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EVALUATION OF THE EFFECTS OF THE ABOMSA WATER SUPPLY PROJECT

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BACKGROUND SURVEY

AND

THE WATER SUPPLY PROJECT

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Preface

In cooperation with UNICEF, Addis Abeba, a socio-economic baseline study of Abomsa town was carried out in 1986 by a team led by Dr. Ingvar Jonsson, Planning and Programming Service at South Eastern Agricultural Development (SEAD) zonal office in Asella, Arsi region. The study was initiated and sponsored by UNICEF.

The survey questionnaire was prepared by Ato Argaw Workneh (SEAD) in cooperation with Ato Kebebew Daka (UNICEF) and the team leader. Dr. Jonsson is responsible for the data processing, analysis and report writing up to paragraph 7.4.2 and section 7.7.2 concerning recommendations for action. UNICEF's coordinators for the study were Ato Kebebew and Woizero Zewdie Abegaz. Dr. Alula Abate, Addis Abeba University, and Mr. Geoffrey Last, Ministry of Education, took a heavy part in the editing of the study. The maps are drawn by Mrs. Gunvor Larsson.

In September, 1987 a supplementary study was accomplished by Ato Aberra Makonnen, Ministry of Education. It evaluates the effects of Abomsa Water Project, Women's involvement in it and the development experiences gained from the project (Paragraphs 7.5 - 7.7 and Annexes 1 - 2).

The objectives of this work have included not only a review of the changes brought about by the installation and operation of an improved water system, but also of the problems faced during the implementation of the project. The latter is intended to provide information and experience which can be used in the identification, design and implementation of similar projects in the future.

A central purpose in this water development project which has been taken into consideration under both objectives of the study was a demonstration of the possibilities of involving women more directly in the process of development and change. In the Abomsa water project, women as individuals and through their organization, REWA have assumed new roles and responsibilities, and have developed new skills and experiences. They have also encountered problems.

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In the Abomsa Water Project, therefore, the new development role for women has been taken beyond discussion into practical action. Although the lessons to be learner are many, there is no doubt this central purpose has been well-served. It has been demonstrated that attitudes can change, new roles can be undertaken by women and can be accepted by the wider community.

In Abomsa, the lessons revealed in this report can now be directed at consolidation and reinforcement. In other rural locations, also lacking improved water supply systems, there is no doubt that the Abomsa demonstration project modified in line with the experience gained, can serve as a model for dissemination.

Women have been the traditional suppliers of water. There is no reason why they should not continue to be the providers of water in a new technical framework which removes most of the drudgery of traditional practices, and offers the possibilities of new roles and responsibilities.

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List of Abbreviations

AMC = Agricultural Marketing Corporation

ARDU = Arsi Rural Development Unit

EDDC = Ethiopian Domestic Distribution Corporation

MOA = Ministry of Agriculture

PA = Peasant Association

REWA = Revolutionary Ethiopia Women's Association

SEAD = South Eastern Agricultural Development Zone

UDA = Urban Dwellers Association

WSSA = Water Supply and Sewerage Authority

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I. INTRODUCTION

1.1 Abomsa town

Abomsa was established in the mid 1950s as a planned settlement for about 900 retired soldiers who were given land to cultivate and houses in the simultaneously-founded town settlement. For the government this was an easier way of solving the sustenance problem of the war veterans than giving them financial allowances for the rest of their lives. Today, Abomsa is the awraja (administrative area) capital of Arba Gugu, and wereda (administrative district) capital of Merti (Figure 1).

After the Italian war, individual grants of land were the major means of rewarding resistance fighters as well as returnees from exile, and to ensure their future loyalty. A legal definition, declaring all land on which no tax was paid as state land, greatly extended the areas available for redistribution (Pausewang 1978, p.9). However, it did not necessarily mean that the area was uninhabited before the new settlers arrived in January 1955. Probably nomadic pastoralists, who still dominate the economic activities of the northern part of Merti wereda, were already using the land for extensive grazing. The new settlers' agricultural practices were innovations in the area and together with the town settlement radically changed the preconditions for human activities in the whole region.

The history of Abomsa is still not written, and information of the founding period is only available as scattered notes in occasional papers. To obtain a more substantial account of the settlement's previous history, three veteran soldiers were gathered and interviewed by one member of the survey team, Ato Argaw Workneh. Most of the background notes given later on (see 2.1) are based on this information.

The special background of the establishment of the new settlement has had a profound impression on the living conditions in Abomsa town to the present time. For instance, the current population structure reveals a large imbalance between the economically active adult population and the combined total of children and aged people expressed by a very high dependency ratio (3.2). This is a result of the collective resettling of a large number of people from the same generation who now have reached old age. It is also bound to have secondary effects on the size of future generations of children.

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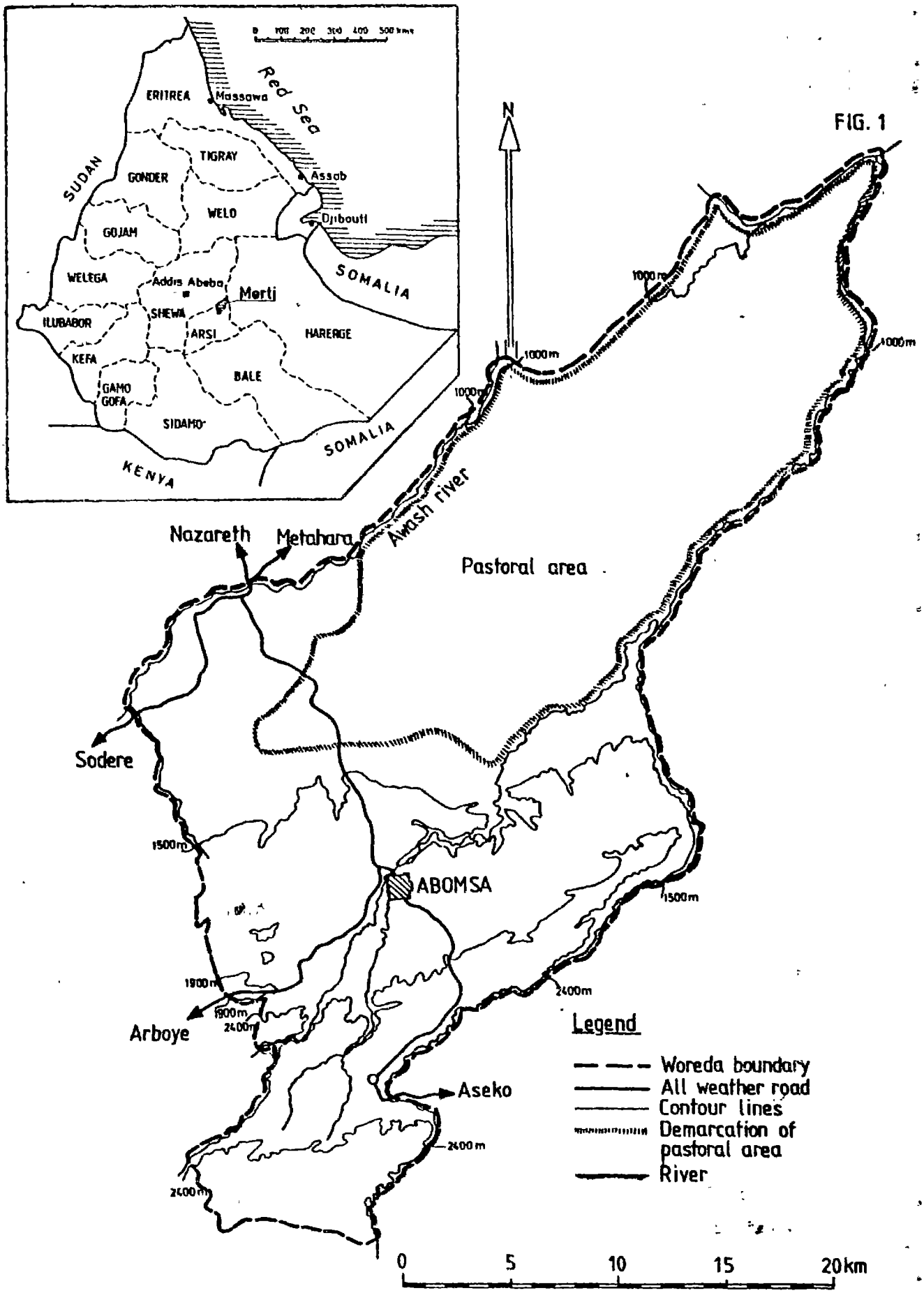

Figure 1. The geographical location of Abomsa town, Merti wereda

The transfer of people from different parts of Ethiopia to an alien environment not altogether suitable for settled agriculture has also had negative repercussions on living conditions up to the present days.

The classical exchange of social services and small-scale industry products between a functional central place and its agricultural surroundings (tributary area or hinterland) has never materialized in the case of Abomsa and its region. This is simply because the original town was a purely agricultural settlement without any traditional town functions. It is only recently, and especially after Abomsa became an administrative center, that the links between the town and its surroundings have developed in any substantial way. Still, this in general applies only to exchange of local products and administrative services without any more comprehensive interconnections.

This fact explains the often-articulated feeling of isolation and the communication problems in their broadest sense, expressed by many people in Abomsa. The lack of good road connections in the area is a physical expression of the absence of social and economic links with the surrounding world, in spite of the fact that Abomsa is located only about 100 km to the south-east of Nazret town, and a mere 50 km from the main Addis Abeba-Assab road.

1.2 The water project

As in the whole of Ethiopia, the health situation and frequency of disease are strongly related to the sanitary and hygienic conditions of the people. An adequate supply of good water is an indispensable prerequisite for a satisfactory state of health. Although one of the main location factors for the choice of the town site was certainly its nearness to the Arba Dima river, this later became a big problem because of its infestation by Bilharzia (Schistosomiasis).

A study conducted between the last quarter of 1983 and the beginning of 1984 indicated that 1,935 people were carriers of one or other among seven identifiable water-born diseases, i.e. 28% of the total population in the town was affected. The same report showed that 7% of the residents were suffering from the debilitating disease, Bilharzia (Statistics from Abomsa Health Centre. 1984)

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Already in 1978, the National Water Resources Commission had designed an infiltration gallery with a pumping system to supply the town with water from a nearby river. The Commission raised 160,000 Birr for the installation work, together with a quarter million Birr raised by the inhabitants. The installations were carried out by the Water Development Section at Arsi Rural Development Unit (ARDU) from June 1980 to June 1982.[1])

However, neither the technical nor the management capacity of the town council was adequate to keep the water pump working properly. After several break downs, the water supply system went out of function within less than 18 months. Renewed efforts to repair the pump were futile, and the project disintegrated.

In the meantime, a new alternative was proposed for a solution to the water problem in Abomsa that could supply clean water and be managed with local technology, e.g. spring water distributed by gravity and handled by local people. Technical surveys by the Water Development Section at ARDU showed that a spring some 5 km outside the town gave an adequate discharge of good and clean water, possible to pipe by gravity to the 11 distribution points already constructed in the town (Project proposal to improve life of women in Abomsa town, Arsi. ARDU, April 1984). For this purpose a pipe-line was needed from the spring to the earlier-installed water reservoir on the outskirts of the town. For the first time in Abomsa history, clean potable water might be made easily available to all its inhabitants.

Women's traditional responsibility for the laborious water-fetching work made it natural to engage women in the new project. Thus, the direct involvement of women by REWA (Revolutinary Ethiopia Women's Association) in the planning, implementation, maintenance and management of the project was a special feature. This was strongly supported by an earlier nationwide

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1. ARDU project area is now included in South-Eastern Agricultural Development zone (SEAD). The present study is undertaken by its Planning and Programming Service at the Zonal Office in Asella, in co-operation with UNICEF, Addis Abeba.

study indicating that the indisputable most felt need of women in Ethiopia is a solution of the water problem (Report from Workshop on Exploring Alternatives in Programming for Women, UNICEF, 1985).

Based on the expressed needs of the Abomsa towns-people, the project was further developed by the Water Development Section of ARDU. A committee was formed with representatives of REWA ("chairman"), Abomsa town administration, local offices of Ministry of Agriculture, Ministry of Health and others concerned. The population was mobilized to provide manual labour and to raise money for the project. UNICEF was approached and provided support in cash and kind (7.1).

During July-September 1984, the construction of the main-pipe-line was completed, and the distribution points were made operational in the town. The water project was officially inaugurated on September 30 1984 and a regular water-supply was made available and charged for from October 1,1984.

Some different figures have been given for the total project cost (240,000-300,000 Birr). The amount was covered in terms of cash, supplies, in kind, labour and technical support, by various doners, including the following organizations: REWA and Abomsa town administration (13%-18%), ARDU and Ministry of Agriculture (21-22%) and UNICEF (60%-66%).

1.3 The aim of the study

As a result of its active participation in the water project, UNICEF is now desirous of having a baseline study of Abomsa town undertaken, for the purposes of introducing integrated basic services, and of assessing the impact of the recently installed water supply system through the active participation of REWA, the community in general and of women in particular.

SRDD (former ARDU) is equally committed to the study, because of its technical and management involvement in the project, and because the development strategy adopted in the Abomsa area could serve as a model for other urban and rural communities. Also, there is a general lack

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of knowledge about socio-economic conditions in smaller towns and the interdependencies between towns and their surrounding rural areas.

This information gap must be filled, especially in the context of the ongoing villagization programme, as the provision of social and economic services to rural villages, semi-towns and towns is an urgent task for all the authorities concerned. A special aspect concerns the availability problem, i.e. how to dimension and locate the service within reach, (physically and economically), of the target population, and promote a proper utilization of the facilities provided.

Based in these justifications, the main aim of the study is to give a broad and comprehensive description of socio-economic conditions in Abomsa town. However its function as an administrative, educational and commercial centre for the surrounding areas sometimes demands a wider outlook.

Special attention was given to exposing existing bottle-necks which impede a fair development of certain segments in society. Also, the water project and its consequences were studied especially to see how women's time and energy could be released for other development activities. Thus, the aim was not limitted to an evaluation of the water project and its impact on the target population. It required a more project-directed approach than the now applied broader survey methodology implies.

1.4 Source materials

The main sources of information were as follows:

1. Prepared questionnaires, directed to a sample of 224 heads of household, i.e. about 13% of the total number of households in Abomsa. The forms were filled out by high school students from Abomsa interviewing randomly selected households in February 1986.

2. Structured interviews of officials from governmental and mass organizations.

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3. Structured interviews of government officials at regional level in Asella, April 1986.

4. Statistics from governmental offices in Abomsa and Asella.

5. UNICEF and ARDU (SEAD) files of Abomsa water supply project.

6. Statistical publications from the Central Statistical Office (CSO), and information from maps and aerial photographs from the Ethiopian Mapping Agency (EM.).

7. General literature on the subject.

1.5 The sampling procedure

Instead of gathering information about all inhabitants of Abomsa, town, a sample of heads of households was selected, and they were interviewed according to a prepared questionnaire. A good sampling method should give all population members the same chance of being selected by using probability methods for choosing the sample.

1.5.1 The sampling frame

According to the kebele lists, there are around 1,750 households in Abomsa town, comprising almost 7,200 household members. This gives an average household size of 4.1 persons. The National Census of 1984 reports a population figure of around 7,500, constituting some 1,970 households. The average family size, according to the Census calculation, is 3.8; in fact the same value as for towns in general both in Arba Gugu Awraja and Arsi Region. (Census Preliminary Report 1984: 32, Office of the Population and Housing Census Commission, CSO).

Thus, it seems probable that all households are not registered in the kebele lists. If the concept of household and family is identical in the two sources, the difference in the target population could be as much as 10%. On the other hand, the smaller average family size of the National Census might indicate some possible different registration

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principles for families and households in the two sources. Nevertheless the kebele lists are the only sampling frame available, and have been used for the sample selection in the study. It is, however, important to note that there may be some bias in the sample population, implying that some of the older or poorer families may not be included.

1.5.2 The sampling method

Ideally, individuals should be selected from a sampling frame by independent random sampling. However, a good alternative to simple random sampling is systematic random sampling, which is generally easier and quicker. When numbered sampling lists are available as in this case, systematic sampling will have precision equivalent to a simple random sample and will be mechanically easier to draw.

1.5.3 Size of the sample

It is often thought that the adequacy of a sample depends heavily on the fraction of the population included in the sample, e.g. that some percentage of a population will make a sample credible. Another method, often advocated in statistical textbooks is to describe how much margin of error can be tolerated or how much precision is required of the estimates. However, the sample size decision must be made on a case-by-case basis, considering the variety of goals to be achieved and taking into account the resources available for the study.

This investigation is designed to make a variety of estimates, which is why it is not appropriate to base the sample size decision on the need for precision of a single estimate. As a compromise between the need to utilize limited time and financial resources and to get as satisfying results as possible, tables have been used showing confidence ranges for variability due to different sampling sizes (Floyd-Fowler 1984:42). It shows that the sample precision increases rather steadily up to sample sizes of 150 to 200. After that point, there is a much more modest gain through increasing the sample size.

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It was therefore decided to select at least 200 households. In order to provide margin for possible non-respons or reporting errors, the number was increased to 230. This gave a sample fraction of between every seventh and eight household. The first number was randomly choosen between 1-8 and then the households were systematically selected from the numbered lists by adding alternatively 7 and 8 households to the selected one. Due to inconsistencies in the kebele lists the final sample size was 224 households.

2. THE STUDY AREA

2.1 The first settlement[1]

An important new inflow of population were the war veterens who arrived in the late 1950's. Around 900 patriots, excluding family members, were given land to make a living as farmers. When they first arrived in January 1955, the area was said to be uninhabited. However, the area was undoubtedly used for the extensive grazing of cattle, sheep and goats by pastoralists, who to-day still carry on their activities in the northern part of the Wereda (Merti).

As in many other parts of Ethiopia, pastoral land was considered state-owned, even if animal tax was paid by the pastorlists. Generally, payment of land tax was needed to give the land user legal rights to the land (Mesfin Wolde Mariam, 1972, p.88-9). Thus, from the governmental point of view, the area was unclaimed and was at the government's disposal and usable for it's aims.

The settlement area (later the town site) was surveyed by engineers who arrived there at the same time as the first soldiers. They laid out the still existing town plan which was said to be 8½ gashas of land, i.e.

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1. Most of the information about Abomsa establishment period was given by the following veterans, interviewed by Ato Argaw Workneh in January, 1986: Capt. Bejene Gisaw (72 years old), Lt. Solomon Goshu (69) and Lt. Zewede Shiferaw (79).

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340 hectares. However, measurement to-day reveals that the built-up area is only slightly more than 100 hectares (Figure 2).

It is probable that the new settlement was designed as an area of one kilometer square. This gives an average compound size for the 900 settlers of nearly 1,000 m^2, if the open spaces reserved for other purposes are excluded[2]. To-day there are around 1,560 dwelling-houses with an average compound area of 435 m^2, out of which about 370 m^2 are used as gardens (Information from the town council and from the questionnaire).

During the early period, the soldiers lived in tents as they started to clear the bushes and construct small thatched huts. Very soon small traders and shopkeepers arrived, and the number of residents increased steadily. The settlers were brought to the new settlement by road via Sodere, Boffa and Tibila, on tracks they had to clear themselves. It was not until 1971-72 that bridges were constructed, across the Awash and Arba Dima rivers.

Within the next few years, a number of government offices were established in Abomsa together with a a police station, school, health clinic, church and prison. It was soon found necessary to move the Awraja administration from Angade (Teferi Berhan), some 15 km south of the town, to Abomsa and this gave rise to the establishment of a number of Awraja offices, a telecommunication and postal service, an agricultural development office, a bank service, etc. (The complete structure of present-day facilities is discussed later in paragraphs 4.2.3-4.)

Probably, in connection with the lay-out of the town plan, the surrounding agricultural land was also measured and divided among the settlers. Traditionally, land was measured in gasha units, i.e. an area of land given to soldier who carried the tor (spear) and gasha

2) It is interesting to note that this is about the same area allotted nowadays to each in the new settlements established according to the ongoing villagization programme.

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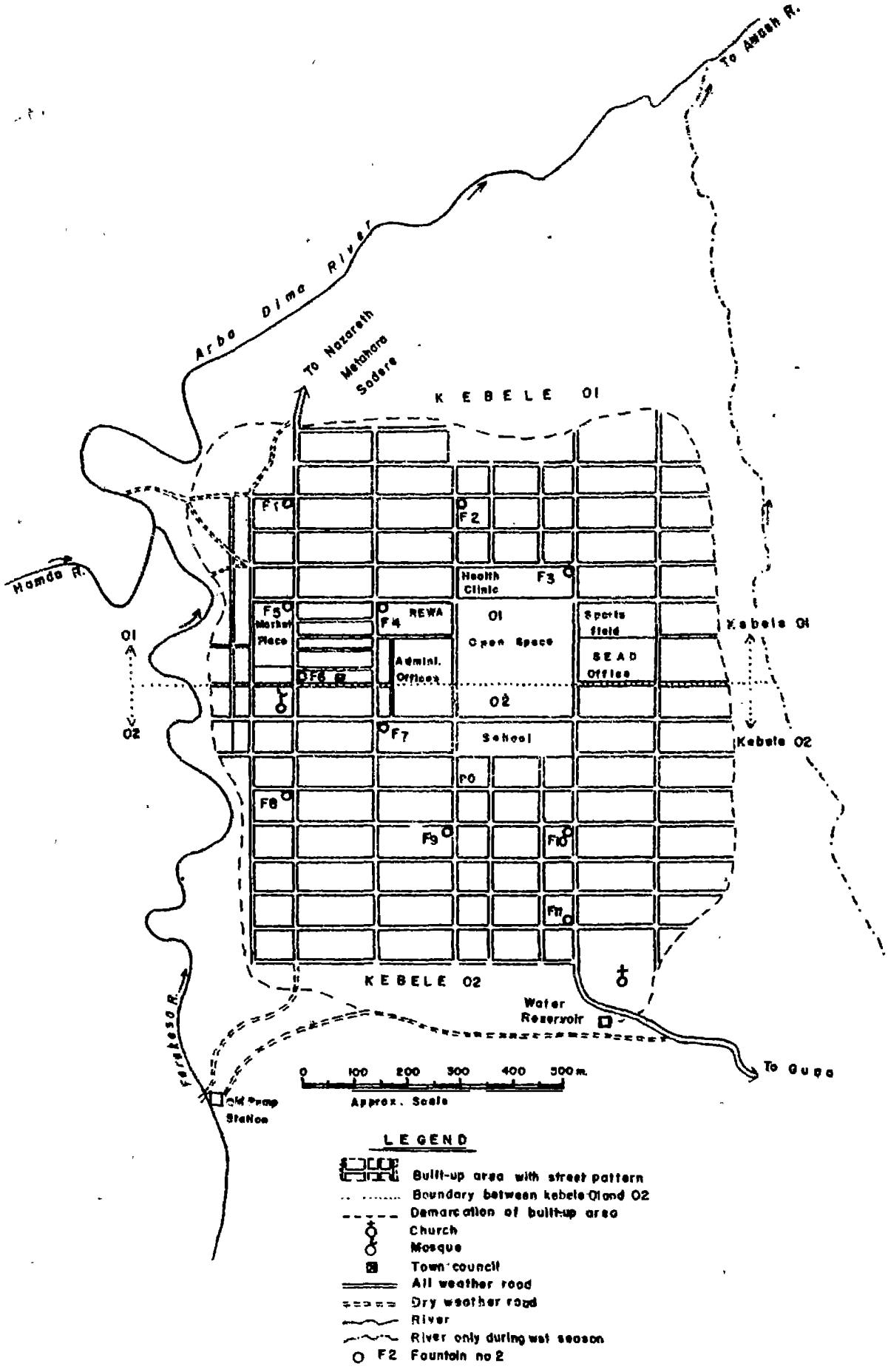

Figure 2. The town plan of Abomsa

(shield) to battle (Mesfin Kinfu, 1970). The name became generally applied to land measured by the kelad system, (using a cord of fixed length), which was known as gasha meret. The size of the gasha unit was originally determined by its productive capacity, so that poor land or land used less intensively was measured in larger gasha units than more fertile or more intensively cultivated land. The aim was to give the different land areas comparable values for taxation purposes (Cohen & Jonsson, 1987).

It is possible to discern the size of a gasha unit on the plain areas north of Abomsa. Analyses of aerial photographs indicate that the gashas were measured as rectangles of the proportion 11 x 7 cords, or, in round figures, 595 x 380 metres = 22.6 hectares. Since this is only slightly more than half the size of a standard gasha of 40 hectares, it is quite obvious that the retired soldiers were given much less than traditional practice would imply.

The total productive land today in the whole Woreda is around 13,000 hectares (General Agricultural Survey, Arssi, 1984). At the beginning of the 1970s, when the aerial photographs were taken, each gasha (22.6 ha) was split up between 6 to 7 cultivators. Thus, it may be a reasonable assumption that 4 soldiers together were given one gasha unit. For the total settlement this would mean an alottment of the order of 6,000 hectares. Only more detailed studies of the whole area around Abomsa town could confirm this figure.

2.2 The first settlers

Out of the 900 soldiers who first settled in Abomsa, 20 were randomly selected among the 224 heads of household interviewed. This suggests that around 150 of the veterans are still alive and residing in Abomsa. On the basis of this sample group, it is possible to draw some conclusions about the first settlers.

When they arrived at Abomsa in 1955, the settlers were, on average, around 45 years old, their ages ranging between 37 and 57 years. Nearly all of them had Amharic as their mother tongue; only a few were Oromigna

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or Tigrigna speakars. All belonged to the Orthodox Christian church. As shown in table 1, a majority of the soldiers were born in Shewa, and still more moved in to Abomsa from that region. With the exception of some soldiers from Hararge and Sidamo, the settlers were born in and migrated to the new settlement from the northern and western regions of Ethiopia.

Most of the settlers were married at the time of their arrival. Since their wives were generally younger, in most cases they have outlived their husbands. Nearly twice as many pioneer women as men happened to be included in the interview sample. They are on average nearly 14 years younger than the veteran group.

With regard to the women's birth places and migration movements, these show about the same pattern as the veteran group with the exception that a substantial number of women in-migrated from Arsi region.

As subgroups, both the wives (widows) and the veteran soldiers have significantly differnt housing conditions with 50% larger compounds and gardens, than more recent settlers. It seems probable that they have kept their old houses unchanged since the establishment period, while migrants who arrived later have split their plots into smaller areas.

However, in other respects it is difficult today to point to any striking differnce between the first settlers and the rest of the population, except personal characteristics depending upon their age. Thus, it is only to be expected that, for example, their educational level is lower than that of younger people. Judging from their own statements at the interviews, (4.2.5), economically, both groups belong to the great majority of very small wage-earners in Abomsa.

2.3 The location and physical setting

Abomsa town is located in the southern part of Merti Woreda at an altitude of between 1550 and 1600 meters above sea level. The flat town area is slightly tilted diagonally from its highest part in the south-east towards the north-west near the confluence of the rivers Hamda

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and Ferekesa (Figure 2). The town site is surrounded on all sides by rivers or minor escarpments which give it a well-defined location on a small plateau area. Obviously, its nearness to the surrounding rivers as well as the convenient building site has influenced the decision to locate the town in this place. In addition, suitable agricultural land is available, especially to the north and north-west of the town.

In wider setting, the town is located on the north-eastern spur of the Chilalo mountain chain forming the central highland area of more than 2,700 m, the Wereda drops, step by step down to the flat land area of Abomsa (Figure 1). A still larger flat area occupies the north-eastern part of Merti at an elevation of 1,300 - 1,500 m, and is covered by bushes and scattered acacia trees.

The northern rim of Merti Wereda is constituted by the broad Awash river valley which drops to an altitude of less than 1,000 m in its most northernly part.

The variety of topographic features strongly influences the natural vegetation and the agricultural conditions of the whole area. This varies from humid highland climate in the south-west, with large area covered by dense forests, to desert areas along the Awash river, only cultivable by irrigation. From an agricultural point of view, the area around Abomsa occasionally suffers from shortage of rain, in spite of its relative favourable conditions compared to the northern parts of the Wereda.

The climatic characteristics of the Abomsa area are given in the following table.

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Table 1. Temperature and rainfall at Abomsa meteorological station (1981 - 1983)

Month	Temperature (°C)						Rainfall (mm)		
	Maximum			Minimum					
	1981	1982	1983	1981	1982	1983	1981	1982	1983
January	-	29.4	31.6	-	11.3	17.1	63.4	50.6	27.9
February	-	28.3	29.8	-	11.7	15.8	0.0	150.9	102.4
March	-	29.0	31.8	-	15.5	16.3	191.6	10.0	140.6
April	-	29.2	31.6	-	15.7	16.8	73.4	51.0	85.7
May	-	29.4	31.2	-	17.0	17.1	0.0	64.2	145.6
June	31.8	32.1	30.7	12.6	17.0	16.8	25.6	8.6	0.0
July	29.6	32.0	31.5	12.2	17.2	16.2	185.0	128.6	157.0
August	31.2	31.0	30.3	11.0	17.6	16.0	98.1	79.3	80.7
September	30.6	31.0	31.4	11.2	17.0	16.8	157.5	67.8	30.6
October	-	31.0	31.1	12.8	16.8	16.4	39.4	169.9	0.0
November	29.7	31.1	31.7	12.2	16.1	17.0	[illegible]	5[illegible].0	0.0
December	-	31.1	31.0	-	16.8	16.8	0.0	14.0	0.0
Annual mean	-	30.3	31.1	-	15.8	16.6	834.0	846.9	770.5

Source: Project proposal to improve life of women in Abomsa town, Arsi. ARDU, April 1984.

As in many areas with relatively small amounts of rainfall, the variations between differnt months are very great. However, the general pattern shows the highest precipitation during the big rainy season (keremt) from July to September, and during the small rains (belg) from February to April. In fact, more than 80% of the precipitation is received in Abomsa during these two wet seasons, fairly evenly distributed between the two.

To estimate the availability of water for rain-fed agricultural production, the Land Use Planning Project (FAO, Rome 1984) has defined

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zones characterized by the differnt durations of the crop-growing period, using a large number of climatic parameters.

The growing period is defined as the part of the year during which the temperature and the moisture supply from precipitation and soil water storage are adequate for crop growth. According to these estimates the area around Abomsa has a length of growing period of some 240 days. Towards the drier areas in the north-east, it gradually decreases to less than 120 days. On the other hand, the growing period increases towards the south, where the central highland areas of Arba Gugu obtain more than 330 days. The Abomsa area falls between the two extremes.

There is a general understanding among the prople interviewed in Abomsa that shortage of rain is the main environmental problem in the area. In fact, in 1985, more than 1,900 people, ie.e about 25% of the total population of Abomsa, were affected by drought problems. Around 670 were children below 15 years of age. During the drought period 111 quintals of grain were distributed to 362 heads of household (Information from Town Administration). This further underlines the area's exposed location to unfavourable fluctuations of climatic conditions.

2.4 The economic potential of the area

The relative location of Abomsa, i.e. its position in relation to natural resources, other producing areas, markets and communication routes is favourable. As has already been noted, the agricultural potential of its hinterland is very high. In addition, there are large forest reserves available in the adjacent highlands. Urban areas like Nazareth and Addis Abeba offer good market outlets, not too distant from Abomsa. In this respect the town could develop its function substantially as a mediator of trade between northern Arsi and the central urban regions of Ethiopia.

There are, however, some severe constraints, especially the extremely poor road communications and the almost non-existing electricity supply. Undoubtedly, the largest negative factor in the further social and economic development of the Abomsa region at the present time is the

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absence of good road connections with the immediate hinterland and also with other regions. At present the town has only poor gravel road connections with Nazareth and Metahara (on the main road between Addis Ababa and Awash), and with Sodere (on the Nazaret-Asella road).

The links with the potentially rich interior of Arba Gugu are still more rudimentary. There, the rough topographic features are an additional problem, which will make improvement and extension of the road system in this direction very costly. Nevertheless, that is necessary for the progressive development of the whole of northern Arsi. Even Abomsa's function as the Awraja capital of Arba Gugu demands improved communications with all the other five Weredas in the Awraja.

The other severe constraint for a progressive socio-economic development in Abomsa is the extremely poor electricity supply. Only 250-300 houses are connected to the electric generator powered by a diesel engine transferred from the former water project pump. The electricity generated is very weak (only up to 25 watts), and the generator works only four hours a day, evenings between 18.00 - 22.00 hours), especially for night school classes and television purposes.

A sum of 450,000 Birr has already been collected from the Awraja population for the installation of a new power system in the town. However, the cost of connection from Abomsa to the Metahara electrical line, which seems to be the best solution to the problem, has been estimated to involve an expenditure of nearly 1.5 million Birr. Nevertheless, the need for supplying the town with an efficient electric system is very urgent. Lack of electricity is not only a problem of light for the town-dwellers; more important, from an economic point of view, is the restriction it implies for the founding of small-scale industries, such as flour mills, oil mills, saw mills, metal works and manufacturing industries - not to speak of its importance for all service activities.

Progress in socio-economic matters is sometimes described in two different terms, i.e. development and growth (Mabogunje 1980, p.67).

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It defines development in this connection as restricted to changes which involve "an intense concentration of activities requiring a high degree of synchronization and sequential ordering over a short period of time, during which the whole social fabric of an area is transformed and its spatial structure reorganized. This allowes the populace to operate and function at a higher level of efficiency in the production, distribution and consumption of both material and non-material goods. Growth, on the other hand, is a process involving different rates of incremental change, during which the possibilities of a given organization are fully exploited." Thus, it is obvious that within a given social structure any organization has the capacity for growth only up to a certain point. "To go beyond this point involves a concern with the development of the organization. This entails structural tranformation to make the system better able to respond to the new demand for a high level of efficiency and equity" (ibid).

Applied to the Abomsa case, an extension and radical improvement of the road system and a new electricity supply would mean a real development process with far-reaching consequences for every aspect of socio-economic conditions. However, it is still obvious that, within its existing structure, incremental, (step-by-step), reforms could bring results on a more modest scale. The subsequent discussion of the socio-economic situation in Abomsa will be more related to outlining prerequisites for progress in the latter sense.

3. THE POPULATION

Socio-economic progress is essentially a human issue and a concern with the capacity of individuals and institutions to realize their inherent potential and ability to cope with the changing circumstance of life and community. In a physical sense, the number of inhabitants (target population), its demographic characteristics, structure and individual/social behaviour are fundamental aspects of all socio-economic studies.

3.1 Population size and its changes

The National Census of 1984 reports a population of 7,489 in-

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habitants in Abomsa town. The same Census gives Merti Woreda 54,084 inhabitants (Census Preliminary Report 1984, Vol. 1, p.32). Since Abomsa is the only town in Merti woreda, the urban population of the Woreda is around 7 percent, which is very near the regional figures for Arsi and for Bale (8%), but somewhat lower than the national average (11%).

Before the National Census, population figures for towns above 2,000 people were published in Statistical Abstracts (CSO, Addis Abeba). Some of these figures are presented in a semi-logarithmic diagram below (Figure 3).[1] As indicated by the graph, population growth during the last 20 years seems to have been very steady, with a growth rate of about 6% yearly. If these figures were correct, and if the same trend continued up to the National Census 1984, then the number of inhabitants in Abomsa should have been more than 12,000 at that time. The gap between the actual population and the projected figure (4,500 or 60%) is very significant and would seem to indicate that Abomsa town did not grow at the rate which might have been expected. The reasons for this could be interesting if investigated, and may include factors other than the unreliability of previous estimates.

However, the Abomsa master plan report of 1968, reported (p.3) that the population estimates for Abomsa in 1966 were based on a 10% population count, compiled by the technicians of the Central Statistical Office, while making a sample survey in Arsi region. This account gives a population size of around 3,800 in 1966.

According to information supplied by the Municipality, the population in 1966 as estimated by the Ministry of Interior was 4,470. Therefore, as an index number for a forecast of the demographic development up to 1987, a figure in between, i.e. 4,000 inhabitants for the year 1967, was used in the master plan. In addition, the prognosis was based on a yearly growth rate of 3%.

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1) A semi-logarithmic scale has the characteristics that the inclination of the curve is directly related to the relative (percentage) change of the variable recorded.

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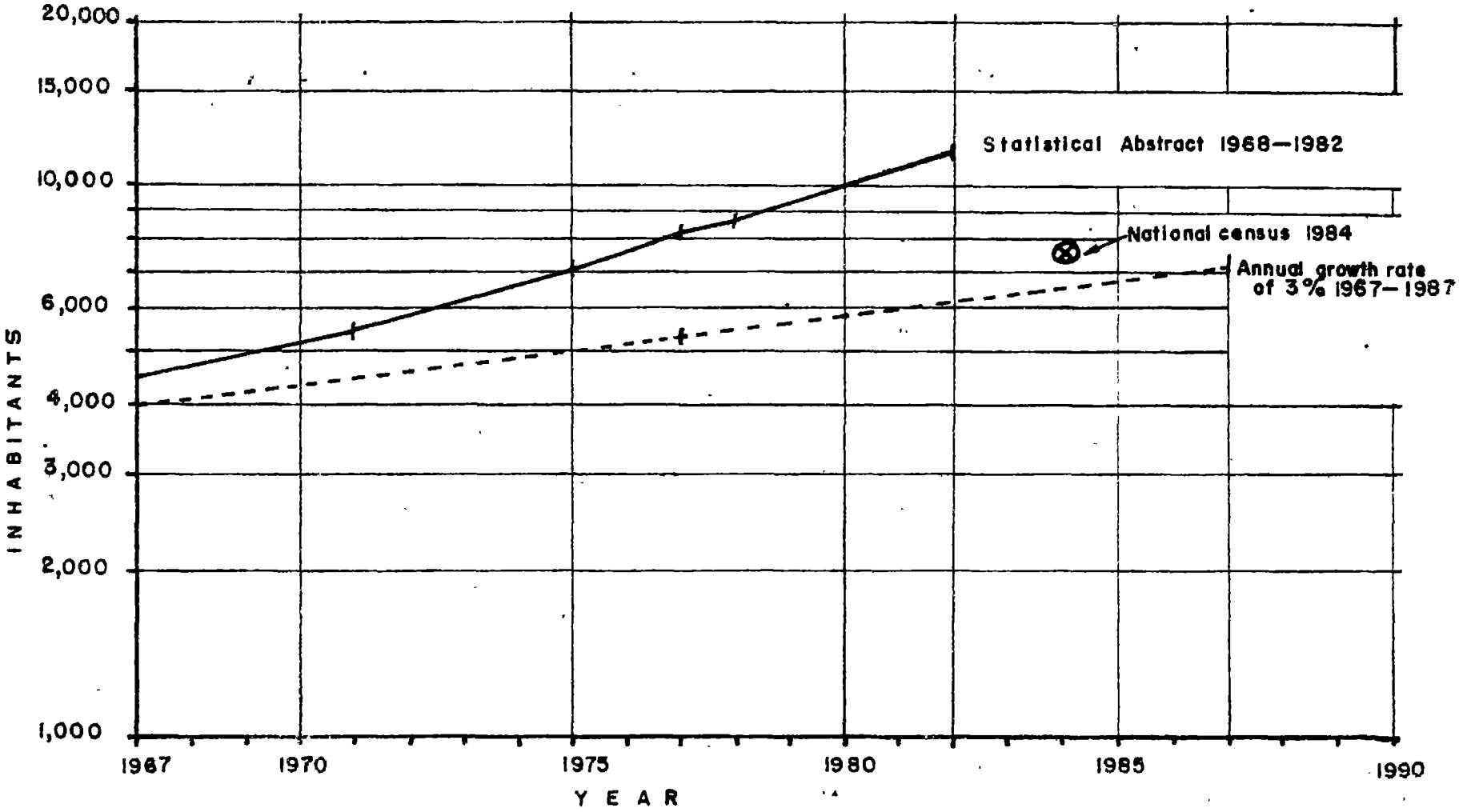

Figure 3. Population changes of Abomsa town between 1967 and 1984, according to different sources

Sources: Ethiopia, Statistical Abstracts 1971, 1975, 1977, 1978 and 1982, Central Statistical Office, Addis Abeba;
National Census 1984, Census Preliminary Report 1984, Vol. 1.

As is evidenced by the graph (Figure 3), the growth assumption was quite correct up to 1984, and would have appeared as the Census figure of that year if the population size given by the Ministry of Interior (around 4,500) had been chosen as the starting point in 1967. Needless to say, this yearly growth trend does not account at all for yearly fluctuations between the first and last years quoted.

On the other hand, the officially published numbers based upon a growth rate of about 6% a year was almost twice as high as the actual values. A continued 3% growth rate will give a population of about 12,000 people in the year 2000. It is probable, however, that the improved health situation foreseen in the future, together with a continued in-migration, may give a higher growth rate than 3%. Even the fact that the parent generation within the next 10 years will considerably increase in size (Figure 4) indicates that a yearly growth of about 4% is probably more realistic. It will give a population size of around 14,000 in the year 2000.

Since the limits of the town has been the same right from the foundation, the settlement density per area unit has increased all the time. Twenty years ago it was around 4,000 people per km^2 in the town. At present the population density is 7,500. If the projected population growth up to the year 2000 occurs the density will nearly double by the turn of the century. It will lead to a considerable concentration of the settlement density, which will probably radically decrease the size of the original spacious compounds and garden areas.

3.2 The demographic characteristics

At each moment in the stock of population displays its historical experiences as well as containing the embryo for its future demographic development. In addition, external events, particularly migration exchange, directly influence the population characteristics. Indirectly, social and economic factors are the main determinants of the changing demographic characteristics. Thus, in different ways the population structure of Abomsa reflects its historical evolution.

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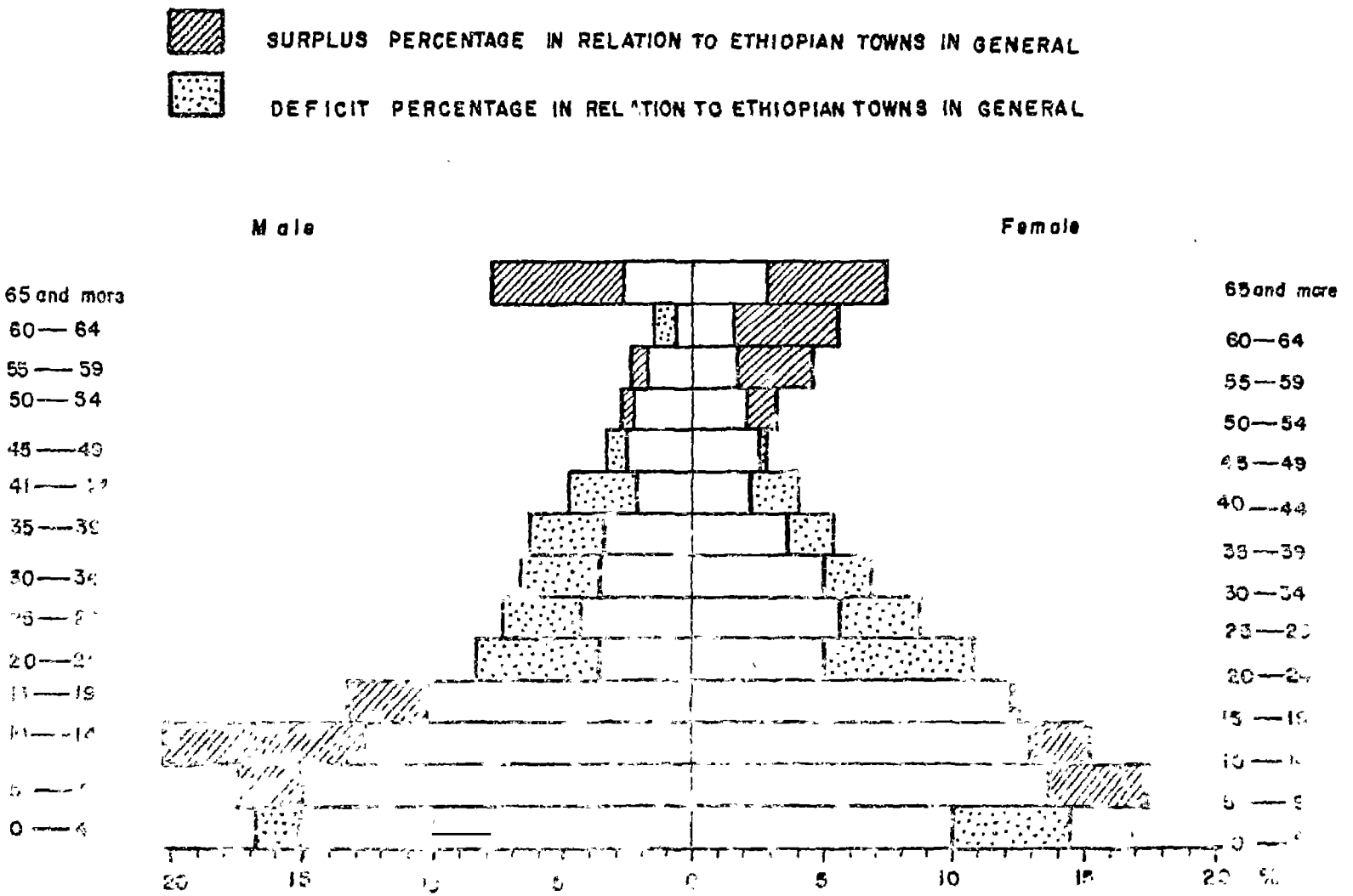

Figure 4. Population pyramid of Abomsa town in 1968

Source: Questionnaires of Abomsa socio-economic study
Lists of Urban Dwellers' Association members

When compared with towns in general the specific characteristics of the town population stand out very clearly in its age pyramid, (Figure 4). The Abomsa material is taken from the questionnaires, where all family members interviewed were registered, and from kebele lists. The latter were used to check the interview material. In some cases (7% of all interviewed households), other families were living in the sampled houses, probably showing a time-lag in the kebele lists. Apparently, the differences between the questionnaires and the kebele lists reflect an on-going migration of people. In order to broaden the base material for the age pyramid as much as possible, even the former residents of the houses were included. Thus, the total material contains information from 960 people, or from around 13% of the total population in the town.

To facilitate the comparison between the age structure of Abomsa and other towns, surplus and deficit percentages for different age-groups have been specially marked on the graph (Figure 4). As seen from the diagram, the age-group above 65 years, among men as well as women, stands out as the most striking anomaly with more than twice as many old people in Abomsa as in other towns. This reflects the unique settlement history of Abomsa, when a large number of pioneers of the same generation simultaneously settled in Abomsa. As previously described, many of them are still alive and residing in the town (2.2). In fact, around 8% of the total population of Abomsa is constituted by people above the age of 65 years, according to this material.

The comparatively large age-groups of women above 50 years of age can probably be explained by the fact that most of the veteran soldiers married, often with considerably younger women. Many of the wives have survived their husbands.

A still more serious difference between Abomsa and other towns is the large deficit in the most active people found in the age-groups between 20 and 50 years. Compared to other towns, there are 17% fewer men in Abomsa and 15% fewer women in this age range. Expressed in the number of people, it implies, statistically, a deficit of 640 men and 560 women, or together, around 1,200 people in their most active age, as compared to the situation in an average Ethiopian town.

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What is the reason behind this abnormal situation? Theoretically, there may be three main explanations. One might be that many of the veteran families had passed their child productive age when they arrived at Abomsa, or that conditions there caused unusual high death-rates among children. The other explanation might be that there has been a constant out-migration of people of working age from Abomsa, for a long time. Perhaps all reasons must be considered in explaining the existing situation.

The age pyramid gives the relative sizes (percentages) of each age-group. This means that the deficit groups are balanced by surplus groups. With the exception of the surplus of old people, the population of Abomsa is characterized by very large groups between 4 and 19 years old, i.e. school-age people. As will be discussed later on (5), one of Abomsa's major service functions for the surrounding areas is its educational facilities (secondary and high school). Apparently, a large number of students from outside the town have been registered as family members in the town , both during the interviews and in the kebele lists.

This assumption is supported by the fact that the largest surplus groups are found among the male popluation, from which, traditionally, the highest proportion of secondary and especially high school students are recruited. The problem will be further touched upon when Abomsa's role as an educational centre is discussed (5.).

Concerning the relatively small group of children below 5 years of age, the best explanation at hand seems to be the very small parent generation. It is not likely that such an unbalanced population structure as Aboms's should give birth figures comparable to a situation which has well-balanced relations between the different age groups.

Thanks to the master plan report (1968), it is possible to compare some of the main characteristics of the population structure from 1967 with the situation today (1986). Since the population prognosis from 1967 and twenty years ahead also projected the age structure for 1987 the master plan's estimate for future decades can be related to the actual values. In the following table the absolute and relative (%) figures from these three sources are presented:

Table 2. Comparison between different age groups registered in 1967 and 1986 and a population projection for 1987.

Age group	Total			Percentage		
	1967	(1987)	1986	1967	(1987)	1986
00 - 04	660	(1,119)	940	16.5	(15.5)	12.6
05 - 14	1,052	(1,790)	2,650	26.3	(24.8)	25.3
15 - 54	2,044	(3,798)	2,440	51.1	(52.6)	32.5
55+	244	(513)	1,470	6.1	(7.1)	19.6
Total	4,000	(7,220)	7,500	100.0	(100.0)	100.0

Source: Questionnaires from Abomsa socio-economic study, 1986; Abomsa master plan report, Ministry of Interior, Addis Ababa, 19[illegible] (Population projection for 1987 in the Abomsa master plan report, 19[illegible])

The comparison between the population age structure 1967,(1987) and 1986 gives a concrete illustration of the extremely unfavourable size relations between the different age-groups of Abomsa today. It also illustrates the big difficulties of projecting future population changes without detailed knowledge of rates of fertility, mortality and mobility for each cohort (age-group). In this case, it seems probable that the older groups of the working ages (15-54 years) have been greatly underestimated, or that the death-rates for the same groups were greatly overestimated. Otherwise the serious underestimation of the old-age group is difficult to explain. Another suggestion might be that a simple projection of the existing age distribution was made, with only slight trend modifications.

3.3 The social profile

The first settlers came mainly from Shewa and to a lesser degree from the northern and western regions. They were almost all Orthodox Christians, and most of them spoke Amharic as their mother tongue (2.2). As will be clear, the later immigration did not change these conditions

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to any large extent.

3.3.1 The migration pattern

According to the interviews, around 75% of the heads of household and their partners (together 322 persons) in-migrated to Abomsa after the foundation of the town (1955). Of these, around 40% moved in during the period 1955 - 69 and about the same percentage during 1965-1974, while only 20% were newcomers during the first decade (Figure 5). If the higher death-rate for the older migration is considered, it seems to have been a rather steady in-migration of around 3% a year. At the same time, at least 2% moved out every year giving the reason, why the net migration result may have been restricted to the magnitude of 1%

In contrast to the veteran group, where the majority moved in from Shewa, the later migrants have mainly come from Abomsa's own region Arsi, (44%). However, as many as one-third of the new comers arrived from Shewa. These two regions accounted together for 55% of all later migrants to Abomsa. (Fig. 6)

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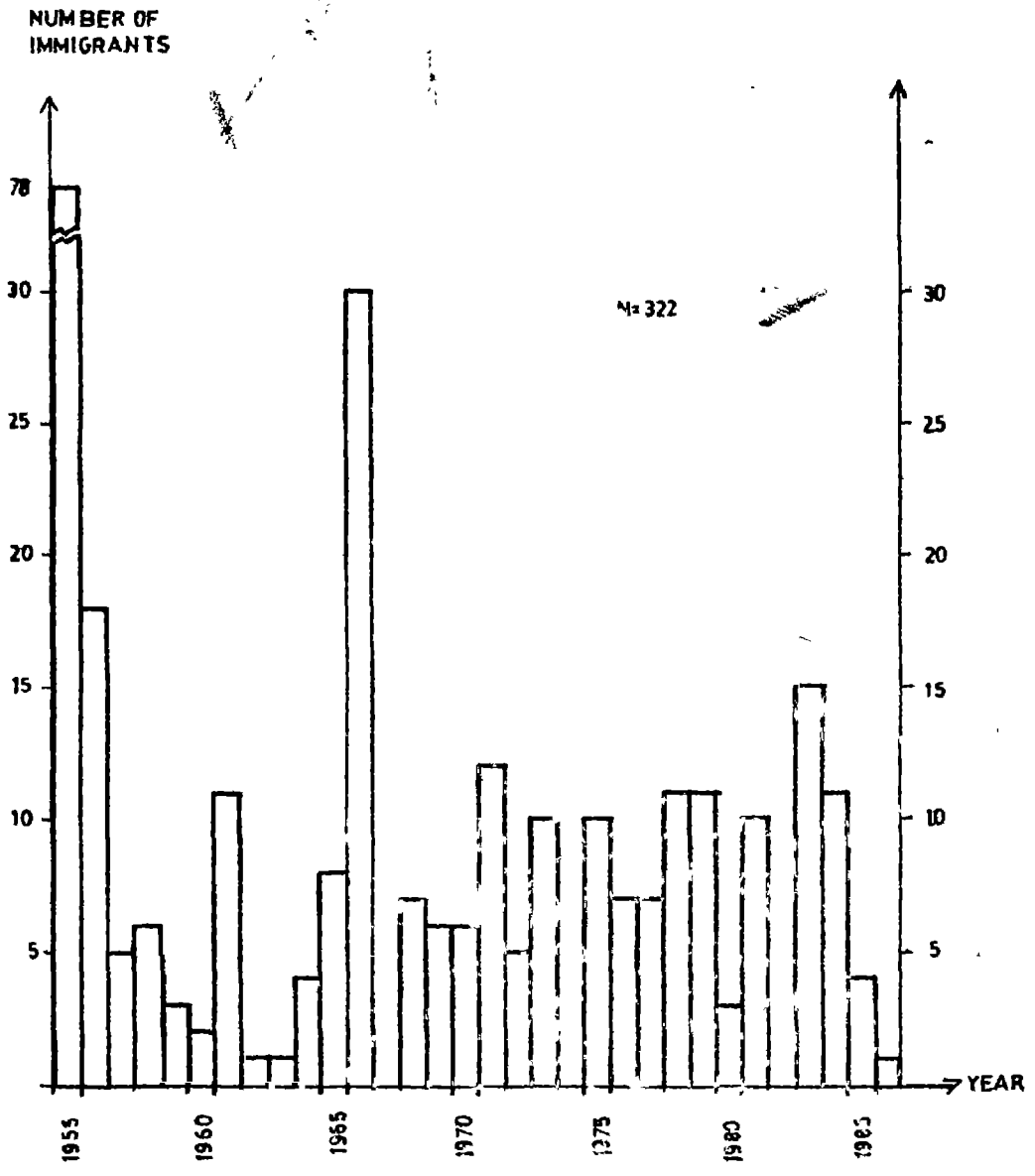
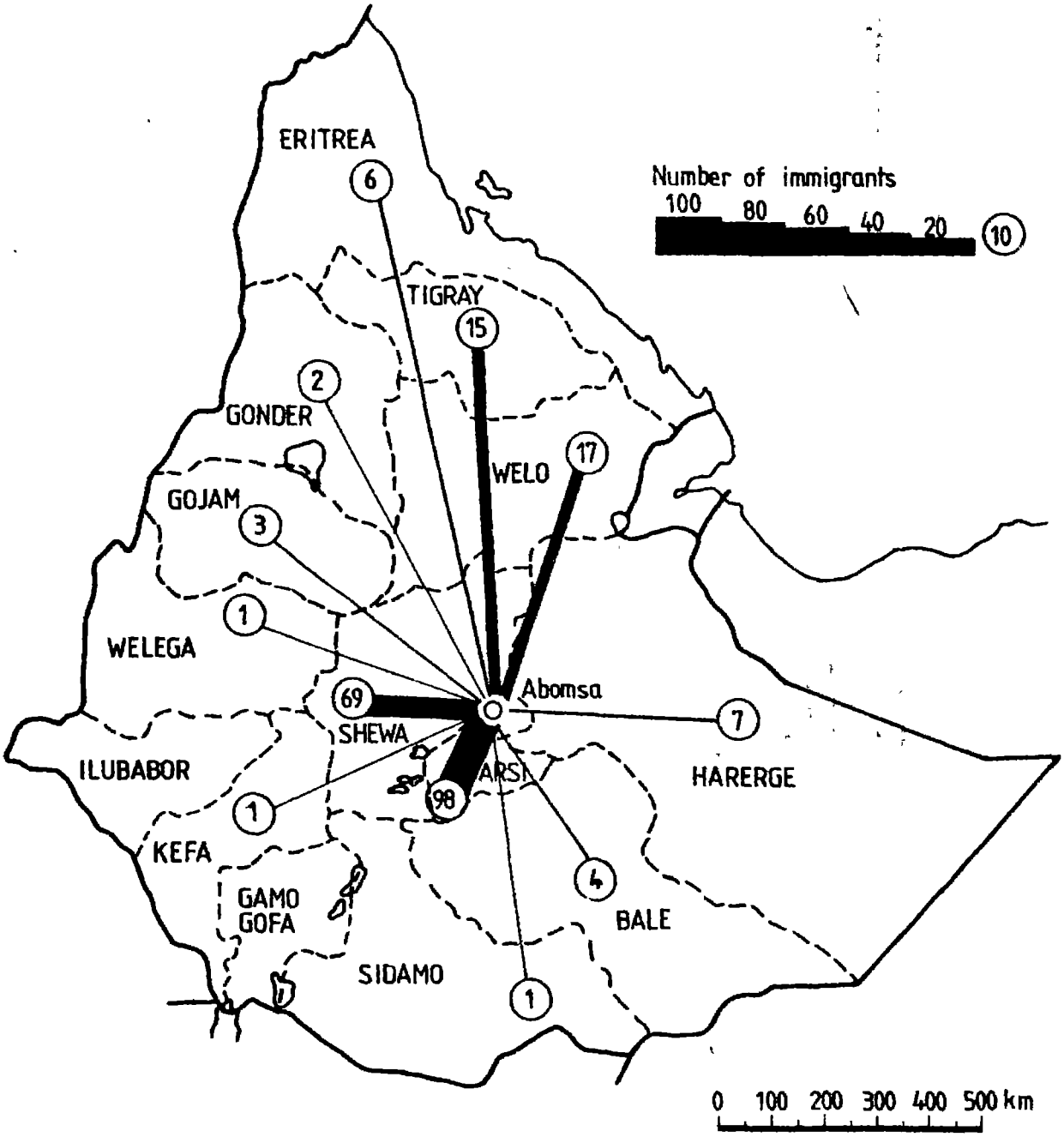


Figure 5. Year of immigration of heads of household and their partners

Regional origin of immigrants to Abomsa up to 1986



Source: Questionnaires of Abomsa socio-economic study, 1986

Figure 6. Regional origin of immigrants to Abomsa up to 1986

The newcomers moved in from more than 150 different places in the 12 regions. The most frequent places are the following table:

Table 3. Most frequent places of origin for in-migrants to Abomsa, 1956 - 1986.

Place (Most frequent location)	Region	Number of immigrants	Percentage of 150 locations
Addis Abeba	Shewa	25	11
Asella	Arsi	9	4
Arboye	Arsi	6	3
Mekele	Tigray	6	3
Aseko	Arsi	5	2
Chole	Arsi	5	2
Gololcha woreda	Arsi	5	2
Deju	Arsi	5	2
Lallo Medir	Shewa	5	2

Source: Questionnaires of Abomsa socio-economic study, 1986.

The table indicates that Abomsa is a receiver of migrants from administrative towns higher up in the urban hierarchy such as Addis Abeba and Asella. This is probably a result of Abomsa's function as an awraja capital, with links to central governmental organs as well as to other administrative units within the awraja. Another striking trend is the in-migration of people from the surrounding smaller towns within the awraja. It is a common type of step-by-step movements upwards in the urban hierarchy, typical for the migration patterns in developing as well as developed countries.

3.3.2 The ethnic composition

In spite of their very scattered places of origin, the ethnic composition in the town has remained surprisingly stable all the time. This conclusion is possible to draw from comparisons between the size of language groups in 1966 and 1986 (table 4):

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Table 4. Distribution of the Abomsa inhabitants according to languages spoken in 1966 and 1986

Mother tongue	Percentage speaking	
	1966	1986
Amarigna	75.9	76.8
Oromigna	17.3	12.5
Tigrigna	4.2	8.0
Guragigna	not known	2.7

Source: Abomsa master plan report, 1967;
Questionnaires of Abomsa socio-economic study, 1986

It is evident from these figures that Abomsa still is a mainly Amarigna-speaking town, existing in a predominantly Oromigna-speaking countryside (Report on the Results of the 1981 Demographic Survey. Statistical Bulletin 46, CSO, 1985).

Nearly half the interviewees stated that Oromigna was their Second language (Table 5). Around two-thirds of the sample population claimed a second language.

Table 5. Distribution of the population after the second language spoken

Second language	Percentage spoken
Oromigna	49.3
Amharigna	31.5
English	11.0
Guragigna	2.7
Tigrigna	2.1
Arabic	2.0
Italian	1.4
Total	100.0

Source: Questionnaires of the Abomsa socio-economic study, 1986

3.3.3 Religion

In the whole of Arsi region, the majority of the people are adherents of the Islamic faith (61%), while Christian groups constitute 39% (CSO, Statistical Bulletin 46, 1985). In contrast to the general regional trend, the Christian religion has prevailed almost universally in Abomsa for a long time. The first settlers were probably exclusively Christian, and only a few of the in-migrants have been Moslems. The relation between the two religious groups were about the same in 1966 as in 1986, (Table 6):

Table 6. Distribution of the population according to religion in 1966 and 1986

Religion	Percentage followers	
	1966	1986
Christian	95.5	94.6
Moslem	4.5	5.4
Total	100.0	100.0

Source: Abomsa master plan report, 1967
Questionaires of the Abomsa socio-economic study, 1986

A Christian church (Medhani Alem) was built just outside the built-up area in the south-eastern part of the town (Figure 2.) during the first years after the settlement was founded. Before the establishment of kindergarten and other schools in Abomsa, a large number of young students were given religious education by church priests. These activities are now decreasing, and are restricted to pre-school education for a few students 2-12 months before they start their formal education. Six priests and four deacons are at present working in the church.

A mosque has been built recently near the market-place (Figure2). Ten persons give regular services at the mosque. Religious education in the moslem faith is offered in a school five days a week; every student is expected to attend two lessons a day.

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3.3.4 Respondents educational level

There is clear evidence that Ethiopia today is placing great emphasis on mass education. Priority is given to the expansion of non-formal adult education as well as primary schooling. The original aim was to achieve universal literacy by the year of 1987. Naturally, this is a formidable goal not possible to attain, especially in a town like Abomsa with an unusually high percentage of older people. Still, the prerequisites are much more favourable in urban areas than in the countryside.

The educational level of the respondents was asked for in a very simple way. Without any given definition, they had to state whether they were illiterate or literate, or had reached specified higher educational levels. The results are presented in the following table:

Table 7. The respondents' educational level

Level of education	Percentage
Illiterate	41.9
Literate	23.4
Primary level (grades 1-6)	17.5
Secondary level (grade 7-12)	14.4
Junior collage	1.4
Graduate	1.4
Post-graduate	-
Total	100.0

Source: Questionnaires of Abomsa socio-economic study, 1986

Not considering the possible differences in the definition of illiterate, the situation in Abomsa is much more favourable than in Arsi in general. There, among people ten years old and above, 72.4% were stated to be illiterate in 1981-1982 (Statistical Bulletin 46, CSO, 1985). Among females, the illiteracy rate was as high as 85.5% in contrast to that of males with 59.4%. According to the Abomsa study in 1966, the

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illiteracy rate then was 41.9%. A considerable improvement has occurred during the last twenty years but there is a long way to go before illiteracy is eradicated in Abomsa.

As the CSC figures from Arsi indicate, there are big differences in the literacy rate and educational level between males and females. In fact, the differences are even greater in Abomsa than in the region as a whole. As shown in table 9, more than twice as many females as males are illiterate. The figures for literates are rather even, probably as a result of the on-going literacy campaigns, where women more frequently participate than men.

When it comes to primary and especially secondary education many more males than females have reached these levels. Not one woman resident has attended junior college or graduated at university level.[1] These question are discussed in more detail in section 5.

Table 8. Educational differences between males and females

Level of education	Percentage	
	Males	Females
Illiterate	27.4	58.1
Literate	24.8	21.9
Primary level (grades 1-6)	21.4	13.3
Sec.level (grades 7-12)	21.4	6.7
Junior college	2.5	-
Graduate	2.5	-
Post-graduate	-	-
Total	100.0	100.0

Source: Questionnaires of Abomsa socio-economic study, 1986

1) This may be due to an out-migration of girls who reach Secondary School level and /or an in-migration of males (civil servants etc) in the secondary school qualifications.

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To understand the possible nature of restrictions on a more popular participation in the education programme, questions were asked about the respondents' reasons for their own failure to attend school or for dropping out. A majority of the respondents pointed to their high ages. In addition to presenting a genuine cause for not attending the school earlier, it illustrates the fact that many heads of household are now fairly old, (on average 50 years). Around 25% gave sickness and 10% poor sight as reasons for their failure to continue school education. Only a few respondents mentioned economic problems, work load at home, or shortage of time.

3.3.5 Family composition and marital status

The average size of households in Abomsa is 4.3, according to the questionnaires. Behind this artificial statistical figure, there are many different family compositions. Only 40% of the families are constituted by husband, wife and child(ren) (table 9). Married couples without children, but living together with relatives or other family members make up 6% of the households. Thus, a minority(46%) of the households are composed of both husband and wife, as compared to nearly 85% in all rural Ethiopia (Rural Labour Force Survey, 1985).

A great number of women live alone with their child or children (31%) or with other family mambers(7%). This shows that nearly as many women are living with child(ren) outside marriage as within marriage (38% and 40% respectively). On the other hand, it is only seldom that a man lives with his child(ren) alone (2%) or with other family member (2%). Around one-eighth of the households have only one family member, in 8% of the cases a woman, and in 4% a man.

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Table 9. Different categories of household compositions

Household category	Number	Percentage
Husband+ wife		
+ child(ren)	89	40
+ other family member	14	6
Sub - total	103	46
Woman		
+ child(ren)	70	31
+ other family member	15	7
Sub - total	85	38
Man		
+ child(ren)	5	2
+ other family member	5	2
Sub - total	10	4
Woman only	18	8
Man only	8	4
Sub - total	26	12
Grand total	224	100

Source: Questionnaires of Abomsa socio-economic study, 1986

Thus, in spite of the fact that almost 90% of the respondents stated that they had entered into marriage, only 46% are now living as a couple. The figure is extremely low in relation to common practice in Arsi, where around 84% of all heads of household were married in 1981-1982 (Report on the Results of the 1981 Demographic Survey, CSO, 1985). The main reason behind the divergent situation in Abomsa is evidently the very high age of a large number of household heads. In fact, around one-third of the marriages were broken because of one

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partner's death, in most cases the husband's. This is the main explanation for the high frequencies of families where women are living alone with their child(ren) or another family member. In 13% of the marriages contracted the wives and husbands have separated, and 10% are formally divorced.

Traditionally, marriage in Ethiopia was established as a contract entered into by the parents of the prospective bride and bridegroom (Ullendorff 1973, p.172 f). This is also the case in Abomsa, where, according to the interviews, 69% of the marriages were arranged by the parents, and only 31% by personal decision of the couple.

4. THE ECONOMIC ACTIVITIES

4.1 The Ethiopian case

One of the striking features about the Abomsa age-structure is the large proportion of young and very old people. Not more than around 30% are in the working age-groups between 20-59 years old. If we extend the active groups to include people between 15-19 years, the proportion is around 42%.

In a strict economic sense, these are the economically active people occupied in the production of goods (primary and secondary products) and services (tertiary products). Ideally, they would be employed by enterprises with fixed conditions of employment and job security, including government, manufacturing and service.

However, in many developing countries like Ethiopia, even peple outside these groups are engaged in various activities, which make some contribution to living. This so-called informal sector consists of small-scale and labour-intensive activities with job insecurity, different types of occupation and low wages.

"No comprehensive study regarding the informal sector in Ethiopia has ever been undertaken. But judging by the findings from research conducted in several African countries, 50 to 80 percent of the labour force in most towns are engaged in informal sector activities" (Alula

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Abate 1985, pp. 258-9). The size of the informal sector is a clear indication that urban growth has not been matched by sufficient economic development and industrialization.

Service activities in general are included in the informal sector, and the service sector is very large in Ethiopian towns. The other main economic activities, agriculture and industry, are of minor importance. However, the balance between the various sectors seems to be related to the size of the town. In towns with a population of up to 10,000 people, more than 30% of the economically active persons are engaged in agriculture. With increasing population, the proportion of those engaged in services rises to a little over 50% in the size-class 20,000-100,000. For the two major cities, Asmara and Addis Ababa, the latter figure reaches the astonishing size of 73% and 79% (Alula Abate 1985, p.257).

In the following discussion economic life in Abomsa is compared with the empirical findings from other towns in Ethiopia, published by Alula Abate in his already-quoted study "Urbanization and Regional Development in Ethiopia" (1985).

4.2 Occupational structure

The classification of occupational activities is by no means clear. In the following table (10), economically non-active persons have been excluded. They constitute around 16% of all heads of household, mainly retired soldiers (13.5%). The activities have been classified in five groups, farmers, traders, civil servants, artisans, and a remaining group of various occupations such as daily labourers, hotel owners, prostitutes, students, etc.

For a comparision with the situation even twenty years ago, figures are presented from the Abomsa master plan report (1967). The classification then was different from the one used now, but to a sufficient extent it is possible to re-classify as follows: Farmers, farm-workers and grazers are entered under "Farmers" and sales workers under "Traders". Administrative, executive and managerial workers

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together with professional, technical and related workers come under "Civil servants", and, lastly, craftsmen, production process workers and labourers come under "Artisans". Protective service is placed under "Others" in the present study.

Table 10. Distribution economically active heads of household by main economic activity in 1966 and 1986

	Percentage	
Occupation	1966	1986
Farmers	51.8	16.0
Traders	24.5	34.5
Civil servants	3.6	23.8
Artisans	15.5	8.2
Others	4.6	17.7
Total	100.0	100.0

Source: Abomsa master plan report, 1967
Questionnaires from Abomsa socio-economic study, 1986

The most striking difference between 1966 and 1986 is the decline of the proportion of farmers from more than half of the economically active household heads to less than one-fifth in 1986. In fact, even compared to other towns in Ethiopia of similar population size, this is an unusually low figure (Alula Abate, 1985, table 9, p. 258). On the other hand, it is possible that the cultivated area and the number of cattle per farmer are larger in Abomsa than for towns in general in Ethiopia, since no information of the productive base among the Abomsa farmers is available; possibly, the agricultural background of Abomsa town lies in that direction. In addition, agricultural activities are also practised by other occupational groups (4.2.1).

Another striking feature is the growth of civil servants up to around a quarter of all economically active household heads. Apparently this is a result of Abomsa's increasing importance as an administrative centre (Awraja capital) and Awraja centre for higher education(5). Even

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the share of traders has increased substantially, according to the tabled figures, indicating a growing significance of Abomsa as a trading centre.

The decrease in the proportion of artisans seems to be more a result of the growth of other sectors than an absolute decline of handicraft workers. As before, most artisans are weavers and tailors.

The most conspicuous aspect of Abomsa's set-up of economic activities is its absolute lack of industrial units. The only secondary production is carried out by a Tailor's Cooperative and there are eleven flour mills, one of which is controlled by the kebele. The others are owned by private persons. Six grain mills were already in operation in 1966.

There are, altogether, five Tailor's Cooperatives in the whole Awraja (Arba Gugu). Four of those are organized as Service Cooperatives, and the one in Abomsa as a Producer's Cooperative. The latter is the largest, having 44 members and a capital stock of nearly 125, 000 Birr. The Service Cooperatives are located in the surrounding woreda capitals. of Arboye (in Joju Woreda), Chole (Chole), Guna (Guna), and Asoko (Asoko). They have financial as well as material and management problems. Audit, marketing, management and technical services are offered by the HASIDA[1] Regional Office in Asella.

One of the main reasons for the total absence of industrial operations is the electricity shortage, which was touched upon earlier (2.4). Contributing factors are evidently the lack of manufacturing tradition and enterprenourial experience among people in the area, as well as lack of capital.

In the absence of industry, the occupational structure of Abomsa reflects an urban economy totally dominated by petty trade, administrative functions and educational activities. According to the traditional production classification, the service sector accounts for more than 80% of actual employment. However, most of the service

1) Handicrafts and Small-Scale Industry Authority.

activities are of typical informal character, i.e. managed on a very small scale, and often on an ad hoc basis. As will be discussed later, the economic exchange is also insignificant (4.2.5).

Concerning the employment rate, it is possible that the situation today is not substantially better than it was twenty years ago. Then, it resulted in the following concluding characteristics of the situation in the town as formulated in the master plan report (19 7.; "Finally, considering that the economic structure of the city is rather elementary, that is, since the prevelant activities are agricultural and commercial and since it is difficult to distinguish the employed from the unemployed and underemployed in these areas due to the phenomenon of widespread latent unemployment in primitive economies, we can estimate that the number of full-time workers will not.... exceed 25% of the total population" [illegible]. This may still be the case.

4.2.1 Agricultural production in the town

Evidently, the percentage of active farmers recorded for the town does not tell the whole truth of the agricultural sector's contribution to the town economy. According to information from the Woreda Agricultural Office, the number of full-time farmers living in Abomsa is 192. These farmers have most of their land and some cattle outside the town.

However, in the future, agricultural activities will be reserved for village people living in the country side. According to information from the agricultural office, the Abomsa farmers have decided to leave their land and henceforth earn their living as town-dwellers.[1]

In addition to these "professional" farmers, other occupational groups own cattle and cultivate land inside town. On the basis of the questionnaires it is possible to estimate the cattle stock approximately as 300 oxen, 900 cows and 300 calves. They are herded in the town environs during the day time and kept inside the town at night. An even greater number of goats and sheep are kept. In 1966 there were 1,400 oxen, 1,300 cows and 800 sheep and goats in Abomsa. In this perspective, animal husbandry has not decreased as much as the decline in the number of farmers in town might indicate.

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In addition, many town households use their garden plots for agricultural production. Around 60% of the households possess their own houses with an average compound area larger than 500 m^2. Among these house-owners, about two-thirds cultivate garden plots of an average size of 430m^2. The total productive garden area in Abomsa reaches around 32 hectares. Maize is by far the most cultivated crop, as a monocrop (60%) as well as in combination with other grains, fruits or vegetables (16%). The dominance of maize production is clearly indicated by the following table 11.

Table 11. Cultivation of grains, fruits and vegetables among house-owners with gardens in Abomsa

Producation	Percentage of cultivators
Maize	60.4
Cabbage	4.9
Pepper	4.9
Cotton	4.9
Papaya	3.0
Onion	3.0
Wheat	2.0
Barley	1.0
Maize+ one or more of the above products	15.9
Total	100.0

Source: Questionnaires of the Abomsa socio-economic study, 1985

Although the area cultivated is not very large, gardening is of great importance for different occupational groups in Abomsa, particularly as a nutritionally valuable food contribution.

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1) The veteran soldiers who still want to keep their land are exempted from the obligation to move out to the country-side. Thus, they will continue to farm their land from their former residence in the town.

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4.2.2 The trading activities

According to the office of the Ministry of Domestic Trade in Asella, trade activities in Abomsa are very limited because no main road passes through the town, and because of the absence of industrial activities. However, the potential for increased trade between Abomsa's hinterland and the big market centres in Nazret and Addis Ababa seems to be very good. In this section, some information about the market organization and the production of the tributary area of Abomsa will be given to illustrate its future potential as a trading centre.

4.2.2.1 The marketing system

The Abomsa hinterland comprises an area of around 3,000 km^2, including most of Merti, Joju, Chole and Aseko Weredas. One of the Weredas of Arba Gugu, Gololcha, has its main oulet via Harerge region. The total population in this market area can be estimated at around 225,000 people, e.g. a population density of about 75 persons per square kilometer.

According to information on topographic maps and census maps, there are 22 market-places in the area. Thus, the average tributary population for each market-place is around 10,000 people. This is nearly twice as many people as in the densely settled area of sourthern Shewa, where comparable figures are available from Kembata and Hadiya Awraja (Alemayehu Lirenso, 1985, table 3, p.23). The low market activities in Arba Gugu compared to those in southern Shewa are underlined by the area distribution of market-centers, on average less than one market place per 100km^2, whereas southern Shewa has five. The spatial organization of the marketing system in Abomsa's hinterland is mapped in figure 7.

It is convinient to distinguish between market-places and market towns. All Woreda capitals are market towns, and act as centres for collection of agricultural products and distribution of industrially manufactured items even to the surrounding smaller market-places. In addition, the market towns have some permanent shops, and perform administrative and social services to the urban as well as to the rural population of the area. The smaller markets are generally held in the open air, as

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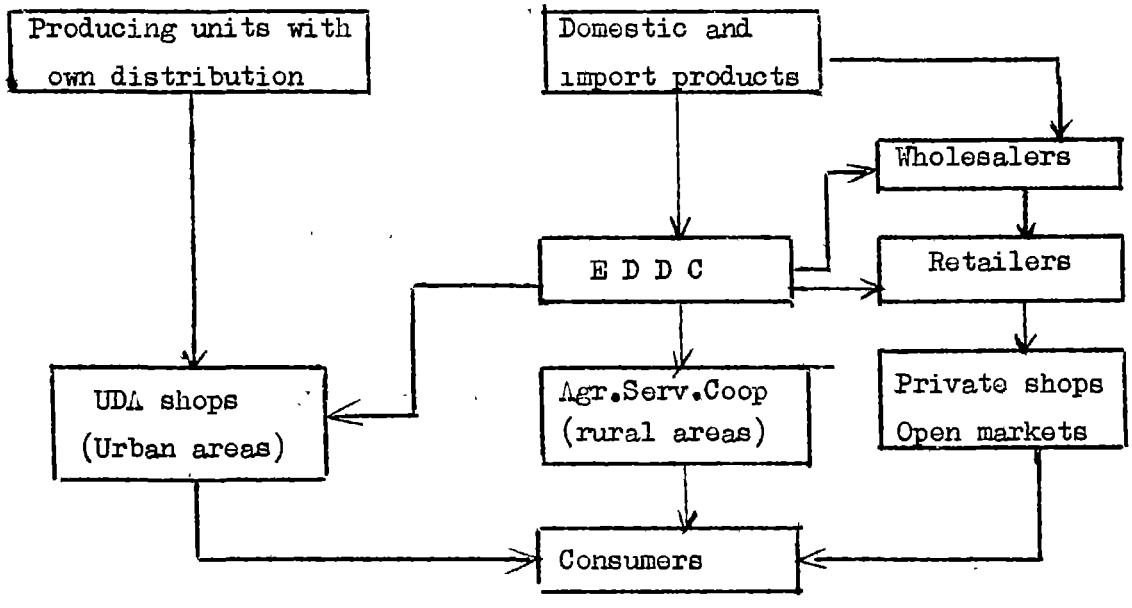
"open markets", without any permanent shelters or retail shops. They usually have one regular main market-day a week.

It is to be expected that the geographical location of Abomsa should give the town a special role as an intermediary trade link between its hinterland and the national market centre. However, probably even the other market towns (particularly Arboye) trade directly with governmental agencies and wholesalers in Nazret, without using Abomsa's more accessible location.

Apart from private wholesalers, there are two major trading corporations directly involved in the collection, distribution and marketing of agricultural and industrial products. These are the Agricultural Marketing Corporation (AMC) for agricultural products, and the Ethiopian Domestic Distribution Corporation (EDDC) for distribution of industrial goods. Their basic roles in the marketing system are shown in the following charts.

Distribution and marketing of industrial products (EDDC).



At present, there is no EDDC branch office in Abomsa; this fact underlines the town's relative un-importance as a trading centre for manufactured goods in the area. The nearest branch office is now located

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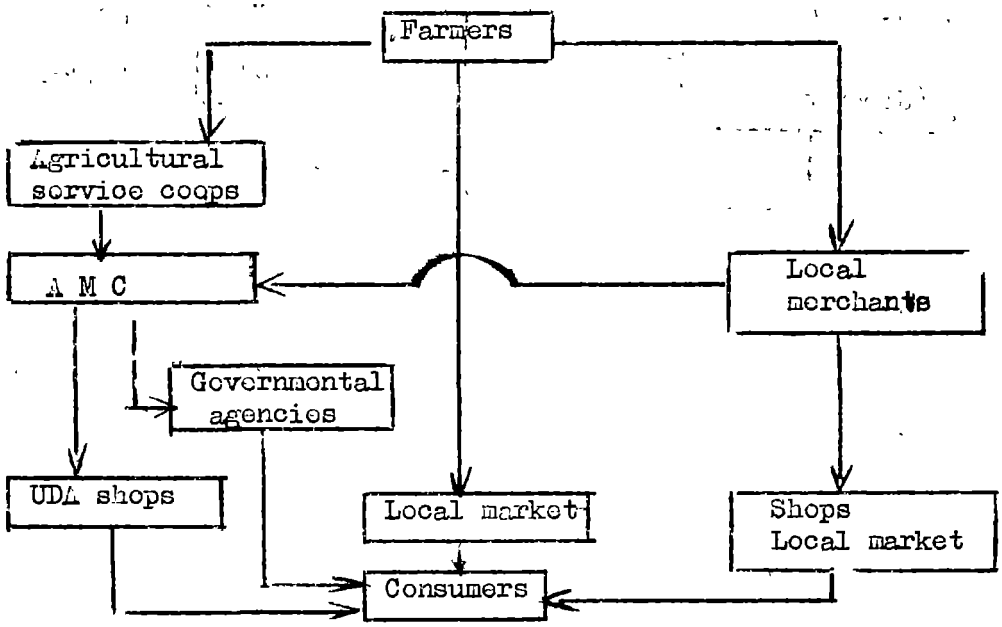
in Nazret. However, an EDDC office will soon be opened in Abomsa. It may gradually increase Abomsa's role as an entrepôt distribution centre for "imported" goods to the area.

In the whole of Arba Gugu, there are only 33 registered wholesalers and 556 retailers (Domestic Trade Office, Asolla). The maximum recorded capital is 10,000 Birr and the minimum 200 Birr. The total capital of all traders reaches just around 1 million Birr.

In addition to Kebele shops , there are around 700 private shops in the Awraja. The number of registered shops in Abomsa is 30 (Report from the Awraja workers Party in Abomsa), or only 4% of the total number of private shops in the whole Awraja. It is, however, about the same proportion as the population shares of the urban and rural areas. It supports the assumption that the shops in Abomsa only serve the town's own population, without any considerable extra capacity for the surrounding areas.

No information is available about the size relations between goods distributed via EDDC and/ or via private traders. On a national level, more than one-third of the goods in 1980-81 were distributed to private traders, while the other channels shared the remaining part, (Alomayehu Lirenso, 1985, table 3, p.55).

Distribution and marketing of food grains is illustrated in the following chart: (AMC related System)



4.2.2.2 Grain trade and marketing potentials of the area

Through its organization, AMC handles most of the products from agricultural output. Abomsa hinterland has a considerable surplus of grain. During the last 4 years, AMC purchase station in Abomsa bought an average of more than 30,000 quintals of grain per year from Merti and from the receiving centres in Jeju, Guna, Chole and Aseko Weredas (table 12).

Table 12. AMC grain purchase from 5 Weredas in Arba Gugu in 1982/83-1985/86

Wereda	Grain purchase in quintals				
	1982/83	1983/84	1984/85	1985/86	Total
Merti	8,751	572	983	6,887	17,193
Jeju	27,253	5,509	5,149	27,795	65,706
Chole	4,833	856	2,702	15,001	23,392
Guna	828	351	902	5,270	7,351
Aseko	-	-	382	7,352	7,734
Total	41,665	7,288	10,118	62,305	121,374

Source: AMC Branch Office, Nazret

In 1983/84 almost two-thirds of the grain was delivered to AMC from local traders. However, during the following years the Service Cooperatives have almost entirely taken over the grain trade with AMC. In fact, only 1% was handled by local merchants in 1985/86 (information from AMC Branch Office, Nazret).

After filling their quotas to the Service Cooperatives and AMC respectively, the farmers and local traders are free to sell to the local market and/or use the grain for their own consumption. Based on an estimated total cropland area of 65,000 hectares and a yield of 10 qts/ha, the total grain production of the area can be estimated at roughly 650,000 qts per year. Even if AMC purchases reach the same high level as this year (1985/86), nearly 600,000 qts should be available for sale on local markets and for the growers consumption. In that perspective,

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not more than around 10% of the production is "exported" to other areas, if channels outside the ANC system such as Senga (Cattle breeding and trade) are not used.

An estimate of the local consumption can be based on the assumption that a person requires an average of 2,700 calories per day and one million calories a year (Chrispeels & Sadava, 1977: pp.76-77). One kilogram of grain has a caloric content of 3,500 calories and the above yield per hectare gives 3.5 million calories. Thus, the carrying capacity of the area on a strictly vegetarian diet is 3.5 persons per hectare of cultivated land. An additional 20% may be added to include animal food contributions from the mixed type of agriculture prevailing in the area. It raises the feeding capacity to at least 4 persons per hectare. The present population density is less than 3.5 people per hectare of cultivated land, and this underlines the area's surplus potential.

Based on these calculations the consumption of grain in the area with a mixed diet should be roughly 225,000 million calories. It is the equivalent of a vegetarian diet of 180,000 million: 350,000 qts = 515,000 qts. This figure should be compared to an estimated total production of 650,000 qts. Thus, the calculations indicate a good margin for considerably increased export from the area, given an effective market organization including outbuilt infrastructure and price incentives for the farmers to produce for a market. In addition these calculations are based on very low yield figures, which could be considerably increased by application of improved inputs.

4.2.2.3 Grain trade in Abomsa

The grain demand of the town has to be satisfied from the local market in Abomsa or from the urban farmers production. In spite of the considerable surplus production of its hinterland, about 25% of the population in Abomsa were affected by drought problems in 1985 (Information from the town administration). This indicates that the shortage of grain among large groups, especially children under 15 years, was mainly of an economic nature, i.e. lack of economic resources to buy enough food from

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the local market at the prices demanded.

Information on market prices from the main market places in the project area is delivered irregularly to the South Eastern Agricultural Development (SEAD) zone office in Asella from its other agricultural offices. They reveal prices which fluctuate widely both by season and by area. This fact illustrates the storage problems as well as the poor economic integration of the area mainly due to lack of transportation facilities. The fact that the petrol station at Abomsa is the only one available in the area and then only for diesel oil, and only with written permission in every single case, is an illustration of the low communication intensity. The prevailing situation apparently severely aggravates the food problems in Abomsa.

4.2.3 Other commercial services

Service businesses are performed in Abomsa by formal as well as by informal establishments. Such services include hotels and taverns, clothing and tailoring, hair-dressing, handicrafts, photography and milling. The activities of tailor's cooperatives and grain mills have been discussed in an earlier section (4.2).

A report from the Awraja Workers Party office in Abomsa gives the following official number of service activities in 1985/86:

Type of commercial service	Number
Buna Bet, Bar	20
Tej Bet, selling local drinks	15
Tea houses	4
Butcher's shop	6
Bakery	4
Photo shop	2
Barber	2
Pharmacy	1

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These are the formal commercial establishments. Besides these, a number of informal activities are carried on within this sector by a large number of people, mainly concerned with running of hotels and taverns. From the interview forms it can be deduced that around 20 hotels are established in the town. The biggest of them have up to 20 rooms, but many have only a few beds to offer.

The taverns are especially numerous and consist of several types, ranging from ordinary tej, tella and araki houses (bars with local drinks). They mostly work on a small amount of capital. Tej houses have slightly higher standards and require more capital. Mini-bars and small tea-rooms are abundant.

A great number of the widows of Abomsa have their main income from these different forms of informal activity. A special kind of "open house" is called mosheta. These sell different kinds of local drinks often in combination with prostitution "services". According to the interviews, as many as 15% of all households interviewed have this informal type of occupation as their main source of income, in absolute numbers more than 250 women. An additional small percentage stated prostitution as their only source of income in the interviews.

Other informal activities include injera making and bread-making, the preparation of local drinks, and handicrafts, especially gabi (cloth) making. Some people make their living by buying and selling firewood, water (when the water project is not operational), milk, vegetables, prepared foods, etc.

Altogether, nearly one-third of the households depend upon performing informal commercial services.

4.2.4 Social service

Around a quarter of all heads of household are employed as civil or military servants. Most of them work at governmental offices at Awraja or Wereda level. They include the following establishments:

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Administration Offices (Awraja and Wereda)
Educational Office
Financial Office
Law & Justice
Town Council
Telecommunications
Post Office
Commercial Bank of Ethiopia (Branch office)
Library
Church
Mosque
Small-scale Industry Development Office
Health Office
Malaria Eradication Service
Agricultural Development Office
Agricultural Marketing Corporation (AMC)
Workers' Party of Ethiopia (WPE)
Military Service Office
Police Office
Prison Office
Security Office

There are also the offices of Mass Organizations:
2 Kebeles (Urban Dweller's Association, UDA)
2 REWA (Revolutionary Ethiopian Women's Association)
2 REYA (Revolutionary Youth Association)

Some of these establishments are very clearly related to the problem areas of Abomsa and will be given special attention in the following chapters, which concern school problems, the health situation, the water project and nutritional questions. Before discussing these general problems, some of the economic aspects of occupational activities are discussed.

4.2.5 The economic situation of the households

Urban studies from the late 1970s showed a great incidence of poverty in Ethiopian towns (Alula Abate 1985: 258-9). Figures from 1978

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indicated that in 18 towns studied (including Addis Ababa) around 35% of the total population was affected by what was characterized as "food poverty", and around 60% by "total poverty". The findings were based upon studies by the International Labour Office (ILO) on jobs and Skills Programme for Africa (JASPA), published in 1982. The same study estimates that, by 1990, an additional half or three-quarters of a million jobs will have to be created, if all the urban growth is to be absorbed.

It is not to be expected that the situation in Abomsa will give a more positive picture. On the contrary, considering the distorted population structure, lack of industrial enterprises, and the restricted trading activities, the situation in Abomsa might be worse than in Ethiopian towns in general.

Questions about household income and expenditure were included in the questionnaires, but the figures given have to be used with great caution. However, they may at least give an acceptable illustration of the relative position between different socio-economic groups, even if the absolute amounts are deliberately kept down.

4.2.5.1 Income distribution

According to the questionnaires, the average monthly income of the households is 89 Birr. However, the income distribution is very skewed, and a majority of the households (53%) have 50 Birr or less a month. In fact, of these households the lowest 25% has an average monthly income of only 17 Birr. At the other extreme, the 15% of households with the highest income earn more money than the majority of all the households on the lower scale, taken together. The distribution of monthly income in different income groups is shown graphically in figure 8.

The relative distribution of household monthly income among different income groups is indicated in more detail in figure 9, which registers the cumulative percentages of number of households and of monthly income. From the diagram, it is easy to see that, for example, nearly

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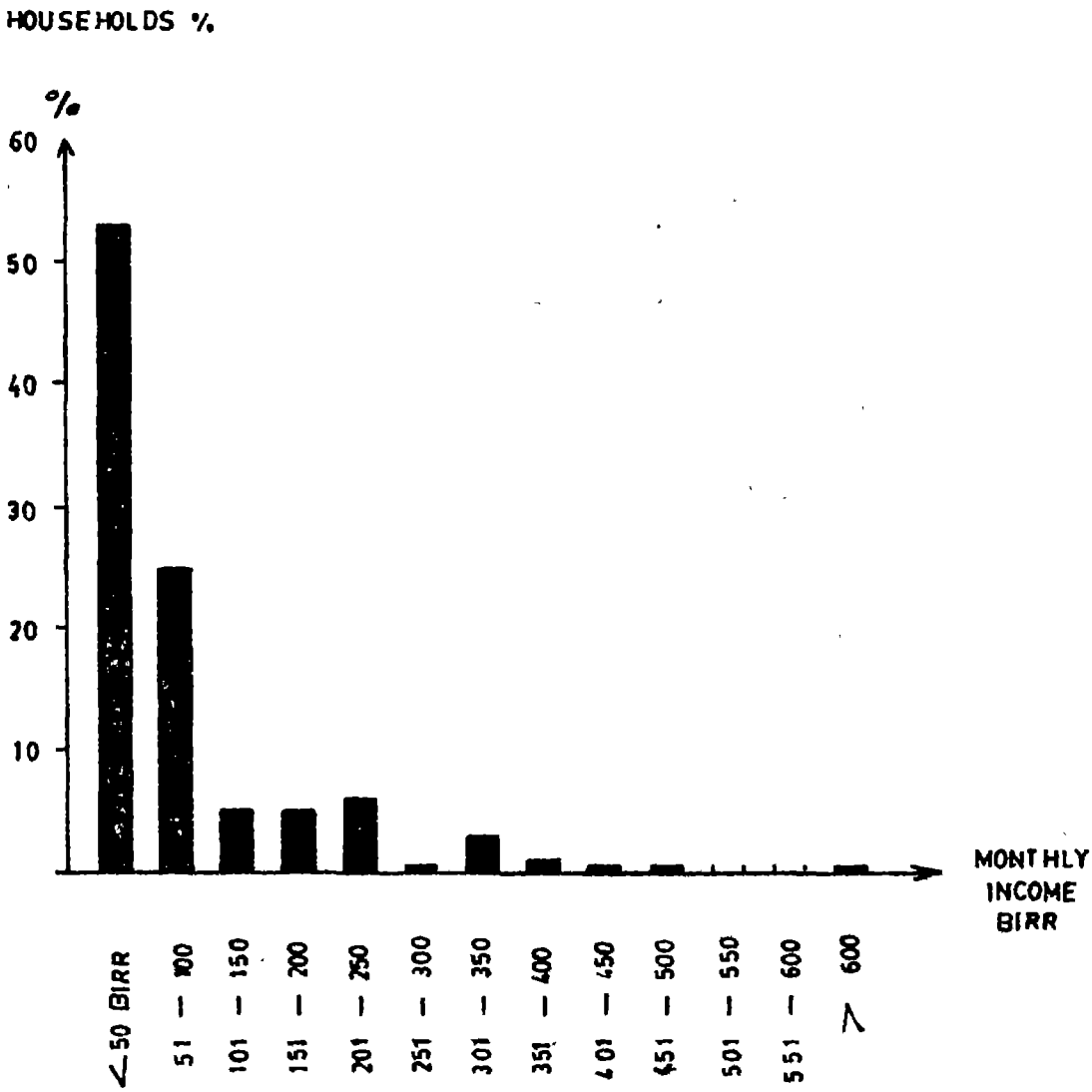

Figure 8. Distribution of households in different monthly income groups in Abomsa

40% of all households in the lower-income layers have not more than around 10% of the total income[1]. To include about 50% of all incomes, we have to aggreagate up to 85% of the households. Consequently, the 15% highest paid families together have as much income as all the rest of the households in Abomsa. This group consists exclusivoly of household heads classified as civil servants and traders (4.2).

The absolute figures registered at the interviews are so low that it seems incredible that no other sources of income are available. Actually, a great number of households have their own garden cultivation, as already mentioned (4.2.1). Also, the considerable cattle stock may be an additional source of income in cash and kind. It is even possible that some earnings outside the stated monthly incomes are transferred to some households by the large number of students who board and lodge with town families. Nevertheless, it is quite obvious that the economic condition of most households in Abomsa is extremely pressing. This also means that the town presently offers a very limited market for sales of consumer goods from outside.

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1) To give an international comparison the economic inequality expressed in this way is about the same as in rural Malaysia, but greater than in rural areas of Bangladesh, India, Indonesia, Pakistan, Philippines and Sri Lanka. (Profiles of Rural Poverty, ILO, Geneva, 1979, p.7).

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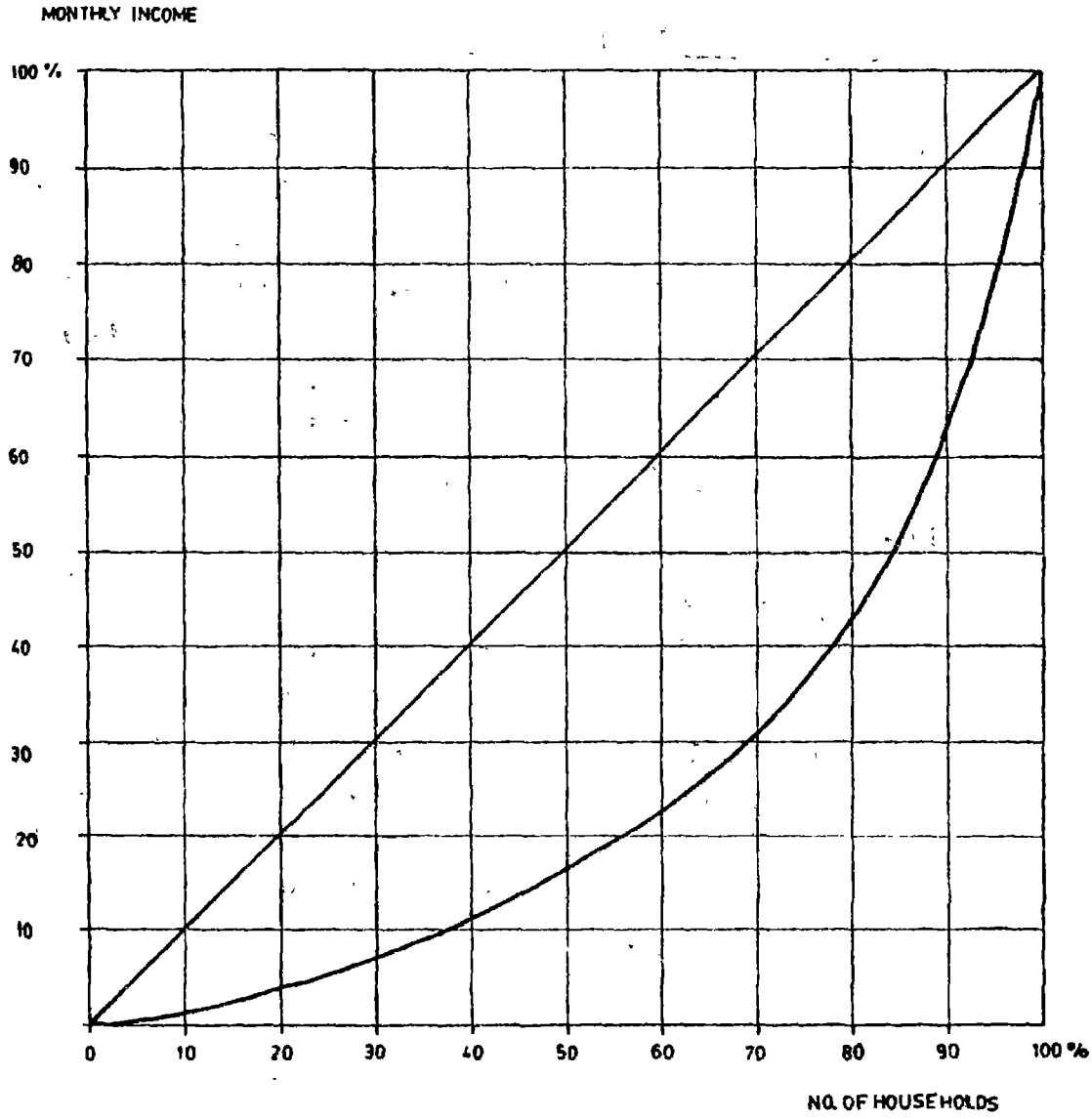

Figure 9. Cumulative distribution of percentages of households and monthly income in Abomsa (Lorenz curve)

4.2.5.2 Income distribution and size of household

The relation between monthly income and size of household is graphically represented in figure10. In the bivariate distribution, the number of household members is taken as the independant variable (x) and the monthly income as the dependent variable (y). The regression lines of the data may be obtained fairly quickly, though only approximately, by a method which avoids much of the computation work. To find the regression of y on x, the mean value of y for each individual value of x is calculated. These points (x,y mean) are then plotted on the graph paper (Figure10).

If the regression line is evened out to a trend curve, it gives support to the conclusion that family size and monthly income are positively correlated up to a monthly income of about 200 Birr, i.e. higher income is connected with larger families. After that income level, the correlation is increasingly negative, i.e. the size of the households tends to decrease with increasing income. However, the strength of the correlation in this part of the graph is very weak, because of the small number of observations.

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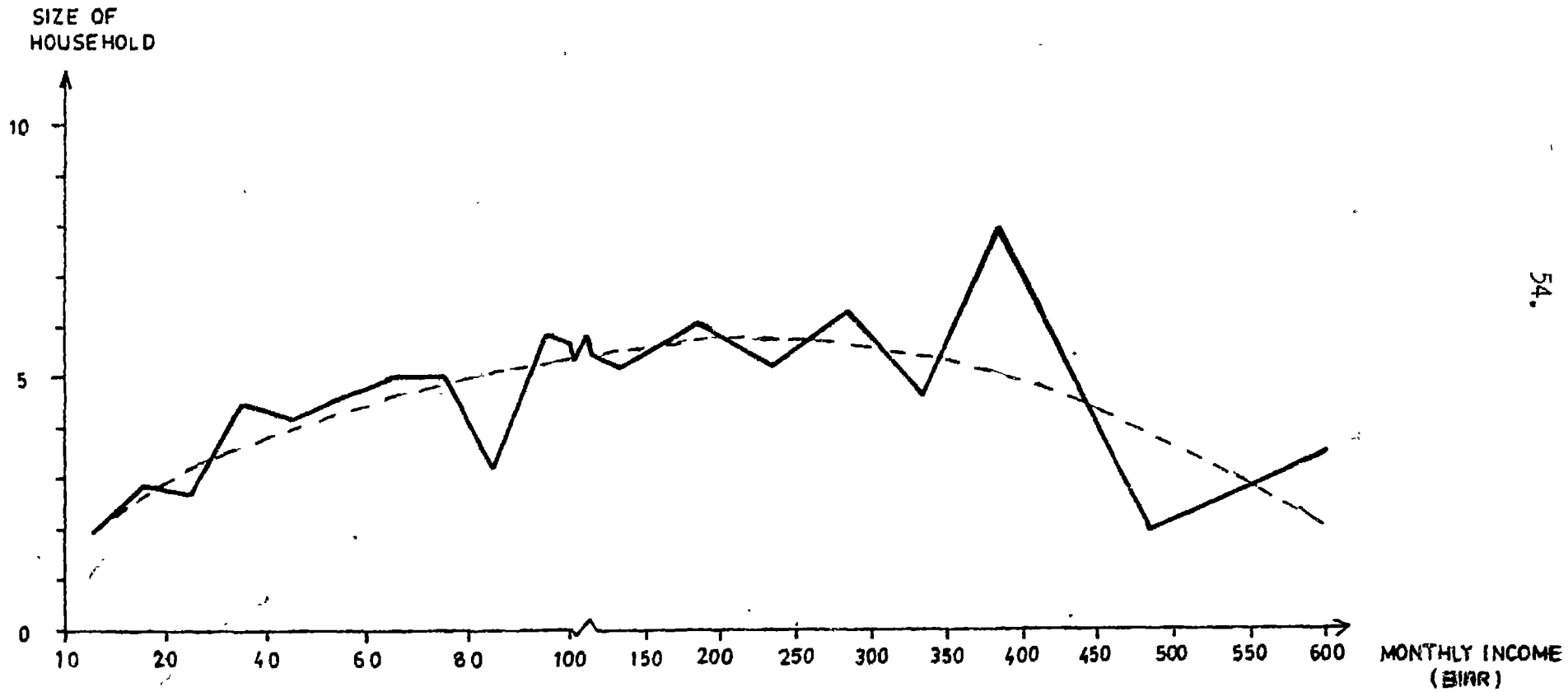

Figure 10. The relationship between household size and monthly income

5. EDUCATION

" The functions of education in Ethiopia today are radically different from those of the pre-revolution period. Education today is regarded as the instrument by which the ideology of Socialism is to be inculcated in the minds of the young as well as of the adult population. Education is the means through which the scientific and technological requisites for the transition to Socialism are to be fulfilled. It is through education that the masses are to be enabled to shape the new forms of social organization and to manage their own economic and social affairs" (Fassil G. Kiros, 1983, p.33).

5.1 Kindergarten

The school system includes kindergarten education of children aged 4-6 years. The financing and operation of such schools is left to the urban and rural communities themselves, with the Ministry of Education having a supervisory role and a responsibility for training teachers and defining curricula.

There is one kindergarten in each of the two Kebeles in Abomsa. Both schools were established around 1981, and were planned to receive 80 children each, by two teachers. In one of the schools, the number of children has gradually decreased to about half the target.

The schools operate daily during weekdays between 8-12 in the mornings. An extension of the working time to include the afternoons would need facilities to prepare and serve food, and at present these facilities are lacking. Neither electricity nor water supply is available.

The schools are run by the Town Council. UNICEF has allocated 35,000 Birr to the schools for buildings and equipment. The running costs are expected to be covered by contributions from the public. One of the schools has plans to get regular support from some special projects such as a flour mill, vegetable garden, and the like. No school fee is charged. The admittance to the school is decided by the Kebeles. They also make a number of contributions in kind, mostly in

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the form of labour force for maintenance and improvements of buildings and playgrounds.

Lack of kindergarten facilities has been stated as one of Abomsa's greater problems. However, that is not supported by the interview answers. In fact, less than 1% of the households mentioned the lack of a kindergarten as one of their most pressing social problems.

From the Kebele lists (3.2), it is possible to estimate the total number of kindergarten age children in Abomsa at around 600. Only a quarter of that number (160 children) could be accommodated in the existing two schools. Yet one of the schools is at present not utilized to its full capacity, and not more than 20% of children of the appropriate age are attending kindergarten.

A great number of reasons are given in the questionnaires for not attending kindergarten (table 13).

Table 13. Reasons given for not attending kindergarten

Reasons given	%
Not able to go	35
Because of disease	15
Too far from homes	14
Physical handicap	10
Goes to church education	10
The child has no interest	7
No clothes to go to school	3
Bad treatment of the children	3
Bullying by other children	3
Total	100

Source: Questionnaires of Abomsa socio-economic study, 1986

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As indicated by the table, unspecified reasons are given in more than one-third of the cases. No specific bottleneck can be found among the other answers, except the large number of disabled and sick children (25%).

5.2 Primary and secondary schools in Arba Gugu

The primary education comprises grades 1-6, formally to be attended by children aged 7-12 years. However, as will be illustrated from Abomsa, this educational level has expanded greatly to include even older children. This is apparently the result of encouragement from the post-literacy programme, leading to some of the newly-literate people continuing their education at the primary level.

Secondary education consists of two levels, junior secondary (grades 7-8) and senior secondary (grade 9-12). Only one comprehensive secondary school is established in Arba Gugu. It is located in Abomsa. In Jeju, senior secondary education is given up to grade 10. Ministry of Education policy at this stage of development is to provide education to grade 10 within each Woreda and to grade 12 within each Awraja. It is on this basis that resources are allocated within the current Ten Year Plan.

There is a total of 77 government schools in Arba Gugu, with 2 mission schools in Gololcha. The number of students is around 28,500 (table 15) from a total population of 350,000 in the Awraja (National Census 1984, CSO). As a rough estimation, the percentage of school-age persons between 7 and 16 years constitutes around 33% of the population in Arsi (CSO, Statistical Bulletin 46, 1985). Applied to Arba Gugu, this gives a school-age population of around 115, 000 persons. Based on that figure, roughly 25% of the school-age people attend school. However, even older students are included in the student number, and the net enrolment ratio is therefore nearer to 20%.

The number and level of schools in each Woreda and the average Woreda population per school is indicated in table 15.

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Table 14. Number and level of governement and mission schools by Wereda, Arba Gugu awraja.

Wereda	Grade 1-6	Grade 7-8	Grade 9-12	Total population per number of school
Merti	13	2	1	3,380
Aseko	9	1	-	4,150
Jeju	14	2	1(to 10)	4,650
Guna	11	1	-	3,320
Gololcha	12	1	-	7,100
Chole	10	1	-	4,450
Total	69	8	2	4,450

Source: Arsi Regional Educational Office, Asella; National Census 1984, CSO

Guna and Merti are by far the best school-equipped Weredas in Arba Gugu. The situation in Gololcha especially is very poor, with more than twice the average population per school as in the other Weredas (table 14).

If the number of students is considered, the leading position of Merti Wereda and the Awraja capital is more pronounced.

Table 15. Number of students by Wereda, grade and sex in Arba Gugu

Wereda	1 - 6			7 - 8			12			Total
	Male	Female	%	Male	Female	%	Male	Female	%	
Merti	3,268	2,156	40	535	236	31	658	246	27	7,099
Aseko	1,618	672	29	215	42	16	-	-	-	2,547
Jeju	3,195	1,723	35	476	157	25	[illegible]	[illegible]	15	5,820
Guna	2,778	1,325	32	277	99	26	-	-	-	4,479
Gololcha	3,083	1,133	27	172	30	15	-	-	-	4,418
Chole	2,532	1,122	31	422	119	22	-	-	-	4,195
Total	16,474	8,131	33	2,097	683	25	886	287	24	28,558

Source: Arsi Regional Education Office, Asella

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In the primary schools, around one-third of the students are girls. Higher up in the school system the proportion of females drops to 25% in junior secondary and 24% in senior secondary schools. The percentage of female students is somewhat lower than on a national level, where the respective figures are 37%, 35% and 35% for Primary, Junior Secondary and Senior Secondary schools (1981/82 from Statistical Abstract 1982, p.246).

The proportion of males is still greater among the teachers. From around 13% of the primary school teachers, the female percentage drops to 9% in junior secondary schools. Among 38 teachers in senior secondary schools, none are female (table 16).

Table 16. Number of teachers by sex, educational level and average number of students per teacher in Arba Gugu.

Educational level	Teachers				Number of students per teacher.
	Male	Female	%	Total	
Primary	379	57	13	436	56
Junior secondary	50	5	9	55	51
Senior Secondary	38	-	-	38	31
Total	467	62	12	529	54

Source: Arsi Regional Educational Office, Asella

5.3 Primary school in Abomsa

In comparison with the situation prevailing in Arba Gugu, as a whole, where only around one-third of the students are females, the girl students in Abomsa primary school are in the majority (54%). In fact the high proportion of female students is very stable in all grades (table 17). It seems to be a general experience that the enrolment of girls in primary schools matches that of boys where the schools are located in or near towns, but tend to be much lower in country schools (Fassil G. Kiros, 1983, p.77).

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As might be expected, school enrolment in Abomsa town is at a higher level than in the Awraja as a whole. Related to the total population, around 23% of the towns-people attend primary school classes. The same comparison for the whole of Arba Gugu gives a proportion of only 8%. However, it is obvious that students from surrounding areas attend school in Abomsa, and this raises the enrolment percentage to some extent.

Table 17. Number of students by grade and sex in Abomsa primary school

Grade	Male	Female	Total	% female students
1	202	235	437	54
2	119	137	256	54
3	95	101	196	52
4	104	120	224	54
5	105	123	228	54
6	179	209	388	54
Total	804	925	1,729	54

Source: Abomsa Elementary School, Abomsa

Legal age for entry into the first grade of primary education is seven, but in practice a great number of older students are also enrolled in school. It is only in the first and sixth grades that the greatest number of students are recruited from the formally eligible age-groups (table 18). As a consequence, around 70% of all students in Abomsa primary school are older for their grades than they should be.

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Table 18. Ages of students of differ primary grades in Abomsa

Grade	The ages of the students (years)													
	7	8	9	10	11	12	13	14	16-20	21-25	26-30	31-35	36-40	
1	172	149	64	27	13	8	1	-	-	-	-	-	-	-
2	-	53	84	57	30	15	5	3	1	1	2	-	1	-
3	-	-	28	61	49	27	12	4	2	6	2	3	-	-
4	-	-	12	39	51	45	30	17	3	5	9	9	-	3
5	-	-	-	10	36	63	49	34	10	19	1	5	1	-
6	-	-	4	13	49	104	68	64	41	36	2	4	-	-
Total	172	202	192	207	228	262	165	122	57	67	16	21	2	3

Note. Information not available from 13 students.

Source: Abomsa Elementary School, Abomsa.

5.4 Secondary school in Abomsa

There is a significant difference between the percentages of female students in the primary and secondary schools in Abomsa. From constituting a majority of the students at primary level, the percentage drops to 30% - 42%, at the junior secondary level and to less than 30% at the senior level (table 19).

Table 19. Number of students by grade and sex in Abomsa Secondary School

Grade	Number of students			
	Male	Female	Total	% Female
7	177	81	258	31
8	98	63	161	4[illegible]
9	243	10[illegible]	[illegible]	30
10	113	3[illegible]	14[illegible]	20
11	102	29	19[illegible]	15
12	96	[illegible]	130	[illegible]
Total	834	344	1,22[illegible]	28

Source: Abomsa Secondary School, Abomsa.

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Although there are junior secondary schools in every wereda in Arba Gugu, a number of students start their secondary education in Abomsa from grade 7. This is especially noticeable in students from other parts of Merti Woreda as shown in the following table 20.

Table 20. Percentage of students in grades 7-12 by place of residence at Abomsa Secondary School.

Grade	Percentages of students residing in								
	Abomsa town			Merti wereda			Other weredas		
	Male	Female	Total	Male	Female	Total	Male	Femal	Total
7	55	84	64	41	10	31	4	6	5
8	63	65	64	24	18	21	13	17	15
9	38	56	43	19	11	16	43	33	41
10	75	90	78	15	3	13	10	7	9
11	49	72	53	10	7	9	41	21	38
12	80	76	79	0	3	1	20	21	20
Total	56	71	60	20	10	17	24	19	23

Source: Abomsa Secondary School, Abomsa

According to the table, as much as 60% of the secondary school students are residents of Abomsa. However, the yearly variations are big, from nearly 80% down to almost 40%. Students with their place of residence in the rest of Merti Woreda constitute in the higher grades a steadily decreasing share of all students, from around 30% of grade 7 to only a fractional percentage of the highest grade.

The sum of all the other Weredas in Arba Gugu contribute around 20% of the students. This is a very low figure, and illustrates the extremely unequal education facilities between rural areas and Abomsa town. Most of the students from other places come from Guna (nearly 100) and from Joju (55-60). Not more than 35-40 students have their place of residence in each of the Weredas Aseko, Chole and Gololcha.

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It must be understood that a number of factors enter into this situation. They include year of opening of various levels of education in different locations, (Senior Secondary education in grade 9-12 was first provided in Abomsa in September 1977), parental and student evaluation of quality of education in different locations, constraints on girls education away from home location, administrative decisions on allocation of places, school capacities, actual travel time and communication facilities between school and home, and the age of students.

However, apart from questions which might be asked about the significance of this data in terms of distribution by location and grade level, the issue under discussion was the economic contribution of students to Abomsa towns.

Although the relative number of secondary school students from Arba Gugu outside Merti Woreda is very low, they constitute a considerable element of the town population. Together with the students from the rest of Merti, they amount to around 500 students. It is probable that board and lodging for some of these students make an additional economic contribution for a great number of households in the town. It is a common practice for parents to provide students studying away from home with sustenance in kind, and many lodge with members of an extended family. However, whether board and lodging is provided as a paid basis or in other ways, it remains true that the resources available to Abomsa town must be augmented by a not insignificant inflow from surrounding areas to support these processes.

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6. HEALTH PROBLEMS

As is well known, disease and death play a much more prominent role in the lives of the people of developing countries than in those of the developed nations, and cause serious losses in manpower and socio-economic development. This is the situation in Ethiopia, and especially in Abomsa, where health problems are considered to be one of the most serious issues in the town. The sanitary conditions as well as the distorted age structure, with high percentages of old people, seem to be the main factors.

6.1 Most common diseases in Abomsa

Because of the formerly-practised use of infected water in the town, the occurrence of water-borne diseases was very high. According to a report from Abomsa Health Centre, more than 1,900 persons were affected during a six-month period from August 1983 to February 1984. This means that nearly 30% of the town population was affected. The statistics relating to the incidence of the most common water-borne diseases are summarised in Figure 11.

Bilharzia is found only in one place in Arba Gugu, namely in the Arba Dima river at Abomsa town, but the lowland areas of Arba Gugu are also severely hit by infectious illness because of lack of clean water for drinking purposes and domestic use. This has also been the case in Abomsa town during the frequent interruptions in the functionning of the water-supply project.

At the interviews, 21% stated that they had been effected by water-borne diseases, mostly Amoeba (55%) and Bilharzia (40%). The most common diseases treated at the Abomsa Health Centre are reported in the following table (21).

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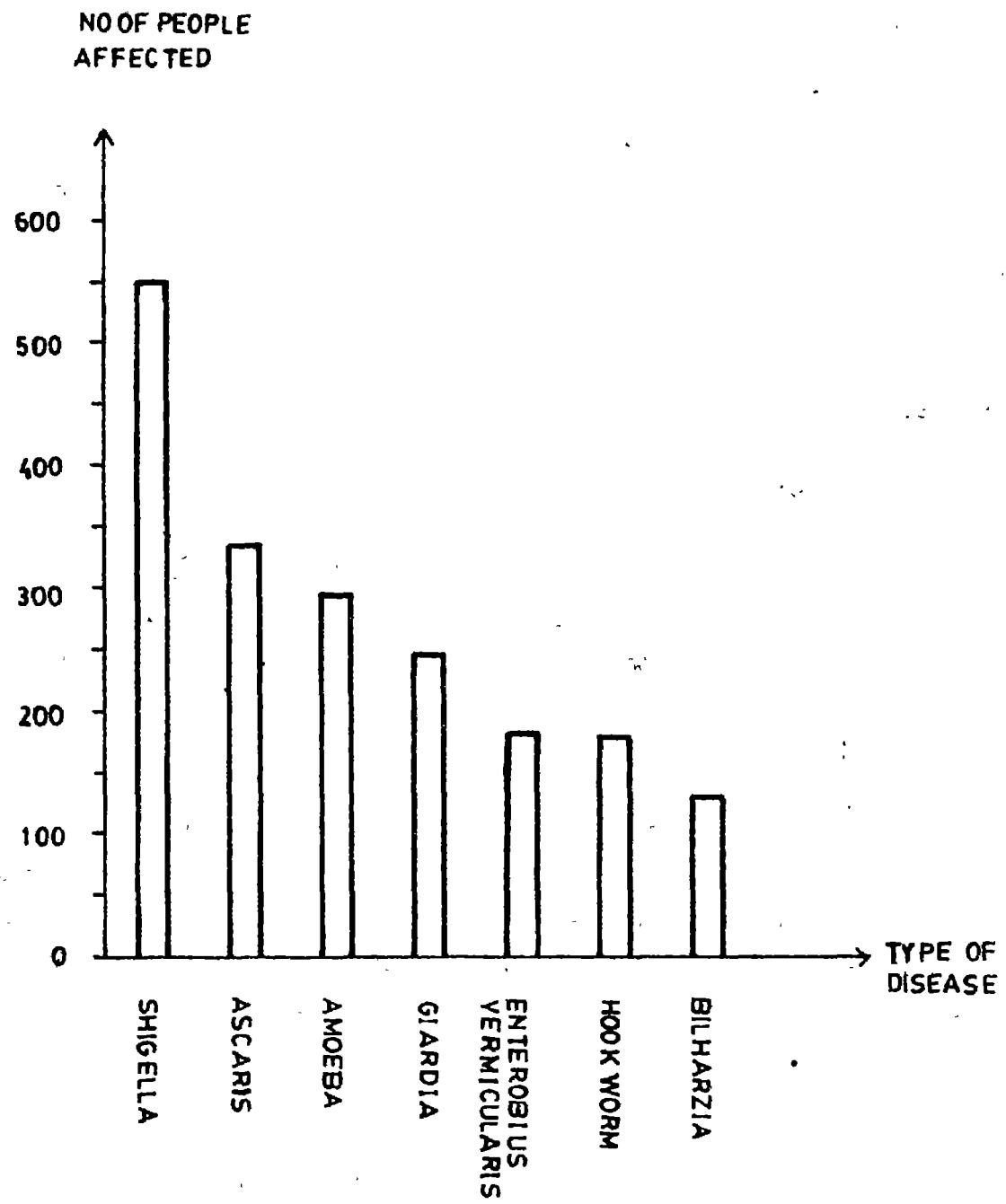

Figure 11. Number of people affected by water-borne diseases in Abomsa town from August 1983 to February 1984

Table 21. The most common diseases treated at Abomsa Health Centre in 1985

Disease	No of persons treated
Intestinal parasites	2,332
Diarrhoea	1,413
U.R.T.I.[1)]	1,098
Skin infections	808
Malaria	631
Venereal diseases	460
Anaemia	410
G.U.T.I.[2)]	384
Eye problems	305
Abdominal problems	176
Total	8,007

1) U.R.T.I. = Upper Respiratory Tract Infections
2) G.U.T.I. = Genito-Urinary Tract Infections

Source: Abomsa Health Centre, Abomsa

Among communicable diseases, tuberculosis (TBC) is the most frequent, with as many as 1,308 cases in 1985. Of those, 258 are still under treatment. Leprosy is also common, with 475 parients in 1985. They are undergoing treatment from a medical doctor from Asella, who visits the centre once a month.

It is evident from the great number of treatments at Abomsa Health Centre, that people from outside the town are also treated. The perspective has to be broadened to include all Arba Gugu Awraja.

6.2 Health problems in Arba Gugu

According to Arsi Regional Health Service Office in Asella, there are more health problems in Arba Gugu than in the other Awrajas of the region. The statement is based on the following points.

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1. The nomadic type of life in the lowlands is believed to be one of the main problems effecting the spread of communicable diseases.

2. There are more communication problems in Arba Gugu than in the other Awrajas of the region, making it difficult to reach the target groups with health services.

3. The living conditions of the people seem to be even poorer in Arba Gugu than in other areas, contributing to the poor health situation.

4. Due to shortage of springs in some lowland areas, especially in Merti and Jeju Woredas, people use mainly pond water which is unsanitary.

5. Bilharzia is found only in Arba Gugu.

6. The frequency of tuberculosis is higher in Abomsa than in the other Awrajas.

A recent study of rural health in Ethiopia gives figures for so-called period prevalence rates, which is a measure of illness(es) in existence during a defined period of time. (Report on the Rural Health Survey 1982/83, vol.1, CSO, Oct.1985, p.14-15). The study estimates the proportion of persons having any illness(es) during the defined period out of the total population, mostly expressed per thousand people.

For Arsi region, the figures are very high, with more than one third of the total population affected by the diseases registered at the time of the study (pp. 47-48). The figure for Arba Gugu may be as high as at least 120,000 people suffering from one illness or another.

The most frequent diseases registered in the annual health service report of Arba Gugu Awraja are shown in table 22. The total number of registered cases of diseases in 1984/85 was around 12,300 and in 1985/86 some 8,700. Compared to a probable number of affected people in the size level

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of 120,000 people, the statistics account only for 10% or less of the assumed number of cases.

Table 22. The most frequent diseases in Arba Gugu in 1984/85 and 1985/86 according to the annual health service report.

Type of diseases (in order of frequences in 1985/86)	Number of cases		% of registered	
	1984/85	1985/86	1984/86	1985/86
Malaria	638	681	5.2	7.8
Helminths	622	606	5.1	7.0
Tapeworm	1,005	521	8.2	6.0
Bacillary Dysentery	1,002	423	8.2	4.9
Acute nephritis	?	408	?	4.7
Gastritis and duodenitis	743	393	6.0	4.5
Venoraal disease	438	393	3.6	4.5
Acute upper respirotory infection	522	364	4.2	4.2
Rheumatism	479	221	3.7	2.6
Ascariasis	363	213	3.6	2.5
Infection of Skin	652	196	5.3	2.3

Source: Arsi Regional Health Service Office, Asella

6.2.1 Health organization in Arba Gugu

In the whole of Arsi region, there are 2 hospitals, 7 health centres, 77 clinics and 272 health posts (Arsi Regional Health Service Office, Asella). Out of these, only 2 health centres, 13 clinics and 57 health posts are situated in Arba Gugu. Apart from the health centre in Abomsa one other centre is located in Addis Hiwot on the northern bordor of Joju woreda. Two clinics belong to this health centre, while the rest (11) are supervised by Abomsa Health Centre.

There is no hospital in Arba Gugu. This means that there are no medical doctors permanently serving an area containing around 350,000 people. As many as 10% of the towns-people of Abomsa consider the lack of a hospital in Abomsa as their most pressing problem. On the average more than 31,800 people are covered by each of the eleven clinics.

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(table 23). In the whole of Arsi, around 22,000 persons on the average are served by each clinic.

Table 23. The average number of people distributed at clinic, community health agents (CHA) and traditional birth attendents (TBA) under Abomsa Health Centre

Woreda	Population	No of clinics	People/ clinic	No of CHA	People/ CHA	No of TBA	People/ TBA
Merti	55,000	1	55,000	8	6,875	20	2,750
Guna	40,000	2	20,000	5	8,000	27	1,480
Jeju	75,000	2	37,500	7	10,700	21	3,370
Chole	45,000	1	45,000	7	5,700	22	2,045
Aseko	42,000	2	21,000	10	4,200	23	1,825
Gololcha	93,000	3	31,000	12	7,750	25	3,720
Total	350,000	11	31,800	49	7,140	138	2,535

Source: Abomsa Health Centre, Abomsa
National Census 1984, CSO, Addis Ababa

In addition to the clinics, there are 49 community health agents (CHA) and 138 traditional birth attendents (TBA) in Abomsa Health Centre area. The number of people under their supervision in each Woreda is registered in the table as 7,150 and 2,500 respectively. The health agents have passed through a three months' education course at Abomsa Health Centre, while the traditional birth attendents have 15 days of training at the same centre. Most of the CHAs are posted to Producer's Cooperatives (PCs). When suitable PCs are not available, they are stationed at some convenient Kebele (Peasant Association).

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In addition to these health agents or paramedicals, trained in modern methods, there are "traditional healers" of various kinds. No information on their activities is available in Arba Gugu. However, it is important to note the existence of a functioning traditional sector within the area of health care.

6.2.2. The Health Centre in Abomsa

The total number of employees at Abomsa Health Centre is27, distributed among the following catogories of staff (table 24):

Table 24. Number and categories of staff at Abomsa Health Centre.

Category	No. of staff
Nurse	5
Health assistant	9
Sanitarian	1
Search workers (supervisors)	2
Laboratory technician	1
Non-teaching or non-paramedical personnel (guards, cleaners, accounts, etc)	9
Total	27

Source: Abomsa Health Centre, Abomsa

To facilitate supervision of all clinics every third month, the centre is equipped with two cars. The sanitarian has a motor-cycle at his disposal, and the search workers a bicycle.

In addition to nearly 10,000 curative treatments of patients a year, the Health Centre carries out a number of preventive measures, such as health education, mother and child service, vaccination programmes, and inspection of sanitation conditions.

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As well as the education of professional staff, health care education is given to town-dwellers and farmers from the area by the Health Centre. During the past few years, the following numbers of participants have attended the courses during the specified number of days (table 25):

Table 25. Number of town-dwellers and farmers taking part in the health care education at Abomsa Health Centre in 1982/83 - 1985/86.

Year	No. of persons attending education	Total number of days
1982/83	2,300	18
1983/84	13,698	181
1984/85	13,310	143
1985/86	23,289	354
Total	52,597	696

Source: Abomsa Health Centre, Abomsa

Unlike expanding health care education, the mother and child activities have been rather stable over the past few years (table 26).

Table 26. Mother and child activities at Abomsa Health Centre in 1982/83-1985/86.

Year	Number of persons served			
	Pre-natal care	Child health care	Delivery service	Family Planning
1982/83	1,236	-	110	1,239
1983/84	2,478	2,927	148	787
1984/85	1,125	1,466	321	637
1985/86	1,284	2,328	159	901
Total	6,123	6,721	538	3,654

Source: Abomsa Health Centre, Abomsa

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The vaccination programme includes mostly children between 0-2 years. More than 1,000 vaccinations are given each year, against tuberculosis, measles, polio, tetanus, diphtheria and pertussis.

According to the regulations, the search workers at the Health Centre should visit each individual house every month. Weekly inspection tours should be made to hotels, bars, butcheries and other establishments, to check cleanliness, equipment, sanitary situation, etc. Even if the inspection tours are strictly carried out, they cannot substantially change the unhealthy conditions prevailing in many parts of the town.

6.3 Malaria eradication.

In all Arsi, 2,475 persons were treated for malaria in 1984/85. It was reported to be the 12th most common illness, constituting some 3% of the registered cases. The relative occurrence in Arba Gugu is higher comprising around 5% of the cases in 1984/85 and the most frequent in 1985/86 with around 8%; in that year the number of cases was 681 (Arsi Regional Health Service Office, Asella).

All of Abomsa and a considerable part of Merti Wereda (around 75% of the area), as well as Arba Gugu as whole (around 40%), are located lower than 1,800 metres, which is the upper altitude limit for the occurrence of malaria mosquitoes. Thus, in order to combat the prevalence of the disease carriers, a Malaria Eradication Team has been organized at the Abomsa Health Centre. It carries out insecticide spraying and cleaning of houses in the threatened areas. Depending upon the seriousness of the malaria threat, different areas are sprayed once to three times a year. According to available statistics, a fair number of sprayings has been accomplished during 1985/86, (Table 27):

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Table 27. Spraying activities against malaria in 1985/86 in Arba Gugu

Wereda	No. of kebeles			No. of houses			No. of population		
	Spraying round			Spraying round			Spraying round		
	1	2	3	1	2	3	1	2	3
Aseko	31	-	-	4,780	-	-	14,872	-	-
Cholo	8	7	8	1,974	1,047	427	6,325	3,358	1,050
Merti	57	5	9	6,968	162	2,461	20,794	603	5,922
Jeju	23	13	7	1,713	2,168	2,339	7,023	6,115	7,282
Gololcha	65	7	4	?	1,107	636	?	4,090	2,185
Guna	-	1	1	-	223	92	-	784	263
Total	184	33	29	15,435	4,707	6,382	49,014	14,950	16,702

Source: Malaria Eradication Team, Abomsa

6.4 Treatment frequencies

A health facility (service) can be defined as any institution, organization or person that gives some treatment to ill or injured people. According to the Rural Health Survey (Statistical Bulletin 47. CSO. October 1985, p.112), six such facilities have been identified in rural Ethiopia. In addition to Health Institutions (Hospital, Health Centre and Health Clinic), there are community Health Agents (within the context of Primary Health Care), Pharmacy, Traditional Healers, Lay Treatment, Self-treatment and a residual group (other facilities). Only the first two of these may be referred to as Modern Health Facilities and are included in this study.

According to the Rural Health Survey Report, less than 30% of the total of ill or injured persons have reported to be treated in one of the various facilities. This leaves more than 70% who have not sought any treatment what so ever and a balance, not stating whether they had treatment or not. Transferred to Arba Gugu Awraja, the number of people treated should be around 40,000.

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About one - third of all treated persons were received at health institutions (i.e. hospital, health centre or health clinic). "Traditional Healers" form the second most frequent health facility, with a bare quarter of all treated persons. The least frequented treatment facility, according to the survey appears to be the community health agents.

In general, most ill or injured persons who were treated in any health facility visit it only once. The proportion who made more than one visit to each health facility is usually a little less than one half of those who received treatment in that facility.

It is reasonable to believe that comparatively more people in Abomsa are treated than in rural Arba Gugu as a whole. Nevertheless, as long as people have to pay for their treatment, the extremely poor economic conditions prevailing among large groups of people prevent them from seeking help, even if the facility, whatever it may be, is available.

6.5 Hygienic problems in Abomsa

Many of the diseases prevalent in the area are lethal to the patient. This happens because people also often suffer from other diseases, are endemically undernourished, and as a rule, live in poor unhygienic circumstances. Poor accommodation, an inadequate water supply or none at all, sub-standard or no sanitation, and poor nutritional standards are some of the most prominent factors here.

These conditions often provide the principal source of infection for the most common diseases. Many of these diseases might be effectively combatted by public health measures such as improvement of the water supply, the installation of proper latrines and sewerage, regular vaccination and disease eradication programmes, and the provision of health education in terms that are intelligible to the people. Some of these problems concerning Abomsa have already been discussed in earlier parts of the study.

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6.5.1 Housing problems

There is a serious shortage of dwellings in Abomsa. At present 271 heads of household, mainly civil servants, are applying for house accommodation, according to information from the Town Council (1986). In the meantime people have to stay in hotels, bars, or live with other families.

Around half the households live in two rooms. More than a quarter have only one room at their disposal, while less than a quarter have three rooms or more (table 28). Some of the rooms are set aside for special purposes. A separate kitchen is used in nearly half of all households (47%). On the other hand, it is unusual to provide special accommodation for animals (only 8%).

Table 28. Percentage of households living in dwellings with a different number of rooms in Abomsa.

Number of rooms	Percentage of households
1	28
2	50
3	15
4	4
5	1
6	-
7	1
8	1

Source: Questionnaires from Abomsa socio-economic study, 1986

Also, the quality of the houses varies considerably. Most of them (85%) have corrugated-iron roofs, while 15% have traditional thatched roofs. Around two-thirds of the dwellings have windows. Not more than 11% have electricity. Less than half of the dwellings use a latrine (47%), and this fact, from a sanitarian point of view, represents serious situation.

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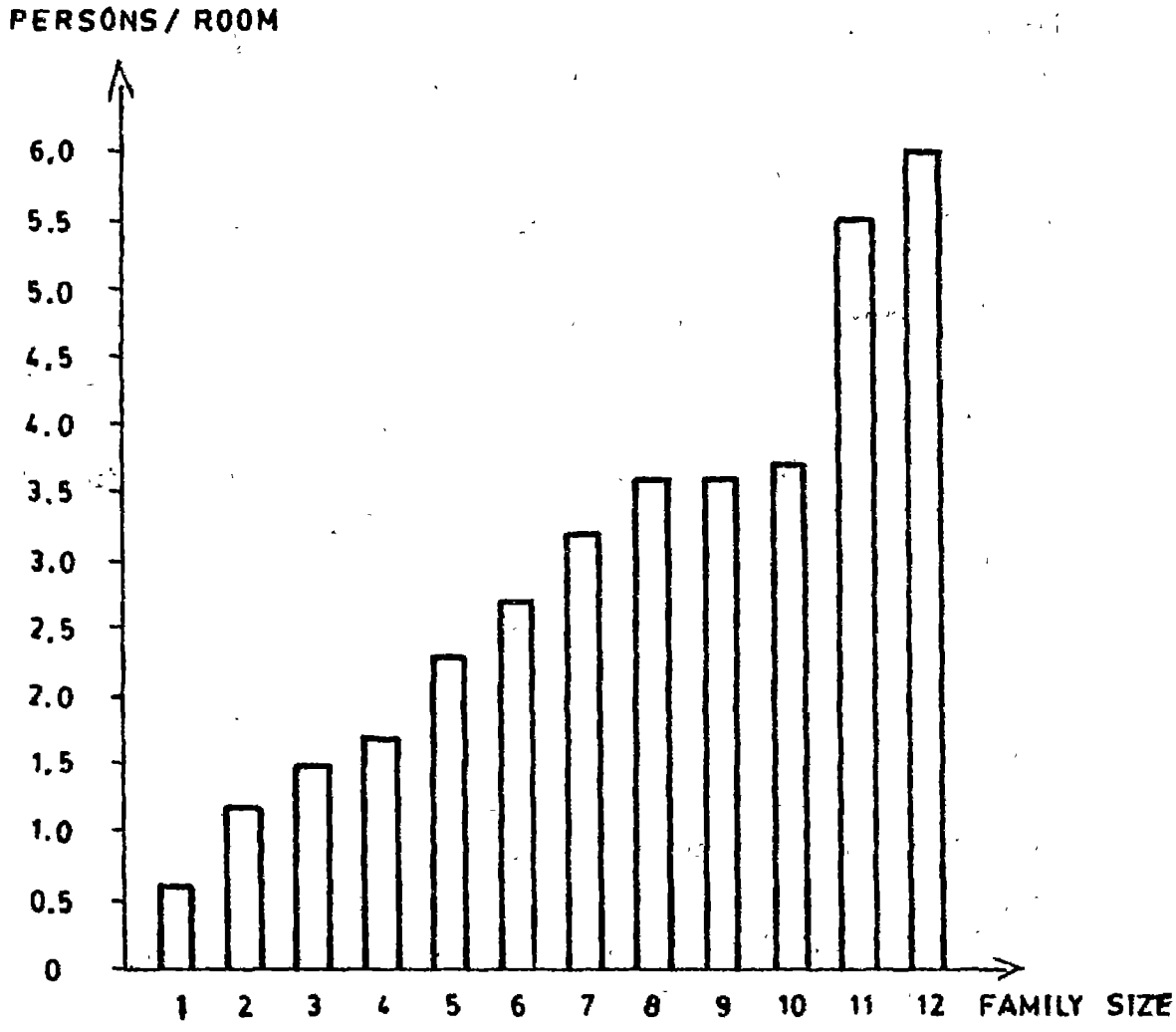

Figure 12. Average number of persons per room for different household sizes

The housing standard depends very much upon the living space available for each household member of the dwelling. On an average, there are 2.5 persons living in each room with kitchen and room for cattle included. However, the number of persons in a room is strongly correlated to the size of the household (Figure 12). From an average of just above half a person a room for a single person household, the number steadily increases up to 5.5 - 6 persons a room for the largest household sizes (11-12 people). Around 3-4 persons a room is very common for household sizes just above the average family size.

In fact, the average number of rooms per dwelling unit has increased considerably during the last 20 years. In 1966, as many as 72% of the dwellings consisted of only one room, compared to 28% at present. At that time, two-room dwellings constituted 24% of the total number of houses and three rooms and more, constituted only 4% (Abomsa Master Plan report, 1967, p.16). The comparable figures today are, respectively 50% and 22% (table 29). In spite of that, the average number of persons in a room was somewhat smaller in 1966(2.4) than it was 20 years later (2.5), because, since then, household sizes have increased faster than the number of rooms per dwelling.

The Master Plan report of 1967 anticipated larger dwellings in the future. "In view of expected improvement in living conditions, an increase is foreseen in the percentage of houses with 2 or more rooms". It was apparently difficult to foresee that the increased number of rooms would be more than offset by the still larger increase of the number of household members. Consequently, on the whole housing conditions do not seem to have improved in any substantial way during the last 20 years in Abomsa.

6.5.2 Nutritional standards

There is a close connection between a person's diet, outlook on life, and general health. Diets influence health and balanced physiological development. An ill-nourished and weak human body is susceptible to various pathogenic agents which it may not have the ability to fight. Both the quantity and quality of food are important for

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children to grow normally, and adults to maintain their health and their capacity to work. Undernutrition or undernourshment refers to an inadequacy in the quantity of a diet, specifically lack of calories (not under-nourishing food to eat). Malnutrition refers to an inadequacy in the quality of a diet, specifically the lack of essential nutrients in a diet (not the right types of food).

The incidence of drought problems in Abomsa in the last year (1985) suggests the occurrence of undernutrition, and maybe also malnutrition. However, these problems cannot be discussed on the basis of the material available for this study. Only some aspects of the dietary habits can be considered from the households interviewed.

All communities have vulnerable groups which are especially at risk with regard to nutrient needs. Those most at risk are young children and pregnant and lactating mothers. Unfortunately, it is often these groups of persons who are deprived of even their minimum nutrient needs because of cultural habits. However, in Abomsa very few restrictions of this kind seem to exist. Only 3% of the households interviewed stated that women are forbidden to eat special food items, and 13% mentioned children. The food most often considered as unsuitable for these groups are raw meat and eggs.

Around two-thirds of the households considered that all family members were given the same food. Only 13%-14% thought that the father or mother of the family got the best food, while 8% favoured their children. In about 80% of the households, all members had their food at the same time, while children were given their food after the grown-ups in the other families.

Most of the households take three daily meals regularly, while 38% stated that they did not eat all meals. The meal generally left out was breakfast in 85% of the cases, or lunch (15%). Thus, all households had their dinner regularly. On the other hand, as many as 38% of the respondents considered kollo/nifro (roasted or cooked grain) as a main meal, whereas 67% ate this as a supplementary food stuff. This statement may indicate that some of the regular meals may be very limited nutritional value.

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6.5.2.1 Food habits

Carbohydrates are a major source of most of the human body's energy. All green plants form carbohydrates and vitamins. Cereals, high in carbohydrates, are a universal staple, for they provide the human body with the greatest amount of energy per unit area of land cultivated, are easy to store and transport, and inexpensive. Nutritionally, starch is the most important carbohydrate. Rice, wheat, barley sorghum, maize, millet and rye contain about 70% starch. Potatoes, other tubers, beans and legumes contain about 40% starch (Dando, 1980, pp.37-38).

Proteins, a group of complex organic compounds, are essential for life and growth. Among others, meat, milk, fish, poultry and eggs are protein-rich goods. Many cereals contain some protein, but proteins from cereals alone are not of high enough quality for normal human growth nor for sufficient human body maintenance.

The dietry frequencies of some of these essential food ingredients are given in table 29.

Table 29. The frequencies of some common foodstuffs in the diet of Abomsa residents

Food	Consumption frequencies in percentage				
	Daily	Twice a week	Once a week	Irregular	Never
Tef	50	3	4	25	19
Maize	9	12	4	59	16
Wheat	45	10	9	34	2
Barley	33	5	6	38	17
Legumes	62	3	3	29	3
Meat	3	5	10	62	20
Eggs	2	11	3	49	35
Fruit	0.4	13	7	51	28

Source: Questionnaires of Abomsa socio-economic study, 1986

Cheap foodstuffs such as grain and legumes are the main ingredients of the diet. Even if meat is relatively cheap, at least compared with meat in, for example,. Europe or the U.S.A. , it is too expensive for most people in Ethiopia to consume regularly. Less than 20% of the respondents eat meat at least once a week. Again, about 20% never eat meat. The consumption of eggs and fruit is still lower.

Both the consumption of meat and eggs are strongly correlated to the monthly income of the household head. As well as economic restrictions, there are also cultural constraints on egg consumption. Also, such products as chickens and eggs represent a useful source of cash income and this restricts consumption.

Concerning drinking habits, coffee is the most common hot drink (table 30). Nearly 80% of the respondents drink coffee once or twice a day. Only a few households do not use coffee at all. Tea is rogularly consumed only by around one-third of the households. Almost half of the households never drink tea. The average expenditure for the consumption of coffee and tea is around 7 Birr a month. This is about twice as much as people in general pay for house rent, and even more than the average costs of fuel for a household.

In spite of the great number of cattle in the town, less than 25% of the respondents drink milk every day. As many as 60% of the households never drink milk (table 30).

Table 30. The consumption of coffee, tea and milk per household

Frequence	Percentage household drinking		
	Coffee	Tea	Milk
Once a day	52	30	17
Twice a day	26	5	4
Three times	7	1	1
Irregularly	9	19	18
Never	6	46	60

Source: Questionnaires of Abomsa socio-economic study, 1986

6.5.2.2 Share of income used for food consumption in different income groups

There is a strong positive correlation between the amount of income used for food consumption and the size of the monthly income (table 31). It is also to be expected that the proportion of the income used for food expenses is considerably higher among low-income groups than among the more wealthy people.

Table 31. Percentage of monthly income used for food expenses in different income groups.

Monthly income Birr	Average amount used for food	Percentage of monthly income used for food
- 10	4.75	68
11 - 20	14.50	63
21 - 30	16.70	59
31 - 40	26.10	66
41 - 50	27.70	58
51 - 60	32.60	60
61 - 70	36.80	54
71 - 80	43.70	55
81 - 90	38.30	44
91 - 100	52.50	53
101 - 150	64.00	48
151 - 200	86.90	42
201 - 300	99.)	41
301 - 400	127.50	38
> 400	217.50	42
Average	46.80	52

Source: Questionnaires of Abomsa socio-economic study, 1986

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In general, more than half of the monthly income is used for food expenses, according to the respondents. Within the lowest income groups nearly 70% goes on food, as compared to around 40% of the highest wage-earners. In absolute figures, the monthly food outlay ranges between 5 Birr and more than 200 Birr per household.

In summary, the great income differences earlier discussed (4.2.5) very strongly influence consumption patterns in Abomsa. It seems probable that an increase of the general income level of the poorest people in the town will primarily be used to improving their nutritional standard.

7. ABOMSA WATER SUPPLY PROJECT

7.1 The background of the project

At the beginning of the 1980s, the town administration of Abomsa attempted to provide water in the town from an infiltration gallery in the nearby Ferekasa river. The project was designed by the National Water Resources Commission, which also raised 160,000 Birr for the installation work. However, no less than a quarter of a million Birr was raised by the town inhabitants. The installations were carried out by the Water Development Section at Arsi Rural Development Unit (ARDU from June 1980 to June 1982[1]).

The water was pumped up from the river by a diesel engine to a water reservoir built in the highest part of the town. From there water was piped to 11 distribution points (tap stations) in different parts of the town (Figure 2).

Unfortunately, a number of technical problems were not solved, and frequent breakages of vital parts of the water-supply system occurred. In addition, the river water was impure, and the prevalence of water-borne diseases continued to remain at a very high level (6.1).

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1) ARDU project area is now included in South-Eastern Agricultural Development (SEAD) zone with its zonal office in Asela, Arsi region.

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After several breaks, the water-supply system went out of action. Renewed efforts to repair the pump failed and the project stopped. In the meanwhile, new suggestions came up for a solution of the water problems. Technical surveys made by the Water Section at ARDU showed that a spring about 5 km outside the town gave an adequate discharge of good and healthy water, which it was possible to pipe by gravity to the water reservoir already in use.

For that purpose a pipeline was needed from the spring to the water reservoir on the outskirts of the town. The cost of spring clearing and capping, pipeline and supporting structure was estimated at 212,000 Birr. In addition, a training component of water management and home science were needed, which raised the total cost to 240,000 Birr (Project proposal, ARDU, April 1984).

To finance the project, the Town Administration and the Women's Association allocated 20,000 Birr in cash and 30,000 worth of Birr in form of labour. ARDU with the limited budget gave top priority to the project, and allocated 31,000 Birr for the construction work. Thus, the local contribution amounted to 81,000 Birr.

However, it is probable that the project would not have been realized if it had not been for the timely UNICEF involvement in the scheme in the procurement of a 160,000 Birr grant. The fund was donated by the Austrian Government in December, 1983. Additional funds were made available from 1984-85 for the training of support staff in management.

7.2 The women's involvement in the project

Various approaches and efforts have been made in Ethiopia to tackle women's problems and enable them to participate in the socio-economic development of the country. A nation-wide study undertaken by the Agricultural Development Department of the Ministry of Agriculture indicated that a great number of women considered a solution of the water problem to be their most felt need. Shortage of flour mills, hospitals, wood for fuel and kindergartens were other needs given considerably lower priority (Workshop on Exploring Alternatives in Programming for Women, UNICEF, 1985).

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As in all traditional societies in Ethiopia, the women of Abomsa have the main responsibility for fetching water. Even after the opening of the new water project, less than 10% of the husbands were in charge of water fetching, mostly those cases where no woman lived in the household (Information from the questionnaires). In about 16% of the interviewed households, children had the main responsibility for carrying water to their homes.

Water fetching is not only a time-consuming work but also a drudgery, affecting the physical conditions and the health of women. Therefore, alleviating this most tiresome and time-demanding daily activity could help women to participate in other development endeavours. Such a step-by-step approach could create confidence in women to undertake and implement further projects.

Consequently, one of the main objectives of the Water Supply Project was to involve women in the planning, implementation and running of the project. With the time saved from water fetching other productive work was aimed to be started. To finance new projects it was decided to give 25% of the profit from the Water Project to the Awraja branch of the Revolutionary Ethiopia Women's Association (REWA).

Thus, REWA took the major part in the planning and construction of the project, and the whole responsibility for running it. For that reason 19 women were given a special training programme conducted on pipework, maintenance, elementary accounting, administration and management of the water scheme. The training was given by ARDU and lasted for 3 months.[1)]

To establish a receptive environment for the planned projects, 64 women were educated in general home economics, including income-generating activities and use of labour and energy-saving devices offered in order to alleviate the burden of women. General education in sanitation

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1) Among the trainees were also women from the Dodota Water Supply Project. At present, 7 of the trained women in Abomsa are employed as the maintenance group of the water system, and supervisors of the water distribution points and administrator.

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and health were also given. Teaching and demonstration materials were locally provided. Around 1?,000 Birr was expended on the activities (Report on Special Contribution, UNICEF, 1985).

7.3 The implementation of the project

The project proposal was developed by the Head of the Water Engineering Section of ARDU, and the project was approved for implementation by the Ministry of Agriculture's Agricultural Development Department. A committee was formed with representatives of REWA (the service also of the chairman), Abomsa town administration, the Provincial Ministry of Agriculture, the Ministry of Health and others concerned. A number of meetings and consultations were undertaken to clarify the role each group would play, and the resources required to implement the project.

During April-September, 1984, the spring development programme and the construction of the main pipeline was completed by the technical personnel from ARDU and the population of Abomsa town. The support from the townspeople was very encouraging, and around 12,500 man-days were delivered free (Town Administration).

According to the interviewed households 93% of the respondents took part in the programme, most of them by giving free labour and money (47%), as well as by labour only (43%) or by money (10%). Of the 7% who did not participate in the project implementation, around 75% stated the reason to be old age, illness(15%) or no capacity (11%).

The Water Supply Project was inaugurated on Septemeber 30, 1984. "At the inaugural ceremony, those women trained in pipe and water managment demonstrated their skill, and it was a very happy occasion for the total population of Abomsa town, where 11 water points are installed. This will not only relieve women from the back-breaking and time-consuming toil of fetching water but will also tremendously improve the health of children in particular and that of the community in general" (Report on Special Contribution. Progress Report No. 1., UNICEF, 1985).

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7.4 The water distribution

7.4.1 The physical outline

According to the technical survey of the project, flow measurements at the water springs recorded an average yield of 3.8 litre/second in the dry season (Project Proposal, ARDU April, 1984). A profile survey between the intake and the town's highest point, i.e. the old reservoir, showed an elevation difference of 20 metres. The first 2.5 km of the main pipe consists of a 6-inch PVC plastic pipe, and the rest is of 4-inch galvanized pipe, since suitable galvanized material for the whole pipe was not available. With these pipe sizes, there was a 5.2 m free head at the reservoir during night flow (Project Proposal, p.7).

The water reservoir is located in the south-eastern part of the town (Figure 2). From there the water is distributed by gravity to 11 distribution points in the built-up area via the former distribution system. Each distribution point has five taps where the town people can draw their water.

The distribution points are fenced in, and water is only available for payment during special service times from 8.30 -12.00 in the morring and 2.30 - 6.00 in the afternoon. The charge is five cents for 80 liters, collected by the trained women. They are also responsible for the maintenance of the water scheme.

During the present year (1986), smaller distribution pipes have been extended from the main distribution points to individual taps at seven public service places. These are the Senior Secondary School, Health Centre, Commercial Bank of Ethiopia, Awraja Agricultural Office, Prisoners' Office, Patriots' Hotel and Sports Stadium (Information from Town Administration Office). These places are charged a monthly fee for water consumption. For the next year there are plans to extend the service to another 6 government agencies, 5 public service offices, 10 private hotels and 5 private houses.

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7.4.2 The water consumption

As earlier mentioned, the water system was inaugurated on 30 September 1984. In fact, water had been temporarily supplied already from the beginning of September; however, during that time, water was delivered free of charge, since the main aim was to clean the pipes and taps by the running water. From 1 November the water project started to operate regularly and against payment for the supplied water, and thus statistics from the sales of water are available from November 1984.

According to the Water Resources Commission, the standard design for rural water supply is 25 litres/day/person for a 15-year design period. Based upon those assumptions, the water consumption in Abomsa should be around 187,500 litres a day as an average for the study period. In order to estimate the quantity actually distributed the number of pots supplied from the different distribution points were counted during a 10 - day period. This registration indicated a much lower consumption than the designed quantity. In fact, the daily distribution varied between some 40,000 litres to almost 70,000 litres, i.e. between 20% - 40% of the design figure (Figure1).

Since the cost of the water is known, it is possible to make a rough estimation of the total monthly supply of water over a longer period, from the accounting of the sale of water tickets per month. The estimated quantity varies between 36,000 and 76,000 litres from November 1984 to August 1986[1]. The average distributed quantity for the period was around 58,000 litres or less than one-third of the calculated standard consumption.

As will be explained later several breaks occurred in the water supply, especially during the first year, when water delivery was stopped for many days. However, it has only been possible to consider the registered breaks in the following calculations of the average daily consumption. In order to even out accidental variations between individual months, "running means" of three months have been used.

1) For one month, September 1985, the recorded sales of water ticket blocks ~~translated~~ to the equivalent average quantity came only to around 14,000 litres. This is so low a figure that it cannot be explained only by a break in the water supply during 5 days in September. Thus, the highly divergent figure has probably some special but unknown cause and it has been left out in this connection.

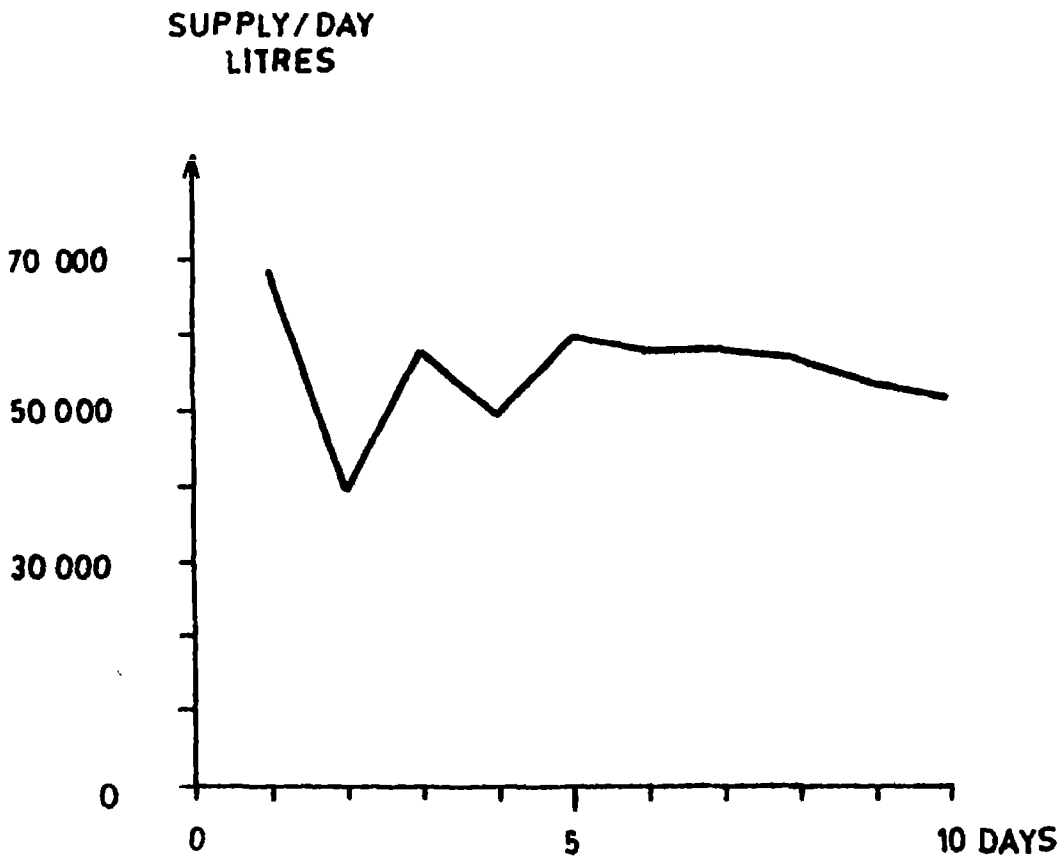

Figure 13. Consumption of water during a ten days period in December 1985

As indicated by the graph (Figure 14), there seem to be clear cyclical changes in the monthly distribution of water, expressed as average quantity per inhabitant a day. From an initial consumption of around 7 litres a day, the quantities increased up to March 1985 to well above 8 litres. Then the distributed amount steadily decreased until August 1985, when not more than 4 litres a person was supplied. Within the next nine months the distributed supply nearly tripled, and reached its highest level in May 1986 with 11 litres. After that the distribution again decreased.

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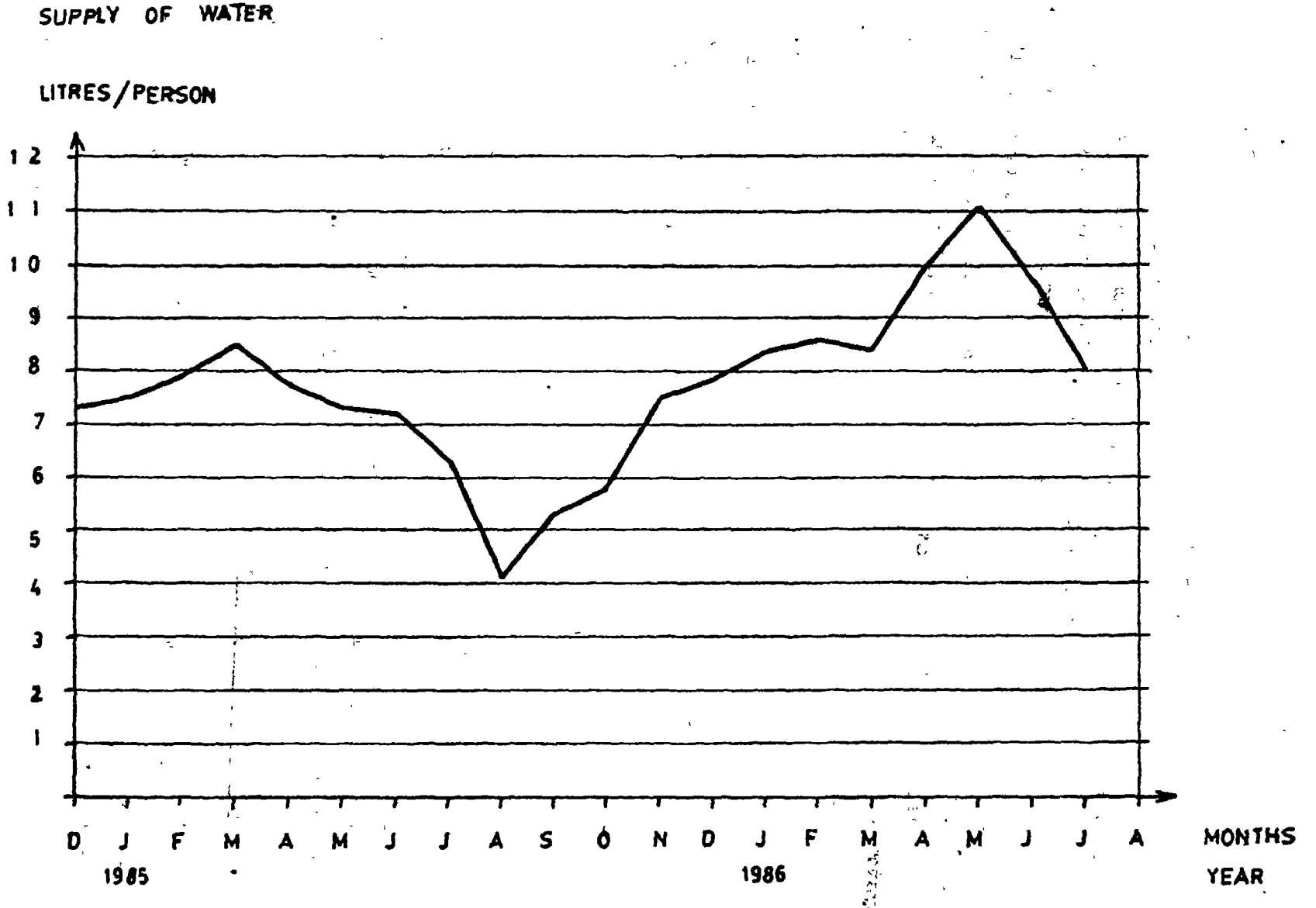

Figure 14. Sales of water from December 1984 to August 1986.
Running means of three months.

Apparently, consumption levels are strongly related to the yearly fluctuations of rainy and dry seasons. During the rainy seasons the distributed quantities decrease, probably because then people can supplement the project water with rainwater. The need for water during the dry season is considerably greater, since no extra water is available. In a longer perspective the consumption of water seems to increase. This can be interpreted as an effect of a rising sanitarian standard as well as of easier acquisition of water through the extended distribution system. The lower frequency of days of breakdown has also contributed to the larger quantities of distributed water through the water project.

In a supplementary study conducted later on, according to the information obtained from residents of the town the average consumption per person came to be 17 liters a day. Residents were also asked to tell the number of pots of water they used prior to the installation of the pipe system and the average consumption came to be 14 liters per person for a day. One can see therefore that since the pipe system there has been a marked growth of water consumption.

In the supplementary study, an attempt was also made to sample from three different groups of the population, civil servants, families nearer to the river and other occupation groups. It was found that families of civil servants consumed a little bit more than the average (18 liters per person for a day) after the pipe system.

7.5 Effects of the project

As indicated previously, a supplementary study was conducted in September 1987 to examine in detail the effects of the project on the community.

Totally 83 households were visited and interviews were held with 83 women and 20 men from the households. An attempt was made to conduct the interviews with people directly involved in the fetching and utilization of water. Other discussions were held with the town council and the Awraja REWA chairpersons, the women involved in the maintenance and management of the water system and personnel in the health centre. Although not directly related to the objective of the supplementary study, a small technical evaluation of the pipe line was

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made since a member of the research team happened to be an expert in pipe work. The technical report is annexed.

The main objective of the Abomsa Water Project was to supply the town with clean and adequate water at reasonable prices through the full participation of women. Meeting this objective was thought to allevicate women and children who are mostly responsible for fetching water from the tiring and laborious activity. It was also expected to affect positively the health of the community. Indirectly the project aims at establishing new development projects for women and children through the economic profit envisaged from the water scheme, and by using the released time for other productive activities.

7.5.1 Supply of safe and adequate water

Safe spring water was led through a 5.8 km pipe line to the town. The community succeeded in getting safe but not adequate water supply starting the beginning of 1977 (E.C). Since then, according to the Town Council, pipe lines have been connected to eight government and mass organizations, seven private houses and the two kindergartens in the town. One of the big hotels has built shower rooms and it has been a blessing to at least a small portion of the community who can afford it.

The objective is met, but partially. A continuous adequate supply of pipe water is not yet assured as the following table* of days of pipe breakdowns indicate.

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* Data-Interview with Town Council - See Annex

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Year (E.C.)	Dato	No of days	Total days
1977	Tahsas 14 - 20	7	
	Megabit	8	24
	Miaxia 25 - 30	6	
	Guenbot 15 - 18	3	
1978	Meskerem 6 - 8	3	
	Megabit	2	
	Miaxia	5	46
	Guenbot	6	
	Sene	2	
	Hamle	20	
	Hehassie	8	
1979	Meskerem	20	20
1980	Meskerem	8	8
Total			98

During the last three years, the community did not get pipe water for a total of three months and eight days. This has been in the words of the chairman of the Town Council a frustration for the community as will be seen later on in the problem section of this report.

The supply of safe drinking water within a short distance of each household has made a big difference specially to women and children. The average distance residents walk to and from the river is 1100 meters while it is only 300 meters to the pipe.

Table 32. Percentage of residents according to distance travelled to fetch water. (in meters).

Distance / Source	$\rightarrow 100$	$100 < x < 201$	$200 < x < 301$	$300 < x < 401$	>400	
Pipe	16.3	25.0	28.7	8.7	21.3	100

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Table 33. Percentage of residents according to distance travelled to fetch water (in meters).

Source	Distance					
	400	400 x 801	800 x 1201	1200 x 1601	1600	
River	25.0	21.2	12.5	25.0	16.3	100

While only 21.3% travel a distance of more than 400 meters to and from the pipe, the river is further by more than 40 meters (round-trip) for 75% of the residents.

The benefit is not only in greatly reducing fatigue but also in the time saved by residents. 76% indicated that they have saved time and have used the time for activities like attending school and literacy classes, study, basketry, spinning, weaving, knitting, etc.

Residents were asked to tell which source they use to fetch water, the pipe, the river or both. 64% of the households indicated the pipe as their sole source unless there is a breakdown. The remaining 36% mentioned using both sources even while the pipe is functional. Their reasons for using both sources are too much queueing at the distribution terminals and not finding it really dangerous if they only use the pipe water for drinking and do other activities using river water. This is contrary to accepted knowledge of the disease Bilharzia as it enters the body through body contact.

The following table shows percentage of households consuming the indicated liters /person per day according to source, pipe or both.

Table 34. Percentage of households by consumption /person per day & by source.

Liters/ Source	5 - 9	10 - 14	15 - 19	20 - 24	_ 25	Total
Pipe	8.0	26.0	26.0	18.0	22.0	100
Both	41.4	17.2	20.7	13.8	6.9	100
Total	21.0	22.5	23.8	16.3	16.3	100

The table shows that the pipe users consume more, as 77.6% of them consume 15 or more liters per person perday while it is only 41.4% for those who use both sources. Nobody was found to use the river only.

Of these two categories, the pipe water users contain a much higher percentage of people with primary and higher education. On the other hand, of those who are in the category of households very much nearer to the river, more than 60% are using both sources indicating distance also plays a role.

One can therefore conclude that while easy accessibility of pipe water is important, education and attitude formation play a great role.

7.5.2 The economic benefits

In the project proposal it was estimated that the total yearly net income in 1985 and 1986 should be in the region of 11,000-12,000 Birr (Project Proposal, ARDU 1984, p.12). Out of this sum, REWA's share of 25% should amount to almost 3,000 Birr and it was expected, that REWA could meet the indirect objective of the project mentioned previously, i.e., the carrying out of development and income generating activities that would benefit women and Children particularly.

In a discussion with the Town Council the account for the last three years showed the following:

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Table 35. Account of the pipe water system (in Birr)

	Year(E.C.)	Income	Expense	Balance
1	1977	8050	8525.60	-475.60
2	1978	12610.97	11023.12	+1587.85
3	1979	15644.47	11134.61	+4509.86

The council's plan with the expected income was to give support to the two kindergartens and also open a workshop for the maintenance of the pipe line. This did not materialize as the income was far short of that projected.

On REWA's side the income they got from the sale of water was only 11.9% of the projected sum as is seen next.

Table 36. Comparison of income received by REWA with projected (Birr)

	Year(E.C.)	Projected income	Received income
1	1977	2361.88	83.00
2	1978	2834.25	135.00
3	1979	2834.25	734.00 (not received but confirmed)
	Total	8030.38	952.00

At the outset, REWA, like the Town Council, had also planned to equip the two kindergartens with the necessary teaching materials using the income expected. Nothing has been tried as the fund was very limited.

There are a number of reasons that contributed to the wide difference between the expected income and the reality.

1. The original calculation was based on a cost of five cents for 60 liters instead of the actual five cents for 80 liters.

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2. The projected daily consumption is far short of the actual one as was seen by observation as well as data got from consumers.

3. The broak downs throughout the years have contributed to the decline in income.

More over, according to EWA; organizations like the Ministry of Agriculture and others used to get water without paying for some time. This they think is also a factor for the low income. Although not substancial, 15% of the residents interviewed admitted they have seen some people getting water from the water distribution terminals without paying.

Thus, to raise the profit margin of the project and secure economic benefits for other development projects, especially for the intended target groups of women and children, the water project has to stabilize its delivery system through a proper and regular service. The reasons for the recurrent breaks have to be removed. There is a tendency towards increased demand of water during the past year (1986), which should be allowed for. There is still a very big potential to increase the water supply, since the maximum production, according to the project proposal, is more than 300,000 litres a day, i.e. around five times as much as the present consumption.

In an interview with the Town council it was indicated that during 1977 and 1978 (E.C.), the kebeles and few individuals started vegetable gardening. The result was very encouraging and directive were also given to the community to follow the example. Few tried but since private house connections are few and the continuous flow of the water has not been assured, the idea could not be sustained.

It is worth mentioning here that although it doesn't bring economic returns to the organizations, some organizations like schools have been able to use the pipe water to grow flowers and trees and as a result have created very lively and conducive environment for their students.

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7.5.3 Health effects

"Improved health is often assumed to follow automatically from the provision of improved water supplies. However, the relationship is a complex one. Water supply without supplementary interventions such as proper sanitation, proper water storage, health education and community involvement may be inadequate as a measure to improve health" (Aboubaker-Claeson, p.1, 1985). The experience gained from a similar water supply project in Arsi region, the Dodota Water Supply project, may give an indication of the necessity to follow-up the water programme with education and improved sanitarian facilities. This is in line with the UNICEF programme which supports a number of activities connected with the health sector in Abomsa, as well in Arba Gugu in general.

The major anticipated health benefits from water supply and sanatarian programmes is the reducation of morbidity and mortality caused by diarrhoea. It is estimated that water and sanitation improvement can reduce diarrhoea morbidity by 25% (Aboubaker-Cleson, p.2, 1985). However, good statistical material is still lacking for an evaluation of the changes in the health conditions which it is possible to ascribe to the new water project and assooiated sanitarian improvements. For that purpose a special health study must be carried out.

In and around Abomsa the following water borne and water and sanitation related major diseases are found:

- Bilharzia
- Ameoba
- Gardia
- Hook worm
- Tape worm
- Round worm
- Vacillery dysentery
- Askaris
- Typhoid fever.

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Of these, Bilharzia is transmitted by the contact of the body with the infected water and is therefore directly a water borne disease. The others are caused by poor sanitation and are indirectly related to the condition of water and the environment.

The next tables show the number of laboratory identified cases by type of disease and age. Only three diseases are considered due to Ameoba and Jardia being the most common and Bilharzia having a direct relation to water.

It does not show actual sample laboratory results of the study but only registered cases from incoming patients to the health centre and so the interpretation should be taken with caution.

Table 57. Number of cases by type of disease and age
1/1/76 - 29/12/76 (E.C.)

Age / Type of disease	0-4	5-9	10-14	15-19	20+	Total
1. Bilharzia	0	6	14	12	16	48
2. Ameoba	61	44	70	74	529	778
3. Jardia	74	62	61	53	318	568
Total	135	112	145	139	863	1394

Source: Supplementary interview.

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Table 38. Number of cases by type of disease and age
3/1/78 - 21/10/78 (E.C.)

Type of disease \ Age	0-4	5-9	10-14	15-19	20+	Total
1. Bilharzia	1	6	33	17	22	79
2. Ameoba	3	6	9	18	55	91
3. Gardia	6	16	33	31	166	252
Total	10	28	75	66	243	422

Source: Abomsa Health Centre.

It has not been possible to get data by age for the last two months of 1978 but in order to make comparison between the two years, i.e., the year just before the installation and the second year after, total number of cases for the three diseases are given next.

Table 39. Number of cases by type of disease and year.

disease \ Year	1976	1978
1. Bilharzia	48	115
2. Ameoba	778	128
3. Gardia	568	322
Total	1394	565

According to the health personnel in Abomsa, unlike Ameoba and Gardia, the eggs laid by the bacteria that causes Bilharzia are very few and it needs good laboratory and concentrated effort to identify it. Second, it could take years for a person to feel the illness and come to the health centre. They therefore indicated that it is unlikely to expect immediate change in the incidence of the disease by the installation of the pipe system. On the other hand, as has been clearly seen in the

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previous tables, Amoeba and Gardia have decreased by oever a half which according to them is a manefestation of the health effects of the pipe water.

Pipe connection has been made to the health centre and according to the personnel has made a world of difference than before. Previously they used to teach the people about diseases caused by the river water and yet the health centre used the same water which was in their words, embarrasing. Before they had to wait for water and [illegible]l it before they start treating patients every day. The expense was enormous as compared to now which is only 40 Birr a month. They have a shower service nowithin the centre.

Regrettably the health centre has no educational program on sanitation and personal hygiene and specially on water borne and related diseases for the general public. The health centre has not tried to treat the spring water in any way. 75% of the residents indicated they have had health education mostly in their literacy class or health education program that is usually given in the health centre for patients. One can imagine therefore that if there had been intensive health education program to the public coupled with health facilities, the health effects of the installation of the pipe system would have been even more.

Residents were also asked to enumerate the health effects of the pipe water.

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Table 40. Number of respondents by age who indicated different effects.

Age / benefits	10-14	15-19	20-24	25-29	30-34	35-39	40+	Total
1. Disease has decreased.	2	8	3	8	11	9	32	73
2. Water has mineral character and is therefore good.	-	-	1	1	6	-	-	8
3. Health condition is worse now.	-	-	-	1	-	1	-	2
4. No problem now or before.	-	2	-	1	1	2	9	15
5. Difficult to compare the two periods because of the breaks.	-	-	-	2	-	-	1	3
Total	2	8	4	14	18	12	42	101

Out of the interviewed 103 residents, 101 have given their opinion and more than 70% believe disease has decreased.

7.5.4 Social effects

The indirect outcome of the Abomsa Water Project was the full involvement of women at all stages of the project and thereby proving that women can after-all function equally to men. This of course would bring attitudinal changes in a community and also would help create new possibilities for women's participation in development.

Residents were asked that after they saw the women in the management and maintenance of the pipe system if they still think it is not women's role and should be confined to the home. The response is seen in the next table.

.../

Table 41. Percentage of respondents' response on attitudes of women's participation in the outside world by age

Age / attitudes	10-14	15-19	20-24	25-29	30-34	35-39	40+	Total
1. Women have to go out of house confinement and work	100	100	100	100	100	91	81.2	90.2
2. Women have never been confined even before	-	-	-	-	-	9	8.3	4.9
3. Women have to be confined to the home	-	-	-	-	-	-	10.5	4.9
Total	100	100	100	100	100	100	100	100

Around 95% of the respondents think that women should go out from their home confinement and work.

What makes these responses dependable is that on most of their replies, they mentioned in detail that it is because of the trained women that they have been able to get healthy drinking water.

On the equality of women and men, a similar but in few cases unexpected replies were given. Few, wanting women to go out and work still think women are inferior to men.

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Table 42. Percentage of respondents on attitudes concerning equality of the sexes by age.

Age / attitudes	10-14	15-19	20-24	25-29	30-34	35-39	40+	Total
1. Women and men are equal	50	50	75	91.7	85.7	90.9	77.1	78.2
2. Women are weaker physically but are equal mentally	50	30	25	-	7.1	9.1	6.2	9.9
3. Women are inferior to men	-	20	-	8.3	7.1	-	16.7	11.9
Total	100	100	100	100	99.9	100	100	100

It is again worth mentioning that in their replies most appreciated the effort of the technician women and have based their response on their observation of the capability of these women.

In a similar attitudinal question, i.e., whether or not they agree if women could shoulder responsibility to manage and implement other development activities by themselves, 83% said they agree. Asked to enumerate that activities, 45% indicated agricultural development and vegetable gardening. Other areas mentioned were small cottage industries like soap making, knitting, weaving, handicrafts, pottery, etc.

As can be seen in the table, it is mostly the above 40 years of age who believe women are inferior. It could be interesting to look at some of the rational they gave for their belief in the following Amharic sayings they quoted:

> "Sait biawuk bewond yalk". implying it is the man who finished the job even if the woman knows about it.
>
> " Kenber kalawahade saitua arssa t:belalech?., Wondu kalwetabet ayhonem" implying unless the man is there, the woman can't farm and feed alone.

.../

These saying do not follow any logic but represent a long standing attitude that is difficult to avoid in old age.

The other societal effect of the project is the moral and psychological uplift brought about on the female sector of the community as a result of observing the technician women in action. According to the technician women, more women in the town have started attending school in expectation of other similar development activities in the future.

Concerning the attitudes of their families, neighbours, relatives and the community in general, all technician women said everybody is happy and have accepted the fact that women can do men's work and have also gone to the extent of wondering how this could be possible.

On their part, most indicated they had no job before and getting the training and being employed has brough them some income and a possibility of continuing their education through extension class. Some mentioned with pride about their participation in this activity where at present no man is trained in the field in the town. They have all forwarded their appreciation to RWA and above all to UNICEF.

7.6 The Operation of the water project.

In general it is the opinion of the general public and the people involved in the management, administration and maintenance of the system that the installation of the pipe line is the biggest and most important community development activity that ever happened in Abomsa. This is also amply reflected by the health and social effects described previously.

Intake problems at the supply springs

During the rainy seasons, water from the higher areas around the water supply springs has infiltrated the intake chambers, causing dirty water and sedimentation in one of the water tanks. To solve these problems, the flood water should be diverted from the intake area by drainage ditches. The upper part of the intake should also be covered by a ceiling to protect erosian material and pollution entering the water-intake area.

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The area which has to be covered is estimated at 600m^2. The total cost for the covering, coiling and the excavation of the drainage ditch is estimated at 5,500 Birr. In addition, engineering costs, wages and contingenies will raise the sum to around 8,500 Birr. (Estimations made by Shiferaw Jarse Tedecha of the Irrigation Development Team, SEAD head office, Asella).

Distribution terminals:

of the eleven water distribution terminals, nine are functioning. One of the two closed is out of order while the other although working could not be opened due to shortage of manpower to manage it. There are totally six women managing the nine terminals. In terminals which serve the most densly populated part of the town, taps get destroyed frequently resulting in two to three taps remaining out of five for some terminals.

Water distribution time:

Residents were asked the time that suits them to collect water from the distribution terminals. The following table indicates that:

Table 43. Percent of households according to suitable time for fetching water.

	Time (Ethiopian)	Percentage
1	12-1 (morning)	61.2
2.	Same as the present time	36.3
3.	Afternoon only	2.5
	Total	100.0

Source: Supplementary interview, 1987.

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As is seen, most prefer the morning, between 12 and 1. This has many reasons. The traditional Ethiopian family, usually the women or children fetch water early in the morning and later on prepare breakfast. People indicated that students go to school after fetching water and in the present circumstances are usually late for school. Even if people are convinced that they catch diseases from the river water, the day to day operational inconvenience of the pipe, i.e., the distribution time and resulting queues have led, as described before, over 30% of the households to use river water also.

Mangement, administration and maintenance of the system.

At present the remaining five technicians and one trained for the accounting work of the system are managing the sale of water in the terminals. These technicians also maintain the pipe line. There is one who does the administrative and accounting work.

The following table shows major problem areas as indicated by residents of the town:

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Table 44. Percent of respondents by major problem areas.

	Problems	Percentage*
1	The system breaks as a result of the plastic pipe being destroyed	91.1
2.	Too much queueing	29.4
3.	Managers of the terminals do not koep order	19.6
4.	Terminals are not open according to scheduale	16.7
5.	Some terminals are not used totally	12.7
6.	Terminals are closed before schedule	11.8
7.	Managers of terminals mistreat people	8.8
8.	Most taps are not working	7.8

Source: Supplementary interview, 1987.
* Each response is calculated individually out of total respondents.

Other points mentioned included the non-availability of spare parts; not enough personnel to manage the terminals; water not treated; opening and closing hours of terminals not suiting the population, etc.

One has to keep in mind that some of these points could have been raised by more people if it had not been for fear of exposing others. The research team has witnessed for itself one breakdown of the pipe, the queueing, the unkept opening and closing hours of the terminals, taps that are not working, terminals closed and in all things that have been raised.

The Town Council, REWA and the technicians all indicated the repeated breakdown of the system as the major problem area. They think the cause is the PVC pipe which has been exposed to man made as well as national destruction. As the area where the plastic pipes are buried is rocky, they think that burying them to the normal standard of upto one to one and a half meters is very difficult.

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The other associated problem mentioned was that since there is no road throughout the 5.8 kms pipe line, maintenance work has been ardous and slow. When the supply line is cut, the team goes out to make a study first which takes usually the whole day as there is no means of transportation. Doing the actual maintenance work adds more days. The non-availability of important spare parts like durable taps, solvents, etc in the market has handicapped the technicians to accomplish proper and lasting maintenance work. All these have added to the frustrations of those who manage the system as well as the whole community.

In conclusion, most problems mentioned by the residents have also been acknowledged by the people who manage the system.

Administration of personnel

The technicians who manage the terminals as well as the maintenance work are employees of the Town Council. They have been working for the last three years and in the words of the residents, the chairman of the Town Council and REWA, they have been daring, creative and successful in their work. Nevertheless, due to management and administrative problems, difficulties have come that are contributing negatively to the whole operation of the system. These are:

- The women who manage the system have not been permanently employeed and as a result their morale and expected earnings have been affected. According to the Town Council, the technicians have been asked to fill forms repeatedly by the Water and Swerage authority.but nothing has resulted.

- There is no division of labour among the technicians. They manage both the distribution terminals and the maintenance work and this according to the women has been the other frustration.

- According to the Town Council, the Water and Sewerage Authority has not been willing to take over the management of the water system. As a result it has not been possible to get any technical and material aid as well as solve the employment of the technicians mentioned previously.

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- The technicians work every day includeing sunday. They have never had any vacation. In their words, they said their rights have not been respected, thoy are insecure.

Maintenance of the system

The maintenance of the water distribution points has been inadequate. Each tap station has 5 taps. Consequently, 55 taps were originally installed. In February 1986, however, a mojority of the taps (28 out of 55) were not working. Three distribution points were totally out of order. In October 1986, nearly two-thirds of the taps were more or less destroyed (35 out of 55). Two of the distribution points were closed. (No. 2 and 10, Figure 2).

Thus, the working capacity of the distribution system was reduced to a minor part of its real potential, causing queues and extended waiting-times. It is mostly the water points in the peripheral areas of towns that are either not working or in bad condition. This supports the tendency for some people in these areas to use the nearby river water which is available at all times of the day.

The reasons for the prevailing unsatisfactory situation has to do with maintenance, as well as economic and management problems. Workshop, spare parts and repair tools are not available, resulting in a lack of proper maintenance of the water system and prolonged interruptions of the water supply. The taps available in the local market are apparently not suitable and get broken easily, Therefore, they must be replaced frequently, resulting in heavy expense.

Unfortunately, the income from the water collection fees is delivered directly to the Treasury of Abomsa Town Council. This routine means that all expenditures have to be approved by the Ministry of Urban Development and Housing. This complicates the procedure and delays the utilization of water income for maintenance expenditure and other related services.

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Role of the Town Council and REWA and their relationship.

The responsibility of the Town Council is the over all management of the system. According to the project document, REWA's responsibility included conducting the necessary follow-up and evaluation of the activities of the technician women and the planning and implementation of development activities, that would benefit women and children using the 25% of the net income from the sale of water.

In reality the two organizations from the beginning had no relation concerning the operation of the project except REWA selecting the women for the initial training. The cause for this according to REWA is the disagreement between the two on the sharing of the income. Town council insists it should be from the net income while REWA says it should be from the gross. While the Town Council thinks agreement has been reached in a joint meeting, the REWA chairperson insists it has been imposed upon them. REWA even goes further by saying that they didn't even agree on the 25% as well as the Town Council taking over the whole management responsibility of the system. All these according to REWA has forced them to leave aside everything to do with the project to the Council and stay neutral. This regrettably has hurt specially the technician women since according to these women they had no way of fighting for their rights.

Suggested solutions

In the previous few pages management, administrative and maintenance problems of the system has been dealt with. Next will be suggested solutions by the community and the people involved in the running of the system.

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Table 45. Percent of residents by suggested improvements.

Suggested improvements	Percentage*
1. Change the PVC pipe with galvanized steel pipe	56.7
2. Put guards on the pipe line	21.7
3. Open all terminals	15.0
4. Assign more water distribution terminal managers	11.7
5. Give education and advice to the managers of the terminals on how to handle the community.	8.3
6. Maintenance work needs much labour, add men to the team	5.0
7. Service will not improve under the town council give it to the Water and Sewerage Authority	3.3

* percentage calculated individual out of total respondents.

Other responses include:

- Add more distribution terminals.
- Opening and closing hours should suit the community.

More than 50% of the respondents suggested changing the PVC pipe for galvanized steel pipe. Nearly a quarter suggested putting guards on the whole pipe line. This shows how serious is the break-down of the line to the community.

There is agreement on the part of The Town Council, RUWA and the technicians on changing the PVC pipes with galvanized pipes to solve the problem once and for all. They base this suggestion on the following reasons:

- As the area is rocky, it is very difficult to bury the pipes to the recommended depth.
- The area is usually flooded during the rainy season and it is always likely the PVC will be exposed in time even if buried deeply.

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- There is always a possibility that people will cut it even if buried deeply.

The administrative and resource (spareparts) problems are the next serious ones. In order to solve the administrative problems like the employment question as well as to get enough spare parts, the system has to be taken over according to the Council by the Water and Sewerage Authority. The acquisition of the necessary materials for maintenance work has been very difficult even if the money is available.

As mentioned previously the other every day problem is the transportation question. The Council is of the opinion that it would improve the efficiency of their maintenance work if one or two motor bikes could be obtained from aiding agencies through UNICEF.

7.7 Summary, Conclusion and Recommendation

7.7.1 Summary and Conclusion

Project proposal

- Project proposal for the projected water consumption was based on 25 liters per person per day This optimistic assumption did not consider the developmental characteristics of Abomsa. This assumption inflated the projected income and hence contributed to the unfulfillment of some of the important objectives of the project.

- REWA has its own organizational structure. When the proposal was prepared, it is only the Awraja REWA that was contacted. This has isolated the National and Regional REWA offices from helping the project.

- The management responsibility of the system was not clear in the proposal. It was decided later on in a joint meeting of the Awraja party organ, the Awraja administration, the Town Council and REWA. As a result REWA has never accepted it fully.

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- Proposal did not give trial period for the system and as a result understanding was made that the system would be self-sufficient immediately.

- Proposal never made clear how in the future the system would develop, i.e., the channel for the acquisition of spare parts, the training of personnel and overall maintenance strategy.

Supply of safe and adequate water.

- The objective of supplying safe and adequate water to the Atomsa community is met partially. A continuous adequate supply of pipe water is not yet assured as a result of the repeated breakdowns of the system.

- The supply of safe drinking water within a short distance of each household has made a big difference specially to women and children.

- Nearly two thirds of the residents use only pipe water unless it is broken. Of those who use both sources, most indicated they use the river only for cleaning utensils and washing cloth. This aggravates the incidence of Bilharzia as it comes through body contact.

- Most of the residents with better education use pipe water only. Nearly all sampled residents nearer to the river use both sources indicating distance also plays a part.

Economic Benefits.

- Since both the Town Councils and REWA's net income from the sale of water is far short of the projected sum, no attempt has been made by both to start any development activity that would support women and children.

- Attempt has been made to do irrigated vegetable gardening by kebeles and few individuals with encouraging results. It was not possible to expand it as the continuous flow of the water has not still been guaranteed.

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Health effects.

- Laboratory results from Abomsa health centre have clearly shown that water and sanitation related diseases have decreased since the pipe water.

- It is impossible to expect a change in the incidence of Bilharzia as it takes years for a person to get the illness and also as a result of the breakdowns and also the wrong utilization of the river water.

- More than 70% of the residents believed that disease has decreased since the pipe water.

- There is no associated health education program on the utilization of water as well as personal and environmental sanitation.

- Eventhough it is not possible to quantitatively measure how much women and children are saved from the laboricus task of carrying water from the river far distance, it is very clear that getting pipe water nearby will have substancial positive health effects.

Social effects:

- The women have proved through the Abomsa Water project that they are capable of managing a development activity. This is amply demonstrated by the fact that at no time were they unable to maintain the pipe line eventually.

- The attitudinal change brought about by the involvement of the women is tremendous. Most residents think women and men are equal and women should come out of their house and take responsibility equally like men.

- The involvement and success of the technician women has brought about a moral and psychological uplift of the women in the town. More women are now attending school in expectation of involving themselves in other similar development activities in the future.

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- Most think they have been able to save time by getting water from near-by and as a result has used it for handicraft work and to be on time for school which was not true before.

The Operation of the Water Project.

- During the rainy season, dirty water infiltrates the springs. Drainage ditches should be dug to divert the flood and also cover the water intake area.

- Of the eleven water distribution terminals, nine are working. One is out of order while the other is closed due to shortage of manpower.

- Most taps are destroyed.

- Most residents indicated it is between 12 and 1 in the morning that suits them to fetch water from the pipe.

- Other major problem areas are the breakdown of the pipeline and related maintenance work as well as personnel administration.

- The two bodies, the Town Council and REWA who have a joint responsibility for the project have not cooperated at all in solving the operational problems of the system.

- Suggestion has been made by over half of the respondent and all people involved in running the system that the PVC pipes should be changed by galvanized steel pipes.

- The Town Council and few residents think that the Water and Sewerage Authority should take over the system in order to be able to solve the administrative and maintenance problems.

7.7.2 Recommendations for action

To handle the current problems of the water project a number of actions have to be undertaken:

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1. Technical improvements and repairs.

(a) To avoid the frequent breaks in the water supply, the PVC pipes have to be exchanged for galvanized steel pipes. The cost has been estimated at about 70,000 Birr.

(b) To manage the distribution of water to the townspeople in a proper way, all eleven water points must be restored. This should include exchange of the presently used "rotation taps" for more robust "push taps", already in use in some other water projects. The cost of new taps is around 1,700 Birr, and for restoring the two non-functioning distribution points around 5,000 Birr is needed.

(c) To get a clear indication of the distributed quantity of water, each distribution point should be equipped with a water metre. Cost can be estimated at 1,700 Birr.

(d) To stop the infiltration of dirty water into the water supply system, the Town Council, in collaboration with SEAD, should cover the catchment area with slabs where necessary. The cost for the improvement is estimated at 8,500 Birr.

The total estimated sum required to carry out these technical improvements would therefore be 86,900 Birr.

2. Service improvements

(a) All 11 distribution terminals should be opened at scheduled hours. The morning hours should start from 12 in the morning.

(b) At least three of the better trained and more efficient technicians should be relieved of the managing of the terminals and be left with the technical aspect of the work only.

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(c) To replace the three technicians and to manage all distribution terminals more efficiently at least six new functionaries have to be employed. This will increase the running cost by around 360 Birr a month. It is probable, however, that the increased costs for a well-functioning distribution system will be more than compensated for by a higher consumption of water, not to speak of the positive health consquences if some of the occasional uses of river water could be avoided.

3. Management improvements

(a) The overall maintenance responsibility of Abomsa Water Supply Project should be taken over by the WSSA's regional office in Nazret. They have the experience, capacity and equipment to undertake major repairs, and the water project belongs to their area of responsibility.

However, since Abomsa is far away from their service facilities, the establishment of a smaller workshop equipped with necessary tools for routine maintenance work is essential. The Town Council, SEAD, UNICEF and WSSA should review this and support its realization.

(b) As a consequence of WSSA's taking over the maintenance responsibility the women functionaries should also be permanently employed and trained by them.

(c) A separate account for water income should be opened to facilitate the flexible utilization of the funds for the water scheme and other development activities, according to the basic agreement between the Town Council, REWA, SEAD (ARDU) and UNICEF.

Any discussion of the handing over of the water scheme should consider the basic agreement on the utilization of funds, training of female technicians, and ensuring permanent emplyment for the people trained.

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4. Economic improvement

(a) The initial agreement between the parties concerned, securing REWA a fixed part of the water profit, must be respected. It is probable that the proposed technical solutions, a well-kept maintenance and service organization and a simplified management procedure will substantially increase the water consumption and the net profit in due course. There is an increased demand for water in the town which can be satisfied if the present bottlenecks can be removed. It could be useful if UNICEF is involved in the Planning and evaluation part of possible development activities REWA would undertake for a limited period.

(b) It has been suggested that the cost of the water, 5 cents for 4 jars, is too expensive for poor people. Even if this may be true in some cases, the provision of a free water supply selectively to some people may create more problems than it solves.

It seems more appropriate for the Town Council to take over some of the more costly project maintenance expenditures. In this way, REWA will get a higher profit which will benefit especially the poorest people of the town, through REWA's committed support to the kindergartens, family education and other social activities.

According to the interviews, on an average, each family in Abomsa spends between 1.50 and 2 Birr monthly on water consumption. Converted to water per day, a monthly water cost of 1.50 Birr will give around 80 litres per household, which is a considerably higher quantity than the water sales indicate . . Thus, there seem to be good reasons for equipping the distribution points with water metres to check how efficiently the payment system is working.

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5. Central Lessons for future Projects.

- At the Design stage of a project proposal all bodies who would be involved in all stages of the project should be involved since the proposal is a basis for commitment. If every body been involved from the beginning in this project there might not have been so much problem with spare parts, the employment question and the confrontation between REWA and the Town Council.

- Design of such a project should have been coprehensive. Getting water from A to B could be a technical thing but it is more than that, it has development aspect. It should have had the other components like education, health and other aspects that have to accompany the water system. Some aspects like education on the use and benefit of clean water, etc, should have begun well in advance of the physical construction of the system. The whole scenario should have been prepared together.

- Base line information was inadequate. Distribution hours for example was not decided on consumers opinion. The 25 liters per person per day consumption estimate was not based on the local situation. Good base line information for design of project is important for narrowing the gap between assumptions and actual operations.

- It might have been useful to identify and include development and income generating activities that could be taken by REWA in the project proposal instead of leaving it for later action. This would have been a clear incentive to continuing action and would also have generated enthusiasm for the water project.

- There should have been a built-in evaluation mechanism that involves all bodies including UNICEF so that problems can be identified at an early stage and assistance provided on time.

- Changes expected like degree of consumption, reduction in time spent on water fetching etc., should be turned into measurable targets which could be used as yardsticks for evaluation later on.

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- Most breakages happened as a result of people cutting the PVC pipes. This shows that the whole effort has not satisfactorily involved all sectors of the community or in other words it has not been very much community based. If the community had been more closely involved, it is likely that delibrate damage could have been controlled.

- There should be a trial period for projects like this where by the construction aspect would be tested and other unforseen circumstances examined. In this instance everything was left to the local people immediately and as has been seen, they were not fully ready to fulfill the set objectives satisfactorily.

- In the preparation of developmental project proposals, care must be taken to:

  - clarify the duties and responsibilities of all involved bodies;

  - base assumptions and projection on not only global standards but also on feasibility study of the local situation;
    (the 25 liters per person per day consumption level and the installation of the PVC pipe could be sited as examples of assumptions made wrongly).

  - include future plan of the development of the project. (No strategy was worked out for example on how to procure necessary tools and spare parts for future maintenance work.)

Annex I

Outcome of Local Discussions With the Town Council Chairman

Extensive discussion was conducted between the chairman of the Town Council and the research team. Themes of the discussion were:

- comparison of project objectives with project accomplishment;
- roles of the Town Council in the project starting from its' inception up to now;
- income obtained from the sale of water and it's utilization;
- support given by the council to REWA in their activities related to the project;
- benefits got by the community as perceived by the council;
- any steps taken by the council to make sure the community uses the pipe water;
- any administrative, management and maintenance problems faced; and
- future plans concerning the development of the water system, etc.

Project identification and preparation:

There was a pipe water system through which water was pumped from the river by a generator before 1974 E.C. It was not enough for the town and the problem of getting safe drinking water became acute. The Town Council, having understood the seriousness of the problem contacted the Awraja Agricultural office and started a study on other possibilities. The project proposal was prepared and presented to UNICEF for help.

Pipe Installation and follow-up:

The Town Council in cooperation with the Awraja administration REWA, and Arssi Rural Dovelopment Unit were able to install 5.8 kms of the pipe line through the full participation of the population in money and labour.

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REWA was involved in the selection of the women who would be involved in the main pipe installation work and later on its management and maintenance after training. REWA was also supposed to do a joint follow-up and evaluation of the progress of the project with the Town Council.

The eight hundred meters plastic part of the pipe which at present is giving all the problem was not burried as normal procedures demanded. As a result, it has been exposed to sun light, flood and above all individuals who repeatedly destroyed it. As the area of the plastic pipe is rocky mostly, burying it up to the normal standard of one to one and half meters becomes very difficult.

The 6" and 4" pipes installed according to the council, are not at all necessary for the flow of water. They also think that the present problem with the pipes emanates from this partly as it has been a problem to maintain them.

The other assoiated problem mentioned was that since there is no road through out the 5.8 kms pipe line, maintenace work has been ordous and slow. When the supply line is cut, the team goes to make a study first which takes usually the whole day as there is no means of transportation. Doing the actual maintenance work adds more days. All these have added to the frustrations of the whole community.

The non-availability of important spare parts like durable taps, solvents, etc in the market has handicapped the technicians to make proper and lasting maintenance work.

Responsibilities of the Town Council:

The water system is under the overall management of the Town Council. It is responsible for:

- administration and management of the system;
- collection and accounting of the income from the sale of water;
- follow-up, evaluation and maintenance and
- the acquisition of the necessary materials.

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First of all according to the council the responsibility of taking over the overall management of the water system was given to the Council through a discussion and agreement between the council, REWA, the Awraja administration and the Awraja Party office. This allegation is contested by REWA. REWA maintains that the decession to shift the managment was imposed on them.

Planned activities envisaged by the Council using the income expected:

One main objective of the project was that the Town Council would receive 75% and REWA the rest of the income and would use it for development and income generating activities that would benefit the community especially women and children as per the activities of REWA.

According to the council, it was planned to give support to two kindergartens and also open a workshop that would be useful for the water system. This was based on the assumption that on the whole the net income from the sale of the water would be arround 11,300 Birr yearly.

In reality the account shows the following:

Year	Income Birr	Expense Birr	Balance Birr
1977	8050	8525.60	-475.60
1978	12610.97	11023.12	+1587.85
1979	15644.47	11134.61	+4509.86

The planned activities therefore could not be accomplished. Further assistance was acquired from UNICEF for the kindergartens but infrastructure for the workshop could not start.

Provision of Safe and adequate Water Supply:

This is the immediate or direct objective of the project. Accordingly, as described previously, Safe spring water was led through a 5.8 kms pipe line to the town. The community succeeded in getting safe and but not adequate water supply starting the beginning of 1977 e.c.

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Since then, pipe lines have been connected to eight Government or mass organizations, seven private houses and the two kindergartens in the town. One of the big hotels has built shower rooms and it has been a blessing to at least a small portion of the population.

Provided that subject to the availability of necessary materials, it is planned that connections will be made to three Government, five private and one producer's cooperative.

There are two problems faced in the provision of safe and adequate drinking water. The flow of water during the dry hot season and the repeated breakdowns, resulting from man made and natural reasons. The flow of water during the dry hot season is not continuous all day. The pipe line was out of order for the following days during the last three years.

Year	Date	No. of days	Total
1977	Tahsas 14-20	7	
	Megabit	8	
	Miazia 25-30	6	24
	Guenbot 15-18	3	
1978	Meskerem 6-8	3	
	Megabit	2	
	Miazia	5	46
	Guenbot	6	
	Sene	2	
	Hamle	20	
	Nehassie	8	
1979	Meskerem	20	20
1980	Meskerem 1-8	8	8
Grand Total			98

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During the last three years, the community did not get pipe water for a total of three months and eight days. This has been a frustration for the community as was clearly told by the interviewed residents of the town.

Community benefits as seen by the Council:

The community has fully understood the value of the pipe water. The water is believed to be mineral water associated to Saint Marie and Saint Michael which happened to earn it more respect as a result. During the rainy season, when the flow of the water is very good, the community goes to the reservious in the early morning to take open bath using the overflowing water. When the pipe line breaks, the community has gone to the extent of drinking soft drinks instead of the river water. During the season of abundant rainfall, the people try to collect the rain water, and use it. They come and beg for only a gallon of the pipe water just for drinking. In the Chairman's Words, he said, " we have been embrassed to face the community when ever it breaks".

Health wise, it is thought there is a big change although one can not say dysenteric diseases have been totally eradicated since it depends on improved personal hygien and environmental sanitation. Bilharzia is also observed to a little extent in children since some children still swim in the river.

During 1977 and 1978, the two kebeles and few individuals started vegetable gardening. The result was very encouraging and directive was also given to the community to follow the example. Few tried but since private house connections are few and the continuous flow of the pipe water has not been assured, the idea could not be sustained.

Administration and management of the water system:

As has been described before, the Town Council has the overall management responsibility. Out of the ten women trained in technical administrative and accounting skills, two have left since then. There are at present six women managing the nine working water distribution terminals out of whom five are trained technicians and are successfully managing the the maintenance of the system. There is one doing the

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administration and accounting of the water system.

Certain administrative and managerial problems are contributing to poor operation of the whole system. These are:

- The women who manage the system have not been permanently employed which has affected their moral and expected earnings and as a result the efficiency of the system. The problem is with the Water and Sewerage Authority.

- There is no division of labour among the women. They manage the distribution terminals and the maintenance work.

- The maintenance work involves great physical effort. One has to travel through the deep river, hills and cliffs as well as manipulating the big 6" and 4" pipes. Men have to be added to the work force but this has not been possible as permission has not been possible to obtain on the employment.

- The Water and Sewerage Authority has not been willing to take over the management of the water system. As a result it has not been possible to get any technical and material aid as well as solve the emplyment problems of the women mentioned previously.

- Very few water meters are installed. The Council has tried but could not buy meters for all the distribution terminals.

Working relationship between the Town Council, REWA and the branch office of the MOA.

According to the Town Council, the responsibilities of REWA with respect to the project were:

- selection of the women for the training,
- do the necessary follow-up and evaluation of the activities of the women; and
- the planning and implementation of development activities that would benefit women and children using 25% of the net income from the sale of water.

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One can say there is no relation between the two organizations concerning the operation of the project. The only connection they had was when REWA complained on the accounting of their share. REWA was expecting 25% of the gross income. There was a meeting in the presence of the regional REWA and according to the Council, agreement was reached on the share to be from the net income. They have no regular meeting to discuss the progress of the project.

The branch office of the MOA has not been involved in any capacity after the installation of the pipe.

With Abomsa Awraja REWA Chairperson

Project identification and preparation:

According to REWA the project idea emanated as a result of the poor health condition of the community especially as it affected children. A feasibility study was conducted and project proposal was prepared in which REWA was given the leading role. Later on, The Party office and the Awraja administration, decided to give the over all management responsibility to the Town Council. Although REWA was in the meeting when the decision was taken, they claimed it was imposed upon them.

Another area of disagreement at the initial stage of the project was the small share of the income that was alloted to REWA. They again indicated that although their own member was in the meeting when the decision was taken, REWA never agreed. REWA also had the impression that the 25% share was to be from the gross income.

According to REWA, the mistake had been done at the inception of the project. The regional REWA had not been involved and they think their interests have not been adequately reflected as a result.

Pipe Installation and follow-up:

REWA has mobilized women in the community to participate in the installation of the pipe line. They have recurited the women for the training.

They have done no follow-up or evaluation of the activities of the women technicians or the whole project. In the words of the chairperson of the Awraja REWA, she said, "We have been dissatisfied from the beginning and we never wanted to have anything to do with the work"

Planned activities envisaged using the income expected.

REWA planned to equip two kindergartens with necessary materials. This is in line with the objective of the project but the

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variation in the envisaged and real income from the pipe water supply was so wide that no tangible activity was achieved. Their account shows the following:

Year	Projected income	Received income
1977	2361.88	83.00
1978	2834.25	135.00
1979	2834.25	734.00 (not received but confirmed)
Total	8030.38	952.00

The received amount is only 11.9% of the projected sum. As a result nothing has been done. Objective could not been met.

One complaint of REWA concerning the small income was that there are organizations like the branch office of the MOA and limited individuals who had been using the water freely. This ofcourse would not be a tangible sum to make a big difference in the income. The absence of water meter reader has also been REWA's concern.

Concerning the management & technical ability of the trained women, REWA thinks they have done their duties with satisfaction. This is reflected by questions raised by the community as to how women alone can run the system. The community has witnessed that the women have been able to overcome the difficult terrain to install and maintain the pipe line.

Problems associated with the System:

Although REWA has not made any effort as a co-owner of the water system to participate in facilitating things, they have identified the following to be pertinent problems:

- The plastic part of the pipe line has been exposed to sun light, flood and man made problems.

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- The installation work has not been properly completed by ARDU. This is seen by the springs not being properly protected.

- The non-availability of spare parts and necessary materials for maintaining the system.

- The decrease in the quantity of water flow through the pipe system due to the hot weather.

- The women technicians having been not employed permanently and its effect on their operational efficiency and motivation.

With the technician Women:

Eight women were trained in pipe installation and maintenance, and of these, five are actively engaged in the work. Two of them have also been given advanced training in ARDU, Asella. Two more were added to the group with training in administration and finance.

The technicians all claimed they had no problem in installing the pipe line but indicated some lessons that could be learned from the experience. These are:

- Plastic pipes should be buried deeper;
- the area's topography and soil characteristics should be carefully studied; and
- the materials to be used like type and size of pipes should be choosen in the light of future development and maintenance of the system.

Management and maintenance of the water system:

As has been indicated before, the women technicians are also managing the distribution terminals. The non-existence of division of labour has created psychological and administrative problems. Psychological, because the women think they have been down-graded, administrative, because the two positions have different salary scales. The technicians aslo think that they have been over worked.

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The other serious administrative problem which might perhaps endanger the whole operation according to them is that they have not been permanent emplyees. This in their words has created moral degradation and is also reflected in their recent operational efficiency. They said they have been contacted by different authorities on this issue but nothing has come out in the last three years. The following Amharic expression by one of the women indicates their frustration, "rasun hulay yemiamew sew yagegnewun medhanit hullu yadnew yimeslewal." This means that a person who has a recurring headache thinks whenever he gets any medicine, it would cure him.

The maintenance of the pipe line has been a struggle of survival of the fittest for the team. In the wish to prove their ability and equality they have been creative, brave and above all successful upto now. As has been indicated especially in the technical part of the report and also confirmed by the technicians, the problems are the following:

- Of the 5.8 kms pipe line, the 800 meters plastic pipe has been destroyed at least seven times. The research team has witnessed the six places where it was cut supposedly by people and mended by the technicians.

- The taps they are getting in the open market don't some times last even fifteen days. Most distribution terminals have one or two taps out of the possible five.

- The part of the pipe that crosses the river on top of pillars has been poorly done and as a result was taken once by the river flood. Unless something is done, they think it will be totally destroyed in the coming rainy season.

- Spare parts starting from taps up to solvents and other maintenance materials are very scarce and sometimes non-existent.

- There is no workshop to do any wellding and modifications. If the big 6" and 4" pipes are broken there are no instruments that would help them to create gears.

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An example indicated by the technicians was that when the pipe was broken on a technician from the Asella took ten days to come and was not able to do it. They did it using their creativity. They think a workshop would be hands in such circumstances.

- The non-existence of road and transportation facility according to them has also lagged the speed of maintenance and has also brought hardship on them.

Since the solutions suggested mostly goes parallel to the Town Council's, REWA's and even the residents of the town, **refer previous pages.**

Benefits to the technicians and attitudes of the community:

Most indicated that they had no job and getting this training and being employed has brought them some income for their families. Most again indicated thay have been able to attend extension class. Some mentioned with pride their participation in this activity where at present no man is trained in the field in the town. One mentioned being able to know more pople through the work makes her happy. They have all forwarded their appreciation to their organization REWA and aboye all to UNICEF.

Concerning the attitudes of their families, neighbours, relatives and the community in general they all said every body is happy and have accepted the fact that women can do men's work and have also gone to the extent of wondering how this could be possible. This whole activity has induced women in the town to start formal schooling in the anticipation of similar other activities in the future.

Annex II

Abomsa Water Supply System-Short technical evaluation Report

The source of Abomsa water supply plant is from three springs collected in a concrete wet chamber. A 6" diameter galvanized steel pipe is installed at the outlet of the chamber with the remaining line covered by 4" galvanized and plastic pipes. The water runs through the 5.8 kms to the town by gravity.

At the end of the PVC pipe (plastic), a 4" galvanized steel pipe is connected accross the river with the support of three reinforced concrete pillars and reaches the 100m^3 capacity reinforced concrete reservoir. A second gravity line starts from the reservoir to the town distribution network.

Breakdown of the pipe line and reasons

As indicated in the main report there has been repeated breakdowns as a result of the destruction of the PVC pipes. Reasons are:

- The plastic pipes are not buried deep enough to be able to escape surface traffic water, water channel erosion and future changes in the ground surface elevation that would endanger the pipes

- Most of the PVC pipes are laid in shallow rocky trenches. Such tronches should be dug deeper than is required and then filled tapped with a bedding material such as sieved sand or soil. Plastic pipes exposed to sunlight without coating or protection deteriorate in time.

Changing the PVC pipes with galvanized steel pipes or improving the installation is a decision that needs further study. The extraction and reinstallation cost of the PVC pipes including the cost of deeper hard trench excavation should balance with the cost of galvanized steel pipes.

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Health related problems of the breakdowns.

Children who were suspected of cutting the PVC in order to get drinking water or for other reasons have contaminated the pipe water by adding minute particles and clothes. Since no disinfectant is dosed in the collecting chamber and the reservoir, it has not been possible to sterilize the contaminated pipe and supply safe drinking water to the town.

Under these conditions, harmful wastes can also enter water distribution systems through cross connections and back siphonage. Mostly this type of contamination comes during repairs of broken pipes.

It is therefore important that after every repair work, some amount of calcuim hypochlorite solution be dissolved and added to the reservior in order to have enough chlorin residual in the distribution net work of the system.

The reservoir and recommended improvements.

A 100 m^3 reinforced concrete reserv. r is constructed at the highest point of the town to serve as a storage tank as well as a source of the secondary gravity line that pushes the water to the distribution network.

- The reservoir has no electrical or mechnical level indicator which shows the daily approximate quantity of water stored in the reservoir. The technicians can only know if there is a problem only when the reservoir is completely emptied which in the past prolonged maintenance work. It is therefore important to have some type of indicator. A steel step ladder can be fixed on the external wall of the reservoir for the daily visual inspection of the reservoir.

- Lockable metal manhole cover should be fixed to the reservoir.

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Distribution Terminals.

Eleven terminals are constructed in different parts of the town. As explained in the report, two are not operational. All in all thirteen houses are getting water directly to private connections and are equipped with water meters. On the other hand all the terminals have no water meters. It is very essential that water meters are installed for each terminal as it is the only releable way of accounting or checking the collected revenue with the consumed water.

Access road.

Access road is very important for major development activities and more so for a pipe water system. There is no accessible road throughout the pipe line. All heavy maintenance tools are transported by manpower. This has become a heavy burden to the technicians specially.

Additional maintenance tools needed.

- Pipe threading die 3" x 4"
- Pipe Vice ..... 2" x 4"
- Pipe Wrenches .... 36"
- Pipe Wrenches .... 42"
- Pipe Cutter ..... 4"

Pipe maintenance accessories.

- Unions .....Diameter 4"
- Nipples ..... " 4"
- Dressing joints " 4"
- Solvent cement

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