ANURADHAPURA DISTRICT DEVELOPMENT PROGRAMME

REPORT ON

FACT FINDING/IDENTIFICATION STUDY

Agrarian Research & Training Institute
P. O. Box 1522
Colombo 07

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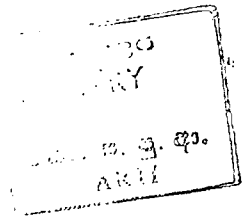
CONTENTS



Chapter One

INTRODUCTION

Origins of the Study

Integrated Rural Development Programmes (IRDP) which take administrative districts as the unit of planning and implementation have been the major instrument employed by government to "widen economic opportunities and enhance living standards of the population of rural areas, and to bring about balanced regional development". IRD projects have been implemented in 15 districts over the last decade. Initially the districts selected for these investments were those which did not benefit from the "lead projects" of the government. Recently Anuradhapura district, a part of which is covered by the Mahaweli Development Project, has been identified for an IRD programme covering the non-Mahaweli portion of the district.

As the first stage of the proposed Anuradhapura District Development Programme, the Regional Development Division of the Ministry of Policy Planning, which has responsibility for IRD programmes commissioned the Agrarian Research and Training Institute to undertake a rapid fact finding/ identification study of the area. The study was conceived as a 9 week effort. A research team was formed in November, 1990. In order to cover a wide area for study the research team was composed of specialists in complementary fields of public administration, agronomy, soil science, agricultural economics and regional development planning. This report is the outcome of that study.

The Terms of Reference

The tasks to be undertaken as defined in the Terms of Reference for the study prepared by the Regional Development Division were as follows:

1. The consultant shall in collaboration with RDD/MPP&I and the North Central Provincial Authorities update the Anuradhapura district Situation Report (1987) in accordance with guidelines issued by RDD.

2. The consultant shall review other available reports, . data and documentation with regard to socio-eonomic conditions, available and potential resources, institutional establishments and development trends in the District.
3. Previous and present development projects shall be studied and described in the report.
4. The situation in the District and its development problems and constraints shall be described and analysed. Required feasibility/ in depth studies shall be recommended upon, indicating terms of references.
5. The consultant shall recommend upon possible areas/sectors for SIDA assistance and a feasible and appropriate approach for this assistance.

The full text of the Terms of Reference is contained in Annex 1 of this report.

Scope and Objectives

The terms in which the research brief was set out in the Terms of Reference left room for considerable latitude of interpretation. But, from discussions with authorities of the Regional Development Division it became apparent that, at this stage, what was required was a description of the local situation and the identification of problem areas for detailed investigation. The area of investigation was to exclude the Mahaweli Development Project.

Within this framework, the objectives of the study were defined as follows:

a. Update the Anuradhapura District Situation Report of May, 1987.
b. Review available reports and documentation on
    i. Socio-economic conditions in the district
    ii. The present institutional set up
c. Provide an overview of major development projects in the district undertaken in the recent past and those which are on-going

d. Describe and analyse in brief the existing situation in the district and identify areas where further research is required

The tasks to be accomplished in order to achieve these objectives are set out in the work-plan for the study (Annex 2).

The Method

The method of study adopted was aimed at reconciling two conflicting requirements. On the one hand, the need for a rigorous preliminary analysis, and on the other hand, completing the study within a time schedule of 9 weeks.

The study was based therefore primarily on information contained in published and unpublished material relating to the district. In addition, discussions were held with key officials of the provincial and district administration, heads of government departments in the district and other district-level officials. Information on major problems at the Assistant Government Agents Division level was obtained by administering a short questionnaire to the Divisional Secretaries/Assistant Government Agents. The knowledge and experience of the members of the research team also was a major source of information.

Limitations of the Study

Given the limited time for the study, it was not possible to establish a complete inventory of all data relevant to the areas studied. This would have been possible only if reliable data collected by technical and administrative organisations were readily available. Another drawback was the difficulty of obtaining recent information on socio-economic conditions, particulars with regard to demographic characteristic, employment and unemployment and data relating to the agricultural sector. The latest data available on these aspects were the Census of Population and Housing of 1981 and the Agricultural Census of 1982, and the discussion of these issues are based substantially on that data.

Organisation of the Report

In addition to this introductory chapter, the report contains six other chapters. The present district administration set up is discussed in Chapter two. Chapter three deals with the natural environment of the district. Chapter four covers the social and economic infrastructure. Chapter five is devoted to the district economy. Chapter six provides a brief review of the major development projects implemented in the district. The final chapter provides a summary and outlines the conclusions of the study.

Chapter Two

PUBLIC ADMINISTRATION

Introduction

The formulation of a plan for the development of Anuradhapura District has to take place within a context of which the main features are:

a. the natural resource endowment of the district;

b. the experience and impact of development programmes that have been attempted in the recent past;

c. the existence of the Mahaweli project within the district but outside the control of the provincial and district administration; and

d. continue changes in the administrative structures which direct and/or supervise the implementation of programmes that are designed to develop the human and other resources of the district on a sustainable basis over the long term.

Allocation of Subjects and Functions

The Anuradhapura district and the Polonnaruwa district together make up the North Central Province which is administered in terms of the Provincial Councils Act No. 42 of 1987.

The Act provides for an allocation of functions between the Central Government and the Provincial Councils. The list of functions that have been retained at the centre, those that have been devolved to Provincial Councils and those over which both the Central Government and the Provincial Councils exercise authority are specified in a schedule to the Act.

Devolved Functions

Among the functions that have been devolved to the Provincial Council, those which are most pertinent for the development of the Anuradhapura district relate to:

a. agriculture and animal husbandry;
b. education and educational services;
c. food supply and distribution;
d. health, including the development of indigenous medicine and the maintenance of public health;
e. provincial housing development programmes;
f. the promotion and establishment of agricultural, industrial and commercial enterprises and the regulation of mines and mineral development;
g. intra-provincial irrigation schemes;
h. protection of the environment;
i. the maintenance of historical monuments, museums and libraries;
j. the construction and maintenance of roads other than national highways and the regulation of road passenger services;
k. the encouragement and development of sports;
l. the maintenance of probation and child care services and the re-habilitation of destitute persons and families;
m. local government and rural development including of the establishment of markets and fairs; and
n. functions and powers relating to the generation of revenue and the maintenance of law and order within prescribed limits.

Statutes

Under the above provisions the North Central provincial Council has already drafted two statutes relating to the establishment of (1) an Industrial Services Bureau and (2) Fisheries.

Assets & Finance

The transfer of assets of Central Government agencies with respect to those functions which have been devolved is proceeding.

The financial provision made to the Provincial Council for 1990 is Rs. 773.2 million for recurrent expenditure, and Rs. 198.3 million for

capital expenditure. By the end of August 1990, 75% of the allocation for recurrent expenditure had been released to the Provincial Council while the sum released for capital expenditure by that date (Rs. 259.2 million) exceeded the total for the year by 30%.

As from 1.1.1991 Provincial Councils are expected to begin the collection of devolved items of revenue. These include: stamp duties, exise duties, fees under the motor traffic act., and taxes on lotteries.

The collection of turnover tax on wholesale and retail trade is to be done by Provincial Councils with effect from 15.4.1991.

Structure of Administration

Figure 1 shows the structure of administration of the North Central Province.

The Governor

The Head of Provincial Administration is the Governor. He summons, prorogues and dissolves the Council, appoints the Chief Minister and may also send messages to the Council regarding statutes and call for proposals for legislation from the Chief Minister. He holds the emergency fund and makes rules for the regulation of the provincial fund.

The Governor also appoints the Provincial Public Services Commission which at the moment makes all appointments to the Provincial council Public Services, approves schemes of recruitment and attends to disciplinary matters. It has not made any fresh recruitments but has issued letters of appointment to those who have opted to join the Council's Public Service.

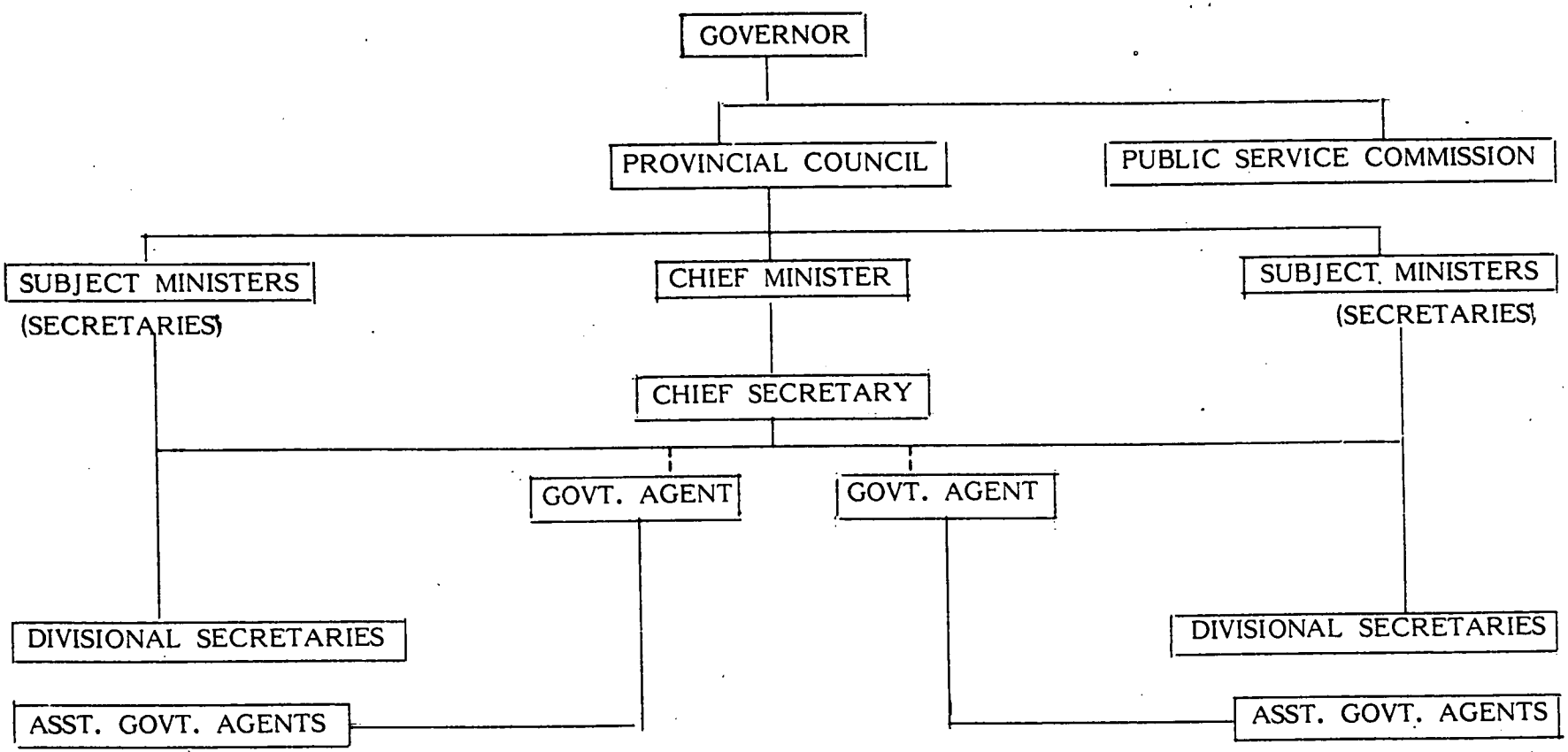
Ministries

The NCP Provincial Council has five Ministers:

1. The Chief Minister who is also the Minister for Agriculture responsibilities also include Agrarian Services; Irrigation; Animal Production and Health; and Heavy Machinery & Equipment.
2. Minister for Education and Health; Transport; and Youth Affairs.

FIGURE I

ORGANISATION CHART - NCP PC



3. Minister for Local Government, Housing and Construction (also has responsibility for Highways)
4. Ministry for Industries, Women Affairs and Rural Development (also has responsibility for Probation and Child Care Services).
5. Minister for Food, Cooperatives, Trade, Social Services and Cultural Affairs and Marketing.

Construction

Construction functions are distributed among the Chief Minister (Irrigation): the Minister for Local Government, Housing and Construction; and the Minister of Education and Health (school buildings and buildings belonging to the Department of Health).

Education

In addition to the cadre common to all provinces, Anuradhapura and Polonnaruwa districts have Divisional Educational Development Officers with responsibility for the welfare of teachers; provision of the mid-day meal; the development of non-formal education and programmes for school leavers and matters pertaining to curricula.

Health

No changes have been made in the system of administration of Health Services which prevailed under the Central Government.

Divisional Secretaries

The main arms of the Provincial Administration are the Divisional Secretaries and the Pradeshiya Sabhas. There are 20 Assistant Government Agent (AGA Divisions in the Anuradhapura district.

Although the intent of the government is that the Divisional Secretary's office would be the focal point of government programmes for the delivery of services to the community, it is precisely at that level that staff problems are most acute.

The marrying of devolved and retained functions in an administrative sense occurs at the divisional level. At the district level the Government Agent (GA has responsibility for the retained functions of the central

government and the AGAs report to him with respect to such functions. As Divisional Secretaries however, they are responsible to the Provincial Council and the Chief Secretary both for the provision of services with respect to devolved functions and with respect to the implementation of developmental programmes and projects which emanate from the Provincial Council. The Divisional Secretary functions as the Secretary of the Pradeshiya Sabha, if one exists, and if not as Special Commissioner for the Pradeshiya Sabha area.

The basic problem here seems to be that the status of members of the provincial public service as yet to be resolved. These questions relate to their pensionability, prospects for promotion and other conditions of service.

A further problem has arisen from the centralization of the recruitment to general cadres in the Ministry of Policy Planning and Implementation.

As far as permanent staff in the government combined services are concerned, there is a reluctance on the part of many of them to join the provincial public service or to accept transfers to the provinces.

Not only the formulation and implementation of development plans but even the collection of revenue would be jeopardized unless these issues are resolved one way or the other.

The coordination of divisional level programmes takes place through a District Coordinating Committee (DCC). This Committee is chaired by the Chief Minister of the Province and has the Government Agent as the Secretary. The Committee includes Members of Parliament, Provincial Council members and Chairmen of Local Authorities. The DCC is expected to function as a decision making body with regard to the allocation of resources within the district, and to monitor progress with respect to the Divisional Development Plans.

The theory behind this arrangement is that Members of Parliament as well as the members of the Provincial Council are elected on a district

basis and there would therefore be a broad identity of spatial interests between these two sets of representatives and also between them and the Chairmen of Local Authorities.

Local authorities, where they exist, are expected to play an active role as agents of the provincial Council in the implementation of development programmes.

At a level further down, the Grama Niladaris are expected to activate the Gramodaya Mandalayas. The role assigned to him is one of mobilisation of the Gramodaya Mandalaya towards catalysing people's involvement in village development activities.

They are further required to intiate the preparation of a Village Development Plan by the Gramodaya Mandalaya. Such an exercise would need to be back-stopped by the provision of funds to Gramadoya Mandalayas.

Each Division is expected to have a Technical Service Unit headed by the most senior middle level technical officers (MLTO) attached to that division.

This unit is expected to provide technical inputs into the maintenance of roads, buildings, minor irrigation works and other minor construction within the division. It will be supported by the sub-provincial unit of the Major Engineering and Services Division of the Provincial Council on technical matters but will operate under the administrative control of the Divisional Secretary.

Guidance from the Centre is to be provided through a Provincial Council Coordination Unit located in the office of the Minister for Provincial Councils. This unit is expected to institutionalize a participatory consultative process covering the entire range of functions assigned to Provincial Councils.

Grama Niladharis

The population and the number of Grama Niladhari areas of each division is set out below.

Population and the number of Grama Niladhari Divisions in the Anuradhapura District
(Categorized by the Divisional Secretary's areas)

D.S. Area	Total	Grama Niladhari Area
1. NP (E)	51,699	37
2. NP (C)	43245	35
3. Nochchiyagama	44,393	36
4. Thalawa	62,292	27
5. Rajangana	38,773	21
6. Padaviya	29,985	12
7. Palagala	33,720	36
8. Kekirawa	57,694	40
9. Palugaswewa	14,477	16
10. Ipelogama	39,052	29
11. Thirappane	30,358	43
12. Mihintale	26,576	27
13. Rambewa	36,753	37
14. Medawachchiya	45,520	33
15. Kahatagasdigiliya	36,753	40
16. Horovpathana	32,569	38
17. Kebilithigollewa	22,915	26
18. Galenbindunuwewa	50,665	44
19. Wilachchiya	19,884	15
20. Thambuttegama	34,480	16
21. Galnewa	33,244	28
	785,047	636

Note : This includes three new Divisions to be created for Galnewa, Palugaswewa and Rajangana.

Staffing

In the North Central Province, the professional cadres are badly under staffed, with 45% vacancies in the Sri Lanka Administrative Service: 97% in the planning service, 69% in the Accountants Service, 86% in the Agricultural Service; 90% in the Animal Production and Health Services; and 100% in the Engineering Service. The clerical grades including typists, stenographers and book-keepers are similarly handicapped. Details are set out in Annexe 3.

This is largely a result of officers not being transferred to the provincial council's cadre thus diminishing the capacity of the Provincial Council to execute its own programmes.

The planning cadres are inadequate to prepare or monitor and implement development plans. There is only one Deputy Director/Planning supported by 18 planning and implementation officers six of whom are attached to the Provincial Council while the other 12 are deployed in the Divisional Secretaries' offices. The initiatives that have been taken so far to address this problem include a 3-day training programme conducted a year ago for divisional secretaries and planning implementation officers in drafting development plans. Monitoring is limited to recording expenditure.

Chapter Three

THE NATURAL ENVIRONMENT

Location

Anuradhapura administrative district, with an area of 1,737,000 acres (7,129 square kilometers) - and is one of the largest administrative districts in the country. The district lies entirely in the dry zone and is located between 79 45' and 81 0' east longitudes and 7 45' and 9 0' north latitudes. In the north it is bounded by Mannar and Vavuniya districts, the east by Trincomalee and Polonnaruwa districts. The south borders Matale and Kurunegala districts and on the west by Puttalam district (map 1).

Topography - Landscape

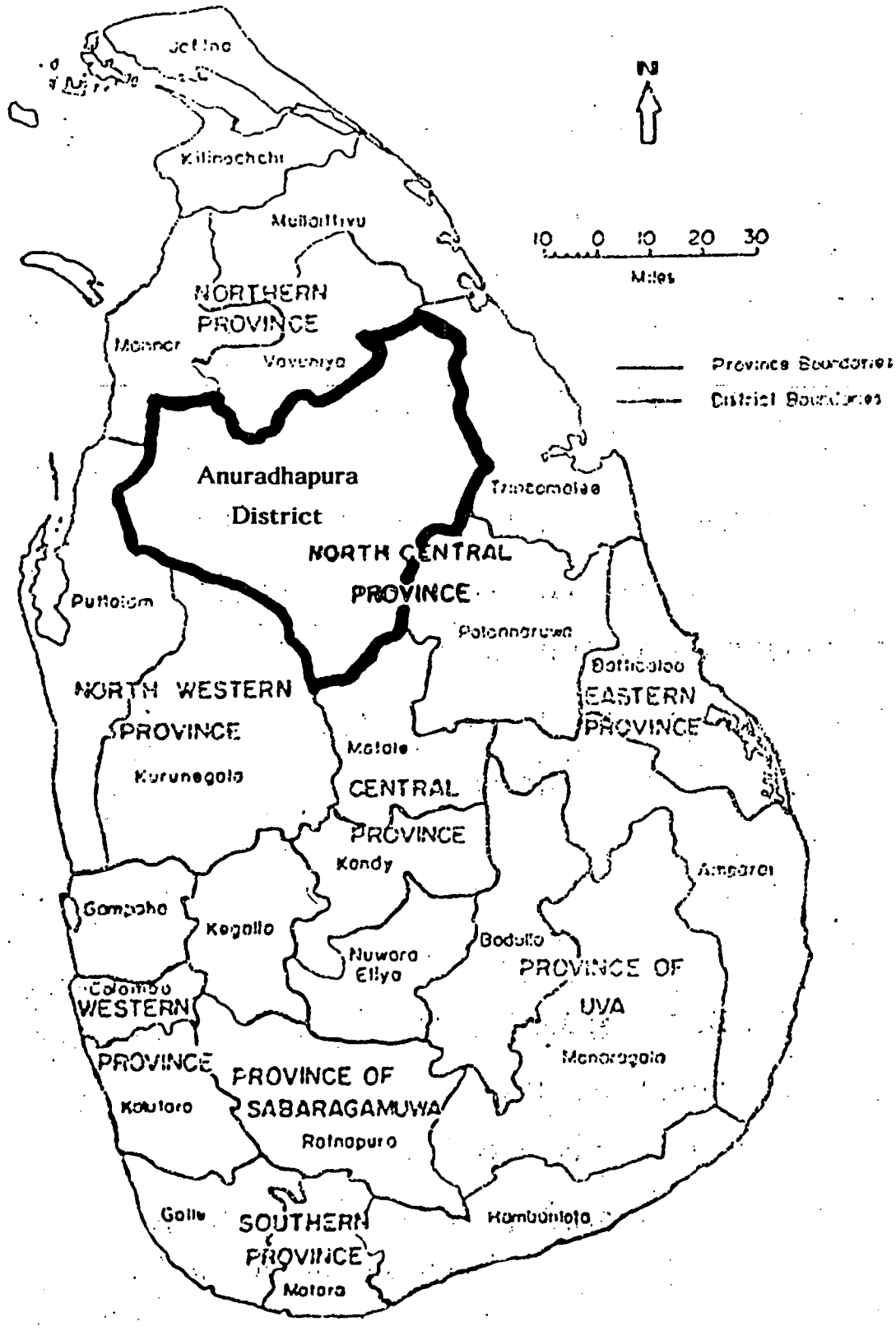
The Anuradhapura district is made up of four main river basins, the Kala Oya and the Malwathu Oya which drain the western segment, and the Yan Oya and Ma Oya which drain the eastern segment. The main watershed that separates the western flowing and eastern flowing river systems consists of a north-south trending, low backbone ridge with prominent inselbergs such as Ritigala, Mihintale and Weddakande.

The topography of the landscape is essentially derived from the processes of denudation and peneplanation that have worn down the land to its present form. This has resulted in a gently undulating peneplain with erosion remnants of the more resistant rock breaking the relief. Differential erosion of the peneplain surface has also left isolated remnants of rock outcrops with bouldery land around their base.

The general aspect of the landscape is thereby one of a gently undulating to undulating mantled plain, made up of relatively shallow but well defined inland valleys along the first, second and successively

Map I

SRI LANKA - PROVINCIAL AND DISTRICT BOUNDARIES



higher order streams. The first order inland valleys or micro-catchments vary in size from 50 to 100 acres, and the distance from the crest to the floor of the adjacent valley is never great, and the slopes average from 1-5%. The valleys between the crests of the landscape are shallow and moderately wide with level to concave floors. The higher order inland valleys which are of a larger size, have incised stream channels with a gentle but significant gradient which enables an easy disposal of high intensity rainstorms. The overall drainage of the streams and rivers has a dendritic pattern.

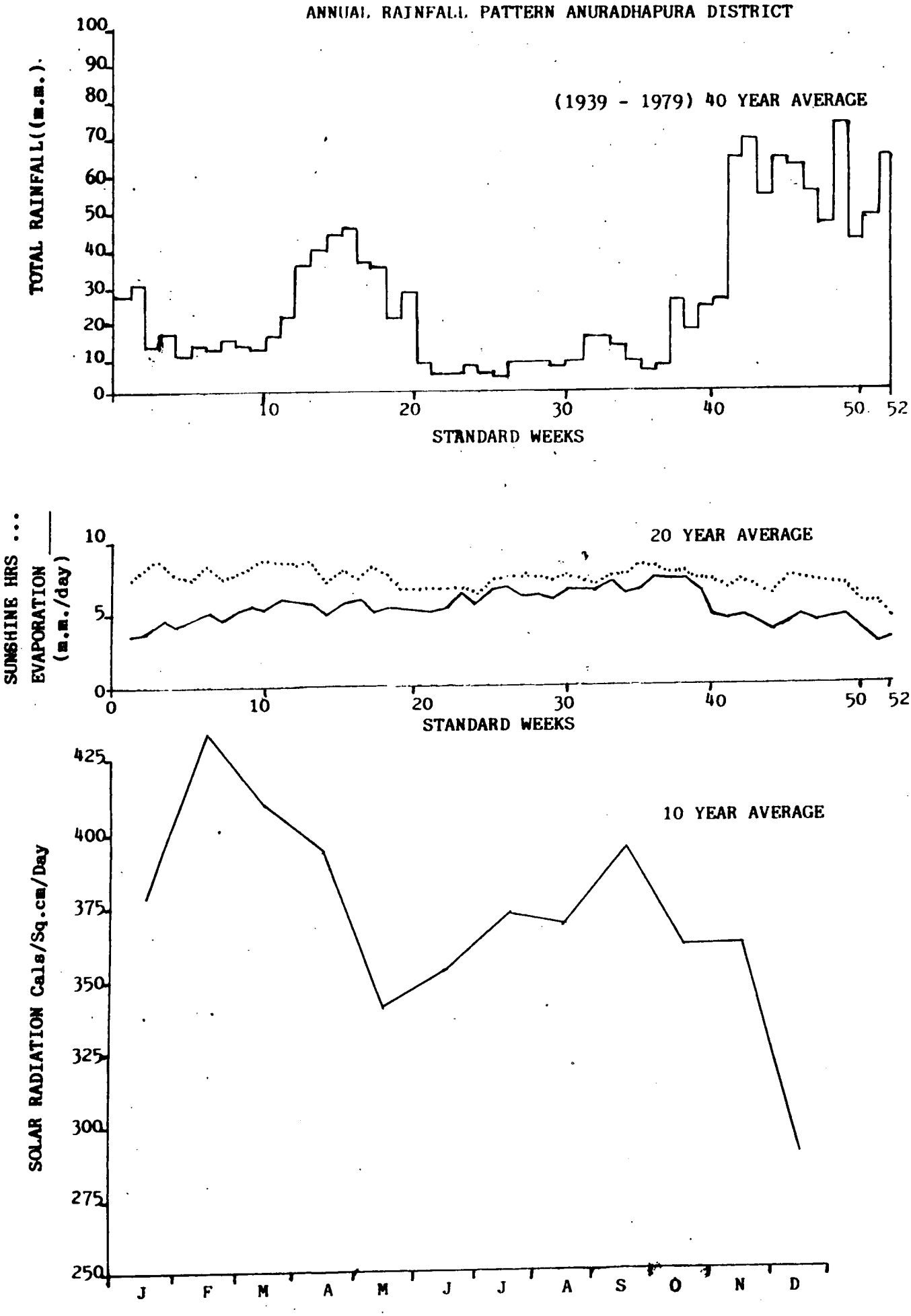
The general morphology of the landscape and the hydrology have an important hearing on the human and agricultural settlement patterns, and also on the differential land use potentials within the inland valley systems as shall be indicated in the subsequent sections.

Climate

An important characteristic of the annual rainfall of the dry zone, in which this district is wholly located, is its division into two well-defined seasons as seen in Figure 2. The mean monthly rainfall records show a bimodal pattern with two rainfall seasons of which the Maha from October to mid January has a rainfall expectancy of 430 mm at the 75 percent probability level, and the Yala from mid-March to mid-May which has a rainfall expectancy of 200 mm at the same probability level. The long term mean annual rainfall for the Anuradhapura rainfall station is approximately 1450 mm. The mean annual open pan evaporation is of the order of 1750 mm.

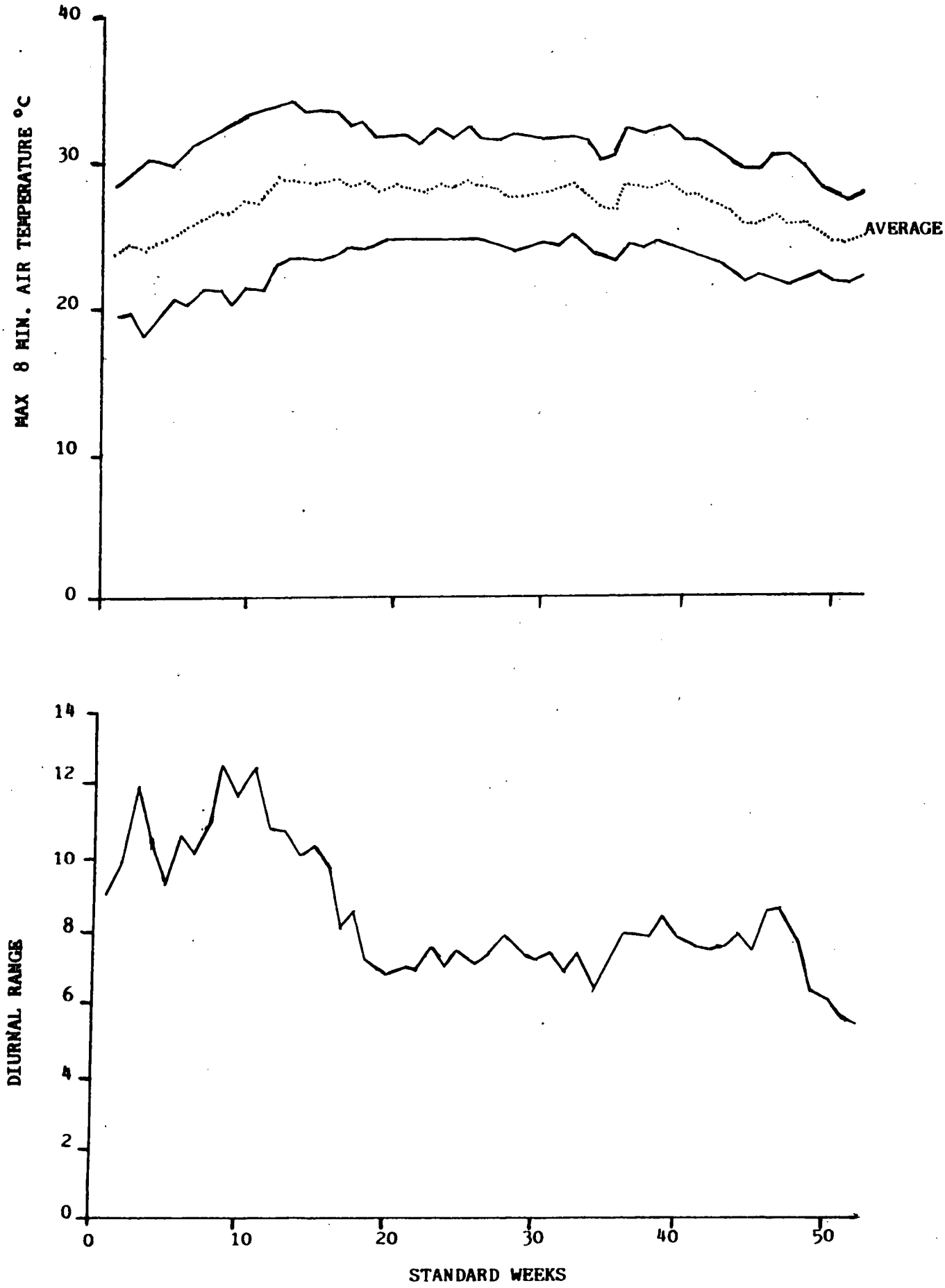
Of the two dry seasons, the one in February-March coincides with the period of maximum solar radiation exceeding 400 cals/sq cm/day and also a high diurnal range of temperature. The longer dry season from May to September is characterized by strong, dry winds and low diurnal range of temperature, with an open pan evaporation of more than 6 mm/day. Solar radiation during this period is around 350 cals/sq cm/day. The mean maximum and minimum air temperatures through the year is shown in Figure 3.

Figure 2:



Source: Somasiri (1981)

Figure 3 TEMPERATURE REGIMES - ANURADHAPURA DISTRICT



Source: Somasiri (1981)

The intermonsoon convectional rains that follow the longer dry season and fall in September-October consists of short duration rainstorms with high intensities that often exceed 75 mm per hour. During these high intensity rainstorms, surface sheet erosion is observed even under a natural forest canopy.

Water Resources and Hydrology

Present situation

Arising from the landscape and climatic conditions previously described, the hydrology and water resources of the district have acquired very distinctive features that have an important bearing on agriculture and settlement patterns in this region.

Because of the relatively limited thickness of the overlying soil mantle and because of the hard underlying bedrock, approximately 40 per-cent of the annual rainfall is lost as surface run-off.Storage of underground water is not possible except in very limited amounts in locations where the underlying rocks are fractured or fissured. Surface water collected in man-made reservoirs or tanks, constructed across the second and third order valleys is therefore the main source of storage. Dry weather flow in the higher order streams and the main rivers is absent from May to November. The total annual evaporation from a free water surface of 1,750 mm exceeds the total annual rainfall which could range between 850-1900 mm. Under these circumstances, the stored surface water in the smaller and medium tanks is barely sufficient for irrigation, and that too only during the Maha season. During the dry season from May to September, the stored surface water in the smaller tanks is just adequate for domestic needs and livestock requirements.

The main source of water supply for domestic needs during the dry season from May to September are the open dug wells located on the high ground just below the small village tanks and adjacent to the tract of paddy fields located at the bottom of the inland valley. The re-charge of water into these wells diminishes gradually as the dry season progresses, and by September the re-charge is barely adequate for the domestic requirements of a village community of around 25-30 families.

In recent times there has been a further exploitation of this limited supply of ground water in the shallow inland valleys below the village tanks by the development of open dug-wells of varying depth for the purposes of lift irrigation for very small extents of subsidiary crops during the Yala season. It should be recognized that there is a limit to the number of such open dug wells that can be productively located within each inland valley: the limit will be determined by the amount of re-charge possible during the course of the protracted dry season.

While the foregoing description of water resources and the hydrology applies to the lower order inland valleys and to the small or minor village tanks, which essentially cover more than three fourths of the surface area of the district, the situation with regard to the higher order inalnd valleys and also the major irrigation schemes is quite different. Here, the groundwater is frequently re-charged by the irrigation water that is lost in seepage and percolation from the canal network and from the irrigated command area. As a result, there is a greater assurance of water supplies in the open dug wells located within the command area both for domestic needs as well as for limited extents of lift irrigation within the major irrigation schemes. One of the characteristic features of the hydrology of this region is the enormous year-to-year variation in rainfall and water supply. A typical or modal year is thereby, at best, an unreliable guide to characterize this environment. Rather, defining the limits of probability of dry and wet rainfall regimes would be a more realistic characterization. This could best be expressed in terms of the small village tank hydrology which receives an adequate supply of run-off inflow to cultivate the whole command area during the Maha season in two out of a total of ten years; half the command area in three out of ten years; and no cultivation at all in five out of ten years. This has a very important bearing on the economic and social viobility of the small tank village settlement, which derives its main sustainence and stability from the associated upland rainfed or settled 'Chena' crop component. In recent times, a small component of lift irrigation from the open dug wells has helped to enhance the income levels of the settlers and thereby ensure a better stability of income.

Further Potential

Recognizing the fact that there is a definite upper limit in the number of small surface storage reservoirs or tanks that could be supported within a square mile area of this landscape, it could be reliably inferred that the upper critical density has already been reached or exceeded in the Anuradhapura district. This had been dramatically demonstrated in the instance of the Mahakanadarawa major irrigation scheme in the early eightees where the normal inflow into this reservoir got drastically curtailed by the haphazard restoration of small tanks within its upper catchment area. This has had an adverse impact on the performance of the Mahakanadarawa irrigation system that was rehabilitated under the TIMP project at considerable cost. It could, therefore, be reliably stated that there is no further potential in this district either for the restoration of abandoned small tanks or for the construction of new small tanks.

In as far as the major river basins are concerned, the picture is slightly different, except that there is a need to properly quantify whatever under-utilized or further utilizable resources are available before embarking on new settlements. Of the four major river basins, the Kala Oya basin is almost fully developed by a cascade of reservoirs along the main river and its major tributaries, and there is no further potential to be tapped. In the case of the Malwathu Oya, there is full development in its upper reaches. It would be useful to examine what unutilized potential of river flow would be available in its middle reaches upstream of Thantirimale.

The Huruluwewa reservoir is located in the uppermost part of the Yan Oya and presently receives some supply from the Bowatanne diversion. It would be useful to examine what untapped potential would be available in that long stretch of its course between Huruluwewa and Wahalkada. In the case of the Ma Oya its full potential is already developed under the Padaviya scheme and no further resource is likely to be available.

The ground water resources, though limited in quantity within the district, are very important from the stand-point of domestic needs. However, extreme care and caution is needed in not over exploiting this

limited resource. The recently installed network of bore-wells fitted with hand-lift pumps is certainly a boon to the population which had previously to walk long distances for their domestic water needs during protracted drought periods. It is highly important that a proper assessment be made without further delay of the safely extractable quantities of ground water available within the district. For the present it could be stated that small quantities can be extracted only within the flood plains of rivers and in isolated pockets within the smaller inland valleys.

To recapitulate, it could be stated that while there is little or no further potential for the development of additional small village tanks in this district, it is worthwhile to prove and estimate any further unexploited resources available in some parts of the Malwathu and Yan Oya basins, and also the safely extractable quantities of ground water available in the flood plains and in the isolated fractured and fissured hardrock locations.

Soils

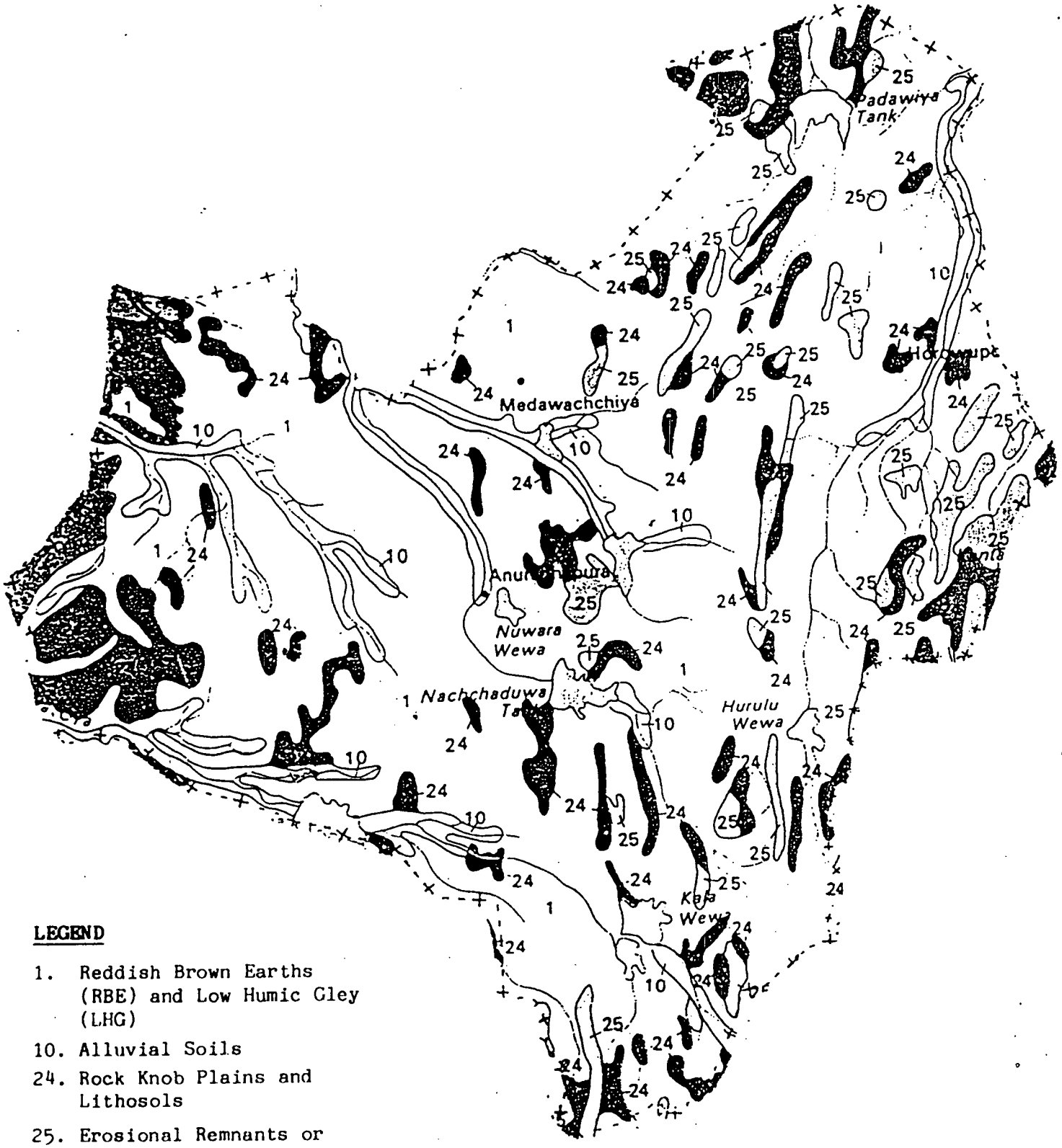
For convenience and also for the sake of relevance, the soils of the district are described in this section more from the stand point of their agricultural potential and utilization rather than from the stand point of soil taxonomy. There are four major great soil groups which make up the surface mantled plain of this landscape. These are (a) the Lithosols which occupy the rocky and bouldery land on the main ridges and summits of the landscape; (b) the Reddish Brown Earths (RBE) which occupy the upper well drained as aspects of the undulating landscape; (c) the Low Humic Gley soils (LHG) which occupy the lower poorly drained aspects of the landscape; and (d) the Alluvial soils which occur in the narrow flood plains of the streams and rivers. See attached soil map (Figure 4).

The Lithosols or lithic soils, as this term implies, are very shallow soils with many exfoliated rock fragments, and these occur mainly on the Rock Knob Plains (RKP) which constitute the ridges that demarcate the main water sheds of both the minor and major catchment basins. The agricultural potential of the lithosols is very poor, and they

Figure 4

GENERAL SOIL MAP OF THE ANURADHAPURA DISTRICT

Scale: 1:500,000



LEGEND

1. Reddish Brown Earths (RBE) and Low Humic Gley (LHG)
10. Alluvial Soils
24. Rock Knob Plains and Lithosols
25. Erosional Remnants or Inselbergs

are, therefore, best left under the natural forest cover or else they should be properly re-aforested in places where they have been illicitly cleared. According to available soil maps they occupy approximately 10-15 percent of the total surface area of the landscape.

Reddish Brown Earths (RBE) together with the Low Humic Gley soils (LHG) are the dominant soil groups in this landscape.

Together they account for around 70-75 percent of the soil cover in this district. The Alluvial Soils (AL) account for the remaining 5-10 percent of the soil cover.

Within the RBE, there are three main soil phases namely the gravelly phase, the shallow phase and the moderately deep phase. These can be easily identified in the field with the aid of the presently available semi-detail soil maps for this district. The gravelly and shallow phases are marginal for agriculture and should be allocated to forestry. The moderately deep phase is best suited for both rainfed and irrigated agriculture. These soils have good chemical characteristics, except for their low Phosporous content. The soils have some significant limitations in their physical properties such as the low available moisture storage capacity and surface sealing or slaking of soil aggregates. Rainfed arable farming is technically feasible on these soils provided proper soil management practices are adopted. Being well-drained soils they are quite suitable for horticultural tree crops provided some supplementary irrigation is provided during the dry season. These soils are usually located on the better drained upper aspects of the soil catena.

Within the LHG, there are usually two phases, the imperfect to poorly drained phase and the poorly drained phase. It is difficult to distinguish between these two phases without observing the soil profile in a freshly cut pit. Since these soils are located in the lower aspect of the relief, or the lower member of the soil catena, these soils are poorly drained during the rainy Maha season and also during the short Yala rainy season. There are little or no limitations for irrigated rice culture on these soils, and indeed they are highly productive paddy soils when irrigation supply is not limiting. As far as possible these soils

should be used for irrigated agriculture. They are not suited for the usual rainfed crops grown in this environmental because of their poor drainage qualities. However, during the Yala season the imperfectly drained phase could be profitably used for growing a small limited extent of high value cash crops with the aid of lift irrigation from open dug wells.

The alluvial soils (AL) as their term implies are assentially located within the narrow flood plains of the higher order streams and rivers. These are soils of variable depth, texture and drainage. At present they are mostly used for rice cultivation. In very limited locations. such as on the well drained levees of the bigger rivers, some high value crops are grown with lift irrigation during the dry season. Almost all the alluvial soils are presently in some form of agricultural use.

Environment and Agroforestry

The importance of accommodating environmental issues in development planning is well recognized. This stems primarily from the concerns about environmental degradation, greater public appreciation on the importance of environmental protection and a certain amount of anxiety that human beings are losing control over the side effects of technological progress.

Intimately linked to discussions on the rural environment in Sri Lanka are issues relating to forestry. Despite the emphasis laid on the protection of forests and the environment, the forest cover is steadily decreasing. This is due to both legal and illegal failing of trees for timber, firewood and also to accommodate increasing acreages for agriculture activities.

According to statistics obtained from the Forest Department, at present, natural dense forest occupy 26 percent (191,000 ha) of the total land area of Anuradhapura district. Much of this area comes under the Wilpattu National Park. Other natural forests areas border Vavuniya and Trincomalee districts. In addition there are isoldated pockets of dense forest which cover the inaccessible erosion remnants. The current

rate of deforestration of dense forest is not known. Estimates made from satellite images by the GOSL/UNDP/FAO Forestry Project indicates that in the North Central Region, which includes Anuradhapura district, the rate of deforestation between 1981 and 1983 is 3.7% per annum. The probability is that the rate of deforestation increased in recent years representing a substantial loss of dense forest cover in the district.

Much of the natural forest has been transformed into low productive scrub land where chena cultivation is usually practised. The area under scrub land is estimated at around 105,000 ha or 15 percent of the total land area of the district. Significant acreages have also been cleared for cultivation under the Mahaweli Project and ADZAP.

There is an urgent need to preserve the remaining dense forests which are of paramount importance in safeguarding the micro environment, water supplies, and preserving the genetic diversity of flora and fauna. At present practical measures to safeguard and develop forestry is limited to the total prohibition of clearing forest (except in areas where selective logging is permitted) or the establishment of forestry plantations. There is considerable evidence to suggest that these measures alone are inadequate to prevent the reduction in forest area and environmental degradation. At present, only about 4200 acres have been reforested.

More research is needed on effective management of forest lands. This is particularly important with regard to the management of open type forest and scrub land where chena cultivation takes place. The introduction of stabilized systems of cultivation to replace the chena system has been talked about for some years. The technology for such systems exists. But there is a clear need to understand the social, economic and institutional constraints which discourage farmers to take up stabilized systems of cultivation in place of chena.

An important consideration in agroforestry programmes is the local demand for firewood and timber. The rural population cannot afford to pay for commercial fuels such as electricity, kerosene and gas. They are almost entirely dependent on firewood for their domestic fuel requirements. Scrub lands and neighbouring forests are the main sources of

firewood. For the moment at least there are adequate supplies of fuelwood in the North Central province. In fact, it is a fuelwood exporting region. However, with increasing population there will be a greater local demand of fuelwood in the future. Therefore, studies are needed to evolve suitable forestry management practices which would ensure adequate supply of fuelwood and industrial wood needed by the people at affordable prices while at the same time giving due recognition to environmental protection. In this regard a study on local fuelwood and timber demands would prove useful.

Wild Life

Until recently, a significant area in Anuradhapura district was covered with forest, which was home to a wide variety of wild life. During the last three decades large areas of forest land have been cleared for agriculture, and human settlement. These coupled with the illicit felling of trees have greatly reducing the natural habitats of wild life.

In 1938, the Wilpattu Sanctuary was established to preserve the local fauna. This park covers an area of 327 square miles, a major portion of which lies in the Anuradhapura district, the rest in Puttalam and Mannar districts. The estimated animal population in the sanctuary is as follows:

Elephants	200 (Tuskers 20)
Leopards	150
Deer	4000
Stags	140
Buffaloes	500
Boars	1000
Peacocks	700
Pheasants	1500
Crocodiles	1000.

Source : Department of Census and Statistics - Anuradhapura.

In addition, there are a few reserves within settlement areas where hunting is prohibited. There areas include Anuradhapura (sacred city

area), Mihintale (including Mahakanadarawa Wewa) and Rasvehera within the Mahaweli Zone. The Ritigala peak and surroundings which have a special and distinctive forest cover on the western and eastern flanks have been declared a native reserve to protect fauna and flora.

Chapter Four

SOCIAL AND ECONOMIC INFRASTRUCTURE

Demography

History of Population - An Overview

Evidence from ancient chronicles and the archaeological remains in and around the city of Anuradhapura suggest that the region was once inhabited by a large population. There may be some controversy about exact numbers, but it is generally believed to have been far greater than the current population.

With the fall of the ancient kingdom of Rajarata in the 13th Century A.C. the region was subtantially depopulated and Anuradhapura district continued to remain sparsely populated until it was reopened for resettlement some sixty years ago. According to an enumeration of population carried out in 1821, Nuwarakalaviya was inhabited by some 17,000 persons living in about 850 villages. This probably was an underestimation as the coverage of the 'census' would have been poor in view of the fact that much of the area at the time was in jungle. Subsequent estimates of the population in the course of the last century are given below:

Year	No. of Villages	Population
1821	856	17,220
1839	1038	45,204
1846	1036	44,067
1871	1036	58,643
1881	994	61,049
1891	1021	69,302

The 1833 division of the island into five provinces placed the Anuradhapura district as a part of the Northern Province. This demarcation was intended to break up the Kandyan Kingdom. The division in 1878 was equally arbitrary and was the major reason for the fact

That provincial boundaries even today are not demarcated according to natural boundaries much less along communal lines.

Population Growth

The following table tives the census data on total population and growth rates for the district and the country as a whole for the period 1901-1989.

Total Population and Growth Rates 1901-1989

	Population	Intercen-sal change (%)	Growth rate (%)	Population sal change	Intercen-sal change (%)	Growth rate (%)
1901	3,565,954	-	-	73,302	-	-
1911	4,106,350	15.0	1.4	79,498	8.5	0.9
1921	4,498,605	9.6	1.0	88,289	11.0	1.1
1931	5,306,871	18.0	1.7	89,458	1.3	0.1
1946	6,657,339	25.4	1.5	118,725	32.7	1.9
1953	8,097,895	21.6	2.8	171,268	44.3	5.4
1963	10,582,064	30.6	2.7	279,788	63.4	5.0
1971	12,689,897	20.0	2.3	388,770	38.9	4.1
1981	14,850,001	17.0	1.6	587,929	51.2	4.1
1989*	16,820,000	13.2	1.6	837,741	-	4.5

* Estimated

Source: Census of Population (Various years)

The information contained in the table shows that there had been a significant drop in the growth rate during the intercensal period 21-31. This is most likely due to high mortality rates as a result of the malaria epidemic which prevailed at the time. The most noteworthy feature is that since 1946, there has been a substantial increase in population in the district. Between 1946-1989, the population has increased by as much as 600 percent. Anuradhapura district has one of the highest population growth rates in the country. The annual growth rate of the population which has consistently been over 4 percent per annum during the last four decades, is over twice as high as the national average.

The principal contributing factor for the spectacular increase in population in the district was the successful eradication of malaria in the late 1940s. The control of the disease rendered the district more habitable and reduced the high mortality rates which prevailed earlier. The crude death rate which averaged 34.3 per thousand of population between 1930-45 declined to an average of 11 per thousand during the period 1946-1960 (ESCAP, 1976). In addition, the restoration of ancient irrigation systems, the clearing of jungle for agriculture and the establishment of smallholder settlement schemes have resulted in large-scale in-migration to the district[1].

Size and Distribution of Population

According to estimates made by the Department of Census and Statistics (Anuradhapura), the total population in the district in 1989 was 837,741 persons. The distribution of the population according to administrative divisions is given in the table below.

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1 Of the 46.5 net increase in population during the period 1946-53, in-migration to the district accounted for 26.1 percent as against 21.42 percent due to natural increase. Net migration accounted for about a third of the 1953-63 population increase. Between 1966-71 some 103,298 persons migrated to the district, whereas only 24,300 were out-migrants (ESCAP, 1976).

Distribution of Population in Anuradhapura District

	Total Population	Males	Females
Anuradhapura Urban Council	52,894	29,406	23,488
Horowpothana	32,569	17,246	15,305
Huruluwewa	50,665	26,340	24,325
Ipalagama	39,052	20,435	18,617
Kahatagasdigiliya	36,753	18,799	17,954
Kebithigollewa	22,915	12,248	10,667
Kekirawa	57,694	31,447	26,217
Medawachchiya	45,520	23,762	21,758
Mihintale	26,576	13,548	13,028
Nochchiyagama	44,393	24,375	20,018
Nuvaragam Palatha (Central)	43,245	22,687	22,538
Nuvaragam Palatha (East)	51,699	26,884	24,815
Padaviya	29,785	15,968	13,817
Palagala	33,720	18,457	15,263
Rambewa	36,753	18,949	17,804
Talawa	62,292	34,243	28,049
Thirappane	30,358	15,855	14,503
Galnewa	33,244	18,090	15,154
Rajanganaya	38,773	20,745	18,028
Palugaswewa	14,477	8,140	6,337
Tambuttegama	34,480	19,405	15,075
Willachchiya	19,884	10,442	9,442
TOTAL	837,741	447,471	390,250

Source: Dept. of Census and Statistics (Anuradhapura)

The urban population accounts for a mere 7 percent and are concentrated primiarily within the Anuradhapura Urban Council (UC) limits. The UC area has the highest density of population with some 1980 persons for square kilometer of land. Other areas of relatively high concentration of population are the AGA divisions of Talawa, Nuwaragampalatha East

and Palagala which have population densities ranging from 150-250 persons per square kilometer. Nochchiyagama, Kebithigollewa and Horowpathana AGA divisions are sparely populated with less than 50 persons per square kilometer (Dept of Census and Statistics, 1981).

Age and Sex Composition

Of the total population in the district, 53 percent were males and 47 percent females. The higher proportion of males is consistent with the national sex composition of the population and has been long considered an important characteristic of Sri Lanka's demography. The reasons attributed are, higher female mortality, possible under-enumeration of females and the pre-dominance of male inmigration to the district.

Current data on the age structure of the population are not available. The most recent information available is the Census of Population and Housing of 1981. The table below gives the age profile of the population of Anuradhapura as recorded in the 1981 Census.

Age Distribution of Population

Age groups	Total	%	Male	%	Female	%
0- 9	164,377	28	83,847	26	80,530	29
10-14	68,867	12	35,551	11	33,316	12
15-19	66,062	11	35,021	11	31,041	11
20-24	66,144	11	35,189	11	30,955	11
25-29	53,730	9	28,986	9	24,744	9
30-34	42,101	7	23,191	7	18,910	8
35-39	27,591	5	14,830	5	12,761	5
40-44	23,699	4	13,062	4	10,637	4
45-49	21,023	4	11,677	3	9,346	3
50-54	17,171	3	10,159	3	7,012	3
55-59	12,146	2	7,380	2	4,766	2
60-64	9,304	1	5,826	1	3,478	1
65 & above	15,174	3	9,554	3	6,160	2
TOTAL	587,929	100	314,273	100	273,656	100

Source: Dept. of Census and Statistics (1981).

An important point to note is the predominance of youth in the district as at the last census. About 40 percent of the population were less than 15 years of age. Those in the productive age group 15-65 years accounted for about 57 percent and 3 percent were above the age of 65 years. The age dependency rate is estimated to be 73 percent.

The youthful nature of the population is consistent with the national age structure of the population and reflects birth rates higher than the death rates. An age profile of this nature has important implications in terms of a district development programme. A high proportion of the population of the lower age groups means that the number entering the workforce exceeds the number moving out. Therefore, creating employment opportunities for the additions to the work force should be given high priority in formulating development plan for the district.

Ethnic and Religious Composition

Anuradhapura district is a predominantly Sinhala - Buddhist area. About 90 percent of the inhabitants belong to this ethnic religous group. Sri Lankan Moors account for around 7 percent of the population. According to the 1981 census 1.5 percent are Tamils. It is very likely that this proportion has reduced considerably following the ethnic disturbances in 1983. Other racial groups account for 0.3 percent. The 1981 Census also revealed that around 1.2 were Roman Catholics and some 0.2 percent were Christian of other denominations.

EDUCATION

The expansion of conventional educational facilities in the Anuradhapura district commenced in the mid 1950s with the "free education" scheme. Over the last three decades a considerable number of primary schools, secondary schools as well as the Central schools (senior secondary schools) have been constructed, specially in the rural settlement areas of the district. Census data shows that there were 453 government schools and 76,290 pupuls in the district by 1966. The number of schools and the pupils had been further increased upto 544 and 192,877 respectively by mid-1990.

Number of schools by type

Type	Number
Primary schools	243
Junior Secondary Schools	197
Senior Secondary Schools (Science and Arts)	17
Senior Secondary Schools (Arts only)	87
Total	544

Source : Department of Education, Anuradhapura.

For the purpose of closer administration and supervision the district is divided into five Educational Divisions (ED) and each of these divisions is headed by an Education Officer (EO . The average number of schools in charge of each EO is 110. The distribution of schools, teachers and pupils according EDs are given in the table below:

Number of schools, teachers and pupils under Educational Divisions (as at July 1990)

	Name of Division	No. of schools	No. of teachers	No. of pupils
1.	Anuradhapura	128	2,480	57,701
2.	Galenbindunuwewa	88	1,250	25,753
3.	Kebithigollewa	127	1,273	30,680
4.	Kekirawa	131	1,773	40,412
5.	Tambuttegama	70	1,382	38,331
Total		544	8,158	192,877

Source : Department of Education, Anuradhapura.

The Department of Education has spent about Rs. 207,660,000/- and Rs. 45,500,000/- on recurrent and capital expenditure respectively in 1990. Current staff position, the approved cadre and existing vacancies in the schools are given below.

Staff position of the Schools in the Anuradhapura District
(as at July 1990)

Post		Approved cadre	Existing staff	Existing vacancies
1. Principals	Class I	114	125	-
	Class II	300	175	125
	Class III	341	142	199
2. Assistant reachers (Graduates)	Science	121	117	03
	Commerce	223	147	76
	Arts	3225	2054	1171
3. Non-graduate teachers		13188	7387	5801
4. Matrons		06	-	06
5. Asst. Matrons		06	04	02
6. Teacher counsellor		-	-	-
7. Clerks/Stenographers/Typists		19	06	13
8. Office Aides (S/L 121, K.K.S. 124)		245	60	185
9. Watchers		121	18	103
10. Laboratory labourers		06	-	06
11. Sanitary labourers		28	20	08
12. Cooks/Assistant Cooks		26	-	26

Source : Approved Cadre and Staff position. The Office of the Chief Secretary, North Central Province.

Impact of the Education Development Programme

The impact of education development programmes implemented in the district over the past three decades can be assessed by examining the changes in literacy rates, school attendance rates and the level of educational attainment of the population over 5 years.

According to the census data, the district literacy rate in 1953 was relatively low at 63%. The literacy rate in the urban sector as well as in the rural sector had increased to 90.8% and 83.3% respectively by 1971. By 1981 literacy rates among urban and rural sectors had further increased to 95.4% and 90.5% respectively exceeding even the national averages. These improvements can be attributed mainly to the expansion of primary and secondary schools and other facilities in the urban areas and rural areas as well. The opening up of new schools has resulted in increasing the school attendance rates too during 1971-1981 period, but a reduction in attendance is observed after grade 8.

The educational attainments also increased remarkably over the past few decades. However 56% of the population aged above 5 years had only a secondary education (grades 309). A slight increase in the percentage of those who attained the G.C.E (O/L) and G.C.E. (A/L) can also be observed.

Percentage of population 10 years and over by literacy and sex

Sector and Sex		Literate		Population	
		Anuradhapura district		Sri Lanka	
		1971	1981	1971	1981
Urban and Rural Sectors					
	M	84.2	90.9	85.6	90.5
	F	66.2	81.3	70.9	82.4
	T	76.0	86.5	78.5	86.5
Urban Sector					
	M	90.8	95.4	90.3	95.3
	F	79.4	91.1	81.5	91.0
	T	86.1	93.5	86.2	93.3
Rural Sector					
	M	83.3	90.5	84.2	79.9
	F	64.7	80.5	67.9	89.0
	T	74.8	85.9	76.2	84.5

Source : Census of Population - 1971 & 1981.

Percentage of population 5-24 years by schooling

Grade	1971			1981*		
	Both sectors	Urban sector	Rural sector	Both sectors	Urban sector	Rural sector
Grade I age 5/6 years	38.1	40.4	37.6	76.1	76.0	76.0
Grade 5 age 10 years	73.3	76.5	73.0	91.5	90.5	91.5
Grade 8 age 13 years	56.2	69.9	54.9	76.4	80.2	76.2
Grade 10 age 15 years	39.4	58.5	37.5	56.5	72.3	55.3
Grade 12 age 17 years	26.5	39.1	25.1	32.1	47.0	30.8
5-24 years	116.0	49.3	49.1	45.5	46.8	43.4

Source : Census of Population, 1971 and 1981.
* 5-29 years

Percentage population by educational attainments

Educational Attainment	Anuradhapura		Sri Lanka	
	1971*	1981**	1971*	1981**
No schooling/unspecified	28.0	13.1	29.2	13.0
Passed Grade 4 or below	39.2	16.7	30.0	12.5
Passed Grade 5, 6, 7, 8 and 9	30.0	56.0	34.5	56.8
Passed O/L less than 6 subjects	4.0	7.4	5.3	8.5
Passed O/L - 6 or more subjects	2.1	4.2	3.5	5.5
Passed A/L less than 3 subjects	0.2	1.1	0.3	1.6
Passed A/L - 3 or more subjects	0.1	1.5	0.1	0.8
Below degree level	0.6	0.4	0.8	0.6
Degree on equivalent	0.2	0.4	0.4	0.6

Source : Population Census, 1971 and 1981.
* Population 5 years and over; ** Population 10 years and over

Problems and Weaknesses of the Education System

As mentioned earlier shools were opened in rural areas to meet the rising demand for education. However, the supply of buildings, equipments, furniture and other educational aids has not met the demand. Some of the schools do not have basic amenities such as toilets, chairs, desks and drinking water. This is more common in rural schools. Most children in primary classes sit on the floor and engage in learning activities.

A shortage of teachers has also become a serious problem. The number of teachers increased substantially over the last 5-10 years and now there are 8198 teachers, including principals, in the district. This district is considered a difficult area and most teachers are reluctant to serve in it mainly because of the prevalence of malaria, lack of living quarters and poor transport facilities.

The problem is especially acute in rural schools. There are only 442 principals (55%) out of the 799 required, and 9705 teachers (58%) out of 16737 in the district. More than 90 percent of the teachers currently serving in the district are from outside the district and they all need residential facilities in proximity to these schools. This is a major lack and needs to be addressed on a priority basis.

HOUSING

The total district population of 587,822 reported for 1981 occupied some 107,914 housing units with an average occupancy rate of 5.4 persons.

The quality of housing and the facilities available can be considered as an important indicator which reflects the living conditions of the people. Generally the quality of housing is defined by the quality of building materials used in construction while the facilities are determined by the indicators such as floor area, number of rooms per house, occupancy rate and availability of toilets and other facilities. The condition of the housing units in this district may be measured in terms of these indicators.

Based on materials used for the constructions, the district housing units have been classified into three groups viz. (a) Permanent units, (b) Semi-permanent units and (c) Temporary units. The materials used for the construction of each type of these houses is as follows:

Classification of District Housing Units by type

Type	Material of Roof	Material of Wall	Material of Floor
Permanent	Tile, asbestos or metal sheets	Cement, stone brick or cabook	Cement or wood
Permanent	Tile, asbestos or metal sheets	Mud	Cement
Semi-permanent	Tile-asbestos or metal sheets	Cement, stone brick or cabook	Mud
Semi-permanent	Cadjan or palmyrah	Cement, stone brick or cabook	Cement, wood or mud
Semi-permanent	Tile, asbestos or metal sheets	Mud	Wood or mud
Semi-permanent	Cadjan or palmyrah	Mud	Cement, wood or mud
Semi-permanent	Tile, asbestos metal sheets	Wood	Cement, wood or mud
Semi-permanent	Cadjan or palmyrah	Wood	Cement
Impoverished	Cadjan or palmyrah	Wood	Wood or mud
Impoverished	Any material	Cadjan, palmyrah or straw	Any material

Source : Census of Population and Housing, 1981 - Anuradhapura District.

Occupied Housing Units by type of sectors

Type	Anuradhapura				Sri Lanka			
	Urban sector		Rural sector		All sectors		All sectors	
	No.	%	No.	%	No.	%	No.	%
Permanent	4041	62.2	22561	22.3	26602	24.7	785949	35.4
Semi-permanent	2238	34.4	75386	74.3	77624	71.9	1271232	54.3
Impoverished	224	3.4	3465	3.4	3689	3.4	160297	7.3
Total	6503	100.0	101411	100.0	107914	100.0	2217478	100.0

Source : Census of Population and Housing, 1981.

The housing conditions in the minor tank settlements established under various development programmes such as ADZAP was found to be very poor. For example 76% and 24% of the houses recently constructed in the ADZAP settlements respectively have been classified as semi-permanent houses and temporary houses/huts (Jayasena, 1988). Almost all the temporary houses/huts have been constructed poorly by using cadjan or straw only to cover roofs and many of them do not have plastered walls or properly constructed floors. The above study further indicates that the floor area of about 38% of the houses is less than 150 sq. feet. The average occupancy rate is reported to be 5.4 persons per housing unit. About 50% of these houses had no separate living rooms or kitchens. Poor incomes, lack of institutional support, shortage of building materials such as wood, cadjan, bricks, tiles etc. have thus become major constraints to the improvement of housing conditions in the district.

HOUSING DEVELOPMENT PROGRAMMES

A considerable progress in the construction of houses in the district can be observed since 1980s, with the commencement of two major National Housing Development Programmes referred to as (a) Hundred thousand Houses programme, and (b) One million Houses programme.

The first programme was implemented during 1978-1986 covering all districts of the country. The stated objective of this programme was to satisfy the demand for housing of low income and middle income earners. Financial assistance for this programme was provided by the government while the implementation activities were undertaken by the newly created National Housing Development Authority and Urban Development Authority. As shown in the following table, about 2003 houses have been constructed in the Anuradhapura District under this programme since 1983.

Number of urban and rural houses constructed under the Major Housing Development Programmes in Anuradhapura District 1979-1989

Area	Under 100,000 houses programme	Under Million houses programme	Sevana Nivasa programme	Total
Urban	-	791	19	810
Rural	2,065	12,402	892	15,359
Total	2,065	13,193	911	16,169

Source : National Housing Development Authority, 1989.

One million houses programme which was implemented over six year period from 1984-1989 further expanded the housing construction activities in almost all the districts of the country (People's Bank, 1988). Instead of direct state intervention this programme sought to encourage

beneficiary participation on a self-help basis, using local skills and local materials for the construction of their houses.

A sum of Rs. 7500/- is channeled to each beneficiary through the Thrift Societies or direct from the NHDA. The recipients are expected to use this money to buy construction material as well as hire labour where necessary but emphasised the use of their own labour as much as possible.

HEALTH AND NUTRITION STATUS

This section sets out the current situation in Anuradhapura District with respect to causes of mortality and morbidity, comparing these with their relative incidence for the country. It also gives the data available on sanitation and public health education to which morbidity is related. The section concludes with an account of the health facilities now available an assessment of present needs.

Causes of Mortality and Morbidity

The causes of mortality as given in the Hospital records is given below for the years 1988 and 1989.

Mortality

	1988	%	1989	%
Pesticide Poisoning	129	27.7	54	28.9
Isohgemic Heart Diseases	82	17.6	20	10.7
Ill defined conditions	45	9.6	07	3.7
Hypertensive disease	37	7.9	08	4.3
Disease of the respiratory tract	24	5.2	11	5.9
Pheumonia & bronchopueunomia	20	4.3	10	5.4
Diseases of the pulmonary circulation and other forms of heart diseases	22	4.7	13	6.9
Malignancies	26	5.6	-	-
Poisoning and Toxic effects other than pesticide poisoning	33	7.1	09	4.0
Unspecified	48	10.3	55	29.4
All deaths	466	100	187	100

Source: Registrar General

The dominant cause of death appears to be due to insecticide poisoning. Of the defined diseases, illnesses and infections of the respiratory system is the next leading cause for deaths in the district.

The causes of morbidity may be seen in the data given for the same period with respect to hospital admissions in Anuradhapura district. malaria is the main reason for hospitalisation followed by diseases of the respiratory tract.

Hospital Admissions

	1988	%	1989	%
Malaria	16,460	20.6	13,447	21.8
Diseases of the respiratory tract	10,972	13.7	9,436	15.3
Normal delivery	10,968	13.7	8,044	13.1
Ill defined conditions	7,511	9.4	5,242	8.5
Traumatic injuries	6,860	8.6	4,976	8.1
Admitted for delivery but discharged before delivery	5,693	7.1	5,172	8.4
Intestinal infections and diseases	4,841	6.1	3,605	5.9
Diseases of the urinary system	1,797	2.3	2,656	4.3
Diseases of the skin and subcutaneous tissue	2,614	3.4	2,027	3.3
Diseases of the gastro-intestinal tract	2,992	3.7	2,147	3.5
Unspecified	9,118	11.4	4,650	7.8
Total	79,826	100.0	61,402	100.0

Source: Hospital records

It is interesting to note that according to the above records the number of deaths have dropped sharply from 1988 to 1989. Similarly of hospitalisation for illness is also less by about 18,500 in 1989. the reasons for this would be worth investigating.

Malaria had declined with the introduction of malathion spraying. But, in the recent past, there had been a substantial increase in the incidence of the disease and according to data given by the Ministry of Health on Malarial incidence. Anuradhapura, Polonnaruwa, Kurunegala, Moneragala and Hambantota districts were among the worst affected.[1] However, according to the information provided in the Regional Development Division Report[2] the number of malaria cases have declined since 1987, nevertheless, about 4-5% of the population is still afflicted annually by the disease.

Reently, another major disease outbreak - Japanese Encephalitis - reached epidemic proportions in the districts of Anuradhapura, Puttalam and Kurunegala (1986-1988 period). The highest number of cases and deaths were reported in Anuradhapura.

Diarrhoea is at the top of the list among in the common communicable diseases in Anuradhapura followed by infectious hepatitis and tuberculosis. The reported cases of diarrohoea had declined by about 100 from 1988 to 1989 and is attributed to the introduction of Oral Rehydration Salt through the Maternal Clinics. Annually about 25% of the preschool children suffer from infectious diarrhoea[3].

Drinking Water and Sanitary Facilities

The present situation with regard to access to drinking water is given below.

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1 National Review of current health sector resources and needs in Sri Lanka, Ministry of Health, 1988

2 Data obtained form the section on health services in the country situaion report prepared by the Regional Development Division, 1989.

3 National Review of current health sector resources and needs in Sri Lanka, Minisry of Health, 1988.

Main Sources of Drinking Water at the household Level

	Piped (%)	Protected wells (%)	Unprotected wells (%)	River.tank (%)	Not stated (%)
Anuradhapura	7.1	60.0	23.4	7.7	2.0
Sri Lanka	17.3	52.3	20.8	7.0	2.7

Source: National Review of current health sector resources and needs in Sri Lanka, Ministry of Health, 1988.

The major source of drinking water is the protected well. The number of ground water wells drilled in Anuradhapura district (up to 1986) is 1,207 which is about 33% of the total drilled wells completed by the Water Resource Board.

Toilet facilities available to the population are low. Our 53 percent of households had their own toilets. About 14% of households had shared toilets (Table below).

Toilet Facilities Available

	Own (%)	Shared (%)	Not stated (%)
Anuradhapura	53.0	13.6	33.4
Sri Lanka	35.1	5.8	59.1

Source: National Review of current health sector resources and needs in Sri Lanka. Ministry of Health 1988.

Maternal and Child Health

The number of pregnant mothers registered with the Mother and Child Health Clinics has increased over the last two years. This is presumably due to the additional recruitment of Public Health Midwives in 1987.

Information on Pregnant Mothers as Given by the MCH Clinics in the District

	1988	% of total pm* in the district	1989	% of total pm* in the district
Total number of pregnant mothers (pm)	16,116	100.0	16,131	160.0
Registered with MCH clinic	13,183	81.8	14,808	91.8
Number of pm receiving ante natal care	12,539	77.8	15,635	96.5
Total No. of deliveries	10,570		12,829	
Total No. of deliveries by trained personnel	10,300		12,486	
Percentage of pm protected with tetanus toxoid doses	60.0		50.0	

Source: Situation report prepared by the Regional development Division (1989)

(pm*-pregnant mothers)

Data in the foregoing table indicate that although, an increased number of mothers have registered with the clinics in 1989, the percentage of mothers treated with tetanus toxoid has gone down only from 60% in 1988 to 50% in 1989. As the number of pregnant mothers receiving antenatal care has increased from 78% in 1988 to 97% in 1989, a better coverage of toxoid should have been possible. The actual effective coverage of pregnant mothers by the clinics, therefore, is likely to be considerably less than that reported.

Immunisation of infants appear to have a good coverage. Over 90% of the infant population has been immunised with respect to B.C.G., D.P.T. (3 doses) and Poliomyelitis (3 doses). This is due to both the UNICEF programme on immunisation and the additional recruitment of Mid Wives enabling a better coverage of infants. The infant mortality rate is lower in Anuradhapura (22 per 1,000 live births) compared to the national average of 37. Similarly, the maternal mortality rate (0.6% is slightly below the national average (0.8%).

Nutritional Status

There have been two national nutritional surveys done in Sri Lanka i.e. in 1975/76 and 1980/82. Although the data of the two surveys are not directly comparable, they can be used to examine the trend in stunting (chronic undernutrition) and wasting (acute undernutrition) levels of pre-school children.

In Anuradhapura, the percentage of stunting was 30.7% in 1975/76 and 35.1% in 1980/82; for wasting it was 6.9% in 1975/76 and 13.8% in 1980/82. This indicates an overall deterioration of nutrition among pre-school children. The higher percent increase in wasting indicates severe short term food deprivation to the child. An increase in long-term food deprivation is also evident by the high incidence of stunting.

Causes for the prevalence of undernutrition are many and varied. According to the 1980/82 national nutritional status survey, a significant correlation was seen between the nutritional status of the pre-schooler and the mother's education, household income, expenditure on food, household size, and environmental sanitation. These reasons also explain the low birth weight of about 25% of the new born in the country. High undernutriion levels of children between 6-36 months is due to the above reasons. Other reasons include late weaning, poor weaning practices, high incidence of diarroheal disease and respiratory infections.

The foregoing indicators of stunting and wasting refer only to energy - protein malnutrition levels among pre-schoolers. Micro-nutrient deficiencies such as iron, iodine, vitamin A have also been identified as nutritional problems among pregnant and lactating mothers and adolesclent girls in particular.

Available Health Facilities and Needs

The area of authority of the Anuradhapura Regional Director of Health Services (RDHS) comprise three Medical Officers of Health (MOH) areas viz., Anuradhapura, Kahatagasdigiliya, and Kekirawa. The mid year (1986) estimated population in each of the MOH areas was 922,000, 279,000 and 101,000 respectively[1].

The availability of curative health facilities the district in terms of the number of institutions are one provincial hospital, four district hospitals, seven peripheral units, six central dispensaries and seventeen maternity homes and dispensaries. The curative health facilities in the RDHS, Anuradhapura and Sri Lanka are as follows.

Institutions of Curative Health in Anuradhapura RDHS and the Country

	Anuradhapura RDHS	Sri Lanka
General Gospital	-	01
Teaching Hospital	-	06
Provincial Hospital	01	07
Base Hospital	-	21
District Hospital	04	121
Peripheral Unit	7	118
Rural Hospital	19	115
Central Dispensary & Maternity Homes	06	85
Maternity Homes	-	22
Central Dispensary	17	350

Source: Situation Report prepared by the Regional Development Division (1989)

The estimated ratio of medical officers (both medical doctors and RMP/AMP to the district population in 1988 was 1,12,400. In 1989 it

1 National Review of current health sector resources and needs in Sri Lanka, Ministry of Health 1989.

was 1:13,705 as the number of medical doctors available reduced by nine.[1] The National average ratio of medical officers to population is 1:7,800[2]. The estimated ratio of public health midwives to the distric population was 1:7,800 in 1988. In 1988. In 1989 108 midwives joined the district health services resulting in a ratio of 1:4,000; the national average ratio is 1:4,900. The following table indicates the available health personnel for 1988 and 1989 in the Anuradhapura RDHS.

Health Personnel Availability & Requirement

Health Personnel	Availability		Requirement (to achieve national level ratio)
	1988	1989	
Medical Officers	38	29	
RMP/AMP	67	66	166
Public Health Inspectors	31	37	National level
Public Health Midwives	186	294	ratio achieved with the existing cadre

Source: Situation Report prepared by the Regional Development Division (1989)

According to the National Health Policy, it is proposed to establish primary health care complexes in Anuradhapura, Kurunegala and Puttalam. These proposals have taken the existing infrastructure, equipment and staff into account and have identified the additional requirement in terms of staff, equipment and new service outlets. Each complex is to serve a population of 60,000 and would consist of a Divisional Health Centre, 3 Sub Divisional Health Centres and one Gramodaya Health Centre for every 3,000 population.

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1 situation report prepared by the Regional Development Division, 1989.

2 National Review of current health sector resources and need in Sri Lanka, Ministry of Health 1989.

Observations on the Need to Improve Health and Nutrition Status

It is observed that some of the causes of major diseases in Anuradhapura are environmental based. Therefore, a major reduction of these diseases is unlikely to occur without substantial improvements in environmental health conditions i.e. protected drinking water, better sanitary conditions and so on. This is highlighted by the high incidence of infectious diarrhoeal disease, viral hepatitis and malaria in the district.

Although poor environmental health can lead to undernutrition (i.e. through repeated attacks of diarrhoea or other infections) the major cause for this is inadequate purchasing power of the poorer segments of the population[1]. But, with the given resources certain action can be taken to reduce undernutrition rates. These range from education programmes for mothers on weaning-food practices, control of diarrhoea at home by the use of oral rehydration salts, promotion of homegardening and information on the best use of available food to provide the family with adequate nourishment.

MOH could organise a more effective supplementary feeding programme as apposed to the current method of distributing Thriposha supplementary food to pregnant and lactating women and pre-schooler. A programme for monitoring the growth of pre-schoolers should be established so that such information can also be an input to a district level health and nutritional surveillance programme.

The relatively poor coordination between the curative health service and the preventive health service is apparent. A better flow of information between the two services can reduce the spread and incidence particularly of communicable/infectious diseases. An effective monitoring system of the preventive health service can be used for planning preventive action.

An area of concern for the authorities should be the high death rates due to insecticide poisoning. The reason for this merits investigating.

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1. National Nutritional Status Survey, 1980/82, Food & Nutrition Policy Planning Division, Ministry of Plan Implementation, 1984.

Economic Infrastructure

Irrigation

Irrigation systems play a very important role in the District not only for the livelihood of the people the majority of whom depend on agriulture but also for domestic use. As such efficient irrigation systems are a sine qua non for the betterment of the people of the District.

Ancient settlers of the area developed a system of reservoirs, big and small, and diversion canals which are considered a marvel of ancient technology. These ranged from small village tanks irrigating a score of fields to large reservoirs built across major streams and transbasin diversion canals irrigating thousands of acres.

This system fell into disuse and decay when the seat of the ancient Kingdom shifted southwards. The restoration of the system started late in the 19th century. A more recent development was the transbasin diversion of Mahaweli water started in the last decade. Several reservoirs, large and small, receive this water now.

Gravity irrigation, where a system of canals is used to convey water under gravity to fields is the method mainly used for irrigation. A very limited extent (4000 acres) is uner lift irrigation and used for the production of subsidiary crops like chillies.

The irrigation system consists of more than 3000 man made tanks in varied sizes spread all over the District. These tanks, for administrative purposes are classified into three groups. i.e. major, medium, and minor or village tanks. The classification is done according to the command area of the tanks in the following manner.

Major irrigation = over 2000 acres.
Medium irrigation= 2000 to 200 acres.
Minor irrigation = less than 200 acres.

Total area cultivated under irrigation is 172,552 acres, made up as following:

Major irrigation	=	16 nos.	63565 acres
Medium	=	80 nos.	22300 acres
Minor	=	3000 nos.	101244 acres

The major and medium tanks are looked after by the Central government through the Department of Irrigation (DI). The Anuradhapura Irrigation Range is divided into 5 Divisions headed by a Deputy Director. These Divisions are Anuradhapura, Padaviya, Mahakanadarawa, Rajangana and Huruluwewa. Each Division is in charge of an Irrigation Engineer (IE) who is assisted by Technical Officers (TOs). Each major irrigation system is kept under a Project Manager whose main responsibilities are maintenance of Head-works and water management. The Irrigation Management Division of the DI oversees the Project Managers.

Improvements, maintenance and water management of minor tanks are responsibilities of the North Central Provincial Council (PC). The Provincial Department of Agrarian Services of the Provincial Ministry of Agriulture and Irrigation is the Implementation Agency for minor tanks. The DAS however, directly deals only with rehabilitation works and introduction of water management practices. Maintenance of the minor tanks is placed under Divisional Secretaries who will be assisted by TOs and Divisional Officers. The Range Irrigation Office of DI handle most of the Head works development of minor tanks.

Provision of irrigation will be further enhanced if the proposed National Irrigation Rehabilitation Project is implemented. Financial assistance of WB is expected for this Project to rehabilitate 77 medium irrigation systems in the District. Already 38 tanks have been identified. The five year project is expected to commence in mid 1991.

Although the present study excludes the Mahaweli Project area, we make the following for purposes of record. 69570 acres in Kekirawa, Tambuttegama, and Galnewa AGA's Divisions are benefited by Mahaweli Project. This area comes under system "H" of the Mahaweli Project. Area under each sub zone is given below.

H1	5080 acres
H2	9530 acres
H4	22490 acres
H5	19540 acres
H7	7160 acres
H9	5800 acres
Total	69570 acres

The majority of minor tanks are rainfed. In the Yala or dry season almost all the minor tanks are go dry. In order to counter the water shortage in the Yala agro-wells are being constructed close to the tanks. These wells are usually 22 ft. in diametre and 25 ft. in depth. There are two programmes implemented in the District. As a pilot project the Central government provides Rs. 10,000 through the Agriculture Development Authority (ADA to individual farmers who can affort to meet the balance cost. The ADA also assists them to obtain credit facilities from banks. It is planned to construct 72 such wells in 1991.

A similar programme is implemented under the PC in which a group of 5-6 farmers are given assistance to construct a well. The farmers would themselves do the construction and PC provides Rs. 10,000 as a grant. The main objectives of this programme are

(a) to encourage farmers to grow high value food crops in yala in place of paddy and

(b) to develop new technologies in water management.

In the short run, the programme would answer the irrigation problem in Yala season. However the economics of a large scale agro-well programme should be carefully assessed, along with their environmental impacts over the long-term.

Communication Services

Postal Services

The District is served by 25 Post Offices (POs) and 177 Sub Post Offices (SPOs). Of the 25 POs, there are one Super Grade, 14 Grade 1 and 10 Grade II POs. All the POs have been provided with basic facilities required for standard services. But the facilities available at

the SPOs ar inadequate. Only 61 of these have telephones, 41 with telegram facility and 119 provide a mail delivery service. On average, a PO/SPO serves 36 sq.km. or 22,000 persons.

At present, postal transportation is done by CTB buses and trains. Both services are in adequate and frequent delays occur in delivering mail and pension money.

The PO at Anuradhapura which serves a growing town needs additional space to provide a more efficient service. A considerable amount of cash needs to be kept in reserve in remote POs. But this is not possible as there are no insufficient cash safes. This has caused considerable difficulties to the people in remote areas.

Telecommunication

The telecommunication service has been modernized recently. Direct dialing facilities are available even to remote areas in the district. There are 11 telephone exchanges capable of providing subscribers direct dialing facilities. There is one auto exchange at Galnewa. Their capacity, present supply, and demand is given below:

Exchange	Capacity	Subscriber	New requests
Anuradhapura	1,248	860	270
Eppawala	48	46	38
Kahatagasdigiliya	96	41	44
Kebithigollewa	48	31	07
Kekirawa	384	171	21
Galenbindunuwewa	48	43	11
Horowpathana	48	43	07
Tambuttegama	192	65	34
Nochchiyagama	96	56	14
Medawachchiya	144	39	09
Galnewa (auto)	50	24	--

The Anuradhapura Exchange is being expanded to cater to 2,000 subscribers with financial assistance under the North East Crash Programme. The capacity of the Exchanges except Galnewa has been increased on the basis of the demand which prevailed at the time. However, the demand for telephone facilities has increased rapidly after modernisation exceeding the existing capacity. Although Glanewa is a town center in Mahawel area, the demand for telephone is very low compared to other areas. This is because Galnewa Exchange (RAX type) cannot provide subscribers with direct dialling facilities.

Roads

The road network in the district is over 3,200 miles representing a density of 1.1 miles per sq. mile. Several trunk roads linking main cities in the country run through the district. Two roads link Colombo through Kurunegala and Puttalam. One road leads to Northern region from Kandy. The Anuradhapura - Habarana road procedes Trincomalee.

There are some 1,288 miles roads maintained by either Road Development Authority (RDA or Provincial Ministry of Highways. Over 2,000 miles of roads are managed by local authorities under Provincial Ministry of Local Govt. 'A' and 'B' class roads are maintained by RDA and 'C' roads have been handed over to the Provincial Council. The existing mileage of each class of road is given below:

'A'	Metaled	218.07 miles
'B'	Metaled	130.78 miles
'C'	Metaled	347.95 miles
'C'	Gravelled	148.27 miles
'D'	Metaled	87.44 miles
'D'	Gravelled	354.14 miles

The physical condition of all the roads are very poor and need provement. The condition of the roads deteriorate further during the rainy season. The cost of improvement of 'A' and 'B' class roads with taring is around Rs. 1.5 m per mile. Whereas, with 'premix', the cost will be Rs. 2.0 m per mile. Most of the graveled roads have been washed off and are unmortable causing severe transportation problems for the rural people. All rural roads maintained by Local Authorities are graveled

or soil payed. The width varies from 20 to 6 feet.

Transport Facilities

The principal transport service in the district is provided by the Regional Transport Board (SLRTB). Private bus operators concentrate on profitable urban routes. Two railway lines run through the district linking the district with Colombo, Jaffna, Trincomalee and Batticaloa.

Regional SLTB which is operating at an estimated annual loss of Rs. 1.5m was adversely affected by recent civil disturbancies. However, it managed to maintain a minimum service. About 27 buses were completely damaged during the troubles.

The minimum requirement of buses per day to keep up with the present time table is 173. Only 106 buses are available at the four depts in the district (Table below).

Depot	Daily reqmt.	Availability
Anuradhapura	87	55
Kekirawa	36	23
Kahatagasdigiliya	26	15
Kebithigollewa	24	13
Total	173	106

The ageing bus fleet which is affected by frequent breakdown due to the poor condition of roads, specially, C and D graveled roads. As there are no replacements, the RSLTB is compelled to withdraw of buses form remote areas. About 10-15 buses reportedly break down daily.

Route Numbers and Bus Operated in District 1986-1989

Year	No. Routs	Av. No. of buses operated	Total KM	No. of Passengers
1986	164	137	11057733	18684321
1987	154	134	11919798	19862977
1988	164	121	9314398	18414933
1989	140	106	6372566	9839912

The data, excludes the inter-city services operated on main roads by other RSLTB's outside Anuradhapura district. Such long distance connecting Colombo, Kurunegala, Puttalam, Trincomalee, Vavuniya, Polonnaruwa operate via Anuradhapura district ease transport problems of semi-urban centres located alongside main roads.

Private bus services have not effectively expanded to meet the demand. Most of the private bus service compete with RSLTB only the more profitable urban areas. The number of private buses operating within the district (excluding inter district long distance are given below:

1986	160
1987	176
1988	285
1989	235

Most of these buses have seating capacity less than 26. There is no co-ordination between RSLTB and Private bus owners consequently commuters are not effectively benefited.

Motorcycles and bicycles are becoming popular modes of transport in urban and rural areas as well. The number of motorcycles in the district increased from 4,778 in 1986 to 10,336 in 1989. In 1990 there are 14,292 motorcycles registered in the district.

Electricity

Ceylon Electricity Board and Local Govt. Authorities provide electricity to district. The length of supply lines within the district are indicated below:

132 Kv H.T Lines	132 km
32 Kv H.T Line	685 km
Single phase L.T. Lines	230 km
2 phase L.T. Lines	18 km
9 phase L.T. Lines	180 km
No. of sub-stations	190

Distribution of electricity for consumption depends on the extension of 32 Kv. H.T. Lines. Although there are requests for rural electrification from Members of Parliament and Members of Provincial Council, the demand for electricity from public is low. Electrification rate for Sri Lanka in 1989 was 27%. Whereas for Anuradhapura District it was 10.3%. In the case of rural areas, the figure is around 4%. The details of consumers are given below.

Domestic consumers	7221
Industrial/Business Consumers	421
Public places	1990
Bulk supplies	65
Religious places	155
Unclarified	09

The rate of electrification is very low in the district is due to overall economic condition of the people . Now households cannot affort to meet the initial cost i.e. internal wiring and main supply. Due to the low demand, rate of return in most schemes are less than 12%. CEB has introduced a loan scheme which is payable in 5 years. Bank of Ceylon and People's Bank also grant credit facilities up to Rs. 5000 electricity supply. It has been observed that publicity for the loan scheme has not been effective enough to attract rural people.

Industry

Industrial and manufacturing activity in the Anuradhapura district remains low, reflecting the relatively undiversified structure of the economy. According to a recent survey carried out by the Provincial Ministry of Industries, Women's Affairs and Rural Development (1990), there are 2144 industrial establishments in the district. Of these, 1102 are enterprises involved in the manufacture of food items, about 250 are mineral bases industries and some 792 are enterprises are classified as "others". The latter includes largely light engineering enterprises. Some 7199 persons are employed in the manufacturing sector.

The majority of the industrial establishments in the district are located in and around the city of Anuradhapura and a few other principal towns. In recent months there is evidence of new investments in industrial enterprises but it has yet to gather momentum.

The low level of industrial activity in the district can be attributed to lack of adequate capital among the population to start industrial ventures, insufficient number of skilled manpower, inaccessability to bank loans and inadequate marketing facilities (PM/I, WA&RD, 1990). Another reason is that, the industrial potential of the district has not been clearly indentified and assessed. This is an area which immediate attention.

Chapter Five

THE DISTRICT ECONOMY

The Agricultural Sector

Anuradhapura is over-whelmingly an agricultural district. Given the slow rate of urbanization and industrial development, agriculture will continue to remain the dominant sector of the economy in the foreseeable future. Thus any attempt at formulating a district development programme should necessarily focus in the problems of the agricultural sector of the district. This sector examines the current state of agriculture in the region.

Land Resources and Land Use

Anuradhapura district covers a total land area of 703,430 hectars. According to the last census of agriculture (1982) some 113,675 hectares or 17% of the total land area is under some form of cultivation, or is potentially cultivable. About 201,181 hectares are under forest cover. Inland waters cover an extent of about 14,500 hectares (Census of Agriculture, Anuradhapura, 1982).

Since the last census, there has been considerable increase in the area under cultivation as a result of opening up of additional land for cultivation under major development projects (Mahaweli, TIMP, MIRP, ADZAP and VIRP) and also through alienation of land to people under various government programmes.

Out of the 87,965 families in the district in 1982, 9,255 families were 'landless', while 1,252 families owned blocks of land of less than 0.2 ha and 33,805 families owned 0.2 - 1.2 ha of land. There were 30,124 families who owned 1.2 - 2.0 ha of land and 13,529 families owning blocks of land of more than 2 hectares.

There were 93,220 ha of asweddumized land of paddy including a rainfed extent of 3137 ha in 1989. Out of this, 23,335 ha came under the Mahaweli Development Scheme. Great extents of forest land have been cleared illicitly for chena cultivation or for timber during the last few years. Therefore, the exact extent coming under Chena cultivation and forest cannot be accurately estimated.

Incidence of encroachment on State land seemed to be very high in the district during the last decade, and after a survey in 1978, an extent of 25,000 ha of encroachments was regularized and alienated to 51,768 persons. The table below shows the extent of lands alienated during the period 1982-1987 under various schemes:

	Hectares
Village Expansion Schemes	1078
Special Grant Schemes	26
Youth Settlement Schemes	162
Model Village Schemes	104
Self-help Housing Schemes	95
Electorate-wise Housing Schemes	63
total	1528

In addition, 928 blocks of land have been given out for commercial and other building purposes in and around Anuradhapura town.

The distribution of the cultivated area amongst AGA divisions in the district is given in the table below.

Distribution of Cultivated Land Area by AGA Division

AGA Division	Area Cultivated (ha) Estates	Small holdings	Total
Horowpathana	-	6081	6081
Huruluwewa	-	7623	7623
Ipologama	466	3673	4139
Kahatagasdigiliya	-	6036	6036
Kebithigollewa	105	4313	4418
Kekirawa	70	8113	8183
Medawachchiya	18	7859	7877
Mihintale	-	3301	3301
Nochchiyagama	914	8877	9791
Nuwaragampalatha (C)	65	7790	8055
Nuwaragampalatha (E)	-	5400	5400
Padaviya	334	4679	5013
Palagala	-	10871	10871
Rambewa	810	6215	7025
Talawa	1383	14358	22766
Tirrapane	2323	4098	4121
Total	4188	109487	113675

The land utilization pattern is derived from the Census of Agriculture of 1982. Table below gives a breakdown of the land use pattern in the small holding and estate sectors.

Land Utilization within Agricultural Holdings

Land Use Category	Small holding sector (ha)	Estate sector (ha)	Total (ha)
Total area of holdings	109,487	4,188	113,675
Asweddumized paddy	67,358	320	67,678
Temporary crops other than Asweddumized paddy	22,440	151	22,591
Coconut	5,562	163	5,725
Other permanent crops	3,570	87	3,657
Forest land	937	909	1,846
Pastures	175	1,122	1,297
Cultivable land but not attributed	9,445	1,436	10,881

From the foregoing table it is apparent that the bulk of the land (62%) is utilized for paddy cultivation. Some 20 percent is utilized for non-paddy crops and about 8 percent to permanent crops. About 9445 hectare of arable land remain unutilized. In the estate sector, pasture occupies around 2827 percent of the land. These are mainly in State livestock farms in the district. Seventeen percent (17%) of the area is devoted to various form of annual and perennial cropping, and around 1,436 hectares (34%) cultivable land remains unutilized.

Size of Holdings

Anuradhapura district is predominantly a smallholder farming area. At the last Census of Agriculture (1982) there were 87,663 smallholdings covering area of 109,487 hectares. Twenty nine (29) holdings with a total land area of 4188 ha were recorded as "estates". The average size of a smallholding was 1.25 hectares as against the national average of 0.8 ha. The distribution of smallholdings and estates according to their size classes are give in the tables below.

Distribution of the Number and Area of Agricultural Holdings

Size Class	No. of holdings	%	Hectares	%
Less than 0.20 ha	1646	1.9	157	0.1
0.20 to less than o.40 ha	7104	8.1	1565	1.4
0.40 to less than 0.81 ha	18002	20.5	8831	8.1
0.81 to less than 1.21 ha	15357	17.5	13682	12.5
1.21 to less than 2.02 ha	31556	36.0	43040	39.3
2.02 to less than 4.05 ha	12022	13.7	30055	27.5
4.05 ha	1976	2.3	12478	11.1
Total	87663	100.0	109807	100.0

Source: Sri Lanka Census of Agriculture
Anuradhapura District Report - 1982
Department of Census and Statistics

Number and Area of Estates by Size Classes

Size Class	No. of Estates	(%)	Area (ha)
0.8 - 11.7	12	41	115
11.8 - 19.7	03	10	45
19.8 - 40.4	04	14	99
40.5 and over	10	35	3929
Total	29	100	4188

Nearly 10 percent of holdings are less than 0.4 ha (1.0 acres) and almost 75 percent are 0.4-2.02 ha (1-5 acres). In the estates sector a majority of the holdings (41) are less than 11.8 ha (30 acres) and 35 percent are about 40.5 ha (100 acres).

Land Tenure

Complexities in land tenure systems in the small farm sector in Sri Lanka are mainly related to paddy lands. There are various forms of tenure systems which have been found to influence production levels and social relationships in rice growing village societies. Consequently, data on land tenure patterns available are those pertaining to paddy lands. Records of the tenure of paddy lands are maintained by the Department of Agrarian Services, whereas there is hardly any information on tenure patterns of other categories of land.

According to records maintained by the Department of Agrarian Services there were about 98,705 paddy farmers in Anuradhapura in 1981. Of this total, some 87,996 (89%) were registered as owner cultivators. About 10,709 farmers (10%) were reported to be ande cultivators (Statistical Pocket Book, Anuradhapura District, 1982). The distribution with respect to the different Agrarian Services Centres is indicated in the table below. Rotational tenure system such as kattimaru and thattumaru are not incluted in the table as there is no information on these systems.

Paddy Land Tenure - Anuradhapura District

Agrarian Services Centre	Owner Cultivators	Share Tenants
Galenbindunuwewa	4527	145
Kahatagasdigiliya	2246	237
Andiyagala	2514	181
Horowpathana	1972	102
Thalawa	47	47
Appawela	3184	92
Koonwewa	1869	07
Ranorawa	1364	801
Kabethigollewa	5650	1752
Padavi-Sri Pura	1494	-
Padavi-Parakramapura	2862	-
Pulmudai	1765	-
Mihintale	4817	262
Kallanchchiya	5306	87
Kapugallewa	1278	36
Rambewa	5615	153
Rajangana Right Bank	3457	26
Anuradhapura	317	398
Parangiya Wadiya	966	-
Palugaswewa	1468	323
Madatugama	2319	31
Yakkalle	1752	280
Maradankadawela	441	382
Pemaduwa	1100	51
Eleyapattuwa	1581	659
Medawachchiya	1398	237
Ratmalagahawewa	23	23
Kekirawa	3395	332
Negampaha	4762	454
Tambuttegama	2617	-
Nochchiyagama	585	321
Thirappane	1995	254
Murriyakadawela	1429	201
Ipalogama	3549	1077
Poonewa	3156	358
Ettakada	775	397
Shrawasthipura	1649	855
Khagama-Kattiyawa	854	55
Total	87996	10709

Source: Statistical Pocket Book, Anuradhapura (1982).

Although the foregoing table shows that an overwhelming number of farmers in the district are owner cultivators, there is reason to believe that this may not be the case today. There is considerable evidence of hidden land transactions, particularly in the major irrigated settlement schemes. Field studies currently being carried out by the ARTI in Mahaweli system H2 area, shows that leasing and mortgaging of paddy land is widespread. There is also evidence of a high incidence of share tenancy and the emergence of newer and more complicated forms of tenure arrangements. The exact magnitude of the problem is unknown and it is an area which merits further research.

10% of agricultural operators do not own any land, 22% own home-gardens only and 59% owned home gardens and other lands accounting 82 percent of the total operated area in Anuradhapura district. The relevant data are set out in the tables that follow.

Area Owned by Type of Land Owned

Type	No of operators	%	Area	%
Not owning any land	9,255	10.5	-	-
Owning home gardens only	19,503	22.2	8,353	8.9
Owning home gardens and other lands	51,729	58.8	77,496	82.3
Owning other lands only	7,478	5.5	8,274	8.8
All groups	87,965	100.0	94,123	100.0

Source: Sri Lanka Census of Agriculture
Anuradhapura District Report - 1982
Department of Census and Statistics.

Paddy Cultivation

Anuradhapura district is considered an important paddy producing area in the country, and the total area asweddumized (93,536 hectares) amounted to about 13% of the national paddy acreage (Department of Census and Statistics, 1988). Despite the substantial acreage the contribution from Anuradhapura district to national paddy output remains low. The table overleaf gives production figures for 1988/89 for the district and other major rice producing regions of Sri Lanka.

The total annual production in 1988/89 was 88,000 metric tons which amounted to only about 4.3% of the national paddy production which is the lowest among the paddy producing districts in Sri Lanka. Of the total quantity produced in the district, 70,000 metric tons (79%) came from the Mahaweli project area while paddy produced is other areas amounted to only 18,000 metric tons.

Figures in the table also indicate that production levels (measured in terms of yield/hectare) in Maha outside the Mahaweli area is lower than other major paddy producing districts like Polonnaruwa, Hambantota and Ampara, whilst in Yala yields per hectare are below the national average.

Paddy Statistics in Selected Districts in Dry Zone

Districts	Maha 88/89			Yala 89			Year 88/89		
	Production (000 MT)	%	Yield kg/ha	Production (000 MT)	%	Yield kg/ha	Production (000 MT)	%	Yield kg/ha
Anuradhapura	15	1.1	3694	3	0.4	2594	18	0.9	3498
Polonnaruwa	140	10.4	4266	111	15.4	4112	251	12.2	4188
Hambantota	84	6.3	4321	58	8.0	4274	142	6.9	4309
Batticaloa	62	4.6	3052	41	5.7	3332	103	5.0	3156
Ampara	166	12.4	3470	108	15.0	3106	274	13.3	3323
Mahaweli H	69	5.1	4479	1	0.1	2624	70	3.4	4356
Sri Lanka	1342	100.0	3429	721	100.0	3279	2063	100.0	3373

Source: Department of Census and Statistics.

Paddy is grown both as an irrigated and rainfed crop in Maha and usually under irrigation in Yala. According to the Dept. of Census and Statistics, the total area asweddumized in the district outside the Mahaweli area during the cultivation year 1986/87 was 69,515 ha. Of this total, the gross area cultivated in Maha 1986/87 was 28,982 ha (42%) and in Yala a mere 3,715 ha or 5% of the area asweddumized. Table below gives the extent sown and harvested in 1986/87 according to the source of water supply.

Area Sown and Harvested by Water Supply Source, 1986/87

	Area Sown (ha) Maha (86/87)	Area harvested (ha) Maha (86/87)	Area sown (ha) Yala (1987)	Area harvested (ha) (1987)
Major irrigation Scheme	15,263	14,672	3,260	2,873
Minor irrigation Scheme	13,111	8,571	501	293
Rainfed	608	252	-	-
Total	28,982	23,495	3,751	3,166

Two important points emerge from the table. The first is the low cropping intensity of paddy lands in the district. Secondly, the risk of crop failure. Data presented in the table below compares cropping intensities of paddy land in Anuradhapura in 1986/87 with other principal paddy producing districts in the dry zone.

District	Annual Cropping Intensity (%)
Anuradhapura	47
Mannar	66
Polonnaruwa	172
Ampara	145
Hambantota	111
Medawachchiya	151
Mahaweli 'H' area	111
Trincomalee	38

Source: Dept. of Census and Statistics, 1988

From the foregoing table, it is evident that Anuradhapura district has the lowest cropping intensity in the dry zone districts, except for Trincomalee.

The table below gives an estimate of the degree of crop failure (measured in terms of the ratio of the grown area unharvested to the grown area sown and impressed as a percentage) for Anuradhapura and other major rice producing areas.

District	Level of Crop Failure (1986-87)	
	Maha 86/87 %	Yala 87 %
Anuradhapura	19	16
Polonnaruwa	1	7
Trincomalee	7	25
Ampara	1	1
Hambantota	9	7
Udawalawe	-	1
Mahaweli H	1	15

It is apparent that Anuradhapura had the highest incidence of crop failure among the paddy producing districts in the country. It is interesting to note that in Mahaweli H area although the crop failure amonted to only 1% in the Maha, Yala crop failure was about the same as in the rest of the district.

THE ARABLE LAND

The Irrigable Lowland

The irrigable lowland is located at the bottom of the catenary sequence and is mainly composed of low humic gley soils. rice is grown on the irrigable lowland during the main rainy season (October-January). Depending on the availability of water, a short-age variety of rice or other field crops are grown to a limited extent during the minor season (April-July). Neat cattle and buffalo are grazed on the stubble after crops are harvested. The success of the crop grown during the minor (Yala) season depends to a great extent on the quantity of water stored in the village tank at the end of the major (Maha) season.

Rice occupies almost the total extent of irrigable lowland during the Maha season. However, due to shortage of irrigation water, large tracts of lowland are left fallow during the Yala season. The irrigable lowlands have, to a large extent reaped the fruits of intensive research that has been undertaken on rice. Rice being the staple food of the people, the Research and Extension Divisions of the Department of Agriculture and other agencies, have been directing their energies towards increasing the productivity of this crop, and average rice yields have increased remarkably during the recent past.

'Chena'

Chena is a slash and burn system of shifting cultivation traditionally practiced on the unirrigable uplands of the Dry Zone (as well as in the wet zone highlands) of Sri Lanka. Such cleared land was cultivated for about two consecutive years and later abondoned for a period of twelve or more years. The rainless months prior to the Maha rainy season are ideal for felling the jungle and preparing the land for sowing. The chena is usually planted with a variety of crops at the beginning of Maha season. Most of the chena work would be completed by the time the tank is filled sufficiently for paddy cultivation in the lowlands. During Yala,

the chena is planted with gingelly, millet and pulses. The traditional fallow period assured the improvement of soil structure due to accumulation of soil, organic matter, improvement of the nurient status of the soil and the control of pernicious weeds.

With increasing population and the resulting pressure on land the traditional chena system has undergone a certain degree of transformation with the result that the cropping period has increased at the expense of the fallow period. The shortening of the fallow period in the highlands has led to a decline in the productivity and stability of the small scale farming system of the Dry Zone. Nutrient loss resulting from soil erosion and continuous crop production has contributed towards the decline in productivity of the chena. Competition from weed growth has also become an important factor. Although the level of productivity of highlands is low, they account for a major portion of the field crops grown in the district. Soil conservation measures are seldom adopted.

Other Field Crops

Important crops in the uplands are maize, kurakkan, chillies, mungbean, blackgram, cowpea, soyabean, groundnut, gingelly and mustard. The highlands also provide fodder for the neat cattle, buffaloes and goats. The area under these crops is given in the table below:

Area Under Various Field Crops in Anuradhapura District

Crop	87/88 Maha	88 Yala	88/89 Maha	89 Yala	89/90 Maha
Maize	9,308	2	4,089	225	5,862
Chillies	3,666	6,161	1,667	2,685	4,122
Kurakkan	3,008	-	1,477	-	2,331
Green Gram	747	565	422	490	790
Black Gram	2,483	537	1,294	957	1,723
Cowpea	2,110	779	1,212	779	2,519
Soyabean	819	387	271	552	245
Gingelly	357	3,997	175	1,658	302

Source: Department of Census and Statistics (1982).

Although most of the above mentioned crops are grown during the main (Maha) season, the choice of crops for the Yala (Minor) season is limited to gingelly, mungbean, cowpea and short-season vegetables. A brief account given in the sectors which follow.

Maiæ and Kurakkan

The average productivity of Maize in the rainfed uplands (Chenas) is relatively low due to the cultivation of indigenous varieties. The maize crop is restricted to Maha due to the absence of short-aged varieties that fit the soil moisture regimen of Yala. Crop loss due to stem borers is very heavy during the Yala season. One of the biggest constraints to increasing the productivity of kurakkan is the suceptibility of this crop to blast disease during the Maha. Absence of short-aged varieties of Kurakkan is also a serious limitation.

Chillies

Chillies are grown on the rainfed highlands mainly during the Maha season. Local varieties comprising of genetically heterogeneous populations are grown by farmers with the first Maha rains. Apart from genetic limitations, moisture stress, pests and diseases contribute to low yields obtained. The chillie leaf curl complex anthranose and damage caused by heliothis armigera are considered serious problems of the chillie farmers. More recently, a leaf disorder (little leaf) has been reported to have caused serious damage to the chillie crop in certain areas.

Grain Legumes

Average yields of Mungbean, Blackgram and Cowpea realized by farmers under rainfed upland conditions range between 500-750 kg!ha, whereas yields of over 2,000 kg!ha are attainable under good management conditions. Lack of suitable varieties adapted to the soil moisture regimes of the two cropping seasons is a major constraint to increasing the productivity of these grain legumes. Crop losses in grain legumes due to insect pests and diseases have been estimated to be high. Mung yellow Mosaic Virus, Cerospora Leaf Spot of Mungbean and Groundnut, Collar Rot of Cowpea, and rust disease of Blackgram are the more important diseases. The bean fly, pod porer, and brunchids are also responsible for heavy crop losses. The competition from seeds have also contributed towards low yields.

Gingelly

Gingelly is the most important highland crop during the Yala season. Moisture stress, low soil fertility and weed competition are the major constraints to increased production of Gingelly. Mixed varieties grown by farmers fetch relatively low proceed compared to the prices realised by white or dark seeded varieties.

Mustard

Mustard is a crop that has been traditionally grown on newly cleared chena lands which are relatively more fertile. However, due to the presence of only limited extents of such lands, average yields realised by farmers are very low. Fertilizer experiments conducted at the Agricultural Research Station at Maha Illuppallama have shown that seed yields of over 2,000 kg/ha can be obtained with the use of adequate quantities of fertilizers. The diamond-back moth is a serious pest of mustard and research on methods to control its damage has to be undertaken.

Vegetable Crops

Vegetable crops grown on the un-irrigable highlands include pumpkins, gourds, brinjal and vegetable cowpeas.

The Home Garden

Home gardens are located in the vicinity of the village tank, the seepage water from which is tapped for this purpose. Tree crops could be successfully grown in such home gardens where there as an assured supply of soil moisture.

The homestead today is grown to a variety of tree crops, such as coconut, jak, mango, cashew nut, moringa, citrus, woodapple and banana: vegetables, such as vegetable cowpea, brinjal, okra, tomato, and a variety of gourds are also grown on the homesteads. The development of agro-wells in these lands could greatly increase their productivity. There is a great potential for the development of an export-oriented fruit industry if systematic fruit cultivation on these lands could be undertaken. The development of plant nurseries could also be a viable undertaking in the homesteads.

Livestock

Although the district offers considerable scope for animal husbandry, the sector has remained relatively undeveloped. However, in more recent years there has been considerable progress in dairy farming.

Neat Cattle

At the last census of agriculture (1982), the neat cattle population in the district was estimated at 113,165. Ninety eight (98%) of the cattle population were indigenous breeds. The remainder were improved breeds and cross-bred animals. The distribution of the neat cattle cattle population amongst the respective AGA division is given in the table below (1982 census).

Distribution of Neat Cattle by AGA Division

AGA Division	Cattle Number		
	Male	Female	Total
Anuradhapura District	37307	75858	113165
Horowpathana	2400	5181	7581
Huruluwewa	2868	5501	8369
Ipolagama	908	1838	2746
Kahatagasdigiliya	3695	9409	13104
Kebithigollewa	2400	4918	7318
Kekirawa	4192	8073	12265
Medawachchiya	3100	6628	9728
Mihintale	1365	2649	4014
Nochchiyagama	1795	3395	5196
Nuwaragampalatha Central	3278	6466	9744
Nuwaragampalatha East	1346	2918	4264
Padaviya	1205	2388	3593
Palagala	2247	3930	6177
Rambewa	2479	5393	7872
Talawa	1831	2757	4582
Thirappane	2198	4414	6696

Estimates made by Nestle Ltd. however puts the current cattle population in the district at 225,000 animals.

Milk Production

There is no record of the total milk production in the district. The information available is the milk collection records of Nestle Let. which is engaged in dairy development activities in the area. These are at present 5000 private milk producers registered with the company. The quantity of milk produced by the registered farmers for January -November, 1990, was 6.8 million litres. Nestle have 144 milk collecting centres in the district and 5 milk chilling centres. The location of these centres and their capacities are given below.

Chilling Centres in the District

Location	Capacity (litres)	No. of Tanks
Anuradhapura	8850	5
Kahatagasdigiliya	7600	4
Medawachchiya	5100	3
Kekirawa	4950	3
Padaviya	4350	2

Other Livestock

Recent information on other categories of livestock is not available. The latest data available is the Census of Agriculture of 1982. At the time of this Census, the buffaloe population in the district was estimated at 54,771 of which 45% were males and 55% females. There were 6505 goats and 586 pigs. The number of holdings engaged in goat rearing was aestimated at 464, 107 holdings were raising pigs. Some 6446 holdings were reportedly engaged in poultry keeping (Census of Agriculture, Anuradhapura district, 1982).

As noted earlier, animal husbandry remains underdeveloped although there is considerable potential for developing the livestock sector in the district. There have been sporadic attempts made in the past to promote animal husbandry in the district under various programmes (eg. ADZAPI. With the notable exception of the current efforts of Nestle to promote dairy farming, other attempts were met with limited response. Given this situation, the problems and prospects for the development of animal husbandry is an ara which needs to be studied.

INLAND FISHERIES

Anuradhapura district is characterised by the existence of large number of man-made reservoirs spread through out the district. The majority of the reservoirs are ancient origin. There is ample historical evidence to show that inland fishing was an important economic activity of the ancient inhabitants of the area. Not only was inland fishing important in terms of nutrition but tax levied on tank fishing generated revenue to the State i.e. to the king in the case of major tanks and village assemblies in the case minor tanks. (Siriweera, 1986) Siriweera (ibid) contents that inland fishing was a socially and culturally acceptable activity in ancient Sri Lanka.

At present there are 11 major tanks and over one thousand minor tanks in the district. These water bodies cover an area of around 62 square miles. Of the total number of tanks in the district inland fishing was introduced to 256 tanks. Some of the major and minor tanks receive Mahaweli waters and thereby contain water throughout the year. Such tanks are suited for the development of inland fisheries on a permanent basis. Tanks which dry up during the drought period can be used for seasonal tank fisheries programme.

During the last few years there had been considerable progress in inland fisheries in Anuradhapura. The district represents 20 percent of all tanks in the country which have been taken up for the development of inland fisheries. In 1982, Anuradhapura district accounted for about 18 percent (6.105 tons) of national inland fish production. (32,700 tons) In 1989, there were 1,653 fishermen in the area. A mojority of them were engaged in fishing as there major occupation (see Table 1). Others were involved in fishing as a secondary occupation. Besides direct fishing substantial employment were generated by way of fish trading and other related activities.

Percentage Distribution of Heads of Fishing Households According to Their Main and Secondary Occupation

Type of Occupation	Main Occupation	Secondary Occupation
Fishing	96.2	4.7
Farming-paddy	-	17.3
Farming-chena/highland	3.8	23.5
Salaried-non government	-	2.2
Self employment	-	4.8
No employment	-	47.5
Total	100.0	100.0

Source: ARTI, (1989)

In the past government provided various incentives and support for the inland fisheries sector. These included organising fisherman at each tank, subsidies on boats and gears, extension and stocking of fingerlings in each tank from time to time. Recently, state assistance to the inland fisheries sector was withdrawn.

Government decision to withdraw support to inland fisheries has adversely affected the industry and the livelihood of the fishing community. The organizational system which prevailed earlier has been disrupted. Fisherman's cooperatives at the tank level had some power to regulate fishing activities. Those fishing in each tank were members of a cooperative society and had to abide by the rules and regulations of the society. The societies had power to prevent non members fishing in the tanks and also prohibit harmful methods of fishing. At present these societies are disorganised. Outsiders can now fish in the tanks unchecked. This has resulted in over-fishing and has led to reduction in fish stock thereby adversely affecting the income levels of those relying predominantly on tank fishing for there livelihoods.

In 1987, the average monthly household income from fishing amounted to Rs. 1,715. As the government has stopped restocking tanks with fingerlings there is reason to believe that incomes from fishing has declined even further.

There is considerable scope for the development of inland fisheries in the Anuradhapura district. With the limited availability and high prices of ocean fish, fresh water fish can be made available to the people at reasonable prices. This is important in terms of enhancing the nutritional standards of the people of the area.

Given these circumstances the government should reconsider it's current policy on inland fisheries. Not only would the development o this sector contribute to enhancing nutritional standards but would also contribute to raising rural incomes and generate additional employment.

On of the major problems in the inland fisheries sector is the fluctuation of income. The daily earnings in the fisherman in Anuradhapura fluctuated from Rs. 300 to Rs. 400 in peak season to Rs. 22 to 30 during the lean period.

Employment and Unemployment

In setting perspectives of a district development plan it is necessary to take account of the current situation with regard to employment and unemployment in the area. In attempting to analyse the present situation in Anuradhapura district, one is handicapped by the lack of recent statistics on the subject. The latest data available is the Census of Population and Housing of 1981. The analysis presented in this section is to a great part based on the 1981 census.

The Labour Force

The table below gives estimates of the economically active population or the labour force in the district.

Labour Force - 1981

	Total Pop.	No. in Productive Age group	Economically Act. Empl. oyed	Unemp. loyed	Total
Male	314273	185021	144495	9301	153796
Female	273656	153650	31662	8179	39841
Total	587929	338671	176157	17480	193637

	Not Economically Active				Total
	Student	Own House Work work	Retd. or unable	Others	
Male	15997	585	2511	12132	31225
Female	14561	94840	3032	1372	113809
Total	30558	95425	5543	13508	145034

Given the definitions employed, some 193,600 persons (33%) of the total population were said to be in the labour force. Females who were engaged in 'own house work' were classified as being not economically active.

On that basis, males constituted over two thirds of the labour force and females less than a quarter.

The unemployment rate for the district was estimated to be 9 percent. Open unemployment was concentrated in urban areas and averaged around 13 percent. The unemployment rate in rural areas was lower (8 percent), but there is evidence of considerable underemployment. About 6 percent of males in the labour force were recorded as unemployed. The corresponding rate among females was 9 percent.

Occupational Distribution

Employed Population by Major Occupational Groups and Sex

Major Occupational	Both Sexes		Males		Females	
	No.	%	No	%	No	%
Professional, technical and related workers	7820	4	4360	3	3460	11
Administrative and management workers	690	-	645	-	45	-
Clerical and related work	6218	4	4972	3	1246	4
Sales workers	7365	4	6758	5	607	2
Service workers	5098	3	4628	3	470	1
Agriculture, forestry and fisheries	119836	68	97937	68	21899	69
Production process and related workers	25586	15	22966	16	2620	8
Unclassified	3544	2	2229	2	1315	4
Total	176157	100	44495	100	31662	100

Given the fact that Anuradhapura is predominantly an agricultural district it is hardly suprising that the agricultural sector (including forestry and fisheries) constitutes the main source of employment for the poulation.

According to the 1981 census, around 68 percent of the employed population were employed in agriculture, forestry and fisheries. The vast majority were farmers while 746 persons were engaged in fisheries, and 83 persons involved in activities related to forestry.

The second largest (15%) employment category ('production process and related workers'|| includes persons engaged in small scale manufacturing enterprises, transport operation, cottage industries, artisans and other self-employed persons. Those employed in professional and technical work, administration and in various services accounted for 15 percent of the employed population.

Agricultural Employment

Given the slow rate of urbanization and industrial growth, agriculture will remain as the main source of employment for the population of Anuradhapura district in the foreseeable future. In this context a key question is how far can the agricultural sector absorb the increasing number of persons entering the labour force? It should be noted that agricultural employment is extremely complex. Farming activities in the district are greatly influenced by ecological constraints, especially the rainfall regime, resulting in a marked seasonality of work patterns. The labour force is fully employed during certain critical periods of the year. Such periods of employment are of short duration and for much of the year the work force remains chronically underemployed. This is a common problem both in the irrigated as well as in rainfed areas but with different degrees of severity. In the rainfed areas seasonal unemployment and underemployment is more pronounced and lasts from 406 months. In the irrigated areas the labour force remains unemployed for 2-3 months anually.

Investment in irrigation can help to alleviate the seasonality of employment. However, the potential for expanding the area under irrigation in Anuradhapura district is nearing its upper limits. Better management of irrigation systems may expand the irrigable area while intensification and diversification of agriculture may generate more employment. But there are clear limits to both.

Given this situation, there is a clear need for empirical studies to assess and quantify the existing labour absorbtive capacity of agriculture in Anuradhapura district and appraise its employment potential. Another area which merits attention is the potential for off-farm employment.

Incidence of Poverty

Knowledge about the poor is essential if governments are to adopt sound development strategies and effective policies for alleviating poverty. Who are the poor? where do they live? what are their precise economic circumstances? Why are they poor? Answers to such questions are fundamental to any attempt at formulating development plans at national or regional level.

Defining poverty has always been controversial; perceptions about poverty have evolved historically and vary considerably from culture to culture. Criteria for distinguishing the poor from the non-poor tend to reflect specific national priorities and normative concepts of welfare and of rights.

In Sri Lanka the official poverty line is set at a monthly income of Rs. 700 per household which is considered the cost of a minimum standard of nutrition and of other basic necessities for an average family. There are several deficiencies in defining poverty in terms of income/ expenditure criteria since such measures fail to capture dimensions of well-being such as health, life-expectancy, literacy, access to clean drinking water, housing and basic amenities.

The above absence of detailed statistics does not permit a comprehensive assessment of the poverty situation in the Anuradhapura district. But from information available it is apparent that Anuradhapura district can be regarded as one of the poorest regions in the country. The clearest manifestation of the high incidence of poverty is that income levels of 55 percent of families (344,418 persons) living in the district are below the official poverty line and are in receipt of food stamps as the following table shows:

Food Stamp Holders in Anuradhapura District - 1989

Distribution of Food Stamp Holders by AGA Divisions

JSP-AGA Division	Total popu lation	Total fami- lies	Food Stamp population	Propor of food stamp recei- vers	Food stamp families	Propor of food stamp fami- lies
Howrowpathana	32569	6986	23450	72	6020	86
Rambewa	36755	7351	14486	39	4482	60
Thirappane	30358	6072	16512	54	3996	56
Palugaswewa	14477	2895	9401	65	2077	69
Kebithigollewa	22915	4583	10714	47	3032	66
Medawachchiya	45520	9104	21058	46	5411	59
Galenbindunuwewa	50665	10133	24701	49	5687	56
Ipalogama	39052	7810	21143	54	5369	69
Kahatagasdigiliya	36753	7351	20369	55	4087	56
Mihintale	26576	5315	8810	33	3095	58
Padaviya	29785	5957	13964	47	3223	54
Nochchiyagama	44393	8879	18430	42	4627	52
Nuwaragampalatha- Central	43245	8649	23816	49	5875	68
Rajanganaya	38773	7755	11888	31	3781	49
Galnewa	33244	6649	13107	39	3634	31
Kekirawa	57694	11539	22248	38	3634	31
Mahawilachchiya	19884	3977	9521	48	2642	66
Palagala	33720	6744	20631	61	4969	74
Tambuttegama	34480	6896	6936	20	2182	32
Nuwaragampalatha- East	51699	10340	19979	39	5292	51
Thalawa	62292	12458	13254	21	3634	30
Total	785849	157443	344418		86853	

Source: Kachcheri - Anuradhapura

It is evident from the above table that poverty in the district has a significant regional dimension. The worst mass of poverty is in the Horowpathana AGA division where 86 percent of the households (72 percent of the population) are below the poverty line. The Janasaviya programme is currently being implemented in the Horowpathana AGA division. The incidence of poverty is comparatively low in the AGA divisions of Thalawa and Tambuttegama (within the Mahaweli Project area) where only about 30 percent of families (about 20 percent of the population) are in receipt of food stamps.

There is considerable evidence to suggest that malnutrition is a serious problem in the area particularly among children. According to the High Level Committee Report on Poverty Alleviation (1988), acute under nourishment (i.e. weight for height deficit) was estimated at 13.9 percent. This is higher than the national average of 12.12 percent. Concurrent chronic-acute undernourishment (i.e. combination of stunting and wasting) in the Anuradhapura district was estimated at 5.8 percent (national average level).

In addition to poverty measured in terms of the official poverty line and the nutritional standards of the population, evidence suggests that a majority of the population encounter difficulties in obtaining clean drinking water. A sizable proportion of households live in substandard housing. Available evidence also suggest that acute deprivation is more pronounced in areas outside the Mahaweli Project zone.

Tourism and Cultural Triangle

The cultural remains of the great civilizations of the world can be considered the common heritage of all mankind. Unesco's efforts in the excavation and conservation of these monuments and objects are aimed at unfolding and interpreing the glory and mysteties of these cultures which have disappeared from the face of the earth with the ravages of time and to preserve the extant evidence for posterity.

Sri Lanka with a recorded history dating back to the 6th century B.C. can also be proud of an ancient civilization with a distinct characters of its own. Ruins of the great political and cultural centres of Anuradhapura, Polonnaruwa, Sigiriya, Yapahuwa, Panduwasnuwara, Tissamaharama and other places scattered throughout the island bear ample testimony to the remarkable achievements of the Sinhalese in diverse fields including irrigation technology. Realizing their significance and as part of its commitment to conserve and rehabilitate the monuments Unesco inaugurated the Sri Lanka Cultural Triangle Project under construction its auspices and funded by an international consortium in 1980. The project, which has just completed 10 years envisages the restoration of all important archaelogical sites situated within the triangular area formed by Anurdhapura, Polonnaruwa and Kandy.

In Sri Lanka archaeological surveys and excavations were started by the British in the early part of the 19th C. and have been continued upto date.

From times immemorial Sri Lanka has been famous for its natural beauty which earned for it such epithets as Serendib, the Pearl of the Indian Ocean and Paradise Isle etc. It was also known widely for spices,

precious stones, pearls etc. which attracted many traders from the East and West. The ancient parts of Sri Lanka such as Mantota and Trincomalee were international trading centres where merchants from different parts of the world traded and exchanged merchandise. Unlike many other litoral states Sri Lanka had the advantage of being located at the hub of the main sea routes between East and West.

Tourism as it is understood today is a farily recent development but travel within and outside the countries of their birth has a long history. In present times tourists from the developed countries, especially those with variable seasons, travel mainly seeking 'sun and sand' for a change from routine, to avoid the harsh weather conditions, and to learn of other cultures.

Within the area demarcated by the Cultural Triangle Project are located the most significant ruins representative of the different periods of Sri Lanka history and most of the sites selected have been the capitals of the country.

Considering the colossal expenditure involved and the shortage of personnel to execute the work, certain sites have been carefully chosen for the first phase of the project based on their historical importance as recorded in the chronicles and classical writings. Abhayagiriya and Jetavana complexes in Anuradhapura are among those under the project.

According to the chronicles and the narratives of foreign travellers to the island like Fa Shian, Abhayagiriya was one of the largest monastic complexes in the country, which accommodated about 5000 resident monks. Ten years ago the area around the Abhayagiri dagoba strewn with stone slabs and pillars, was covered by a thicket. Now most of the area has been excavated and what has been uncovered and unearthed reveals a well planned monastery surrounded by boundary walls, replete with residential buildings, image houses, dining halls, toilets with sewerage systems, bath houses, workshops such as foundries, water storage and drainage systems etc. in short, a highly organised and self-contained Arama. After excavation archaelogists repair and restore the structure

faithfully following the ancient design and using similar building matterials. Pathways, passages, paved areas, ponds etc. are repaired and conserved. Special efforts are taken to redesign and lay out the landscape to be in harmony with the buildings. At the Abhayagiri complex a cultural centre is to be set up to exhibit the numerous artefacts that have been found, and to serve as an information centre for tourists. In addition to restoration and conservation centre for tourists. In addition to restoration and conservation the project also envisages the development of facilities for the tourists both local and foreign to see, enjoy and understand the ruins. Provision of good roads, information centres, museums and other infrastructure facilities has also been planned.

Chapter Six

REVIEW OF DEVELOPMENT PROJECTS IN THE DISTRICT

Anuradhapura Dry Zone Agricultural Project (ADZAP)

Anuradhapura Dry Zone Agricultural Project (ADZAP) was the largest minor tank rehabilitation and settlement project ever attempted in the dry zone district of Anuradhapura. It was supported by the Asian Development Bank (ADB), the International Fund for Agricultural Development (IFAD) and the Government of Sri Lanka (GOSL). The total project cost was US$ 39.6 million including a foreign exchange component of US$ 17.9 million. Of this total 38% and 37% was to be provided by the ADB and IFAD respectively, while the balance 25% was to be provided by the GOSL. The project was scheduled to be implemented over a five year period from 1981-85. Accordingly project activities were started in 1981. However, progress of the project development activities were observed to be very slow. Following a review in 1984, the project was extended upto February 1988 while the original project targets were scaled down.

The major objective of the project was to optimise the development of available resources in an effort to increase food production and productivity, employment and incomes of about 23100 farm families of whom about 13400 were landless and afflicted by severe poverty. Thus, the project was designed to establish a more stable farming system including irrigated paddy cum rainfed subsidiary food crops supplemented by livestock enterprises (ADB, 1980). According to the initial plans it was about 600 partly utilized and abandoned minor tanks were to be rehabilitated and the adjoining lowland and upland distributed among landless poor who mainly depend on chena cultivation. They were to be provided agricultural and community infrastructure facilities needed for settlements based on a stable agricultural production system.

After the 1984 review, the number of tanks to be rehabilitated was reduced to 138. The extent to be developed was also brought down to about 3000 ha. of upland. The number of beneficiary families was also reduced by over 50% to about 10,000 landless families (ADB, 1984).

The project components and the development activities as well as financial allocation for each programme are set out in the annexe. Consequently tank rehabilitation and land development activities became the major project component which accounts for about 26% of the total investment. The allocation made on agricultural infrastructure and agricultural support facilities were 23.5% and 11% respectively. About 17% of the total investment was on livestock development, 13.5% and 9% was on rural roads and project management respectively.

The implementation of project development activities was assigned to several Ministries/Departments and Institutions. Thus the Ministry of Agricultural Development and Research (MADR), the Ministry of Lands and Land Development (MLLD), the Ministry of Rural Industrial Development (MRID), the Ministry of Power and Highways (MPH) and about 19 Departments/Institutions functioning under these Ministries were involved in the implementation of the project. The MADR functioned as the principal co-ordinating agency for the project. The field level co-ordination and implementation activities were undertaken by the project management office (PMO) established in Anuradhapura.

The physical progress achieved by the time of project completion in mid 1988, seemed to be satisfactory, but the overall benefits of these development activities were far short of expectations.

According to the revised project target it was expected to rehabilitate 138 minor tanks and settle about 10,000 landless families. The Department of Irrigation which was responsible for upland development activities could complete the construction activities relating to these targeted tanks by the end of 1987 (see Table and Annexe 4). However, of this number, only about 83 tanks could be taken for settlement infrastructure development (see fig. 5). The balance 55 were dropped mainly because of the non-availability of sufficient lowland to be distributed among selected

Figure 5

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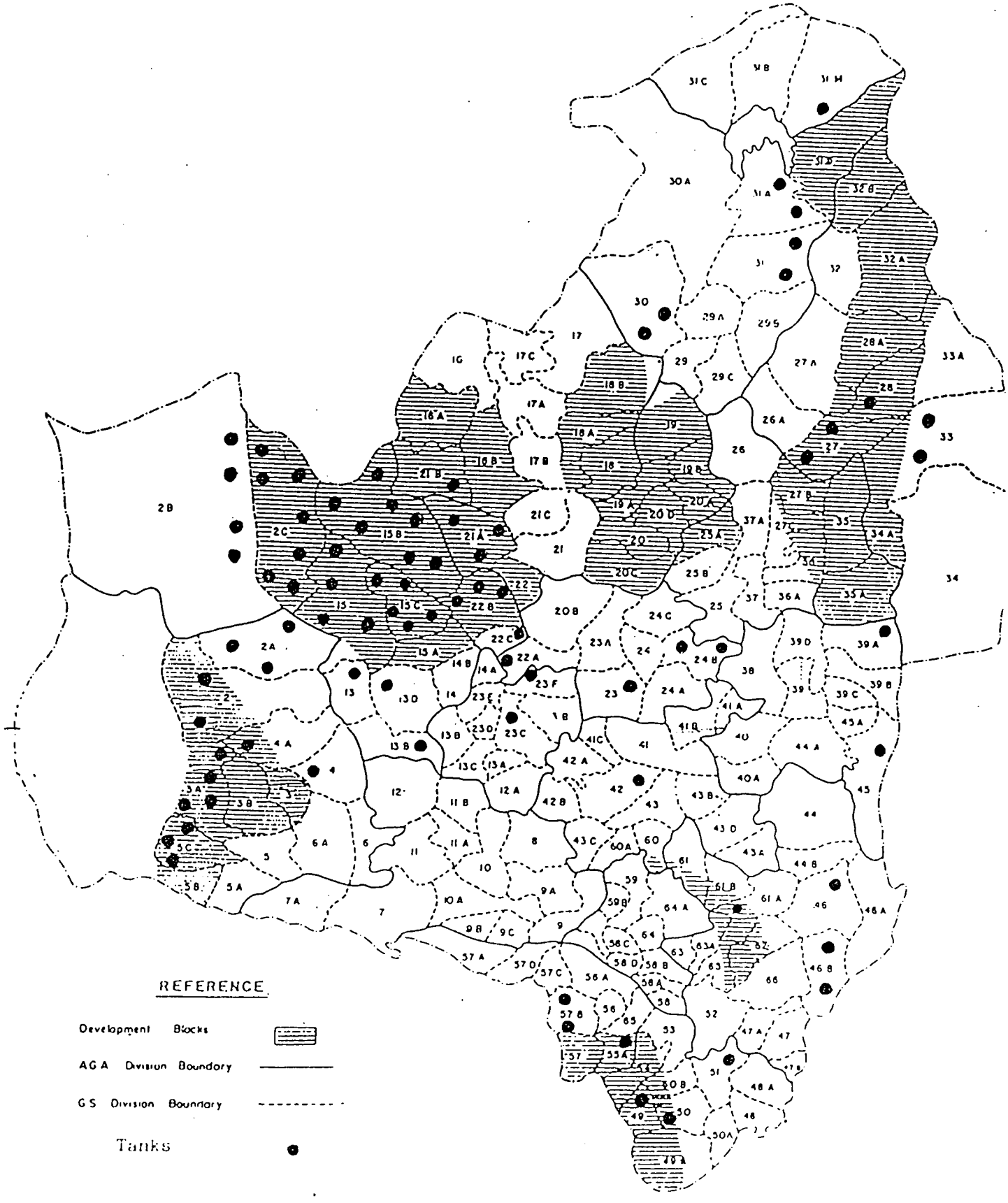
REHABILITATED MINOR TANKS UNDER THE

ANURADHAPURA DRY ZONE AGRICULTURAL PROJECT

Scale:- 6 miles to an inch



beneficiaries. By the end of 1988 lowland and upland could be developed under 81 rehabilitated tanks. However, lowlands and uplands could be distributed only among 4250 selectees against the targetted 10,000. Of these allottees 958 or 28% were reported to have settled on their new farm allotments by the time of project completion. It was found that most of the allottees were reluctant to reside on their allotments mainly because of the non-availability of community infrastructure facilities such as housing, health, schools, drinking water, transport etc. (Jayasena, 1988). Selection of unsuitable persons, fear of elephants etc. were among the other reasons attributed for this. Further, the water storage condition of the majority of the minor tanks rehabilitated was also found to be very poor mainly because of insufficient catchment areas and various technical defects in the construction of tank bunds and sluices etc. Due to lack of irrigation water many settlers could not use their lowland for paddy cultivation. Expected production and productivity levels could not be realized even from highland cultivation activities mainly because of the limited availability of rain water, drought and inadequate agricultural infrastructure and supporting facilities. Implementation of livestock development activities, water management programmes, provision of credit facilities, and settlement infrastructure facilities were also unsatisfactory. Therefore, the project could not establish a sustainable production system as envisaged in the project plan. A mid-term evaluation study undertaken in 1987 identified poor planning and co-ordination, lack of proper monitoring and evaluation as contributing to the failure of this project (Jayasena, 1988).

The workshop on ADZAP held in early 1989 at the Agrarian Research and Training Institute, also discussed in detail the overall project achievements as well as the project identification, formulation and implementation mechanisms. According to the conclusions of this workshop the project could not achieve its original development objectives due to the weaknesses inherent in the planning process. If revealed that the planners had formulated this project on certain assumptions without paying adequate attention to the resource base and its limitations (proceedings of the ADZAP workshop 1989). Planners had not used the available knowledge base for the preparation of this project.

Distribution of rehabilitated minor tanks and allocation of paddy land and high land by electorate

Electorate	No. of Tanks	Paddy Land				High Land			
		No. of tanks BOP prepared	No. of tanks settled	No. of lots	No. of families settled	No. of tanks BOP prepared	No. of tanks settled	No. of lots	No. of families settled
Anuradhapura West	49	49	49	2,980	2,548	49	49	3,218	2,583
Anuradhapura East	07	07	07	312	275	07	07	390	287
Horowpathana	06	05	05	259	245	06	05	321	255
Kekirawa	07	07	07	304	289	07	07	366	284
Kalawewa	03	03	03	173	139	03	03	172	128
Mihintale	03	03	03	151	133	03	03	164	133
Medawachchiya	08	08	07	640	520	08	07	671	580
Total	83	82	81	4891	4149	83	81	5302	4250

Source : Sri Lanka Dry Zone Agricultural project, Anuradhapura (Summary of Physical Performance).

The overall project implementation and co-ordination was found to be very poor mainly due to several problems such as political domination and intervention, lack of a self-management system for line agencies, insufficient control by the executing agencies, lack of team work among implementing agencies at the field level and the absence of replanning according to the ground situation (Niyangoda, 1989).

The lessons learned from the ADZAP thus indicate the importance of understanding dry zone farmer circumstances and resource base limitations in designing development projects in the future. Furthermore it emphasised the need for a strong and efficient monitoring and evaluation mechanism for the proper implementation of such projects.

Tank Irrigation Modernization Programme (TIMP)

The establishment of irrigated settlement schemes in the Dry Zone has been an important component of Sri Lanka's agricultural development strategy for over 50 years. The main emphasis has been on the expansion of the area under irrigated settlements, a process that has culminated in the Mahaweli Development Project, the largest development programme ever undertaken.

The rapid expansion in the area under irrigation has, in more recent years, accompanied a growing awareness that benefits realized from old established schemes are far below their potential. Although sporadic attempts have been made in the past to improve performance levels in the older schemes, the response has been limited. Physical deterioration of the irrigation systems due to inadequate maintainance, outdated management methods, insufficient control structures and devices for water distribution, other design faults and a general lack of incentives for efficient water management have contributed to the adverse performance.

From about early the 1970s, there has been increasing recognition of the need to rehabilitate, modernize and effectively manage old established irrigation systems. The Tank Irrigation Modernization Project (TIMP was the first major attempt by the government of Sri Lanka in modern times to revitalize and improve production conditions in old irrigation systems. The project was conceived and planned in the early 1970s but implementation was delayed until 1977.

The fundamental premises underlying TIMP were that design features adopted in the past for paddy monocropping were inappropriate for modern intensive agriculture. The existing systems were poorly operated and maintained, a lack of effective farmer participation, inadequate support and servicing facilities were principal causes for the poor performance of established irrigation systems.

Five major irrigation systems in the north and north and north central regions of the Dry Zones were selected for the TIMP. Three of the schemes - Mahawilachchiya (with a command area of 1040 ha.),

Mahakanadarawa (2400 ha.) and Padaviya (5000 ha.) are situated in the Anuradhapura district.[1]

The total cost of the project was Rs. 289 million and was funded by the Government of Sri Lanka, credit made available by the World Bank and a grant from the United Kingdom (World Bank, 1976). Nearly, 85 percent of budgeted sum was devoted for the civil works component. Construction activities commenced in January 1977 and completed in November, 1983.

Objectives of TIMP

The principal objective of TIMP was to increase agricultural productivity levels in the five selected irrigation systems by intensifying land use, greater efficiency of water use and adopting improved cultivation practices. Within the context of the overall objective, the specific aims of the project were:

1. The renovation and improvement of irrigation networks.
2. The adoption of better water management practices.
3. The introduction of a package of improved cultivation practices which involved early dry tillage using tractors in place of conventional mud ploughing, cultivation of non-rice crops in Yala and the growing of short aged (3-3 1/2 months) paddy varieties.
4. Enhance farmer participation, strengthen agricultural extension, improve marketing facilities and access roads.

The implementation of the project was expected to bring about substantial increases in agricultural production and improve farm incomes. Cropping intensity in the irrigated area was envisaged to rise from 108 percent to 156 percent. Average paddy yields were expected to increase from 40 bushels per acre 74 bushels per acre. Total paddy production in maha was anticipated to increase from 27,000 tons 45,000 tons. Yala paddy output was expected to rise from 6,500 tons to 15,000 tons. In addition, the production of non-paddy crops which was virtually non-

1 The other two were Pavatkulam (1760 ha) and Vavunikulam (2400 ha) both in the Vavuniya district.

existent in the pre-project stage would increase to about 7,200 tons. On completion of the project net farm incomes in the area were estimated to increase from Rs. 2,850 to Rs. 7,650 per hectare. Some 10,500 farm families were expected to benefit from the project (World Bank, 1976).

TIMP in Anuradhapura

As noted earlier, three major irrigation systems - Mahawilachchiya, Mahakanadarawa and Padaviya - in the Anuradhapura district were selected for rehabilitation under TIMP. The salient hydrological characteristics of the three systems are given below.

Hydrological characteristics of the Three Tanks selected for rehabilitation

	Mahakanadarawa	Mahawilachchiya	Padaviya
Tank capacity (Ac. ft)	34,000	32,500	85,000
Tank surface area (Ac)	4,000	3,200	6,480
Head on outlet at full supply head (ft)	19.0	22.0	24.0
Catchment area (Sq. miles)	126	141	206
Irrigated area (Ac.)	6,000	2,600	12,500
Area irrigated per square mile of catchment (Ac.)	48	18	60

Source : Irrigation Department

A noteworthy feature of the three irrigation systems is that their catchments are entirely in the Dry Zone. The bulk of the water supply to the tanks is received during the maha rains from October to January. However, the catchments of the tanks contain a large number of small village tanks which intercept most of the run-off to the main tanks (Kariyawasam, 1984).

The implementation of the project in its entirety was vested with the Irrigation Department. The subsequent operation and maintenance of the rehabilitated systems was also the responsibility of the Irrigation Department.

The civil works components of the project were as follows:

1. Desilting and enlarging the entire water conveyance systems.
2. Improving the drainage systems.
3. Brick lining of canal systems with separate bays to facilitate water distribution.
4. Repair and modification of existing irrigation structure for the rotational issue of water.
5. Installation of new gated regulators in the main, branch and distributory canals.
6. Installation of devices to measure water flows at various points in the system.
7. Repairing and widening farm roads with gravel surfaces.
8. Provision of offices, residential premises and other buildings for supervisory and construction staff (Jinadasa, 1990).

The water management component of the project involved adherence to a strict 24 hour rotational issue of water. Each farm was to be supplied with a 7 day rotation and the entire irrigation requirement of a farm was to be supplied in a time period of 12 hours. Under this system, of the 6-10 farms receiving water from a field canal, only 2 farms were permitted to take water at a given time (Abeysekara, 1986).

As noted before, the agricultural programme implemented under TIMP laid emphasis on dry ploughing as a potential means of advancing the timing of cultivation and minimizing the incidence of staggered cultivation. In fact, this practice formed the fundamental agricultural rationale of TIMP and contributed to the perceived need for additional investment in farm power. **The Staff Appraisal Report (World Bank, 1976) recommends that farm power investment should be directed exclusively towards mechanical power with the provision of 150 four-wheel tractors and 450 two-wheel tractors. Animal power was not to receive any support.**

Another key component of the agricultural package was the cultivation of some 8,500 acres of non-paddy crops principally on well drained lowlands in the yala season. This was proposed as a major factor for increasing cropping intensities (World Bank, 1976).

Achievements and Implications of TIMP

TIMP was implemented at a time when work on the Mahaweli Development Programme was given high priority status by government. This placed a strain on local resources resulting in a shortage of staff and equipment for the project. Many components of TIMP have suffered from inadequate synchronization. There were delays in procurement of machinery and other equipment. In some instances the machinery and equipment procured were found to be unsuitable during field operations. Inevitably, these difficulties led to delays in the rehabilitation and agricultural programmes. The project was expected to be completed in 1980 achieving full development in 1985 (World Bank, 1976). Even in 1980, the project was still to gather momentum. Work was completed in 1983 with the completion of rehabilitation work in the Padaviya scheme.

Rehabilitation activities were also affected by the limited knowledge on novel design concepts adopted for irrigation structures (Jinadasa, 1990. Furthermore, at the design stage, farmers were not consulted with regard to the irrigation difficulties they encounter in their canals. The farming community was totally unaware of the design proposals. Consequently, the engineering staff had to face numerous problems in trying to accommodate farmer requests.

Empirical studies carried out in the early stages of the TIMP suggest that project had little or no impact on the household economy of the beneficiaries (ARTI, 1981; Abeysekera, 1983, 1985). Inquiries on the effectiveness of the water management programme revealed that despite meticulously planning the 24 hour rotational irrigation schedule, its implementation proved difficult. This was partly because of the lack of additional staff which was required to implement the water management programme. The rotational irrigation schedule worked relatively well at the distributory canal level but was hardly operational at the field canal level. An exception was in Mahakanadarawa, where in maha 1980-81 the system was successfully implemented but at a high cost (Jinadasa, 1990. The irrigation schedule was further disrupted by design faults such as inappropriate location of some farm turnouts, incorrect level of certain lined secondary and tertiary canals and inadequate free boards in the secondary and tertiary canals (Abeysekera, 1986). Problems with the

rotational issue of water led to confusion and conflict among farmers and there were instances of wilful damage of irrigation structures.

The agricultural development strategy advocated under TIMP did not receive the desired level of acceptance by farmers. Dry tillage and dry sowing of paddy which were key components of the agricultural package were totally rejected by farmers (ARTI, 1981). Farmers continued to practice the traditional system of paddy cultivation which involved mud ploughing. This also resulted in major problems in the water management programme. The irrigation system was designed to be operated for dry land preparation and considerable difficulties were encountered in discharging larger supplies of water for mud ploughing.

The production of non-paddy crops under irrigation in lowlands during yala was also of limited success. Aside from the lack of farmer knowledge, inconsistent and disjointed government policies towards non-rice crops, discouraged farmers from growing these crops on an extensive scale.

The experiences of TIMP have important implications as regards planning and implementing rehabilitation projects of other major irrigation systems. A major shortcoming of TIMP was the over emphasis of the civil work component. Development of irrigated agriculture should not be considered to merely require engineering solutions. Physical improvement should be followed with other complementary strategies such as the provision of appropriae farming practices, delivery of the required production inputs and other services, strengthening of farmer involvement and so on. In the case of TIMP there was no organisation and institution-al set-ups for delivering complementary inputs and services essential for irrigated agriculture.

Experience of TIMP demonstrates the importance of understanding farmer circumstances and preferences and accommodating them in designing and implementing the project. There is a clear need for more dialogue between authorities responsible for the project and the beneficiaries. As far as possible, the cooperation of the latter should be enlisted from the very beginning.

TIMP also demonstrates that the success of a project of this nature also depends on favourable factors outside the project including national policies. Evidence to this effect was borne out by the limited success of the attempt to promote the cultivation of other crops in place of rice at a time when national policies were not conducive for growing other crops.

Although TIMP was characterized by many shortcomings, it must be noted that the project represented the first major effort in modern times to improve production conditions in old established irrigation systems which had deteriorated due to long years of neglect. Experiences gained from the project will no doubt prove beneficial in planning and implementing similar projects in the future, albeit at a high cost.

Major Irrigation Rehabilitation Project

Work on the major irrigation rehabilitation project (MIRP commenced in 1985. Seven major irrigation systems with a total command area of 46,000 ha were selected for rehabilitation.[1] Of these, three irrigation systems - Rajangana (5,910 ha), uruluwewa (4,090 ha) and Nachchaduwa (5,400 ha) are situated in Anuradhapura district.[2]

Implementation of MIRP was to be phased out over a period of six years (1985-90). However, due to delays in implementation the duration of the project has been extended until the end of 1991. The total cost of the project was estimated at Rs. 1,206 million. The foreign exchange component amounts to 42 percent of the total cost (World Bank, 1984). Finances for the project were to be met by the Government of Sri Lanka from its own resources and funds made available to the government from the World Bank (credit), CIDA (Credit and grant) and the Swiss Development Cooperation (grant).

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1 The total area comprised 26,000 ha of Purana lands and about 20,000 ha of land cleared up for cultivation under the Dry Zone land settlement programme.

2 The other 4 irrigation systems are Giants Tank (Mannar) Iranamadu, (Kilinochchi), Kantalai (Trincomalee) and Morawewa (Trincomalee).

Objectives of MIRP

The overall aim of the project is to increase agricultural production in the seven selected major irrigation systems. Specific objectives of the project are:

1. Rehabilitate the existing irrigation system for optimum utilization of available water.
2. Introduce an integrated management programme to ensure proper operation and maintenance of the irrigation system and distribution of irrigation supplies.
3. Strengthen support services provided by various government institutions (World Bank, 1984).

The project is expected to generate an incremental production of about 73,800 metric tons of paddy and 6,200 metric tons of soya (World Bank, 1984). Project induced increases in family income was estimated to range from about Rs. 5,900 to Rs. 10,600. MIRP was expected to benefit about 34,000 farm families.

MIRP in Anuradhapura

As noted earlier, three major irrigation systems in three districts - Rajangana, Nachchaduwa and Huruluwewa - were selected for the MIRP. The total land area expected to benefit from the project was estimated at 15,400 ha.

The total cost (including contingencies) for rehabilitating the schemes was estimated at approximately Rs. 341 million.[1]

The activities undertaken under the project area are:

1. Reviewing the irrigation canal network for their ability to convey water throughout the command area and determining canal capacities at various locations during peak requirement.
2. Repairing damaged irrigation structures, remodelling these for higher

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1 Rehabilitation cost for Rajangana was estimated at Rs. 145 million. The allocations for Nachchaduwa and Huruluwewa were Rs. 140 million and Rs. 56 million respectively (World Bank, 1984).

discharges and installing devices for better control on distribution of water.

3. Constructing new structures for controlling the distribution of water supplies.
4. Raising canal banks to provide free board for revised discharges, strengthening canal banks and enlarging sections wherever necessary and adopt measures to prevent soil erosion in vulnerable areas by appropriate lining.
5. Improving roads in the irrigated area, including resurfacing of roads along canal banks (World Bank, 1984; Jinadasa, 1990).

Rehabilitation work is being carried out simultaneously on all three systems but on a particular scheme would cover complete rehabilitation of a section of each scheme. The planned area for development in each year in the respective schemes were as follows:

Area Rehabilitated (ha)

Scheme	1985	1986	1987	1988	1989	1990	Total
Rajangana	684	948	1207	1345	936	790	5910
Nachchaduwa	250	1400	1400	940	1100	310	5400
Huruluwewa	458	770	589	1035	750	488	4090
Total	1392	3118	3196	3320	2786	1588	15400

Although 15,400 ha of land were to be developed by the end of 1990, there has been some delay in the implementation schedule attributed to civil disturbances in the country which prevailed in 1989/90. According to the Irrigation Department, about 90 percent of the rehabilitation was completed by the end of 1990. The remaining work will be carried out in the course of 1991.

In addition to the physical works component, MIRP also included an Integrated Management Programme (INMAS). The fundamental premise underlying INMAS is that the efficacy of irrigated agriculture lies in the close interaction between irrigation water, critical inputs such as

fertilizer, farm power, chemicals and services such as credit and marketing facilities (ARTI, 1987, 1990). Under INMAS all cultivation activities (crop calendar, choice of crops, input servicing, credit and marketing) will be linked to water management through the Project Manager approach (World Bank, 1984). Institutional building and setting up of farmer organisations is also given high priority under the programme.[1]

INMAS has been implemented in all three irrigation systems in the district brought under MIRP. The effectiveness of the programme in Huruluwewa and Nachchaduwa was assessed by the ARTI as part of a larger study on INMAS. According to the findings of this study the effectiveness of the programme has been mixed. On the positive side there has been some improvement in the timeliness of water deliveries. Consequently, there has been a significant reduction in the incidence of staggered cultivation in the schemes. There was some success in growing other field crops in the lowlands during yala, especially in Huruluwewa, where a substantial acreage was devoted to soya production.

The quantity of water delivered to farmers' fields had improved in Nachchaduwa, whereas in Huruluwewa there were no significant changes in the quantity of water delivered to the farm level. This is attributed primarily to design faults and also due to wastage of water (ARTI, 1989 .

The ARTI study also showed that very little was achieved by way of coordinating the activities of the different line agencies servicing the farming community. The performance of farmer organisations which were expected to play a key role in the INMAS programme was also below expectation.

Implications of MIRP

Implementation of MIRP followed the World Bank sponsored Tank Irrigation Modernization Project (TIMP - the first initiative to tackle problems of major irrigation systems in the country. It was also preceded by the VIRP which was similarly concerned with minor irrigation systems.

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1 For a detailed account of INMAS see World Bank (1984), ARTI (1987, 1990 .

The experience gained from these early efforts were accommodated in planning and implementing MIRP.

Unlike in the case of TIMP where the emphasis was on physical rehabilitation and other technical considerations, MIRP included both a civil works programme as well as a management component which are key factors for raising productivity levels in major irrigation systems. There was also, reportedly, more consultation with the members of the farming community in planning and implementing the project. This was facilitated by the existence of farmer organisations. Another feature was the inclusion of the acreage illicitly cultivated into the project design thereby minimising illegal tapping of water and damages to irrigation structures.

Village Irrigation Rehabilitation Programme (VIRP)

Public investment in irrigation in Sri Lanka has traditionally been biased towards development of major irrigation systems. In recent years, concerted efforts have been made by government to improve production conditions in village irrigation systems. Government has implemented a number of village irrigation programmes under various budgetary heads. These include, IRD Projects, ADZAP and Irrigation Development Programme of the Irrigation Department.

Village Irrigation Rehabilitation Programme (VIRP) was a comprehensive project designed to physically rehabilitate and improve water management practices in minor irrigation systems and anicuts. It was formulated as a five year project (1981 - 1985). Some 1,200 minor tanks and anicuts in 14 districts were to be rehabilitated with the aim of providing improved irrigation facilities for about 31,500 ha of land. Around 22 percent (7,100 ha) of the total area would represent land previously cultivated under rainfed conditions.

The project life was taken to be 25 years. With rehabilitation of each scheme scheduled to be completed within a year, full production levels were expected to be realized in 1991.

Total project costs, net of taxes and duties, were estimated at Rs. 784 million with a foreign exchange component of about 22 percent. The project was funded from a World Bank loan of Rs. 240 million (approximately 68 percent of project costs) and the balance (Rs. 244 million) was to be funded by the government of Sri Lanka.[1]

At the inception of VIRP, the two NCP districts were excluded. Anuradhapura district was incorporated into the project in the latter half of 1985. The duration of the project was subsequently extended until the end of 1990.

Objectives of VIRP

The main aim of the project was to increase agricultural production and farm incomes in existing village irrigation systems by: first, physical rehabilitation of deteriorated minor tanks and anicuts. Second, implementing a water management programme to ensure efficient utilisation of irrigation water once physical rehabilitation was completed. The third objective was to strengthen the capacity of government institutions involved with minor irrigation systems, particularly the Department of Agrarian Services, to esnure proper maintenance of minor irrigation systems (World Bank, 1981).

The implementation of VIRP in the Dry Zone was expected to increase cropping intensities from an average of 70 percent (under minor tanks and rainfed conditions) in maha and 5% in yala to 85% and 20% in the two seasons respectively. In addition, the added security was expected to reduce the risk of crop failure from an average of 15% to 5% in maha and from 20% to 15% in yala. At full development, VIRP was expected to increase rice production by some 37,800 tons per annum. It was also envisaged that the project would generate 2.1 million man days of additional employment, which is equivalent to 8,000 additional full time jobs. Per capita farm income was expected to increase from Rs. 1,600 to Rs. 2,100 representing a rise of about 28%. Some 20-25,000 farm families were expected to benefit from the project. Lastly, VIRP was believed to have a beneficial environmental impact through its

1 Base cost estimates were at mid 1980 prices.

contribution by stabilization of agriculture in the Dry Zone and by the provision of water supplies for domestic use and for livestock (World Bank, 1981).

VIRP in Anuradhapura

As noted earlier VIRP was launched in the Anuradhapura district in late 1985. There were no restrictions on the number of tanks to be rehabilitated. The number taken up for rehabilitation each year depended on the availability of staff, financial resources and other facilities with the Divisional Irrigation Engineer (Jinadasa, 1990).

The selection of tanks was based on the following criteria;

1. The command area of the tank should not be less than 20 acres unless it is one in a cascade and needs improvement to provide safety for tanks downstream.
2. The useful storage of the tank should not be less than three acre feet per acre of command area and should not exceed 70 percent of the yield potential.
3. The tank should benefit at least ten families after rehabilitation.
4. The incremental area brought under irrigation in maha should be at least ten times the privately irrigated land submerged or three times other cultivated land submerged.
5. The cost for a project including civil works and physical contingencies valued at mid 1980 prices but excluding price contingencies, should not exceed Rs. 5,000 per acre for existing area plus Rs. 10,000 for the incremental area (World Bank, 1981).

By the end of 1989, 225 minor tanks in the district were rehabilitated. In 1990, 18 more tanks were taken up for improvement making a total of 243 tanks and improving irrigation facilities for about 17,000 acres of land (Jinadasa, 1990).

The Irrigation Department was responsible for the civil work component of the project. Once physical rehabilitation was completed, the irrigation system was handed over to the Department of Agrarian

Services (DAS) which was responsible for implementing a water management programme and the operation and maintenance of the irrigation system. The Irrigation Department continued to be responsible for the satisfactory functioning of headworks and rehabilitated structures for a period of two years thereafter.

Implications of the VIRP Strategy

Since implementing the VIRP, a number of studies have een carried out on various aspects of the programme.[1] This section summarizes some of the important findings of the studies undertaken in the past.

VIRP typifies a deliberate and focussed intervention by the State into village irrigation systems through a process of physical rehabilitation, providing advice on appropriate operation and maintenance activities, setting up a framework for efficient water management and also providing advice on better farming practices. This was in contrast with the earlier role where government involvement in village irrigation systems was confined largely to physical refurbishment, whilst leaving the village community to operate and maintain them (Abeyratne & Perera, 1986).[2]

A major shortcoming of the VIRP strategy highlighted in almost all empirical studies on the programme was the insufficient dialogue between State agencies involved with the programme and members of the farming community. Moreover, no attempt was made to enlist the cooperation of te local community in designing the project or in the process of rehabilitation itself. This was partly because there were no farmer organisations at the time. At the preliminary investigation stage, State agencies had to depend entirely on Vel Vidanes to obtain information on the needs of the farming community.

There are several advantages in promoting community participation from the inception of a programme of this nature. Small-scale irrigation projects are widely scattered. It would both be time consuming and

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1 See Abeyratne & Perera (1986); Abeyratne (1986); Herath, et al, (1988); Jinadasa (1990 .

2 For a analysis of the role of the State in village irrigation see Abeyratne and Perera (1986).

costly for government to invest in feasibility studies on every minor irrigation scheme. The government can rely on the knowledge of the community for obtaining information on the local environment, soil, hydrological and economic conditions as well as, more importantly, the social organisation which prevails in the area. The involvement of the local community in the rehabilitation could also reduce costs of the project considerably.

Another problem identified was that, at the design stage the acreage to benefit from the physical rehabilitation was estimated on the basis of the capacity of the tank. The actual acreage under cultivation, which includes encroachments, was not taken into consideration. Consequently, illicit tapping of water was widespread resulting in water shortage problems (Herath, et al 1988; Jinadasa, 1990).

VIRP was expected to increase cropping intensities under minor tanks. In many schemes there has been some improvement in cropping intensities during the maha season, whereas there was nomajor change in the intensity of land use during yala. Field investigations also indicate that in several schemes, land was left fallow during yala even after rehabilitation. There is also no evidence of cultivation of subsidiary food crops in the lowland area during yala. An exception is Badulla district where some farmers cultivated vegetables and other field crops during the yala season (Herath et.al, 1989).

Construction work on VIRP was carried out by private contractors. The activities of private contractors were not adequately supervised. As a result, the quality of work was not of the desired standard (Abeyratne, 1986; Herath et.al, 1988). Close supervision of the work of private contractors is necessary to ensure that construction activities are carried out properly.

Another issue which merits attention is that, from the inception of the programme itself, there was a lack of coordination between government institutions involved in the project. As noted earlier, physical rehabilitation of the irrigation system was the responsibility of the Irrigation Department. Once rehabilitation works were complete the

irrigation system was to be handed over to the Department of Agrarian Services which was vested with the task of implementing the water management programme. Due to the lack of coordination between these two departments there were reportedly substantial delays in the handling over and taking over of particular schemes. In some instances DAS was reluctant to take over schemes which it felt were not satisfactorily rehabilitated. There were also instances when the DAS had to reinvest in minor repairs to bunds and irrigation structures to bring back the physical work to the design standards.

SUMMARY AND CONCLUSIONS

It would be evident from the text of this report that over and above what was called for in the terms of reference we have presented an in-depth survey of the potential for development particularly in the agricultural sector.

The principal constraints to development in the long term have been indentified as those which flow from its natural resource base while in the short term both the formulation and the implementation of development programmes would be impeded by the paucity of suitable staff particularly at the divisional level.

Our review of development projects embarked on over the last decade or so has shown up the importance of prior consultation with the designated beneficiaries in formulating development programmes. It has also drawn attention to the need for strict supervision over such construction components as are integrated into development plans.

The areas which required further study before a development plan for Anuradhapura district is formulated are outlined below:

Irrigation

1. The need for tank development to be planned in terms of small and large drainage basins rather than in cascade terms. This would involve identifying tanks in which spill-ways need to be lowered, in order to promote the necessary flows to down stream users: and those which need to be de-silted rather than have their bunds raised.

Crop Diversification

2. A planned programme of crop diversification under irrigation in Yala.

Animal Husbandry

3. The development of animal husbandry. This needs to be studied in terms of both developing dairying and also of animals for draught. The potential for stabilising the practice of communal grazing needs to be examined along with programmes for the imporvement of the stock.

Forestry

4. Re-forestation must be undertaken on a planned basis over a relatively short period of time. This is essential in order to counteract drought hazards; supply fuel wood and timber over the long term; and supplement the fodder requirements of cattle.

Inland Fisheries

5. The development of inland fisheries and the establishment of the necessary infrastructure for it within the project area.

Manufacturing Industry

6. The potential for the development of manufacturing industry, primarily based on the resources available on the district but not limited to them, needs to be explored systematically. Agro-processing employing more efficient procedures and technologies could be expected to make a substantial impact on farm income. These would need to be supported by an appropriate infrastructure including rural electrification and the development of other sources of energy including wind and solar energy.

Education

7. The development of educational facilities particularly the infrastructure therefor, including transport facilities, furniture and equipment and residential accommodation for the tutorial staff needs to be planned in response to perceived needs rather than in deference to "political" demands.

Health and Nutrition

8. The problems of health and nutrition need to be examined on a priority basis and the development of an infrastructure, including the provision of safe drinking water and programmes to ensure sanitation require urgent attention. So does the need for effective staff training and education programmes in the area of maternity health and child care.

Marketing

9. The development of infrastructure for effective marketing particularly of agricultural produce requires a planned programme that would cover the entire project area.

Institutional Information

10. The development of community organizations, preferably on a voluntary basis, needs to be studied in a context in which the district administration would play a supportive role.

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Annex I

REGIONAL DEVELOPMENT DIVISION (RDD), MPP&I SUPPORT TO ANURADHAPURA DISTRICT

Terms of Reference for Fact Finding/Identification Study

1. Introduction

1.1 The Swedish International Development Authority (SIDA) has indicated willingness to finance rural development projects/activities in the District of Anuradhapura, North Central Province. In this regard, a fact finding/identification study shall be carried out in the District.

1.2 SIDA will on the recommendation of RDD, finance through RDD a locally based consultant company to perform the work.

1.3 Background information for the study will be found in the Situation report of 1987.

2. Scope of Work

2.1 Anuradhapura District is one of the least developed districts in Sri Lanka. This situation is related to the weak economic base of the district, which is exposed as structural and symptomatic poverty. The study will identify and analyze the causes for prevailing situation, recommend upon a development strategy for the district and outline sectors/projects for possible development intervention with SIDA assistance.

3. Terms of Reference

3.1 The consultant shall in collaboration with RDD/MPP&I and the North Central Provincial Authorities update the Anuradhapura District Situation Report in accordance with guidelines issued by RDD.

3.2 The consultant shall review other available reports, data and documentation with regard to socio-economic conditions, available and potential resources, institutional establishments and development trends in the District.

3.3 Previous and present development projects shall be studied and described in the report.

3.4 The situation in the District and its development problems and constraints shall be described and analyzed. Required feasibility/ in depth studies shall be recommended upon, indicating terms of references.

3.5 The consultant shall recommend upon possible areas/sectors for SIDA assistance and a feasible and appropriate approach for this assistance.

4. Mode of Work and Time Schedule

4.1 The consultant shall prepare a detailed work programme within an overall time schedule of 3 weeks, for approval by RDD before commencing the work.

4.2 The consultant shall initially prepare a draft concept of the fact finding/identification study, indicating the report format for RDD approval.

4.3 The consultant will work under the overall guidance and supervision of RDD and in close collaboration with SIDA, NCP Chief Secretary, PPU and the GA of Anuradhapura. Consultation should be made with relevant ministries and institutions, other donors and a selection of rural development projects.

4.4 The report will be in a concentrated form. A draft should be presented for RDD, SIDA and NCP for discussion before finalization.

5. Composition and Qualifications

5.1 The consultant company should assign highly qualified personnel to the work, covering the following professions: Social science, agriculture, economics and regional development planning. CV's shall be approved by RDD in connection with contract negotiations.

Annex 2

Anuradhapura District Development Programme
Work Plan for Fact Finding/Identification Study

1. Introduction

This document sets out the work plan, composition of the team of consultants and the budget for the fact finding/identification study for the proposed Anuradhapura district development programme. The study excludes programmes under the Mahaweli Development Project.

2. Work Involved

In accordance with the Terms of Reference of 12/7/90 and as revised on 16/10/90 by the Regional Development Division of the Ministry of Policy Planning and Implementation, the consultants will undertake the following :

a) Update Anuradhapura District Situation Report of May, 1987.

b) Review available reports and documentation on the (i) socio-economic conditions in the district, (ii)institutional establishments, (iii) development trends in the district.

c) Give an overview of major development projects undertaken in the recent past and those which are on-going.

d) Describe and analyse in brief the existing situation in the district and identify areas where further research is required.

2.1 Updating Situation Report

Updating the Situation Report (1987) will involve the following areas of analysis.

a) the present district administrative set-up within the NCP provincial council

b) district budget

c) demographic characteristics of the district

d) current state of the agriculture and forestry sectors covering the following areas:
   i) land use
   ii) agrarian structure and farming systems
   iii) land tenure systems
   iv) state of animal husbandry
   v) irrigation and water management
   vi) farm production and incomes
   vii) credit, input supply and marketing
   viii) agricultural extension and farmer training
   ix) farmer organizations
   x) review of forestry development programmes in the district

e) recent developments in social and other economic infrastructure :
   i) road development
   ii) transport
   iii) communication
   iv) rural electrification
   v) health facilities
   vi) education
   vii) on-going poverty alleviation programmes

2.2 Review of Development Projects

The following development projects will be reviewed :

i) Anuradhapura Dry Zone Agricultural Project
ii) Major Irrigation Rehabilitation Programme
iii) Village Irrigation Rehabilitation Programme
iv) Five Tank Modernization Programme

3. Study Team

The study team will consist of 4 researchers from the Agrarian Research and Training Institute, one from the Regional Development Division of the Ministry of Policy Planning and Implementation and an outside consultant. Their names, designations and area of expertise are given below. Additional information is contained in CVs which are annexed.

Name	Designation	Speciality
D.G.P. Seneviratne	Director/ARTI	Public Management
C.R. Panabokke	Consultant/ARTI	Agronomist/Soil Scientist
W.G. Jayasena	Research and Training Officer ARTI	Regional Development Planner
M. Samad	Research and Training Officer ARTI	Agric. Economist
M.U.A. Tennakoon	Director/Central Bank Staff Training College	Social Scientist

The representative of the RDD will be a specialist in Regional and Rural Development Planning.

The team will work in close collaboration with officials from the Regional Development Division at the Ministry and with district level officials.

4 Steering Committee

A study Steering Committee will be formed consisting of the Consultants, officials of the Regional Development Division, a representatives of SIDA and officials of the district administration. The Committee will function primarily in an advisory capacity.

The membership of the committee will be as follows :

1. Director/Regional Development Division
2. Additional Director/Regional Development Division
3. Policy Planning Advisor/RDD
4. Representative of SIDA
5. Chief Secretary/NCP Provincial Council
6. Government Agent/Anuradhapura District
7. Six Consultants

There will be three meetings of the Steering Committee. The first meeting of the Committee will be held in Anuradhapura in the third week of October.

6. TIME TABLE

Tasks	Week	1	2	3	4	5	6
	date	22/10/90 to 28/10/90	29/10/90 to 4/11/90	5/11/90 to 11/11/90	12/11/90 to 18/11/90	19/11/90 to 25/11/90	26/11/90 to 7/12/90
1.Collection of data		———					
2.Data Analysis				———			
3.Drafting Report					———		
4.Discussion with RDD						———	
5.Final Report							———

Annex 3

DETAILS OF EXISTING CADRE OF THE DIVISIONAL SECRETARIES OFFICE (01.06.1990)

SECRETARY'S DIVISION	SLAS.11/1			SLAS 11/11			SLAccts. S.11/11			SLPS			Finance Asst.			MLTS-1/ 11;A/111			DRAUGHTSMEN			DEVELOPMENT OFFICER			SERVICE OFFICER			SURVEYOR			TECHNICAL OFFICER			OFFICE STAFF			MINOR STAFF		
	Approved cadre	Existing cadre	Vacancies	Approved cadre	Existing cadre	Vacancies	Approved cadre	Existing cadre	Vacancies	Approved cadre	Existing cadre	Vacancies	Approved cadre	Existing cadre	Vacancies	Approved cadre	Existing cadre	Vacancies	Approved cadre	Existing cadre	Vacancies	Approved cadre	Existing cadre	Vacancies	Approved cadre	Existing cadre	Vacancies	Approved cadre	Existing cadre	Vacancies	Approved cadre	Existing cadre	Vacancies	Approved cadre	Existing cadre	Vacancies	Approved cadre	Existing cadre	Vacancies
PADAVIYA	01	--	01	01	--	01	01	--	01	01	--	01	02	--	02	06	02	04	01	--	01	06	03	03	04	01	03	01	--	01	01	--	17	05	12	09	06	03
KEBITIGOLLEWA	01	--	01	01	01	--	01	--	01	01	--	01	02	--	02	06	02	04	01	--	01	06	05	01	04	01	03	01	--	01	01	--	17	07	10	09	04	05
MEDAWACHCHIYA	01	--	01	01	01	--	01	--	01	01	--	01	02	--	02	06	02	04	01	--	01	06	04	02	04	01	03	01	--	01	01	--	17	10	07	09	05	04
RAMBEWA	01	--	01	01	01	--	01	--	01	01	--	01	02	--	02	06	04	02	01	--	01	06	02	04	04	01	03	01	--	01	01	--	17	07	10	09	04	05
HOROWPATANA	01	--	01	01	--	01	01	--	01	01	--	01	02	--	02	06	01	05	01	--	01	06	05	01	04	01	03	01	--	01	01	--	17	07	10	09	05	04
GALENBIDUNU-WEWA	01	01	--	01	--	01	01	--	01	01	--	01	02	--	02	06	01	05	01	--	01	06	07	--	04	--	04	01	--	01	01	--	17	12	05	09	06	03
KAHATAGASDIGILIYA	01	--	01	01	01	--	01	--	01	01	--	01	02	--	02	06	01	05	01	--	01	06	05	01	04	05	--	01	--	01	01	--	17	06	11	09	05	04
N. P. EAST	01	--	01	01	01	--	01	01	--	01	--	01	02	--	02	06	01	05	01	--	01	06	04	02	04	10	--	01	--	01	01	--	17	12	05	09	04	05
N. P. CENTRAL	01	--	01	01	01	--	01	--	01	01	--	01	02	--	02	06	01	05	01	--	01	06	09	--	04	01	03	01	--	01	01	--	17	13	04	09	04	05
NOCHCHIYAGAMA	01	01	--	01	--	01	01	--	01	01	--	01	02	--	02	06	04	02	01	--	01	06	03	03	04	--	04	01	--	01	01	--	17	10	07	09	06	03
VILACHCHIYA	01	--	01	01	--	01	01	--	01	01	--	01	02	--	02	06	02	04	01	--	01	06	03	03	04	--	04	01	--	01	01	--	17	04	13	09	04	05
THALAWA	01	--	01	01	02	--	01	--	01	01	--	01	02	--	02	06	02	04	01	--	01	06	08	--	04	03	01	01	--	01	01	--	17	09	08	09	04	05
THAMBUTTEGAMA	01	01	--	01	01	--	01	--	01	01	--	01	02	--	02	06	01	05	01	--	01	06	02	04	04	01	03	01	--	01	01	--	17	12	05	09	04	05
IPALOGAMA	01	01	--	01	--	01	01	--	01	01	--	01	02	01	01	06	03	03	01	--	01	06	06	--	04	--	04	01	--	01	01	--	17	12	05	09	03	06
THIRAPPANE	01	--	01	01	01	--	01	--	01	01	--	01	02	--	02	06	02	04	01	--	01	06	05	01	04	02	02	01	--	01	01	--	17	13	04	09	05	04
MIHINTALA	01	01	--	01	--	01	01	--	01	01	--	01	02	01	01	06	01	05	01	--	01	06	02	04	04	--	04	01	--	01	01	--	17	12	05	09	04	05
KEKIRAWA	01	--	01	01	01	--	01	--	01	01	--	01	02	--	02	06	01	05	01	--	01	06	06	--	04	01	03	01	--	01	01	--	17	15	02	09	04	05
PALUGASWEWA	01	--	01	01	01	--	01	--	01	01	--	01	02	--	02	06	01	05	01	--	01	06	03	03	04	--	03	01	--	01	01	--	17	11	06	09	05	04
PALAGALA	01	--	01	01	01	--	01	--	01	01	--	01	02	--	02	06	04	02	01	--	01	06	06	--	04	02	02	01	--	01	01	--	17	12	05	09	04	05
RAJANGANE	01	--	01	01	01	--	01	--	01	01	--	01	02	--	02	06	03	03	01	--	01	06	02	04	04	01	03	01	--	01	01	--	17	11	06	09	04	05
GALNAWA	01	--	01	01	01	--	01	--	01	01	--	01	02	--	02	06	02	04	01	--	01	06	04	02	04	01	03	01	--	01	01	--	17	12	05	09	02	07
T O T A L ..	21	05	16	21	15	07	21	01	20	21	--	21	42	02	40	126	41	85	21	--	21	126	94	33	84	32	59	21	--	21	21	--	21	357	212	145	189	92	97
% Vacancies			76%			33%			95%			100%			95%			67.5%			100%			26%			70%			100%			100%			40.6%			51.3%

Annex 4 Rehabilitation of Minor Irrigtion Schemes under Anuradhapura Dry Zone Agricultural Project

No.	AGA's Division	Tulana No.	Name of Tank	Estimated Cost	Expenditure	Acreage benefitted		Settlement develop
						Existing	New	
01	N.P.C.	2C	Gulupettwewa	490,000	410,908.65	-	60	X
02	N.P.C.	15	Kuda Halmillewa	685,000	582,532.58	-	73	X
03	N.P.C.	2B	Randoowa	320,000	303,917.74	-	32	X
04			Ehatuwagama	310,000	300,708.69	30	40	
05			Ethpanthiya	325,000	297,100.00	30	35	
06	N.P.C.	15B	Katukeliyawa	950,000	949,678.27	40	87	X
07	N.P.C.	2C	Mahadangawewa	520,000	468,525.33	-	52	X
08	N.P.C.	13	Attikulama	220,000	192,877.68	35	05	
09			Sandanankuttigama	320,000	257,571.91	50	25	
10			Meegaswewa Mahawewa	290,000	283,823.23	-	33	
11			Dematagama Pahalawewa	258,000	219,258.05	-	26	
12			Sivalagala Marikarayagama	750,000	739,520.12	140	-	
13	N.P.C.	13D	Vihara Kallanchiya	630,000	629,752.04	40	57	
14	N.P.C.	13	Ihala Attikulama	395,000	392,284.61	-	40	X
15			Dunumadalawa	737,000	726,359.36	32	43	
16	N.P.C.	15B	Siyambalagaswewa	415,000	414,428.02	-	42	X
17	N.P.C.	13E	Pahalagama Kudagama	665,000	612,796.76	54	27	X
18			Meegasdigiliya	475,000	474,951.54	72	32	
19	N.P.C.	2B	Ulukkulama	540,000	538,678.98	-	65	X
20	N.P.C.	2B	Helambagaswewa	370,000	369,299.49	60	15	
21			Labugama	650,000	620,359.20	23	54	
22	N.P.C.	15B	Siyambalagaswewa	510,000	495,298.79	-	56	
23	N.P.C.	15B	Katugampola-yagama	970,000	955,472.06	-	120	X
24			Malberiyagama	350,000	348,028.57	20	27	
25	N.P.C.	15B	Halmillewawewa	816,000	815,652.51	58	82	
26	N.P.C.	22C	Teppankulama	780,000	779,987.26	-	78	X
27	N.P.C.	23B	Ihala wewa	210,000	188,185.93	-	21	X
28			Ichchankulama	220,000	219,779.65	10	32	
29	N.P.C.	23F	Halmillewa Netunkeanniya	289,000	266,514.89	-	29	X
30	N.P.C.	22B	Anduwaketiya	600,000	599,995.10	12	50	X
31	N.P.C.	15	Godagaha wewa	920,000	919,998.38	-	92	
32	N.P.C.	2C	Kimulwewa	942,000	941,999.50	-	102	
33	N.P.C.	2B	Kiralapetiyawa	720,000	719,997.36	-	72	X
34	N.P.C.	2C	Kotukellyawa	720,000	719,926.12	-	74	X
35	N.P.C.	2A	Medawachchi Eliya	640,000	474,814.69	-	64	X