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RAINFED FARMING IN THE DRY ZONE OF SRI LANKA

-A Case Study of Two Village Clusters In The North Central Province-

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F O R E W O R D

Despite the current emphasis on the development of irrigation potentials of the Dry Zone, it is estimated that approximately 3 million acres of land suitable for agriculture in this region are not likely to come under any major irrigation command in the near future. Hence the extent to which these vast land resources could be utilized for agricultural production depends on the ability to overcome problems of 'Dry Farming".

Shifting or Chena cultivation is the main form of Dry Farming practised by the peasantry of Sri Lanka from very ancient times. This system of cultivation which is based on the exploitation of the natural fertility of the soil not only satisfied the needs of traditional societies, but also has, in recent years contributed substantially to domestic agricultural production particularly in the area of subsidiary food crops.

Chena cultivation as practised in the Dry Zone for many centuries under the prevailing physiographic and demographic conditions no doubt enabled the most effective and economic use of highland. However, in recent years, rapid population growth and the resultant pressure on land resources, indiscriminate clearing of forests causing ecological and environmental problems have provoked much concern particularly in regard to the traditional methods of Chena cultivation. These problems reached such an alarming proportion that made it necessary for the Government to introduce legislation to strictly prohibit new clearing of forest land and has underscored the need to transform Chena cultivation to permanent and more scientific form of Dry Farming.

A considerable amount of research on the technical aspects of Dry Farming has been conducted by the Research Stations of the Department of Agriculture in an effort to develop a viable pattern of Dry Farming to replace the traditional Chena cultivation. However, the socio-economic implications of transforming Chena cultivation in to a stable system of Dry Farming has received little attention. In this context, the ARTI undertook a research stu on soicio-economic aspects of evolving a stablised system of Dry Farming with the primary objective of promoting the effective utilisation of available resources and increasing agricultural production and farmer incomes on lands where Chena cultivation has been the traditional form of landuse.

The findings of this study, which among other things, stress on the need for a clear land policy to bring about a rational allocation of land resources while providing security of tenure to the farmers, would be of immence value to those who are concerned with the overall development of the dry zone. A state sponsored credit scheme for highland farming, more market outlets, floor prices for pulses and coarse grains, specialised advisory services and further research on suitable cropping systems are identified by the researchers as vital components of a planned action programme to promote a stable system of highland cultivation in place of the traditional Chenas.

This study was initiated in late 1975 and the bulk of field work done in 1976. However, due to senior members of the research team leaving the ARTI at report writing stage and the others proceeding for post-graduate training, caused considerable delays in publishing the report. Inspite of these problems and resultant delays, I hope the researchers have been able to highlight many factors of topical interest worth serious consideration in any programme envisaged for the development of the Dry Zone.

Several Research and Training Officers of the Institute took part in the study at various stages. However, special mention should be made of Mr.M.Samad who brought out the report in this final form. My thanks are due to him as well as to others from both within and outside the Institute who made this study possible.

T.B.SUBASINGHE
DIRECTOR.

A C K N O W L E D G E M E N T S

The completion of this research was made possible by the generous assistance and advice extended to us by many although the present authors were mainly responsible for finalising the report.

Colleagues of the ARTI research staff: Messrs R.D. Wanigaratne and F. Abeyratne were involved with the project from the survey stage to late 1976. Miss T. Sanmugam helped in designing the questionnaire and in data processing, Messrs M.A. Gunawardane and P. Piyaratne served as statistical investigators in the record keeping programme. Mr. H.A. Siriwardane Information and Publication officer edited a few chapters in the early drafts.

Dr. Walter Fernando, Deputy Director (Research) and Dr. Somasiri, both from the Department of Agriculture were directly involved in the planning and selection of sites for the study. Mrs. Senanayake and Mr. John collected technical information during Maha 1975/76 from several chena and highland plots in the two clusters. Mr. B. Jinendradasa, DAEO, Anuradhapura and AI Mihintale extended their fullest cooperation throughout the project.

Dr. E. Abeyratne, the then Director of Agriculture, Dr. C.R. Panabokke, Deputy Director of Research (Department of Agriculture) and Mr. F.G. Saunders, then FAO Chief Advisor of the ARTI provided valuable advice to the research team.

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C O N T E N T S

CHAPTER 1

INTRODUCTION

1.1 SCOPE

This study is primarily aimed at understanding the socio-economic implications of evolving a stable system of rainfed highland farming in areas of traditional shifting cultivation. The study, therefore, covers the traditional rural settlements of the dry zone of Sri Lanka. The research programme formed a part of a larger study that was initiated by the ARTI to cover the three major agro-ecological zones of the country, namely the Wet Zone low country, the Wet Zone mid country[1] and the Dry Zone.

The need to undertake the present research on rainfed farming areas was primarily guided by the following reasons:

(i) Nearly 3 1/2 million acres of land in the dry zone suitable for agricultural development are not likely to come within efficient irrigation command in the near future. These lands are being mostly utilised under the chena system of cultivation which is likely to continue as the predominant form of land utilisation for some time. There is increasing concern about the undesirable effects of the traditional system of chena cultivation, which results in the destruction of valuable forest land, leading to soil erosion and displacement of wild life.

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[1] Research findings are incorporated in two publications -

(a) Land Reform and Development of Class II Coconut Lands, ARTI, 1977 and

(b) Socio-economic survey of the Beminiwatte Agricultural Productivity Committee Area, ARTI, 1976.

(ii) During the past several decades considerable attention has been focussed on irrigated farming in the dry zone, whereas rainfed farming has received relatively little attention upto now.

(iii) A consensus of opinion now exists that a stable form of rainfed farming could make a very significant contribution to step up agricultural production, increase and stabilize farm incomes and generate greater employment opportunities in a large part of the dry zone.

1.2 OBJECTIVES

The primary objective of this study is to examine the problems and possibilities of developing a stable system of farming under rainfed conditions which -

- promotes the efficient utilisation of the available resources and increased agricultural production
- improves and stabilises the farmer income in an environment of uncertainty and generates greater employment opportunities.

A closer collaboration with the Department of Agriculture was suggested in view of the fact that the development of the unirrigable highlands in the dry zone is largely a problem of a technical nature. It was also agreed at this stage to explore the possibilities of setting up a second agrarian field laboratory for trying out a programme of settled rainfed farming on the basis of available experience.

The lack of sufficient data on socio-economic and agro-technical aspects required for an implementation programme on highland rainfed farming, necessitated the launching of a research phase to collect the relevant information. A major part of the study became the responsibility of the ARTI.

The specific objectives of the study are as follows:-

a) to gather bench-mark data for a field laboratory project in the dry zone and for the evaluation of any subsequent action programmes;

b) to collect information on the present conditions in rainfed farming areas with special reference to problems likely to arise in the process of stabilising chena cultivation;

c) to identify measures to increase agricultural production and improve farm incomes through a more effective utilisation of available resources.

1.3 METHODOLOGY AND PROCEDURES

(i) Selection of villages for the Study

Since the project was intended to be partly experimental in nature, the selection of a larger area for an indepth study was ruled out. The traditional type of chena cultivation emphasised in the study is found mainly in the Anuradhapura District. Two other considerations guided the final selection of the area, they are:-

a) The need to represent contrasting village types in relation to the availability of forest land for chena cultivation, with a view to studying the process of change towards stabilisation. It was assumed that receptivity to any action programme would be higher in areas with less forest reserves.

b) The need to study a settlement scheme where dry farming experiments of some nature had been carried out.

The study location was narrowed down to the Mihintale Agricultural Productivity Committee area of the Anuradhapura District on the following considerations:

a) This area is not expected to come within the command of a major irrigation project in the near future.

b) It is sufficiently close to the Maha Illuppallama Research Station and the district Agricultural Extension Office. This was thought to be important in view of the fact that the selected area may eventually be developed into an agrarian field laboratory.

The next problem was to select the villages from the Mihintale area. In keeping with the objectives of the study, two groups of villages had to be selected on the criterion of relative availability of forest land for chena cultivation. These two situations were broadly identified as the long fallow cycle and the short fallow cycle. The long cycle chena can be broadly defined as one where forest is recleared for cultivation after about 15 years or more. The short cycle is observed in situations where cultivators have to clear "Landu" forest or scrub jungle for recultivation, for want of sufficient time for the full recuperation of forest land.

In the selection of study localities, the basic unit was to be a 'cluster' of villages rather than a single village. This was considered necessary given the complex socio-economic character of the 'purana' village. A group of villages of the same 'variga' having intimate social and economic ties with one another represents a homogeneous entity. Following village clusters were finally selected:

a) Nochchikulama-Mankulama, Kele-Thirappane and Kahapathwilagama villages to represent the long cycle chena areas

b) Nelunkanniya, Thariyankulama-Hammillewa villages to represent the short cycle chena area.

For convenience, the long cycle villages are termed as Cluster I and the short cycle villages as Cluster 2 throughout this study.

Another village was selected by the Rural Sociology Unit of the ARTI for a detailed study on sociological aspects.[1] This village lies in close proximity to the Cluster 1 villages and represents conditions similar to the latter.

It was also agreed to study the Kurundankulama dry farming scheme situated approximately three miles from the cluster 2 villages in order to evaluate the present status of one of the early attempts at settled rainfed highland farming.[2]

(ii) Data Collection

Methods of data collection adopted in the course of the study were as follows:-

a) Structured questionnaire:

This was used for the village surveys and for the study of the Kurundankulama Dry Farming scheme;

b) Unstructured indepth interviews;

c) Participant observation by researchers living in the selected localities;

d) Record-keeping programme for selected farm households by trained investigators;

e) Study of official documents and reports;

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1 See Ishak Lebbe et al: The Role of Local Groups in Rural Development.

A Case Study of Mawegama Village: ARTI, 1978

2 The study on the Kurundankulama Dry Farming Scheme which formed a part of the present study was published early on a request made by the Department of Agriculture which launched on a programme to revitalise the activities of this scheme. For details of this study see:

Gooneratne et al - Kurundankulama Dry Farming Settlement: A Socio-Economic Appraisal, ARTI, February, 1977.

(iii) Field Operations

A socio-economic survey of the two village clusters was carried out by the ARTI in December, 1975, using a structured questionnaire. In keeping with the objectives of the study outlined earlier, information on the following aspects were collected.

a) Demographic data
b) Land ownership and tenure
c) Cultivation practices; paddy, highland and chena
d) Farm labour, draught power, farm supplies and marketing
e) Extension and rural organisations
f) Household incomes and levels of living
g) Problems associated with settled highland farming

The questionnaire was pre-tested in two villages close to the Cluster 1 villages. All the households in the selected villages were interviewed by permanent investigators of the Institute under the supervision of Research and Training officers. The number of households surveyed is given below:

	Village	No. of households
Cluster 1	Nochchikulama-Mankulama	34
	Kele Thirappane	27
	Kahapathwilagama	40
Cluster 2	Nelunkanniya	66
	Thariyankulama-Hammillewa	78

Information from the Kurundankulama dry farming scheme was collected by means of a questionnaire survey covering all households in March 1976.[1]

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[1] Gooneratne et al - Kurundankulama Dry Farming Settlement op cit

Periodic visits were made by Research Officers of the Institute with a view to collecting detailed information on the following aspects:

a) Water management problems related to paddy cultivation;

b) Availability and effectiveness of agricultural extension services for chena cultivation;

c) Credit and Marketing problems;

d) Performance of village institutions.

The collection of agro-technical information during the 1975/76 Maha season was undertaken by two researchers from Maha Illuppallama Research Station and an Agricultural Instructor.

A study on the cost of production of chena crops was initiated in Yala 1976 with a view to collecting reliable data on chena operations. Ten farm households were selected from each of the two village clusters on the basis of the representativeness of different farm sizes and the willingness of the farmers to cooperate in a programme which extends over two cultivation seasons.

Two trained investigators, who were expected to visit selected farmers at least once a week and record the information on a specially designed record book, were stationed in the two clusters. The exercise was continued till the end of Maha 1976/1977 during which season the programme was expanded to include total farm operations (chena, highland and paddy).

1.4 FIELD PROBLEMS AND PROBLEMS OF EXTENDED STUDY

The period during which the survey was carried out was the fourth successive year of drought which affected the Dry Zone. The crop year for which information on farm operations and incomes was sought (1975/76) happened to be the worst affected since 1970. Hence, the information obtained on cultivation patterns, farm incomes and labour utilisation cannot be considered as typical of the Dry Zone purana village.

However, this situation gave more impetus to chena and highland cultivation which are the focal points of the present study. Moreover, the indepth studies and frequent field visits during 1976 and 1977 when weather conditions improved, enabled the researchers to appraise themselves of the normal conditions.

The study was not confined to a single (questionnaire) survey. Various teams made field visits to gather information on specific topics and field investigators made weekly visits to selected households. This programme had obvious implications on the degree of cooperation extended by the villagers. Every effort was made to clarify the objectives of the study.

Attempts were however, made by the researchers and the resident investigators to assist the farmers as and when it was possible to do so. The delay of 1976 Maha loans to the villages in Cluster 1 was brought to the notice of the Bank by the researchers which helped expedite the loan issues. The team also assisted the Cultivation Committee and the Agricultural Instructors of Mihintale to launch a pilot programme for cultivating chillies and three other pulses (cowpea, green gram and black gram) on selected chenas using improved methods. This too helped to win the confidence of the villagers. The programme gave very encouraging results in Cluster 1, though in Cluster 2, it was interrupted, as the extent of cooperation was low. However, even here the younger farmers demonstrated a greater readiness to cooperate.

1.5 DATA PROCESSING AND ANALYSIS

It was planned to process the data collected through the questionnaire by computer. Initial coding and transferring of data for punching was done by trained investigators of the Statistical Unit of the ARTI. Computer analysis was done in two stages.

a) Simple frequency distributions of each variable. This was done with a view to assessing the degree of variations in data, and deciding on suitable classifications

for the second stage.

b) Detailed tabulations. Cross tabulations of relevant variables were attempted in this stage.

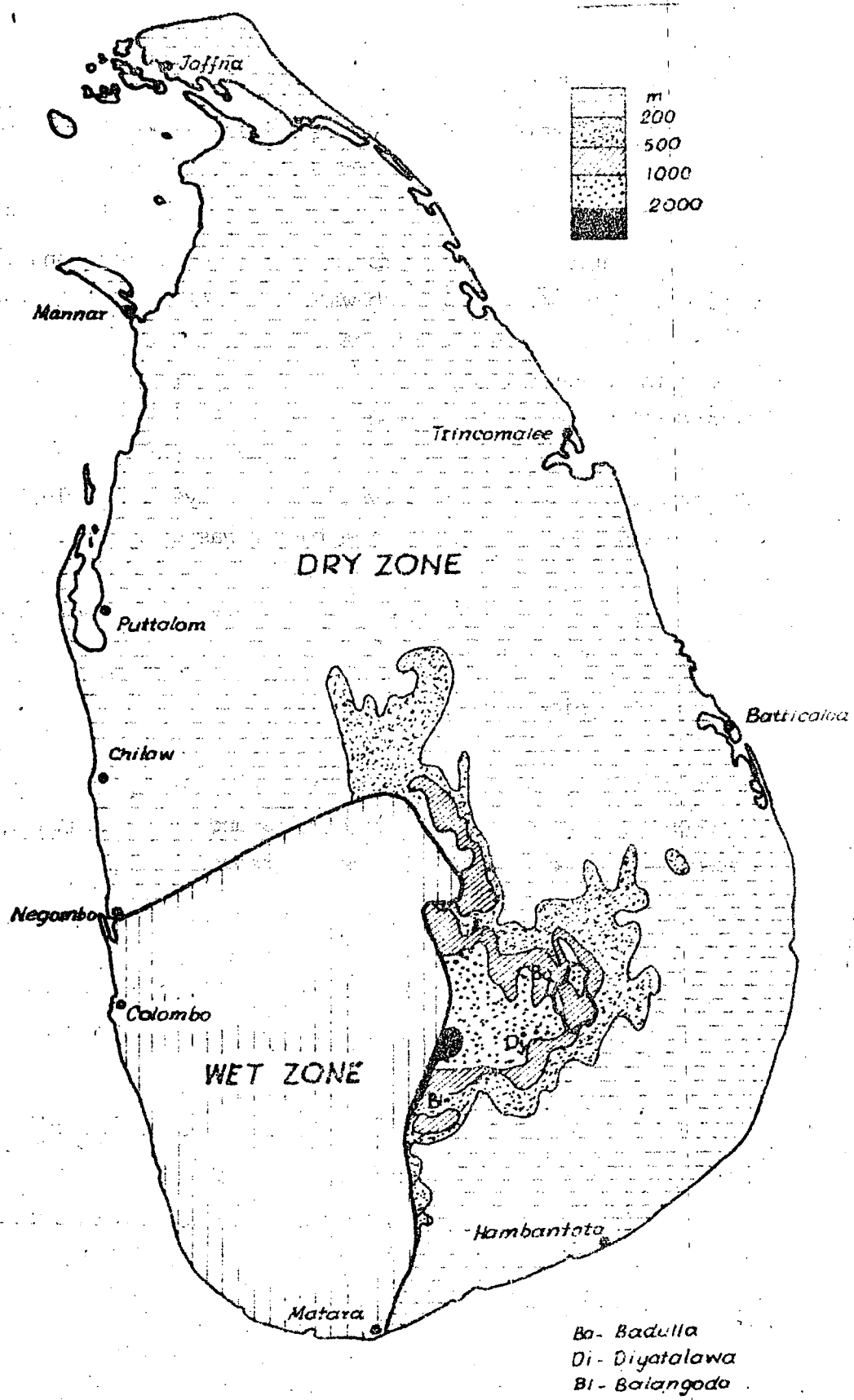
Several unanticipated problems arose in the computer analysis. The agency which undertook the job was not familiar with the analysis of this type of data and this caused a fair amount of delay in data processing. Moreover, a number of copying mistakes in transferring data for punching was detected only after the tabulations.

The data could have been analysed in two ways: on a cluster basis or on a village-wise basis. The former was preferred on two counts:

a) in the selection of sites the cluster was treated as one entity;

b) high cost of data processing

However, within Cluster 2, some noteworthy differences were observed between the two villages, Nelumkanniya and Thariyankulama-Hammillewa Attention has been drawn to those whereever relevant.



The division of Ceylon into the Wet Zone and Dry Zone on the basis of the effective dry period by analysis of individual monthly rainfall totals for the observation period 1931. 1960.

Adopted from Manfred Domrös "The Agroclimate of Ceylon"

CHAPTER 2

ENVIRONMENTAL CONDITIONS AND AGRICULTURAL SYSTEMS

2.1 DRY ZONE ENVIRONMENT

The Dry Zone of Sri Lanka covers almost three quarters of the island's land surface. The demarcation of the Dry Zone is based on several criteria, such as:

(i) the 75" isohyet of mean annual rainfall, which is the more popular definition:

(ii) the 20" isohyet of the mean South-West monsoonal rainfall; and

(iii) an effective dry period of three consecutive months each receiving a rainfall of 4 inches (map 1)[1].

The last definition seems to be the most appropriate as the presence of prolonged dry periods constitutes the most important climatic factor affecting crop production in the region.[2] Chena cultivation with which this study is primarily concerned is largely practised in this area.

Rainfall is the most important climatic factor affecting agriculture and human settlement in the dry zone. The area receives an average

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1 For details see, B.H. Farmer, Pioneer Peasant Colonisation in Ceylon. Oxford. U.P. 1957, G. Thambyapillay Dry Zone Climatalogy, Journal of National Agricultural Society, Vol: 2 (1), 1965: R. Wickramatileka, S.E. Quadrant of Ceylon, A Study of the Geographical Aspects of Land Use. Chicago, U.P. 1973: and M.M. Domros, The Agro-Climate of Ceylon, Wiesbaden, 1974.

2 The Dry Zone is also defined as the area where soil moisture falls below wilting point for at least two months in the average year, P.G. Cooray. "Effective Rainfall & Moisture Zones in Ceylon". Bull, Cey. Geog. Soc. Vol. iii (1948-49) pp. 39-42.

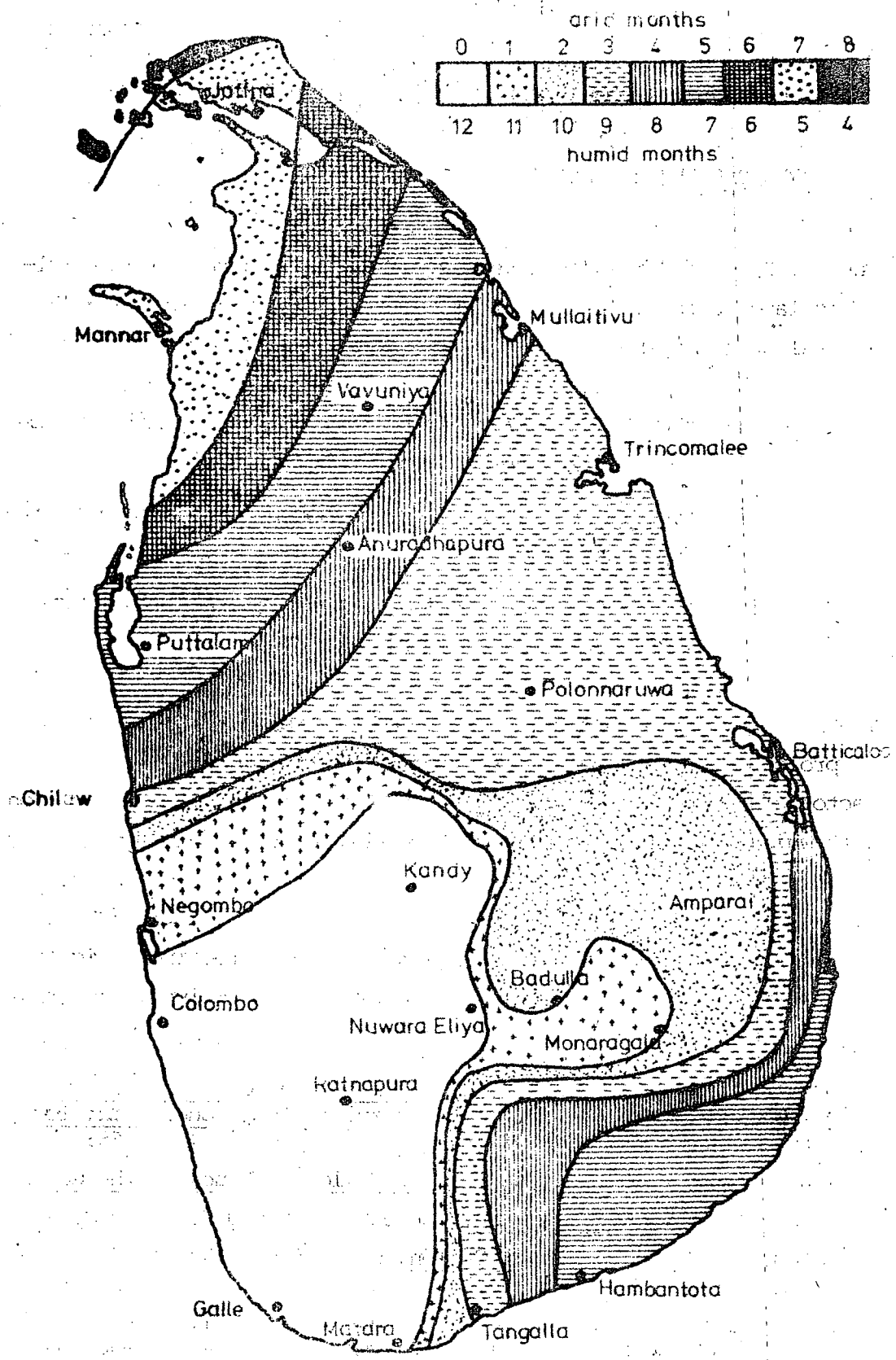

Fig The number of humid and arid months in Ceylon according to the aridity index of De Martonne/ Lauer (1952)

"Adopted from Manfred Domrös The Agroclimate of Ceylon"

annual rainfall of 50-75 inches. The distribution is characterised by a bi-modal pattern, with two well defined rainy seasons, the Maha (Major rainy season) extending from early October to late January - (North-East monsoon period) and Yala (Minor rainy season) from late March to late May. Each rainy season is followed by a marked dry period.

The shorter dry period occurs between February and March while the longer dry season extends from late May to September. The duration and intensity of the wet and dry periods show marked variations within the Dry Zone (map 2).

Almost 69% of the average annual rainfall is received during Maha while 26% is received during Yala. The annual range in the distribution of rainfall is therefore very large resulting in an unfavourable agro-climatic situation in the area. The Dry zone rainfall pattern is also characterised by a high annual variability. Certain years of high rainfall may be followed by years of low rainfall.

From the point of agricultural production what is more important in regard to rainfall distribution is the occurrence of an agro-climatic Dry period.[1] The Dry period is characterised by a deficit of rainfall and thus has a direct bearing on cultivation. The average duration, average frequency and probability of an 'effective dry period' are indicated in Map 3. It is clearly seen that in this zone, the dry period lasts for four to six months during which time cultivation is rendered impossible unless irrigation facilities are available.

The dominant soil group in the Dry Zone is the reddish-brown earths. These soils have good chemical fertility by tropical standards.

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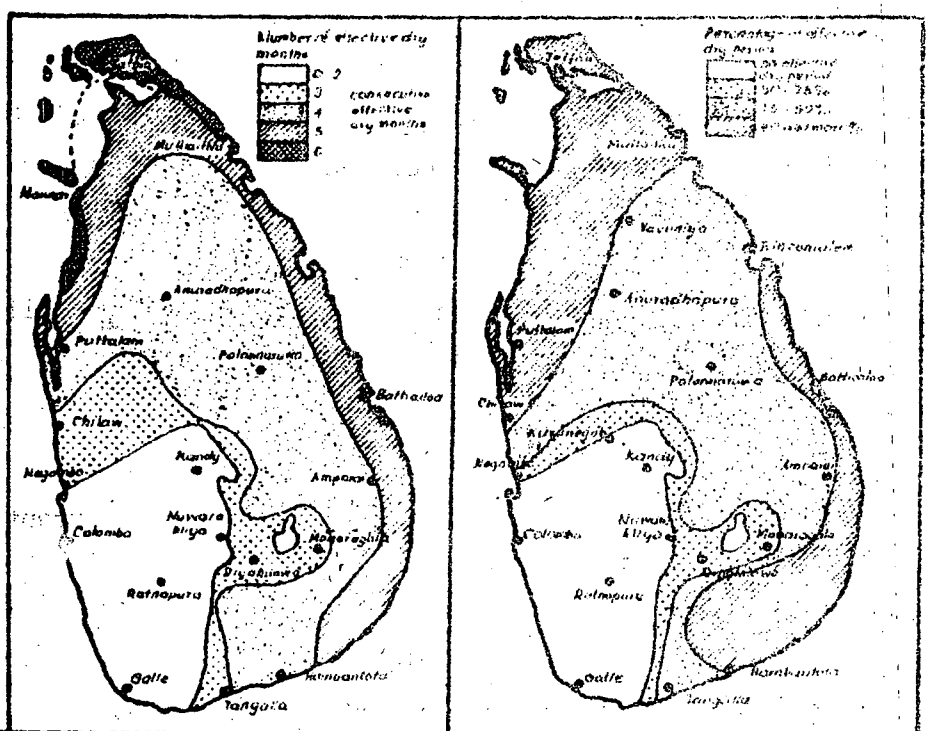
1 For the definition of Agro-climatic Dry Period and a detailed account of its importance the reader is adviced to refer, Domros (1974) op cit p. 97-105.

MAP NO. 3

RAINFALL



Average duration of the 'effective dry period', according to the definition of Wikkramatileke 1963.

Average frequency and probability of an 'effective dry period, according to the definition of Wikkramatileke 1963.

They are of a non-friable nature and are difficult to work under dry or moderately dry conditions. Adequate moisture conditions for cultivating these soils exist only for restricted periods during the cultivation season. These soils are ideal for lowland paddy cultivation.[1] The bulk of the Dry Zone lies below an elevation of 1000 feet. Topographically the landscape is flat or gently sloping, separated by low undulating ridges.

2.2 CLIMATE AND SETTLEMENT IN THE DRY ZONE

Life in the Dry Zone has always been difficult. In many parts of this area human existence is virtually impossible without irrigation.

During the dry period water is scarce even for domestic purposes. The cultivation of annual crops, particularly moisture-sensitive crops like paddy, could rarely be done without irrigation even in the Maha season. During the Yala season it is virtually impossible to grow paddy without irrigation. The variability of rainfall makes even the cultivation of most perennial crops, which demand less water, often a risky venture.

A region exposed to such vicissitudes was once the seat of a prosperous agrarian economy based essentially on paddy cultivation. "Extensive works of irrigation, secured with an immense amount of labour, skill and science had transformed arid plains to areas of plentiful prosperity at a period when agriculture in Europe was in the rudest and most primitive state."[2] From about 1200 A.D., the prosperity of the dry zone economy began to decline due to a variety of reasons and there was a shift of population from the region to the wet zone. The area then remained sparsely populated

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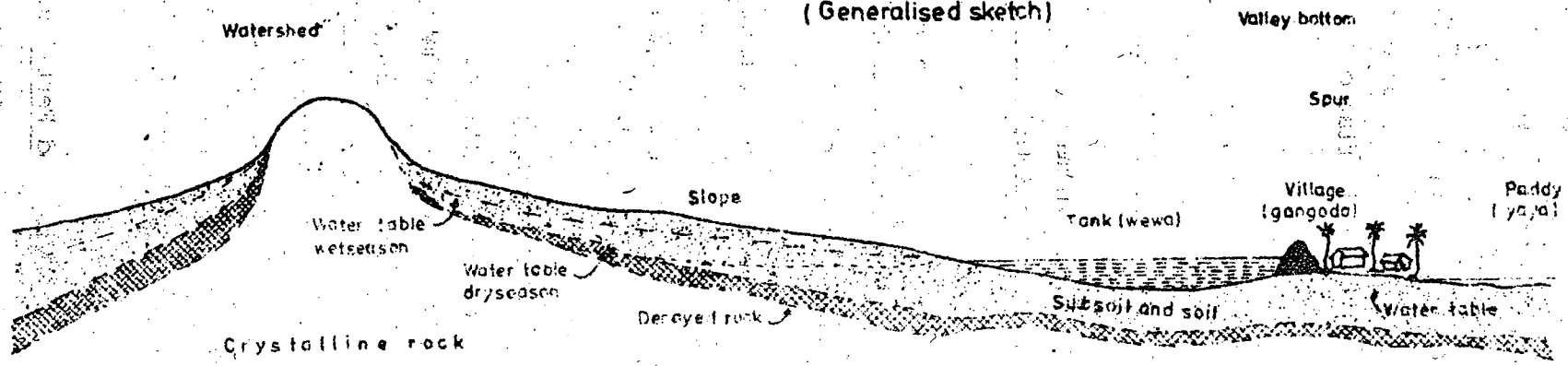
1 For details, see C.R. Panabokke, Soils of Ceylon and Fertilizer Use Colombo 1967.

2 R.L. Brohier; Ancient Irrigation Works of Ceylon: Part one p 1. Govt. Press.

FIGURE NO. 1

THE DRY ZONE CATENA

(Generalised sketch)



Top soil	Rock or thin soil	Lighter ——→ heavier soils			Tank	Loams	Paddy soils (gley)
Groundwater wet season	Little or none	Near surface ——→ at surface			Tank	Near surface	Irrigated
Groundwater dry season	None	None	Little	Some	Tank	Near surface	Irrigated
Traditional land use	Jungle	Jungle, chena (dry grains)		Jungle, chena (including elvi)	Tank	Garden	Paddy

and isolated until the beginning of this century when renewed efforts were made by the State to restore the ancient tanks and colonize the area.

There are two major types of agricultural settlements in the Dry Zone. These are the colonisation schemes and the traditional purana settlements.

Colonisation schemes were established under renovated or newly constructed large and medium sized tanks. The process of colonization gathered momentum particularly with the introduction of the Land Development Ordinance of 1935. The settlers were offered many incentives to migrate into these areas. All the necessary infrastructure facilities as roads, hospitals, schools, postal services were provided by the state. The settlers were given holdings of 5 acres of irrigated paddy land and 2 acres of highland upto 1958, and since 1960, 2 acres of paddy land and 1 acre of highland.

By mid-1960s, irrigable land to the extent of 325,000 acres has been distributed among peasants in 75 major colonisation schemes.[1] Paddy cultivation is the main agricultural activity in the major schemes. However, under medium-sized tanks with a less assured supply of water, some chena cultivation may be practised by the settlers. The highland allotment in most of the colonisation schemes remains generally under-utilised.

The other settlements of the Dry Zone are the purana villages generally associated with small tanks. These settlements are characterized by the threefold land use system: that of irrigated paddy (kumburu), the homestead (watu) and the chenas (Hen). Paddy is cultivated on the lands located immediately below the tanks. The homesteads are situated at one end of the tank bund, while chena cultivation is practised on surrouning forest lands.

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1 Some lands has also been alienated to middle-class Ceylonese in large extents and since 1960s several youth settlement schemes were also started in the Dry Zone.

2.3 CHENA IN THE DRY ZONE AGRICULTURAL ECONOMY

Shifting cultivation, referred to as chena in Sri Lanka, is no doubt the oldest form of agriculture in the dry zone regions, and was extensively practised in the very ancient times.[1] In every dry zone purana village, agriculture first started with the chena. When a tank is constructed or restored the land below the bund is first cleared for chena. The permanent rice fields are developed only after a few seasons. The chena cultivation is then shifted to lands on either side of the puranawela (old field) and later into the forest zone.

Chena cultivation is usually carried out in the relatively flat tracts of the Dry Zone where irrigation facilities are absent. It is mostly practised in areas of dry mixed evergreen vegetation. Within this zone itself it may extend up to elevations of 2000 feet to such areas as the Matale foot hills.[2] In North Central and Southern Provinces where settlements are associated with tanks, chena cultivation is done in the vicinity of the village, by people who are essentially sedentary farmers practising irrigated paddy cultivation. Hence, it is different from the system of shifting cultivation practised in many other tropical regions.

Cultivation of typical chena is usually done with axe and hoe as the farmers' only tools. The bushes and smaller trees of the selected jungle patch are cut down during the dry season and set on fire just before the commencement of the rains. After this the soil

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1 Stockdale, F.A., Chena Problem and Some Suggestions for its Solution, Tropical Agriculturist, LXVI, (4 and 5) 1926.

2 In other Asian countries like, Burma, Malaysia, Thailand, Indonesia etc., shifting cultivation is practised mainly on hill slopes of wet evergreen forests.

is mixed with a stick or the hoe for planting.[1] One, very rarely two, or at most three, crops are gathered from this land which is then abandoned when the farmer shifts to a new site. The farmer continues to shift from the location to another in periodic succession until he returns to the original site some fifteen to twenty years later.

Chena crops depend for their successful growth on the ash produced from the burnt vegetation and the increased soil fertility resulting from long years of fallow. The farmers shift land more due to the excessive weed growth than to a loss of soil fertility.[2]

Typical chena cultivation is characterized by a system of mixed cropping. The Maha chena is planted with a large variety of crops such as upland paddy, cereals (Maize, Sorgam) Millets (Kurakkan, Meneri), pulses, chillies, mustard and variety of root crops and vegetables.[3] They are planted at different times of the season over an extended period. Mixed cropping offers the chena farmer many advantages in the form of higher returns per acre per year, brings about an even distribution of labour, reduces the risk of total crop failure and ensures regular supply of a large number of food items over several months.[4] The Yala chenas are mostly devoted to the cultivation of gingelly.

In the context of the Dry Zone purana village chena cultivation has been an integral part of the economy. It produces the entirety of food requirements of the village and virtually all the cash incomes.

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1 For different clearing systems followed in different countries, See H. Ruthenburg, Farming systems in the Tropics, 1976, pp. 34.35

2 For details see E. Abeyratne, Dry Land Farming in Ceylon. Tropical Agriculturist, Vol: 12, 1956, pp. 191-229.

3 E. Abeyratne, ibid.

4 E. Abeyratne, ibid.

In times of a paddy crop failure, which is a common feature under small tanks, chenas provided the only means of livelihood to the farmer. The chena was therefore essential to the very survival of the village economy. The land use principles involved in the traditional practices were basically sound and were admirably adapted to the physical conditions, of the environment.[1] As Brohier says chena cultivation cannot be certainly put down as an unnecessary and unprofitable occupation.[2]

Under customary law, each village had its communal forest lands. Every inhabitant had the right to use these forest lands for chena cultivation and for other purposes as grazing of cattle and collection of firewood.

During the Dutch and early British periods many attempts were made to prohibit chena cultivation. Chena cultivation was then considered to be primitive and a wasteful practice causing extensive damage to the forest cover. The Crown Land Encroachment Ordinance of 1840 gave the state the right to control chenas as they were declared waste lands and therefore, belonged to the State. There have been brief periods during the past century when chena cultivation had been officially prohibited altogether. This attitude however softened in later years as it was realised that chena cultivation was essential for the survival of the village.

The importance of chenas to the village economy was given due recognition under the Land Settlement Ordinance of 1931. In section 10 of the Ordinance it is stated that Crown Property set apart for the purpose of a communal chena reserves shall not be otherwise used without the consent of the inhabitants of the village. The procedure in the past had been for the Government Agent to allot 1 acre plots of land on a nominal rent of Rs. 1/- valid for an

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1 B.H. Farmer, op. cit. p. 77

2 R.L. Brohier, Food and the People, Colombo 1975 p. 77

year on the recommendation of the Tulana headman. The land was to be used by the villagers on a rotational basis (10-15 years) from this reserve. This practice had however been rarely observed as specified in the law.

Chena rules have not been strictly enforced during the recent past due to the fact that successive governments have relied heavily on chena cultivation for increased food production. As Brohier recently pointed out "nearly every food drive initiated hitherto was clearly based on the chena system of cultivation."[1] During the second World War food production permits were issued for chena cultivation. Since the 1960s the emphasis given to increased food production led to further unofficial relaxation of chena rules. Restrictions on imports of several food items made chena cultivation more profitable than ever, and it has today become one of the most important methods of land use in the Dry Zone producing large quantities of food and other crops.

2.4 FUTURE OF CHENA CULTIVATION

An authoritative assessment of the land available for development in the Dry Zone is still lacking. The figures given by different sources show much variation. The Committee on Land Utilisation (1967) estimated that about five and half million acres of land are eminently suited for agriculture and another one and a half million acres described as marginal lands capable of development. This means that around seven million acres are available for development in the Dry Zone. The maximum irrigable extent is considered to be around 1.6 million acres, of which a little less than one million acres are yet to be developed. The developed homesteads and highland account for around 1 million acres. Thus over 4 million acres appear to be still available for agricultural development. The bulk of this land cannot be provided with irrigation facilities in the foreseeable future and has therefore to be

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1/ R.L. Brohier, op. cit. p. 43.

utilised for rainfed agriculture. The development of this vast extent can have a great impact on employment and production.

Table 2.1 LAND USE IN THE DRY AND INTERMEDIATE ZONES

	Dry Zone %	Intermediate Zone %
Paddy	06.1	11.6
Land under crops and homesteads	06.0	34.7
Land under shifting cultivation	15.4	29.0
Forest	60.1	15.8
Grasslands, etc.,	07.0	07.0
Water bodies and other lands	05.4	02.0
	100.0	100.0

Report of the Land Utilisation Committee, 1967.

Large areas of the unirrigable lands in the Dry Zone are today utilised for chena cultivation. However, accurate figures in this regard too, are lacking. In the mid 1960s chena cultivation was practised within an extent of 15.4% (1,583,070 acres) of the total area of the Dry Zone.

In the Intermediate Zone chena cultivation was practised within 29% (625,150 acres) of the land area. It was estimated that around 150,000 acres were cleared each year for chena cultivation in the late sixties.

Today, however, a much larger land area is brought under this system of cultivation. Its contribution to the nation's food production is high. Most of the chillies, pulses, dry grains and large quantities of vegetables are produced in the chenas involving a

considerable saving on foreign exchange and providing employment to large numbers.[1] The table below shows the acreage under some of the traditional chena crops over the period 1970-76.

Table 2.2 AREA OF LAND UNDER SELECTED CHENA CROPS

Crops	Acres	
	1970	1976
Kurakkan	50,828	97,630
Maize	47,100	94,592
Chillies	50,037	134,575
Manioc	147,037	373,575
Sweet Potatoes	39,151	112,548

Source: Statistical Pocket Book of Sri Lanka, 1977
Department of Census and Statistics

A question has often been raised as to the future of chena cultivation and its place within a progressive agricultural system. Under the traditional subsistence economy chena cultivation no doubt performed a vital role. It was perhaps well adjusted to conditions characterised by low population pressure and an open land resource situation. However, even in this situation the wasteful aspects of the system had been recognised.[2] Forest destruction, soil

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1 Under the reforestation scheme, it was estimated that the value of food crops raised on about 17,000 acres was Rs. 8.6 million in 1974. Administration Report of the Conservator of Forests for the year, 1974, March 1975.

2 F.A. Stockdale, op. cit and Editorial, Tropical Agriculturist LIV (1) January March 1948.

W.R.C. Paul, Roving Agriculture and the Problem of Dry Farming, Tropical Agriculturist CV (1) 1949.

R.A.de Rosayro, Some Aspects of Shifting Cultivation in Ceylon, Tropical Agriculturist, LV (2) April-June 1949.

erosion, over exploitation of timber resources, etc., were considered as the pernicious effects of this system of land use. Thousands of acres of valuable land are indiscriminately cleared and abandoned after gathering a few crops. The degeneration of the forest cover in many parts of the highlands had been partly due to the practice of extensive chena cultivation by the peasants of the Dry Zone who migrated to these areas.[1] Stockdale went to the extent of even suggesting that excessive chena cultivation may have been one of the causes for the decline of the Anuradhapura civilization,[2] although no concrete evidence has been found to support this hypothesis.

The increasing importance and the spread of chena cultivation has resulted in aggravating several problems. Streans, tanks, tank beds, irrigation channels and even forest reserves have been encroached by the increasing number of chena cultivators. Encroachment of forest reserves by chena cultivators was noted by the Committee on Land Utilisation (1967). The Conservator of Forests has pointed out that "increasing population pressure makes forest conservation more and more difficult and that the long term danger of this cannot easily be overlooked."[3]

In some parts of the Dry Zone excessive clearing of forests for chena cultivation has already created a serious problem of timber shortage for house construction and for other domestic purposes. The short fallow period does not permit adequate forest regeneration in such areas. Soil erosion has become a serious problem in the absence of proper soil conservation methods. Uncontrolled chena cultivation, particularly by some farmers cultivating large extents of land on a commercial scale has also resulted in the displacement of wild life.

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1 Brohier, op. cit. p. 40

2 F.A. Stockdale, op. cit.

3 The Administration Report of the Conservator of Forests for 1974 p. 1

Research findings and expert opinion seem to converge on one essential point - that chena cultivation needs to be replaced by a more progressive system of agriculture. Ever since Stockdate highlighted this problem in the early part of this century, the need for evolving a system of settled rainfed farming has been constantly reiterated. It has also been widely acknowledged that the strategy for developing the extensive non-irrigable areas in the Dry Zone could be a system of settled dry farming. The Report of the Land Utilisation Committee (1967) confirmed the view that land in the Dry Zone can be more or less continuously cultivated without resorting to a long forest fallow.[1]

In the peasant communities of the Dry Zone of Sri Lanka there has generally been no tradition of settled non-irrigated arable farming as in other countries of Asia, notably India. Arable farming of this kind is still in the early stages of development.[2] One of the factors which appear to have restricted the development of settled rainfed farming in the Dry Zone is the emphasis on irrigation development for paddy cultivation and the low prices for chena produce.[3] The first attempt to replace the chena system by a settled system of farming was initiated in 1928. Experiments were started at the Anuradhapura Experimental Station and a dry farming scheme was established in 1938 at Kurundankulama. Subsequently, several other dry farming schemes were also established.[4]

Intensive research on rainfed farming commenced in 1949 with the establishment of the Dry Zone Research Station at Maha Illuppallama, which carried out research relating to agronomic aspects of rainfed farming. The prospects of agricultural development in the Dry Zone

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1 Report of the land Utilisation Committee (1967) p. 29.

2 ibid p. 28

3 ibid p. 28

4 See Kurundankulama Dry Farming Settlement, ARTI, op. cit.

were considered optimistic in the late sixties. The Land Utilisation Committee Report noted that "the basic principles of formulating economically profitable and viable farming systems for the Dry Zone are now fairly well established."[1] The same report, however, underlined the need to speed up research in order to solve several technical problems connected with soil erosion, maintenance of soil fertility, equipment and machinery. During the last few years, the position regarding the prospects for highland rainfed farming seems to be somewhat unclear. The dry farming schemes which were established in the 1940s had fallen into a state of neglect. Recently it was noted that "the work on dry farming initiated at Maha Illupallama some years ago does not seem to be receiving attention any more."[2] In the mid 1960s the research efforts at Maha Illupallama had shifted to problems of irrigated crops and the follow up on earlier research on rainfed farming appear to have been virtually abandoned. In recent years however, rainfed farming has received renewed interest particularly by the Agriculture Department and many research programmes have been launched. Some of the recent efforts in this regard are:

1) Establishment of a pilot project on rainfed farming at Maha Illupallama; (Yoda Ela)

2) Attempts to revive the Kurundankulama Dry Farming Scheme in 1975;

3) Commencement of a pilot cropping systems project in selected villages under the Sri Lanka Canadian Dry Zone Project. This is a research/extension project incorporating dry farming.

It is now clear that even after the development of the full irrigation potential of the Dry Zone about 3-4 million acres of land that remain outside irrigation command, have to be developed under a system of rainfed farming. The development of these lands to realize their full potential cannot be expected under the existing systems of rainfed farming. This is because chena cultivation is still

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1 Report on the Land Utilization Committee 1967.

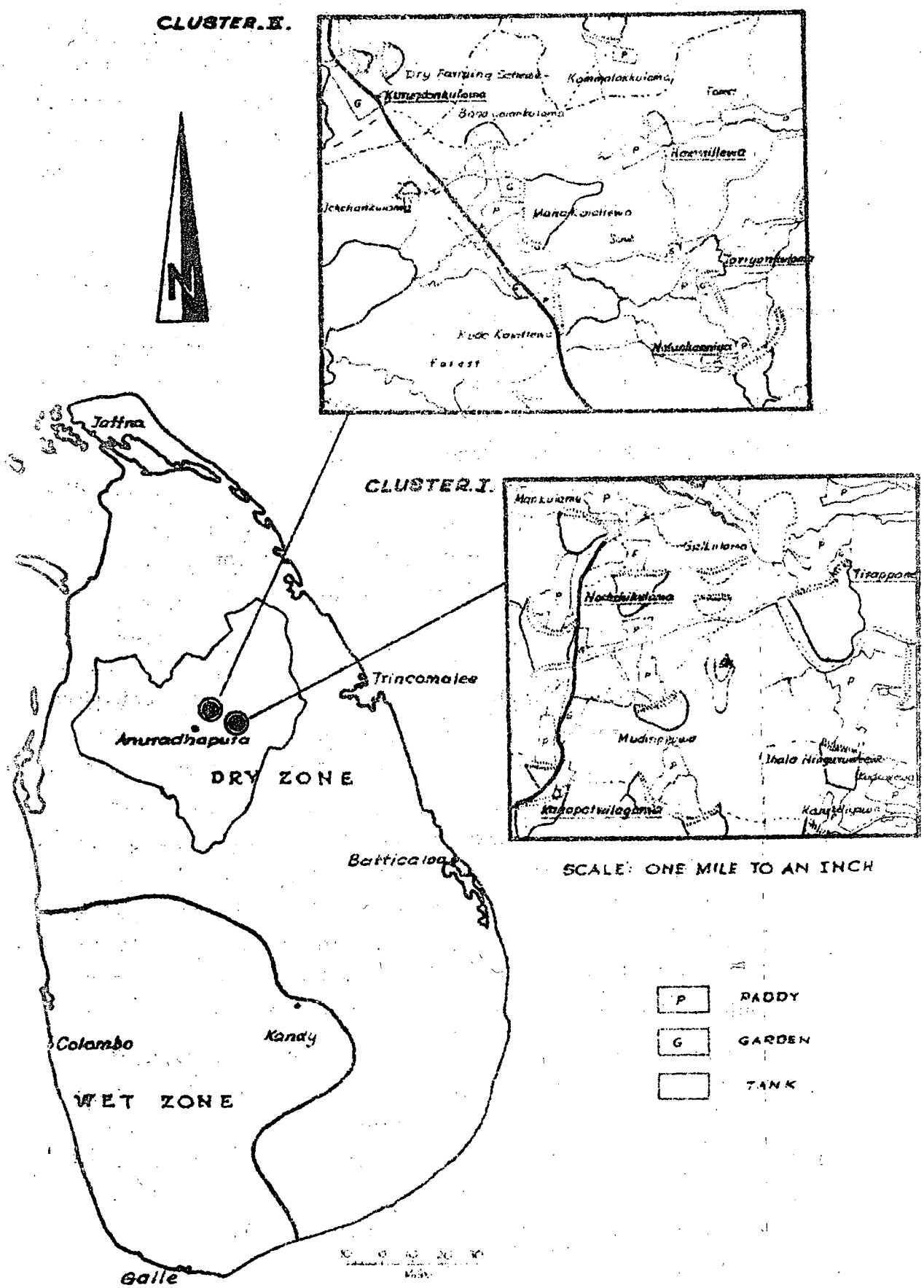
2 T. Jogaratnam "Employment and Dry Zone Agricultural Development" in Youth, Land and Employment, Marga Seminar Papers, 1974, p. 37.

practised under the traditional production system with only a few minor modifications. It has remained more or less static in its basic features which were ideally adapted to a subsistence economy with a low man/land ratio. Basically, therefore, the chena system has not developed sufficiently in relation to the changing demographic, socio-economic and resource environment of the country.

The rapid increase in population, particularly in the Dry Zone has brought about a situation where land can no longer be considered as freely available to permit a system of extensive cultivation as the traditional chena system. The increasing unemployment problem and the need to augment the country's food production call for maximum use of the available land resources. This resource development and conservation in a large part of the Dry Zone from a long term point of view rests largely on an alternative development path to the traditional system of chena cultivation that should take into account the changing technological, demographic and socio-economic parameters.

Having considered the main characteristics of chena cultivation and its status in the agricultural economy of the Dry Zone, an attempt is made in the following chapters to present the findings of the case studies conducted in the Anuradhapura district. In the next chapter (Chapter three) the economic and social conditions of the respective clusters are discussed. Chapter four deals with issues related to the agricultural economy of the selected villages. The final chapter concentrates on the main theme of the study - the problems and prospects for chena stabilization drawing on comparative insights from the village studies and the Kurundankulama dry farming scheme.

MAP NO. 4



SRI LANKA - LOCATION OF STUDY VILLAGES

CHAPTER 3

ECONOMIC AND SOCIAL CONDITIONS IN THE STUDY VILLAGES

3.1 CLUSTER 1

3.1.1 BACKGROUND

The village cluster is located 20 miles South-East of Anuradhapura town. Mihintale (10 miles) is the closest administrative-cum-commercial centre. The inhabitants of the village cluster are exclusively Sinhala Buddhists who belong to the same 'varige' of the Govi caste.

The original village settlements, characterised by clusters of simple wattle and daub houses were located below the tanks of Kahapathwilagama, Kuda Nochchikulama and Mankulama. However, in all these settlements the purana gangoda is fast disintegrating. Many have moved out to higher areas where they have obtained land under the Land Development Ordinance. In Thirappane and Kahapathwilagama, nearly half the households still remain in the old 'gangoda'. The new settlements have a dispersed character with the houses located mainly along the roads on separate allotments.

Though the villages are relatively remote from the urban centres, they are accessible to motorable roads. A bus operates between Anuradhapura and Seeppukulama through this village cluster. This however is not very regular. There are no grocery shops in the village, although a few basic items are available in one or two tea boutiques.

There were 101 households in this village cluster, consisting of 663 persons, of which 343 were males and 320 females. The average size of a household was 6.6. Of the total number, 36% had large families of 8 members and above, while households with small families (less than three members) accounted for only 15%. Most households however, had families of medium size (4 - 7).

Table 3.1.1 AGE AND SEX DISTRIBUTION

	Males		Females		Total	
	No	%	No	%	No	%
/ 5 years	53	15.45	33	10.00	86	12.97
5 - 10	52	15.16	63	19,68	115	17.35
10 - 14	46	13.41	41	12.81	87	13.12
14 - 20	53	15.45	54	16.87	107	16.14
20 - 30	48	13.199	48	15.00	96	14.48
30 - 45	42	11.95	42	13.12	83	12.52
45 - 60	28	8.74	28	8.75	58	8.75
/ 60	11	5.83	11	3.43	31	4.68
Overall	343	100.00	320	100.00	663	100.00

A noteworthy feature of the population is the predominance of youth, with almost 74% being under 30 years of age. Nearly 31% of the population belonged to the age group 15-30 years and a large proportion (44%) were below 14 years of age. Only 4.7% were above 60 years of age which shows that mortality rates at senile ages are high in this area.[1] 52% of the total population belonged to the productive age group of 15-60 years and the dependent population (less than 14 years and above 60 years) amounted to 48%. Sexwise distribution of the population is near even with a slightly higher proportion of males (52%). The lower percentage of children below 5 years as against that between the age group 5-10 years reveals a fall in the birth rate since 1970. This is in keeping with the general pattern of population growth in the country.

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1 Information collected during the course of this study revealed that inward and outward migration from these villages were totally absent.

Table 3.1.2 EDUCATIONAL LEVEL OF THE POPULATION ABOVE 14 YEARS

	Males		Females		Total	
	No	%	No	%	No	%
No education	6	3.13	30	16.39	36	9.60
Upto Grade 5	45	23.44	40	21.86	85	22.67
Grade 5-GCE	107	55.73	77	42.08	184	49.07
GCE and above	31	16.15	36	19.67	67	17.87
Technical	3	1.56	-	-	3	0.80
Overall	192	100.00	183	100.00	375	100.00

The literacy levels in this village cluster are relatively high with 90% of the population having had schooling of some sort. A higher percentage of the females (16%) were illiterate. However, the proportion of women pursuing studies after GCE ordinary level was higher than the males, as the latter drop out from school to continue with farming activities. 92% of the heads of households have attended school and about 62% have received an education beyond Grade 6.

Table 3.1.3. EDUCATIONAL LEVEL OF HEAD OF HOUSEHOLD

Educational level	No	%
NR	0	
No Schooling	8	7.9
Upto Grade 5	30	29.7
Grade 6 to GCE	55	54.5
GCE passed and above	8	7.9
Technical and professional	0	0.0
Overall	101	100.0

There is very little outward migration from this village cluster. The low rate of outward migration could be mainly attributed to the ready availability of land for farming, an attractive income from agriculture and the virtual absence of opportunities for acquiring skills other than those in farming. Employment opportunities are scarce even in the urban centres close to the village cluster.

3.1.2 ECONOMY AND SOCIETY

1. General Features

Agriculture is the predominant economic activity in the village cluster. Seventy three percent of the households depended exclusively on farming. No household depended purely on non-agricultural activities for their livelihood. Activity-wise classification of the Households is given in the table below.

Table 3.1.4 CLASSIFICATION OF HOUSEHOLDS BY HOUSEHOLD CATEGORY

	No. of households	Percentage
Household Category		
Agricultural	64	63.4
Agric. + labour	10	09.9
Agric. + non agricultural	27	26.7
Total	144	100.00

The importance of agriculture in the village economy is also revealedly the fact that 69% of the total household income came from agriculture. Opportunities in the village for non-agricultural employment (cottage industry, trade and commerce etc.,) are absent. However, the greater spread of educational facilities had enabled some members of a few households to secure white-collar employment.

Almost all the households in the village cluster practise irrigated paddy cultivation and also highland and chena cultivation under rainfed conditions. Livestock rearing, though not carried out on an organised scale, is also an important activity.

The village cluster still has a favourable land-man situation. There are 470 acres of paddy land distributed under seven tanks with an average of 4.5 acres per household. Landlessness is not a serious problem in the paddy sector. Forest lands are also available for chena cultivation on a long-fallow basis.

The village cluster still has several characteristics of a subsistence economy. Instability of the village economy due to weather fluctuations is an important feature. Continuous drought conditions since 1971 drastically affected farming operations in the villages. There was virtually no paddy cultivation and most villagers were forced to depend on chenas for their livelihood.[1] Chena cultivation was also seriously affected by the adverse weather conditions.

During the period of the study, chena cultivation has been the most important agricultural activity. Chena extents exceeded the combined acreage under Paddy and Highland (Maha 1974/75). Income from chenas amounted to 48% of the total farm income and 34% of the total family income.

II Employment

In the context of the purana villages, the following factors are relevant in the analysis of the employment pattern.

a) High rate of participation of children in economic activities-Though the compulsory schooling age is 14 years, it is often found that the dropout rate is high. Hence, the group between 10 - 14 years may approximately be included in the work force.

b) There are marked seasonal variations in the pattern of employment entry and withdrawal from the work force, especially, for females.

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[1] Many households had to even sell their household goods and cattle during the drought years for subsistence and for financing agricultural production. Relief work had to be continuously provided to the villagers for several years since 1971.

c) The housewife/housekeeper is an active participant in economic activities of the household and hence can be treated as gainfully employed.

The activity categories of the population in the three villages are presented in the table below. This includes employment both on a full-time and part-time basis.

Table 3.1.5 ACTIVITY-WISE DISTRIBUTION OF POPULATION

	No	%
Employed (10 years and above)	283	42.5
Unemployed	3	0.5
Disabled, old and young	174	26
Others (student, housewives etc.,)	203	31
Total	663	100.00

The labour force participation rate which is 62% of the work force, is relatively higher than in the other agro-ecological zones of the country. The agricultural calendar during normal weather conditions is tight, especially when chenas (both Maha and Yala) are cultivated in addition to paddy. Hence, during the agricultural season almost all the able persons are at work.

Seasonal under-employment is a common feature, even in the years of normal weather conditions, certain months have no agricultural activities. Under employment is more pronounced during the years of bad weather. Combination of different agricultural enterprises is primarily determined by weather conditions. Inability to undertake one or more activities or the need to carry out certain operations on a reduced scale leads to under-employment of part of the village labour. Seasonality factor also has a bearing on under-employment among males and females.

Open unemployment is minimal in the villages as everybody is engaged in some activity. Of the three persons reported unemployed, one was a graduate who was awaiting employment. Non-agricultural employment is more diversified in this cluster due to the wider diffusion of educational attainments.

The majority of the working population (87%) were in agriculture. Only 38 persons were engaged in non-agricultural work, either on a full-time (25) or part-time (13) basis. The table below gives the nature of non-agricultural employment.

Table 3.1.6 OCCUPATIONAL DISTRIBUTION (NON-AGRICULTURAL)

	No	%
White collar/salaried	17	44.7
Trade/Commerce	4	10.5
Technical and professional	11	28.9
Non-agricultural labour	6	15.8
Total	38	100.00

During the years of drought (which lasted since 1971) the Government provided income support to the affected villages through the rural works programmes. Such work in this village cluster was concerned with the construction of roads and repairing the tank bunds. Most of the villagers performed 4-5 hours of work daily on these projects for which payment was in kind such as wheat flour, milk foods, etc., given under the World Food Aid Programme.[1]

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1 The drought relief programme was a very important source of capital formation in the area. However, the potentials of this programme were only partly realised. Observations made in the course of field work indicated that productivity of employed labour was low. This was due to corruption on the part of village officials in charge of the programme and minimal supervision of work undertaken. Desilting the village tanks and raising their bunds were not effectively done. The common tendency was to regard drought relief programme as a subsidy from the government without a corresponding obligation on the part of the villagers.

III Income

The period under study (1975 crop year) was a drought year and this affected the household incomes in the villages. Hence, some caution is necessary in generalising income data for this year. The adverse weather conditions affected the income situation in two ways:

a) The composition of farm income was affected as the relative contribution of highland and paddy would change.

b) drought-relief work was a special feature during this period. Hence, the pattern of work and earnings has been affected.

Some general features of the income pattern of a purana village may be noted. Seasonal fluctuations in incomes resulting from adverse weather conditions are normal. The risk and uncertainty cause farmers to invest little. Diversification in cropping patterns is partly attributable to the same factors.

The average annual income of a household in this cluster was Rs. 5,953 which works out to about Rs. 500 per month. This is probably an under-estimation since the value of goods and services provided free by the government has not been included. A sizeable proportion of this income is non-monetised.

Table 3.1.7 COMPOSITION OF HOUSEHOLD INCOME

(CROP YEAR 1974/75)

Source of Income	Average per household	
	Rs.	%
Income from Agriculture	4081	69
Income from non-agricultural sources	1390	23
Income from drought relief	482	8
Total family income	5953	100

The above table illustrates the dominance of farm income in total income.

This would have been much greater during a normal season. Since the income from drought relief was a special feature, it is safe to assume that about 80% of income is contributed by farm earnings. The high dependence on agriculture particularly under rainfed conditions also points to the inherent instability of the purana village economy.

Table 3.1.8 COMPOSITION OF FARM INCOME

	% of total income
Paddy	11.8
Highland	29.0
Chena	48.2
Livestock	11.0

The above table shows the importance of chena as the main source of income in the cluster. This is a fairly recent development as discussed earlier and stems from two causes.

i) drought conditions which limited the cultivation of paddy.

ii) attractive prices for chena produce.

This trend was also observed in the case of Walagambahuwa, a traditional village in the dry zone studied by the cropping systems project.[1]

Distribution of Income

The pattern of income distribution shows a high degree of inequality. The lowest 35% of the households receive only 10% of total income and the next 35% receive 29% of the income while the highest group comprising 30% enjoy 61% of all income received. The average household income varied from Rs. 30 per month to over Rs. 600 per month.

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1 D.E.F. Suraweera, Socio-economic Factors Affecting Cropping Systems in A Selected Dry Zone Region - Paper presented at a Workshop on Cropping Systems, at Agricultural Research Station, Maha Illupallama, 1977.

Table 3.19 DISTRIBUTION OF GROSS FAMILY INCOME

Income group (Rs. per annum)	% of households	% of total income
- 1,000	9.9	1.2
1,001 - 3,000	26.71	8.8
3,001 - 5,000	15.8	10.9
5,001 - 7,000	17.8	17.9
7,001 and above	29.7	61.1
	100.0	100.0

The inequality in income is partly explained in terms of household category which shows that agricultural and non-agricultural households are found in the higher income groups. This is because regular paid employment diversifies and thereby introduces an element of stability to the household incomes.

It is possible to analyse the observed income pattern by occupational groupings also, but the degree of variation is too small to yield any meaningful results. The agricultural labour households have the lowest income while white-collar workers enjoy higher incomes. This observation is consistent with the findings in other village studies as well.[1]

Another variable related to the degree of inequality in the distribution of income is the size of holdings. Two concepts could be used here:

i) access to paddy land - since it forms the base of economic standing of villagers.

ii) total operational land as a guide to current income earning/generating possibilities.

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1 See ARTI Socio-Economic Survey of the Beminiwatte APC Area, Research Study No. 13, ARTI, Colombo, 1975.

Table 3.1.10 GROSS FAMILY INCOME BY SIZE OF OPERATIONAL PADDY HOLDING

Size of paddy holding (acres)	Households	Average Income/household
No land	2	1,380
0.1 - 1.0	11	2,795
1.1 - 2.00	26	3,985
2.1 - 5.00	29	7,177
/ 5.00	33	7,779
Overall	101	5,953

Even though paddy was cultivated only on a limited scale the close association between the size of paddy holdings and total income clearly indicates the role of paddy land ownership in determining the relative income levels in the village. Table 3.1.10 shows the gross family income by the size of operational paddy holdings from which it is clear that the gross family income is higher in households with larger operational paddy holdings. Households with more paddy land command more of other agricultural resources also.

Family size is another important variable related to income variations. A larger family enables the cultivation of bigger holdings. It also results in increased labour inputs and effort on the part of heads of households. It also means that more labour is available for undertaking arduous operations in chena cultivation and other agricultural activities. These relationships in turn lead to higher gross family incomes. As shown in the table below larger the family size the greater is the average gross family income.

Table 3.1.11 GROSS FAMILY INCOME BY SIZE OF FAMILY

Family size	No. of households	Average Income
1 - 3	15	3873
4 - 5	25	4748
6 - 7	25	5438
8 - 9	21	7284
9	15	9037
TOTAL	101	5953

IV Levels of Living and Amenities

Living conditions in the village cluster were generally poor. As noted earlier almost 40% of the households obtained very low incomes. The household expenditure[1] pattern further highlights the low living standards of the village cluster. Expenditure on food and other essential items reveals the following characteristics:

a) 75% of the annual household expenditure was incurred on food

b) expenditure on education was only 2%

c) textiles and footwear accounted for only 5% of the total expenditure.

The above indicates that the majority of the households are living close to subsistence levels.

The village has no electricity. Housing conditions are still poor. Almost 80% of the houses are wattle and daub huts with cadjan or straw roofs. The rest, made of brick, have in most cases permanent roofs with separate kitchens and are generally well constructed with adequate ventilation. The wattle and daub huts had simple mud walls and floors with poor ventilation. Many of such houses were generally, 'over crowded' with over 2 persons per room.

Housing conditions in the purana gangoda are also unsatisfactory. Houses are located too close to one another and sometimes several families occupy parts of a single house. Family disputes are a common feature.

Although fluctuating economic fortunes and low levels of incomes partly explain the poor quality of housing, other factors have also been responsible for this situation. They are:

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1 Data on household expenditure were collected from a sample of 10 households for the year 1976.

a) reluctance to improve gangoda houses, since most people contemplate shifting to higher locations:

b) those occupying encroached lands hesitate to invest on permanent houses due to the uncertainty of obtaining titles to the land.

More than 95% of the houses had no latrines. Drinking water is obtained from a few wells but many villagers often drink tank water without purification. Bathing is done in the tank.

The availability of certain consumer durables also indicates the relative levels of living of the households. Several popular items possessed by the households are listed in the table below.

Table 3.1.12 OWNERSHIP OF CONSUMER DURABLES

Type of goods	Household owning	%
Bicycles	52	51.5
Sewing Machines	16	15.8
Radios	28	27.7
Wall Clocks	08	07.9
Petromax lamps	21	20.8

Bicycles were the most popular of the consumer durables with little over half the households owning them. The adverse economic conditions in recent years are also reflected in the small number of households owning the other items. Generally, farmers invest in these items in good crop years and sell or mortgage them in lean years. The poorer households did not even possess the basic items of furniture as chairs and tables.

During the Maha rains the entire gangoda settlement become very muddy due to overcrowding and constant treading of cattle. The surroundings become extremely unhealthy and the outbreak of diseases such as dysentery are not uncommon.

Access to medical facilities is reasonably good. Rural hospitals are available at Tammennawa (6 miles) and Mihintale (11 miles). There is also a dispensary at Galkulama (8 miles). Western treatment is resorted to in case of serious illness, although many villagers still continue to depend on the village physician for minor ailments.

Maternal and child care leaves much room for imporvement.[1] Signs of malnutrition are apparent among many children. Despite this, the milk consumption is low and cattle are not even milked by many. The production of nutritious pulses such as cowpea, green gram, soya beans etc., are on the increase and could be further expanded. Such programmes coupled with those for the expansion of animal husbandry must necessarily be supplemented with related programmes on home economics, family health and nutrition.

The schools (one at Kahapathvilagama and another at Ihalagama) serving the village cluster have facilities only for primary education for science. Children proceeding beyond grade 10 have to attend school at Anuradhapura.

The survey indicated that almost 53% of the children of school-going age(below 14 years) were in fact not attending school. The high dropout rate could be attributed to many factors such as:

a) Lack of interest on the part of parents as well as teachers.

b) The effects of drought which had dislocated the economy of the villages.

c) Increased cultivation of labour-intensive crops (such as chillies) leading to greater participation of children in planting, weeding and harvesting operations.

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1 Even today around 30% of the births take place in the village itself under poor sanitary conditions assisted only by traditional midwives.

V Community Life

Certain essential features of a traditional purana village still survive in this cluster. Kinship ties are still very strong and the villages resent the infiltration of outsiders. Marriages are still confined to persons within the 18 neighbouring villages belonging to the same variga.

Solidarity among the villagers still persists in several areas of activities. The villagers still get together for various social functions. A few elders act as recognised leaders of the village in maintaining community solidarity and minor disputes and disagreements are settled amicably through their intervention.

Cooperation among the villagers is also found in several areas of agricultural work such as bethma cultivation of paddy, rotational use of tank water and erection of fences, watch huts, etc., They also cooperate in the execution of certain agricultural operations as harvesting through the kaiya and attan systems, and in the opening up of yaya chenas.

In recent years, the shift towards a market oriented agriculture, imporved transport and educational facilities, increasing economic inequalities and the penetration of party politics have threatened the traditional areas of cooperation and solidarity. The strong community feelings are being fast replaced by individualistic values and aspirations. The educated youth in particular attach very little importance to the kinship ties based on varige affiliations.

Increasing economic inequalities[1] and the growing sense of individualism have also affected the traditional areas of cooperation in agricultural activities. The richer and larger farmers often

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1 See section on Land Tenure.

ignore decisions taken at Kanna meetings. Disputes are common in sharing of tank water, erection of fences, rotational crop watching etc., The system of attan is being gradully replaced by hired labour. Kaiya groups are more often than not organised among those of similar economic standing (mainly among poorer farmers) and also among rival groups in the village.

There are hardly any functional rural organisations[1] in the cluster. Only Thirappane had a Rural Development Society. Even this functioned amidst serious rivalries.[2] Attempts to organise a Praja Mandalaya and Kantha Samithiya failed at the commencement itself. Nochchikulama - Mankulama villages have a Death Donation Society managed by a few dedicated village elders.

As the villages are relatively remote and isolated the need for such organisations and the potential contribution they could make are considerable. Leadership is not a serious problem given the literacy levels of the village. However, several other factors mentioned earlier prevented the formation and functioning of useful organisations.

3.1.3 LAND TENURE

PADDY LANDS

There are 429.4 acres of paddy land in the cluster distributed under seven tanks. Several households also own and or operate paddy lands outside the village. A total of 454 acres were operated by the households in the cluster. The average size of the operated paddy holding was 4.5 acres. A noteworthy feature in this cluster is the favourable paddy land situation. Almost all the households (99) were engaged in paddy cultivation. The table below shows the distribution of paddy land in this village cluster.

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1 Production oriented village organisations as Cultivation Committees and Cooperatives are discussed elsewhere.

2 This village is devided into groups based on rivalries that exist for instance between the Gammedda and the new settlement, older and the younger people etc.,

Table 3.1.13 DISTRIBUTION OF OPERABLE HOLDING

Size class (acres)	Households No.	%	Extents Acres	%	Average size
0 - 2	37	37	55.6	12	1.5
2 - 5	29	29	103.3	23	3.7
5 and above	33	33	294.5	65	8.9
TOTAL	99	100	453.6	100	4.58

Except for 37% of the households which operated an average extent of 1.5 acres others on an average had 6.4 acres of operable paddy land per household. Almost 33% of the households operated an extent of nearly 9 acres.

The majority of the paddy land (76) were operated by the owners themselves. Extent under share cropping (ande) is small. The ande cultivation in the purana villages of the Dry zone is qualitatively different from that of the wet zone. It is more due to factors such as excessive parcelization and dispersion of fragmented holdings than to landlessness[1].

Table 3.1.14 TENURE OF OPERATED PADDY LAND

	Extent (acres)	%
Owned and operated	344.2	76.0
Ande	17.8	3.9
Leased/mortgaged	45.3	10.0
Encroached	45.5	10.1
TOTAL	452.8	100.0

10% of the paddy lands were encroachments. Almost 63% of encroached lands belonged to the households with holdings over 5 acres, thereby

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1 See Chapter on Paddy Cultivation

indicating that it is the richer households,[1] which encroach on crown land because of their investment capacities.

Only 10% of operated land was leased or mortgaged. Economic difficulties created by the prolonged drought in recent years had forced many farmers to pleage their paddy lands to obtain credit. Over 75% of these transactions have been with the richer farmers in the village.

It is important to note that landlessness with regard to paddy lands is not a serious problem in this cluster. Only 9 households did not own any paddy land. However, many of them had encroached paddy lands. The average extent of owned paddy lands for the entire cluster was 3.66 acres per household, while the average per household owning paddy land was 4.5 acres.

Considerable inequalities existed in the distribution of owned paddy land. 25% of the households owned more than half the total extent of paddy lands, with each household owning holdings of over 5 acres. On the other hand, more than one-third of the households owned only 14% of the total owned extent.

Most of the paddy land (87%) was singly owned,[2] while around 13% was held under joint-ownership.

Excessive parcelization of the holdings is a major problem. On the average there were 7 parcels per household. In the size class of over 5 acres, the average number of parcels was as high as 20-30. Several factors have been responsible for the excessive fragmentation and parcelization of the paddy fields:

a) possession of paddy fields under several tanks.

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1 See section on income situation above.

2 This category also includes land held under leasehold tennure.

b) enlargement of the holdings through marriage; and

c) distribution of shares in the 3 locations of the purānawela, - Upper, middle and lower areas, Akkarawela (freehold) and Badu Idam (leasehold) under several tanks.

Many of the cultivation problems in the paddy sector such as non-cultivation, staggered cultivation, wastage of water, crop failure etc., are associated with this phenomenon.[1]

HIGHLAND

Highland can be broadly categorised into two:

a) continuously occupied or farmed highlands (wathu) and

b) chena lands - (hen).

The lands classified as highlands belong to 3 tenurial types. Firstly, there are the purana gangoda lands. These lands are small in extent and have no titles as they are held under customary tenure. Most of these lands are jointly owned. There is still a high social value attached to the purana gangoda lands. Secondly, there are the LDO allotments.[2] Most of the larger highland holdings (1-2 acres) belong to this category. These are considered here as owned high land. The third type are the encroachments which accounted for 38% of highlands. Overcrowding in the gangoda settlements and increasing pressure on land have resulted in most of the easily accessible lands being encroached by the villagers for residential and cultivation purposes anticipating ownership rights to be regularised at a subsequent date.

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1 See chapter on Paddy Cultivation

2 Lands alloted under the Land Development Ordinance on a 99 year lease.

The table below indicates the tenure of operated highland.

Table 3.1.15 TENURE OF OPERATED HIGHLAND

Tenure type	Extent of operated highlands	
	Acres	%
Owned and operated	78.2	47
Leased/rented	24.5	15
Encroached	64.1	38
	166.8	100

80% of the highland holdings were less than 2 acres in extent. 54% of the owned highland extent (78 acres) were singly owned while 27% were allotted lands. 18% were jointly owned and were mostly located in purana gangoda. 33% of the household did not own any highland although they all had encroachments on state lands.

A notworthy feature in recent years with regard to the tenure pattern of highland allotments is that encroachments on state land was predominant among the richer households. These households which already possessed larger paddy holdings had enclosed large extents of the more fertile and easily accessible state lands with the objective of converting them into permanent highland holdings at a subsequent date. Consequently, the poorer households were left with the marginal lands and many such households cultivated only small extents of highland. The tenure pattern in chenas has persisted without much change. It still preserves the broader aspects of the traditional communal tenure. Boundaries of the village forest are generally recognised by the villagers. However, as government regulations pertaining to clearing of forest land for chena cultivation are not strictly enforced,the location of chenas, extents cleared, period of fallow etc., are left entirely in the hands of the individual cultivators.

In Maha 1974/75 about 74% of the households in this cluster had chenas. The average size of the chena operated was 2.3 acres.

Table 3.1.16 SIZE DISTRIBUTION OF CHENAS IN MAHA 74/75

	Households		Extents	
	No.	%	No.	%
0 - 2 acres	50	68	76.2	44.4
2.1 - 5	20	27	66.2	38.6
5.1 and above	4	5	29.1	17.0
TOTAL	74	100	171.5	100.0

The above table shows that nearly 70% of the chenas were less than 2 acres in extent. The larger chenas of more than 5 acres accounted for only 5% of the chenas and were generally operated by wealthier farmers in the village. These farmers also had larger paddy holdings and in some cases they had a regular source of income.

Some forest lands previously used for chena cultivation are being gradually developed by larger farmers for permanent cultivation.[1] This situation might develop further with the increasing profitability of highland farming and competition for land and will further aggravate the inequalities in land ownership.

3.2 CLUSTER II

3.2.1 BACKGROUND

The cluster consists of the villages of Thariyankulama (including Hammillewa) and Nelunkanniya. It is located five miles east of the Anuradhapura town. The villages are accessible by a gravel road and they lie in clost proximity to the Anuradhapura - Matale main road.

The inhabitants of the villages are Sinhala Buddhists of the same variga and case (washermen). Except for 3 families, there are no 'outsiders' living in the village proper. However, in recent years many outsiders have settled down in the immediate vicinity of the villages

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1 Unlike in other areas of the Dry Zone, land grabbing by outsiders is still absent.

The areas surrounding the villages have undergone considerable changes during the last two decades or so. A block of around 50 acres on the Eastern border of Nelumkanniya is a settlement (established in the early 1960s), consisting of 50 families from Kandyan villages who belong to the Goigama caste. The two villages on the South West border, Kuda Kalattawe and Maha Kalattawe are now inhabited mainly by outsiders from the South West low country.[1] A block of about 100 acres of land to the West which originally formed the communal forests of the village cluster is now a private farm[2] and 40 acres of chena land to the South has been recently encroached and developed by another private individual. These developments have drastically reduced the land available to these villages for chena cultivation.

The traditional characteristics of a purana village are absent. The tank and the paddy fields remain as the only visible features of a purana village. The old gangoda settlements under the village have disintegrated and the settlement has expanded to the surrounding areas. Most of the new homesteads are located on either side of the roadway leading to the old settlement.

A bazaar, with several shops (owned by a single trader-cum-landlord) is located on the main road at Kalattawe. These shops cater to virtually all the needs of the villagers including the provision of loans and purchase of produce.

Contact with outsiders and the urban centres is strong, and so is the impact of the forces of the market economy, their impact being visible in every aspect of economic and social life. Traditional forms of cooperation have virtually disappeared.

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1 These villages are said to have been originally occupied by Tamil people most of whom left the area during the communal riots of 1958. The few who remained work as agricultural labourers now.

2 About 75 acres were obtained as middle class allotments by 3 brothers. 25 additional acres have been encroached.

The village cluster consisted of 144 households with a total population of 792 persons (412 males and 380 females). The average household size was 5.5 persons.[1] The classification of the households by family size is given in the table below.

Table 3.2.1 DISTRIBUTION OF HOUSEHOLDS BY FAMILY SIZE

	Family size	Number of households	
		No.	%
Small	3 and below	35	24
Medium	4 - 7	76	53
Large	8 and above	33	23

24% of the households had small families. This is mostly due to the presence of a large number of young couples rather than to a low birth rate and is evident from table 3.2.2 where the proportion of persons in the age groups below 10 years of age is high.

Table 3.2.2 AGE-SEX DISTRIBUTION OF POPULATION

Age	Males		Females		Total	
	No.	%	No.	%	No.	%
5 years	82	19.90	63	16.57	145	18.30
5 - 10	93	62.57	88	23.15	181	22.85
10 - 14	47	11.40	40	10.52	87	10.98
14 - 20	55	13.34	51	13.42	106	13.38
20 - 30	50	12.13	72	18.94	122	15.40
30 - 45	51	12.37	50	13.15	101	12.75
45 - 60	24	5.82	11	2.89	35	4.43
60	10	2.42	5	1.31	15	1.89
Overall	412	100.00	380	100.00	792	100.00

[1] This is slightly lower than the average household size of 5.9 persons for the Dry Zone Rural Sector.

Nearly 81% of the population in this Cluster were under 30 years of age of whom many were less than 14 years. Only 1.3% above the age of 60, indicating the much lower life span in this village cluster, (see Cluster 1). A noteworthy feature is the presence of a very large (54%) dependent population (less than 14 years and above 60 years).

The average life span of the females is low compared to males and also when compared with females in the cluster 1 villages. Only 1.3% of the female population was above the age of 60 years.

The literacy level of the population is lower than that of the Cluster 1 villages. 22% of the population were illiterate. Of those who have attended school, about 70% have had only primary education (upto Grade 5). Illiteracy was higher among the females with 63% of illiterate population among them.

Table 3.2.3 EDUCATIONAL LEVEL OF POPULATION ABOVE 14 YEARS

	Males		Females		Total	
	No.	%	No.	%	No.	%
No education	32	16.41	54	27.41	86	21.93
Upto Grade 5	110	56.41	105	53.29	215	54.84
Grade 5 to GCE	48	24.61	33	16.75	81	20.66
GCE and above	4	2.05	5	2.53	9	2.29
Vocational and technical qualifications	1	0.51	-	-	1	0.25
Overall	195	100.00	197	100.00	392	100.00

78% of the heads of households had some education but only 25% of them had received an education beyond Grade 6. This situation may act as a disadvantage in organising agricultural and other development schemes in these villages. It also could have an impact on the formation and functioning of rural organisations. Geographical or occupational mobility among the population is minimal. This is

largely a result of the lower caste status and low educational levels.

The villagers in this cluster continued to remain poor and backward. The lower caste status may be a reason. This may also be the primary cause which has enabled 'outsiders' to extend greater control of the economic and social life in the villages. As noted earlier large extents of land on which the villagers practise chena cultivation had been encroached by 'outsiders' there by aggravating the problems of land hunger in the area. Consequently the villagers are left with little alternatives but to seek employment as hired labour in the large private plots. This in turn had led to the emergence of a rural proletariat which has never been a feature of a purana village society of the dry zone.

3.2.2 ECONOMY AND SOCIETY

1. GENERAL FEATURES

Although agriculture is the predominant economic activity of this village cluster it formed a weak base. In spite of the fact that all households were engaged in this activity only 41% depended exclusively on it. A large proportion (56%) of households supplemented their farm incomes by working as agricultural labourers. The table below gives an activitywise classification of the households.

Table 3.2.4 CLASSIFICATION OF HOUSEHOLDS BY HOUSEHOLD CATEGORY

Household category	No. of households	%
Agricultural	59	41
Agricultural + labour	80	56
Agricultural + non-agricultural	05	03
TOTAL	144	100

The extent of paddy land available to the village is limited. The average extent per household was only 0.9 acres. 33% of the households did not own any paddy land and only 69% were engaged in its

cultivation. This is rather unusual for a Dry Zone purana village and has been mainly responsible for the weak social and economic situation of the village cluster.

The increasing pressure on paddy land has compelled many households to depend exclusively on highland rainfed farming which is more vulnerable to fluctuating weather conditions. This dependence has increased in recent years due to adverse weather conditions. In the 1974/75 crop year paddy contributed less that 1% to the gross family farm income. The relative position of highland and chena has also changed drastically. Lack of sufficient forest land for chena cultivation has resulted in many farmers taking up to continuous highland farming. Only 50% of the households cultivated chenas in Maha 1974/75 and others were engaged exclusively in highland farming.

The increasing land-shortage has created a rush to occupy the remaining lands. This has resulted in the better land being grabbed by the richer villagers and outsiders. The poorer households depend mostly on working as hired labourers both for subsistence and to finance a small highland or a chena plot. The demand for hired labour has increased as a result of larger scale highland cultivation by more affluent farmers. 56% of households had at least one member working as agricultural labour. There are definite signs of the emergence of a large rural proletariat in this cluster, which had never been a significant feature of the purana village.

This village cluster still remains poor and backward. The lower caste status has been largely responsible for this situation, which has also been the primary cause which has enabled outsiders to exert control over the economic and social life of the village cluster.

II EMPLOYMENT

The three villages of this cluster had a total population of 792 persons. The potential work force[1] defined to be those above 10 years was 466, out of which 15 were above 60 years. The dependent

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[1] See above section 2.1.2 (ii)

population consisting of the unemployed, young, old and disabled was close to 43%.

Table 3.2.5 ACTIVITY-WISE DISTRIBUTION OF POPULATION

	No.	%
Employed	434	56
Unemployed	17	02
Disabled, Old and Young	341	43
TOTAL	792	100

There is little overt unemployment as everybody is engaged in some productive activity, particularly during the cultivation season. Hence, reported unemployment very often amounts to aspirations for better paid and/or higher status jobs tham complete unemployment.

Increasing market orientation of chena production and continous highland farming have brought about certain changes in the unemployment situation. Demand for labour is very high during the Maha season. This is due to several reasons.

a) cultivation of cash crops adopting improved planting methods and other cultural practices.

b) need for better land preparation.

c) cultivation of larger extents of chena and highland

d) presence of a few large highland farms creating a high demand for labour.

In Yala, there is widespread under-employment because highlands are used only for gingelly cultivation and there is little or no paddy cultivation. During off season and drought periods the bulk of the labour force remains idle. The occupational distribution shows the lack of diversity in economic activity. Only 5 persons were reported to be engaged in activities other than farming. The absence of white-collar workers or Government Servants in this cluster is noteworthy.

The increasing importance of hired labour is a phenomenon to be reckoned with. 56% of the households depend partly or exclusively on hiring out labour. As it will be shown in the next section, these households recorded lower income levels compared with agricultural households. It was observed that more women and children from these households engage themselves as hired labourers.

III INCOMES

The average annual income of a household in the cluster was Rs. 5,910 which works out to about Rs. 500 per month. It is interesting to note that income levels in Cluster I are not very different from this cluster.

Income data disaggregated by type of household show that agricultural households enjoyed higher incomes than agriculture and labour households as shown in the table below.

Table 3.2.6 INCOME LEVELS BY HOUSEHOLD TYPE[1]

Household category	No. of households	Annual Average (Rs.)	Monthly Average (Rs.)
Agricultural	59	6921.00	578
Agriculture + labour	80	5206.50	434

Low income associated with labour households is consistent with the situation observed in Cluster 1. The composition of household income is shown in table below.

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1 Since there were only 5 households in the Agriculture + non-agricultural group, it is excluded from the discussion.

Table 3.2.7 COMPOSITION OF HOUSEHOLD INCOME - YEAR 1974/75

	Average per household	
	Rs.	%
Income from agriculture	4798.00	81
Income from non-agricultural source	662.00	11
Income from drought relief	450.00	8
Total family income	5910.00	100

Composition of income reveals that farm income accounts for 81% of the total family income. Off farm employment accounted for 11% of the total income which was mainly derived from hiring labour. Income from drought relief work was also significant.

Table 3.2.8 COMPOSITION OF FARM INCOME

	% of total farm income
Paddy	0.5
Highland	48.5
Chena	48.0
Livestock	3.0
Overall	100.0

Table 3.2.8 gives the composition of farm incomes from which it is seen that in contrast to Cluster 1, highland contributes a proportionately larger share to farm income. The contribution from paddy was negligible as it was cultivated on a very limited scale due to drought.

Table 3.2.9 DISTRIBUTION OF GROSS HOUSEHOLD INCOME

Income group (Rs. per annum)	% household	% of total income
Less than - 1,000	5.5	0.7
1,001 - 3,000	31.9	14.4
3,001 - 5,000	24.3	16.6
5,001 - 7,000	9.7	14.0
7,001 and above	28.5	54.3
TOTAL	100.0	100.0

The distribution of income shows a high degree of inequality. 62% of the households received an income less than Rs. 5,000 per year while 28% of households obtained 54% of the total income generated in the cluster.

As in the case of cluster I villagers income levels could be explained in terms of household category and the distribution of land among them.[1]

The majority of the households (56%) in this cluster belong to the household category classified as agricultural + labour households. This is particularly proved in the case of Nelumkanniya which is a village characterised predominantly by farmers and particularly labourers. The bulk of the households receiving annual incomes of Rs. 5000/- or less were from this category. Similar to Cluster I those who receive higher incomes were from the household category classified as agricultural households.

In this cluster II too the inequality in the distribution of land accoutned for the variations in income levels. This is clearly seen from the table below which shows that the average annual household income increased with size of operational holdings.

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[1] See pages 43 - 45

Table 3.2.10 GROSS FAMILY INCOME OF SIZE OF OPERATIONAL PADDY HOLDING

Size of holding (acres)	Households	Average Income/Household
No land	46	3538
0.1 - 1,00	36	5703
1.01 - 2,00	31	6724
2.01 - 5.0	23	15702
5.1 and above	8	16454
Overall	144	5903

The same tendency was observed in Cluster 1, and here too it was observed that those with larger paddy holdings also have access to other agricultural resources.

IV LEVELS OF LIVING AND AMENTIES

About 40% of the households in this cluster obtained a monthly income of less than Rs. 250/- which could be considered as below subsistence levels. The majority of low income households belonged to those with agricultural labourers.

The household consumption pattern, was very much similar to that of the Cluster 1 villages, with the exception that very little (0.5%) was spent on education.

Housing conditions in this cluster were much poorer than in the cluster 1. 13% were mere cadjan huts of one room. These belonged mostly to agricultural labour households, who had only encroached lands.

Table 3.2.11 HOUSING CONDITIONS

Type of house	No.	%
Cadjan house	18	12.5
Thatched mud-walled house	104	72.2
White-washed thatched mud-walled house	02	01.4
Brick house with permanent roof	20	13.9
TOTAL	144	100.0

The majority of houses (72%) were simply mud-walled houses with thatched roofs. These houses rarely had more than two rooms and were overcrowded.

Table 3.2.12 OWNERSHIP OF CONSUMER DURABLES

Type of good	No.	%
Bicycles	30	20.8
Sewing machines	20	13.9
Radios	29	20.1
Wall clocks	6	4.2
Petromax lamps	19	13.2

Bicycles and radios were the most popular items possessed. The successive droughts in recent years had created a situation whereby most households had mortgaged their assets to raise money for consumption and production purposes. The majority of households, particularly the agricultural labour households who were placed in the lowest strata of income, did not own any of these items.

Access to educational facilities is better in this cluster than in cluster 1. Schools are available at Nelumkanniya (which had classes up to Grade 5) and Kalattawe (up to Grade 10). In addition there

is a Maha Vidyalaya at Galkulama. Despite these facilities almost 70% of the children in the school-going age were not attending school. Factors such as the low social status, economic difficulties and the high cost of clothing and school books have been mainly responsible for this situation.

In terms of medical facilities too, this village cluster is well served. There is a dispensary at Galkulama (3 miles) and the Anuradhapura base hospital is only 5 miles away.

Health and sanitary conditions in the villages were low. Only 10% of the houses had latrines. A few wells provide drinking water to the villagers, but tank water is liberally used even for drinking. Maternal and child care are much neglected aspects. Malnutrition is apparent not only among children, but also among the adults of poorer households.

V COMMUNITY LIFE

This cluster represents an example of a dry zone purana village in the process of disintegration. One of the few features it retains from its purana character is its homogeneous caste composition. However, even this factor had not been able to resist the forces of disintegration that is overcoming the village society.

Although the residents in the two villages belong to the same 'varige' group, inter-village and intra-village rivalries are common. The villagers still get together on occasions such as weddings, funerals, etc., but, cooperation in other spheres of village activity, particularly in agriculture is minimal. Furthermore, Thariyankulama people consider Nelumkanniya residents to be inferior, especially as they are much poorer.[1]

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[1] Most agricultural labourers come from this village.

Traditional areas of cooperation as attan and kaiya are fast disappearing. Attan is today practised mostly among a few poorer households operating small extents of land. Other forms of cooperation typical of dry zone purana villages are also being gradually eroded. Adherence to kanna meeting decisions is rare. Bethma Cultivation (during times of water scarcity) has to be virtually imposed by the Cultivation Committee. There was little cooperation in water management (rotational issue of water etc.,) erection of fences, watch huts and rotational watching.

The village had no accepted leaders who can play an active role in its affairs. Even minor disputes are settled by resorring to the normal legal channels such as Grama Sevake or by the intervention of the police.

State-sponsored or other voluntary rural organizations are absent in Thariyankulama. Nelumkanniya, however, had a traditional Rural Development Society sometime back, but is now inactive.

Many factors have been responsible for the inability of the villagers to cooperate and organise themselves in community work, some of which are:

a) Low level of education

b) Dominating influence of outsiders

c) Impact of the town and the market economy on a relatively illiterate society

d) Inadequate attention paid to the villagers by the State Agencies and officials due to their lower social status.[1]

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[1] The AI and the KVS for instance had not visited these villages for several years, although they are only 5 miles from the town.

3.2.3 LAND TENURE

The land tenure pattern in this village cluster has undergone marked changes due to several factors such as:

a) population growth

b) establishment of settlement schemes adjacent to the villages

c) development of large extents of land by middle-class entrepreneurs.

Some reference to these developments have already been made in an earlier section. These factors have drastically reduced the amount of land available to the villagers which has led to a situation of acute land shortage.

i. Paddy Lands

There were only 137.5 acres of paddy lands in this village cluster distributed under three tanks. The table below shows the distribution of the entire paddy acreage in the cluster.

Table 3.2.13 DISTRIBUTION OF PADDY LANDS IN THE VILLAGE CLUSTER

	Puranwela	Akkarawela	Total
Thariyankulama	66.0	6	72.0
Nelumkanniya	13.3	6.2	19.5
Hammillewa	42.0	4	46.0
TOTAL	121.3	16.2	137.5
%	88	12	100

(Source: Paddy Lands Register, Kalattewa Cultivation Committee)

The average extent per household was 0.9 acres. Only 98 households (69%) were engaged in paddy cultivation.

Table 3.2.14 SIZE DISTRIBUTION OF OPERABLE PADDY HOLDINGS

Size class (acres)	Households No.	%	Extent No.	%	Average Size
0 - 2	67	68	80.3	37	1.2
2 - 5	23	24	74.4	34	3.3
5 and above	8	8	63.2	29	7.9
TOTAL	98	100	217.9	100	2.2

The average extent operated per household was only 2.2 acres. 68% operate an acreage extent of 1.2 acres only. The fact that 8% of the households had access to 30% of operable paddy land reveals increasing inequalities in paddy land operation. This situation is further aggravated by the fact that 31% did not have access to any paddy cultivation.

Table 3.2.15 shows the tenure pattern of operated paddy land. In this cluster too the bulk of the Paddy Land were owned. The extent leased/mortgaged comprised of larger holdings suggesting the accumulation of paddy lands in the hands of a few larger farmers.

Table 3.2.15 TENURE OF OPERATED PADDY LAND

	Extent (acres)	%
Owned and operated	164.1	75.3
Operated on Ande	9.7	4.5
Leased or mortgaged	25.6	11.8
Encroached	18.5	8.5
	217.9	100.0

As in Cluster I Ande cultivation is not widespread in this cluster. Only 5% of the total operable extent was under this tenure type. Out of the total extent of owned paddy land 60% was singly owned.

33% of the households were landless and landlessness is bound to increase in the future with population increase. Given the limited extent of paddy land one would expect a greater proportion of the Paddy Lands to be jointly owned under the traditional system of inheritance. Why this is not so is perhaps partly due to the fact that co-owners of excessively fragmented holdings would have been compelled to sell their shares.

Two other developments deserve to be noted. One is the increasing control of village paddy lands by a few richer individuals. The fact that 4% of the households controlled 30% of the owned paddy land does at least partially explain this development. The other, a more serious development, is the passing of village paddy land to the hands of outsiders. One trader alone operated almost 50 acres of paddy land adjacent to the village cluster. All these paddy lands originally belonged to the residents of Kalattawe and Nelunkanniya. About 15 acres under Hamillawewa tank were also owned by an outsider.

ii. Highland

A striking feature of the highland tenure system is that the largest porportion of operable highland was encroached. Increasing population pressure on the limited available highland has resulted in many people occupying better lands with the intention of getting them regularised later. Those who had encroached on larger extents had even leased out parts to others.

The average extent of operable highland per household in the village cluster was 2.1 acres. 42% of the holdings were less than 1 acre in extent while 16% of households cultivated an average extent of 5.1 acres. The relatively large size of the highland plot is due to the larger extents encroached. Tenure of operable highland is given in the table (below) 3.2.16.

Table 3.2.16 TENURE OF OPERABLE HIGHLAND

	Extent	%
Owned and operated	125.9	42.7
Leased/rented	31.4	10.7
Encroached	137.4	46.6
	294.7	100.0

The problem of richer households and outsiders encroaching large extents of land is more serious in this cluster. This has adverse effects particularly on the poorer villagers given the acute land shortage and the low socio-economic levels. Many of the poorer households are unable to occupy sifficiently large extents as they are unable to finance their development.

This village cluster demonstrates several new developments with regard to tenure pattern of chena lands. Aspects of communal chena tenure are virtually absent and normal chena rules are not observed.

Many outsiders had their chenas located on scrub jungles belonging to the village. They enter the land generally through the intermediaries whose support dispels any fear of opposition on the part of other villagers. One outsider cultivated almost 40 acres of chena during Maha 1974/75. Generally the larger chenas were operated by outsiders.

Table 3.2.17 SIZE DISTRIBUTION OF CHENA EXTENTS IN MAHA 1974/1975

	Households		Average size
	No.	%	(acres)
Less than 2 acres	31	43	1.3
2.1 - 4.0	34	47	3.4
4.1 and above	7	10	9.7

The average extent of operated chena were generally larger than in Cluster 1. As clearing of land for chena is not regulated by law, inequalities in the extents operated are bound to occur. This problem is further aggravated by the increasing profitability of chena farming, as large extents have already been opened up by those who are able to make investment and many of them apparently have no intention of abandoning the lands so developed.

CHAPTER - 4

AGRICULTURAL ECONOMY

4.1 PADDY CULTIVATION

4.1.1 INTRODUCTION

There are several reasons for the inclusion of a separate section on paddy even though its economic significance during the period of our study (crop year 1974-75) is small. Firstly, the purana villager of the Dry Zone is first and foremost a paddy cultivator. Paddy cultivation is the whole basis of village life with institutions, customs, beliefs and values rooted in it. Secondly, under normal weather conditions the farmer always gives first priority to paddy cultivation which has its implications on highland and chena cultivation. Thirdly, the social value attached to the ownership of paddy land, especially in the old field, is still strong. One's place in the village rituals and festivals, role in community work, chances of becoming a leader and at one time even the right to fish in the tank were restricted to persons with some claim to land in the 'old field'. However, in recent years this trend is fast disappearing particularly with the penetration of the market economy.

A village with more paddy land and with better irrigation facilities shows a greater degree of economic stability and is generally more prosperous than one without such advantages. As stated by Farmer, the individual and the village community stand or fall in prosperity and in social esteem according to their holding of paddy.[1] Some important features may be noted in respect of the two village clusters. In Cluster 1 the presence of a number of tanks and a higher paddy acreage has given a greater degree of stability to the village economy than in Cluster II. Due to the presence of several tanks it is possible to cultivate some paddy lands under one or two tanks without running the risk of experiencing an absolute water shortage affecting village life.

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1 B.H. Farmer, Pioneer Peasant Colonisation in Ceylon, op. cit, p.56

The two study areas were affected by drought conditions almost throughout the period from 1971 to 1975. Even during Maha the rainfall received was inadequate to fill the tanks even partially. Only a fraction of the fields was cultivated. However this was also subjected to frequent crop failures. There was no cultivation, at all, during the Yala season. This situation is shown in the table below.

Table 4.1 PADDY CULTIVATION - CROP YEAR 1974/75

	Cluster I		Cluster II	
	Acres	%	Acres	%
Total operable paddy extent	453.6	100	218.9	
Extent cultivated				
Maha 1974/75	72.6	16.0	17.8	8.1
Harvested	43.8	10.0	2.0	0.9
Yala	19.10	4.2	1.20	0.6
Harvested	11.10	2.4	1.20	0.6

During these drought years the villagers were unable to even meet their own requirements of rice. This was particularly so in the Cluster II villages where only a few households (2% in Maha) cultivated paddy. Drought conditions had two other consequences; firstly the spread of New High Yielding Varieties was affected and secondly, the shortage of draught power. Most villagers were forced to sell their cattle to cope with the difficult situation and this drastically reduced the cattle population in the villages.

4.1.2 CULTIVATION PRACTICES AND PRODUCTION

Information on some of the important management practices was collected without reference to a particular season. Enquiries were made on cultivation practices adopted by farmers during periods of normal weather conditions.

Land preparation is still dependent to a great extent, on animal power. Buffaloes are used mainly for puddling the fields. Ploughs and other animal-drawn implements are rarely used in land preparation.

Even though there is an adequare number of buffaloes in Cluster 1. (3.5 buffaloes per household), they are not uniformly distributed among households cultivating paddy. The Buffaloe population in Cluster II is insufficient with only 0.94 buffaloes per household. This partly explains the increasing tendency to use tractors for land preparation in this cluster.

Although the water supply in the Maha season is more reliable the majority of the farmers still prefered to cultivate the Old High Yielding Varieties (OHYV) of paddy. However, New High Yielding Varieties (NHYV) were also clutivated by some of them.

Table 4.2 USE OF IMPROVED VARIETIES

		Cluster I	Cluster II
		% Households[1]	
Maha	NHYV	59	33
	OHYV	88	62
Yala	NHYV	35	22
	OHYV	66	17

The adoption of improved varieties was higher in Cluster 1, perhaps due to the higher educational levels than in cluster II. The inability to obtain seed paddy and the risk due to water shortage prevented many farmers from adopting NHYV.

The majority of the farmers still practice broadcasting. The few who transplanted confined this practice to a small part of the cultivated extent. In both village clusters, out of the households who

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1 Some farmers cultivate both OHYV and NHYV therefore percentages show enhanced values.

transplanted paddy, less than 4% transplanted more than 50% of the paddy extent cultivated by them.

In addition to the lack of water and its unreliable supply, the high cost involved was a major constraint which prevented the majority of the farmers from adopting transplanting. There is also no tradition of transplanting in these areas.

Table 4.3 shows the pattern of fertilizer use in the two village clusters. More than 50% of the farmers in each cluster did not apply any fertilizer. Chemical fertilizer was applied only by about 35 to 40% of the households in Maha, and the quantities applied were much below the recommended dosage.

Table 4.3 FERTILIZER APPLICATION OF % HOUSEHOLDS

	CLUSTER I			CLUSTER II		
	Chemical	Manure	None	Chemical	Manure	None
Maha	42	4	53	36	14	50
Yala	30	3	65	18	9	73

Although large quantities of cattle manure are available in the villages only a few farmers applied it on their paddy fields. Lack of capital, risk of crop failure, inadequate extension facilities were some of the reasons responsible for low fertilizer application. Most paddy fields are rarely weeded. Chemicals are, however, being used increasingly for controlling excessive weed growth. Pest and disease control practices too leave much room for improvement.

Owing to continuous drought conditions paddy production in the villages had been extremely low since 1971. This situation is revealed when the production figures for 1974/75 Maha and 1975 Yala are examined.

Table 4.4 PADDY PRODUCTION AND YIELDS (IN BUSHELS)

	Total Production	Maha 1974/75 Average per h/h	Per acre yield	Total Production	Yala 1975 Average per h/h	Per acre yield
Cluster I	1,306	12.9	29.8	293	2.9	26.4
Cluster II	89	0.91	44.5	30	1.2	25.0

The low yields may be attributed to the unfavourable weather conditions and also to poor management practises. Improved extension coupled with better water management could, however, lead to significant improvements in the production and yield levels.

The possibility of cultivating crops[1] that require less water than paddy on the paddy fields, particularly in Yala, has often been suggested. In both Clusters no farmers had cultivated any of these crops. Although most farmers stated that lack of water is the main reason for not doing so the same farmers grow such crops on highland and on chena. The farmers are not aware of the technicalities of cultivating 'other field crops' on paddy fields, particularly on problems associated with land preparation for field crops on paddy fields under dry conditions.[2]

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1 Crops such as green gram, cowpea, chillies, black gram etc.

2 It was also observed that the farmer generally prefers to grow paddy in his fields. If water is collected in the tank early he starts his paddy cultivation, if not, he waits till there is sufficient water in the tank. By this time, it is too late to plan any other crop. Also, as long as sufficient highland is available for the cultivation of other crops it is doubtful that the farmers will voluntarily use their paddy lands for the cultivation of crops other than paddy.

4.1.3 PROBLEMS IN THE PADDY SECTOR

Fragmentation is a serious problem in most dry zone purana villages[1], and is very much so in the two village clusters studied.

Fragmentation of paddy lands involves:

i) fractionalization

ii) parcelization

Due to its higher social value and other advantages the old field has been excessively fragmented into parcels of very small fractions. The other is excessive parcelization leading to scattering of plots in the different fields under one tank and also among several tanks both within and outside the village. Instances were found in Cluster I where several households owned 20-30 parcels scattered under several tanks.

These problems result in many farmers not cultivating some of the parcels or resorting to staggered cultivation. This in turn leads to a greater dependence on the chenas, problems of resource allocation particularly labour, etc., Excessive fragmentation also leads to problems in water management, resulting in water wastage and frequent crop failure which again increases the dependence on the chenas.

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[1] For details see the following:
E.R. Leach (1963) Pul Eliya, a village in Ceylon.
A Study of Land Tenure and Kinship.
B.H. Farmer, Pioneer Peasant Colonisation in Ceylon, op. cit.
Water Resources Board (1968) Report on Cultivation Habits and Practices in the Toruwa Tulana, North Central Province.
M.U.A. Tennakoon (1972) A note on Some Social and Economic Problems of Subsistence Farming in Rural Settlements of the Dry Zone of Ceylon. Staff Studies, Central Bank of Ceylon, Vol. 2. No: 1
P. Ganewatte (1976) Fragmentation of Paddy Lands - A Case Study of a Cluster of Five Purana Villages in Anuradhapura District, Occasional Publication No. 5 ARTI.

4.2 CHENA CULTIVATION

4.2.1 INTRODUCTION

The objective of this section is to examine the present status of chena cultivation in the two village clusters with particular reference to the structure and transformation of the chena system. It is intended to provide the background to an understanding of the processes, problems and prospects of developing a stable system of rainfed highland farming in areas of traditional chena cultivation.

Chena cultivation plays an important role in the economy of the villages studied. This is shown by several factors such as the number of farmers engaged in chena cultivation, the extent of chena cultivated in relation to other patterns of land use and the incomes derived from chena cultivation. The table below shows the importance of chena cultivations in the villages covered in this study.

Table 4.2.1 RELATIVE IMPORTANCE OF CHENA

	Cluster I	Cluster II
Households engaged in chena cultivation (% of total)	74.0	50.0
Ratio of chena extent to (a) operable highland	1.04	0.72
(b) operable paddy land[1]	0.38	1.02
Income derived from chena (1974/75)		
(a) as a % of total income from paddy, highland and chena	54	50
(b) as a % of total family income	34	39

[1] Only a portion of operable paddy land is under cultivation at a given time; therefore the ratio of chena; paddy at a given time would be much higher.

The role of chena as the traditional appurtenance to irrigated paddy farming is changing rapidly. Even as late as the 1950s chena cultivation was done largely for subsistence. It produced most of the food crops other than paddy and provided the entirety of cash incomes. Chena cultivation was also looked upon by the farmers as an insurance against paddy crop failure. The cultivation of a large variety of crops maturing at different times gave the farmers two sets of advantages.

i) The farmer was able to obtain a steady supply of food crops over a long period

ii) Minimised the risks of crop failure as the staggered maturing of crops enabled the farmer to obtain the produce from a few crops at least.

Since the 1960s, chena cultivation has undergone several changes. Chenas today produce large quantities of the nation's food. In addition to vegetables, most of the pulses, and grams are produced in chenas.

A more striking development is the increasing role the chenas play in providing cash incomes for farmers. Chillies is the major cash crop followed by gingelly and mustard. Even pulses are increasingly being cultivated for the market. The market orientation of the chena is due to factors such as:

i) attractive prices for certain chena products.

ii) high demand created as a result of import restrictions and import bans placed on several products such as chillies and pulses.

iii) prolonged droughts which resulted in continuous paddy crop failure in many parts of the dry zone.

4.2.2 TYPES OF CHENA AND THEIR IMPORTANCE

Broadly speaking there are two types of chenas, the Maha and Yala chenas.[1] These differ considerably in respect of size, crops cultivated and incomes obtained.

Maha is the more important chena season, coinciding with the main rainfall season in the dry zone. The farmer derives the bulk of his income from the Maha chena and it also involves greater application of labour and other inputs. Generally a variety of high value crops is cultivated in the Maha chenas.

Yala chenas are rarely established on new land, except by those who did not cultivate Maha chenas. Most farmers make use of the Maha chena sites for Yala. It mostly involves preparing the land with the mammoty and repairing the existing fences etc., where necessary. Hence, requirements of labour and capital investments are less.

The table below gives the average size of the chena operated in both seasons in the respective village clusters.

Table 4.2.2 AVERAGE SIZE OF CHENA (ACRES)

	Cluster I	Cluster II
Maha 1974/75	2.3	3.2
Yala 1975	1.9	2.5

The total extents of chena cultivated in Maha and Yala for both clusters are given (below) in table 4.2.3.

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1 Chenas could of course be distinguished on several criteria as crops cultivated (e.g. Thala hen, Wihen, etc.,) location (Yala hen) etc.,

Table 4.2.3 CHENA EXTENTS

	Cluster I	Cluster II
	(Extent in Acres)	
Maha 1974/75	172.6	222.1
Maha 1975/76	203.1	207.9
Yala 1975	42.2	126.3

In cluster II the higher extent of chena in Yala is a reflection of the increasing importance of continuous highland rainfed cultivation due to the absence of paddy cultivation in this season.

4.2.3 GENERAL CHARACTERISTICS OF CHENAS

Farmers generally prefer to have their chenas located as close as possible to their homes for reasons such as easy access, better crop protection, etc., However, actual location of chenas is determined by several other factors. The availability of suitable and adequate forest land is important. As farmers prefer to have a 'Nawadeli' chena because it is more fertile and needs less weeding, distance is sometimes ignored.

Easy accessibility to the chenas is important when it comes to transport and disposal of chena produce. In both clusters most chenas were within easy reach of a cart road but in the cluster II villages only a few chenas (7%) were located within a distance of one mile to the bus road, whereas in cluster I 65% of the chenas were situated at a distance of less than one mile from the bus route.

The age of forest cleared for chena cultivation and the number of seasons a land is cultivated also reveal several characteristics of the chena system. The age of forest cleared generally indicates the availability or otherwise of adequate forest land for allowing a sufficiently long fallow period.

Table 4.2.4 AGE OF FOREST CLEARED

	Percentage of chenas	
	Cluster I	Cluster II
Age of Forest		
5 years	7	47
6 - 10 years	23	37
11 and above	60	16
Overall	100	100

It is seen that the bulk of the forest cleared in Cluster II was less than 5 years. This indicates over-exploitation of the soil as the fallow period is not sufficient long enough to permit the rehabilitation of the land. The situation is different in Cluster I where almost 60% of the chenas were established on forest lands which were more than 11 years old.

The farmers generally prefer not to cultivate the same chena for more than two Maha seasons. However, the lack of adequate forest resources particularly in Cluster II, does not allow the farmers to do this. A large number of chenas had been cultivated for three or more seasons consecutively. As noted earlier, the available forest land in Cluster II for shifting is limited. Hence, many farmers are settling down to continuous highland farming and already 50% of the households practise only highland cultivation. Even in Cluster I many of those who have cultivated their chenas for three or more seasons stated that they would not abandon these lands.

4.2.4 CROPPING PATTERN IN CHENAS

The cropping pattern in the Maha chenas for the respective clusters is given in table 4.2.5

Table 4.2.5 CROPPING PATTERN IN CHENA (MAHA 74/75)

% of extent cultivated	Cluster I		Cluster II	
Crop	Maha 1974/75	Maha 1975/76	1974/75	Maha 1975/76
Paddy	4.8	5.2	18.4	1.4
Kurakkan	51.6	45.5	21.4	23.7
Chillies	24.5	28.8	40.9	54.3
Maize and Other Pulses	6.1	8.2	10.2	11.4
Root Crops and Vegetables	6.0	8.6	3.7	5.4
Others	7.1	3.9	5.3	3.9
	100	100	100	100

A noteworthy feature in the cropping pattern is that traditional chena crops such as Manioc, Amu, Thana etc., are being gradually replaced by other food crops of commercial value. Crops such as maize, green grams, cowpea and chillies are now cultivated on an increasing scale. Chillies are grown primarily for the market, (particularly in Cluster II) and make a significant contribution to farm incomes. In Cluster I kurakkan is cultivated along with some of the traditional chena crops. In both clusters however a fair extent is still devoted to the cultivation of root crops and vegetables. These are grown mostly for demestic consumption and the little surplus is sold locally.

Table 4.2.6 CROPPING PATTERN IN CHENA (YALA 1975)
(% of extent cultivation)

Crop	Cluster I	Cluster II
Kurakkan	7.1	0.8
Chillies	-	4.0
Cowpea	3.1	-
Gingelly	83.9	94.5
Root crops	5.0	0.8
	100	100

The Yala chenas are almost exclusively devoted to the cultivation of gingelly. (84% in cluster I and 95% in cluster II) Some crops such as chillies which are left overs from previous Maha season account for a much smaller extent. A significant feature in Yala cropping in Cluster I is that about 3% of the extent was devoted to the cultivation of cowpea. This is a recent development brought about by the profitability of cowpea and by a greater awareness of its nutritional potential.

Market orientation of chena cultivation is more pronounced in Cluster II. This has proceeded almost at the expense of its traditional role of subsistance food production. This character is still preserved to some extent in Cluster I.

4.2.5 AGRICULTURAL PRACTICES AND MANAGEMENT LEVELS

Several changes have taken place in the agricultural and management practices of chena cultivation. Such changes have been primarily due to two factors:

i) tendency towards stabilisation; and

ii) increasing market orientation of chena cultivation

An examination of the agricultural and management practices would be relevant to understand the present levels of production and yields as against the actual potential and also to identify the main bottlenecks that prevent the change towards the development of continuous farming on more intensive lines.

There is little land preparation as such on the traditional Nawadeli Hēna. The forest is usually slashed and burnt and the ash is allowed to remain on the soil. In older chenas land preparation is performed to some extent.

In the case of Cluster I, 27% of the farmers reported that they do not practice any form of land preparation. These were mainly those who cultivated Nawadeli Hēna. In older chenas most of the farmers

prepared their land by hoeing. (67% in cluster I and 74% in cluster II). Intensive land preparation involving digging the soil and ploughing are practised on chenas which have been cultivated consequently for a couple of seasons.

An important feature in land preparation in Cluster II villages was that there was much diversity in the methods adopted.[1]

This is mainly due to the increasing tendency towards a more stabilized system of farming and the extensive cultivation of crops such as chillies and pulses which require better land preparation.

The method of planting varies with the type of crops grown. Kurakkan (mixed with mustard and some green gram, chillies[2] etc.,) and other traditional chena crops are usually sown broadcast. The seeds are mixed with a stick or a rake or sometimes by the mammoty. Maize and other pulses as cowpea, green gram and black gram are generally planted in rows. Chillies are transplanted in rows as it helps efficient weeding and harvesting. On many of the Nawadeli chenas in Cluster I chillies are still broadcast by some farmers. However, there is greater awareness of improved planting methods in this cluster too.

Except for certain crops like cowpea, black gram etc., the farmers generally use the seed from the previous season's crop. Usually these seeds are of poor quality. The seed rate used for chillies was as high as 41 lbs per acre as the farmers would only get about 50% germination.

Nurseries for crops such as chillies are poorly established. Management practices of such nurseries are limited to a single weeding and

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1 In 6% of the chenas of Cluster II the land had been ploughed and in another 15% of the land was prepared with mammoty, whereas in cluster I only 6% of the farmers have preprared the land by digging while none of them reported ploughing.

2 traditional varieties

daily watering. Fertilizer application or adoption of pest and disease control is absent. Hence diseases such as damping off and, leaf curl are very common. Technically there is much room for improving in nursery practices and management. Weed control, where practised, was poor in cluster I. In cluster II chenas a much higher proportion of the farmers adopted weed control.

Generally, fertilizer application is not practised in chenas cultivated for 1-2 seasons.[1] However, in cluster II the cultivation of the same chena continuously is causing a decline in soil fertility. Here, although it is advisable to apply fertilizer, the risk of crop failure acts as a disincentive.

Most non-traditional chena crops such as chillies, cowpea, grams etc., are more susceptible to pests and diseases. Leaf curl disease in chillies, and bean fly attack in cowpea were widely reported. Only a few farmers were aware of proper control methods, as there were no extension facilities for chena crops.

With the widespread cultivation of such crops in the future one could expect a high incidence of pest and disease outbreaks. Therefore, the need for providing a better extension service for chena cultivation should receive more attention.

4.2.6 COSTS AND RETURNS IN CHENA CULTIVATION

As the information collected by the questionnaire survey for the crop year 1974/75 were found to be inadequate for understanding the cost structure and returns, data on production costs and returns in chena cultivation were collected by means of a record book from a selected sample of chena farmers during the crop year, 1976/77. Only the data from the cluster I villages are used for this discussion.

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1 Some farmers, in both cluster, reported the use of organic mannure (cowdung) for their chillie nurseries.

The average size of the Maha chena among the record keeping farmers was 4.1 acres.[1] The diversity of chena crop production was an important feature. The chena produced a large quantity of grains and vegetables, but quantities of maize and pulses were still low. The potential for increasing the production of the latter crops is particularly high.

The average size of the Yala chena among the record keeping farmers was 1.68 acres of which 1.47 acres were devoted to gingelly and 0.21 acres to cowpea. (The cultivation of cowpea in Yala is fast becoming popular).

A comparison of actual yield realised by the farmers and the potential yield will help to understand the improvements that are necessary to achieve a higher level of productivity and incomes to chena farmers. The actual yields and the potential[2] for a selected number of crops are given in Table 4.2.7

Table 4.2.7 ACTUAL YIELD PER ACRE OF SELECTED CHENA CROPS AND POTENTIAL YIELD UNDER RAINFED CONDITIONS

	Actual (bu)	Potential* (bu)
Kurakkan	14.35	10 - 16
Maize	19.31	15 - 20
Cowpea	9.15	26 - 35
Green Gram	2.40	14 - 18
Chillies	153 lbs.	675 lbs.

* H.P.M. Gunasena : Production of Field Crops - Lake House 1974.

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1 This was considerably higher than the cluster average of 2.3 acres in 1974/75.

2 The yield levels given are what is realizable under rainfed conditions with improved management standards.

An examination of the table reveals the following important trends:

1) Relatively higher yields are already obtained from traditional crops such as Kurakkan and Maize. These have been cultivated by the farmers over long periods.

2) The yield levels of non-traditional crops such as cowpea, green gram, chillies, etc., are much below the potential. In the previous section it was observed that management levels of these crops leave much room for improvement.

The table below on cost of production demonstrates that the main input in chena cultivation is labour. Expenditure on purchased inputs is still low. During both seasons over eighty five percent of the cost was on labour. In Maha other inputs accounted for only 15%. Less than 2% of the cost was incurred on non-conventional inputs such as fertilizers, agro-chemical etc., Non-conventional inputs were not used in Yala chena. The per acre cost of Yala chena was much lower due to the predominance of gingelly cultivation.

Table 4.2.8 COST OF PRODUCTION OF CHENA PER ACRE

	MAHA		YALA	
	cost in Rs.	%	cost in Rs.	%
Labour				
a) Hired labour	20.89	6.68	57.11	31.54
b) Attan labour	12.30	3.93	-	-
c) Family labour	233.65	74.76	105.96	58.52
Inputs				
a) Seed & planting material	39.18	12.53	18.00	9.94
b) Fertilizer	0.06	0.02	-	-
c) Agro-chemicals	4.56	1.46	-	-
Machinery hire	0.93	0.30	-	-
Other (including transport)	0.98	0.31	-	-
TOTAL	312.55	100.00	181.07	100.00

The position was different for non-traditional crops. In addition to seeds 4.2% of total expenditure was incurred on inputs, particularly agro-chemicals. The cost per acre was also higher for these crops.

Table 4.2.9 PER FARM AND PER ACRE COSTS AND RETURNS

	MAHA		YALA[1]	
	Per farm Rs.	per acre Rs.	per farm Rs.	per acre Rs.
Total value of production (1)	3,610.35	880.60	346.80	206.40
Total cost (2)	1,280.50	312.60	304.20	181.07
Net Returns (3)	2,329.85	568.00	42.60	25.33
Cost of family labour (4)	957.00	233.65	178.01	105.96
Family returns (3+4)	3.288.85	801.65	220.61	131.20

The per farm and per acre costs and returns from Maha and Yala chenas are given in Table 4.2.9. Even under the current production levels the returns could be considered as reasonable, especially for Maha chena when family labour is not included in the cost.[2]

Table 4.2.10 PER ACRE COSTS AND RETURNS OF SELECTED CROPS (MAHA)

	Total cost	Cost of labour	Cost of family labour	Inputs	Production (bu)	Total value Rs.	Family returns Rs.
Kurakkan	251.83	244.37	183.27	7.46	14.35	439.20	370.64
Chillies	344.30	253.46	190.09	80.84	152 lb.	1,530.00	1,375.79
Cowpea	469.14	405.00	303.75	64.14	9.15	1,372.50	1,207.11
Green Gram	442.52	227.38	253.03	107.14	2.40	384.00	194.51

1 The gingelly crop was affected by bad weather during the season under consideration. Hence the low returns.

2 For the family farm, family labour can be regarded as virtually cost -less since the opportunity cost may be close to zero.

Per acre costs and returns for a selected number of crops are given in Table 4.2.10. Family returns are highest for chillies, the most extensively cultivated cash crop. Returns from cowpea are only slightly lower than for chillies. Consequently, this crop is fast gaining popularity. Returns from green gram aer still low.

4.2.7 PROBLEMS OF CHENA FARMERS

Chena farmers face several problems at different stages of their cultivation cycle. These vary from environmental problems to a variety of others such as capital, labour, inputs, extension and marketing.

Environmental problems are caused primarily by the uncertain weather conditions. Due to its exclusive dependence on rainfall, delays or inadequate rainfall at planting or during the growing period may cause crop failure. Hence, the risk involved in chena cultivation is very high. This problem affects the adoption of improved and intensive farming techniques that are vital for a system of stabilised farming.

Heavy damage to chena crops is also caused by wild animals. Guns are not available in sufficient numbers while cartridges are expensive and difficult to obtain.

Few farmers are able to raise the required capital for chena cultivation which is increasingly becoming commercialised. In the Cluster II, this problem is partially solved by the money-lender advancing funds on a crop-loan basis, which obviously is disadvantageous to the farmer. Such sources are not available in Cluster I.

4.2.8 CHENA - PADDY INTER-RELATIONSHIPS

At a time when far reaching changes are taking place both in the chena system and paddy cultivation it has often been questioned whether the two systems compete with each other for resources. While research on this aspect is very limited, the evidence available from the few studies appear to be contradictory.

Tennakoon[1] referring largely to settlements based on small tanks where paddy cultivation is carried out under uncertain water supply conditions observed that there was competition between chena and paddy cultivation. He noted that in chena cultivation it was necessary to sow seeds before mid November to take advantage of the rains in late November-January.

It is only after sowing and fencing the chenas that the cultivator moves into irrigated paddy fields. Tennekoon attributes the delay in harvesting of Maha paddy to the harvesting operations of the Maha chena produce.

Silva[2], working in the Hambantota district produced evidence which fails to confirm the view that chena cultivation is detrimental to paddy cultivation. His argument is based on the fact that the strategy adopted by the paddy cultivator enables him to devide his resources between the two systems in a satisfactory manner. Silva concludes that chena cultivation is in fact complementary to paddy cultivation rather than competitive. Silva's findings however, relate to a district where paddy cultivation is carried out in large holdings under more assured water supply conditions and may not be the same in situations where the cultivation of paddy is carried on under small tanks as in the areas covered by the present study.

Jayatilleke and Tennekoon[3] in a subsequent study which examined the competitivenss of chillie and paddy cultivation in the Anuradhapura district concluded that there was little diversion of resources from

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1 Tennekoon, M.U.A. : 1971; A note on some social and economic problems of subsistence farming in rural settlements of the Dry Zone - op. cit. page 29 - 31.

2 Silva, W.P.T. - Chena Paddy Inter-relationships - in Farmer B.H. (ed) Green Revolution, op. cit.

3 Jayatilleke K.S.E. & Tennekoon M.U.A. Competitiveness of Chillie and Paddy Cultivation. Examination of data from Anuradhapura district: Staff Studies - Central Bank of Sri Lanka - Volume 5 (1) 1975 - pages 190 - 200

rice cultivation to chena cultivation. These two authors state that the farmer plants chillies with the onset of the Maha rains, and only thereafter takes to irrigated rice cultivation, this is not due to a special preference for chillies but a strategy to cultivate both crops with a limited amount of labour supply. Further, they observed that the farmer was reluctant to sow his irrigated rice fields until the tank held sufficient water for irrigation.

The season during which the present study was carried out was not very favourable for a detailed study on this aspect, as paddy cultivation was adversely affected by successive droughts. Thus, no attempt was made to study the problem in great detail. However, from field observations and views expressed by farmers from the villages covered in the study it can be concluded that chena cultivation as presently practised can be competitive to paddy cultivation. Some of the major reasons which support these conclusions are given below:

a) Chena cultivation is exclusively dependent on rainfall, hence, farmers are compelled to commence their chena planting operations with the initial Maha rains in order to match their cultivation practices with the rainfall pattern. By adhering to such a schedule, paddy cultivation is invariably delayed.

b) As noted earlier in recent years there has been marked changes in the crops cultivated in chenas. High value cash crops such as chillies, cowpea, green grams, etc., have replaced the traditional chena crops. These crops demand not only more capital but also require intensive labour application. Therefore, it could be argued that there is a considerable diversion of capital and labour resources to the chena which would otherwise go into paddy cultivation.

c) Unlike the traditional chena crops, harvesting operations of the new crops cultivated in the chenas is staggered over a long period of time. During this period labour is also required for certain operations in paddy cultivation. The demand for labour at such a time cannot be met by family labour alone and the farmers are compelled to hire outside

labour to carry out their agricultural operations in time.

d) As mentioned in the previous section chena cultivation is no longer an appurtenance of paddy cultivation. Not only is a high priority given to its cultivation but the average chena holdings are larger than those cultivated a few years back. This again makes a greater demand on the farmer's capital and labour resources.

e) The adverse weather conditions in recent years compelled some farmers to become more dependent on their chenas and farmers gave more emphasis to its cultivation than to the cultivation of paddy for fear of crop failures which had been frequently experienced in the case of the latter.

The above conclusions were based on observations made at a time when there was little paddy cultivation in the villages covered in the study. Therefore, in a normal season one could expect the level of competition between the two sections to be more intense. The farmer's preference for the chena is understandable given the profitability of chena cultivation in recent years. The extent of competition between the two systems could be expected to vary from one locality to another depending on the conditions under which farming is carried out. Hence an indepth study is essential to get a clearer understanding of the exact nature of chena-paddy inter-relationships. The aim of such a study should in fact be not to corroborate the assertion that chenas' compete with paddy but rather to identify more concretely the rationale behind the farmer giving first preference to chenas. How and in what-ways the paddy cultivation calender could be and needs to be modified to obtain a successful Maha crop and possibly a meda crop if water is available?

4.3 HIGHLAND CULTIVATION

4.3.1 INTRODUCTION

Highland, as defined in this study, comprises the following two categories of land:

i) small home gardens in the gangoda settlements; and

ii) larger holdings (wattas) held on LDO permits or the encroached lands which have been fenced and farmed continuously. The latter two features distinguish the highland from chena.

The home gardens in the gangoda are generally planted with perennial crops. No other cultivations are generally practised but in recent years the farmers usually raise their chillie nurseries here. The income derived from the gangoda plots is negligible.

The LDO allotments and the encroached highlands are located on higher elevations. Permanent crops are still absent on the latter but on LDO allotments a few farmers have planted some perennial crops.

The importance of highland is more pronounced in the Cluster II villages. Almost all households in this cluster cultivate highlands and the average size of a holding is greater than that of Cluster I. In Maha 74/75, the total extent of highland cultivated in Cluster II exceeded the total chena extent indicating a gradual shift towards a more settled system of farming. This tendency is also borne out by the fact that only 50% of the households were engaged in chena cultivation.

The situation, however, is different in cluster I where the chena extents were larger than the highland plots. 75% of the households in the cluster were engaged in chena cultivation and the average size of the operated highland was smaller (only 1.7 acres)

The importance of highland cultivation in Cluster II is also shown by the fact that income from highland account for 48% of the total farm income whereas in Cluster I its contribution was only 29%.

These observations give a reflection of the man - land relationship with respect to each cluster. The greater population and the ralative shortage of forest land for chena cultivation in the cluster II villages have resulted in the more accessible chenas being rapidly converted

to parmanent highland farms. This is evident from table 4.3.1 where 71% of the highlands in Cluster II were located within a ¼ mile from the dwellings.

Table 4.3.1 DISTANCE OF HIGHLAND PLOT FROM HOMESTEADS (% OF HOUSEHOLDS)

Distance	Cluster I	Cluster II
Less than 0.25 mile	51.1	70.8
0.25 - 0.5 mile	21.3	12.3
0.5 - 1.0 mile	12.8	9.2
1 mile	14.9	7.6
	100	100

The tenurial complexities arising out of this situation were highlighted in Part I. Although the land situation is still favourable in Cluster I, the same tendency, where some chenas were being converted into permanent highland farms was evident, particularly on those lands which were located close to the village or along roadways,etc.,

4.3.2 CROPPING PATTERN

Other than for the perennial crops the annual crops cultivated on highlands are not very different from those grown on chenas. In both clusters they consist of a mixture of subsistence crops (kurrakan, Maize) and cash crops (chillies,cowpea). Table 4.3.2 shows the cropping pattern in Maha 1974/75 in the respective clusters.

Table 4.3.2 EXTENTS OF HIGHLAND CROPS CULTIVATED DURING MAHA 1974/75

	Cluster I		Cluster II	
	Extent (Ac.)	%	Extent (Ac.)	%
Paddy	1.0	1.1	9.0	4.6
Kurakkan	28.4	32.2	39.9	20.5
Maize	1.1	1.3	13.0	6.2
Cowpea	4.1	4.6	14.3	7.4
Green Gram	0.6	0.7	0.6	0.3
Chillies	17.8	20.8	78.4	40.1
Manioc & other yams	29.0	32.9	0.1	0.1
Vegetables	3.3	3.8	27.1	13.9
Others[1]	3.8	3.2	11.2	6.0
TOTAL	88.1	100.0	194.6	100.0

As seen from the above table the cropping pattern in the two clusters is somewhat different. In Cluster II a greater extent is devoted to the cultivation of cash crops such as chillies. This is due to the fact that 31% of the households did not own any paddy land and had to rely on chena and highlands. The close proximity of this cluster to urban centres is another reason which may have induced these farmers to grow more cash crops and vegetables. The cropping pattern in Yala 1975 is shown in the table (below) 4.3.3.

[1] Includes crops such as tabacco, soyabeans, sorghum etc.,

Table 4.3.3 EXTENTS OF HIGHLAND CROPS CULTIVATED DURING YALA 1975.

	Cluster I		Cluster II	
	Extent (Ac.)	%	Extent (Ac.)	%
Kurakkan	4.0	14.9	1.3	1.3
Maize	0.5	1.9	9.1	8.1
Cowpea	0.4	1.5	2.5	2.2
Green Gram	-	-	0.3	0.3
Chillies	1.5	5.6	2.9	2.6
Gingelly	13.6	50.8	89.7	79.7
Yams	6.3	23.5	4.8	4.3
Vegetables	0.5	1.9	0.5	0.4
Others	-	-	0.5	0.4
TOTAL	26.8	100.0	112.6	100.0

A feature of the Yala cropping pattern was that there was a marked reduction in the acreage cultivated from that in the preceeding Maha. In Cluster I only 30% of the Maha extent was cropped in Yala whereas in Cluster II the cultivated extent in Yala amounted to 60% of that of Maha.

The reduction in Yala acreage could be attributed to the weather conditions characteristic of the season and the inadequate rainfall experienced during this period does not permit the cultivation of a large variety of crops as extensively as in the Maha season. As shown in Table 4.3.2 gingelly which is a drought-resistant crop is cultivated on a large scale on the highlands during the Yala season. A few other crops such as Maize and Manioc which are also capable of withstanding prolong dry periods are also cultivated in this season.

4.3.3 CULTIVATION PRACTICES

Highland cultivation requires more intensive land preparation than in

chena lands. However, low-cast implements suited for this purpose are absent and hence most farmers in both clusters resort to hoeing.[1] A few farmers till the soil with the mammoty.[2] It is interesting to note that in Cluster II about 15 farmers reported the use of tractors for land preparation. This was on a large tract bordering Thariyankulama where the average size of holdings is large and cultivation is carried out on a commercial scale.

Most cultivation practices adopted in highland cultivation are similar to those in chenas. However, more households in cluster II adopted improved planting methods than the households in Cluster I. This is particularly true in the case of chillie cultivation. Only a few farmers reported fertilizer application. The high cost of fertilizer and the risk associated with rainfed farming are the main reasons for the low levels of fertilizer application. There will be a greater need for fertilizer application particularly in Cluster II with the gradual shift towards a permanent settled system of cultivation.

Weeding is widely practised in both clusters, the main method being handweeding. The demand for hired labour is mainly for weeding operations. Chemical weeding has bee reported in a very few cases.

There is now a greater tendency for the adoption of pest and disease control methods in both clusters. Chemical control has been reported by 57% and 52% of the farmers in Cluster I and Cluster II villages respectively. The farmers are aware of the usefulness of pest and disease-control but financial constraints prevent many of them from adopting such measures.

In recent years cultivation of improved crop varieties especially of chillies has increased. Improved varieties such as MI I are cultivated extensively. The same trend was observed with regard to certain pulses.

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1 65% in cluster I and 61% in cluster II.

2 34% and 26% in cluster I and II respectively.

Soil conservation methods are not adopted by farmers engaged in highland farming. Only a few highland plots had a supplementary source of irrigation. In both clusters only 5-6 households had their own wells and only 2 had water pumps. The basic problem is that even these wells run dry during drought periods. Nevertheless under a system of continuous highland farming, some supplementary irrigation facilities are necessary to safeguard the crops against unexpected dry spells.

4.4 ANIMAL HUSBANDRY

4.4.1 GENERAL

The importance of animal husbandry as an integral part of the development of dry zone agriculture is well recognised. However, its place in the economy of the villages covered in the study is of less significance. The contribution of animal husbandry to the gross farm incomes was 11% in Cluster I and 2.6% in Cluster II. The average household income derived from this enterprise amount to Rs. 464/- per annum and Rs. 155/- per annum in the respective clusters and is almost exclusively derived from cattle rearing.

Only a few households (11 in Cluster I and 10 in Cluster II) were engaged in poultry keeping. Rearing of goats or other farm animals was totally absent in both village clusters.

4.4.2 CATTLE REARING

The traditional system of agriculture in the dry zone is usually combined with ownership of a few heads of cattle. The role of cattle in the context of the economic and social conditions of a dry zone purana village is different from that in other areas of the country. The aim of cattle-keeping is not only for milk production and to provide traction power for arable farming. In the purana village society possession of cattle represents wealth, social status and influence. Livestock also provides insurance against crop failure. During periods of drought when crop failures are frequent many farmers are able to secure some income through the sale of cattle. One of the principal

methods of capital accumulation in an agrarian society where other investment opportunities are limited is in the purchase of cattle.[1] Thus, there is a tendency to hoard cattle by the richer and more prosperous households.

The total cattle population in the two village clusters at the time of the survey was 1279. A detailed breakdown is given in the table below.

Table 4.4.1 DISTRIBUTION OF CATTLE

	Cluster I	Cluster II	Overall
Total cattle population	952	327	1279
Total number of buffaloes	359	135	494
Total number of neat cattle	593	192	785
Total No of households owning buffaloes	36	13	49
Average per reporting household	10	10	10
Average per household of entire cluster	3.5	0.9	2.0
Total number of households owning neat cattle	45	30	75
Average per reporting household	13	6.4	10.4
Average per household of entire cluster	5.3	1.3	3.20

The cattle are exclusively of the indigenous breeds. These animals are well adapted to the difficult environmental conditions of the dry zone but have very low productive capacity and body weight. These are usually compensated by increasing the stock.

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1 See for instance, K.N. Raj, Investment in livestock in agrarian economies, An analysis of some issues concerning "Sacred Cows" & "Surplus Cattle", Indian Economic Review, Vol. IV, No. 1, April 1969.

The management standards are very low. The animals are allowed to graze on tank beds, road sides and on harvest residues and in most cases are left out in the open at night. The animals grow up alternately gaining weight in the rainy season and losing weight in the dry season. Only a few households in both clusters milk the cows. The milk so obtained was primarily for home consumption and only 12 households reported the sale of milk and milk products such as curd.

4.4.3 PROBLEMS IN CATTLE REARING

A conspicuous feature in recent years has been the decline in the livestock economy in the village clusters. This was evident from the fact that only a few households keep cattle and also by the small population of animals.

In addition to the sale of cattle for slaughter to overcome economic difficulties in recent years, several other factors may be attributed to this trend. Extensive areas which functioned as grazing lands are being increasingly utilized for arable cultivation. In purana villages of the dry zone there is no tradition for the cultivation of pastures and fodder for animal husbandry. Hence, this resulted in many farmers selling their animals. Cattle theft which has increased greatly has also become a major problem. Further, veterinary services were grossly inadequate. Consequently outbreaks of contagious diseases brought about a drastic reduction in the cattle population. There was no milk collecting centre or other marketing outlets for milk in the vicinity of the villages and many farmers did not even milk their herds.

Although many farmers indicated their desire to embark on cattle-rearing the lack of capital was reported to be a major constraint. The degeneration of livestock farming has had serious consequences on the agricultural economy of the villages, particularly with regard to paddy cultivation. Usually, buffaloes are the source of traction power needed for various operations in paddy cultivation. As evident from the table 4.4.1 the number of buffaloes is small in relation to the total paddy acreage. Consequently the farmers have

to hire tractors for these operations for which charges are exhorbitant. A few farmers who own buffaloes hire them out to their colleagues and here again the charges are high. These aspects are discussed in greater detail elsewhere.

4.4.4 PROSPECTS FOR THE EXPANSION OF LIVESTOCK INDUSTRIES

(a) Cattle: The potential for the expansion of cattle rearing is much greater than for other livestock enterprises. Cattle rearing is being practised by a few farmers while many others had been engaged in this activity at some time or other. Thus many farmers in the villages possess experience and knowledge on cattle farming. Further, from a social point of view cattle rearing is more acceptable to the village community than other livestock enterprises. The major reason for the need to promote cattle rearing is to meet the increasing demand for traction animals for agricultural activities. In addition to this it would enhance milk production which could not only provide the farmers with a steady income throughout the year but would also improve the nutritional standard of the farm households. The cattle dung too could be used to improve the fertility of soil and this is particularly vital when a system of stabilised cultivation is envisaged.

(b) Other Livestock Enterprises: Goat rearing has a great potential in the villages covered in the study and particularly in the Cluster I villages where scrub jungle is available for goats to browse. Goats could be reared for meat production. Adequate marketing and intensive extension efforts should be directed to popularise this activity among the farmers. The importance of goats as a source of manure for highland crop production should receive more attention.

Althouth organised poultry keeping could generate a reasonable income to the dry zone villages, this enterprise does not seem to be popular among the farmers covered in the study. The farmers are still unaware of the benefits or the technicalities of organised poultry keeping.

Hence, intensive extension efforts are required to popularise this activity at least as a backyard enterprise so that it could provide a source of income and also improve the nutritional standards of the villagers.

4.5 FARM LABOUR AND FARM POWER

4.5.1 FARM LABOUR

As noted earlier the major 'input' in chena cultivation is labour. Labour costs amounted to over 85% of the total costs incurred by a farmer cultivating an acre of chena[1]. Generally, the size of family of the operator - (the availability of family labour) is positively related to the size of holdings and consequently larger families obtained higher incomes than smaller families[2]. Further a higher intensity of cultivation under a system of stabilized agriculture involves more intensive application of inputs, particularly labour, to land. In this section, an attempt is made to examine the availability and the types of labour used in rainfed agriculture in the villages covered in this study.

The main types of labour used fall into four categories.

i) family labour

ii) hired labour

iii) attan labour (exchange)

iv) contract labour

Unlike in the wet zone attan in not very common. In several cases the reported attan was in fact work performed for a daily wage. There

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1 See page 84

2 See page 39

was reluctance on the part of some persons to disclose that they worked as wage-labourers. The relative importance of different forms of labour use is conveyed in the following table.

Table 4.5.1 HOUSEHOLDS REPORTING TYPES OF LABOUR FOR CULTIVATION

	Cluster I		Cluster II	
	No.	%	No.	%
Family labour only	37	37.4	38	29.5
Family labour and exchange labour	12	12.1	22	17.1
Hired labour only	-	-	-	-
Hired and family labour	33	33.1	43	33.3
All three types	17	17.2	36	27.9

The above may not reflect the relative importance of the different types in strict terms as it does not indicate the intensity of labour use. Contract labour also had been grouped under hired labour since it forms a very small part of total labour used.

Family labour was used by all the households, though there were differences in the degree of reliance on this form of labour. The following table gives some idea of the availability and use of family labour.

Table 4.5.2 AVAILABILITY OF FAMILY LABOUR

	Cluster I	Cluster II
Total man equivalents	372.7	366.2
Average man equivalents per household	3.69	2.54
No. of fulltime workers in own farm	115	112
Average per reporting household	1.3	1.4
Part time in own farm	164	266
Average per reporting household	1.74	1.96

Though Cluster I had a higher number of man equivalents, the availability of workers for own farm work did not differ much between the two clusters. In both the number of part time units was higher due to the importance of the category of housewives and students.

A few operationwise differences in the use of family labour should be noted. Strenuous tasks such as jungle clearing, land preparation and ploughing are generally reserved for men, whereas transplanting, weeding and harvesting activities are normally carried out by females.

Attan labour is traditionally associated with paddy cultivation, though several instances of highland operations involving attan labour were found. In Cluster II, many agricultural + labour households did not own any paddy land which implies that they are out of the attan network. Increasing commercialisation and monetisation of the economy have reduced the importance of the attan system further.

Hired labour is becoming increasingly important in both clusters. While no household depended entirely on hired labour as far as total farm activities were concerned, many instances were found where hired labour only was used for particular operations such as weeding. In Cluster II a few farmers got jungle clearing done on a contract basis. Under this arrangements, the contractor mobilised hired labour and completed the operation for a fixed sum of money. Diversification of chena cropping patterns, especially the extensive cultivation of chillie has led to heavy reliance on hired labour.

The source of hired labour in general is the locality itself. In Cluster II especially, there were a number of households in which certain members worked for daily wages. The pace is generally set by a big trader-cultivator farming about 100 acres of highland adjoining this cluster.[1]

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[1] He also operated about 50 acres of paddy land in the adjoining villages. During times of good weather these paddy fields are cultivated using hired labour mostly from the Cluster II villages.

Risks and uncertainty in rainfed farming, inadequate paddy extents, lack of access to credit facilities for their own farming operations and the pressure of subsistence needs compel the members of these households to opt for wage-labour even at the expense of their own cultivation operations.

Reliance on hired labour even by the small farmers has been a controversial issue[1]. Labour use patterns when analysed by the size of total operational holding shows that family labour is mostly used by holdings in the 1-2 acre group, while their is a higher rate of reliance on hired labour as the holding size increases.

The same tendency is observed in regard to income. 31 out of 44 households in the income group of Rs. 1000-3000 did not use any hired labour whereas, 41 out of 54 operators in the group above Rs. 5000 used hired labour.

As expected, it is the agricultural labour households who were mostly dependent on family labour and attan labour. However, even these households used hired labour during peak activity periods.

Recent changes in chena cropping pattern have had a marked impact on labour use pattern. The growing of chillies on large extents by richer households in the villages and by private entrepreneurs have provided a sizeable demand for wage labour.

The available data suggest that there is no regularity of employment over the crop year. The pattern of labour use is dependent on features specific to the dry zone purana villages. Economic activity is very much a matter of rainfall conditions. The maha season is the main period of activity with both chena and paddy cultivation. In yala there is a lull as it is very rarely that sufficient water is available for paddy cultivation and chena cropping is generally confined to gingelly. However, in instances where new chenas are established, it is usual that cultivation operations commence towards the

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1 See S. Hirashima (ed) Hired Labour in Rural Asia, I.D.E. - Tokoyo, 1977.

latter part of the Dry Season. In general there is considerable under-employment during the Yala season. This was clear from the labour use records maintained during the season. Intensive cultivation under a system of stabilised farming would absorb the surplus labour during the Yala season.

4.5.2 FARM POWER AND MACHINERY

Under existing conditions, farm power as generally understood is mostly in relation to the paddy sector. A noteworthy feature is that most farmers from both clusters still depend on animal power (buffaloes) for operations such as land preparation and threshing. However, the ownership of buffaloes showed a highly skewed pattern with 39 and 13 households owning 359 and 135 buffaloes in Cluster I and Cluster II respectively. Successive draught in recent years had forced many farmers to sell their drought animals. However, the larger farmers were in a position to hire tractors to carry out their farming operations.

Data on the ownership of agricultural implements show that only few farmers own even the basic implements such as mammoties and wooden ploughs. However, it was observed that these too were in unsatisfactory conditions. Only four households owned water pumps. These were the larger operators who cultivated their holdings on a commercial scale.

Table 4.5.3 OWNERSHIP OF AGRICULTURAL EQUIPMENT AND CARTS

	Households Owning	
	Cluster I	Cluster II
Wooden ploughs	10	39
Iron ploughs	4	-
Sprayers	-	1
Water pumps	-	4
Carts	3	12

An important issue that has to be raised is the extent to which mechanisation and use of farm power will be required in a chena stabilisation programme. Continuous farming on highland presents problems of

tillage, fertility and weed control on a much greater scale than experienced by chena farmers up to now. However, the absence of low cost implements suitable for work on highland could be clearly noted. Lack of sprayers was a major constraint in the control of pests and diseases particularly, in new crops. Even the Cultivation Committee did not have any sprayers which were in working condition. The development and popularisation of such implements should receive high priority in any extension programme for chena stabilisation. These problems were also observed to be very serious in the Kurundankulama dry farming scheme.

In discussing farm power and machinery for rainfed farming, particularly in respect of land preparation the concept of 'minimum tillage' merits attention. This system involves the preparation of a good seed bed for planting with the least disturbance to the soil structure. 'Minimum tillage' has been experimented in the Maha Illuppallama Research Station and the results were reported to be encouraging.

The traditional system of land preparation in chena cultivation could also be considered to be closely linked with the concept of 'minimum tillage.'[1] Even in the established plots in the cluster II villages most farmers do not resort to tillage. However, the pressing problem under such a system of land preparation is the prolific weed growth. The success of 'minimum tillage' depends largely on the adoption of economical methods of weed control. Therefore, unless more economical methods of weed control are developed the prospects of introducing this concept under a system of stabilised rainfed farming will be limited.

4.6 CREDIT AND OTHER INPUTS

4.6.1 CREDIT

The gradual shift from subsistence production to market oriented production in highland and chena cultivation has shown the need for more

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[1] See, H. Ruthenburg 1976 op. cit. pages 34-35 and also pages 16-17 of this report.

capital. Capital is required for the purchase of fertilizer, agro-chemicals and other inputs. With the evolution of settled system of farming the requirements of these inputs will increase and consequently it will become necessary for the farmer to invest more in his cultivation.

During periods of good weather the cultivation of most paddy lands in the villages will further increase the need for capital, particularly as NHYVs are now cultivated by a large number of farmers. The need for greater investment has not been matched by suitable arrangements to obtain the required capital.

Table 4.6.1 shows a breakdown of the households which obtained credit from various sources.

Table 4.6.1 SOURCE OF CREDIT (CROP YEAR 1974/75)

	Households reporting			
	Cluster I		Cluster II	
Source	No.	%	No.	%
Cooperative	31	74	31	26
Bank	01	02	06	05
Money lender	-	-	58	49
Friends/neighbours	02	05	16	14
Relations	08	19	07	06
Overall	42	100	118	100

Institutional credit facilities are provided almost exclusively for paddy cultivation. Only a few farmers made use of this facility. The cumbersome procedures involved and the delays in the provision of credit discouraged many farmers from applying for institutional credit.

It is observed from the above table that a higher proportion of the households in Cluster II, obtained credit from various sources. This may be attributed to the fact that many farmers in this cluster were engaged in highland cultivation on a commercial scale and paddy cultivation was undertaken to a limited extent.

A significant feature in the Cluster II villages is the relative importance of non-institutional sources of credit. Institutional credit facilities are not available for highland and chena cultivation and the farmers have to rely on private sources for their credit requirements.

The Trader-money lenders play a key role in financing agricultural activities in the Cluster II villages. They provide loans to the cultivator at the beginning of each season. The credit is considered to be interest-fee. However, the farmers has to sell his produce to the creditor who buys it at a price lower than the market price prevailing at that time.[1] In one particular situation where the trader-money-lender cultivated a large extent of land adjacent to the village, some farmers had to work as hired labourers in his land in order to repay their loans.

In addition to cash loans the traders also provide seed material, agro-chemicals etc., on credit. They even advance money for subsistence purposes in slack seasons. Such loans are repaid after the harvest.

Although it appears superfically that the Trader-money lender performs a fair service to the villagers, such a system has its obvious disadvantages to the farmer. The farmers are forever tied to the creditor and are compelled to sell their produce to him at prices determined by the latter and hence are unable to fully benefit from the higher prices in the open market.

Any system of stabilized chena cultivation would necessarily involve greater investments of capital. Therefore, institutional credit facilities on easy terms, preferably combined with marketing, is a vital requirement for improving chena cultivation.

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1 This results in a hidden interest on the loans. Since this produce is sold to the creditor within a period of about 6 months from the date the loans are provided, the actual 'annual' rate of interest is very high.

As noted earlier under the present credit scheme, institutional credit facilities are not provided to the cultivators of chena lands and most of the highland holdings as these lands do not have titles. This calls for a restructuring of the present credit scheme and it may be necessary to have some form of registration of chena lands till such time that a suitable tenurial system is introduced.

4.6.2 INPUTS

The supply of inputs in the two village clusters was not satisfactory. At the time of the survey, seed paddy was in short supply and many farmers were unable to cultivate their paddy lands. In the case of certain highland crops such as chillies, cowpea and green gram the farmers used seed from successive crops or borrowed seeds from a neighbour. Such seeds were of poor quality and have very low germination percentages, compelling the farmers to use very high seed rates. Some farmers purchased seeds from private traders. In Cluster II, a private trader buys the seeds from the farmers at nominal rates immediately after one season's harvest and resells them at 3-4 times the purchase price at the commencement of the next season.

The cooperatives were the main suppliers of fertilizer in both village clusters. Here too it was not available in sufficient quantity and very often the stocks arrived late.

Most farmers in both village clusters depended on the private traders for the supply of agro-chemicals. Some agro-chemicals were also available at the cooperative stores. It usually happened that the farmers purchased whatever chemicals the trader provided and applied them to their crops even though they were not the recommended chemicals. Many farmers complained that they lacked extension advice on the application of agro-chemicals and in most instances had to depend on the advice of the trader who was more keen to dispose of what he had in stock. There were many instances of considerable crop damage by the excessive use of agro-chemicals.

There is now an urgent need for streamlining the supply of agricultural

inputs. Not only should the inputs be made easily available but it is more important to provide adequate extension advice on the proper use of inputs so as to minimize the wastage and crop damage.

4.7 MARKETING

4.7.1 INTRODUCTION

Agricultural marketing in the Dry Zone has to be viewed in the light of certain factors peculiar to the region. Firstly, agricultural activity is predonimantly confined to the Maha season when the weather conditions are favourable. Secondly, as almost every household is engaged in farming and cultivate similar crops within a given period of time, this results in gluts during a particular period and virtual scarcity during other times of the year. Thus, the structure and organisation of the agricultural markets of the Dry Zone and the nature of the marketing problems in the area vary from season to season and also from crop to crop. This section outlines the agricultural market structure in the villages covered in the study and discusses some of the main problems reported by the farmers.

4.7.2 MARKETING OUTLETS

Farmers rely on several outlets to dispose of their produce. Some of the major marketing outlets are shown below in order of importance.

Table 4.7.1 MARKETING OUTLETS

Percentage households using different outlets

Outlets	Cluster I	Cluster II
	%	%
Collector	56	55
Nearby town	21	11
Village boutique	9	12
Cooperative	8	12
Marketing Department	-	8
Others	6	2

A very striking feature is that none of the farmers sold their produce at the Polas. The absence of commission agents, a source especially important in certain areas of the country[1] is also significant.

Collectors function as the most important marketing outlets for the villagers in both clusters. Most of them come in lorries from places as distant as Kandy and Matale and visit the villages several times during the Maha harvest. They collect mainly vegetables, but small quantities of chillies, grains, pulses etc., are also purchased. A few traders from Anuradhapura also visit the villages in bicycles to purchase chillies and pulses. The collectors have an understanding among themselves so as to prevent any competition between them and they exercise monopolistic powers in the purchase of farm produce in the area.

Anuradhapura town and other townlets are located close to the villages, but they are relatively less important as marketing outlets. Generally the non-perishable products such as pulses and grains are sold to the boutique keeper in the townlets and in the village itself. These boutique keepers function as collecting agents for big traders in the larger towns. Although the prices prevailing in the town are higher than those offered by the boutique keeper, the difference is not large enough to induce the farmer to take the produce to the town. The farmer is also aware that if he takes his produce particularly the perishables, to the town he is compelled to dispose of it at whatever price he is offered. For having spent for transport, he obviously cannot bring back his produce. Further, during this time the farmer has to devote more attention to protecting his crop from damage by animals, theft, etc., and hence prefers to dispose of it to the collectors who visit the village.

A noteworthy feature in the market structure in the study area was the marginal role played by State institutions. Although 8% of the farmers in Cluster I and 12% in Cluster II indicated the use of the village cooperative as a marketing outlet, this was exclusively for the sale of paddy under the guaranteed price scheme. The cooperatives

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[1] e.g. vegetable growing areas in the upcountry.

did not play any role in the marketing of chena products.

4.7.3 BASIS OF SALE

The basis of sale reveals some interesting features of the market mechanism. The virtual absence of sales to commission agents is a reflection of irregularity of production and sales (mainly due to uncertain weather conditions) and also due to remoteness in the case of Cluster I, where the majority of the sales are made on a cash basis. The involvement of the trader/money-lender in the provision of credit on a crop-loan basis has still not penetrated into this cluster as in the Cluster II villages. In the latter cluster 23% of the farmers sold their produce to set off loans. Some even pledged their produce to the money-lender long before harvest.

4.7.4 PACKING AND GRADING

There is virtually no grading of any chena produce. The collectors buy them in bulk offering a low price for the ungraded product and later grade the product themselves and sell it at a higher price. Once the products are purchased they are pressed into gunny bags and transported in lorries which are very often over-packed. This results in considerable wastage during transport, particularly of the perishable products and accounts for the high prices, which the consumer eventually has to pay.

4.7.5 PROCESSING AND STORAGE

The absence of proper storage facilities is conspicuous. The highly seasonal character of crop production, and the frequent occurance of droughts enhance the need for proper storage facilities. Only a few farmers in Cluster I had Bissas for storing paddy whereas not a single household had these in Cluster II. In most cases paddy is kept in gunnies within the premises. 'Kurakkan Atuwa' is a common feature but storage facilities for other products as gingelly, grains and pulses are not available.

There is no tradition of food preservation. Many vegetables perish on the farm itself during Maha and in Yala the villagers have no vegetables whatsoever. The possibilities of drying or preserving in pickled or other forms of certain vegetables need to be explored.

4.7.6 MARKETING PROBLEMS FACED BY THE FARMERS

The problems faced by the farmers with regard to marketing are manifested in two ways:

a) Low prices

b) Inability to sell the products

These may be attributed to several other causes:

I Inadequate transport facilities. The farmers in both Clusters have either to depend on the bus service or their own bicycles to transport their own bicycles to transport their produce to nearby market centres. However, only small quantities could be transported by these means. Furthermore, the bus service itself is not very regular and as in the case of Cluster I, transport to distant market centres on bicycles is inconvenient. Only a very few farmers in both Clusters owned any bullock carts.

II Due to the remoteness of the village clusters from main consuming areas, the farmers have to rely predominantly on the collector. As noted earlier, the few collectors virtually exercise monopolistic powers and even their visits are very irregular. Thus, much of the perishables go waste on the farm itself. This problem is nore serious in the Cluster I villages where large quantities of vegetables are produced during the Maha season.

III The lack of storage and processing facilities is another factor contributing to the low prices.

IV Farmers have very little or no savings at the time of the

Maha harvest as this period is preceded by the prolonged drought period during which there are no agricultural activities. Hence, the farmers have to dispose of their produce as soon as it is harvested in order to meet household expenditure and settling debts. This results in the farmers selling their produce at very low prices.

The absence of institutional marketing facilities allows the private trader to monopolise the market. Irregularity of these marketing outlets and the other weaknesses associated with this system could result in slowing down the process of evolving a stable system of market-oriented production on highlands and chena. The need for regular, assured and attractive marketing outlets is a precondition for evolving such an agricultural system. Some institutional participation in marketing is, therefore, necessary to initiate a healthy atmosphere of competition among private traders, thus enabling the farmer to receive a fair price for his produce.

4.8 AGRICULTURAL EXTENSION AND RURAL ORGANISATIONS

4.8.1 AGRICULTURAL EXTENSION SERVICE

One of the features which was very evident during the course of this study was that a considerable number of farmers lack adequate knowledge of improved methods of crop management. This was more significant in the case of highland cultivation where several non-traditional crops are now cultivated extensively and which require management practices 'new' to the average dry zone farmers. However, there was a relatively higher degree of awarness as well as adoption of improved cultivation pratices in paddy cultivation.

As seen from the table 4.8.1 (below) only a few farmers (36% in Cluster I and 19% in Cluster II), reported the meeting of extension personnel for advice.

Table 4.8.1 PERCENTAGE DISTRIBUTION OF HOUSEHOLDS ACCORDING TO SOURCE OF AGRICULTURAL INFORMATION

	Cluster I		Cluster II	
	No.	%	No.	%
1. Agricultural Instructor	14	14	9	6
2. Village Level extension agent (K.V.S.)	19	19	18	13
3. Livestock Officer	3	3	1	0.5
	36	36	28	19

A very large proportion of farmers (75% in Cluster I and 88% in Cluster II) stated that the K.V.S. (Kushikarma Viyapthi Sevaka) rarely inquired into their problems. Even though it was the responsibility of the APC (Agricultural Peoductivity Committee) and the CC (Cultivation Committee) to channel the services of the agricultural extension personnel they did not perform this function effectively. The farmers had to rely predominantly on their own experiences or on that of their neighbours.

Nearly a third of the farmers in both clusters said that they listened to agricultural programmes over the radio. A majority of them (95%) had not participated in farmer training classes or even seen demonstrations. Farmer Journals (Govikam Sangarawa) or leaflets issued by the Department of Agriculture had not been made available to the farmers in the villages covered in this study. The above facts reflect the inadequacy of agricultural extension services. These may be attributed to the following:

1. General neglect by the extension personnel
2. Inability and lack of interest of rural institutions (APC and CC) to obtain the services of agricultural extension personnel, especially that of the K.V.S.
3. Difficulties faced by the extension personnel themselves,

e.g. a) problems of transport

b) the large area that has to be covered by the divisional and village level extension personnel

4. Low incentives provided to the K.V.S.

The area served by the Divisional (AI) and the village level extension workers (KVS) appears to be too large, particularly when proper transport facilities are not available. This is more significant in the case of the village level extension worker. Hence, the need to reallocate extension personnel considering factors such as transport, number of farm families, intensity of agricultural enterprises etc., is very apparent in both clusters.

It should be noted that the emphasis of agricultural extension must not only be on the provision of adhoc technical advice with regard to disease, pest and weed control, rather it should be geared to the urgent and immediate extension needs of the farmers which invariably vary according to the farming system. The increasing importance of chena and highland and the tendency towards chena stabilisation is likely to make new and increasing demands on the extension services. Hence, the approach to agricultural extension has to be modified in accordance with the system of farming. In regard to paddy cultivation the most important aspect in which the farmers need guidance is on efficient water management so as to cultivate the maximum extent with the available tank water and also adhere to timely operations. In regard to highland and chena cultivation, the farmers require more scientific agricultural information on specialised aspects such as cropping patterns, soil conservation and other management aspects.

It is clear that the present 'crop specific' extension approach needs to be replaced by a 'systems' approach where efficient water management, soil conservation, land improvement and other important management practices are incorporated into a more comprehensive programme.

The concentration of extension efforts on a few selected farmers

('contact farmer approach') seems to be less effective in the villages covered in the present study. Some of the respondents were not even aware of the 'contact farmers' in their own locality. The usefulness of group methods in the dissemination of agricultural information should not be under-estimated. This method could be adopted under the yaya system of cultivation which is seen in paddy as well as in chena cultivation. Thus, organised group methods, specially field demonstrations could be used as an efficient tool in the dissemination of information.

4.8.2 ROLE OF FORMAL RURAL ORGANISATIONS SUPPORTING AGRICULTURE

The cooperative and the Cultivation Committee were the two formal village level organisations serving the farming community in the area. Cluster I was served by the Nochchikulama Cooperative Society while the Cooperative at Kalattawa served the farmers in the other cluster.

The principal areas of supporting activities of the cooperatives were confined to the follows:

i) Chanelling of credit to farmers.

ii) Issue of fertilizer under the subsidy scheme and sale of agro-chemicals.

iii) Purchase of paddy under the GPS for the Paddy Marketing Board.

Although cooperatives perform an useful function to the farmers of the villages, there were many weaknesses. Attention has already been drawn to the shortcomings in respect of credit supply and marketing. In the case of credit the following aspects deserve to be specifically noted:

i) Delays in issuing loans

ii) Lack of interest on the part of the cooperative to recover loans. This results in a high rate of defaulting which in turn makes many farmers ineligible for fresh loans.

iii) Lack of any form of supervision by the cooperative of the use of credit granted. Further, there was no collaboration between credit institutions and the extension services on how best to make use of credit.

There were many deficiencies in the distribution of fertilizer and agro-chemicals. Very often the fertilizers were not available at all and even when available the quantity stocked was insufficient to meet the demand of the farmers.

Even in the sphere of marketing the cooperatives have failed to make a significant contribution. As noted earlier the cooperatives have not concerned themselves with marketing of chena products and even with the purchase of paddy under the G.P.S. Inefficiency in the cooperatives discouraged the farmers from selling the paddy to the cooperative stores.

The Cooperatives could have played a more dynamic role in agricultural development, especially given the advantages the cooperative network possesses in respect of facilities such as transport. The two cooperative stores serving village clusters demonstrate the kind of problems that prevent the cooperatives from performing this vital role.

i) excessive bias towards consumer activities.

ii) the managers of the village cooperatives, were outsiders paid by the MPCS who had no interest in helping the farmers.

iii) lack of involvement of the villagers themselves in the management of the cooperatives.

The other rural organisation, namely the Cultivation Committee was somewhat different. They still had a popular base. The nominated members who formed the Committees were, in most cases, farmers from the villages themselves. These Committees were also set up for the specific purpose of planning and developing agriculture in their respective areas, the more important functions expected of them being the following:

i) Maintaining accurate Land Registers of paddy and highland and settling land and tenancy disputes.

ii) Preparing annual production programmes for the development of paddy and highland cultivation and livestock.

iii) Holding Kanna meetings and implementing the Kanna programmes.

iv) Helping the farmers to obtain their agricultural inputs and other requirements in farming.

v) Coordinate the activities of other agencies working at village level to improve agricultural production.

The Cluster I villages were served by the two Cultivation Committees Nochchikulama CC for the villages of Nochchikulama-Mankulama and Kahapathwilagama CC for Kahapathwilagama and Tirappane. The Cluster II was served by Kalattewa CC. An Examination of the performance of the three Cultivation Committees serving the two village clusters reveals the following characteristics.

All the Cultivation Committees were exclusively concerned with paddy cultivation. This is natural, given the overall importance of paddy cultivation in the purana village economy. The tradition of the Cultivation Committees functioning under the Paddy Lands Act (1958) had also been an exclusive concern with paddy cultivation. Under the Agricultural Lands Law (1973) all aspects of agricultural development (including highland and livestock) were brought under the purview of the Cultivation Committees. These however, continued to be biased towards paddy cultivation. As a result they took no interest in highland/chena cultivation and livestock. The development possibilities and problems of the latter sectors were not properly appreciated or understood by the members. At the time of the survey work of the Committees was confined to the holding of the Kanna meeting and implementing its decisions, especially in regard to irrigation water distribution. The Committees no doubt did a very useful service in this regard although there were many problems associated with the actual implementation of the Kanna programme[1] itself. A striking weakness

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[1] See above under Paddy Cultivation.

of the Cultivation Committees was that they were not able to deviate from the bias towards paddy During the last several years when there was little or no paddy cultivation these Committees virtually remained dormant, although much could have been done to help the farmers in their highland/chena cultivation which had developed not only to be the most important agricultural activity, or the principal method of land use, but also the only means of livelihood to the people.

The important point regarding village level organisations and extension services is that there was little or no interaction between them. These organisations have to work in very close collaboration in order to plan for agricultural development and to efficiently implement such programmes. It is also clear that a breakaway from the tradition of giving overemphasis to paddy cultivation is essential in the light of the growing importance of highland/chena cultivation in the dry zone traditional settlements. Integration of livestock will have to receive priority with increasing chena stabilisation. The need for looking at agricultural activities from the view point of a farming system would only be possible if different organisations working at village level work very closely with one another.

This in fact was the aim of the Agricultural Productivity Law. The Agricultural Productivity Centres were expected to plan agricultural development within a village council area by bringing together all agencies involved in agricultural development at village level, CC was to be the village level agent of the APC. The Cultivation Committees serving the two village clusters came under the Mihintale APC. The latter lacked dynamism and foresignt due to unsuitable leadership. The APC as a result was unable to guide and help the CC to play a dynamic role within the context of a changing agricultural situation.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

5.1 CONCLUSIONS

This section attempts to summarise some of the main findings of the study with regard to specific issues concerning rainfed farming in the purana villages in the Dry Zone. Based on these findings some recommendations are made which, it is hoped, would prove useful for any future policies on rainfed highland farming in the Dry Zone of Sri Lanka.

5.1.1 TRENDS IN CHENA FARMING

a) The traditional role of chena farming in the purana village economy was observed to be rapidly changing. Chena cultivation is no longer an appurtenance of paddy cultivation, but has emerged as the dominant agricultural activity in the village covered in the study. Chenas have become commercialized and market-oriented. This is evident by the fact that several new cash crops are grown extensively in place of the traditional chena crops.

b) The study reveals conclusively a slow but definite tendency towards a spontaneous stabilization of chena farming. This is particularly evident in areas such as Cluster II where there is a high population pressure on limited forest reserves in which chena cultivation could be practised.

c) The trend towards spontaneous stabilisation of chenas has aggravated inequalities in the access to land. Those with the ability to invest more capital enclose larger and more productive lands while the poorer households are left with only the marginal lands. A consequence of the increasing inequalities due to the above, has resulted in the emergence of a class of agricultural labourers. This is predominant in Cluster II where the problem is more pronounced.

d) In areas such as those referred to above, there is large-scale encroachment of the limited forest lands. The indiscriminate clearance of forest is followed by the haphazard establishment of settlements on lands enclosed for purposes of cultivation. This in turn has led not only to serious ecological probmels but the villagers are facing difficulties in obtaining timber for house construction and even in meeting their requirements of firewood.

e) The encroachment on limited land resources for arable farming purposes has also led to the degeneration of the livestock economy. As more and more lands are brought under cultivation, the extent of land available for grazing is progressingly reduced. This in turn has led to a decrease in the animal population which may aggravate the problem of draught power shortage.

5.1.2 PROBLEMS RETARDING A SYSTEM OF STABILISED CULTIVATION

a) One of the major obstacles for the rapid evolution of a system of stabilised cultivation is the present tenurial patterns of the chena and highland holdings. Almost every chena and highland is an encroachment and due to the uncertain tenurial conditions farmers are reluctant to invest in the improvement of their holdings.

b) Lack of suitable low-cost implements for tillage operations and the difficulty of controlling prolific weed growth on lands which are cultivated consecutively for 2-3 seasons are still major bottlenecks. In areas where the highlands are farmed continously farmers are faced with the problem of maintaining and improving the fertility of the soil.

c) The role of state institutions in the supply of agricultural inputs, particularly the fertilizer and improved seed material is insignificant. Institutional credit facilities are not available to chena cultivators. These functions are performed by private traders who virtually exercise monopolistic powers and

provide these services on terms which are unfavourable to the farmers.

d) Extension facilities available for highland farming were inadequate. Extension services, which have been traditionally biased towards paddy, have not been adequately geared to meet the needs of a rapidly expanding highland rainfed farming sector.

5.2 RECOMMENDATIONS

5.2.1 THE NEED FOR A LONG-TERM PLAN

a) A comprehensive long-term plan for the development of unirrigable land is a long felt need. While the current emphasis on the development of irrigated agriculture, particularly under the major irrigation projects, is justified one should not overlook the fact that nearly 3½ million acres of land suitable for agricultural development in the dry zone are not likely to come within any major irrigation projects in the near future. These lands not only support a substantial proportion of the population of the dry zone but also account for a large share of the domestic agricultural production, particularly of pulses, cereals and other highland products. Thusm it is equally important to formulate a comprehensive plan for the development of such lands. Such a plan should not only be intended to rationalise the use of the vase land resources but also must take into account the future physical and economic basis for the establishment of settlements in the area. In this regard it would be useful to undertake a cost-benefit analysis of rainfed farming as against irrigated agriculture in the dry zone of Sri Lanka. The potential for dry-farming needs to be examined in terms of capital investment, its immediate employment opportunities and the potential for the production of food and industrial crops.

b) A comprehensive plan has to be prepared by a group consisting of agriculturists, land use planners, forest and wild life experts

together with economists and sociologists so that all aspects pertaining to resource use, development and conservation, maintenance of environmental balance are given due recognition.

c) Such a plan should necessarily have a certain degree of flexibility depending on the conditions of different regions particularly in relation to population pressure and the availability of land for chena cultivation. In areas where land is in short supply, or where such a situation is fast approaching, chena cultivation has to be prohibited and the land re-allocated for permanent cultivation. In areas where sufficient forest lands are still available, chena cultivation could be permitted only in areas specifically earmarked for the purpose. This could be done as a preparatory step towards introducing permanent agriculture at a subsequent data. In such areas farmers could be given the required technical and economic backing to adopt intensive forms of agriculture within a modified fallow system.

5.2.3 NEED FOR A CLEAR LAND TENURE POLICY

a) A well-defined land tenure policy in respect of lands on which chena cultivation is practised is essential. Such a policy should not only encompass long-term national objectives of maximum resource utilisation and production but should also take into consideration the immediate interest of the village community itself. It should aim at bringing about a rational allocation of resources in the rural community so as to promote greater equity in access to resources, income distribution and so on.

b) A tenure system for this area should be such that while it gives greater security of tenure to the cultivators of highland holdings, it also provides the necessary incentives for investment in the development of land. Formulation of such a tenure pattern may make it necessary for a programme for land reallocation and the issuing of title deeds to the lands.

c) In the event of reallocation of land among the members of the

village community consideration should be given to the following aspects:

i) The optimum size of highland that could be worked with family labour.

ii) The optimum size of highland required to obtain a satisfactory level of income.

iii) The size of highland to be allocated in relation to the ownership of paddy lands.

d) In areas where there are adequate forest reserves it is essential that existing legislation regulating the indiscriminate clearance of forest be strictly enforced. If such legislation itself is found to be dificient it may be necessary to introduce new legislative measures.

5.2.4 THE NEED FOR BETTER SYSTEMS FOR RURAL CREDIT, INPUT SUPPLY & MARKETING

a) As noted earlier, under the present institutional credit system the bulk of the highland cultivators in the purana villages are denied credit facilities as they lack ownership claims to the land they cultivate. If a programme of stabilised cultivation is envisaged credit becomes necessary to meet the expenses of land improvement, use of purchased inputs, equipment etc., Hence the need to formulate a suitable credit programme taking into account all aspects relevant to rainfed farming including its highly risky nature. In this respect an experiment carried out by the ARTI in collaboration with the Bank of Ceylon on group-credit merits attention.[1] Under this programme each member of an organised group of farmers was provided credit under a system of 'gurantee interse' which made the adoption of improved methods of cultivation and repayment of loans the collective responsibility of the group. This system facilitated disbursement of credit

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1 Ref. See Gooneratne et al - Group production - A Case Study - ARTI punlication 1977.

and helped in its recovery. Furthermore, it enabled supervision in the use of credit by the farmers.

b) Associated with credit facilities is the need to streamline and improve input supplies and marketing. At present, besides the private traders the only other retail outlet for inputs is the village cooperative store. This Cooperative serves a large number of villages and is primarily concerned in the distribution of consumer items. It is therefore, necessary to have better institutional arrangements to assure a speedy and regular supply of inputs, equipment etc., required under a stabilized system of rainfed farming.

c) There is no assured market for certain types of chena products particularly the perishables. Even for crops such as chillies, cowpea and other pulses the market is controlled by a group of private traders who do not give a fair price to the farmers. Hence, it is essential that state organisations play an active role in the marketing of farm products.

d) There is wide fluctuation in the prices of most highland and chena crops. Guranteed prices are available for some of them. Hence, it is recommended that the guaranteed price scheme should be extended to cover some of the major crops produced in the dry zone.

e) Given the seasonal nature of rainfed highland crop production and the resulting gluts particularly of perishables, the hitherto neglected area of processing of farm products needs to be given high priority. Processing industries, besides helping to solve the problems of marketing and price fluctuations, could also help to diversify the economy of these areas which is heavily dependent on crop production.

5.2.5 IMPROVED EXTENSION SERVICES

a) Specialised advisory services will be required initially for chena farmers to adjust themselves and get accustomed to the

requirements of a stabilized system of cultivation. As noted in an earlier section extension facilities in the villages covered in the study were inadequate. There is now an urgent need for intensification of extension services geared to the needs of a rapidly expanding system of rainfed cultivation.

b) Intensive training facilities on all aspects of dry farming should be provided to village-level extension workers.

c) Since the techniques of scientific dry farming are unknown to the average dry zone purana villager great emphasis should be placed in organising demonstration plots within the village itself.

5.2.6 NEED FOR RESEARCH

The deficiencies in the present technology on rainfed farming were noted at different points in this study. A few suggestions appear to be relevant in this connection.

a) Tillage problem needs to be looked into carefully to evaluate and evolve machinery and equipment suitable for settled highland farming. Some mechanisation is necessary for speedy land preparation. The development of efficient hand tools and certain animal-drawn equipment should receive careful attention in order to evolve a balanced system. Farmers' knowledge and experience has to be fully utilized in developing such tools.

b) More research is necessary to overcome the problem of prolific weed growth in dry land farming. At present farmers incur high costs in hiring labour for weed control and this is one of the main reasons behind the need to practise chena cultivation. Therefore, research should be undertaken to explore the possibilities for adopting more economical methods of weed control.

c) Research on cropping systems for rainfed farming is essential. The potential for the inclusion of animal husbandry as an integral component of the farming system should also be explored more systematically.

GLOSSARY

Akkarawel	:	Free hold paddy land
Ande	:	Share cropping system upland tenure
Attam	:	Exchange labour
Badu Idam	:	Leasehold land
Bethma	:	A system of cultivation whereby only part of the paddy fields are cultivated during periods of drought by mutual consent of cultivators
Bissa	:	A basket or wattle and daub structure usually erected on poles for storage of paddy
Chena	:	Patch of land cultivated under shifting cultivation
Gama	:	Village
Gangoda	:	The site of village settlements
Kantha Samithe	:	Women's organisations
Korale	:	An administrative division equivalent to the present AGA' division
Kumbura	:	Paddy field
Maha	:	The main paddy season coinciding with the period of the North East monsoon
Meda	:	The period of paddy cultivation between the Maha and Yala seasons
Nawadeli Chena	:	A chena plot cleared from virgin jungle.

Praja Mandalaya	:	A rural society concerned with Community Development
Purana	:	Old, traditional
Puranawela	:	Old field
Watta	:	Garden
Wewa	:	Tank
Yala	:	The minor season coinciding with the South West monsoon period
Yaya	:	Tract of paddy field