

**"A PLAN FOR AGRI-HORTI DEVELOPMENT : AN AREA
PLANNING APPROACH"**

Thesis submitted in part fulfilment of the requirements for the Degree of
Master of Science (Agriculture) in Agricultural Extension to the Tamil Nadu
Agricultural University, Coimbatore.

By

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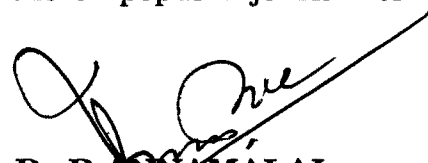
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CERTIFICATE

This is to certify that the thesis entitled "**A PLAN FOR AGRI-HORTI DEVELOPMENT : AN AREA PLANNING APPROACH**" submitted in part fulfilment of the requirements for the degree of MASTER OF SCIENCE (AGRICULTURE) IN AGRICULTURAL EXTENSION, to the Tamil Nadu Agricultural University, Coimbatore is a record of bonafide research work carried out by **Mr.P.PRIYAKUMAR**, under my supervision and guidance and that no part of this thesis has been submitted for the award of any other degree, diploma, fellowship or other similar titles or prizes and that the work has not been published in part or full in scientific or popular journal or magazine.

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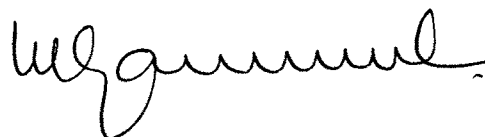
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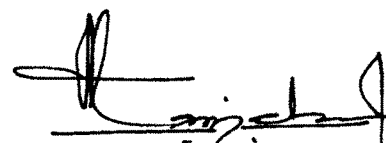
I should not leave out my well wishers Natarajan Sir, Anitha mani Madam, Sasi sir, Late Joseph sir, Ajith Sir, Sadasivan, Anilkumar A.G. and Haridasan whose advices and encouragement helped me a lot in all my steps.

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(PRIYAKUMAR)

ABSTRACT

A PLAN FOR AGRI-HORTI DEVELOPMENT : AN AREA PLANNING APPROACH

BY

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The study entitled "**A Plan for Agri-Horti Development : An Area Planning Approach**" was carried out with the aim of preparing a development model for the rural area where the region have equal importance for the cultivation of both agricultural and horticultural crops.

The research work was carried out in Anchal block of Kollam district in Kerala State. All the fourteen settlements (Revenue villages) in the block were considered for this study since the study was aimed at area planning to ascertain the right locale for right infrastructure facilities as well as to centralise and decentralise the infrastructure for better utilization. Ninety wardmembers and twenty three agricultural assistants were interviewed by using a well structured interview schedule to know the utilization behaviour, space preference for the selected facilities and opinion of the beneficiaries.

Relevant secondary data for this study were collected from various departments. The important findings of the study ~~have~~ been presented below:

Area homogeneity with respect to the cropping pattern of the study area, a prerequisite for Area Planning, was analysed and found as homogeneous. Fifty one infrastructure facilities were considered for this study. These facilities were found to be distributed evenly. But the number of facilities enlisted in the settlements were not proportionate to its population size. Similarly no settlement possessed all the fiftyone facilities considered in the study.

Categorisation of settlements was done according to their levels of development into developed, moderately developed and less developed ones. For this, settlement function scalogram and functional hierarchy methods were used. By using service potentiality method one growth centre, twelve service centres and one central village could be identified among the settlements. These settlements which were identified in the study should be raised from the present hierarchal levels.

All the settlements are having nine functions commonly. Ten common functions existed in ten settlements. Assistant director of agriculture and block development officer were the two functionaries seen in the developed settlement alone. Thirty eight functions/functionaries were existing commonly in developed and moderately developed settlements.

To the selected potential central places, needed infrastructure facilities were proposed after considering populations size, distance matrix and opinions of agricultural assistants and ward members. The proposed facilities were agro service centres, fertilizer and pesticide shops, veterinary and animal husbandry centres, daily markets, weekly markets, milk collection centres and primary agricultural co-operative banks. Eventually a model plan for the development of farming in the study area was prepared.

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INTRODUCTION

CHAPTER - I

INTRODUCTION

Planning presupposes purposive direction and regulation of socio-economic forces according to the requirement of desired social ends. It is a total process covering all the aspects of socio-economic life. In India, development planning is an accepted tool to achieve socio-economic development of the masses steeped in poverty, illiteracy etc. Planning in India started since 1951 with highly aggregative national level models. Experience over the years had shown deficiencies in national plans and the need for revision.

Even during the struggle for independence itself Mahatma Gandhi pleaded for decentralised administrative system with village as basic unit. Lord Chesterton claimed even a century ago that : " Nothing is vital until it becomes local". In search for an ideal unit of planning upward from the village, the first district was identified in late 1960s as a lower level unit of planning. But in late 1970s it was felt that even a district was too big in area involving population and to concentrate on specific target groups. Hence, the idea of experimenting with a block level planning emerged (Dhanasekaran, 1990).

A block level planning emphasises reformation of the agrarian structure and institutional set-up. The important development programmes launched through the blocks were Community Development programme (CD) and Integrated Rural Development Programme (IRDP). Both the programmes were right steps in right time, but both had some draw backs. In CD programme the individual village was accepted as a unit of development (Mohan et al., 1987). In community blocks too the allocations were made on ad-hock basis and there, too, some pockets in the blocks could get preferences. In the case of IRDP, it was not based on decentralised microlevel planning (Dhanasekaran, 1990). The most disturbing thing was that the Growth centre approach (Cluster approach) which form the hub of microlevel planning had not been adopted in formulating these block plans, thus leaving a big lacuna in planning process. Cluster approach is planning with space dimension, which is referred as area planning. Planning without space dimension is an experiment in futility.

1.1. Area Planning

Area planning approach is the best for integrated rural development because this include functional integration, spatial integration and over all which is "planning from below". Functional integration means the integration of activities of various sectors of development, called inter-sectoral linkage. Experience had shown that the most important single reason for poor performance of various rural development programmes was the ignorance of inter-sectoral linkages and the lack of coordination among various

functionaries. Thus, functional approach emphasise that different sectors are inter connected by systems of backward and forward linkages, which is more important. For instance, agricultural development is associated with increased demand for farm inputs like machinery, fertilizer, seed, credit and agricultural information. These form the backward linkages. Forward linkages for agricultural development includes storage of agricultural commodities, marketing and transportation of agricultural commodities. Hence, in development planning both backward and forward linkages should be considered.

1.2. Spatial Integration

In spatial integration, the main thrust is to interrelate or combine different parts of regional settlement system in a coherent pattern and also a complete compatible system of settlements. Spatial integration is achieved through spatial planning, which involve distribution of facilities over the space at appropriate location taking into consideration of specific level and nature of specialisation of the function. Hence after spatial planning the social and economic infrastructures will not be dispersed randomly over the space but they will be concentrated at certain focal points which serve as incipient point of growth. The methodology followed for spatial planning is the identification of central places viz., Growth centres, Service centres and Central villages. It can be concluded that Spatial planning is indispensable in an area planning process.

1.3. Relationship between Area Planning and Planning for Agricultural Development

In area planning the main economic base of the area should be identified. Agriculture is the main base in most of the districts of India. Hence, in rural areas developmental efforts should centre around Agriculture. Agriculture is the sector of economic activity in which most rural people are engaged and from which most household income is earned directly or indirectly. As a result, the development of Agriculture as well as Horticulture in the rural areas through area planning approach can ultimately lead to the social and economic development of the area as a whole. To attain this objective, agriculture and horticulture sectors should be modernised by strengthening the infrastructure facilities.

1.4. Importance of infrastructure facilities in Agri-Horti development

With a rapid advancement in science and technology, extension service and hard work of farmers, the development of rural infrastructure facilities also help to keep the food production in pace with the need of expanding population in India during recent decades. Availability and utilization of infrastructure facility have greater influence in increasing productivity. The returns from agriculture/horticulture will determine the future plan and investment of the farmer. The farmer will not be in a position to invest money in agriculture if he does not get remunerative price for his produce due to the non availability of market and loss of produce due to lack of

storage and processing facilities. Similarly, availability of transport facility, input facility, power, machinery, agriculture information etc. directly influence the production. Mere presence of these facilities will not help the farmer. They utilize them only if they are accessible to them. That is why they should be placed at viable locations in sufficient number by adopting spatial planning.

OBJECTIVES

Realising the importance of area planning in agricultural and horticultural development, this study was under taken with the following objectives.

- i. To assess the distribution of infrastructure facilities over a space.
- ii. To analyse the sustainability of infrastructure facilities in the settlement.
- iii. To ascertain the potentiality of existing infrastructure facilities for Agri-Horti development.
- iv. To prepare a model for proper utilization of infrastructure facilities for Agri-Horti.development.

Importance and Scope of the study

The area selected for the study is a rural area. Cultivation of agricultural as well as horticultural crop is more in the study area. In such a

condition for the improvement of farming, the best suitable planning which could be chosen is Area planning.

The study would help to identify the spatial and functional imbalance that exists in the study area. The settlement function scalogram analysis would give a pictorial representation of levels of settlements and distribution of infrastructure facilities in the study area. The ranking of settlements could give the idea about the comparative development level of settlements to the planners. Identification of vital points like growth centre, service centre and central village would help the planner to recognise the locale for placing facilities.

Limitations of the study

This study primarily depends upon the secondary data. Getting such information from various departments by a single student researcher is a tedious task.

The possibility of rechecking the data collected is difficult by the student.

The findings of the study would directly be applicable to the locals of the study area and the space with similar situations.

Having the idea mentioned above, relevant literatures were reviewed and presented in the next chapter.



REVIEW OF LITERATURE

CHAPTER - II

REVIEW OF LITERATURE

In this chapter the concepts relating to the present study and the related past studies are reviewed, and are presented under the following sub-heads:

- 2.1. Agriculture
- 2.2. Development
- 2.3. Agricultural development
- 2.4. Integrated area development
- 2.5. Area Planning
- 2.6. Development planning
- 2.7. Spatial planning
- 2.9. Spatial integration
- 2.9. Infrastructure facilities
- 2.10. Area homogeneity
- 2.11. Hierarchy of settlements

2.1 Agriculture

Agriculture is the most important enterprise in the world. It has been a mainstay of human being since time immemorial. Agriculture in any form has been practised in those areas where men have been living permanently.

According to Sharma (1981) agriculture is the science of producing crops and livestock from the natural resources of earth.

In the views of Dutt and Sundaram (1982) the significance of agriculture can be best explained by considering the role of agriculture in the development of national economy by the following aspects.

- Agriculture and allied occupations such as animal husbandry, forestry etc., contribute to the major national income.
- Agriculture forms the major source of livelihood for 68 per cent of the population.
- Agriculture is the only industry which provides employment for 68 per cent of the population.
- It plays an important role in India's trade.

As opined by Rindos (1984) agriculture atleast in its larger scale and more intensive forms, generally means widening differences in social status.

De (1989) stated that agriculture is a productive unit where a free gift of nature namely land, light, air, temperature, rain water, humidity etc., are

integrated into a single primary unit (crop plant or their usable parts) indispensable for human beings.

Agriculture, the greatest boon to mankind which meets the basic needs has been given importance in this study.

2.2. Development

Development is an interdisciplinary concept having a goal to enrich the quality of life both individually and collectively.

According to Sharma (1978) development can be regarded as all pervading human activities, discovering the latent potentialities and mobilizing them to achieve the desired social goals.

Development as stated by Alexander (1990) embraces major shifts in the industrial, occupational and spatial distribution of productive resources and in the degree of exchange basis and monetisation of the economy.

According to Sudha (1994) development is mainly concerned with agricultural development, by establishing facilities in appropriate locations will enable the people to avail those facilities, thereby contributing to increase their production resulting in development.

2.3. Agricultural Development

Half of the country's national income is derived from agriculture and seventy per cent of India's population get employment through agriculture.

Agriculture development as stated by Dubhashi (1972) is the foundation for the economic development of our country and it has to be a multi-focussed, multi-processed and multi-feceted effort.

As viewed by Tripathy **et al.**, (1979), agricultural development in the area should not only be more production through higher productivity, but also a greater equality in income distributin and employment generation through a process of planned and directed development.

As opined by De (1989) agricultural development is multi-directional having galloping speed and rapid spread with respect to time and space.

In the view of Prasad (1989) agricultural development represents the technocratic strategy of development and so far as it aims to maximise agricultural output and productivity.

As reported by Misra and Achyutha (1990) since agricultural development can be taken as a key to self-sustaining growth in rural areas, a rural development model can be designed around an agricultural development strategy which will not only benefit the well-to-do farmers but

also a substantial number of poor farmers and which can provide the basis for other development activities in rural areas.

Concentration in this study is on Agri-Hort development which is the main thrust of the nation.

2.4. Integrated area development

To overcome the shortcomings of Community Development Programmes special emphasis was given to area development and integrated approaches.

Integrated area development according to Sen (1972) refers to the appropriate location of social and economic activities over a physical space for the balanced development of a region.

Sundaram (1977) stated that integrated area development planning is an approach that would provide a frame of reference for integrated or complementary development between different sectors of economy, areas and area levels.

Integrated area development as perceived by Sadhana (1991) is both functional and spatial integrations over a period of time where, functional integration means to co-ordinate expansion of various social and economic services needed for the development of areas and spatial integration implies

the linkage between various levels of urban centres for the development of the region.

According to Gomathy (1992) integrated area development implies appropriate location of social and economic activities over a space for optimal utilization by the people and for the balanced development of the space.

Sudha (1994) opined that the integrated area development in the sense is location of infrastructure facilities in the area for the effective utilization of people and for the overall development of that area.

2.5. Area planning

Krishnaswami (1974) opined that in area planning, the main economic base of the area should be identified. Agriculture is the main base in most of the districts in India. Developmental efforts should centre around this main economic base, viz., agriculture. This should be modernised and strengthened so that it could serve as a nucleus for the overall development of the area. The infrastructure for agriculture should be developed. This will include irrigation facilities, road and transportation, storage, marketing and processing facilities.

2.6. Development planning

The development process can be achieved through the development planning which is a systematic and rational way of achieving it.

According to Banerji (1969), development planning is a conscious and continuing attempt by a Government through the application of intelligent foresight and systematic disciplined knowledge to increase the rate of economic and social progress.

Dahia (1982) defined development planning as the preparation and co-ordination of medium and long term economic policy by those government institutions involved in formulating, implementing or executing development policy.

Kurian (1987) viewed that planning for development has taken place within a social framework of political and historical condition and regime of institution.

Thus development planning must cover every sector and aspects of life and should be linked together, for economic and social structural change.

2.7. Spatial Planning

A realistic planning exercise should have three essential dimensions i.e., economic, social and spatial. Where interpersonal disparities in economic and social development are significant, spatial planning is oriented to the poorer sections of the society within the framework of overall area or original development goals.

Spatial planning could be of two types namely adaptive and developmental. The adaptive spatial planning is primarily based on the recognition of the impact of general trends of development on the spatial system. The task of adaptive planning as stated by Hermanson (1971) is as follows.

To streamline the process of spatial evolution so as to achieve at any point in time a spatial structure which match the needs of industry for efficiency and growth.

Developmental spatial planning have been referred to by him as active spatial planning. He explained that this spatial planning is one that is based on the recognition of interplay and feed back relations between economic development and spatial evolution.

According to Ghosh (1972) spatial planning is a kind of physical planning which depends upon the availability of electricity, transportation system, water resources, mineral resources and the like, in an area and the objective is creation of social satisfaction to people where the planning is undertaken.

Spatial planning as stated by Annamalai (1982) is one of the means to resolve conflicts in a situation full of various constraints and arriving at an

optimal solution such that 'folk' and 'work' are organized in space with maximum mutual benefits and minimum conflicts.

Natarajan (1983) stated that spatial planning cannot be done for each and every settlement separately. It should take into account the interlinkages and the hierarchies of a whole range of settlements. Therefore spatial planning should aim at creating a spatial organisation framework which would be capable of sustaining the strains of transition.

Only through spatial planning the overlapping of area of operation by the infrastructure facilities are found by Wanmali (1985) can be eliminated any comprehensive system of distribution of goods and services could be made possible.

Singh (1989) viewed that spatial planning aims at generating development through rational locational decisions for socio-economic activities at most appropriate places for maximisation of benefits from economic planning. Moreover such a planning ensures that social and economic infrastructures are not dispersed randomly over the space but are cocentrated at certain focal points, which serve as incipient points of growth.

Dhanasekaran (1990) opined that spatial integration is obtained through spatial planning which, inturn, refers to the appropriate location of social and economic activities over a physical space, for the development of a

region. Spatial planning is important because the sectoral development needs provision of necessary inputs and infrastructural facilities, which cannot be scattered or dispersed too thinly due to constraints of resources and keeping in view their optimum utilization.

According to Misra and Achyutha (1990), spatial planning is the sum total of the concepts, approaches, methods and techniques of evolving a desired spatial organisation and structure.

Sadhana (1991) perceived spatial planning as a method to bring about optimum location for the establishment of facilities so that human activities would converge and disperse to speed up the development process with particular reference to horticulture.

According to Gomathy (1992) spatial planning refers to the method that would reduce the existing wide variations in the maximum travel distance for different functions by providing a locational plan for guiding future investment in service and other activities.

2.8. Spatial integration

Wanmali and Khan (1970) stated that spatial integration is interrelating or attempting to combine different parts of regional settlement system in a coherent pattern. It also involves completion of any incompatible system of settlements.

Ghosh (1972) defined spatial integration as the process of integration between physical resources and the men in an area.

According to Sharma (1978) spatial integration is the process of development of an area conceived to be operating through certain central places which are serving the area in the provision of goods and services for the entire area.

Tripathy *et al.* (1979) viewed that spatial and functional integration are the two main aspects of the area planning based on growth centre approach to development. Functional integration is achieved through strengthening of sectoral interlinkages at all levels of activities and spatial integration is achieved through distribution of facilities over the space at appropriate location taking into consideration the specific level and nature of specialisation of the function.

Natarajan (1983) emphasises that the infrastructure facilities need to be located in optimum places which could be done by following an approach for spatial integration through area planning.

Gomathy (1992) perceived spatial integration as the process through which the functions located at certain central places served the in and around area thereby bringing about development of the entire area.

Thus in this study spatial integration was considered as important for planning of infrastructure facilities.

2.9. Infrastructure facilities

Infrastructure plays an important role in agricultural development.

As reported by Bose (1972) the farm may be compared to the portion of a building that is above the ground. This is the superstructure. Below the ground is the invisible foundation on which the superstructure stands. This foundation is the infrastructure that includes road, banks, co-operatives, organisations for the supply of inputs such as fertilizers, pesticides, improved seeds, implements, marketing facilities etc.

Annamalai (1982) found that the infrastructure facilities have not been established based on scientific methods and there is an imbalance between areas.

As opined by Balakrishna et al. (1982), infrastructure facilities are nothing but the blending of social facilities such as schools, hospital etc., and economic facilities such as bank along with transport and communication facilities.

Palaniswami (1984) viewed infrastructure facilities as different services or functions exist to render all the needs of human development in their day to day life.

According to Singh and Sidhu (1987) power supplying machinery is also an imperative infrastructure for agricultural growth. The chief source of power in Indian agriculture continue to be the animal. Tractor as a means of motive power, diesel engines and electric power for water lifting have come under this infrastructure facility.

There are two kinds of infrastructure facilities as perceived by Setty (1988) namely physical infrastructure and social infrastructure. The physical infrastructure includes financial and marketing facilities and social infrastructure consists of positive attitudes, values and preferences of people and a climate for change and development.

According to Gomathy (1992) infrastructural facilities refers to those functions/services provided by government or non-government agencies to facilitate agricultural development.

In this study, infrastructure facilities required to Agri-Horti development are taken into consideration.

2.9.1. Potentiality of infrastructure facilities

Utilization of infrastructure has great influence in increasing the productivity.

According to Gaurha (1977), the role of infrastructure facilities in hastening the pace of technological change among the rural communities has been too crucial which needed special emphasis.

Singh (1980) reported that in addition to other facilities agricultural credit facility is the most urgent need for the development.

According to Singh and Sidhu (1987), storage as an imperative infrastructure for agricultural fulfils an important economic function of regulation of supply in relation to demand, stabilization of price and maintenance of buffer stocks. Cold storage is important for marketing of perishable fruits, vegetables, fish, meat and milk products.

They further opined that infrastructure is a wide term and conceptually includes all those elements which are not only basic to the primary sector, but which also belongs to secondary and tertiary sectors of the economy. In respect of agricultural development infrastructure refers to the construction of such social overhead which aid in fostering production and distribution and in the process contribute directly to balanced growth of

the total economy. Infrastructure embraces, the social economic and even the cultural and agronomic areas of human behaviour and endeavour.

Road, railway, water and air transportation, according to them, are the important infrastructures. These infrastructures increases mobility of men and meterial, open new markets for capital and consumer goods and tends to maintain the free structure of the market economy. The capital goods and farm inputs are picked up from the industrial unit for distribution to the producers. Road transport is practically important because the motor vehicles can reach the remotest villages and can prove much more useful in promoting agriculture. Poor transportation is one of the major bottle necks in quick and cheap movement of agricultural commodities and inputs.

In the views of Ulaganathan (1988) the farmers of the region with abundance of infrastructure may be in a better position to utilize their resources than those of a region where the necessary infrastructure is lacking or inadequate.

Verma and Shahi (1988) stated that infrastructure facilities play a very important role in the process and pattern of developments. The regional disparity in infrastructure tends to increase the variation in development even though the region have the same resource base.

Ahmed and Hossain (1990) found infrastructural facilities to affect positively agricultural production, employment of those with marginal or no land, diffusion of technology and greater use of input and higher income.

Dadibhavi and Vaikunthe (1990) opined that the overall index of rural infrastructure tends to increase per capita income. It also tends to reduce the poverty ratios in the rural areas. But there are wide variation in the availability of infrastructure facilities in the rural areas of Indian status.

They have concluded that development of rural infrastructure appears to be useful for improving the living conditions.

As stated by Sadhana (1991), infrastructure plays a catalytic role in the process of development and influences all the regional potentiality and mobilises the production factor of the region, higher the level of regional development and **vice-versa**.

Singh (1991) opined that the backwardness of agriculture in the most of the third world countries has been explained, besides some other facts, in terms of non-availability of marketing infrastructure in these countries because the price which a farmer gets for his marketing surplus determines his future production and investment plans. Well planned and conveniently located assembly points benefits the farmers as also the economical prices to

the consumers. This helps in the growth of infrastructural facilities for the transportation, storage and processing of the farmer's produce.

According to Iqbal (1994) in rural India the base for agricultural crops, the processing and storage facilities have been of poor nature resulting into a loss of Rs.30,000 crore every year. Old technology is being used in processing of many agricultural crops. Hence the need of the day is to minimise post harvest losses. This could be possible by bringing the most efficient processing technology to the farm sector in general and processing sector in particular.

Ahmad (1995) opined that the farmers are not getting remunerative prices for their produce because the marketing infrastructure in rural areas could not maintain the pace of its growth along with the growth of production and further farmers are not fully aware of modern marketing practices. Due to the lack of facilities for packaging, storage and transportation, the farmers also have to incur significant post harvest losses. Agricultural marketing plays an important role not only in stimulating production and consumption, but in accelerating the pace of economic development. For this reason, it has been described as the most important multiplier of agricultural development.

According to Selvam (1997), the difference between the developed and developing nations is more manifest in infrastructure than in anything else. Infrastructure development must precede economic and social development.

Infrastructure development itself should be diverse and broad based. Economic infrastructure, financial infrastructure and social infrastructure constitute the 'trinity' of infrastructure facilities. The state and style of development of nation are in direct proportion with development of their infrastructure.

2.9.2. Space preference of the people

Since, people are the end beneficiaries of the infrastructure facilities, they should be consulted for the distribution of the facilities over the space.

According to Barnala (1978), the infrastructure development and service programme might perfectly be left to their own respective sector which needed to be taken up on the basis of established criteria and priorities.

Krishnan (1979) opined that investigating the perception of people regarding the optional location of various facilities is essential.

Annamalai (1982) stated that the space preference data are important for the establishment of infrastructure facilities at right places

Natarajan (1983) reported that the findings on the utilisation of infrastructure facilities by the settlements would show the places where from the people avail the facilities, the distance they travel and the difficulties in

utilising the facilities. Space preference particulars would help the planners to know the places preferred for the establishment of facilities for better utilisation in population distance dimension.

Singh (1988) viewed that the actual needs of the people and the potentials available in a specific area should be taken into consideration during the distribution of infrastructure facilities.

Gomathy (1992) perceived that the space preference should be taken into consideration for optimal location of various existing as well as proposed facilities.

Based on the above review, the space preference has been considered in this study to know the sustainability of infrastructure facilities for agri-horti development and to propose the model for the same.

2.9.3. Location of infrastructure facilities

Anything to be introduced in an area should not only depend on the space preference of the people but also should take into consideration the factors like population, capital to be invested, distance, area of coverage etc.

As opined by Wanmali and Khan (1970) if the locational priorities are properly finalised and defined, then the development of social facilities in the



future will reduce the gap between the central and peripheral sectors of an area.

Wanmali (1972) stated that location is identifying certain places to put a particular thing or activity in that particular place.

Tripathy **et al.**, (1979) reported that when new activities or facilities are proposed, the location of such facility becomes extremely important.

Gomathy (1992) perceived that utilisation behaviour of the infrastructure facilities by the farmers varies with respect to the level of the functions and locational preference of the functions.

Thus, while locating the functions it should be done with great care to reduce the gap in distance and it was taken into account in developing the model for this study.

2.10. Area homogeneity

For effective development planning the homogeneity of area is important.

Misra **et al.**, (1971) stated that the identification and mapping of homogenous areas have acquired considerable significance in the context of area planning from the grass root level.

As viewed by Annamalai (1982) before identifying locale for establishment of infrastructure facilities, homogeneity must be assessed.

Based on the above review, it is important to study the homogeneity of area for planning.

2.11. Hierarchy of settlements

There are discrete and structurally distinct groups of centres; each group is a distinct entity. All functions of different order, therefore, need to be located in the most appropriate places.

As reported by Tripathy **et al.**, (1979) there is a hierarchy of settlements based on the number of facilities of different orders and specialisation and also on the basis of the area served by a settlement.

In the words of Chetwynd (1980) a hierarchy of urban centres-service centres, market town and regional centres serves a rural region and binds it together.

Singh and Rai (1988) stated that the spatial framework is conceived as a hierarchial system of settlements of minimum configuration, which satisfy the criteria of efficiency and equity. He further added that if the existing hierarchy of settlements in a particular region is utilised for formulating a

development plan than areas far away from the important centres of economic activity may remain permanently under developed.

Higher will be the centrality, of the place having the function if the functional hierarchy level is high. And hence identification of hierarchy of settlements was given emphasis in this study. The hierarchy is detailed below.

2.11.1. Growth centres

Ensminger and Roy (1972) defined growth centres as small towns or large villages which have the potential of becoming nuclei for the future economic, social and political development of the surrounding area.

As stated by Narayan and Rao (1974) the growth centre approach provides for the concentration of development activity in a central place of rural hinterland where the impulse of the growth will first gradually polarise and later percolate to the neighbourhood.

According to Ramesh and Ramana (1978) growth centre is a place which has potential to generate and sustain growth in an area it serves.

As viewed by Natarajan (1983) growth centre exercise is a basic tool for micro-level planning and would be of help in developing and modernising rural areas.

Singh (1986) viewed growth centre as an urban core with rural hinterland capable of growth. He further stated that spatial planning

through identification of growth centre is needed not only for judicious use of scarce resource, but also is necessary for the development of backward area.

According to Dhanasekaran (1990) the concept of Rural Growth Centres does not necessarily imply the creation of whole new towns in rural areas. Rather it implies concentrating new investments in those existing rural centres which have the greatest potential of developing into service or growth centres in the foreseeable future, say one to two decades.

Sadhana (1991) perceived growth centre as one where there is a symbiotic relationship between the centre and the hinterlands or service regions.

In this study, the hierarchy of growth centres is important in locating the infrastructure facilities based on the importance of it.

2.11.2. Service centre

According to Ramesh and Ramana (1978) service centre is a middle order centre providing service facilities for processing the raw materials produced in its hinterland, which would be smaller in size than that of the growth centre.

As viewed by Chetwynd (1980) service centre is in the bottom of the hierarchy and normally in closest proximity to the farms and villages in any given region.

Singh and Rai (1988) opined growth centres as a centre which provides service facilities and public amenities to the centre itself and area depend upon it. It is functionally and spatially related to the whole region. They also

reported that a number of functions have been proposed at different service centres aiming at integrated community development with the provision of trickle-down effect through hierarchial order.

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Naidu (1989) viewed the service centre as an area which has provide the basic minimum service that are considered essential for civilized existence as a point of preliminary outlet for information and technical guidance, reasonable level of social service and the point of contact for integration with the rest of the country.

Gomathy (1992) perceived service centre to be the space and it is a second order level of hierarchy. It is self sufficient and also serves the nearby area.

Sudha (1994) perceived service centre is as place with the highest order functions which will satisfy the needs of its own place and the other dependent settlements.

2.11.3. Central village

Sen (1975) reported that a small group of villages with a central village at its focal point and with functional interlinkages should be the ideal unit for planning.

Central village as defined by Ramesh and Ramana (1978) is one which provides facilities to a cluster of villages with a small hinterland.

Shrivastav (1980) stated that those settlements which provide goods and services to their surrounding region are called central villages.

Sadhana (1991) perceived central village as one which consisted of various facilities needed for horticulture, serving the settlements nearby having a hinterland as its own providing facilities to various people.

According to Gomathy (1992), central village is referred to the space, which form the third order level of hierarchy and the area in and around the central village are dependent upon it.

Sudha (1994) stated that Central villages are the large villages having higher order functions which will provide goods and service to an area larger than itself.

2.11.4. Hinterland

Sen (1975) opined that the hinterland villages depend on the growth centre are by definition close and if adequate transportation linkages are provided all hinterland villages can make use of services provided in the growth centre.

Ramesh and Ramana (1978) opined that the area served by the growth centre, known as its hinterland, would be large in size and the services and facilities offered by these centres would be the central functions.

As stated by Tripathy **et al.**, (1979) hinterland referred to those villages falling in neighbourhood and constituting the zone of influence.

Rao (1989) viewed that the smallest planning units consist of the central village and its hinterland. Further along with the hierarchy of settlements, the service centres being more central in character and have large hinterlands. The unit consisting of central places and their hinterlands at the three hierarchial level is the basic planning unit.

Gomathy (1992) perceived hinterland as the space which utilizes the service from the growth centre, service centre and central villages.

Sudha (1994) perceived hinterland refers to the dependent area on the growth centre.

2.11.5. Nodal centre

According to Bhat (1989) social and economic organisation of space has been influenced by the historical and political factors as well as the spontaneous emergence of a few of the human settlements as nodals; they have an advantage over other settlements in attracting economic activities,

infrastructure, social facilities and amenities. The areas of influence of these nodal centres are functional economic areas.

Gomathy (1992) perceived nodal centres as the space where the functions are attracted by influential persons.

According to Sudha (1994), nodal centres are the potential growth centre due to influence.

Area planning for Agri-Hort development in an area can be bring about by interrelating different parts and completion of any incomplete sector of settlement system. Identification of locales of infrastructure, determination of hierarchy of settlements, finding out growth centres, service centres, central villages and also seeking the opinions of the ultimate users of these facilities are essential for this. To achieve this the methodology followed in this study have been described in the next chapter.



RESEARCH METHODOLOGY

CHAPTER - III

RESEARCH METHODOLOGY

The aim of this study is to prepare a model for proper utilization of infrastructure facilities for Agri-Horti development. The infrastructure facilities, among many other contributors would bring about agricultural and horticultural development, if located in appropriate locations. With this hypothesis in mind this investigation was attempted.

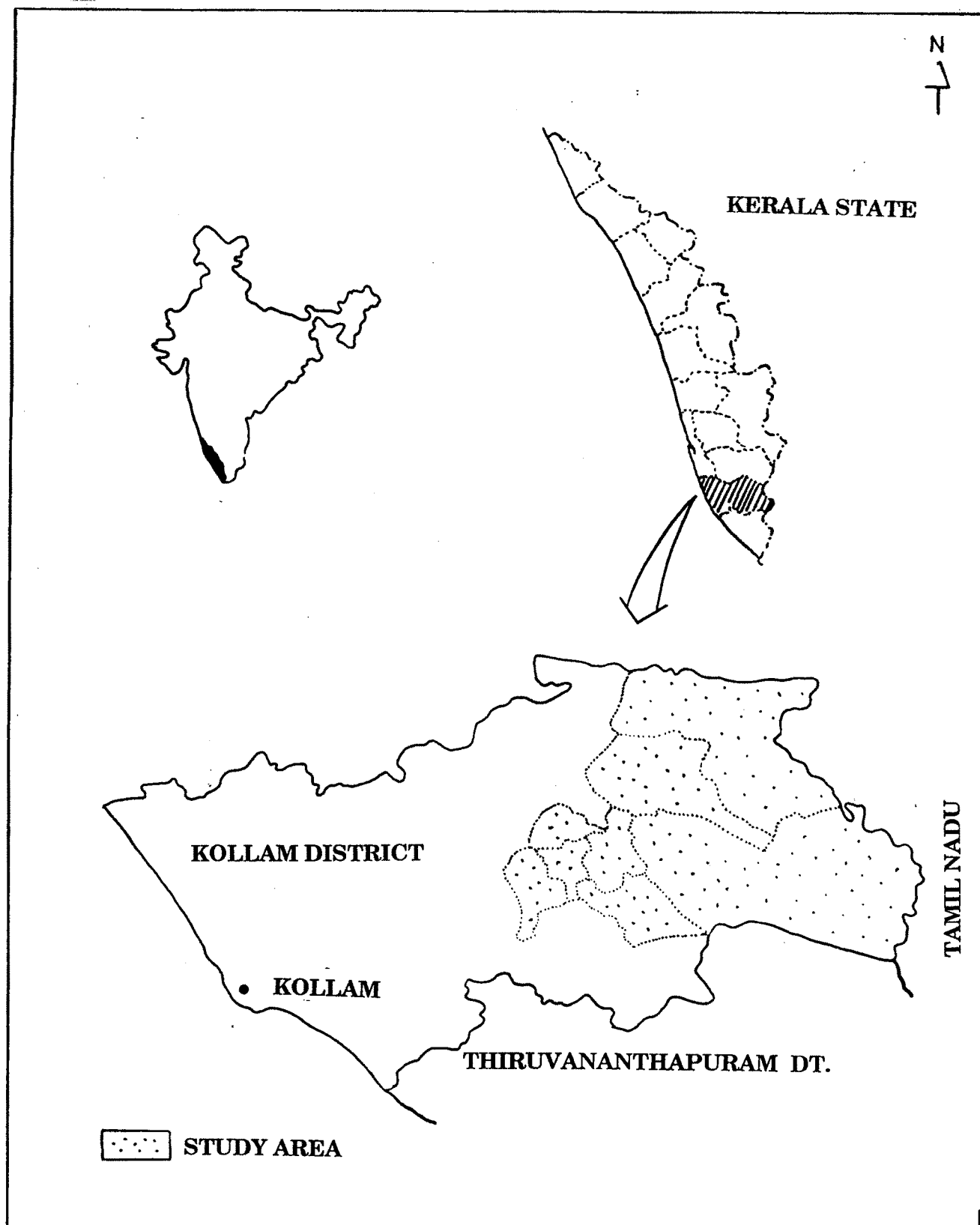
In this chapter the research methodology has been discussed under the following Sub-heads :

- 3.1. Locale of research
- 3.2. Description of study area
- 3.3. Selection of respondents
- 3.4. Selection of infrastructure facilities
- 3.5. Data collection tool
- 3.6. Existence of area homogeneity
- 3.7. Identification and ranking of settlements
- 3.8. Statistical tools used.

3.1. Locale of Research

This study was conducted in Kollam district of southern Kerala (Fig.1). This district is one among the agriculture and horticulture dominated areas.

Fig.1. Location of study area in Kollam district



In this district there are 13 Development Blocks (Block Panchayats) and three municipalities. Out of these, Anchal Block was selected since no research study of this kind for agriculture and horticulture was undertaken in the field of planning and due to the following reasons.

1. In this block agricultural and horticultural crops are being intensively cultivated. Vegetable production and rubber plantations are prominent along with rice cultivation, coconut and other crops.
2. This block acts as a gate way for the transportation of agricultural products between Tamil Nadu and Southern Kerala.
3. In this block one of the famous cattle markets is situated. This acts as an important centre for sale of cattle from near by blocks and Tamil Nadu, and this centre plays an important role for the development of cattle rearing in this region.
4. Since this block is blessed with so many water bodies the scope of development of inland pisciculture is more.
5. Conversion and dispersion of functions are observed in this block.

3.2. Description of study area

The study area is sarrounded by Western Ghat in the east, Pathanamthitta district in the north, Thiruvananthapuram district in the south, Chadayamangalam and Vettikkavala blocks of Kollam district in the West. The total geographical area of the block is 950.77 Sq.km.

Based on the height from Mean Sea Level (MSL) Kerala is divided into three Natural Regions viz., Low Land: Less than 7.5m above MSL, Mid Land: 7.5 to 75m above MSL and High Land: above 75m of MSL. This block stretched out from Mid Land to High Land with a maximum height of 1758m above MSL.

This Block Panchayat consists of 14 Revenue villages. These Revenue villages will be referred here after as settlements in this study. They are presented in Table.1.

Table.1. List of settlements in the study area

S.NO.	CODE NO.	SETTLEMENTS
1.	7	ALAYAMON
2.	8	CHANNAPETTAH
3.	4	ANCHAL
4.	14	ARYANKAVU
5.	13	THENMALA-EAST
6.	1	EDAMULAKKAL
7.	2	ARAYKAL
8.	3	KARAVALOOR
9.	10	KULATHUPUZHA
10.	9	THINKALKARIKKOM
11.	11	THENMALA-WEST
12.	12	EDAMON
13.	6	YEROOR
14.	5	AYIRANALLOOR

In addition to the cultivated area, considerable portion of the land of this block is covered under reserve forest, oil palm plantations, teak plantations and eucalyptus plantations in government sector.

3.2.1. Agriculture and Horticulture

The total cropped area in this block is 36702.42 ha. Three types of cultivation practices are mostly seen in this block viz. Home Stead Cultivation (Home Garden), Wet Land Cultivation and plantation. The area covered by major crops are given in the Table -2.

Table.2. Area coverage of major crops cultivated

S.No.	Crop	Area(ha)	%
1.	Rice	1595.20	4.35
2.	Coconut	3749.46	10.22
3.	Rubber	19791.68	53.92
4.	Banana	1537.07	4.19
5.	Tapioca	2970.82	8.10
6.	Vegetable	276.00	0.75
7.	Pepper	4627.60	12.61
8.	Pulses	166.70	0.45
9.	Arecanut	594.54	1.62
10.	Other crops	1393.35	3.79

Source : Panchayat level statistics, Kollam district.(1997).

3.2.2. Irrigation

In this block rainfed farming is practiced because this block area does not come under irrigation projects except 10 small constructed canals running through the side of the block area are not functioning properly. Eventhough the block is receiving good rainfall and having so many ponds and rivers, majority of them dry up during summer months. Usually wells in the homestead and ponds are used as sources of irrigation.

3.2.3. Soil type

Laterate soil is the major type of soil in this block and the rest are Forest soil and Reverine Alluvium. Texture of these soil include Sandy Loam, Gravelly Loam, Sandy Clay and Silty Clay. The soil is Acidic in nature.

3.2.4. Rainfall

Since this block is situated in the western side of Western Ghat, it gets good and equally distributed rainfall during South-West monsoon and North-East monsoon seasons. The Average Annual Rainfall of Kerala state is 3050mm and that of Kollam district is 2531mm. The distribution of rainfall obtained in the block during the period of 1990-1998 is given in Table -3.

3.2.5. Population

The population of this block was 210648 as per 1991 census. Among them 186753 were literates. The genderwise distribution is furnished in Table -4.

**Table.3. Monthwise rain fall of Anchal block for the period 1990-1998.
(in mm)**

YEARS	1990	1991	1992	1993	1994	1995	1996	1997	1998
JANUARY	40.20	7.60	2.20	0.00	0.00	26.00	16.60	13.00	17.80
FEBRUARY	0.00	0.00	0.00	84.60	128.80	0.00	38.20	22.00	55.60
MARCH	48.70	116.80	0.00	19.30	11.20	136.40	59.60	46.50	69.00
APRIL	19.70	115.80	45.80	185.60	160.00	216.40	66.00	92.00	149.40
MAY	476.62	94.00	379.60	267.60	181.00	292.20	377.20	304.50	283.50
JUNE	366.40	892.70	614.60	480.80	561.00	284.40	299.20	588.60	384.30
JULY	410.40	386.40	465.20	384.40	352.00	435.40	223.40	411.70	336.80
AUGUST	124.80	148.60	242.40	89.60	440.00	253.40	215.00	151.40	297.00
SEPTEMBER	65.40	66.00	319.00	61.40	189.20	260.00	364.46	128.00	276.20
OCTOBER	422.30	237.60	688.00	415.30	436.40	211.60	73.50	441.00	248.30
NOVEMBER	280.40	394.40	468.00	250.30	143.80	250.20	N.A.	348.30	154.60
DECEMBER	2.20	0.00	0.00	28.00	10.00	0.00	N.A.	9.00	8.00
AVERAGE	188.10	205	269	189	218	197	173	213	190

Source : Materiological observatory, Thiruvananthapuram

Table.4. Genderwise and literate wise distribution of population

S.No.	Category	Population	Literates
1.	Male	103795 (49.27)	95875 (92.37)
2.	Female	106853 (50.73)	90878 (85.05)
3.	Total	210648 (100.00)	186753 (88.66)

* Numbers within parantheses refers to the percentage.

3.3. Selection of respondents

For area planning it is appropriate and useful to seek suggestion/opinion from local leaders. Hence for this study, all ward members of village panchayat from all settlements were chosen as respondents. There are 90 ward members in the study area and all are practicing farming.

3.4. Selection of infrastructure facilities

A list of 58 existing infrastructure facilities in the study area (Vide Appendix A) were subjected to judges opinion for selection of infrastructure facilities that would contribute for Agri-Horti development. The judges were from the fields of extension education and extension research. Based on the judge's opinion 51 infrastructure facilities were selected for this study. The list of the infrastructure facilities have been presented in the Table -5.

3.5. Data collection tool

For any social science research, data collection is the inevitable requirement, based on which the outcome can be obtained.

Being a study to develop a plan for Agri-Horti development, this study was largely dependent on secondary data which was collected from various departments. An interview schedule was developed and used to (Vide appendix B) collect primary data which was mainly to find out the utilization behaviour and space preference of the respondents with respect to the infrastructure facilities.

Table.5. Infrastructure facilities selected for the study

S.No.	Infrastructure facilities	Number
1.	Agricultural Officer	8
2.	Agricultural Assistant	23
3.	Assistant Director of Agriculture	1
4.	Agro Service centre	4
5.	Fertilizer & Pesticide Shop	57
6.	Rubber collection centre	44
7.	Honey Collection Centre	3
8.	Weekly market	6
9.	Daily Market	22
10.	Rice Mill	76
11.	Oil Expeller unit	10
12.	Arecanut Processing unit	2
13.	Cashew factory	12
14.	Cattle market	3
15.	Milk Collection Centre	27
16.	Tea Factory	2
17.	Canal	10
18.	Dam/Check dam	9
19.	Veterinary & A.H. Centre	17
20.	Nationalized Bank	8
21.	Non-nationalized Bank	5
22.	Primary Agricultural Co-operative Bank	17
23.	Other co-operative societies	33
24.	Block Development officer	1
25.	Industrial Extension officer	1
26.	Tribal Extension officer	1
27.	Non Governmental Organisations	106
28.	Youth Clubs	128
29.	Implement repairing Centre	60
30.	Lower Primary School	56

S.No.	Infrastructure facilities	Number
31.	Upper Primary School	29
32.	High school	27
33.	Govt. Hospitals & PHC	18
34.	Community Radio & Community TV	69
35.	Medical shops	32
36.	Diagonostic centre	26
37.	Health worker	36
38.	Railway station	5
39.	Bus stand	3
40.	Bus stop	136
41.	Bituminous Road	97
42.	Other type of road	
43.	Telephone Exchange	7
44.	Telephone Booth	91
45.	Sub post office	9
46.	Other type of post office	31
47.	Printing press	20
48.	Technical College & Teaching Centre	86
49.	College	1
50.	Taxicar & Autoriskshaw	505
51.	Lorry & Tempo	190

3.6. Existence of area homogeneity

Annamalai (1982) reported that any plan for development will be effective only if the area is homogeneous. Before identifying locale for establishment of infrastructure facilities, homogeneity should be assessed.

For this Kendall's coefficient of concordance 'W' was used (Siegel, 1959). For this purpose, the area under major crops for each settlements over a period of time was collected. To find out the concordance of different settlements, the crops were ranked for each year separately as shown in Table 6.

Table.6. Rank of cropped area over a period of time.

Year	Rank for crops	Crop I C1	Crop II C2	Crop N CN
Year I	Y ₁			
Year II	Y ₂			
....				
....				
....				
Year K	Y _K			
		R ₁	R ₂	R _j

The sum of each column was arrived out first as R₁, R₂, R₃.....R_j.
The mean of the sum was denoted by $R = \sum R_j / N$.

N = Number of crops

R_j = Sum of each crop over different years for different settlements

K = Number of year (or settlements) as the case may be

Again S was estimated as, $S = \sum (R_j - R_j / N)^2$

Then the Kendall's coefficient of concordance 'W' was calculated as:

$$W = \frac{S}{1/12 K^2 (N^3 - N)}$$

To test the significance of calculated 'W', χ^2 was used where, $\chi^2 = K(N-1) \times W$, Which followed the χ^2 distribution with $N-1$ degree of freedom. If the calculated χ^2 exceeded the table value. 'W' was said to be significant which implied the existence of area homogeneity.

If the cropping pattern was observed to be uniform, then the area is considered as homogeneous.

3.7. Identification and ranking of settlements

The information about the number of existing facilities and population would help in identifying and ranking the settlements. Ranking of settlements would help to identify the hierarchy of it. This ranking can be considered as the rationale for locating the infrastructure facilities.

All the settlements will not be in the same level and there would exist hierarchy in the settlements. The hierarchy would be decided by the centrality of the settlements which in turn would be the out come of the quality and quantity of the central functions performed by the settlement. The central functions are those which by their nature, available in few settlements, but are availed by a number of settlements. Thus, the central functions will not be omni present in nature.

The frequency of occurrence of a function is the deciding factor for the degree of importance of the function. A settlement which is having a number of functions of a particular level will be more important than a settlement having less number of functions of the same level. If the number of functions existing in the settlements is same, then the settlement would be having lower order functions. Thus, these criteria would help to identify the functional hierarchy.

3.7.1. Identification of degree of development

To identify the basic planning unit, assessing the degree of development of the settlements is a must. If we differentiate the developed and less developed areas and rank them accordingly, then it is easy to decide for the intervention of a function.

3.7.1.1. Scalogram method

Scalogram technique was originally developed to measure the attitude. The scale selects a few items out of a larger universe which are unidimensional and ranked according to the higher or lower degree of complexity in the dimension. Here a Settlement Function Scalogram was used to demarcate the degree of development of the settlements or to rank them as developed, moderately developed and less developed. Scalogram may well contain little useful information that is not already known. Scalogram can be particularly good devices for analysis related to area planning because they provide a visual dimension to the information on settlements and their functions.

3.7.1.2. Operation of Settlement Function Scalogram

A settlement function scalogram is a matrix patterned one. In this matrix, settlements of the study area listed along the left vertically in descending order based population size and along the top of the matrix, selected settlement functions are listed.

Fourteen settlements and fifty one infrastructure facilities selected for the study were arranged in the matrix form so that row represented the settlements and columns represented the infrastructure facilities.

To facilitate interpretation, the settlement function scalogram is commonly triangulated. This involves shifting columns and rows until the filled cells form a pattern as close as possible to a triangle extending out from the upper left corner of the matrix.

For triangulation of scalogram each row and column were summed up to find the total facilities in each settlements and the total number of the facility in the study area. Based on the row summings, the settlements were interchanged by arranging them in the descending order of the total facilities available. Likewise, considering the column summings, the infrastructure facilities were interchanged by arranging them in descending order. A thick traceline was drawn as shown in Table 7, along the boundary of least errors showing the compact scalogram. The scale was tested for its item reproducibility.

The order of settlements in the triangulated scalogram suggested a rough settlement hierarchy pattern. Thus the settlement function scalogram helped to rank the settlements based on the degree of development in a continuum.

Table.7. Settlement Function Scalogram model

Settle- ment	Popu- lation	Infrastructure facilities							Total Number of Unit	Rank
		1	2	3	4	5	6	7		
1	P1	3	2	2	1	1	1	0	10	D
2	P2	2	3	0	2	1	0	0	8	D
3	P3	2	2	1	1	1	0	1	8	D
4	P4	3	1	1	1	0	0	0	6	MD
5	P5	2	1	1	1	0	0	0	5	MD
6	P6	3	1	1	1	0	0	0	6	MD
7	P7	2	1	1	0	1	0	0	5	MD
8	P8	2	1	1	0	0	0	0	4	LD
9	P9	2	1	0	0	0	0	0	3	LD
10	P10	1	1	0	0	0	0	0	2	LD
Total		22	14	8	7	4	1	1	57	

D - Developed; MD- Moderately developed; LD-Less developed.

3.7.2. Ranking by Centrality Score

Knowledge about the centrality score of each settlement is an essential thing for the planners for determining the hierarchy of the settlements. Every function does not have equal importance. So, the relative importance of the functions was predicted by assigning appropriate weight to each function.

3.7.2.1. Computation of weight of the function

The weight of the function could be found by three methods viz., (1) ratio of total settlement and existing functions method (2) population

threshold method and (3) functional hierarchy method. These three methods are explained below.

3.7.2.1.1. Ratio of total settlement and existing functions method

In this method, the weight of the function was determined by dividing the total number of the settlements with total number of units of that particular function. That is,

$$\text{Weight of a function} = \frac{\text{Total number of settlements}}{\text{Total number of that particular function}}$$

Computation of weight by this method is illustrated in Table 8.

Table.8. A model of computation of weight - Ratio of total settlements and existing functions method.

S.No	Functions	Unit	Weight
1.	f_1	u_1	n --- = w_1 u_1
2.	f_2	u_2	n --- = w_2 u_2
3.	f_3	u_3	n --- = w_3 u_3
4.	f_4	u_4	n --- = w_4 u_4

* Where 'n' is the number of settlements.



The weight of the function varies inversely with the frequency of occurrence of the function.

3.7.2.1.2. Population threshold method

In this method, the weights were calculated based on the population threshold of each function. In such case the lowest population threshold i.e., a settlement where a function appears in the study area for the first time with population as a measure was identified and equated to unity. This was considered as the base for calculating the value of other functions. The computation of weight is presented in Table.9.

Table.9. A model of computation of weight of functions-population threshold method.

S.No	Functions	Population threshold	Weight
1.	f_1	P_1	$P_1/P_1 = W_1$
2.	f_2	P_2	$P_2/P_1 = W_2$
3.	f_3	P_3	$P_3/P_1 = W_3$
4.	f_4	P_4	$P_4/P_1 = W_4$

3.7.2.1.3. Functional hierarchy method

This method also determines the hierarchy of functions and settlements. Based on the population thresholds of functions the levels of functional hierarchy were identified. The functions were then clustered with respect to sudden rise in population threshold as first level, second level,

third level and fourth level functions. For each level, weights of functions were determined on the basis of the population threshold of functions into the settlement system. Classification of the functions in different levels and the computation of weights of them have been shown in Table-10.

Table.10. A model of computation of weight of functions - Functional hierarchy method.

Levels	First level	Second level	Third level	Fourth level
Population size	P1-P2	P3-P4	P5-P6	P7+
Weights	$P1/P1=W_1$	$P3/P1 = w_2$	$P5/P1=w_3$	$P7/P1=w_4$
Functions	1) f_1 2) F_2 3) f_3	1) f_4 2) f_5 3) f_6	1) f_7 2) f_8	1) f_9

3.7.2.2. Computation of centrality score

After calculating the weight of functions the centrality score of each settlement was computed by listing the number of each function against the settlements, multiplying it by its weight and then adding up the values thus arrived. Computation of centrality score is depicted in Table 11.

Table.11. A model of computation of centrality score

S.No.	Infrastructure facility	Unit	Weight	Score
1	f1	u1	w1	$u1xw1 = s1$
2	f2	u2	w2	$u2xw2 = s2$
3	f3	u3	w3	$w3xw3 = s3$
4	f4	u4	w4	$u4xw4 = s4$
Total				$S = S1+S2+S3+S4$

All the three methods were used to assess the weights of the functions as given in Appendices C,D, and E. The centrality score for the settlements were also computed for all the three methods as appended in F,G and H.

To select the most reliable method among the three methods, the intercorrelation between the methods was worked out and is shown in Table 12.

Table.12. Intercorrelation of three measures of centrality.

	Method I	Method II	Method III
Method I	1		
Method II	0.856463**	1	
Method III	0.864668**	0.998624**	1

** Significant at 1 per cent level

Table 12 reveals that the second and third methods are highly associated. The third method had the advantage of ranking both the settlements and the functions. So this method was used for ranking the settlements in this study.

Based on the centrality scores arrived at, the mean and standard deviation was calculated to rank the settlements as developed, moderately developed, less developed.

3.7.3. Identification of growth centres, service centres and central villages through service potential method.

The identification of growth centres, service centres and central villages was done based on its service potential. The following components had been worked out to calculate the service potential.

3.7.3.1. Functional presence

Functional presence is the existence of various functions in a settlement. The weights of all the functions in the settlement were summed up to calculate the functional presence (fp) of that settlement.

3.7.3.2. Functional dependency

Functional dependency is the dependency of a settlement for a function outside it. The total weight of those functions utilized from outside the settlement will reveal the functional dependency (fx d) of the settlement.

3.7.3.3. Functional status

Functional status of a settlement is the difference between the functional presence (fp) and the functional dependency (f α d) and can be denoted as $fs = fp - f\alpha d$.

3.7.3.4. Interdependency

The functions which serve the dependent settlements would hold different weights. The sum of the scores of such functions utilised by the dependent settlements denote the inter dependency (fD) of a settlement.

$$fD = \sum_{i=1}^n (fp1 \times q1) + (fp2 \times q2) + \dots (fpn \times qn)$$

where,

Σ = Sum of

fp = Function serving other settlement

q = Total number of settlements served

fD = Functional interdependency

3.7.3.5. Service potential

The scores of functional status and interdependency if added together will reveal the score of service potential of the settlement.

i.e. (fp - fxd) + fD = Service potential

The service potential score may be positive or negative. Those settlements having a score of less than one had been identified as central villages. All those villages which obtained a score of more than one would be identified as service centres and growth centres. When a sudden rise of score was noticed, cutting line would be drawn. Those settlement above this line would be identified as growth centres and those below the line would be identified as service centres.

3.7.4. Sociogram method

Generally sociogram method is used to identify the leaders i.e., to depict the person from whom people get advice. Here this method had been used to depict the movement of people to other settlements for some facilities. This would help to identify the spatial gaps and to suggest the possibility of new central places.

3.8. Statistical Tools used

In addition to above stated methods, to classify the settlements with respect to the degree of development mean + 1/2 standard deviation was used. Methods like percentage and correlation were also used.

By adopting the above methodology the collected data were subjected to analysis and the findings have been reported in the succeeding chapter.



FINDINGS AND DISCUSSION

CHAPTER - IV

FINDINGS AND DISCUSSION

This chapter comprises findings of the present study and the interpretation, which is a search for broader meaning of research findings. The findings are presented under the following sub-heads:

- 4.1 Existence of area homogeneity
- 4.2 Distribution of infrastructure facilities
- 4.3 Ranking of settlements
- 4.4 Utilization behaviour of farmers and sustainability of infrastructure facilities
- 4.5 Identification of locale and potentiality of infrastructure facilities
- 4.6 Model for the study area

4.1 Existence of area homogeneity

To prepare a meaningful plan, existence of area homogeneity is a must. Especially in the area planning from the grass root level, identification and mapping of homogeneous areas have significance, as stated by Misra et al (1971). This was followed by Annamali (1982), Sadhana (1991) and Sudha (1994).

Existence of homogeneity of the study area was assessed before conducting the survey. The method involved was collection of data regarding

the area under major crops for each settlement (Planning unit) in the study area over a period of time. The data for a period of 10 years were collected for this study. The coefficient of concordance (W) and the chi-square (χ^2) arrived at are presented in Table.13.

Table.13. Co-efficient of concordance and chi-square value

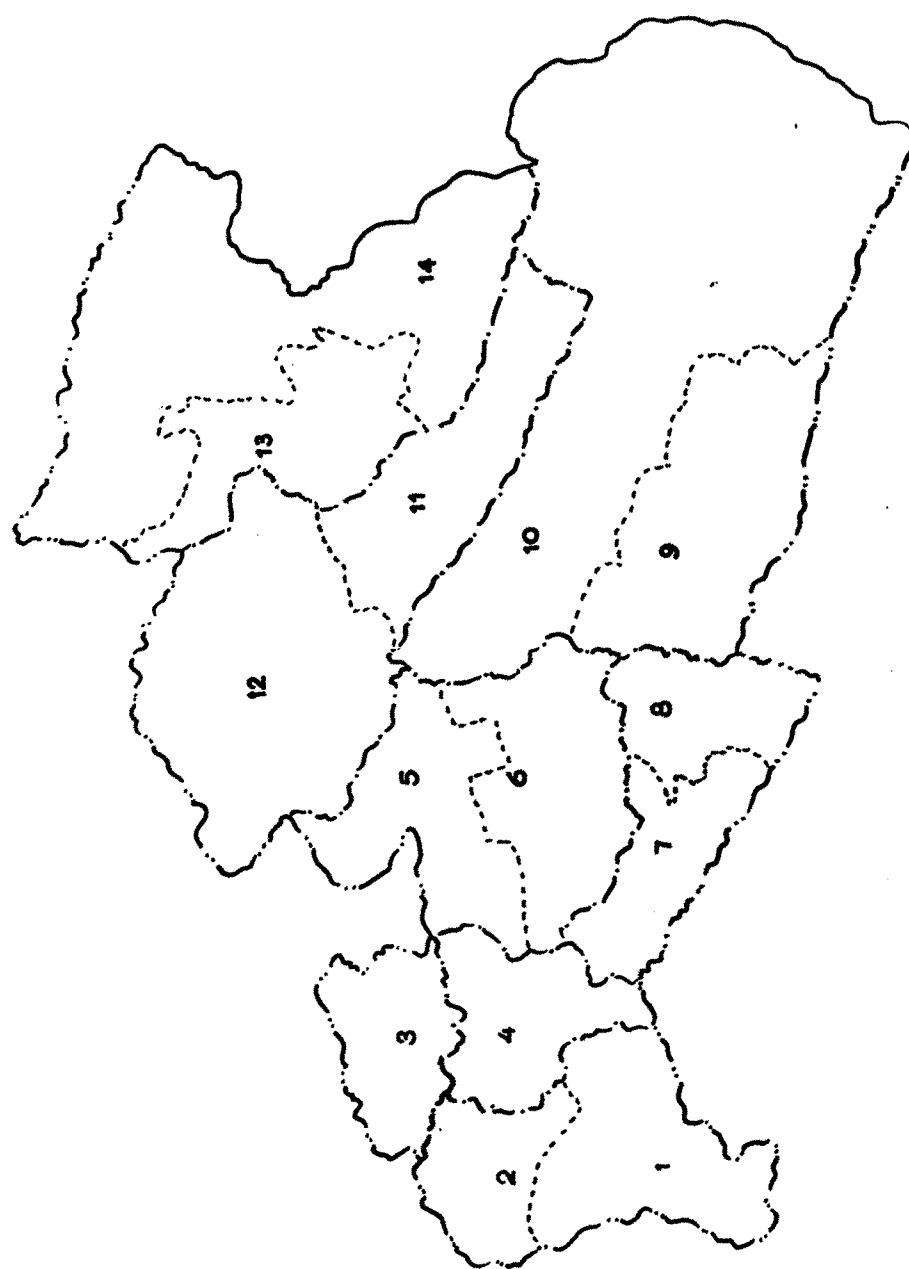
Values	Years									
	87-88	88-89	89-90	90-91	91-92	92-93	93-94	94-95	95-96	96-97
W	0.66	.66	.65	0.75	0.65	0.81	0.81	0.82	0.84	0.84
χ^2	73.92	73.92	72.8	84.	72.8	90.72	90.72	91.82	94.08	94.08

The chi-square values were found to be significant at 1.0 per cent level of probability. Thus, it could be inferred that a high degree of homogeneity existed in the study area which in turn implies that the area under investigation followed uniform cropping pattern.

4.2 Distribution of Infrastructure facilities

The study area was found to be spread over an area of 950.77 Sq. Km. This study was concentrated on 14 settlements of the Anchal block. Only 51 infrastructure facilities as mentioned elsewhere in this report were considered in the present study, as opined by the judges. The location of the settlements in the study area is presented in Fig.2. The population of the settlements varied from 5893 to 28612. Similar kind of variation was also noticed in the distribution of infrastructure facilities. Total number of units of facilities existing in settlements varied from 36 to 791. It was thus observed that the population size had no relation with the distribution of infrastructive facilities.

Fig.2. Location of settlements

**SETTLEMENTS**

1. Edamulakkal
2. Araykal
3. Karavallor
4. Anchal
5. Ayiranallor
6. Yeroor
7. Alayamon
8. Channapettah
9. Thinkarikkom
10. Kulathupuzha
11. Thenmala West
12. Edamon
13. Thenmala East
14. Aryankavu

It was observed from the Table.14 that non of the settlements were found to posses all the 51 facilities under consideration, eventhough the facilities were distributed evenly in the study area. The settlement Anchal which is the head quarter of the block Panchayat had 791 units of facilities and the settlement Yeroor possessed 280 units of facilities. The lowest number of units of facility was found in settlement Thenmala East as 36.

The analysis of distribution of existing infrastructure facilities revealed that more infrastrueture facilities existed in those parts of settlements with better transport facility. Annamalai (1982), Sadhana (1991) and Sudha (1994) also viewed that concentration of most of the important facilities in few settlements was due to the availability of transport facility. Sarin (1991) also opined that roads provide a vital link for integrating the region with the rest of the regions.

4.3 Ranking of settlements

One of the steps in Planning for integrated area development is the identification of basic planning unit for optimum spatial distribution of infrastructure facilities. Each individual unit is too small to sustain some of the functions. However, a group or cluster of villages with a central village as its focal point and with close functional interlinkages is an ideal basic unit of planning. Identification of these viable units can be done by ranking the settlements.

There are four methods to rank the settlements as mentioned elsewhere in this report. The out come of two methods have been reported here.

Table.14. Existing Infrastructure facilities - Settlementwise

			INFRASTRUCTURE FACILITIES																										
S.No.	Code No.	Settlements	Population	Other types of road	Taxi, Car & Auto	Bus stop	Youth Club	Community TV centre	LPS	Rubber Collection Centre	UPS	HS	Other types of post office	NGO's	Bituminous road	Telephone Booth	Fertilizer & Pesticide shop	Veterinary & AH centre	Rice mill	Diagnostic centre	PACB	Daily Market	Implement mfg. centre	Other cooperative soci.	Tech. College & Teaching Cen.	Milk collection centre	Lorry & Tempo	Govt. Hospital & PHC	Health worker
1	4	Anchal:	28612	145	269	24	24	9	6	6	6	4	2	25	11	21	11	1	15	4	1	1	26	5	34	2	95	2	7
2	3	Karavalgor	21727	14	11	8	17	10	4	5	2	2	2	15	5	5	4	2	8	2	3	5	5	2	9	2	2	2	7
3	6	Yeroor	20110	123	36	17	10	5	5	2	2	2	3	7	6	4	6	1	13	1	1	4	3	4	3	0	3	3	
4	1	Edamalakkal	19756	11	35	15	14	5	6	3	1	3	2	9	14	10	8	2	3	2	1	1	8	3	0	2	48	2	3
5	9	Thinkal-	17800	18	13	5	6	5	3	3	1	1	2	4	3	3	3	1	4	1	3	1	0	0	0	0	0	0	0
6	2	karikkom																											
6	2	Araykal	16222	9	17	7	10	4	5	4	2	2	3	10	17	15	7	2	2	2	1	3	2	2	3	1	5	1	2
7	10	Kulathupuzha	15471	25	14	6	6	7	4	3	2	3	0	8	6	4	3	1	4	2	1	1	4	0	1	1	11	1	3
8	12	Edamon	12618	10	15	8	8	4	3	1	1	1	4	5	5	4	2	1	7	2	1	1	1	3	6	3	3	1	0
9	5	Ayiranalloor	12613	109	17	11	11	5	6	3	2	2	3	5	4	3	5	2	9	0	0	3	0	4	2	1	0	0	0
10	11	Thenmala W.	11596	6	20	8	9	4	4	3	1	1	2	7	7	3	2	1	5	1	1	1	1	2	6	2	16	2	3
11	8	Channapettah	10338	18	6	10	2	2	4	2	3	1	1	3	6	1	2	1	2	1	1	1	1	1	3	1	2	0	0
12	14	Aryankavu	9692	10	12	4	4	4	2	2	3	2	2	1	3	1	1	1	0	1	2	0	1	5	2	0	6	3	4
13	7	Alayamon	8200	12	35	8	5	3	2	6	2	2	2	7	10	17	3	1	4	7	1	0	8	2	17	2	2	1	4
14	13	Thanmala E.	5893	12	5	5	2	2	2	1	1	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total			210648	522	505	136	128	69	56	44	29	27	31	106	97	91	57	17	76	26	17	22	60	33	86	27	190	18	36

(CONTINUE...)

		INFRASTRUCTURE FACILITIES																													
S.No.	Code No.	Settlements	Population	Medical shop	Printing Press	Oil expeller unit	Sub post office	Nationalised bank	Agricultural Assistant	Agricultural Officer	Telephone exchange	Weekly market	Cashew factory	Non nationalised bank	Agro service centre	Bus stand	Cattle market	Honey collection centre	Railway station	Canal	DAM/Checkdam	Assistant Director of AGRI	BDO	Tribal Extension Officer	Industrial Extension Officer	College	Arecanut proc. c.	Tea factory	Total functions	Total units of functions	
1	4	Anchal	28612	9	7	2	1	1	3	1	1	1	3	1	1	1	1	1	0	0	0	0	1	1	0	0	0	0	0	42	791
2	3	Karavallor	21727	1	1	1	1	1	0	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	35	164
3	6	Yeroor	20110	2	1	1	1	1	3	1	1	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	36	280
4	1	Edamalakkal	19756	4	3	1	1	1	0	0	1	1	3	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	35	228
5	9	Thinkal-	17800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	80	
		karikkom																													
6	2	Araykal	16222	1	1	1	1	1	3	1	0	0	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	34	150
7	10	Kulathupuzha	15471	3	2	1	1	1	2	1	1	1	0	0	0	0	1	0	1	0	0	0	0	0	1	0	0	0	0	37	138
8	12	Edamon	12618	0	0	1	0	0	3	1	0	0	0	1	1	0	0	0	1	1	3	0	0	0	0	0	2	0	0	34	114
9	5	Ayranalloor	12613	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	8	0	0	0	0	0	0	23	219	
10	11	Thenmala W.	11596	1	1	1	1	1	0	0	1	0	0	0	0	0	0	0	2	3	1	0	0	0	0	0	0	0	35	130	
11	8	Channapettah	10338	0	1	0	1	0	0	0	1	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	29	82	
12	14	Aryankavu	9692	1	0	1	1	1	3	1	1	2	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	32	89	
13	7	Alayamon	8200	10	3	0	0	0	3	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	32	183	
14	13	Thanmala E.	5893	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	11	36	
				32	20	10	9	8	23	8	7	6	12	5	4	3	3	3	3	5	10	9	1	1	1	1	1	2	2		

4.3.1 Settlement function scalogram

Settlement function scalogram, as already mentioned, is a preliminary analysis to demarcate the developed and less developed settlements. An illustration of scalogram method of ranking of settlement is given, in Table.15. The item reproducibility value was found to be 0.96 which showed the fitness of the scale.

As illustrated in the scalogram only 9 functions were commonly available in all the settlements. They were high school, upper primary school, lower primary school, rubber collection centre, community T.V. centre, youth club, bus stop, taxicar & autorikshaw and other type of road. Non governmental organisations, bituminous road, telephone both, fertilizer and pesticide shops, veterinary and animal husbandry centres also existed in all settlements except Thenmala East. While primary agricultural co-operative bank function in 12 settlements, the nationalised bank exist in 8 and non-nationalized bank in 5 settlements. Daily market, weekly market and cattlemarket were functioning in 11, 5 and 3 settlements respectively. Functionaries like Agricultural officer and agricultural assistants were serving in 8 settlements and assistant director of agriculture in Anchal (4).

In order to have better perception about the degree of development of the settlements, they were classified based on mean and standard deviation by taking into account the total number of units of functions possessed by each settlements. A range was identified by calculating mean $\pm$ 1/2 standard deviation. This has been depicted in Table.16.

Table 1.5. Ranking of settlement by Sologram Analysis

S.No.	Settlements	INFRASTRUCTURE FACILITIES																										Level of Settlements																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
		Population	Other types of road	Taxi, Car & Auto	Bus stop	Youth Club	Community TV centre	LPS	Rubber Collection Centre	UPS	HIS	Other types of post office	NGO's	Bimonthous road	Telephone Booth	Fertilizer & Pesticide shop	Veterinary & AIH centre	Rice mill	Diagnostic centre	PACB	Daily Market	Implement mfg. centre	Other cooperative soci.	Tech. College & Teaching Cen.	Milk collection centre	Lorry & Tempo	Govt. Hospital & PHC		Health worker	Medical shop	Printing Press	Sub post office	Nationalised bank	Agricultural Assistant	Agricultural Officer	Telephone exchange	Weekly market	Cashew factory	Non nationalised bank	Agro service centre	Bus stand	Cattle market	Honey collection centre	Railway station	Canal	Dam/Checkdam	Assistant Director of AGR	BDO	Tribal Extension Officer	Industrial Extension Officer	College	Arcaneat proc. c.	Tea factory	Total functions	Total units of functions																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
1	Archal	28512	145	253	24	24	9	6	6	6	4	2	25	11	21	11	1	15	4	1	1	1	1	26	5	34	2	95	2	7	9	7	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

D - Developed, MD - Moderately developed, LD - Less developed

Table.16. Total number of units of functions and associated settlements - scalogram method.

S.No	Range of centrality score	Number of Settlements	Degree of development
1.	Less than (Mean - 1/2 S.D)	4	Less developed
2.	Between Mean $\pm$ 1/2 S.D	9	Moderately developed
3.	More than (Mean + 1/2 S.D)	1	Developed

Anchal has been identified as the developed settlement. It is the block headquarters and posses 42 functions (791 total units of functions). In moderately developed settlements the units of functions were distributed from 114 to 280 in number whereas in less developed settlements, it was 36 to 89.

4.3.2 Ranking of settlements by functional hierarchy method

This method of ranking the settlements is based on the centrality score of each settlement as detailed in the previous chapter. By using this method settlements were ranked and have been shown in Appendix H.

To distinguish the degree of developement of settlements and to catagorise them as less developed, moderately developed and developed, mean $\pm$ 1/2 standard deviation for the centrality scores were calculated. The result has been presented in Table.17.

Table.17. Development hierarchy based on centrality scores - functional hierarchy method.

S.No	Range of centrality Scores	Number of Settlements	Development hierarchy
1.	Less than (Mean-1/2 S.D)	4	Less developed
2.	Between Mean $\pm$ 1/2 S.D	9	Moderately developed
3.	More than (mean + 1/2 S.D)	1	Developed

With respect to the norms of mean $\pm$ 1/2 standard deviation, the settlements possessing the centrality scores of above 286.49 were classified as developed and those settlements which had centrality score below 106.31 were categorised into less developed. Settlements with score values between 106.31 and 286.49 were considered as moderately developed ones.

The result of classification of settlements by this method is exactly similar to the result obtained by settlements function scalogram method.

4.3.3. Identification of central villages, service and growth centres through service potentiality method.

The settlements in the study area were ranked as growth centre, service centres and central village based on their service potential scores. The service potential score of each settlement has been presented in the Table.18. The details in table revealed that among the 14 settlements Anchal was a growth centre and Thenmala East was a central village. The remaining were service centres.

4.3.4. A comparison of ranking of settlements by different methods

Objectives of all the three methods used for ranking the settlements were same. But their approaches were different. The method, settlement function scalogram was based on the functional presence. The functional hierarchy method was based on the weights of the functions existing at different levels. In the case of service potentiality method both the functional status and inter dependency became the base.

Comparison of results of these methods was made to identify the settlements having common hierarchial level. It has been presented in Table.19.

The results obtained by scalogram and functional hierarchy methods were exactly similar. More or less similar result emerged out by service potentiality method also. Scalogram and functional hierarchy methods catagorised the settlements into one developed, four less developed and nine moderately developed settlements, while service potentiality method classfied the settlements into one growth centre, one central village and twelve service centres.

Anchal has been found to be a developed settlement according to the ranking of scalogram and functional hierarchy methods. Service potentiality method ranked Anchal as a growth centre because this settlement obtained highest service potential score. Thenmala East was ranked as a central

village by service potentiality method whereas the other two method ranked this settlement as less developed one.

The settlements Kulathupuzha, Yeroor, Thenmala West, Edamulakkal, Karavalloor, Araykal, Edamon, Alayamon and Ayiranalloor were moderately developed and Aryankavu, Channapettah, Thinkalkarikkom were less developed evident from the ranking of scalogram and funtional hierarchy methods. But service potentiality method categorised all these settlements as service centres.

After ranking of settlements through different methods it was possible to find out the degree of development of each settlement. These results could be used to propose suitable strategies for elevating the settlements to immediate next hierarchy level.

Table.18. Ranking of settlements by service potentiality method

S.No	SETTLEMENTS	POPULATION	SERVICE POTENTIAL	HIERARCHY
1.	ANCHAL	28612	12 22.00	GC
2.	KARAVLOOR	21 727	172.80	SC
3.	YEROOR	20 110	278.80	SC
4.	EDAMULAKKAL	19 756	278.80	SC
5.	THINKALKARIKKOM	17 800	45.00	SC
6.	ARAYKAL	16 222	139.80	SC
7.	KULATHUPUZHA	15 471	269.80	SC
8.	EDAMON	12 618	139.80	SC
9.	AYIRANALLOOR	12 613	183.80	SC
10.	THENMALA WEST	11 596	157.80	SC

11.	CHANNAPETTAH	10 338	64.80	SC
12.	ARYANKAVU	96 92	110.80	SC
13.	ALAYAMON	8200	115.80	SC
14.	THENMALA EAST	5893	-6.20	CV

GC - Growth centre

SC - Service centre

CV - Central village.

Table.19. Comparison of ranking of settlements by different methods

S. No	Code No.	Settlements	METHOD I	METHOD II	METHOD III
1.	4	ANCHAL	D	D	GC
2.	3	KARAVALOOR	MD	MD	SC
3.	6	YEROOR	MD	MD	SC
4.	1	EDAMULAKKAL	MD	MD	SC
5.	9	THINKALKARIKKOM	LD	LD	SC
6.	2	ARAYKAL	MD	MD	SC
7.	10	KULATHUPUZHA	MD	MD	SC
8.	12	EDAMON	MD	MD	SC
9.	5	AYIRANALLOOR	MD	MD	SC
10.	11	THENMALA WEST	MD	MD	SC
11.	8	CHANNAPETTAH	LD	LD	SC
12.	14	ARYANKAVU	LD	LD	SC
13.	7	ALAYAMON	MD	MD	SC
14.	13	THENMALA EAST	LD	LD	CV

D - Developed

METHOD I -

Settlement function
Scalogram

MD - Moderately developed

METHOD II -

Functional
hierarchy method

LD - Less Developed

GC - Growth centre

METHOD III -

Service potentiality
method

SC - Service centre

CV - Central Village

4.4. Utilization behaviour of farmers and sustainability of infrastructure facility

4.4.1. Agricultural Officers

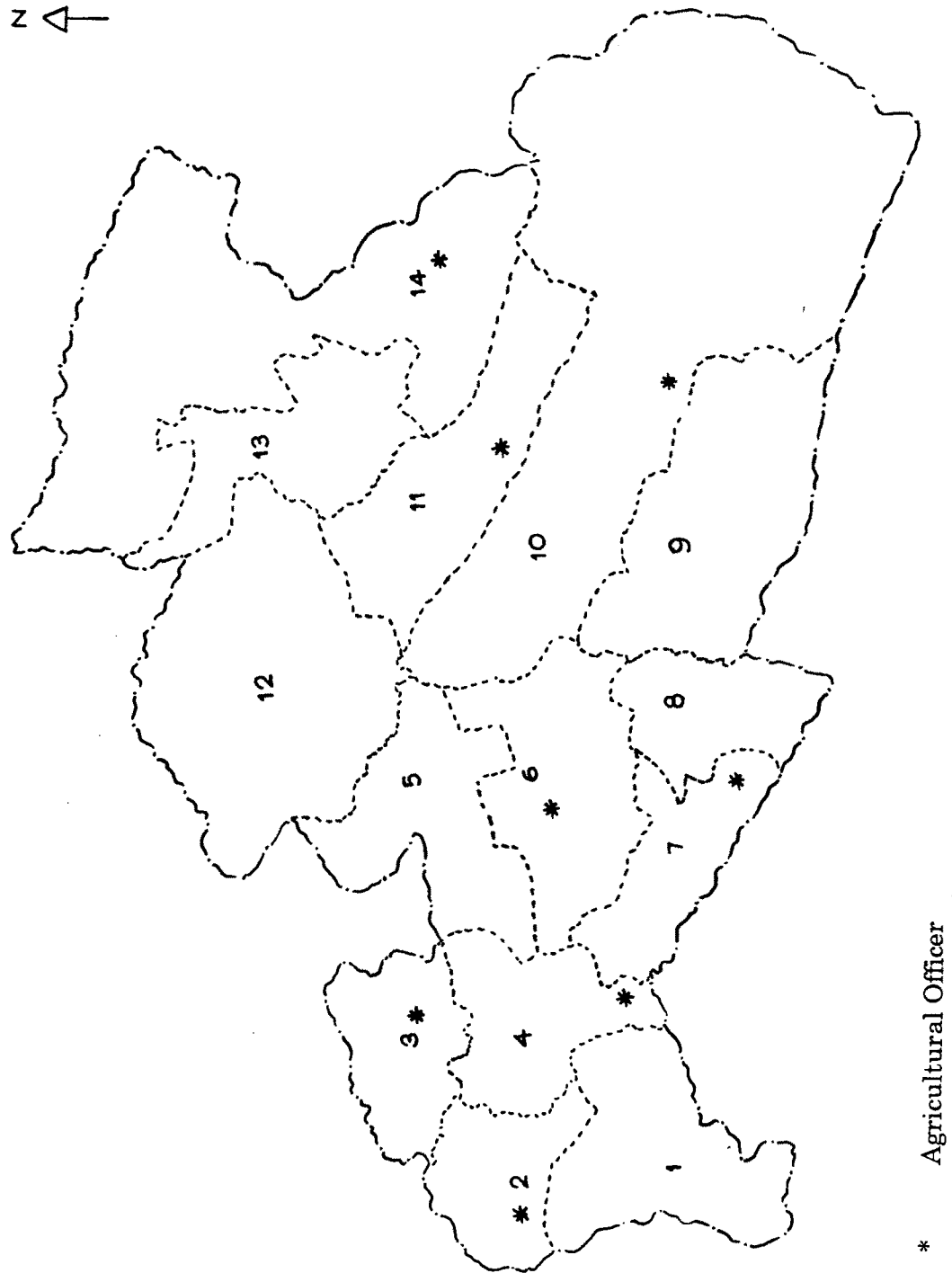
There are eight agricultural officers serving in this study area with a ratio of one functionary per village panchayat (Fig.3.). Hence two settlements (Revenue villages) share the service of one agricultural officer in the study area except Karavalloor(3) and Anchal(4) settlements, since they are village panchayat as well as revenue villages. The head quaters of these functionaries are "Krishi Bhavans".

Even though the location of head quarters of the functionaries for the settlement pair 1 & 2, 11 & 12 and 13 & 14 are not exactly at the common centres, utilization of all functionaries by the farmers is found to be cent per cent. This is because that these locations are either at panchayat head quaters or at developed centres with good transport facilities. This finding is in accordance with the findings of Gomathy (1992) and Sudha (1994). This function is found to be sustainable.

4.4.2. Agricultural Assistants

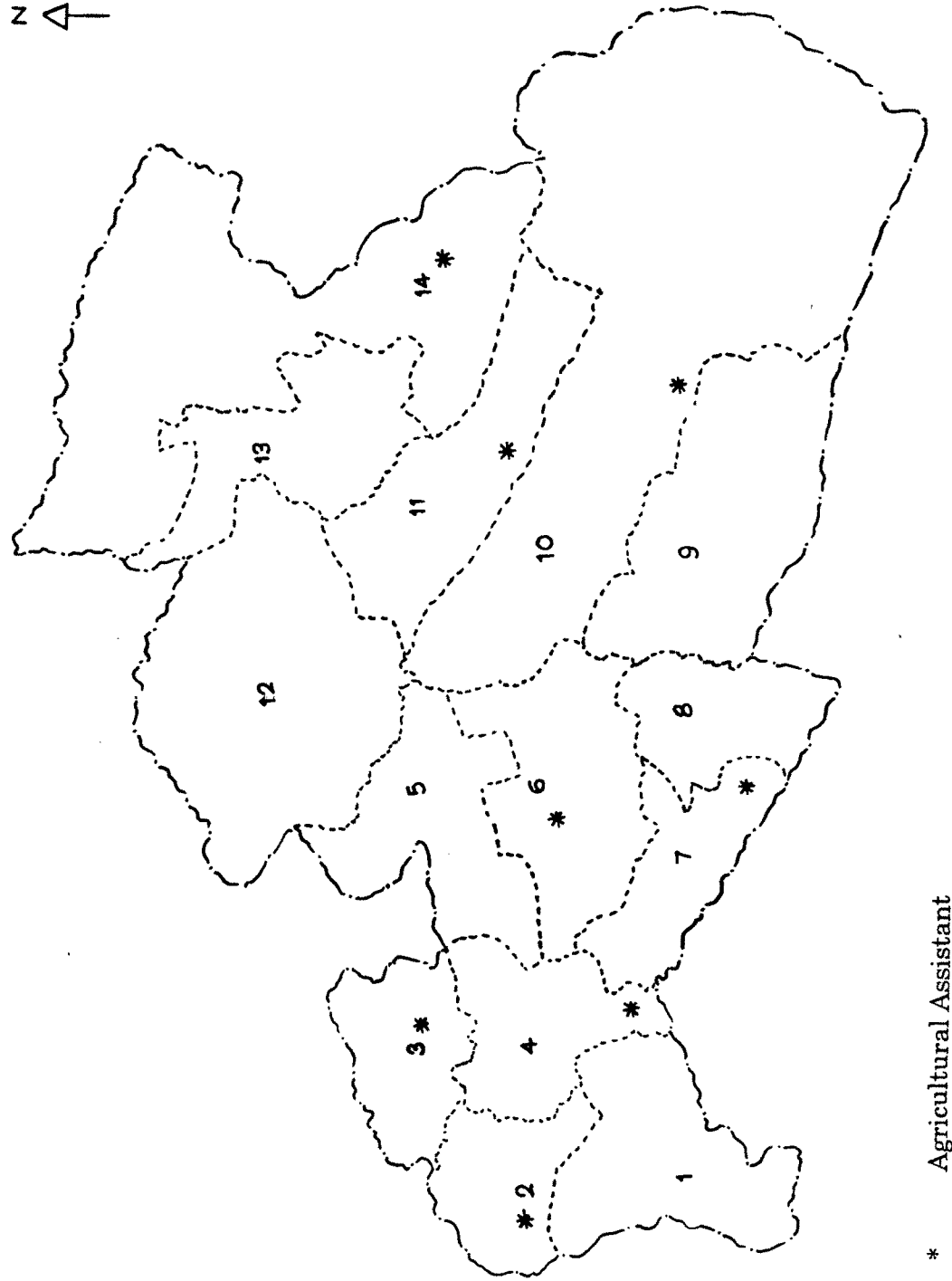
There are 23 agricultural assistants who constitute the grass root level functionaries of the study area (Fig.4). Under each agricultural officer three agricultural assistants are serving. Hence the head quarter of this functionary is also "Krishi Bhavan". The jurisdiction of agricultural officer is divided into three regions and assigned to each of the agricultural assistant.

Fig.3. Location of agricultural officer



* Agricultural Officer

Fig.4. Location of agricultural assistant



In the settlement pair of 9 & 10 there are only two agricultural assistants. Cent per cent utilization of this function by farmers was found. This finding is similar to that of Velumani (1988) Gomathi (1992) and Sudha (1994). This function is found to be serving the community need and it is sustainable.

4.4.3. Assistant Director of Agriculture (ADA)

There is only one ADA in the study area at Anchal(4), which is the head quarter of the block (Fig.5). The seven agricultural officers in the study area are under the supervision of assistant director of agriculture in Anchal block. Agricultural officer of Thenmala West is under the supervision of ADR of Punalur. Since it is a high level function, it has no direct contact with farmers.

4.4.4. Block Development Officer

A single functionary is present in the study area with headquarter at Anchal(4). Percentage analysis revealed that cent per cent of the respondents utilized this function. This function is found to be sustainable, since the utilization of this functionary is relatively high in nature.

4.4.5. Agro service centre

In this study area there are four agro service centres existing in the settlements of Edamulakkal(1), Anchal(4), Yeroor(6) and Edamon(12) (Fig.6). But, it is found that these facilities are not at all functioning due to administrative problem and non availability of implements in these centres.

Fig.5. Location of assistant director of agriculture and block development officer

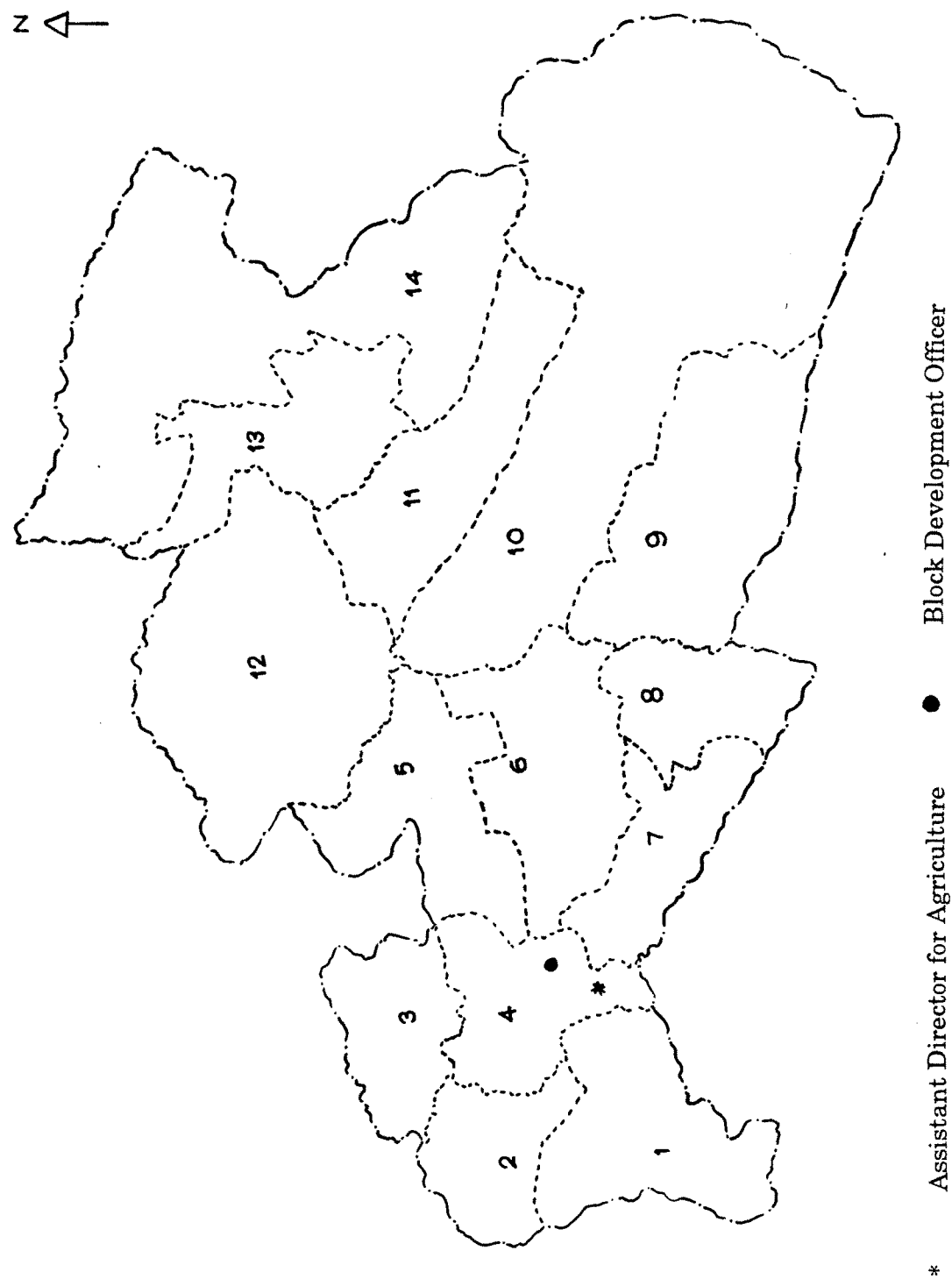
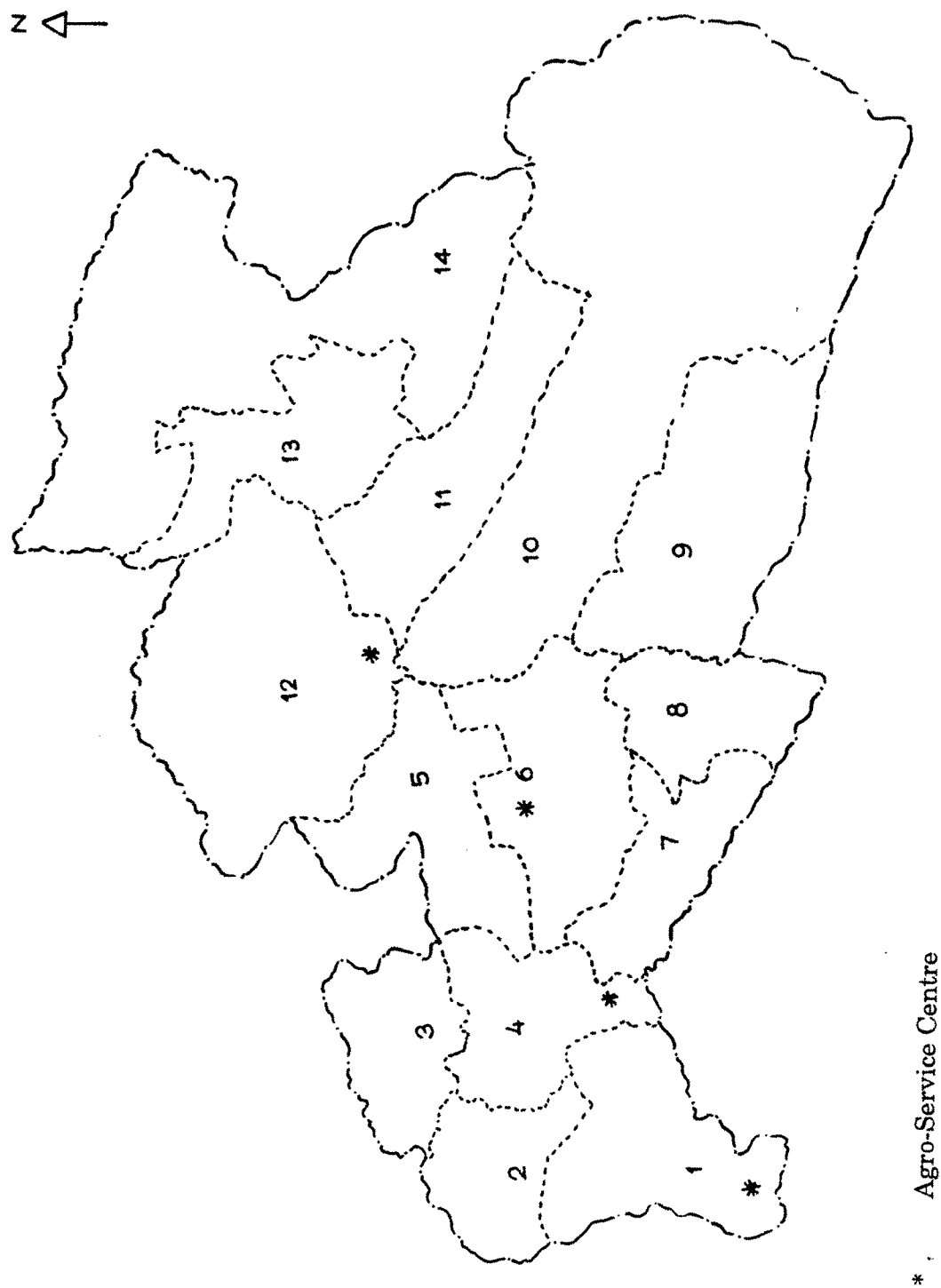


Fig.6. Location of agro service centres



Since capital investment has already been made, there is a need to evaluate the reasons for its nonfunctioning.

4.4.6. Rice mills

This facility is seen plenty in number (60) in all the settlements except Thenmala East (13) (Fig.7). In Aryankavu(14) only one unit is seen. The reason for this may be due to the non cultivation of paddy in these two settlements. All respondents have reported that they are utilizing this facility. Hence this function is sustainable.

4.4.7. Cattle markets

Cattle market plays a potential role in the development of farming in it's surrounding areas. Presence of this facility enhances the cattle rearing and milk production. It also acts as a centre for marketing cattle for meat. In this study area there are three cattle markets present (Fig.8). They function twice in a month. Among this, cattle market in Anchal (4) is popular, biggest and the oldest one. This acts as the pivotal centre for cattle trade. This is used by the people of the study area as well as by the out siders including Tamil Nadu state. Utilization of these facilities by the respondents is to the tune of cent per cent.

4.4.8. Milk collection centres

The milk collection and sale is under taken by the milk producer's co-operative societies and there are 19 such units, at least one in each

Fig.7. Location of rice mills

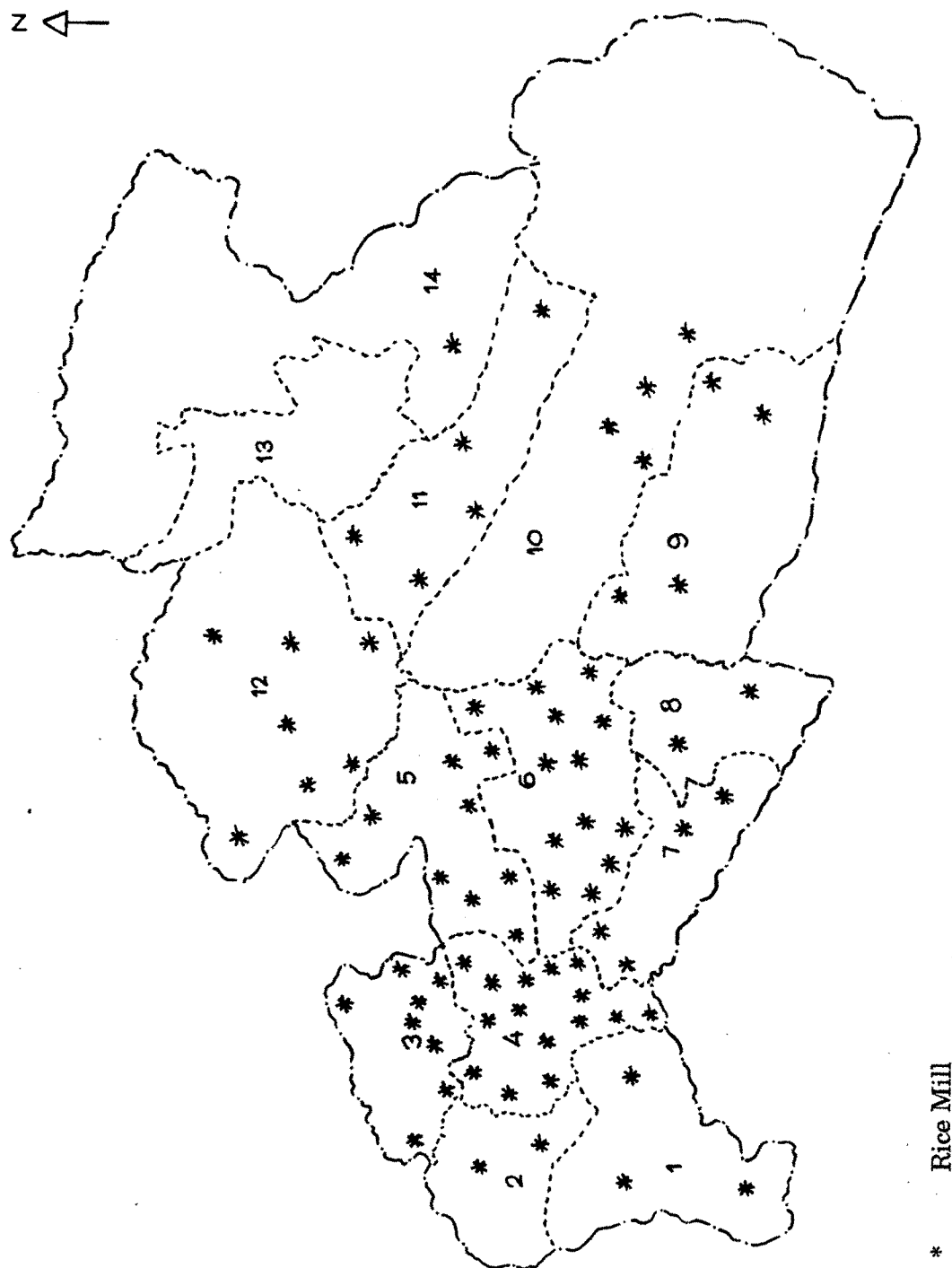


Fig.8. Location of cattle markets

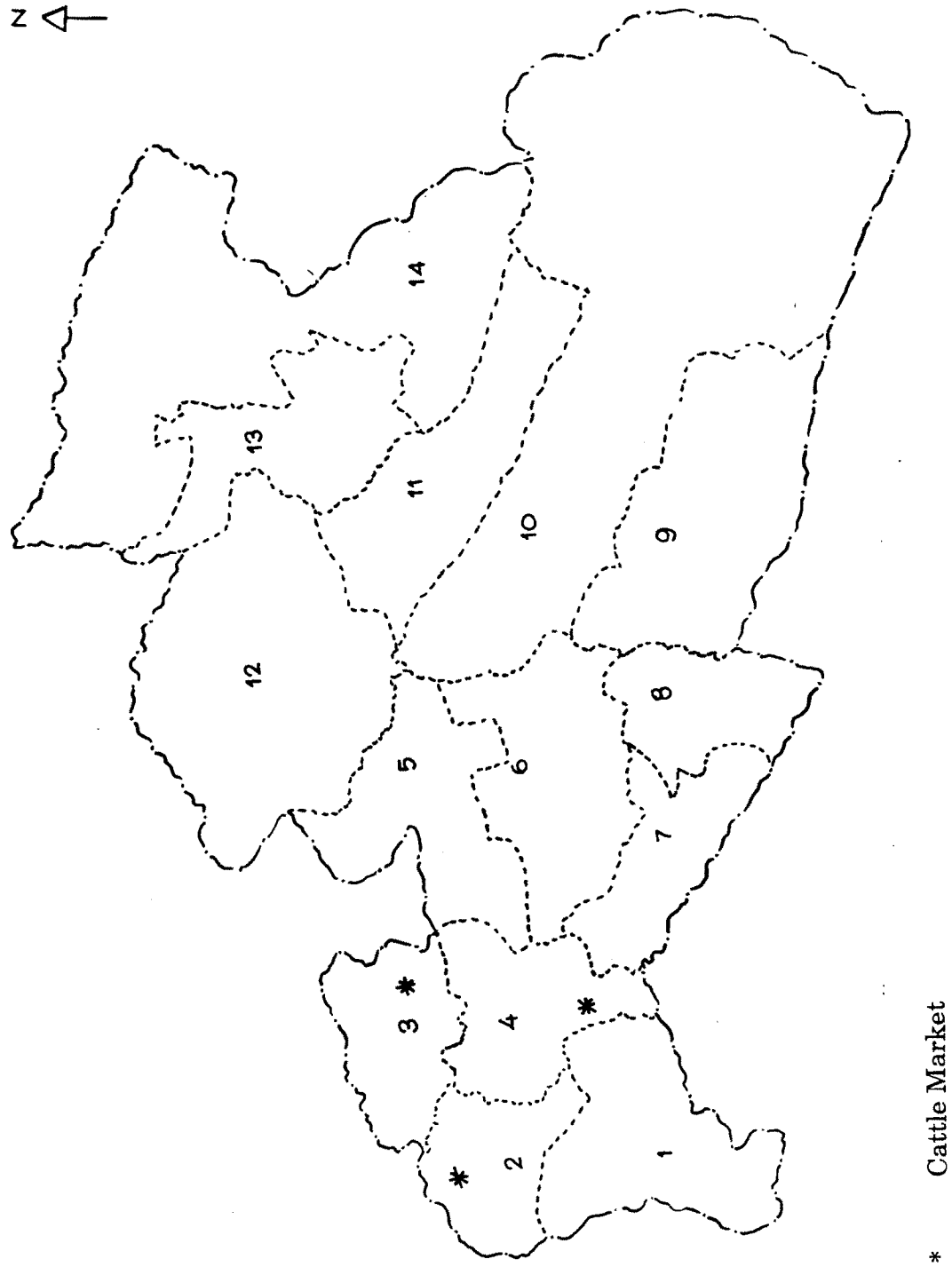
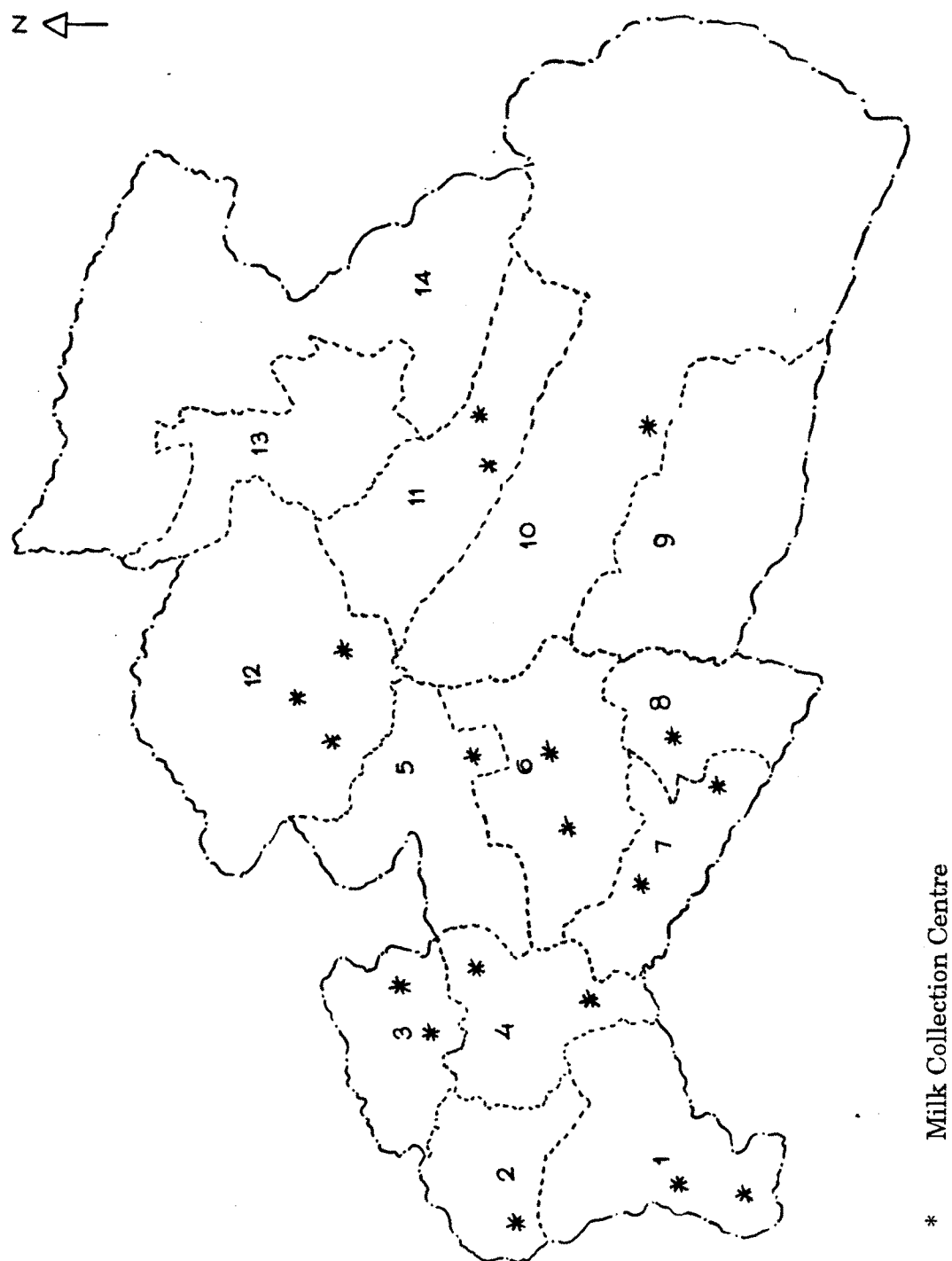


Fig.9. Location of milk collection centres



settlement, in the study area. They do not exist in Thinkalkarikkom(9), Thenmala East (13) and Aryankavu(14). (Fig.9).

These societies have their own area of service and collect the milk from this area through assigned milk collection agents. These agents travel the entire area and collect milk from farmers and sell milk to consumers. Thus the utilization of these units are not a problem for farmers in the settlement. Utilization was reported by cent per cent of the respondents.

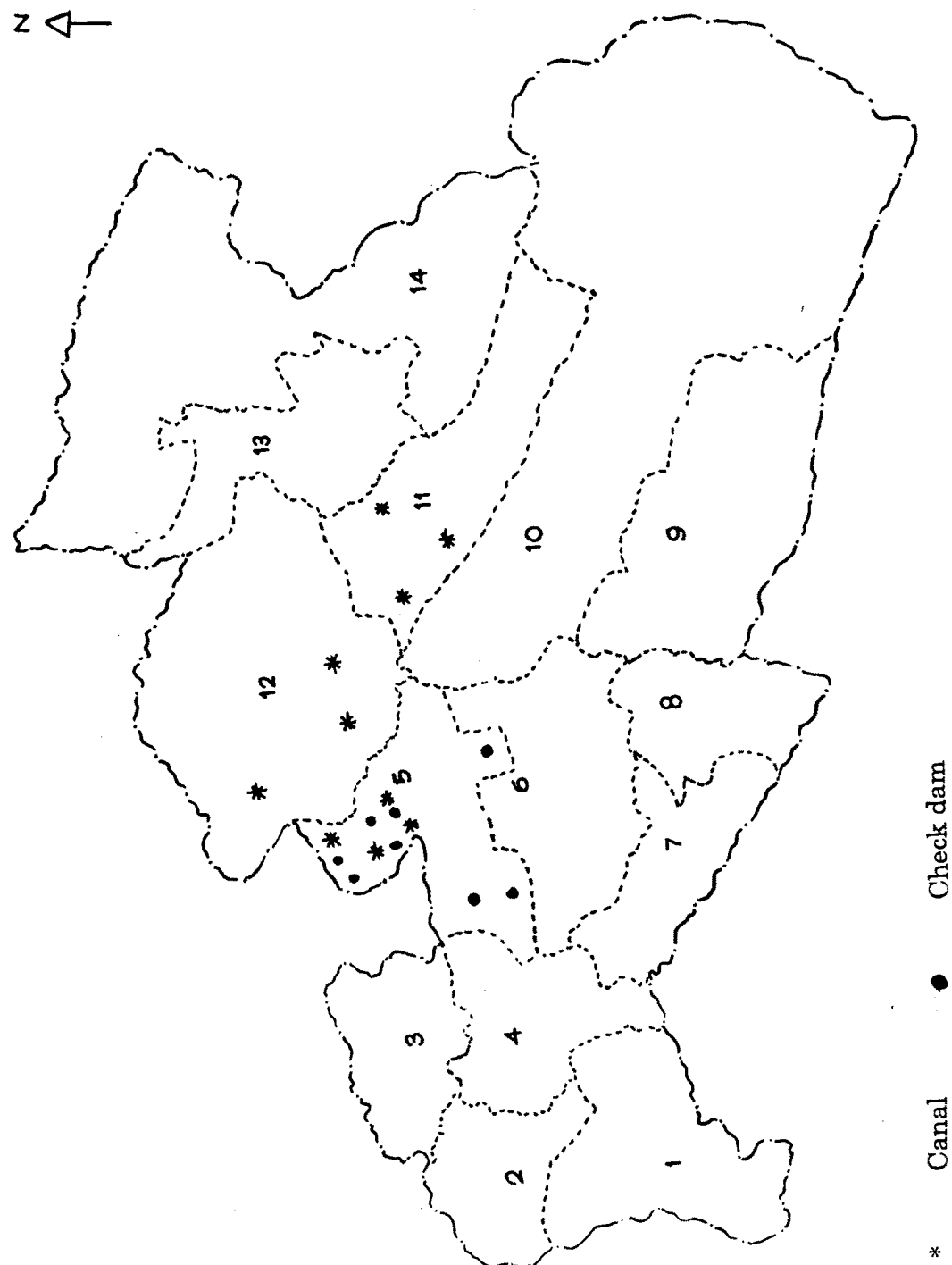
4.4.9. Canals

There are ten small constructed canals of Kallda Irrigation Project (KIP) which pass through one side of study area (Fig.10). Out of these, three canals exist in settlement - 11 and three in settlement - 12. In the settlement - 5 there are four canals passing through. It has been found that the farmers are not getting the actual benefit from the canals because they get no water from this canal in time but, it is being let out when it is not needed. Thus it affects their crop, especially paddy.

4.4.10. Check dams

During 1958-59 eight check dams were constructed across the streams of settlements 5 and 6 (Fig.10) for irrigating paddy crop. All these check dams are out of functioning for many years and remaining as unrepaired. One dam is also exist in Thenmala West

Fig.10. Location of canals and check dams



4.4.11. Veterinary and animal husbandry centres

These facilities include veterinary hospitals and ICDP subcentres (artificial insemination centres). There are 17 centres distributed in all the settlements of the study area except Thenmala-East (13) (Fig.11). Utilization of these functions by the respondents is observed to be cent per cent.

4.4.12. Primary agricultural co-operative banks

Primary Agriculture Co-operative Bank (PACB) plays a vital role in agriculture development of a region. In this study area 17 PACB's are existing (Fig.12). The only settlement which do not possess this function is Ayiranalloor (5).

Utilization of these institutions by the respondents are found to be cent per cent. This may be due to the easy availability of loans both for agriculture and non agricultural purposes.

In the PACB of Anchal(4) there is a permanent provision for the farmers to borrow fertilizers from the PACB depot.

4.4.13. Other types of co-operative societies

There are 33 co-operative societies, other than PACB in the study area. They include Milk producers co-operative society, Rubber producer's co-operative society, Scheduled Caste service co-operative society, Scheduled

Fig.11. Location of veterinary and animal husbandry centres

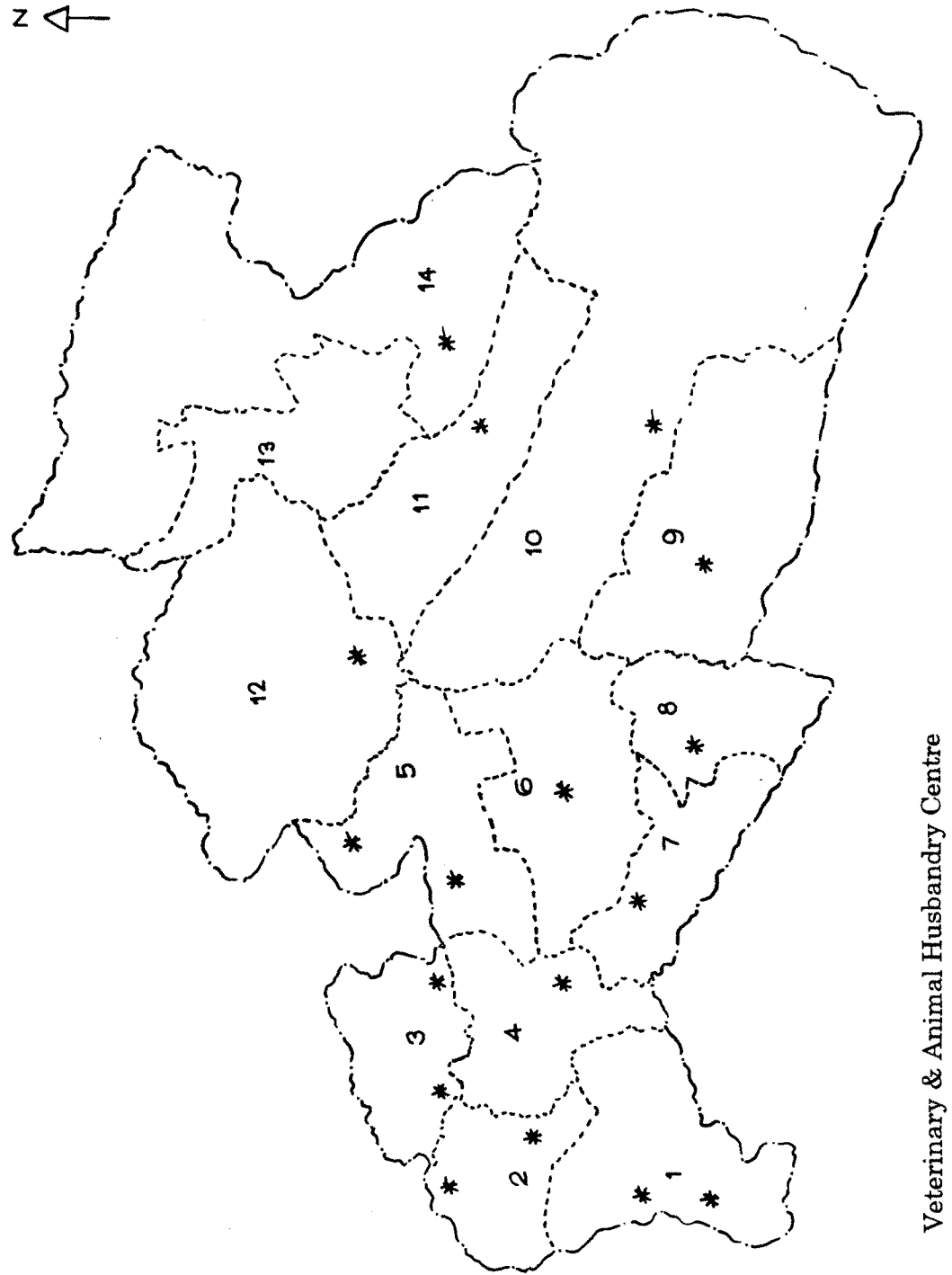


Fig.12. --- location of primary agricultural co-operative banks

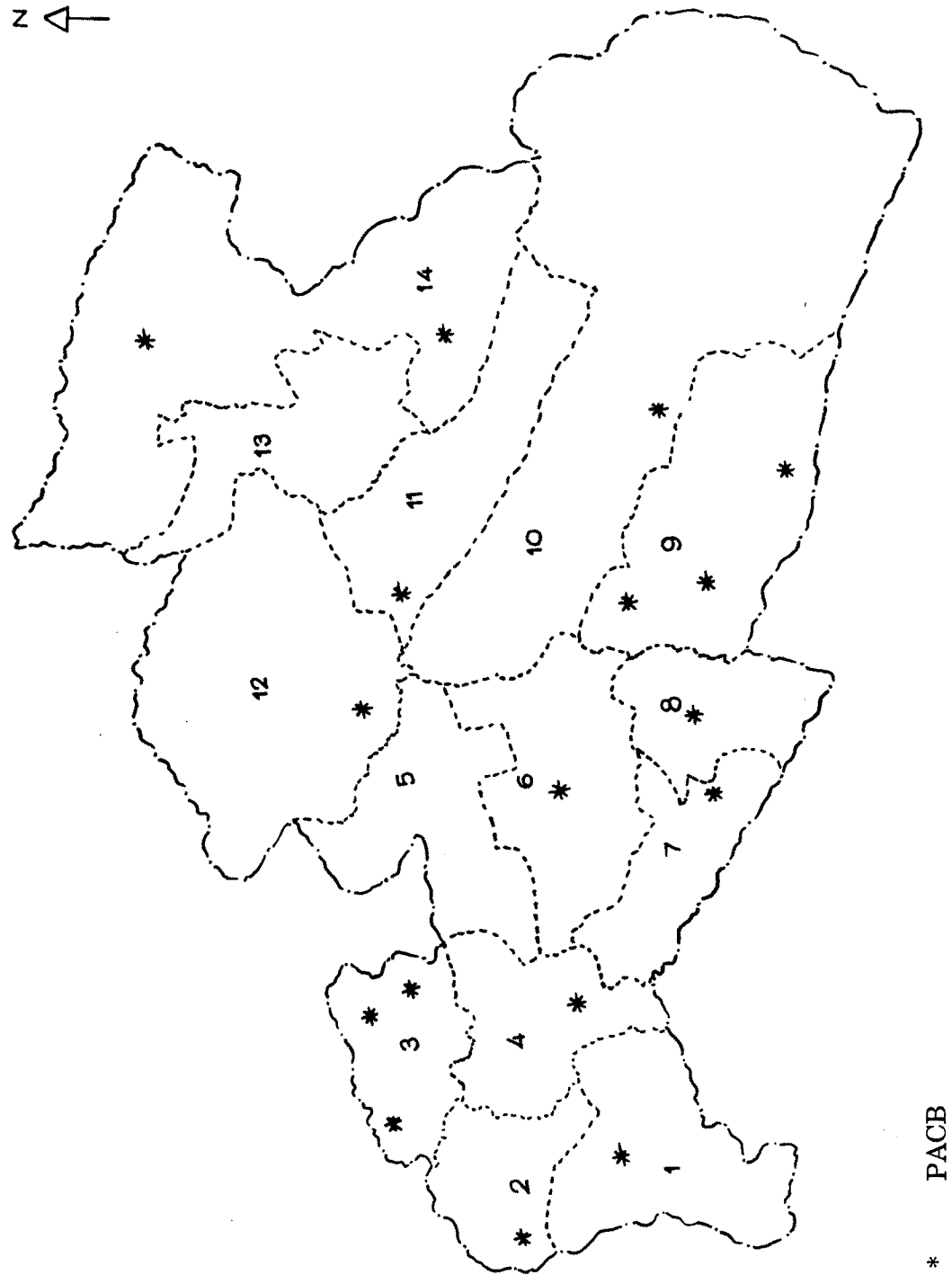
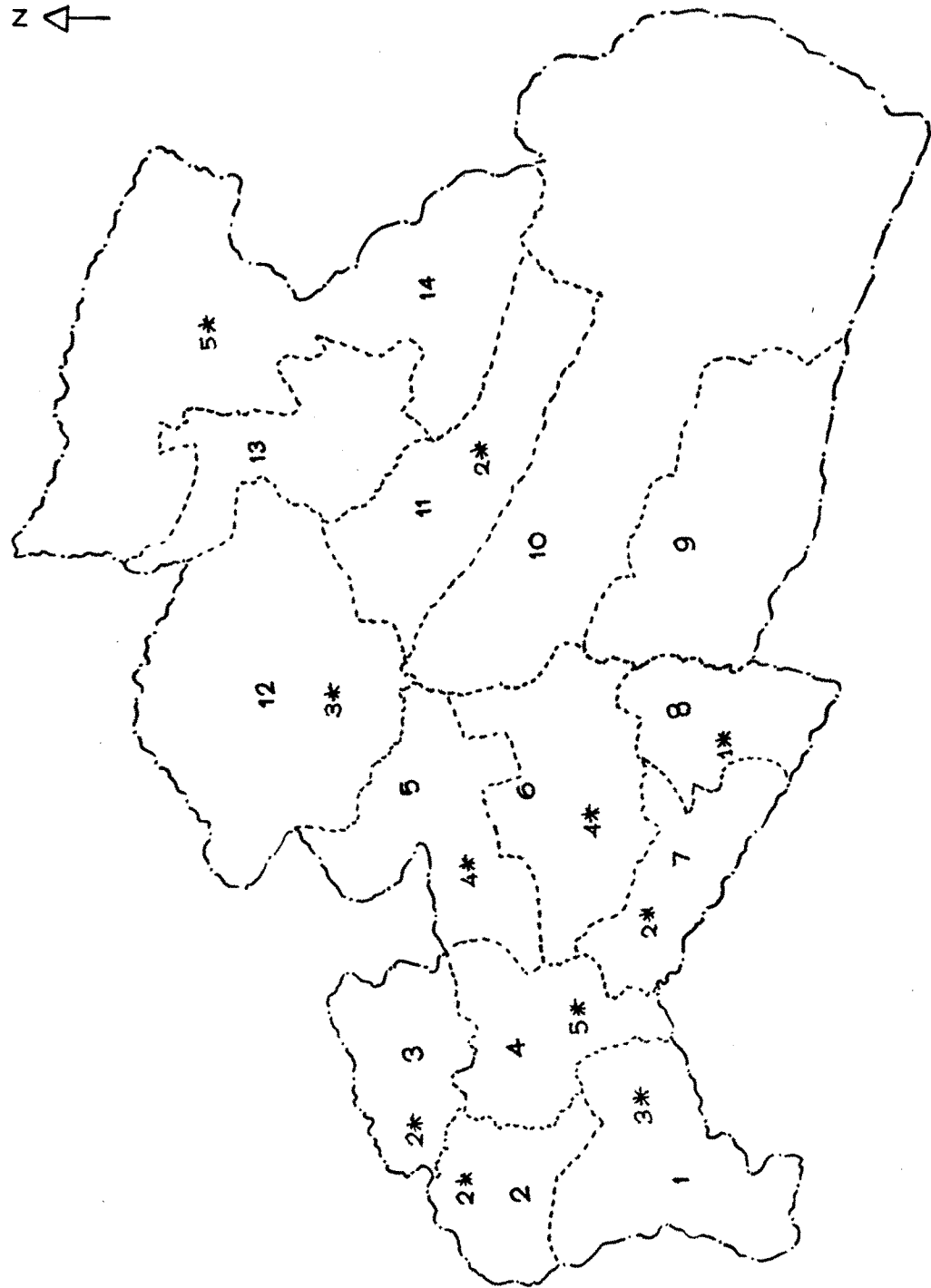


Fig.13. Location of othertypes of co-operative societies



* Other types of co-operative societies

Tribe service co-operative society, Block housing co-operative society, Women's industrial co-operative society and Estate employee's co-operative society. These societies are functioning successfully in the locations as in (Fig.13).

4.4.14. Nationalized banks

Out of 14 settlements, 8 settlements have this facility. Ayiranalloor(5), Alayamon(7), Channapettah(8), Thinkal karikkom(9), Edamon (12), and Thenmale East(13) do not have this facility. (Fig.14). Since the jurisdiction of these banks cover the other settlements also, cent percent utilization by the respondent is found. Respondents utilize this institution for availing credit as well as other transaction.

4.4.15. Non nationalized banks

This facility is found to be existing in Edamulakkal(1), Anchal(4) Yeroor(6) Channappettah(8) and Edamon (12) (Fig.15). Under this category only scheduled bank is included. Utilization of this facility is reported by cent per cent of the respondents.

4.4.16. Youth clubs

Youth Clubs include Arts and Sports clubs and Women's Organisations (Mahila Samajam). There are 128 such clubs in the study area (Fig.16). All these clubs are serving the community of their respective area and are functioning well.

Fig.14. Location of nationalized banks

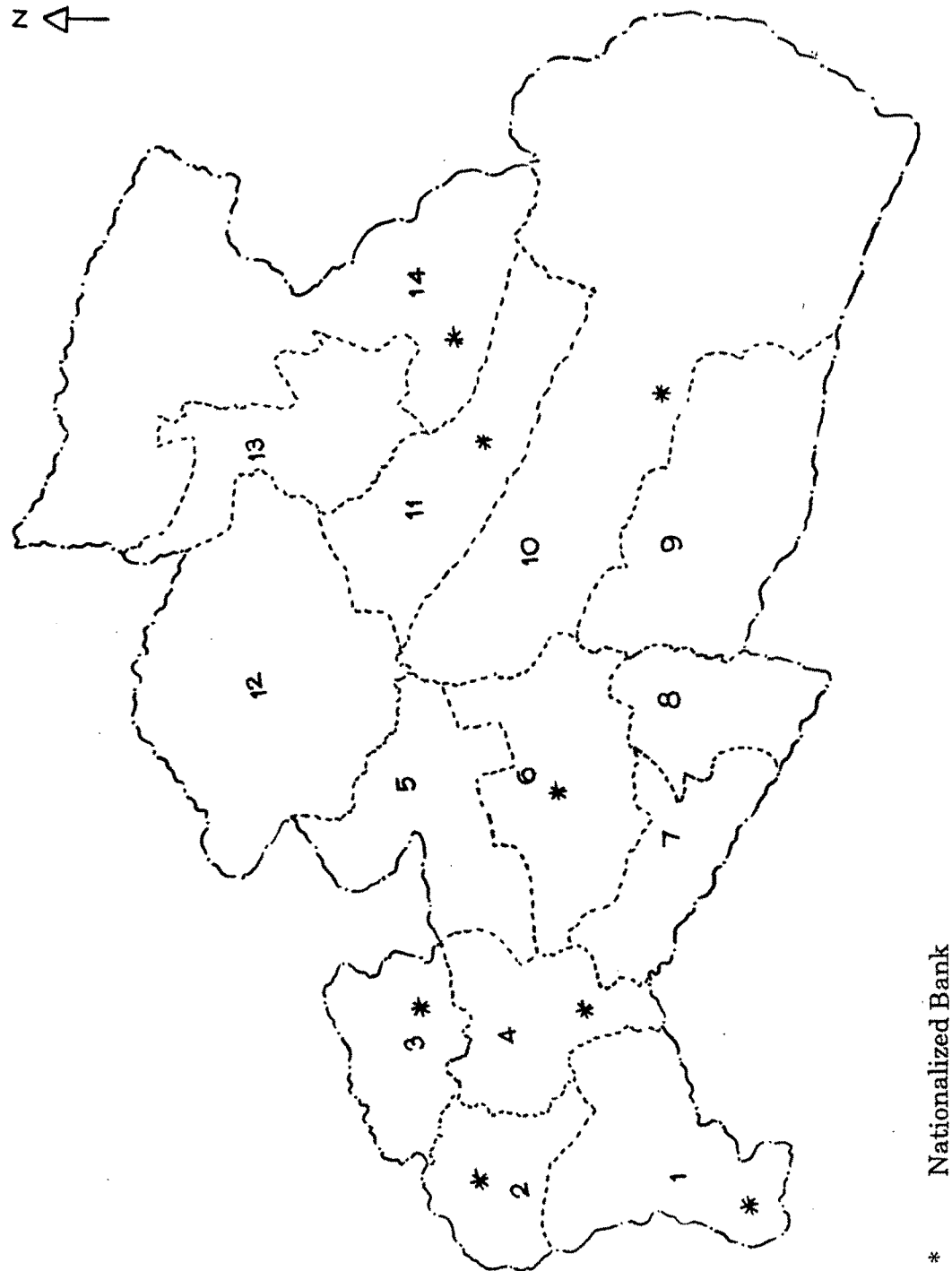


Fig.15. Location of non nationalized banks

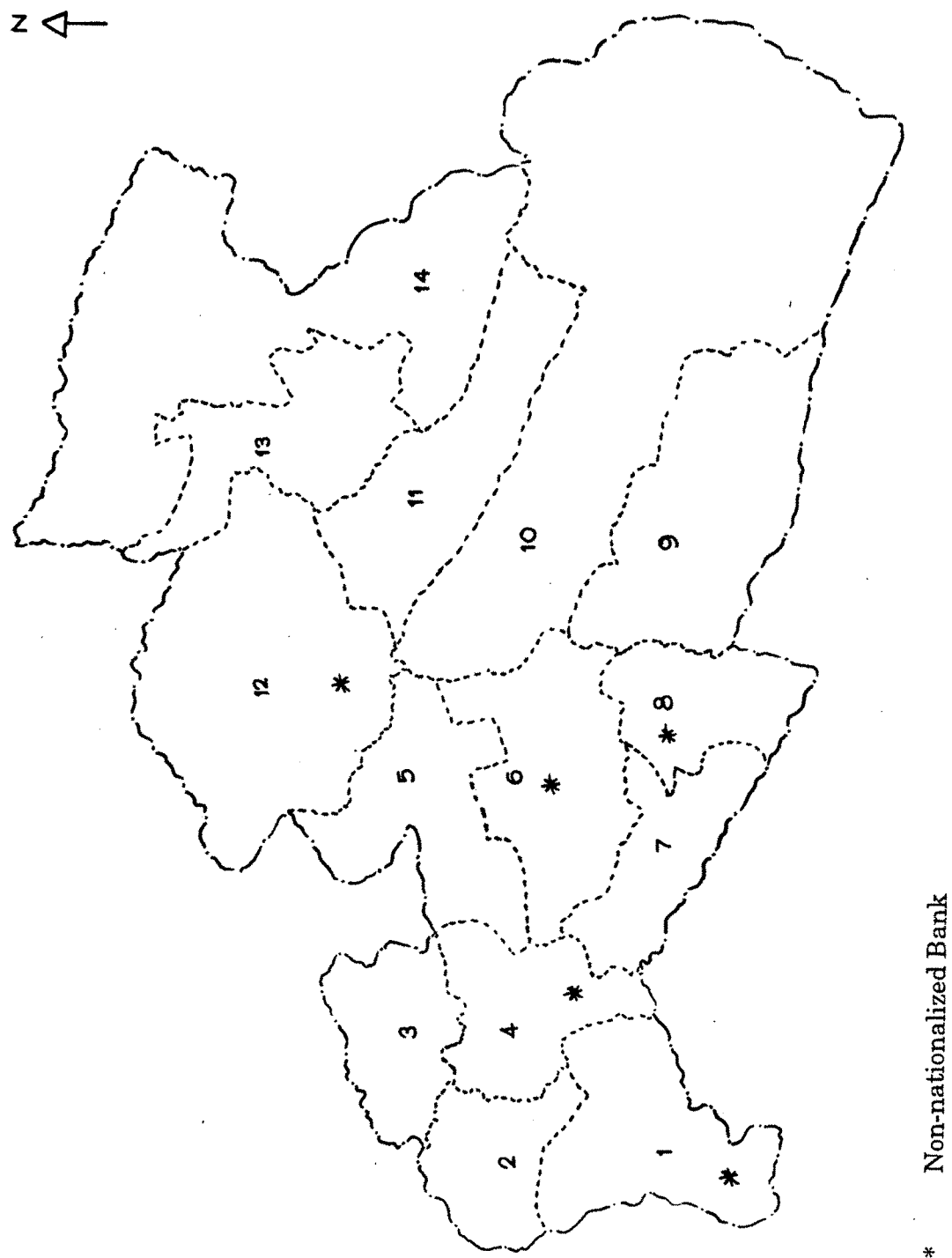
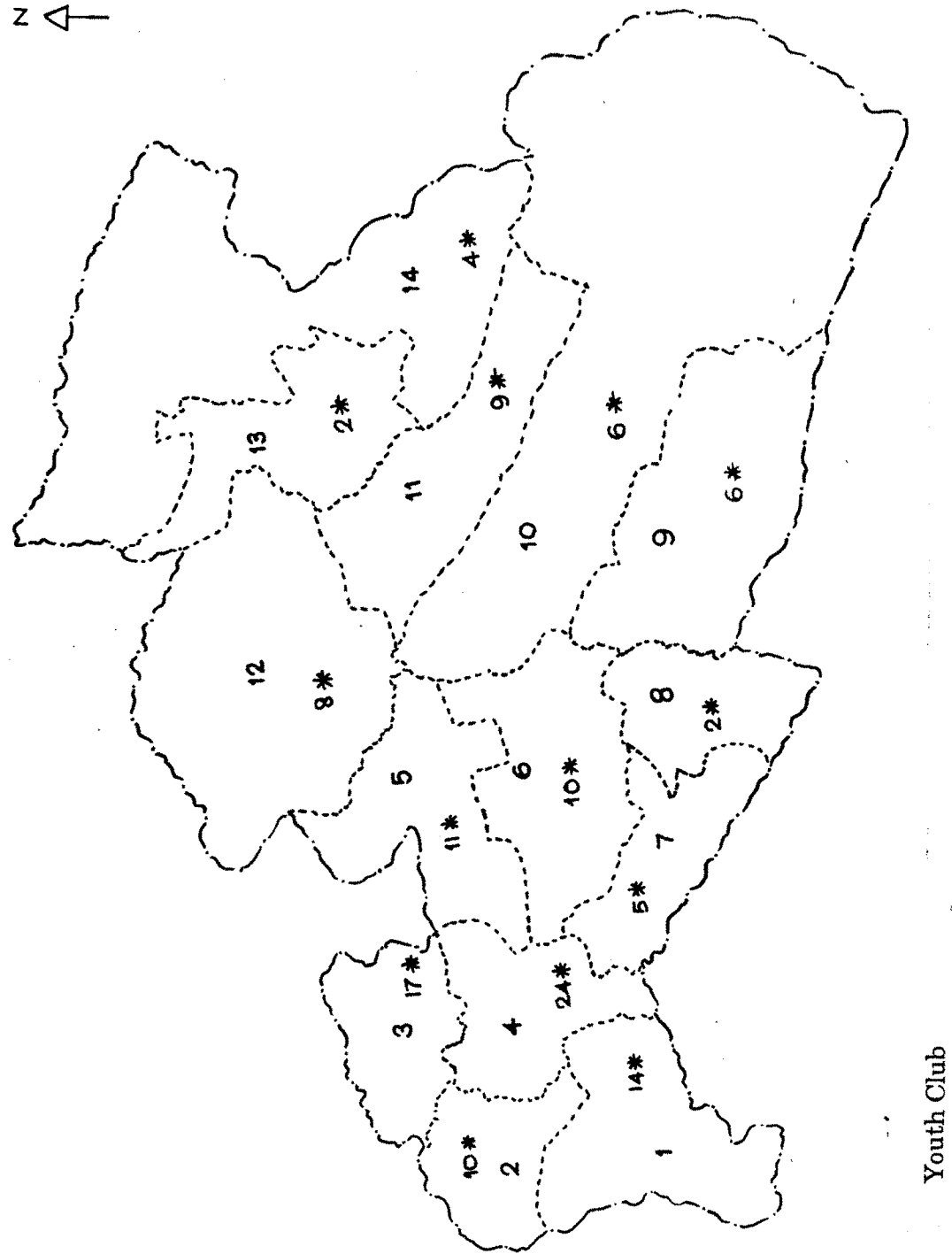


Fig.16. Location of youth clubs



4.4.17. Implement manufacturing and repairing units

This facility is an inevitable one for the farmers. They get their implements repaired from these "engineering workshops". There are 60 such facilities located in the study area and all are utilized by the respondents when ever necessary. These facilities are located in the developed centres (Fig.17).

4.4.18. Bus stands

In this study area there exist three bus stands in Edamulakkal (1), Anchal(4) and Kulathupuzha (10) (Fig.18). It is found that these facilities are being utilized by the respondents both from inside as well as outside the settlements because it is an inevitable facility for their day to day life. This finding is similar to the findings of Palaniswami (1984).

4.4.20. Railway stations

Existence of five Railway stations in the settlements, Thenmala-W(11),Edamon (12) and Aryankavu(14) is found (Fig.19). Utilization of these facilities is cent per cent by the respondents from inside as well as outside the settlement because, this facility acts as a potential mean for transport in their daily life.

Fig.17. Location of implement manufacturing and repairing units

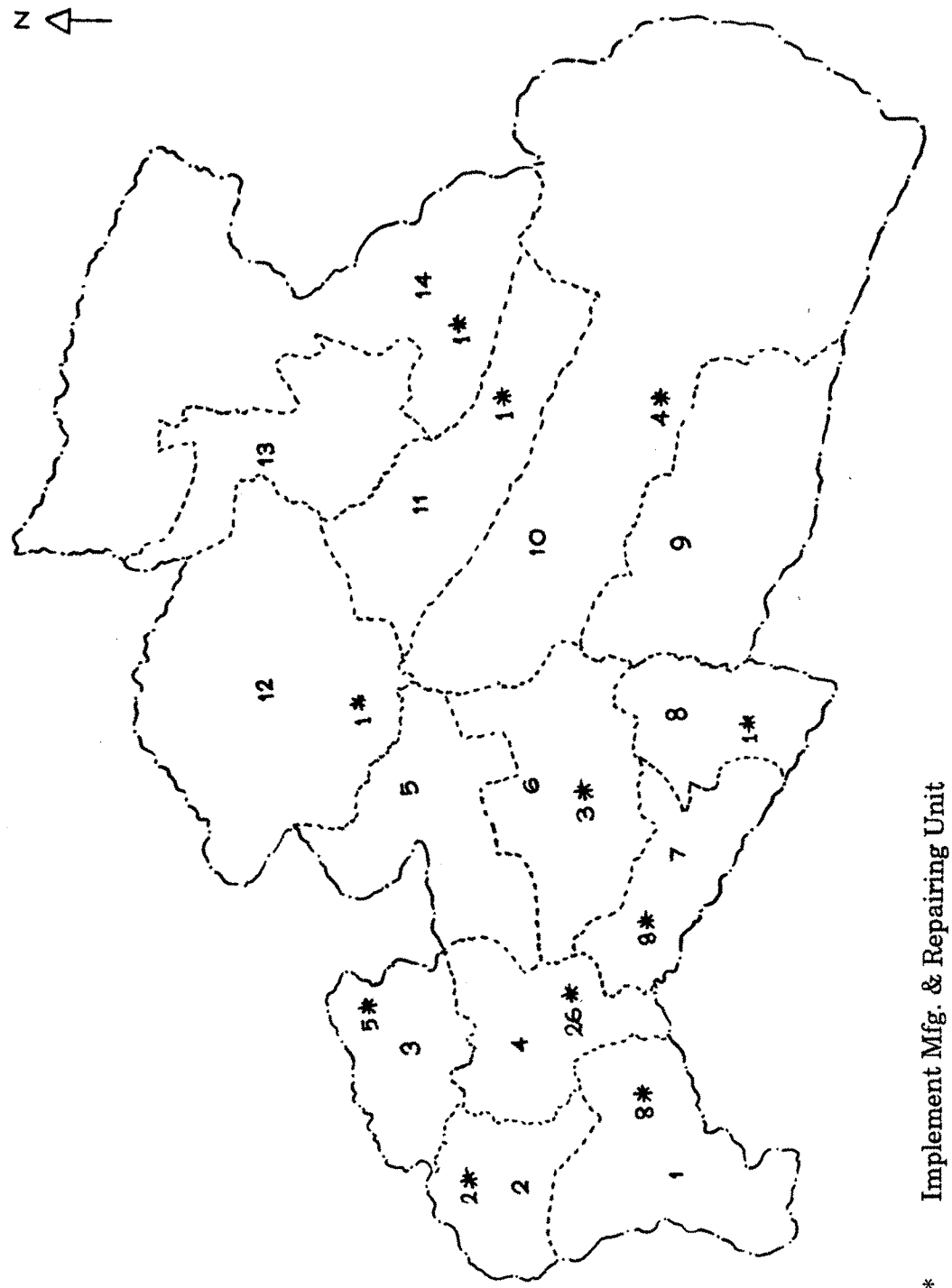


Fig.18. Location of bus stands

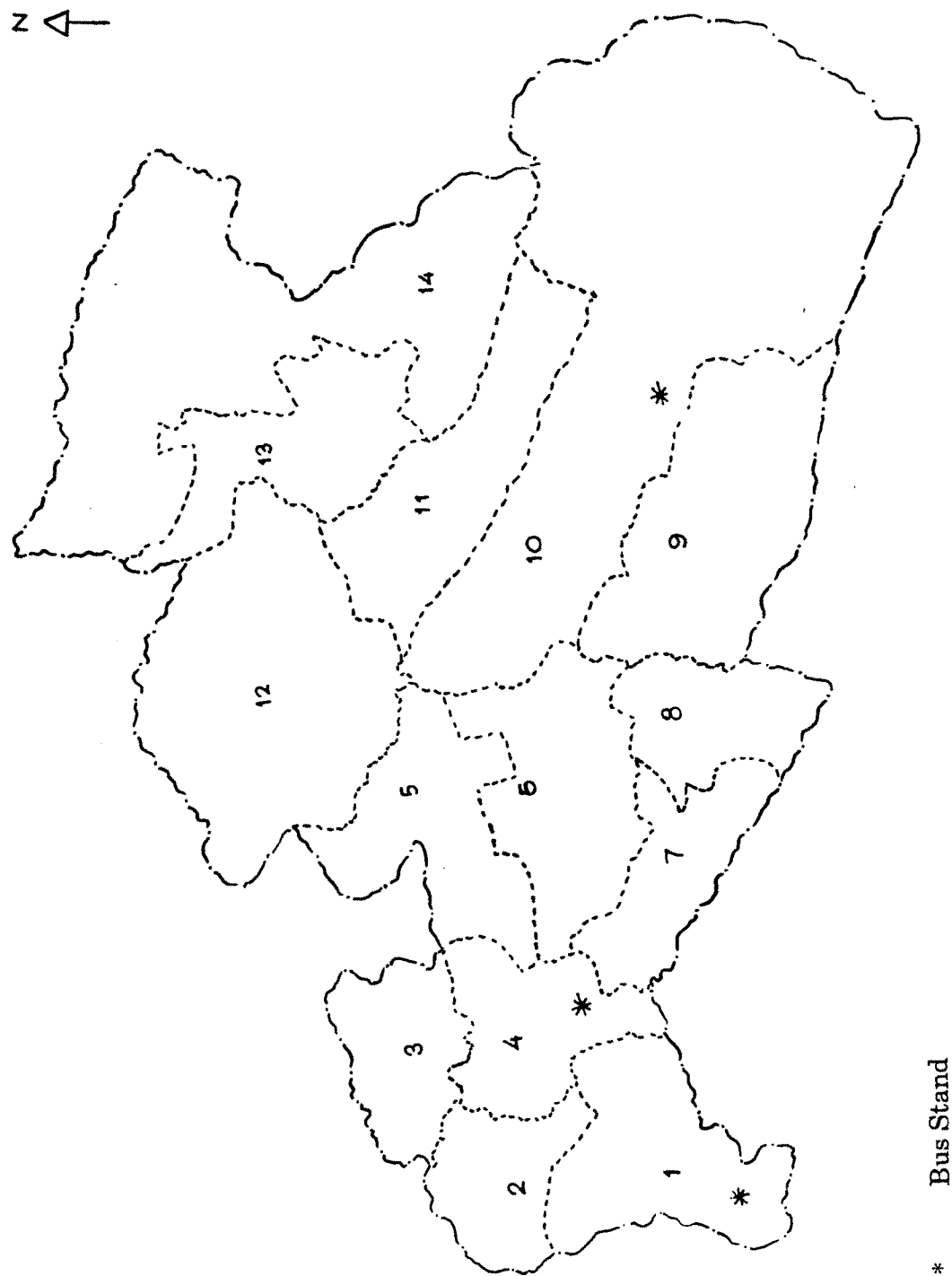
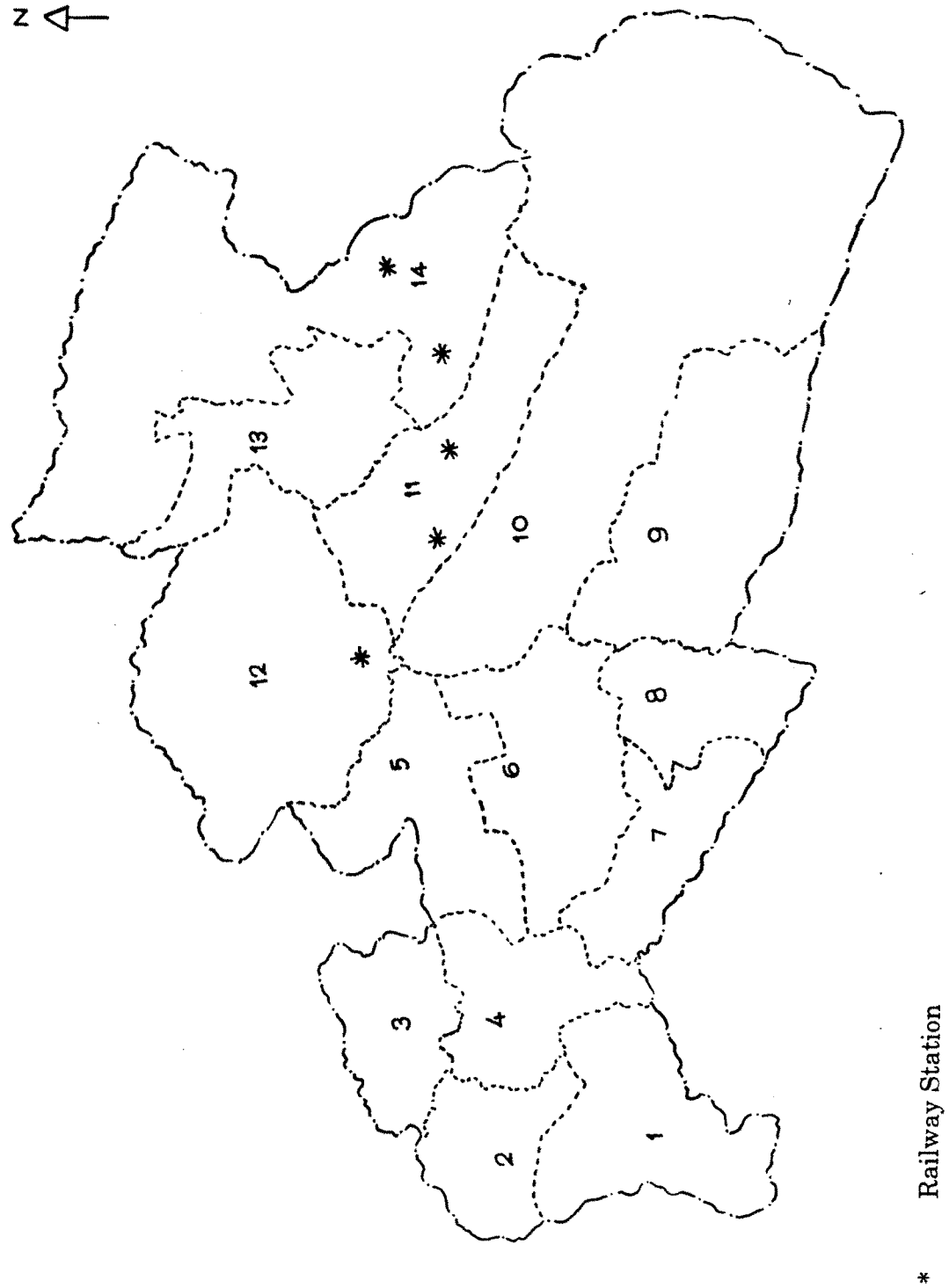


Fig.19. Location of railway stations



4.4.20. Sub post offices

This facility is found in nine locations of the study area which are distributed equally (Fig.20).Utilization by the respondents in the settlements is noted to be cent percent. This is because that these facilities are located in either panchayat head quaters or at developed centres and this being inevitable facility for the respondents. This function is found to be sustainable.

4.4.21. Other types of post offices

In this study area there are 31 Branch Post Offices and Extra Departmental (ED) Post Office existing (Fig.21). They are distributed in all settlements except Kulathupuzha (10) and are better utilized by the residents.

4.4.22. Community TV centres

Community TV facility is confined to scheduled caste/scheduled tribe colonies, Youth Clubs and Panchayat Libraries. There are 69 TV centres of such type (Fig.22). Out of that 54 TV centres are functioning well.

4.4.23. High schools

There are 27 high schools distributed through out the 14 settlements (Fig.23). These include Government School and Private (Management) Schools. All schools are utilized by the residents with in the settlements and some schools are utilized by residents out side the study area.

Fig.20. Location of sub post offices

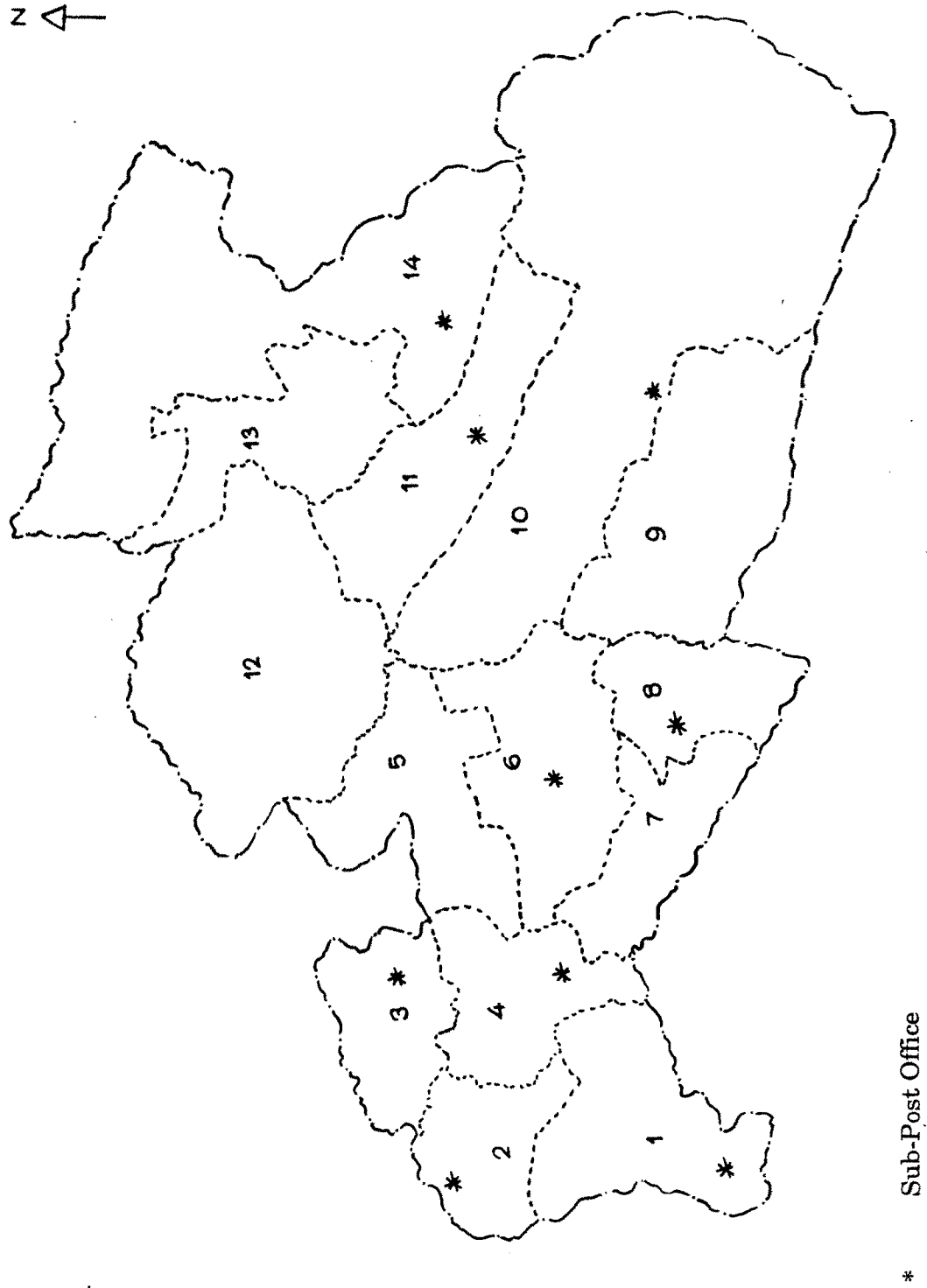
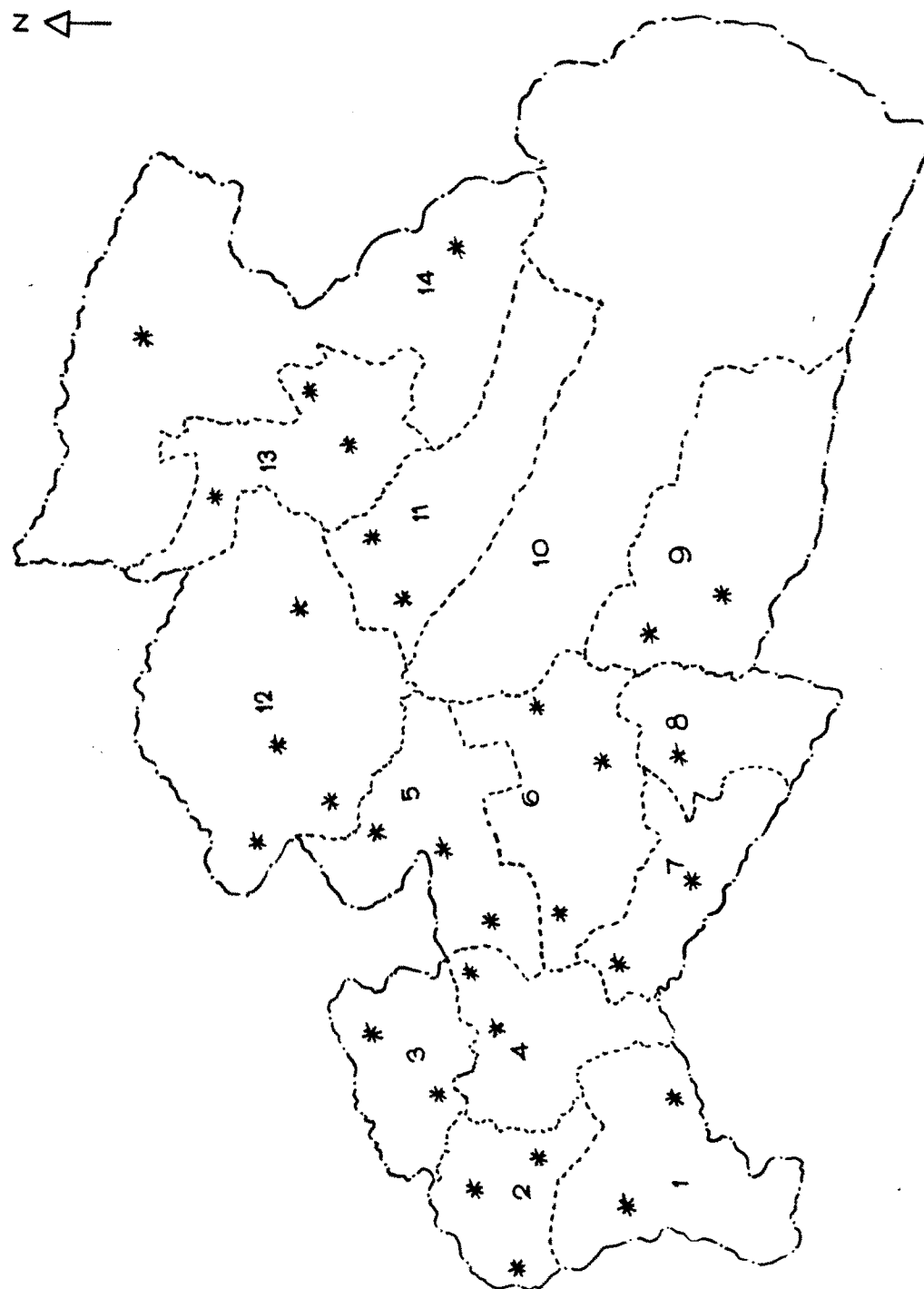


Fig.21. Location of other types of post offices



* Other types of Post Office

Fig.22. : Location of community TV centres

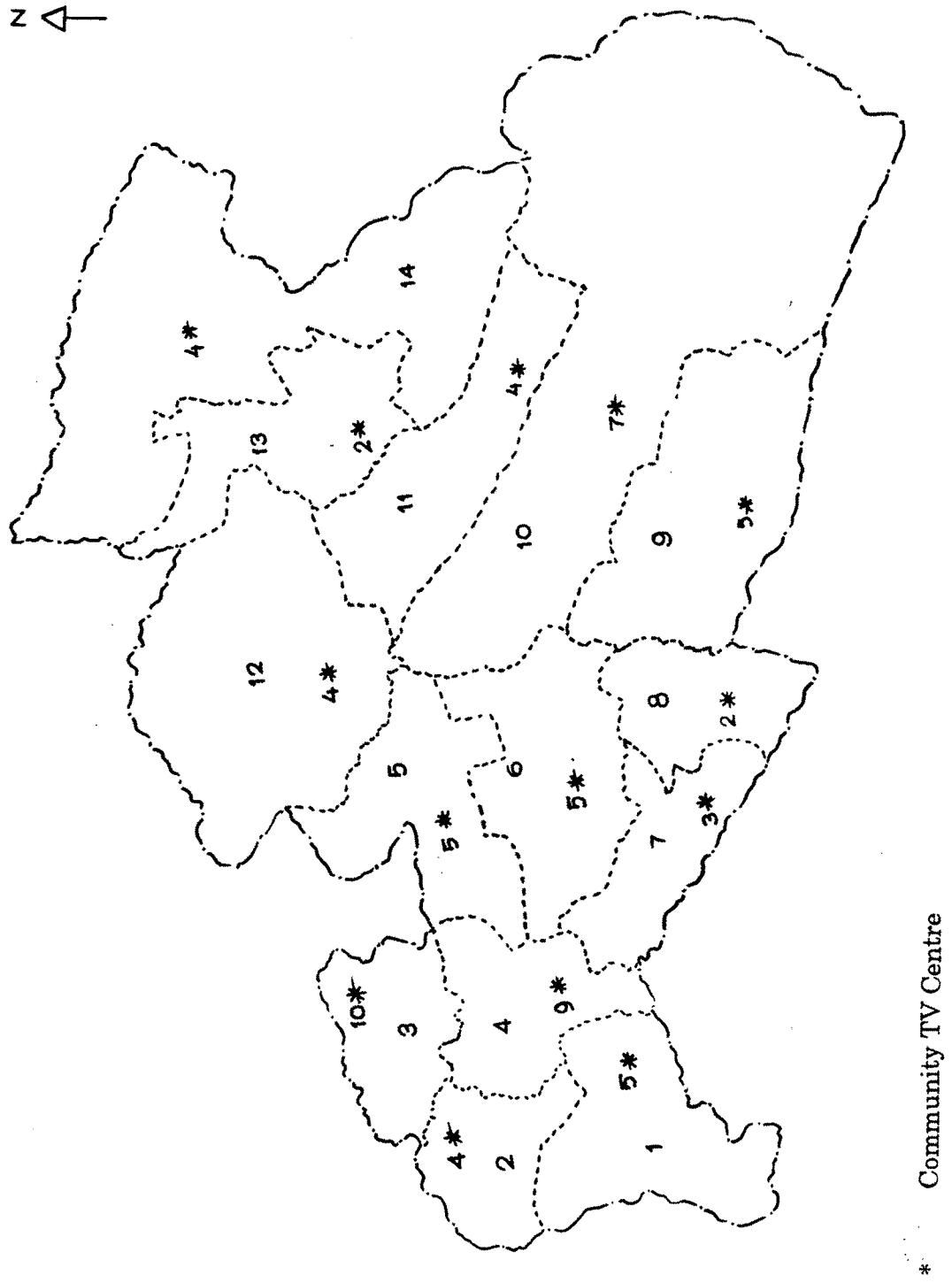
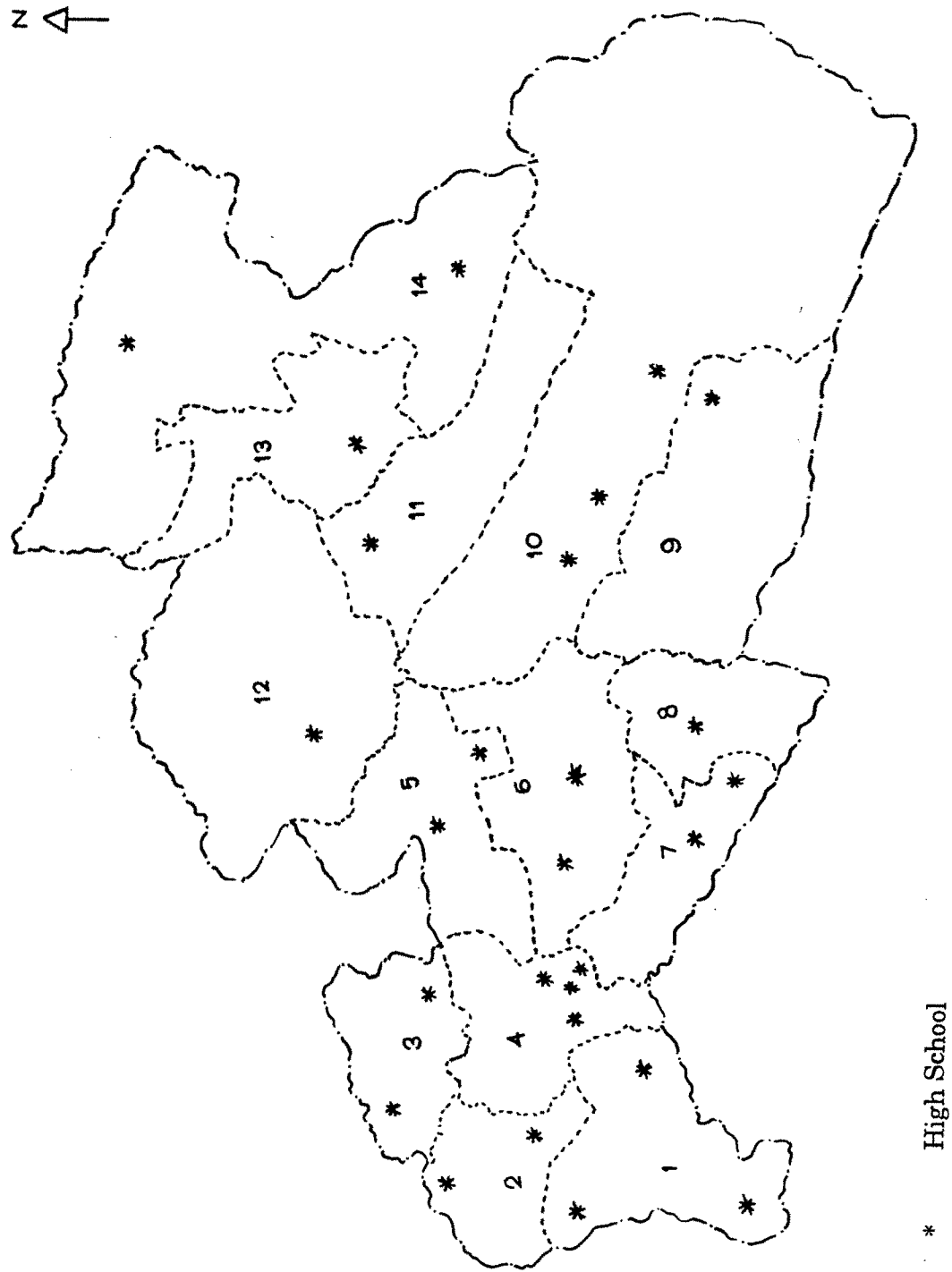


Fig.23. - Location of high schools



4.4.24. Colleges

In this study area there is only one college at Alayamon (7) (Fig.24). This college is utilized by the residents inside the study area and out side the study area and this is sustainable.

4.4.25. Government hospitals and public health centres (PHC)

Under the health facilities there are 10 PHC and 8 government hospitals existing in the study area (Fig.25). government hospital include Allopathic hospital, Ayurvedic hospital and Hemoeo pathic hospitals. Residents inside the study area as well as outside the study area avail these facilities.

4.4.26. Health workers

There are 36 health workers in this study area (Fig.26) and they include Health inspectors, Lady health inspectors, Leprosy inspectors. They function under government hospitals/primary health centres (PHC) or PHC sub-centres. The jurisdiction of the hopsital/PHC (usually village panchayat or revenue village) is divided and assigned them as their area of service, so that all people can utilize this function.

4.4.26. Non Governmental Organisations

There are 106 non governmental organisations in the study area (Fig.27). These include Padasekhara samithi (Group farming samithi), Kera samrakshana Samithi, Keravikasana Samithi, Kurumulaku vikasana

Fig.24. Location of colleges

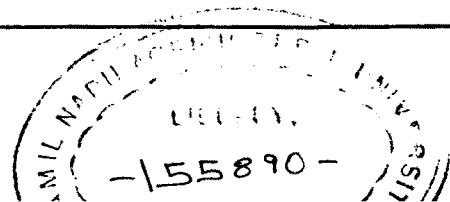
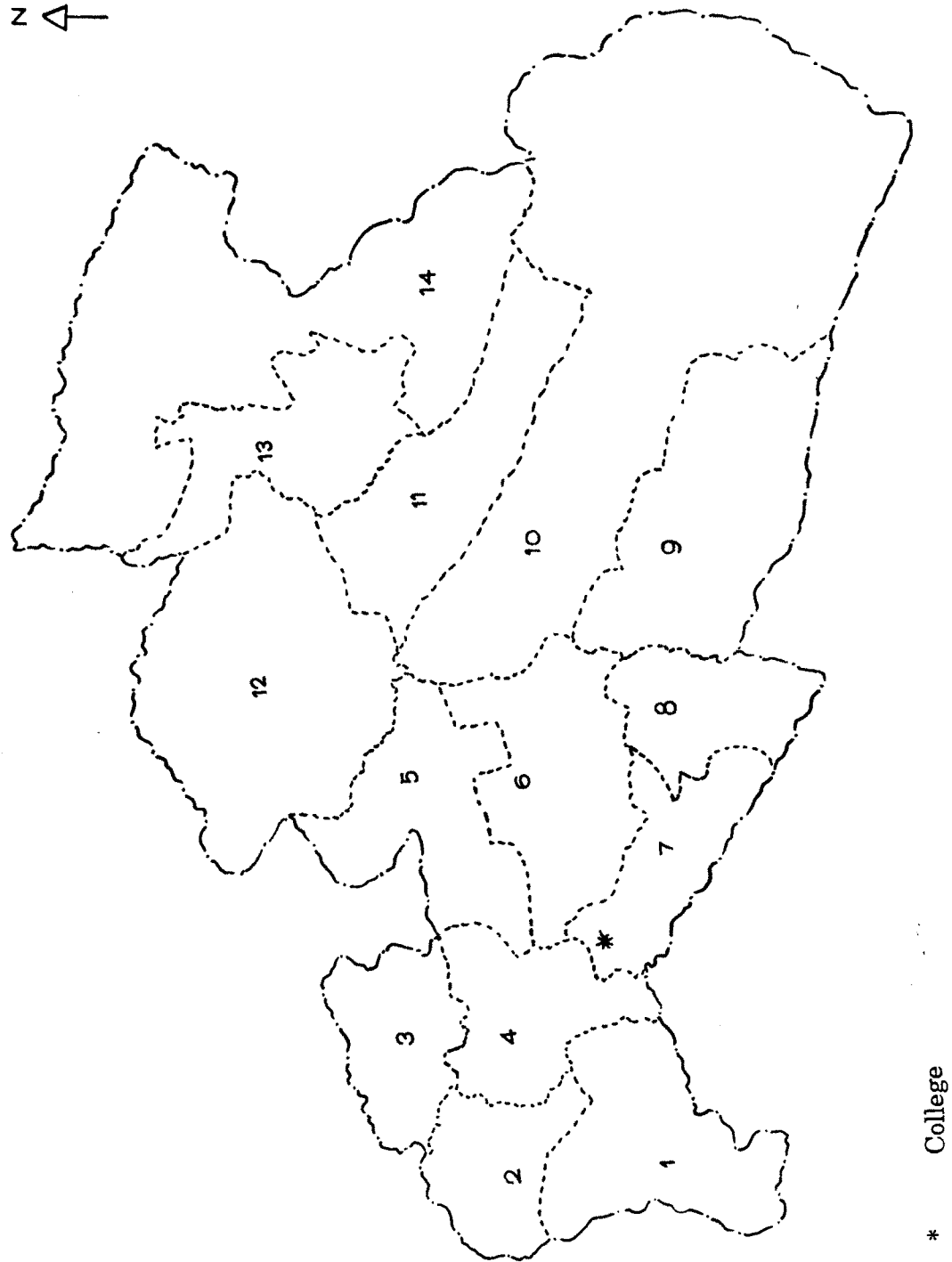


Fig.25. Location of government hospital & primary health centres

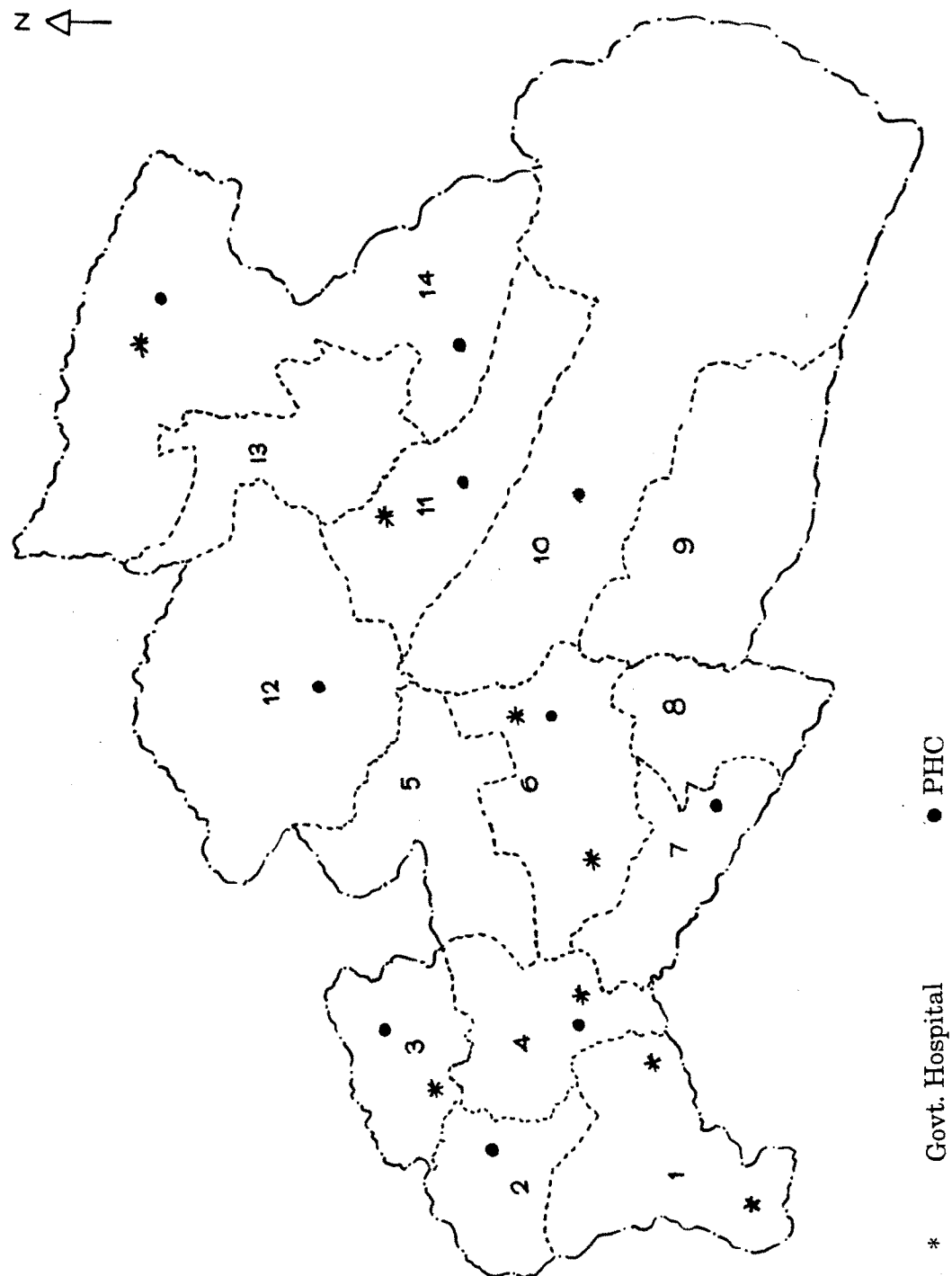


Fig.26. Location of health workers

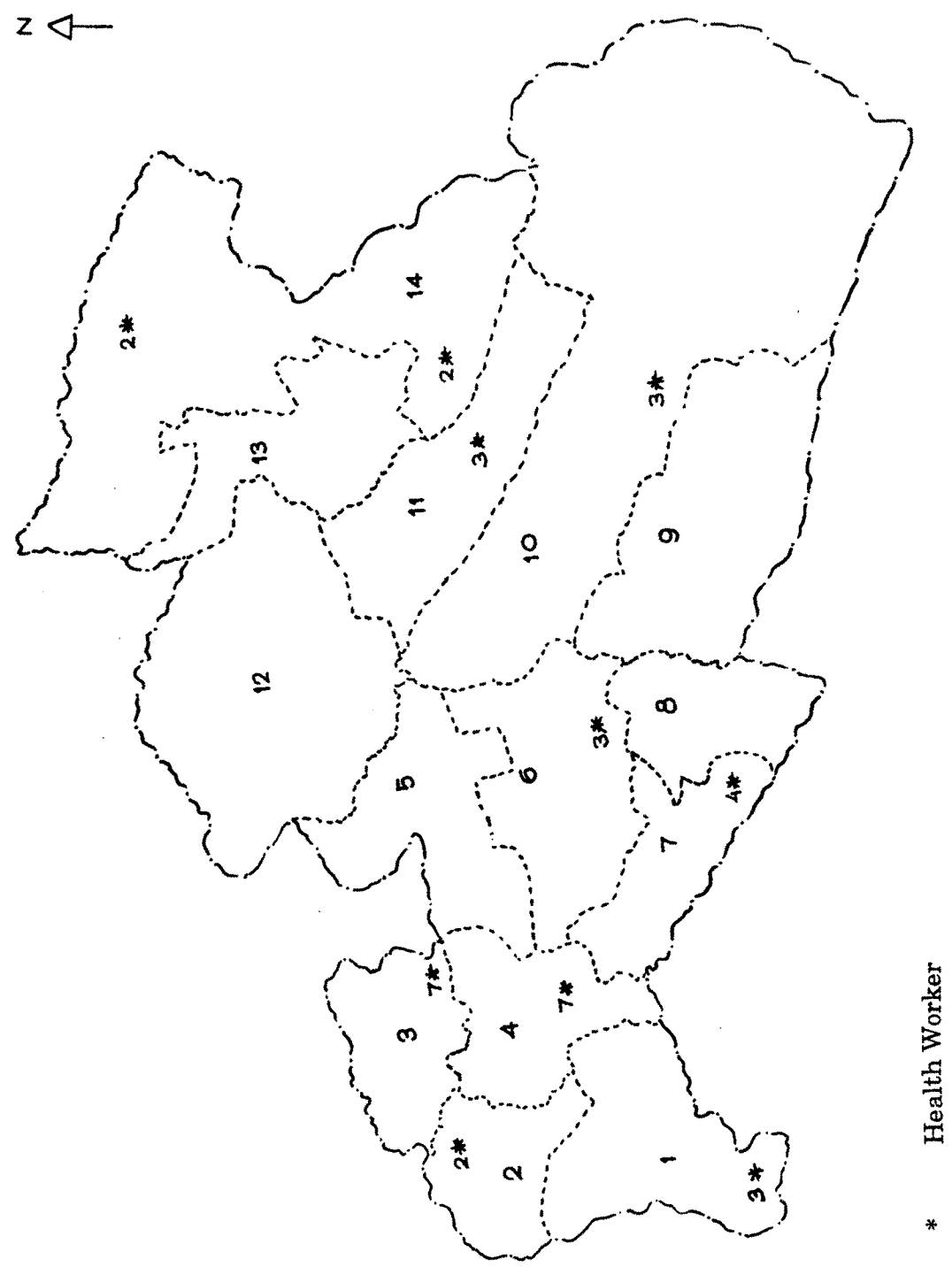
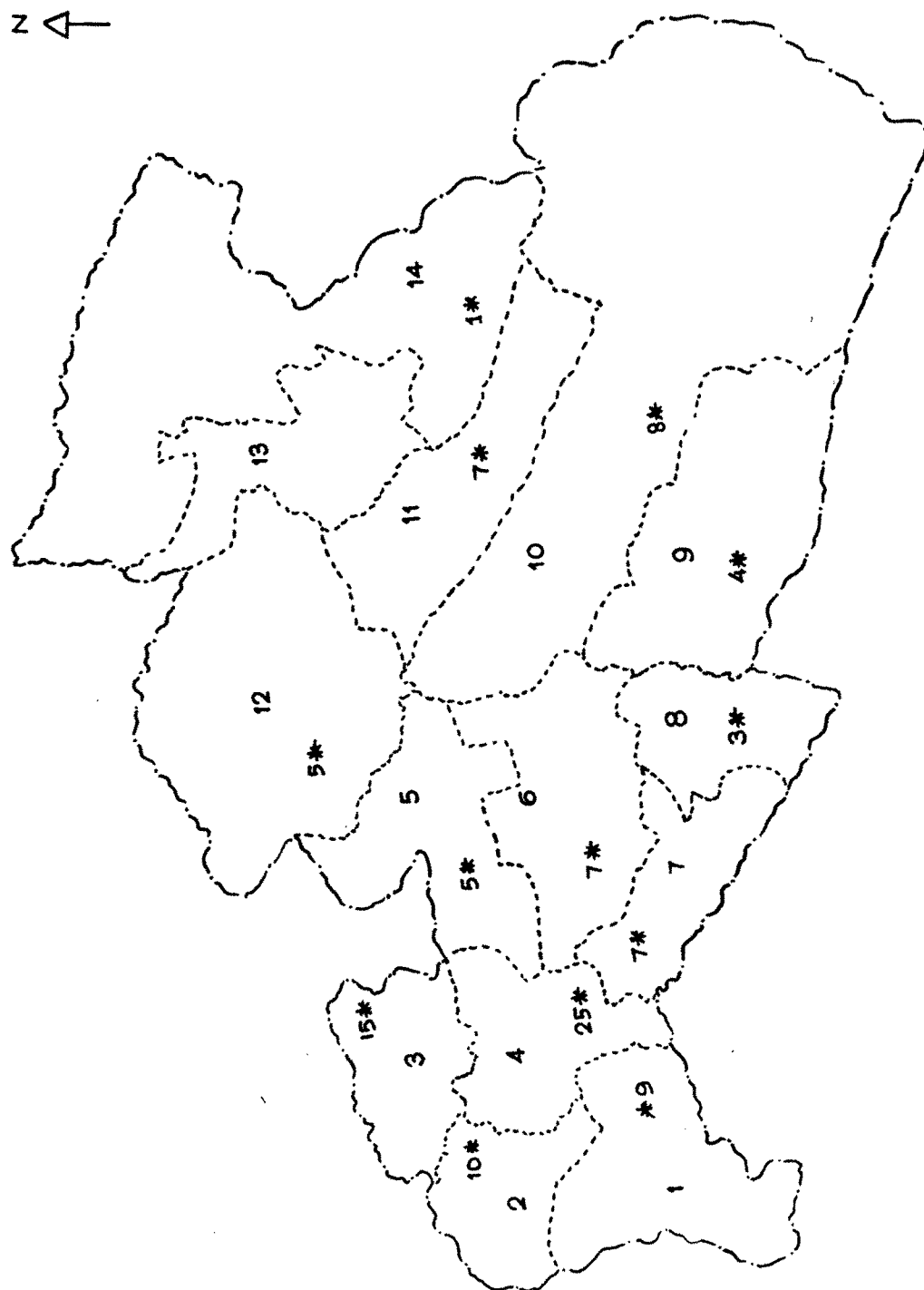


Fig.27. Location of non governmental organisations



* NGO's

samithi. All these organisations work with cooperation of Krishi Bhavan. Except Thenmala East (13), all the settlement have these organisations. Utilization of these organisations is found to be cent per cent. Members of these organisations obtain inputs at subsidised rate.

4.4.28. Daily markets

There are 22 daily markets in the study area. Absence of daily market is noticed in Alayamen (7) Thenmala East (13) and Aryankavu (14) (Fig.28). It is found that the quantity of farm produce brought to these markets for sales is very less. These markets are small in size. The utilization of these markets are found to be cent per cent. People from outside the settlement also utilize this facility which make this function more utilized and viable.

4.4.29. Fertilizer and pesticide shops

There are 57 fertilizer and pesticide shops in the study area which are evenly distributed in all the settlements except Thenmala East (13) (Fig.29). These are runned by private and public sectors. The public sector distribute fertilizer and pesticides through PACB's depot.

4.4.30. Weekly markets

Agricultural produce of the region are brought to weekly markets and marketed. There are 6 weekly markets functioning in the study area (Fig.30). They are in the settlements Karavallur (3), Anchal (4), Alayamon (7) Channapettah (8), and Aryankavu (14). Among these, market in Anchal

Fig.28. Location of daily markets

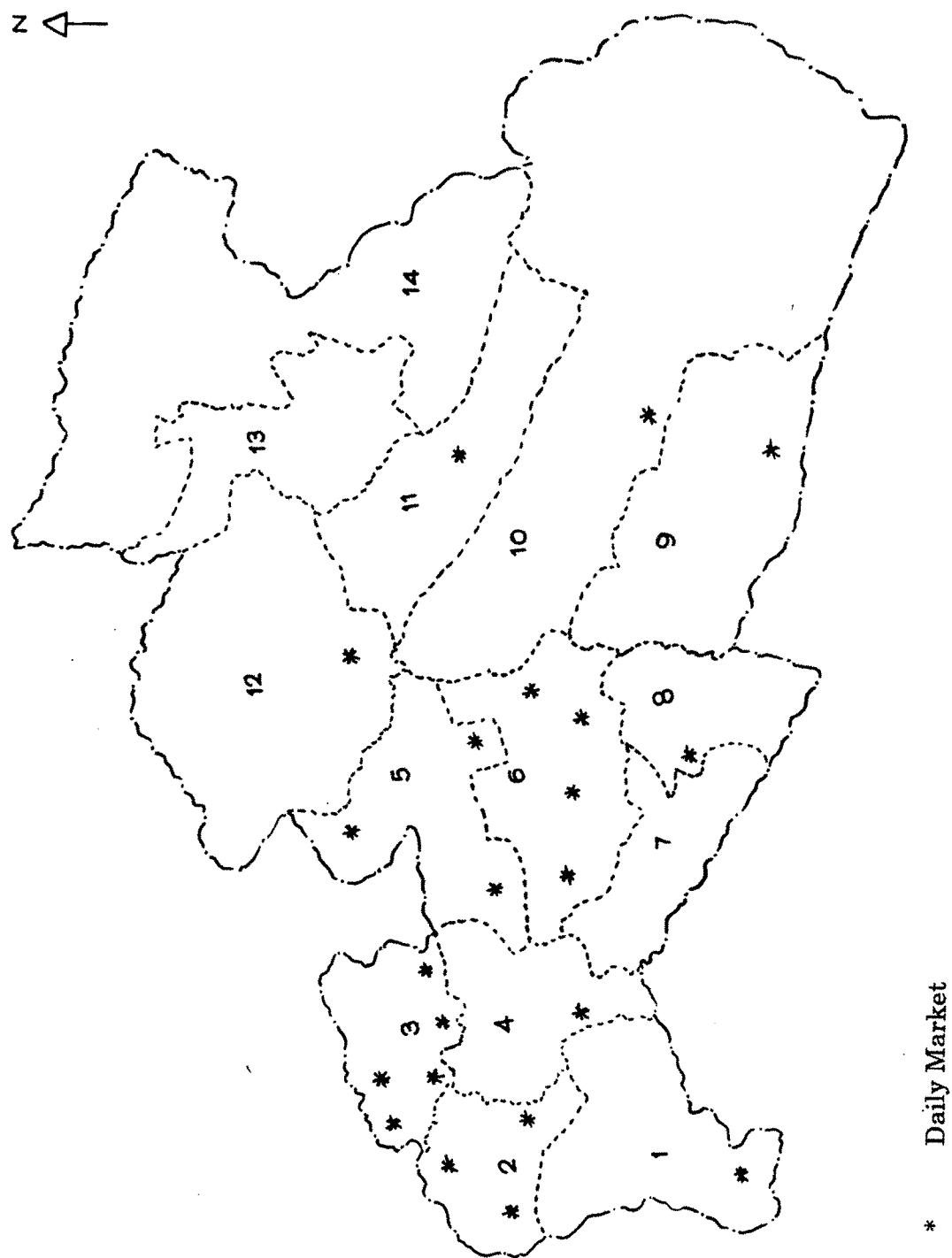


Fig.29. Location of fertilizer and pesticide shops

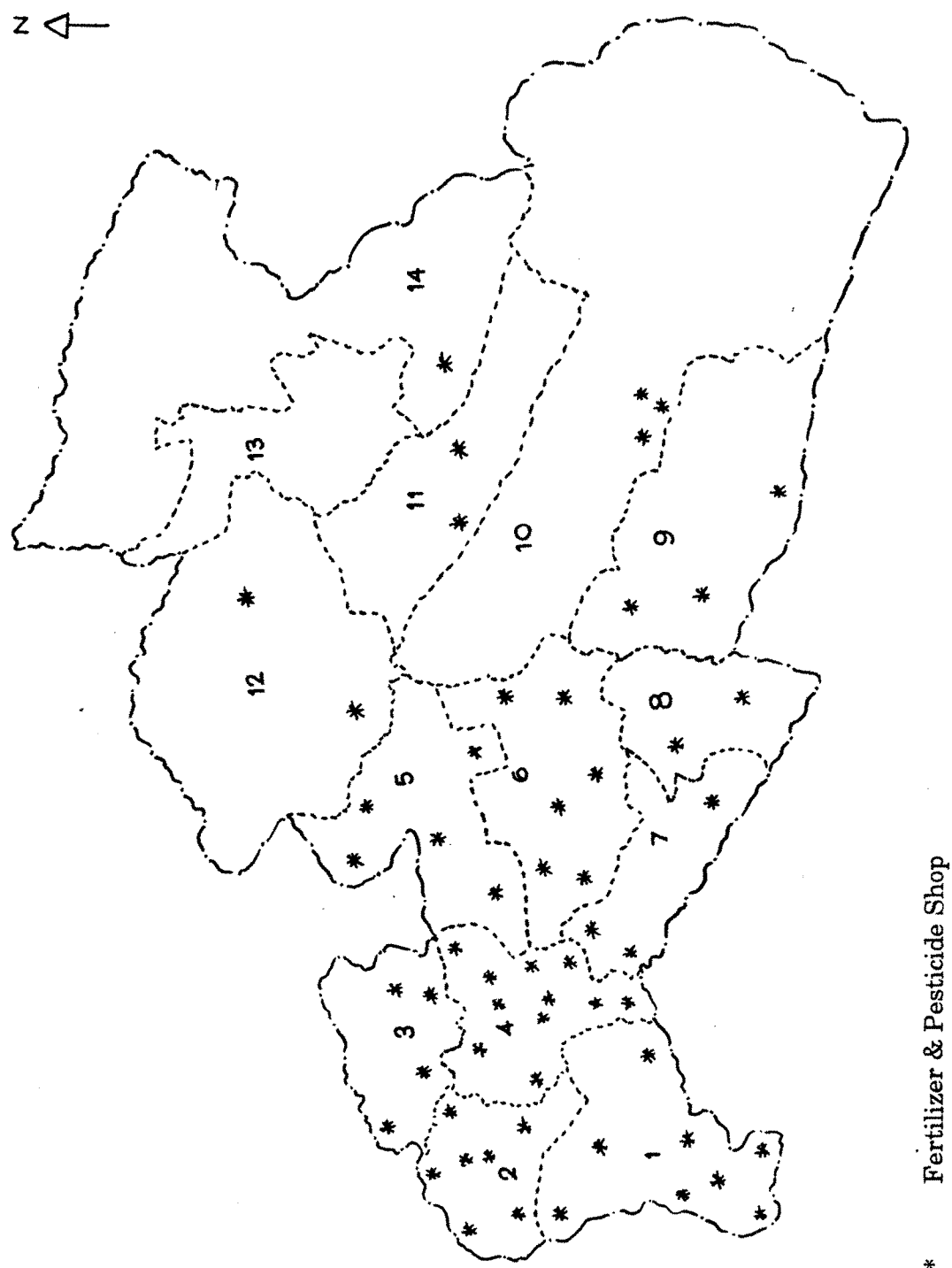
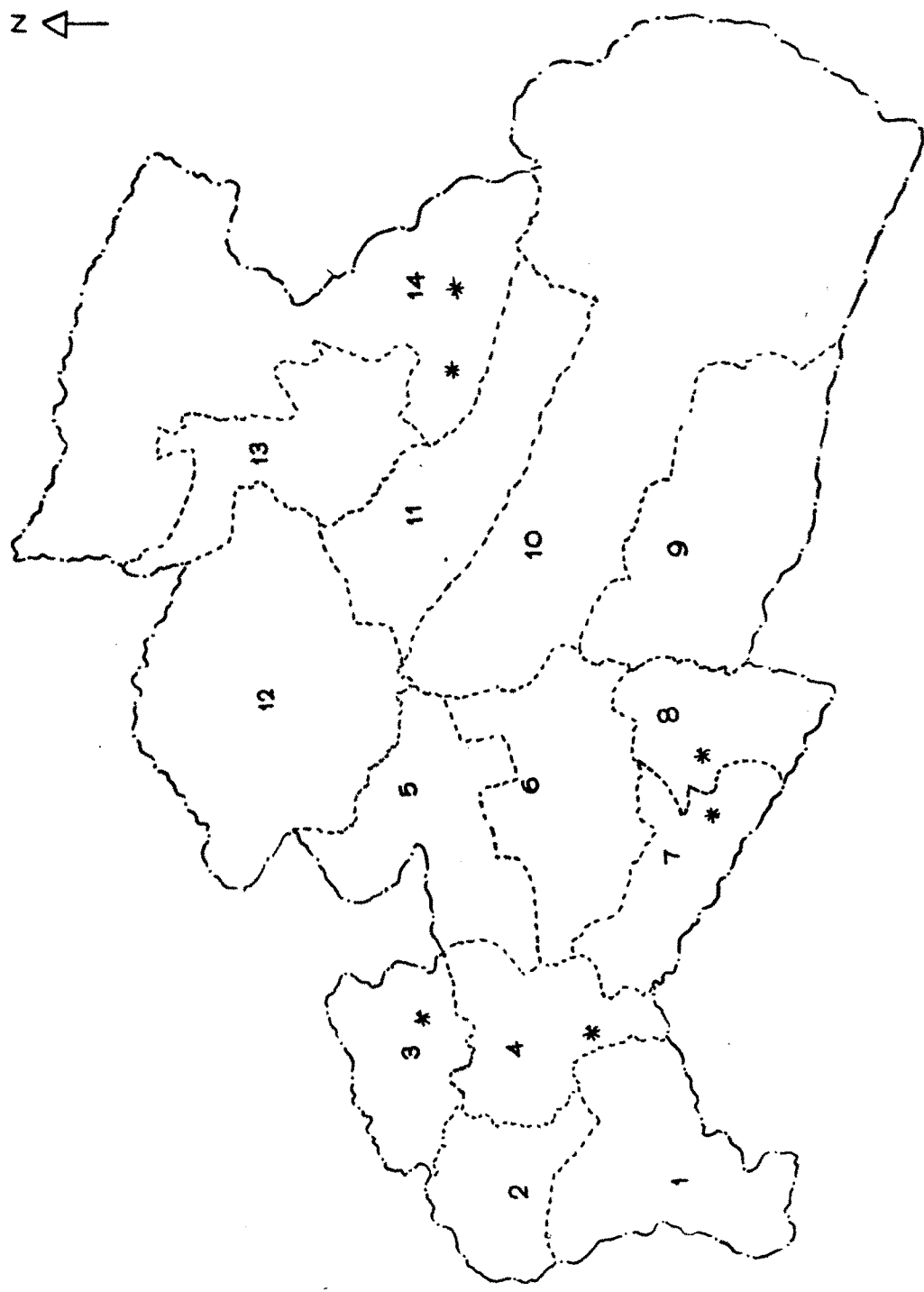


Fig.30. Location of weekly markets



* Weekly Market

settlement is the biggest one. All these markets function twice in a week. Farmers from inside and out side the study area utilize these markets. As a result these markets act as a sustainable centre for Agri-Horti development. The percentage analysis reveals that the utilization of these facility is cent per cent.

4.5 Identification of locale and potentiality of infrastructure facilities

Locale identification for the establishment of infrastructure facilities has been done based on the population threshold, utilization behaviour and space preference of respondents, opinion of agricultural assistants, distance matrix, hierarchy of the settlements and the identified central places. The potentiality of the proposed facility has also been considered.

4.5.1. Assistant Director of Agriculture

This higher level functionary monitor, supervise and guide the agricultural officers in the block. There is only one functionary serving in the block with the office at Anchal. Since respondents have no direct contact/utilization of this functionary nobody has suggested to shift the office from its existing location. More over it is the policy of government that this functionary would exist in every block head quarters only. Thus, no kind of change in the existing situation is proposed.

4.5.2. Agricultural officers and Agricultural Assistants

They are the functionaries working at the grass root level. There is one agricultural officer and three agricultural assistants for each village panchayat. Agricultural assistants work under the guidance of agricultural officer. In the study area there are 8 agricultural officers and 23 agricultural assistants serving the community. The settlement pairs 1 & 2, 5 & 6, 7 & 8, 9 & 10, 11 & 12, and 13 & 14 are in the same panchayats. Hence they share the services of concerned functionaries. In Kulalthupuzha panchayat one agricultural assistant post is vacant. Since the beneficiaries in this study area are fully satisfied with the service of these functionaries and location of their head quarters, no suggestion was made to shift the head quaters from its existing position. Hence there is no reason to propose any new function or shift of any function in this study area.

4.5.3. Agro service centres

These functions have been established to spare the farm implements and machineries to farmers on hiring basis. Four functions exist in this study area. These are not functioning due to the lack of technical assistance to manage it as well as lack of machinery. But farmers are aware of this function and respondents have reported the need to establish this function in their settlements. But establishment of this function is capital intensive for government. More over it is known that village panchayats are giving fund to purchase machinery for NGO's like padasekhara samithi. Hence, it is proposed that groups of these NGO's may undertake these non functioning

Agro service centres and start new functions in settlements 3,7 & 10 to render service to the community.

4.5.4. Fertilizer and pesticide shops

There are fifty seven functions found to be distributed evenly in all the fourteen settlements. In settlements Edamon (12) and Aryankavu (14) there exist one and two functions respectively. As a result, the farmers at the other side of these settlements have to travel a long distance of about 25 Km to avail this function. Hence, it is proposed to establish one function in settlement 13 and three more functions each in settlements 12 and 14. The facilities present in the other settlements are sufficient to serve the community and farmers are found to be satisfied with its locations also.

4.5.5. Weekly markets

Weekly market is one among the potential functions which determine agriculture development of an area. Because farmers can rely upon only this function for bulk sale of their produce during harvesting seasons. There are only six functions existing in this block. They exist in Karavaloor (3), Anchal (4), Alayamon (7), Channapettah (8) and Aryankavu (14). Out of these six functions four functions exist in western side of the study area. Due to the non availability of this function, farmers of Kulathupuzha (10) have to travel 19 km and farmers of Thenmala West have to travel 15-20 Km to sell their produce. Similar is the case with farmers in the northern area of the

settlement Aryankavu, where two functions are existing at the southern most end of the settlement.

It is necessary to consider the distance to be travelled, population size to sustain a function and suitable and viable location to establish this kind of functions in addition to the suggestion of beneficiaries. It would be more appropriate to establish this function in settlements 10, 11, and 14, Since these locations are considered as service centres, and they are capable of extending services to other settlements also.

4.5.6. Daily markets

There are twenty two daily markets existing in this block and are equally distributed. Settlements Alayamon (7), Thenmala East (13) and Aryankavu (14) lack this function. It is seen that one function is to be established in Thenmala East (13) where as in all other settlements people are found to be satisfied with the functions available and its locations. Hence there is no need to shift or establish any more function. Thenmala East (13) seems to be a growing centre for the near and far settlements, this functions thus may be established. This pave way for its utilization of the near and far settlements.

4.5.7. Veterinary and Animal Husbandry Centres

These functions include veterinary hospitals and sub centres. There are 17 functions existing in this block. Only one settlement which lacks this

function is Thenmala East (13). In all other settlements these functions have been distributed evenly. Utilization of this function by the farmers are high. Since the settlement Aryankavu (14) have only one function and is situated at the southern end of the settlement, the farmers of northern side of this settlement could not easily avail this function. Similar is the case for farmers of the settlement Thenmala-east where this function is absent. Establishment of one veterinary hospital in Aryankavu (14) and one sub centre in Thenmala East will be helpful for the development of cattle rearing in that areas. The population size of these concerned settlements are found to be sufficient to sustain these facilities.

4.5.8. Milk Collection Centres

There are twenty seven centres existing in the study area and are also evenly distributed. Only three settlements lack this function. They are Thinkalkarikkom (9) Thenmala East (13) and Aryankavu (14). While considering the suggestions made by the beneficiaries and population size of the settlements to sustain new function, it can be proposed to establish one new function in settlements 5, 9, 10, 13 and two functions in settlement 14 so that more farmers can avail the benefits from this function. These settlements have sufficient number of milch animals and this function can sustain in future if established.

4.5.9. Cattle Markets

Existence of this function in a region highly influences the farm operations and degree of development of cattle rearing in that area. There are only three cattle markets found in Anchal block and they are located in one end of the study area. People, especially from settlements 10, 11, 13, 12 and those coming from Tamil Nadu have to travel a long distance to sell their cattle. Among the three markets Anchal market is the biggest and oldest as well as popular. Due to this reason, the respondents have suggested to start one more function in their settlements instead of shifting this function. Moreover shifting this function to any other settlement is not possible, because it is the property of the concerned village panchayat.

To establish a new function like this, those settlements should have the potential to serve as well as enhance the development of surrounding settlements. Thenmala West is such a potential level of settlement, which has been recognised as one of the service centres as reported in previous chapter. In addition to that, this settlement is the common centre, situated in equal distance from the surrounding settlements. This settlement is most accessible to the farmers in nearby settlements and those traders coming from Tamil Nadu. Hence it is proposed to establish one more function in Thenmala West, so that it can act as a potential function to the near and surrounding settlements.

4.5.10. Primary Agricultural Co-operative Banks (PACB's)

PACB is one of the prime functions which provide credit facility for the development of farming. There are seventeen functions existing in the study area and only two settlements do not have this facility. One is Thenmala-east (13) and the other is Ayiranallor (5) from where farmers have to travel to Yeroor (6) to avail this facility. Similarly in Anchal (4), having a population size of 28612, there exist only one function and it is located at one end of the settlement. Considering the potentiality of the function to serve the population, the distance to be travelled as well as preference of the beneficiaries, it is pertinent to propose to establish one PACB in Ayiranallor (5), whose population is 12613, and 2 more PACBs in Anchal (4). Since the respondents are found to be satisfied with the service extended from the PACB Aryankavu, there is no need to establish a PACB in the settlement Thenmala East (13).

4.5.11. Nationalised and Non nationalized Banks

These institutions are evenly distributed in the study area. There are five nationalised and eight non nationalised banks serving the community. Since the respondents are satisfied with the service extended to them and the distance to be travelled to reach the bank is also minimum, there is no need to shift or establish new function of both types from the existing settlements.

4.6 Model for the study area

The final phase of this study is to prepare a model plan for Agri-Horti, development for the study area. This has been systematically achieved through identification of the distribution of infrastructure facilities, ranking of the settlements, utilization of infrastructure facilities and locale identification for the establishment of infrastructure facilities. The proposed facilities have been depicted in Fig.31 and Table 20. The model thus arrived has been presented in the Fig.32.

The findings of the study have been summarised along with conclusion in the succeeding chapter.

Fig.31. Proposed facilities

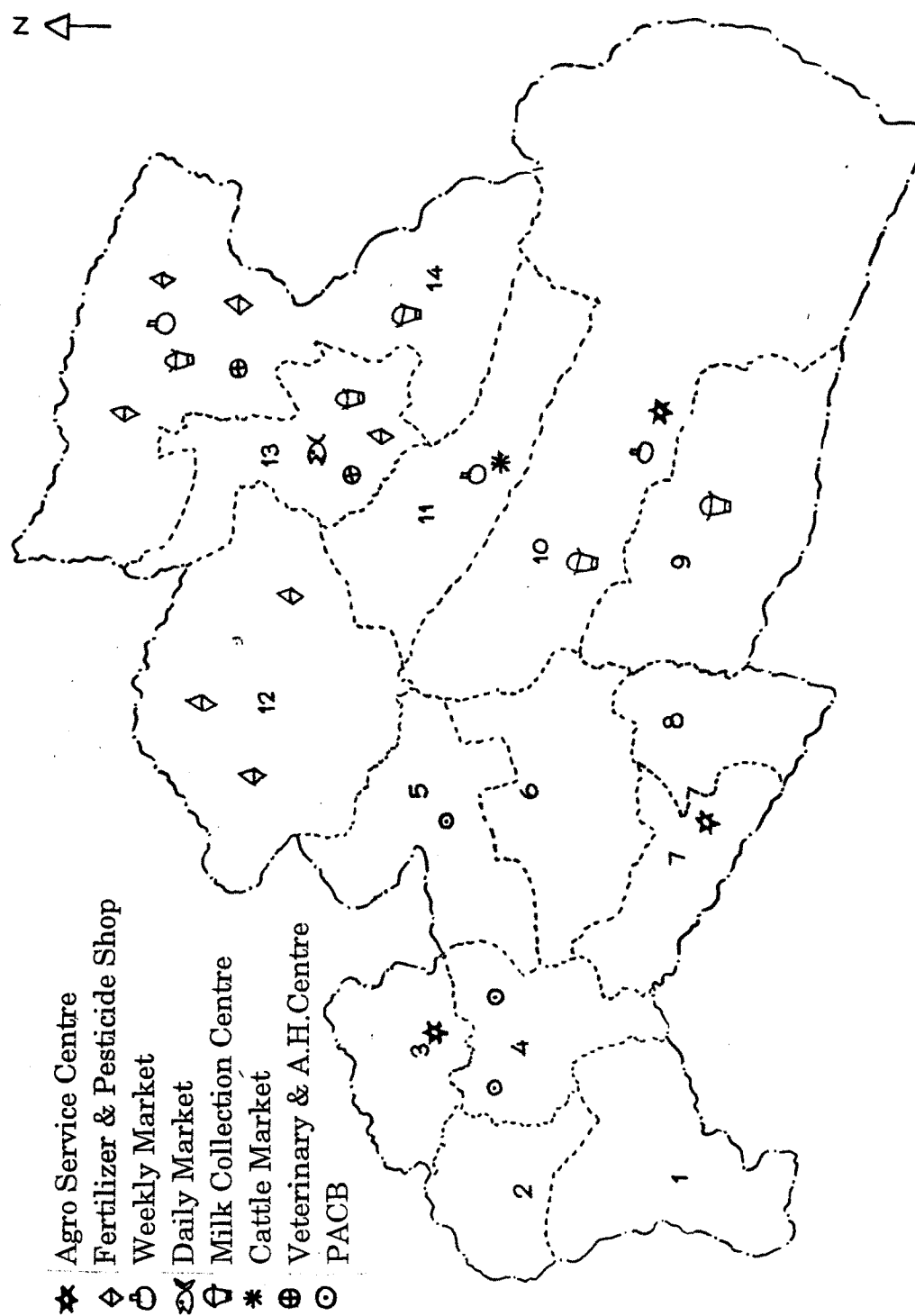
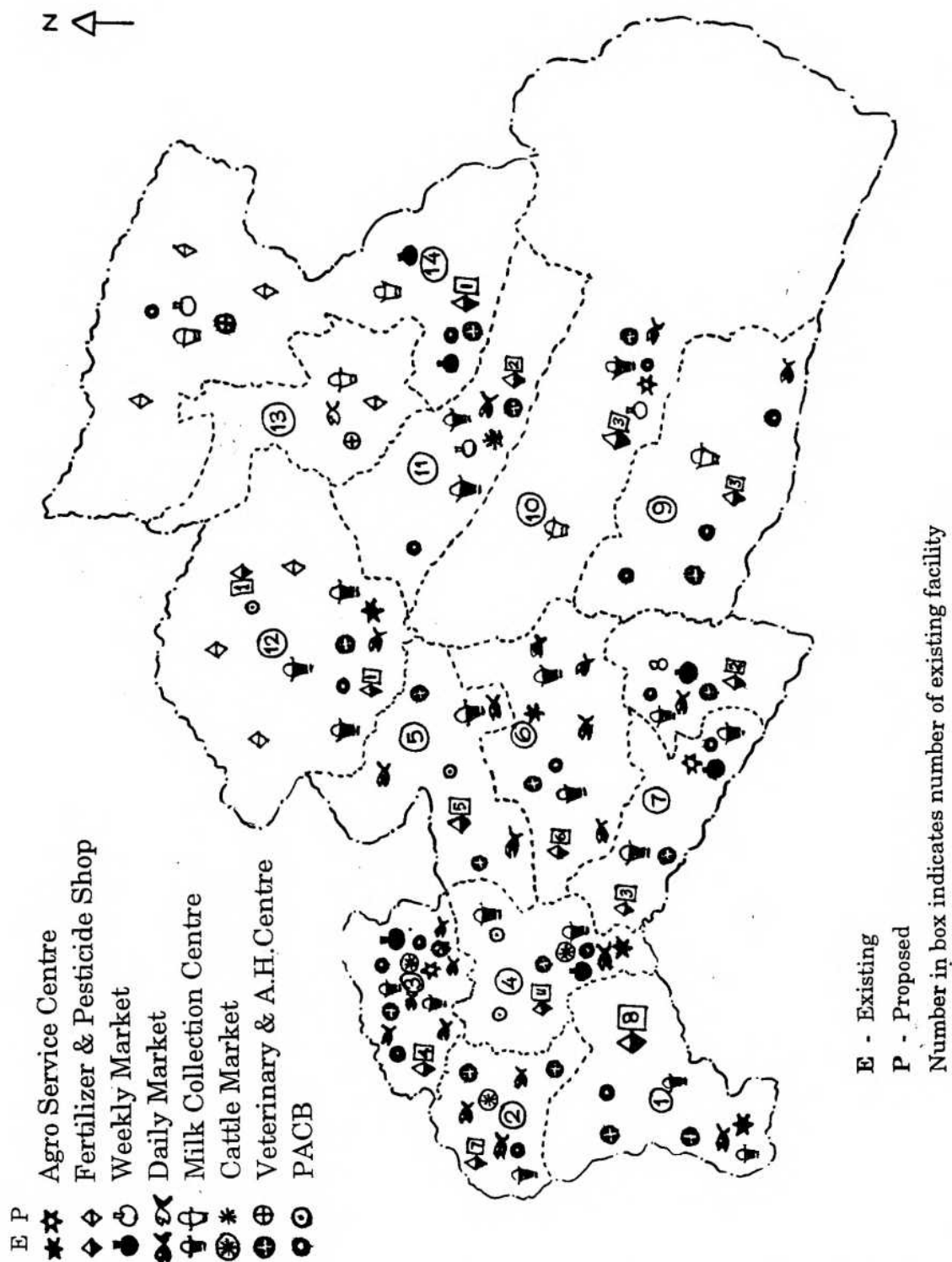


Table.20. Optimisation of infrastructure facilities - proposed number of facilities in settlement wise.

S. No	Code No.	Settlements	Agro service centre	Fertilizer and pesticide shop	Weekly market	Daily market	Veterinary & A.H. centre	Milk collection centre	Cattle market	PACB
1.	7	ALAYAMON	1							
2.	8	CHANNAPETTAH								
3.	4	ANCHAL								2
4.	14	ARYANKAVU		3	1		1	2		
5.	13	THENMALA-EAST		1		1	1	1		
6.	1	EDAMULAKKAL								
7.	2	ARAYKAL								
8.	3	KARAVALOOR	1							
9.	10	KULATHUPUZHA	1		1			1		
10.	9	THINKALKARIKKOM						1		
11.	11	THENMALA-WEST			1				1	
12.	12	EDAMON		3						
13.	6	YEROOR								
14.	5	AYIRANALLOOR								1

Fig.32. Model for the study area





SUMMARY AND CONCLUSION

CHAPTER - V

SUMMARY AND CONCLUSION

Sectoral planning will facilitate administration to establish infrastructures scientifically. Area planning is still more an effective planning since it is the integrated development planning which constitute functional and spatial integration. Spatial planning is the hub of area planning. This places the relevant infrastructure facilities in optimum locations, so that the accessibility would be increased as well as overlapping of services extended by the functions could be minimised. This is very important for optimum utilisation of functions by beneficiaries. Area planning for rural areas should be centred around the Agricultural and Horticultural sectors because, these form the economic as well as social base of the rural areas. How well it can be done was the aim of the present study with the following objectives.

1. To assess the distribution of infrastructure facilities over a space.
2. To analyse the sustainability of infrastructure facilities in the settlement.
3. To ascertain the potentiality of existing infrastructure facilities for Agri-Horti development.

4. To prepare a model for proper utilization of infrastructure facilities for Agri-Horti development.

The present study was conducted in Anchal block of Kollam district in Kerala. Under this study all the fourteen settlements (revenue villages) of the block were considered. A well structured interview schedule was constructed and used for primary data collection. Ninety ward members and twenty three agricultural assistants were interviewed to know thier space preferences and opinions regarding infrastructure facilities. Secondary data were collected from various departments. The salient findings are summarised below.

1. Uniform cropping pattern was seen through out the study area which showed the homogeneity of the area.
2. There existed no relationship between the population size and the number of facilities in the settlements.
3. The infrastructure facilities were found to be distributed evenly over the space.
4. No settlement possessed all the 51 facilities considered for the study.
5. Out of the fourteen settlements one settlement was found as developed, four settlements were less developed and remaining were medium developed.

6. In the study area one settlement was identified as growth centre, twelve settlements as service centre and only one settlement as central village.
7. There were only nine functions commonly seen in all the settlements. Similarly ten common functions were seen in 13 settlements.
8. Assistant Director of agriculture and block development officer were the two functionaries seen in the developed settlement alone. The functions / functionaries which were absent in less developed settlements were agro-service centre, bus stand, cattle market, honey collection centre, college, canal, checkdams, tribal extension officer and industrial extension officer.
9. Thirty eight functions/functionaries were existing commonly in developed as well as moderately developed settlements.
10. It is proposed to establish three agro service centres in settlements Karavaloor (3), Alayamon (7), and Kulathupuzha (10).
11. It has been proposed to establish three fertilizer and pesticide shops in Edamon and Aryankavu. one such function may also be established in Thenmala East.
12. It is proposed to establish one weekly market in each of the settlements namely, Kulathupuzha (10), Thenmala (11) and Aryankavu (14)

13. It is found necessary to establish one daily market in Thenmala east.
14. Establishment of one veterinary and animal husbandry centre in Thenmala East (13) and Aryankavu (14) will be beneficial.
15. There is a need to establish two milk collection centres in Aryankavu (14) and one each in Ayirnalloor (5), Thinkalkarikkom (9), Kulathupuzha (10), and Thenmala east (13).
16. Thenmala west (11) is the viable centre to establish a cattle market and this function is found to be the most needed one in this location.
17. In Anchal, it is very essential to establish two more Primary Agricultural Co-operative Banks (PACB) to satisfy the felt need of the habitants. Similarly in Ayirnalloor also one PACB is necessary.

Implications of the study

1. It was observed that nobody in the study area suggested to shift any function from its existing location since they utilized the functions. This was because of the well developed transporting facility prevailing in this area. It clearly indicates that transport facility enhances the utilization of functions.

2. Almost all facilities which are inevitable for the daily life (either for farming or other aspect) were distributed evenly in the settlements and all have been utilized by residents. Hence if the proposed functions are established in the corresponding locations, it will ultimately enhance the better growth of Agricultural and Horticultural sector.
3. Even though the functions are distributed in settlements evenly it is observed that they are not distributed according to population size of the settlements. This is one reason for the existence of gap/imbalance regarding in its differential utilization. So due importance has to be given to establish facilities according to the increasing population size.

Suggested area for future research

1. Study of similar research can be conducted in other areas.
2. The impact of the model developed need to be studied after a reasonable period of time from the day of it's implementation.

Policy makers, administrators and extension workers who are engaged in development of farming community in the study area can consider the recommendations derived by this study.



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APPENDICES

APPENDIX A

TAMIL NADU AGRICULTURAL UNIVERSITY

Dr.R.Annamalai, Ph.D
Professor and Head

Department of Agrl.Extension
and Rural Sociology
Coimbatore - 641 003.

M.Sc (Ag)/Thesis/98

Dear Sir,

Mr.P.Priyakumar, student of the Department of Agricultural Extension and Rural Sociology is undertaking a study entitled "**A Plan for Agri -Horti Development : An Area Planning Approach**" under my guidance.

In this study the settlements are to be ranked based on the infrastructure facilities available. Infrastructure play a catalytic role in the process of development and influences all the regional potentiality and mobilises the production factors of the region.

The main objectives of the study are to assess the distribution of infrastructure facilities over a space, to analyse the sustainability of infrastructure facilities in the settlement, to ascertain the potentiality of existing infrastruture facilities for Agri-Horti development and to prepare a model for proper utilization of infrastructure facilities for Agri-Horti development.

In this connection, the student has identified the infrastructure facilities required for Agri-Horti development by examining research studies and discussion with extension scientists. I request you to kindly express its relevancy by making tick marks in the appropriate column in the appendix.

Further you are welcome to add additional facilities if any, relevant to the study.

With kind regards,

(R.ANNAMALAI)

Professor and Head

**INFRASTRUCTURE FACILITIES REQUIRED FOR
AGRI-HORTI. DEVELOPMENT**

S.No	Facilities	Relevant	Irrelevant
AGRICULTURE			
1.	Assistant Director of Agriculture		
2.	Agricultural Officer		
3.	Agricultural Assistant		
4.	Fertilizer and Pesticide shop		
5.	Agro service centre		
6.	Implement manufacturing and repairing centre		
7.	Private seed sellers		
8.	Horticultural nursery		
IRRIGATION FACILITIES			
9.	Pond		
10.	River/stream		
11.	Canal		
12.	Dam/Check dam		
ANIMAL HUSBANDRY AND DAIRY			
13.	Veterinary and animal husbandry centre		
14.	Rinder check post		

PROCESSING FACILITIES

- 15. Rice mill
- 16. Oil expeller unit
- 17. Cashew factory
- 18. Tea factory
- 19. Arecanut processing unit

BANKING INSTITUTIONS

- 20. Primary Agricultural co-operative Bank
- 21. Other co-operative societies
- 22. Nationalized bank
- 23. Non Nationalized bank

MARKETTING FACILITIES

- 24. Fruit collection and sales centre
- 25. Flower collection and sales centre
- 26. Rubber collection centre
- 27. Daily market
- 28. Weekly market
- 29. Cattle market
- 30. Honey collection centre
- 31. Milk collection centre

TRANSPORT FACILITIES

- 32. Bituminous road
- 33. Other types of road
- 34. Bus stand

- 35. Railway station
- 36. Bus stop
- 37. Taxi car and Autorikshaw
- 38. Lorry and Tempo

COMMUNICATION FACILITIES

- 39. Telephone exchange
- 40. Telephone Booth
- 41. Sub Post Office
- 42. Other types of Post office
- 43. Printing press
- 44. Community TV centre

EDUCATIONAL INSTITUTIONS

- 45. Lower Primary School
- 46. Upper Primary School
- 47. High School
- 48. College
- 49. Technical college and teaching centre

MEDICAL FACILITIES

- 50. Government Hospital and Primary Health Centre
- 51. Health worker
- 52. Medical shop
- 53. Diagnostic centre

MISCELLANEOUS

- 54. Block Development Officer
- 55. Tribal Extension officer
- 56. Industrial Extension Officer
- 57. NGOs
- 58. Youth Clubs

APPENDIX B**DEVELOPMENT PLAN FOR AGRICULTURE AND HORTICULTURE****PART-I**

1. Name of the block :
2. Name of the settlement :
3. Total area :
4. Area under agricultural crop :
5. Land utilization pattern :
 - a) Total geographical area
 - b) Forest
 - c) Land put for non-agricultural use
 - d) Barren and uncultivable land
 - e) Permanent pastures and common grazing lands
 - f) Cultivable waste
 - g) Fallow land
 - h) Current fallow
 - i) Total cropped area
 - j) Area irrigated
 - k) Area irrigated more than once
 - l) Cultivable land used for trees and gardens

6.Irrigation

Source	Area	Number
Well		
Tube well		
Tank		
Canal		
Channel		
River/stream		
Others		

7.Number of household :

8.Total population : a)Male
b)Female

9.Literates Total : a)Male
b)Female

10.Occupational distribution:

Sl.No.	Work Force	Male	Female	Total
1.	Cultivators			
2.	Agricultural Labourers			
3.	Household industry			
4.	Marginal workers			
5.	Other workers			
6.	Non workers			

PART - II
INTERVIEW SCHEDULE

Respondent No.

Settlement :
 Block :
 Name of the respondent :
 Father's Name :
 Farm size in (acres) :
 Category of farmer : Marginal /Small / Big

1. Please mention whether you have utilized the facilities
 enlisted here. Yes /No

a)If yes, Local / Outside

b)State the problems, if any in utilizing them

c)Please give your suggestions for improvement

2. Do you need shift in the facilities to your settlement

Yes /No

a)If yes, at what distance

b)Give the reason for shifting.

3. Are you in need of the following facilities? Yes / No

a)If yes, at what distance?

b)Will your settlement bear the establishment capital?

4. Please give your suggestion for improving your settlement.

EXISTENCE OF INFRASTRUCTURE FACILITIES

S.No.	Facilities	Tick if present	Number of Units
1.	Assistant Director of Agriculture		
2.	Agricultural Officer		
3.	Agricultural Assistant		
4.	Block Development Officer		
5.	NGO's		
6.	Tribal Extension Officer		
7.	Industrial Extension Officer		
8.	Fertilizer and Pesticide shops		
9.	Agro service centre		
10.	Implement manufacturing and repairing centre		
11.	Veterinary and A.H. centre		
12.	Canal		
13.	Dam /check dam		
14.	Daily market		
15.	Weekly market		
16.	Cattle market		
17.	Milk collection centre		
18.	Honey collection centre		
19.	Rubber collection centre		
20.	Rice mill		
21.	Cashew factory		
22.	Arecanut processing unit		
23.	Tea factory		
24.	Oil expeller unit		

25. Primary Agricultural Co-operative Bank
26. Other co-operative societies
27. Nationalized bank
28. Non nationalized bank
29. Bituminous road
30. Other types of road
31. Bus stand
32. Railway station
33. Bus stop
34. Taxicar and Autorikshaw
35. Lorry and Tempo
36. Telephone exchange
37. Telephone booth
38. Sub post office
39. Other types of post office
40. Lower Primary school
41. Upper Primary school
42. High school
43. College
44. Technical college and Teaching centre
45. Community TV centre
46. Printing press
47. Youth club
48. Government hospitals and Primary Health centre
49. Health worker
50. Medical shop
51. Diagonostic centre.

EXISTING FACILITIES

[illegible]

[illegible]

Part-III**OPINION OF AGRICULTURAL ASSISTANT**

Name of the AA :

Revenue Village / Panchayat :

1. What are the infrastructure facilities beside the existing, required for your area of operation (jurisdiction) for Agri-Horti development.
2. Do you propose shifting of the existing infrastructure facilities from your area to other area and why?

NB : Infrastructure facility is like Depot, Fertilizer and posticide shp, PACB, Banks, Shandy, etc.

APPENDIX - C

**Computation of weight through ratio of settlements to
existing function method**

S.No	Facilities	Number of Units	Weight
1.	OTHER TYPES OF ROAD	522	0.03
2.	TAXICAR AND AUTORIKSHAW	505	0.03
3.	BUS STOP	136	0.10
4.	YOUTH CLUB	128	0.11
5.	COMMUNITY TV CENTRE	69	0.20
6.	LOWER PRIMARY SCHOOL	56	0.25
7.	RUBBER COLLECTION CENTRE	44	0.32
8.	UPPER PRIMARY SCHOOL	29	0.48
9.	HIGH SCHOOL	27	0.52
10.	OTHER TYPES OF POST OFFICE	31	0.45
11.	NON GOVERNMENTAL ORGANIZATIONS	106	0.13
12.	BITUMINOUS ROAD	97	0.14
13.	TELEPHONE BOOTH	91	0.15
14.	FERTILIZER AND PESTICIDE SHOP	57	0.25
15.	VETERINARY AND ANIMAL HUSBANDRY CENTRE	17	0.82
16.	RICEMILL	76	0.18
17.	DIAGNOSTIC CENTRE	26	0.54
18.	PRIMARY AGRICULTURAL CO-OPERATIVE BANK	17	0.82
19.	DAILY MARKET	22	0.64
20.	IMPLEMENT MANUFACTURING & REPAIRING CENTRE	60	0.23
21.	OTHER CO-OPERATIVE SOCIETIES	33	0.42
22.	TECHNICAL COLLEGE AND TEACHING CENTRE	86	0.16
23.	MILK COLLECTION CENTRE	27	0.52
24.	LORRY AND TEMPO	190	0.07

S.No	Facilities	Number of units	Weight
25.	GOVT. HOSPITAL AND P.H.C	18	0.78
26.	HEALTH WORKER	36	0.39
27.	MEDICAL SHOP	32	0.44
28.	PRINTING PRESS	20	0.70
29.	OIL EXPELLER UNIT	10	1.40
30.	SUB POST OFFICE	9	1.56
31.	NATIONALIZED BANK	8	1.75
32.	AGRICULTURAL ASSISTANT	23	0.61
33.	AGRICULTURAL OFFICER	8	1.75
34.	TELEPHONE EXCHANGE	7	0.61
35.	WEEKLY MARKET	6	2.33
36.	CASHEW FACTORY	12	1.17
37.	NON NATIONALIZED BANK	5	2.80
38.	AGRO SERVICE CENTRE	4	3.50
39.	BUS STAND	3	4.67
40.	CATTLE MARKET	3	4.67
41.	HONEY COLLECTION CENTRE	3	4.67
42.	RAILWAY STATION	5	2.80
43.	CANAL	10	1.40
44.	DAM/CHECK DAM	9	1.56
45.	ASSISTANT DIRECTOR OF AGRICULTURE	1	14.00
46.	BLOCK DEVELOPMENT OFFICER	1	14.00
47.	TRIBAL EXTENSION OFFICER	1	14.00
48.	INDUSTRIAL EXTENSION OFFICER	1	14.00
49.	COLLEGE	1	14.00
50.	ARECANUT PROCESSING UNIT	2	7.00
51.	TEA FACTORY	2	7.00

APPENDIX - D

Computation of weight through population threshold method

S.No	Facilities	Population Threshold	Weight
1.	OTHER TYPES OF ROAD	5893	1.00
2.	TAXICAR AND AUTORIKSHAW	5893	1.00
3.	BUS STOP	5893	1.00
4.	YOUTH CLUB	5893	1.00
5.	COMMUNITY TV CENTRE	5893	1.00
6.	LOWER PRIMARY SCHOOL	5893	1.00
7.	RUBBER COLLECTION CENTRE	5893	1.00
8.	UPPER PRIMARY SCHOOL	5893	1.00
9.	HIGH SCHOOL	5893	1.00
10.	OTHER TYPES OF POST OFFICE	5893	1.00
11.	NON GOVERNMENTAL OGRANIZATIONS	8200	1.39
12.	BITUMINOUS ROAD	8200	1.39
13.	TELEPHONE BOOTH	8200	1.39
14.	FERTILIZER AND PESTICIDE SHOP	8200	1.39
15.	VETERINARY AND ANIMAL HUSBANDRY CENTRE	8200	1.39
16.	RICE MILL	8200	1.39
17.	DIAGONOSTIC CENTRE	8200	1.39
18.	PRIMARY AGRICULTURAL CO-OPERATIVE BANK	8200	1.39
19.	DAILY MARKET	10338	1.75
20.	IMPLEMENT MANUFACTURING CENTRE	8200	1.39
21.	OTHER CO-OPERATIVE SOCIETIES	8200	1.39
22.	TECHNICAL COLLEGE AND TEACHING CENTRE	8200	1.39
23.	MILK COLLECTION CENTRE	8200	1.39
24.	LORRY AND TEMPO	8200	1.39
25.	GOVT. HOSPITAL AND PHC	8200	1.39
26.	HEALTH WORKER	8200	1.39
27.	MEDICAL SHOP	8200	1.39

S.No	Facilities	Population Threshold	Weight
28.	PRINTING PRESS	8200	1.39
29.	OIL EXPELLER UNIT	9692	1.64
30.	SUB POST OFFICE	9692	1.64
31.	NATIONALIZED BANK	9692	1.64
32.	AGRICULTURAL ASSISTANT	8200	1.39
33.	AGRICULTURAL OFFICER	8200	1.39
34.	TELEPHONE EXCHANGE	9692	1.64
35.	WEEKLY MARKET	8200	1.39
36.	CASHEW FACTORY	8200	1.39
37.	NON NATIONALIZED BANK	10338	1.75
38.	AGRO SERVICE CENTRE	12618	2.14
39.	BUS STAND	15471	2.63
40.	CATTLE MARKET	16222	2.75
41.	HONEY COLLECTION CENTRE	12618	2.14
42.	RAILWAY STATION	9692	1.64
43.	CANAL	11596	1.97
44.	DAM/CHECK DAM	11596	1.97
45.	ASSISTANT DIRECTOR OF AGRICULTURE	28612	4.86
46.	BLOCK DEVELOPMENT OFFICER	28612	4.86
47.	TRIBAL EXTENSION OFFICER	15471	2.63
48.	INDUSTRIAL EXTENSION OFFICER	15471	2.63
49.	COLLEGE	8200	1.39
50.	ARECANUT PROCESSING UNIT	12618	2.14
51.	TEA FACTORY	5893	1.00

APPENDIX - E

Computation of weightage through functional hierarchy method

Levels	First level	Second level	Third level	Fourth level
Population size	5000-13000	15000-18000	19000-22000	28000 +
Weight	1.00	3.00	3.80	5.60
	Other types of road	Bus Stand	-	Assistant Director of Agriculture
	Taxi car & Autorikshaw	Cattle market	-	Block development officer
	Bus stop	Tribal Extension officer		
	Youth club	Industrial Extension officer		
	Community TV centre			
	Lower primary school			
	Rubber collection centre			
	Upper primary school			
	High school			
	Other types of post office			
	Non governmental organisations			
	Bituminous road			
	Telephone booth			
	Fertilizer & pesticide shop			
	Veterinary & A.H. centre			
	Rice mill			
	Diagnostic centre			
	PACB			
	Daily market			
	Implement manufuring centre			
	Other co-operative societies			
	Tech. college & Teaching centre			
	Milk collection centre			
	Lorry & Tempo			
	Govt. hospital & PHC			

Levels	First level	Second level	Third level	Fourth level
	Health worker			
	Medical shop			
	Printing press			
	Oil expeller unit			
	Sub post office			
	Nationalized bank			
	Agricultural assistant			
	Agricultural officer			
	Telephone exchange			
	Weekly market			
	Cashew factory			
	Non nationalized bank			
	Agro service centre			
	Honey collection centre			
	Railway station			
	Canal			
	Dam/Check dam			
	College			
	Areca nut processing centre			
	Tea factory			

APPENDIX F
COMPUTATION OF CENTRALITY SCORE TROUGH RATIO OF SETTLEMENTS TO EXISTING FUNCTION METHOD

S.No	CODE NO	SETTLEMENTS	POPULATION	INFRASTRUCTURE FACILITIES	D-DEVELOPED	MD- MODERATELY DEVELOPED	LD- LESS DEVELOPED
1	4	ANCHAL	28612	OTHER TYPES OF ROAD	0.30	0.00	0.00
2	10	KULATHURUZH	15471	OTHER TYPES OF ROAD	0.30	0.00	0.00
3	6	YEDOR	20110	OTHER TYPES OF ROAD	0.30	0.00	0.00
4	11	THENMALA WEST	11596	OTHER TYPES OF ROAD	0.30	0.00	0.00
5	1	EDAMULAKKAL	19750	OTHER TYPES OF ROAD	0.30	0.00	0.00
6	12	EDAKON	12618	OTHER TYPES OF ROAD	0.30	0.00	0.00
7	2	ARAYKAL	16222	OTHER TYPES OF ROAD	0.30	0.00	0.00
8	3	KARAVALOOR	21723	OTHER TYPES OF ROAD	0.30	0.00	0.00
9	7	ALAYAMON	8200	OTHER TYPES OF ROAD	0.30	0.00	0.00
10	14	ARYANKAVU	9692	OTHER TYPES OF ROAD	0.30	0.00	0.00
11	8	CHANNAPETTAH	10330	OTHER TYPES OF ROAD	0.30	0.00	0.00
12	5	AYIRANALLOOR	12613	OTHER TYPES OF ROAD	0.30	0.00	0.00
13	9	THINKALKARIKKON	17800	OTHER TYPES OF ROAD	0.30	0.00	0.00
14	13	THENMALA EAST	5993	OTHER TYPES OF ROAD	0.30	0.00	0.00
				TELEPHONE BOOTH	154	0.00	0.00
				TELEPHONE BOOTH	154	0.00	0.00
				FERT. & PESTI. SHOP	246	0.00	0.00
				VETERINARY & AH CENTRE	824	0.00	0.00
				RICE MILL	104	0.00	0.00
				DIAGNOSTIC CENTRE	538	0.00	0.00
				PACB	824	0.00	0.00
				TEA FACTORY	74	0.00	0.00
				DAILY MARKET	636	0.00	0.00
				IMPLEMENT MANU. CENTRE	233	0.00	0.00
				OTHER CO-OPERATIVE SOCI.	424	0.00	0.00
				TECH. COLLEGE & T.C.	163	0.00	0.00
				MILK COLLECTION C.	519	0.00	0.00
				LORRY & TEMPO	074	0.00	0.00
				GOVT HOSPITAL & PHC	178	0.00	0.00
				HEALTH WORKER	389	0.00	0.00
				MEDICAL SHOP	438	0.00	0.00
				PRINTING PRESS	700	0.00	0.00
				OIL EXPELLER UNIT	1400	0.00	0.00
				SUB POST OFFICE	1556	0.00	0.00
				NATIONALISED BANK	1750	0.00	0.00
				AGRICULTURAL ASSET	609	0.00	0.00
				AGRI. OFFICER	1750	0.00	0.00
				TELEPHONE EXCHANG.	2000	0.00	0.00
				WEEKLY MARKET	2939	0.00	0.00
				CASHEW FACTORY	1167	0.00	0.00
				NON NATIONAL BANK	28	0.00	0.00
				AGRO SERVICE CENTRE	395	0.00	0.00
				BUS STAND	4657	0.00	0.00
				CATTLE MARKET	4657	0.00	0.00
				HONEY COLL. CENTRE	2800	0.00	0.00
				RAM. WAY STATION	2800	0.00	0.00
				CANAL	1400	0.00	0.00
				DAM / CHECK DAM	1556	0.00	0.00
				ASST. DIRECTOR OF AGRI.	14	0.00	0.00
				BDO	14	0.00	0.00
				TRIAL EXTN. OFFICER	14	0.00	0.00
				INDUSTRIAL EXTN. OFFI.	14	0.00	0.00
				COLLEGE	14	0.00	0.00
				AGRICULT. PROC. UNIT	14	0.00	0.00
				TOTAL	151.11	0.00	0.00
				LEVEL OF SETTLEMENTS	D	0.00	0.00

COMPUTATION OF CENTRALITY SCORE THROUGH POPULATION THRESHOLD METHOD

S.No	CODE: NO	POPULATION	WEIGHT	SETTLEMENTS	INFRASTRUCTURE FACILITIES	LEVEL OF SETTLEMENTS
1	4	ANCHAL	28512	1	TEA FACTORY	918-7
2	3	KARAVALOOR	21727	4	TEA FACTORY	213-74
3	6	VEROOR	20110	3	TEA FACTORY	313-55
4	1	EDAMULAKKAL	19756	11	TEA FACTORY	283-33
5	9	THINKAL KARIKKOM	17800	18	TEA FACTORY	90-72
6	2	ARAYKAL	16222	9	TEA FACTORY	183-56
7	10	KULATHUPUZHA	15471	21	TEA FACTORY	170-35
8	12	EDAMON	12618	13	TEA FACTORY	142-58
9	5	AYIRANALLOOR	11596	6	TEA FACTORY	249-32
10	11	THENMALA WEST	10339	8	TEA FACTORY	162-26
11	8	CHANNAPETTAH	9692	10	TEA FACTORY	96-09
12	14	ARYANKAVU	8000	12	TEA FACTORY	107-64
13	7	ALAYAMON	8000	12	TEA FACTORY	224-34
14	13	THENMALA EAST	5993	12	TEA FACTORY	36

Appendix - H. Computation of centrality score through functional hierarchy method

S.No.	Code No.	Settlements	INFRASTRUCTURE FACILITIES																											
			Population	Other types of road	Taxi, Car & Auto	Bus stop	Youth Club	Community TV centre	LPS	Rubber Collection Centre	UPS	HS	Other types of post office	NGO's	Bituminous road	Telephone Booth	Fertilizer & Pesticide shop	Veterinary & AH centre	Rice mill	Diagnostic centre	PACB	Daily Market	Implement mfg. centre	Other cooperative soci.	Tech. College & Teaching Cen.	Milk collection centre	Lorry & Tempo	Govt. Hospital & PHC	Health worker	
			Weight	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
1	4	Anchal	28612	145	269	24	24	9	6	6	6	4	2	25	11	21	11	1	1	15	4	1	1	26	5	34	2	95	2	7
2	3	Karavaloor	21727	14	11	8	17	10	4	5	2	2	2	15	5	5	4	2	8	2	3	3	5	5	2	9	2	2	2	7
3	6	Yeroor	20110	123	36	17	10	5	5	2	2	2	3	7	6	4	6	1	13	1	1	4	3	4	3	2	0	3	3	3
4	1	Edamulakkal	19756	11	35	15	14	5	6	3	1	3	2	9	14	10	8	2	3	2	1	1	8	3	0	2	45	2	2	3
5	9	Thinkalkarikkom	17800	18	13	5	6	5	3	3	3	1	2	4	3	3	3	1	4	1	3	1	0	0	0	0	0	0	0	0
6	2	Araykal	16222	9	17	7	10	4	5	4	2	2	3	10	17	15	7	2	2	2	1	3	2	2	3	1	5	1	2	2
7	10	Kulathupuzha	15471	25	14	6	6	7	4	3	2	3	0	8	6	4	3	1	4	2	1	1	4	0	1	1	11	1	1	3
8	12	Edamon	12618	10	15	8	8	4	3	1	1	1	4	5	5	4	2	1	7	2	1	1	1	3	6	3	3	1	0	0
9	5	Ayiranalloor	12613	109	17	11	11	5	6	3	2	2	3	5	4	3	5	2	9	0	0	3	0	4	2	1	0	0	0	0
10	11	Thennala west	11596	6	20	8	9	4	4	3	1	1	2	7	7	3	2	1	5	1	1	1	1	1	2	6	2	2	3	3
11	8	Channapettah	10338	18	6	10	2	2	4	2	3	1	1	3	6	1	2	1	2	1	1	1	1	1	3	1	2	0	0	0
12	14	Ayankavu	9692	10	12	4	4	4	2	2	3	2	2	1	3	1	1	1	0	1	2	0	1	5	2	0	6	3	4	4
13	7	Alayamon	8200	12	35	8	5	3	2	6	2	2	2	7	10	17	3	1	4	7	1	0	8	2	17	2	2	1	4	4
14	13	Thanmala	5893	12	5	5	2	2	2	1	1	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

(CONTINUE....)

		INFRASTRUCTURE FACILITIES																												
S.No.	Code No.	Settlements	Population	Medical shop	Printing Press	Oil expeller unit	Sub post office	Nationalised bank	Agricultural Assistant	Agricultural Officer	Telephone exchange	Weekly market	Cashew factory	Non nationalised bank	Agro service centre	Bus stand	Cattle market	Honey collection centre	Railway station	Canal	DAM/Checkdam	Assistant Director of AGRI	BDO	Tribal Extension Officer	Industrial Extension Officer	College	Areca nut proc. c.	Tea factory	Total	Total units of functions
			Weight																											
1	4	Anchal	28612	9	7	2	1	1	1	1	1	1	3	1	1	1	3	3	0	0	0	5.6	5.6	0	0	0	0	0	804.2	0
2	3	Karavallor	21727	1	1	1	1	1	3	1	0	1	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	167	MD
3	6	Yeroor	20110	2	1	1	1	1	3	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	280	MD
4	1	Edamalakkal	19756	4	3	1	1	1	0	0	1	1	3	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	230	MD
5	9	Thinkalarkkom	17800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	LD
6	2	Araykal	16222	1	1	1	1	1	3	1	0	0	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	152	MD
7	10	Kulathupuzha	15471	3	2	1	1	1	2	1	1	1	0	0	0	0	3	0	1	0	0	0	0	3	3	0	0	0	144	MD
8	12	Edamon	12618	0	0	1	0	0	3	1	0	0	0	0	1	1	0	0	1	3	0	0	0	0	0	0	2	0	144	MD
9	5	Ayranalloor	12613	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	8	0	0	0	0	0	0	0	219	MD
10	11	Thenmala west	11596	1	1	1	1	1	0	0	1	0	0	0	0	0	0	0	2	3	1	0	0	0	0	0	0	0	130	MD
11	8	Channapettan	10338	0	1	0	1	0	0	0	1	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	82	LD
12	14	Ayankavu	9692	1	0	1	1	1	3	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	89	LD
13	7	Alayamon	8200	10	3	0	0	0	3	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	183	MD
14	13	Thanmala	5893	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	36	LD	

D - Developed; MD - Moderately developed; LD - Less developed

