RGS
006

REPORT OF DIAGNOSTIC SURVEY

Using rapid rural appraisal techniques

OF

DACHE GOFARA PEASANTS ASSOCIATION

IN BOLOSO SORIE WEREDA

CCRDA

Based on the work of staff members of

REDD BARNA FARM AFRICA
MINISTRY OF AGRICULTURE
(North Omo)

April 1993
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PREFACE

This is a report of a Rapid Rural Appraisal (RRA) survey carried out in the area of the Dache Gofara Peasant Association (PA) of Boloso Sorie (Areka) wereda (previously awraja) in the North Omo zone (previously region), South Ethiopia. The survey took place between 16th and 28th March 1992.

The core members of the survey team were:

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Ato Alemu Tadesse, Mr. Stephen Sandford, Wt. Elfinesh Atske, Ato Elias Watcho and Ato Eshetu Abate. Particular thanks are due to Ato Alemayehu Konde for substantial assistance in editing.

Diagnostic survey of Dache Gofara PA is a follow up of Rapid Rural Appraisal training in Soddo (July 1991). FARM Africa organised a training for staff members from different NGOs and Government organisation in RRA techniques. Two of the participants were from REDD BARNA Ethiopia.

FARM Africa initiated a day long periodical group visits to learn from different NGOs activities in Soddo. These visits created a conducive environment to exchange views and share experiences between NGOS operating in an agricultural development in the area.

During group visits and other meetings; FARM, as part of its activities, encouraged several NGOs to do a joint diagnostic survey with the RRA techniques application. These surveys were used for on the job RRA Techniques teaching and application. Participating NGO and government experts were taught in an actual situation. Hitherto, diagnostic surveys with RRA techniques application have been undertaken with CONCERN, WORLD VISION, SOS Sahel, FAO/FFHC/AD and REDD BARNA.

This diagnostic survey is a result of discussion between the REDD BARNA, Areka Development program manager and Farmers' Research Project (FRP) of FARM Africa.

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The identification of specific objectives of the survey and the PA area selection were done by the REDD BARNA staff. The necessary multidisciplinary team selection, checklist preparation and a day long orientation on RRA techniques were carried out by FARM before the survey started.

The objectives of the survey include:

1. To identify crop production constraints and their effects on specific crops produced; With the aim to look at:

   a) The crop and its relative performance, extent of damage, the amount of yield reduced, its impact on the livelihoods of the people.
   b) The farmers' traditional attempts to overcome these problems.
   c) Improved methods applied to solve these problems, and sources of innovations.
   d) What other alternatives do the farmers envisage, means of participation.

2. To assess ways and means of maximising production and utilising the available limited resources in the PA. Taking into consideration:

   a) The farmer-induced cropping pattern and changes, types, replacements, expansion.
      Implications of such new crops' introduction on:
      - existing crops and cropping pattern,
      - food habits and markets and
      - the importance of the crop in the farming system;

   b) Intensification of farming practice through:
      - introduction of agro forestry,
      - expansion of cash crops and
      - improving livestock feed availability and production.

3. To survey natural and socio-economic conditions that influence production systems in the area with the view to:
   - identify farmer-perceived other constraints in the existing farming system,
   - identify (in all cases) farmers' priorities or solutions for the constraints and their 'best bets' development options.

4. To identify the needs of women, and ways in which they themselves could actively participate in their specific development activities. i.e. identification of:
   - women-perceived constraints and
   - their priority solutions, 'best bets'.

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CHAPTER 1. INTRODUCTION

1.1. General description of the PA

Dache Gofara Peasant Association is situated in Boloso Sore awraja, about 20 Km east of Areka town and 10 kms away from the main road from Soddo to Hosaina.

The PA area lies between Gamo river in the south and Shapa river on the northern bounds. The middle part of the PA undulates inclining towards the two rivers (see Figure 1.1). During rainfall seasons, the floods drain towards the two rivers eroding the soils along the side slopes.

The farmers identified three types of soils in the PA area. Black cotton soils which cover the swampy areas, and slightly distributed in the middle parts, red soils mainly along the river banks and black to grey soils mainly distributed over a larger area of the PA.

Perennial crops, eucalyptus trees, and variety of other tree species cover the whole PA area throughout the year. Most of the flora found grown in the PA is a fairly recent introduction in the PA.

Rainfall pattern and distribution is erratic. It's onset and termination does not correspond to the cropping calendar of the PA. It has been consistently deviating from the long-term normal pattern, i.e., time of onset, ending, and distribution changed for the last 20 years. As a result, crop yields and performances significantly declined.

The PA was inhabited about one and half century ago (an old man of over 100 years). The pioneer immigrants and settlers were a wife and husband named W/o Dache and Ato Gofara, who fled the then tribal conflict at Kindo Koyisha and surroundings. The PA got its name from these first settlers of Dache and Gofara. The PA was later occupied by 72 other clans who immigrated from different parts of the country.

Members of the PA number about 832 households. The population is largely Christian and the people are mostly Welaita origin, with some inhabitants from bordering tribes of Kambata and Hadiya people.

The area is densely populated and has land shortage. The lack of farm land and limited sources of off-farm activities left the people to fall under severe food stress.

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The PA adjoins the main road that goes to Areka town by dry weather road. It has got a health post, a tertiary market place, springs, elementary school and churches. For veterinary service, high schools, secondary markets, a health clinics and commodity purchases the people travel to Areka town.

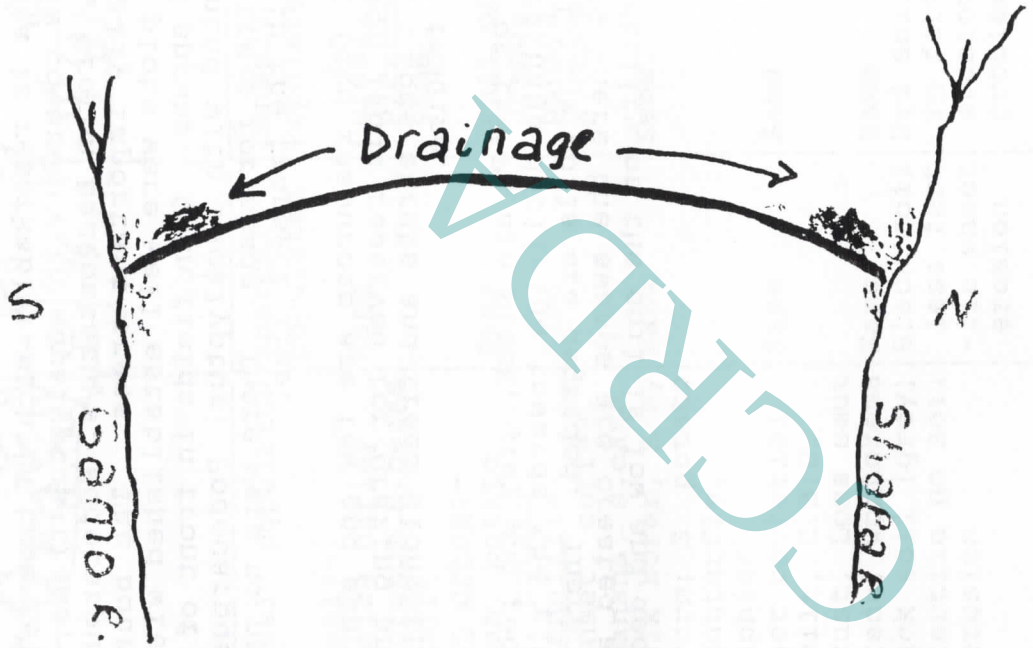
The main cash and food crops grown in the PA include, maize, enset, haricot beans, taro, sweet potato, teff and fruits. The farmers depend on crop and livestock production for their livelihoods. Other sources of income in the PA include petty trade, migrant wage labour and local employment. However, the majority of the families in the PA are impoverished and destituted.

The major problems of livelihoods identified during the diagnostic survey are:

a) lack of resources for production
b) crop and livestock pests and diseases
c) high population pressure on land and its produce
d) lack of farm inputs i.e oxen power, seeds, fertilisers
e) livestock feed shortage i.e no or less grazing land which is overgrazed
f) decline in soil fertility due to high eucalyptus tree population and lack of fallowing land and crop rotation
g) lack of resources for cash income.

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FIGURE 1.1. CROSS SECTION OF DACHE GOFARA P.A.



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1.2. Transect of natural resources

To understand the distribution of natural resources in the PA, the team walked a transect line with a group of informants from the PA.

The teams observations and verbal data obtained from the informants are summarised in Figure 1.2.

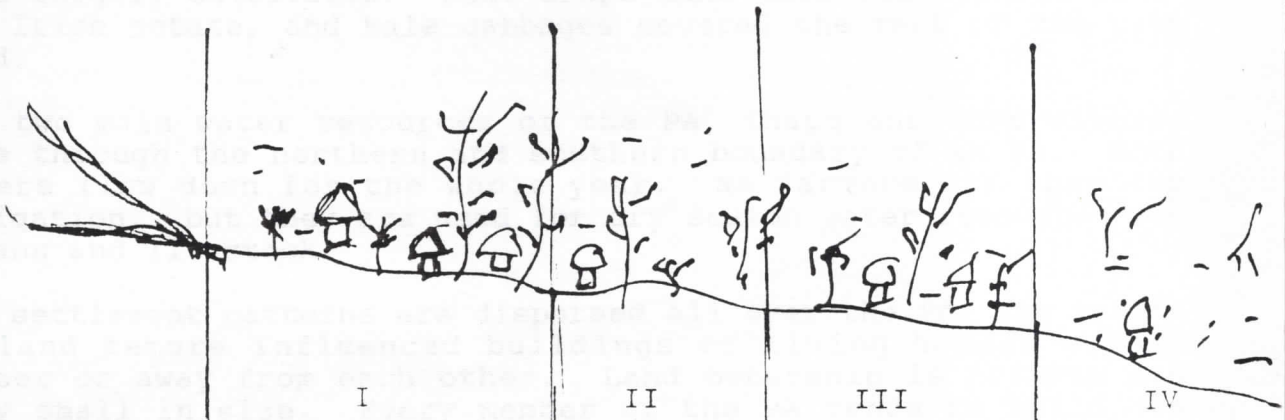
The PA area is remarkably rich in tree resources where vast area of land is covered with eucalyptus trees, Olea africana, Cordia africana, Croton mactostachys, Podocarpus gracilior and other economically important trees. The boundaries of nearly all farmers' plots were well established with hedges of different trees and shrubs. Open fields in front of the houses (dejaf Am.) were planted with eucalyptus, Podocarpus Juniperus, and Olea africana trees for shade. There were no natural forest resources observed in the transect line.

Livestock feed resources are few and scanty. There were small open common lands reserved for grazing and walking during the day time. Some shrubs and trees along the hedges are used for livestock feeding.

The soils of the PA are black, grey and red in colour. At the end of the drainage declining towards the rivers, as indicated in Figure 1.1, the soils are degraded. There are flat lands near to the rivers where the swamps are created and wet throughout the year. Fertility of the soil is low and declining.

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FIGURE 1.2. TRANSECT OF DACHE GOFARA PA



	I	II	III	IV
Settlement	Densely populated	Scarcely populated	Densely Populated	Scarcely populated
Crops	Cereal:- maize barley sorghum H.beans teff	Same	Cereal, Root, P/crops are same	Same
	Root crops:- yam, potato s. potato	Same	Fruit crops:- orange, papaya avocado	Same
	Perennial:- enset, coffee, banana, s.cane	Same		
Crop pests	Stalk borer, Army worm, S. potato butterfly, aphids	Same	Same	Same
Crop disease	Enset bacterial wilt, C.B.D, Rust, Loss smut	Same	Same	Same
Crop weeds	Seredo, wontokema	Same	Same	Same
Soils	Black soil (grey) fertile no soil erosion	Black soil less fert -ile sheet erosion	Red soil poor in fertility erosion problem	Black soil/ grey, poor soil, moisture absorbed by the Eucl.
Livestock	Cattle, donkey, sheep, mule, goats, chickens	Same	Same	Same
Livestock diseases	Black leg, internal parasite, anthrax, feacal constipation, tryps	Same	Same	Same

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(continued Figure 1.2.)

	I	II	III	IV
Grazing	Cut and carry poor grazing of open areas Crop residue, enset	Same	Cut and carry individual grazing crop residue & enset	Communal grazing cut & carry, enset
Forestry	Eucalyptus camalendulensis, Cupressus lusitanica, Olea africana, Erythriana abyssinica, Croton macro-stachys, Cordia africana, Podoc-arpus gracilior, Albizia gummfera, Milletria ferruginey	Same	Same but Eucalyptus camldulensis dominate	The same but communal forestry is availabl
Infrastructure	Church (2)	---	Market, small health post	School const ructed by REDD BARNA, Church
Water source	From river & spring	From river	From river	From river and spring
Land tenure	Private holding	Private holding	Private holding	Private holding

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During transect walk, significant fields of perennials crops were observed. Among others, enset,banana plantation and fruit trees were largely cultivated. Root crops like taro root, sweet potato, Irish potato, and kale cabbages covered the rest of the crop land.

The two main water resources of the PA, Shapa and Gamo rivers, pass through the northern and southern boundary of th PA. Both rivers flow down for the whole year. No farmers use them for irrigation, but they are used for dry season water resources for humans and livestock.

The settlement patterns are dispersed all over the PA. The nature of land tenure influenced buildings of living houses either closer or away from each other. Land ownership is private and very small in size. Every member of the PA tends to build his house on his private land. The decision of house construction depends upon the size and suitability of land for cropping. Priority is given to the crops, not to the house building.

Most of the houses were thatched with grasses. While walking transect, the group observed small fields of grasses for roof cover.

Very small number of livestock herd was seen grazing on common grazing lands and in front of the houses (dajaf Amh.) grazing. Some of the sheep and cattle were tethered.

Land use types of individual holdings were fragmented. Land holdings were divided into many plots of different crops. For instance, the group observed on a single farmer's farm, plots of enset, taro, sweet potato, maize, coffee, sorghum, barley, teff, and kale cabbages. Apportioning of land to 8 or 10 crops has prevented a wider production of any single crop. There was no expanded or large area for a single crop for production in bulk.

The cropping pattern was mixed with annual and perennial crops, which includes cereals and root crops.

Rainfall is erratic and unreliable at its start and end. The climate is cool and wet most of the year.

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1.3. Maps of the PA

Maps containing lots of informations about the PA (Figures 1.3, 1.4 and 1.5) were drawn by a group of ten farmers, of whom three were women. These farmers were randomly selected from a large crowd of farmers who were mobilised to participate in food for work programme. Before the selection, one of the team members (from REDD BARNA) briefed the crowd on the purposes of team's arrival in their PA area. Prior to this meeting, the farmers were not informed about the diagnostic survey in their PA. The attempts made to contact peace and security committee members of the PA was unsuccessful.

The survey team's discussion with the people to understand their environment began by drawing the PAs sketch map on the ground. They selected an open space (without grass cover) at the centre of common grazing land and cleared it off the dust. They used hand hoe and tree branches to smooth over the ground.

The first attempt of sketching was done by three farmers. They tried to understand their boundary by talking to each other. They started with mental map and went on to drawing on the ground. While the drawing was in progress, one of the women constantly tried to improve on the boundaries of the PA. At last, an old man, who was sitting down and watching what was going on, reminded the group about the prominent features located at the boundaries of the PA. Then, the extension worker of REDD BARNA (who was born in the PA and working with the PA) took over the stick and finalised the PA map.

The farmers used local materials like, hoe, stick, leaves, flowers, ashes, rope, and grasses to show locations of different resources on the map.

The farmers with the assistance of extension agent demarcated on the sketch map various resources available in their PA area.

Land forms - flat lands, eroded areas, swamps, gulleys

Land use types - Crop distributions, forest areas, settlements, rivers, roads, grazing lands, grass lands

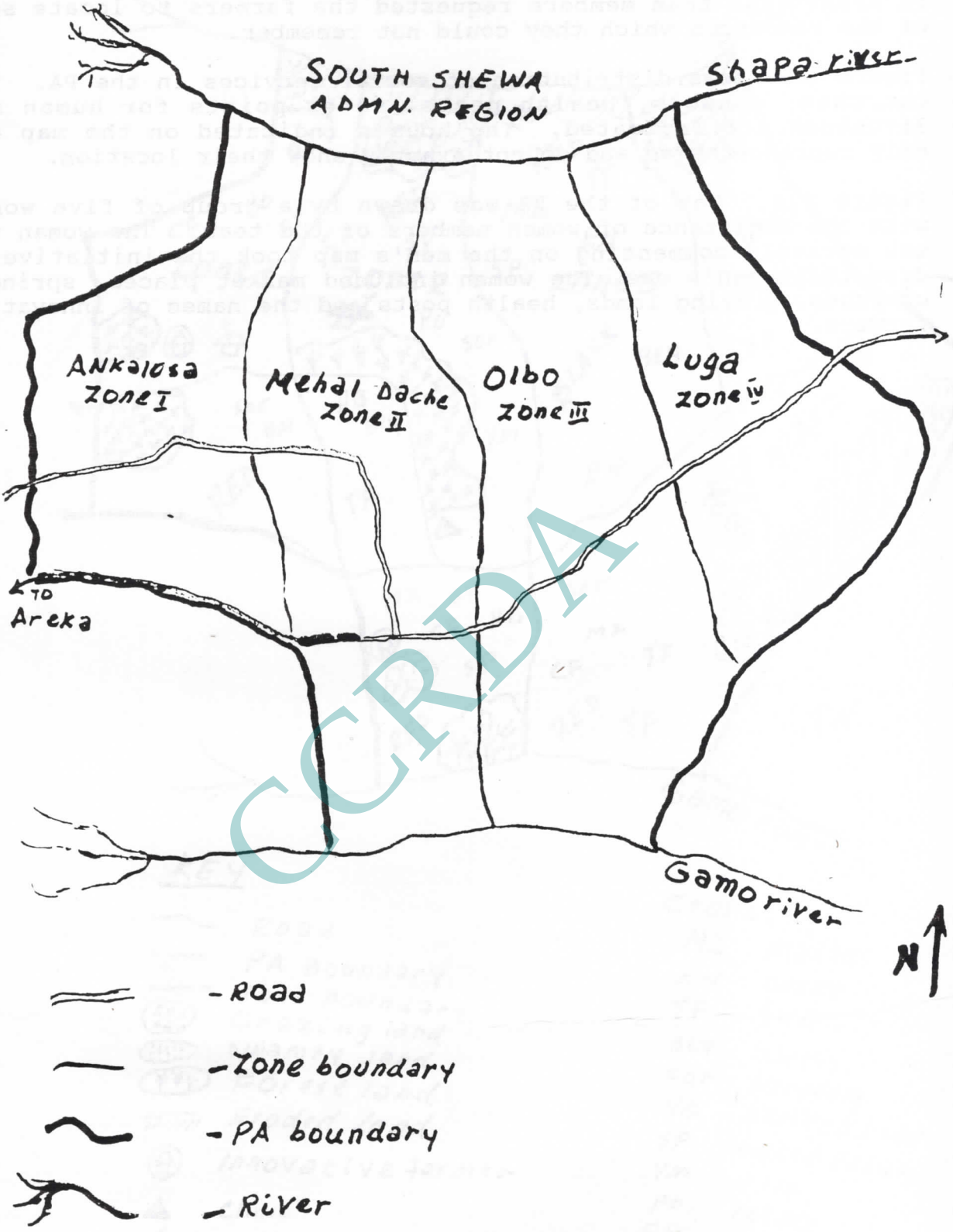
Infrastructures of social interests, i.e. schools, churches, protected springs, PA office, innovative farmers house, health posts

Road net works. i.e foot paths, the motorable road from the PA to the junction of Areka-Hosaina main road

The PA is divided into 4 villages or zones (REDD BARNA). These are 1) Ankolosa 2) Mehal Dache 3) Olbo 4) Luga Zones, which are used as the lowest administrative units, and project implementation units (Figure 1.3).

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FIGURE 1.3. MAP OF DACHE GOFARA P.A.



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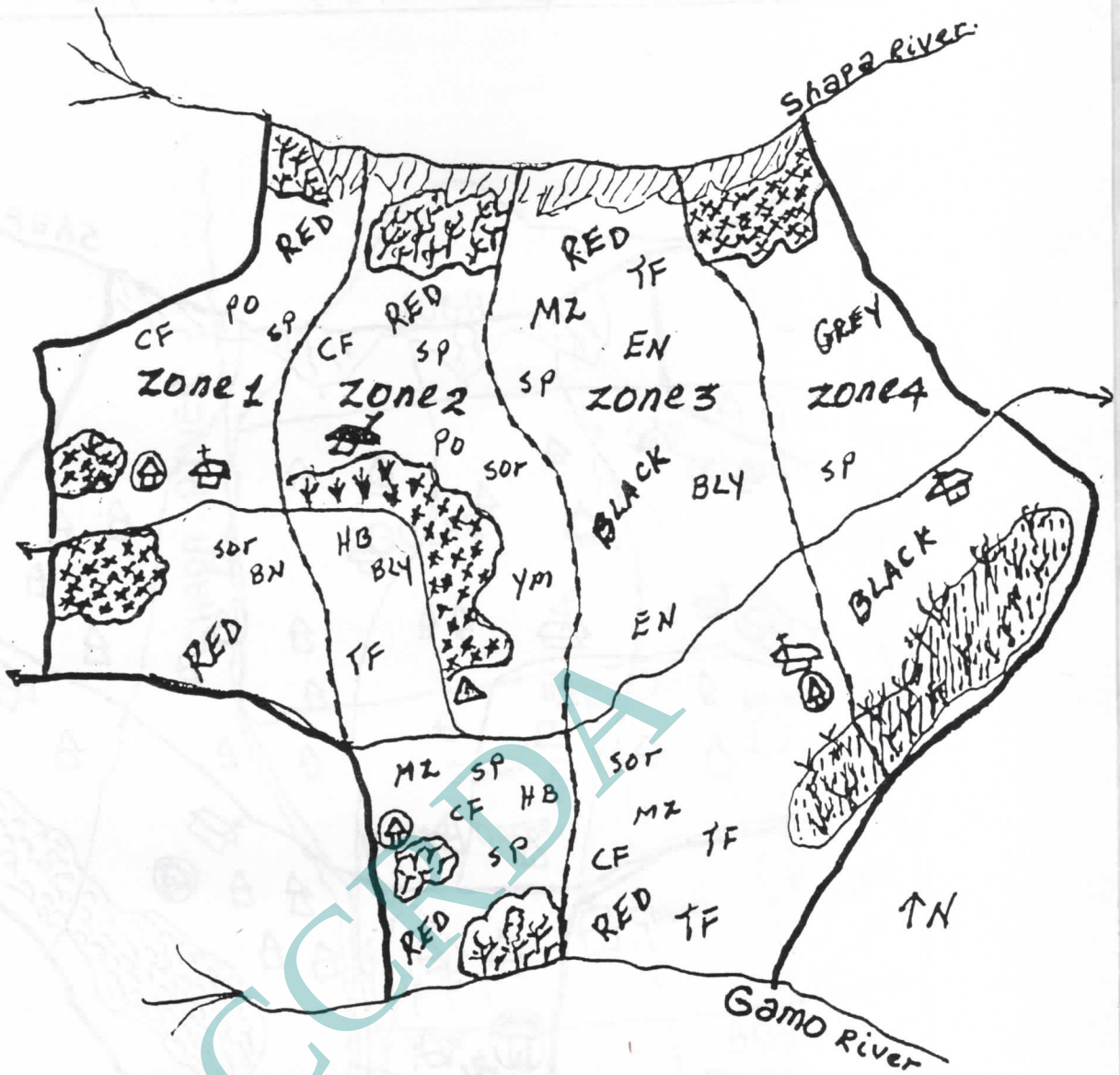
Figure 1.4 shows land use types and resources available in the PA area. The team members requested the farmers to locate some of the resources which they could not remember.

Figure 1.5 shows distribution of social services in the PA. The churches, schools, health posts, water points for human and livestock are indicated. The houses indicated on the map are only representative and do not exactly show their location.

Figure 1.6, Map of the PA was drawn by a group of five women with the assistance of women members of the team. The woman who was actively commenting on the men's map took the initiative to draw the women's one. The women included market places, springs, churches, grazing lands, health posts and the names of innovative farmers.

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FIGURE I.4. LAND USE MAP OF THE P.A.



KEY

- Road
- PA Boundary
- Zone Boundary
- Grazing land
- Swampy land
- Forest land
- Eroded land
- Innovative farmer
- Clinic
- School
- Church

Crops:

MZ	maize
EN	enset
TF	teff
BLY	barley
SOR	sorghum
HB	haricot bean
SP	sweet potato
YM	yam
PO	Potato
CF	coffee
BN	banana

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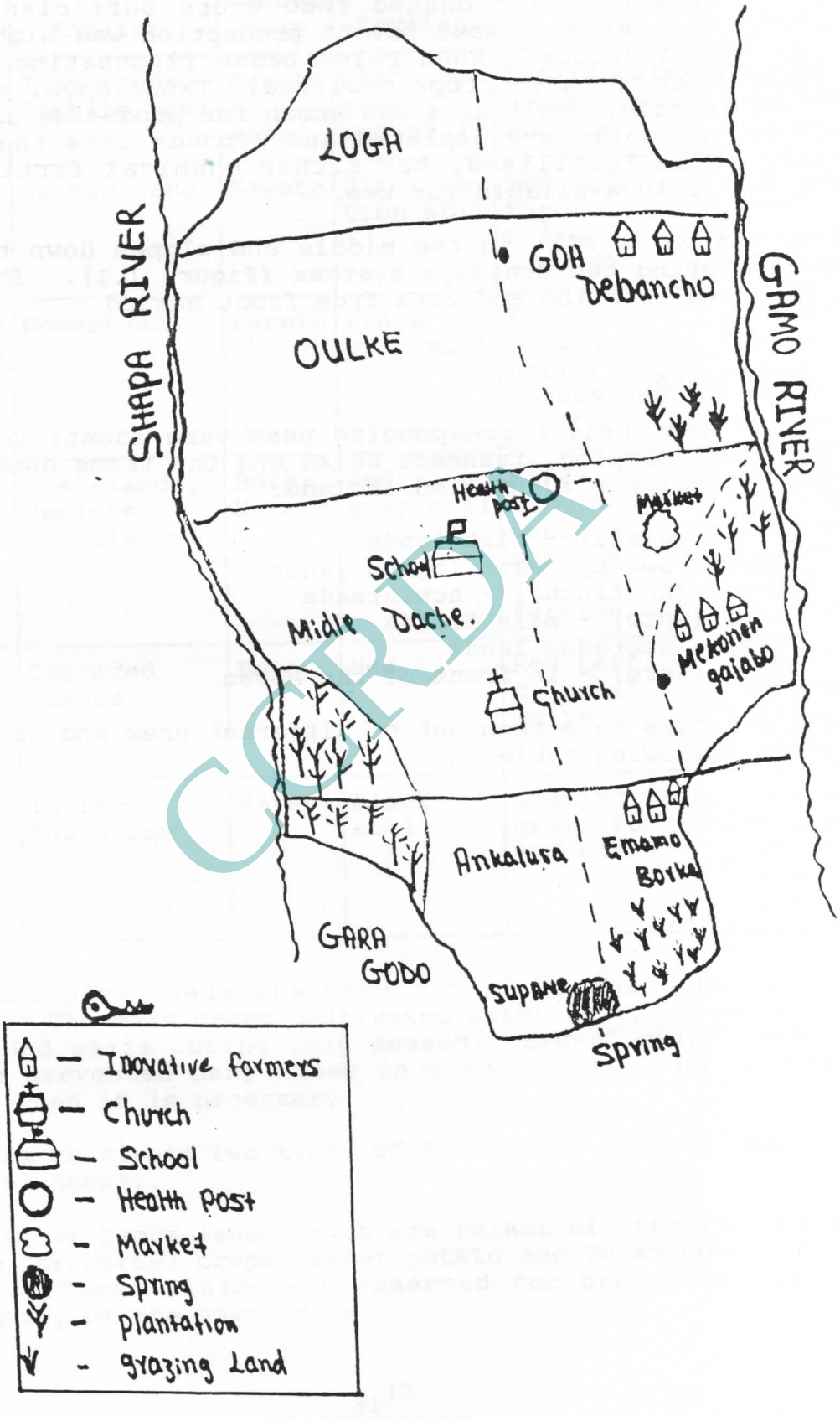
FIGURE 1.5. SOCIAL MAP OF THE P.A.



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FIGURE 1.6. MAP OF DACHE GOFARA P.A.

(Drawn by Women)



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CHAPTER 2. PHYSICAL CHARACTERISTICS

Rainfall patterns and soil types influence farming systems development in the PA. When the rainfall was in abundance some 20 years ago, the people produced food crops sufficient for the whole year. Enset and sweet potato production was high and even was fed for livestock. When rains began fluctuating the yield and plantation of these crops declined. Those days, soils were "fat" and fertile, small area was known for producing high yield. Nowadays, the soils are depleted and produce less than before. It needs to be fertilised, but either chemical fertilisers or manure is hardly available for use.

Land in the PA is flat in the middle and slopes down to the two rivers, creating two drainage systems (Figure 1.1). It is suitable for oxen traction and free from frost hazard.

2.1. Land forms

Land forms and their corresponding uses were identified through participatory mapping, transect walks and the teams observations. The main land forms identified include:

i) Letita (demba) - flat lands
ii) Chere - swampy, waterlogged lands
iii) Derkwa (Shafincha) - homesteads
iv) Shoka (Geta) - main fields
v) Gosha - degraded lands
vi) Zagwa (Kere) - in front of the house

These land forms have been put to different uses and are indicated in the following table.

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Table 2.1 Land forms in the PA and their uses

Land form		Soil types		Land use	
Local name	English	Local name	English	Crops	Planting Months
Letita or Demba	Flat lands, fertile area	Kareta Bota	Black to grey, red soil	Teff (white) h.beans,maize sorghum	August January January
Chere	Swampy land	Kareta	Black cotton soil	Red teff, taro maize S.potato	Apr.-July Jan-Dec February Apr.-Sept
Derkwa or shafincha	Homesteads	Kareta	Black to grey soil	Enset, cabbage, coffee spices,yam, fruits	January July-Jan May/July July/Aug. October
Shoka or Geta	Flat-lands, depleted wastelands	Bota, Kareta	Red, grey soil	Maize, s.potato, taro sorghum teff(white)	Jan-Aug. Oct.-Apr. Jan-Dec Jan/Feb-Dec. July-Dec
Gosha	Degraded lands	Bota	Red	Red teff, s. potato maize	Apr.-July Oct.-Mar. Jan/Feb-Aug.
Zagwa or Kere	In front of the house	Kareta	Black soil	Grazing area, grass for cut and carry	Continous grazing dry and rainy seasons

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Land around homesteads are used for crops that are regularly harvested. The main crops cultivated were enset, cabbages, yams, cassava, and maize during Belg season. Except maize, the other crops are harvested many times in a year. Bits and pieces are harvested when it is necessary.

The farmers cultivate two types of flat lands or main crop fields (Letita and Shoka).

1) Letita or Demba lands which are relatively fertile and suitable for cereal crops, sweet potato and Irish potato plantation. These fields are reserved for production in large quantity of the same crops.

2) Shoka (or) Geta lands which are less fertile and over cultivated. The soils are depleted and sometimes considered to be wastelands. The soils are shallow and require seasonal fallowing. The land needs longer preparation period and fertilisers.

3) The Chere lands (swampy lands) are suitable for less rainfall period cultivation. The farmers mainly plant taro root, red teff and maize on them. During heavy rainfall seasons the crops completely fail.

4) Gosha (degraded) lands in the PA are situated along the two river sides. Floods wash away top soils from the farm lands every year. Significant area of land was out of production. Some farmers have already started planting eucalyptus trees on these eroded lands.

5) Zagwa lands - open fields in front of the houses are important places of livestock tethering. The largest single plot of land allocated to a single use could be zagwa (kere) land. From these open fields, a proportion is restricted for grass growth for cutting and carrying uses. Milking cows and horses benefit from these protected fields.

2.2. Soils

The soil types and distributions in the PA are shown in Figure 1.4 and table 2.1 (pages 14 and 17). The farmers identify 4 types of soils. Black cotton soils of swampy lands, black and fine soils of homesteads, black to grey soils of grazing lands and undistributed fields and red soils of depleted and eroded areas.

The soils under perennial crops are intensively used and exhausted. This is because it is intensively and continuously cultivated (without rest) for years. The fields are intercropped at different seasons of the year and require turning over of the soils. For every newly planted crop it needs land preparation, planting and weeding. For instance, inside coffee and enset plantation, haricot beans, sweet potato, maize, Irish potato and others are intercropped at different cropping seasons. Moreover, intercropping demands too much water and mineral resources in the soil.

Chemical fertilisers and manure are used, if any, on the soils of the main fields (Letita and shoka). In the past fertilisers were regularly used and available but the soils were with their natural fertility. Today, it has become impossible for many farmers to buy fertilisers in the markets. Some of the soils have ceased production without fertilisers. The farmers were extremely worried about their future production when this survey was conducted.

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2.3. Vegetation cover

An extensive area of the PA is covered with introduced and natural vegetation. Introduced vegetation has taken over large areas of crop lands. Various species of shrubs and forest trees were planted along strips of track, on the boundaries of two farmers in the open space, in front of the houses, in the crop fields' edges and elsewhere. With dense perennial crops cover and tree plantation, the PA area resembles natural forest colony on earth.

Shapa and Gamo river valleys were covered with natural forest trees and shrubs. Some of the open valley were under coffee plantation, fruit trees and shrubs as well.

According to the farmers interviewed, about 50 years ago, a larger area of land was covered with forest trees and grasses. With the increase of population and changes in land tenure system, wooded lands were cleared for crop cultivation. Economically valuable trees were destroyed while clearing off the bushes.

However, the people were able to quickly replace old natural trees with eucalyptus, which were imported from Jimma Administrative Region. The local chiefs first imported eucalyptus species from Jimma area.

Physically, the area appears to look ever-green and fertile for visitors disguising the socio-economic reality of the people. Many of the tree species do not shed their leaves in any of the seasons. This is due to sucking up of moisture from the soils.

The study team observed that a large area of land in the PA is taken over by shrubs, hedges and forest trees, which competes with food crops for soil moisture.

2.4 Rainfall

There was no quantitative rainfall data obtained from any sources in the area. There was no rainfall recording station in the surrounding which would help us to make some statistical inferences, except that of Areka IAR station located away from the PA.

The rainfall pattern and distribution was discussed with two groups of farmers for two days, at different locations. On the first day, the discussion was held with 5 innovative farmers and on the second day with a group of 12 farmers, of whom 4 were women. The second day discussion was interrupted by an old man of 80 years, who is respected by the community as "RAIN MAKER".

During a long spell of dry weather (in rainfall season), the community contributes money and pay bribery to the rain maker. When the team members raised rainfall issues in the meeting, the followers of the rain maker explained that they do not have rainfall problem in their village. Because, they said, "we can

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buy rain from our lord rain maker". They said "it is because of our trespasses and sin that we do not receive proper rainfall". If we were generous and righteous we would have received sufficient, healthy and timely rains through out the year". For instance they said, "we have to raise more money and pay "large sum" to buy sufficient rainfall from him".

According to the followers of the 'rain maker', if more money is paid (bribed) then greater amount of rains are "Sold or gifted" to the people. Rainfall onset, end and distribution depends upon the amount of money paid for or donated to the rain maker. One of the informants attributed that "rainfall is not their worry, but only lack of farm inputs that reduces their crop yield. He said, "rather give us an ox than talking to us about rainfall stress". Then the old man (the rain maker) and his followers walked away home.

After supplementary briefings and persuasion, discussion about rainfall and cropping pattern continued with 6 farmers.

The farmers interviewed identify 3 types of rainfall patterns with different rates of distribution.

a) 'Bega Zinab' (Amh.), small showers of rain coming in October and November, which helps to plant sweet potato, taro and yam root crops. In Tahsas (Dec.) with some soil moisture from previous rains, land preparation for enset plantation and maize starts.

b) 'Belg Zinab' (Amh.) is normally expected after and on the 11th of Tir (E.C), Epiphany day (Yetimket Elet Amh.), the major period in which normal rains appear for 'Belg' crops.

   Tir (January) rains are used to plant enset, maize, sorghum haricot beans, cabbages (denkela Wel.) and sweet potatoes in Yekatit (Feb.). For the last 20 years, 'Belg' rains have been unreliable and deceptive. It was highly variable and tricky. It rains for few days and stops for longer period, partly or completely destroying the season's crops. Twenty years ago (1964 E.C.), rainfall was high and dependable during 'Belg' season. The failure of 'Belg' rains create difficult conditions for the 'Keremt' (Amh.) months cropping.

c) 'Keremt' Zinab (Amh.) The long rainfall season which begins in Sene (June) and continues with high rainfall until the middle of Meskerem (September). During these months, coffee and fruit tree seedlings sugar cane, barley, teff (red and white) etc are planted for dry season (Bega Amh.) harvest. Teff harvest is in Hidar (Nov.) when the rains end.

Figures 2.1 and 2.2, rainfall calendars showing the past and present rainfall pattern and figure 2.3., yearly rainfall amount between 1976 and 1983 (E.C.) were drawn by 5 innovative farmers. They were assisted by their educated children who participated during an open discussion with the farmers.

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Figure 2.2, the farmers 'historical' rainfall calendar (refers back to 20 years ago) indicates that rainfall patterns in the months of the year for successive years was similar (dependable) in its start, end and distribution. They recall that the months of Yekatit and Genbot were without any rainfall. Tahsas and Tir used to get small showers, but the lowest rainfall amount for the years.

Megabit and Miazia rains were reliable and sufficient to support crop growth about 20 years ago. The Miazia rains were higher than Megabit, creating conducive climate for crops planted in Megabit. Although the farmers calendar recorded small or no rainfall in Genbot about 20 years ago, moisture stress was not a problem of crop growth. This is because Miazia rain satisfied the soils and the waters infiltrated deep into the soil.

The major annual rainfall used to occur in Sene, Hamle and Nehasse. The heaviest rains were known to fall in the months of Hamle and Nehasse.

The five innovative farmers interviewed described the current rainfall pattern as "illusive and deceptive". They said "we can not predict when it starts and when it ends". We plant our crops "whenever" the rain starts, the problem is it stops at the time of critical crop performance, at the time when we can not plant any other substitute annual crop.

The farmers noted a significant level of reduction in rainfall amount and distribution for the last 20 years. They have illustrated the amount of rainfall and its distribution in Figure 2.1. It can be noticed from the figure that:

a) No rainfall in Hidar, Yekatit and Genbot.

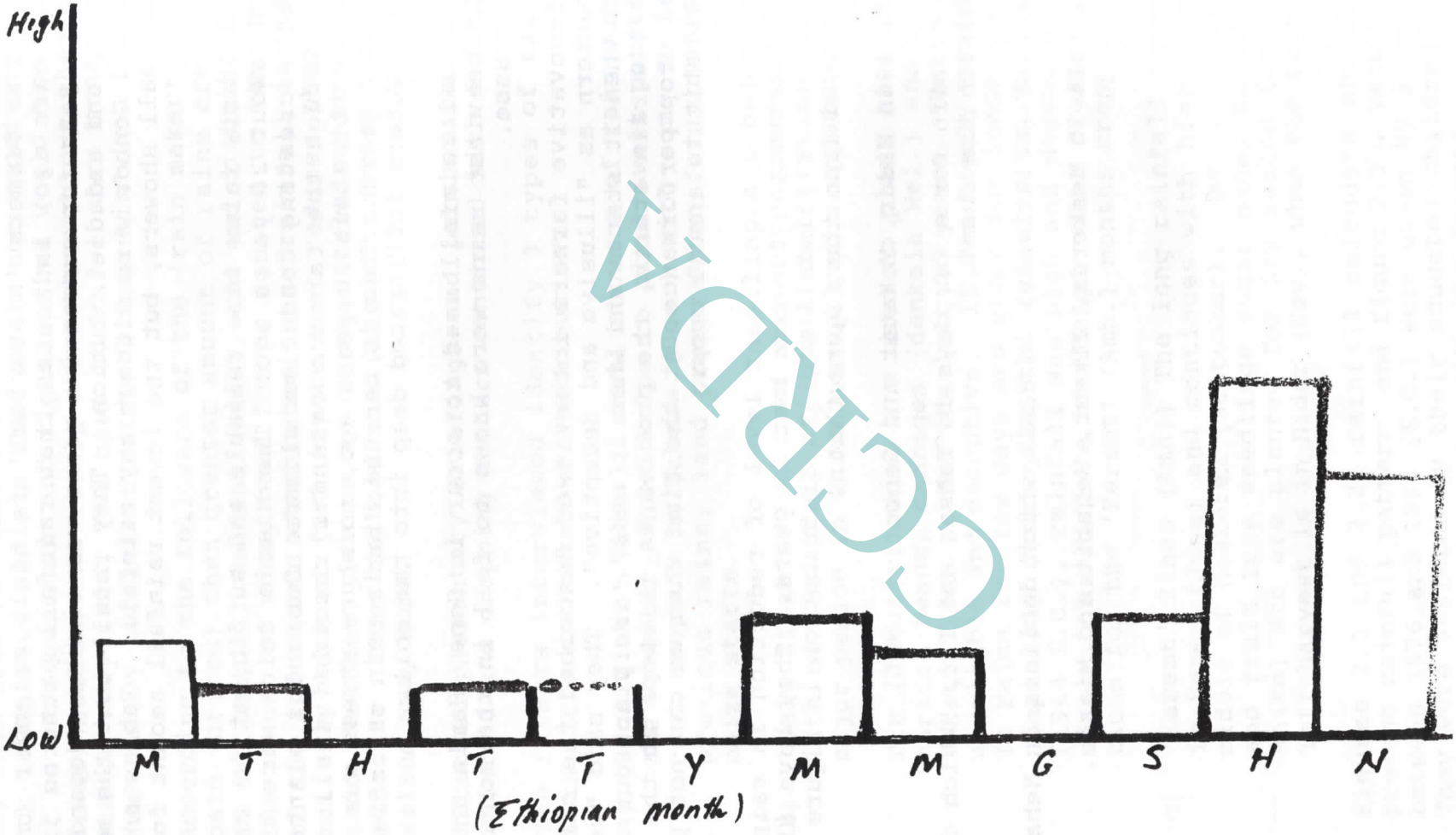
b) Showers of rain for a few days in Tahsas and Tir, "Which does not moisten the dust".

c) High rainfall (relatively) in Hamle which declines in Nehasse.

d) Some rainfall in Meskerem, Tikemt, Megabit and Miazia.

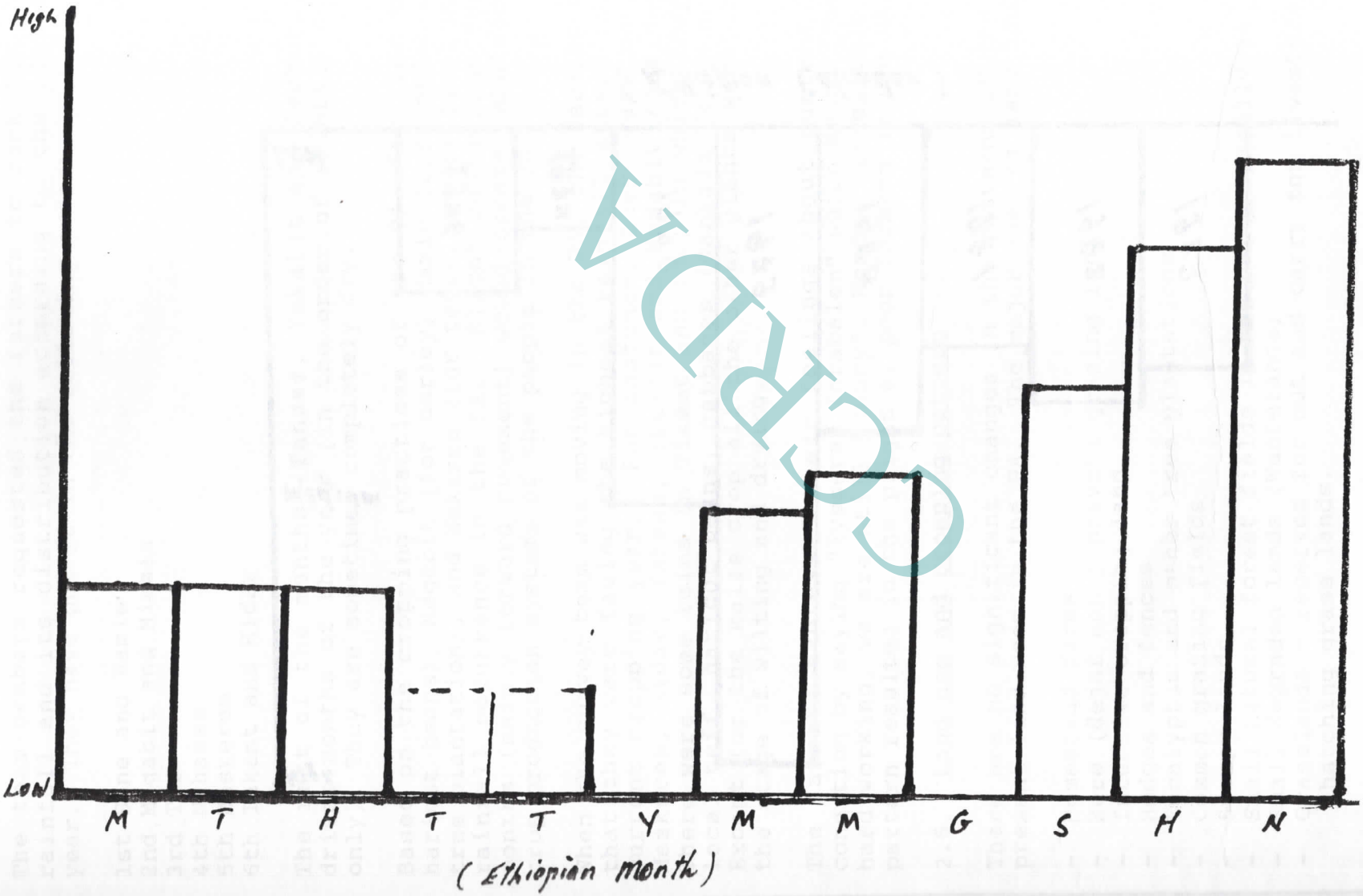
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FIG. 2.1. MONTHLY DISTRIBUTION OF RAINFALL AT PRESENT



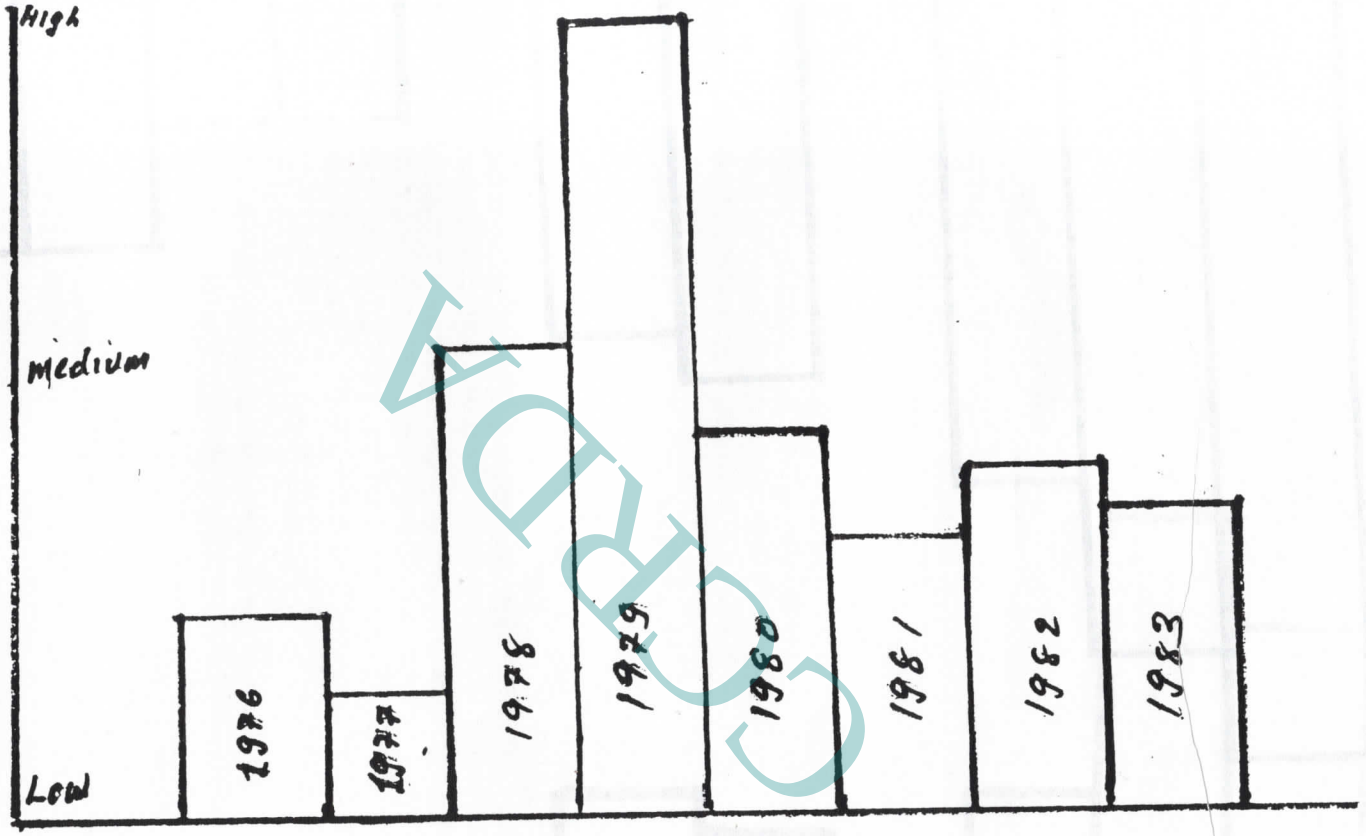
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FIG. 2.2. MONTHLY DISTRIBUTION OF RAINFALL 20 YEARS AGO



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FIG. 2.3. ANNUAL RAINFALL 1976 - 1983 E.C.



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The team members requested the farmers to rank the amount of rainfall and its distribution according to the months of the year. They have put it in the following order:

1st Sene and Hamle
2nd Megabit and Miazia
3rd Tir
4th Nehasse
5th Meskerem
6th Tekemt and Hidar

The rest of the months (Tahsas, Yekatit and Genbot) are the driest months of the year (in the order of rainfall occurrence only). They are sometimes completely dry.

Based on the cropping practices of the PA, Tir (for maize and haricot beans), Megabit (for barley) Hamle (for coffee and fruit tree plantation), and Nehasse (for teff), are critical months for rainfall occurrence in the PA. Slight deviations from these months (mainly forward movement) would create imbalance in the crop production systems of the people in the PA.

When the survey team was moving in the PA, the farmers expressed that they were facing the highest rainfall stress during the current cropping year. For instance, there were no rains in Meskerem, Hidar, Tahsas, Yekatit and Megabit (one day only). There were some rains in Tikemt and Tir, in which they planted local teff, haricot beans, cabbages (dankala Wel.) and maize. Except for the maize crop all the other plants were already at the stage of wilting and drying.

The farmers expressed their feelings about current rainfall condition by saying "Eyeseran Inrabalen" which means, "despite of hard working, we are still hungry". Hence, unreliable rainfall pattern resulted in the plight of poor farmers in the PA.

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2.5. Land use and cropping pattern

There are no significant changes in the patterns of the past and present land uses in the PA. The major uses of land include.

- Homestead farms
- Kere (dejaf Amh.) private grazing land
- Intensive cropping land
- Hedges and fences
- Eucalyptus and other tree plantations
- Common grazing fields
- Swampy lands
- Small natural forest fields in the valleys (galleys)
- Small degraded lands (Wastelands)
- Grasslands - reserved for cut and carry for livestock feed and thatching grass lands.

When the first settlers arrived in the PA area, livestock rearing was the major occupation of the people. During those days, there were extensive areas of grazing lands covered by nutritive grass species. Livestock grazing was not controlled.

Livestock herd was large in size i.e physically strong bulls and high milk-producing cows with large udders. The oxen were used for day-long traction without fatigue.

Land cultivated was small in size but produced high yield. The main crops were enset, taro root, maize, sorghum, barley and local teff variety. Enset plants were robust and sufficient for human and livestock feed.

A Large area of land was covered with natural vegetation, which included bushes, shrubs tall trees and grasses. The Eucalyptus tree was not introduced during those days.

The population density was relatively low until the last 50 years. The dwelling units (hamlets) were sparsely scattered all over and situated on the private holdings. A single family owned a large area of land which was sufficient for feed and food production

2.5.1. Cropping pattern changes and reasons

Information on cropping pattern changes and reasons was summarised from discussions held with men and women young and old (as old as 80 - 120 years) farmers of the PA.

According to the informants, the following factors influenced the changes in cropping pattern and distribution of the area.

2.5.1.1. Socio-economic factors

a) Immigration: the current inhabitants of the PA migrated from different areas of origin. When they arrived in the area, they brought with them different types of crops and varieties. For instance, enset 'male' and 'female' varieties, haricot beans, coffee seedlings, cabbages, teff, barley, and sorghum crops were brought by the earlier immigrants.

b) Interaction: Some farmers through market, weddings, trade, etc interactions were able to introduce crops like sugar cane, fruit trees, sweet potato and taro root varieties. There was a long period of exchange with Mareko, Kambata, Gamo and Kulo farmers.

c) Local chiefs: Some elderly farmers explained that the kings of Welaita and Jimma had social relationships through which, coffee plantation and Eucalyptus trees have been imported to Welaita region.

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Moreover, the two known Welaita awraja figures of the 1950s (E.C) Germame Neway and Dejazmach Wolde Semayat, (who were influenced by the then development programme) introduced various improved varieties of maize, teff, haricot beans, fruit trees like oranges, banana (Kenya and Asmara varieties), Irish potato and others to the people.

d) Welaita Agricultural Development Unit (WADU) is acredited with introducing crops and improved cropping systems in the area. Among others, white colour teff, improved barley seeds boloke (haricot beans), sweet potato varieties, fruit trees like guava, avocado, oranges, kawo Boyna (taro root) etc were introduced by the WADU Programme.

e) Missionaries: Expatriates, working with Catholic Mission, Kale Hiwot church, Adventists operated in the area for decades. It is probable that some vegetables, fruit trees, etc were introduced by their development programmes.

f) REDD BARNA: Recently, REDD BARNA issued to the farmers, Katumani and A-511 maize varieties, improved coffee and fruit tree seedlings.

g) Innovative farmers: Above all, energetic farmers of the area imported various better varieties of enset, cassava, sweet potato, cabbages, fruit trees and sugar cane from the adjacent awrajas of Kambatana and Hadiya, Kulo Konta and Gurage.

Moreover, exchanging of seeds of new crop varieties between the farmers from inside and outside has been a common practice for years.

2.5.1.2. Environmental factors

Erratic rainfall patterns and distribution also influenced cropping pattern changes in the PA; For instance, the area and size of enset plantation is changing due to moisture stress. To sustain its growth, enset requires more water than other crops. Until it is completely removed off the field, it is also affected by bacterial wilt. Thus, maize and sweet potato crops seem to be encroaching to replace it.

Coffee plantations have been reduced by half due to mismanagement and coffee berry diseases. As a cash crop, it is being replaced by teff (white colour) and fruit trees i.e avocado, oranges, bananas. Because they are used (both) as food resources and cash income, these fruits have received appreciation from the Welaita farmers.

Expansion of area for crop production in the PA seems to be impossible. All the plots suitable for crops have been used. However, an ever increasing need for food crops production forced

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some farmers to break social values of the community. Many farmers have now began changing their 'Kere' (dejaf Amh.), open grazing fields in front of their houses, to cropping fields. The team observed some of the keres, planted with teff, maize and taro root. Some farmers were seen sowing them for the first time.

Intensification of cropping pattern through intercropping using improved varieties and tree crops became a common system of production in the PA.

The farmers resorted to increase yield per unit of area through introducing high yielding crops such as:

a) Underground tubers such as taro root, Welaita dono, sweet potato, Irish potato, yam, and cassava in which the same plant is harvested for several times in a year.

b) Producing in bulk from the same stem i.e enset provides high yield from the same plant.

c) Using narrow based plant crops with expanded branches in the open space in the air. Fruit trees like avocado, oranges, guavas, banana and others fall under this category.

The crops listed above are usually changed to new improved varieties (high yielders) when ever it is available.

To understand more on the cropping pattern changes and reasons, a case study on banana expansion was carried out.

IS BANANA SCRAMBLING FOR HOMESTEADS?

For those who walk in the PA, it is easy to observe many banana plants in most farmers homesteads. In fact the proportion of enset to banana plants vary from farmer to farmer. In some farmers homesteads the ratio reached 1:1 and few farmers grow more banana than enset plants.

They have been growing enset for many years, but banana were introduced into the area very recently and were rarely seen in the area 15 years ago. In 15 years time, the population of banana plants are observed to be highly increased.

What are the reasons behind this phenomenon ?

Depending on our own observation and discussions with farmers the following reasons were forwarded:

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Table 2.2 Comparison of banana and enset crops

Reasons	Enset	Banana
Food shortage	When the yield of other crops decline farmers depend only on enset plants besides that enset is harvested at any time at any stage when there is a critical food shortage	Banana plants can not be ha ested before maturity, eve if the family starves
Diseases and insect	Enset is more susceptible to "wolua" (Bacterial wilt disease It is attacked by 'Gotie' and 'Gortta' (Wel.)	The local banana is less su ptible to ''wolua' (bacter ial wilt) disease Banana are not attacked by 'Gotie' and 'Gortta'(Wel.)
Pests and wild life	Enset is destroyable by moles and porcupines	Moles and porcupines never destroy banana plants
Drought	Enset is less drought resist-ant than the local banana varieties	The local bananas are more drought resistant than ens plants
Propagation	Propagation of enset (produc-tion of suckers) and trans-planting from the nursery needs more work,time and care. More over, uprooting of some plants as sources of plantation material cont-ributes to the loss of the plant population	Banana reproduces voluntari suckers propagated without human interference , needs less manure. Suckers are detached and planted far f the mother corm.
Feed value	During feed (forage) shortage it can be uprooted and given to domestic animals	Domestic animals do not fee on banana plants

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A farm map (Figure 2.4) showing Ato Ayele's farm land was drawn on the ground by himself. It did not take him much time to sketch it and explain his cropping pattern.

Ato Ayele owns a small area of land which he inherited from his father. He uses his land for crop cultivation, open grazing and eucalyptus tree plantation.

The crops which he grew include root crops, like taro root, Irish potato, Welaita dono, sweet potato and enset, cereal crops such as teff, barley and maize. Around his homesteads he planted coffee trees, vegetables (cabbage), maize and enset crops.

He has kere fields for livestock grazing, during dry and wet seasons.

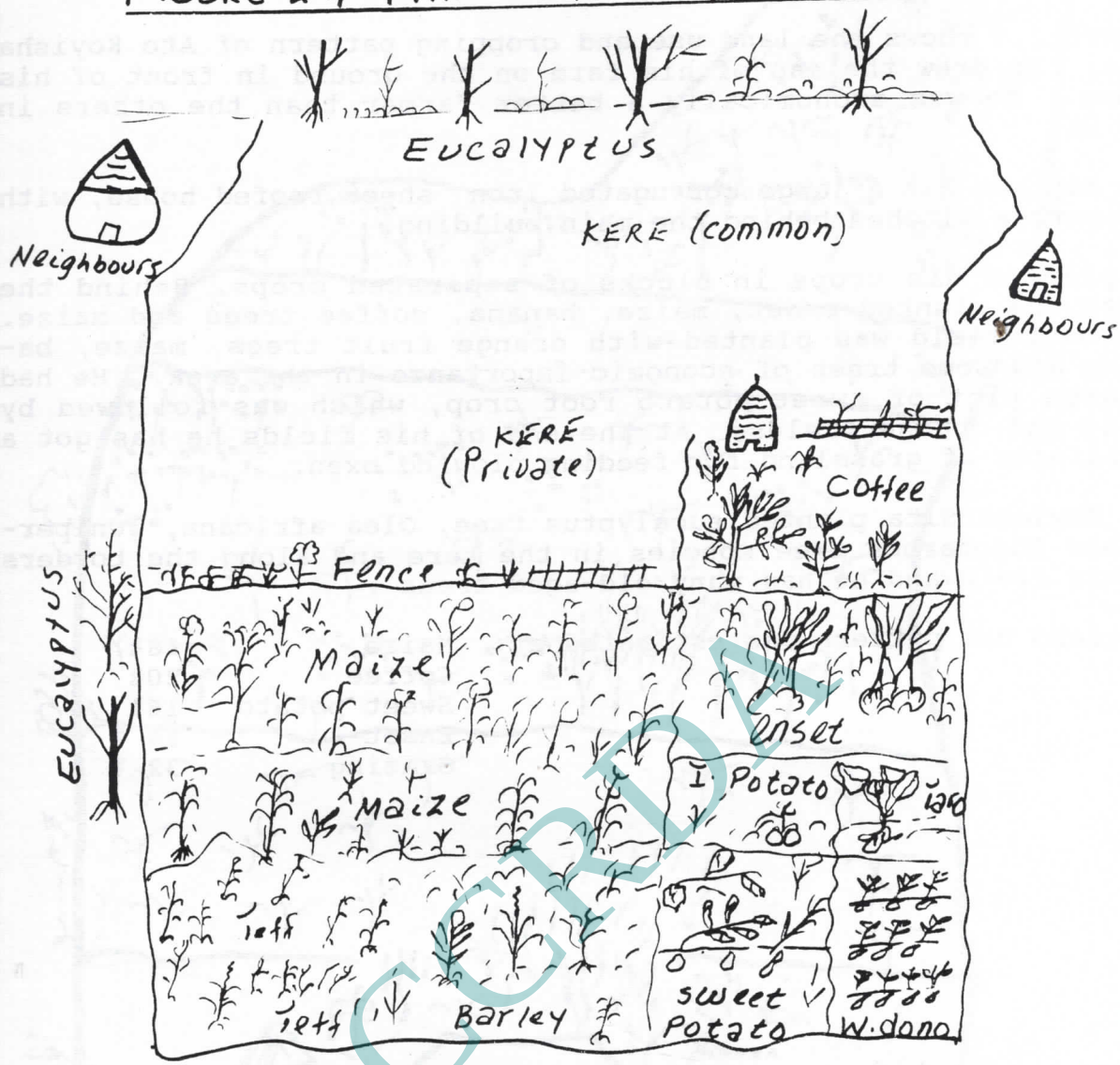
He planted enset on a smaller area of land and maize covered the largest proportion.

Ato Ayele Geye planted eucalyptus on the boarder of his crop fields and along the boarder of grazing plots. The plots closer to the eucalyptus tree were barren land. No grass species are properly established on them.

His cropping pattern is a typical example of an intensified cropping system, which includes a mixture of enset, root and cereal crops of different varieties.

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FIGURE 2.4 FARM MAP OF ATO AYELE GEYE



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Farm map of Ato Koyisha Sita

Figure 2.5 shows the land use and cropping pattern of Ato Koyisha Sita. He drew the map of his farm on the ground in front of his house. He was economically a better farmer than the others in the PA.

Ato Koyisha has a large corrugated iron sheet roofed house, with a separate kitchen behind the main building.

He planted his crops in blocks of separated crops. Behind the house, he planted enset, maize, banana, coffee trees and maize. His next field was planted with orange fruit trees, maize, bananas and some trees of economic importance in the area. He had a large plot of sweet potato root crop, which was followed by maize and orange fields, At the end of his fields he has got a small area of grassland for feeding plowing oxen.

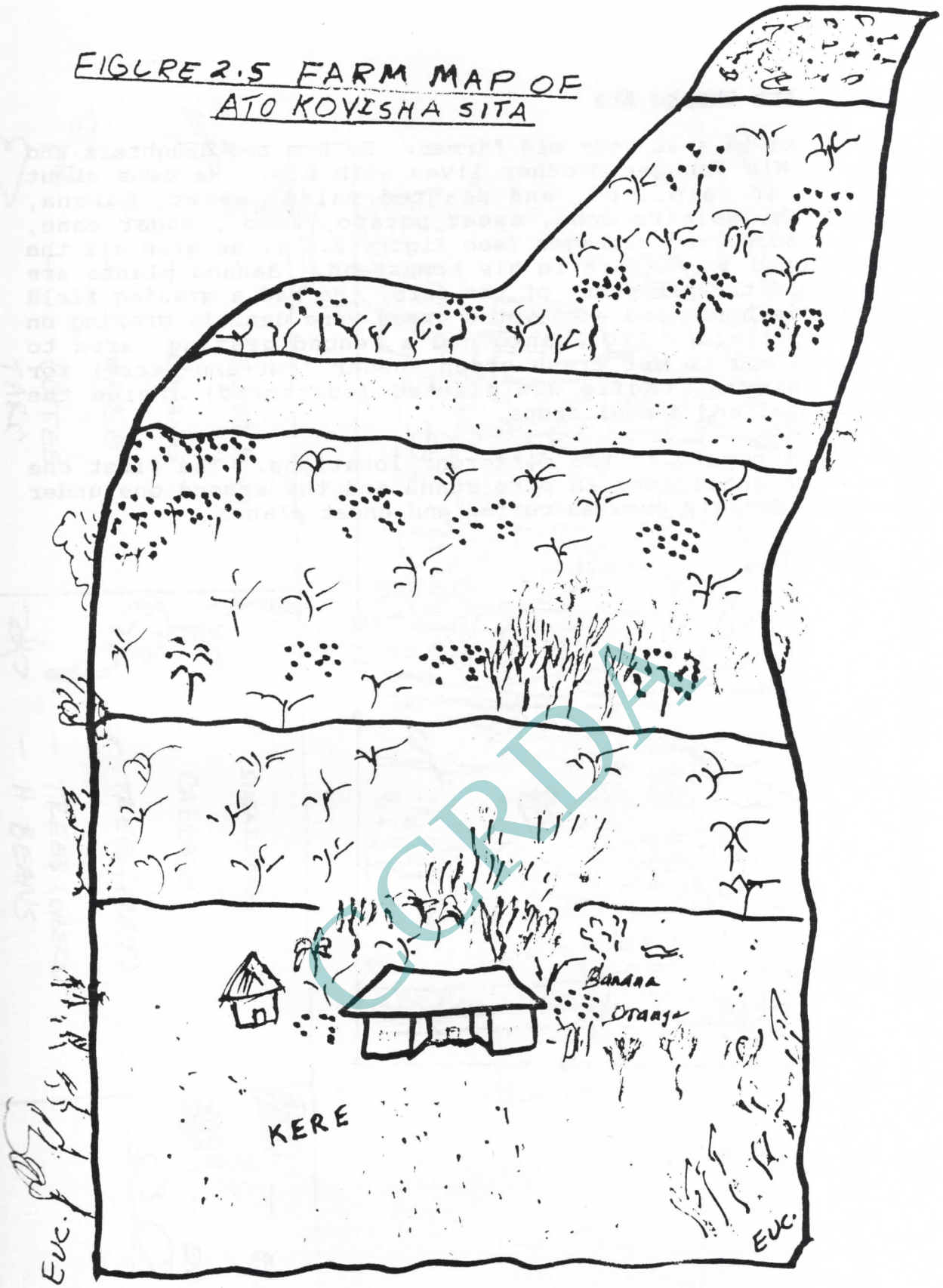
Ato Koyisha Sita planted eucalyptus tree, Olea africana, Juniperus and Podocarpus tree species in the kere and along the borders of his field and he has many old-aged trees .

His land use pattern was estimated at:

Maize	18%
Coffee	20%
Sweet potato	16%
Enset	14 %
Grazing	32 %

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FIGURE 2.5 FARM MAP OF ATO KOYESHA SITA



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Farm map of Ato Chanko Eka

Ato Chanko Eka is a 40 year old farmer. He has two daughters and four sons. His younger brother lives with him. He owns about one hectare of farm land, and planted maize, enset, banana, haricot beans, Welaita dono, sweet potato, taro , sugar cane, coffee, avocados, and cabbages (see Figure 2.6.). He grew all the crops mentioned in mixture in his homestead. Banana plants are planted around the periphery of the farm. He had a grazing field infront of his house and eucalyptus trees were densely growing on this grazing field. Ato Chanko had a fenced grazing area to graze calves and to get fresh green fodder (cut-and-carry) for his other animals. Maize was planted (scattered) inside the other perennial and annual crops.

He grew sweet potato in two different locations. The first one is on an open small land in pure stand and the second one under the shade of densely growing coffee and enset plants.

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FIGURE 2.6. ATO CHANKO EKA'S FARM LAND MAP



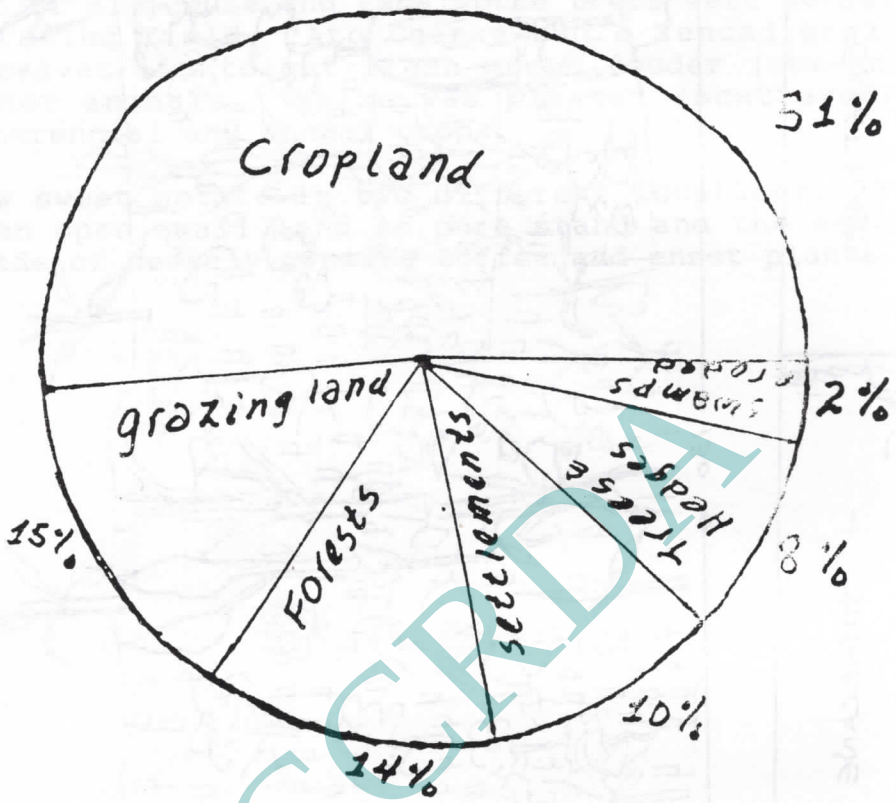
AREA - $130 \times 70 = 9100 m^2$

- ENSET PLANTS
- BANANAS
- MAIZE
- COFFEE
- TARO
- SUGARCANE
- CABBAGE
- TREES (FRUIT)
- TREES (OTHERS)
- H. BEANS
- GRAZING AREAS
- ENSET SUCKERS
- S. POTATOES

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The land in Dache Gofara PA is used for six main purposes. The proportion of the land used for different agricultural purposes in the PA is illustrated in Figure 2.7. below.

FIGURE 2.7. PROPORTION OF MAJOR LAND USES IN THE PA



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The summary of the land use and cropping pattern trends and reasons in the PA is given in the following time line.

The trend analysis illustrates the physical, social and economic factors that inter-played in changing land use and cropping patterns through time. This discussion was held with carefully selected five wise and older men of the PA.

The land use changes were taking place between the variables indicated in the pie diagram (Figure 2.7.). Due to the reallocation of plots to the ex-soldiers, crop land is encroaching over the grazing fields and forest lands. As stated earlier, some households have also began turning over their keres in to crop lands.

Time line of land use and cropping pattern changes
(based on 5 old men interviewed)

1930 (E.C)	**Italian occupation:** - Crop production was less - Type of crops; maize, sorghum, enset, barley, yam, Welaita dono, finger millet, emmer wheat - The soil fertility was high - Less human population - High production of crops from small area, and high production from animals - Large area of grazing (communal) land - Large number of livestock - Large area of natural forest - People were kind to each other
1950 (E.C)	**Land tenure under feudal system [feudalism era]:** - Land was provided to the feudal land lords - Expansion of agricultural land - High population growth - No. of livestock decreased due to grazing area allocation to farm land - Communal forest and grazing area taken away by the feudal lords - The feudals encouraged individuals to expand agricultural land and productivity
1962 (E.C)	**WADU Agricultural extension / minimum package programme:** - Encouraged farmers to plough land over a larger area - Introduced tree plantation - Introduced modern cropping methods - Introduced fertilisers and their application methods - High population growth and the size of land owned became smaller and smaller - Improved crops such as maize varieties;Kenya, Alemaya composts, and teff, (white colour, minjare) and h.beans (white) were introduced

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(Continued.. Time line of land use and cropping pattern changes)

1967 (E.C)	**The 'Derg' Regime:** - Land was provided to individual farmers - High taxation - Producer cooperatives and service cooperatives established - Less efficiency of the farmers in agricultural production - Farmers became traders - Farm land became smaller e.g 0.5 ha/house hold - Communal grazing area was owned by the PA and individual - The soil fertility was depleted/became unproductive - Input supply was limited
1972 (E.C)	**Socialism era:** - Productivity of the soil became lower - The size of population and the rate of consumption became very high - Weather variation affected agricultural production, low soil fertility, draught etc, contributed to low yielding of the crops. - The farm land owned by the farmers became very small - Grazing and forestry areas became lesser due to expansion of farm land. The size of a family increased - Soil erosion became one of the factors for low yield (sheet erosion on the farm land) - Eucalyptus became one of the problems of the soil fertility in the PA. Because around almost all farm boundaries the tree is planted. This tree by its nature has got high absorption capacity of soil moisture and nutrients and it is deep rooted plant. There is high competition between crops and eucalyptus trees for land and water. - The youth, agriculturally active part of the community, were forced to join the military service. - Agricultural marketing corporation quota was high. Thus, forcing farmers to sell most of their crops with a minimum price.

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2.5.2. Changes in water availability and reasons

The people use springs and rivers for water consumption (for details see Chapter 6) The women fetch water from Supan, Getcha and Gamo springs for human uses. The springs are perennials and are located in the PA area. Shapa and Gamo rivers are mainly for livestock use.

Farmers indicated that total water levels or water volumes received by the rivers and springs decline over time. It is said that the area is receiving a total rainfall amount of less than what it had been receiving many years ago. This decline was evidenced by the drying up of some springs and the reduction in flowing period of the main rivers.

The group of farmers interviewed revealed that Gamo river dries when there is no rainfall for a long period. They noted that the river dried for 6 years after 8 rainfall shortage years, during which they walked with their livestock to the Shapa river. The decline in water flow (the volume of water in the river) started when the rainfall amount and distribution began changing during the last 20 years.

The farmers further explained that the water flow in the rivers depend on the amount of rainfall, for instance, the amount of water looks like :

Tekemt	to	Yekatit	-	Lowest water flow
Megabit	to	Genbot	-	Medium water flow
Sene	to	Meskerem	-	Highest water flow

Between Megabit and Genbot rain waters infiltrate in to the ground until the water table rises up. Water flow becomes constant in some of the feeder streams. Springs begin to flow out. This implies, if the rainfall trend continues, then between Sene and Meskerem, Springs spill over and run down the sources. The volume of water in the two rivers rises to its maximum limit with the heavy rains in Sene. In Meskerem, the springs and rivers start slowing down, until the coming rainfall season.

However, the farmers did not mention serious water availability problem in their area. The quality of water used is very low.

2.5.3. Livestock use, changes and reasons

An innovative farmer in one of the group discussions expressed the importance of oxen by saying "Bere yelelachew sewoch behiwot eyalu yemotu sewoch nachew", according to the team's translation which means, "People who do not own oxen are half dead".

The household herd mix is composed of cattle, goats, horses, and poultry. The aim of cattle keeping is to produce milk, to provide for traction power, manure for fertilisation and to satisfy

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cash needs. The farmers highly prefer horse ownership because of its importance during social commitments like funeral ceremonies and weddings. Horse ownership makes a man "somebody" or an important person in a community. A horse owner is on the top of a social ladder in the PA. He can hire it out to run for a few minutes at a funeral ceremonies of kinsmen.

Livestock keeping is related to the size of land owned. People who own larger area of land often own larger number of livestock. This is because, they preserve wider kere fields for open grazing and cut and carry system for hay making. Usually, at the end of cropping fields, some plots would be reserved for green grass for oxen, a horse or calves.

People with smaller area of land tend to keep only essential animals like an ox and a cow or a cow alone, usually tethered on the kere field. Thus, feed availability regulates the number and mix of livestock herd in the PA.

Other contributing factors for the decline in livestock population include:

- Animal diseases
- Selling (of animals) to pay tax, and various contributions demanded by the government
- To fulfil social commitments, like funeral ceremonies and weddings.
- The occurrence of drought - mainly, in 1977 E.C many of the farmers sold their livestock and purchased food crops.

The reduction in communal grazing area, due to provision of open lands to the then warlords happened after 1940s E.C. The land reform proclamation of 1967 E.C. resulted in land reallocation to private farmers which in turn largely reduced open fields for grazing. As arable cultivation spreads at the expense of grazing area, the farmers tend to reduce the number of animals they keep. Farmers usually keep a limited number of animals and feed them mainly by cut-and-carry system. The animals are mostly kept and fed in the house.

The collection of natural grass for animal feed is one of the major tasks of women. When compared with intensive grazing, this type of animal keeping is labour intensive.

There is a general decline in feed availability in the area. Due to the erratic nature of rainfall, the production of enset, maize, sorghum and other straw sources have reduced. In the long run this trend may end up changing livestock herd to small ruminants. i.e goats and sheep flock.

CCRDA

CHAPTER 3. SOCIAL STRUCTURES

Dache Gofara PA is about 20 Kms away from Areka town. Social services and opportunities available for the community are far away from the reach of many poor people. The nearest possible means of transport they can catch is about 7 kms away from the PA areas. The main weekly market is in Areka town. There are bi-weekly tertiary market places in the adjacent PA. The main marketable goods are those produced in the area, mainly, locally produced food crops. Markets in Kambata and Hadiya and Kulo Konta awraja are the major sources of grain crops.

Ministry of Agriculture, Environmental Protection and Development (MOAEPD) provides extension services, inputs (fertiliser) and veterinary services from Areka town. REDD BARNA established a development centre nearer to the PA area and provides farm inputs, credits and extension services. REDD BARNA motivates poor farmers to participate in development activities through "Food-For-Work" programme. The organisation issues food crops first and lets them work later, when they get stronger.

REDD BARNA deployed multipurpose extension agents at the grass root level to work with families. The agents were recruited from the area and can understand the language and the people.

The farmers in the PA receive medical services from the health post built by the assistance of REDD BARNA and the farmers themselves. A community health assistant assigned provides limited medical services where for serious cases the farmers are referred to the Areka health station and Soddo Hospital.

School age children attend their elementary education in the school established at the PA, and get promoted to Areka for senior high school education.

The road network in the PA is very poor. The people do not have a chance even to see public transport vehicles unless they walk to the main road, The only vehicles which move around are the REDD BARNA Project vehicles.

Christianity is the main religion of the people, Most of the Christians follow the reformed churches liturgy. The people are served from three church buildings, distributed in Mehal Dache, Ulbo and Luga Zones (see maps, Figures 1.2 and 1.3)

CCRDA

3.1. Population density

The study team was not able to obtain the exact figures of the total population in the PA. The former PA leadership was removed and the new peace and security committee members were not yet settled to take over their offices. In the absence of reliable data, the team members tried to use various sources and techniques to explain population characteristics; Some of the sources and techniques applied were:

- Transect walk observations
- Sample survey of 100 households
- Secondary data review
- Qualitative deductions from various indicators of population characteristics.

During transect walk, team members observed that out of the four zones, indicated in Figure 1.3, Mehal Dache and Ulbo zones were densely populated. The other two zones, Ankelusa and Luga, were relatively less populated.

The population density on a given area implies the distribution of houses, intensity of crop cultivation, availability of grazing land and the pressure upon food resources and the family income.

The Areka IAR Survey* indicates that the computed average farm size in the area is 1.0 timad in arable land, 0.4 timad in grazing land and 0.6 in other uses. In this system, no land was left for fallowing, reflecting the intensity of cropping and land shortage in the area.

The distribution of houses depends upon the number of households residing in the PA. It's normal that a family builds a house on his private holding and resides in it. When a family male member reaches at his marriage age, he builds a house near to his parents house and takes away land out of crop production. As the team observed, houses were distributed all over the PA.

There are about 800 households in the PA, and the PA area covers 720 hectares (REDD BARNA). Assuming that every family owns a separate house, the density of houses per hectare will be about 1 house to 1 hectare (or the ratio of 1:1). These houses are actually built on the arable part of the land holding. The land near to the houses is cultivated without rest. Hence, the pressure on these lands is high. The people as well as the animals expect some kind of produce for the whole year round.

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* IAR Research Report No. 15; Areka area mixed farming zone, Northern Omo Region, Addis Ababa, 1991.

CCRDA

Farmers interviewed estimated the average number of children borne in a family to be about 10. A rich farmer who married 3 wives had 32 children (of which one died during our survey).

To get a clearer picture of population factors, the team conducted a quick sample survey of 100 households, (about 12% of the total households) which included sizes, ages, and sex composition factors of the family.

The family sizes obtained were:

- Lower limit 5 children per family
- Median 6.5 Children per family
- Average 7.66 Children per family
- The upper limit of 21 Children (3 wives)

Thus, the arithmetic average of 7.6 children per family was an appropriate estimate. The IAR Areka diagnostic survey also estimated an average household size of 7.3 members (IAR Research report Number 15:6)

The total population of the PA is estimated to be 5000 (This figure has been suppressed down). Crude density of the PA area is nearly 7 persons/ha. Which indicates, one hectare of land supporting livelihoods of 7 people. Hence, very high pressure is exerted upon the resources.

GCRDA

3.2. Age and sex structures

As stated earlier, there was no organised data on population parameters recorded in the PA. To make a sensible explanation the team carried out a sample survey on 100 households. The key parameters of investigation include, family size, age and sex structures of persons living in the households selected. The data on the family members of 100 households interviewed is shown below (Table 3.1).

Table 3.1 Age and sex structures of 100 households interviewed.

Age limits	Male	%	Female	%	Total	%
(Infants) 0 - 5	105	28	109	27.9	214	28.1
(Children) 6 - 14	157	42	144	36.9	301	39.4
(Adults) 15+	111	30	137	35.2	248	32.5
Total	373	100	390	100	763	100

A total of 763 people reside in the dwelling units of 100 house holds interviewed, of which 373 people were male and 390 were female. According to the information on age limits about 214 were infants, 301 children and 248 adults.

When the team extrapolates the information obtained to the total PA population, it is revealed that 49% and 51% are male and female population respectively. Moreover, 28% is an infant population under the age bracket of 5, 39.4% are children and 32.5 % is an adult population. In the age bracket of child hood (6-14 years) there are less female children than male, Possibly, this could be a marriage age whereby female marry young men from other Peasant Association.

The team attempted to record the death case in the PA for one year, between Megabit 1983 E.C. and Megabit 1984 E.C. (the date of diagnostic survey in the PA). Age specific deaths and causes per deaths are also recorded (refer to chapter on health problems).

Total death cases recalled for the year were about 70 people, Of which 30 were female and 40 were male, Age specific death cases are shown in the following table (Table 3.2).

Table 3.2. Age specific deaths for one year.

Age limits	Number of cases
0 - 5	13
6 - 14	19
15 - 30	10
31 - 45	13
46+	15
Total observations	70

The age of 46 was taken as an upper limit because of life expectancy of an Ethiopian man at birth (Central Statistics Agency estimates).

CCRDA

3.3. Migration pattern

The farmers interviewed explained that about 72 different clans migrated to the PA from many directions. They came in small and large groups of people from the same clan. They still trace back to their fore fathers places of origin.

There have been continuous voluntary and forced migrations to different locations in the country. These migrations took place for different purposes. The young and poor farmers migrated to the employment centres on their own will. The types of migrations include:

1) Temporary migrations: smooth and voluntary migrations to
   a) Coffee berry picking to Jimma Region
   b) Urban centres (any where) for casual paid labour
   c) State farms situated at different parts of the country i.e. Arba Minch, Awassa, Awash valley, Shashamane etc.
   d) Sugar cane milling factories in Wonji and Metahara. The farmers who migrate seeking temporary employment visit their families when the employment period is over.

2) Permanent migrations: Some farmers who migrated to the urban centres and state farms established permanent living conditions and reside there. Many farmers were forced to join military service, this type of migration was turbulent. The families were forced to give away their adult children. In late 1970s (E.C.), many young members of the community fled away from their PA in fear of harassment. Many were driven away to join men in uniform, and became permanent employees. But now some of them have rejoined their families.

3) Migrant traders: Healthy migrations for trade purposes have been going on for years in the PA. Traders looking for agricultural products migrate to the market centres of the Kambata and Hadiya, Kulo Konta and Chebo and Gurage awrajas. This type of travelling takes weeks and months. They import pulse crops (field peas and Faba beans), cereal grains mainly maize and teff, mules and horses to their area. They migrate from one market centre to the other and regularly come back to their home place.

4) Motivated migrations: The State Farms in cotton and maize plantation regions occasionally advertised for temporary employment of a particular activity. Various members of the community moved away on temporary basis. These types of casual employments normally ends in 2 to 3 months. In such cases, the migrants were provided with transportation facility for both ways.

CCRDA

The farmers interviewed could not exactly figure out the number of migrants in each type of migrations.

The main causes for voluntary migrations are:
- Under-employment on the private farm (small area of land),
- Lack of clothes (no cash ready available to buy),
- Lack of food to support the family for the whole year and
- Debts incurred for Meskel festival's oxen purchase.

The income from farm activities do not support the livelihoods of the community for all the time. The number of consumers in the family are greater than the household business can support. Some farmers said that children have become a burden to the family. They cannot feed and dress them all, at all the times. Therefore, adult children are encouraged to migrate (by their parents) to the areas of employment.

Few families were broken down due to male spouses' migration to employment centres. The wife and children who were abandoned joined the mothers' parents. Until the family reunion, some of the children were given away to friends and relatives to be taken care.

The main driving forces for migration were difficulties created in the livelihood systems of the PA and enforcements generated by the political systems.

CRDA

3.4. Ethnic composition

The people in Dache Gofara essentially speak Welaita language but belong to different tribal origins. An old man of 125 years (?) explained that about 12 different clans arrived in the PA and settled at different times. The clans arrived in the PA were agriculturalists and livestock herders. What follows is a list of Welaita clans.

The first clan groups of settlers in the PA were:
- Welaita Mala
- Yeboyna
- Laroswa
- Amara (Kesiga)
- Tota
- Bubula
- Tigrya
- Maserya
- Zatwa
- and others not mentioned here.

Among these clans, the Welaita Mala were the earliest settlers and the first 'Balabats', rulers of the area. The ruling line was taken over by the Tigrya clans men, or Kawona family.

The Welaita Mala tribes distributed land to the other clan settlers as a friendly gesture.

The second clan groups of settlers in the PA were:

- Woshegana
- Zamina
- Gudareta
- Kanchachila
- Woitwa (Hadiya)
- Hiratwa (Hadiya)
- Boroda Mala
- Zirgo mala
- Gezo mala
- Meshera (Hadiya)
- Donga, Dage (Hadiya)

The other minority groups included in the second settlement period were:

- Chinasha (pot makers)
- Aylia (Slaves)

The clans are divided into two classes. These classifications are based on blood bonds.

1) The Mala i.e 'pure race' as it is referred to as 'chewa' in Amharic language. They enjoy their freedom of carrying 'pure blood of human quality'; it is like being a 'true man'

2) The Dogola i.e 'blood impurity'. This class belongs to the long quality of human beings subjected to be treated as 'less human beings'. The destiny of a Dogola man is in the hands of his master.

The Mala classes are divided in to a) Tigray and b) Goka tribes. The Tigray tribes consist of the Kawona family which was the ruling body of the Welaita people during the imperial regime.

The lower class of Aylia (Baria Amh.) lived as tenants (chisegna Amh.). They were house servants of the masters and chineshya lived as pot makers. The lower classes' living conditions were under a terrible plight.

The Tota clan have got the largest population while the Bubula and Amara's are the wealthiest of all other clans. The Bubula clans men are good at farming and live on crop cultivation. They are hard working and innovative to obtain better products on their land than other clans.

The clans belong to different Christian denominations and religious groupings. Some of the churches attended in the PA include, Orthodox church, Catholics, Adventists, Kale Hiwot and Meserete Hiwot churches. Moreover, there are few muslims and pagans living with Christians in harmony.

GCRDA

3.5. Occupational composition

The mainstay of the livelihoods of the people include:-

1) intensive crops farming
2) livestock rearing
3) petty trade
4) migrant labour and
5) small scale local employments.

Additional occupations like cotton spinning, carpentry, weaving, tannery are not taken up by many farmers. But there are some pot-making and handicrafts making like basket works for income generating purposes. The women make some household utensils out of grasses.

The team observed some individuals sawing a log into planks on a saw horse. The carpenters used wanza, zigba, bahrazaf, and other appropriate trees for timber (board) production. The planks produced are sold in the houses of the farmers and along the sides of the main road. Because wanza tree was largely sawn, the farmers were highly concerned about its fast eradication, and were seeking for some kind of control measures. If the markets were interested in eucalyptus tree planks, then soil moisture and yield on land would have been stabilised.

In Dache Gofara PA, many people, including men and women, young and old trade in various commodities, The women brew some local alcoholic drinks in their homes, which are sold on the main market days. They sell them out in the market places and along the road sides. The main drinks brewed include 'Borde', made up of maize, sorghum and barley malts; 'Areke', distilled from grains of various crops or honey ; and 'Talla', brewed from Gesho leaves and some grains.

The women also prepare or cook food (food trade) in their homes and sell them out in the market places. All sorts of crops produced in the PA were cooked and sold in the open markets. Root crops, teff injera, bread from enset and maize were cooked and sold out. Adult children trade chickens, fruits, sugar cane and small ruminants. Where as, financially better off adults trade on grain crops, small ruminants, and travel from one market place to the other.

However, the major income of the people depends mainly on agri-cultural products.

CCRDA

3.6. Share cropping (Kota Wel.)

Share cropping and "shared-rearing" of animals is a common business in the PA. The main reason for sharing crops and animal rearing activities is an acute shortage of resources for the other partner to invest on his own capacity.

In Dache Gofara, land, seeds and oxen power are serious constraints of production. These factors of production are utilised between two people to equally share the produce. The poor people do not reserve seeds of crops for next planting season. They use all seeds before the crop gets fully matured. They sell their oxen to solve various problems the family encounter. The land which is an immovable asset is left for utility. Thus, during cropping seasons, land is given away for share croppers. The contracts of sharing include:

Share cropper : Contributed traction power (if available)
: Labour power for all operations
: The whole lot of seeds to planting

Land owners : Assists with his labour
: Offers coffee to the people working in the field
: Feeds the oxen (if oxen are used)

Yield : Yield is equally shared between the two partners after the amount of seed used is deducted.

Share cropper does not have any right on the land which he used for share cropping. The land owner decides on the next years renewal of share cropping contract.

3.7. Human health

Farmers in Dache Gofara experience an appalling health situation. The situation is aggravated by ever increasing malnutrition. Health problems emanate from contagious diseases and low hygiene.

The study team with the help of community health assistant attempted to record the number of people died during one year (Megabit 1983 E.C. to Megabit 1984 E.C.). The cases were registered on the monthly basis with the causes of death and age levels. The information was gathered from farmers who tried to remember hard; who died, when, why and at what age?

The data of the survey are shown in the following tables (Tables 3.3, 3.4 and 3.5 respectively).

GCRDA

Table 3.3. Number of death cases per month

Months 1983 EC.	No. of deaths	Months 1984 EC.	No. of deaths
Megabit	5	Meskerem	5
Miazia	4	Tekemt	4
Genbot	4	Hidar	6
Sene	3	Tahasas	6
Hamle	4	Tir	5
Nehasse	8	Yekatit	10
------	-	Megabit	6
Total	28	Total	42

From the data obtained, it was estimated that an average of about 6 people died per month. As the distribution of the cases reveal, more people died in the dry season than the wet (rainfall) season.

The causes of deaths are given in the following table.

Table 3.4. Major causes of deaths reported

Causes	No. of deaths
Unknown	6
Typhoid	30
Hookworm	5
Diarrhoea	19
Amoeba	1
Accidental	2
Pneumonia	2
Liver cancer	1
Malaria	4
Total	70

Typhoid and diarrhoea were the main causes of deaths reported during the survey period. However, had it been properly investigated, the diseases reported could have been of the same nature. In the area, water borne diseases largely affect children and adults also.

CCRDA

The main causes for the under-five deaths were the following:

Table 3.5. Causes for under-five deaths

Causes	No. of deaths
Hookworms	4
Typhoid	3
Diarrhoea and vomit	4
Unknown	2
Total	13

The main health problems for the infants seems to be low hygienic situation and malnutrition. Out of the total infant deaths about 30% died from hookworm problem This could reflect the food scarcity situation of the families.

Out of the total deaths for the year about 18% were infants (0-5 years) and about 27% were older children. Typhoid disease was the main cause for under 14 deaths.

In the PA, REDD BARNA constructed a health post and assigned a community health assistant. It was facilitated with basic drugs, furnitures and simple medical equipments. But the health post was heavily looted during the take over of the new government.

ECRDA

3.8. Role of women in the household

The situation of the women is not different from any other rural area. The major parts of the women household activities are livestock rearing, collecting fire wood and fetching water. In general, women are responsible for house management activities. Beside this, women help their partners in the field activities and they prepare food and coffee for 'debo' (group work). The product obtained from the land is not enough to feed the families. So, supporting the families with additional income is the responsibility of the women. These activities are continous through out the year.

Decision on what to produce and what to do with the family farm income is mostly done by the male (house hold head). Nevertheless, women can decide whether to consume or to sell some of the products such as milk and milk by-products, enset, sweet potato and cabbage. Hence, to fulfil the needs of the women, part of the product harvested could be consumed and the rest could be sold on local market for cash. The income obtained from the above mentioned products is used for the family consumption.

3.9. Income sources and expenditures

Farmers in the Dache Gofara PA have weak sources of income and strong area of expenditures. Land as a major source of income is small in size. Crop production is controlled by rainfall stress, low input and lack of oxen power. Livestock production is low because feed resources are in short supply. Off farm activities are taken up in a small scale, because the PA area is far away from the main road and town.

Income sources of the people are limited and revolves around the same kind of commodities and income generating activities.

The men mainly obtain their income from teff, coffee and fruit sale. For pressing problems, they sell their goats, sheep and calves. Some men earn from sweet potato, taro root and fresh maize sales in the local market places.

Some good farmers have established a sort of revolving fund for their major sources of income. They buy an ox or a horse when the prices are low. They feed them for a few months and sell them out when the prices are high. The profit earned from the new sales is used for household expenditures (refer chapter 5 for details).

The women depend on livestock product sales for their major sources of income. In the community the women who milk cows are said to be a well off women. An average woman depend on small commodity sales in a small local markets. Usually, farm products like sweet potato, maize, enset products, taro, coffee leaves, natural spices (green leaves) and cabbages provide cash for an exchange of other necessities. The traders travel long way to Shone (Shewa) carrying salt, onion and bananas for sale.

The livelihoods of the people largely depend on the resources from the markets. Adult members of the family exchange various farm products in the markets. The mother and the adult girl exchange (trade on) local alcoholic drinks brewed at home. Some of the traded drinks are, 'Borde', 'Areke' and 'Tella'. The girls trade coffee, and small grains, where as the mothers specialise in trading of butter, cheese, milk and cooked food.

Adult boys in turn trade on small ruminants, chicken, sugar cane, fruits and small grains. The boys' income is mainly spent on their own expenses like clothes, transport and investments. They do not contribute much to the family food expenses. They also go for share cropping.

CCRDA

An overall degradation of resource or wealth seems to be soaring up in the PA area. Livelihoods of the people also simultaneously decline. Decline in coffee and enset yield and actual area of plantation is irretrievable in short span of time.

The farmers efforts do not produce the necessary yields. Thus, chances to make wealth in short term becomes difficult.

Nonetheless, the farmers interviewed made an effort to categorise wealth structures in the PA. The criteria used to differentiate the classes of farmers were:

- Oxen ownership
- Cattle ownership
- Size of land
- Share cropping
- Hard working and success

Based on these criteria and other value judgments, four category of farmer classes were defined. Intrinsically, the innovative farmers applied livelihood strategies when categorising the community members.

Category 1. The poorest of the poor who own or are:
- A tukul
- A few chicken
- 1 timad of land
- 1 - 5 children
- Seasonal migrants
- About 500 households

Category 2. The poor who own or are:
- A few goats or sheep
- A few chicken
- 1 - 2 timad of land
- 1 - 8 children
- Petty traders
- Seasonal migrants
- About 200 households

Category 3. The richer who own or are:-
- Tin-roofed house or well built tukul
- 0.5 to 1 cow
- A horse or a mule
- 1 - 3 wives
- 1 - 10 children from each wife
- Share croppers
- Can feed their family for the whole year
- Hard working and successful
- About 250 households

CCRDA

Category 4 The richest who own or are:-

- Tin-roofed house and well built tukul
- 2 or more oxen
- 1 or more hectares of land
- a horse or a mule
- Money lenders
- Share croppers
- Share livestock (buy from others)
- Employers of casual labourers
- About 35 of households

Classification of farmers into wealth category was done only with one group of farmers. The women did not participate in the classification process. When the team members raised the issue of wealth structures among the women, it was indicated that women who have got milking cows in their house and properly care for them (feeding, watering etc), they are said to be 'rich'. Women who do not work hard in the house and win their lives are classified as 'poor' women.

The team members posed a question about the condition of the poor people for the innovative farmers interviewed. The reply was that all or some of the following misfortunes are happening to the poor farmers :

- They face long period of hunger
- Malnutrition
- Low food intake
- Dependency on food aid and alms giving
- Poorly dressed
- High out migration
- Family separation / disruption
- High dependency on enset products
- Work for others
- DEATH !

ECRDA

3.11 Land tenure system

There are variety of land tenure arrangements in the PA area. The major pattern of land control was family ownership combined with some share cropping. The right to control the land is based on the household head.

Land was redistributed to the people after the 1975 land proclamation. For the landless and for those who had a small area of land, pieces of plots of land were reallocated. Land was taken away from those who had 'big' area of land and given to those who had 'smaller' area.

During land reallocation, the uncultivated areas in the PA common lands used for grazing and large areas of farm lands used by the big land lords were redistributed to the people.

Land is mainly acquired by inheritance. When a male child gets married, his father allocates a portion of his land for his son's use. When the father dies, all his male children inherit their father's land.

Share cropping arrangements between households owning and lacking land are common in this PA. The land owner provides seed and/or fertiliser. When the land owners provide such inputs, they in return receive the original cost of the inputs plus 50% of the volume of the harvested crop (see section 3.6).

CCRDA

CHAPTER 4. MAJOR CROP PRODUCTION

The major crops grown in the PA in order of importance and area coverage include:

Cereals:- Maize, teff, haricot beans and barley.

Root crops:- Sweet potato, yam, cassava, taro and Welaita dono.

Perennial crops:- Enset, coffee, sugar cane, and banana .

Each of these crops have got local and improved varieties. Cereal crops dominate other crops within the PA.

4.1. Land preparation

Farm land is prepared by draught oxen for cereal crops production and agricultural hand tools are used for back yard crops. These tools are Tikiya, Shelkiya and Ayilia. Those who do not have oxen request their close friends and relatives to lend them on temporary bases to prepare their farm land. Generally, group interviews with the farmers revealed that there is a shortage of oxen in the PA. As mentioned earlier, Eucalyptus tree highly dominates and competes with crop production.

The schedule for agricultural land preparation and planting methods of major crops are shown in the following tables (Tables 4.1. and 4.2 respectively).

Table 4.1. Land preparation calendar

Crops	Activities	Time of land preparation
Maize Barley h.beans	- Cleaning crop residue and bush - Plowing from 3-7 times to loosen soil	October | V January
Teff	Land preparation	April --> July

CCRDA

Table 4.2 Methods of planting crops

Crops	Traditional sowing planting methods before 1962EC	Improved* planting since 1962 E.C.	Planting season of crops (Amh. / Wel.)		Int crop
			Belg/Geba	Meher/sila	
Maize	Broadcasting	Row planting	/	--	Maize cab
S. Potato	Dispersed planting	Row planting	/	/	Maize s.p
h. beans	Broadcasting	Row planting	/	/	Maize h.b
Barley	Broadcasting	Broadcasting	/	/	--
Local Teff	Broadcasting	Broadcasting	/	/	--
			Yam, cassava sugar cane & enset	Coffee vegetables	-- --

* Improved planting method introduced by the WADU extension system and the farmers are using row planting except for barley and teff

The farmers intercrop because of the following two reasons:
- For maximum utilisation of the land,
- To overcome food shortage within the family.

The following disadvantages of intercropping are also mentioned by the farmers:
- Competition for minerals will result in low yield of the main crop,
- Shelter for pests and diseases.

Table 4.3. (next page) indicates the land preparation calendar for root and cash crops while the estimated yield of the major crops is illustrated in table 4.4.

CCRDA

Table 4.3. Periods of land preparation for root crops and cash crops

Name of Crops	J	F	M	A	M	J	J	A	S	O	N	D
Sweet potato							XXXXXXX					
Potato	XXX									XXXXXXXXXXX		
Yam								XXXXXXX				
Taro										XXXXXXXXXXX		
Cassava												
Enset												
Teff				XXXXXXXXXXXXXXX								
Banana											XXXXXXX	
Coffee	XXXXXXXXXXX											

Table 4.4. Types of crops and their yield / ha (group interviews)

Crops	Varieties	Yield with fertiliser	Yield without fertiliser	
Maize	- Kenya	16 q/ha	2 - 3 q/ha	
	- Alemaya composite	12 -24 q/ha	2 q/ha	
	- Moshore/local	14 q/ha	4 q/ha	
Teff	- Bota Gasha (wel.)	7 q/ha	--	According the key in ants no fa produces t without fe liser app ation
	- Yilga (Wel.)	6 q/ha	--	
	- Siya (Wel.)	8 q/ha	--	
Barley	- Bota Benga (white Barley)	4 - 6 q/ha	3 q/ha	
	- Kareta Benga (black barley)	3 - 5 q/ha	2 q/ha	
	- Murgedno (wel.)	4 q/ha	2 q/ha	

Note: Sweet potato and haricot beans; key informants interviewed were not able to estimate yield/ha. Because these crops are gradually harvested and used while they are still fresh and in the field.

CRDA

Crops in the PA are intercropped with a "multi-storey systems" sequence. Figure 4.1 demonstrates multi-storey sequencing of the crops in the fields.

Figure 4.2 showing the farmers' monthly labour calendar was drawn by 3 farmers. The figure indicates the distribution of labour requirement and labour input used in a year. However, the demand for labour input depends upon the rainfall pattern and distribution between months. When the starting [illegible] fall shifts to the later months, the concentration [illegible] quire-ment also shifts to the later months.

Labour requirement increases when the farmers cultivate more than one crop in the season. For instance, maize, haricot beans and enset planting starts in January with high demand for labour input. In July and August, haricot beans, teff and barley are planted while harvesting maize. Relatively, dry months of the year are the least busy months.

Figures 4.3 and 4.4, crop calendars drawn by the farmers indicate the time of production of each crop during the year. The approximate period of performing different agricultural activities for the specific crop growth cycle is shown. However, the calendar changes with the start and end of the rainfall in the year. The overlapping of a single operation indicates harvesting of the first crop to be followed by the second crop within the same or next cropping season. For instance, sweet potato and potato harvesting could be land preparation for the coming teff or maize cultivation.

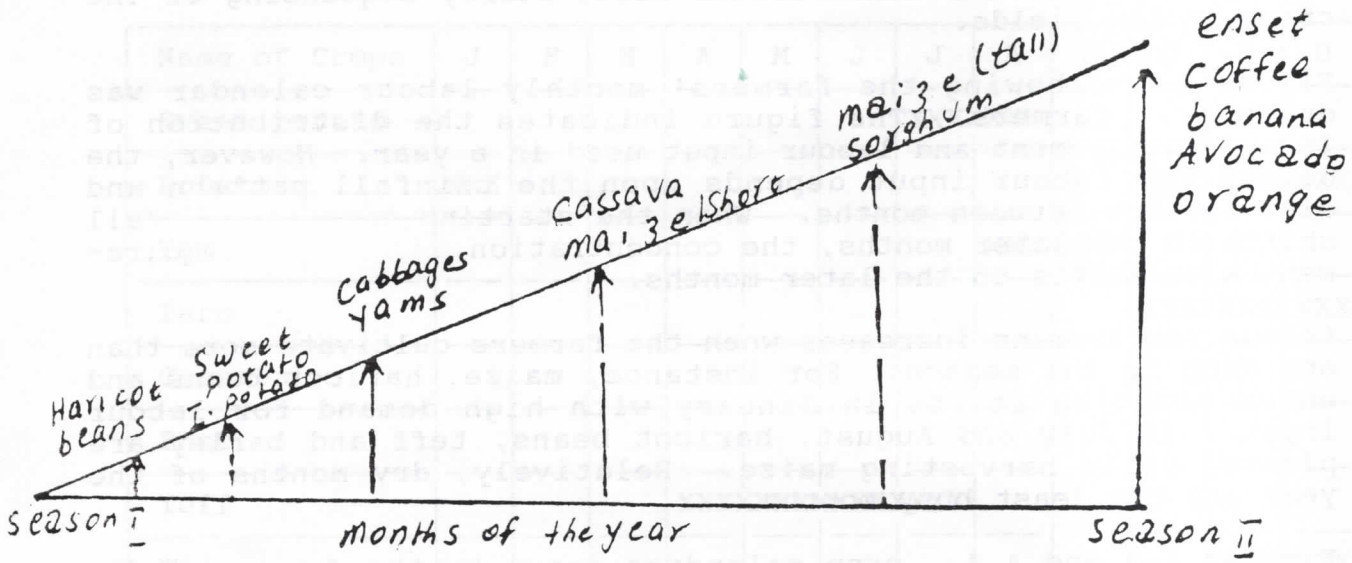
Since land is in short supply in Dache Gofara PA, a given land operation does not cover the whole period of time indicated in the figure. It shows the average trend of cropping pattern and calendar.

According to the farmers' information (Figures 4.2, 4.3 and 4.4), there are more than one agricultural activities or operations throughout the year in the PA. Sometimes, land preparation, weeding and planting/sowing of seeds of different crops overlap each other. However, the dates of operations for different activities vary depending upon the size of plots to be used.

In Dache Gofara PA, the land is covered with perennial crops throughout the year. The crops like enset, banana and coffee trees grow sustainably. If shade is provided to the crops like yam, cabbages, sweet potato they can be grown throughout the year. The soils under perennial crops are relatively wet and support root crops growth even during the dry seasons.

CCRDA

FIGURE 4.1 INTERCROPPING SYSTEMS /MULTI-STOREY/



In such a system, production of crops continues from one season to the another, and provides some amount of food to the people for the whole year. However, harvesting of the crops is relatively short lived for any one crop. Because, production of one crop discontinues once the crop is harvested and the other crop in the sequence follows for the next harvest.

Ranking of teff varieties has been done with the help of seven farmers (table 4.5). Three varieties of teff produced in the PA include 'Bota Gasha' 'Yilga' and 'Siya' local varieties. Bota gasha is a 'white' colour teff variety which was introduced in the area very recently. The farmers prefer 'Bota Gasha', mainly because of its sale for cash income and high yield. For rainfall tolerance the farmers prefer 'yilga' local variety and for early maturity 'siya' variety, which is mainly used for food during food shortage period (in the rainy season).

Ranking of maize varieties was also made with the same seven farmers. As is indicated in table 4.6, Kenya variety was a preferred variety in the PA. Because of double cropping season and small area of land holding, the farmers prefer a crop which matures earlier to provide space for the next crop. For the relative rainfall stress conditions, and taste, 'Moshore' local variety of maize is preferred.

CCRDA

FIGURE 4.2. FARM LABOUR CALENDAR (BASED ON THREE FARMERS)

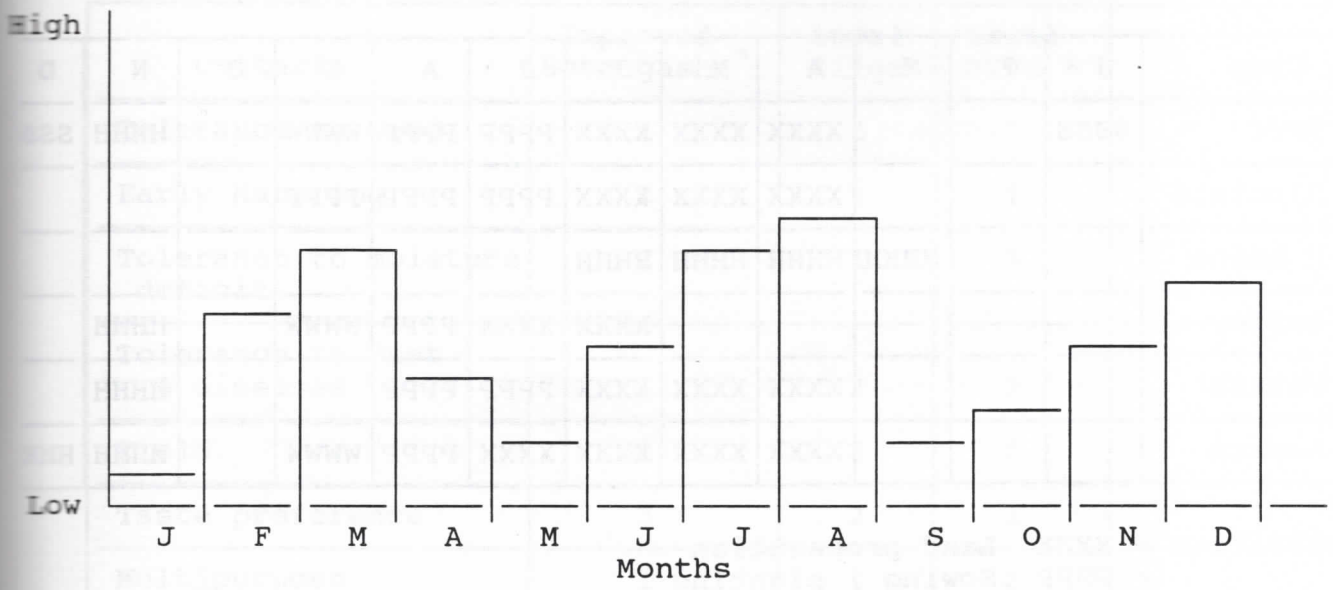


FIGURE 4.3. CROP CALENDAR OF SURVEY AREA, BELG SEASON

Crop	J	F	M	A	M	J	J	A	S	O	N	D
Maize	XXXX	PPPP	PPPP		WWWW	ShSh	CCCC		HHHH	SSSS	XXXX	XXX
Enset	XXXX	PPPP	PPPP			WWCC			WWCC	XXXX	XXXX	XXX
H.beans	XXXX		PPPP	PPPP	WWWW			HHSS			XXXX	XXX
S.potato				PPPP	PPPP				XXXX	XXXX	XXXX	XXX
Teff	HHHH	HHHH		XXXX	XXXX	XXXX	XXXX	PPPP	WWWW	WWWW		HHH
Sorghum	XXXX		PPPP		WWWW						HHHH	SSS
Barley	XXXX		PPPP					HHSS			XXXX	XXX
Yam	XXXX HHHH	XXXX HHHH	XXXX HHHH	XXXX	XXXX	XXXX				PPPP HHHH	PPPP HHHH	PPP HHH

Activities - XXXX Land preparation
- PPPP Sowing / planting/
- WWWW Weeding
- ShSh Shilshalo
- CCCC Cutivation
- HHHH Harvesting
- SSSS Storage

CCRDA

FIGURE 4.4. CROP CALENDAR OF MEHER SEASON
(Based on 7 farmers)

Crop	J	F	M	A	M	J	J	A	S	O	N	D
Teff	SSSS			XXXX	XXXX	XXXX	PPPP	PPPP	WWWW		HHHH	SSS
S.potato				XXXX	XXXX	XXXX	PPPP	PPPP	PPPP			
H.beans			HHHH	HHHH	HHHH	HHHH						
Barley						XXXX	XXXX	PPPP	WWWW		HHHH	
Potato				XXXX	XXXX	XXXX	PPPP	PPPP			HHHH	
Asmera				XXXX	XXXX	XXXX	XXXX	PPPP	WWWW		HHHH	HHH

Activities - XXXX Land preparation
- PPPP Sowing / planting
- WWWW Weeding, shilshalo, and cultivation
- HHHH Harvesting
- SSSS Storing

FIGURE 4.5. PLANTING CALENDAR OF ROOT AND CASH CROPS

Crop	J	F	M	A	M	J	J	A	S	O	N	D
S.potato									====	====		
Potato			====									
Yam										====		
Taro	====	====										
Cassava												
Enset												
Teff			====				====	====				
Banana	====	====	====	====	====	====	====	====	====	====		
Coffee				====	====	====	====	====				

CCRDA

Table 4.5. Ranking of Teff varieties (Based on 7 farmers)

Criteria	Improved Bota gasha*	Local Yilga	Local Siya *	
Tolerance to weed	1	2	3	
Early Maturing	2	3	1	
Tolerance to moisture deficit	2	1	3	
Tolerance to Pest & diseases	1	2	3	
Yield	1	3	2	
Taste preference	3	2	1	
Multipurpose	1	3	2	
Storage	-	-	-	Storage proble is not observe by the farmers
Flour produced /kg	2	3	1	
Price	1	3	2	

* Over all preference of teff variety was 'Bota' gasha

Table 4.6. Ranking of Maize varieties (Based on 7 farmers)

Criteria	Improved Verities		Local variety Moshore
	Kenya	Alemaya C.	
Early Maturing	1	2	3
Tolerance to Moisture stress	3	2	1
Tolerance to Pest & diseases	2	1	3
Yield	1	2	3
Taste preference	3	2	1
Storage	3	1	2
Flour product/kg	1	2	3
Price	1	2	3

CCRDA

The first rains come between January to March and are used for planting maize, enset, haricot beans and sorghum. The second rains start in June and are used for teff and haricot beans planting.

The farmers in the PA obtain their seeds from the markets, gifts from friends and relatives, private stores, REDD BARNA and some improved seeds from the Ministry of Agriculture.

4.2. Methods of planting crops

4.2.1 Methods of planting major cash and root crops

Teff, coffee and banana are the major cash crops in the PA. Root crops such as sweet potato, enset, Irish potato, taro, cassava, yam and Welaita dono are also growing in the area. Among these crops Welaita dono is rarely seen. Concerning methods of planting (in the area) each crop has its own characteristics which consequently leads the farmer to follow various methods for each crop.

4.2.1.1. Cash crops

Teff:- The soil should be prepared very well before planting. The sowing rate, according to the farmers, is about 5 kg per timad per watta (wel.). The farmer carries the seed in a container called kuna (Amh.) and broadcasts the seeds on the well prepared soil bed. Many farmers get difficulties in properly broadcasting teff on the prepared soil. However, few farmers in each area are able to sow the seeds properly and uniformly .

Sowing teff is more difficult than sowing other crops because:

a) The seeds are very tiny, and so it is difficult to scatter uniformly,

b) If the sowing rate (the density) increases, it will be impossible to thin or decrease the population of these very small seedlings.

Coffee:- Farmers prepare coffee seedlings around their dwelling house. The purpose of preparing coffee seedlings near to the house is;
a) To get shade,
b) To provide sufficient water even from showers (rains) and
c) To closely follow up.

After three years the seedlings will be transplanted to a vacant space around or away from homesteads and mulched very well with straw or tree branches.

CCRDA

Banana:- According to the farmers, banana is introduced into the area recently. But it seems that the number of banana trees in each homestead is increasing rapidly. Banana is propagated vegetatively by using its suckers. These suckers grow out of the parent corm and are detached (uprooted) from the mother plant and transplanted in an open area or intercropped.

4.2.1.2. Root crops

Sweet potatoes:- sweet potato is propagated vegetatively i.e. using the cuttings. Farmers plant the cuttings in a well prepared soil and the spacing between plants is about 45 cm. They plant from 2 to 3 cuttings in each pit. This is done to increase the establishment of the cuttings. Usually the planting is done in rows using animal tractions.

Enset:- First the plant is uprooted and the corm is divided symmetrically into two equal parts. Then these parts are buried separately in a well prepared and manured pit. After a year the shoots or young suckers will be separated from their mother corm and planted in Megabit (March) in a nursery 'Beshesuwa'(Wel.) from where the farmers transplant the young ones among the big enset plants.

Enset is usually intercropped or mixed with maize, taro root, haricot beans, cabbage, bananas etc.

Irish potato :- It is planted in rows. The spacing between rows and plants is 50 cm and 25 cm respectively.

Taro:- According to the farmers, taro root production is the most difficult of all other crops. Before planting taro roots the soil should be plowed up to seven times. The spacing between rows and plants is greater than other root crops. The cormels and corms are used as a planting material.

Taro is sometimes intercropped with maize. The ratio of taro to maize plants could be about 20:1.

Yam:- The seedlings/ suckers are obtained from the old mother plant i.e when farmers harvest the edible part (root) they leave the upper part of it in the ground from which some months later suckers / seedlings appear. Then these tillers are separated from the main plant and planted in a prepared area. Yam is usually consumed in Ginbot (May).

Cassava:- The plant can be propagated vegetatively using the stem cuttings. The farmers said that the soil preparation and management are very easy comparing to other root crops.

CCRDA

Welaita dono:- Farmers use the roots for planting of the crop. They cut the root in to 2-3 pieces and usually plant it in Megabit. The plant needs a well prepared soil and good management. This crop is planted very rarely in the PA and it is a late maturing crop.

4.2.2. Arrangement of the main crop in the field (cropping sequence)

According to our observations in the PA, most farmers plant enset, maize, haricot beans, bananas and other root and fruit crops in mixture. Mixing up of all these crops is an indication of shortage of land in the area. During our discussion with 6 farmers it was clear that farmers understood the importance of crop rotation very well. The crop rotation pattern used is: haricot beans -->teff --> maize --> root crops (taro, sweet potato, potatoes etc)

4.2.3. Sources of seeds

Some farmers, especially the poor are unable to keep (store) some crops' seeds for the next planting season. These farmers get seeds from a market or from their relatives.

Root crops planting materials are usually obtained from the preserved plants in the farm. For example, during our trip in the PA we saw some sweet potato plants under the shade of coffee and enset plants. According to the farmers, these plantations under coffee and enset do not give yield but are used as a source of planting material from which the cuttings are taken.

For most root crops planting material is not sold in the markets. If some one lacks planting material, he can not buy it from the market. No farmer sells the cuttings, therefore, the only option is to ask other farmers to give him freely.

SCRDA

The farmers have different methods of selecting seeds. The selecting procedure and storage of seeds for next cropping season for different crops is given below.

Name of crops	Methods and ways of seeds selection
Sweet potato	- During harvesting they take the stem and plant around home stead using manure in order to set longer stem and full of leaves for next planting season. - Some farmers immediatly take the stem after harvesting the plant. - They select the best varieties and form well established part. Most farmers select Gessa variety.
Potato	- Since potato does not stay for a long period it shrinks and looses its germination after harvesting. Better tubers are stored for about one month in cool dry place for next planting.
Yam	- From the yam fields certain corm parts are randomly chosen for next cropping season.
Taro	- Selection of taro is based on the variety. Farmers select the corm from the previous harvest or get them from the neighbours according to their selection.
Cassava	- Here there is only one variety where no selection takes place after harvesting. Stem is used for the next cropping season.
Teff	- After harvesting and threshing farmers reserve the yield for market and planting. - Selection of teff is based on the season of planting: For 'Belg' local, for 'Meher' white teff. - If the seed is not available, it is purchased from the markets.
Coffee	- Most farmers plant berries picked up from a well-shaped, high yielder mother coffee tree. Farmers establish their own nursery around their homesteads and plant them after 3 years. Some farmers take from their neighbours, who grow coffee seedlings in their nursery.
Banana	- Banana plants are propagated by suckers. Some farmers duplicate from their own field. If a farmer wants to grow a variety which he doesn't have, he asks his neighbours to give him (they don't sell suckers) some suckers. - Bananas are planted around homesteads near to the fences. Welaita and Kenyan varieties are the most preferred.

CORDA

4.2.4. Crop rotation

The main objective of crop rotation is to get yield throughout the year. In this PA, since there is a shortage of land, farmers are used to crop rotation system. Crop rotation have been practiced long ago with the growth of population.

Farmers have the following crop rotation types:

- Teff --> haricot bean --> teff
- Maize --> teff --> haricot bean
- Maize --> sweet potato =>
- Maize --> haricot bean =>

Crop rotation is acceptable by the farmers because it has some advantages. But farmers have their own problem of crop rotation. Since the land has been cultivated for several years, it has lost its fertility unless they use additional fertiliser and manure. Crop rotation, if it is properly managed, is helpful to soil fertility. It is advisable if the farmers rotate cereals with legume crops. But sometimes farmers plant cereals consecutively. This diminishes the soil fertility. The recommended criteria for crop rotation are:

- Rotating cereals - legumes - cereals (legumes fix nitrogen and develop soil fertility)
- Farmers take all crop residues from the land, this should be controlled and farmers shoud allow residues to decay in the soil
- When applying fertiliser, proper amount should be applied for each crop.

CCRDA

4.3. Varieties of some cash and root crops

Table 4.7 Varieties of cash and root crops

Crops	Varieties	Remarks
Enset	Bullo, Silkantie, Ketene,*Bedadia, *Lembo, Sesa, Cheche, Gefetemo, Moche, Sweetie, Phinko, Kuteha, Arkia, *Shelekumia, *Phetuma Ankuwa, *Alegena, Aginia, Lemuwa, Walema, *Ankogena, *Dokuwa, Phelo, Keberia, Nekaka, Arkia, Gessihe, *Pheluma	28
Sweet potato	Welaita Sweet potato, *Dila (peno),*Echa, *Gessa, Phella	5
Potato	Welaita potato,*Irish potato, Volvo	3
Yam	*Welaita yam, Wolabo,*chewa and *A-ina	4
Taro	Gerezum, *Yeda, *Yetira, Shisha and Demia	
Cassava	Cassava (Mita boye)	Only one variety
Banana	*Welaita banana, *Yeferenge banana, Kenya	3
Coffee	*Aruma, mikie, morie	3
Teff	*Yilga (wolaita teff),*Saya, Bota, mitazo	4

* The high yielding varieties

Table 4.8 Yield estimates, location of markets and prices

Crop	Yield Per timad (kgs)	Yield Per plant (kgs)	Market name	Price / 100 kg, 1992	
				At market	At home
Teff	70-80		Boditi, Areka, Shone	140-150	120-130
Banana		7-10	Boditi, Areka, Shone	26/100kg	10-13
Coffee	400		Boditi, Areka, Shone	500	?
S. potato	5,000		Koteha	---	6
Taro	10,000		Koteha	---	5
Yam	---	2.5	Koteha	---	22-24
W.potato	3,000		---	---	14
Potato	6,000		Areka, Boditi	15	
Enset	Not known	Not known	Areka, Boditi	16	

GCRDA

Based on four farmers interview, cash and root crops varieties are further ranked in table 4.9 below.

Table 4.9 Ranking of root and cash crop varieties.

Type of crops	Varieties	Yield ranking
Sweet potato	Welaita	6
	Fino	4
	Faha	5
	Gessa	1
	Tcha (Kenya)	2
	Dilla	3
Potato	Volvo (Irish potato)	1
	Welaita Dono	2
Yam	Welaita	1
	Aena	2
	Chewa	3
	Welebo	4
Taro	Yeda	1
	Yitira	2
	Shishia	3
	Demia	4
	Gerezu	5
Cassava	Mita boye	
Banana	Welaita	1
	Kenya	2
	Ferenge	3
Teff	Seye	1
	Yilga	2
	Bota	3
	Mitazoa	4
Coffee	Meki	1
	Aruma	2
	Morie	3

CCRDA

Continued Table 4.9.

Type of crops	Varieties	Yield ranking
Enset * (clones)	Lemua	1
	Doko	2
	Anko	3
	Alagena	4
	Shelkumia	5
	Felua	6
	Bedadia	7
	Kucha Arekia	8
	Lembo	9
	Bulo	Not ranked
	Finko	Not ranked
	Ketene	Not ranked
	Agene	Not ranked
	Yesherie	Not ranked
	Nekaka	Not ranked
	Keberi	Not ranked
	Sessa	Not ranked
	Giftalo	Not ranked
	Chiche	Not ranked
	Areke	Not ranked

* Ranking is done only to the nine clones, the rest are similarly prefered

CCRDA

4.4. Weeding and thinning

Several types of weeds affect crops in the PA. Weed infestation is higher when the land is not well prepared. The effects of weeds on crops vary from one to the other.

- Most of the weeds observed are indigenous. But a weed like wontokema is exogenous. This weed infest nearly all the crop lands. "It is supposed to have been imported with food aid i.e. wheat."

- Time of weeding differs from one crop to another. This is due to the capability of the crop to suppress the weeds.

- Farmers use different tools and methods to eradicate weeds, they use tikiya and / or shelkiya for most crops, but a crop like teff is weeded by hand.

  Of all farm activities weeding is tedious. Unless farmers weed at proper time there will be a great loss in production. Some farmers interviewed indicated a yield reduction on some crops like taro to be above 40% while some crops are more affected than other crops.

- From the information given by the farmers the main cause for weed expansion is allowing the weeds to flower / mature.

According to the farmers interviewed, the following methods are essential for better control of weeds.
- Optimum land preparation
- Weeding at proper time and method
- Using pure seeds

Using pure seed, using the best method of weeding before flowering and proper land preparation discourages weed growth in the crops.

Different types of weeds were observed and informed by the farmers during our interviews and discussion. According to the farmers, pela is the most difficult and widely distributed weed in the cereal crop fields. In the past the infestation and coverage of the weed was not as wide as it is this time.

The weeds observed, and the severity of damage by the type of crop are listed in the following tables (tables 4.10 and 4.11). Moreover, information on the methods of weeding and weeding periods is given in Figures 4.6 and 4.7 and table 4.12.

Table 4.10. Weeds and types of crops affected

Weeds	Damage	Crops affected
Wontokema	High	Maize, teff, s.potato , h.beans , barley
Bezidia	Medium	Teff, h.beans, barley, maize
Adele	Low	Maize, h.beans, teff, barley
Pela	High	Maize, h.beans, s. potato, enset, coffee, yam

The purpose of weeding is:
- To reduce competition for water, air, and nutrients between the crops;
- To reduce yield reduction; to control pests and diseases of crops.

CCRDA

Table 4.11. Types of weeds affecting cash crops and root crops

No.	Type of weeds	Sweet potato	Potato	Yam	Cassava	Taro	Enset	Teff	Banana	Coffee	Remark
1	Tutu Tuchi		X	X	-	-	-	X	-	-	
2	Sura	X	X	X	-	-	-	-	X	-	
3	Pela	X	X	X	X	-	-	-	X	-	
4	Cholia	X		X	-	-	-	-		X	
5	Bizdia	X	X	X	-	X	X	X	X	X	
6	Erbete	-	X	X	-	-	-	X	-	-	
7	Mega	X	X	X	-		X	-	X	X	
8	Bugunda	-	X	X	-	-	-	X	-	-	
9	Adelia	X	X	X	-	X	-	X	-	-	
10	Wontekma	X	X	X	-	X	-	-	-	-	
11	Delicha	-	X	X	-	-	X	-	-	-	
12	Humbo	-	-	-	-	-	X	-	-	X	
13	Mechara	-	-	-	-	X	-	-	-	-	
14	Gelesho chol	-	-	-	-	-	-	-	-	-	

Note:- As farmers information weed infestation is very high, unless they prepare their land in good condition, most weeds are specific to certain crops

CCRDA

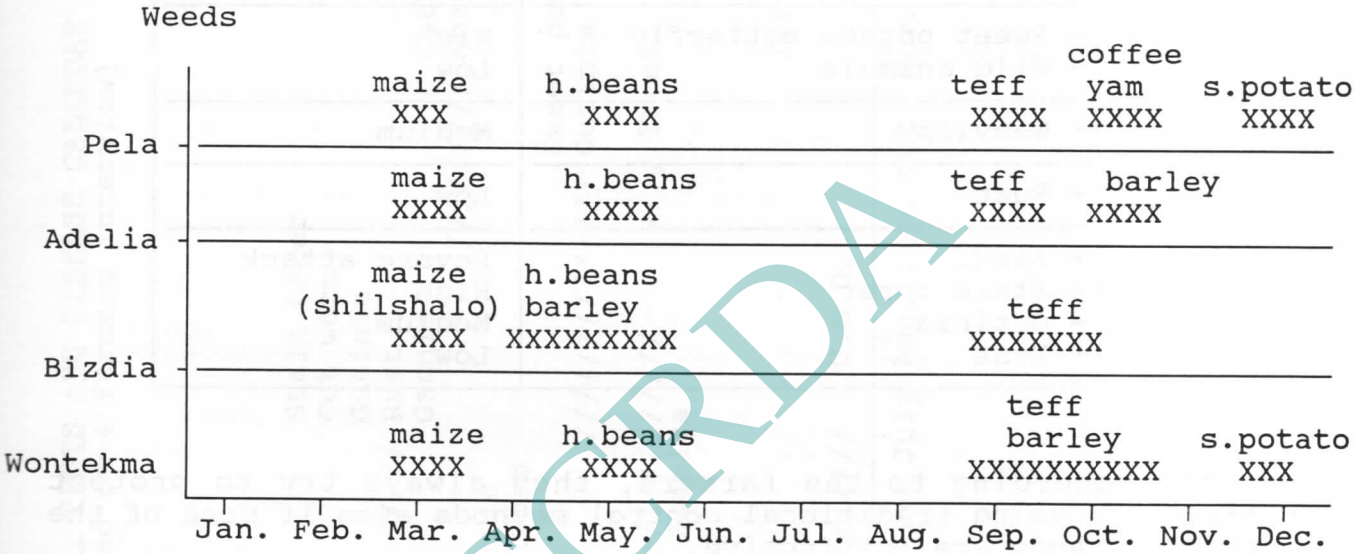
FIGURE 4.6. WEEDING CALENDAR OF ROOT AND CASH CROPS

No.	Name of crops	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
1	Sweet potato	//////											
2	Potato				//////								
3	Yam		//////										
4	Cassava												
5	Taro	//////////////

Table 4.12. Methods of weeding cereal crops

Methods of weeding	Crops
Hand weeding (up rooted)	teff, h. beans, maize
Shilshalo by oxen	maize, sorghum
Weeding with hand tools (Aylie, Tike & Shelke)	maize, sorghum, enset, coffee, yam, s.potato, h.beans and cassava

FIGURE 4.7. WEEDS AND WEEDING TIME OF THE YEAR



The farmers said that maize and teff crops are the most sucept-able to weeds infestation. Farmers weed maize two to three times excluding shilshalo, and teff 3 to 4 times depending on the weed types and infestation.

4.5. Insects pests and diseases

The main pests and diseases affecting crops and the period they severely attack plants in the PA are given in table 4.13 and Figure 4.8. The farmers interviewed indicated that all crops are affected by pests and diseases. The main food crops like enset and sweet potato, are the most affected. The decline in yield and plantation of coffee trees is very high. The C.B.D. has completely destroyed coffee trees from some farmers' fields. The yield (seeds) and the vegetative part of almost all crops is affected by pests and diseases.

CGRDA

Insects, diseases and wild life are among the major agricultural problems. Loss of production by these constraints is believed to be very high in the PA.

Table 4.13. Types of pests and diseases identified by the farmers interviewed

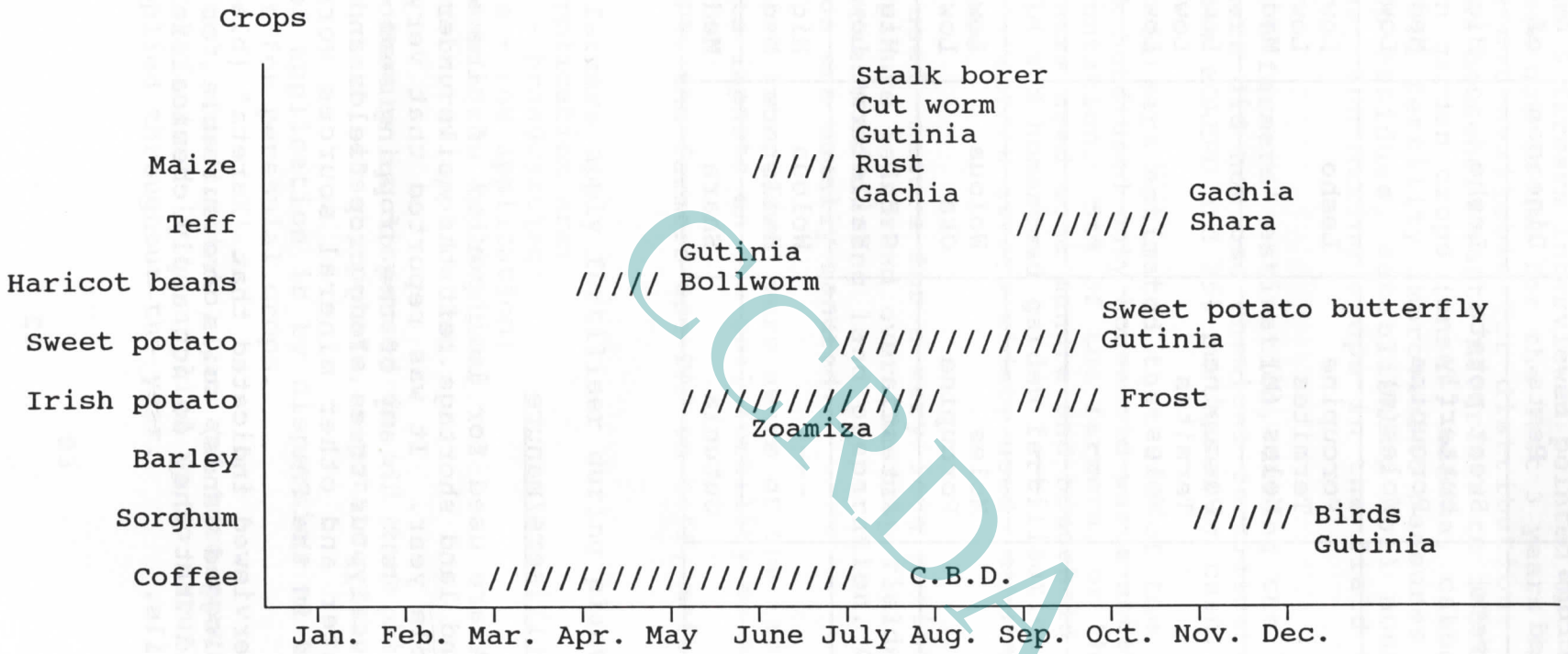
Crops	Pest and disease	Extent of damage
Maize	- Stalk borer - Wild animals - Weevils and rust	High Low Midium & low
Teff	- Cricket	High
S.potato	- Sweet potato butterfly - Wild animals	High Low
H.beans	- Weevils	Medium
Barley	- Rust	Low
Sorghum	- Birds - Stalk borer - Gutinia - Rust	Severe attack High Medium Low

CGRDA

Infact, according to the farmers, they always try to protect their crops using traditional control methods even if some of the control methods are ineffective.

Here, farmers encounter the many types of diseases, pests and wild life which damage some of the cash and root corps in the PA All informations about diseases, pests and wild life damage are illustrated in Tables 4.14 and Figure 4.8.

FIGURE 4.8. INSECTS, PESTS AND DISEASE CALENDAR
(Based on 4 farmers interview)



CCRDA

Table 4.14. Insects, pests and diseases of root and cash crops in Dache Gofara PA

Name of crops affected	Pests	Diseases	Extent of damage
Sweet potato	Sweet potato butterfly Porcupine Moles(m)	Lesho	High Medium Low
Potato	Porcupine Termites Moles (M)	Lesho	Low Low Medium
Yam	Porcupine Termites Moles		Low Low Low
Taro	---	---	
Cassava	---	---	
Enset	Moles Porcupine	Woloua Oka	Low, High Low, High
Coffee	Antestia	C.B.D Hailstorm	High, High Low
Banana	---	Woloua Hailstorm	High Medium
Teff	Gutunia	Shara	Medium

CCRDA

4.6. Use of fertilisers/manure

Soils in the PA are used for long period of time without rest. Intercropping and land shortage left the soils under a continuous use for the whole year. It was reported that very few farmers practice fallowing land in any of the cropping seasons. Intensive plantation of eucalyptus trees along crop fields and its competition to the water and other mineral sources worsen the soil fertility status in the PA.

The farmers interviewed indicated that 'Kareta' (black soils) and 'Chere' (water logged lands) soils are suitable for crop production. They said that they do not apply chemical fertilisers for the 'chere ' soils.

The farmers pointed out that chemical fetrilizers were used in the PA since the time of WADU. WADU extension agents demonstrated soil fertility improvement levels with different chemical fertiliser applications. DAP and UREA (chemical fertilisers) were widely used for about 17 years (1963 - 1980 E.C) in the PA.

A group of 5 farmers interviewed pointed out that chemical fertilisers were not in use for the last 3 years in the PA. Fertilizers were not available for distribution. Some farmers used manure and household waste materials to increase soil fertility, mainly on garden crops (enset, banana, cabbage). Other traditional soil fertility improvement measures used were mulching with crop residues, establishing soil mounds, crop rotation practices, and mixing crops in the field with haricot beans (legumes).

Based on 5 farmers' estimation, during the last 3 years 33% of the farmers did not use chemical fertilisers, 42% purchased on credit from MOAEPD and 25% purchased on cash.

The same farmers estimated that 24% of the farmers who have no livestock herd used only household waste materials for coffee and enset plantation. 54% of the farmers, or the medium size livestock owners used some manure and household waste materials for main field and homestead garden fertilisation; 20% of the farmers or high livestock owners widely used manure for soil fertility maintenance.

Farmers used manure for a very long period and for different crops. Manure is spread over the crop fields in the dry season, after harvest or during land preparation. Crops planted along homesteads are usually manured.

The farmers interviewed were aware of the importance of fertiliser and its impacts on the soil fertility maintenance.

In this PA, the farmers use DAP on teff, maize, h.bean and potato.

All the farmers apply fertiliser during planting time. The methods of application are:
For teff - broadcasting;
For maize - row application;
For h. bean - row application;
For potato - row application.

Manure:- Manure is dispersed in all farm lands. It is applied mainly on taro, enset, potato, s.potato, yam, banana and coffee.

Method of application is by dispersing on the field and around the plant for perennial crops.

For potato , sweet potato, yam and taro manure is applied during weeding. For enset it is applied up to maturity while for coffee it is applied throughout the year.

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Problems affecting the farmers to use fertiliser /manure

1. Since the income of the farmers is low, they can not buy fertilisers as required.
2. The price of fertiliser is high and manure is only available to those farmers having cattle, goat, sheep and horses.
3. Manure is not prepared carefully. There is a loss of certain minerals from it.
4. Manure application requires hard work, tedious and time consuming.

4.7. Uses of chemical pesticides

The main objective of chemical pesticide is to eradicate pests and diseases. From our investigation and the farmers' interviews, there are several diseases and pests affecting crops. Farmers do have their own cultural practices to deal with the problem but still these cultural practices are not fruitful. So, they have started to use disease and pest-killer chemicals for the last 15 years (table 4.15). The degree of damage differs from crop to crop. The essential chemicals and pesticides are not available in the PA.

Table 4.15. Pesticides used

No.	Type of crop	Type of disease and pest	Used chemical
1	Sweet potato	Sweet potato butterfly	Sevin Roger
2	Coffee	C.B.D	Dacolin

1. The chemical used on sweet potato butterfly eliminated the pest for some time. Since the pests life cycle has full metamorphosis, application should be for longer time. But there is no chemical to be used . Unless a major action is taken there will be a full damage on sweet potato. MOA and other organisations cooperate to give chemicals and pesticides to the farmers. The main question of the farmers is chemical pesticides for those crops attacked by diseases and pests.

2. For C.B.D, Dacolin is used. But the farmers did not successfully apply the chemical, because for one cropping season they have to apply it for seven times which demands tedious work and sprayers.

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4.8. Moisture stress

Dache Gofara PA lies in the middle altitude, woina dega zone, which should have received normal rainfall throughout the year. The farmers interviewed reported about irregular rainfall pattern for the last 20 years. As a result, crop yield and livestock feed availability declined with a decrease in livestock production.

Soil moisture stress occurs in the PA for various reasons;

1) Low and declining rainfall
2) Low or little water percolation through the soils
3) Dense eucalyptus tree plantation in and around crop fields which sucks water out of the soils
4) Densely squashed fields with multiple (intercropping) cropping which requires more water availability in the soil
5) Long dry period, etc.

The farmers seasonal crop calendars indicated that crops require water during the main performance periods, for example;
- Maize and haricot beans require water in Tir,
- Barley requires water in Megabit,
- Fruits and coffee plantation requires water in Hamle and
- Teff requires water in Nehasse.

Lack of rainfall during these months affects the performance of the crops indicated. In the past, rainfall shortage have already affected several crops in the PA. According to the farmers, enset plantation simultaneously declined with the decline of rainfall in the area. At different ime maize, haricot beans, sorghum and teff crops failed due to rainfall changes in its appearance and finishing (end). This has become a recurrent phenomenon in the Dache Gofara agriculture.

The farmers pray to God, try to buy from rain makers, sacrifice an animal to a known deity (Goddess) to get rainfall. Some farmers planted a relatively rainfall stress tolerant variety of crops like local maize, local teff, root crops and fruit trees.

Some innovative farmers practice early plowing or plow shortly after harvest. According to the farmers early plowing has the following advantages:
- Slows down the velocity of run off;
- Increases soil water storage;
- Increases soil nutrients level and allows fast growth or penetration of root into the ground.

Soil and water conservation activities initiated by WADU and REDD BARNA provided some protection for soil erosion hazards.

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4.9. Methods and timing of harvesting and storage

Farmers in Dache Gofara use different types of hand tools to harvest and thresh field crops. Simple hand tools like 'Shelkiya', 'Ayilia', and 'Tikiya' are used to uproot root crops. Sickle is used to cut maize, sorghum and barley and to mow teff from the fields.

Crops are harvested at different stages of development:

a) Early green stage (infancy):- At this stage seeds are not fully matured and ready (ripe) for harvest. Shortage of food necessitates some families to harvest crops (like maize, enset, taro root, etc.) while it is at its infancy stage. Such harvest bridges the acute food shortage periods of the families.

   An infancy stage harvest highly reduced the numbers and yield of enset plant in the PA. Because the households use the corm (of enset) for human diet and livestock feed, the whole plant is up-rooted and used only once.

b) Advanced green stage:- The stage in which plants turn their leaves and stalk to dull yellow colour. At this stage significant proportion of maize, haricot beans, taro root and sweet potato is harvested.

c) Full maturity stage:- The stage in which seeds stalk, and leaves of many crops dry out and lose their freshness. Some crops like maize do not reach up to this stage due to early uses in the area. Even crops like enset , taro root, sweet potato, haricot beans, etc. are harvested in small quantity at this stage and left for storage. According to the farmers, most of the crops are harvested before their full maturity.

Farmers in the PA use a very simple local methods of storage. Usually, clay vessels, bins and granary that are locally produced are used for grain storages. Root crops are economically harvested (smaller quantity) and stay underground until they are completely removed from the ground. Table 4.16 indicates methods and timing of harvesting and storing of the crops in the PA.

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Table 4.16. Methods and timing of harvesting and storing
(Based on 3 farmers interview)

Crops	Materials used for harvesting and threshing	Time of harvesting	Time of storing	Selection seed/plan material
Maize	Sickle - to cut Hand - to remove ears Stick - to separate seeds	Oct - Nov	November	Observing performanc the field/ Healthy se
Teff	Sickle - to mow Animals- to threshing	Nov - Jan	January	Cleaning s from weed
Sweet potato	Hand tools - to dig out	1st -in June 2nd -Oct-Nov	Undergro- und until harvested	Healthy tu
Barley	Sickles - to cut Animals, stick - to thresh	November	Nov - Dec	Cleaning s from weeds

* Farmers' criteria for selection of seeds for planting / sowing are
- Size of seeds
- Pest and disease tolerants
- Performance of crops at the field

Farmers have their own harvesting and storing techniques. These techniques differ in seasons and methods to each crop. Below are some examples on the stages of harvesting (Table 4.17) and storage practices (Table 4.18).

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Table 4.17. Stages and methods of harvesting

Crops	Stages of harvesting	Methods of harvesting and tools in use
Sweet potato	Leaf colour changes (yellow) Soil cracking	Digging up with local tools; tikya or shelkiya
Potato	Yellow leaf colour flowering of the crop	" "
Taro	Red leaf colour,(Symptom) leaves die	" shelkiya
Welaita dono	Shading of leaves	" tikiya
Yam	Yellow leaf colour	" tikiya
Cassava	Cracking of soil (symptom)	" tikiya
Teff	Drying of the flowers Colour change to white Grinding by teeth	Threshing with sticks cutting with sickles
Coffee	Colour changes to red	Picking up by hands
Banana	Banch bends, color change on part of the banch Inviting birds	Cutting by sickle
Enset	When they look inflorecence (for kocho preparation) For amecho as needed	

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Table 4.18. Storage practices

Crops	Storage pratices
S.potato	Sweet potato stays under the ground for several months. Farmers gradually harvest the crop for consumption or market (no improved storage system)
Potato	Spread out in open air for few weeks before planting. For markets and consumption they directly harvest from the ground where it has been planted
Taro	Make a bed and spread on it. Spread under a sleeping bed in a house (cool dry places) Store in a pit and underground
Yam	No storage, harvest to use directly
Cassava	No storage, stay in the soil and consumed gradually
Teff	They store in bins Most of the time they sell after threshing Store in a large clay pots (jars)
Coffee	Store in bins in a house Store for some months until the price rises
Banana	No storage, they sell it on the stand
Enset	Kocho is prepared through fermentation kept for longer period for consumption, sale in a pit.

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CHAPTER 5. LIVESTOCK

5.1. Historical background

Information on historical background for the introduction of livestock was obtained from a group of 7 elderly farmers, of whom 5 were over 65 years of age. The oldest informant was over 100 years and lived in the PA throughout his life time. They were interviewed inside the farmers' hamlets by the team members who are livestock experts. Their historical accounts of the livestock introduction begins from the time of the first settlers in the PA.

They explained that about a century-and-half ago, lady Dache and her spouse Gofara migrated from Kindo Koysha awraja to the PA area. They brought with them 'Waka', species of a cow and 'Borana', species of a bull. These were the first domestic animals to inhabit in the PA. The breeds of these species (which were the cattle of those days) were very large (huge) in body size. The udder of the cows was big (large) and triangular in shape. Milk production of the cows was very high.

During those days, livestock feed was abundant. An open grass fields with many different species and legumes were used for free grazing. The quality and distribution of grasses and legumes was good and large in area.

The calving rates were on yearly basis and milking time was for 9 months. The cows used to provide 3 milking vessels (8-9 litres) per day.

Around 1920, the disease called "purto" (render pest) appeared in the area and eradicated (killed) most of the cattle. The people attempted to cure animals by providing them urine to drink from the affected cattle. But it did not stop the outbreak of the disease.

At this epoch, about 72 large and small-sized tribes/clans immigrated from many different parts of the country. Variety of crops, new agricultural practices and Arsi type of livestock species were introduced into the area during the later migration.

Hides and skins of dead animals were used to exchange poultry from the neighbouring ethnic groups (i.e Hadiya and Kambata). Chicken were exchanged for sheep and goats with Gamo farmers. Eventually, the farmers said that horse, mule and donkey were exchanged with shoats and cattle from the Kambata tribes.

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5.2. Types, current situation and purposes of keeping livestock

A discussion was held with 5 elder farmers at Olbo zone to understand the types and purposes of keeping livestock in the PA. The team members also realised that the current herd of cattle in the PA is Zebu (Arsi) type, and small in size. The farmers keep livestock for various purposes:

a) For traction (oxen);
b) For milk and milk products;
c) For cash earnings;
d) For manure - fertilisation;
e) For transportation - goods and humans.

The five farmers interviewed indicated that calving rates of cows in the PA is very low.

The major constraints identified were:

a) Because of food shortage, cattle are quickly sold and replaced. The cattle are not kept for more than 5 years in the same family.

b) Feed shortage; livestock is tethered in front of the family house and do not let them freely walk.

c) Low access to bull services.

The farmers in Dache Gofara adopted sheep and goat rearing from Gamo farmers (ethnic members) when rinderpest eradicated their cattle from their PA. The farmers feel that it is easier to manage goat and sheep than rearing cattle herd. Goat and sheep are used for cash income and milk production for children in poor families. Goat and sheep are sold for new year celebration, Christmas and Easter feasts and in December for tax payments.

Equine family, i.e. horses, mules and donkeys, were introduced to the people about 150 years ago. The animals were acquired through bartering system of marketing. In those days, Kambata and Mareko lands (south Shewa region) were largely suitable for equines. The farmers said that the current equine population is small due to impoverishment of the large majority of the farmers during the last 17 years of revolution. However, some farmers still buy them from the Kambata and Hadiya awraja.

Among the equine species, horses are highly demanded and the most expensive in the markets. Horses are highly valued because of the following reasons:

- Used in the past to fight against enemies;
- Confers honour for the owner and is highly regarded in the community;

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- Used to ride on during funeral ceremony when kinsman passes away;
- Strong horse owners are named after their horse's name e.g. Dama Godo, Bona Godo, Bula Godo, Mena Godo, Halamo Godo etc.

Because of high social status that horse ownership confers in the community, some farmers prefer to exchange their cattle for horses. Horses are fed better than any other animals and sold for very high prices.

The farmers did not know when and where local species of poultry were introduced from. They mainly bought them from the local markets. WADU attempted to change to improved breed of leghorn. But, because of wild birds (like hawks), wild animals' attack and diseases the farmers resisted against changing local breeds. Poultry keeping is an important source of cash income for the families.

Bee keeping is another farm activity and source of income in the PA. In October and November bee hives are put up on a tree (called abalo), to encourage bees to occupy them while moving around in a colony. Once the bees enter into the hives, they are moved to the homesteads until harvesting. Bee keeping using local bee hives started about 40 years ago. Later, WADU introduced German type of bee hive, and recently, REDD BARNA distributed 'Kenya type" of bee hives to some bee keepers.

Some 50 years ago, honey was extracted about 6 times in a year. From one bee hive, a skin bag (Silicha Amh.) of honey (about 50 kg) was produced. Nowadays, they harvest only twice in a year and produce an equivalent of one clay pot (Masero Amh.) of honey (about 15 kg) from one bee hive. Due to depletion of natural vegetation i.e. flowering trees, herbs and shrubs, bees lack sources of nectar to convert it to honey stuff.

The study team has been provided data on the species and numbers of the livestock population in the PA by Areka MOAEPD (see Figure 5.1).

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Table 5.1 Species and numbers of livestock in the PA.

Species	Number	Species	Number
Oxen	565	Mule	40
Bull	200	Donkey	80
Cows	300	Sheep	350
Heifer	150	Goat	100
Calves	180	Chicken	860
Horses	50		

According to the innovative farmers' information, lots of farmers lead their lives without many of the above livestock species. Average livestock holding per household is not more than half an ox (i.e. shared) and a cow.

Livestock ownership is surveyed in 16 households. The data collected from the Areka MOAEPD office, indicating size and composition of livestock for these households are shown in table 5.2. Livestock ownership could be shared between 2 households. In this case cows are milked in turn, oxen labour power is equally used. To share an animal, the right of ownership or sharing should be exchanged with money or give a small animal as a gift. Shared ownership of livestock (oxen, cows, goats and sheep) is a means to own a live animal by poor farmers.

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Table 5.2. Size and composition of Livestock / household/

Farmers serial No.	No. of cattle/ h-hold	Plowing ox	Young bull	Cow	Heifer	Calf	Goat	Sheep	Donkey	Horse	Mule	Poultry
1	2	1	1	-	-	-	-	-	-	-	-	4
2	1	-	-	-	1	-	-	-	-	-	-	-
3	-	-	-	-	-	-	-	-	-	-	-	-
4	2	--	1	-	1	-	-	1	-	-	-	5
5	3.5*	1	0.5*	-	-	2	2	0.5*	-	-	-	1
6	-	-	-	-	-	-	-	-	-	-	-	-
7	4	1	-	3	-	-	-	-	-	-	-	-
8	-	-	-	-	-	-	-	-	-	-	-	-
9	1	1	-	-	-	-	-	-	-	-	-	-
10	1	-	-	-	1	-	-	-	-	-	-	-
11	0.5*	-	-	0.5*	-	-	-	-	-	-	-	-
12	2	-	-	1	1	-	-	-	-	-	-	4
13	3	-	-	3	-	-	-	3	-	1	-	-
14	2	-	2	-	-	-	-	-	-	-	-	-
15	-	-	-	-	-	-	-	-	-	-	-	-
Total	22	4	4.5	7.5	4	2	2	4.5	-	1	-	14
Average per h-hold	1.47	0.27	0.30	0.50	0.27	0.13	0.13	0.30	0	0.07	0	0.93

* Fractions indicate shared animals

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5.3. Feeds and feeding

Livestock feeds and feeding practices in the PA were discussed with 4 elderly farmers, of whom one was a female farmer.

Livestock are fed in 3 different ways in the PA.

a) Tethered feeding (controlled movement):- During transect walk and participatory mapping, the study team observed small area of open grazing fields. The team also observed lots of cattle and small ruminants fastened with a long rope to a tree or fence. This type of feeding was mainly used during rainfall or Keremt season. Free movements were controlled.

   The fields were overgrazed, poorly managed and bare. Supplementary feed was provided to the animals from the crop fields. The households cut and carry weeds and thinnings of maize plants for tethered animals. Some farmers feed their livestock with tree leaves and pods.

b) Open area grazing (free movement):- The animals graze in open fields for part of the day. For the remaining part of the day, they are taken home for home feeding. The grasses grawn on open common grazing fields were very poor, and short. In this case, livestock only enjoy free movement but not nutritive feeding.

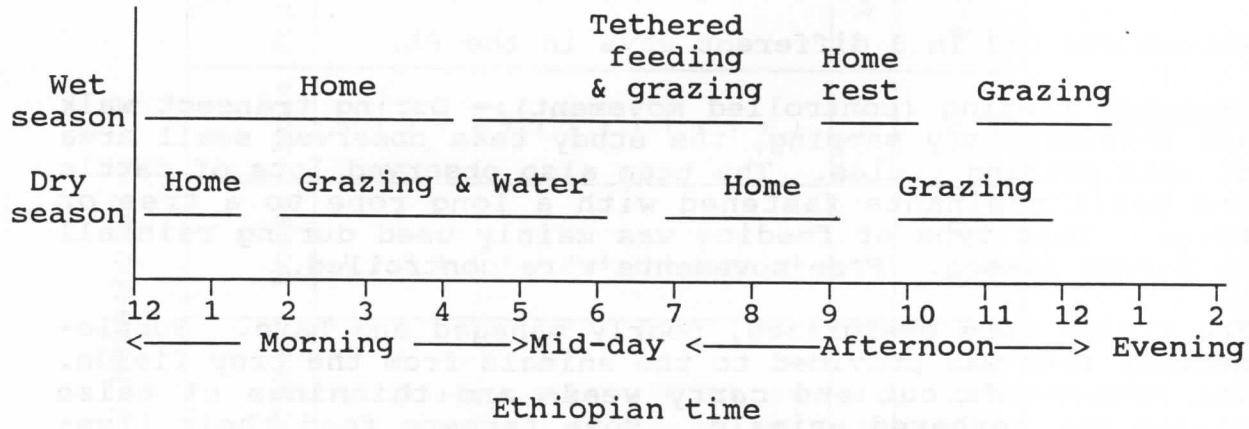
c) Home feeding:- During the evenings, all livestock are kept inside the house with the people. The bulk of feeding is done during the evenings. Livestock owners cut and carry grasses with nutritive values for evening feedings. The farmers add a mineral salt to the grass while feeding at home. Maize and sorghum thinnings and weeds partly cover feed resources of the evenings. Teff straw is used for dry season feeding with some dried stalks of maize and sorghum.

Swampy areas along the streams and the main rivers, road sides, open spaces in front of the gate of the house and crop fields (post harvest) are the main areas of open grazing and free movement. Swampy areas provide more grass for dry season grazing.

For home feeding, the farmers use fresh grass, tree leaves, crop residues, crop straw, sweet potato cuttings, enset corm, stems and leaves.

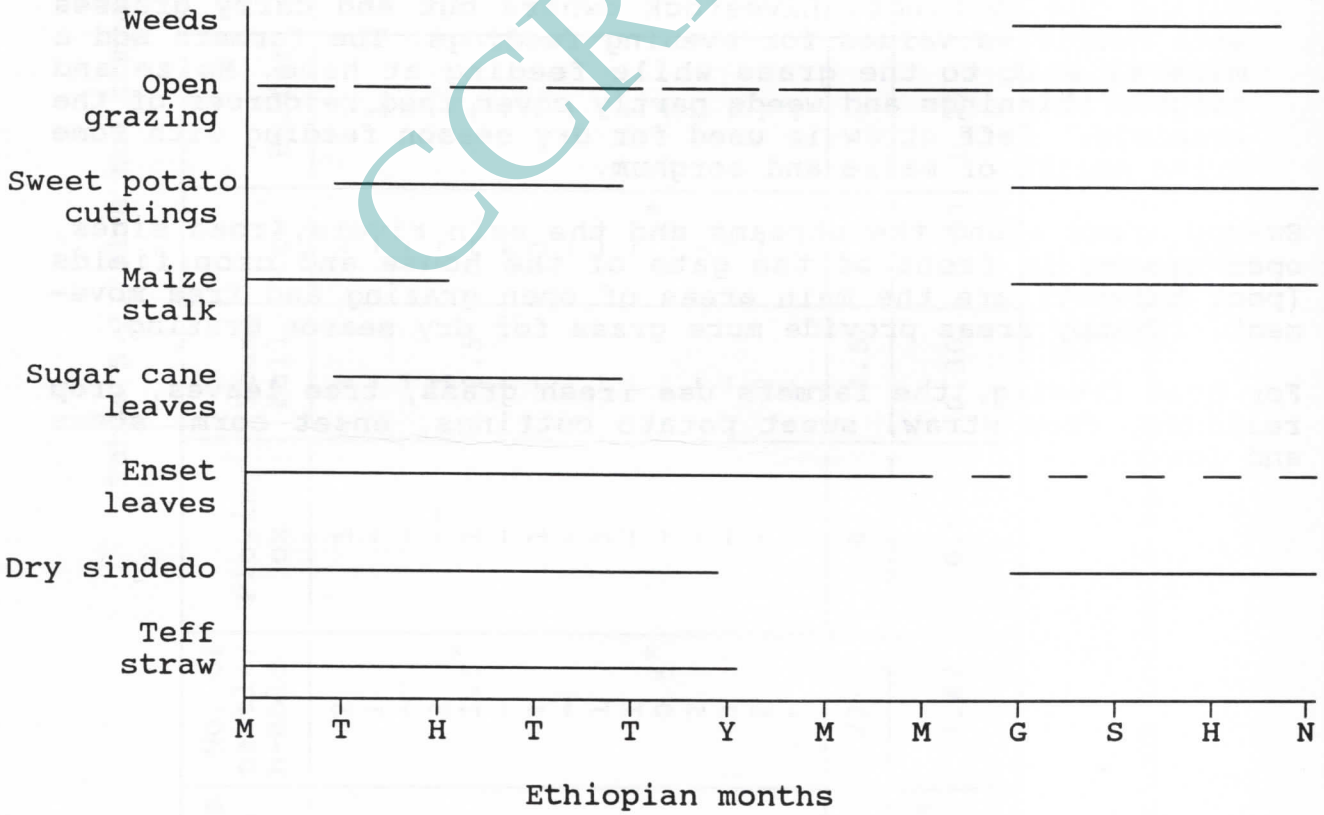
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FIGURE 5.1. GRAZING TIME OF THE DAY



As can be seen from Figure 5.1, the farmers do not drive out their livestock for grazing before 2 or 3 o'clock (Ethiopian time) in the mornings. It's cold outside and cattle can not graze on the grasses. During mid-days, livestock rest in the house, and are driven out late in the afternoon for grazing and feeding (tethered). Moreover, the feeding calendar is shown in Figure 5.2.

FIGURE 5.2. LIVESTOCK FEED CALENDAR



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MOAEPD livestock production expert from the Areka office estimated the proportion of sources of livestock feeds:

Grazing green grass	50%
Standing hay	30%
Maize stalk	7%
Teff straw	6%
Weeds	5%
Other	2%

As illustrated in table 5.3, most of the grass and shrub species are used for stock feeding in the PA.

Table 5.3. Grass, shrub and tree species used for livestock feeding

Vernacular name	Amahric	Status	Use
Grass type			
Arsima	--	Eradicated	Livestock feed (good for milking cow)
Gonta	--	Present in the PA	Livestock feed
Sira	Serdo	Resistant variety	" "
Pella	Wage	Present in the PA	" "
Gata	--	" "	" "
Senblet	Senbelete	" "	Cover of a roof
Dupa	Sendedo	" "	Livestock feed
Maga	Muja	" "	" "
Sherefa	Arem	" "	" "
Huachia	--	" "	" "
Kuli bonkota	--	" "	" "
Shrubs & trees			
Mokota	Wanza	" "	Livestock feed
Bortua	Korch	" "	" "
Gueria	--	" "	" "
Gora	Gerawa	" "	" "
Gesangua	--	" "	" "
Eter wanga	--	" "	" "
Ladic	Agam	" "	Goats' feed
Oha	--	" "	Livestock feed
Adilia	Adey abeba	" "	" "
Setura	--	" "	" "

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Livestock feed on teff straw, maize stalk, wanza tree leaves, enset branches and cane sugar leaves during dry seasons. During the main rainy season livestock are fed with green grasses, weeds, maize thinnings and rarely enset leaves are used.

Horse owners feed their animal with barley, maize, butter, eggs and Areke (local spirit) before attending riding occasions (burial ceremony or wedding party).

From Tir - Genebot, livestock feed is inadequate. Many animals lose their weight and even die when the dry period is harsh.

Feed sources available for goats and sheep include:

- Chacha tree for goats;
- Oha tree for goats;
- Wogara tree for goats (wet and dry season feed);
- Gumarya tree for goats, sheep and cattle, for both seasons;
- Wusanguwa tree for goats, sheep and cattle;
- Buluwa tree for goats;
- Chankuwa tree for goats.

There could be more feed resources which the study team did not list above. Because of large vegetation cover it is expected that some species might have not been registered.

5.4. Livestock diseases

The team of specialists in veterinary science discussed about the problem of livestock diseases with 43 farmers. The farmers described about the diseases, local means of treatment, and pointed out the time when diseases break out. Their descriptions are presented in table 5.4.

The farmers treat sick animals by letting them drink the urine of other affected animals. As a preventive measure, they also drench their animals with the affected animals' urine. However, both methods did not prevent death of livestock.

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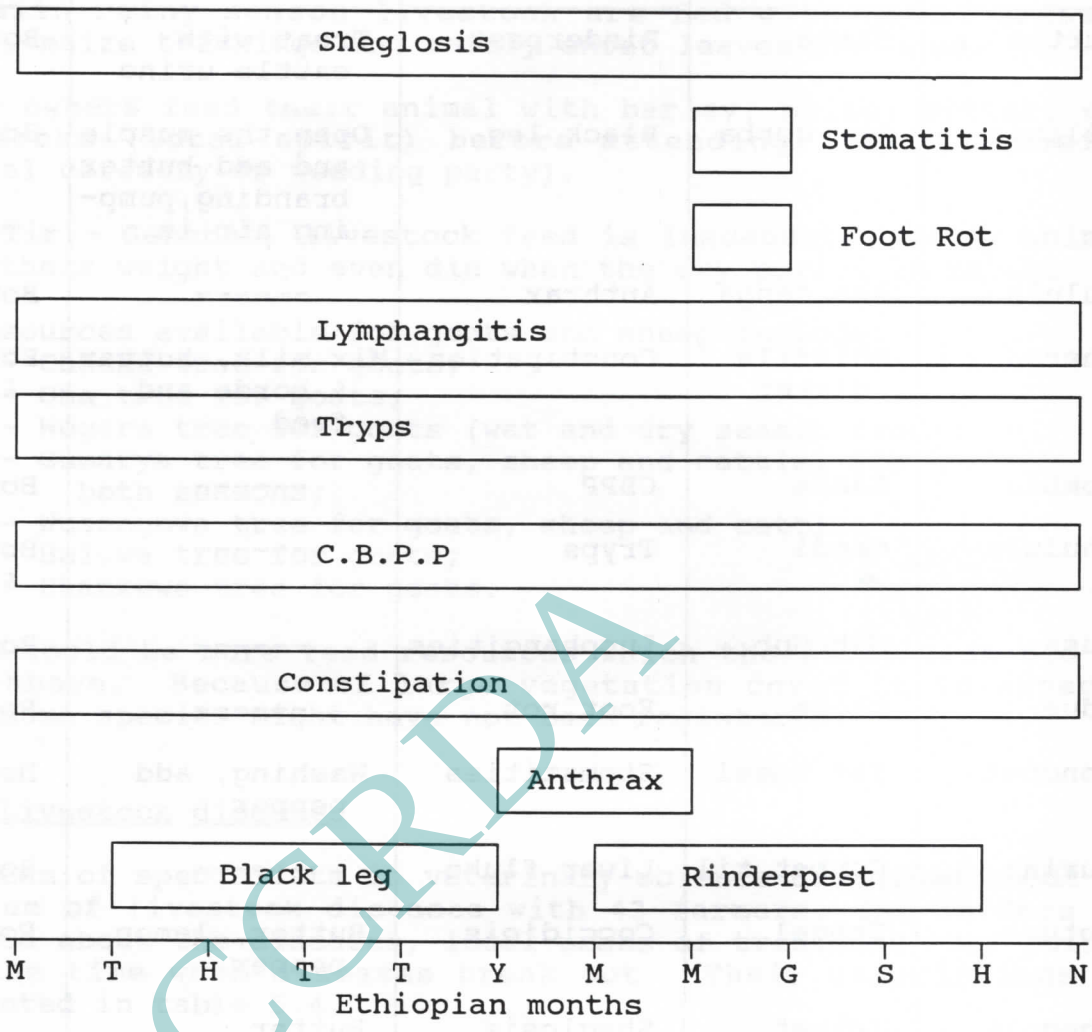
Table 5.4. Livestock diseases and traditional treatments

Diseases vernacular	Amahric name	English	Local treatment	Livestock attacked
Furtwa	Desta	Rinderpest	Treat with cattle urine	Bovine
Tilikia	Aba gorba	Black leg	Open the muscle and add butter branding,pumping air in	Bovine
Dulula	Aba senga	Anthrax	------	Bovine & Caprine
Ahera	Shinfila dirket	Constipation	Mix milk, butter & borde and feed	Bovine, Equine & Caprine
Sombia	Sanba	CBPP	------	Bovine
Shulula	Gendi	Tryps	------	Bovine,caprine, & Equine
Tusa	Gub Gub	Lumphangities	------	Bovine, Equine
Odua	Choke	Foot rot	------	Bovine, Caprine
Bonchua	Yaf Kusel	Stomatities	Washing, add pepper	Bovine, Caprine
Muria	Guvbet til	Liver fluke	------	Bovine, Caprine
Kotuwa	Fengel	Coccidiois	Butter, lemon pepper	Poultry
Shegela	Tekmet	Sheglosis	Butter	"
Oshincyha	Gunfan	Common cold	------	"
Chucha	Kimal	Mites	------	"

The breakout of the diseases and their occurrence in a year is given in Figure 5.3.

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FIGURE 5.3. LIVESTOCK DISEASES CALENDAR



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5.5. Access to veterinary services

MOAEPD office at Areka provides veterinary services. The farmers have to trek their sick animal to Areka town for about 3 hours. Often, they do not get proper treatment after so many hours walk. The experts in animal health at Areka complained about the supply of veterinary drugs. They do not receive the necessary medicines for treatment. This incapacitated their service in the area.

5.6. Livestock production, use and marketing

Livestock is a source of livelihood in the PA. The women obtain part of their cash income from milk and milk products sales. According to the farmers interviewed, the greater proportion of milk produced goes to the market.

The farmers regularly sell and replace their stock. Their turn-over in the livestock is high in a short period. When the group tried to understand the calving history of the cows, very few cows extended their life span in the same house after 3 calvings. The cows were fattened and sold during the major festivals. i.e. Meskel festival.

Likewise, some oxen could survive only one Meskel festival before they are fattened and sold. When the land preparation period approaches, weak and thin oxen are purchased for traction. They are intensively used until the end of current cropping season. Then in July it is lodged in a stable where it is fed (fattened) for about 2 months. The oxen is fed for the whole day and night with grasses, maize, enset, sweet potato, mineral salt and others. As Meskel festival approaches, the price of an ox triples when it is taken to the market.

The families use part of the oxen sales to cover their debts, next oxen (bull) purchase, and other family needs or routine expenditures. A few case studies were conducted on livestock turnover in the PA.

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Case study 1

Ato Chama Anshebo purchased an ox for Birr 400 in Meskerem 1983 E.C. He used it for traction for about 8 months, which enabled him to obtain 200 Birr worth of crop income. In June (the same year) he lodged it in a stable where he fed it for 3 months. During Meskerem 1984 E.C. festival, he sold the ox for Birr 950 in Areka market, and obtained an added value of Birr 550 after a year. In Meskerem 1984 E.C., he again bought another ox for Birr 600. It was still in use when this interview was carried out.

Case study 2

Ato Langena Basa and his family live on 3 timad of land. He plants enset, coffee, maize, sugar cane, sweet potato and haricot beans. In December 1981 E.C. he bought a 3 1/2 years old ox for 200 Birr. He used it to cultivate maize, haricot beans, and sweet potatoes on his land and sharecropped on his friends' land. In June (the same year) he decided to fatten his ox. He fed with sugar cane, sweet potato, enset, tree leaves and mineral salt.

CHAPTER 7. TREES ON FARM AND AGRO FORESTRY

Historical accounts of Dache Gofara PA area record that the area was covered with dense forest trees and tall grasses. When settlers successively immigrated into the area, all the indigenous trees and grass lands were deforested for crop cultivation. The last forest area was cleared off during the last 30 years. Then, crop cultivation was expanded and intensified with changes in land tenure and population increase.

In spite of long deforestation process, the PA area is still covered with different kinds of tree species which are indigenous and exotic. The indigenous trees are the remnants of the old natural forest trees, and the exotic ones are those imported from different origins.

Trees in the PA are used for different purposes. The importance of trees can be classified into:

a) Physical uses
b) Social uses
c) Economic use

a) Physical uses:- Trees are used to block against wind during rainfall seasons. Cereal crops like maize, sorghum etc. are protected from falling down by the trees used as wind breaks.

Some trees are purposely planted in between the crops to add soil fertility and to reduce the heat of the sun for some crops during dry seasons. These trees also protect against excessive evaporation of soil moisture.

The trees planted in front of the house provided beauty to the scenery of the area.

The trees were also planted to protect against soil erosion. The velocity of the run off declines when the trees are planted on the floods' pathway.

b) Social uses:- Farmers in Dache Gofara PA own small area of land. They need to economically use their land. Whatever grows on their land should be able to satisfy the family needs. Likewise, trees grown on individual plots largely possess important social values. Some of these values include;

- Owning large area of big trees is prestigious
- Used for house building
- Fuel wood needs
- Used as meeting places - provide shelter
- Used for fencing
- Demarcate boundary between two land holdings
- Feed resources for livestock
- Household furnitures, bed, chairs, boxes, etc.

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c) Economic uses:- Farmers make significant amount of mo
of trees. Eucalyptus trees generate more money than th
tree species. It is sold without any sort of proce
Some tree species like Cordia africana, Podocarpus gracilion
and Juniperus are locally used for planks production. The
planks or the board of these trees are sold to the traders
where it finally reaches to the people residing in Areka town.

Economically important fruit bearing trees occupied some portion of land in the PA. Some of these fruit trees include; Avocado, guava, orange, citrus fruit, and peaches. All the fruits produced are marketable.

Cordia africana was the most preferred tree for planks production and lots of furnitures are produced out of it, and it has high market value.

Lots of indigenous and exotic tree species grow in the PA Area. Some of the trees are listed in Table 7.1.

Table 7.1 Tree species grown in the PA Area

Welaita	Amahric	English
Anka	Bisana	Croton macrostachys
Gugunta	Girar	Acacia abyssinica
Mokata	Wanza	Cordia africana
Wogara	Woira	Olea africana
Ocha	Dokima	Syzygium guineense
Ziga	Zigiba	Podocarpus gracilior
Wolayta Tida	Ye-habesha Tid	Juniperus procera
Gara	Girawa	Acacia sieberiana
Kilia		
Chachuwa		
Wusangiwa		
Zagia	Sasa	Albizia gumafera
Bota Zagia	Birbira	Millettia feruginea
Camushia		

CCRDA

Among the above mentioned trees, some are eliminated because of unwise use of forests. The main cause is the expansion of farming land. Most of the natural forests were destroyed from the PA area and river banks because of building of houses, fuel wood needs and farm land expansion.

The trees that were completly eliminated from the area include:

In Welaita
Kilia
Itana
Gamushia
Chachulua and others

There are exotic tree species which replaced the indigenous ones.

Two of the exotic trees introduced in the PA area are mentioned below:

	Welaita name	Amharic name	Scientific name
1.	Welaita Zafia	Key Bahrezaf	Eucalyptus camalendulensis
2.	Paranja Tida	Ye-fereng Tid	Cupressus lusitanica

The most dominating tree in the PA is eucalyptus tree. The farmers interviewed explained about the introduction of eucalyptus tree in the area. When the natural forest was cleared, the people faced shortage of wood for fuel and house building. The known figures of the area, such as, 'Chika shum' or member of the 'Balabat' (ruling family), took the initiative of importing eucalyptus tree seeds from Addis Ababa and Jima areas. One of the pioneers of eucalyptus tree import was a man called Fitawrari Bibiso, who brought the seeds from Addis Ababa city, and planted around Soddo zuria, in a Haba village. Then, his friend Fitawrari Halala Gobe from Dache Gofara PA area visited him and brought with him some seeds of eucalyptus. He planted it around his homesteads and later on distributed to his friends and relatives in the PA area. Since then, individual farmers established their own nurseries and planted the seedlings on their private plots. In short span of time, the tree was appreciated and sweeped over the whole areas in Boloso Sore awraja.

However, as the tree has advantages, it has some disadvantages as well. According to the farmers information, the following advantages and disadvantages are listed.

Advantages of eucalyptus

1. It is easy to establish
2. Good for fuel wood
3. Grows fast
4. Useful for construction
5. Easy to get
6. Low or no management costs
7. Cash crop and generates income
8. Drought resistant

Disadvantages

1. Exploits the moisture and dries up the farm land
2. Occupies the area of farm land, creates shortage of agricultural crop and pasture lands
3. Dominates the indigenous species that are used for soil fertility
4. Destroys grasses from grazing lands
5. Dries up water resources
6. Attracts the peasants' attention only towards eucalyptus

CCRDA

As described in the preceding chapters, because of the eucalyptus tree, most crop lands became poor and less fertile. The soil lost its fertility and productivity. It also decreases the size of crop land and grazing land.

The second exotic tree is Cupressus lusitanica that was introduced by missionaries from America and other countries. To this area, it was introduced from Otona, Swedish Interior Mission (SIM) compound.

Cupressus lusitanica is a useful tree for timber and is ornamental. It is used as shade tree and a good hedge establisher in the homesteads and around farm land. It is also used for fuel wood and fencing.

Dache Gofara PA is still densely afforested. The individual plantations of eucalyptus and other indigenous and exotic trees is too dense. There are many big and old trees, which could be over 60 years. Eucalyptus tree is older and big tree with larger canopy. Podocarpus tree is the same as eucalyptus. Wanza (Cordia africana) is more exploited by the traditional lumber producers. Because the people plant trees as shelter, boundaries and homesteads, the PA area, therefore,is full of different kinds of tree species.

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7.1. Agro-forestry trees (Traditional agro-forestry)

On the farm land the farmers plant some indigenous trees that help to increase the soil fertility. Such tree leaves are used for animal feed. Their foliage is good fodder. These trees are given in the following lists.

Welaita name	Amharic name	Scientific name
1. Mokota	Wanza	Cordia africana
2. Bortuwa	Korch	Erythrina abyssinica
3. Gara	girawa	Acacia sieberiana

The other trees on the farm land include

Welaita name	Amharic name	Scientific name
1. Wolla	Warka	Ficus sur
2. Aeta	Shola	Ficus vasta
3. Anka	Bissana	Croton macrostaches
4. Botazagia	Birbira	Millettia ferruginea
5. Zagia	Sasa	Albizia gumafera

All these trees are not planted, but generate themselves naturally. Farmers keep them without damage, therefore they grow big and provide forest uses. Such trees are rare and scattered. The team was able to observe few of these trees on the farm land. In this PA more trees are planted along the road sides and farm boundaries than elsewhere.

7.2. Fruit trees on the farm land

Some farmers planted fruit trees on their homesteads as home garden. Some of these fruit trees are listed below.

Welaita name	Amharic name	Scientific name
1. Abucatuwa	Avocado	persea americana
2. Zaytonia	Zeyton	Psidium gusajava
3. Papaya	Papaya	Carica papaya
4. Buritucania	Birtukan	Citrus sinenisis
5. Lomi	Lommi	Citrus limon
6. Muzea	Muz	Musa sapientum
7. Manguwa	Mango	Mangifera Indica
8. Gishta (eta)	Yeberelib	Annona chrysophylla

These fruit trees were brought by those who were friends to missionaries. Avocado was brought from Adventist mission, Sake, Damot Weide awraja. The followers of Adventist church introduced to this PA some 20 years ago. Moreover, REDD BARNA distributed similar fruit trees recently.

The uses of fruit trees

Fruit trees provide multiple uses for the agro-forestry practices of the area. Some of these are:

1. It is used for small amount of cash earnings;
2. It is used as supplementary food; i.e increased amount of food intake, better quality of food and nutrition, easy to prepare etc.;
3. Helps to maintain good health eg. Avocado;
4. Helps to treat diseases and injuries (curative) eg. lemon juice;
5. Maintains or increases diversity of species and habitats eg. Avocado;
6. Improvement of moisture availability and fertility of soils.

Problems

1. It seems that the farmers of this PA do understand less about the uses of fruit trees;
2. They can not get the seedlings of fruit trees;
3. The expansion of banana trees;
4. Diseases of orange fruits.

CCRDA

Solution

1. Teaching of farmers about multiple uses of fruit trees is important;
2. The seedlings of fruit trees should be distributed by Redd Barna;
3. Find pesticides for orange fruit disease.

7.3. Uses of trees in farm land (Traditional agro-forestry)

Traditional agro-forestry systems which (consists of) combines the uses of trees and shrubs with crop and livestock production have been sustainably used by the Dache Gofara farmers for generations. There are some trees grown on the farm lands. The farmers explained about its bad and good effects on the soils and crops. Table 7.2. explains such effects by species.

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Table 7.2 Effects of trees on land and crops

Name of species	Good effects	Bad effect
Cordia africana 'Wanza'	Help for soil fertility, fodder for livestock in dry season. Good for furnitures & construction. Timber tree-good lumber production, yoke, farm implement, produced cash income by selling the lumber, plants raw materials for crafts and cottage industry.	It has no bad effects on the soils and crops
Croton macrostachys 'Bissana'	Fuel wood, farming tools medicine for ring worm, help to kill tapeworm, with koso (its buds used for this purpose), veterinary medicine	Destroys crops around the tree reduces soil fertility, suppress the vegetation growth
Erythrina abyssinica 'Korch'	Live fence, shelter, protection from wind, protection from animals, demarcating boundaries, leaves fodder for livestock during dry season, adds to soil fertility. Fuel wood during dry season, used as coffin	To some extent exploits soil moisture, no wood value
Acacia sieberiana 'Girawa'	Fodder for livestock, it is good for milking cows, it increases the production of milk. Help for soil fertility. Fuel wood. Bees feed	It attracts some insects which attack the crop N.B. The tree was eliminated around the area when the soil lost its fertility
Ficus sur 'Warka'	Soil fertility, shelter for coffee and enset, good for enset growth and development. Fuel woods needs	The shade suppresses the cereal crops, too much place in farm land
Ficus vasta 'Shola'	Enriches soil fertility . Make some furnitures. Fuel wood needs.	Take much place farming land

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Farmers do not need to plant more trees in their farmland. They have already used more trees at the boundary of individual plots and farm lands. It creates shortage of crop land. At least some 25% of crop land was affected by trees planted around the boundary. Also they do not take proper management of the trees. They left it to grow as it is ever since it was planted.

7.4. Problems of too much trees to crop production

1. The farmers do not have better understanding about the advantages and disadvantages of agro forestry systems.
2. Indigenous trees which fertilise the soils are eliminated.
3. Uncontrolled cutting of cordia for lumber production destroys the species which is important in traditional agro forestry.
4. Planting trees for live fence or boundaries without management
5. Lack of introduction of multipurpose trees, such as, Leucaena leucocephala, Sesbania sesban and the others.
6. The expansion of eucalyptus encouraged the elimination of other indigenous species which are helpful for soil fertility.
7. Keeping trees for very long period depletes the soil fertility of the farm land.

To overcome some of the problems mentioned above, the following sets of solutions are suggested.

1. Teaching the farmers about the advantages and disadvantages of trees on the farming land. In this way they can understand the most important uses of tree species, how to plant mango, keep and use them.
2. Encourage farmers to plant Cordia africana (wanza), Acacia sieberiana and some other indigenous species on the farming land.
3. Advise farmers not to cut down Cordia for lumber. Protecting and controlling through kebele committee is important.
4. Teach farmers to manage better trees that are planted at the boundary, live fence and farming land. It should be pruned or pollarded to reduce shade. Root pruning helps to minimise water sucking [Pollarding, cutting all branches over]. Decrease the height of the live fence trees such as 'Korch' pruning lateral roots from young trees that would compete with crops.
5. Introducing new species such as Leuceana leuocephala, Sesbania sesban and some other small trees that have multipurpose uses.
6. Avoiding trees which affect soil fertility from farming land and teaching the methods for farmers through extension service.
7. Avoiding planting of eucalyptus trees on farming land, instead planting fruit trees and some other agro forestry trees.

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CHAPTER 8. FOOD PREFERENCES AND FOOD CALENDARS

Farmers in Dache Gofara produce crops with high food values. In both Belg and Meher seasons, food resources such as cereals and root crops are cultivated. Livestock, enset, cassava, taro, yam and fruit trees serve as food resources for entire year. Enset, yam, cassava and some other fruits are harvested in bits and piece meal.

However, food availability depends on the seasons. In rainy seasons, fresh cereal crops, haricot beans and vegetables like kale are available for consumption. In dry season, dry grain crops, root crops and purchased food are available. The only food reserve available for all the time is perennial root crops and enset plants. Enset is a "step mother" of all people in the PA. Life without it is unthinkable. But according to the farmers its overall decline is about 40%.

Food in the area is a traded commodity. Ready-made food like Kocho, injera, boiled root crops and haricot beans, 'Kuma' (bread made up of maize), wheat, barley etc are sold in all open markets in the area. The income obtained is exchanged for another raw food item to be taken home.

On the market days, farmers use local drink called 'Borde' as food. It is taken with ginger, chilli pepper salt and onion, which gives flavour to the drink. The women distil 'Areke' (alcohol) from various crops like maize, barley, sorghum, teff and dagussa. Large number of women are engaged in processing food crops for drinks. The farmers said, "because of Areke distilling, the price of crops is very high". There is a competition between traders who distil Areke and consumers of food grains.

The male farmers interviewed used a blackboard to draw food diets calendar of 20 years ago and the current one. Hence, Figure 8.1 shows the food availability about 20 years ago. During those days, they had food reserve for the whole year. For instance, sorghum, maize and enset were available for the whole year. 'Kocho' from enset was the main reserve because it could stay up to five years without a major damage. Sweet potato was fed for animals for fattening, because no body could finish it from the ground.

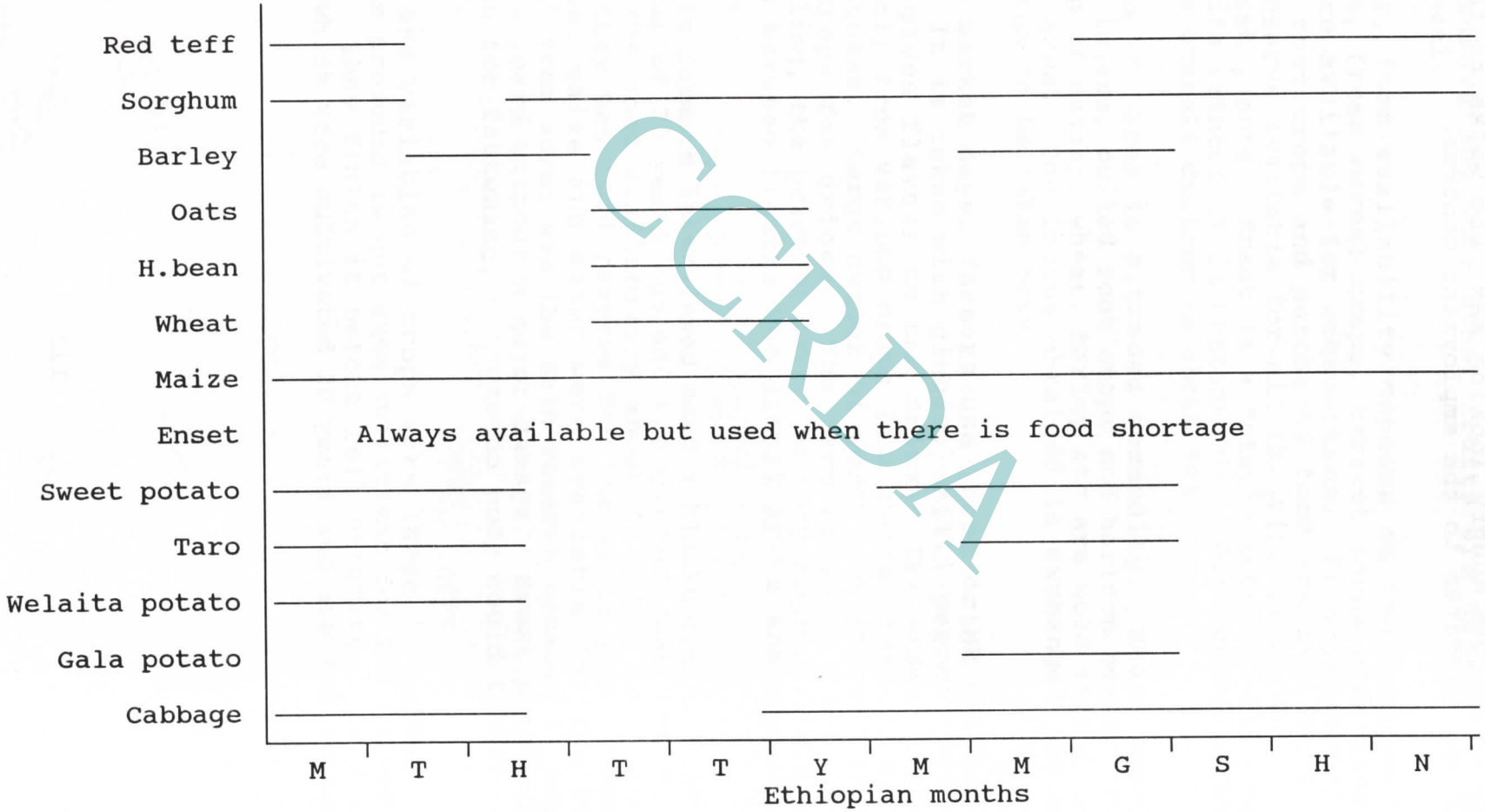
Types and varieties of crops were large in number. Nowadays, what is produced is not even sufficient for the harvesting period alone. They finish it before full maturity. Even some of the crops which were cultivated 20 years ago are not available today.

GCRDA

The same farmers drew Figure 8.2 to show the food diet calendar of today. In this calendar, crops like wheat, oats, sorghum, welaita dono, gala dono are not shown. Because, they are not produced (very small area) in this area as before. The figure shows that the crops produced last only for very short period. There is an extended time of food shortage in the PA. This was illustrated by the hungry looking man, who walks to fetch food, or a man who migrates to the employment centres.

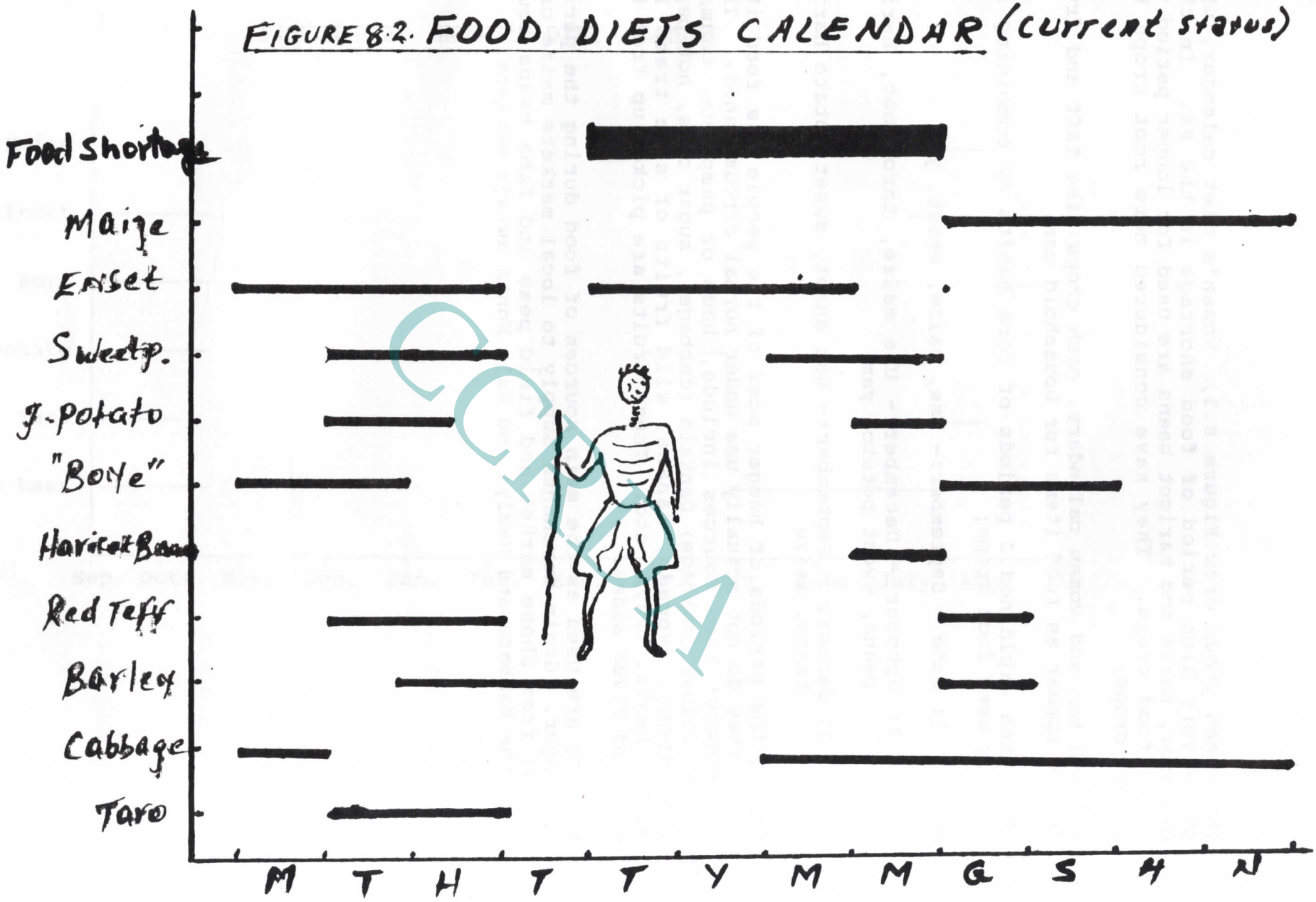
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FIGURE 8.1. FOOD DIET CALENDAR ABOUT 20 YEARS AGO
(Drawn by farmers)



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FIGURE 8.2. FOOD DIETS CALENDAR (current status)



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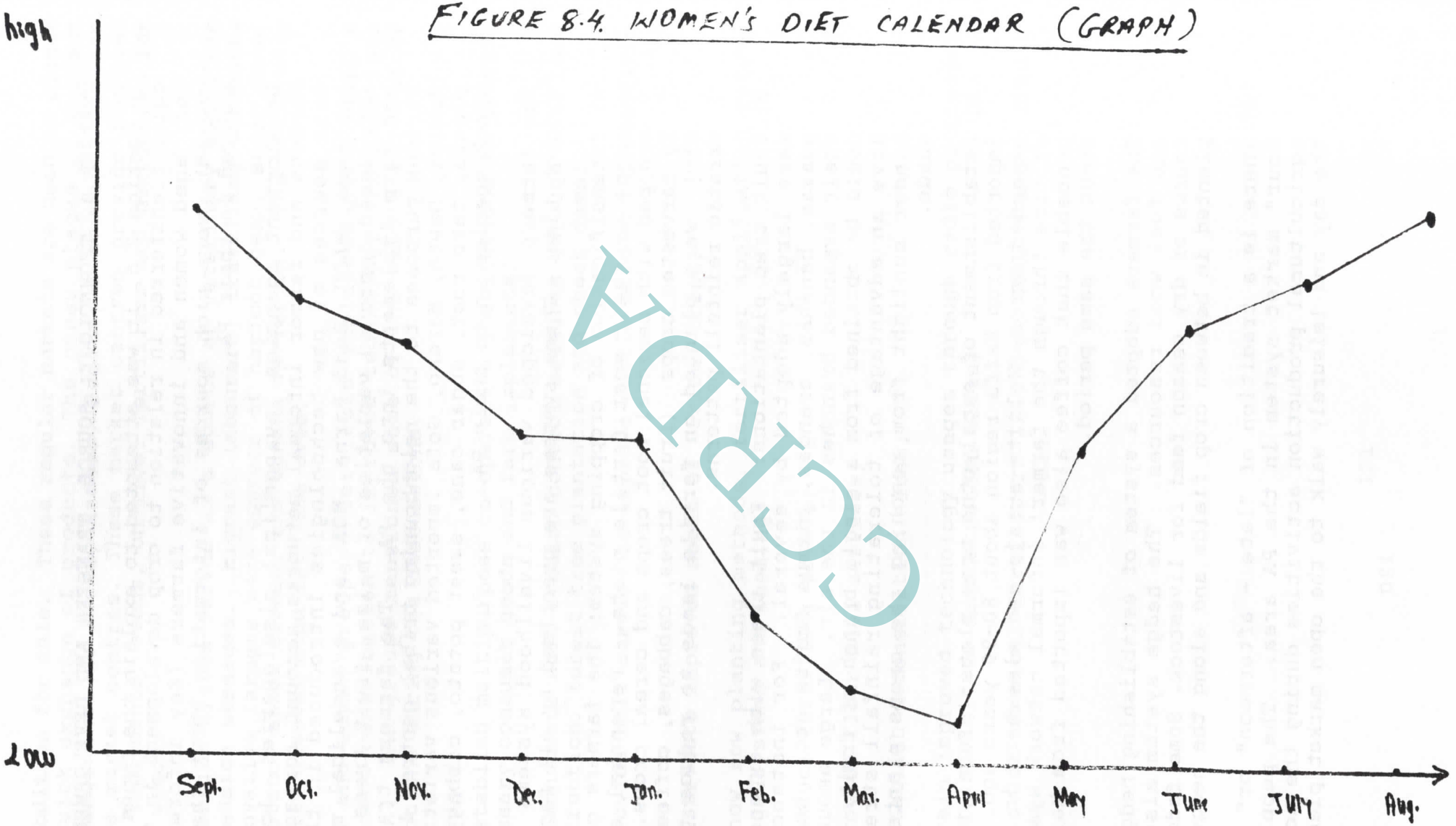
To buy food crops some farmers earn more money by working for richer farmers. Some farmers borrow from money lenders and others sell some of their livestock.

Farmer prefer to buy 'Kocho' (an enset product), maize and haricot beans, when they are under food stress. Particularly, demand on enset parts (corm) and products becomes very high.

The trend in food availability is reflected in Figure 8.4, women's diet calendar. The information was obtained from a group of women interviewed. Decline in food availability begins in February and rises again in May. The trend is shown in qualitative terms.

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FIGURE 8.4. WOMEN'S DIET CALENDAR (GRAPH)



CCRDA

CHAPTER 9. TECHNOLOGY: SOURCE, TRANSFER AND DEVELOPMENT

In section 2.5, it was attempted to explain the types of technologies transferred in relation to crop development in the PA. Old men, aged women and innovative farmers (Key informants interviewed), were rich sources of information about the technology induced in their PA.

Development agencies, evangelical missionaries, local chiefs, markets and farmer informal networks account for acting as the main sources of new technologies introduced in the PA. For instance, WADU, Redd Barna, MOA and evangelical missionaries introduced improved varieties of maize, fruit trees, vegetables and farm implements into the PA. The farmers travelling for various purposes to the neighbouring tribal centres like Kambata, Hadiya, Dawro, Mareko, Gofa imported various varieties of enset plants, taro root, sugar cane, sweet potato, cabbages and livestock species in to their PA.

The farmers developed various livelihood systems in their PA through time. These systems are practised by all farmers.

a) Intensification of cropping system: The farmers grow multiple crops on their most fertile plots. Perennial crops intercropped with seasonal root crops and cereal crops. Continuously harvested crops (fruit trees, cabbages, coffee trees, chat etc) were planted on fertile lands to reduce the risks of erratic rainfall patterns.

b) Fruit tree plantations: Fruit trees with expanded branches were largely adopted by several. For instance, avocado, guavas, bananas, oranges, citrus fruits etc. bear fruits on their expanded branches in the air. Large amount of fruits could be obtained from a single branch of fruit. Fruit trees have an advantage of tolerating rainfall stress, but may hinder sunlight from reaching the crops planted under its shade.

c) Establishment of eucalyptus tree plots: Eucalyptus tree was imported from Kaffa region about 80-90 years ago. But, it was expanded across Welaita awraja and elsewhere in a short span of time through the farmer' informal network systems. It is probable that coffee also was imported from kafa region at about the same period.

   The farmers adopted a system of establishing hedges for fence and fuel wood resources. The hedge system also helps as a source of dry season feed for livestock. Some fodder trees are planted in between crop fields and along the hedges.

d) There is a tradition of "late - afternoon" or" the eleventh hour" market system in the PA area. The people engage in agricultural production activities during the active part of the day and leisurely walk to the open market place with small

CRDA

commodities for sale. These regular markets are used as places of quick exchange of products. The other places of product exchange include Areka, Hadero, Boditi, Gamesha, Soddo and Shone market centres. These market centres provide improved farm implements, seeds, chemical fertiliser and herbicides for teff weeds.

MOA extension system served as a source of veterinary medicines and extension messages. Migrant labourers, travelling merchants and innovative farmers were sources of haricot bean, sugar cane, sweet potato, enset clones, and banana varieties. The seeds were informally disseminated into the area.

The men and women groups interviewed explained about WADU's significant contribution to improved technology transfer into their PA. The groups mentioned some of the WADU's efforts of introductions during the discussions.

WADU tried :

- To establish multipurpose co-operative institutions to provide necessary consumer goods and farm implements;
- To demonstrate soil erosion control measures through soil bund construction, forest tree plantation and check dams;
- To provide bull service to improve cattle herd and productivity;
- To distribute improved seeds of various crops;
- To show row planting methods, fertiliser application rates, storage systems and weeding;
- To conduct fertiliser trials;
- To provide flour mill services;
- To establish demonstration sites;
- To train improved technology usages through radio programmes and field visit to demonstration sites;
- To provide chemical fertilisers like DAP, UREA through credit schemes.

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The sequence of crops introduced
(By 4 innovative farmers)

The oldest

- Sorghum
- enset
- taro root
- maize (welayta)
- dono (welayta)
- yam
- teff
- sweet potato
- banana
- sugar cane
- maize (Kenya)
- sweet potato (echa, gessa, pino)
- Irish potato
- Avocado, papaya, orange
- Vegetables

The latest

The innovative farmers said that modern maresha (plowing implement) was introduced during the Italian occupation.

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CHAPTER 10. AGRICULTURAL PRODUCTION PROBLEMS, FARMERS RESPONSES AND OPTIONS*

Agricultural production problems and their possible solutions were collected from different sources. The key informants and sources considered were:

(i) Old-aged male and female farmers;
(ii) Innovative farmers;
(iii) REDD BARNA grass-root development workers;
(IV) Ordinary group of women;
(V) Ordinary group of male farmers. Besides, the team's records during transect walks and private households livelihoods observations. While interviewing the families were used as additional sources of problem identification.

At the end of field survey the team members had a day long discussion on the problems identified.

The area of problem identification was related to the specific elements of the system under investigation. However, the problems identified were not discussed with a larger group of farmers and prioritised. Feed back on the surveys findings was not attained from the people.

Based on the survey data analysis and farmers indication, the team members summarised 9 areas of problems constraining livelihoods of the people in the PA.

In this chapter the nature of each problem, its location, its main victims and its timing are discussed. For each problem a "best bet" option or possible solution is proposed.

The nine main problems which have been identified are:

1. Erratic rainfall situation and dry spells occurrence
2. Land scarcity for expanded crop production
3. Declining soil fertility
4. Crop pests and diseases
5. Lack of oxen for traction
6. Livestock feed shortage
7. Expansion of eucalyptus plantation and hedges
8. High population pressure on resources
9. Health problems - high death rates

Each of these problems and its best bet solution is discussed one by one below.

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* The options indicated are the options of the farmers and the survey team members.

CORDA

10.1. Problem I: Erratic rainfall situation and dry spells occurrence

What is the problem ?

Rainfall amount and distribution in the seasons have been declining during the last two decades. In the past, rainfall occurrence in the months of the year was sufficient to support plant growth and yield. But now, its onset and end, its level and distribution changes with a difficult period of dry spells occurrence.

The area used to get its first rain in the middle of Tir (January) which ended in Yekatit (February). There used to be a short pause in Megabit (March) and increased rainfall in April with sunny Genbot (May) which was followed by heavy rainfall seasons. In some of the months rains poured for weeks without any stop.

The current rain beginning periods, distribution and end of rainfall is unpredictable, The farmers experienced some drops of rainfall for few days. It does not come in large amount to stay in the soils for longer period.

Why is it a problem ?

It is a problem because it negatively affects crop production in the PA. The farmers interviewed indicated the following effect on their production systems.

- Planting dates and months became unpredictable;
- Caused a change of crops planted, usually resorted to a crop of second choice;
- Vegetative growth and yield of various crops diminished eg. the size of enset plant decreased;
- Cereal crops fail during dry spells. i.e. maize, sweet potato, barley, haricot beans etc fail when there is a dry spell during their growing cycle;
- Psychologically depressed the farmers feelings;
- Waste of seeds, manure and chemical fertiliser;
- Degeneration of fruit trees, cabbages, enset plants;
- Affects grass growth.

Who is affected ?

All the farmers in the PA are affected. However, farmers with very small area of land, and farmers who do not plant enset and fruit trees on larger area of land are highly affected.

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Where is it found ?

All over the PA. crops planted closer to the hedges and eucalyptus plantation are largely affected. Because there is high competition for moisture and soil nutrients. Farmers residing in between the river banks and the slopes, and cultivating swampy land are less affected.

When did it become an issue ?

According to the farmers interviewed, rainfall pattern began changing 20 years ago. This situation was aggravated by the expansion of eucalyptus trees and hedges in between crop fields.

How are farmers coping ?

The people in the PA cope this erratic rainfall situation in various ways. Some of these include:

- Regularly planting perennial crops like enset, coffee, banana and fruit trees, which relatively tolerate rainfall stress situation.
- Changing seasons and types of crops planted
- Intercropping systems:
  - .Planting different variety of crops that belong to different maturity periods.
  - .Plant vulnerable crops under the shade of coffee, enset and fruit tree plantations.
- Emphasise on root crops plantation

BEST BET FOR PROBLEM I

What ?

Introduction of drought tolerant and early maturing crops in the PA area. Farmers in Dache Gofara adopted various local crops and varieties that relatively resist dry spells and provide some yields. Tree crops like fruit trees, enset, bananas and root crops needs to be expanded with improved system of management.

Why ?

Due to the recurrent rainfall stress problem in the PA, large number of productive fields were out of production. Many families are forced to starve and/or absolutely depend on enset plants for their livelihoods. It becomes necessary to diversify crops planted under rainfall stress situation and enable the available land to feed the people for the whole year.

CCRDA

How ?

Continuity of crop production and land utilisation could be done in several ways.

a) Establishment of agro-forestry systems;
b) Expansion of short maturing crops;
c) Expansion of root crops production;
d) Proper utilization of swampy lands and open gulleys;
e) Initiation of traditional irrigation sehemes.

a) Establishment of agro-forestry systems

Farmers in Dache Gofara PA largely adopted intensive agriculture to cope with scarcity of land and limited food production. What is required from them is to properly manage the combination and pattern of mixing crops and trees in a space utilised. It may be necessary to:

- Balance the amount of trees and crops planted on a single plot
- Adopt row plantation of agroforestry trees and crops
- Reduce the number of root crops and cereals planted under coffee and enset plantation
- Select the combination of tree species and crops cultivated on the same field
- Prune excessive branches and leaves
- Encourage planting priority fruit trees in relation to economic values and food requirements. i.e avocado, oranges, bananas
- Cut down economically less important trees from the crop fields

b) Expansion of short maturing crops

Some crops have a capacity of escaping rainfall shortage periods. These varieties could be investigated from various sources.

- The farmers may select from their own genetic resources;
- IAR, Awassa College of Agriculture and Alemaya University of Agriculture could provide relevant crop varieties upon request. In particular, IAR at Awassa have developed superior maize variety ready for dissemination

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c) Expansion of root crops production

The farmers in Welaita awraja produce a number of root crops which have a drought tolerance quality and short maturity. These root crops include:

- Welaita dono (wel.)
- Gala dono (wel.)
- Taro root
- Irish potato
- Cassava
- Yam
- Sweet potato
- Zingible (Amh.)
- Enset (Amh.)

The farmers and development agencies together could select the crops and varieties which are better yielders and distribute during planting time.

d) Proper utilisation of swampy lands and open gulleys

The farmers need to be encouraged to plant their root crops in the swampy lands and open gulleys. Because, moisture is retained for more period in these soils than the flat land soils. Swampy lands require an establishment of drainage systems to avoid excess soil water holding capacity which may lead to crop failure.

Various trees already planted in the open gulley needs to be cleared off before planting root crops or others.

e) Initiation of traditional irrigation schemes

An aerial survey needs to be under taken to investigate the posibility of utilising Shapa and Gomo rivers for small irrigation. The possibility was not assessed by the study team.

Who benefits ?

All interested farmers in the PA could benefit from the above strategies. But, it might be necessary to work with different categories of farmers (refer to section 3.10). This has an obvious advantage of introducing new technology according to the needs of each category. Some could already have practiced one or more of the options.

CCRDA

10.2. Problem II: Land scarcity for expanded crop production

What is the problem ?

The size of land for crop cultivation and livestock grazing is increasingly becoming a serious problem in the PA. The arable land owned by individual families is very small. Grazing lands turned into crop lands during land reallocation period, escalating the already soaring livestock feed shortages. Private holdings are fragmented and apportioned whenever a young member from a family marries.

Individual land holdings hardly support livelihoods of the people. In physical terms, land area owned by individuals is declining with additional demands for land. As a result, land for crop production, livestock grazing and for future demand is diminishing.

Why is it a problem ?

It is a problem because the people in the PA no longer produce reliable food reserve for the increasing family comsumption. Land holdings are fragmented reducing land area for crop cultivation and livestock feed production. This has resulted in a serious feed and food shortage in the PA.

Land for future genertation's utility is becoming scarce. Private house buildings and social service centres, like (kere wel.) have already occupied significant plots of crop lands. If the trend continues, it is possible that most of the current crop lands could be changed into dwelling units and social service areas.

Who is affected ?

Land scarcity problem is distributed among all the members of the PA. Land fragmentation and shrinkage has a direct relation with families having big number of male children. In a situation where there are no other opportunities, land alone serves as the main source of employment for the people.

The farmers stressed about the declining land holdings during various discussions. The families with adult male children and smaller size of land have already felt the severity of the problem. Moreover, it is a continuous, expanding and challenging problem for all other farmers.

Where is it found ?

All over the peasant association area.

CCRDA

When did it become an issue ?

Land fragmentation and scarcity historically occurred in the PA area. When crop cultivation widely replaced extended livestock rearing activities, land was put to intensive cropping system. After 1920 E.C. more people concentrated on permanent and sedentary agricultural settelements. New crops and farming implements were introduced. As a result of settled cropping, the human population began to grow until small size of plots were fully utilised. The period of socialism was an era by which land became scarcer in the community than ever before.

How are farmers coping ?

The farmers tried to deal with land scarcity problems in various ways.

a) Private and common grazing lands changed to crop cultivation
b) Cleared forest lands and grass lands for crop cultivation
c) Land reallocation
d) Outmigration to look for a new land elsewhere and become a tenant or farm labourer
e) Participation in resettlement programme
f) Share-cropping and migrant-farming
g) Changing 'Kere' (grazing lands infront of the house) to crop lands (recent action)
h) Migration to state farms and sugar cane factories for permanent employment

CCRDA

BEST BET FOR PROBLEM II

What ?

It is rather difficult to suggest any practical solutions to the land scarcity problem. Any suggestion could only be that which indirectly improves the situation.

Intensification of crop cultivation on the available land seems feasible solution. Introduction of agro-forestry provides an incremental production and soil improvement prospects. Therefore, planting high yielding fruit trees could establish sustainable agroforestry system.

In the long run, some farmers from the PA need to voluntarily migrate to places where land is abundant. This could be arranged through the government institutions and NGO collaborations.

Encourage individual farmers to specialise in high yielding crop varieties. Small area of land should be able to produce food sufficient to the people.

Why ?

It is necessary to enable farmers to produce enough food substances to feed their family. For this purpose, different types of strategies need to be designed and implemented with the farmers participation. Land is not elastic to be stretched wider. It is rather static. Thus, the farmers must be able to systematically force food out of it.

How ?

REDD BARNA, and ministry of Agriculture could provide with high yielding variety of crops. IAR at Areka and Awassa could be contacted to give an advice on the methods of cultivation of the crops.

Voluntary migrations to the land abundant areas could be arranged through the MOA and the farmers themselves.

Contacts should be made with the ministry of Natural Resources Development and Protection awraja offices to plant agroforestry trees.

ILCA could be a potential source of tree species for agroforestry.

Who benefits ?

Primarily, farmers with a large size of family members benefit out of the programme. However, intensification of cropping system through agro-forestry helps the whole farmers in the PA.

CCRDA

10.3. Problem III: Declining soil fertility

What is the problem ?

Farmers in Dache Gofara use their land without rest. Most of the plots are intercropped and occupied for the whole year. There is no season that the land is left fallow. The crops require water and soil nutrients as long as they stay in the fields. The cropping pattern practised is competitive and depletes the soil nutrients and soil moisture.

The farmers complain that their plots' productivity have declined. Their harvest has significantly gone down for all crops planted.

Why is it a problem ?

Soil fertility decline is a problem because of various reasons;

a) The farmers can no longer expand or cultivate a new area of land
b) The yield on major crops is reduced
c) People tended to depend on single (enset) crop production
d) Technology which improves the soil fertility does not exist in their area
e) Large scale production of crops like teff and maize is constrained

Who is affected ?

The fertility of soils on all farmers land is declining. Because, all the farmers intensively utilise their land without rest. The problem is more serious for poor farmers who can not apply fertiliser to improve their soil compositions.

Where is it found ?

All over the PA. However, the soils distributed along Mehal (central) Dache Gofara and Ankalusa zones are highly affected.

When did it become an issue ?

The problem became an important issue when WADU's activities phased out. Since then, the main crop fields' productivity declined. Very few farmers managed to purchase farm inputs from MOA since WADU terminated.

CCRDA

How are farmers coping ?

The farmers in the PA do not use any ellaborate method to improve their soil textures. However, their simple cultural soil improvement mechanisms include:

Manuring: household refuses and cow dung are sparsely distributed in the crop fields.

Intercropping: Legumes are intercropped with cereal and root crops.

Soil conservation measure: WADU initiated soil conservation and soil maintainance methods. Some farmers residing along the sloppy lands protect their soils from erosion through soil bunds establishment.

BEST BETS FOR PROBLEM III

What ?

To improve soil fertility an integrated soil and vegetation management mechanisms should be applied.

To improve soil fertility farmers need to accumulate their household refuses and dung at one place before spreading. They do not economically and properly apply when it is available. But, if it is collected and piled up at one place then proper decision could be taken when and where to apply the fertility maintenence resources.

The farmers do not use crop residues to improve their soils. The straw from haricot bean and pigeon pea could be spread over the fields after harvesting. Some tree leaves could be used for mulching as well.

Crop rotation practices with legumes is essential. Crop sequencing exercise of one cereal crop with the other further depletes the soil fertility.

Intercropping is widely practiced in the PA. This system needs to be improved through row plantation, proper crop mixing and the time of application.

Compost making is a potential source of soil fertilisers. The PA is endowed with large amount of vegetation cover. Approprate trees and shrubs could be screened and utilised for compost making.

Above all, there is a high competition between trees and crops for soil nutrients and water. The farmers should be advised to properly manage trees on their farms.

CCRDA

Why ?

Food crops production should be stablised, if possible, should be increased to satisfy the needs of the ever increasing population. If the present trend continues, some fields may totally cease producing food crops due to lack of soil maintenance measures.

How ?

The farmers awareness about integrated soil vegetation and soil water management seems to be low. Therefore, the effects of large vegetation on soils and crops and the impacts of intercropping on soil fertility should be discussed with the farmers.

- Proper crop mixture should be suggested
- The proper timing of crop mixing should be taught
- Screening of vegetation or trees could be done
- The farmers should be advised to properly manage hedges grown on their land.
- Chemical fertiliser is seriously needed by the farmers. Farmers should be able to buy fertilisers on credit.
- Further discussion should be arranged with farmers about compost making and its use.

Who benefits ?

All farmers in the PA benefits

10.4. Problem IV: Crop pests and diseases

What is the problem ?

Essential food crops of the area are seriously threatened by the pests and diseases. As indicated in Chapter 4, sweet potato is affected by sweet potato butterfly, enset is attacked by bacterial wilt, coffee production and plantation is devastated by coffee berry disease, haricot beans are affected by weevils etc.

Why is it a problem ?

It is important because food availability is affected by increasing yield decline due to pests and diseases. The farmers interviewed estimated that 100% of sweet potato plantation was destroyed by the butterfly in 1983 E.C. alone. The overall decline in enset performance has been about 40% during the last 20 years. An over all production decline in coffee plantation was about 75%.

The impacts of yield decline on the lives of the people is obviously severe. Lots of families already depend on food aid. Assets of some families have been degraded.

CSRDA

Who is affected ?

All farmers who planted enset, sweet potato and coffee trees are the most affected ones. Moreover, economically disadvantaged farmers were victims of the pest and diseases attack. The farmers who planted larger area of enset, sweet potato and coffee trees were less affected. Because, some of the plants tolerated the effects of the attack.

Where is it found ?

The problem of pest and disease occur all over the PA. But, it was observed that some crops planted in a low and cool temperature were less affected. It seems the middle part of the PA is highly affected.

When did it become an issue ?

According to the farmers, the problem came into being after the major rainfall failure some 20 years ago. Ever since, the rainfall was not adequate to crop growth. With the intermittent and recurrent rainfall, the appearance of pests also increased.

How are the farmers coping ?

The farmers' attempt to cope with pest and diseases problem include:

- Screening of pest and disease tolerant varieties
- Altering planting dates
- Eradicating shelters of pests or alternate hosts
- Plowing during relatively dry season
- Avoiding contamination
- Investigation of seasons of pests occurrence
- Removing leaves, pods and plants affected by hand
- Using chemical fertilisers
- Scaring rodents and insect pests.

The farmers' attempts seems to be integrated, simple and mechanical. They tried to select seeds to avoid contamination and multiplication of the pests and diseases. They have some selections of varieties and crops for their own use.

CCRDA

BEST BETS FOR PROBLEM IV

What ?

Possible solutions suggested to deal with pests and diseases problem include:

- Screening and provision of pest and disease tolerant varieties of enset, sweet potato and coffee
- Search for easily available and low price sweet potato butterfly pesticide
- Advise farmers to properly use time of planting
- Early land preparation - dry season
- Crop rotation practices

Why ?

The major food and cash crops are damaged while in the field and even after harvest by various pests and diseases. The farmers could not easily purchase pesticides from the markets. Either the chemicals are not in the markets or the price is very high that an average farmer can not buy them.

Therefore, simple, accessible and appropriate techniques needs to be developed within the PA area.

How

One way of introducing appropriate technology is through on-farm trial of sweet potato, coffee and enset varieties. REDD BARNA may contact IAR to get sweet potato and enset varieties.

Coffee Berry Disease tolerant seedlings could be obtained form the Ministry of Coffee and Tea Development Offices.

Some intermediary hosts for sweet potato butterfly could be eradicated by the farmers themselves.

Encourage farmers to practise crop rotation and to alter planting dates to escape pest out breaks.

Assess traditional ways of controlling pests and diseases, conduct on-farm trials for future recommendation.

Who benefits?

All Sweet potato, enset and coffee growers benefit. Farmers who participate in the on-farm trial benefits more than the subsequent adopters.

CCRDA

Practical problems

In the case of sweet potato variety, the unwillingness of research stations to provide planting materials could be one problem to start on-farm trials.

In an intensive intercropping farming system, eradication of alternative host appears to be impossible. It is possible that insect pests may not be completely wiped out by the methods applied.

10.5. Problem V: Availability of oxen power

What is the problem ?

The farmers in the PA face an acute shortage of oxen for traction. Therefore, most of the farmers use simple wooden hand tools for land cultivation. These tools mainly consist of small iron pieces with wooden handles which do not properly turnover the soils and properly dig weeds out of the crop lands. Some farmers even do not own these simple farm implements. Because, these tools are not made in their PA and are bought from the main markets.

Why is the problem important?

The soil fertility and the yields obtained have been increasingly declining in the area. Land is not timely cultivated. Deep rooted weed species are not properly cleared off the crop fields. Manual land preparation and weeding are difficult tasks and take longer period of time. As a result, the farmers faced a yield decline and decrease in land area cultivated.

Where does the problem occur?

It is a problem all over the PA.

Who is affected?

As stated in section 3.8, all farmers described in category 1-3, do not own traction power. Those who fall in the category one, do not even own proper hand tools.

How are the farmers coping with?

The farmers deal with traction problem through various ways:

a) Exchange manual labour to oxen labour: Several farmers in the PA exchange 2 days human labour for one pair of oxen day. This form of exchange causes delay in planting or sowing dates because, labour service is rendered to the oxen owner on critical days of planting.

CCRDA

b) Some farmers borrow oxen from relatives and closest friends without any immediate reciprocation
c) Use simple hand tools
d) Give away land to sharecroppers
e) Organise mutual group work (Debo Amh.) and work on rotation. Number of days spent on an individual members' field depends upon the agreement of the group
f) Fallowing
g) Plant eucalyptus and other tree crops
h) Leave open for grass growth and cut and carry system (uses)

BEST BETS FOR PROBLEM V

What ?

During focus group interview, five innovative and elderly farmers suggested provision of oxen for the needy farmers. As an alternative farm implements they suggested to avail improved hand tools like spade, hand hoes, cycles and other appropriate implements (tools).

Why ?

To increase production on land and to raise food security.

How ?

In the past, REDD BARNA distributed oxen for poor farmers. Often, these oxen were perceived as "government property" [Yemngist Bere, Amh.] by the recipients and were not properly managed. Some were sold out and some were slaughtered for family consumption. The innovative farmers indicated that the recipients did not feel that it was their oxen. The ox was sentimentally isolated from the family herd and ownership, because it was big when it was brought in.

Thus, the farmers suggested that any donor should buy a young bull so that it may grow up with the family's cattle (if any !) to be accepted as their oxen.

The donor agency must closely follow up the performance of oxen. They said the right of oxen ownership should be in the hands of the donor, and the use right of its labour power in the hands of the recipients. This should continue until the ox is disposed.

The farmers suggested to buy a single ox for two families. This could provide an opportunity to properly feed the ox. Land is extremely limiting factor for cattle rearing in the PA. They do not have grazing lands, cut and carry feeding is scarce due to grass resources. Thus, two families could easily manage the ox and share its labour power.

Improved farm implements could be distributed by donor agencies to the needy farmers.

CCRDA

Who benefits ?

Interested farmers are encouraged to under-sow and over-sow grass species and plant fodder trees in their fields. They should be motivated to raise and sell out some grass species to other farmers, with the help of experts in REDD BARNA or MOA.

Practical problems:

There might be a problem of finding land and grass species to sow.

10.7. Problem VII: Expansion of Eucalyptus plantation and hedges

What is the problem ?

For the last half of a century, eucalyptus and other hedge trees and shrubs largely encroached upon the crop fields and grazing areas. Several farmers planted eucalyptus trees on the boundaries of crop fields and grazing lands. Long strips of lands between two farmers are separated by thick and thorny hedges. Taking away significant proportion of land out of production, trees and other shrubs grown on the hedge rows stretch their branches and root systems on the crop fields.

Why is the problem important ?

There is competition between hedges, eucalyptus trees and crops for land and water. As it is observed in the area, eucalyptus tree expanded at the cost of crop fields and grazing land. The tree imparts the following effects on crops and land.

- Absorbs large amount of water through its roots
- Suppresses grasses and other vegetation growth
- Takes away land out of production
- Its leaves are not easily decayed in the crop fields
- Creates inconvenience for oxen plowing (root system)
- Reduces crop yield and grass for grazing.

Where does the problem occur ?

All over the PA.

Who is affected ?

Farmers who planted eucalyptus trees along the edges of their crop fields and grazing land are highly affected. Borders of cultivated lands, plots and hedges could be similarly affected. Because, the expanded root systems and the shade effects stretch over a wider area of land.

SCRDA

How are the farmers coping ?

Some farmers dig a ditch between the crop fields and eucalyptus tree plots to control expansion of root systems. Some trees were planted in galleys, waste lands and along the river banks, away from main crop fields. Very few farmers cut down and thin the plots to reduce its pressure on crops.

BEST BETS FOR PROBLEM VII

What ?

In Welaita society, area coverage and age of eucalyptus tree is an indication of wealth and status. Preservation of a tree for a longer period provides higher prestige in the community. A man who cuts trees is less respected. Thus, any best bet suggestion requires an understanding of the value of the trees' vis-a-viz to other crops and trees.

One way to deal with hedges and eucalyptus tree expansion is through education. The farmers should realise its negative effects on crops and grass growth.

Once the farmers are educated, proper management system could be followed. i.e thinning, pruning, pollarding, digging ditches and gradually substituting with alternative and less hazardous tree for the crops. [Educate => manage => substitute]

How ?

Informal training sessions could be organised with field visits to the severely affected fields. The sessions should be conducted through open discussions aided by slides and posters from affected lands. Those farmers who are conscious about the effects could be used as informants [Travel seminars]. Interested farmers could start with various measures of management.

On interested farmers' plots, other eucalyptus species with less effects on land and crops could be planted. This helps in completely substituting the known and bad species.

An attempt could be made to utilise educational mass media at Soddo station to increase the resource awareness of the larger masses of farmers.

Who benefits ?

All farmers in the PA will benefit. But early participants in the program could gain more than the other farmers.

GCRDA

Practical problem

Farmers obtain an immediate income from eucalyptus trees. It is widely used to build houses and for fencing. The farmers may resist ideas about managing eucalyptus tree.

10.8. Problem VIII: High population pressure on meagre resources

What is the problem ?

The farmers interviewed noted that the number of population has been steadily growing for the last half of a century. The number of people living in a house (family) is higher than the amount of subsistence farm income. The number of total population (as to the farmers) is greater than the carrying capacity of the land in the PA. Thus, the pressure on land and means of existence is becoming increasingly high.

Why is the problem important ?

The livelihoods of most of the poor people are in a shaky state. As the number of male adults increase in the family, the demand for land increases. By which, land is further apportioned into a smaller fragments, eventually decreasing food production.

The people's means of subsistence provides scanty opportunities to live on. Because, the number of people depending on the available resources is greater than the resources could produce. As a result, many families lead destituted life.

The aggregate annual farm income divided to all family members seems to be very low.

Who is affected ?

The people with small land area and large family size are the most affected.

Where does the problem occur ?

The problem occurs all over the PA.

When did it become an issue ?

The demand for and pressure on land became an acute issue when free migration for paid employment was restricted during the last 20 years. Lots of people who previously were able to move (out of the PA) were forced to stay in the area.

CCRDA

How are the farmers coping ?

The younger members of the families are encouraged to migrate to urban centres and state farms for employment. The early migrants provided shelter and assisted to look for employment opportunities.

Few families started attending family planning programmes.

Some young people willingly joined the then national military service and took up permanent employments with standing army.

BEST BETS FOR PROBLEM VIII

What ?

During one of the interview sessions with the innovative farmers, the importance of family planning was widely discussed. they said,

> "Our women are just sitting down at home and producing children. The number of family is getting too high to feed. Our children expect food, shelter and clothes from us . We are unable to provide them because our produce is declining. Our wives and children do not love us any more. The family affection and regards are already fading away. We do not respect each other as we used to sometimes ago. The family ties are loose and disregarded."

Then ! they said, "do something to our wives!!"

During the discussion, the study team suggested a family planning program as one remedy for birth control methods. "Yes, it is a good idea," was the answer.

Why ?

To decrease pressure on small family wealth and stabilise balance between family needs and scarce resources, it becomes necessary to control population increase ? It has become difficult to allocate an additional land for family needs. Because, land area can not be expanded. The farmer seems to have exhausted the available land resources up to its optimum produce. It's now time to think about future population adjustment.

How ?

Intensive training on population pressure and on scarce resources should be given to the people. In principle, the people themselves should understand that some families are unable to feed and buy clothes for children. Because they are many in number.

CCRDA

The people should realise the ratio between the land and the people, and its future impacts on natural resources and livelihoods of the people. The effect should be felt at the lower level and by the people.

This could be done with the assistance of family planning association and through "Group approach".

There are already organised "women goat groups" and "women credit associations". These two groups are well accepted. An additional traditional "Equb" groups could be contacted for family planning purposes.

Another core group called "village mothers" group could be organised by REDD BARNA to advise other groups on family planning activities. Recruit elderly "village mothers" who are successful in life, from different religious groupings and train them on family planning techniques. Equip them with the knowledge and techniques of birth control measures.

The training could be provided through visits and travel seminars to the family planning centres and prominent mothers or "wise mothers" who had smaller children, successfully brought them up and made them sustain and able to help themselves through time. Alternatively, visit mothers who trained their children up to the higher levels in the area to share their experience, these "village mothers" can work through the goat groups, equb, mahaber, credit association and congregations.

CCRDA

Who benefits ?

Women organised in groups and village mothers can benefit from the program. However, interested young women and adult girls could benefit from the intervention.

Practical problems

Some women might resist birth control measures for the following two reasons:

- Wish to have more children
- The negative effects of birth control measures (i.e pills) on women's health, mainly on those who do not eat proper food and malnourished.

10.9. Problem IX: Human health problems, high mortality rates

What is the problem ?

Livelihoods of the people are adversely affected by various diseases in the PA. It was indicated that typhoid fever, hook-worm, amoeba, diarrhoea, pneumonia, malaria and other diseases frequently affect the health of many members in the family. In one year alone, out of all the known deaths about 42.8% died from typhoid fever and 27% from diarrhoea of unknown origin.

Low nutritional status and an absolute food consumption decline aggravated recurrent diseases. Most families lack balanced diets in their food habits.

Above all, deaths and burial ceremonies (mourning) are a day to day phenomena in the whole area.

Why is it a problem ?

Health problems create a serious social and economic imbalance in the living standards of the people. Some farmers indicated that several households impoverished due to high costs incurred for medication and funeral ceremonies. The disposal of the last asset takes place when a family member gets ill or dies away. In Welaita culture, families are expected to provide food and drinks to the mourners when their family member dies.

Who is affected ?

All families who do not own large area of land and at least some savings on cattle resources are largely affected. And also, the family whose member (preferably the mother) does not trade on petty commodities and earn some money for the family can not get a proper diet, and can not take sick people to the clinics.

Several malnourished children and old aged men and women were observed during the given period. Which indicates, vulnerability of this section to health hazards.

When did it become an issue ?

The farmers could not indicate a historical moment by which health status of the community began to be under threat. Various interlinked causes and overlapping eventualities were mentioned.

The farmers described that food crops production and consumption decline over a period of time. When land was fertile and productive the most preferred crops were produced, and milk production and consumption was high . But with the advent of large scale deforestation for expanded cropping and concomitant rainfall decline, food resources became scarce.

CCRDA

Above all, the situation was aggravated by the policy changes during the socialism era in the country. However, the problem of poor nutrition and illnesses started much earlier than the advent of the socialism.

How are the farmers coping ?

The farmers attempt to treat some of the diseases through improving nutritional balance of diets, The kind of diet source depends upon the types of diseases observed.

In such incidence, livestock products like, meat, milk and butter are used to improve the diets of patients. For example, for malnourished child, goat milk, chicken soup and porridge from "Bulla" (enset stem extracts) are fed. For diarrhoea, bulla porridge mixed with butter, some cabbages, medicinal herbs and spices etc. are used.

Some tree leaves, root crops, known herbs, barks of trees etc. are used as supplementary traditional treatments of various diseases.

For serious illnesses, villagers carry patients in a small bed to the Areka health clinic. For intensive care, the health centre refers to the Soddo hospital and elsewhere.

BEST BETS FOR PROBLEM IX

What ?

The focus group interviewed suggested integrated sets of solutions to the health problems in the area. Their sets of solutions include:

1. Improvement of diets and consumption patterns of the families
2. Undertaking preventive and curative measures of health
3. Enhance the capacity of women to earn additional income, to purchase food for food shortage period and have balanced diets in the family.

Why ?

Multiple factors affected health status of the people. To deal with these factors different inter-related solutions are necessary. Proposal of sets of multiple solutions enable the households to produce at home and to purchase from the markets and from those who produce in excess in the villages.

Food availability motivates the farmers to diversify their meals and their food habits. Thus, to attain sustainable health in the community, nutritional status and measures of treatments need to be improved.

GCRDA

How ?

The farmers themselves should be encouraged to cultivate as many different vegetables as possible around their homesteads. They should be provided with seeds of vegetables.

To save losses of vitamins while cooking and preparing food, nutritional education should be given to the women.

Besides, for treatment and training, the health post already built in the PA should be strengthened. Appropriate manpower and medical facilities should be provided. Proper linkages with the Areka health station needs to be established.

To enhance the purchasing power of the women, extend women credit facilities to the larger members of the community. All women contacted during the survey demand for credit facilities from REDD BARNA program. Encourage the credit groups to start trade on vegetables and sell them out to their group members. If possible, train some women from the groups on nutrition and primary health care. Let them monitor the nutritional status of the families and report to women's section of REDD BARNA project. The trainees could work with community health assistant in the health post.

Who benefits ?

Primarily, the targeted group can benefit out of the intervention. Secondly, all the needy ones eventually benefit from the health post visits. The women interested in planting vegetables and engaged in petty trade could benefit more than all other members of the community.

Practical problems

The people affected are large in number. There could be manpower and financial constraints to cover all the households affected. A proper targeting and screening might also be difficult due to the similarity of effects of ill-health and poor diets on livelihoods of most of the people.

GCRDA