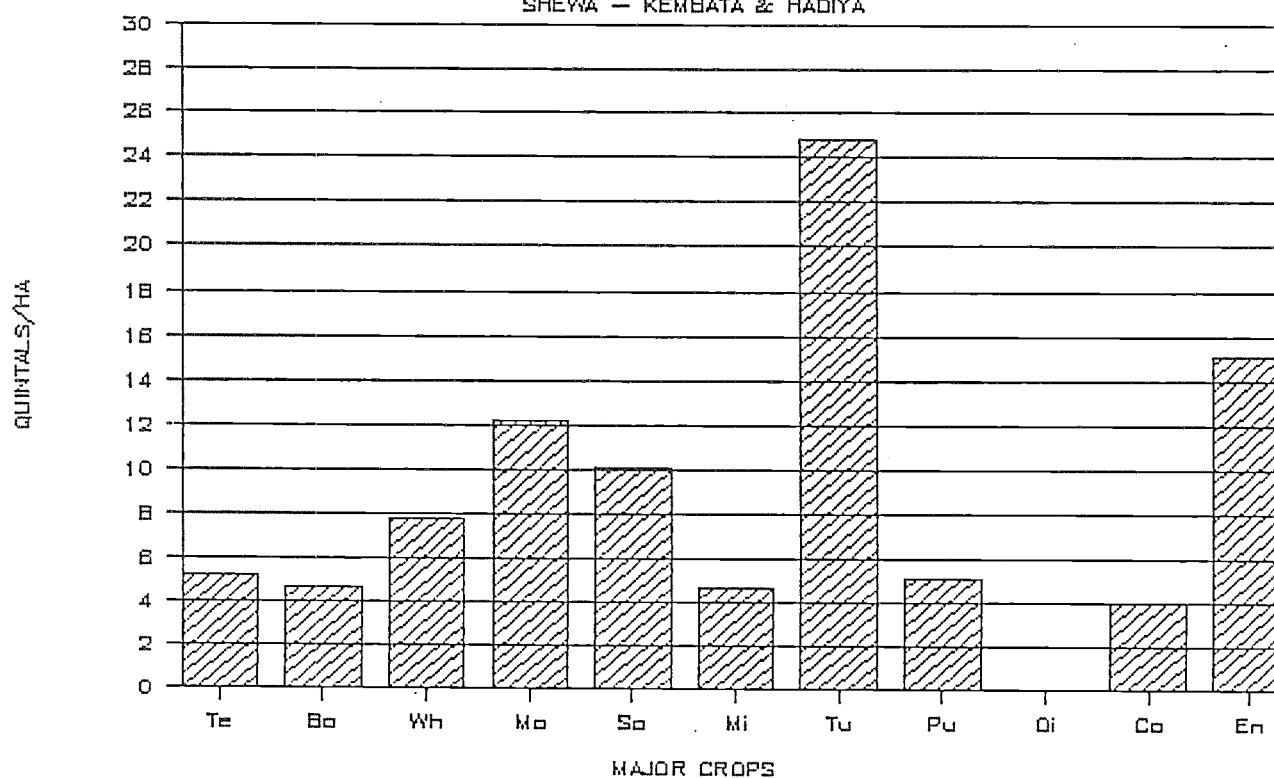
CROP YIELDS
SHEWA — CHEBO & GURAGIE
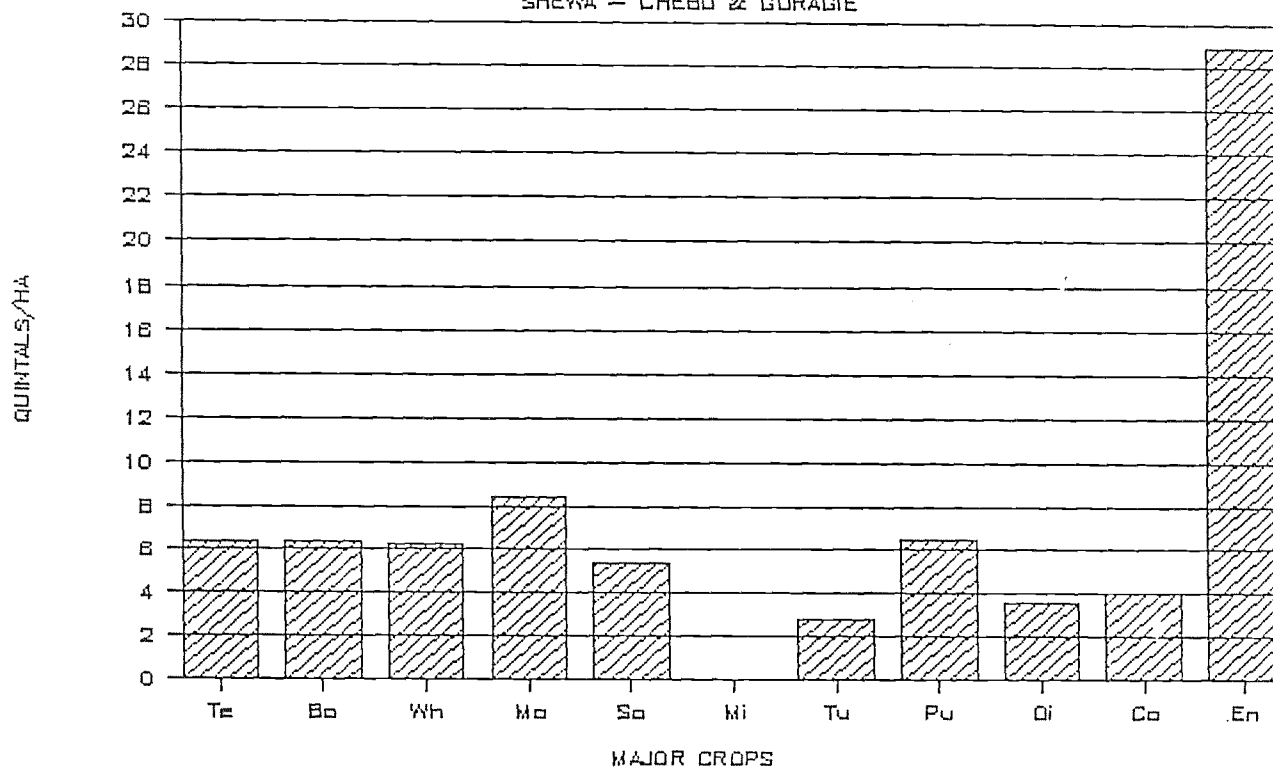
CROP YIELDS
SHEWA — MENAGESHA
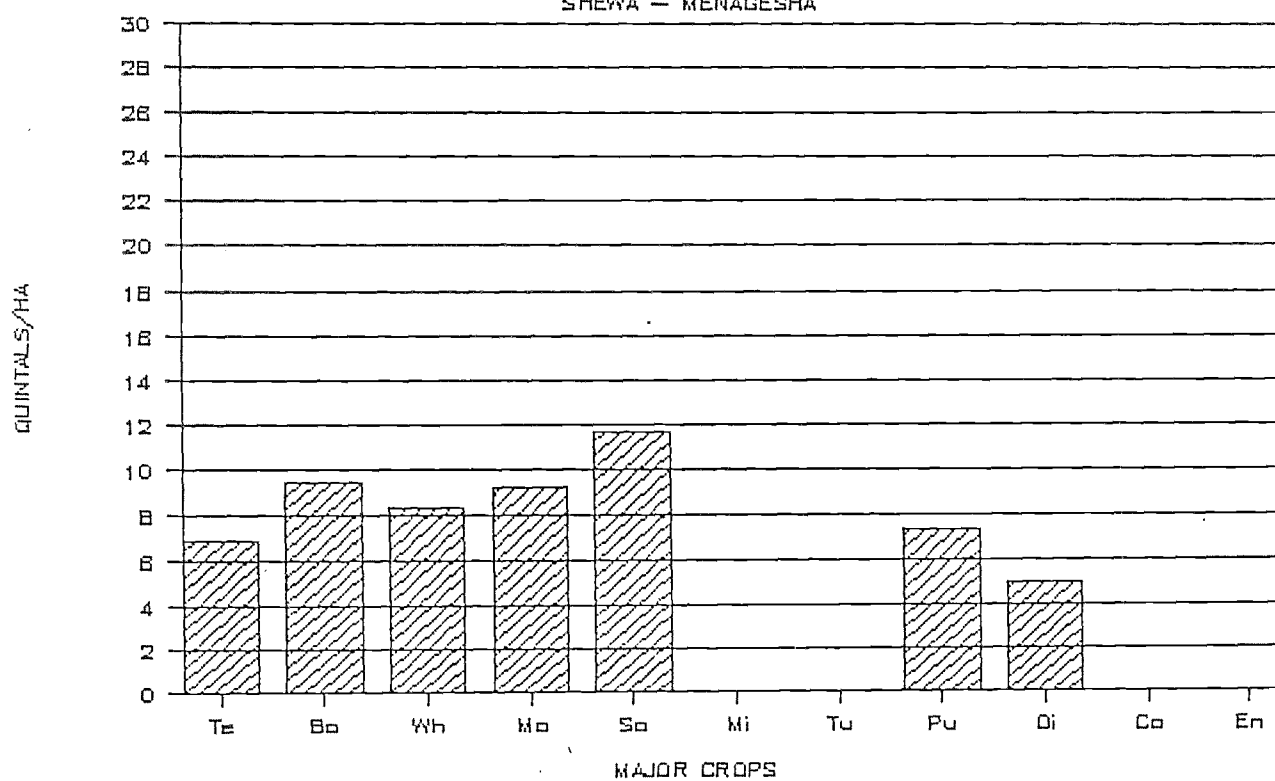
CROP YIELDS
SHEWA — JIBAT & MECHA
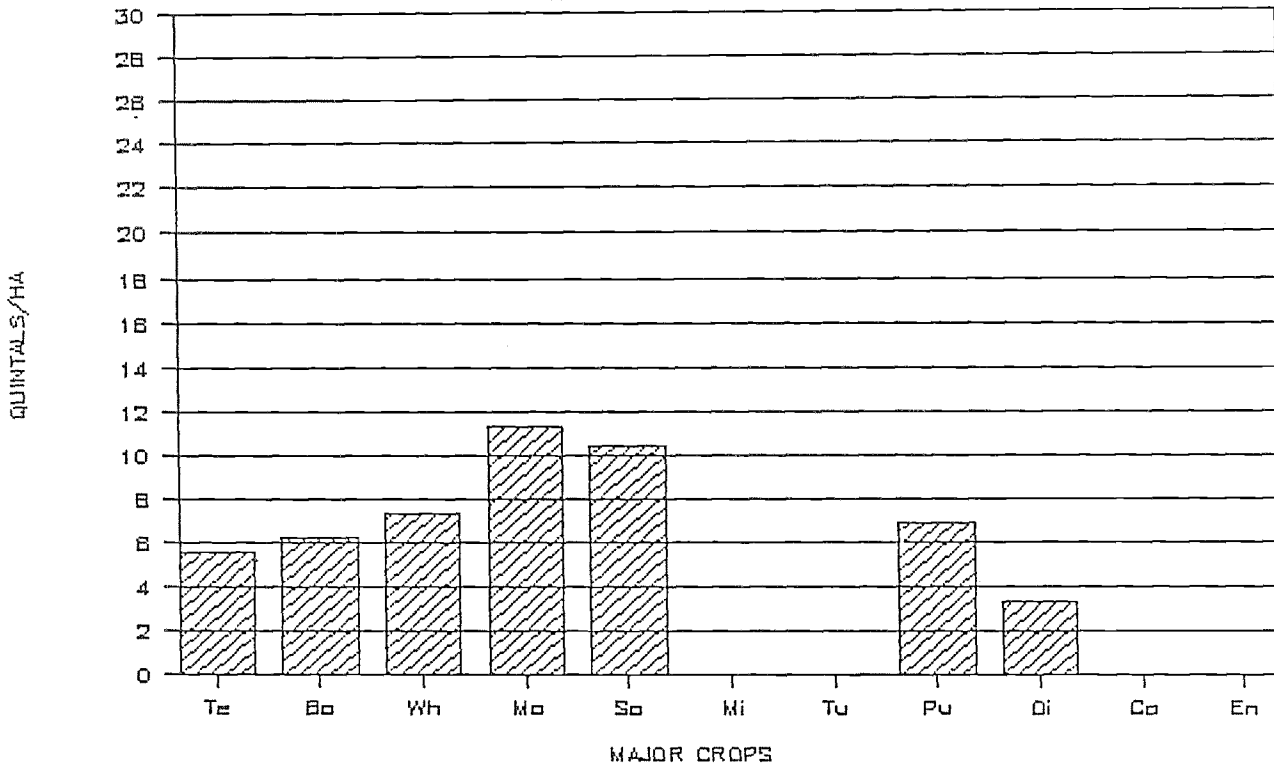
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SHEWA — SELALE
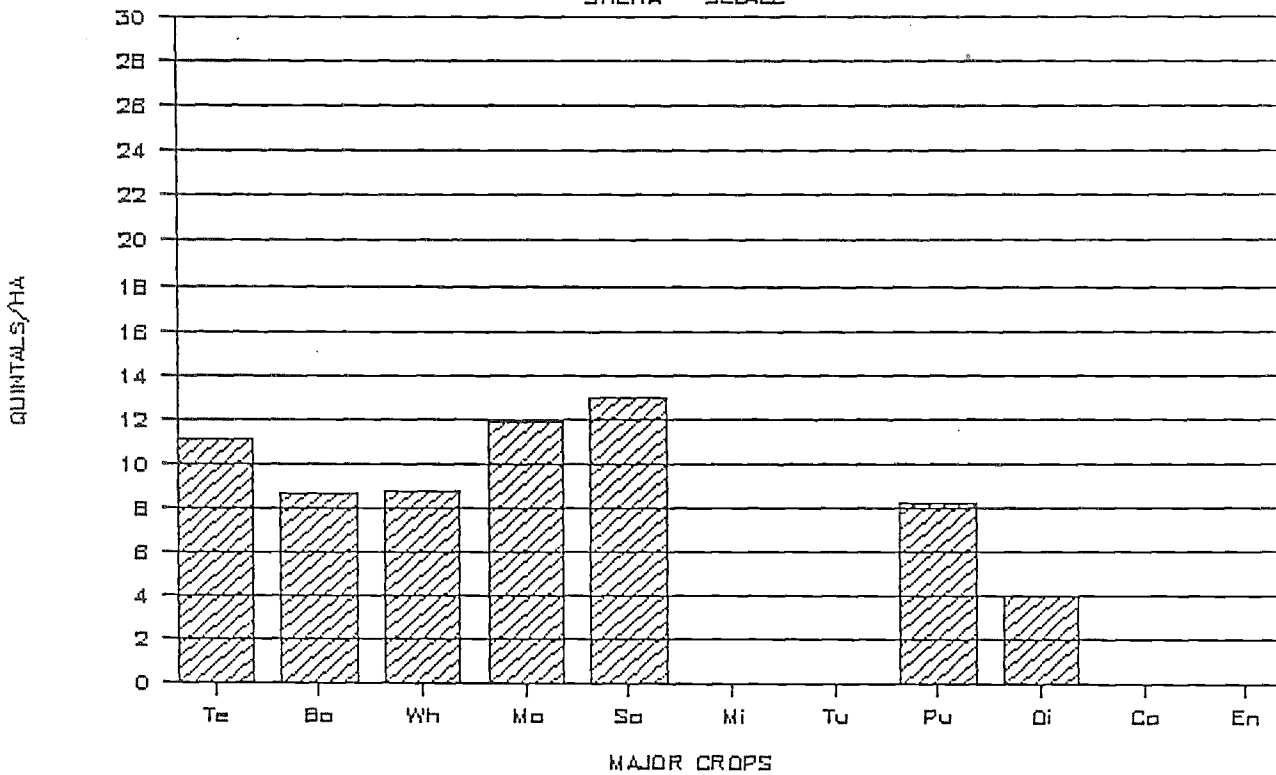
CROP YIELDS

SIDAMO — WALAYITA
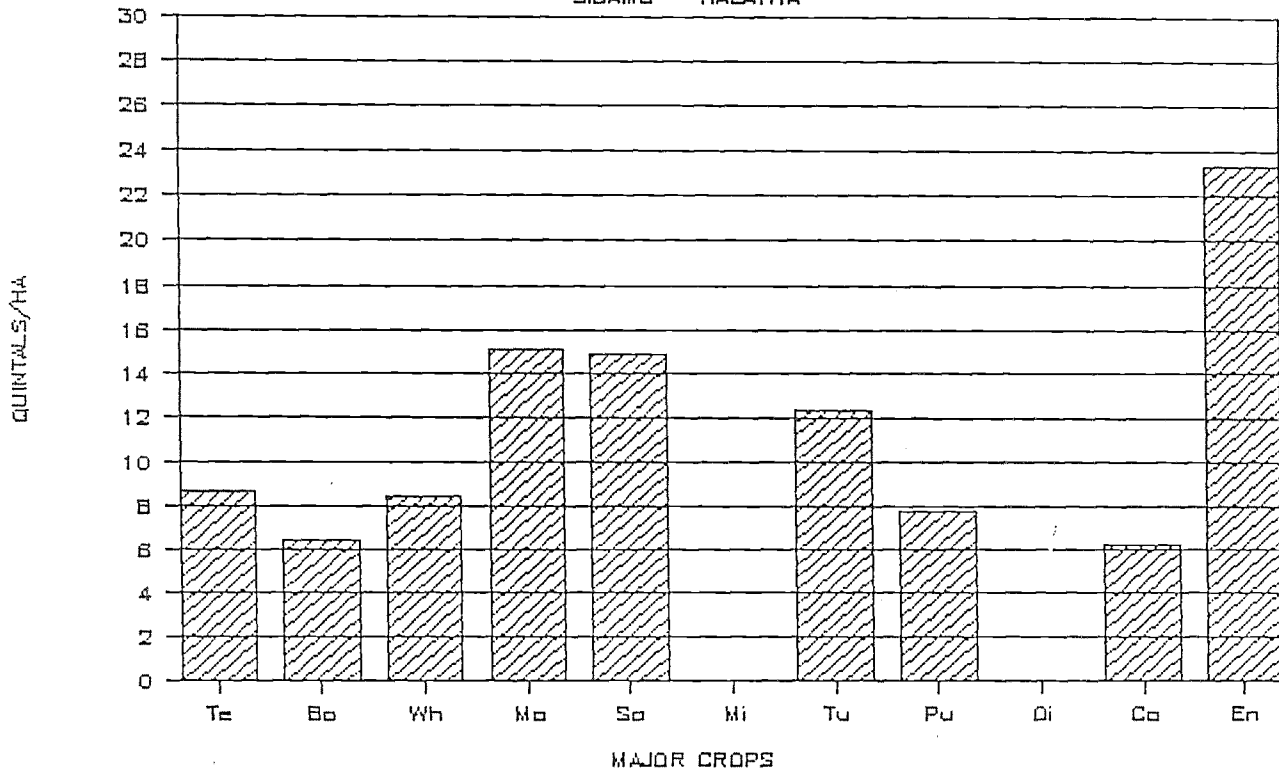
CROP YIELDS

SIDAMO — SIDAMA
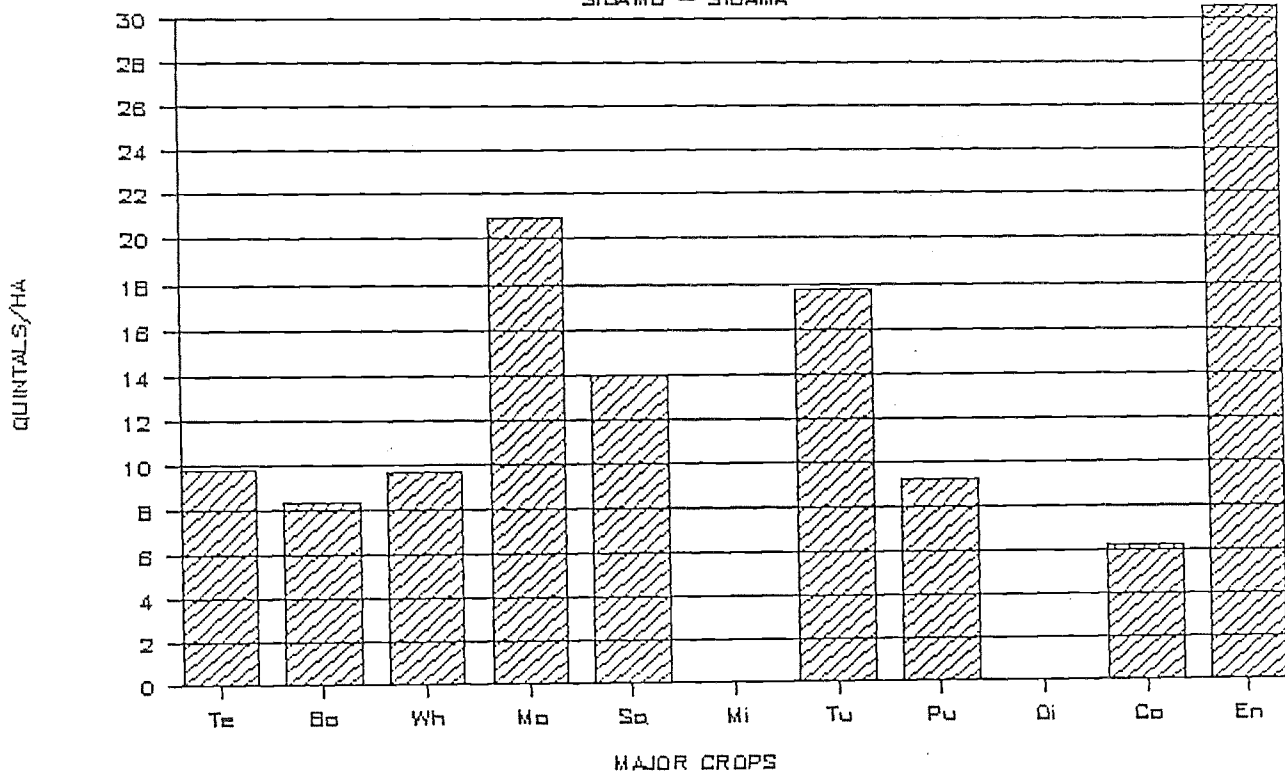
CROP YIELDS
SIDAMO — JEM JEM
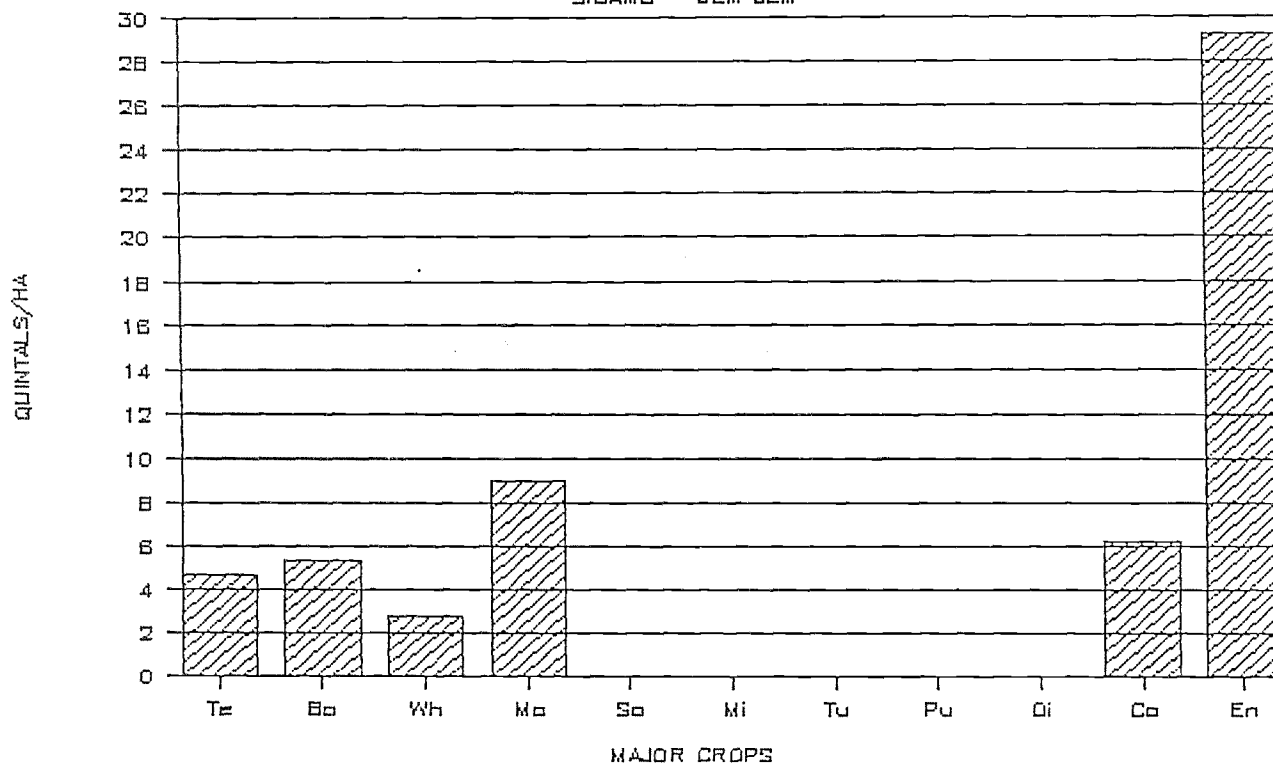
CROP YIELDS
SIDAMO — BORENA
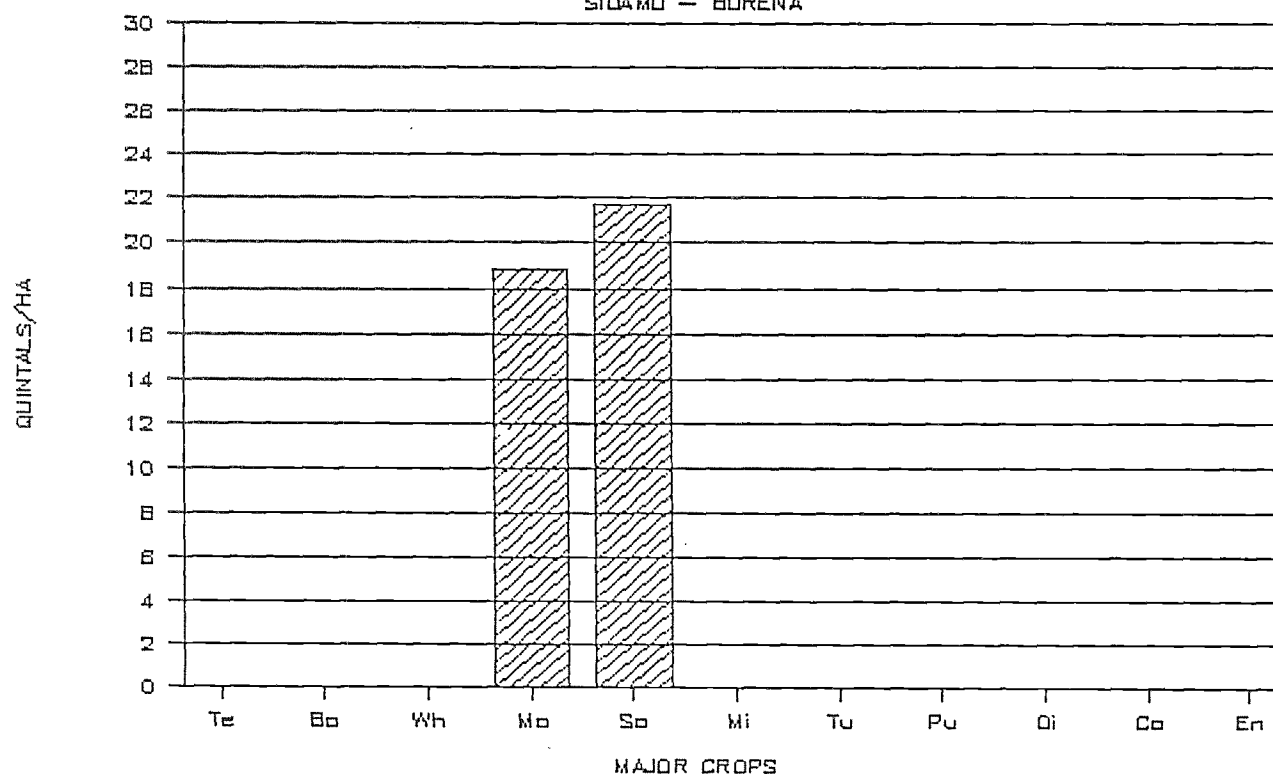
CROP YIELDS

SIDAMO — ARERO
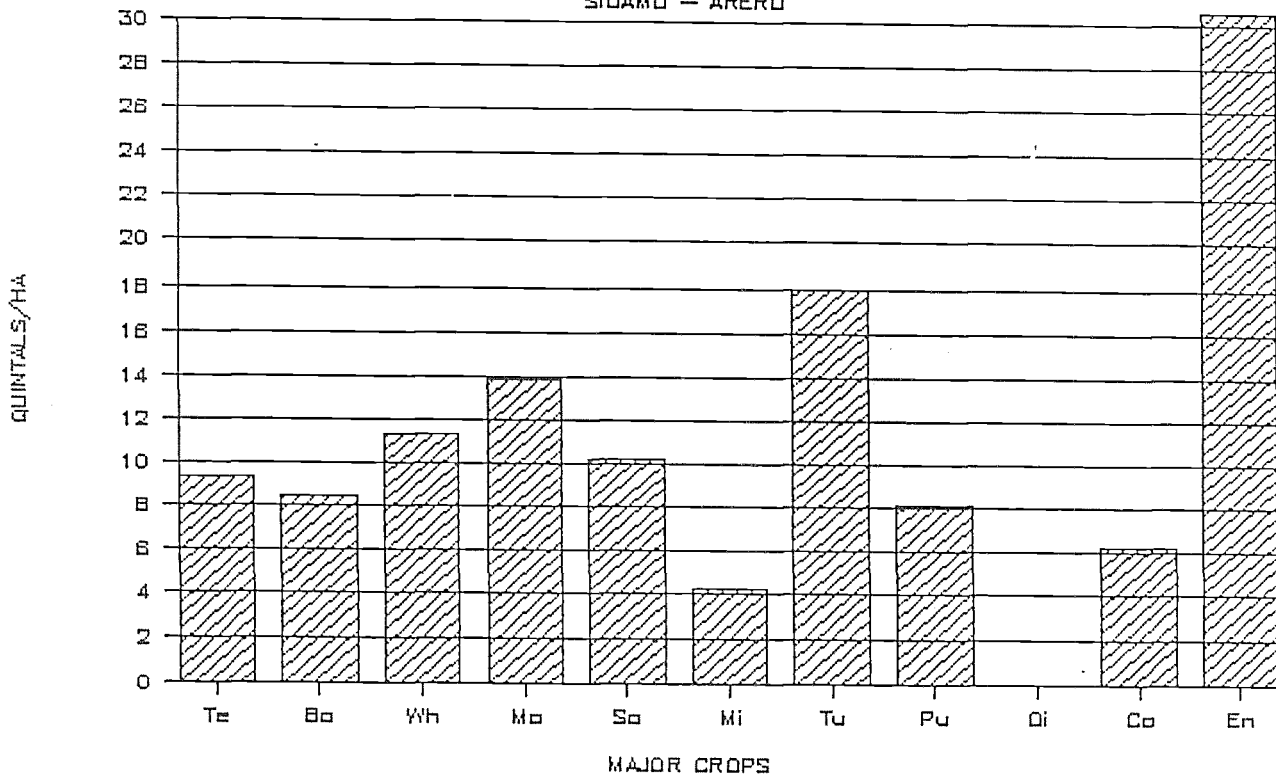
CROP YIELDS

SIDAMO — GEDIO
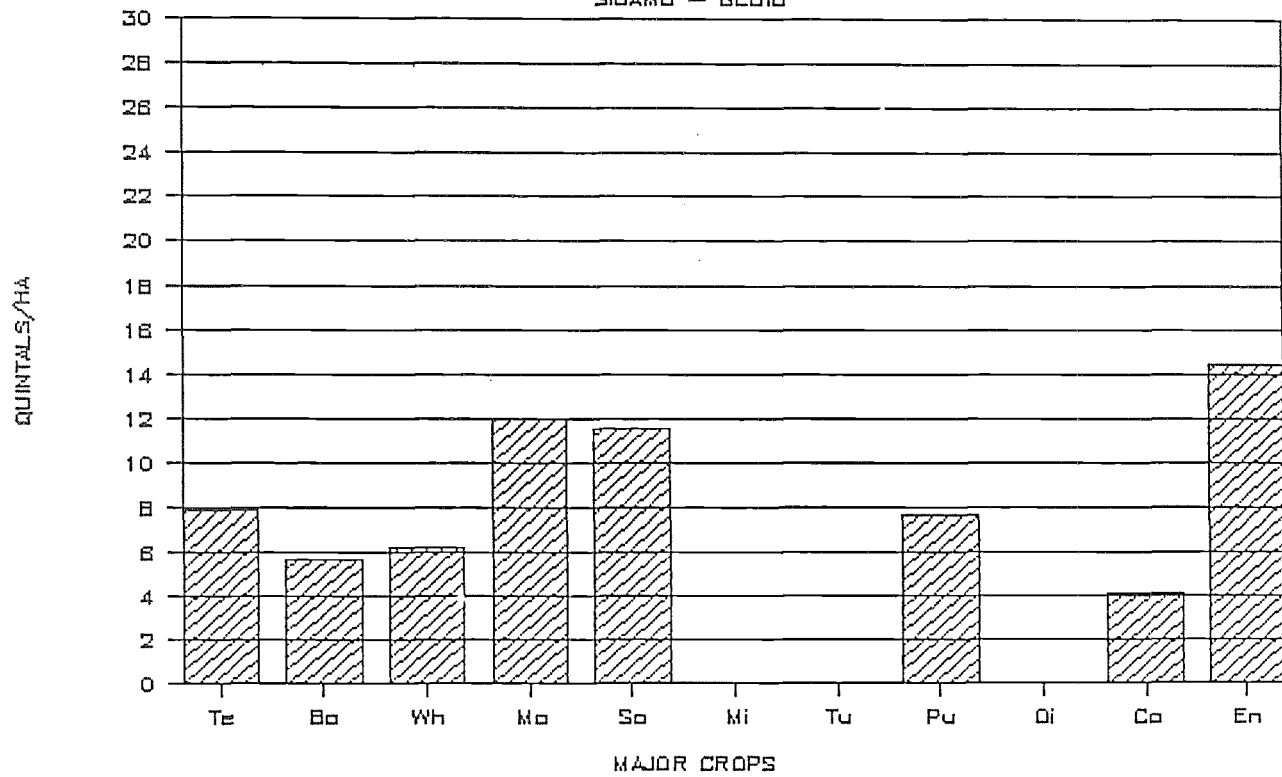
CROP YIELDS

TIGRAY
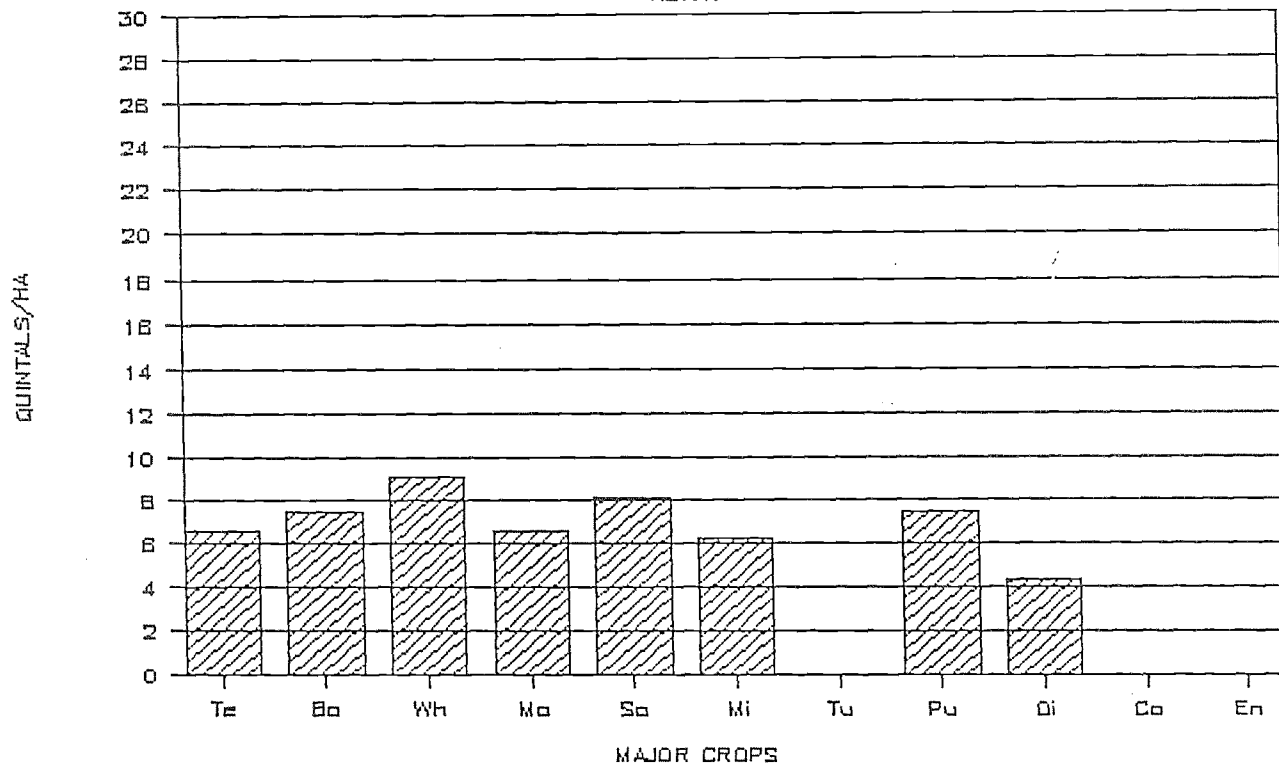
CROP YIELDS

WELEGA — HORO GUDURU
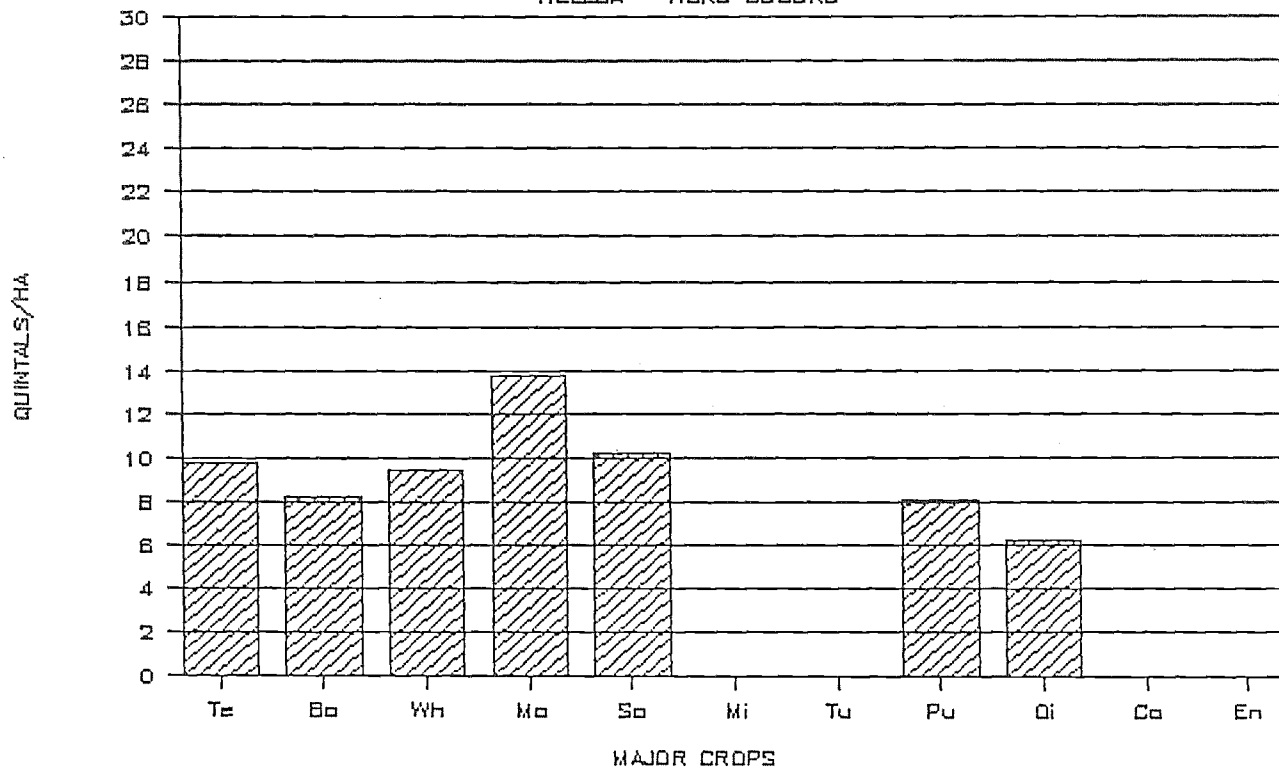
CROP YIELDS

WELEGA — NEKEMTE
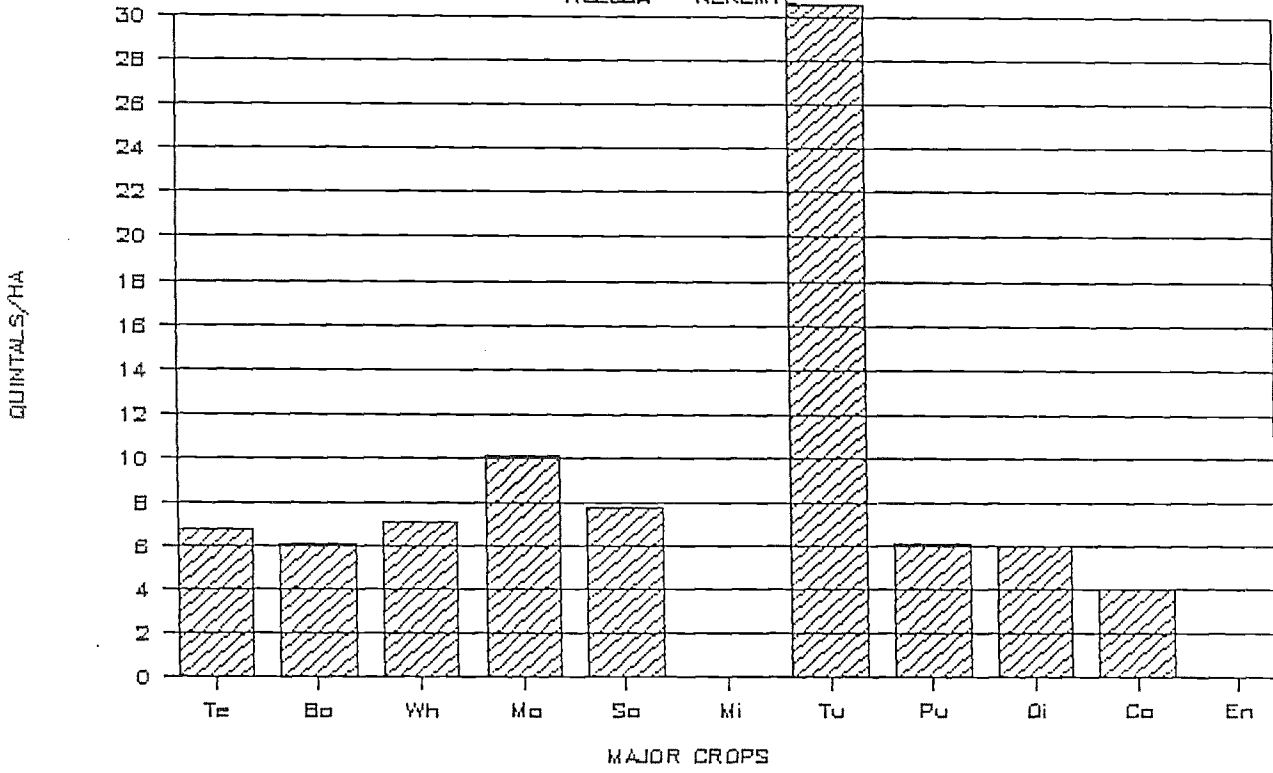
CROP YIELDS

WELEGA — ARJO
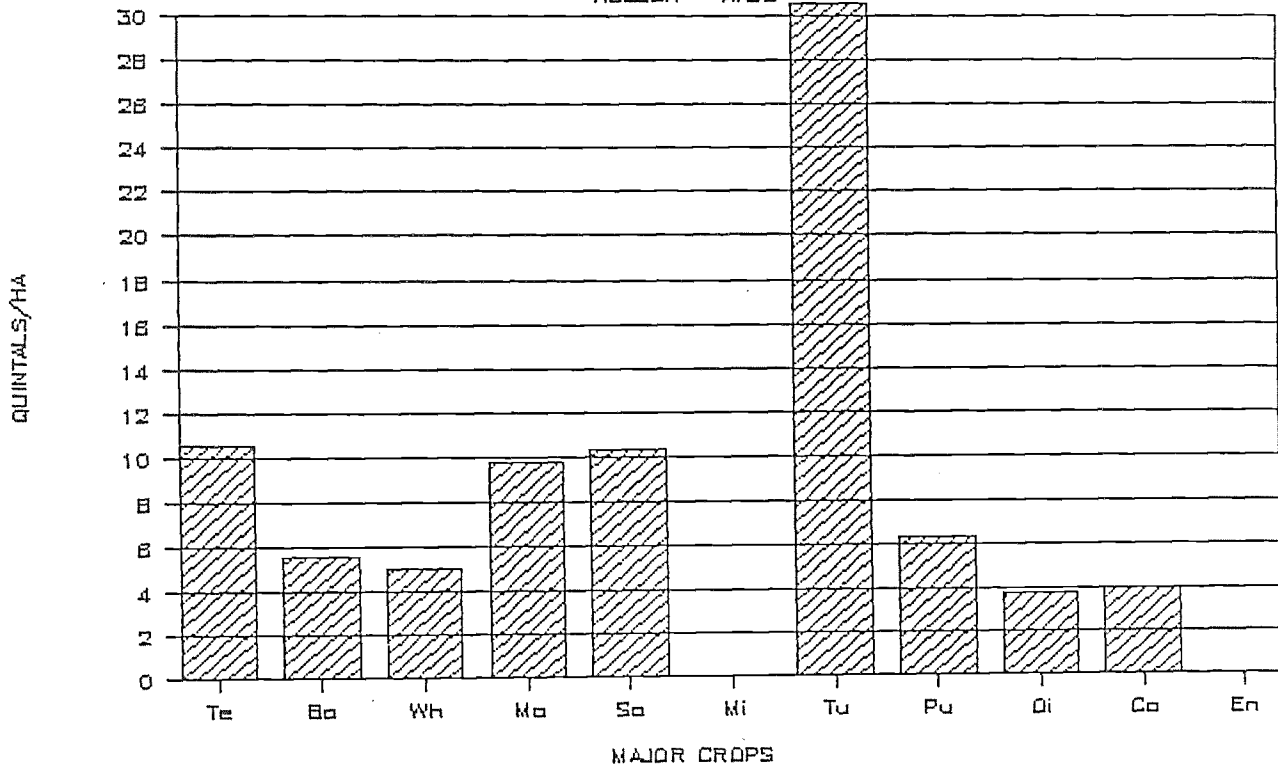
CROP YIELDS
WELEGA — GIMBI
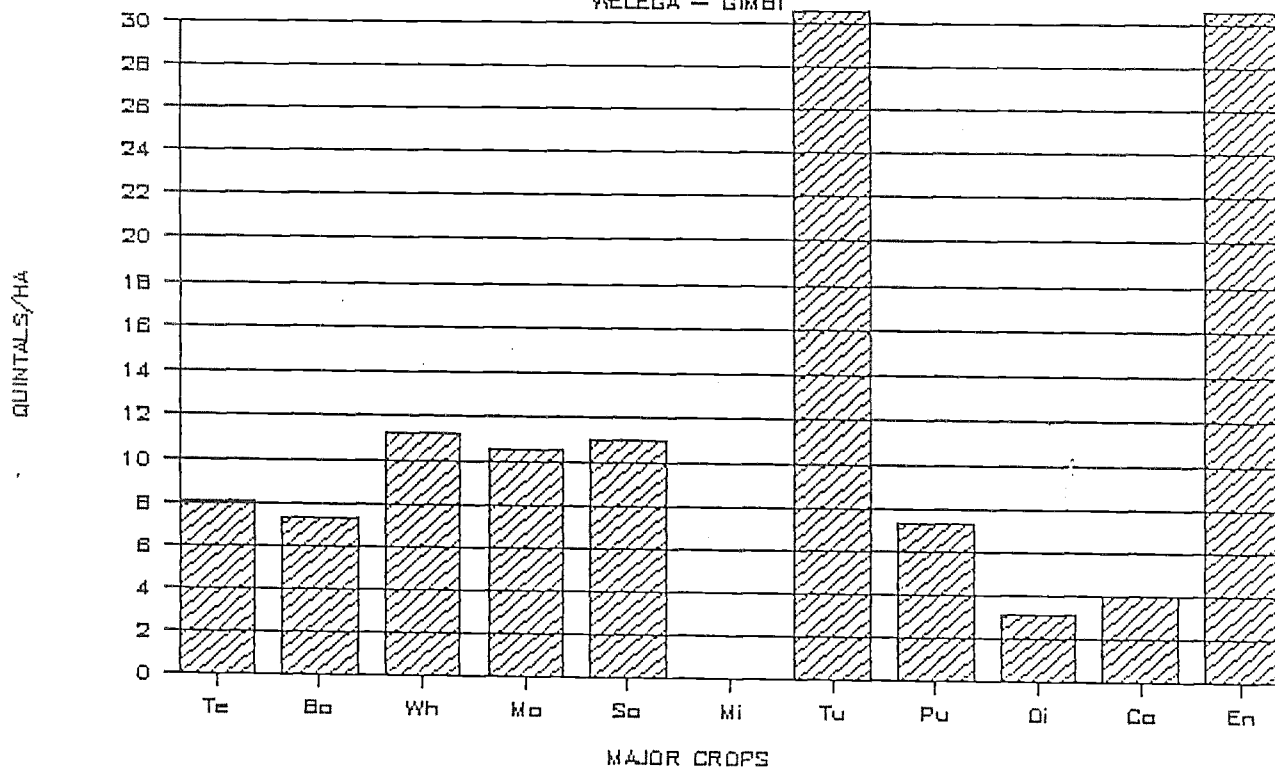
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WELEGA — KELEM
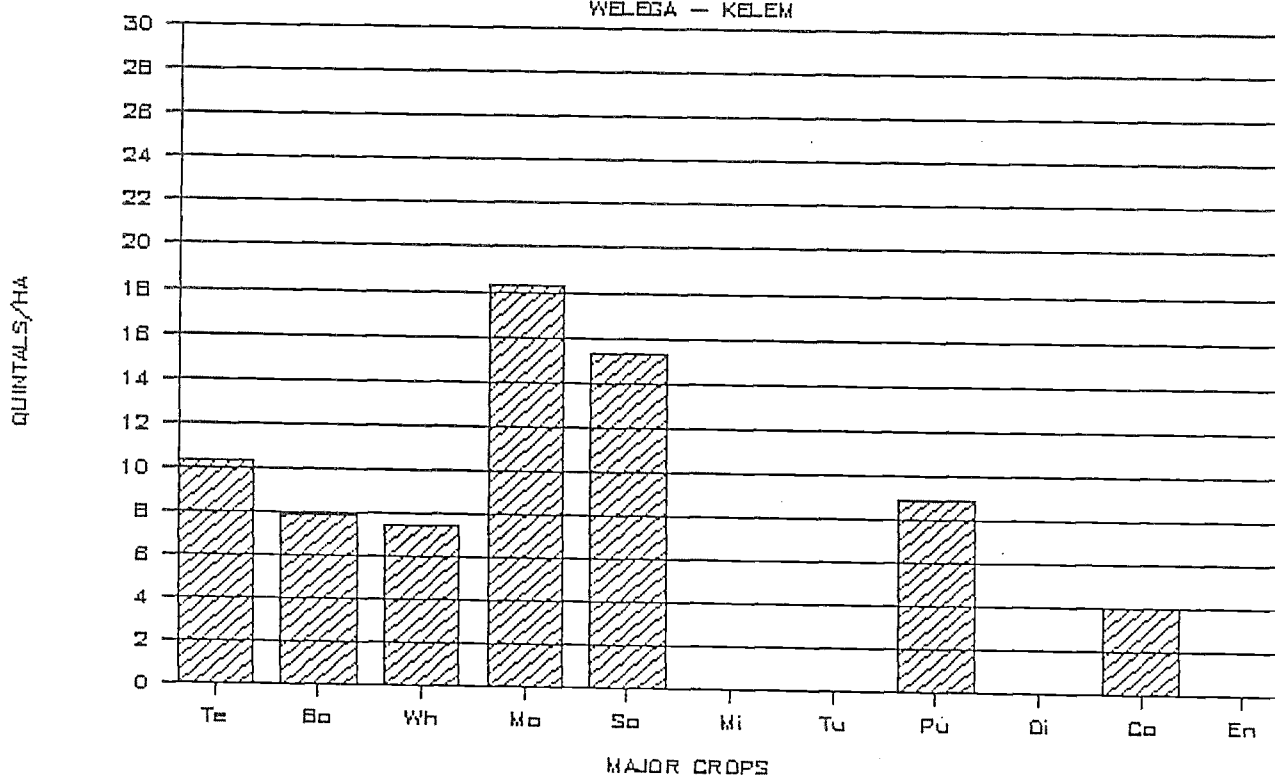
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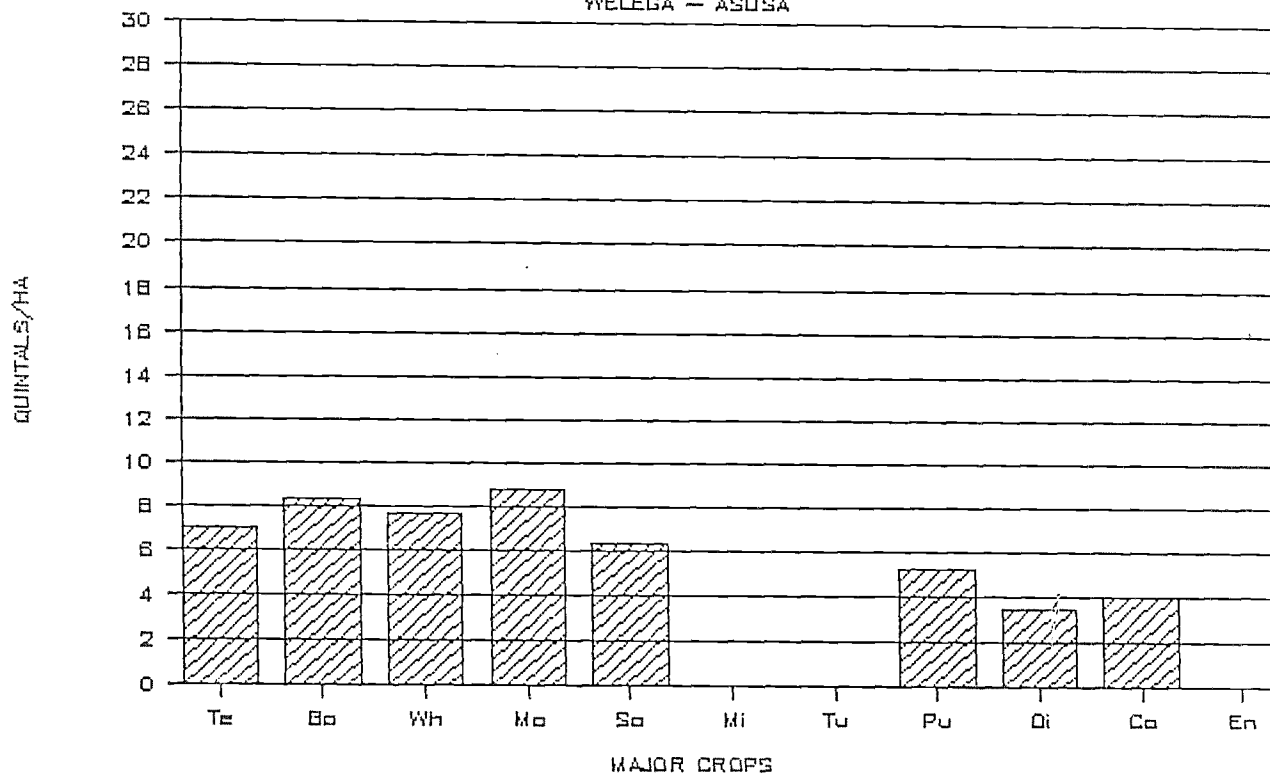
CROP YIELDS
WELO — RAYA & KOBO, LASTA, WAG
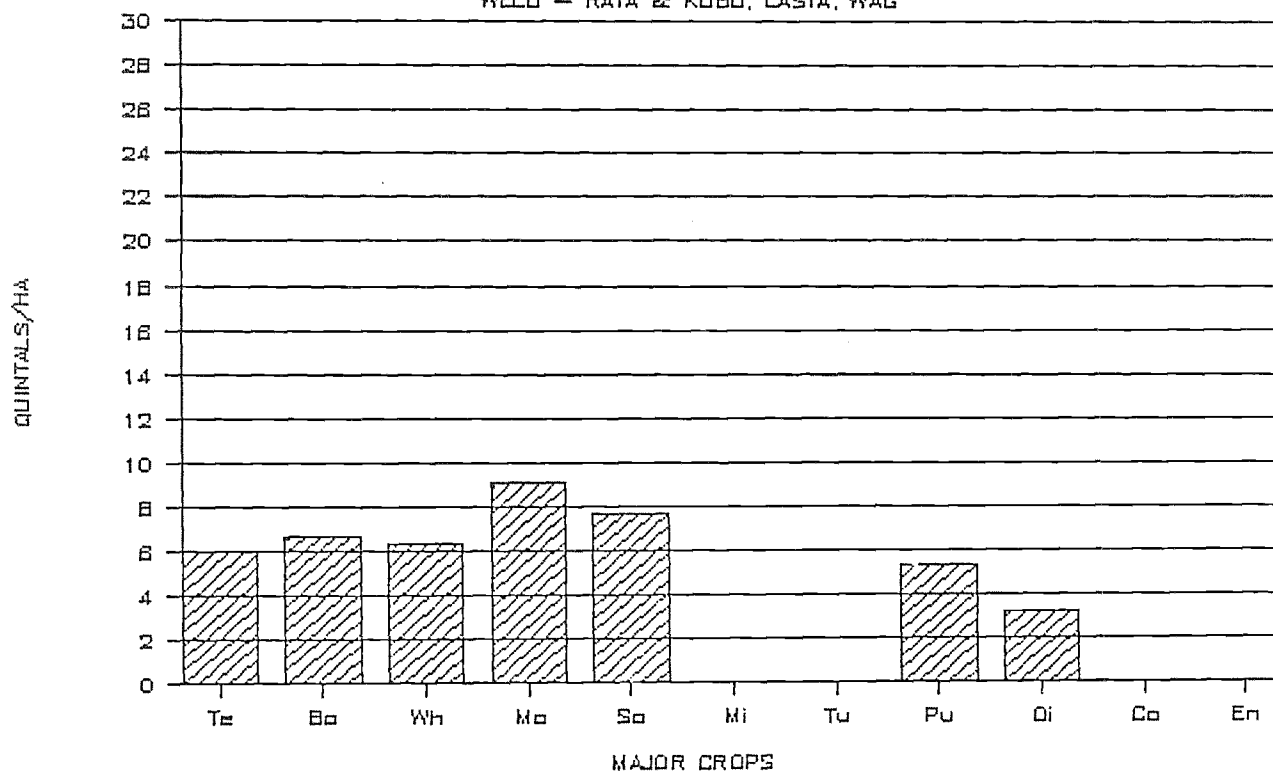
CROP YIELDS
WELO — YEYU
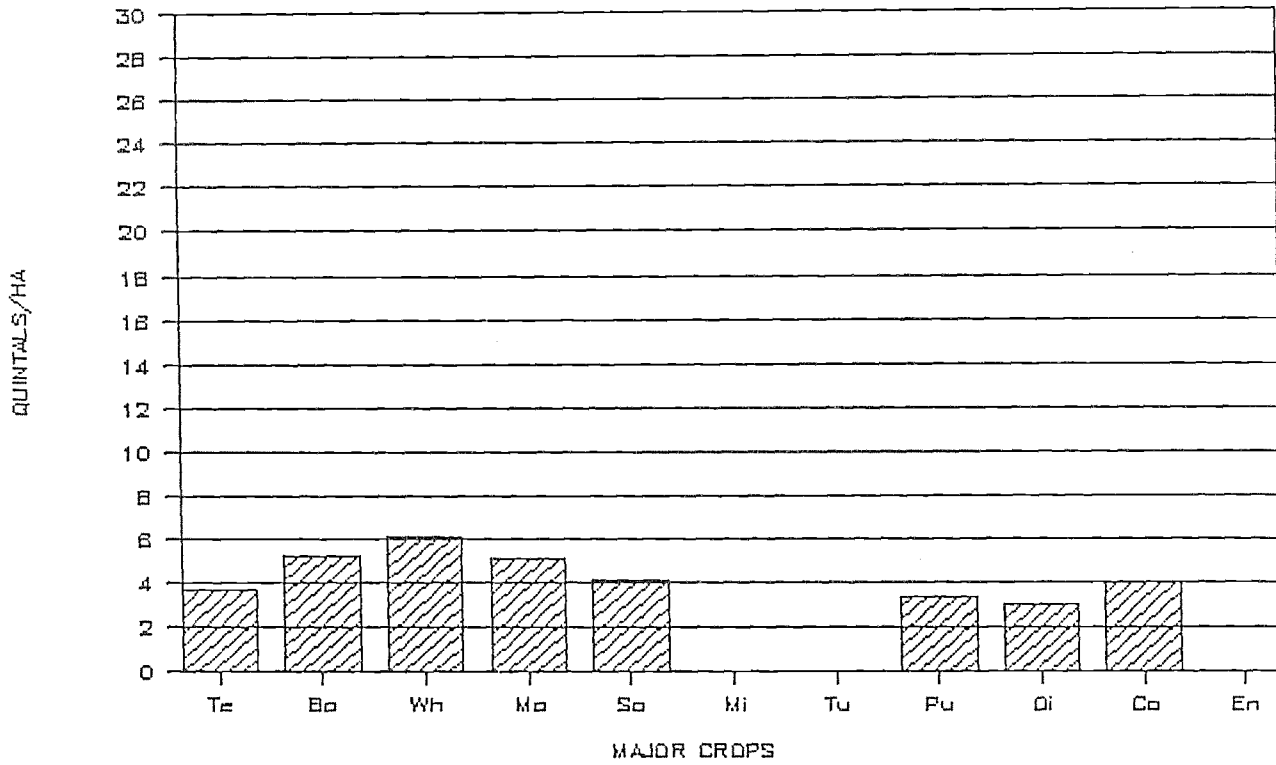
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WELO — AMBASEL
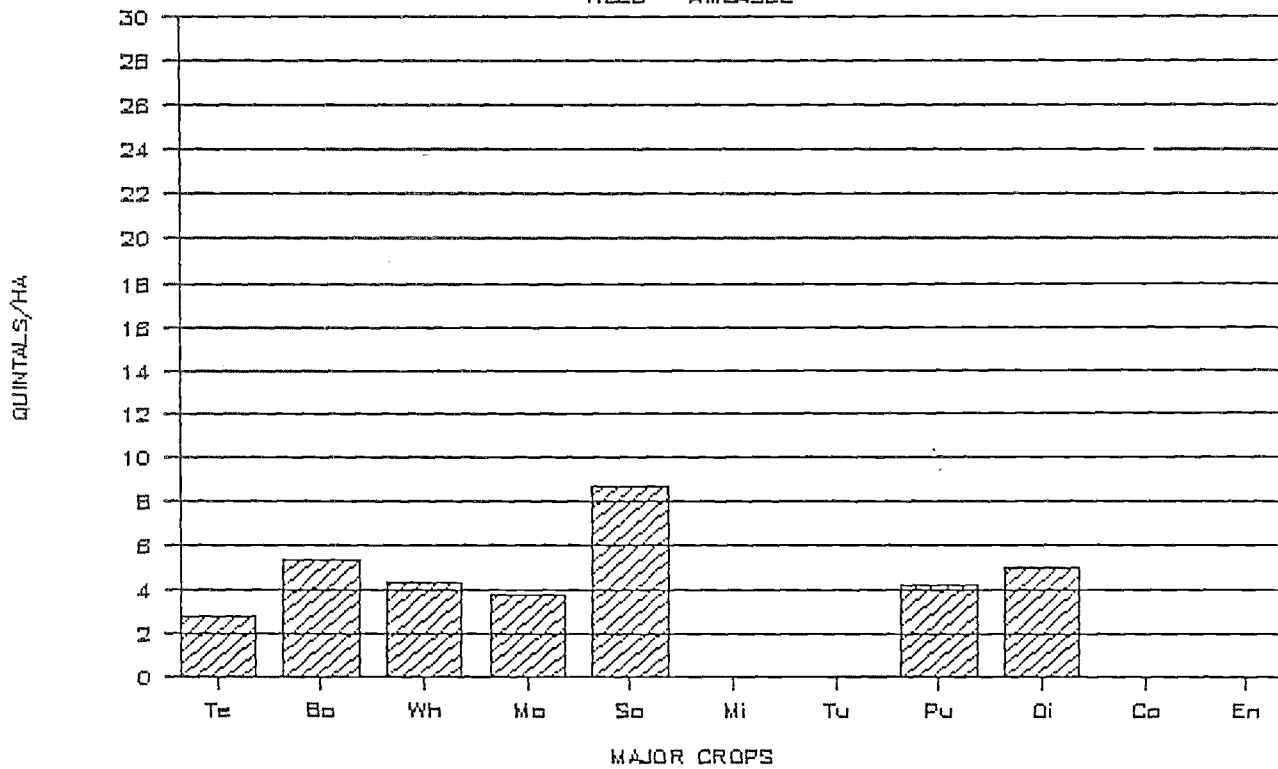
CROP YIELDS

WELO — AWSA

CROP YIELDS

WELO — KALU
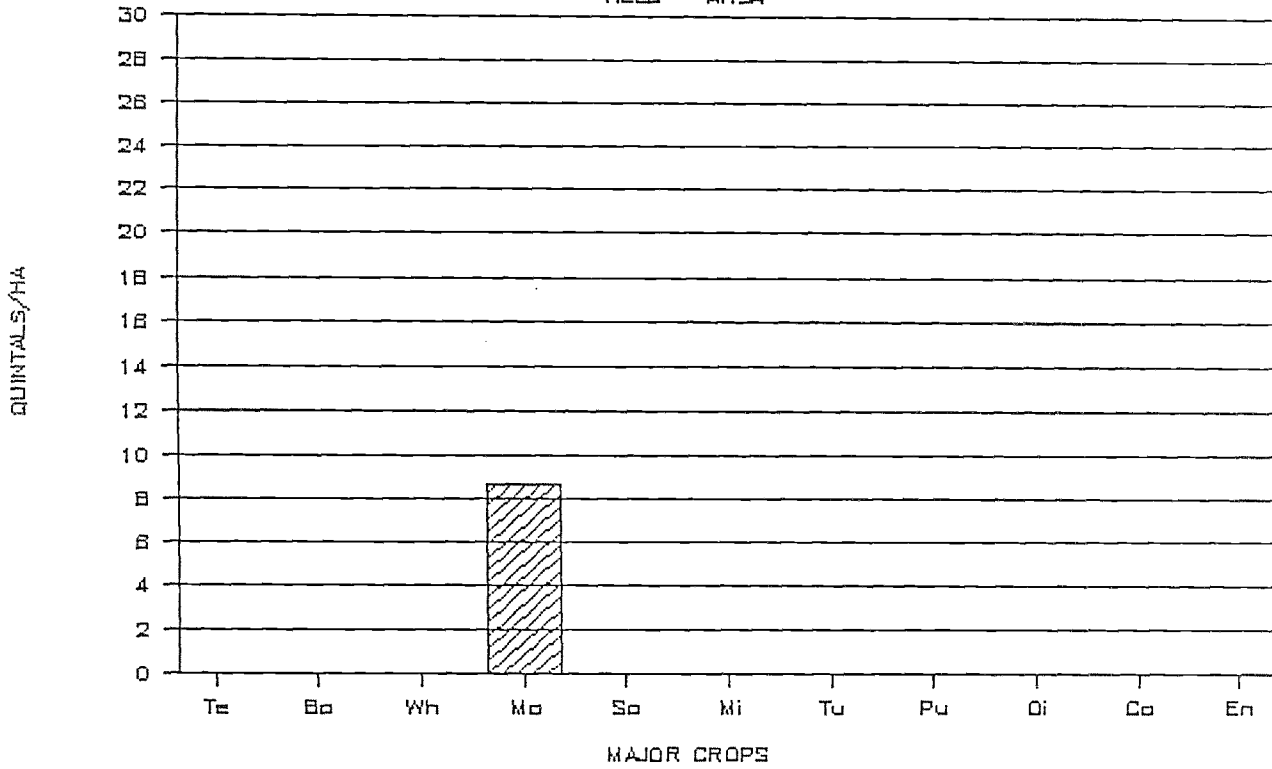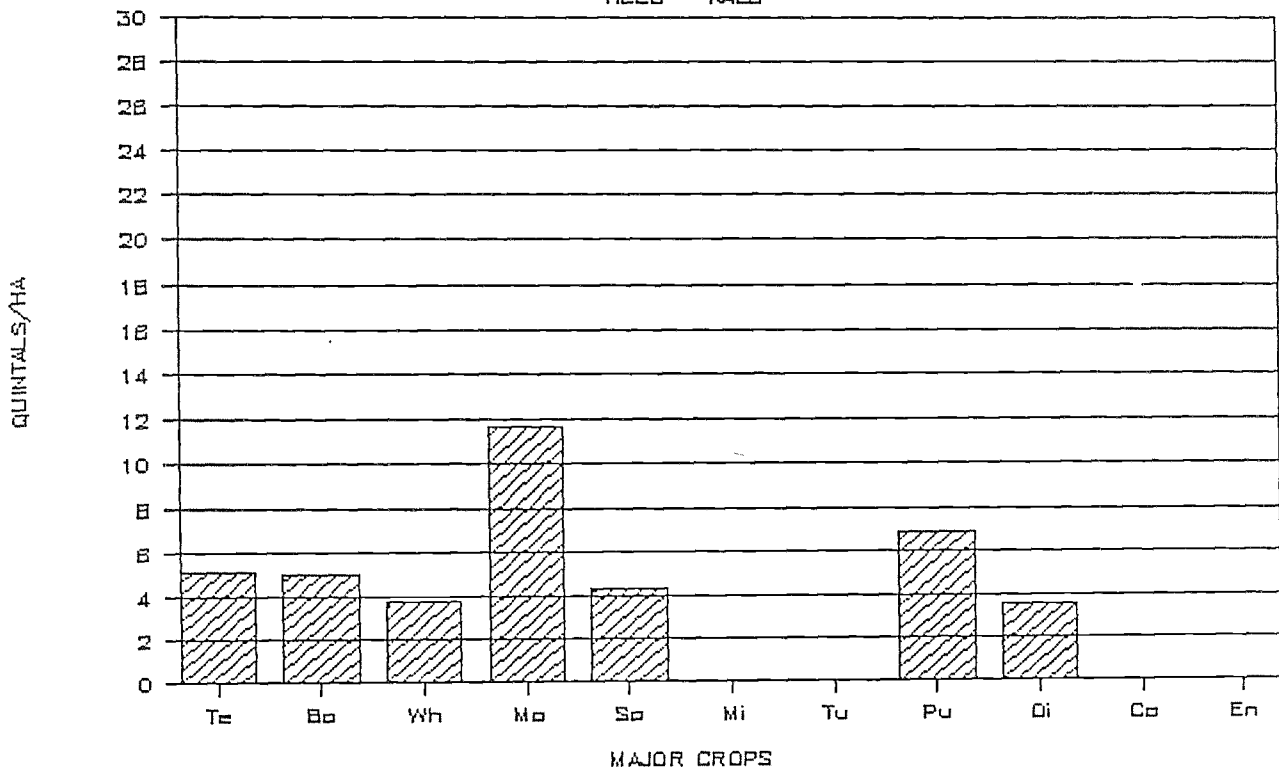
CROP YIELDS
WELO — DESIE ZURIA
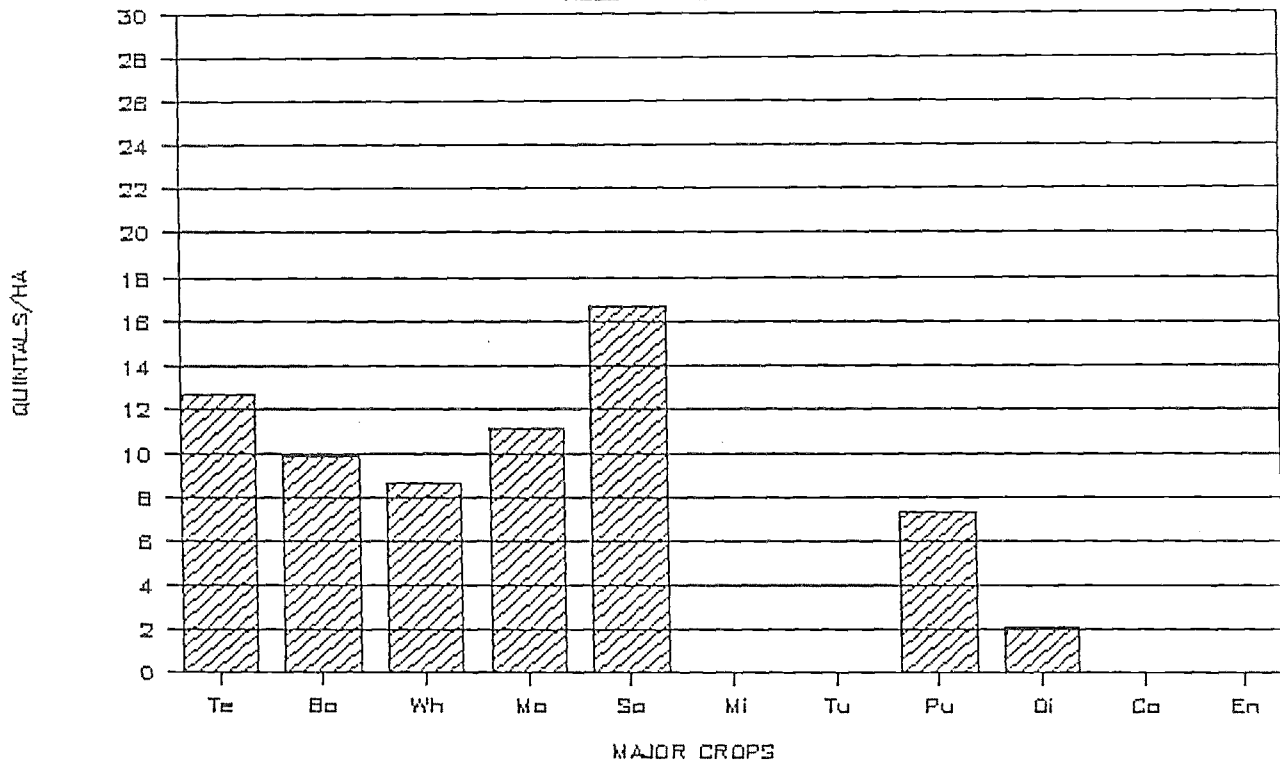
CROP YIELDS
WELO — WEREILU
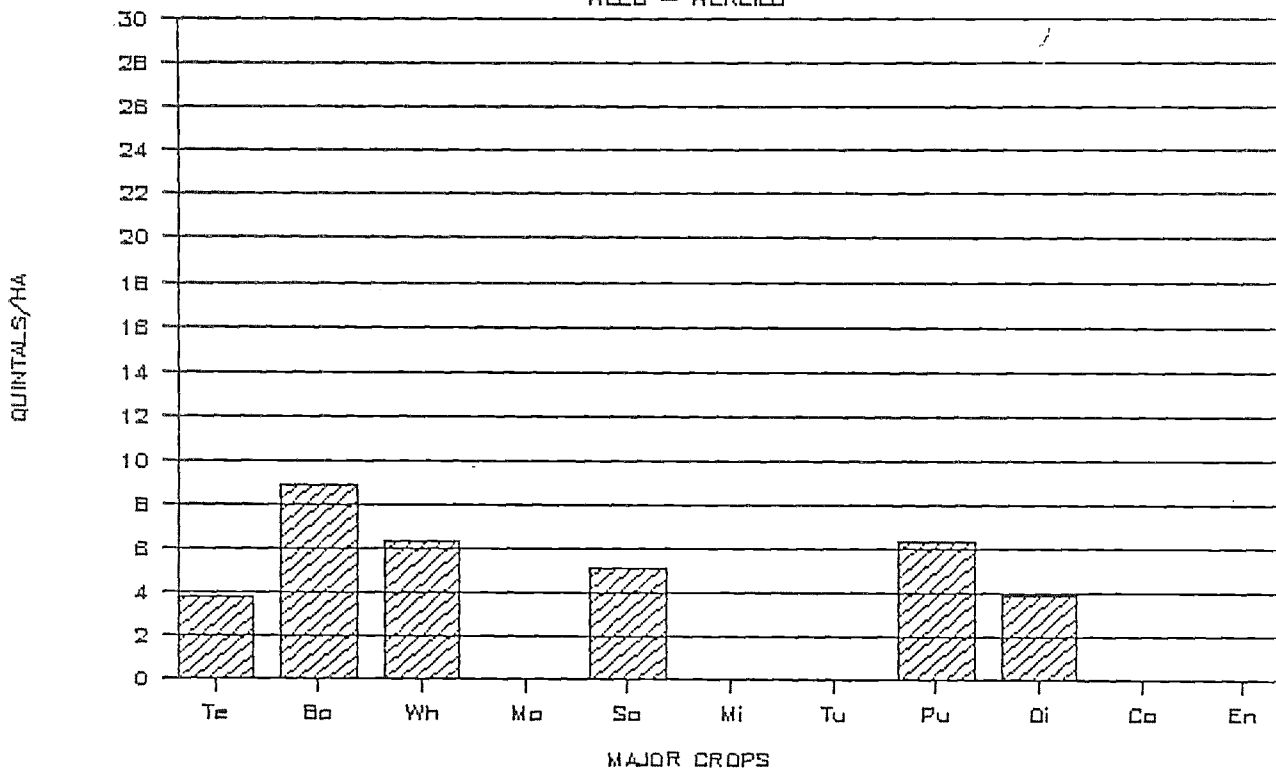
CROP YIELDS

WELO — BORENA
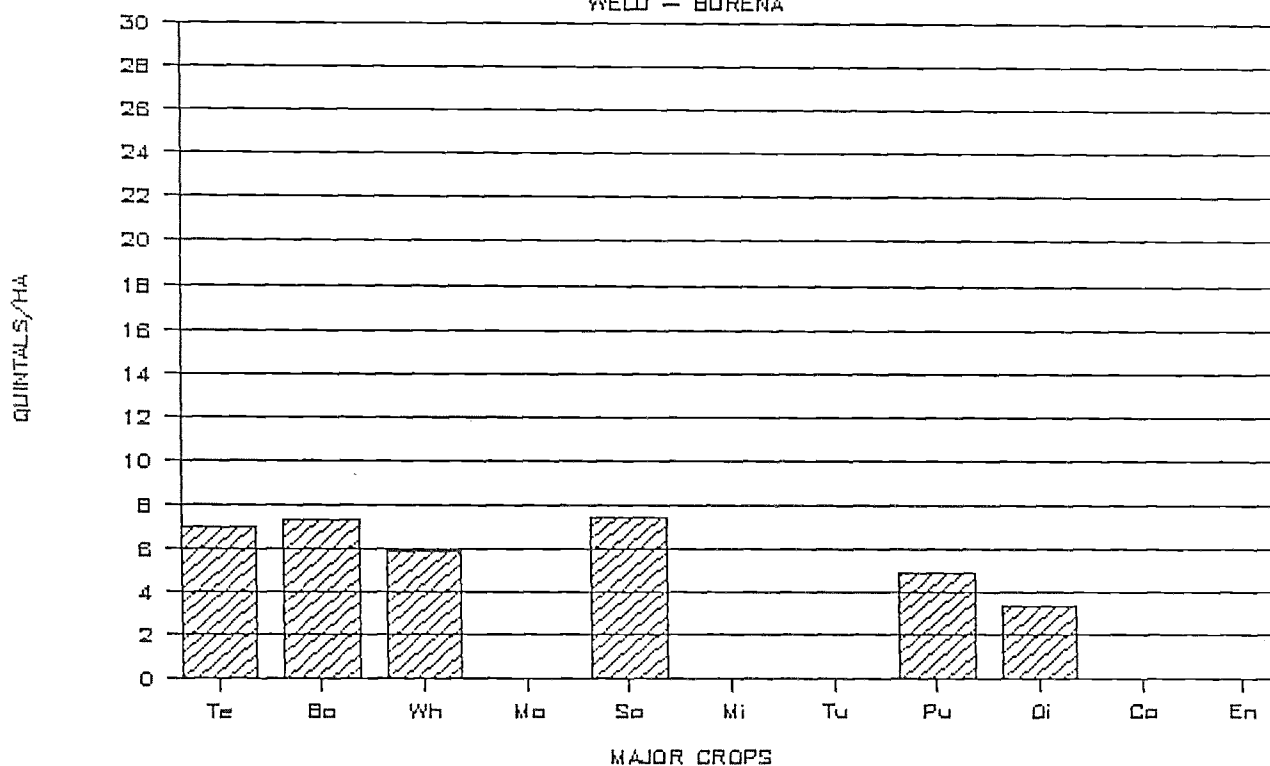
CROP YIELDS

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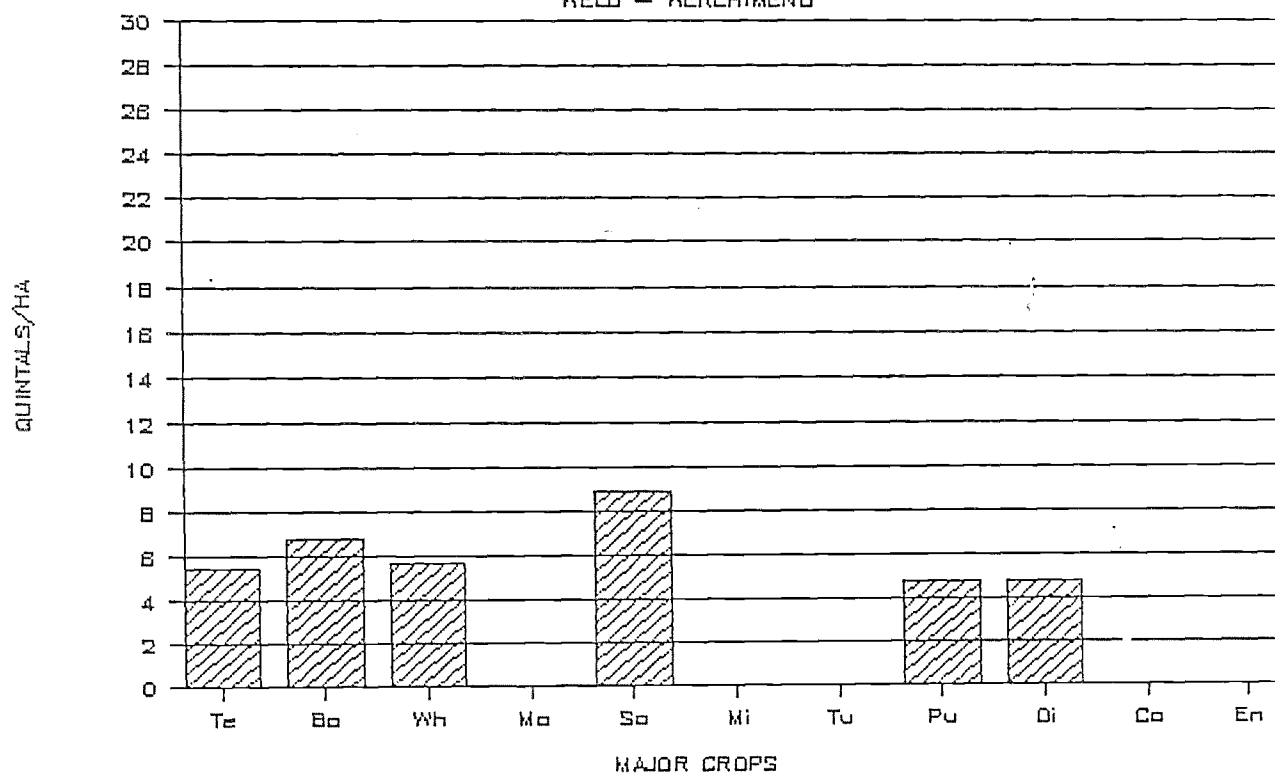
CROP YIELDS
WELO — WADLA DELANTA
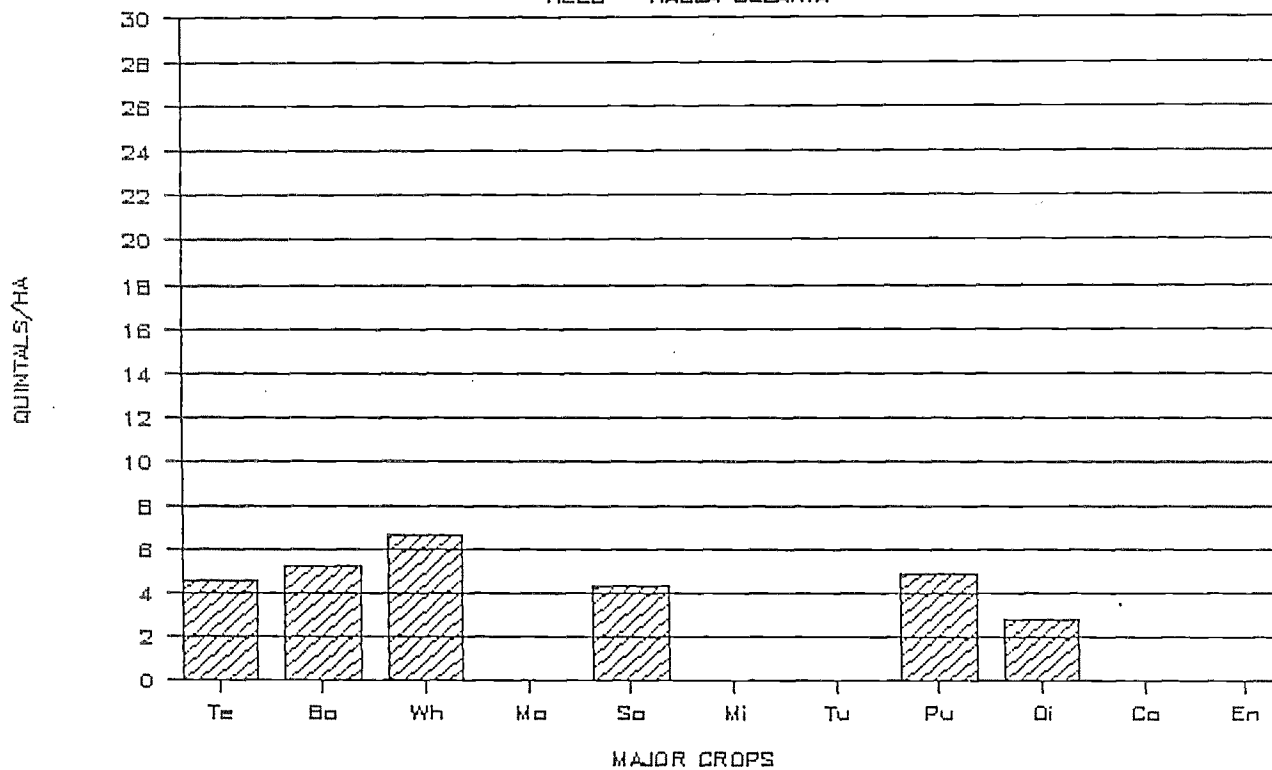
TLU & CONSUMABLE DRY MATTER

TLU & CONSUMABLE DRY MATTER

ARSI
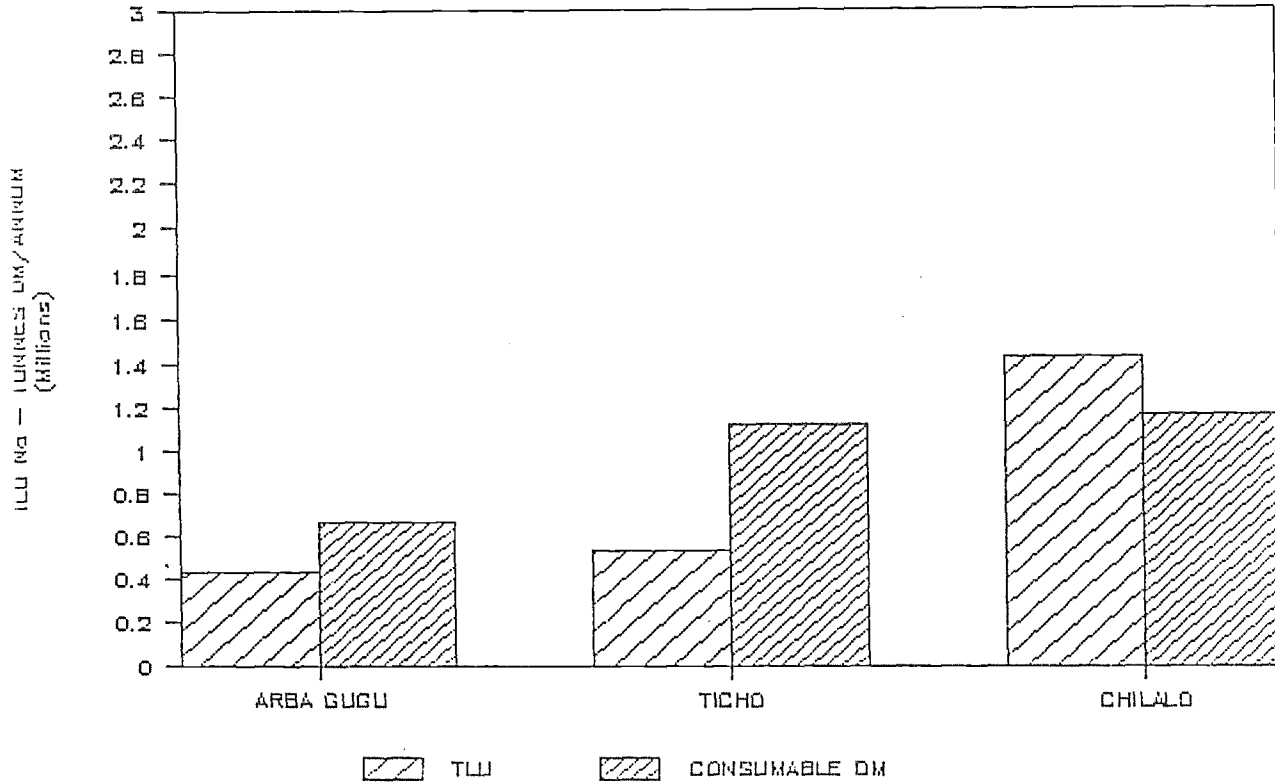
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BALE
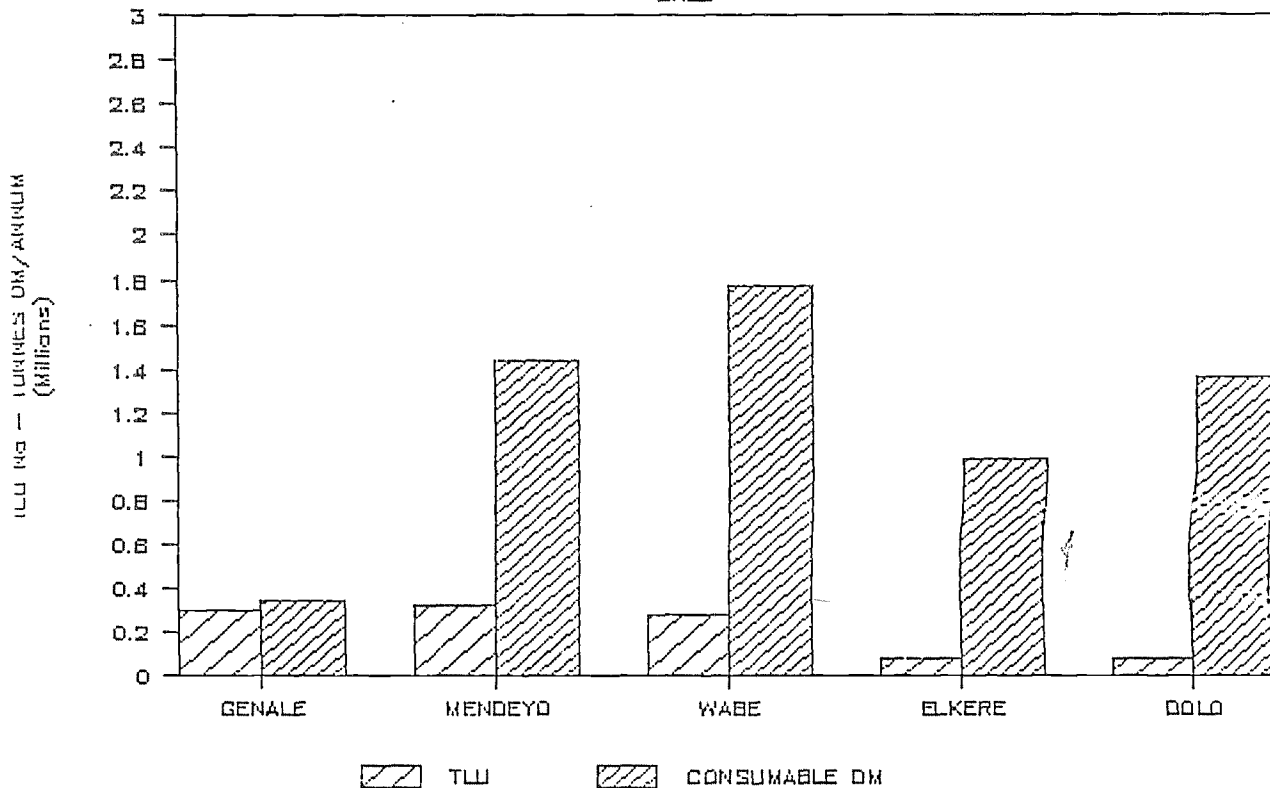
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GAMO GOFA
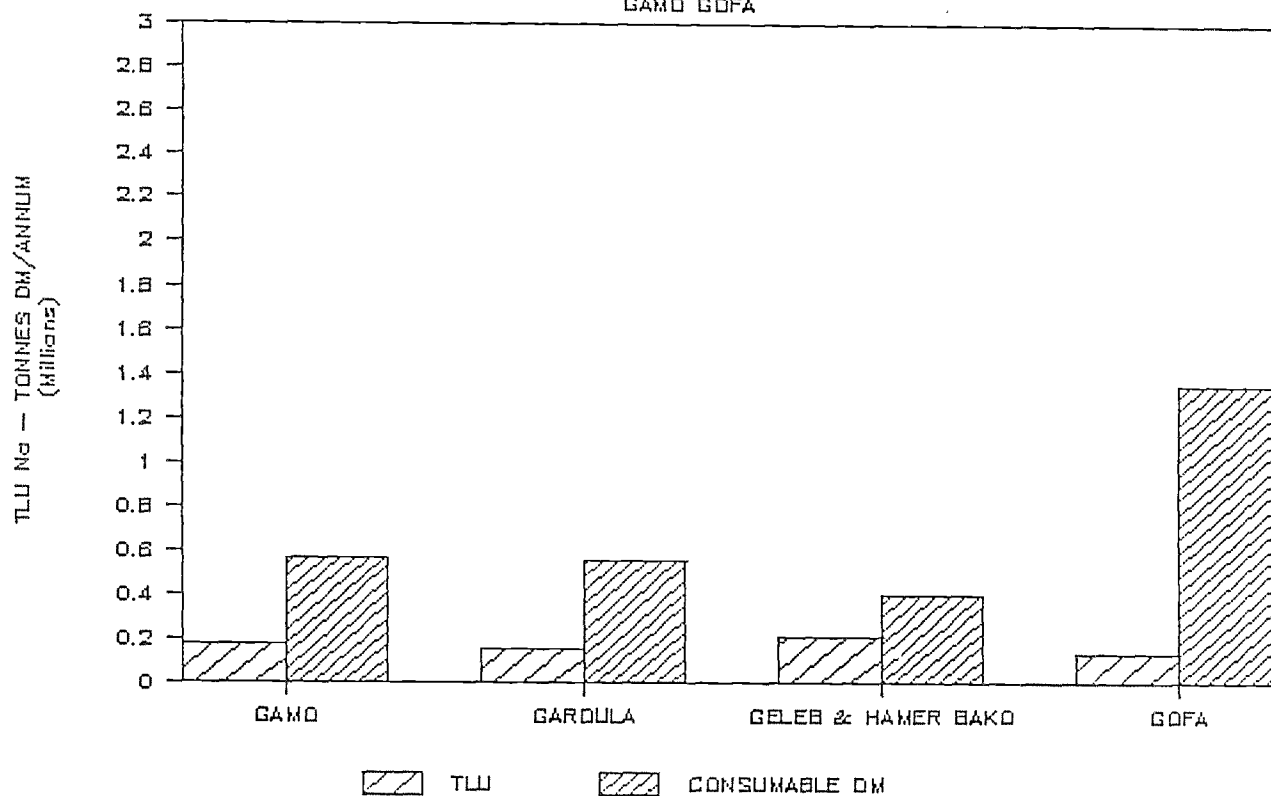
TLU & CONSUMABLE DRY MATTER

GOJAM 1
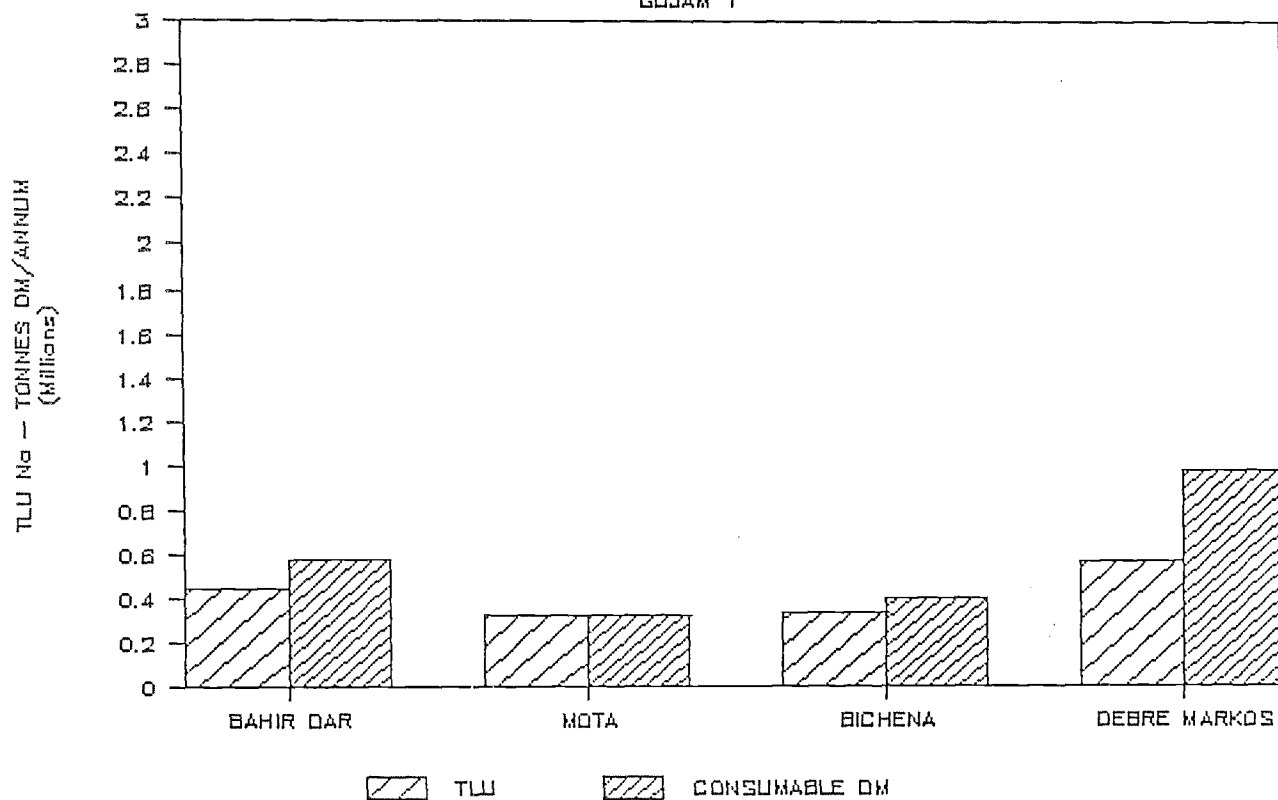
TLU & CONSUMABLE DRY MATTER

GOJAM 2

Legend: TLU, CONSUMABLE DM

TLU & CONSUMABLE DRY MATTER
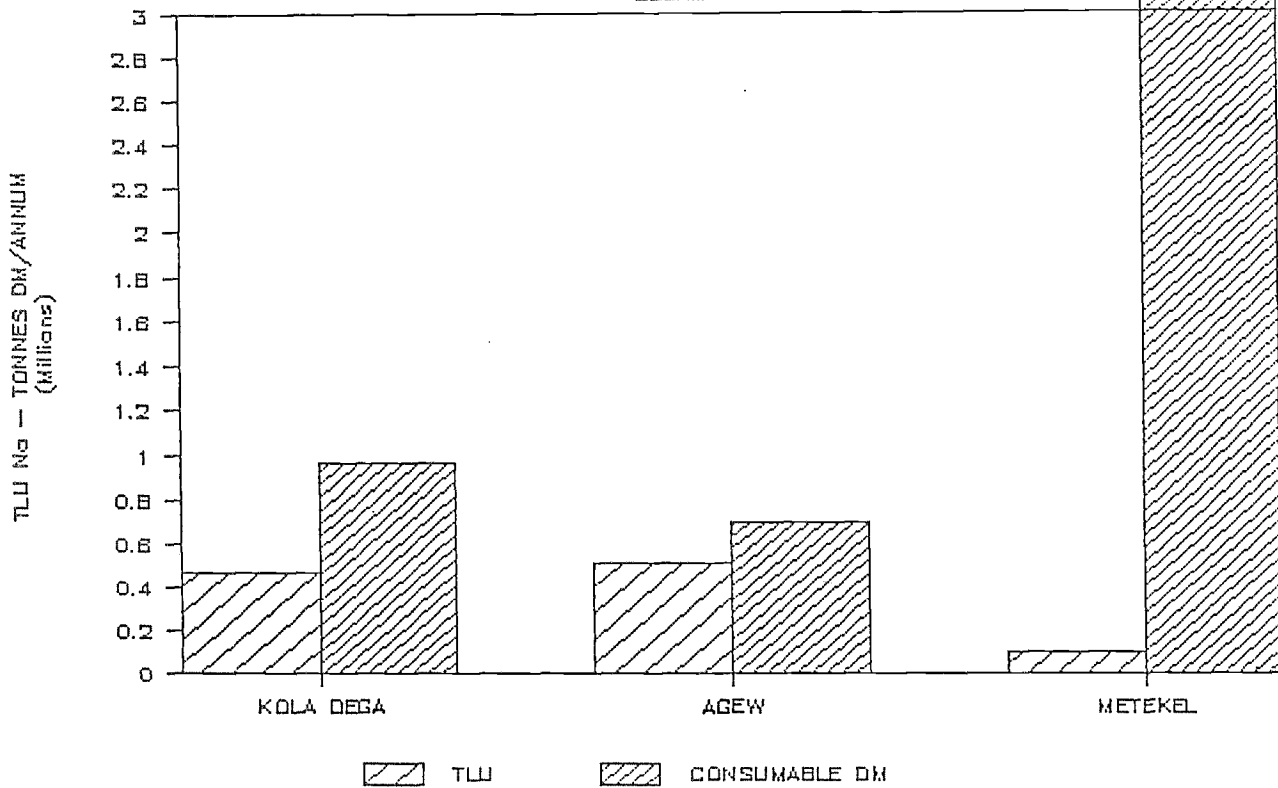
GONDER 1

Legend: TLU, CONSUMABLE DM
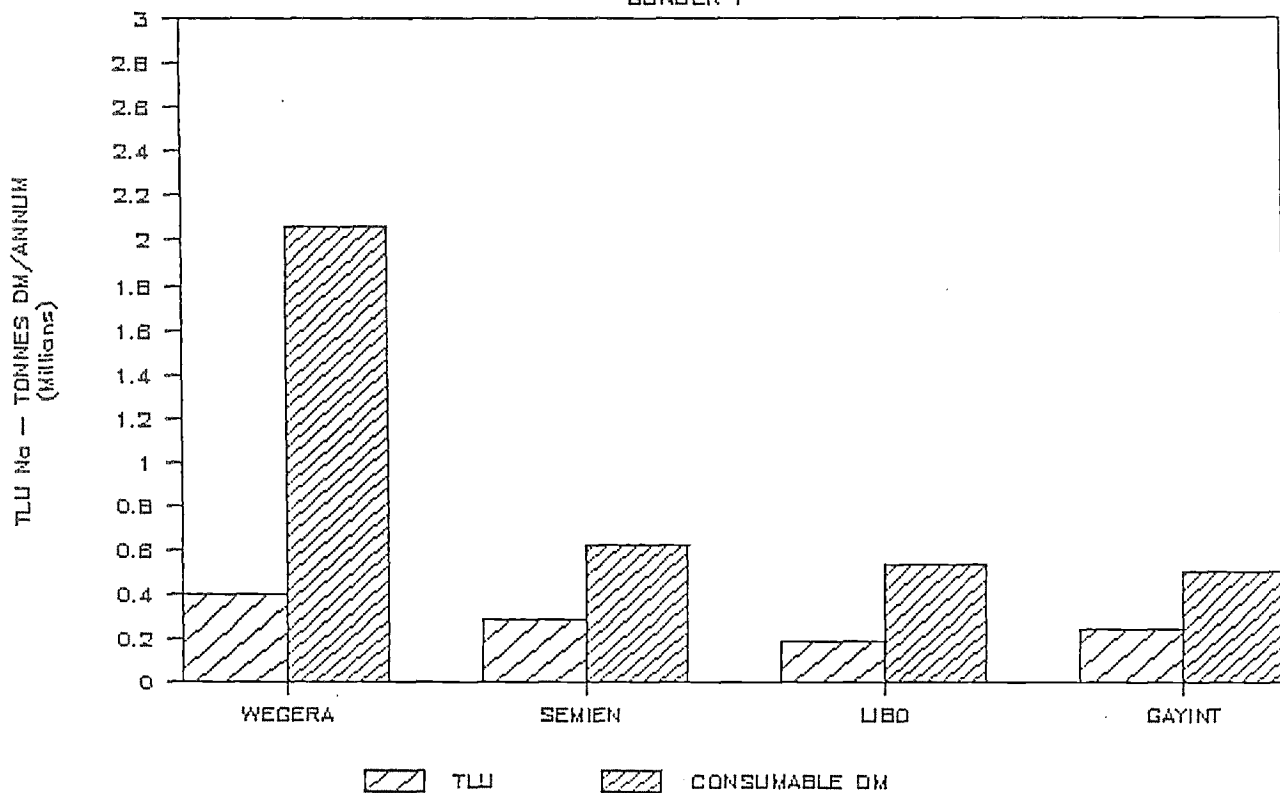
TLU & CONSUMABLE DRY MATTER
GONDER 2
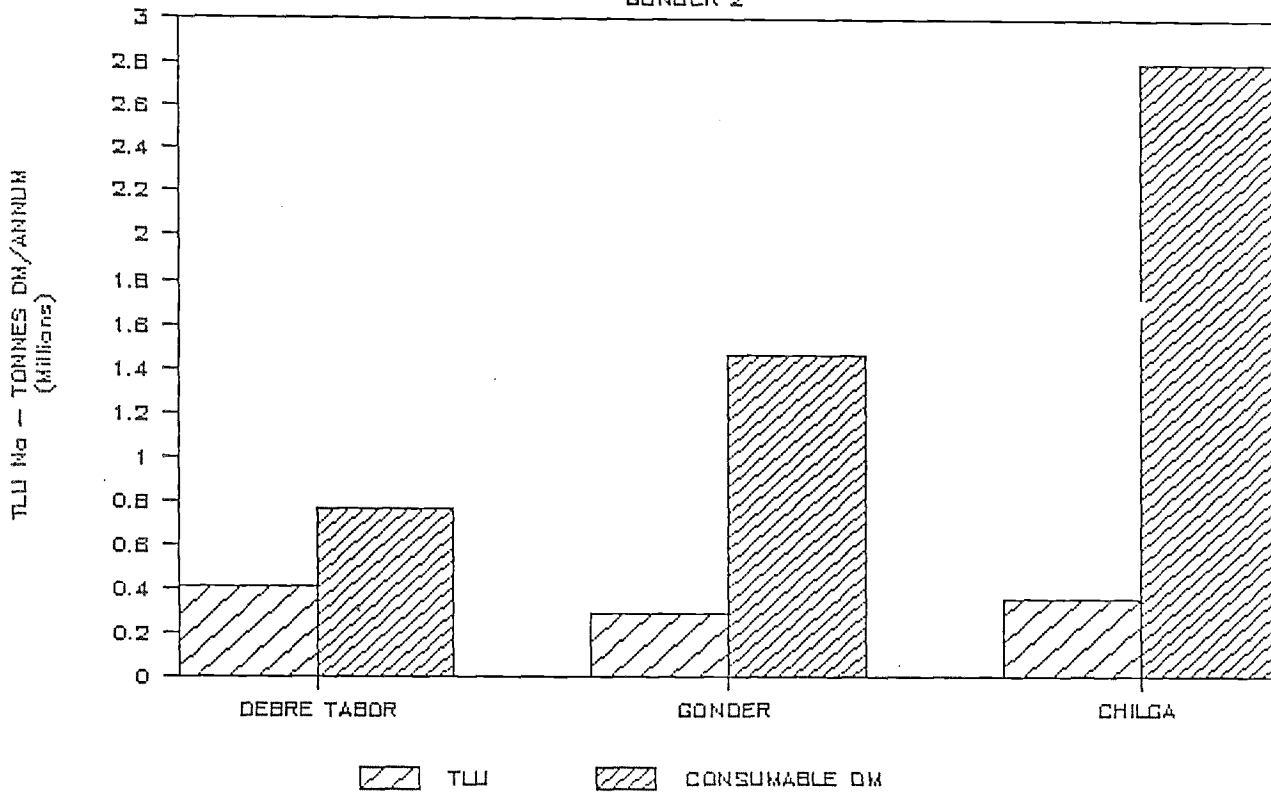
TLU & CONSUMABLE DRY MATTER
HARERGE 1

TLU & CONSUMABLE DRY MATTER
HARERGE 2

TLU & CONSUMABLE DRY MATTER
HARERGE 3
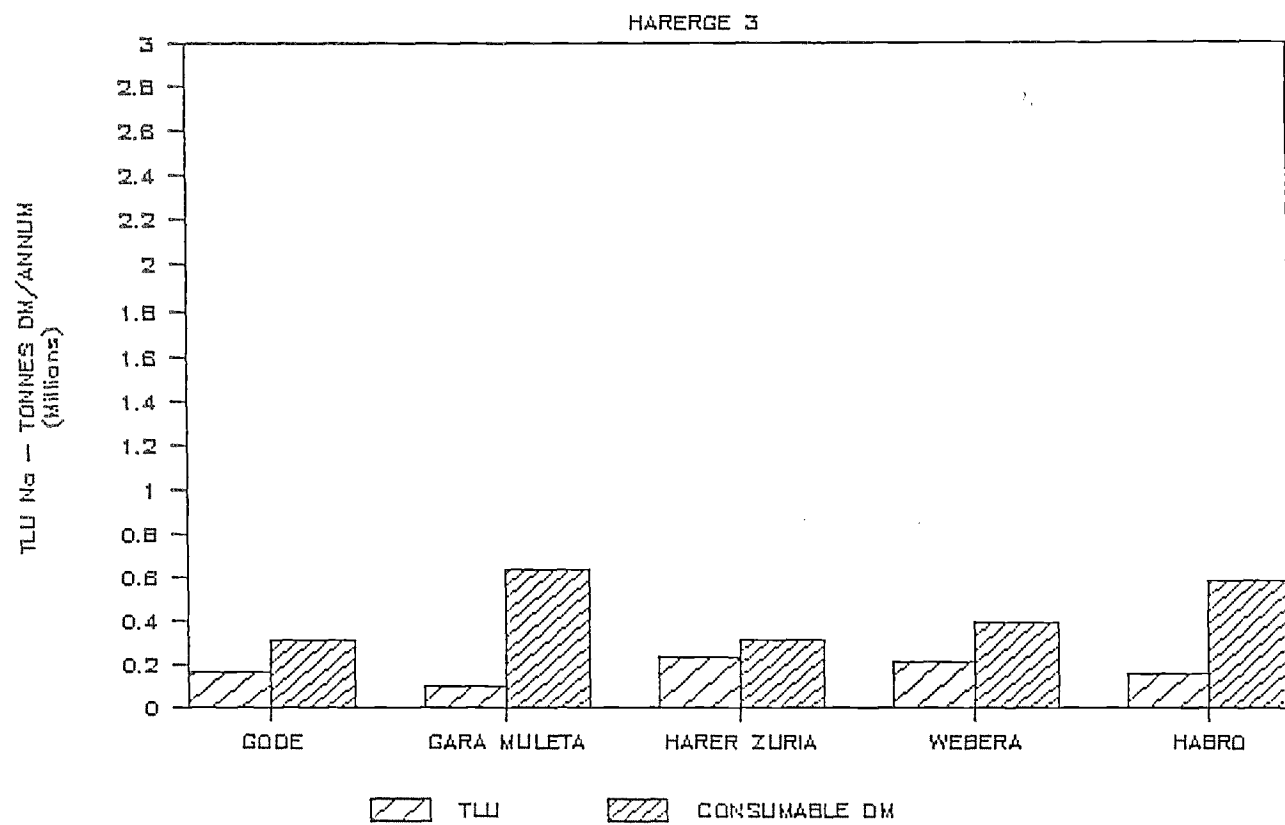
TLU & CONSUMABLE DRY MATTER

ILUBABOR
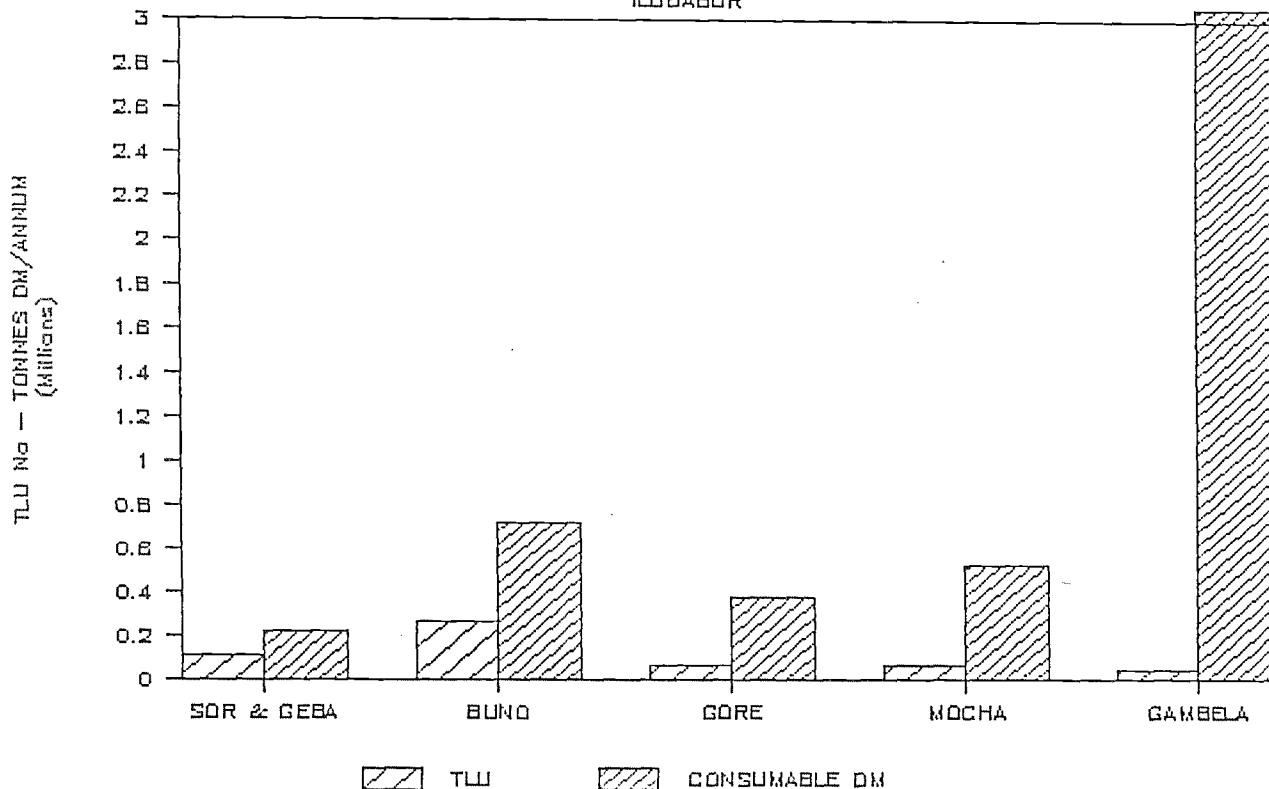
TLU & CONSUMABLE DRY MATTER

KEFA 1
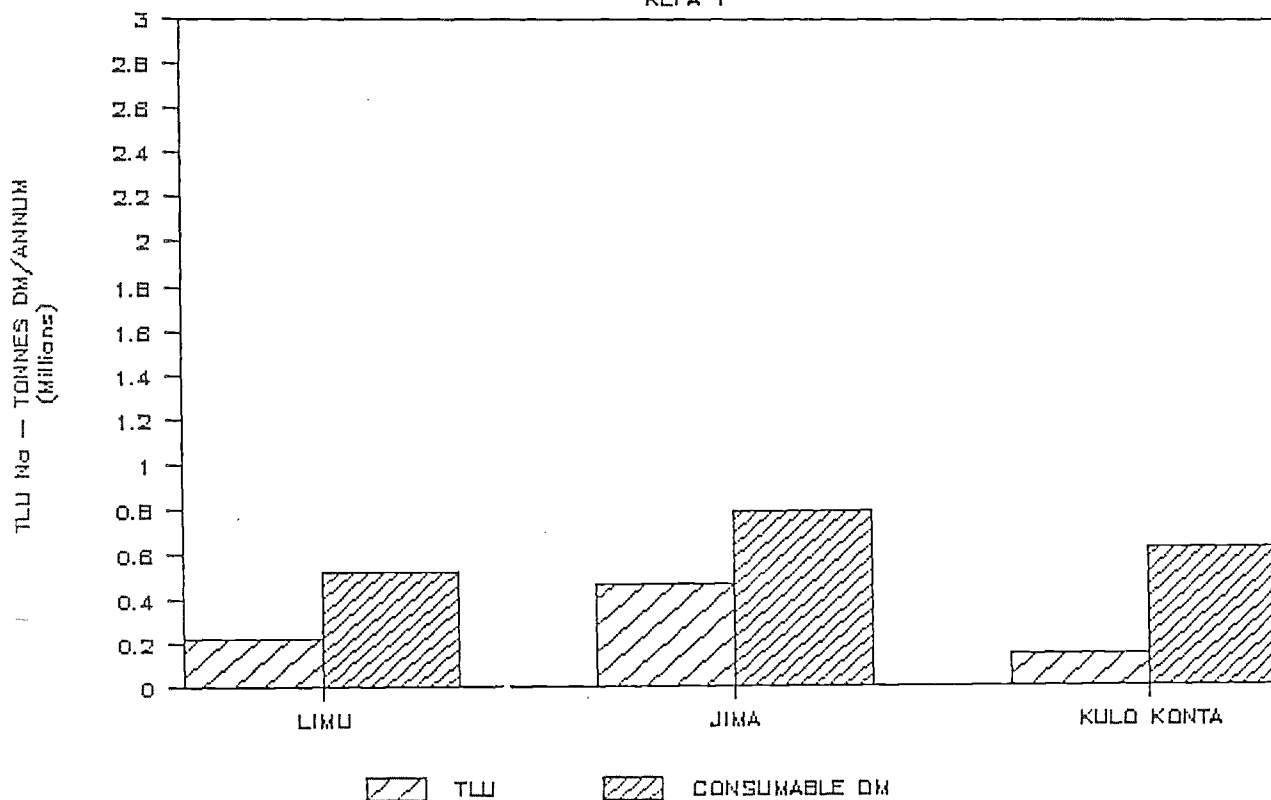
TLU & CONSUMABLE DRY MATTER

KEFA 2
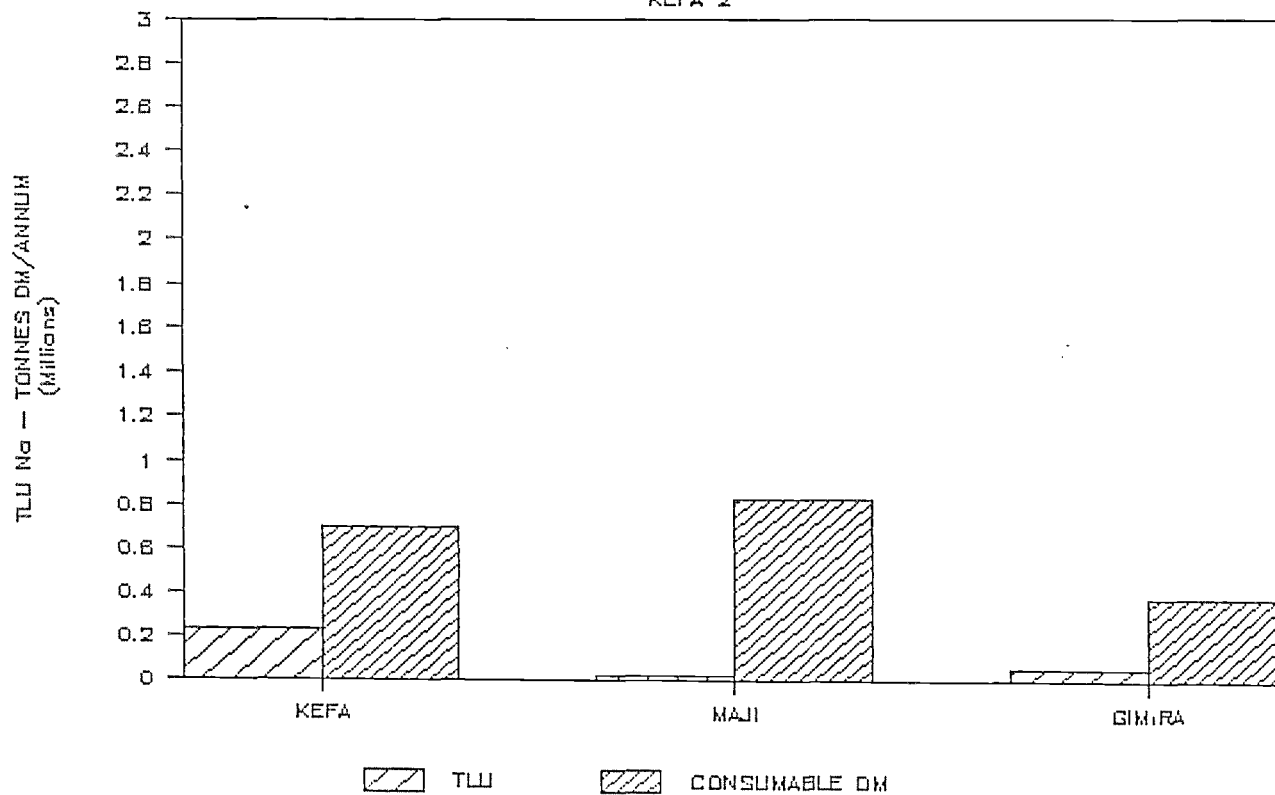
TLU & CONSUMABLE DRY MATTER

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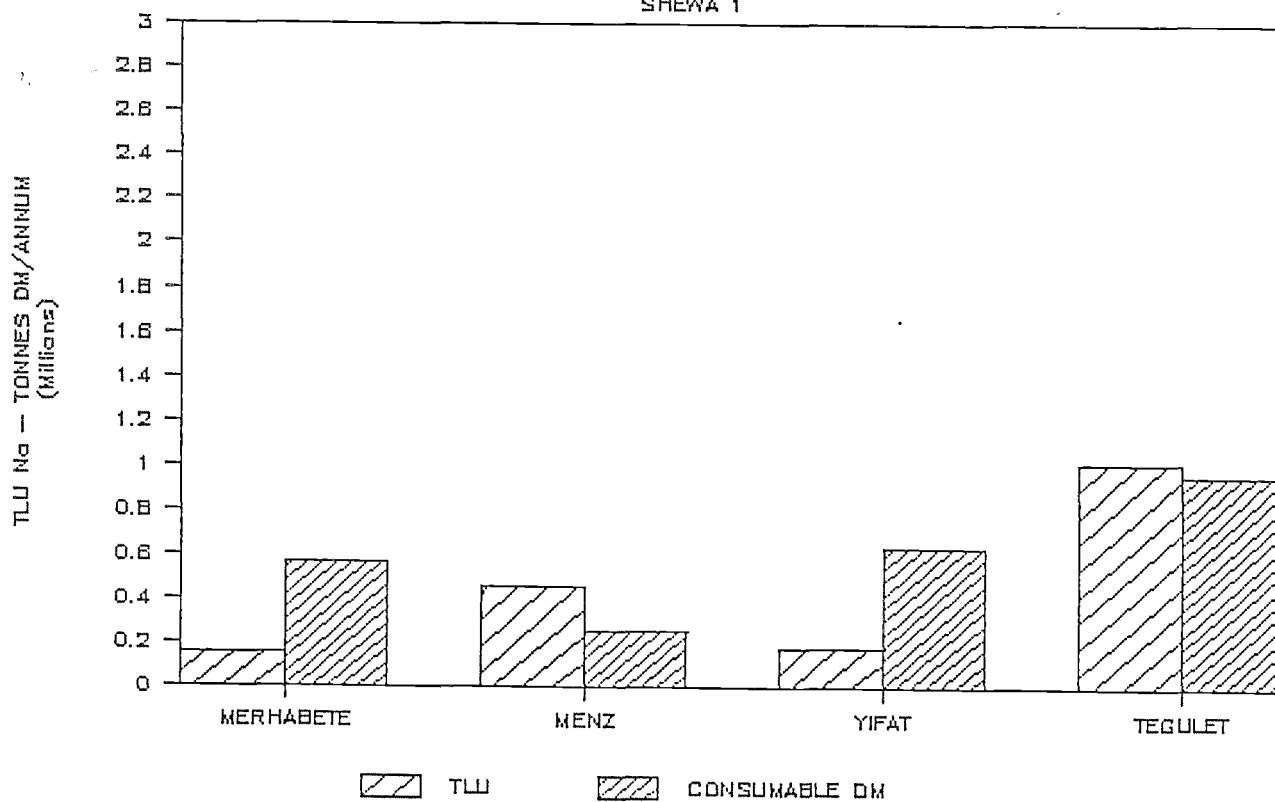
TLU & CONSUMABLE DRY MATTER

SHEWA 2
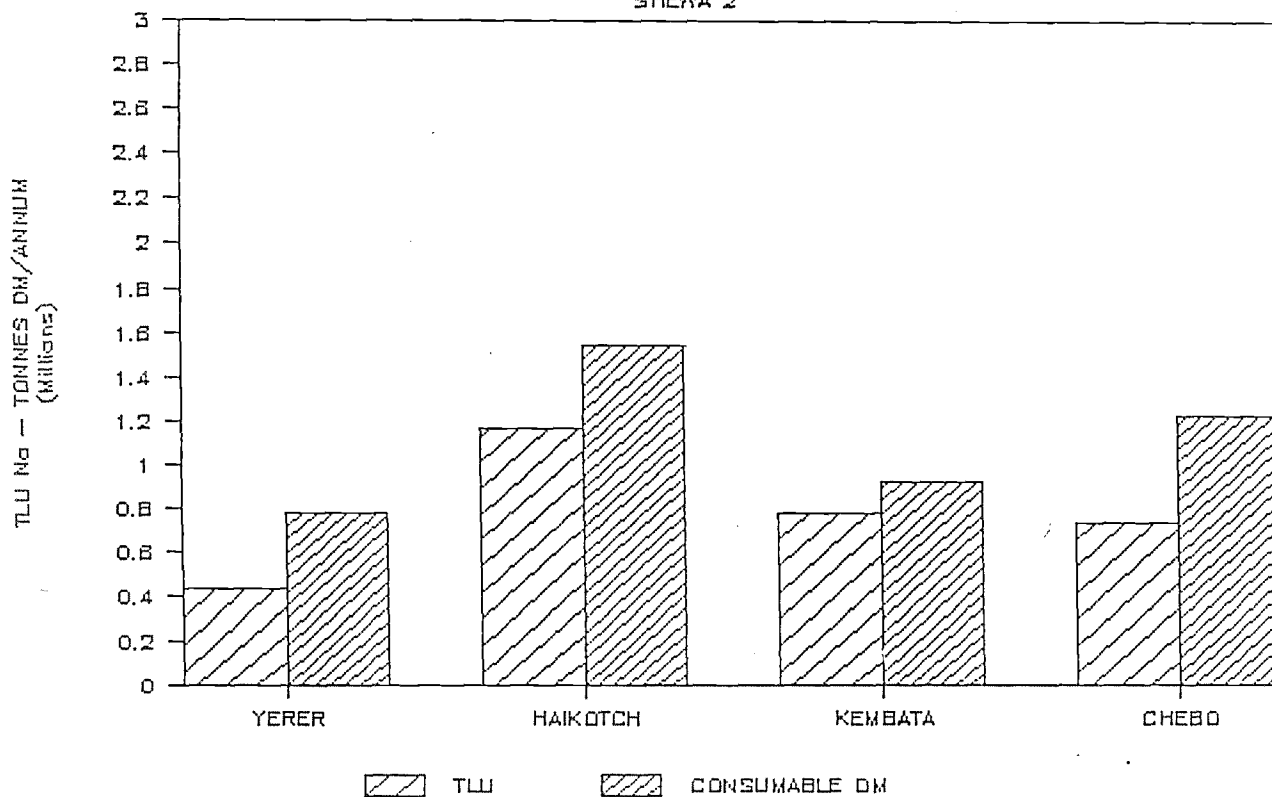
TLU & CONSUMABLE DRY MATTER

SHEWA 3
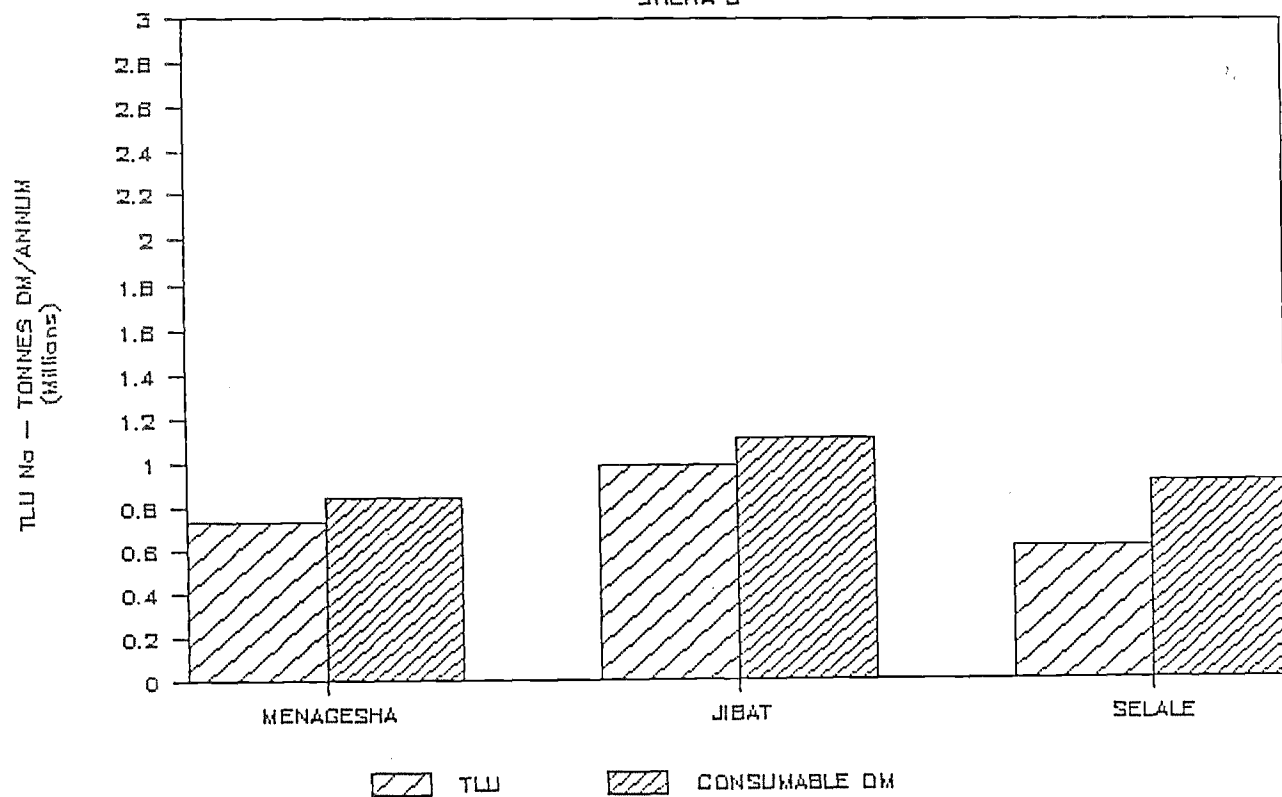
TLU & CONSUMABLE DRY MATTER
SIDAMO 1

WOLAYITA SIDAMA JEMJEM

TLU CONSUMABLE DM

TLU & CONSUMABLE DRY MATTER
SIDAMO 2

BORENA ARERO GEDIO
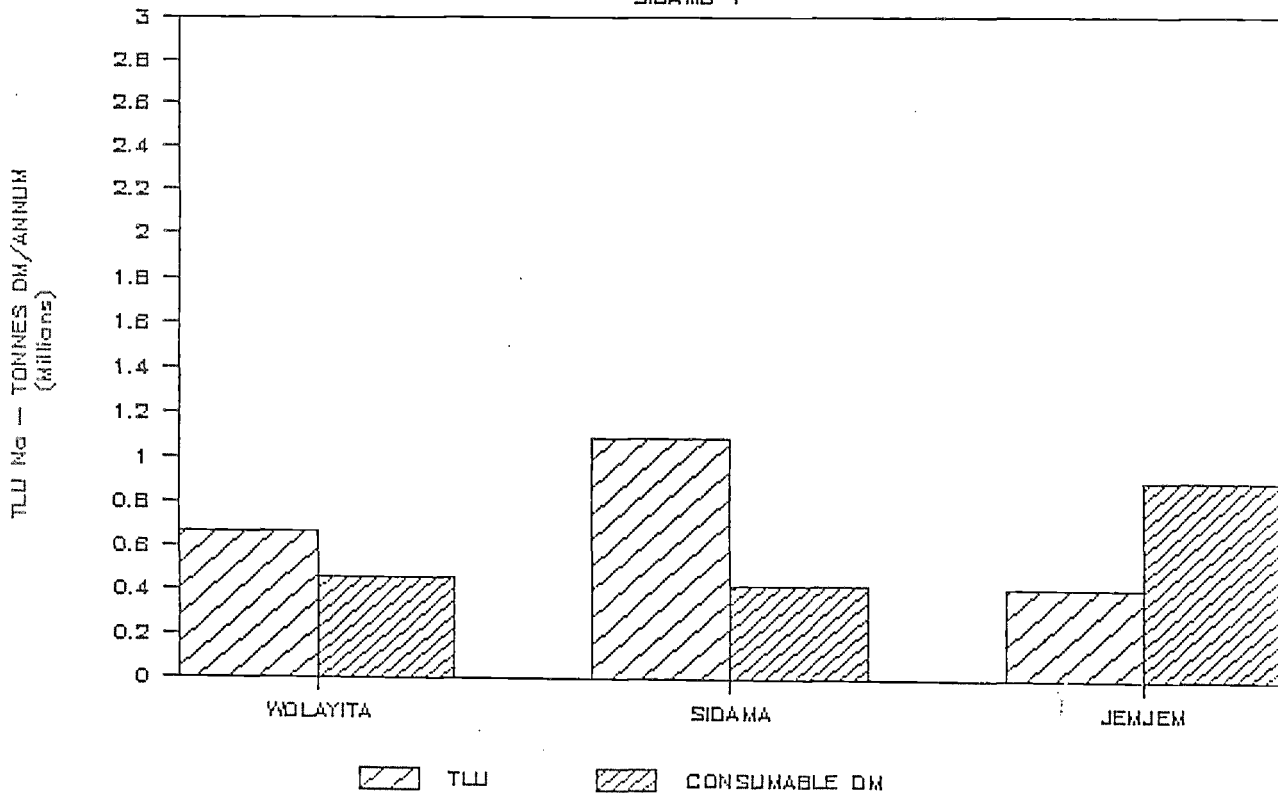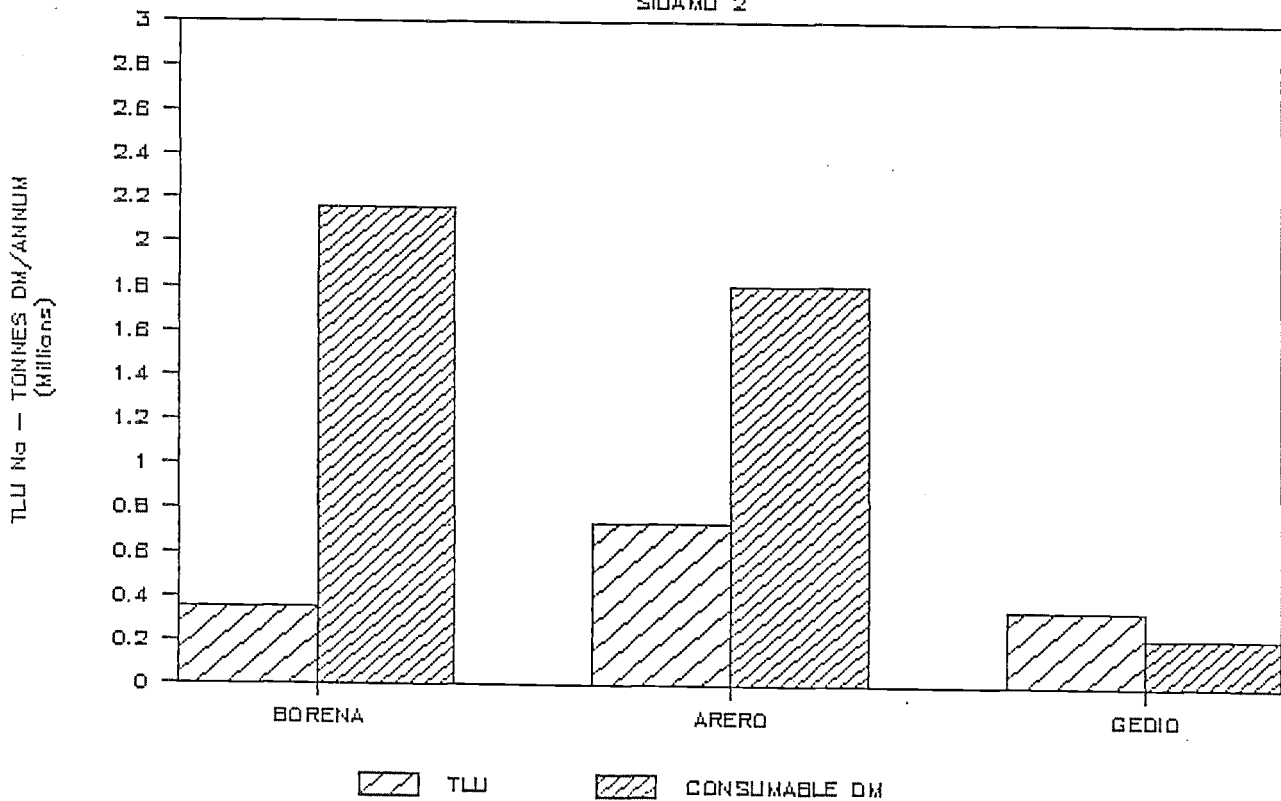
TLU CONSUMABLE DM

TLU & CONSUMABLE DRY MATTER

TIGRAY & ERITREA

TLU No — TONNES DM/ANNUM (Millions)

TIGRAY   ERITREA

▨ TLU   ▨ CONSUMABLE DM

TLU & CONSUMABLE DRY MATTER

WELEGA 1

TLU No — TONNES DM/ANNUM (Millions)

HURO GODURU   NEKEMTE   ARJO
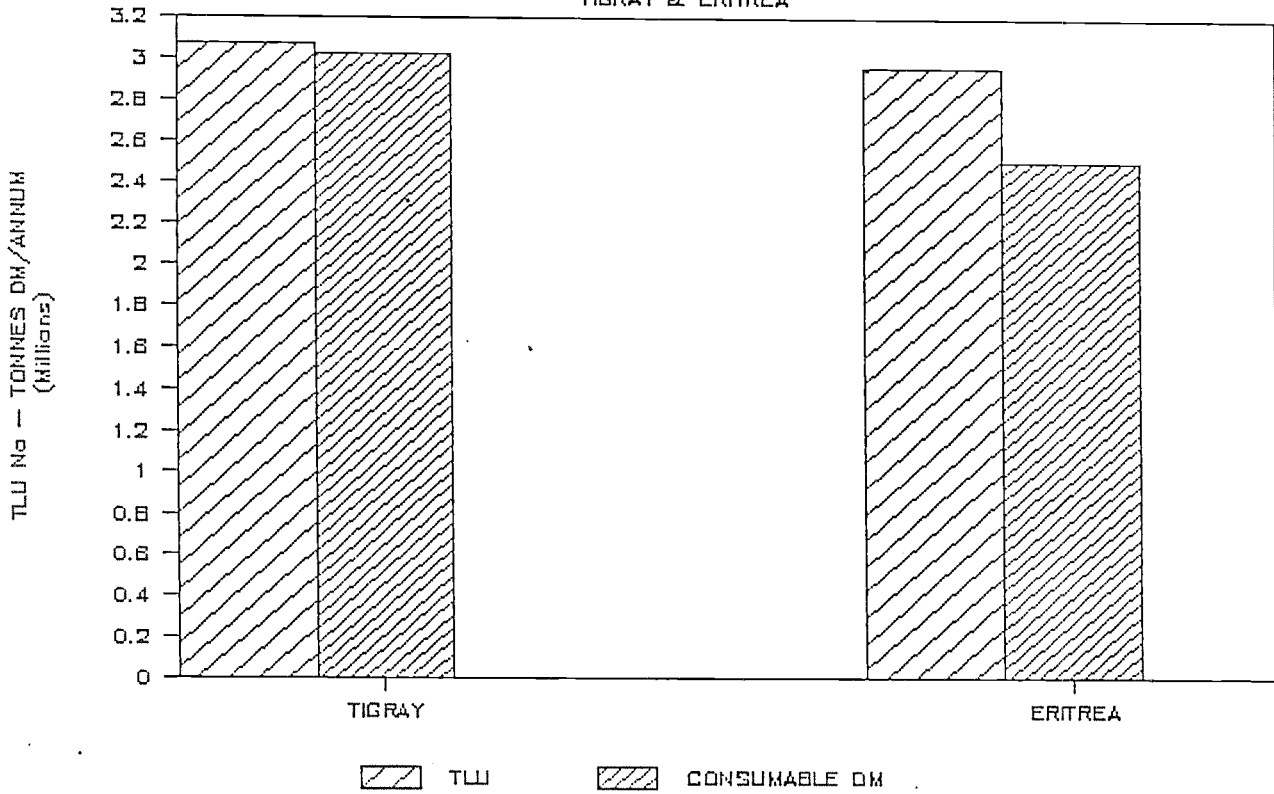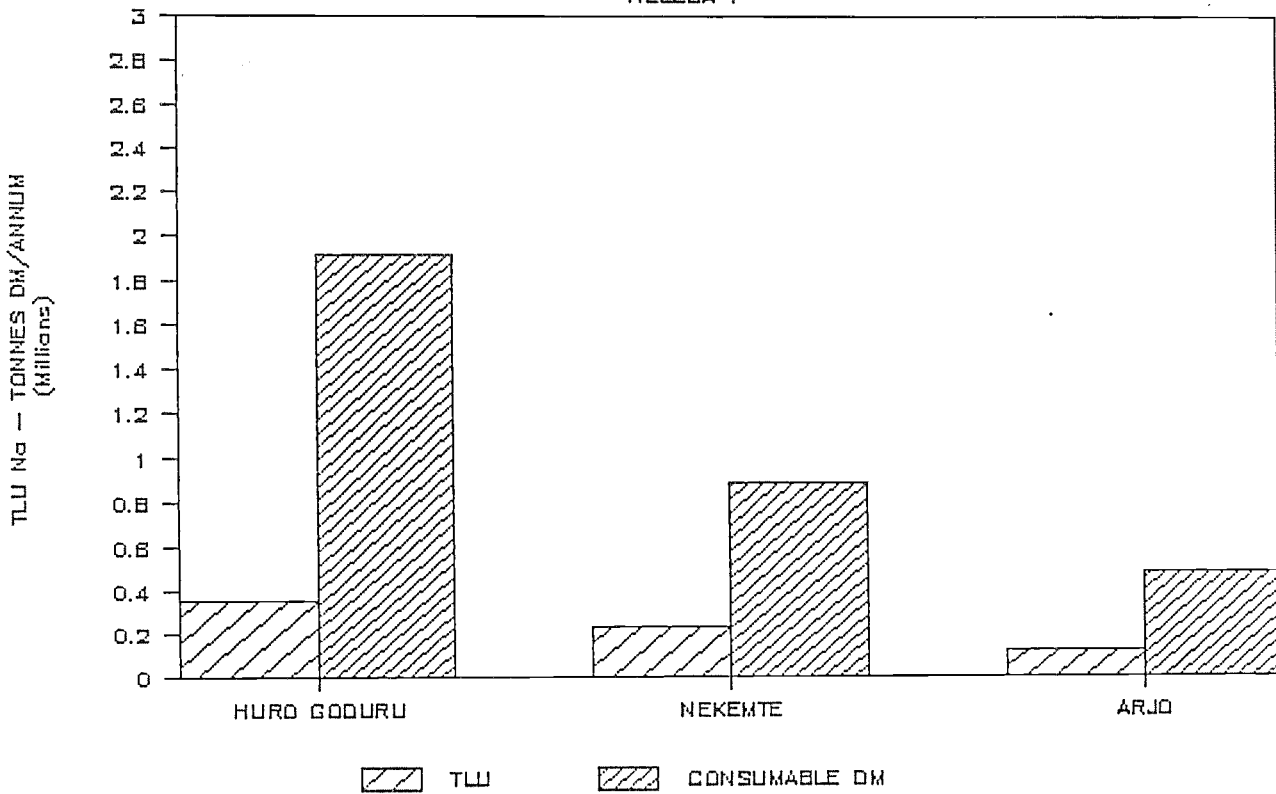
▨ TLU   ▨ CONSUMABLE DM

TLU & CONSUMABLE DRY MATTER
WELO 2
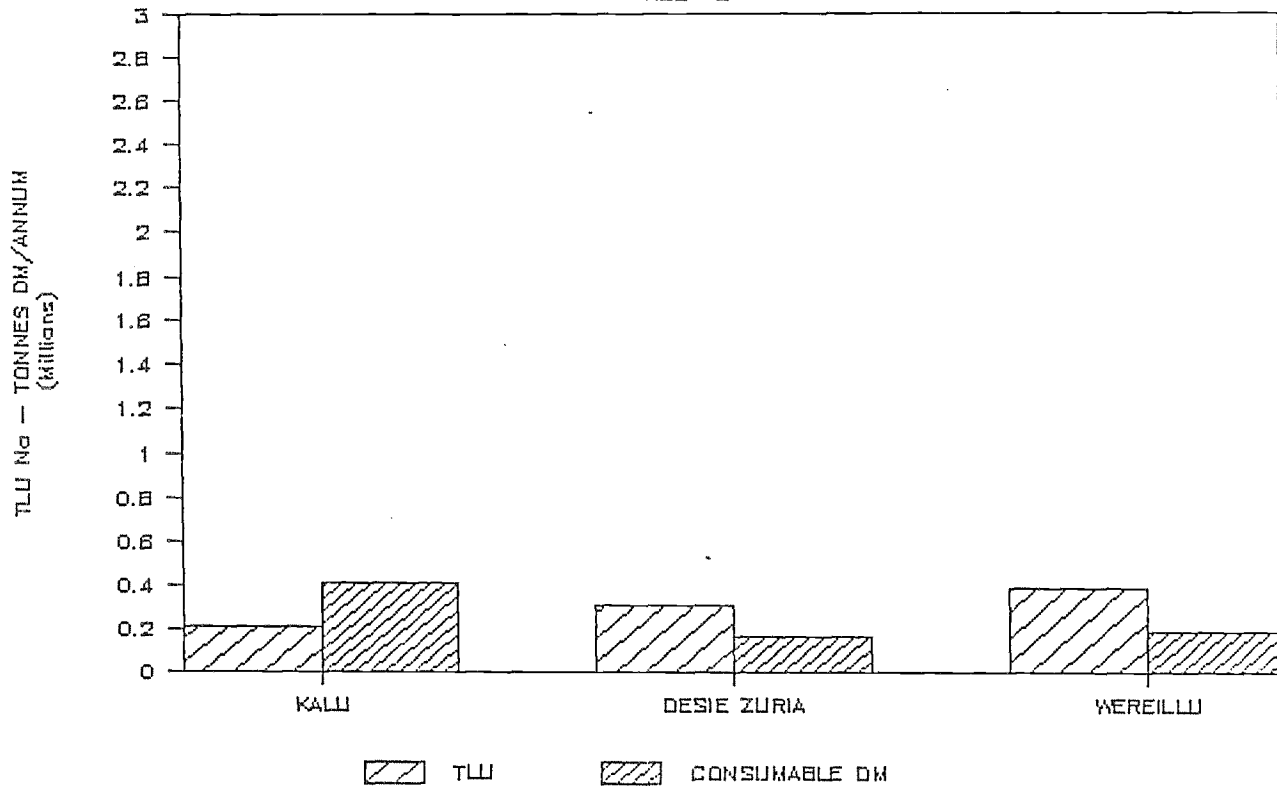
TLU & CONSUMABLE DRY MATTER
WELO 3
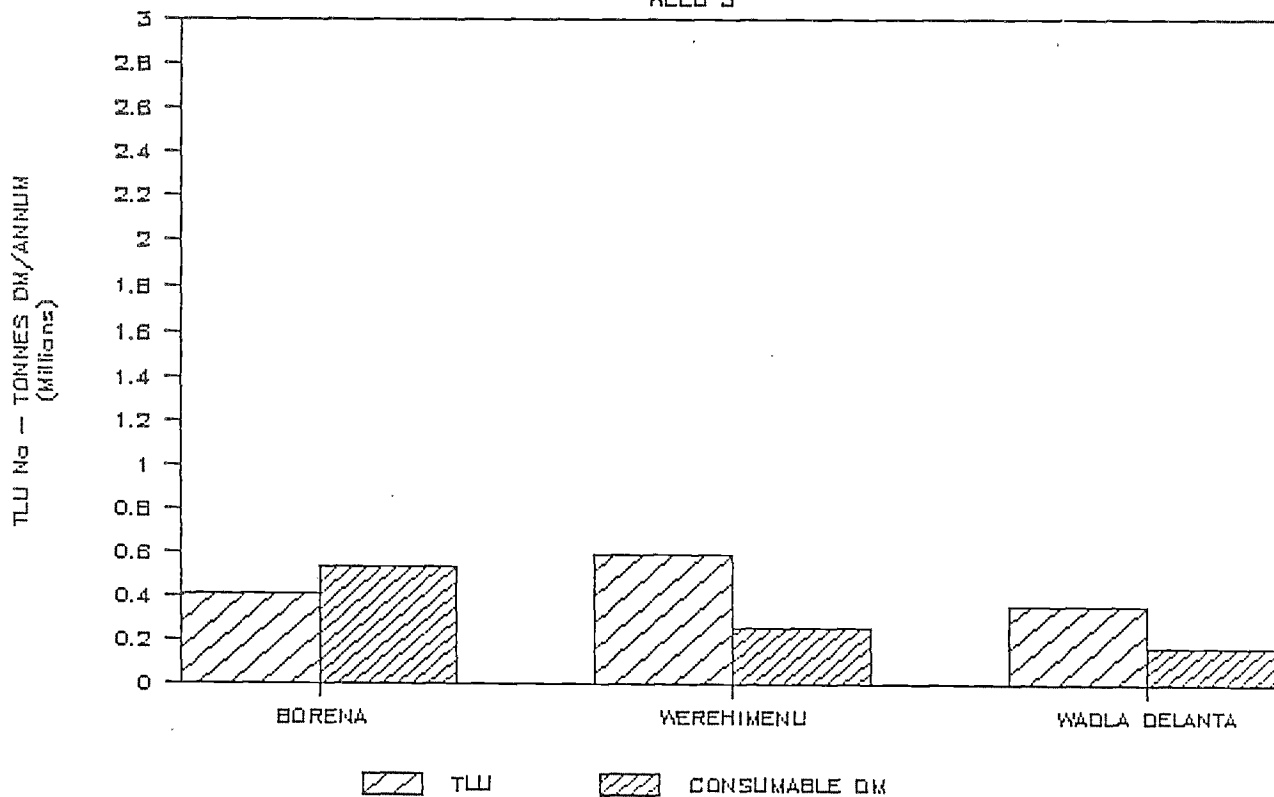
TLU & CONSUMABLE DRY MATTER

WELEGA 2
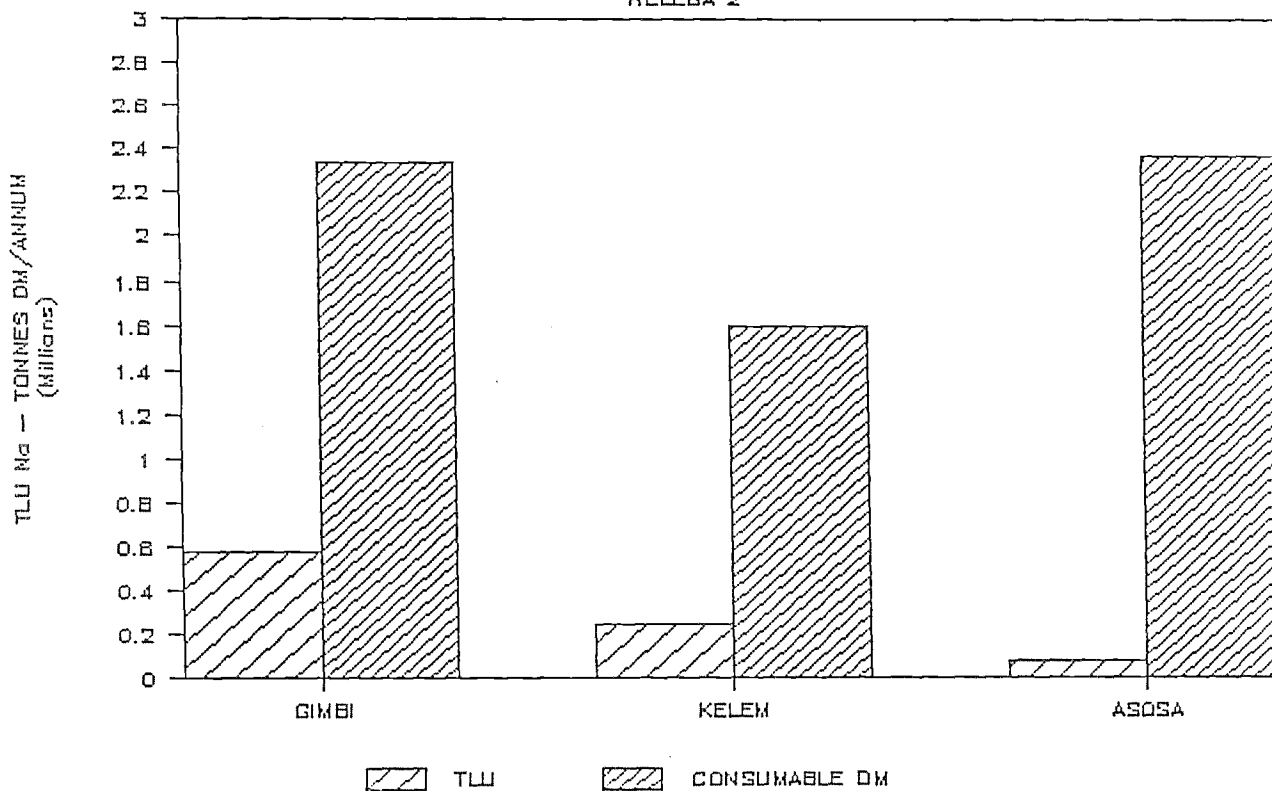
TLU & CONSUMABLE DRY MATTER

WELO 1
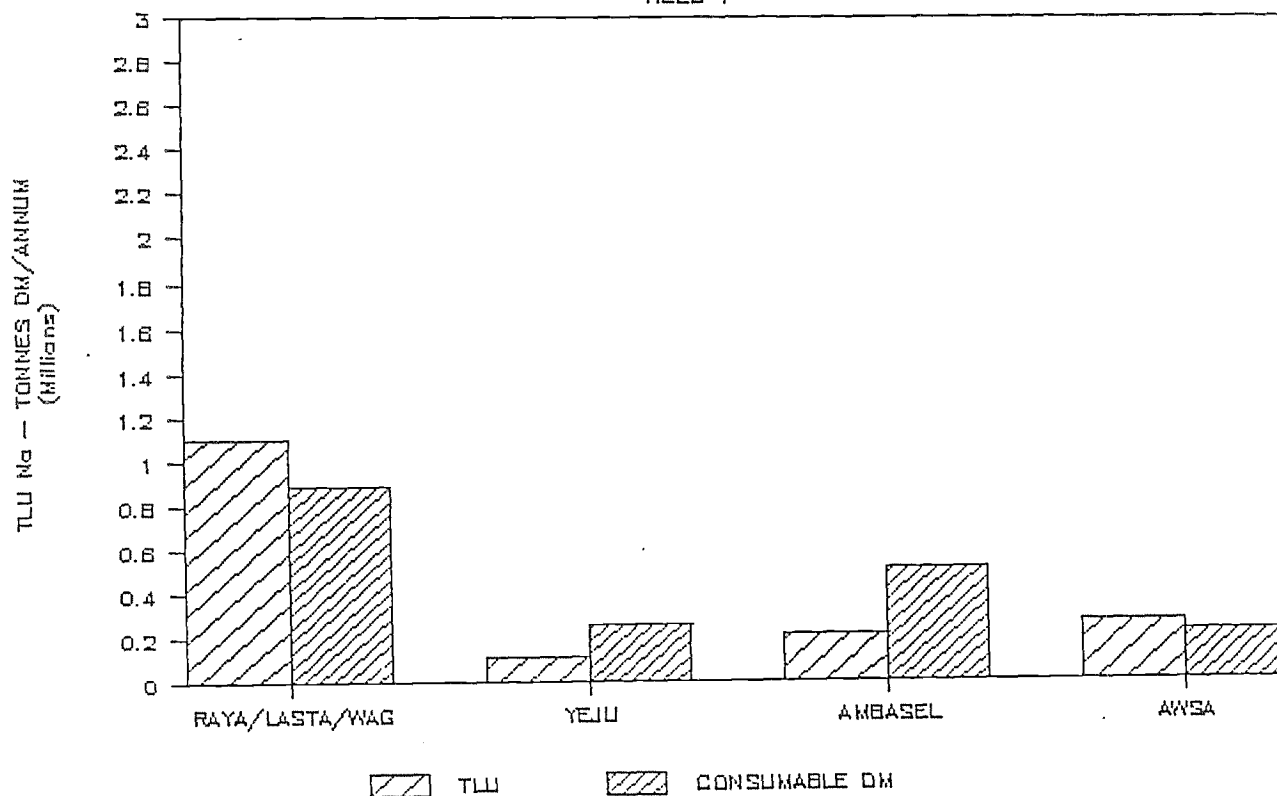
CURRENT FORAGE AVAILABILITY

CURRENT FORAGE AVAILABILITY
ARSI
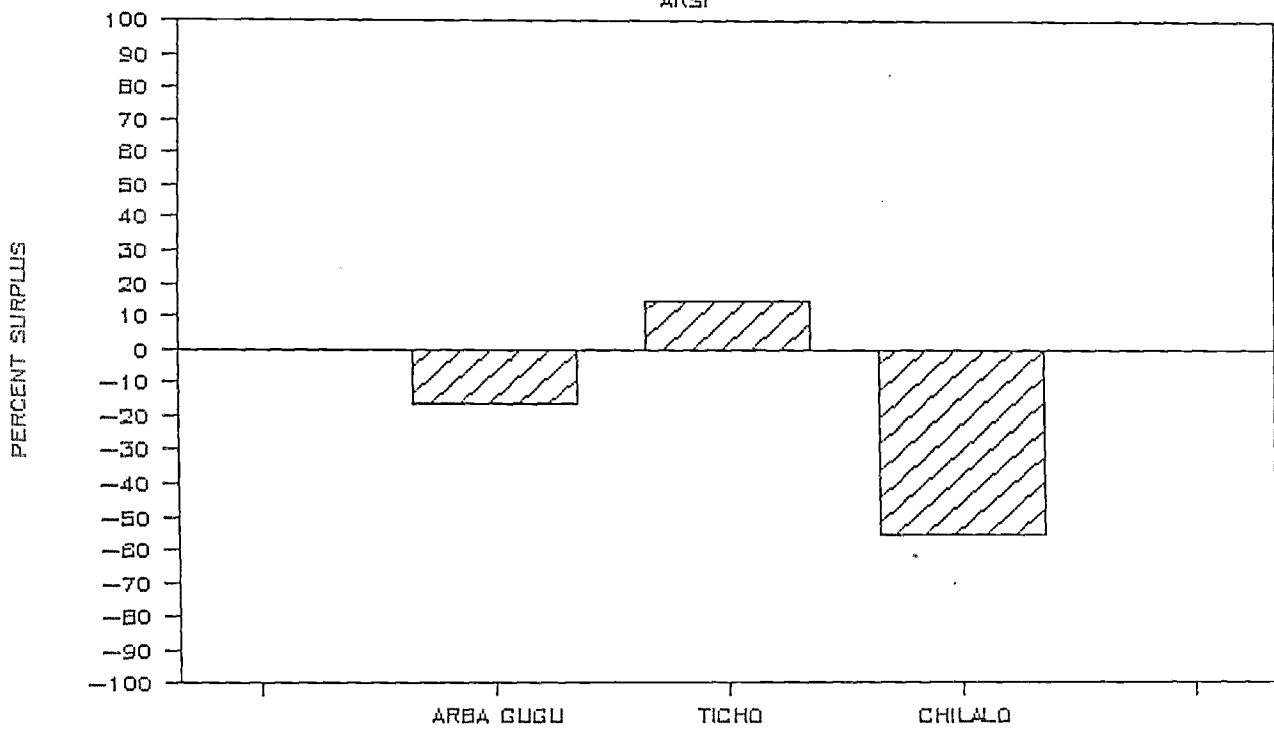
CURRENT FORAGE AVAILABILITY
BALE
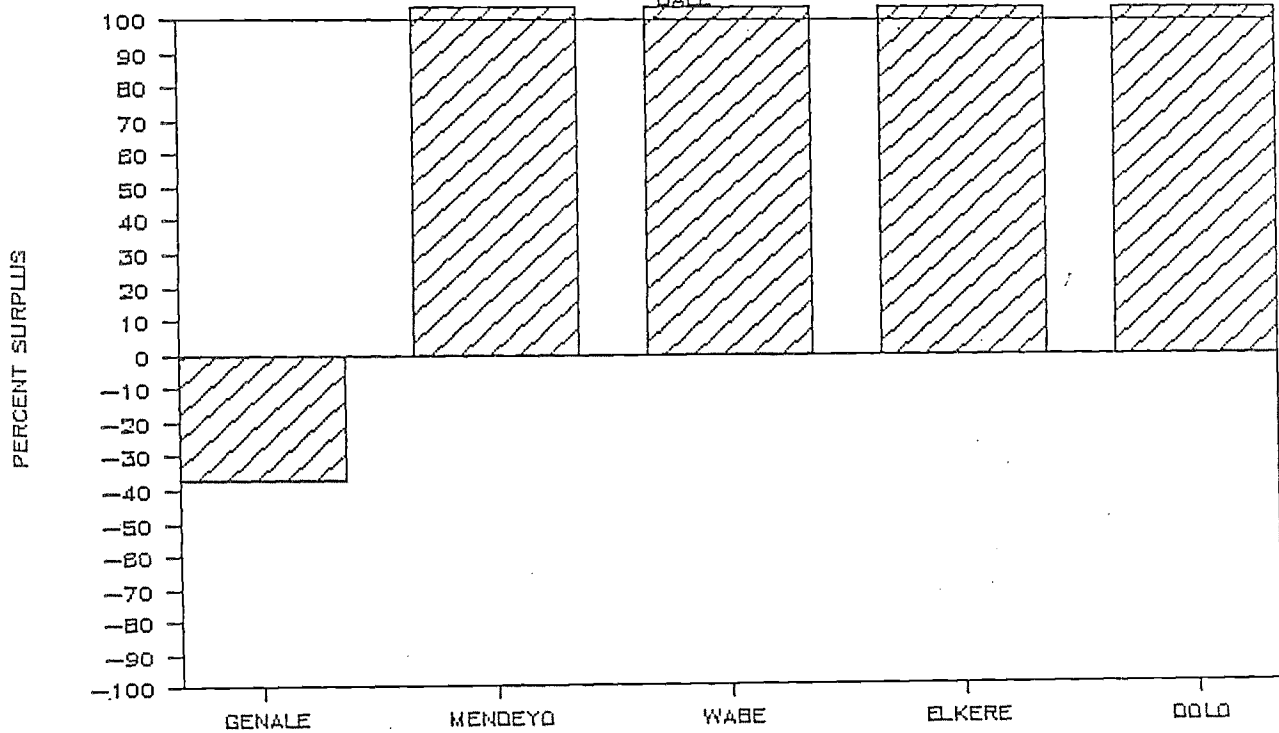
CURRENT FORAGE AVAILABILITY

ERITREA & TIGRAY
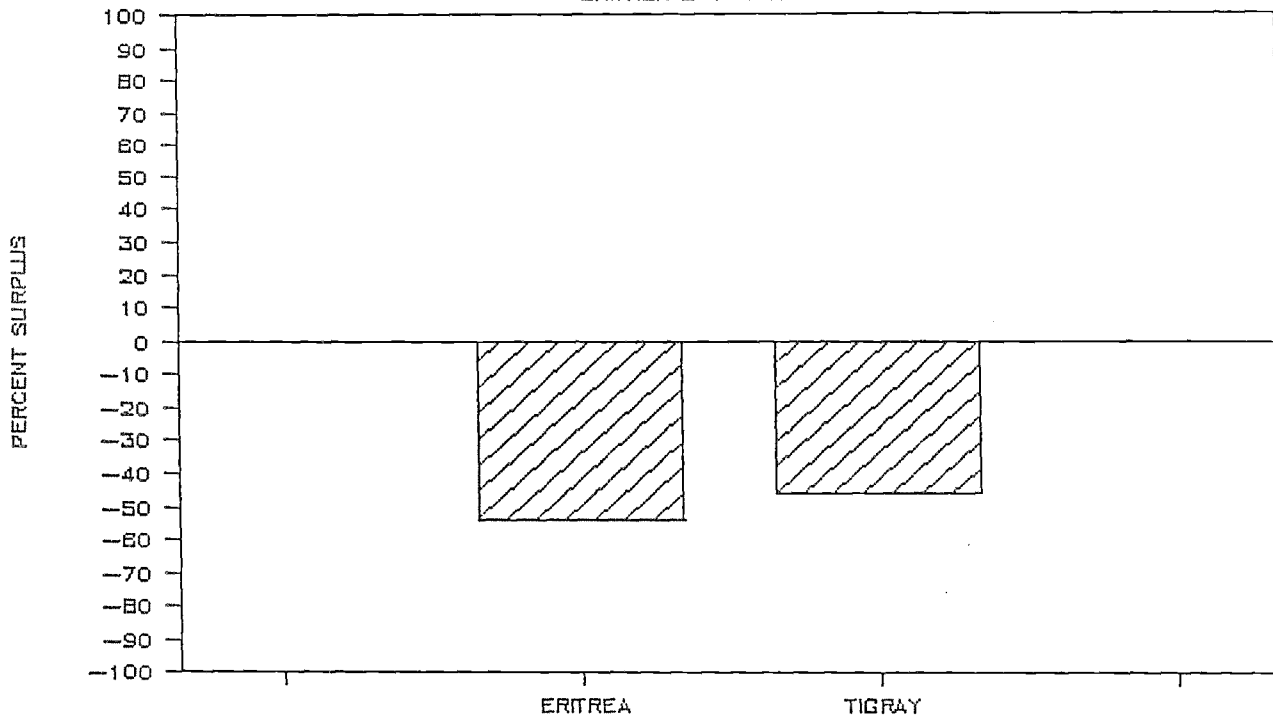
CURRENT FORAGE AVAILABILITY

GAMO GOFA
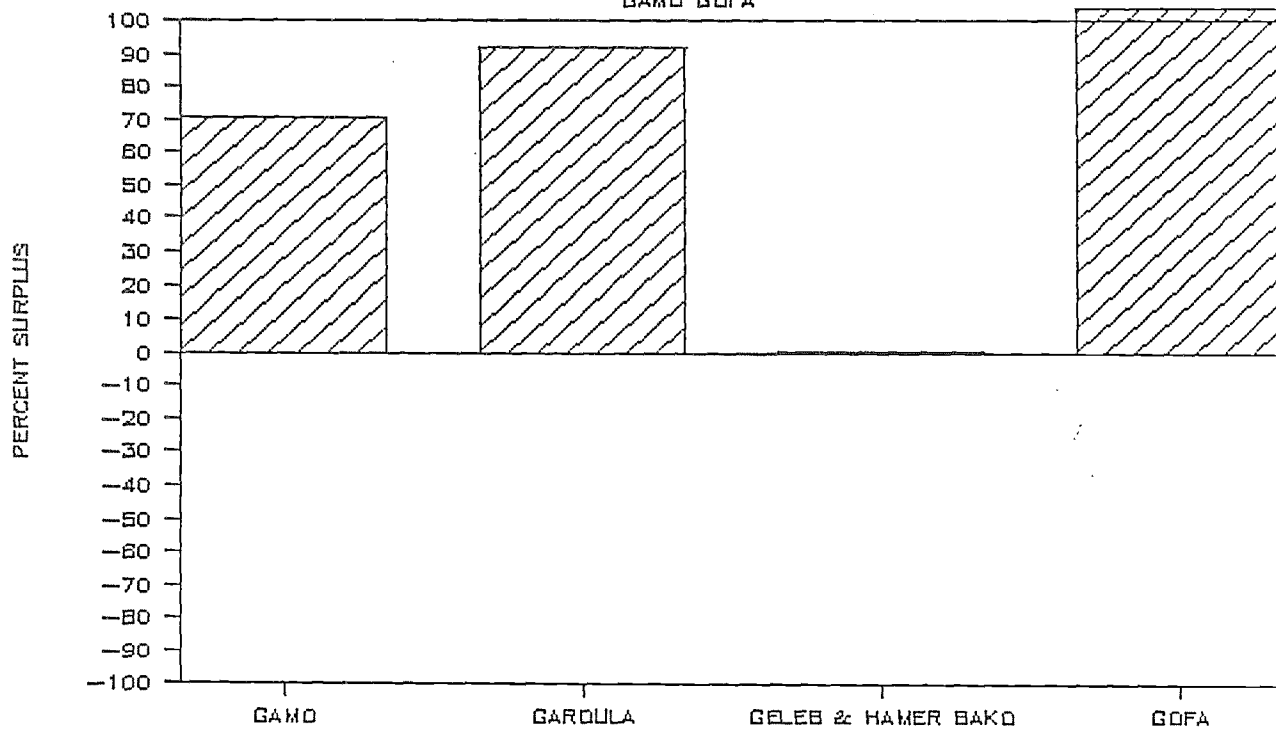
CURRENT FORAGE AVAILABILITY

GOJAM
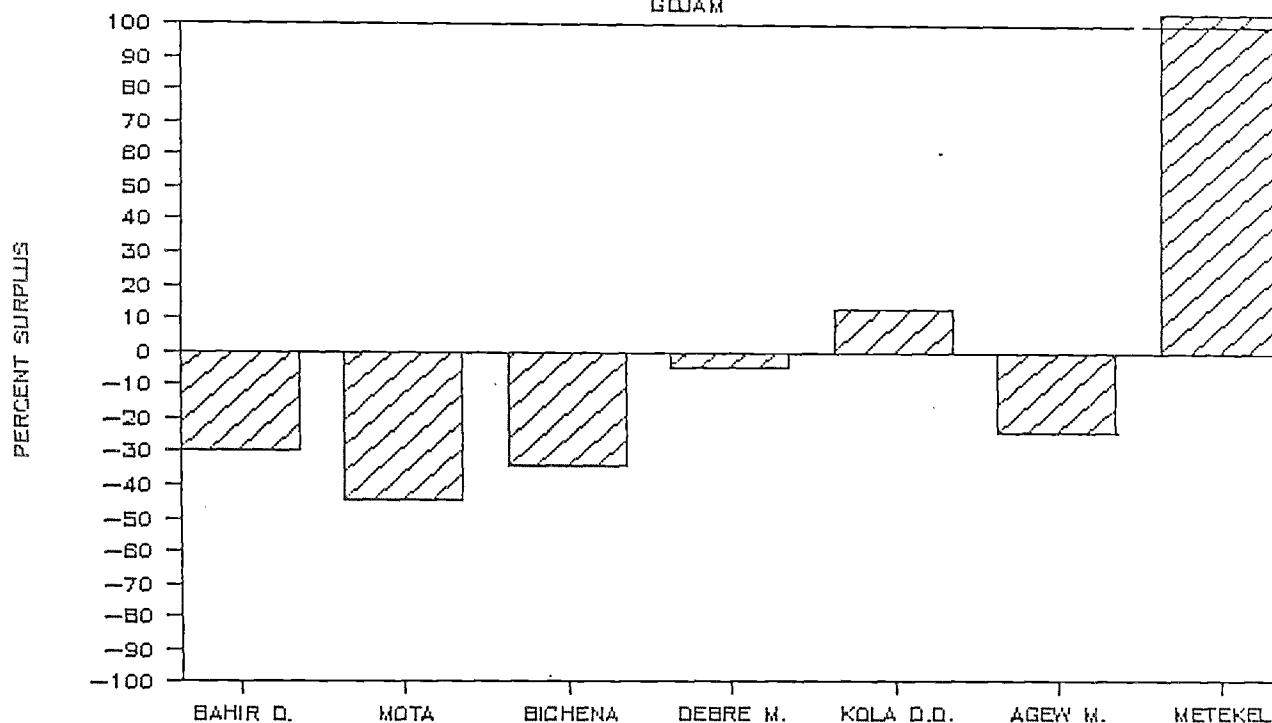
CURRENT FORAGE AVAILABILITY

GONDER

CURRENT FORAGE AVAILABILITY

HARERGE 1

CURRENT FORAGE AVAILABILITY

HARERGE 2

CURRENT FORAGE AVAILABILITY

ILUBABOR

PERCENT SURPLUS

SOR & GEBA   BUNO   GORE   MOCHA   GAMBELA

CURRENT FORAGE AVAILABILITY

KEFA

PERCENT SURPLUS

LIMU   JIMA   KULO K.   KEFA   MAJI   GIMIRA

CURRENT FORAGE AVAILABILITY
SHEWA 1

CURRENT FORAGE AVAILABILITY
SHEWA 2

CURRENT FORAGE AVAILABILITY

SIDAMO

CURRENT FORAGE AVAILABILITY

WELEGA

CURRENT FORAGE AVAILABILITY

WELO 1

CURRENT FORAGE AVAILABILITY

WELO 2

PROJECTED FUELWOOD AVAILABILITY

PROJECTED FUELWOOD AVAILABILITY
ARSI

CUBIC METRES/ANNUM (Millions)

ARBA GUGU   TICHO   CHILALO

☒ 1985   ☒ 1995   ☒ 2010

PROJECTED FUELWOOD AVAILABILITY
BALE

CUBIC METRES/ANNUM (Millions)

GENALE   MENDEYO   WABE   ELKERE   DOLO

☒ 1985   ☒ 1995   ☒ 2010
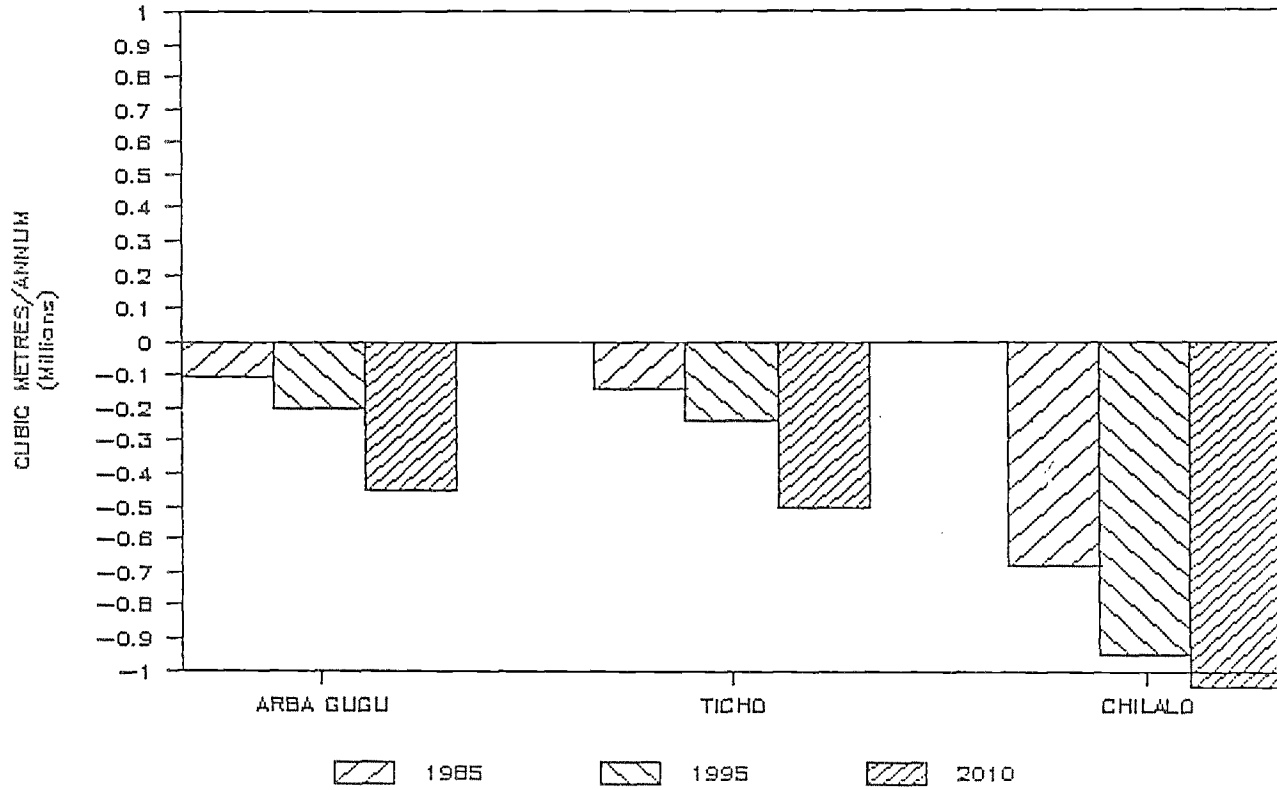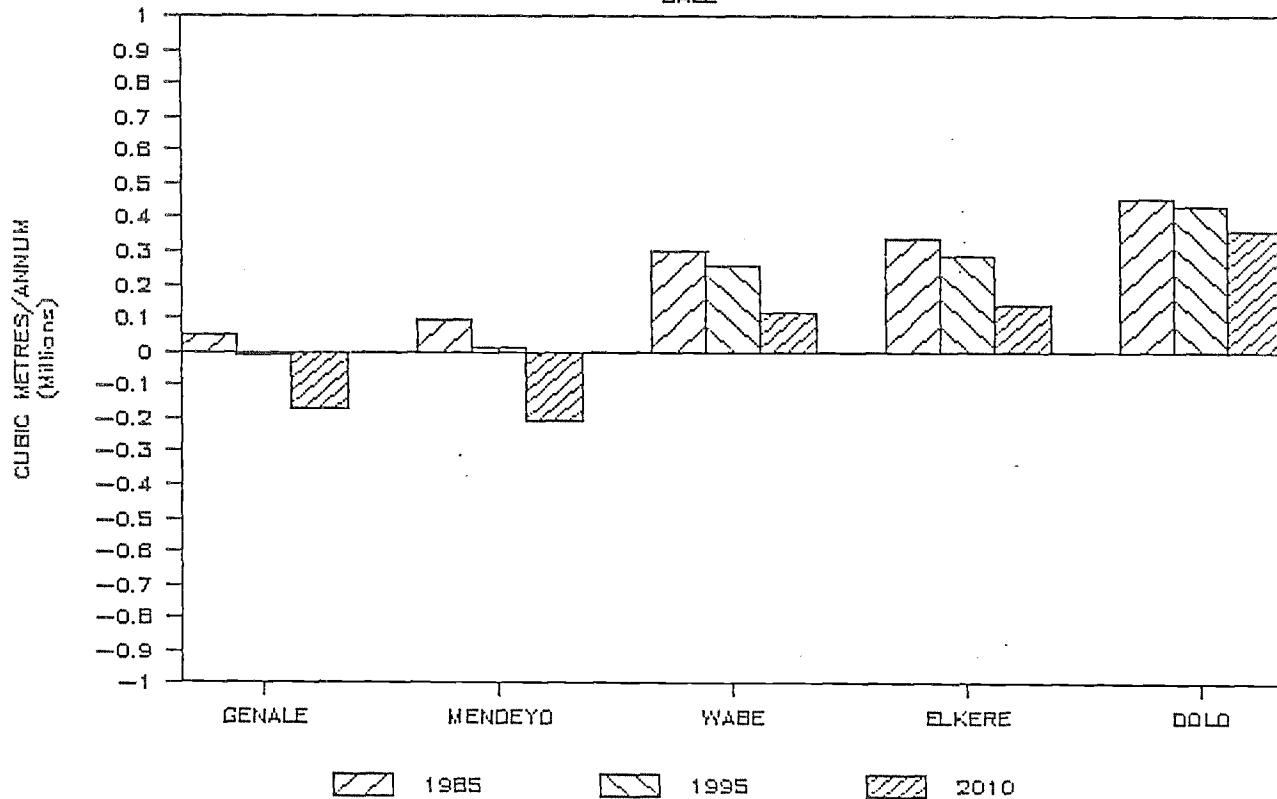
PROJECTED FUELWOOD AVAILABILITY
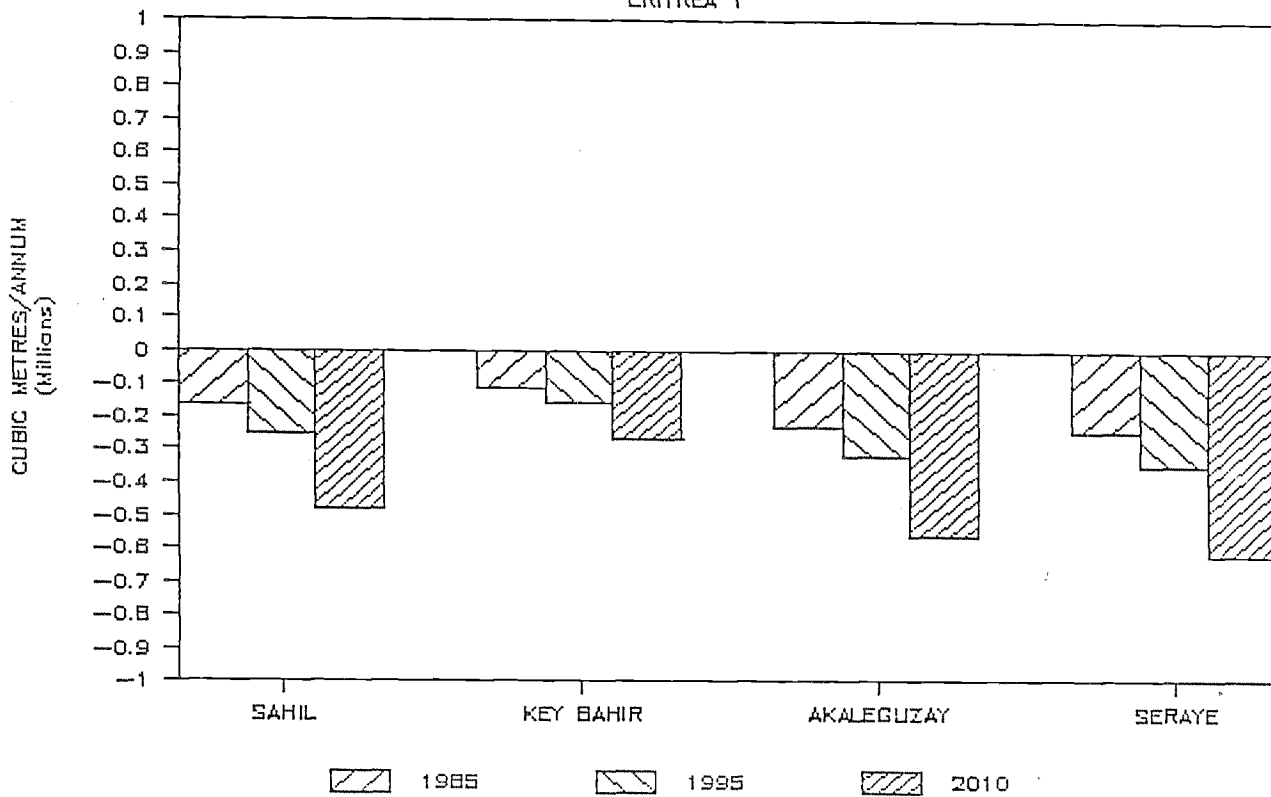
ERITREA 1

PROJECTED FUELWOOD AVAILABILITY

ERITREA 2

PROJECTED FUELWOOD AVAILABILITY

GAMO GOFA
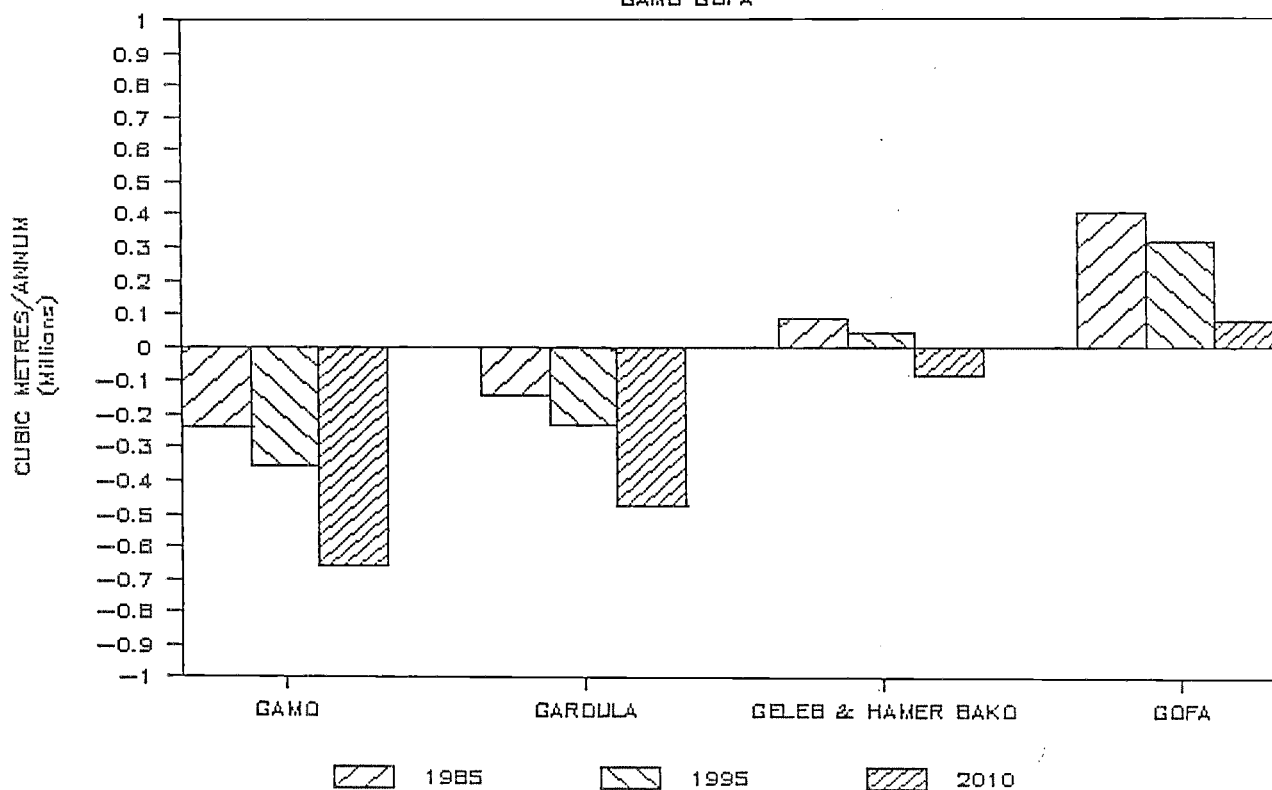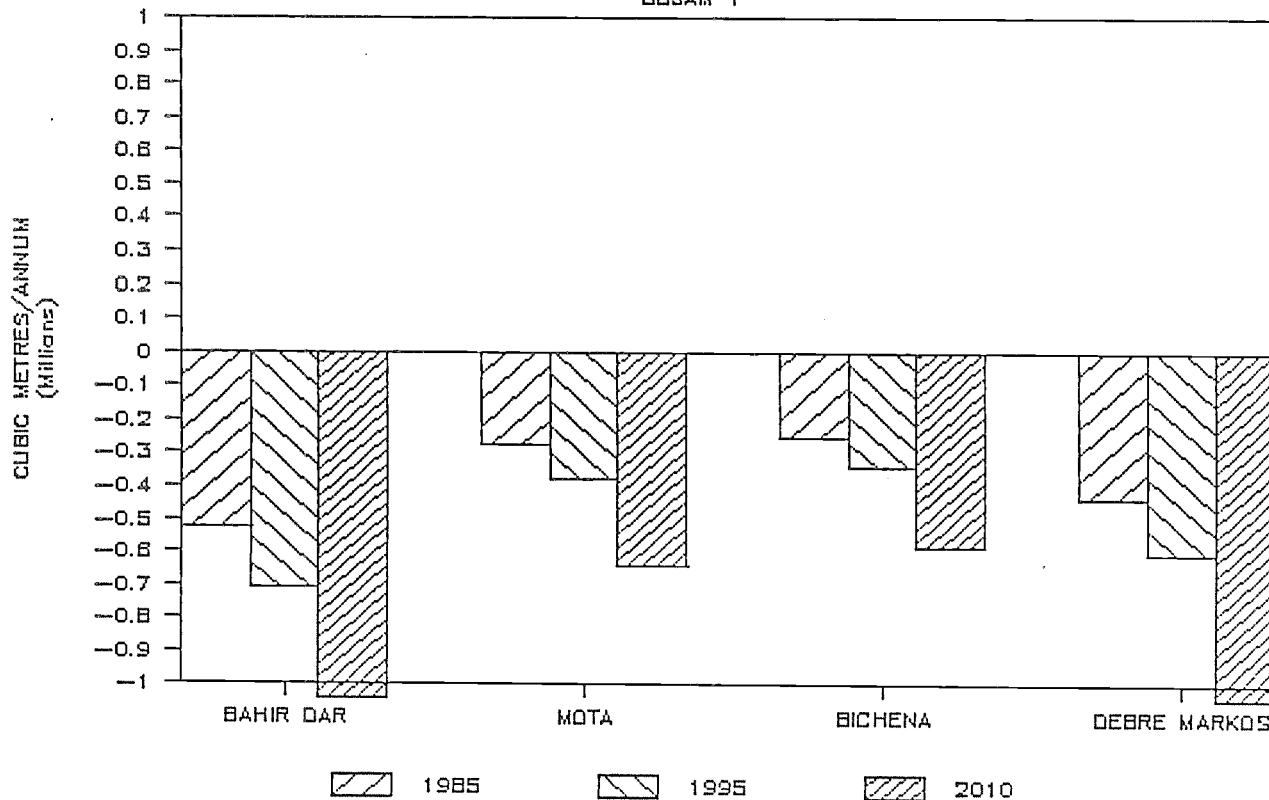
CUBIC METRES/ANNUM (Millions)

GAMO   GARDULA   GELEB & HAMER BAKO   GOFA

1985   1995   2010

PROJECTED FUELWOOD AVAILABILITY

GOJAM 1

CUBIC METRES/ANNUM (Millions)

BAHIR DAR   MOTA   BICHENA   DEBRE MARKOS

1985   1995   2010

PROJECTED FUELWOOD AVAILABILITY

GOJAM 2

KOLA DEGA DAMOT   AGEW MIDIR   METEKEL

1985   1995   2010

PROJECTED FUELWOOD AVAILABILITY

GONDER 2

DEBRE TABOR   GONDAR   CHILGA

1985   1995   2010
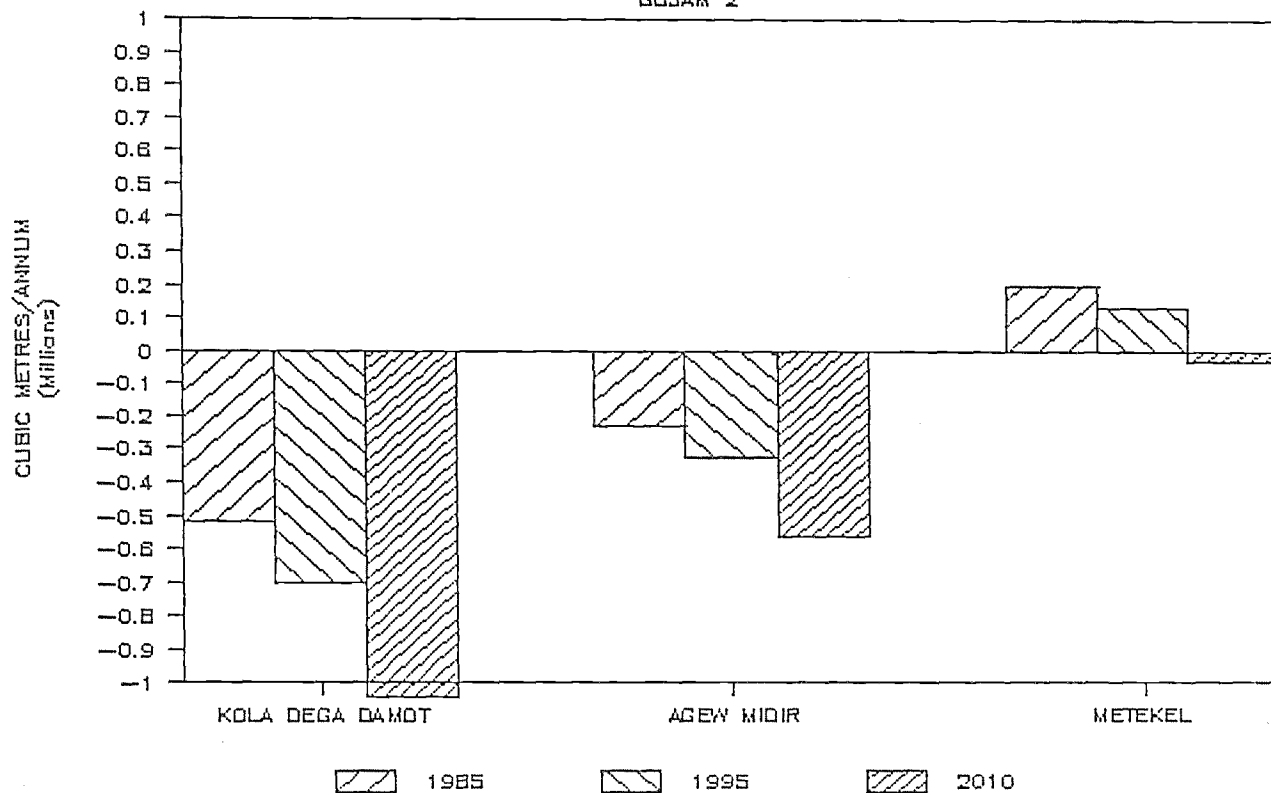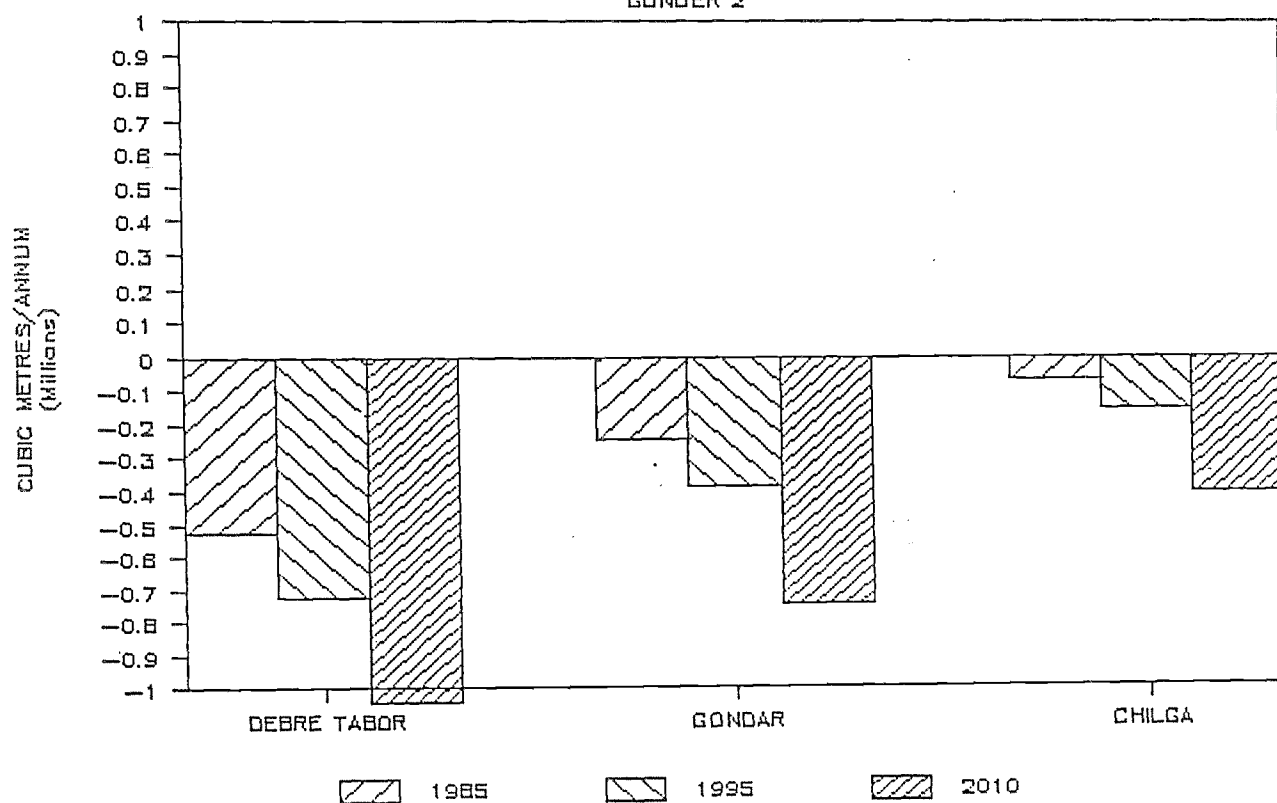
PROJECTED FUELWOOD AVAILABILITY

GONDER 1
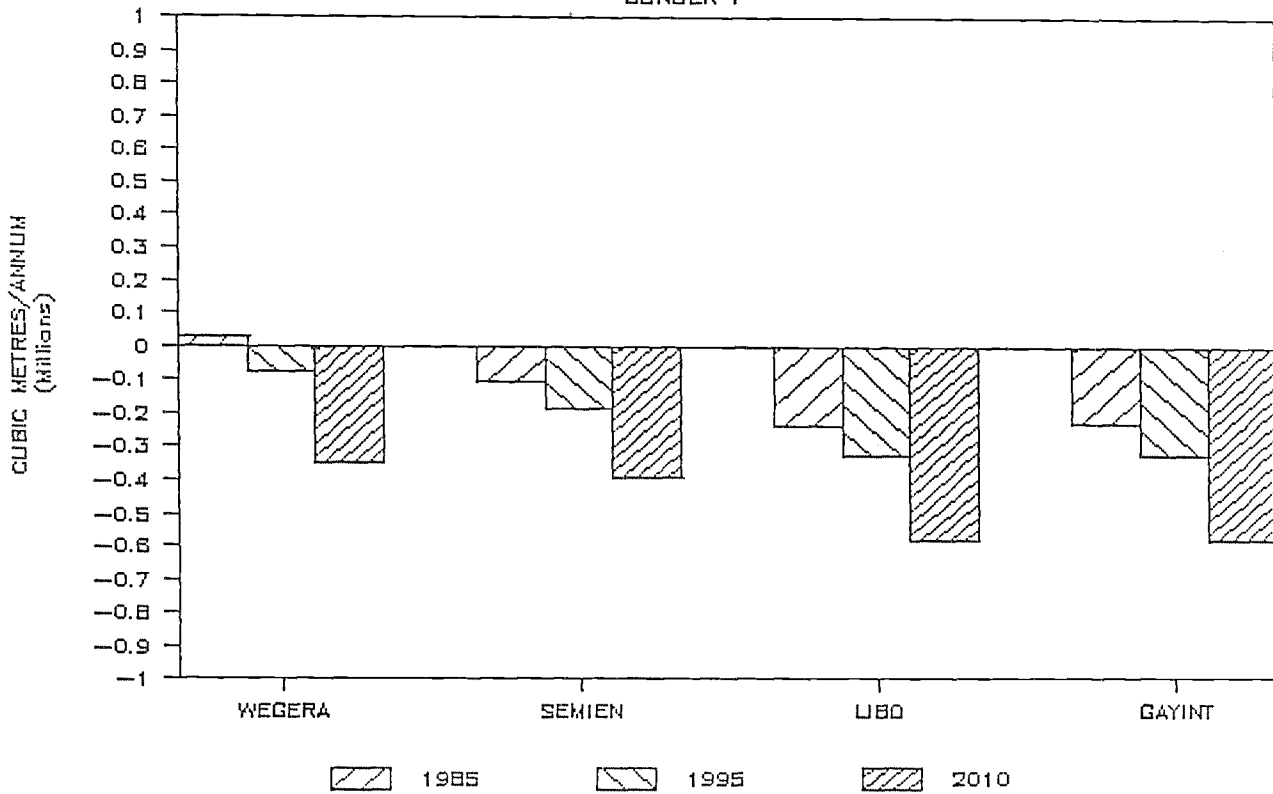
PROJECTED FUELWOOD AVAILABILITY
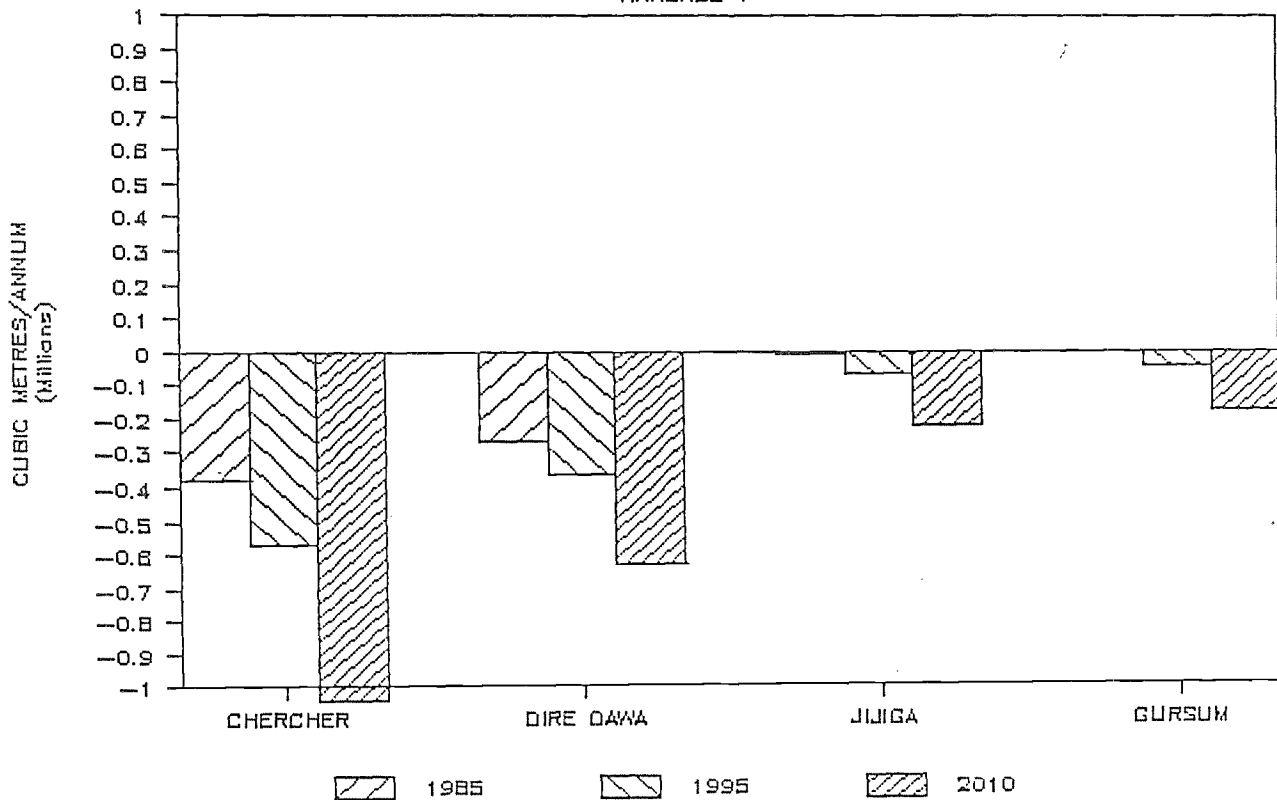
HARERGE 1

PROJECTED FUELWOOD AVAILABILITY
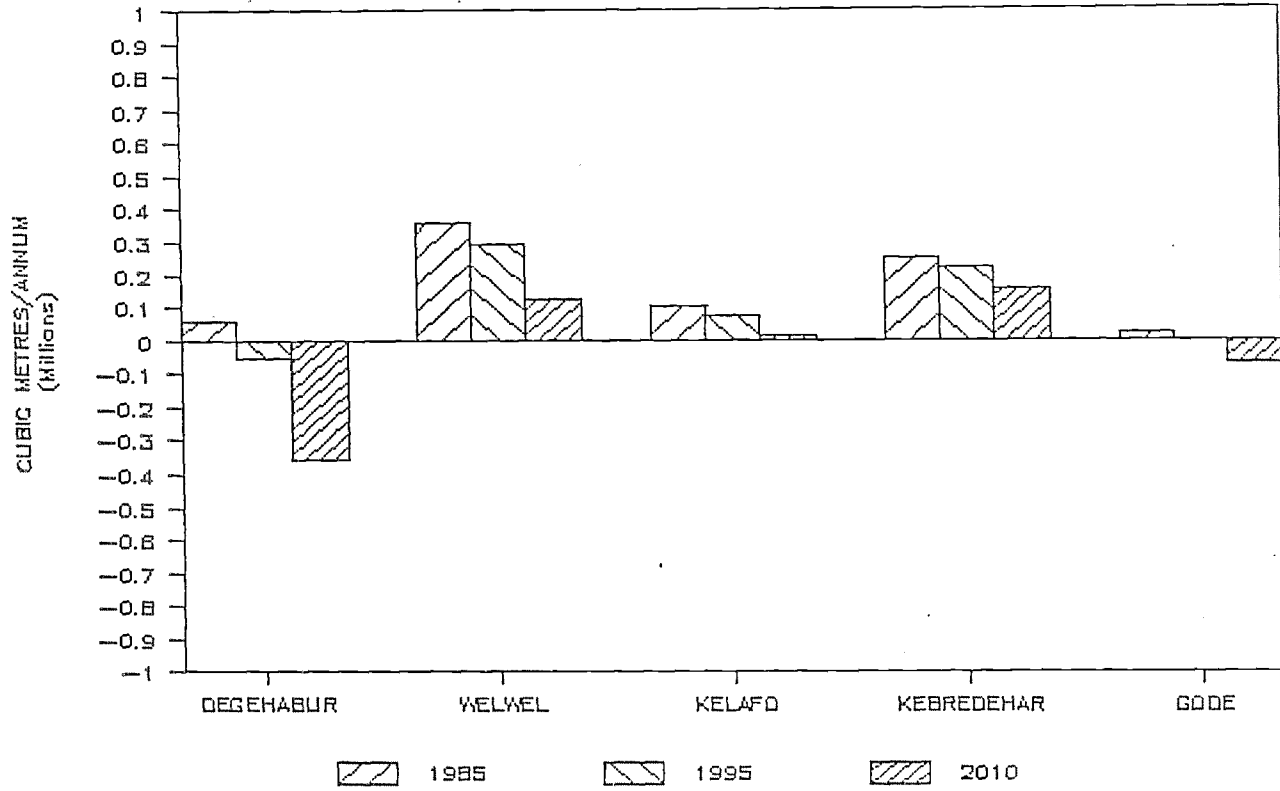
HARERGE 2

PROJECTED FUELWOOD AVAILABILITY

HARERGE 3
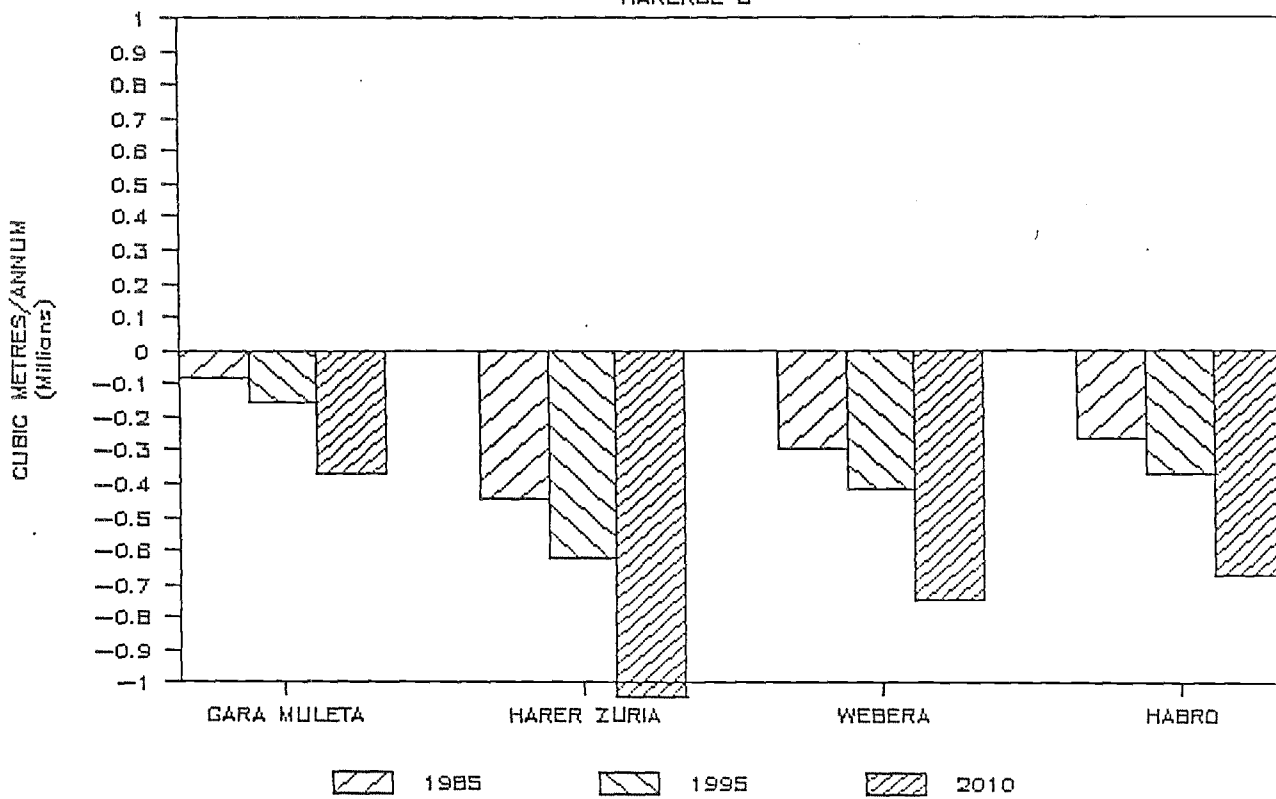
PROJECTED FUELWOOD AVAILABILITY

ILUBABOR
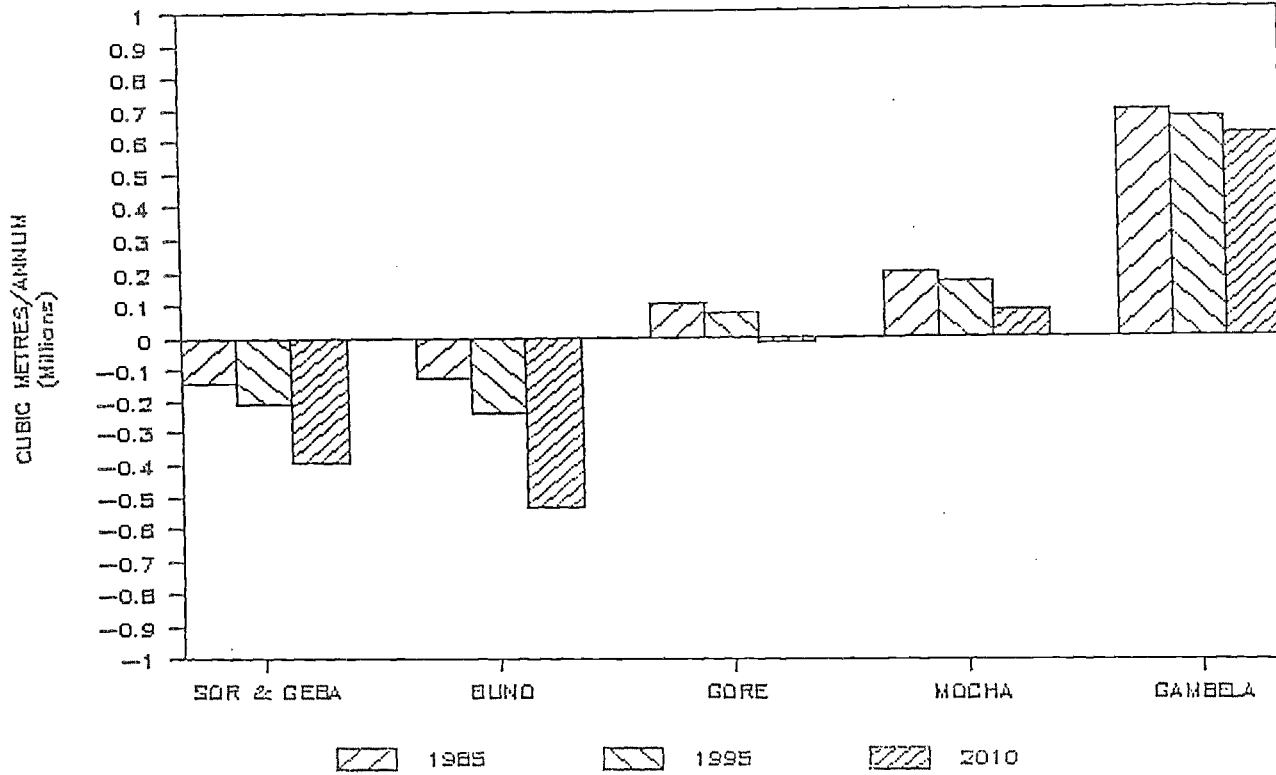
PROJECTED FUELWOOD AVAILABILITY

KEFA 1
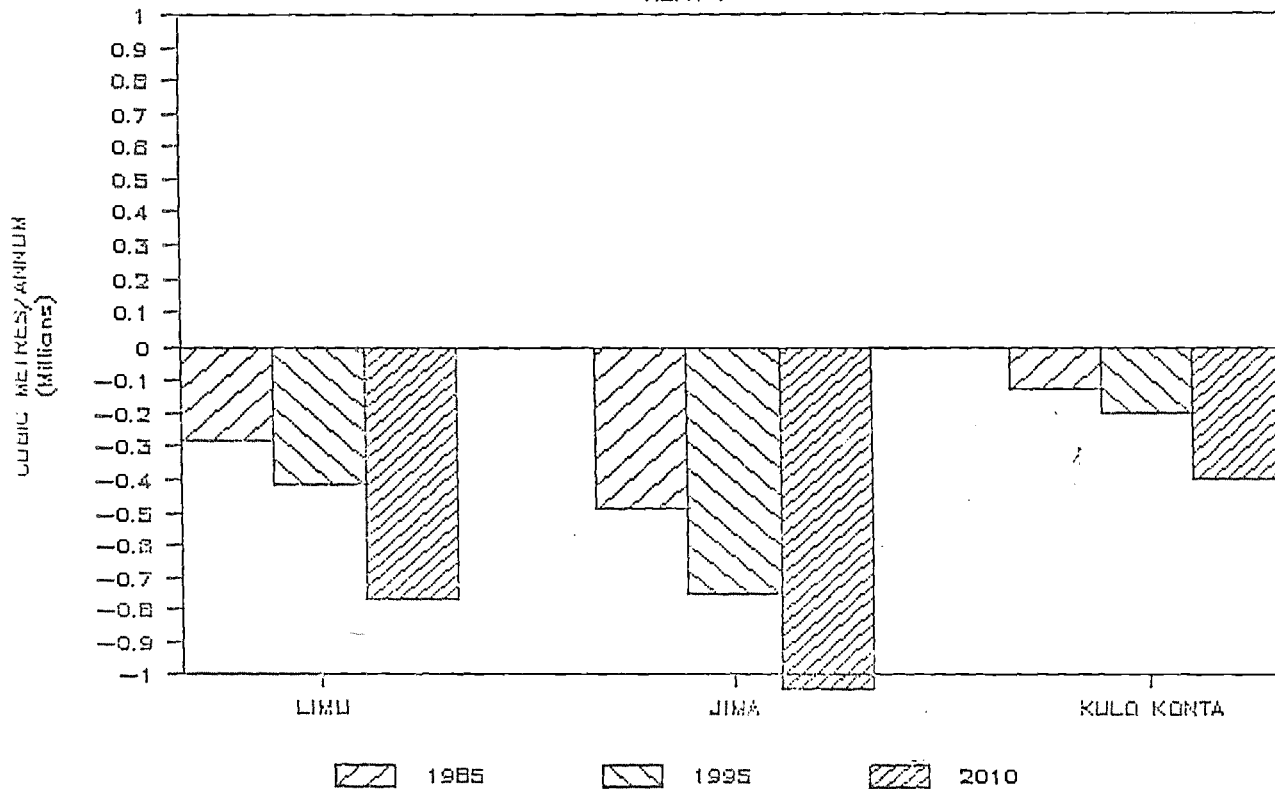
PROJECTED FUELWOOD AVAILABILITY

KEFA 2
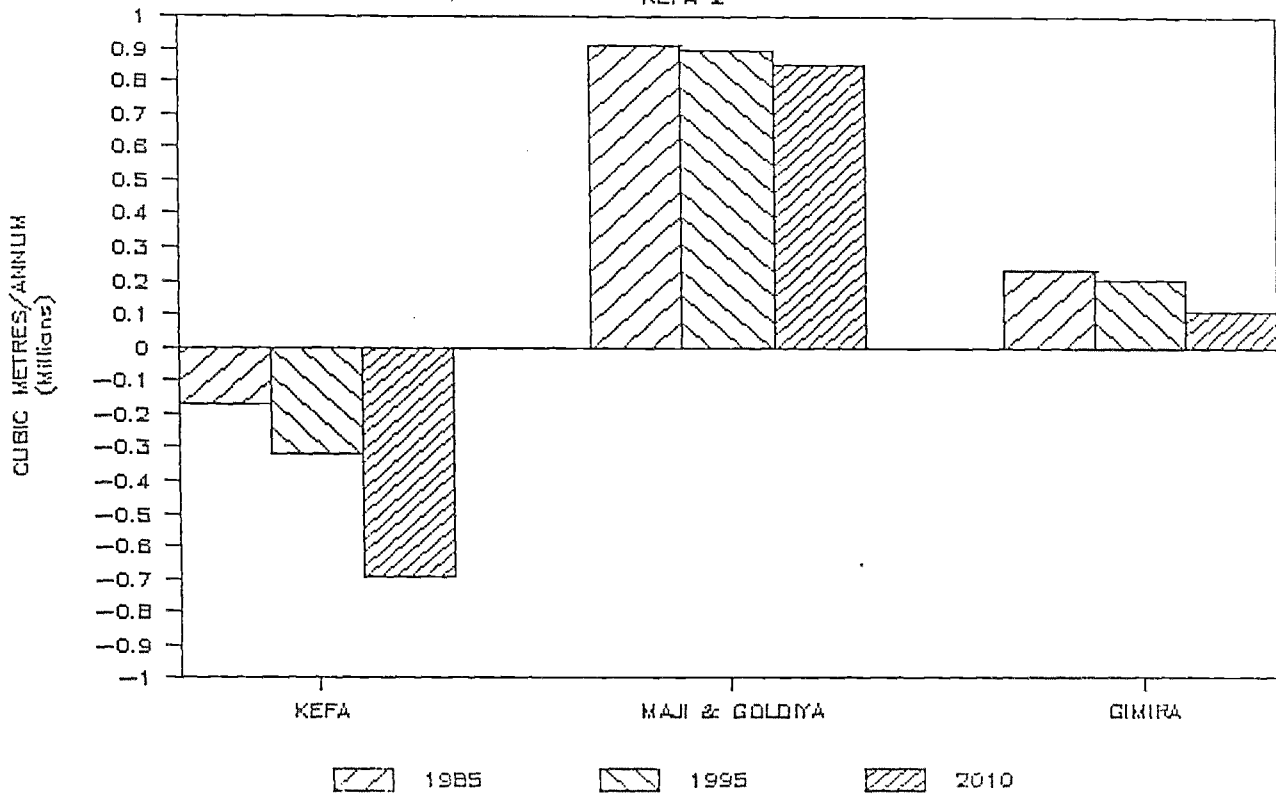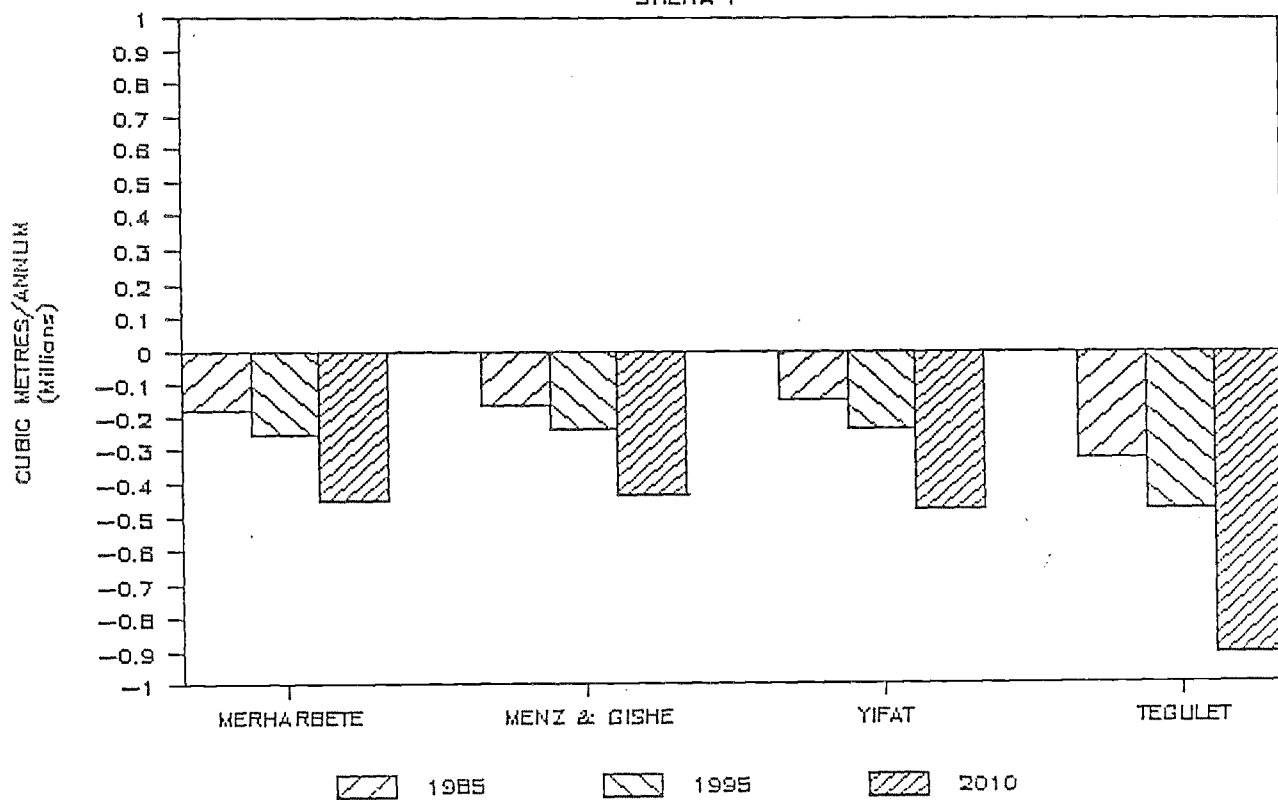
CUBIC METRES/ANNUM (Millions)

KEFA   MAJI & GOLDIYA   GIMIRA

1985   1995   2010

PROJECTED FUELWOOD AVAILABILITY

SHEWA 1

CUBIC METRES/ANNUM (Millions)

MERHARBETE   MENZ & GISHE   YIFAT   TEGULET

1985   1995   2010

PROJECTED FUELWOOD AVAILABILITY

SHEWA 2

CUBIC METRES/ANNUM (Millions)

YERER   HAIKOTCH   KEMBATA   CHEBO

☐ 1985   ☐ 1995   ☐ 2010

PROJECTED FUELWOOD AVAILABILITY

SHEWA 3

CUBIC METRES/ANNUM (Millions)

MENAGESHA   JIBAT   SELALE

☐ 1985   ☐ 1995   ☐ 2010

PROJECTED FUELWOOD AVAILABILITY

SIDAMO 1

CUBIC METRES/ANNUM (Millions)

WELAYITA   SIDAMA   JEM JEM

☒ 1985   ☒ 1995   ☒ 2010

PROJECTED FUELWOOD AVAILABILITY

SIDAMO 2

CUBIC METRES/ANNUM (Millions)

BORENA   ARERO   GEDIO

☒ 1985   ☒ 1995   ☒ 2010
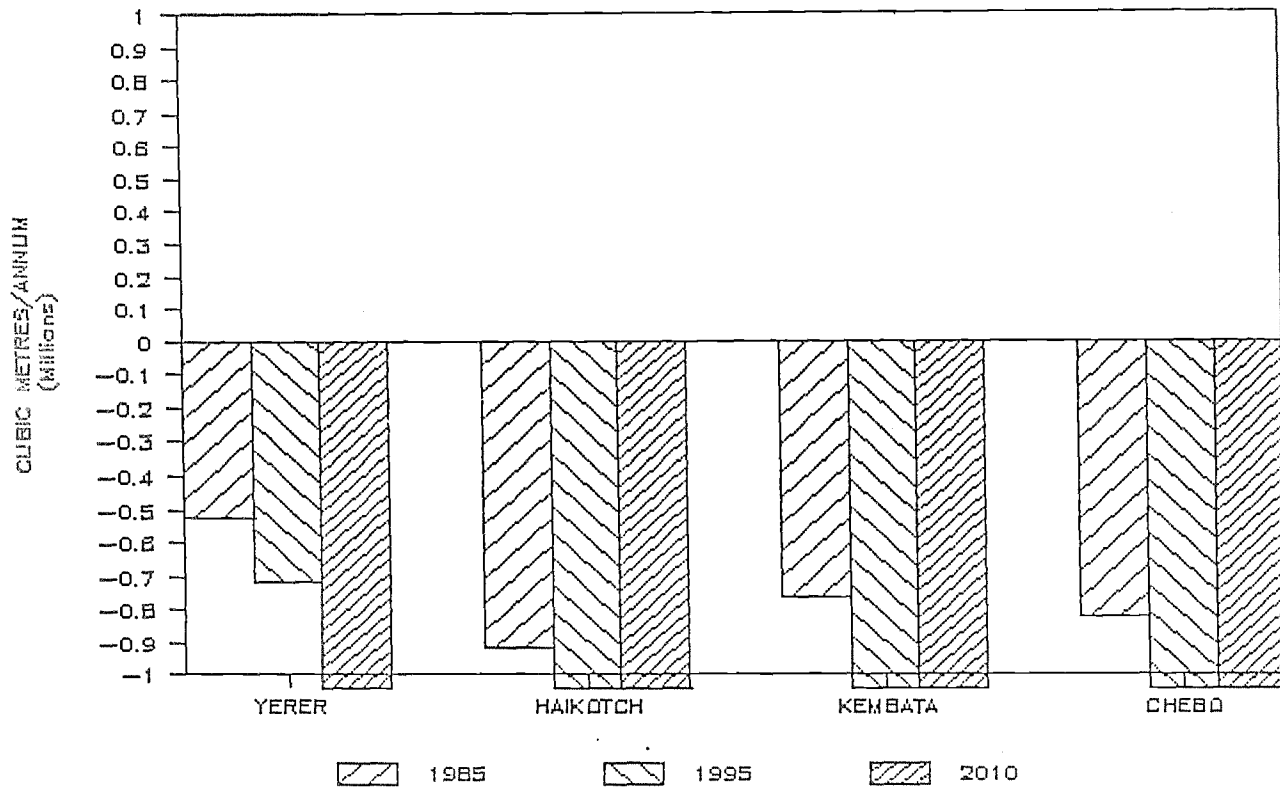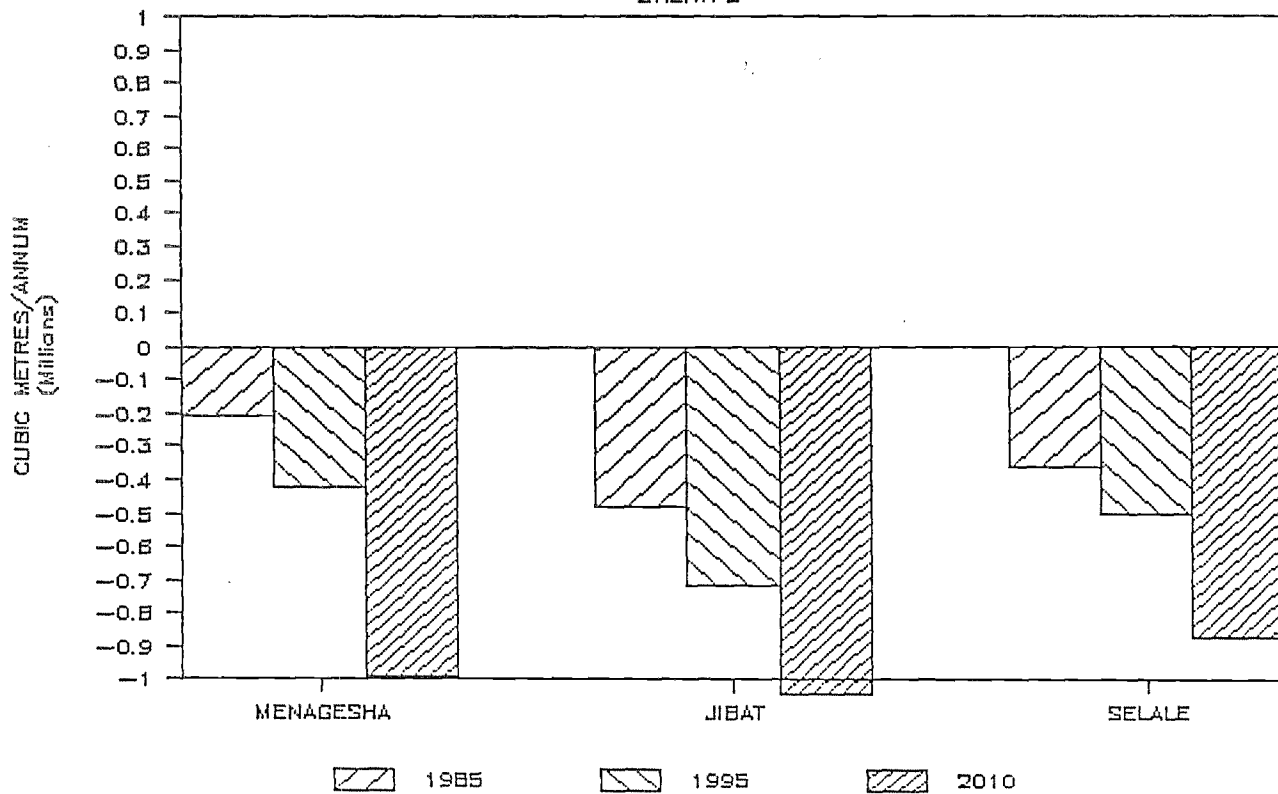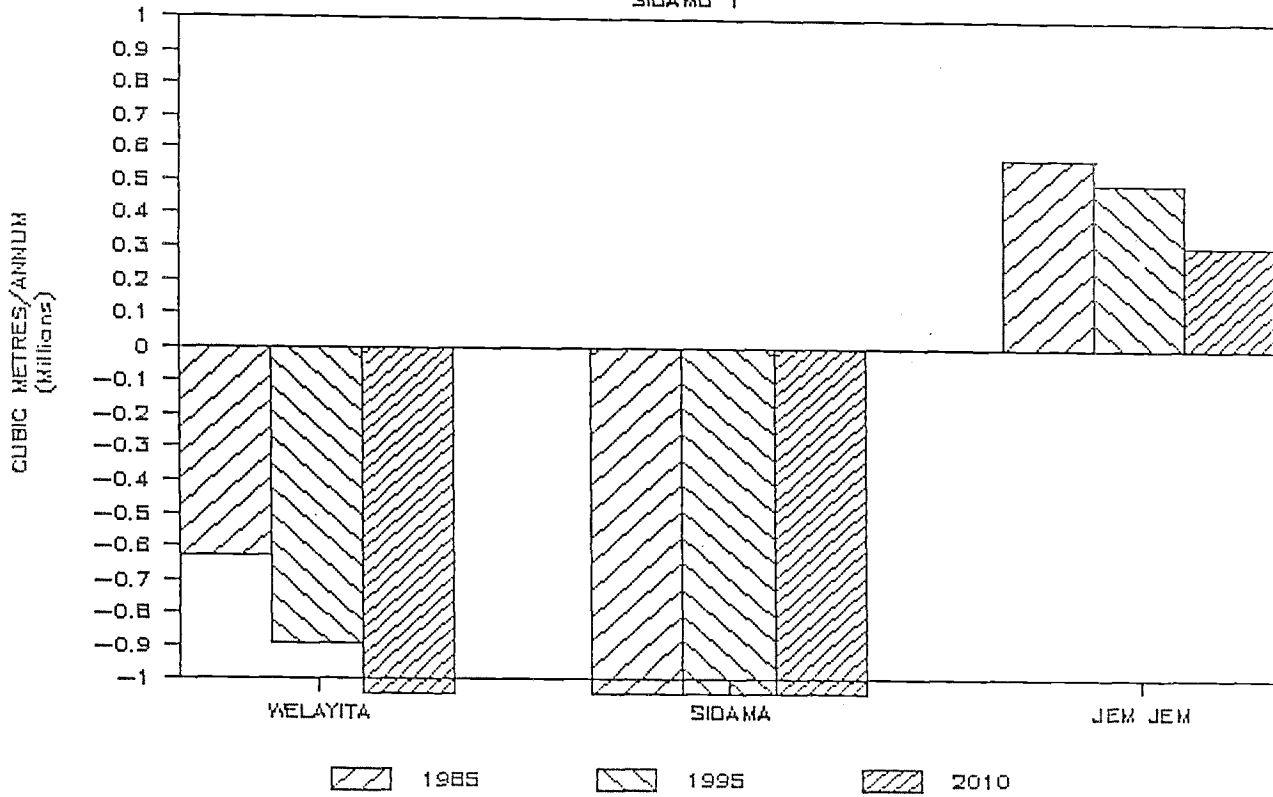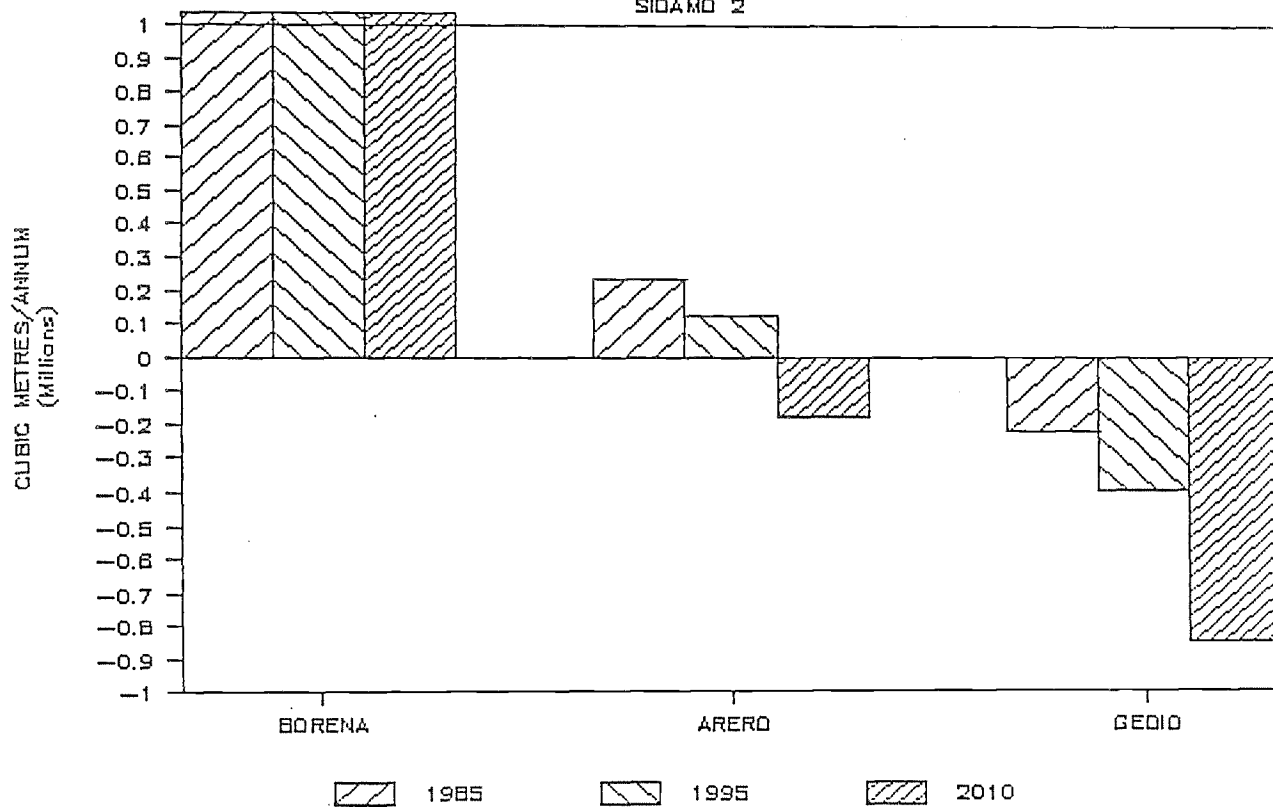
PROJECTED FUELWOOD AVAILABILITY
TIGRAY 1

PROJECTED FUELWOOD AVAILABILITY
TIGRAY 2

PROJECTED FUELWOOD AVAILABILITY

WELEGA 1

PROJECTED FUELWOOD AVAILABILITY

WELEGA 2

PROJECTED FUELWOOD AVAILABILITY

WELO 1

PROJECTED FUELWOOD AVAILABILITY

WELO 2

PROJECTED FUELWOOD AVAILABILITY

WELO 3

IMATED FUELWOOD PRODUCTION FROM EXISTING VEGETATION

Land Use/Vegetation types

		1	2.1	2.2	2.3	2.4	3	4.1	4.2	4.3	5.1	5.2	5.3
Awraja		Annual Reproduction Rate (m3/annum/ha)											
Code	Name												
		0.00	0.00	0.10	0.30	0.30	0.00	3.00	2.00	2.00	0.90	0.30	15.00
I													
0101	ARBA GUGU	0	0	3,360	54	0	0	0	0	150,000	0	0	0
0102	TICHO	0	0	62	20640	0	0	0	0	0	0	0	0
0103	CHILALO	0	0	119	12240	2,700	0	12,000	46,000	48,000	0	6,900	0
E													
0201	GENALE	0	0	22	10080	0	0	300,000	368,000	172,000	4,500	34,500	0
0202	MENDEYO	0	0	42	6480	0	0	60,000	24,000	56,000	0	6,000	0
0203	WABE	0	0	0	2160	0	0	0	0	0	125,100	0	0
0204	ELKERE	0	0	0	0	0	0	0	0	0	0	0	0
0205	DOLO	0	0	0	2880	0	0	0	858,000	38,000	0	15,600	0
TREA													
0301	SAHIL	0	0	1	4800	0	0	0	0	0	0	0	0
0302	KEY B.	0	0	4	9720	0	0	0	46,000	0	0	0	0
0303	AKALEG.	0	0	31	9880	0	0	0	2,000	0	0	0	0
0304	SERAYE	0	0	38	30120	0	0	0	0	0	0	0	0
0305	HAMASSIEN	0	0	10	20680	0	0	0	94,000	0	0	0	0
0306	KEREN	0	0	0	7776	0	0	0	34,000	0	0	0	0
0307	AKORDAT	0	0	39	3864	0	0	0	0	0	0	0	0
0308	GASH	0	0	20	49440	0	0	0	0	0	0	0	0
O GOFA													
0401	GAMO	0	0	0	39000	0	0	0	26,000	0	0	0	0
0402	GARDULA	0	0	23	0	0	0	0	0	0	10,800	2,700	0
0403	GELEB & HAMER BA	0	0	0	0	270	0	0	0	0	131,400	6,900	0
0404	GOFA	0	0	0	4800	0	0	0	354,000	260,000	132,300	118,500	0
AM													
0501	BAHIR DAR	0	0	0	15648	0	0	0	0	0	0	0	0
0502	MOTA	0	0	30	8712	0	0	0	0	0	0	0	0
0503	BICHENA	0	0	22	5880	0	0	0	0	0	0	0	30,000
0504	DEBRE MARKOS	0	0	101	3000	0	0	0	0	0	0	0	0
0505	KOLA DEGA DAMOT	0	0	91	12096	0	0	0	0	0	0	0	0
0506	KOEW MIDIR	0	0	40	5880	0	0	0	0	12,000	0	0	0
0507	METEKEL	0	0	0	57504	0	0	0	0	72,000	67,500	300	0
DER													
0601	WEGERA	0	0	81	53736	0	0	0	0	0	126,900	49,860	0
0602	SEMIEN	0	0	25	54456	0	0	0	0	0	0	0	0
0603	LIBO	0	0	17	25200	0	0	0	0	0	0	0	0
0604	GAYINT	0	0	28	29472	0	0	0	0	0	0	0	0
0605	DEBRE TABOR	0	0	69	18960	0	0	0	0	0	0	0	0
0606	GONDAR	0	0	62	17160	0	0	0	0	0	0	7,920	0
0607	CHILGA	0	0	30	37728	0	0	0	0	0	0	0	0
ERGE													
0701	CHERCHER	0	0	33	19248	0	0	0	0	0	0	0	0
0702	DIRE DAWA	0	0	2	0	0	0	0	0	0	0	0	0
0703	JIJIGA	0	0	0	15720	0	0	0	0	0	0	0	0
0704	GURSUM	0	0	1	24720	0	0	0	0	0	0	0	0
0705	DEGEHABUR	0	0	0	0	0	0	0	0	0	0	0	0
0706	WELWEL	0	0	0	0	0	0	0	0	0	0	0	0
0707	KELAFO	0	0	0	0	0	0	0	0	0	0	0	0
0708	KEBREDEHAR	0	0	0	6600	0	0	0	0	0	0	0	0
0709	GODE	0	0	0	9840	0	0	0	0	0	0	0	0
0710	GARA MULETA	0	0	6	21024	0	0	0	0	0	0	0	0
0711	HARER ZURIA	0	0	25	4440	0	0	0	0	0	0	0	0
0712	WEBERA	0	0	19	18960	0	0	0	0	0	0	0	0
0713	HABRO	0	0	28	15000	0	0	0	0	0	0	0	0
BABUR													
0801	SOR & GEBA	0	0	0	0	13,500	0	0	380,000	44,000	0	0	0
0802	BUNO	0	0	54	0	10,476	0	0	430,000	173,600	0	0	0
0803	GOKE	0	0	0	48	16,956	0	0	550,000	162,800	0	0	0
0804	MOCHA	0	0	1	0	10,881	0	0	676,000	222,800	15,120	0	0
0805	GAMBELA	0	0	0	0	0	0	0	372,000	0	53,640	0	0
A													
0901	LIMU	0	0	25	17160	6,345	0	0	186,000	76,000	0	0	0
0902	JIMA	0	0	7	23040	4,455	0	0	166,000	155,600	49,500	0	0
0903	KULO KONTA	0	0	0	12912	3,915	0	0	48,000	22,000	0	0	0
0904	KEFA	0	0	2	10848	5,915	0	0	624,000	185,600	0	3,900	0
0905	MAJI & GOLDIYA	0	0	0	192	7,722	0	0	196,000	645,600	78,300	39,600	0
0906	GIMIRA	0	0	2	4896	7,128	0	0	226,000	274,800	0	21,000	0
WA													
1001	MERHABETE	0	0	47	11280	0	0	0	0	0	0	0	0
1002	MENZ & GISHE	0	0	25	22056	0	0	0	0	0	0	0	0
1003	YIFAT	0	0	10	4824	0	0	0	0	0	0	0	0
1004	TEGULET	0	0	90	35184	0	0	0	22,000	0	0	0	0
1005	YEKER	0	0	66	5880	0	0	0	0	0	0	0	0
1006	HAIKOTCH	0	0	8	54696	540	0	0	2,000	0	2,700	10,800	0
1007	KEMBATA	0	0	0	21600	20,277	0	0	18,000	78,000	0	9,540	120,000
1008	CHEBO & GURAGIE	0	0	63	39888	28,350	0	0	0	58,000	3,600	0	0
1009	MENEGESHA	0	0	73	17448	0	0	18,000	0	0	0	6,600	375,000
1010	JIBAT	0	0	45	60120	945	0	0	0	116,000	0	1,200	0
1011	SELALE	0	0	75	9072	0	0	0	0	0	0	3,600	0
AMO													
1101	WELAYITA	0	0	0	8016	10,638	0	0	0	0	115,380	900	0
1102	SIDAMA	0	0	19	15408	22,140	0	0	0	0	0	0	0
1103	JEM JEM	0	0	2	4968	0	0	0	10,000	627,200	4,500	23,700	0
1104	BOKENA	0	0	0	0	0	0	0	0	4,000	0	35,400	0
1105	ARERO	0	0	0	43992	0	0	39,000	0	110,800	6,300	23,700	0
1,106	GEDIO	0	0	0	30792	2,538	0	0	56,000	151,200	0	4,800	0
RAY													
1201	ADWA	0	0	25	11664	0	0	0	0	0	0	0	0
1202	AGAME	0	0	19	1152	0	0	0	0	0	0	0	0
1203	HULET AWLALO	0	0	29	0	0	0	0	0	0	0	0	0
1204	ENDERTA	0	0	87	20736	0	0	0	0	20,000	0	0	0
1205	RAYA	0	0	4	26880	0	0	0	0	46,000	0	0	0
1206	TEMBIEN	0	0	66	5400	0	0	0	0	0	0	0	0
1207	AXUM	0	0	27	23520	0	0	0	0	0	0	0	0
1208	SHIRE	0	0	38	46368	0	0	0	0	0	0	0	0
EGA													
1301	HORO GUDURU	0	0	0	82440	270	0	0	0	0	55,800	6,600	0
1302	NEKEMTE	0	0	8	15240	19,305	0	0	0	14,000	16,200	0	0
1303	ARJO	0	0	4	7680	18,252	0	0	38,000	44,000	0	0	0
1304	GIMBI	0	0	43	27240	42,552	0	0	4,000	371,600	0	49,200	0
1305	KELEM	0	0	70	0	9,801	0	0	0	146,800	0	0	0
1306	ASOSA	0	0	32	960	0	0	0	0	0	0	85,200	0
O													
1401	RAYA & KOBO	0	0	0	8760	0	0	0	0	38,000	0	0	0
1402	YEYU	0	0	6	9360	0	0	0	0	0	0	0	0
1403	AMBASEL	0	0	29	5016	0	0	0	0	4,000	0	0	0
1404	AUSA	0	0	20	0	0	0	0	0	0	0	0	0
1405	KALU	0	0	32	0	0	0	0	0	0	0	0	0
1406	DESE ZURIA	0	0	9	2736	0	0	0	0	0	27,000	0	60,000
1407	WEREILU	0	0	32	2232	0	0	0	0	0	0	0	0
1408	BORENA	0	0	60	17208	0	0	0	6,000	0	0	0	0
1409	WEKEHEMINO	0	0	37	6768	0	0	0	0	0	0	0	0
1410	WADLA	0	0	24	12336	0	0	0	0	0	0	0	0
1411	LASTA	0	0	10	34176	0	0	0	0	0	0	0	0
1412	WAG	0	0	6	45504	0	0	0	0	0	0	0	0
1500	ADDIS ABABA	0	0	0	0	0	0	0	0	0	0	0	600
1601	ASSEB	0	0	0	0	0	0	0	0	0	0	0	0
	COUNTRY TOTAL	0	0	5,806	1,582,090	265,869	0	429,000	5,860,000	4,588,400	1,026,540	574,920	585,600

CAPUT FUELWOOD REQUIREMENT:
ANNUM   0.8

and use/vegetation classes
efined in Table 3.

Area in Hectares

6	7.1	7.2	7.3	8.1	8.2	9.1	9.2	9.3	10.1.a	10.1b	10.2.a	10.2b	11.1	11.2
0.90	0.50	0.30	0.10	0.20	0.10	0.05	0.10	0.30	0.00	0.10	0.00	0.10	0.01	0.00
0	2,500	0	0	8,000	7,800	450	13,600	0	0	0	0	0	0	0
0	54,500	0	0		21,100	0	40,000	9,900	0	0	0	0	0	0
0	0	0	0	4,000	300	1,900	9,300	600	0	0	0	0	0	0
0	0	0	0	0	500	0	0	10,200	0	0	0	0	0	0
16,200	173,500	26,700	0	0	0	25,350	28,200	56,200	0	300	0	0	0	70
91,800	161,000	0	0	64,000	2,700	38,000	56,200	106,600	0	0	0	0	0	0
13,500	355,000	45,900	0	145,200	66,800	71,150	48,100	7,200	0	0	0	0	560	0
0	0	0	0	1,400	10,800	1,150	0	3,600	0	0	0	0	0	0
5,400	0	0	0	58,000	5,400	7,200	800	0	0	0	0	0	290	0
0	500	0	0	8,800	15,960	0	0	0	0	0	0	0	155	0
0	0	0	0	5,600	13,000	4,600	800	0	0	0	0	0	30	0
0	0	0	0	11,800	2,160	1,800	700	900	0	0	0	0	0	0
1,800	0	0	0	7,200	11,720	2,250	11,200	4,500	0	0	0	0	0	0
118,000	0	0	0	97,400	30,680	50,350	1,400	9,000	0	0	0	0	35	0
35,100	0	0	0	43,840	26,700	27,250	6,000	0	0	0	0	0	0	0
0	49,000	3,000	0	0	400	7,000	1,440	2,880	0	0	0	0	0	0
10,800	43,500	40,500	0	0	14,980	500	0	900	0	0	0	0	0	0
12,600	8,500	0	3,100	2,200	29,000	3,300	11,900	13,800	0	0	0	0	95	0
23,400	36,500	0	0	1,100	950	15,000	15,000	70,800	0	0	0	0	0	0
0	0	4,500	0	0	5,900	3,140	1,420	0	0	0	0	0	0	0
0	0	0	0	0	5,940	0	0	0	0	0	0	0	170	0
0	0	0	0	0	0	450	15,700	6,000	0	0	0	0	345	0
0	0	0	0	0	1,020	0	19,700	3,900	0	0	0	0	0	0
0	0	1,800	0	0	6,200	3,640	4,320	0	0	0	0	0	0	0
0	0	9,840	0	5,800	14,600	62,780	88,040	0	0	0	0	0	0	0
0	0	23,280	0	0	17,440	2,000	59,200	0	0	0	0	0	0	0
0	0	35,640	0	0	23,240	0	0	6,600	0	0	0	0	0	0
0	0	0	0	0	22,760	220	0	0	0	0	0	0	0	0
0	0	0	0	0	26,940	0	0	0	0	0	0	0	0	0
13,500	0	0	0	0	6,900	1,100	0	0	0	0	0	0	0	0
53,100	0	25,080	0	0	5,000	0	24,300	28,500	0	0	0	0	0	0
27,900	0	62,880	0	0	0	14,350	62,500	0	0	0	0	0	0	0
4,500	12,800	11,100	0	39,800	31,700	4,100	25,400	27,000	0	1,300	0	900	390	0
0	0	14,940	0	20,400	20,400	1,100	4,900	0	0	300	0	0	250	0
0	0	0	0	71,200	41,820	12,000	23,400	20,400	0	0	0	0	215	0
28,800	0	0	0	39,200	11,800	27,900	127,000	0	0	0	0	600	35	0
3,600	0	0	0	74,400	64,700	88,150	30,400	0	0	800	0	0	0	0
31,500	0	0	0	327,400	83,500	105,850	15,000	0	0	3,700	0	0	220	0
0	19,400	0	0	57,000	89,400	2,150	85,100	0	0	2,500	0	0	115	0
0	35,500	0	0	114,400	80,400	4,900	18,000	3,600	0	0	0	0	115	0
0	39,000	0	0	16,800	41,100	18,000	46,800	0	0	0	0	0	0	0
0	0	0	0	42,800	23,200	200	2,300	0	0	0	0	0	0	0
0	0	0	0	7,200	6,800	900	2,100	0	0	0	0	0	0	0
0	0	0	0	0	9,700	0	24,900	10,800	0	0	0	0	0	0
0	0	0	0	0	13,300	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	300	0	0	0	0	0	0
0	6,300	0	0	0	0	0	14,400	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	18,160	0	0	0	0	0	0
0	0	0	16,920	0	0	0	0	25,500	0	0	0	0	0	0
90,900	0	0	25,340	0	0	250	0	566,700	0	800	0	0	0	0
0	27,500	0	0	0	0	0	12,140	2,160	0	0	0	0	0	0
0	0	0	0	0	0	0	31,320	0	0	0	0	0	0	0
23,400	3,500	0	0	0	0	0	22,280	35,080	0	0	0	0	0	0
0	0	0	0	0	0	1,400	5,340	27,180	0	0	0	0	0	0
17,100	0	0	0	0	0	10,250	22,020	138,660	0	0	0	0	10	0
0	0	0	5,900	0	0	1,200	180	26,760	0	0	0	0	0	0
0	25,000	0	0	0	0	2,700	0	0	0	0	0	0	0	0
0	39,600	0	0	0	0	0	0	0	0	0	0	0	0	0
23,400	13,400	2,100	0	0	30,600	2,550	0	37,200	0	0	0	0	0	0
0	89,400	4,500	0	0	16,600	1,650	0	0	0	0	0	0	0	0
0	3,000	0	0	10,800	12,900	4,450	2,900	0	0	0	0	0	30	0
0	0	600	0	15,600	1,000	17,600	800	13,800	0	0	0	0	0	0
0	0	0	0	0	400	3,650	6,200	0	0	0	0	0	0	0
0	0	0	0	1,800	0	2,780	8,600	0	0	0	0	0	0	0
0	3,000	0	0	15,000	4,260	1,950	0	0	0	0	0	0	0	0
0	0	0	0	16,800	0	0	18,800	0	0	0	0	0	0	0
0	23,200	0	0	4,200	4,800	0	7,100	0	0	0	0	0	25	0
0	0	0	0	0	2,800	810	4,720	2,640	0	0	0	0	0	0
0	0	0	0	17,200	300	980	900	1,800	0	0	0	0	0	0
0	30,500	0	0	57,600	3,300	2,750	10,000	24,600	0	0	0	0	0	0
18,000	713,000	30,600	0	92,200	65,400	69,500	170,600	25,200	0	0	0	0	325	0
27,900	137,500	11,400	0	59,000	36,300	16,000	61,900	24,000	0	0	0	0	120	0
11,700	73,500	0	0	0	800	0	0	0	0	0	0	0	0	0
0	0	27,600	0	14,200	3,480	50	0	11,400	0	0	0	0	1,265	0
0	0	7,500	0	9,400	640	0	0	0	0	1,000	0	0	2,245	0
0	0	0	0	16,800	350	550	0	0	0	0	0	0	420	0
0	0	0	0	1,200	11,920	1,050	0	0	0	2,300	0	0	0	0
0	0	0	0	0	14,400	0	0	1,800	0	0	0	0	0	0
0	0	0	0	0	0	0	0	14,700	0	0	0	0	0	0
0	0	0	0	19,400	3,960	650	0	14,100	0	0	0	0	0	0
0	0	0	0	0	0	600	73,500	0	0	0	0	0	0	0
10,800	2,400	0	0	0	0	0	36,900	0	0	0	0	0	0	0
0	0	0	0	0	0	0	17,800	0	0	0	0	0	0	0
0	76,500	0	3,800	0	0	4,740	35,080	72,720	0	0	0	0	0	0
23,400	0	0	0	0	0	3,660	5,040	151,680	0	0	0	0	0	0
0	0	0	0	0	0	0	56,140	105,420	0	0	0	0	0	0
34,200	7,500	9,600	0	0	19,300	1,250	0	0	0	0	0	200	105	0
5,400	6,000	4,200	0	0	19,000	0	0	0	0	0	0	0	25	0
12,600	0	0	0	0	27,520	8,250	0	0	0	0	0	4,960	20	0
18,000	0	0	0	0	4,900	6,400	900	3,900	0	0	0	0	135	0
13,680	0	0	0	0	12,700	2,600	0	0	0	0	0	0	0	0
0	6,200	0	0	0	0	0	0	0	0	0	0	0	40	0
0	0	0	0	0	6,860	0	0	0	0	0	0	0	205	0
0	0	0	0	0	2,560	450	0	0	0	0	0	0	0	0
0	0	3,600	0	0	5,420	0	0	0	0	0	0	0	0	0
0	0	3,900	0	0	17,020	100	0	0	0	0	0	0	0	0
0	0	0	0	0	28,080	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	300	0	0	0	0	0	0	0	1,350	0
799,380	2,278,200	410,760	55,060	1,586,640	1,251,280	790,650	1,660,680	1,587,360	0	13,000	0	6,660	9,440	0

11.3	11.4	11.5	12	Estimated Total Fuelwood Production (m3/annum)		Projected Population			Fuelwood Requirement			Require
						1985	1995	2010	1985	1995	2010	1985
												M negative
0.00	0.01	0.01	0.00	Including forest	Excluding Forest	Total No.			m3/annum			
0	0	0	0	464,005	406,005	1,670,544	2,234,197	3,743,602	1,336,435	1,787,358	2,994,882	930,430
0	0	0	0	173,744	173,744	348,428	465,991	780,810	278,743	372,792	624,648	104,999
0	0	0	0	146,202	146,202	360,665	482,356	808,232	288,532	385,885	646,586	142,330
0	0	0	0	144,059	86,059	961,450	1,285,850	2,154,560	769,160	1,028,680	1,723,648	683,101
0	0	0	0	3,663,794	2,053,794	1,011,524	1,352,820	2,266,773	809,220	1,082,256	1,813,419	(1,244,575)
0	0	0	0	899,802	231,802	224,809	300,662	503,786	179,848	240,529	403,029	(51,955)
0	0	0	0	422,842	338,842	305,267	408,266	684,087	244,213	326,613	547,269	(94,628)
0	0	1,595	0	450,555	450,555	185,109	247,566	414,819	148,087	196,053	331,856	(302,468)
0	7,350	5	0	496,665	496,665	198,789	265,862	445,476	159,031	212,689	356,381	(337,634)
0	0	0	0	1,393,930	535,930	97,550	130,464	218,605	78,040	104,372	174,804	(457,890)
0	360	2,465	0	952,073	776,073	2,627,774	3,514,402	5,888,703	2,102,219	2,811,522	4,710,962	1,326,145
0	0	525	0	84,716	84,716	314,967	421,239	705,825	251,974	336,991	564,660	167,258
0	50	1,330	0	56,404	10,404	155,976	208,603	349,534	124,781	166,883	279,627	114,377
0	0	0	0	56,589	56,589	334,866	447,852	750,417	267,893	358,282	600,334	231,304
0	0	0	0	54,158	54,158	376,373	503,363	843,431	301,098	402,690	674,745	246,940
0	345	0	0	152,058	38,058	697,772	933,204	1,563,669	558,217	746,563	1,250,935	520,159
0	1,420	1,040	0	80,791	46,791	276,375	369,626	619,342	221,100	295,701	495,474	174,309
0	50	930	0	314,028	314,028	236,678	316,534	530,302	189,342	253,227	424,305	(124,686)
0	0	0	0	191,330	191,330	254,768	315,980	526,103	107,814	251,184	420,882	(3,515)
0	0	0	0	1,495,168	1,112,168	1,254,274	1,677,475	2,810,763	1,003,419	1,341,980	2,248,610	(111,749)
0	0	0	0	128,720	102,720	426,619	570,564	956,032	341,296	456,451	764,826	236,576
0	835	495	0	124,703	124,703	332,608	444,832	745,357	266,086	355,865	596,285	141,383
0	0	0	0	224,395	224,395	170,012	227,375	380,988	136,009	181,900	304,790	(88,386)
0	0	0	0	1,017,350	663,350	325,035	434,704	728,387	260,028	347,763	582,709	(403,322)
0	0	0	0	558,009	558,009	3,261,106	4,361,426	7,307,969	2,608,885	3,489,141	5,846,375	2,050,876
0	0	0	0	30,608	30,608	695,246	929,827	1,558,010	556,197	743,861	1,246,408	525,589
0	0	0	0	14,852	14,852	365,928	489,394	820,024	292,742	391,515	656,020	277,890
0	0	0	0	6,247	6,247	328,601	439,473	736,377	262,881	351,578	589,102	256,633
0	0	0	0	55,251	55,251	615,025	823,608	1,380,031	492,660	656,887	1,104,025	437,409
0	0	0	0	36,807	36,807	690,124	922,977	1,546,533	552,100	738,382	1,237,226	515,293
0	0	0	0	35,880	35,880	335,722	448,997	752,336	268,578	359,198	601,869	232,698
0	0	0	0	378,364	378,364	229,661	307,150	514,657	183,728	245,720	411,726	(194,636)
0	0	0	0	964,134	964,134	2,935,731	3,926,266	6,578,818	2,348,585	3,141,013	5,263,055	1,384,451
0	0	0	0	332,497	332,497	378,951	506,812	849,210	303,161	405,450	679,368	(29,336)
0	0	0	0	119,961	119,961	286,827	383,604	642,764	229,462	306,883	514,211	109,501
0	0	0	0	48,197	48,197	354,202	473,712	793,749	283,362	378,970	634,999	235,165
0	0	0	0	56,440	56,440	355,840	475,903	797,420	284,672	380,723	637,936	228,232
0	0	0	0	40,529	40,529	712,242	952,558	1,596,098	569,794	762,046	1,276,878	529,265
0	0	0	0	161,122	161,122	507,636	678,915	1,137,585	406,108	543,132	910,068	244,987
0	0	0	0	205,388	205,388	340,032	454,761	761,995	272,025	363,809	609,598	66,637
0	1,035	4,395	0	2,391,146	2,391,146	4,181,974	5,595,000	9,371,584	3,345,579	4,474,400	7,497,267	954,433
0	2,205	3,915	0	183,701	183,701	702,308	939,272	1,573,836	561,846	751,417	1,259,068	378,146
0	1,695	520	0	28,252	28,252	365,110	488,301	818,193	292,088	390,641	654,555	263,836
0	0	0	0	162,950	162,950	215,197	287,805	482,244	172,157	230,244	385,795	9,207
0	2,710	95	0	147,456	147,456	182,539	244,129	409,061	146,031	195,303	327,249	(1,425)
0	35	0	0	386,485	386,485	413,055	552,423	925,635	330,444	441,938	740,508	(56,041)
0	1,120	0	0	547,105	547,105	238,085	318,416	533,535	190,468	254,733	426,828	(356,717)
0	615	0	0	169,290	169,290	87,536	117,071	196,162	70,028	93,656	156,930	(99,262)
0	1,930	0	0	327,330	327,330	97,988	131,049	219,585	78,390	104,839	175,668	(248,940)
0	0	0	0	90,285	90,285	87,536	117,071	196,162	70,028	93,656	156,930	(20,257)
0	5	25	0	157,030	157,030	295,340	394,990	661,842	236,272	315,992	529,474	79,242
0	0	180	0	57,195	57,195	631,841	845,029	1,415,924	505,473	676,023	1,132,739	448,279
0	0	0	0	69,959	69,959	455,841	609,689	1,021,540	364,659	487,751	817,272	294,740
0	0	0	0	64,028	64,028	409,566	547,756	917,815	327,653	438,205	734,252	263,624
0	0	0	0	3,897,467	1,489,467	968,775	1,295,646	2,170,973	775,020	1,036,517	1,736,779	(714,447)
0	0	0	0	437,800	57,800	250,504	335,026	561,367	200,403	268,021	449,094	142,603
0	0	0	0	654,830	291,830	411,740	550,664	922,689	329,392	440,532	738,151	124,562
0	0	0	0	747,984	197,984	117,728	157,450	263,822	94,182	125,960	211,057	(103,602)
0	0	0	0	967,222	291,222	118,273	158,180	265,045	94,619	126,544	212,036	(196,604)
0	0	0	0	1,109,630	737,630	70,529	94,326	158,052	56,423	75,461	126,441	(681,207)
0	0	0	0	3,493,241	2,047,241	2,462,621	3,293,526	5,518,604	1,970,097	2,634,821	4,414,883	(77,145)
0	0	0	0	299,830	113,830	491,507	657,345	1,101,442	393,206	525,876	881,154	279,376
0	0	0	0	457,422	291,422	978,805	1,309,060	2,193,450	783,044	1,047,248	1,754,760	491,622
0	0	0	0	144,907	96,907	276,609	369,959	619,867	221,287	295,951	495,893	124,300
0	0	0	0	867,683	243,683	523,840	700,587	1,173,896	419,072	560,470	939,119	175,330
0	0	0	0	1,155,454	959,454	60,274	80,611	135,071	48,219	64,489	108,058	(911,235)
0	0	0	0	567,866	341,866	131,586	175,984	294,877	105,269	140,787	235,901	(236,598)
0	0	0	0	1,672,445	1,612,445	8,131,010	10,874,478	18,221,185	6,504,814	8,699,582	14,576,948	4,892,369
0	0	0	0	39,027	39,027	272,828	364,882	611,394	218,263	291,906	489,115	179,236
0	0	0	0	61,681	61,681	280,393	374,999	628,346	224,314	300,000	502,677	162,633
0	0	0	0	114,084	114,084	332,927	445,259	746,073	266,342	356,207	596,858	152,257
0	0	0	0	169,424	147,424	589,499	788,400	1,321,036	471,599	630,720	1,056,829	324,175
0	0	0	0	40,026	40,026	706,767	945,235	1,583,828	565,414	756,188	1,267,063	525,388
0	0	0	0	120,144	118,144	1,294,619	1,731,432	2,901,173	1,035,695	1,385,146	2,320,938	917,551
0	0	0	0	277,667	259,667	1,273,049	1,702,584	2,852,835	1,018,439	1,362,067	2,282,268	758,772
0	0	0	0	143,081	143,081	1,206,584	1,613,693	2,703,091	965,267	1,290,955	2,163,113	822,186
0	0	0	0	439,331	421,331	788,574	1,054,645	1,767,154	630,859	843,716	1,413,723	209,528
0	0	0	0	215,908	215,908	870,013	1,163,562	1,949,654	696,011	930,849	1,559,724	480,103
0	0	0	0	52,072	52,072	515,764	689,786	1,155,800	412,611	551,829	924,640	360,539
0	0	0	0	3,158,593	3,053,593	3,809,531	5,094,892	8,536,959	3,047,625	4,075,914	6,829,567	(5,968)
0	0	0	0	146,704	146,704	974,779	1,303,676	2,184,428	779,823	1,042,940	1,747,542	633,119
0	0	0	0	58,747	58,747	1,422,909	1,903,008	3,188,665	1,138,327	1,522,407	2,550,932	1,079,581
0	555	0	0	799,120	739,120	269,225	360,064	603,320	215,380	288,051	482,656	(575,740)
0	0	0	0	1,224,780	1,224,780	104,634	139,938	234,478	83,707	111,950	187,583	(1,141,073)
0	0	0	0	597,912	558,912	410,187	548,586	919,207	328,149	438,869	735,366	(230,763)
0	0	0	0	331,330	275,330	627,797	839,620	1,406,861	502,238	671,696	1,125,489	226,908
0	0	815	0	392,727	392,727	2,421,749	3,238,863	5,427,011	1,937,399	2,591,090	4,341,609	1,544,672
0	770	2,675	0	54,219	54,219	502,299	671,778	1,125,626	401,839	537,422	900,501	347,620
0	870	2,000	0	24,326	24,326	346,524	463,444	776,542	277,219	370,755	621,234	252,894
0	760	915	0	15,489	15,489	217,080	290,324	486,465	173,664	232,259	389,172	158,175
0	0	0	0	75,780	75,780	355,067	474,868	795,665	284,053	379,895	636,548	208,266
0	0	0	0	92,879	92,879	131,454	175,807	294,582	105,163	140,646	235,665	12,285
0	0	0	0	7,266	7,266	279,692	374,061	626,774	223,753	299,249	501,419	216,487
0	0	0	0	38,247	38,247	307,731	411,562	689,609	246,185	329,249	551,687	207,938
0	0	0	0	84,514	84,514	281,903	377,018	631,729	225,522	301,615	505,383	141,008
0	0	0	0	1,757,077	1,697,077	2,489,663	3,329,693	5,579,205	1,991,731	2,663,754	4,463,364	234,654
0	0	0	0	219,210	219,210	459,693	614,797	1,030,148	367,754	491,837	824,118	146,544
0	0	0	0	103,653	103,653	358,752	479,797	803,944	287,001	383,838	643,155	183,348
0	0	0	0	136,936	100,936	192,709	257,730	431,850	154,167	206,184	345,480	53,231
0	0	0	0	607,975	603,975	808,347	1,081,088	1,811,462	646,677	864,871	1,449,170	42,703
0	0	0	0	394,491	394,491	447,789	598,876	1,003,471	358,231	479,101	802,777	(36,260)
0	0	0	0	274,812	274,812	222,374	297,405	498,329	177,899	237,924	398,663	(96,913)
0	970	2,205	0	588,636	582,636	3,533,923	4,726,292	7,919,336	2,827,138	3,781,034	6,335,468	2,244,502
0	105	390	0	122,090	122,090	183,430	245,320	411,056	146,744	196,256	328,845	24,654
0	0	110	0	39,086	39,086	278,010	371,813	623,008	222,408	297,450	498,405	183,322
0	668	8,250	0	49,145	49,145	367,473	491,461	823,488	293,979	393,169	658,791	244,834
0	0	0	0	38,830	38,830	161,415	215,878	361,723	129,132	172,702	289,378	90,302
0	0	0	0	37,232	37,232	399,595	534,421	895,472	319,676	427,537	716,377	282,444
0	0	0	0	103,425	103,425	249,599	333,815	559,338	199,679	267,052	447,470	96,254
0	0	0	0	8,504	8,504	217,859	291,366	488,210	174,287	233,093	390,568	165,783
0	0	0	0	30,333	24,333	475,682	636,160	1,065,977	380,545	508,944	852,782	356,219
0	0	0	0	9,815	9,815	357,982	478,768	802,219	286,386	383,014	641,775	276,571
0	0	0	0	17,780	17,780	248,409	332,224	556,671	198,727	265,779	445,337	180,947
0	0	0	0	54,906	54,906	368,723	493,133	826,290	294,979	394,507	661,032	240,073
0	0	0	0	77,490	77,490	225,746	301,914	505,885	180,597	241,532	404,708	103,107
0	0	0	0	600	600	1,481,642	2,207,575	4,803,725	1,185,314	1,766,060	3,842,980	1,184,714
0	1,270	7,095	0	10,015	10,015	89,747	120,028	201,117	71,797	96,022	160,894	61,782
0	27,745	42,050	0	25,459,130	19,150,130	42,407,098	56,715,538	95,032,083	33,925,678	45,372,431	76,025,666	14,776,140

1995	2010	1985	1995	2010	1985	1995	2010

bers in parenthesis   numbers in parenthesis

m3/annum			ha required @ 15 m3/ha		negative numbers in parenthesis m3/annum		
,381,352	2,588,876	62,029	92,090	172,592	(930,450)	(1,381,352)	(2,588,876)
199,049	450,904	7,000	13,270	30,060	(104,999)	(199,049)	(450,904)
239,685	500,384	9,489	15,979	33,359	(142,330)	(239,685)	(500,384)
942,621	1,657,589	45,540	62,841	109,173	(682,101)	(942,621)	(1,657,589)
(971,538)	(240,376)		582	25,310	1,244,575	971,538	240,376
8,727	171,227	0	582	11,415	51,955	(8,727)	(171,227)
(12,229)	208,428	0	0	13,895	94,628	12,229	(208,428)
(252,502)	(118,699)	0	0	0	302,468	252,502	118,699
(285,976)	(140,284)	0	0	0	337,654	285,976	140,284
(431,558)	(361,046)	0	0	0	457,890	431,558	361,046
,035,448	3,954,889	96,956	139,750	262,326	(1,326,145)	(2,035,448)	(3,954,889)
252,276	479,944	11,151	16,818	31,996	(167,258)	(252,276)	(479,944)
156,478	269,223	7,625	10,432	17,948	(114,577)	(156,478)	(269,223)
321,693	563,745	15,420	21,446	37,583	(231,304)	(321,693)	(563,745)
348,533	620,587	16,463	23,236	41,372	(246,940)	(348,533)	(620,587)
708,505	1,212,877	34,677	47,234	80,858	(520,159)	(708,505)	(1,212,877)
248,910	448,685	11,621	16,594	29,912	(174,309)	(248,910)	(448,685)
(60,801)	110,277	0	0	7,352	124,686	60,801	(110,277)
59,854	229,552	0	3,990	15,303	3,515	(59,854)	(229,552)
226,812	1,133,442	25,331	38,993	80,939	111,749	(226,812)	(1,133,442)
355,751	662,106	15,905	23,582	44,140	(238,576)	(353,751)	(662,106)
231,162	471,582	9,426	15,411	31,439	(141,383)	(231,162)	(471,582)
(42,495)	80,395	0	0	5,360	86,386	42,495	(80,395)
(315,587)	(80,641)	0	0	0	403,322	315,587	80,641
,951,132	5,288,366	149,701	204,252	352,558	(2,050,876)	(2,951,132)	(5,288,366)
713,253	1,215,800	35,039	47,550	81,053	(525,589)	(713,253)	(1,215,800)
376,663	641,168	18,526	25,111	42,745	(277,890)	(376,663)	(641,168)
345,351	582,855	17,109	23,022	38,857	(256,633)	(345,351)	(582,855)
603,636	1,048,774	29,161	40,242	69,918	(457,409)	(603,636)	(1,048,774)
701,575	1,200,419	34,353	46,772	80,028	(515,293)	(701,575)	(1,200,419)
323,310	565,909	15,513	21,555	37,733	(232,698)	(323,310)	(565,909)
(132,644)	33,362	0	0	2,224	194,636	132,644	(33,362)
,176,879	4,298,921	94,252	145,125	286,595	(1,384,451)	(2,176,879)	(4,298,921)
72,953	346,871	0	4,864	23,125	29,356	(72,953)	(346,871)
186,922	394,250	7,300	12,461	26,283	(109,501)	(186,922)	(394,250)
330,775	586,802	15,678	22,052	39,120	(235,165)	(330,775)	(586,802)
324,283	581,496	15,215	21,619	38,766	(226,252)	(324,283)	(581,496)
721,517	1,236,349	35,284	48,101	82,423	(529,265)	(721,517)	(1,236,349)
382,010	748,946	16,332	25,467	49,930	(244,987)	(382,010)	(748,946)
158,420	404,206	4,442	10,561	26,947	(66,637)	(158,420)	(404,206)
,083,254	5,106,122	115,805	178,255	359,567	(954,433)	(2,083,254)	(5,106,122)
567,716	1,075,368	25,210	37,848	71,691	(376,146)	(567,716)	(1,075,368)
362,389	626,302	17,589	24,159	41,753	(263,036)	(362,389)	(626,302)
67,294	222,845	614	4,486	14,856	(9,207)	(67,294)	(222,845)
47,847	179,793	0	3,190	11,986	1,425	(47,847)	(179,793)
55,453	354,023	0	3,697	23,602	56,041	(55,453)	(354,023)
(292,452)	(120,357)	0	0	0	356,717	292,452	120,357
(75,654)	(12,360)	0	0	0	99,262	75,654	12,360
(222,491)	(151,662)	0	0	0	248,940	222,491	151,662
3,371	66,645	0	225	4,443	20,257	(3,371)	(66,645)
158,962	372,444	5,283	10,597	24,830	(79,242)	(158,962)	(372,444)
618,829	1,075,544	29,885	41,255	71,703	(448,279)	(618,829)	(1,075,544)
417,792	747,313	19,645	27,853	49,821	(294,740)	(417,792)	(747,313)
374,176	670,224	17,575	24,945	44,602	(265,624)	(374,176)	(670,224)
(452,950)	247,312	17,811	29,728	62,513	714,447	452,950	(247,312)
210,221	391,294	9,507	14,015	26,086	(142,603)	(210,221)	(391,294)
235,702	533,321	8,304	15,713	35,555	(124,562)	(235,702)	(533,321)
(72,025)	13,073	0	0	872	103,802	72,025	(13,073)
(164,679)	(79,187)	0	0	0	196,604	164,679	79,187
(662,169)	(611,189)	0	0	0	691,207	662,169	611,189
587,579	2,367,642	71,379	112,242	221,667	77,145	(587,579)	(2,367,642)
412,047	767,324	14,625	27,470	51,155	(275,376)	(412,047)	(767,324)
755,826	1,463,338	32,775	50,388	97,556	(491,622)	(755,826)	(1,463,338)
198,964	398,906	8,287	13,264	26,594	(124,300)	(198,964)	(398,906)
316,787	695,436	11,693	21,119	46,362	(175,390)	(316,787)	(695,436)
(894,965)	(851,398)	0	0	0	911,235	894,965	851,398
(201,079)	(105,965)	0	0	0	236,598	201,079	105,965
,087,130	12,964,503	326,158	472,476	864,300	(4,892,369)	(7,087,130)	(12,964,503)
252,879	450,088	11,949	16,859	30,006	(179,236)	(252,879)	(450,088)
238,319	440,996	10,042	15,888	29,400	(162,653)	(238,319)	(440,996)
242,123	482,774	10,150	16,142	32,185	(152,257)	(242,123)	(482,774)
485,296	909,405	21,612	32,220	60,627	(324,175)	(485,296)	(909,405)
716,163	1,227,037	35,026	47,744	81,802	(525,388)	(716,163)	(1,227,037)
,267,002	2,202,795	61,170	84,467	146,853	(917,551)	(1,267,002)	(2,202,795)
,102,400	2,022,601	50,565	73,493	134,840	(756,772)	(1,102,400)	(2,022,601)
,147,874	2,020,032	54,812	76,525	134,669	(822,186)	(1,147,874)	(2,020,032)
422,384	992,392	13,969	28,159	66,159	(209,528)	(422,384)	(992,392)
714,941	1,343,815	32,007	47,663	89,588	(480,103)	(714,941)	(1,343,815)
499,757	872,568	24,036	33,317	58,171	(360,539)	(499,757)	(872,568)
,022,321	3,775,974	129,307	183,751	341,309	5,968	(1,022,321)	(3,775,974)
896,236	1,600,838	42,208	59,749	106,723	(633,119)	(896,236)	(1,600,838)
(465,660)	2,492,185	71,972	97,577	166,146	(1,079,561)	(1,465,660)	(2,492,185)
(501,069)	(306,464)	0	0	0	573,740	501,069	306,464
,112,830	(1,037,197)	0	0	0	1,141,073	1,112,830	1,037,197
(120,045)	176,454	0	0	11,764	230,763	120,045	(176,454)
396,366	850,159	15,127	26,424	56,677	(226,908)	(396,366)	(850,159)
,198,364	3,948,085	102,978	146,556	263,259	(1,544,672)	(2,198,364)	(3,948,085)
(485,203)	846,281	23,175	32,214	56,419	(347,620)	(485,203)	(846,281)
346,429	596,908	16,860	23,095	39,794	(252,894)	(346,429)	(596,908)
216,771	373,683	10,545	14,451	24,912	(156,175)	(216,771)	(373,683)
304,107	560,761	13,884	20,274	37,384	(208,266)	(304,107)	(560,761)
47,767	142,787	819	3,184	9,519	(12,285)	(47,767)	(142,787)
291,983	494,153	14,432	19,466	32,944	(216,487)	(291,983)	(494,153)
291,002	513,440	13,863	19,400	34,229	(207,938)	(291,002)	(513,440)
217,101	420,869	9,401	14,473	28,058	(141,008)	(217,101)	(420,869)
966,677	2,766,287	28,522	66,904	184,419	(294,654)	(966,677)	(2,766,287)
272,627	604,908	9,903	18,175	40,327	(148,544)	(272,627)	(604,908)
280,184	539,502	12,223	18,679	35,967	(183,348)	(280,184)	(539,502)
105,248	244,544	3,549	7,017	16,303	(53,231)	(105,248)	(244,544)
260,896	845,195	2,847	17,393	56,346	(42,703)	(260,896)	(845,195)
84,609	408,286	0	5,641	27,219	36,260	(84,609)	(408,286)
(36,888)	125,851	0	0	8,257	96,913	36,888	(125,851)
,198,397	5,752,832	149,633	213,226	383,522	(2,244,502)	(3,198,397)	(5,752,832)
74,166	206,755	1,644	4,944	13,784	(24,654)	(74,166)	(206,755)
258,364	459,319	12,221	17,224	30,621	(183,322)	(258,364)	(459,319)
344,024	609,646	16,322	22,935	40,643	(244,834)	(344,024)	(609,646)
133,872	250,548	6,020	8,925	16,703	(90,302)	(133,872)	(250,548)
390,305	679,145	18,830	26,020	45,276	(282,444)	(390,305)	(679,145)
163,627	344,045	6,417	10,908	22,936	(96,254)	(163,627)	(344,045)
224,589	382,064	11,052	14,973	25,471	(165,783)	(224,589)	(382,064)
484,611	828,449	23,748	32,307	55,230	(356,213)	(484,611)	(828,449)
373,199	631,960	18,438	24,880	42,131	(276,571)	(373,199)	(631,960)
247,999	427,557	12,063	16,533	28,504	(180,947)	(247,999)	(427,557)
339,601	606,126	16,005	22,640	40,408	(240,073)	(339,601)	(606,126)
164,041	527,218	6,874	10,936	21,815	(103,107)	(164,041)	(527,218)
,765,460	3,842,380	78,981	117,697	256,159	(1,104,714)	(1,765,460)	(3,842,380)
86,007	150,879	4,119	5,734	10,059	(61,782)	(86,007)	(150,879)

| ,222,901 | 56,076,136 | 985,077 | 1,748,193 | 3,791,742 | (14,776,140) | (26,222,901) | (56,076,136) |