

PLANNING OF SERVICE CENTRES IN RURAL AREAS
OF DEVELOPING COUNTRIES

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PLANNING OF SERVICE CENTRES IN RURAL AREAS OF DEVELOPING COUNTRIES

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PART I

**PLANNED DEVELOPMENT OF THE SPATIAL STRUCTURE OF A
SOCIO-ECONOMIC SERVICES APPARATUS**

I. 1. INTRODUCTION

An ever-growing interest is being shown in so-called integrated planning, particularly in developing countries. There are a number of reasons for this, including the fact that a steadily improving insight is being gained into:

- a the mutual relationships between developments that take place on different administrative levels of a society: national, regional and local;
- b the connection between developments in different sectors;
- c the interrelationships between the social, economic and physical aspects of one and the same development process.

As will be apparent later, these close ties emerge clearly when plans are being drawn up for the future settlement patterns in rural areas and for their services apparatus. This type of planning results in what are called Centres Plans.

Such plans are of great importance for the future development of rural areas in developing countries, for the following reasons:

- 1 In these countries the authorities annually spend many hundreds of millions of dollars on improving the infrastructure by building roads, harbours, air-fields etc. By establishing such social and economic service units as schools, policlinics, storage facilities and water supplies, they endeavour to promote not only the prosperity of the rural population, but also their welfare. The future development of the countryside is largely influenced by the extent and the nature of these services.
- 2 Not only their quality and quantity, but also the spatial distribution of the socio-eco-

conomic services are important for the living conditions and development potential of rural areas. This distribution provides the physical framework within which the future development must take place and where a new socio-economic structure must come into being. One of the problems of town and country planning is that of enlargement of scale. It is becoming more and more obvious that services catering for rural populations can only operate at their optimum when they provide for a certain minimum number of persons. This minimum number of persons (threshold) has a tendency to increase. Enlargement of scale results in the disappearance of many small service centres, or a decline in their function. And in developing countries where a very large proportion of the rural population still lives in small to very small communities, this means a radical change.

In planning the future physical structure of the service apparatus, it is essential that a certain line of thought be followed as to the most desirable future socio-economic structure of the rural area, and of its relationship to the rest of society. This guiding image for the future can, of course, differ from country to country and even from region to region. There are, however, a number of basic factors which always have to be taken into account in planning a future service apparatus. And there are a number of relationships between this service apparatus and its surroundings which are met with everywhere. Because of this it has been possible to set out a system of guidelines (See Chapter I. 2) which are important in spatial planning of the socio-economic services apparatus in rural areas. From here on, such a system of guidelines will be referred to as a relation model. It is self-evident that this relation model is of a general nature and will have to be adapted to the circumstances in the country or region for which plans are being drawn up.

The way in which the relation model can be adapted will be demonstrated in three case studies, described in Part II. The first of these deals with Surinam (Dutch Guiana). It was in this country that the author first applied the relation model. He had a great deal of information at his disposal, having lived there for six years, and for this reason it was possible to go into more detail in describing this project than it was with the others. However, as will be seen from the case studies of Syria and Malaysia, a plan for the spatial structure of the socio-economic services apparatus for an agricultural area can be compiled, even with considerably fewer data.

Of constantly vital importance in the planned development of a country, no matter what aspect of society it is concerned with, is evaluation. Guiding development in a certain direction by means of planning will only be beneficial if, through evaluation, one keeps well-informed on the effects obtained by this planned development.

If the data on which the plan is based are scarce or unreliable, the plan should be implemented with greater caution and interim evaluation gains in importance.

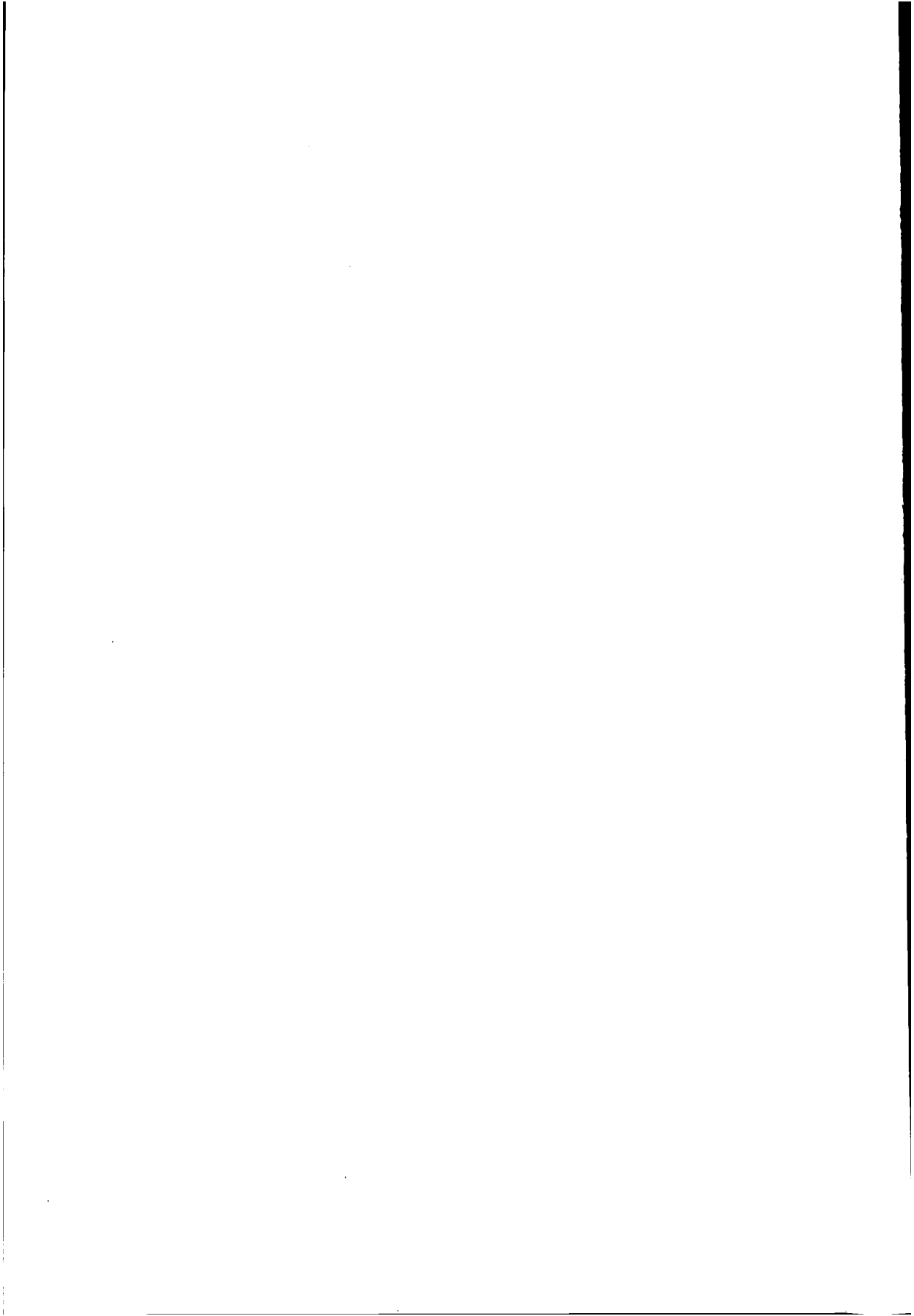
But every plan, no matter how detailed and reliable the data on which it is based may be, should remain flexible for as long as possible; that is to say, if experience gained during

the execution of the plan, or newly acquired data, should show that changes are necessary, the plan must remain adaptable to these changes for as long as possible.

The relation model and the case studies deal mainly with the spatial planning of the service apparatus, or, in other words, with the questions of where the social and economic services are to be placed and how they are to be linked up with the road system.

However, there are also other measures that must be taken if the plan is to be carried out efficiently, and these are dealt with in Chapter I. 3.

It is hoped that the ideas put forth in the theoretical section and described in the case studies will contribute to a deeper understanding of one of the component parts of planning for agricultural areas in developing countries.



I. 2. A MODEL FOR PLANNING THE SPATIAL STRUCTURE OF A SOCIO-ECONOMIC SERVICES APPARATUS

I. 2.1. MODEL: ITS CONCEPT AND USAGE

In compiling plans for the spatial structure of a socio-economic services apparatus, a great many factors must be taken into account. Under varying circumstances these factors can differ considerably from one another in their influence and significance. As a result of this, in spite of the fact that all concrete cases have a number of characteristic features in common, the impression can easily be gained that one is constantly dealing with completely isolated situations.

For a better understanding of the nature and the structure of complex phenomena, people nowadays often make use of a model.

A model is, in essence, a simplified description of a certain phenomenon. By omitting details, which can often vary widely, an attempt is made to gain a deeper insight into the actual features of the phenomenon.

The model-type of description can be applied in the study of existing situations, or if required, to those desired in the future, e.g. in analysing present or future settlement patterns (Chorley c.s. 1967). It can also be used in analysing existing or future processes, an analysis which is often done by economists.

The model that will be described in the following is a theoretical model, not to be confused with the physical constructions used in architecture or hydrological laboratories.

Theoretical models can be divided into:

– Conception models

With these models, an attempt is made to isolate the different variables connected with a certain process, but the relationships between the different variables and components of the phenomenon represented by the model are not analysed in detail.

– Relation models

These models not only show the variables and components of which the represented phenomenon consists, they also reveal, non-mathematically, the relations that exist between the various parts of the phenomenon.

– Mathematical models

These are relation models which indicate mathematically the relations between the various parts of a phenomenon. In this way economists show the relation between income (I), consumption (C) and the amount saved (S) – all elements of the economic process as the equation: $I = C + S$.

It will be shown in this chapter, by way of a relation model, how one can set about planning settlement patterns and the physical structure of the service apparatus. The elements of this model are guidelines for activities connected with planning.

The relations between the various guidelines will be described non-mathematically. The general character of a model usually means that it will first have to be adapted and/or elaborated before it can be applied in a particular case.

The model has been drawn up with the idea in the background that in developing countries plans generally have to be compiled at short notice without having all data at one's disposal, much of which can often only be obtained after a lengthy investigation. It is at the same time based on the fact that in most of these areas, there is as yet no extensive service apparatus spread over a complicated hierarchy of centres.

The model can be put into practice most simply in areas that are not yet occupied and which have a homogeneous physical landscape. But it can also be used in areas with a heterogeneous landscape, as well as in areas already occupied and with a service apparatus at their disposal. The greater the density of the existing services apparatus, the more time will be required to realize a new spatial structure.

I. 2.2 IMPROVING LIVING CONDITIONS IN RURAL AREAS

There is a close relationship between the overall development of an agricultural area and its living conditions. Only when this insight gains ground will special attention be given to the planning of settlements.

The living conditions of an area are to a certain extent determined by the quantity, quality and spatial structure of its social and economic service units.

The spatial structure of the socio-economic services apparatus means the way in which the socio-economic facilities (also called service units, e.g. schools, clinics, hospitals,

markets, shops, storage facilities and government buildings) are placed in the area concerned in relation to its habitation. Whether this services apparatus functions satisfactorily or not is determined to a great extent by the communication and transport systems.

In arriving at their decision to provide better living conditions in rural areas, the authorities will have to take the following points into consideration:

1 To many farmers increasing their production and consequently having to think more in terms of the market economy will only be attractive if they have opportunities in their immediate vicinity to spend their extra earnings on what they consider useful, or at least, desirable services or goods. Creating the need for services and goods, and then satisfying this need, is possible by improving the quantity and quality of social and economic services.

2 The governments of many developing countries have undertaken the social and political obligation to strive for the improvement of public health and the level of education. This policy can only be carried out by an expansion of the services apparatus.

3 In many developing countries there is a great difference in quality and quantity between the socio-economic service units located in the towns and those in the countryside. One of the causes of urbanization is that the level of service in the towns is usually much higher.

Particularly the better-educated younger people are often not prepared to remain in the countryside because of the poor living conditions. This often leads to an insufficient number of qualified people (skilled workers, midwives, teachers, government officials, agricultural extension officers etc.) who are willing to establish themselves in rural areas. Thus, efforts to raise the level of public health and education and to promote agricultural development are seriously hampered.

If this situation is to change, one of the prerequisites is that the living conditions be improved. This will not be brought about by providing a few incidental services. A package approach is required.

I. 2.3 GENERAL PRINCIPLES OF CENTRES PLANNING AT NATIONAL LEVEL

Once it has been decided to improve the services apparatus on the old land (i.e. the already occupied areas) by providing socio-economic services, a number of problems immediately crop up, for instance: where should these services be established?

Although local and regional conditions will have to be borne very much in mind, a number of general guidelines at national level are important in a policy directed towards the improvement of living conditions.

These can help foster a uniform procedure and will, to a certain extent, guarantee a more balanced set-up of the services apparatus throughout the entire country.

1. 2.3.1 *The principle behind concentration*

In deciding on the places where socio-economic services are to be established, it is possible to be guided simply and solely by the local situation; that is to say, the services are established in places where there is the greatest demand from the population, or where political pressure is insisting on an improvement in the services apparatus. This does not always necessarily coincide with the actual needs of the population. If such a line of action is followed, the distribution of service units in rural areas will depend largely on the existing settlement pattern.

The matter of deciding where services are to be placed may also be left entirely in the hands of representatives of various ministries (Education, Health, Agriculture etc.) or to local or regional government. In these cases particular attention often seems to be paid to the communications between the regional or provincial headquarters of the authority concerned and the place where the desired service unit is to be established.

Another important factor is the availability of a site on which the desired services can be built. This can lead to the service units being located eccentrically in the area they are to serve.

With these approaches, which are usually applied in already occupied areas, no definite policy is followed and the incidental decisions made generally result in a scattered services apparatus. This is also the case in new agricultural areas when service units are established only after the population has, either directly or indirectly, made its needs felt. Here one cannot speak of planning.

The result of such an approach is that an efficient set-up of the services apparatus is scarcely possible. Moreover, it consolidates already existing or spontaneously forming settlement patterns, and the chance is lost to set up or remodel the settlement pattern in such a way that an optimum structure is created for agricultural development.

It will be clear that a more objective line of action must be followed in establishing social and economic service units. The main principle behind the planned development of the spatial structure of social and economic services, discussed below, is that wherever possible these units should be concentrated in nuclei, which from here on will be called 'centres'.

Such centres can provide the following advantages:

- 1 The various service units exercise a certain influence upon one another. A concentration of services stimulates this interaction, which on the other hand will be less intensive if the services are spread out over the area.

One of the reasons for this is that when people visit such a service centre they can settle several matters at one time. If, for instance, the office of the agricultural extension service is located near the market, farmers will be more inclined to call on the extension officer than if they have to make a separate trip to his office situated one or more kilometers from the market and other services that are important to farmers. Concentration brings

about a complex of possibilities, which is, as a whole, more than the sum of the various components separately.

2 Once several services are grouped together, the larger concentrations of population will in many cases more readily justify the placing of public utilities, such as electricity and water. At the same time, more attention can be given to connecting the centre with the general road system. This will result in a more efficient functioning of many services, improving the living conditions for those residing in the centre. This is of particular importance in the matter of appointing the staff of the service units (teachers, agricultural extension officers, midwives), as it will remove at least some of their objections to being appointed to rural areas. For them, improved living conditions are not only a matter of the level of service they can obtain in rural areas, but also the fact that a group of people – small though it may be – with the same education and interests are living close by. The better living conditions can improve the staffing of the service units, which leads to a better functioning of the services.

Concentration means that for the outlay of a certain sum of money, a higher level of service can be provided than would be the case without concentration.

3 If the agricultural structure is to be improved and production increased, a complex of radical measures usually has to be taken. Many of these have an important organizational aspect: coöperatives, farmers associations, marketing, processing, the granting of credit, irrigation and/or drainage organizations etc. When these organizations can be placed in a modern infrastructure, they will function much more satisfactorily.

This means that the physical and spatial structure of the service apparatus can have either a stimulating or a hampering effect on the agricultural development.

Thus, in deciding on the spatial structure of the service apparatus, the developments that can be expected in agriculture, or those that are to be encouraged, must be kept in mind. In other words, only when it forms part of an integrated development plan for an area, can a satisfactory plan for the spatial structure of socio-economic services be drawn up.

From this point onwards, a distinction will be made between:

- a *the centre*: the site on which the concentration of services is situated.
- b *the service area*: the area whose population is primarily dependent on the centre for its various services.

The centre can have three functions:

- a a service function.

The majority of services of importance for a certain area are concentrated in it.

- b a residential function.

It nearly always has a residential function for people working in the services. Sometimes,

some or all of the people engaged in agriculture will be living in the centre. It is also possible that the centre will house persons who work outside the service area (commuters).

c an economic function.

This will be so if economic activities, such as marketing and small-scale industry, take place in the centre.

I. 2.3.2 *Types of centres*

Once the decision has been made to concentrate the socio-economic services in those places where it is physically, economically and socially possible and desirable, the question then arises as to what types of concentration are to be brought about.

Before passing on to a classification of the types of service centres that could be introduced in rural areas, we will first go into the matter of how existing human settlements can be theoretically classified. After that we will show what relationship exists between the kind of services available in a centre and the number of people cared for by such a centre.

Classification of human settlements

When a certain process is going to be affected by means of a plan – a process such as the creation of or change in human settlements – it is very important that the existing settlements be analysed systematically and, if possible, that their various forms be classified.

Functional hierarchy of settlements and the threshold for service units

It is a common observation that there are fewer large centres than small ones in a region and that large centres provide a greater number of goods and services than small centres do.

It has emerged clearly from various settlement studies that there is a close relationship between the size of a centre and the number and kind of functions it fulfils. The function of a centre is determined by its service units: school, clinic, hospital, market, courthouse etc.

Fig. 1 shows a number of relationships that have been established empirically.

In the theoretical approach to settlement questions, various problems arise as to the classification of centres. In particular, it has not yet been decided whether one has to do with a continuum or whether obvious classes can be distinguished as a result of the step-type increase of the number of functions within different types of centres. We shall not go further into these questions here. It will suffice to say that up to now no classification has been compiled that can automatically be used in all situations.

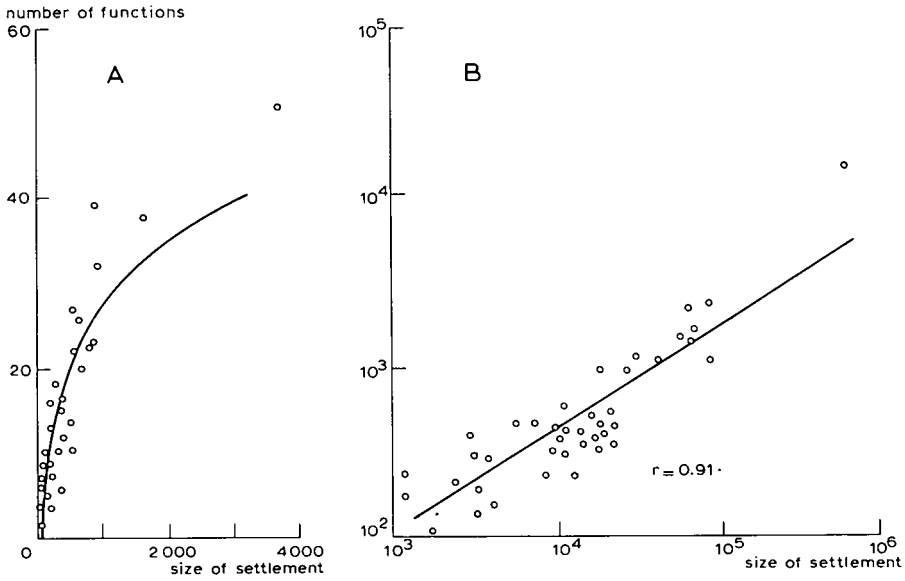


Fig. 1a Relationship of functional range to settlement size in Southern Illinois USA (A), and Southern Ceylon (B) In the first graph the y-axis is arithmetic and in the second graph logarithmic. (Source: Haggett, 1965, p. 115. After Stafford 1963, p. 170; Gunawardena, 1964)

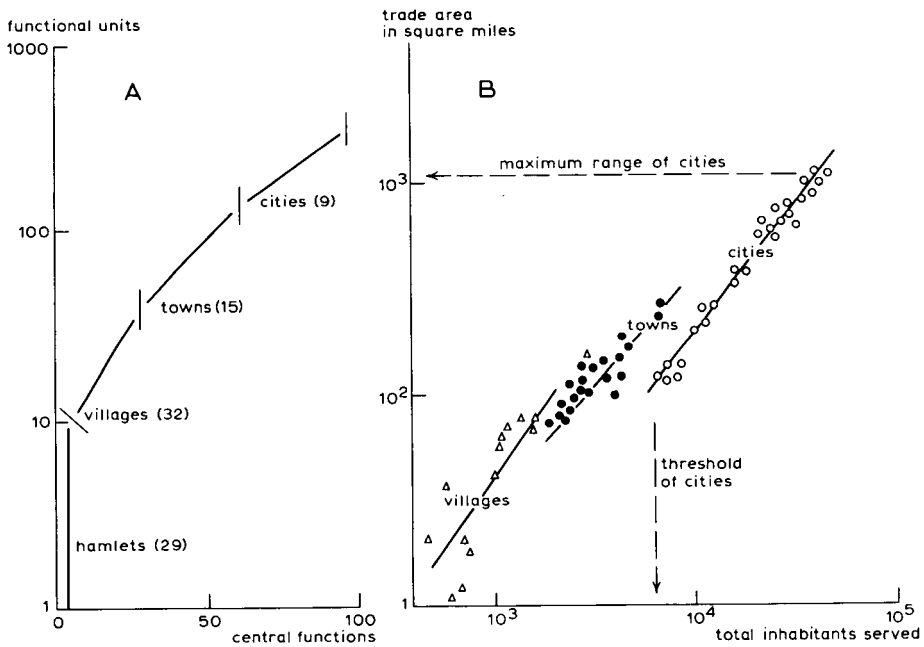


Fig. 1b Settlement hierarchy in south-western Iowa, USA, for four classes of central places. (Source: Haggett, 1965 p. 118. After Berry, Barnum and Tennant 1962, pp. 79 and 80.)

It is possible to establish the so-called 'threshold' for certain functions empirically. Haggett and Gunawardena (1968, 1964) suggest that the threshold of any function is the middle point of its 'entry zone'. Haggett formulates the rule that for a given function there is a lower population level at which no settlements of this size have the specific function, while conversely there is an upper population level at which all settlements of that size have this kind of function (Haggett, 1968).

The threshold of existing functions, empirically established, is without doubt a useful piece of information for settlement planning, but it has only a relative value. In most rural areas of developing countries, the level of service – the quantity and quality of the service units present in a certain area – is very low.

As has already been stated, the development policy of an area should not only be based on what the population actually feels is needed. When new and better services are introduced, new needs will be created. Satisfying these needs may then be one of the incentives for a rural population to make greater efforts towards achieving the developments planned for their area.

Establishing the future thresholds for service units – which will be called standards from here on – can thus only to a limited extent be based on the thresholds fixed empirically on the present situation. In a general sense, the standards can be derived from the national targets set by the authorities with regard to, for instance, public health and education. As well, they can be derived from the development that has been planned for a certain area (See Section I. 2.3.5).

A relationship usually exists between the capacity of a service unit (the number of people served), its radius of action and its frequency of use. A hospital will be used less frequently than a school or clinic; also, the efficient set-up of a hospital requires that a greater number of people be served than is the case with a clinic. As the number of people to be served increases, the economics of scale can be put to use, by which the quality of the services can be raised and/or their price lowered.

Raising the quality and quantity of services is of importance since, because of the steadily improving transport and communication facilities, the agrarian population is in a position to compare its level of service with that of neighbouring towns. If the quality of a service is below a certain level, the agrarian population will then go elsewhere to satisfy its needs, e.g. to a town or a larger village in the neighbourhood. Because of this, a service whose quality is below par will languish and eventually disappear.

Investigations in the USA and The Netherlands have shown that small villages have to contend with a loss of function as a result of this mental urbanization; that is to say, that even though the population may continue to live in rural areas, its pattern of needs more and more approaches that of the urbanite.

In view of the sparsity of population in agricultural areas as compared with the towns, and the usually limited transport facilities in developing countries, enlarging the service area and increasing the number of people to be served per centre and per service unit will only be possible to a limited degree. Nevertheless this process of mental urbanization

must be kept in mind, especially when setting up new agricultural areas.

Classification of centres as an aid to the physical planning of the services apparatus in rural areas

A simple classification is given below of those centres with an important function for agricultural areas, together with some of their characteristics, i.e. their radius of action (the distance over which the influence of services placed in the centre is still appreciable) and the population that can usually be expected in the centres.

TABLE 1.
TYPES OF CENTRES OF IMPORTANCE FOR PLANNING IN RURAL AREAS, AND THEIR MAIN CHARACTERISTICS

Classification as used in this study	Other names often used	Population	Radius of action
additional primary centre	hamlet	< 1500	< 2 km
primary centre	local centre village	1500-5000	3- 6 km
secondary centre	large village small town	5000-10000	8-20 km
tertiary and other centres	regional centre city large town	> 10000	> 20 km

With the standards for the service units (which will be discussed in Section I. 2.3.5) and the figures for the expected population, the type and number of service units that have to be taken into account when planning a new centre or expanding an existing one can be established.

The classification is of a theoretical nature and will have to be adapted to existing conditions or those expected in the future. This applies particularly to the population figures and the radius of action of the different centres, as will be shown in the case studies dealt with in Part II.

A brief description of the different types of centres follows:

Primary centres

A primary centre, which may also be called village or local centre, should contain all the services that are of primary importance to the rural population, and which they use, or should be able to use, daily: primary schools, clinics, shops.

Fixing the radius of action of a primary centre depends, of course, on many factors. If the population is spread out over the service area, care will have to be taken, for instance, that the primary school is within a reasonable distance for young children attending it. If the population resides concentrated in the centre, the farmers must be able to get to their land without losing too much time. In both cases the acceptable distance will largely be determined by the means of transport available. Do people have to walk? Are there

bicycles or mopeds? Is there intensive public transport? Is there a school-bus system? We may safely say that if the population, or a large proportion of it (e.g. schoolchildren) can only get about by walking, which is frequently the case in rural areas of developing countries, the radius of action of a primary centre must not exceed 4 km.

The actual radius of action of a primary centre is, to a great extent, determined by the topographical conditions: rivers, ravines and mountain ranges. Such conditions must be kept in mind when deciding where new centres are to be established.

Deciding the minimum population necessary for the effective functioning of the centre will largely depend on the minimum number of people necessary for the effective functioning of the centre's most important service units, e.g. a school or clinic. This will usually be 1,500 for a primary school, and 2,000 for a clinic. It is therefore recommended that wherever possible the service area should have at least 2,000 people living in it or coming to live in it.

In deciding a primary centre's minimum number of inhabitants, one must think in terms of the *area of competence*, i.e. an area with a size and population figure that guarantees the effective functioning of a centre's service units.

For social and organizational reasons, however, the population figure of the service area of a primary centre should not be too high. The service area must remain an *area of interest*, i.e. an area of such a size that people know one another, are well-informed about what is going on in the centre (village) and, partly because of this knowledge and a sense of belonging, are prepared to take part in activities important to the local community; in other words, it must be able to function as a social unit.

There are scarcely any empirical data on the most desirable upper limit of population for an area of interest. It is considered that the population of a primary centre should not exceed 4,000-5,000. Both the lower and the upper limit between which the number of inhabitants of a primary centre may vary depends on the circumstances obtaining in the area for which plans are being drawn up.

It is possible to arrive at a proposal for a network of primary centres in an area, based on the topography, the population that can be expected in the future and its distribution, the radii of action and the desired number of inhabitants.

Additional primary centres

Although we have up to now strongly emphasized the importance of concentrating services, this does not always mean that it is necessary or desirable to have all the services that belong in a primary centre concentrated there. In areas with a very sparse agricultural population, living either completely scattered or in very small concentrations (hamlets), there will certainly be a need for a number of services with a low threshold outside the centre, as otherwise the people would have to travel unnecessarily great distances to get to the services. Consideration could be given to small shops or auxiliary schools, which might consist of the lower classes of a primary school, under the supervision of the head of the primary school with six or more classes located in the primary centre. These

additional service cores could function as the hub of part of the primary centre's service area.

Particularly in those cases where the population is not yet used to the idea of centres, these additional primary centres can fulfil an important function in bridging the gap between a scattered and a concentrated services apparatus.

The additional primary centres have a radius of action of 2 km or less, and serve a population of usually not more than 1,500. They should not have more than a supplementary function. A check will have to be kept that their existence does not impede the growth of the primary centre.

Secondary centres

The secondary centre (also called regional centre) contains those services whose frequency of use is not a daily matter for the majority of the population.

Compared with primary centres, it is more difficult with secondary centres to arrive at standards as to the radius of action and the number of people to be served. Some general criteria, which the secondary centres should satisfy, will have to suffice.

The secondary centre's services must be regularly and easily accessible to the population. This means that the secondary centre must lie in the centre of the service area's road system.

The service units at secondary level, such as health centres (these are service units where preventive and curative medical care is given), secondary schools etc. also need a certain minimum number of persons who make use of them if they are to function efficiently. This number, however, can be fixed with greater flexibility than for service units at the local level. As a result of the variation in the number of inhabitants, the size of the service units can also vary considerably (e.g. the number of beds in the hospital).

Just how greatly the radius of action, for instance, of a secondary centre may vary can be seen in the case studies. In Surinam 10 km was proposed, in Malaysia 11 km and in Syria 15-20 km. The proposed radius of action for primary service centres in these three case studies varied between 3 and 4 km.

With regard to the range of its service units, the secondary centre suffers less of a handicap from a somewhat unfavourable topographical configuration than a local centre does. Secondary centres in most cases are either already in existence or are chosen from the existing or planned primary centres.

Tertiary centres

Both as to their service area and to the population they serve, tertiary centres (sometimes called district centres) are largely determined by the existing or planned administrative divisions of a country. With regard to the level of its services, this type of centre differs only slightly from the secondary centres situated within its service area. Most of the time the difference lies in the fact that a number of organs of government administration are established there. Depending on the administrative level of these organs, one may speak

of a district or a provincial centre.

In developing countries, in view of the important role usually played by government and its departments in the agricultural development, these centres generally have an important function. The location of these centres is often already decided by the existing concentration of a large number of government buildings. In that case, they should be regarded as one of the data when a centres plan is being compiled.

Centres of a higher order

Finally, centres of a higher order can be distinguished. These centres have at their disposal services of national, and sometimes international, significance: the seat of national government, extensive industrial complexes, large harbours, international airports, central hospitals etc.

Even though centres of this type do have a function for agricultural areas, they will usually not come up for discussion when plans are being compiled for the spatial structure of the service apparatus of agricultural areas (centres plans), and for this reason will not be given any further consideration.

1. 2.3.3 The centres and their administrative service areas in relation to administrative areas of another order

Each centre of a higher order contains all the service functions of centres of a lower order. The service area of a secondary centre always contains the service areas of a number of primary centres. The service area of a tertiary (district or provincial) centre contains the service areas of a number of secondary centres.

As one goes higher in the hierarchy of centres, it is less likely that the service area of the centre of the higher order will completely contain the service areas of the centre directly below it. Thus it is possible that a service area of a secondary centre may fall inside the service areas of two or more tertiary centres.

It is, however, recommended that the borders of the service areas of primary, secondary and, if possible, tertiary centres coincide. In other words, the service area of a tertiary centre should consist of the service areas of a number of secondary centres and the service area of a secondary centre should consist of the service areas of a number of primary centres (Fig. 2).

How the different types of service areas can be fixed will be described below. In doing so, a distinction is made between the theoretical service area and the administrative or actual service area. It is assumed that the administrative and actual service areas coincide, which will not always be the case in practice. Still, this will have to be aimed for, for reasons outlined below.

In an area for which a centres plan is being compiled the theoretical service areas are shown on a map by a circle whose radius equals that of the radius of action fixed for the

various types of centres. These circular theoretical service areas are only meant as an aid to see whether the entire occupied area, or that to be occupied in the future, is covered by theoretical service areas and whether any large areas fall outside the scope of the radii of action fixed for the various types of centres. They also provide a check on whether too much overlapping occurs, which will result in unnecessary competition between the centres and make it difficult for the inhabitants in those areas to know to which centre they should gravitate.

Once the sites of centres have thus been shown systematically, the next step is to fix the administrative service areas. An administrative service area is the area covered by the (preferably coinciding) spheres of influence of the most important service units in a centre.

In fixing these areas, there are two important factors: (1) units of local administration and (2) census units.

1 Units of local administration

In already occupied areas, units of local administration will usually be one of the data which have to be taken into account when compiling a centres plan, as in practice only little adjustment of these areas is possible. If changes in the units of local administration are recommended in the plan, this will usually call for lengthy consultations with many agencies. In areas yet to be occupied, such units will usually be lacking, particularly at the primary centre level. In such cases recommendations should be given in the centres plan for the future set-up of units of local administration. This also applies to the census units.

2 Census units

Census units are the smallest geographical units on which statistical material is collected. An integrated development of a certain area can be achieved only when sufficient data are available. Difficulties often arise when information is compared since different authorities base their collection of material on different area divisions. The result may be that data collected by means of a population or an agricultural census can only be compared at a national or provincial level, but not at a lower level. The same applies to the large amount of data set forth in government department reports.

We may assume that the primary centre is the smallest administrative unit in which integration and coördination of the various government programmes will take place. It is therefore recommended that, if possible, the administrative service areas of primary centres consist of one or more census units used by all departments collecting data necessary for a planned development. This will considerably simplify the future processing and comparison of the data needed when plans are being compiled.

As a census unit is usually closely allied to the district covered by civil servants working at the lowest level of administration (assistants of agricultural extension services, administrative assistants, midwives) it follows that the service areas of primary centres should, as far as possible, correspond with these administrative areas.

Care should be taken that if any alteration in the census units should prove necessary, this be done in such a way that it will always be possible, geographically, to compare data to be collected in the future with data already collected. It is precisely the trend that socio-economic events take with time which is of great importance in planning.

Not only for planning is it important that official administrative units, census units and the service areas of primary centres coincide, but also for coördinating activities when the various development plans are being implemented. Hence, one should not shrink from the reorganization of an obsolete division of administrative units so as to fit them to the new conditions or those expected in the future, even though this will bring with it difficult administrative decisions.

Another aspect which must be taken into account when fixing the administrative service areas in already occupied areas is the social structure and the habitation pattern. If the population lives in small hamlets, the question will arise as to which hamlets will have to come under the service area of a primary centre.

To this end, social research into the opinion of the local population is required, in order to obtain such a composition of population in the service area of primary centres that will eventually lead to the growth of a sound territorial social group.

In fixing the administrative service areas, it must be borne in mind that centres of a higher order generally have a greater attraction for the population than centres of a lower order

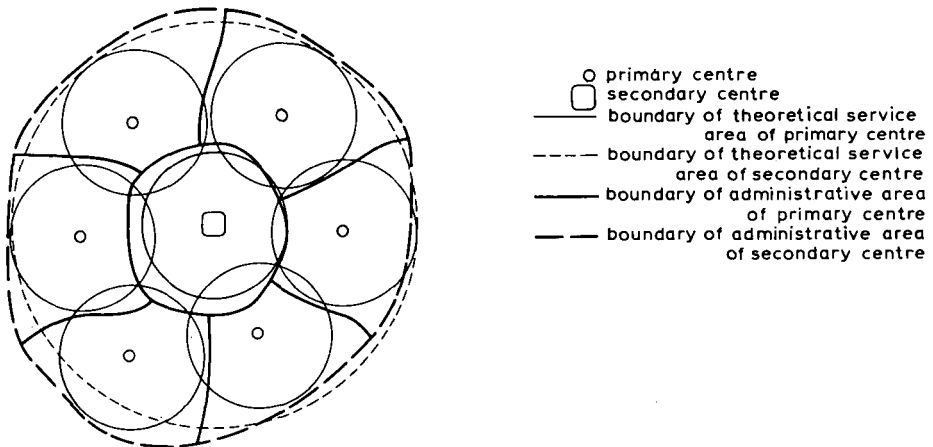


Fig. 2 Relationship between theoretical and administrative service areas of primary and secondary centres

do. The tendency will thus exist for the service area of a primary centre with a secondary service function to expand at the expense of the service areas of neighbouring primary centres (Fig. 2).

As is obvious from the above, fixing administrative service areas, especially in already occupied areas, is no simple matter and will usually take quite some time. Nevertheless, it is an important part of preparing and implementing centres plans.

1. 2.3.4 The centres and their relation to the road network

One of the most important aims of a centres plan is to improve living conditions in agricultural areas by improving the quality and quantity of service units through concentration. Such concentrations, however, will only be effective if the people can reach them easily. It should be possible to get to the centre quickly and without much discomfort from any point in the service area. This means that the site of the centre and the road network must be adapted to one another.

In the following, four types of road will be distinguished: primary, secondary, tertiary and quarternary. Contrary to the terminology used with centres, a primary road provides a higher level of service than a secondary one, and so on. The relationship between the different types of centres and roads is shown systematically in Fig. 3.

Additional primary centres, being the smallest type of centre, will be situated at the intersection of a quarternary road (a pathway or causeway), giving access to the agricul-

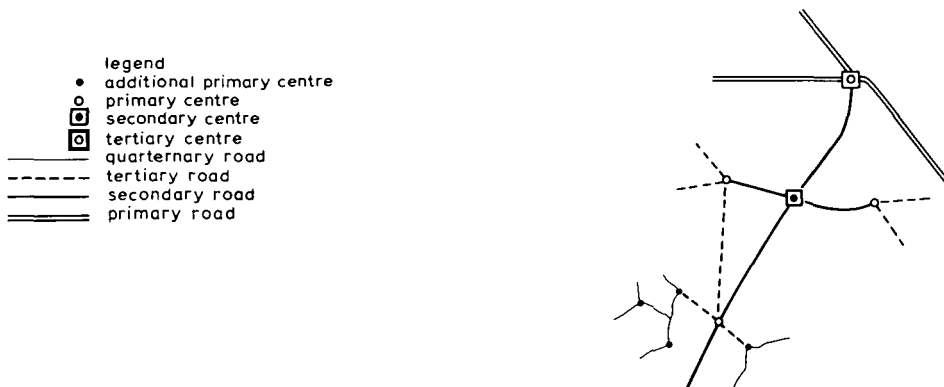


Fig. 3 Relationship between types of centres and types of road

tural parcels, and a tertiary road (unmetalled road), leading to the primary centre.

Primary centres will preferably be located at the intersection of tertiary roads giving access to the service area and a secondary road (a metalled, all-weather road) leading to the secondary centre.

Secondary centres will be situated at the intersections of secondary roads giving access to the secondary service area and should, if possible, be planned on a primary road.

Tertiary centres will be situated at the intersections of secondary roads and a primary road. Important tertiary centres should be located at the intersection of primary roads.

Apart from roads, other means of transport play an important role, particularly in the development of higher centres. Such centres should preferably be situated on or near waterways, railways and air fields.

1. 2.3.5 *Standards for socio-economic service units*

As has already been mentioned (see Section I. 2.3.2) each service unit has its so-called threshold, or standard. Fixing this standard is very important when a centres plan is being compiled, as it provides one of the essential data on which to base the decision as to what kinds of services are to be established in a centre, taking the present and future population and their expected needs into account.

These standards can, of course, differ from country to country as a result of varying levels of development, a particular structure of the government etc. Broadly, the standards for the most important services are contained in, or can be derived from, the norms laid down by the authorities in their national development plan.

It has been found that the standards for schools and clinics at the local level are very similar in many countries, in spite of varying types of organization.

The standards should be established at national level but must be applied flexibly. The accessibility of an area and the distribution of the population are two factors that may make it desirable or necessary to deviate from the established threshold.

In spite of the variations which must always be possible within a country or even a district, it is recommended that these standards be established, since the government will then be in a position to arrive at a balanced geographical allocation of the national funds set aside for the establishment of socio-economic services. At the same time this will provide an insight into regional variations in the cost of the services apparatus.

Apart from the standards for services to be established by the authorities, attention should also be given to standards for services that will be provided by the private sector, e.g. shops. The standards that apply at a certain moment can be set down statistically, e.g. the number of different kinds of shops etc. available per 1,000 inhabitants. Besides this, an attempt must be made, in consultation with government authorities and the private sector, to fix the most desirable standards for the future, taking the expected development into consideration.

To give an idea of what the standards for government services can be, those adhered to in Surinam in 1960 are shown in Table 2.

1. 2.4 GUIDELINES FOR CENTRES PLANNING AT REGIONAL LEVEL

The principles discussed in Section 1. 2.3 should be fixed at national level. They form the framework within which the physical plans for the service apparatus of a certain region must be elaborated. It will now be shown how these national guidelines can be applied at a lower administrative level, which from here on will be called the regional level.

1. 2.4.1 *Analysis of the present situation*

The model for planning the spatial structure of the socio-economic service apparatus can be employed both in agricultural areas that will be newly occupied (the new land), and in those areas that have long been used for agriculture (the old land).

As has already been pointed out in previous sections, the model must be adapted to fit the particular conditions under which it is to be applied. These remarks also hold good for the analysis of the present situation.

In those areas not yet in use, but for which plans are being prepared to make them suitable for agriculture – hence the so-called new land – it will be sufficient to establish what type of agricultural development can be expected in the future, or in certain cases, what type of agricultural development is to be encouraged.

Because of the lack of old structures, there will generally be more opportunity of establishing new types of settlement patterns within a short space of time on new land than on the old land.

When a centres plan for already occupied areas is to be compiled, the present socio-economic situation in the area concerned must also be analysed. In the introduction to this book it was stated that the model has been designed especially for use in developing countries, where there are generally little data available and only limited funds for investigation and inventory, and yet guidelines are required at short notice for the best possible spatial structure of the services apparatus.

Given this point of departure, we shall now briefly go into the question of what data are, in principle, necessary for compiling a centres plan. These data can be regarded as the minimum of information one must have at one's disposal. If exact data are not available, one will have to work on estimates.

The population

In the first place an insight into the distribution of the present population will have to be obtained. The latest population census will be of great help here, and it should preferably not be too old (in general, not more than five years).

TABLE 2. STANDARDS FOR SOCIO-ECONOMIC SERVICES (SURINAM 1960)

Ministry of:	Services personnel	The services apparatus in the District Centre	
		Personnel	Buildings
Public Affairs ¹⁾			
Home Affairs	Per 10,000 persons: 1 executive officer 1 sub exec. officer 4 assistants 1 clerk	District Commissioner and Secretary, plus clerical staff depending on number of persons in district	District Office, which can also house branches of Ministry of Finance and Social Services
Development ²⁾			Land registry office to be housed in District Office
Justice and Police	Per 10,000 persons: 1 inspector of police 1 sergeant of police 10 constables 2nd class 3 auxiliary constables	District superintendent Per 1,000 persons: 1 constable	Police headquarters, House of detention, sometimes a prison Court House
Health	Per 10,000 persons: 1 medical officer 1 midwife 1 hospital orderly 1 pharmaceutical assistant	1 Chief Medical officer nursing staff 1 health inspector ³⁾	District hospital, pharmacy
Social Services		1 departmental head 1 official, inspection of labour and safety regulations 1 labour exchange official 1 social assistance official 1 social worker 2 clerical workers	District Office Old people's home
Education	Per 1,000 persons: 1 head master 5 teachers 2 kindergarten teachers	Teaching staff	Per 1,000 persons: 1 primary school ⁴⁾ Establishments for elementary technical and agricultural training If population warrants it, 1 junior secondary school
Finance Post & Telegraphs Taxation		1 director, administrative staff based, on number of persons in district	Taxation and Post Office to be housed in District Office

1) This Ministry only has a service function at national level

2) Practically no service function at local and regional levels

3) Bureau of Public Health

Regional (Secondary) Centre		Local (Primary) Centre	
Personnel	Buildings	Personnel	Buildings
1 Executive officer 1 sub exec. officer 1 clerk 2 exec. assistants	Government office with room for Polder Board	1 government official	Office on house
Chief officer per 1,000 persons: 1 constable	Police station, Lock-up	1 constable, plus auxiliary constables if required	
1 medical officer 1 midwife 1 hospital orderly 1 pharmaceutical assistant 1 sanitary inspection official	Large policlinic, pharmacy	1 orderly	1 policlinic
1 social services official 1 social worker	Office Old people's home	1 social worker	Office on house
Teaching staff	Per 1,000 persons: 1 primary school ⁴⁾ Establishments for technical and agricultural training	Teaching staff	Per 1,000 persons: 1 primary school
1-2 postal officials 1 taxation official	Small post office Office on house		Letterboxes and slot machines for stamps

⁴⁾ A primary school usually consists of 1 school building with 6 classes and 2 kindergarten classes, grounds with an area of 4,000 m², 1 sportsfield 70x100 m, 1 gymnasium, 1 school garden 20x40 m; staff consists of 1 headmaster and 7 teachers

TABLE 2. (continued)

Ministry of:	Services personnel	The services apparatus in the District Centre Personnel	Buildings
Economic Affairs ⁵⁾			
Agriculture, Animal Husbandry and Fisheries	Per agricultural population of 10,000 to 15,000 persons: 1 branch officer 2 sub-officers 4-6 assistants	Branch officer, plus staff varying according to type of agriculture practised in the district Teaching staff	Head Office, Agricultural school Storage facilities for agricultural produce and supplies
Public Works and Transport		Head of section, plus technical and administrative staff	Office warehouse Public utilities parking areas

5) This Ministry only has a service function at national level. On a lower level it has a coördinating and activating task

If no figures from a recent census are available, or only those from a very obsolete one, another way must be found to get an idea of the distribution of the population.

Estimates or countings done by village headmen and/or lower government officials, provided they will coöperate, can generally be obtained within two to four months. These data are not completely reliable, of course, but are, in general, to be preferred above estimates made on the basis of aerial photographs. As a last resort, however, if none of the other sources are available, aerial photographs can provide material on which to base an estimate of the population.

The population figures can be reproduced on a map where the census units show a certain density of population (see Map II, Case Study Surinam), or preferably on a so-called dot map (see Map VIII, Case Study Malaysia), which gives a better overall picture of the actual location of the population.

The current land use and settlement pattern

The only way to collect this information, other than a time-consuming field investigation, is from aerial photographs on a scale 1 : 10,000 to 1 : 50,000, or topographical maps. Photographs will ease the task of interpretation considerably, as from them it is a simple matter to classify the current settlement patterns.

The most important classification criterion is the way in which the population obtains its livelihood. This will generally be reflected in the various forms of land use, which are easily discernible with a little experience (see the case studies of Surinam and Malaysia). From the patterns of access, settlement and land parcels – all elements that can be seen clearly in aerial photographs – a more detailed classification can be obtained. The data on

Regional (Secondary) Centre		Local (Primary) Centre	
Personnel	Buildings	Personnel	Buildings
Sub-branch officer clerical staff teaching staff	Office Elementary agricultural school Storage facilities agricultural produce and supplies	Assistant	Office and warehouse on house School farm Storage facilities agricultural produce and supplies
Foreman	Workshop and warehouse Public utilities Parking areas		Public utilities

land use and the settlement pattern derived from aerial photos can be shown on maps, scale 1 : 50,000 to 1 : 250,000. The older the aerial photos are, the greater will be the need for a complementary field investigation, to check whether any important changes have taken place in the meantime.

The socio-economic services

The places where socio-economic services are present is decided by the buildings, rooms or sites that are used by service units, either continuously or at regular intervals. The types of services that might be considered important for such an inventory can be seen in the legends of Maps III and IX of the case studies. The data on socio-economic services can only be obtained from a field investigation. In carrying out this investigation, the already mentioned aerial photos, but more particularly topographical maps (preferably on a scale 1 : 50,000 to 1 : 100,000) can be of great help.

It is recommended that the survey of the geographical distribution of the existing socio-economic services be carried out jointly with the field investigation connected with the interpretation from aerial photos of the land use and settlement patterns.

The time required for such a survey varies according to the degree to which an area is occupied and to the transport the investigators have at their disposal. Experience has shown that an inventory of the socio-economic services of a thickly populated area of 250,000 – 300,000 hectares can be made within a month. The data obtained from such a survey are usually recorded on maps, scale 1 : 50,000 – 1 : 100,000. For planning, it is essential that all data be ultimately recorded on maps of the same scale, if possible 1 : 100,000 for the working sheets.

The socio-economic structure

The data set forth above only give an impression of the geographical distribution of physical elements within a certain area, such as land use, location of roads, the sites of houses, and where applicable, buildings with a socio-economic function. These are, admittedly, the outward visible indications of a community, but they alone do not provide an adequate insight into the existing socio-economic structure. Therefore, further investigation will be required.

A thorough sociological and socio-economic investigation will usually involve several years of field work. Processing the data obtained will also take some years, as has been learned from experience. This is a very valuable type of investigation, even though its importance is not always fully appreciated. In planning, however, people generally cannot wait for years for the results of an investigation. Hence, brief orientating investigations will have to be carried out so that within a period of four to twelve months an overall picture can be obtained of those aspects of the social structure that are of direct interest to planning.

When a centres plan is being drawn up, one of the most important issues is the relationship between the occupation pattern and the different social groups: the kinship groups (tribe, clan, family), the territorial groups (village communities) and the special-interest groups or associations (coöperatives, marketing organizations).

Of equal importance is the way in which the population makes use of the existing services and what desires they may have for any eventual improvement of the service apparatus.

1. 2.4.2 The future situation

With the data discussed in the previous section it is possible to analyse the present situation in a particular region. The next step in compiling a centres plan is to examine what developments are to be expected and/or encouraged in that region. Here, the different levels of government planning will have to be taken into consideration, i.e. national, regional and local, as has already been mentioned in Section I. 1, Introduction.

Since the centres plan can only be drawn up when a more or less elaborated image exists of the developments expected in a particular region, it is recommended that, if at all possible, the centres plan form part of a regional plan, or be compiled within its framework. Hence, we shall now deal with those components of a regional plan that are relevant to a centres plan.

Future land use map

A regional plan indicates the future development that has been projected in the various sectors, and is based on a great many data concerning the natural resources, marketing possibilities, the expected increase in population, and the position held by the region within the framework of the national development plan. The plan will also show how the

land is to be used in the future. This is recorded on the so-called future land use map (see Maps IV and X of the case studies).

Provided that the various developments are shown in sufficient detail, this map (preferably on a scale of 1 : 100,000 to 1 : 250,000) will give an insight into how the future population will be distributed over the area. The regional plan will also give an idea of the region's total population at the end of the plan period.

Future socio-economic structure

Apart from the geographical distribution of the planned future production apparatus, the regional plan will also have to provide an insight into the future socio-economic structure. With regard to agriculture, this means that the plan will show what types of farms are planned (see Map IV), how the areas reserved for forestry are to be exploited, etc.

The effects that the proposed development will have on the social structure should be indicated in a regional plan, e.g. the diminishing function of tribe or clan and the increasing importance of the nuclear family, territorial groups and associations. This information must be available when a centres plan is being drawn up.

1. 2.4.3 *The compilation of a centres plan*

We shall now go into the matter of how one sets about compiling a centres plan for a particular region, utilizing the principles and guidelines fixed at national level (Section I. 2.3), the analysis of the existing situation (Section I. 2.4.1) and the insights that one has acquired into the planned future situation (Section I. 2.4.2).

Classification of present service centres

It is possible to classify the present service centres on the basis of the map showing the socio-economic services. Table 1 (Section I. 2.3.2, p. 23) gives an idea of how this can be done.

As this classification is based on service units, it will first have to be established what services must be present in a centre before it can be put into a certain category (see Table 12, Case Study of Malaysia p. 124).

Since the different types of centres frequently shade off into one another, a more detailed classification is used than that given in Table 1 :

- additional primary centre
- potential primary centre
- primary centre
- potential secondary centre
- secondary centre
- tertiary centre

With this classification it is possible to indicate the development potential that exists in the present situation, particularly for primary and secondary centres. It is a simple matter to convert potential primary or secondary centres into fully-fledged primary or secondary centres, by the addition of several service units.

If important concentrations of government services on a regional or provincial level occur in more than one centre in an area, a further subdivision of tertiary centres will be required.

Naturally, classifying the centres and subsequently choosing which existing concentrations qualify for the function of future primary and secondary centres is only relevant in a centres plan being compiled for an already occupied area.

Choice of primary centres

In an already occupied area, the next step is to show which of the existing concentrations of service units qualify for the function of a primary centre.

To do this, a circle should be drawn around all the existing centres, with a radius equal to the radius of action of a primary centre (see p. 23). This will indicate where two or more service areas overlap to any great extent. When, as a result of such overlapping, the centres have too few people to reach the threshold of the most important service units of a primary centre, the choice of primary centres must then be restricted to those centres:

- a whose theoretical service areas overlap one another the least,
- b where most of the socio-economic services are already present.

For some centres this will mean a proposed rise in function, in the sense that an additional primary centre or a potential primary centre will be designated as a primary centre. This rise in function will be achieved in practice by establishing in that centre those socio-economic services that are not yet present, but which are necessary if the centre is to become a primary centre.

It may also happen that a decline in function is proposed, for instance, where the function of a potential primary centre will be reduced to that of an additional primary centre in the future.

In practice, such a decline in function can only be brought about gradually. For instance, when renovations or important repairs to buildings are required, it can be decided not to maintain that particular service in its original location, but to transfer it to the centre of the next highest order in the neighbourhood. In some cases, where no substantial investments have been made in buildings or grounds, the services can be transferred within a fairly brief period. The social and political consequences of such a decline in function are dealt with in Section I. 3.5.

Once it has been fixed which of the existing centres are to fulfil the function of primary centre within the framework of the centres plan, a check should be made to see what areas are not covered by the theoretical service areas of such centres, or in other words, which areas qualify for the establishment of new primary centres.

This may concern areas on the old land, that is to say, areas already occupied but far

removed from existing centres, as well as, of course, those areas that will be occupied in the future, the so-called new land.

The location of primary centres on new land should be chosen in such a way that:

- a the future occupied area is covered by theoretical service areas, while overlapping is avoided as much as possible,
- b sufficient population is present in each service area, or will be present in the future in view of the planned development, to satisfy the threshold requirements of the most important services that belong in this type of centre.

Choice of secondary centres

Choosing the sites for secondary centres is done in the same way as for primary centres. First a check is made as to how the area to be served (old and new land together) is covered by the theoretical service areas of existing potential or fully-fledged secondary centres.

From the general picture thus obtained, it can be decided which of the existing potential or fully-fledged secondary centres (which have already been designated as primary centres) will also fulfil a secondary service function in the future. Here, just as with primary centres, proposals will have to be made whether functions should be raised or lowered. After that it can be established what new secondary centres will have to be set up in order to cover the whole area concerned with theoretical service areas of secondary centres.

Choice of tertiary and other centres

In already occupied areas, tertiary centres will, in general, already exist, and when a centres plan is being drawn up, this must be considered as one of the data. It is only in compiling a centres plan for very large areas, as yet unoccupied, that the problem will arise of having to introduce new tertiary centres.

In deciding the location of this type of centre in new areas, or in proposing a rise in function from secondary centre to tertiary centre, one must always bear in mind the national framework within which the centres plan must be accommodated. The same applies in those cases where large centres with a supra-regional sphere of influence have to be taken into account. In view of their own particular problems, these large centres demand a special study, which does not, however, come under the heading of a centres plan.

Outline of the future road network

Once the future land use and the system of centres based on it has been established, it can then be indicated how the existing road network will have to be adapted or extended. This should be done on the basis of the relation between the centre and the road network, as given in Section I 2.3.4. For the practical application of this method, the reader is referred to the case studies (Maps V, VI and X).

What issues from a centres plan elaborated at regional level

The planning activities dealt with above result in a map showing the centres and the road network (see Maps V, VI and X). It is recommended that, if possible, working maps on a scale of 1 : 100,000 be used during the preparation of the centres plan. The final maps incorporated into the centres plan will in most cases have to be on a smaller scale, 1 : 250,000. Once all the data have been obtained, a centres plan for an area with approx. 300,000 persons can usually be compiled within one to two months. A centres plan will usually form part of, or be closely related to, a regional plan and the map of centres and roads will be a component part of this regional plan.

In literature devoted to planning, regional plans are sometimes called strategic or general framework plans, that is to say, these plans indicate the general direction in which the planned process of development is to proceed. They do not usually indicate, however, exactly how the various projects mentioned in the regional plan are to be realized.

The map mentioned above gives a rough idea of where the various types of centres should be established and, broadly, what the road network should be, but it does not indicate the exact position of new centres, nor the way in which old centres are to be expanded, neither does it indicate in detail the number and the size of the various services.

How the centres plan can be further elaborated at local level (the third part of the relation model) will be dealt with in the following section.

I. 2.5 GUIDELINES FOR CENTRES PLANNING AT LOCAL LEVEL

Once it has been established: a. which existing concentrations of service units are to function as centres in the future, and what new centres are proposed, and b. the location and service level of the centres, one can move on to further details of centres planning.

In the first place, this will consist of deciding more precisely the site of a new centre, or how an existing centre is to be expanded. Next a more detailed prognosis is made as to the population and economic activities that can be expected in a centre in the future. From this, an estimate can be made of the number, size and type of service units which, with an eye to the planned development, should be accommodated in the centre. Finally, the question of the town plan for the centre has to be dealt with.

The type of planning that shows in more detail how a new centre is to be realized, or an old one expanded, is called local planning. Yet even this type of planning is not sufficiently detailed for direct implementation. Before the construction of roads, houses and public buildings can begin, project planning will have to be carried out. We shall not go into project planning here, as this is usually a purely technical matter. In the following section we shall devote our attention to local planning within the framework of compiling a centres plan.

I. 2.5.1 *Deciding on the definite location of a centre*

In deciding on the definite location of a centre the following factors will have to be kept in mind:

a soil and topography

A detailed investigation into the topography and the condition of the soil should first be made in order to establish the technically most suitable building sites. A site should preferably be chosen where there is no risk of flooding and where the condition of the soil is such that no unnecessarily high costs will be involved in the foundations of the buildings.

b accessibility

The centre should be readily accessible from all points in its service area. Primary and secondary roads should preferably go round the centre and not through it (see Fig. 4).

c existing services

On the old land the centre should preferably be located where a certain concentration of service units already exists. These existing units should be embodied harmoniously into the new centre.

d landscape aspects

The centre should be situated as aesthetically as possible in the landscape. Topography, rivers, vegetation etc., are important factors.

1. 2.5.2 *Estimating the future population in the service area of a centre*

Before deciding on the nature and size of the services to be placed in a primary centre, an estimate will have to be made for each individual centre as to what the population figure of its service area will be in the future.

A distinction can be made between:

a the present population figure

That is the number of inhabitants present at the time of planning.

b the optimum population figure

That is the number of inhabitants that may be expected when all the development potentials in a service area have been realized. This figure is usually the one taken into account when the town-plan of a centre is being drawn up.

c the maximum population figure

It may happen that at the time when plans are being drawn up for a centre, its present population figure already exceeds the optimum. In such a case, one can speak of an economic over-population. One can hardly expect that this population will immediately start decreasing. In general, allowance will have to be made for a certain increase. In such circumstances one may assume a maximum population figure – which will, of course, usually be arbitrary – to serve as a starting point in compiling a town-plan.

Estimating the optimum future population in the service area of a primary centre
It will now be shown how the optimum population in the service area of a primary centre

can be determined. It should be made clear that this method of estimating the population will only serve in areas where the people are mainly engaged in agriculture.

When the word 'population' is used from here on, this means, unless otherwise indicated, the entire population. If the number of economically active persons in a certain sector is known, to this must be added the number of those not actively engaged in the economic process but dependent, via the breadwinners, on its results.

The estimate of the future population is made sectorwise:

1 Agriculture and animal husbandry

For those centres whose entire service area is marked by one and the same type of farming, one estimate will suffice for the whole area. If there are areas within a service area which differ from one another as far as the agricultural land use is concerned, a separate population prognosis will have to be made for each of these areas.

If the service area is composed of various census units, these can serve as a starting point for an estimate of the future agricultural population. For each census unit, it can be established what acreage is suitable for agriculture and in what way that acreage will be used. This information can be obtained from the land use map.

A portion of the acreage suitable for agriculture (A_a) will have to be used for roads, irrigation and drainage canals etc. This usually takes up 10-15 % of the agricultural acreage, but it can differ from place to place.

An insight into the structure of the agricultural production apparatus will also have to be obtained. Is the area cultivated by large or small holdings? What are their areas? How many workers are required per area unit? In an area of small holdings the average size will suffice (A_f).

From the demographic data collected at regional level (Section I. 2.4.1) the average size of a family (F_s) can be calculated. On the basis of this information, it is possible to calculate the agricultural population (P_a) using the following equation:

$$\frac{A_a - \frac{\alpha}{100} \cdot A_a}{A_f} \cdot F_s = P_a$$

The significance of the symbols used in this equation are as follows:

A_a	=	Area recommended for agricultural use
α	=	Percentage of area occupied by roads, etc.
A_f	=	Average farm size
F_s	=	Average family size
P_a	=	Agricultural population

2 Fishing and Forestry

Methods of estimating for these two sectors are less simple. Estimates of the population

earning its livelihood from fishing and forestry will have to be made on the basis of the local situation, the land use plan and an estimate of the development of local fishing and forestry. The population engaged in fishing will be shown as (P_{fi}) and that engaged in forestry as (P_{fo}).

3 Mining

This will, of course, only be met with in certain centres. When it does occur, a separate estimate of the entire population of such a centre will have to be made, based on the developments expected in mining. These are usually very difficult to predict.

In cases where mines are exploited by private enterprise, the mining companies often take responsibility for the socio-economic services for the mining population (P_m), especially when the mine is located in a remote district. In such cases the service sphere of the centre will be limited to the population that is directly or indirectly involved in mining.

4 Industry

Here, too, it is difficult to estimate the future industrial development per centre. However, if industries of any considerable size are expected in a district, these will usually not be established in a primary centre of an agricultural area. Nevertheless, to round things off, the population engaged in industry will be shown as (P_i).

5 Services sector

In agricultural areas it may be assumed that the population providing services (P_s) is a fairly constant percentage (β_1) of the agricultural population. It is usually estimated to be 15-20 %. In areas where the population earns its livelihood from mining and industry, this percentage (β_2) is considerably higher. The coefficient β_2 will have to be based on empirical data.

The estimate of the total optimum population in primary centres (P_{top}) can now be made, using the following equation:

$$(P_a + P_{fo} + P_{fi}) \cdot \left(1 + \frac{\beta_1}{100}\right) + (P_i + P_m) \cdot \left(1 + \frac{\beta_2}{100}\right) = P_{top}$$

The meanings of the symbols used in this equation are as follows:

P_a	=	Population in agriculture
P_{fi}	=	Population in fishing
P_{fo}	=	Population in forestry
P_i	=	Population in industry
P_m	=	Population in mining
P_{top}	=	Optimum total population in primary centres

- β_1 = Population providing services as percentage of the agricultural population
- β_2 = Population providing services as percentage of the mining and industrial population

Example of how the prognosis of the population of a primary centre is made
 We have the following data at our disposal:

The administrative service area consists of 6,000 hectares, 1,500 of which are unsuitable for agriculture but will be used for forestry. Fifty male workers will be employed in forestry. Of the area suitable for agriculture, 10 % is needed for roads and canals. Small-holdings (I), amount to 3,000 hectares, with an average farm size of 5 hectares. Large-holdings (II) amount to 1,500 hectares. Large-holdings employ one male worker per 10 hectares. It is estimated that 40 male workers will be employed in fishing.

No mining or industry is expected in the area.

The average family size for all groups is assumed to be five persons.

The population providing services amounts to an average of 15 % of the agricultural population.

The future optimum population is estimated as follows:

Agricultural population in I:

$$\frac{3000 - 3000 \times \frac{10}{100}}{5} \cdot 5 = 2,700$$

Agricultural population in II:

$$\frac{1500 - 1500 \times \frac{10}{100}}{10} \cdot 5 = 675$$

Population dependent on forestry

$$50 \times 5 = 250$$

Population dependent on fishing

$$40 \times 5 = \underline{200}$$

$$\text{Total agricultural population} \quad 3,825$$

The optimum population in the area amounts to:

$$3825 \cdot \left(1 + \frac{15}{100}\right) = 4,399$$

Estimate of the future optimum population
in the service areas of secondary centres

This figure is determined by adding the estimated optimum populations of all the service areas of local centres together, plus the regional service population (P_{sr}). The percentage of the total population constituted by the secondary service population (β_3) will have to be fixed empirically on the basis of demographic data obtained at national or regional level. In Surinam it was found to be 5 %.

The population can then be estimated by means of the following equation:

$$P_{10s} = (P_{c1} + \dots + P_{cn}) \cdot \left(1 + \frac{\beta_3}{100}\right)$$

P_{10s} = Optimum total population in the service area of a secondary centre

P_{c1} = Population of primary centre 1

P_{cn} = Population of primary centre n

β_3 = Population providing regional services as percentage of total population to be served.

In estimating the population of secondary service centres, the margin that must be maintained is higher than with primary centres, since in secondary centres it is often difficult to estimate the developments expected in the industrial or service sectors.

The estimating method given above is admittedly rough. Nevertheless, it is questionable whether a more refined technique is worthwhile when, in general, only incomplete or not very reliable data are available. It can be said that the tentative estimate of the future population in primary and secondary service areas bears a strongly speculative character. The advantage of using this estimating technique, however, is that the planner is forced to indicate clearly what premises he has taken as his starting points and how he has used them. In this way the estimate can be revised quickly and effectively as soon as better data become available.

Nevertheless, it is recommended that as better data become available and more insight has been gained into the possibilities for development in the service areas of the various centres, more refined methods of estimating be applied.

As the standards for service units are usually given per 1,000 or 10,000 persons, rounding off the estimated populations in thousands is admissible.

1. 2.5.3 *Estimating the number and scope of the services in a centre*

Once the future population has been estimated and the standards for the various socio-

economic service units have been fixed, it is a simple matter to calculate the number and size of the services desired in a centre in the future.

When, for instance, the standard for the police apparatus is one policeman (P_{om}) per 2,000 persons, a primary centre with 4,000 persons in its service area will need two policemen. Or expressed in an equation:

$$P_{om} = \frac{P_{top}}{\gamma}$$

P_{om} = policemen
 γ = No. of policemen per 1,000-10,000 inhabitants
 P_{top} = Optimum total population in service area of primary centre

For the Department of Education, the need for class rooms and teachers in primary centres can be calculated with the following equation:

$$\frac{P_{top} \cdot \frac{P_{ps}}{100}}{X} = T = C$$

where:

P_{top} = Optimum total population in service area of a primary centre
 P_{ps} = Primary school population as a percentage of total population
 X = No. of children per class and teacher
 T = Teachers
 C = Classrooms

Equations can be drawn up in this way for all relationships between the various services, the optimum future population and the recommended land use of service areas of centres. This means that part of the relation model for compiling plans for the spatial structure of the services apparatus can be worked out to a mathematical model.

The usefulness of a mathematical model

One might ask whether there is any point in elaborating further on the possibility of compiling a mathematical model to establish the number and scope of services in a centre. Just as the relation model performs a useful function in the analysis and comparison of complex phenomena, so also can a mathematical model lead to a deeper insight into the nature of the relations that are only indicated in general terms in the relation model.

Immediately a relation is expressed in an equation, it must be fully appreciated exactly what the substance of this relation is. At the same time, consideration must be given to what quantitative aspects are bound up with such a relation.

Within the framework of the centres plan, this means, among other things, that one is compelled to formulate clearly the standards which are used as coefficients for the equations. This provides a number of advantages for the practical course of action.

Once the guidelines and standards have been clearly set out in the form of a model, plan activities acquire a greater transparency. It can immediately be seen what part of the plan is being dealt with and how this is connected with other activities going on within the framework of the centres plan, or with those activities that still have to take place.

It also makes it possible to sum up the consequences quickly when it becomes necessary to adapt certain guidelines or standards because of special circumstances. For instance, it is easier to check what variations there will be in investment and exploitation costs under conditions where it is necessary to deviate from the established standards, such as the difference in cost of the services apparatus between very sparsely populated areas and densely populated areas.

Because one has a clearly set out mathematical model at one's disposal, alternative proposals can be put up for consideration at short notice. Also, if experience or new data obtained from investigations should make it necessary to make a change in the standards or guidelines, an insight can quickly be gained into the effects this will have on other standards and guidelines and possibly on the model itself.

With the aid of a model the entire set-up of plan activities can be readily understood, thus providing more opportunity of studying the plan process itself and of introducing any necessary improvements into it systematically.

It has been learned from experience that a certain resistance exists on the part of departments responsible for placing social service (Public Health, Education, Social Welfare) towards coöperating in the matter of compiling relation and mathematical models. Part of this resistance is due to the fact that they fear that such a model will not be handled flexibly enough. Added to this is that through the improved perception of the whole, the officials will be in less of a position to make arbitrary decisions.

Social services are often placed on the basis of personal experience which, however important this in itself may be, should still be systematized and tested if it is to provide a positive contribution to planning.

Further, emotional arguments often play a role in, for instance, the placing of a clinic or school. In many countries it has only been possible up to now to get services established at the lower administrative level on the basis of fairly general, hard to grasp, arguments. The existence of a model means that a more precise argumentation is forced, while at the same time the model gives a clearer insight into costs and alternatives. That this, in fact, does mean a certain loss of freedom of action on behalf of these departments cannot be denied, but should not be considered a disadvantage.

The fear that particularly when a mathematical model is introduced the flexibility of the policy of placing services will be affected is often not entirely unjustified, in view of the tendency of the administration towards a fairly inflexible interpretation of precepts and criteria. For this reason it is once more explicitly stated that such a model should only be regarded as an expedient, allowing all the component activities within the framework of a centres plan to be presented in an orderly fashion and thus to arrive at more efficient procedures.

One must be constantly on one's guard not to be misled by the strongly simplified version of reality presented by a model. The results obtained through the use of a model will constantly have to be tested against the extremely complicated reality.

The model, in both its relation and mathematical forms, is a useful aid if applied with care. It is therefore recommended that this method be studied and elaborated further.

1. 2.5.4 *Guidelines for the physical planning of centres*

The objective of the system of guidelines presented in this section is to bring about a harmonious spatial structure (town plan) for the services apparatus in primary and secondary centres.

When the site of the centre has definitely been fixed, (Section I. 2.5.1), when the type and number of the population to be served are known (Section I. 2.5.2) and on that basis and with the aid of the standards (Section I. 2.5.3), it has been calculated what services are to be placed in a centre, a start can be made in drawing up plans for the spatial structure of the centre. This task is usually assigned to the architects of the government's Town and Country Planning Department.

In setting up a centre, the types of service units to be placed must be kept in mind and the demands they make of their immediate vicinity. A school, for instance, should not be built on a trunk road. A fish market should not be situated to windward of a polyclinic, or in a residential quarter.

The elements (houses, service units, industries, roads, parks etc.) which form the centre must be placed together in such a way that they form one harmonious whole; that is to say, in view of their functions, they should be placed as logically as possible with regard to one another and all of them together should present an aesthetic and socially justified entirety. For this reason, in accordance with their character, the service units are brought together in quarters.

a The services quarter

This consists of two poles: firstly, the social services, such as school, polyclinic, church, mosque or temple, community house and sports field; secondly, the economic services such as shops, storage facilities, market etc. The two poles should be located close together, but should not form a hindrance to one another in any way. This services quarter will be the most important part of primary and secondary centres in an agricultural area.

b The industrial quarter

Although large industries will seldom be found in primary and secondary centres, those activities connected with the processing of agricultural products must be taken into account, e.g. rice husking, copra drying, oil pressing etc. Apart from these, space must be

available for garages, repair shops and other service units which, in view of their character, can best not be located in the services quarter.

Space must also be reserved for public utilities, e.g. a power station. These utilities generally require a great deal of space and as a result of the noise and/or the air pollution they cause, can be an annoyance to their immediate surroundings.

These services are therefore brought together in a quarter which, if there is a prevailing wind, is preferably located to leeward of the centre. If possible, this quarter should also be accessible to heavy traffic.

c The residential quarter

The residential quarter will preferably be planned upwind of the centre. The size of this quarter will be determined largely by the character of the centre's residential function (Section I.2.3.1 page 18).

Although the various quarters are separate from one another, they should combine into one organic whole. The service units must be easily accessible to the inhabitants of the service area.

Apart from placing the social service units so that they provide their services in the best possible way, the social, socio-psychological and religious aspects of the community must also be taken into account, as these often place very specific demands on the character and particularly the location, of services in their relation to one another. For instance, in an area inhabited by both Hindus and Moslems, a beef abattoir built on one of the main approach roads to the centre would be irresponsible. In drawing up the plan for a centre, the types of houses that the inhabitants are used to building for themselves must be kept in mind as far as they effect the manner in which the residential quarter is laid out.

The importance of form, even for small centres, should not be underestimated. In many countries, town planners are so occupied with the problems of urban centres that they give scarcely any attention to the small agricultural centre. Moreover, it has been found that when plans are being drawn up for agricultural centres, urban standards are often applied. More thought should be given to the questions of town planning for small centres in developing countries in view of their great number and the fact that a large proportion of the population is dependent on these centres for its services.

In compiling land use plans for centres, the disadvantage will keep cropping up for some time to come that only limited data of doubtful reliability are available. In this respect, it will have to be realized that a great deal of uncertainty exists, particularly with regard to those services provided by private individuals. The centres, therefore, should be set up in such a way that for as long as possible a great measure of flexibility is maintained.

The land use plan should therefore be elaborated in such a way that it indicates:

- a how the centre will look when it is geared to serve the optimum population.
- b which part should be set up immediately so that the service apparatus can meet the needs of the present population and those expected within a short space of time.

c what possibilities there are for expansion in case the optimum population is exceeded. Each of these phases indicated in the land use plan will have to be elaborated in such a way that if the development of the centre does not progress further than the first or second phase, the centre is still complete in itself.

A schematic land use plan for a new primary centre is shown in Fig. 4.

It is clear that applying the above-mentioned guidelines will demand a great deal of imagination and resourcefulness on the part of the town and country planner.

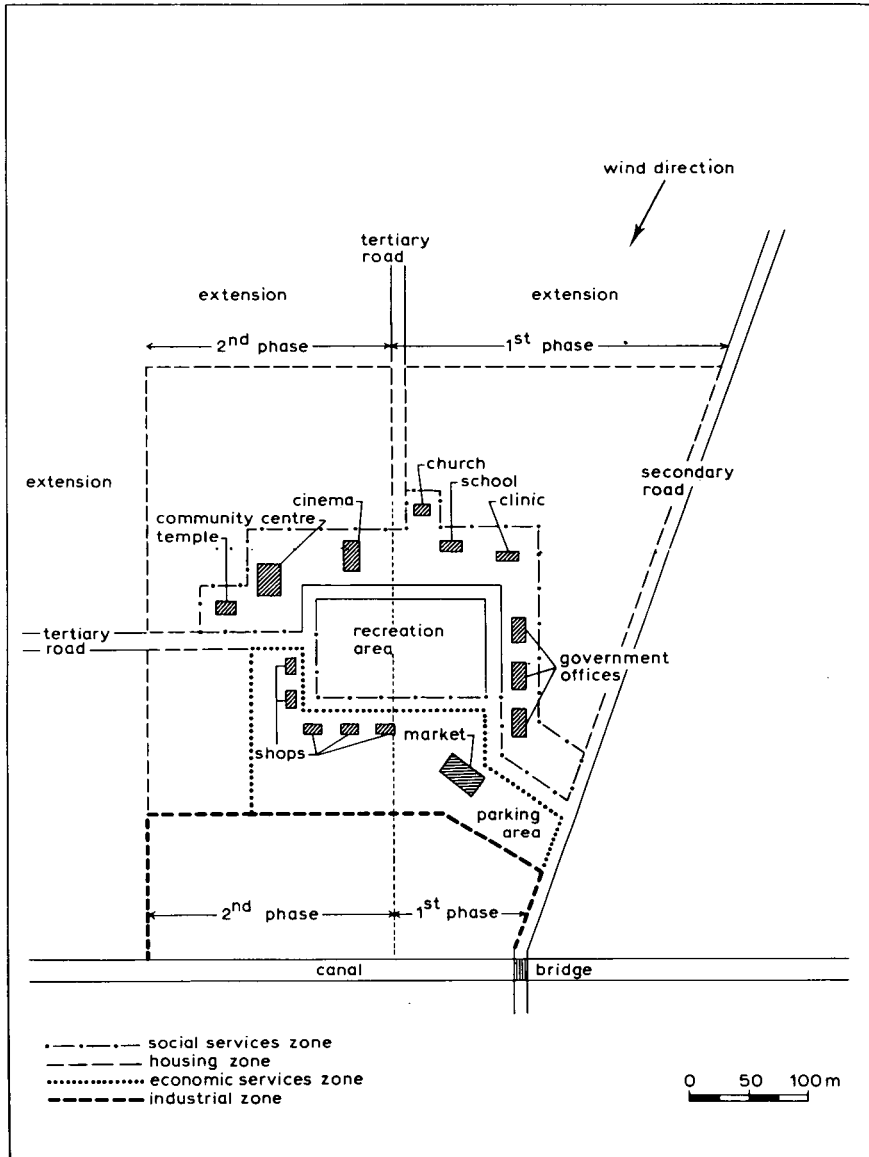
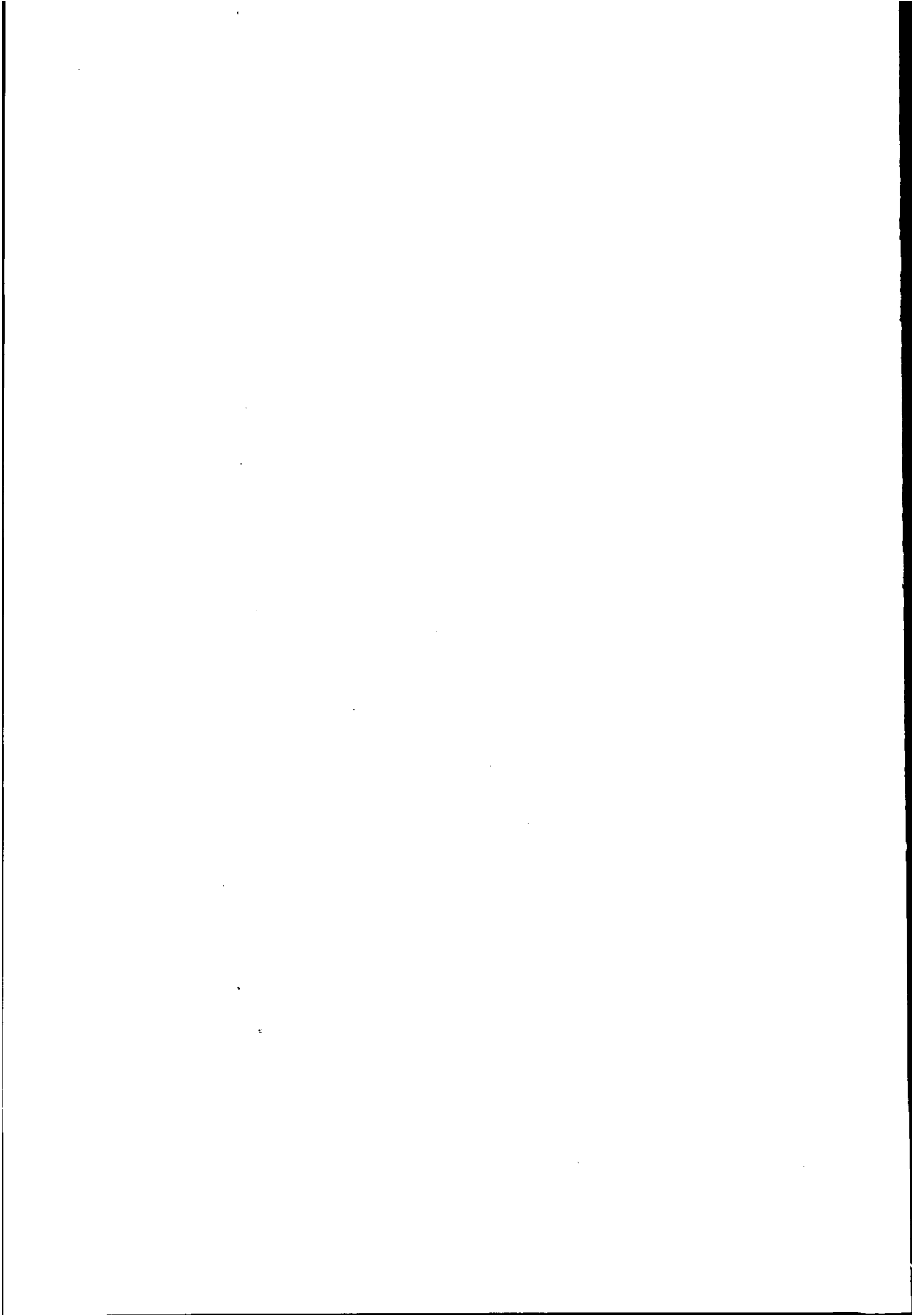


Fig. 4 Schematic town plan for a new primary centre



I. 3 IMPORTANT PROVISIONS FOR IMPLEMENTING A CENTRES PLAN

I. 3.1 INTRODUCTION

Chapter 2 presented a system of guidelines (a model) indicating how to go about compiling plans for the spatial structure of a modern services apparatus.

Compiling plans, however, is only one of the many activities that have to be performed if a certain development is to be achieved. Many plans, good in themselves, have failed in developing countries because of insufficient attention to details and, more particularly, because of inadequate support and supervision during the execution of the plan.

Once centres plans have been drawn up, their execution is usually no longer in the hands of one authority, and the coördination of the simultaneous activities of many different authorities forms an important aspect of the execution of the plan.

It is, of course, impossible to indicate in detail how a centres plan should be implemented. This is determined by the social, economic, political and administrative aspects of the situation within which a centres plan is to be carried out.

There are, however, several matters which almost always play an important part in the execution of a centres plan and which, if not settled satisfactorily, can seriously endanger the entire operation.

I. 3.2 THE POLICY OF LANDOWNERSHIP IN THE CENTRES

In implementing a centres plan in an area where a new centre is to be established or where an old centre is to be expanded, the planners must have land at their disposal. In new

areas which have been reclaimed at government expense, this will not usually constitute a problem. Nevertheless, it may happen that, for instance, the Ministry of Agriculture raises objections to areas being withdrawn from agriculture for the purpose of building a centre.

More serious problems, however, may arise in obtaining sufficient ground in areas that are already settled. If the centres plan has been accepted in principle, the government should as soon as possible ensure its right of disposal over those areas considered necessary for the establishment or expansion of centres. In countries where land is predominantly privately owned, it must be assumed that land speculation will lead to a considerable rise in the price of land around the centres.

How this right of disposal is to be obtained depends on the social and political situation. It may be done by purchase, by expropriation or, preferably, by a regulation laid down by law giving the authorities far-reaching powers on the ultimate land use in a centre.

Where land for future building can only be obtained through purchase or expropriation with compensation, substantial funds will have to be available. On the other hand, the authorities can expect considerable revenues at a later date when these lands have been parcelled out and are sold or leased as building sites.

These revenues will usually exceed the often substantial costs that have to be made.

It has been found that local centres as a rule require about 20 hectares, and secondary centres about 40 to 60 hectares. These figures may, of course, be subject to variation, depending on the number of people who will make use of the centre's residential function and on the distribution of the buildings.

Not having disposal over the land in good time often leads to the services being placed arbitrarily. In such cases schools and clinics may be found outside the population concentrations in places where land could be bought cheaply. This will usually impair the efficiency of the services and make any principle of concentration impossible.

I. 3.3 LEGAL ASPECTS

The centres plan can only be realized by effective combined action between government, private enterprise and the population. If this teamwork is to come into being, a number of rules will have to be laid down to which government, private enterprise and the population must adhere.

If observance of these rules is to be ensured, or if necessary enforced, they must be based on statutory provisions.

It is therefore important that a check be made as to what new laws must come about and what existing laws may have to be adapted to guarantee that the plan be carried out smoothly and that an effective occupation and use of the centres, be realized.

I. 3.3.1 Legislation on town and country planning

The regional land use plan

In the regional plan, a lot of attention is usually given to the future land use. Certain areas are earmarked for agriculture in its various forms. Some parts of the existing forest area are intended for exploitation, while others are reserved as protective forest for the prevention of erosion. Areas with an important tourist potential must be safeguarded against any destruction of their natural beauty.

Drawing up regional land use plans, however, will be of little use if the authorities have no means of dealing with any persons not adhering to the planned and fixed land use, through which, for instance, the risk of erosion may occur or the potential development of tourism is threatened. It is therefore recommended that at least part of the land use plan be fixed by law and that at the same time provision be made for any action that could be taken against those who, through improper occupation or exploitation, are endangering the land use in these areas.

The land use plan for the centres (Town Plan)

This plan is considerably more detailed and shows which areas are destined entirely for public use (roads, canals, parks etc.) and which are intended for building sites. Four types of built-up areas can be distinguished:

- 1 Sites intended for buildings or open spaces with a social or administrative service function: schools, sports fields etc. (1st Order).
- 2 Sites intended for housing (2nd Order).
- 3 Sites intended for buildings or open spaces with an economic service function: shops, markets, storage facilities etc. (3rd Order).
- 4 Sites intended for buildings with an industrial purpose: rice mills, sawmills, factories etc. (4th Order).

It is very important that the spatial divisions indicated in the land use plan be adhered to if the plan is to be a success. A factory with a great deal of noise and air pollution in the midst of a residential quarter or social service units can seriously impair the function of these service units and consequently the entire centre.

Once the land use of a village has been decided, it can be fixed by law in two ways:

- a it can be stipulated that the land may only be used as indicated in the plan; this is called 'exclusive land use' (U.S. Department of Agriculture, 1958).
- b the various forms of land use can be given a certain order of rank, as has been done above, and it can then be stipulated that in an area where the land use has been decided, service units of a higher order (e.g. 1st Order) may be placed, but not of a lower order (e.g. 4th Order). This means that housing may occur in the industrial quarter, even though this is not very desirable, but that industrial establishments would not be tolerated in the midst of the social services. This so-called 'cumulative land use' is usually

preferable in developing countries in view of the fact that it provides a greater flexibility during the implementation.

Zoning ordinances

Zoning ordinances are primarily intended to guarantee the projected effects of town and country planning. If, however, zoning is applied too rigidly, there is a risk that it will restrict the scope of activities in the private sector, through which the development of the area will be impeded rather than stimulated.

No matter how much care and discussion go into the compilation of land use plans, it is conceivable and even probable that objections will arise from the private sector. These private individuals must then be given the opportunity of expressing their objections to the proposed land use plan, and should their claims not be admitted in the first instance, they should be able to appeal against such a decision.

What consequences this method will have from a judicial and administrative-organizational point of view, and which bodies will be entrusted with this task, will differ from country to country.

Since this can concern substantial interests, both public as well as private, sufficient attention should be given to the matter of preparing legislation in this field and to the way in which it is to be put into effect.

Amongst the items that must be kept in mind are that legislation and the government's capacity for control fit in with one another. Theoretically good legislation which cannot be put into effect undermines the authority of the government and contributes nothing at all to development.

The foregoing, however, does not mean that a passive policy is recommended. In situations where town and country planning is required, the enactment of legislative measures and the set-up of an adequate control mechanism should be actively promoted.

1.3.3.2 *Further legislation and the policy of granting permits*

There are numerous ordinances in force in most urban centres, which are essential to the orderly process of socio-economic life. One thinks of building ordinances, comprising regulations on the construction of houses, their appearance, their position on their lots etc. There are usually also statutory regulations on public health, water supplies etc. If such legal provisions exist for urban centres, it will have to be checked in how far these are applicable in the smaller centres (primary and secondary) in the countryside. It may happen that separate provisions will have to be fixed for these centres.

In bringing about a rational structure of the socio-economic services provided by the private sector, the government can exert great influence through its policy of controlling the opening of new businesses. Before a private individual can begin setting up and exploiting any kind of business, such as shops, services of various kinds, industrial esta-

ishments, he should have a permit in his possession. When permits are being issued, it is desirable that, without imposing too many restraints on private initiative, the spatial aspect should be kept in mind.

The success of a centres plan is partially dependent on the readiness on the part of the private sector to set up its services in the centres. First and foremost an attempt will have to be made to obtain this coöperation voluntarily by creating attractive establishment conditions in the centres. Any attempt to force the concentration of services provided by the private sector will, in general, not meet with much success.

If interest in the establishment of services in a centre is lacking, this may indicate that the centre does not satisfy the desired conditions for establishing these services. However, it has been proved that a well-managed policy of permit-granting can, to a great extent, contribute to the setting up of vigorous centres.

I. 3.4 ADMINISTRATIVE ASPECTS

The establishment or expansion of a centre will involve many government services. It is always best if one body be given the responsibility of seeing that these plans are carried out. In most countries the Public Works Department would qualify for this task as far as the physical aspects are concerned. If there is a separate department for town and country planning, the coördinating activities could be entrusted to it.

Drawing up a programme for the preparation of building sites and the construction of buildings in the centre

In consultation with the different departments responsible for the socio-economic services, a building plan covering a span of several years should be drawn up. Once this programme is known, it can be decided when and where sites are to be opened up and made ready for building.

In some countries the cost of such activities comes under the estimates of various departments. When this work is carried out under a centres plan, difficulties can arise. It is recommended that the cost of opening up and preparing for building of those sites intended for socio-economic services be brought under the budget of one department, e.g. the Public Works Department. This item must be fixed each year in such a way that it is possible to prepare those parts of secondary, primary and additional primary centres which qualify under the previously compiled building plan.

Effective coördination and, in some cases, an alteration in the mechanics of budgeting are necessary if the execution of the centres plan is to proceed smoothly.

Public utilities and communications

These two items are vastly important in the matter of good living conditions. Once the future structure of the services apparatus of a country or region is known, the depart-

ments responsible for electricity, water supplies, telecommunications and public transport – in consultation with the authority in charge of coördinating the centres plan activities – can proceed to draw up their plans. Since the growth of many centres is, to a large extent, decided by the availability of public utilities and effective means of communication, it is recommended that the centres be provided with such facilities as soon as possible.

Areas of competence

When the administrative service areas were discussed in Section I. 2.3.3, it was recommended that the areas of competence of various service institutions (school, medical aid, administration, agricultural extension etc.) coincide as far as possible with the service areas of primary and secondary centres. This is important not only for administrative coördination, but also for socio-economic integration.

I. 3.5 SOCIAL ASPECTS

In view of the close relationships that exist between the rural community and its service apparatus, it is necessary that when the centres plan is being implemented sufficient thought be given to the social aspects. The centres plan can, moreover, play an important role in government social-development programmes. Some of these social aspects, therefore, in so far as they are important to a centres plan, will be discussed briefly below.

The centres plan must be in keeping with social reality
A centres plan that has been put into effect provides a material framework for the socio-economic services apparatus. The spatial planning of this apparatus is attuned to the planned development, and for this reason the development will be advanced by the operation of the new or reconstructed services apparatus. However, this will only be the case if the new structure is accepted by the rural population. When a centres plan is being drawn up, one must be on one's guard not to think only in terms of the future, with the result that a services apparatus is proposed and perhaps partially realized, which the population will not, or at least not yet, accept. On the other hand, there is the risk that if one conforms too closely to the present situation, a structure may be created which will in the long run hinder development. It is the planner's difficult task to ally himself with social reality on the one hand, and on the other to introduce new developments.

Introducing the centres plan to the population

As many parts of the service apparatus are vital to the every-day needs of the people – one only has to think of education and public health – any changes to be made in this apparatus will constantly occupy the centre of attention.

In general, one will only be able to get such changes put through successfully if the people have been thoroughly informed of the new developments beforehand, and if at all possible, have been convinced of the practical value of these changes. This means that plans – and particularly those concerning primary centres – should be put to the people and discussed with them, and that, as far as possible, their desires or objections should be taken into account.

This may seem, at first glance, a very time-consuming affair which will delay the implementation of the plan. If, however, it should turn out later that the proposed plan for, for instance, a raising or lowering of the function of certain centres (Section I. 2.4.3) is not accepted by the population, considerably greater delays will then occur, while there is also the risk that the services will completely fail in their objectives. A proposed lowering of function of an existing centre will usually meet with very definite objections, for although in most cases it means that the quality of the services will perhaps be raised for most of the population, at the same time the distance from these services will be greater for a proportion of the population.

It is, however, advisable to time these discussions with the population well; the planner should not turn to the people too soon. If the desires of the population are sounded too early in the process, many ideas will be put forward which are impossible to fulfil. When it later appears that they cannot be realized, unnecessary frustrations will result.

Only when the planner has a clear picture in his own mind of what can and should be done in view of the expected developments, should he present to the people a concrete and, to them, intelligible plan. If it should be clear from the ensuing discussions that certain desires cannot be met, this will provide useful pointers for the policy of extension to be carried out prior to and during the execution of the centres plan.

The modernization of the rural community

New organizational forms (coöperatives, farmer, associations, irrigation boards etc.) will usually have to be established for the development of agriculture, as the old social institutions are no longer adequate.

Along with this, the phenomenon of enlargement of scale presents itself in all countries (see Chapter I. 1), which makes, or will make, small agricultural hamlets unsuitable to serve as a centre for socio-economic services.

The proposals for the future spatial set-up of the services apparatus, discussed in Chapter I. 2, take these matters into account and will thus help support the future development. But a new framework for the spatial distribution of socio-economic services will only encounter resistance unless numerous organizations work towards the modernization of the community itself. Changes in the physical and social structures must be attuned to one another, or to put it another way, the areas of interest must be gradually enlarged so as to coincide with the areas of competence of the most important service units (see Chapter I. 2.3.2).

Building up communities on new land

On the new land, where no obstructions from an existing service apparatus stand in the way of drawing up and carrying out a centres plan, the new physical structure can be used as an opportunity to create modern agrarian communities. Such communities, however, do not simply come into being by placing people in an entirely new environment. Here, too, planning for a new infrastructure, in the broadest sense of the word, and the execution of such plans, will have to be closely accompanied by social planning and its execution.

Drawing the population into the development and management of their own area

A centres plan approaches the question of the development of local and regional agricultural communities from the aspect of the provision of services. The aim of a centres plan, however, is not only to create a coördinated apparatus of decentralized services through which the population, even in the most remote parts of the countryside, comes under the care of the government; it also endeavours to bring the services apparatus within the sphere of interest of the local and regional population. If in the long run, however, the people are to feel that the services offered belong in their own system, and if they are to acquire a sufficient sense of responsibility of their part in promoting local and regional interests, a further expansion of the social and organizational structure is essential. It will then become possible to create local or village councils to which the management and maintenance of the services apparatus can be delegated.

Integrating heterogeneous rural communities

In many countries, living in one and the same agricultural area are groups which differ as to race, culture, religion, tribe or language. One of the most important objectives of the government of such countries is to bring about integration in such communities. This integration, however, cannot be forced. The concentration of service units used by all groups, even though they perhaps live separately on the land, may be the first step in their getting to know and appreciate one another. But here too, the fact remains that the physical structure of the services apparatus is only a means, not an end, and that it will have little effect without social development and integration programmes; such programmes can be supported by the centres plan and they, in their turn, can support the centres plan.

The above has indicated only a few of the aspects of a social development programme that can be aided by a centres plan. At the same time, the fact has emerged that a centres plan, in its turn, is partly dependent on such development programmes if its execution is to be a success.

The question arises as to whether the governments of developing countries will be in a

position to perform all the coördinated activities set forth in the previous sections as being desirable. In some countries it will undoubtedly be quite some time before such a situation can be realized. There are other countries, however, which are far advanced in this respect. But no matter what a country's capacity to coördinate may be, it can only begin to coördinate when a clear insight has been obtained into the many relationships between the different types of development programmes. It is for this precise reason that so much thought has been devoted to pointing out the existence of connections and relationships.

PART II

CASE STUDIES

II. 1 INTRODUCTION

How the system of guidelines set forth in Part I can be applied in drawing up a Centres Plan under completely differing circumstances will be demonstrated with the aid of three case studies.

The Centres Plan for the Nickerie District (Surinam) came into being in 1957 and was revised in 1964. In that same year the Centres Plan for the Euphrates Project (Syria) was compiled, and in 1968 that for the State of Trengganu (Malaysia). All these Centres Plans formed part of regional plans on which the author worked as a member of planning teams which made brief stays (3-6 months) in the various regions, acting as consultants to the planning organizations existent in these countries.

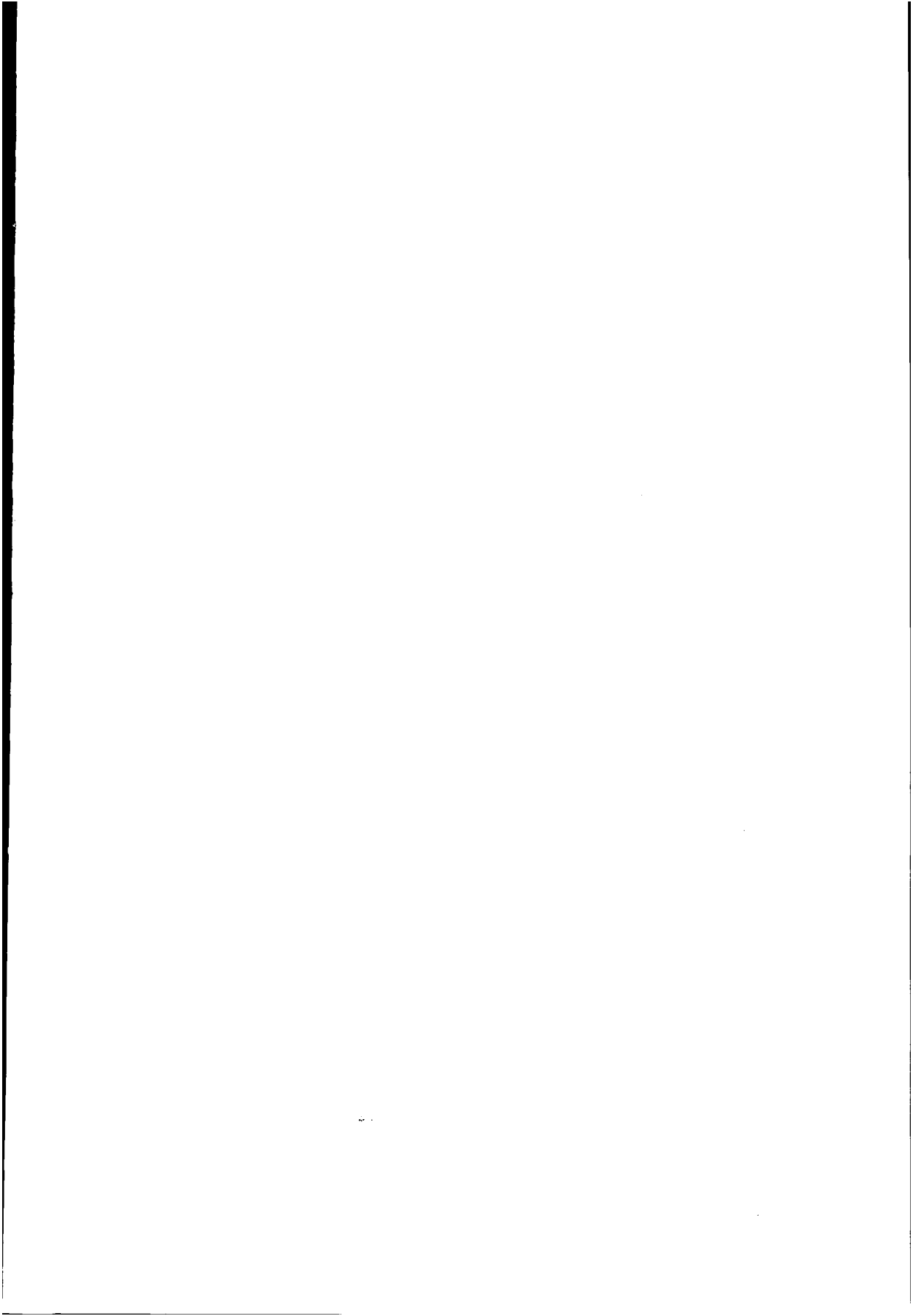
The Centres Plan for Nickerie differs from the others because it concerned the revision of an already existing plan on which the author had worked while still with the Bureau of Rural Development in Surinam. The amount of information he thus had at his disposal when drawing up this case study was considerably greater than with Syria and Malaysia. For this reason not only could the analysis of the present situation be dealt with in more detail (particularly the classification of the settlement patterns), but it has also been possible to indicate how the guidelines for compiling detailed town plans for the centres could be applied in practice.

The design of a model (system of guidelines) on which to compile a centres plan was first introduced by the author in 1957. Since then it has been further developed, although its fundamental ideas have remained broadly the same. When the various Centres Plans were being drawn up, they were in each case based on this model which was, however, specially adapted to the specific situation.

There is thus no question of dealing with a model which, once laid down, is applied without modification under all kinds of circumstances. As a result, one will not always

find the same systematization and clarity in the case studies as are suggested in the theoretical model. The advantage is, however, that even though the model is not immediately recognizable the reader will be able to see that its fundamental ideas have remained applicable under widely varying circumstances, and that this method has made it possible, at short notice and with limited data, to arrive at a number of concrete proposals for the future structure of the services apparatus on both old and new land, while keeping in mind the developments expected in various fields.

The Case Studies are divided into a number of sections. The introduction to each Case Study will indicate the broad outlines of the framework within which, and the circumstances under which, the various Centres Plans came into being. This will be followed by an analysis of the present situation. Sections II. 2.3, II. 3.3 and II. 4.3 of the Case Studies will describe how the guidelines for compiling a Centres Plan at regional level have in each case been put into practice. The results of this planning are reproduced on the separate maps Nos. V, VI and X. Only in the Case Study on Nickerie has an example been given of how the guidelines can be applied in working out a detailed town plan for centres (Section II. 2.3.6).



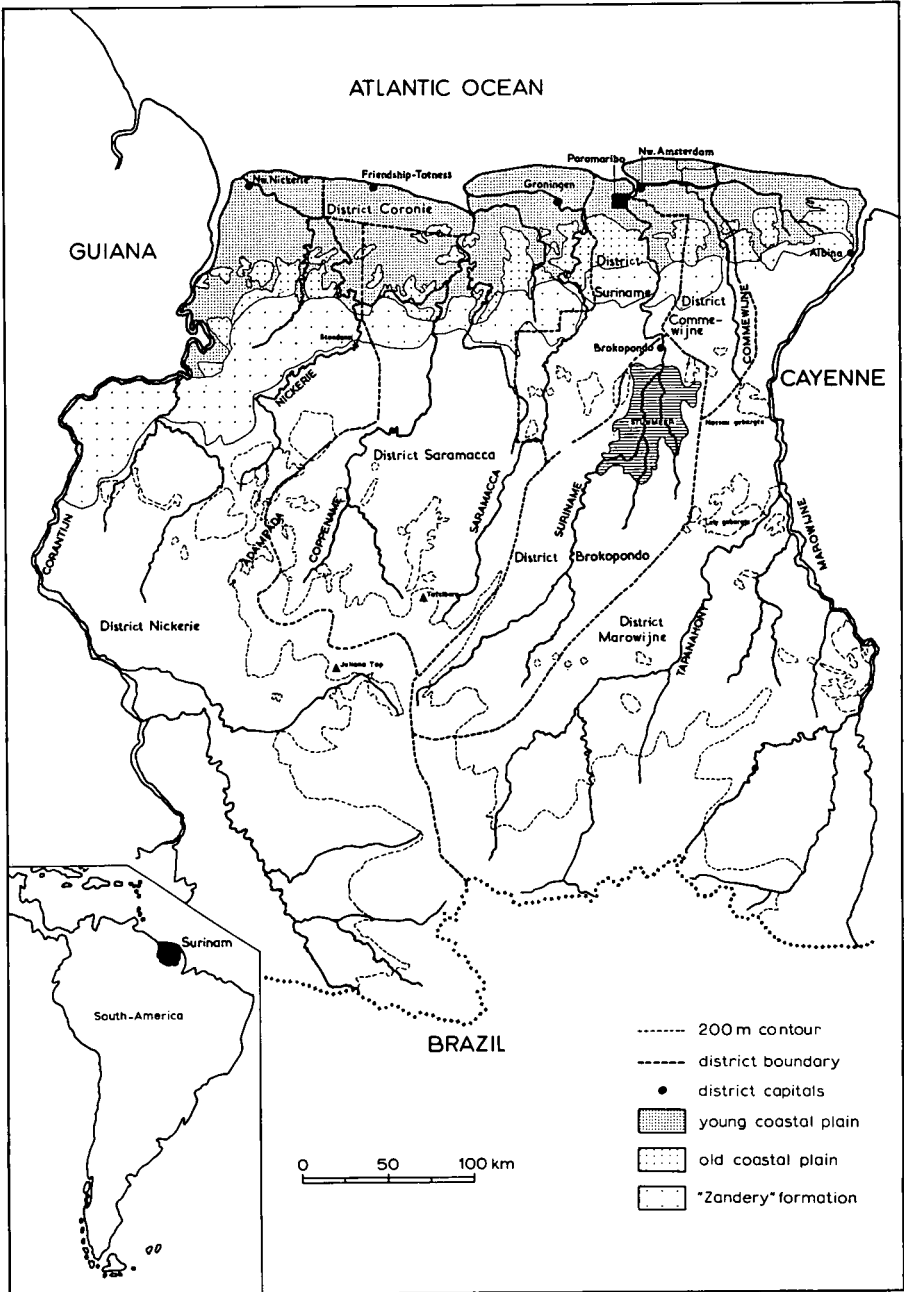


Fig. 5 Surinam location map

II. 2 SURINAM

II. 2.1 INTRODUCTION

In 1954 Surinam (See Fig. 5) became an independent state within the Kingdom of the Netherlands. That same year a ten-year plan was published, giving particular attention to the development of agriculture. Of the development funds available, 42 % was destined for the agricultural sector. In addition, a large proportion of the investments to be made were to benefit the infrastructure and the social sector of rural areas.

The conviction existed in Surinam that the agrarian population would only be able to make rapid advances if an integrated development of rural areas took place. This meant not only a development directed towards the physical, social and economic aspects, but also one in which the development plans on various levels - national, regional and local - and in various sectors should be attuned to one another. Hence a Bureau of Rural Development (Bureau Landelijke Opbouw, B.L.O.) was established in 1952, whose task included drawing up regional plans for agricultural areas and working out projects at local level.

During the period 1957-1960, this Bureau of Rural Development presented six reports containing proposals for the expansion of old villages and the establishment of new ones, in the light of current and expected developments in the agricultural sector. The Planning Division of the Department of Public Works brought out four reports containing town plans for the proposed villages and towns.

The following sections will show how the guidelines given in Part I have been adapted for use in Surinam. [Bureau Landelijke Opbouw 1957 (1)]. The examples have been taken from one of the eight administrative units (districts) of Surinam: the Nickerie District. [Bureau Landelijke Opbouw 1957 (2)].

The Centres Plan for this district, the first version of which was completed in 1957, was revised and expanded in 1964 as the result of a regional plan drawn up for this area under the Development Fund of the European Economic Community. It is this revised plan that will be dealt with. (Europees Ontwikkelingsfonds, 1964).

II. 2.2 ANALYSIS OF THE SETTLEMENT PATTERNS IN SURINAM, WITH SPECIAL ATTENTION TO THE NICKERIE DISTRICT

II. 2.2.1 *Physical aspects*

Surinam is situated in the so-called tropical rain forest zone. There are two rainy seasons and two dry, characterized by their great irregularity. The average rainfall is 2294 mm. Surinam has an area of 143,000 km², less than 5% of which has been put to use by man. The population of nearly 400,000 is concentrated entirely in the coastal plain. This coastal plain can be divided into:

- 1 the young coastal plain (Demara formation), containing the greater part of the occupied area;
- 2 the old coastal plain.

The young coastal plain can be subdivided into a number of soil landscapes:

- a the 'Ritsenlandschap' (Chenere landscape), consisting of narrow sandy ridges (ritsen). Between the ridges, which are often found in groups, there are small depressions of clay (swamps). The ridges are usually dry and are covered with mixed high forest. The depressions usually contain water and have a swamp vegetation of grass and scrub.
- b the young marine clay landscape, consisting of young marine, estuary and river clays. This landscape predominates in the present agricultural area of the Nickerie District. Its most important elements are the extensive swamps, covered with forest, scrub and grass.
- c the levee landscape found along the rivers. This is usually covered with high swamp forest.

The greater part of the young marine clay landscape is inundated at high tide.

Further into the interior is the old coastal plain (Coropina formation), followed by a sandy strip with a great deal of savanna (Zanderij formation), where small Indian villages are to be found.

The greater part of the interior consists of a basalt complex of very old origin (with here and there young intrusions), which is dissected by a number of rivers running from south to north. Bush negro settlements are found along these rivers. (Bush negroes are the descendants of slaves who fled into the interior).

II. 2.2.2 Socio-economic aspects

The population of Surinam has a highly heterogeneous composition due to the socio-economic development of Surinam in the past

When Europeans (the British and the Dutch) first established themselves in Surinam in the middle of the 17th century, the area was inhabited only by a few Indian tribes.

The Europeans concentrated on plantation agriculture, initially on the old coastal plain, but their attention soon turned towards the young coastal plain.

The labour force needed for these plantations was brought in from Africa. It is estimated that between 1650 and 1826 a total of 300,000 to 350,000 slaves were transported to Surinam. Their descendants, whether racially mixed or not, are called Creoles.

After the abolition of the slave trade in 1826 and the manumission of slavery in 1863, other areas had to be found from which workers could be drawn. Between 1873 and 1916, 34,000 people from India (Hindustanis) were brought to Surinam to work as contract labourers, and between 1891 and 1939, 33,000 persons from Indonesia (Indonesians).

It is to these successive waves of immigration that Surinam owes its present plural society. In 1960, 41 % of the population consisted of Creoles, 37 % of Hindustanis, 17 % of Javanese and 4 % of Chinese, Europeans and other nationalities.

The social structure of the countryside is characterized by a lack of powerful territorial communities. The most important social unit is the family: with the Hindustanis it is the joint family, with the Indonesians the nuclear family, and with the Creoles the matrifocal family. Apart from the joint family, these social structures have had little influence on the settlement patterns.

The plantation type of agriculture deteriorated severely in the 19th century and small-scale agriculture gained more and more in significance.

Mining (mainly bauxite) at present constitutes the most important economic sector. Admittedly, this branch of industry employs only 5 % of the population, but it provides 32 % of the gross national product, whereas agriculture, employing 44 % of the population, provides only 17 % of the gross national product.

The beginning of a movement towards industrialization can be observed in the capital, Paramaribo, and around the mining centres.

There is a strong tendency towards urbanization: almost 50 % of the population lives within the city limits of Paramaribo, and more than 87 % lives within a radius of 20 km of the capital.

This striking concentration of the population in and around the capital is the result of migration waves which have taken place amongst the various ethnic groups in Surinam since the middle of the last century.

The great disparities in employment opportunities and in the quantity and quality of services between town and country are the main causes of the phenomenon of urbanization.

II. 2.2.3 *Settlement patterns in Surinam*

In classifying the settlement patterns in Surinam, the most important criterion was the chief means of livelihood in a certain area.

Four different groups of settlement patterns can be distinguished, which, on the basis of the way they came into existence and their residential and accessibility patterns, can be subdivided into 24 settlement patterns, 18 of which are encountered in areas where agriculture is the principal means of livelihood. Table 3 shows the various settlement patterns found in Surinam.

II. 2.2.4 *Analysis of Settlement patterns on the lower reaches of the Nickerie River*

This section will briefly describe the settlement patterns found on the lower reaches of the Nickerie River. Several of the more recent settlement patterns will be discussed in more detail, as it was partly due to the experience gained in these areas that provided the impetus for a Centres Plan for Surinam.

Two aerial photographs will be used to illustrate the analysis; the various elements, in so far as they occur in the text, are indicated by numbers on the photographs.

Photo I reveals that the part of the young coastal plain shown on it belongs entirely to the clay landscape. The high forest of the river banks is still to be seen on the right bank of the Nickerie River (Photo I, No.1).

The Nickerie District was first settled in 1797 when the then Governor, Frederici, had plantations laid out on the left bank of the Nickerie River. Plantation agriculture enjoyed a brief period of prosperity, after which the majority of the large holdings, including those in the Nickerie District, were gradually superseded by small holdings.

The only remaining plantation still operating as such is Waterloo; it comprises the former plantations Waterloo, Hazard and Nursery (Table 3: 1.2.1).

The land under sugar can be seen clearly (Photo I, Nos. 2,3,4). A large part of the plantation, however, lies fallow or is completely abandoned (Photo I, No. 5; Table 3: 1.2.3). Around the sugar mill are the plantation workers' houses and also the buildings used for certain social services (Photo I, No.6). Here we can speak of a service centre (Table 3: 4.1).

Some of the emancipated slaves settled on parcels of land along the Nickerie River (Table 3: 1.3.4.2). Practically all these parcels have now been abandoned. Only here and there (Photo I, No.7) can some remains be seen.

Other emancipated slaves were given grants of land on old plantations, converted for this purpose by the Government (Table 3: 1.3.1.1). In developing these areas, the Government was, as a rule, committed to the existing drainage and accessibility patterns. This is obvious in Photo I, where the old plantation system can still be seen in those areas being used as small holdings (Photo I, No. 8).

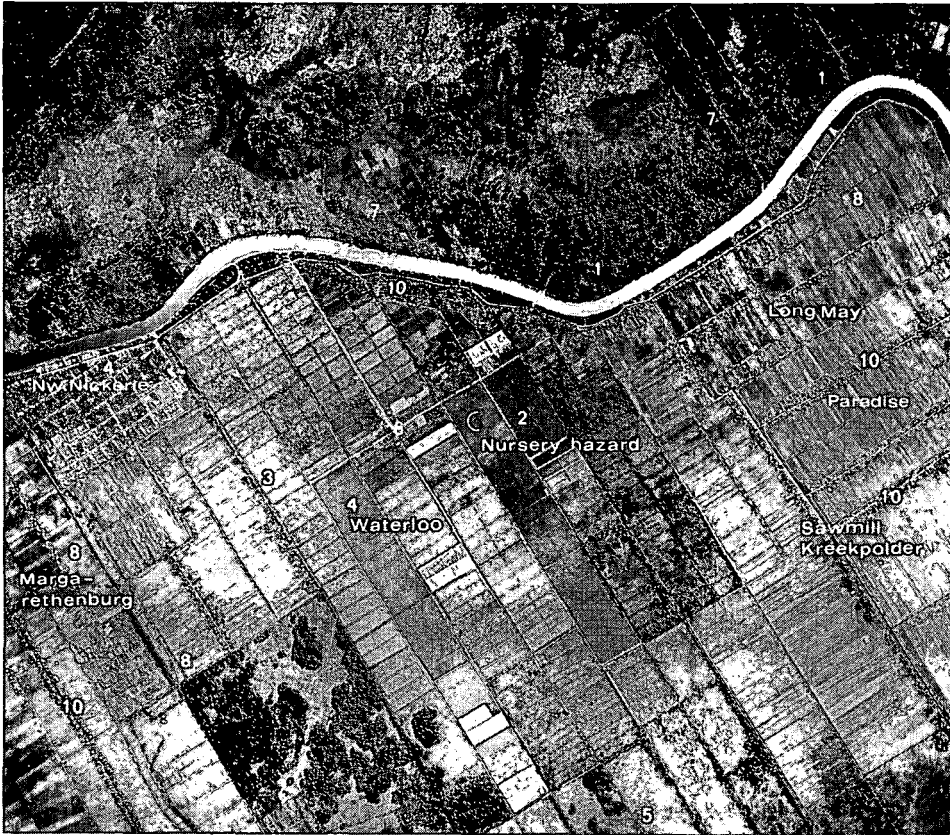


Photo 1 Nieuw Nickerie and surroundings C.B.L. Surinam, photo 1958: Royal Netherlands Geographical Society

Since many of the contract workers (Hindustanis and Indonesians) were not prepared to remain on the plantations as labourers after completion of their contract, but were willing to settle as small farmers, for them too the Government organized settlements on old plantations (Photo I, No. 8).

Some of the former contract workers diked and reclaimed their own land (Table 3: 1.3.4.1), e.g. Saw Mill Creek Polder and Van Drimmelen Polder (see Map III). The Government began to take an increasingly active role in such land reclamation works, and finally took over completely. There will be more about this later.

1945 marked the advent of agricultural enterprises in the Nickerie District. Mechanized agriculture on a large scale is being carried out in the Prince Bernhard Polder and in the Wageningen Project (Table 3: 1.2.2 Map IV).

TABLE 3 SETTLEMENT PATTERNS IN SURINAM

1	<i>Settlement patterns where agriculture is the main economic activity</i>
1.1	Settlement patterns in areas with primitive agriculture
1.1.1	Villages on artificial ridges in the middle of fields
1.1.2	Open structured villages in the middle of shifting cultivation area
1.1.3	Compact villages in the middle of shifting cultivation area
1.2	Settlement patterns in areas with large-scale agriculture
1.2.1	Plantations
1.2.2	Large-scale agricultural enterprises
1.2.3	Abandoned plantations
1.2.4	Agriculture on large-scale plots under long lease
1.3	Settlement patterns in areas with small-scale agriculture
1.3.1	Small-scale agriculture on old plantation areas
1.3.1.1	Settlements organized by the government on old plantations
1.3.1.2	The Coronie settlement pattern
1.3.1.3	The Para settlement pattern
1.3.2	Small-scale settlement projects organized by the government on virgin land before 1945
1.3.2.1	Settlement in the clay landscape
1.3.2.2	Settlement in the <i>ritsen</i> (Chenere) landscape
1.3.2.3	Settlement in the old coastal plain (Coropina formation)
1.3.3	Small-scale settlement projects organized by the government on virgin land after 1945
1.3.3.1	Polders in the young sea clay landscape
1.3.3.2	Polders in the ' <i>ritsen</i> ' landscape
1.3.3.3	Settlement projects in the old coastal plain
1.3.4	Settlement projects organized by the farmers themselves on virgin land
1.3.4.1	Farmers' polders
1.3.4.2	River parcels
2	<i>Settlement patterns where fishing is the main economic activity</i>
2.1	Fishing villages
2.2	Fishing done in inundated plantations
3	<i>Settlement patterns where mining is the main economic activity</i>
3.1	Mining villages and their surroundings
4	<i>Settlement patterns where the main economic activity is in the tertiary and secondary sectors</i>
4.1	Service centres
4.2	Small urban centres
4.3	Large urban centres

Apart from some small concentrations of service units, which can be seen on Map III, most of the services are concentrated in the main town of the District, Nieuw Nickerie (Photo I, No. 9; Table 3: 4.2).

Because of its isolated position, the Nickerie District has, up to now, not been affected by the drift to Paramaribo which is occurring elsewhere in Surinam. The population of the main town of the Nickerie District has increased sharply over the last few years and one might even speak of a certain urbanization tendency in the Nickerie District. The hamlets Paradise, Klein Henar and Waterloo function as service centres.



Photo 2 Settlement pattern in Nickerie

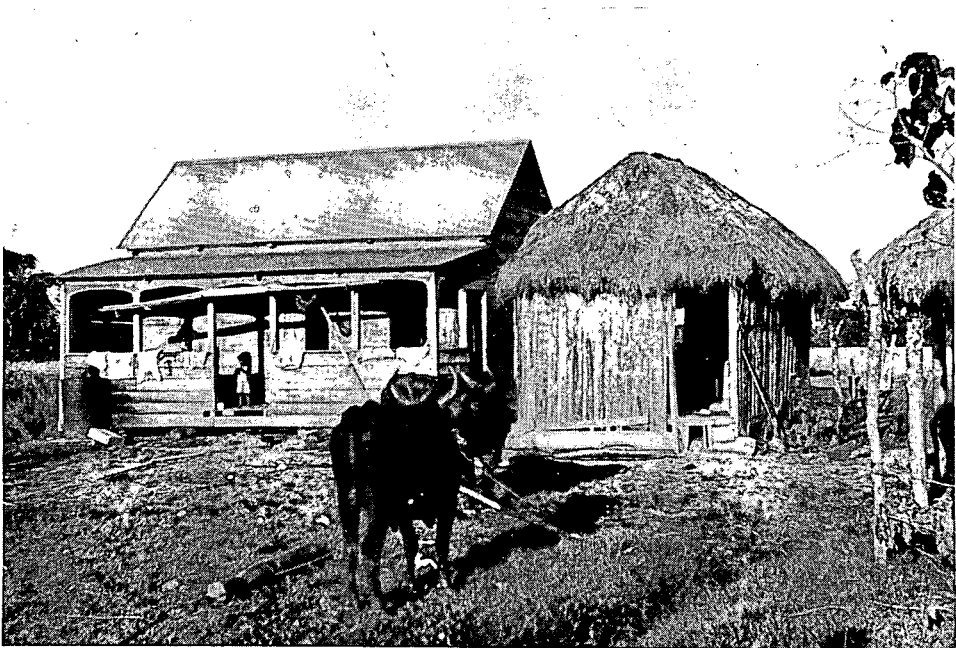


Photo 3 Indian farm

A noticeable feature in nearly all settlement patterns where agriculture is the chief means of livelihood is the linear village (Photo I, No. 10 and Photo 2). Owing to the high cost of road building, the land has, as a rule, been cut up into extremely elongated lots (10m x 1000m is no exception). The result is a highly concentrated settlement in linear villages, amongst which the service units are dispersed. The lack of residential and service nuclei, together with the fact that some of the inhabitants settled in Surinam only a few generations ago, has led to a situation where one can scarcely speak of territorial communities as are found elsewhere in the world in areas of settled agriculture.

The settlement patterns that came into being after 1920, the year that the Government took over completely in the matter of reclaiming land for the expansion of the agricultural area, will now be discussed more fully. Such works include the Corantijn and Clara Polders, as well as the expansion of already existing polders (Table 3: 1.3.2.1 Map III).

All these polders were laid out for irrigated rice cultivation. In general, their accessibility left a lot to be desired. Most lots could only be reached by a clay causeway which was practically impassable during the rainy season.

The roads, usually very costly to build in clay areas, were spaced far apart and the result is a system of extremely elongated land parcels.

The polders laid out after 1930, e.g. the Clara Polder, are often sparsely populated because much of the land was allotted to farmers who already owned land in the old polders. The predominance of the joint family in the social structure had in many cases resulted in farms consisting of more than one parcel not being divided up; the married brothers remained living in houses around the parental home.

The poor accessibility and the almost complete lack of social and economic services did not encourage settlement in these areas and the population remained sparse (see Map II). After 1945 the Government of Surinam entered into land reclamation on a large scale. In Nickerie the Nanni Polder was completed (work had begun in 1943) and in 1951 work was commenced on the Groot Henar Polder (see Table 3: 1.3.3.1, Map III), where the first farmers settled in 1953. Both polders lie wholly within the young clay landscape.

In view of the problems experienced elsewhere in the settling of farmers special attention was given in the Groot Henar Polder to the size of the holding and to the settlement pattern. Some background information on this recently developed settlement pattern will be given below.

The land use

In setting up the Groot Henar Polder, the basic idea was that irrigated rice cultivation would be introduced in this area. Hence an extensive irrigation system was constructed (Photo 4, No. 1). It was also intended that a dry crop be grown. Initially this was to be cacao only, but bananas were later added. This meant that the polder had to have a great drainage capacity, which imposed heavy demands on the drainage system (Photo 4, No.2).

The polder was intended for small-scale agriculture. At the time the photo was taken the

greater part of the area was planted with rice (Photo 4, No. 3). Here and there areas can be seen which had just been reclaimed (Photo 4, No. 4), or which still had to be reclaimed (Photo 4, No. 5). Bananas had also been planted (Photo 4, No. 6).

Banana cultivation in this polder was a failure because insufficient attention had been given to the physical conditions of production. In addition, the road system proved to be entirely inadequate.

Accessibility

A primary road runs through the Groot Henar Polder, the so-called East-West Connection (Photo 4, No. 7). Apart from a shell-sand road to the drainage sluice (Photo 4, No.8), this is the only all-weather road for motor traffic in the area. When plans were being drawn up for the Groot Henar Polder, they were based on the idea that all parcels should be accessible for tractors via clay causeways (Photo 4, No. 9), and for bicycles via shell-sand paths (Photo 4, No.10). All causeways and bicycle paths link up with the East-West Connection (Photo 4, No. 7).

Land parcelling

When the land was being divided up into lots, the more intensive network of tractor causeways and bicycle paths permitted a less elongated form than was the case in the old polders. Initially, the basic pattern of the lots in the greater part of the new polders was approx. 120m wide and 600m long, which meant farms of 7 to 8 hectares. Later, parcels of 2 and 4 hectares were also introduced. In the years since the polder has been in operation, the number of 4-hectare parcels has increased steadily.

Part of the Groot Henar Polder consists of former plantations. Here the form of the plots had to be adapted to the still existing bunds and canals. The old plant beds of the former cacao plantation Lotland can still be seen in Photo 4, within the new squarish parcels.

Two different types of housing lots can be seen (Photo 4, No.12). One is elongated, about 3/4 hectare large, and is found along the motor road; the other is smaller, squarish, and is found in the service centre (Photo 4, No.13).

Location of farmers' houses

By way of an experiment, three different residential forms were introduced in the Groot Henar Polder. The settler, on applying for a land parcel, could choose one of three alternatives:

a He could live on his farm (Photo 4, No.11). In that case he would be a long way from the social services, and as well, the accessibility of the parcel left a lot to be desired (bicycle paths). The advantage was that he would be living on his farm and thus be in a better position to keep an eye on things than he could living elsewhere.

b He could reside along the East-West Connection (Photo 4, No. 12). In that case the plot was easily accessible as far as personal transport was concerned. The farmer would live closer to the centre's socio-economic services, and as his residential plot would be 3/4

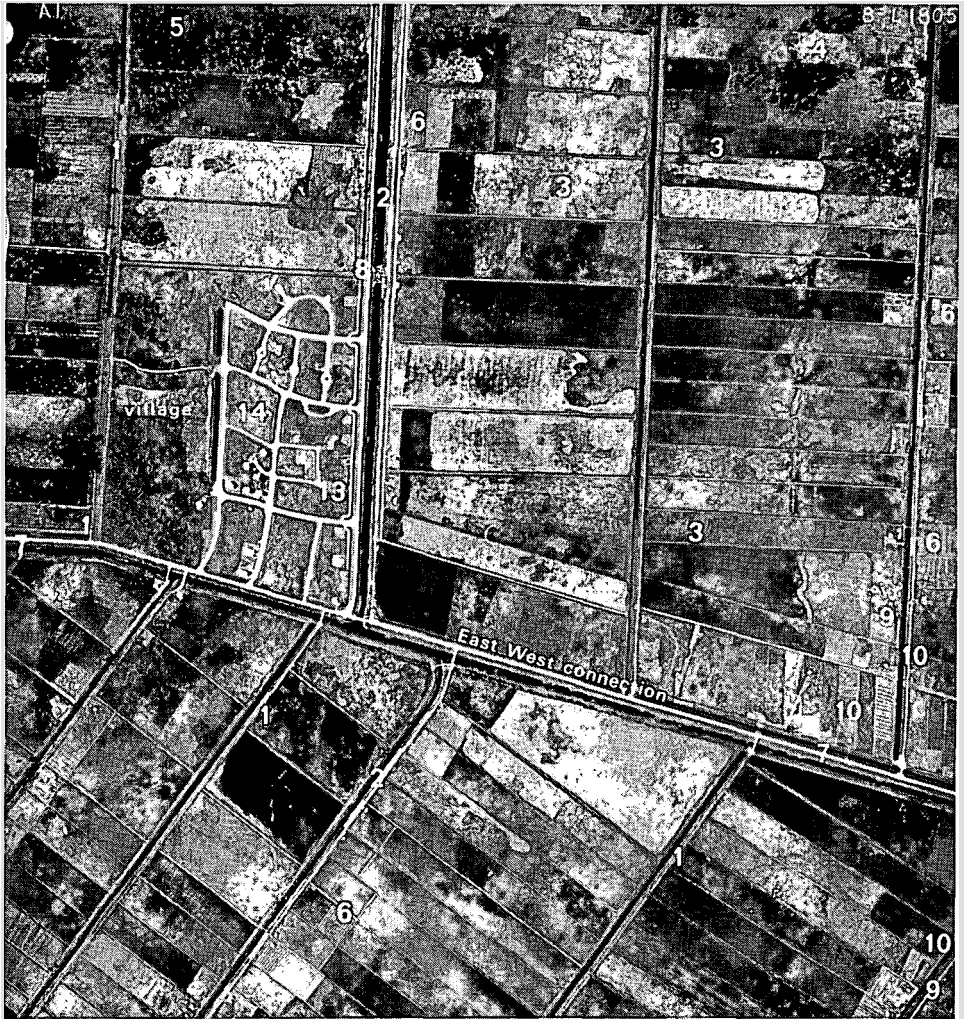


Photo 4 Service centre in the Groot Henar polder C.B.L. Surinam, photo 1959. Royal Netherlands Geographical Society

hectare he would be able to keep livestock on it and practise intensive agriculture (vegetables, fruit). The distance he would have to travel to his holding varied from several hundred meters to a maximum of 3 km, depending on the location of the holding allotted to him.

c He could reside in the village itself (Photo 4, No.13). Here he would reside amid the socio-economic services, e.g. in the neighbourhood of a school (Photo 4, No.14, still

under construction in the photo). He had a good chance that electricity and water would be laid on to his house in the future. He would, however, only be able to keep poultry on his lot in the village and the possibility of keeping an eye on his agricultural holding was smaller because of the distance he would have to travel, which might vary from 500 m to 3 km.

The reason behind this experiment was to find out what residential pattern would best serve future needs, and how small agricultural holdings could best be opened up.

The planners also decided to concentrate all socio-economic services, with the exception of a few shops, in the service centre. This was the first time that the principle of concentration of service units had been put into practice in Surinam.

It can be seen on Map III that several of the principles applied in Groot Henar had already been realized in the Nanni Polder, e.g. the more efficient form of land parcels. By planning all housing along the main road, clay causeways sufficed to open up the agricultural parcels in this polder.

The fact that the Nanni Polder, ten years after the allocation of its land, has remained practically uninhabited, whereas the Groot Henar Polder, only a few years after being brought under cultivation has the majority of its farmers in residence, is primarily due to the timely placing of social services, particularly a school, in the service centre, Groot Henar.

II. 2.2.5 *Some concluding notes*

It is clear from the descriptions of the various settlement patterns in Surinam that particularly after 1945 the Surinam Government realized that a modern agriculture could only come about through a satisfactory infrastructure.

Among other things, this has led to a much denser road network being built in new settlement projects than in old ones. The fact that a denser road network alone is not sufficient, but also that the type of road is of great importance, has emerged clearly in the Groot Henar Polder. When it was decided to grow bananas as well as cacao, the accessibility via bicycle paths and tractor causeways (which are practically impassable in the rainy season) was found to be inadequate.

The result of this finding has been that when new areas are now being opened up, plans are based on the idea that each agricultural parcel must, if at all possible, be accessible by means of an all-weather road suitable for motor traffic. This means considerable investments, particularly in the young marine clay landscape.

At the same time, increasingly heavier demands are being made on irrigation and drainage as a result of the wider range of crops that are to be grown, and with the increasing mechanization being applied in rice cultivation.

All of this has caused the cost of land reclamation to increase from an average of approx. Sf 1500 (U.S. \$ 750) per hectare to considerably more than Sf 4000 (U.S. \$ 2000) per hectare.

The Nanni Polder also demonstrated that satisfactory accessibility alone was not enough. The lack of services, such as schools and polyclinics, usually meant that migration to the area got under way very slowly. Because of this, fairly extensive land use had developed in the Nanni Polder, which means that the heavy investments in drainage and irrigation have only partially been turned to account. Now that this type of land use has stabilized, it could only be changed with great difficulty, and the result is a not inconsiderable loss of income, from both a micro economic and a macro economic point of view.

The timely placing of social services in the Groot Henar Polder, i.e. before the settlers were established in the area, proved to be an important stimulus for a rapid migration to the new land and resulted in this area being brought under intensive cultivation without any delay.

Nearly all settlement patterns in the small-scale agricultural areas are characterized by residences concentrated in linear villages and the lack of service centres.

The natural landscape, and the irrigation, drainage and road systems resulting from it, have influenced the settlement pattern to such a degree that despite great racial and cultural differences between the various population groups, no striking dissimilarities are to be seen in the settlement patterns. This is obvious when a comparison is made in Photo I between Margarethenburg, which is predominantly Creole, Longmay with its Indonesian population, and the Sawmill Creek Polder, which is Hindustani.

Within the settlement patterns, however, the differences are clear: the type of house, the plants growing in the yard and the way both are maintained will usually indicate to which ethnic group the occupant belongs.

II. 2.3 THE CENTRES PLAN FOR THE NICKERIE DISTRICT

II. 2.3.1 *The national framework*

The most important reasons behind the decision of the Bureau of Rural Development to set up a Centres Plan for Surinam were the following:

- 1 The country's population has a great geographic mobility (van Dusseldorp, 1963). One of the reasons for this is probably the fact that a large proportion of the population belongs to the first or second generation of an immigrant population; in 1950, more than 45 % of the population above the age of 45 was born outside Surinam.

The internal migration is characterized by a strong trek towards the town of Paramaribo and its immediate surroundings. This urbanization is caused by the great differences in employment opportunities and living conditions between town and country.

The enormous concentration of the population – in 1950, 87 % of the total population was living within a radius of 20 km of the capital – could form a serious obstacle to a balanced development of the country in the future.

One of the ways in which this urbanization tendency can be counteracted – along with the creation of attractive employment opportunities in rural areas – is to improve the present living conditions there.

2 Surinam has a plural society. Great differences exist from religious, sociological and economic points of view between the Creole, Hindustani and Indonesian population groups. If Surinam is to grow into one nation, social integration and acculturation of the different groups is essential.

In the urban climate of Paramaribo, the process of acculturation is already under way. In the rural areas it is proceeding much more slowly, partly because of the way the different nationalities tend to live in separate groups. An attempt should therefore be made to create an infrastructure which will foster the integration of the various population groups.

3 In rural areas the only social group of any significance at present is the (joint) family. All attempts to form territorially organized social groups have met with little or no success. This fact is obvious from the unsatisfactory functioning of corporate bodies in polders and villages, bodies whose establishment has been laid down by law since 1932 and 1938, respectively.

The reason why such bodies do not function satisfactorily is not only the very heterogeneous composition of the population. Territorially orientated groups did exist in Nickerie – in the Sawmill Creek and Boonacker Polders, which had been reclaimed by the people themselves – but due to the strongly paternalistic manner in which they were administered by the Government, these groups had little chance to develop.

The concentrated ribbon settlement and the wide dispersion of social and economic services means that one can scarcely speak of any form of village. This is characteristic of most settlement types in Nickerie and in the rest of Surinam. Such conditions contribute to the lack of any territorial structure within the agrarian society.

4 In the majority of the new settlement projects, plans were based on the idea that the farmer would live on his land. (The Groot Henar Polder was the only project which deviated partly from this basic idea.)

It was against this background that the Bureau of Rural Development made its proposal to bring about a concentration of socio-economic services. It was to be introduced directly on the new land – and in the course of several decades on the old land also – and it would provide a physical structure upon which a social structure, adapted to the proposed agricultural development, could come into being.

The guidelines upon which the Centres Plans for the various districts were then compiled have been discussed in Section I. 2.3.

II. 2.3.2 *The future development of Nickerie*

The Centres Plan, as has been stated in Section I. 2.4.2 (The future situation), should

form part of a regional development plan. It is impossible to decide on the nature and frequency of services and their location, without first having an idea of the developments expected in the future at regional (and national) level.

The broad outline of the Centres Plan for Nickerie had already been drawn up by the Bureau of Rural Development in 1957, but it was adapted to fit the regional plan compiled for the Development Fund of the European Economic Community.

A brief outline of this regional plan, which formed the framework for the Centres Plan for the Nickerie District, is given below:

Development potential of the region (van Dusseldorp, 1967, p. 101)

From a soil-scientific point of view, the region on the lower Nickerie River has a very great agricultural potential. The young marine clays are rich in chemicals and are suitable for many different crops, provided sufficient attention is given to the physical properties of these soils (they are heavy and difficult to till).

The expansion of the agricultural area and the increase in productivity on the old land are, to a great extent, limited by the lack of fresh water during the dry season. This factor could be eliminated by building a dam in the Upper Nickerie River, by which the salt water tongue penetrating the Lower Nickerie River from the sea could be forced back. By pumping water from the Maratakka River (see Map IV), the agricultural area could be provided with a constant supply of fresh water. In addition, a freshwater reservoir, south of the polders and their expansions, is proposed.

Nickerie is a predominantly agricultural district, with approx. 60 % of its labour force engaged in agriculture. Of the total area, 80 % is used for rice cultivation, 15 % is grassland and 5 % is under other crops. The Nickerie farmers are industrious and progressive, which is obvious from the fact that 76 % of the land suitable for agriculture is under cultivation, as against only 41 % for the whole of Surinam. In addition, Nickerie, comprising 38,4 % of Surinam's agricultural land, owns 66 % of the country's tractors. This tractor fleet mechanically cultivates 68 % of the agricultural area (1960 figures).

The farmers of this area, whose fathers and grand-fathers, for the great majority, were contract labourers on plantations, have within one generation worked themselves up to be reasonably prosperous farmers, some of them now with farms of 15 to 20 hectares under mechanized rice cultivation.

The total population of the Nickerie District, amounting to 28,000 people in 1962, is expected to be approx. 50,000 by 1975. The rapid growth in population, and the desire existing among many farmers to enlarge their farms, makes expansion of the agricultural area in Nickerie a matter of great urgency.

Bauxite reserves have recently been discovered in the interior of Nickerie, and this could play an important role in the regional development of West Surinam.

The proposed regional development

The regional development could thus be based on the following general concepts:

a Nickerie is rich in natural resources, having a very great agricultural potential and vast bauxite reserves.

b Nickerie has an enterprising population, engaged predominantly in agriculture, and increasing rapidly in number.

c The district has a reasonable infrastructure at its disposal.

The regional plan was thus based on the assumption that agriculture and mining would be the driving forces for the future development.

As it is not expected that the development of mining in the interior will have any effect on the physical planning of the agricultural area on the lower reaches of the Nickerie River – except, that is, for an increase in the importance of the main town of the District – the following will deal only with that part of the regional plan which concerns the agricultural development of the region.

Firstly, the type of products which the agricultural sector should be producing at the end of the plan period, the so-called production target, will be indicated. This was based on the following criteria:

a As far as natural conditions allow, all food crops needed in the Nickerie District will be produced within its own borders;

b It is presumed that the Nickerie District will remain an important rice producer, both for the internal market and for export;

c Nickerie is admirably suited to the cultivation of bananas because of both its geographical position (accessible to ocean-going ships) and its soil. Special emphasis has therefore been placed on the development of this crop.

d As it is not yet known with certainty how long bananas can be grown on one and the same plot, a certain distribution of risk is desirable. It is therefore proposed to introduce citrus also.

e Nickerie will undertake its share of the production of meat needed to supply the rapidly increasing demand in Surinam.

With these criteria concerning the desired future production, and on the basis of the employment opportunities being aimed for, it was possible to make an estimate of the necessary expansion of the agricultural area over the period 1963-1975 (see Table 4):

TABLE 4.
PRODUCTIVE AREA PER CROP IN NICKERIE IN 1975 (IN HECTARES)

Crop	Area in 1963	Area desired in 1975	Expansion between 1963 and 1975
rice	17,400	29,300	11,900
sugar	600	1,000	400
bananas	200	3,300	3,100
citrus	50	2,100	2,050
other crops	1,700	3,800	2,100
total	19,950	39,500	19,550

It was further indicated in the regional plan what type of farm was to provide the proposed agricultural production in 1975, or in other words, what the structure of the agricultural production apparatus would have to be.

In fixing the type of farm, various criteria derived from national plans were taken into account. For instance, the average income of farmers would have to be approx. *Sf* 1100 (U.S.\$ 550) towards the end of the plan period. A certain differentiation in the socio-economic status of farmers would have to be aimed for, by the introduction of middle-scale farms. However, as it was proposed to introduce banana cultivation to Nickerie – a crop with which the population was entirely unfamiliar – emphasis would have to be placed on large-scale holdings in the initial stages of implementing the regional plan. This deviates from the policy which, for social and political reasons, is generally pursued in Surinam, namely the construction of an agricultural production apparatus in which the small independent family farm predominates.

It was felt that only large-scale holdings would sufficiently guarantee the desired production, in both quality and quantity, that is required for the efficient set-up of a transport and marketing apparatus. It was, however, intended that in the course of time the large holding would be cut up into small independent farms. These large holdings (nuclear estates) were to serve as the centre of operations. Part of the former large holding would remain under central management and would provide services to the farmers in combating disease and plagues, and in harvesting and marketing.

With these criteria in mind, in the regional plan for Nickerie the following types of farm were proposed for the new agricultural area (see Map IV):

- a an estate for banana cultivation, which could provide a continuous supply of bananas in the initial years and which would be exploited permanently as a large enterprise.
- b the expansion of the already existing mechanized rice cultivation in Wageningen in order to obtain optimal production.
- c nuclear estates for bananas and citrus, from which independent small holdings should evolve in the future.
- d mechanized middle-scale rice farms of approx. 24 hectares.
- e small rice farms (4 hectares or less).

On the old land, an enlargement of farms was proposed in certain polders and a further mechanization of rice farming, while in other polders a more intensive agriculture was to be practised, with emphasis on market gardening.

There were also several criteria that had to be kept in mind when the sites of the different agricultural areas were being selected, since these would influence the way in which, and the pace at which, the agricultural area was to be expanded. These were:

- 1 The areas under banana should be so located that the large production quantities could be transported quickly and efficiently, without unduly large investments having to be made in the building and maintenance of roads. In other words, the areas should be

located as near as possible to the point of shipment, which was planned provisionally in Nieuw Nickerie.

2 Heavy demands are made on drainage in areas under banana. This means that the closer the areas are to the rivers, the lower the cost of land reclamation. On the other hand, the thick layer of organic material considered necessary for banana cultivation is usually found far from the rivers.

3 The banana area should be expanded in lots of 500 hectares at a time, so as to enable an efficient shipping scheme to be set up.

4 Criteria for the location of the other crops were also established.

5 Apart from the expansion of the agricultural area, land consolidation on the old land was considered desirable so as to prevent large discrepancies between the incomes of farmers on the old and the new land.

In the light of these criteria, a land use plan for both the old and new land was drawn up and formed part of the regional plan (Map IV).

The regional plan also dealt in detail with several other matters: manpower planning, the educational system, accompanying social matters, the economic, social and administrative organizations needed at local and regional levels, and also the construction of a socio-economic infrastructure which would foster the proposed developments and which can adapt itself to the expected increase in prosperity in rural areas.

What physical infrastructure the service apparatus would require in order to promote the proposed agricultural development will be discussed in the following sections.

II. 2.3.3 *The centres plan*

When the Centres Plan for the Nickerie District was being drawn up, the following data were available:

- 1 A map showing the current land use based on aerial photographs taken in 1950. See Map I;
- 2 A map showing the density of population based on data gathered in 1964 by local civil servants. See Map II;
- 3 A map showing the geographical distribution of existing socio-economic services, based on a complementary field investigation in 1964 (Map III);
- 4 An analysis of the various settlement patterns (summarized in Section II. 2.2.4);
- 5 A map showing the proposed future land use in such detail that the future distribution of the population could be roughly derived from it (Map IV).

On the basis of these data and the guidelines set out in Section I. 2.4.3, work proceeded along the following lines:

a First, it was established what concentrations of services existed and what function they fulfilled. These concentrations are shown in Table 5.

b Next, circles with a radius of 4 km were drawn around these concentrations of service units (4 km being the radius of action of a primary centre as laid down for Surinam at national level).

From the number and nature of the existing services and from the extent to which they overlapped, it was then determined which of the existing concentrations would qualify for the function of at least a primary centre in the future (Table 5).

c It was then established which areas on the old and already inhabited land, as well as on the land to be reclaimed in the future (cf. the plan shown on Map IV), were not covered by the theoretical service areas of the primary centres indicated under (b). The question was then considered as to where new primary centres would have to be placed in order to cover the entire future occupied area as effectively as possible without any great overlapping, which would cause serious competition between the primary centres.

d Once the sites for the primary centres had been fixed, the matter of which of these centres were to qualify for the function of secondary centres was gone into. This was done by drawing a circle with a radius of 10 km (i.e. the radius of action of a secondary centre, as laid down at national level) around the centres which, on the basis of the already existing services, could be classified as either potential secondary or secondary centres. This showed that three of the existing concentrations of service units qualified for the function of secondary centre: Nieuw Nickerie, Groot Henar and Wageningen.

e A check was then made as to which areas (either those already occupied or to be occupied in the future) were not yet covered by the theoretical service areas of the centres mentioned and it was investigated which of the primary centres established under (c) should be chosen as secondary centres so that the entire area (old and new land) would be covered as effectively as possible by the sphere of influence of secondary centres.

f The final step was to check whether there was any need to place tertiary centres. It seemed unlikely that in the area of the lower reaches of the Nickerie River, any need would arise in the near future (say, within 20 years) for a new tertiary centre, apart from the already existing one of Nieuw Nickerie, which functions as the main town of the district. This might well be the case, however, in the future mining area, which is not included in this study.

The results of the various plan activities discussed above are shown on Map V.

A total of thirteen primary centres were planned, four of which were allotted the function of secondary centre and one of which fulfils the function of tertiary centre. Also shown on the map are a number of service nuclei within the service areas of primary centres.

A list of the existing and projected centres is given in Table 5.

TABLE 5.
PRESENT AND FUTURE CENTRES IN THE NICKERIE DISTRICT*)

No.	Name Centre	Present function (1964)	Future function (1990)
1	Nieuw Nickerie	Tertiary centre	Tertiary centre
2	Corantijn	Service centre	Primary centre
3	Nanni	—	Primary centre
4	—	—	Primary centre
5	Paradise	Potential Primary centre	Primary centre
6	Groot Henar	Potential secondary centre	Secondary centre
7	—	—	Primary centre
8	—	—	Primary centre
9	—	—	Primary centre
10	—	—	Primary centre
11	—	—	Primary centre
12	Wageningen	Potential secondary centre	Secondary centre
13	—	—	Secondary centre

*) Excluding the mining area in Adampada.

II. 2.3.4 *The future road network*

With the aid of the future land use map and the Centres Plan derived from it, and in accordance with the relationships between centres and roads dealt with in Section I. 2.3.4, the road network that will be required in the future can now be indicated (Map V). The main traffic artery will be the so-called East-West Connection. This road begins at Slangeneiland (Centre No. 13), where by means of a ferry it connects with the road system in Guiana. The East-West Connection will run by way of the dike of the Nanni Reservoir through the centre of the occupied area on the southern bank of the Nickerie River. The road crosses the Nickerie River at Klein Henar by a ferry and continues on through the rice-growing area of middle-scale and large-scale holdings, to join up with the already existing road network in Central and East Surinam. In course of time, this road will give access from East Surinam to the road system in Cayenne. This primary road will eventually have to be bitumenized and widened into a four-lane highway.

The area will also be accessible via a number of existing or projected secondary roads. These roads should also be asphalted in due course and should consist of two or three lanes. There is already a secondary road connecting Wageningen with the East-West Connection. It is proposed to link Wageningen with the southern bank by way of a ferry, after which a secondary road will run through the area to be reclaimed, to join up with the primary road.

A secondary road has also been planned along the route of the already existing tertiary

road from Groot Henar through Paradise to Nieuw Nickerie. Map V shows various other secondary roads which will open up the middle and western parts of the area south of the Nickerie River.

Nearly all the primary and secondary centres have been planned on primary or secondary roads. The tertiary road network (metalled all-weather roads with one or two lanes) and the feeder-roads (clay causeways and bicycle paths) provide access to each farm in the area. These feeder roads are not shown on the map.

II. 2.3.5 The administrative service areas of the centres in Nickerie

The circles shown on Map V, representing theoretical service areas of centres, are merely instrumental in drawing up a Centres Plan. Once the site of a centre has been decided, the administrative boundaries of its service area have to be fixed (see Section I. 2.3.3).

When these boundaries were being fixed in Nickerie, it was done on the basis of the census units. These are shown by name and number on Map V. In Nickerie the census units usually coincide with the polders.

A census unit whose greater part lies within the service area of a centre and which is easily accessible from this centre, or could be made easily accessible, was placed under the administrative service area of that centre.

The administrative service areas of secondary centres were formed by the combined administrative service areas of those primary centres whose greater part lies within the theoretical service area of a secondary centre.

In fixing the administrative service areas on old land, it is of primary importance that the existing situation be taken into account. For instance, the Paradise centre has been placed under the regional service area of Nieuw Nickerie because of the strong influence exerted by Nieuw Nickerie, even though it would have been theoretically possible to attach it to the present service area of Groot Henar.

It is recommended that the administrative areas of the various services (school districts etc.) eventually coincide as far as possible with the administrative service areas of centres, as has been discussed in Section I. 2.3.3. There will, however, always be certain service units whose service areas do not coincide with that of the centre in which they are located. This refers particularly to service units from the private sector.

II. 2.3.6 The town plan for Groot Henar

In the foregoing, the case of Nickerie has illustrated how a Centres Plan can be compiled at regional level, as part of a regional plan.

This section will show how the guidelines for elaborating a Centres Plan at local level, laid down in Section I. 2.5, can be put into practice. The town plan for the Groot Henar centre will serve as an example.

Groot Henar occupies a special category in the Centres Plan for Surinam, as it was drawn

up in 1956 by Mr. A. Barker, a town and country planner from Guiana, before the Centres Plan itself was brought out (Bureau Landelijke Opbouw, 1956). After that time, all town plans for the centres were drawn up by the Town and Country Planning Department of the Ministry of Public Works in Surinam.

The centre forms part of the experimental settlement project in the Groot Henar Polder, discussed in Section II. 2.2.4. In 1956 the centre was intended merely for the establishment of services at local level, but in the framework of the Centres Plan in 1957, the centre was also allotted a secondary service function. It then appeared that the town plan had been designed on such a grand scale that, without any significant alterations, secondary service units could also be accommodated.

In estimating the future population of the centre, the calculation method discussed in Section I. 2.5.2 was used, and the following points were taken into account:

- a 90 % of the area will be used for agriculture;
- b farms will have an average area of 4 hectares;
- c an average family comprises 5 persons.

TABLE 6.
ESTIMATE OF FUTURE POPULATION IN THE SERVICE AREA OF GROOT HENAR

Census unit		Area of census unit in hectares	Projected optimal agricultural population	Estimated services population		Total population per census unit
No.	Name			In centre	Outside centre	
(1)	(2)	(3)	(4)	(5)	(6)	(4 + 6)
20	Prince Bernhard Polder ¹⁾	630	270	30	10	280
21	Hampton Court Polder ²⁾	1170	1500	150	70	1570
22	Groot Henar Polder ³⁾	2740	2500	240	130	2630
23	Henar Polder	225	260	30	10	270
Population for primary services				450		450
Population for secondary services				750		750
Total		4765	4530	1200	220	5950

- 1) The sparsity of population is due to the fact that rice is grown in the Prince Bernhard Polder on a mechanized large holding.
- 2) The present population in the Hampton Court Polder already exceeds the number that has been calculated from the given criteria. If such over-population of census units is to be avoided in the future, the optimum population should be adhered to. It is also possible to estimate a maximum population (see Section I. 2.5.2). In the case of the Hampton Court Polder, this was estimated to be approx. 1700 persons, bringing the total population of the service area Groot Henar to more than 6,000 persons.
- 3) The projected agricultural population in the Groot Henar Polder has been calculated on the basis of a number of projected farms in this area.

It was assumed that the services population would consist of 15 % of the total agricultural population, and that of this 15 %, 65 % would live in the primary centre.

The secondary services population is estimated to be 5 % of the total population in the service area of a secondary centre.

From this population prognosis (approx. 6,000 persons) (Table 6) and from the standards for the service units set out in Table 2, an estimate can be made of the services that should be established in the Groot Henar centre, following the method given in Section I. 2.5.3. The result is shown in Table 7.

TABLE 7 SERVICE UNITS TO BE EXPECTED IN THE SECONDARY CENTRE GROOT HENAR (SURINAM)

Ministry	Type of service Local Service*)	Regional Service
Home Affairs	government office 1 burial ground, temples and churches 1 government official and 3 assistants	the Government office could include branches of the Ministry of Finance, Land Registry Office, Post Office etc.
Police and Justice	3 constables	police station with both local and regional function, headed by 1 sergeant or inspector
Social Services	1 office with 2 social workers	
Health	1 policlinic	attached to the policlinic, a health-centre with 10-20 beds and 1 pharmacy
Education	6 primary schools of six classes each, plus kindergarten classes, sportsfield	public hall with local and secondary service function
Economic Affairs**)	36 shops 1 market warehouses	a number of specialized shops, a cinema etc., and industries of regional importance. An industrial area of 30,000 m ² has been reserved for this purpose
Agriculture, Animal Husbandry and Fisheries	1 office with storage facilities	1 branch superintendent of Extension Service
Public Works	public utilities, parking areas	1 office and workshop, telephone exchange

*) Some of these service can also be placed in additional service centres

***) Included under Economic Affairs are those services provided by the private sector but requiring a government permit.

Exactly when these services will be established, particularly the secondary service units, depends on the pace at which agriculture develops in the primary and secondary service areas.

Figure 6 represents the town plan for Groot Henar. It will be seen that the economic service units (e.g. shops) are situated around a spacious square, which can be used as a parking area. If necessary, part of the square can function as a market. This square is situated on the East-West Connection.

Also on the main road, and to leeward of the centre, is the industrial area. (The North-East trade wind is the prevailing wind in Surinam).

The social services, adjoining the shopping centre, are situated further into the centre.

Three separate housing zones can be seen, each with space for a temple, a mosque or a church. The existence of three, more or less independent housing areas is linked up with the heterogeneous composition of the population.

One of the reasons for concentrating services in a centre was the hope that, by creating the right physical framework, the social and cultural integration of the three most important population groups (Hindustanis, Creoles and Indonesians) would be encouraged, and that this would meet with more success than had been the case within the old physical structure.

It had been learned from experience, for instance when farmers were being settled in other districts, that a too sudden transition from the usual settlement pattern, where the various groups live separately, to another in which the groups were forced to mix more closely, usually resulted in one of the groups withdrawing from the project. The communal use of the same socio-economic services – schools, policlinics, government offices, shops and market – is almost always accepted, but people generally prefer to reside among their own kind.

With this point in mind, land in the polders has always been allocated in such a way that people of the same race could live as a group.

Since the Groot Henar centre had an important social function to fulfil, also for the agricultural population, its residential area had to allow the people of each group to live apart from those of the other groups. How this problem was solved is shown in Fig.6.

In this way, it may be possible that, step by step, further integration will be effected. As people keep meeting one another in the same service units and have similar interests in these services, the first step on the road to integration will be taken. At a later stage, it is hoped that a gradual mixing of the racial groups will take place in the residential areas.

It must, however, be explicitly stated that a change in the physical structure such as that outlined above will, in itself, contribute little to integration. At any rate, one should not expect too much from it. Only by a combination of programmes directed towards integration, and a physical structure adapted to them, can any results be expected, and even then, only after some considerable time.

The centre has been designed in such a way that it can be realized in several stages. The freshwater canal dividing the centre in two gives a finished look to that part of the centre

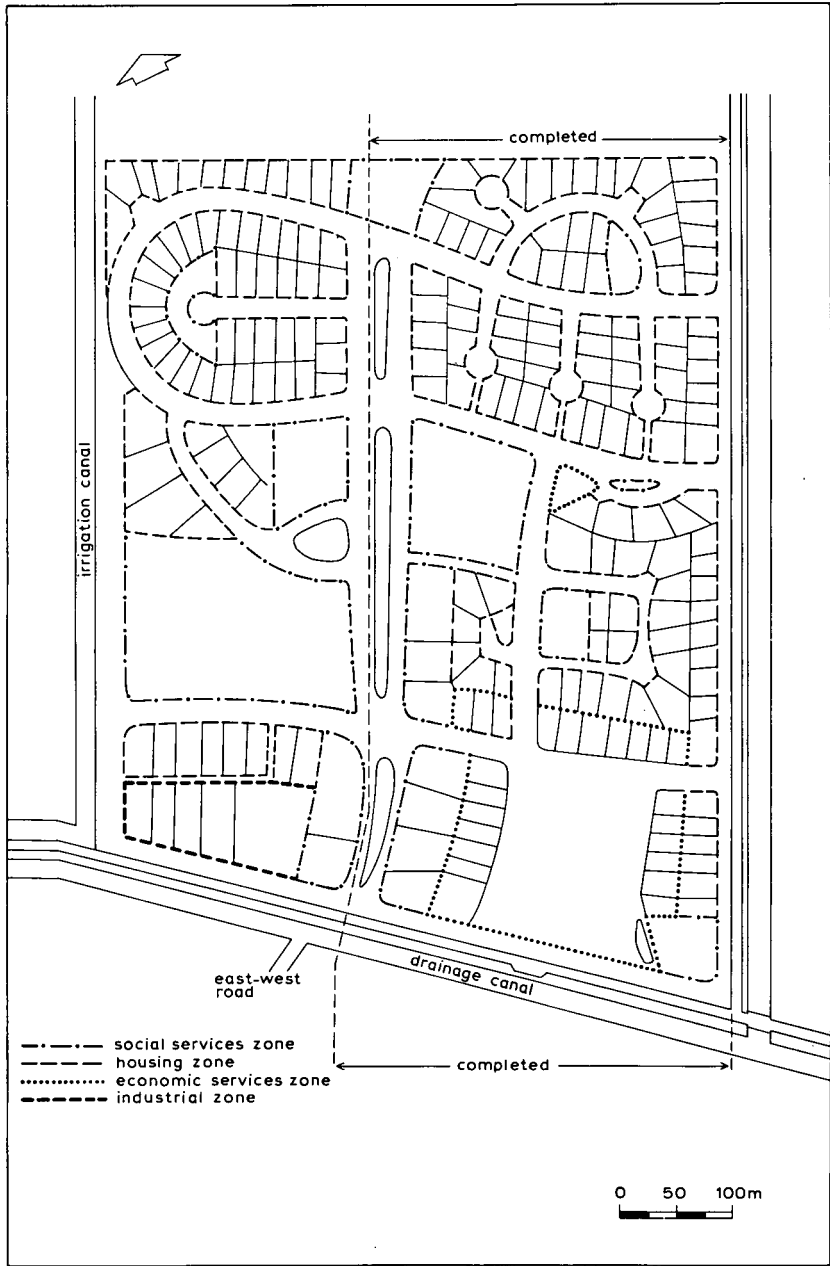


Fig. 6 Townplan of Groot Henaar BLO 1956

already completed. Should it be necessary to expand the centre after the second phase, this can be done in a northerly direction. The design of this town plan conforms closely to the guidelines set out in Section I. 2.5.4.

II. 2.4 SOME CONCLUDING REMARKS

More than ten years have elapsed since the Bureau of Rural Development drew up the Centres Plan for Surinam. This gives rise to the question of what has been achieved to date. Unfortunately, there is little that can be said. The causes underlying this are to be found in various circumstances:

- 1 The Centres Plan is not one that can be executed by one body alone. Close coöperation between all the government departments involved is an indispensable factor. It is obvious that this demands certain adjustments on the part of these departments, a process which takes time. This inter-departmental coöperation could have been promoted if one department, working with the heads of the various district administrations, had been given the responsibility of coördinating activities and executing the Centres Plan. The Bureau of Rural Development fulfilled this function for some time, but the responsibility did not remain with this Bureau, with the result that not as much progress has been made as was originally hoped.
 - 2 On the old land, the physical reconstruction of the services apparatus can only take place gradually. When services are already present, the resistance of at least a part of the population to the transfer of these services allows little room to manoeuvre in the execution of the Centres Plan.
 - 3 The situation on the new land is more propitious and signs would indicate that the Centres Plan can be implemented more rapidly there. The fact that favourable results have already been achieved is apparent, among other things, from the rapid settlement of the Groot Henar Polder.
 - 4 It has been observed that a spontaneous concentration of services has occurred in several places, e.g. in Paradise. In such cases, when Government support is lacking, for instance in compiling and implementing a responsible town plan, a chaotic situation threatens to develop which can only be reconstituted later with great difficulty and at great expense.
 - 5 The Centres Plan was merely a preliminary sketch of the physical structure of the services apparatus in the rural areas of Surinam. Such a plan needs regular adjustment, as has been made clear from the regional plan drawn up by the European Development Fund in 1964, which further elaborated and extended the Centres Plan compiled in 1957 by the Bureau of National Development.
- Before old plans are adapted and improved, an investigation should first be carried out to evaluate what progress has been made. Such an investigation has scarcely been undertaken in the case of the Centres Plan.

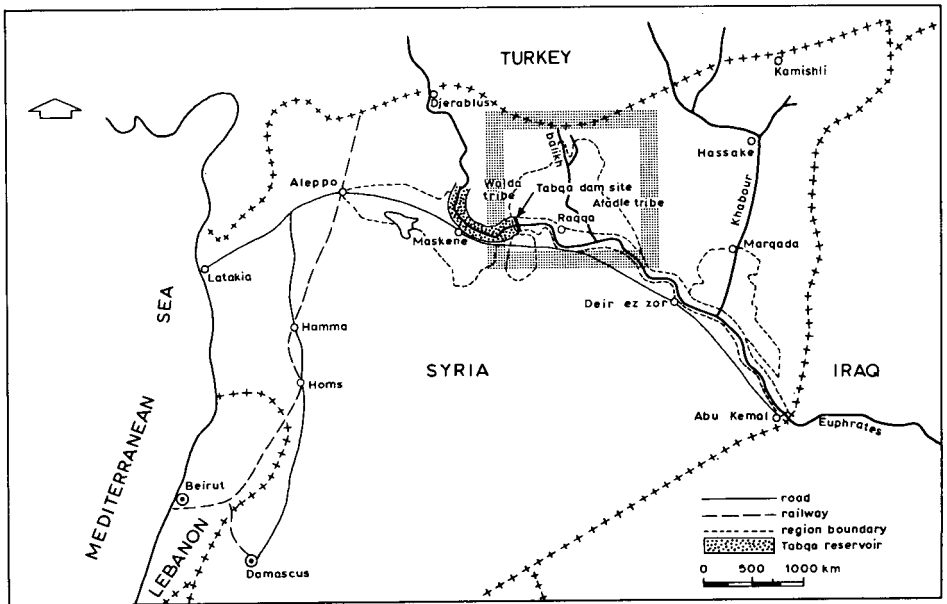


Fig. 7 Syria location map

II. 3 SYRIA

II. 3.1 INTRODUCTION

The Syrian Government has, for some considerable time, been working on plans to develop the area on the middle reaches of the Euphrates. The Euphrates Project Authority has been set up, with the specific task of preparing and executing development plans for this area. A dam is to be built in the Euphrates which, by generating electricity and allowing large tracts of land to be irrigated, will foster the development.

One of the first investigations conducted by the Euphrates Project Authority was a topographical study undertaken by Russian experts. This study indicated several possible sites for the dam. A detailed investigation of these sites by a Swedish firm led to the choice falling to Tabqa (Fig. 7).

A soil investigation carried out by Dutch experts in 1963 showed which areas were suitable for irrigation, from the point of view of their topographical situation and their soil conditions. Included in the report on this investigation was a scheme showing the system of irrigation canals that would be required.

That same year, the Euphrates Project Authority commissioned the Netherlands Engineering Consultants (NEDECO), represented by the International Land Development Consultants (ILACO) and the Netherlands Economic Institute (NEI), to study what social and economic consequences would arise from the construction of the dam and from the development of the areas that would be irrigated.

Included in this study was the question of what this vast project, whose total cost was estimated to be US \$900 million, would contribute to Syria's economic development on a national and regional level.

The team of experts who were to carry out this commission visited Syria from April to November 1963, and presented their report, entitled 'An Agro-Economic and a Socio-Economic Evaluation of the Euphrates Project', to the Syrian authorities in August 1964. The Euphrates Project is of such magnitude that, although it might be called a regional development plan, its execution will have such a vast effect on the national development of Syria as a whole that it has a far greater significance than is normally the case with regional plans.

The Project also devoted its attention to the spatial planning of settlements and socio-economic services in the new agricultural areas.

The soil investigation covered an area of 1,350,000 hectares, of which 536,000 hectares in six different regions were found suitable for irrigation.

The following Case Study will demonstrate how the guidelines discussed in Part I were applied under the conditions obtaining in the area on the middle reaches of the Euphrates. The Centres Plan compiled for Irrigation Region 1, situated around Raqqa (Fig.7), will be used as an illustration.

It must be emphasized that the information on the present situation is based on data obtained in 1963.

II. 3.2 ANALYSIS OF THE SETTLEMENT PATTERNS IN THE EUPHRATES VALLEY

The settlement patterns will be analyzed on the basis of data gathered by the various members of the team.

II. 3.2.1 *Physical aspects*

Irrigation Region 1 is situated on either side of the Balikh, a river flowing south from the Turkish border and joining the Euphrates just to the east of Raqqa (Fig.7). The Balikh valley varies in width from 1 to 5 km and divides the Irrigation Region into eastern and western halves. The valley is narrow in the south, with a sharp escarpment on its western side; it broadens considerably between Hazima (Centre No. 35) and Tell el Semen (Centre No. 11), narrows again, then broadens once more in the most northern part of Region I (Map VI).

In the western half lies the Wadi el Feid, situated in a broad valley which contains a large part of the area intended for irrigation. To the north of Raqqa is a small plateau which has been earmarked for irrigation, and a hilly area which will remain uninhabited. There are two extinct volcanoes in the softly undulating eastern half.

II. 3.2.2 *Socio-economic aspects*

The valley of the Middle Euphrates belongs in one of the world's oldest areas of civilization. Now, however, except for a number of sometimes imposing ruins, there is but little to be seen of this glorious past.

At present, 90 % of the population in the Middle Euphrates area lives in the valley and is engaged mainly in cotton growing, which has undergone a very rapid development over the last 20 years.

The high cotton prices have made it an interesting proposition for entrepreneurs, most of them businessmen from Aleppo, to invest their money in agricultural development. If the irrigated area was formerly confined to the banks of the Euphrates, nowadays – and certainly around Raqqa – the greater part of the valley is irrigated, and near the villages of Hamret Ghanam (43) and Hamret Balisim (44), powerful pumps recently installed, drive irrigation water tens of meters up to the plateau.

From 1952 to 1962, the area under cotton in the Mohafazat Deir ez Zor and Raqqa increased from almost 10,000 to 120,000 hectares. This development meant a radical structural change. Subsistence farming, consisting mainly of the extensive cultivation of wheat and barley and of sheep-grazing, has changed into intensive commercial irrigated cotton farming, generating a sharp increase in population by means of immigration.

If, in the valley, one can speak of a spectacular development, this is less the case on the plateau. Here, the introduction of the tractor led to large tracts of land being ploughed up and sown with wheat and barley. This dry farming, carried out under the 'mir mir' system (one year fallow, one year under crop), is coupled with great risks, at least in the area around Raqqa, as sufficient rain for a good harvest only falls once in two to four years.

Livestock farming also plays an important role in this area. Many of the villagers, living in or at the edge of the valley, keep sheep. During the period when the fields are under crop, the sheep are grazed outside the valley under the care of a shepherd who is usually employed by a number of farmers collectively.

True nomads are very rarely seen nowadays to the north of the Euphrates valley, in contrast with the area to the south, where the Fidaan tribe keep not only sheep but also large herds of camels.

People whose livelihood depends entirely on sheep rearing see their existence threatened more and more, in the area to the north of the Euphrates, by the encroaching mechanized grain farming. The fierce drought between 1958 and 1960, which decimated the Bedouins' herds, has given many people a disinclination for livestock farming, and a steadily increasing interest is being shown in agriculture. Many Bedouins are already employed in agriculture during the cotton harvest.

It is obvious from the above that the spectacular growth of irrigated cotton farming in the valley, and the serious drought in the years 1958 to 1960, have provided part of the impetus for a decision to undertake a large-scale irrigation project.

There were 12,000 people living in the rural areas of Irrigation Region I in 1960. Of

these, 6,500 lived in the Balikh valley and on the plateau around Raqqa. Raqqa itself had 15,000 inhabitants.

As the social structure has had an important influence on the settlement pattern, it will be dealt with in some detail below.

The fakhad, a patrilineal kinship group, forms the basis of the social structure in rural communities. Marriage is still mainly a transaction between families. During the first years of the marriage, the son and his wife usually live in the house of the son's father, especially if the father is a landowner.

The development of the entrepreneur-sharecropper relationship over the last ten years, and the growth of the money economy accompanying it, is tending to loosen the patriarchal ties: a son can easily become independent of his father by working away from the farm as a sharecropper.

For all that, the fakhad still functions effectively and disputes of all kinds are settled within it. The higher social unit, the tribe, has lost most of its former significance. Although the sheikh sometimes performs his duty as a judge, his importance as a political and social leader has disappeared.

On the whole, the rural community is uncomplicated and amorphous, and is based on the equality of its members. Local leadership still reposes on age and personal qualities and virtues, although land ownership is becoming increasingly important as a result of the economic changes during the last ten years. Individual landownership, a state formerly not appreciated in a system where land was communally owned, is becoming more and more attractive, and aspirations to become a land owner are increasing rapidly. Traditional values are being replaced by economic values and a more individualistic attitude is developing.

Other than the fakhad, social and economic organizations are non-existent. The coöperative movement has been introduced into Syria by the Ministry of Land Reform, but the Ministry's activities have not extended into Irrigation Region I, and most farmers know nothing of the movement.

Nor are there any religious organizations, though everybody tries to be a good Moslem. All in all, the fakhad is still the most prominent social organization.

It is against this socio-economic background that the proposed plans for the development of the Euphrates area should be seen.

II. 3.2.3 *Settlement patterns in the middle reaches of the Euphrates*

A distinction can be made between the settlement patterns of the Bedouins (their villages and camps) and those of the sedentary population living in the Euphrates valley.

When the Bedouins are moving with their herds through the desert, they live in tents, which are shifted regularly from one oasis to another. Each tribe has its own grazing areas and in moving through the desert, follows certain established routes, mainly determined

by the existence and capacity of watering places. It seldom happens that tribes deviate from their routes. Thus we might speak here of a settlement pattern which varies with the season. In the places where they spend the winter, the Bedouins are building more and more stone houses for themselves.

In and around the valley where the majority of the inhabitants live, various settlement patterns are to be found, but almost always the houses are grouped together to form larger or smaller villages or hamlets.

The villages around Aleppo, however, differ considerably from those in the areas downstream of the Deir es Zor, both as to the compactness of the group of buildings and to the form of the houses.

The Euphrates valley in the Mohafazat Raqqa is narrow and is under intensive cultivation. The buildings have been grouped close together to leave as much land as possible for agriculture (Photo 5, No.1). The valley has even been depopulated in some places because the villages have been shifted to the edge of the plateau. This can be seen in Photo 5 on the north bank (Photo 5, No.2). The escarpment on the south bank (Photo 5, No.3) is too steep and eroded for habitation.

Where more space is available, as it is on the plateau, the open village structure predominates, and the villages are often built ribbon-like along the edge of the valley.

The structural basis of the village must be sought in the kinship structure. A village is first and foremost a kinship group's habitation. Proximity to farmland is of secondary importance. If more than one fakhad lives in the same village, a dividing line can often be drawn between the areas occupied by each fakhad, and not infrequently even between large family groups. These separate parts of the same village sometimes have their own names. Such a situation has evolved from the way in which the tribes originally occupied and farmed stretches of land along the Euphrates. The pattern has been broadly maintained as the sons prefer to build their houses in the immediate vicinity of their paternal home, or at least close to the homes of their near relatives.

Whether the villages are of a close or open structure, they have no geographical centre, unless it is the house (mudhif) of the village headman (mokthar) or the sheik. There is no real focus such as an open square on which the important buildings like the mosque, mudhif, shops, warehouses or market are to be found. Paths and roads form a whimsical pattern.

All this is in accord with the villagers' desire for space for their individual dwellings. A farmer likes to have room for his cattle and for his privacy, especially that of his women-folk and his married sons.

Houses are rarely built side by side in a row. When this does happen, e.g. on a large scale in some of the Land Reform villages, the farmers complain repeatedly of the lack of space. There were, however, younger people who expressed the desire for a village with houses built along streets, and other modern town-like appurtenances.

Some small concentrations of population could be observed on the plateau most of them open-structured hamlets or villages.



Photo 5 Raqqa and surroundings

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Raqqa with its 15,000 inhabitants is the only town in the area. As can be seen in Photo 5, No. 4, only part of the town lies within its old walls (Photo 5, No.5).

The road system has scarcely been developed. A bitumenized primary road (Photo 5, No.6), with which Raqqa is connected via a secondary road, runs through the Euphrates valley from Aleppo via Deir ez Zor to Iraq. A number of roads run north from Raqqa but they are nothing more than groups of tracks (Photo 5, No.7), often many kilometers wide. On the plateau it is very easy to get about, even with a car, at least in the dry season. In the rainy season traffic comes to a standstill. The valley itself has scarcely been opened up, except for the primary road, and the villages are often hard to reach.

Irrigation Region I proved to be an area where almost every form of infrastructure was lacking. The brief outline of the settlement patterns in the surrounding areas has, however, been given to show the background which, since the future settlers are expected to come from these areas, had to be taken into account when the Centres Plan was being compiled.

II. 3.3 THE CENTRES PLAN FOR IRRIGATION REGION I OF THE EUPHRATES PROJECT

II. 3.3.1 *The future development of the Euphrates area*

The economic development of Syria was, up to a short time ago, confined to the western part of the country. The most important concentrations of population and economic activity are all situated on or around the axis Damascus-Homs-Hamma-Aleppo (Fig.7).

Over the last ten years, interest has also been directed towards the interior, and to the Euphrates valley in particular. As a result, the Euphrates Project Authority has embarked upon the greatest development project ever undertaken in Syria.

By building a dam 50 m high and with a storage capacity of 12 milliard m³, by constructing a power station with a capacity of 750,000 megawatts, and by laying out an irrigation system based partly on gravity flow but mainly on lift irrigation by electrically driven pumps, the Project aims at converting 361,000 hectares of dry unproductive land into highly productive irrigated land and at improving 167,000 hectares of already irrigated valley land. As the storage lake will inundate 22,000 hectares of irrigated farm land, the net expansion of the irrigated agricultural area will amount to 339,000 hectares.

The total investment, both private and public, required up to the year 2000 will be about US \$900 million. In that year the net contribution to the national product will be of the order of US \$147 million per year.

It is thus obvious that not only does the Euphrates Project mean a total transformation of the Euphrates area, but also that it is a project which once it is implemented, will affect the national development of Syria for many years to come.

The area intended for irrigation has been divided into a number of irrigation regions. Irrigation Region I, whose total area is 525,000 hectares, has 155,000 hectares suitable for irrigation. It will be possible to establish between 18,000 and 20,000 farms in this area. These farms should be of such a size and composition that they can provide the farmer with a net annual income of US \$420 at the start of the project, and US \$840 by the year 2000.

In view of these income targets and the great land hunger which is expected around 1970, and also the farmers' present management capacity, a mixed farm of 5 hectares is proposed for 1970, comprising 3.5 hectares for cotton, 1 hectare for fodder crops and 0.5 hectare for other crops. The proportion given over to livestock farming could gradually increase as the farmers become more familiar with the handling of dairy cattle.

For the year 2000, a mixed holding of 10 hectares is proposed, comprising 5 hectares for cotton, 4 hectares fodder crops and 1 hectare other crops, as well as 5 hectare farms with intensive cultivation (horticulture etc.).

It was assumed that the people living in Irrigation Region I would all be engaged in agriculture and thus the ultimate agricultural population, when the entire irrigated area has been put to use, was estimated to be 170,000. The services population was estimated to be 30,000, which means that between 1980 and 1990 a total population of 200,000 is to be expected. The 1960 population in this area was 12,000.

When at least a proportion of the original 5 hectare farms are gradually increased to 10 hectares, which will presumably happen in the last decade of the century, the agricultural population is expected to decrease to 130,000. The population prognoses per irrigation district, compiled in accordance with the method discussed in Section I. 2.5.2, are shown in Table 8.

The dates mentioned above are naturally dependent on the date on which the execution of the project is begun and the pace at which it progresses. It is expected that the dam will be completed about 1970, after which more than 10,000 hectares of land will be brought under irrigation annually. This will be increased to 25,000 hectares annually after 1975. It has been assumed that Irrigation Region I will be completely irrigated by 1980, and the entire Euphrates Project area by 1993.

II. 3.3.2 *The Centres Plan*

Bringing 155,000 hectares of irrigated land under cultivation, on which 18,000 to 20,000 mixed farms are to be set up, as well as housing 170,000 to 200,000 people, can only be accomplished successfully if a physical and socio-economic infrastructure attuned to this development comes into being.

The first step in compiling the Centres Plan for this area was to establish the general guidelines and criteria on which the plan was to be based. This meant adapting the

TABLE 8 ESTIMATES OF THE POPULATION PER IRRIGATION DISTRICT IN IRRIGATION REGION I (SYRIA)

Irrigation district	Net irrigable area	Average size of farms in ha.	Number of farms	Estimated optimal population			Total
				In agriculture farmers and families	labourers, tractor-drivers and families	In services	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	2,420	10	242	1,331	665	352	2,349
2	4,145	10	415	2,283	1,142	604	4,028
3	5,160	10	516	1,838	919	486	3,243
4	9,440	10	944	5,192	2,596	1,374	9,162
5	5,450	10	545	2,998	1,499	793	5,290
6	11,745	10	1,175	6,460	3,230	1,709	11,399
7	5,530	10	553	3,041	1,521	805	5,367
8	2,760	10	276	1,518	759	402	2,679
9	2,445	10	245	1,345	673	356	2,374
10	3,770	10	377	2,074	1,037	549	3,660
11	7,565	10	757	4,164	2,082	1,102	7,348
12	1,050	10	105	578	289	153	1,020
13	3,160	10	316	1,738	869	460	3,067
14	3,060	10	306	1,683	842	445	2,970
15	2,720	10	272	1,496	748	396	2,640
16	3,530	10	353	1,942	971	514	3,427
17	3,220	10	322	1,771	886	469	3,126
20	660	5	132	726	363	192	1,281
21	1,690	5	338	1,859	930	492	3,281
22	420	5	84	462	231	122	815
23	transit						
24	785	5	157	864	432	229	1,525
25	4,125	5	825	4,538	2,269	1,201	8,008
26	5,785	5	1,157	6,364	3,182	1,684	11,230
27	2,035	5	407	2,239	1,120	593	3,952
28	920	5	184	1,012	506	268	1,786
29	8,505	5	1,701	9,356	4,678	2,476	16,510
30	2,605	5	521	2,866	1,433	758	5,057
31	4,900	5	980	5,390	2,695	1,426	9,511
32	3,695	5	739	4,065	2,033	1,076	7,174
32A	8,000	5	1,600	8,800	4,400	2,328	15,528
33	2,200	10	220	1,210	605	320	2,135
34	14,535	10	1,454	7,994	3,997	2,115	14,106
35	9,150	10	915	5,032	2,516	1,331	8,879
36	10,925	10	1,093	6,009	3,005	1,590	10,604
37	7,100	10	710	3,905	1,953	1,033	6,891
Total	165,205		20,866	114,143	57,076	30,213	201,432

guidelines discussed in Section I. 2.3, to the specific conditions obtaining in the area on the middle reaches of the Euphrates, and the results were as follows:

- The social and economic services were to be grouped together in centres.
- Three types of centres were distinguished:
 - 1 Primary centres whose radius of action would be approx. 4 km, and whose population would be 3,000 to 5,000;
 - 2 Secondary centres whose radius of action would be 15 to 20 km;
 - 3 Tertiary centres whose service areas were predetermined by the borders of the Moh-fazat (province).
- The administrative service areas of the primary centres should coincide as far as possible with the irrigation districts.
- The system of roads should be interrelated with the irrigation systems so that they can be utilized for field controls of water management; primary roads may be autonomous in this respect.
- The interrelationships between the different types of centres and the types of road must be kept in mind(Section I. 2.3.4).
- The road network within the service area of a primary centre should be designed in such a way that with the fewest possible kilometers, the following conditions are met:
 - 1 each lot lies on a quarternary road;
 - 2 farms are connected as directly as possible with the hamlets;
 - 3 hamlets are connected as directly as possible with the primary centre under which they resort;
 - 4 secondary irrigation works are readily accessible so as to facilitate rapid inspections;
 - 5 quarternary roads are constructed in such a way that they can be converted into tertiary roads at a later date.

The guidelines for compiling a centres plan at regional level, as given in Section I. 2.4, were put into practice in this case in the following way:

a With the aid of aerial photographs, scale 1: 10,000, and topographical maps, 1 : 25,000 and 1 : 100,000, field reconnaissance was carried out to get an idea of the country and the distribution of the population and social services.

These data were noted on working maps, but the sparsity of both population and services made it superfluous to compile a map showing their distribution, although a map showing the most important of the existing centres was compiled (Map VI). These were nearly all potential primary or primary centres.

b A socio-economic investigation was simultaneously carried out. From the information

thus obtained, an analysis was made of the socio-economic structure in the middle reaches of the Euphrates, of which a brief summary has been given in Section II. 3.2.2.

c Various aspects of the future development were known. These were:

- the layout of the irrigation system;
- how the area to be brought under cultivation would presumably be divided into irrigation regions;
- the area to be irrigated in each irrigation region;
- the location of the areas to be irrigated (Map VI).

d With the aid of the above data and the already mentioned criteria, the Centres Plan was drawn up. In doing so, an attempt was made to place the local centres in each irrigation region so that:

- the area to be irrigated would be covered as effectively as possible by theoretical service areas, without too much overlapping;
- the already existing centres would be utilized as effectively as possible;
- the conversion of theoretical service areas into administrative service areas, on the basis of the irrigation districts, would create no serious problems.

In this way, a total of 54 centres were planned to provide the socio-economic services in the irrigation regions. Table 9 shows how the centres situated in Irrigation Region 1 (a total of 52, 2 being outside the Region) are distributed through the irrigation districts. Of these centres, one is a tertiary centre (Raqqa), and four are secondary centres, two of which are those just mentioned as being outside the Region.

From the pattern of centres shown on Map VI, the road network could be determined. A secondary road was projected along the escarpment of the valley, from Sweidiye Kebire (1) via Raqqa (27) to Jdeidet Khabour(52). A number of secondary roads would run north from Sweidiye Kebire (1) Raqqa (24) and Kezla (45), which would be connected with one another individually.

Those primary centres not yet opened up were then linked to this secondary road network by tertiary roads. The entire road system was connected to the national road network by means of two river crossings at Tabqa (53) and Raqqa(24), giving access to the primary road running from Aleppo to Deir ez Zor. In the future, it is expected that a road branching off the primary road and running from Aleppo to Hasseke in the north-eastern part of Syria will be built.

II. 3.3.3 *Elaboration of the settlement pattern for one irrigation district*

The Centres Plan could not be further elaborated as the layout of the secondary and tertiary irrigation systems was not yet known. Nevertheless, to give an idea of how one might set to work in further elaborating a Centres Plan, the settlement pattern in one

TABLE 9 THE CENTRES IN IRRIGATION REGION I (SYRIA)

Irrigation district	Population expected (in round figures)	Centres serving the irrigation districts*) Existing centres	New centres
(1)	(2)	(3)	(4)
1	2,400	Sweidiye Kebire (1) Kediran (21)	
2	4,000		(2)
3	3,200		(3)
4	9,200	Stayan (4) (reg. centre)	(5)
5	5,300		(6)
6	11,400		(7)
			(8)
			(9)
7	5,400	Tell es Samen (11)	(10)
		Tel es Samen (11)	
8	2,700		(12)
9	2,400	Sharkrak (17)	(12)
10	3,700		(13)
11	7,300	Tell es Samen (11) Mohammed el Khalaf (15)	(14)
			(20)
12	1,000	Sharkrak (17)	
13	3,100		(16)
14	3,000		(16)
		Sharkrak (17)	
		Ali Bajiliye (18)	
15	2,600	Ali Bajiliye (18)	
16	3,400	Hamman el Turkman (19)	
17	3,100	Hamman el Turkman (19)	
			(20)
20	1,300	Sweidiye Kebire (1)	
21	3,300	Kediran (21)	
22	800	Selhabiye (22)	
24	1,500	Selhabiye (22)	
25	8,000	Selhabiye (22)	
26	11,230	Gatuniye (23) Jazra (24) Bir Hasham (25)	
27	4,000		(26)
		Raqqa (27)	
28	1,800	Selhabiye (22)	
			(31)
29	16,500		(28)
			(29)
			(30)
30	5,109		(31)
31	9,500		(32)

TABLE 9 (continued)

32	7,200		(33)
32A	15,500	Hazima (35) Kheiwet Abid (36) Er Rahyat (37) Masjid Nkeib (27a) Hamret Ghanam (43)	(34)
33	2,100		(38)
34	14,100		(39)
			(40)
			(41)
			(42)
35	8,900	Hamret Ghanam (43) Hamret Balasim (44) Kezla (45) (reg. centre)	(46)
36	10,600	Fatset Dib (47)	(48)
			(49)
		Musheirafet es Shanet (50)	(51)
37	6,891	Ideidit Khabour (52)	(51)
		Ideidit Khabour (52)	

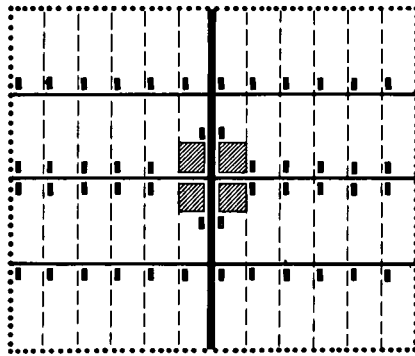
*) The centres are indicated by name and/or number in this table and by number only on Map VI

irrigation district, that of Primary Centre 6, Irrigation Region I, will be gone into in detail (Map VII). The irrigation experts provided a tentative layout of the irrigation system, on which the settlement pattern could be based.

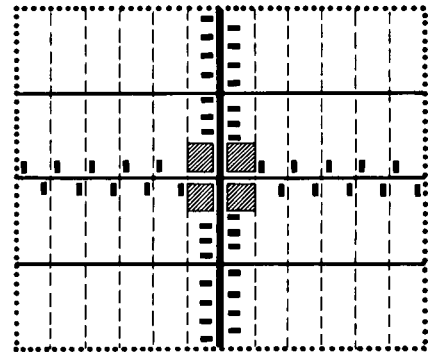
First of all, it had to be decided what settlement forms were to be established. In 1963, almost the entire population lived grouped together in hamlets or villages. In the future, however, i.e. after 1980, the significance of the mixed farm must increase if the projected minimum income is to be attained. But a mixed farm demands a dispersed settlement, with the farmer living on his land, if extensive, inefficient farming is to be avoided. Various types of settlement were considered (Fig.8).

A search was made for a settlement form that would be sufficiently flexible to permit a development in the direction of dispersed settlement. It was therefore proposed that the farmers should live in small hamlets (hamlet system, type 3, Fig.8). These hamlets could coincide with the social unit (the fakhad). A group of hamlets could be served by one local centre.

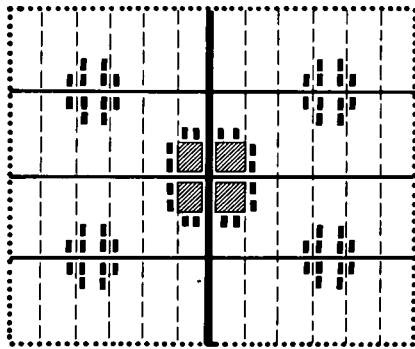
When choosing the sites of the hamlets, an attempt was made to have the farms of the inhabitants of one hamlet coinciding with one irrigation section. In this way it was possible, right from the outset, to have a considerable number of farmers living on their farms, and to have not one single farm plot more than 2 km away from the hamlet. These hamlets could, where necessary, function as additional primary centres.



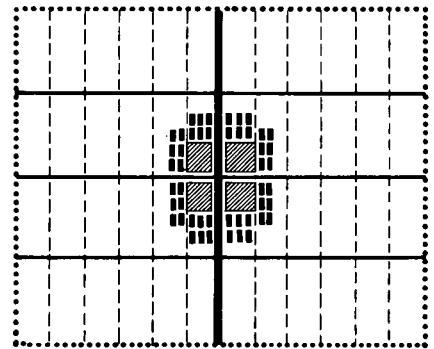
type 1
ribbon system



type 2
concentrated ribbon system



type 3
hamlet system



type 4
village system

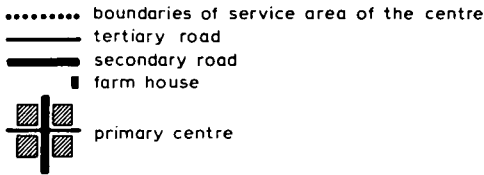


Fig. 8 Possible types of settlement within primary centres

It was considered inadvisable to spend too much on the construction of houses, as this would hamper a change of residence in the future. This factor was also important considering that part of the population would presumably have to shift once more after 1980, when the proposed enlargement of farms takes place. By situating the hamlets close to the local centre, the distance to the socio-economic units was kept to a minimum.

Wherever possible, primary and additional primary centres were projected on sites not intended for irrigation.

The results obtained from applying these guidelines, as well as the criteria and guidelines for projecting a road network (Section I. 2.3.4) are shown on Map VII.

Detailing the Centres Plan at local level, i.e. compiling town plans for the various centres, falls outside the scope of this regional plan.

II. 3.4 *Some concluding remarks*

It is clear from the above that even in an area where the physical infrastructure is a *tabula rasa*, many limiting factors do, nevertheless, exist. The entire set up of the Centres Plan was determined by the layout of the irrigation system and by the current social structure on the old land, from which the future inhabitants of the new land are to be drawn. This social structure is so closely bound up with the settlement pattern that any radical change in the settlement pattern was considered inadvisable.

The close tie-up with the irrigation network was due not only to technical matters, but also to social and administrative considerations.

At present, the kinship group is the most important social unit, whereas in a modern agricultural community, the territorial group (village, irrigation district) and the special-interest group or association (irrigation district, coöperative) predominates.

By having the settlement pattern coincide with the organizational units of the irrigation system (irrigation districts and sections), the first geographical basis has been laid for the creation in Syrian society of new social groups which are significant for the development of a modern agriculture.

The proposed Centres Plan can also play its part in the further integration of Syrian society. In the Euphrates area there are still a number of different tribes, each with its own tribal territory officially established by the French to put an end to the many tribal feuds. Although the tribe may have lost much of its functional value, it still plays an emotional role which should not be underestimated. In establishing the new settlers, a certain integration of fakhads could be brought about, which in course of time might even lead to the integration of tribes. The territorial group may eventually become more significant than the kinship group.

Nevertheless, this integration must not be forced. It would be unwise, for instance, to bring together in the same village members of the Affadles and Walda tribes, both of which occur in Irrigation Region I (Fig.7) and each of which maintains a certain aloofness towards the other. For the time being, their integration will have to be confined to the secondary centre level.

Bringing members of different tribes together, prematurely, in one and the same village has led to serious conflicts in the past.

Three integration levels have therefore been provided for in the proposed Centres Plan: the hamlet, the primary centre and the secondary centre. It would seem justified to expect that this will guarantee a gradual process of integration and that clashes between the tribes will be avoided.

The construction of the Euphrates Dam – which initially met with certain delays due to problems concerned with its financing – is, according to recent reports, progressing satisfactorily. Whether the Centres Plan will be implemented has, however, not yet been decided.

II. 4 MALAYSIA

II. 4.1 INTRODUCTION

In 1967 the Dutch company NEDECO-ILACO (Netherlands Engineering Consultants – International Land Development Consultants) was commissioned by the Malaysian Government to compile a regional plan for the State of Trengganu (Fig.9).

An ILACO team operated in the field from May to November, 1967, and at the end of 1969 the regional plan was submitted. The aim of this plan for the State of Trengganu was to accelerate the development of this economically backward member-state of the Malaysian Federation. Within the scope of the plan, suggestions were made as to what spatial structure of the settlement pattern and the service apparatus would stimulate the proposed development.

In the following Case Study it will be shown how the criteria and guidelines discussed in Part I. Section 2, have been applied in this particular case, using as an illustration the Centres Plan for Besut, one of the six administrative units of the State of Trengganu.

II. 4.2 ANALYSIS OF THE SETTLEMENT PATTERNS IN TRENGGANU, WITH SPECIAL ATTENTION TO THE BESUT DISTRICT

II. 4.2.1 *Physical aspects*

Trengganu is situated on the east coast of the Malay Peninsula. It is one of the higher parts of the Sunda platform and is characterized by mountains and hills, rising abruptly from flat plains of deep alluvium. Mountains form an ever-present background to the

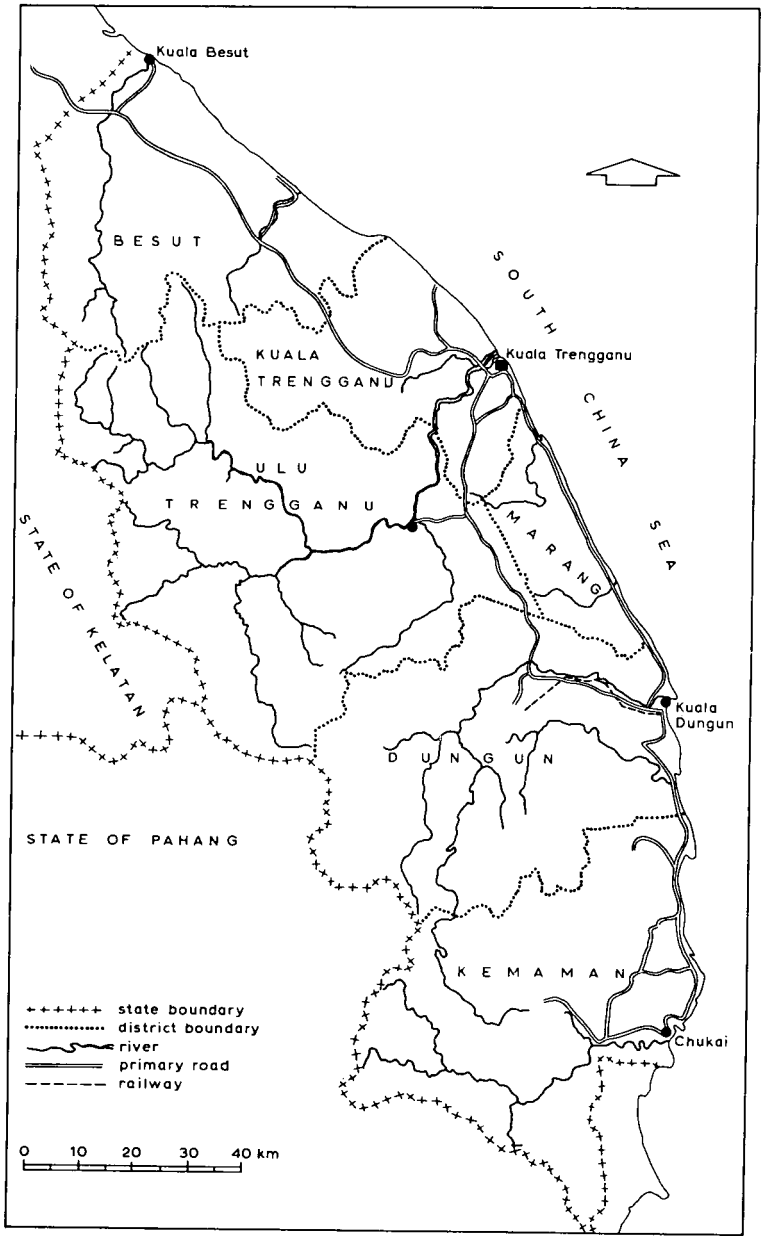


Fig. 9 State of Trengganu location map

populated plains. Maturely dissected, they are not rugged, barren peaks, but are subdued to a general roundness and are covered with forest.

The mountain ranges project southward from the Thai border, diverging from north to south. The ranges to the east of the Central Range are discontinuous and much broken by drainage lines. In the Kelantan-Trengganu-Pahang border area the system merges with the dissected Trengganu plateau (Ginsburg 1958, p.2-3).

At the foot of the mountainous and hilly hinterland on the eastern side of the peninsula is a coastal plain with an average width of 20 miles. In Trengganu this plain is dissected by many rivers which, particularly in the monsoon period, carry off great quantities of water and sometimes cause serious damage by flooding. The rise in sea-level over the last millennia has caused the fall of the rivers to diminish, with the result that drainage, far into the interior, is poor. In the higher valleys of the rivers one also often encounters areas with a surplus-water problem, due to a narrowing of the river bed.

Apart from the few areas where mountain spurs project to the coast, a strip of dunes and sand flats varying in width is found along the entire coastline, behind which there are often extensive and sometimes deep (up to 10 meters) swamps.

II. 4.2.2 *Socio-economic aspects*

Trengganu was, until recently, one of the most isolated areas in Malaysia. Much of the overseas influence to which the west coast of Malaysia was exposed, such as British colonial rule and the immigration of Chinese and Indians, either did not reach this state or did so only at a much later period. Thailand's suzerainty over this area was not taken over completely by the British authorities until 1902. But even under British rule, this area remained outside the mainstream of development that took place elsewhere in Malaysia.

A road from the west coast to Trengganu was completed in 1958, but fast communication with the other states of the Federation, as well as in Trengganu itself, has only been possible since 1965 when many ferries were replaced by bridges.

Its former isolation is also reflected in the composition of the population. The floods of Chinese and Indian immigrants, which were a result of the rapid development of mining and plantations on the west coast, scarcely reached Trengganu. The population of the state in 1957 consisted of 92 % Malays, 7 % Chinese and 1 % Indians. For the Federation as a whole, the ratio was 50 % Malays, 37 % Chinese and 11 % Indians.

The inhabitants of Trengganu live predominantly in the coastal belt and on the alluvial areas along the large rivers. They live grouped together in kampongs (village, hamlet) of various sizes.

Of the kinship groups, only the nuclear family is of importance. It has a significant socio-economic function as it is the organizational unit responsible for the majority of the present agricultural production. Outside the nuclear family, kinship ties are of importance

TABLE 10 SETTLEMENT PATTERNS IN TRENGGANU (MALAYSIA)

Types of settlement patterns	Type No.	Parcellation Size lots	Parcellation Patterns
Settlement patterns in areas with shifting cultivation or semi-permanent agriculture	I	Average size less than 2 acres	Irregular form of lots scattered in the forest
Settlement patterns in areas with permanent traditional small-scale agriculture	II	Average size 3-4 acres or less	Plots have a squarish shape; farms are often fragmented
Settlement patterns in areas with modern small-scale agriculture (FLDA schemes)	III	If parcellated the size of the plots is 4 acres or more	Plots have a squarish shape in flat areas; in hilly areas they are adapted to the topography
Settlement patterns in areas with plantation agriculture	IV	Parcels of 100 acres and more	Plots have a squarish shape
Settlement patterns in areas with fishing as main activity	V	Average size 3-4 acres or less, sometimes only house lots of less than an acre	Plots have a squarish shape
Settlement patterns in areas with mining as main activity	VI		No clear parcellation visible; only the actual place of mining can be seen
Settlement patterns in areas with industry and services as main activities	VII	One acre or less	Rectangular shape

but these are often overshadowed by the relationships that result from the territorial group.

The most important territorial group is the kampong. These are small communities in which practically everyone knows one another and where, generally speaking, everyone cooperates in the interests of the kampong as a whole. One might speak here of an area of

Communication	Inhabitation	Socio-economic services	Geographical location and occurrence
Paths	Scattered small groups of houses	Practically non-existent	In the interior and at the fringe of occupied areas
Most of the houses can be reached by farm or tertiary roads, some of which are all-weather roads	In rice areas, houses clustered together; in rubber areas, tendency to linear villages	Social and economic services of a local nature, e.g. shops and schools, usually available	Majority of the occupied area is covered with this settlement pattern, which is sometimes intermingled with Type V
In FLDA schemes the centres can be reached by secondary roads. Other schemes can be reached in most cases by tertiary roads	In FLDA schemes, houses are concentrated in one village	In FLDA schemes all facilities of local and sometimes regional nature available	6 FLDA schemes in Trengganu of which two in the Besut District: Chalok and Tenang
Most plantations can be reached by secondary or tertiary roads	Workers' houses are concentrated in clusters, usually around estate yard	Social and economic services of a local nature, e.g. shops and schools, available	Mainly in the East and South of Kemaman
Most of the villages can be reached by secondary or tertiary roads	Mostly linear villages along the shore. If the village is located on or near a river, sometimes nuclear villages	Social and economic services of a local nature, e.g. shops and schools, available	Along the coast on beach ridges and at the river mouths. This type of settlement is often intermingled with Type II
Most of the mines can be reached by secondary or tertiary roads. Some even by railway lines	At the big mines, large villages. At small mines clusters of houses or barracks near the mining area	At the big mines, all services of local and regional nature available. At the small mines, little or no services available	Bukit Besi in Dungun; the small mines are mainly located in the interior of Kemaman
Dense road pattern of all-weather roads if situated on waterways with port facilities	Densely populated area with houses close together	All socio-economic services of importance available	Most important examples: Kuala Trengganu, Dungun, Chukai; smaller centres are: Jerteh, Kuala Besut, Kuala Brang, Marang, Kemasik, etc.

interest, although, because of their small number of inhabitants, many kampongs cannot function as an area of competence (Section I. 2.3.1).

The kampong has no definite institutionalized organizations. Nor can one speak of a closed community since the kampong inhabitants maintain rather close and frequent contact with relatives and friends in other kampongs. The steadily extending and impro-

ving road network is integrating the kampongs more and more into the whole fabric of society. For this reason, internal social control is decreasing.

The kampong is the smallest unit with any administrative significance, in the sense that the Mentri Besar (Prime Minister of the State) appoints a Ketua Kampong (Village Headman) over one or more kampongs. The Ketua Kampong is not paid a salary but receives an annual allowance. His status is decided more by his personal qualities than by the office he holds. He is usually regarded by the people as the *primus inter pares* but he has no formal powers to enforce his authority. The kampongs have no administratively fixed boundaries.

From the social view-point, the kampong is the most important territorial group. Administratively, the Mukim (administrative unit) is of greater significance. This territorial unit does have clearly defined, administratively fixed boundaries, which are shown on the topographical map (Map VIII). A Mukim contains a number of kampongs. The administrative officer in charge of the Mukim, the Penghulu, is the lowest grade of government official. He fulfils an important function in the everyday life of the rural population. The Mukim has no significant social function in Trengganu.

Next in the administrative order of rank is the District, headed by a District Officer. The District level is the lowest at which governmental organizations of both the Malaysian Federation and the State of Trengganu are represented. Consequently the District is the smallest administrative unit within which any significant measure of coördination can take place.

The District is followed by the State, headed by the Sultan. Government of the State is in the hands of the Mentri Besar.

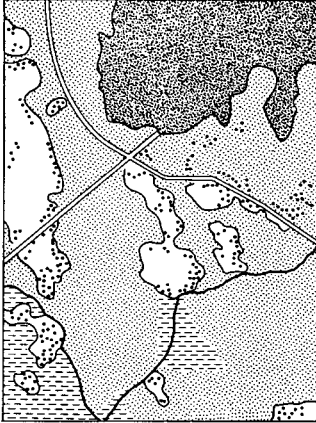
Development Committees have been established at three administrative levels: state, district and village. These Committees fulfil an important function in coördinating not only development activities, but also matters of general administration. A Development Committee consists of the heads of the various government services as well as representatives of the people.

In 1957, 60% of the male working population was engaged in agriculture, mostly on holdings of less than 10 acres. Economically, Trengganu is dependent to a great extent on mining, which is concentrated mainly around the Bukit Besi Mine in the Dungun District, where both tin and iron are found.

II. 4.2.3 *Settlement patterns in Trengganu and Besut*

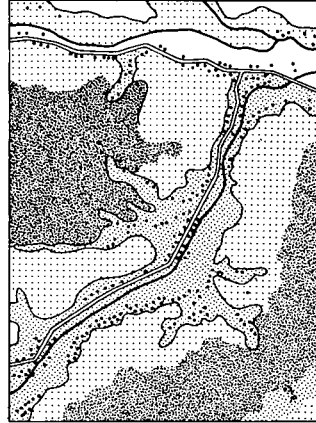
Seven settlement patterns under which the settlements in Trengganu can be broadly classified are given in Table 10. This is merely a rough outline which may be refined further. A description of the settlement patterns found in the Besut District is given below. Settlement Patterns IV and VI do not occur in Besut. The names mentioned in the text refer to Map VIII.

SETTLEMENT ON PLAINS



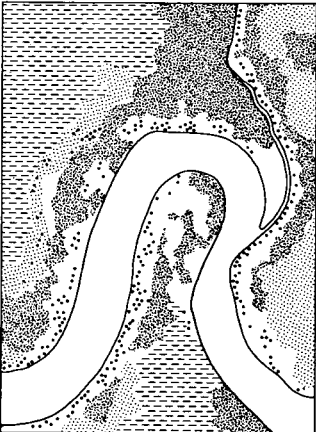
- structures
- == roads
- ~ contours
- streams

VALLEY SETTLEMENT



- fresh water swamp
- paddy
- rubber
- forest

LEVEE SETTLEMENT



- structures
- streams

COASTAL SETTLEMENT



- fresh water swamp
- mangrove swamp
- paddy
- forest

Fig. 10 Malay settlement: Ginsburg, M. and Ch. T. Roberts, 1958



Photo 6 Jerteh and surroundings in Besut
 Reproduced by permission of the Director of National
 Mapping, Malaysia. Government Copyright Reserved

Pattern I.

Settlement patterns in areas with shifting cultivation or semi-permanent agriculture
 Shifting cultivation in its pure form does not occur in Besut. Nevertheless, along the fringes of the area that is at present under permanent agriculture, there are areas which are being used semi-permanently, e.g. in the upper reaches of the Sungei' Anga in Besut and along the main road between Kampong Bintang and Kampong Ulu Chalok. It is assumed that here one has to do with a transitional phase. Once the land is definitely allotted to the inhabitants, the traditional small-scale agriculture will soon develop.



Photo 7 FLDA Scheme Tenang in Besut
Reproduced by permission of the Director of National
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Pattern II.

Settlement patterns in areas with permanent traditional small-scale agriculture
A distinction can be made here between settlements in flat areas where rice in particular is grown (Padi Settlements; Ooi Jin Bee, 1964) – (also called Settlements on Plains; Ginsburg, 1958) (Fig. 10) – and those settlements in areas with a varied topography where various kinds of crops are grown (Settlement in Cash Cropping Areas and Mixed Cultivation Areas; Ooi Jin Bee, 1964) – (also called Valley and Levee Settlements; Ginsburg, 1958 Fig.10).

The first type of settlement pattern is found especially in the delta of the Sungei Besut (See Photos 6 and 8), where the large majority of the population lives, and also along several small rivers. Rice is the predominant crop (Photo 6, No.1). On the higher parts alongside the dusun (a holding planted with vegetable crops and fruit trees) (Photo 6, No.2; Photo 8, No.1), rubber is also found (Photo 6, No.3). These settlement forms are characterized by a squarish field pattern and an open cluster form of habitation concentrations.

The other settlement pattern is to be found along the middle reaches of the Sungei Anga and the Sungei Besut and in the higher parts of the Besut District, particularly along the main road from Kampong Batu Balai to the district border with Kuala Trengganu. The form of the plots in these areas is more irregular: as well as compact settlements there are many linear villages and even some dispersed settlement. Not only is rice grown in these areas but also a great deal of rubber and other crops such as maize and pineapples.

A third variant of the settlement pattern is to be found in those areas recently settled by the government (Photo 8, No.5). This variant is distinguished principally by the systematic layout of the villages.

Pattern III.

Settlement patterns in areas with modern small-scale agriculture

This type of settlement is to be found in two schemes implemented by the Federal Land Development Authority (FLDA): Chalok and Tenang (See Photo 7). This Authority is successfully developing modern small-scale agricultural holdings throughout Malaysia. One of the most notable features of these settlements is the compact residential concentrations (Photo 7, No.1), which are larger than those found elsewhere. The centres have been made easily accessible and are provided with all the important socio-economic services.

Pattern V.

Settlement patterns in areas with fishing as the main activity

This settlement pattern (Photo 8, No.2) is found along the entire coast of Trengganu, usually on the sand ridges which often rise abruptly out of the sea (Photo 8, No.3). Except in a few places such as Kuala Besut (Photo 8, No.4), this area was until recently one of the most inaccessible parts of Trengganu, partly due to the swamps which exist in many places behind the shore. A considerable improvement is taking place at the moment in opening up this area.

It is difficult in aerial photographs to distinguish the borders of the plots situated on the sand ridges; this is a much simpler matter when people are engaged in rice cultivation.

The fishermen's houses are built either in a long row along the beach, e.g. in Kampong Nangkok, or in open clusters, sometimes of considerable size, e.g. in Kampong Bari Kechil and Kampong Bari Besar (Map VIII). Kuala Besut and Kampong Ajar Tawar have become compact settlements (Photo 8, No.6).

Mapping, Malaysia. Government Copyright Reserved

Photo 8 Mouth of the Sengei Besut



Pattern VII.

Settlement patterns in areas where industry and services are the main activities. The most important centre in the Besut District is Kampong Rajah (Photo 8, No.7), where many social and administrative service units are located. In Jerteh (Photo 6, No.4) and Kuala Besut (Photo 8, No.6) there are many economic services such as a market, shops etc. Typical urban centres do not exist in Besut.

In addition to those centres already mentioned, there are also a number of small primary service centres in the agricultural area.

After an inventory was made of the socio-economic services (Map IX), it was possible to classify the existing concentrations of service units. The criteria for this classification, which was based on the service units present in a certain concentration, are given in Table 11; the results of the classification are shown on Map X.

TABLE 11 CLASSIFICATION OF PRESENT CONCENTRATIONS OF SOCIAL AND ECONOMIC SERVICES (MALAYSIA)

Type of service unit	Types of existing service centres						
	Kampong	Potential primary centre	Full primary centre	Potential secondary centre	Full secondary centre	District centre	State centre
Surau	x	x	x	x	x	x	x
Masjid	0	x	x	x	x	x	x
Shop	x	x	x	>10	>20	>20	>40
Primary school		0	x	x	x	x	x
Clinic		0	x	x	x	x	x
Balaraya		0	x	x	x	x	x
Police station		0	0	0	x	x	x
Secondary school				0	x	x	x
Sub Health Centre				0	0	x	x
Market				x	x	x	x
Postal agency				0	0	x	x
District office						x	x
Other services of importance for entire district						x	x
Services of importance for entire state							x

x The service has to be available

0 One or more of these services have to be available, but not all of them are needed for a service centre of this type

> The number of service units mentioned, or more, have to be available

II. 4.3 THE CENTRES PLAN FOR THE BESUT DISTRICT

II. 4.3.1 *The future development of the State of Trengganu and the Besut District*

Trengganu's resources are rather limited. Some of its more unfavourable conditions are its geographical location and long lines of communication with the more prosperous west coast, its mountainous hinterland, the strong influence of the North-East Monsoon and the absence of good natural harbours.

As a consequence, the productivity and hence the income of the Trengganu population are lower than the average for the Federation as a whole. In turn, these relatively low levels of productivity and income are attended by relatively low levels of education and training, and by a limited availability of management skill.

In view of these circumstances, the strongly agriculturally orientated State of Trengganu will, in the next two decades of its development, still be greatly dependent on the growth of its natural production potential. This potential lies principally in agriculture and forestry. The future of mining, which is at present still of considerable significance, is uncertain due to the inferior quality of the ore and the high cost of production.

The proposed development strategy for Trengganu, therefore, is directed primarily towards agricultural development. To guarantee rapid progress and to make it easier to attract capital, large-scale agricultural undertakings are particularly envisaged. These could be set up by private enterprise, by semi-governmental organizations such as the State Economic Development Corporation (SEDC), by joint ventures between the two, or by the Federal Land Development Authority (FLDA). Consideration is also being given, however, to small-scale agriculture – whose further development will be stimulated particularly in the period after 1980 – as well as to forestry.

Even if production in the fishing industry remains the same a considerable decline in the number of fishermen is to be expected. Coastal fishing is still the most important form at present, but the development of trawler fishing which will operate further out to sea is being planned.

The establishment of new industries or the expansion of existing ones for the processing of products from agriculture and forestry should create favourable conditions for industrial development, which will be of particular importance after 1990.

Through education, training and extension work, the people will be prepared for the part they will be required to play in carrying out the development plan.

The entire services apparatus will have to be constructed in a way that will support this development, and the spatial planning of this apparatus must be adapted to fit in with the whole.

Within the framework of development planned for Trengganu, the developments to be expected in Besut are outlined broadly below. This outline is restricted to those aspects which are important to the Centres Plan (Map X).

Agriculture

The first stage — a project which is already under way — is to improve the irrigation of rice in the Sungei Besut Delta. At a later stage a number of large agricultural holdings will be established, primarily for the cultivation of oil palms. Small agricultural holdings will eventually be established around the borders of the large estates, and these small holdings in close coöperation with the large estates, will also cultivate oil palms. The palm oil factories will be located on the large estates (Map X). Such nuclear estates for palm oil production are based on the same principle as that described for the banana nuclear estates in Nickerie (Section 2.3.2). Several expansions in acreage have also been planned for small-scale agricultural holdings for the cultivation of crops other than oil palms.

Forestry

Exploitation of the extensive forestry area of Trengganu is planned, in so far as the forests need not be left intact to serve as watershed protection, and provided the area offers a good production potential. The proposed production of timber in this area is great enough to warrant one of the three modern, large-scale integrated forest-industry-units planned for Trengganu being placed in Besut. Such a unit includes not only a sawmill but also a factory for the production of pre-fabricated houses, plywood and veneers. This unit has been projected in Jerteh and according to the regional plan will commence operations round about 1986.

Fishing

As a result of the introduction of more efficient methods of fishing, and of the fact that coastal fishing is practised so intensively at present that the limit of over-fishing has almost been reached, a fairly considerable decline in the number of fishermen will have to be expected in the future. In spite of the fact that a new type of fishing is proposed — the so-called trawler fishing, which means larger boats operating further out to sea — this will not contribute to employment. Kuala Besut is to be one of the harbours where Trengganu's trawler fleet will be stationed. This will bring with it a number of additional activities: the erection of an extensive fish market, the establishment of a fish-processing factory, the construction of storage facilities for the fish-processing industry and the setting up of work and repair shops.

Mining

The only mineral deposits known at present which could eventually be considered for exploitation are at the Kelantan border. It is doubtful whether the anticipated off-shore mining will have any direct effect on the development of the Besut District.

Secondary sector

Apart from the above-mentioned processing industries connected with agriculture, forestry and fishing, no sizable undertakings are to be expected in the secondary sector.

Tertiary sector

This development will have to be attuned to those developments expected in the primary and secondary sectors.

II. 4.3.2 *The Centres Plan*

The first step taken in compiling the Centres Plan for Besut was to adapt the criteria and guidelines (Section I. 2.3) to the situation in Malaysia, and Trengganu in particular. It was recommended that here too the Government should as far as possible change over to a policy of concentrating social and economic service units.

Set out in Table 12 are the different types of centres, their radii of action, the population they will cater for in the future, their relationship to the road network, and the service units they should contain.

In compiling the Centres Plan, the following data were utilized:

- 1 A map showing the present land use. (This map has not been included in this publication).
- 2 A map showing the distribution of the population based on figures collected by local government officials in 1967 (Map VIII). In contrast with the map of Nickerie where the distribution of the population is shown in areas indicating the population density, here the number of inhabitants is indicated by dots, each representing 50 people. This method is preferable as it gives a clearer picture of the actual distribution of the population.
- 3 A map showing the geographical distribution of existing economic services, based on a field investigation conducted in 1967 (Map IX).
- 4 An analysis of the various settlement patterns and a classification of the existing concentrations of service units (Section II. 4.2.3, Table 11; Map X).
- 5 A map showing the various agricultural development plans; by comparing this with the present land use map it was possible to get an idea of the projected future land use and the future distribution of the population. (Map X).

On the basis of this information, combined with the criteria set out in Table 12 and the guidelines given in Section I. 2.4.3, the following action was taken:

- a Circles with a radius of 2 miles (the radius of action of a primary centre) were drawn on a map around the existing concentrations of service units.

From the nature and number of the services present, it was determined which of the concentrations could fulfil the function of primary centre in the future. In choosing these primary centres, an attempt was made to select them in such a way that their theoretical service areas would not overlap to any great extent. It will be seen, however, on Map X that the selected future primary centres in the area around Jerfeh overlap considerably. In spite of this fact, there are still other potential primary centres but these do not qualify for further development and, in fact, have been recommended for a reduction in function; in other words, in the future they will fulfil merely the function of additional primary centres.

This situation is the result of the very great density of population in this area and of the fact that an extensive services apparatus has already been established in this region.

The overlapping was considered acceptable because if the two-mile radius of action is

TABLE 12 FUNCTIONS AND CHARACTERISTICS OF THE SEVERAL TYPES OF SERVICES CENTRES

Characteristics	Additional primary centre (Kampong)	Primary centre
General function	to assist primary centres in providing services needed daily	to provide services needed daily
Average radius of action	1 mile	2 miles
Boundaries of service area	—	have to be drawn once a decision on the administrative service area is made
Population to be served	500 persons	1500-4000 persons
Relation to road system	on a quarternary road	at a junction of quarternary roads and a tertiary road
Service functions,		
Social facilities		
Surau	x	x
Masjid	—	x
Primary school	—	x
Secondary school	—	—
Balaraya	—	x
Clinic	—	x
(Sub)Health centre	—	—
Health centre/hospital	—	—
Hospital	—	—
Police post	—	x
Police station	—	—
Police Headquarters	—	—
Postal agency	—	x
Post office	—	—
District administration office	—	—
State administration office	—	—
State assembly	—	—
Economic facilities		
Shops	x	x
Market (small)	—	x
Market (large)	—	—
Workshop/pump station	—	x
Storage facilities	—	x
Rural industries (rice mill)	—	x
Other industries	—	—
Housing facilities		
Housing for farmers	x	x
Housing for service personnel	—	x
Housing for other persons	—	—

*) If a service unit of a higher order is available, the service unit of a lower order is not needed

PROPOSED FOR TRENGGANU (MALAYSIA)

Secondary centre	Tertiary centre (District)	State centre
to provide services needed frequently but not daily	to provide services at district level	to provide services at state level
± 7 miles	—	—
have to be drawn once a decision on the administrative service area is made	district boundaries	state boundaries
10.000 persons	population of the district	population of the state
at a junction of tertiary roads and a secondary road	at a junction of secondary roads	at a junction of secondary roads and a primary road
X	X	X
X	X	X
X	X	X
X	X	X
X	X	X
X*)	X*)	X*)
X	X	X*)
—	X	X*)
—	—	X
X*)	X*)	X*)
X	X*)	X*)
—	X	X
X	X*)	X*)
—	X	X
—	X	X
—	—	X
—	—	X
X	X	X
—	—	X*)
X	X	X
X	X	X
X	X	X
X	X	X
X	X	X
X	X	X
X	X	X
X	X	X
X	X	X
X	X	X

maintained the number of inhabitants catered for by a primary centre in these areas would exceed the desired maximum of 4,000 (Table 12). Moreover, it was considered that in choosing a greater number of primary centres, the already existing services apparatus would be put to the best possible use.

b Once it had been decided which existing concentrations of service units would fulfil the function of primary centres in the future, it could be determined which of those areas, either already occupied or to be occupied in the future, were not yet covered by theoretical service areas. It was then possible to indicate where new primary centres would have to be established so that the entire future occupied area would fall within the theoretical service areas of primary centres.

c Once the matter of the primary centres had been settled, the question was examined as to which of these could best fulfil the function of secondary centres, on the basis of the services they already contained. This was decided by drawing a circle with a radius of 7 miles around the centres concerned, 7 miles being the radius of action for a secondary centre (Cf. Table 12). Here too it appeared that considerable overlapping would occur in the Sungei Besut Delta area. There were, however, so many service units of secondary level already present in the centres Kuala Besut, Kampong Rajah and Jerteh, that a reduction in function of any one of these centres to that of primary centre was not considered realistic. Moreover, in view of the developments planned for the Sungei Besut Delta, it is anticipated that each of these secondary centres has a good development potential. Kuala Besut will have a fishing harbour, with all its resultant activities; Jerteh should have an extensive timber-processing industry in 1986, and by virtue of this centre's favourable position with regard to the road network, it is reasonable to assume that it will attract other industries of secondary importance; Kampong Rajah is the capital of the district and thus fulfils not only the function of secondary centre, but also that of tertiary centre.

The results of all the planning activities described above are recorded on Map X and in Table 13.

TABLE 13.
SERVICE CENTRES IN BESUT

	Existing service centres	Proposed service centres		
		Based on existing centres	New	Total
tertiary centre	1	1	—	1
(full) secondary centre	1	5	—	5
potential secondary centre	7	—	—	—
(full) primary centre	7	30	12	42
potential primary centre	38	—	—	—

The small number of centres in the area between Kampong Jabi and Kampong Buloh is due to the limited development potential of this area; there are mountains to the west and deep swamps to the east, and it is assumed that for the period of the plan, 1970-1990, at any rate, these areas cannot be used for agriculture or any other purposes. The primary road passing through this area will cause the service areas of the centres situated on this road to take on an elliptic form.

In spite of attempts to make the best possible use of all existing centres, a number of centres will have to undergo a reduction in function. It was recommended that four potential secondary centres will function in the future merely as primary centres, while various potential primary centres will function only as additional primary centres. Such a reduction in function can only be realized gradually: all new service units with a secondary service character can be placed in the proposed secondary centres, but the secondary service units at present located in proposed primary centres should be transferred to the proposed secondary centres only when they come up for renewal. The same applies to the potential primary centres that are to become additional primary centres.

The proposed Centres Plan will exert no influence on the existing settlement pattern; the kampong will remain characteristic of the settlement pattern, even in the new agricultural areas. An increase in the average number of inhabitants per kampong will have to be expected, however, when people begin to settle in the service centres, a phenomenon that has been observed in the settlement schemes of the Federal Land Development Authority (FLDA), (Map VIII).

The future road network

From the future centres and their relationship to the road network (Table 12), it was possible to draw up a plan for the future road network. As can be seen on Map X, the federal road from Kota Baru to Kuala Trengganu will remain the principal traffic axis and the existing secondary road network need only be expanded by several new secondary roads in order to open up the new land.

On the basis of the secondary road network, tertiary roads were then projected to all primary centres not yet linked up with primary or secondary roads.

II. 4.4 *Some concluding remarks*

The preceding section has only given a rough outline of the location of the future centres. All further action at local level, i.e. compiling town plans for the expansion of existing centres or the establishment of new ones, is outside the scope of a regional plan. This task in Malaysia is the responsibility of the Department of Town and Country Planning.

Nor does the spatial plan for socio-economic services indicate how the administrative boundaries of the service areas should be fixed, although some criteria on this have been given in Sections I. 3.4 and I. 3.5. Fixing these administrative service areas will give rise to

certain unavoidable administrative problems since Trengganu already has a refined administrative system at local level (Mukims, see p.157), which does not coincide with the logical service area of the centres.

It is anticipated that the services apparatus will only be able to attain its most desirable spatial structure smoothly and systematically on the new land. The fact that the old land already has an intensive services apparatus at its disposal, and that many of the social and economic services have only recently been placed will cause the reconstruction of the services apparatus in these areas to proceed slowly.

The Centres Plan described above will only be able to provide an optimal contribution to the development projected for the area if it forms part of an integrated development programme. Some of the measures that should be included in such a programme are outlined in Section I. 3.

SUMMARY

The aim of this publication is to give a brief and systematic description of the process involved in compiling plans for the services apparatus of rural areas in developing countries. Part I describes the relation model on which this process is based. Part II illustrates with the aid of three case studies, how the model can be applied in practice.

There is a relationship between the development of an agricultural area on the one hand, and the services apparatus existent within it on the other. Understood by services apparatus is the totality of social and economic service facilities available in a certain area: schools, markets, shops etc.

The result of any agricultural development is almost always to be measured by an increase in the population's income. Such an increase, however, will only be meaningful for the population if they can spend their larger income in a manner which they feel is worthwhile. In other words, there must be a services apparatus available to make this spending possible. If this is not the case, there will be little incentive for the population to make the effort to adapt to the changes which are almost always bound up with an accelerated agricultural development.

It is not only the type, the quality and the quantity of facilities that go to make up the services apparatus which are important, but also their location, that is to say, how these facilities are distributed throughout the area.

Any agricultural development usually demands considerable adjustments within the existing social and administrative structure. The kinship groups, e.g. the tribe, often lose their function, either completely or partially, while the larger territorial group gains in importance. The small territorial group (the hamlet) must make way more and more for the larger village in the function of providing services. Many new organizations begin to play

an important role in the life of the farmer: irrigation committees, coöperatives, farmers' associations etc.

The introduction of new organizational forms – a difficult and time-consuming process – can be eased if the physical set-up of the settlement pattern and that of the service apparatus, in particular, provides logical starting points for the activities of these new organizations. That is to say, a service apparatus should be created with a physical structure which fosters the methods of the new organizations, thus facilitating their introduction.

What the above implies is that when development plans are being compiled for agricultural areas, sufficient thought should be devoted to the future composition and physical structure of the services apparatus.

Since this plan process is an extremely complicated one which will appear to differ greatly under different circumstances, even though certain principles and basic elements always remain the same, it is recommended that the situation be described by means of a model.

A model is a simplified description of a phenomenon through which, by the omission of details, an attempt is made to acquire a better insight into that phenomenon.

Various types of models can be distinguished. In this publication a theoretical model has been used which is, moreover, a relation model. This is a model not only showing the different variables and components of which the phenomenon consists but also revealing non-mathematically, the relationships existing between the various parts.

The relation model used in this publication shows the various elements – standards, criteria, guidelines and procedures – which go to make up the planning of the physical structure of a services apparatus, as well as their mutual relationships.

The elements have been grouped together under three headings, viz. those applicable (1) at national level, (2) at regional level and (3) at local level.

Finally, certain other measures are presented which are important to the implementation of a plan which issues from the suggested plan methodology.

GUIDELINES AND CRITERIA AT NATIONAL LEVEL

The basic idea is that a concentration of service units in centres results in a more efficient functioning of these services, since concentration promotes their more intensive use. Concentration also makes it possible to install public utilities, which improve the living conditions of the persons providing the services. Moreover, the various centres if they are well planned, can have a spatial structure that promotes the development of new territorial communities.

If concentration is the starting point for the policy of establishing social and economic services in rural areas, a classification of the various types of centres is required. A list is given below of the most important types of centres appearing in the process of planning rural areas.

Type of centre	Other names often used	Size of population	Radius of action
additional primary centre	hamlet	<1500	2 km
primary centre	local centre, village	1500-5000	3-6 km
secondary centre	large village small town	5000-10000	8-20 km
tertiary centre	town, city	>10000	> 20 km

Population figures are based on the fact that the area served by a primary centre must be an area of competence as well as an area of interest. This means that the area must be large enough and have a population figure sufficient to guarantee the effective functioning of the centre's service units. It also means that the area must be small enough to enable the people to know one another, to be well-informed about what is going on in the centre (village) and, partly because of that knowledge and a sense of belonging, they are prepared to take part in activities important to the local community. In other words, it must be able to function as a social unit.

When centres plans are being drawn up, use is made of theoretical service areas. These are indicated by circles with a radius equal to the radius of action mentioned above. Administrative service areas are also distinguished. These are areas representing the actual sphere of influence of the majority of service units present in a centre. The administrative service areas should coincide, as far as possible with the districts of the various government services and with the census units, i.e. the territorial units in which statistical material, utilized in development plans, is gathered.

If all these areas can be made to coincide, an effective geographical basis will exist on which a policy of coördinated development can be carried out and a realistic basis will exist on which viable rural communities can emerge.

Another guideline which should be established at national level is the relation between the types of centres and the road network. Only when the centres are easily accessible to the population is the concentration of services justified. The relationships, therefore, between types of centres and types of roads are of importance.

Types of centres	Types of road
additional primary centre	on quaternary road
primary centre	at junction of quaternary road and tertiary road
secondary centre	at junction of quaternary and tertiary roads and a secondary road
tertiary centre	at junction of quaternary, tertiary and secondary roads, and a primary road

The final items to be established at national level are the standards for the various social and economic services. That is to say, it must be decided how many people are necessary

if a certain service unit is to function satisfactorily. This can be expressed in ratios such as: one school per 1500 people, one clinic per 2000 people, one health centre per 50,000 people, one shop per 500 people etc.

When these standards are being established, they must be based not only on the existing situation, but also on the level of service related to the development which has been projected for the area.

These standards should be applied with a certain flexibility, taking into account the accessibility of the area, the transport which people have at their disposal and the density of the population.

GUIDELINES AND WORKING METHODS AT REGIONAL LEVEL

This group of the model's elements shows how one can set about analysing the present situation. For this purpose, an insight is required into the present distribution of the population, the land use, the nature and extent of the existing service apparatus and the settlement pattern. In addition, an analysis of the socio-economic structure will be useful. With regard to the future situation, one should have at one's disposal a future land use map which is precise enough to enable the future distribution of the population, as well as the most desirable settlement pattern, to be derived from it. Also required is an insight into the future social and economic structure that might normally be expected in the area concerned. This information will, in most cases, only be available when the centres plan forms part of a regional plan.

Once all these data have been gathered, one can proceed as follows:

- a The existing concentrations of services can be classified under the various types of centres. To indicate a certain transitional phase, the types listed above can be extended to include two additional types: potential primary and potential secondary centres.
- b A circle is then drawn around all existing centres with a radius equal to the radius of action that has been established for primary centres at national level. This radius may differ from country to country, and is decided by the physical and socio-economic circumstances: the intensity of land use, topography and accessibility, the existing settlement pattern and the distribution of existing concentrations of services.
- c When these circles – the so-called theoretical service areas – have been drawn on the map, it can then be seen:
 - which theoretical service areas overlap, or in other words, which centres compete with one another.
 - which areas of either the already occupied land or the land that will be occupied in the future, are not covered adequately by the service functions of the centres.

On the basis of these two observations, it can be decided which of the already existing

concentrations can be enlarged or where new primary centres can be set up, on the one hand in order to cover the entire future occupied area as effectively as possible with theoretical service areas, and on the other to prevent overlapping as far as possible.

d Once it has been decided where the future primary centres should be situated, the next step is to select those primary centres which will also fulfil the function of secondary centres. In doing so, a circle is drawn on the map around those centres which have been classified as potential secondary centres, or centres of a higher order, with a radius equal to the radius of action laid down for secondary centres at national level.

In the same way as was done for primary centres, a choice is then made from existing primary centres or from projected primary centres so that, without too much overlapping, the entire future occupied area is covered by the theoretical service areas of secondary centres.

e Tertiary centres will usually have to be planned within a national framework.

f Once the various types of centres have been established, a road system can then be designed with the aid of the relationships between types of centres and types of road as shown on p. 29.

The result of these planning activities is a map showing the locations of the various types of centres and the accompanying road network. A description is usually added. The finished product is designated a 'Centres Plan' and usually forms part of a regional plan.

GUIDELINES AND METHODS FOR PLANNING CENTRES AT LOCAL LEVEL

These guidelines first show how one can set about deciding on the definite location of new centres or the expansion of old ones – taking into account the soil, topography, accessibility, landscape aspects and the existing services.

They then show how the future population in agricultural areas can be determined – based on the future land use, the size of holdings, the size of families and the number of the services population.

The nature and number of services to be expected in a centre in the future can be estimated by relating the standards fixed at national level to the projected population in that centre.

Once it is known how many people will be living in the centre itself and the number of services that will be established there, a town plan can then be drawn up. In doing so, it is recommended that the services be grouped together, e.g. that a services quarter be planned which separates into two closely connected poles of predominantly economic and predominantly social service units. In addition, the residential and if necessary, the industrial quarter must be planned.

The town plan should be flexible, in the sense that it can be carried out in phases each of which is complete in itself, while expansion remains possible, even when the estimated future optimum population is exceeded.

GUIDELINES IMPORTANT FOR THE EXECUTION OF THE CENTRES PLAN

These guidelines focus attention, among other things, on the fact that to carry out a policy of establishing service units, the government must have sufficient land at its disposal in and around the centres. If the proposed land use plan is to be realised, legislation on zoning will be required. Additional important legislative and administrative measures are the policy of granting permits, police regulations, building ordinances etc.

As many organizations are involved in the execution of a centres plan, coördination of all activities should be in the hands of one body. This includes the resources available for preparing the land for building, the installation of public utilities etc.

Finally, a number of guidelines are given showing how administrative service areas can be fixed, and how, on the one hand, a centres plan must receive support in its social aspects and how, on the other, it can support certain social development programmes.

THE CASE STUDIES

The second part of this publication demonstrates, with the aid of three case studies, how the guidelines and working methods for the planning of centres can be applied in practice. The first case study deals with Surinam (South America). A centres plan has been compiled, within the framework of a regional plan, for an area of nearly 40,000 hectares, whose future population is expected to be 50 000. The results are shown on Map V. This centres plan covered both old and new land.

The second case study deals with a centres plan for one of the irrigation regions of the Euphrates Project in Syria. This region has a total area of 525,000 hectares, 155,000 of which are suitable for irrigation. The future population is estimated to be 170,000 to 200,000. The results are shown on Map VI. This centres plan formed part of a regional plan and dealt mainly with new land.

The third case study concerns a centres plan for the Besut District in the State of Trengganu, Malaysia, for which a regional plan had been compiled. The centres plan dealt with both old and new land. The results are shown on Map X.

In all three case studies, the model (i.e. the guidelines, standards and working methods) was first adapted to the situation in the particular country. The next step was to collect as much of the data as possible, i.e. of the data indicated in the model as being of importance in compiling a centres plan at regional level. It was found that this information could, in general, be collected within a period of four to six months. Compiling the centres plan, in conformity with the guidelines, required one to two months.

How the guidelines for drawing up a town plan can be applied is shown only in the case study on Surinam.

The social measures, which are important to the further execution of the plan, are gone into only briefly in these three case studies.

RESUME

La présente publication a pour objet de donner une description sommaire et systématique du procédé concernant la mise sur pied de projets de l'organisation desservante destinés à pourvoir aux besoins des districts ruraux de pays en voie de développement. Cette description est rédigée à l'aide d'un modèle à interrelations (1re partie). L'application du modèle à la pratique est éclairée à l'aide de trois analyses de cas (2e partie).

Or, il existe un rapport entre le développement d'une région agraire, d'une part, et l'organisation desservante qui s'y trouve, d'autre part. Par organisation desservante on entend dans ce qui va suivre l'ensemble des mesures de prévoyance sociale et économique réalisées dans une région donnée, telles que les écoles, marchés, magasins, etc

Le résultat d'un développement agraire se mesure en proportion de l'accroissement du revenu de la population. Cet accroissement, cependant, n'aura de sens et d'importance pour la population que si le revenu plus élevé qui devient disponible peut être employé à bon escient.

Cela implique la nécessité de la présence d'une organisation desservante qui rend cet emploi possible. Si cela n'est pas le cas il n'y aura rien qui incitera la population à faire des efforts et à chercher à s'adapter aux changements qui sont presque toujours liés à un développement agraire accéléré.

Ce ne sont pas seulement la nature, la qualité et la quantité des organes formant l'organisation desservante qui sont importants mais aussi leur structure dans l'espace, autrement dit la répartition de ces organes dans le territoire. La plupart des développements agraires réclament une adaptation très poussée de la part de la structure administrative et sociale existante. Les groupements par pourcentage tels que la tribu ou le clan perdent souvent tout-à-fait ou en partie leurs fonctions et les groupements territoriaux plus grands gagnent en importance.

Le petit groupement territorial (le hameau) doit céder le pas à la fonction desservante du village plus grand. De nombreux organismes nouveaux vont jouer pour les paysans un rôle important; ce sont, entre autres, la circonscription du service des eaux régissant les irrigations, les coopératives, les associations de fermiers, etc.

L'introduction de nouvelles formes d'organisation, processus difficile et de longue haleine peut se trouver facilitée si la répartition territoriale du mode d'habitation, mais surtout de l'organisation desservante, a été mise sur pied de façon à lui donner des points de contact concrets.

Il faut donc, autrement dit, créer une répartition territoriale de l'organisation desservante qui propage et favorise le fonctionnement et l'introduction des nouveaux organismes.

Ce qui précède implique qu'en mettant sur pied des projets de développement pour des territoires agraires il faut consacrer suffisamment d'attention à la future composition et structure territoriale de l'organisation desservante.

Comme ce processus de planification est très compliqué, tout identiques que puissent demeurer certains de ses principes et de ses éléments de base, et comme son cours peut être très varié selon les circonstances, il est à recommander d'en donner une description à l'aide d'un modèle.

Un modèle est une description sommaire d'un symptôme, à l'aide de laquelle on tâche, en omettant les détails, de se faire une idée plus nette du phénomène que l'on étudie.

Il y a diverses espèces de modèles. Dans la présente publication, on se sert d'un modèle théorique, savoir le modèle à interrelations. Ceci est un modèle qui n'indique pas seulement les différentes variantes et composantes qui constituent l'ensemble du phénomène à étudier mais qui montre aussi de façon non-mathématique les rapports existants entre les diverses parties.

Le modèle à interrelations utilisé dans la présente publication fait voir les divers éléments qui jouent un rôle dans la planification, savoir les critères, directives et méthodes de travail importants dans la planification de la structure territoriale de l'organisation desservante, ainsi que leur corrélation mutuelle.

Ces éléments ont été réunis en trois groupes, qui sont: 1. les directives et les critères qui sont d'importance pour ce mode de planification sur le plan *national*; 2. sur le plan *régional* et 3. sur le plan *local*.

Pour terminer, un groupe encore de mesures ont été rendues schématiquement, ce sont celles qui sont importantes lors de la mise à exécution du projet qui découle de la méthode de planning proposée.

DIRECTIVES ET CRITERES SUR LE PLAN NATIONAL

On est parti du principe que la concentration des unités desservantes en des points centraux entraîne un meilleur fonctionnement des organismes puisque une concentration favorise une utilisation plus suivie des organismes et permet l'aménagement d'organes

d application pratique directe qui contribuent entre autres à améliorer l'ambiance d'habitation pour la population desservante. En outre les divers centres peuvent, s'ils ont été bien conçus présenter une structure territoriale propice au développement de nouvelles organisations.

Si la concentration devient le point de départ de la politique d'installation d'organismes sociaux et économiques dans les régions rurales, il est nécessaire d'en venir à une classification des diverses espèces de centres. Le tableau qui suit donne un aperçu des centres les plus importants pour la planification dans les territoires ruraux.

Types de centres importants pour la planification dans les régions rurales et leurs principaux traits caractéristiques.

Types de centre	Autres noms fréquemment utilisés	Effectif de la population	Rayon d'action
centre primaire additionnel	hameau	< 1500	2 kms
centre primaire	centre local village	1500-5000	3- 6 kms
centre secondaire	grand village petite ville	5000-10.000	8-20 kms
centre tertiaire	ville, cité	> 10.000	> 20 kms

Pour la mise sur pied de projets de centres, on se sert de régions-à-desservir théoriques. Ils sont indiqués par des cercles dont le rayon est égal au rayon d'action porté au tableau. Outre cela, on distingue des régions-à-desservir administratives qui sont les régions indiquant la zone d'influence réelle de la majorité des unités desservantes se trouvant dans un centre. Les régions administratives doivent coïncider autant que possible avec les subdivisions en rayons et ressorts des services gouvernementaux et avec les unités de recensement, c'est-à-dire les unités territoriales sur la base desquelles on réunit du matériel statistique important pour les projets de développement.

S'il on réussit à faire coïncider toutes ces régions, l'on obtient une bonne base géographique sur laquelle on peut fonder une politique de développement bien coordonnée et mettre à exécution de façon réaliste un mode de constitution d'une communauté.

Un autre directive à fixer sur le plan national est le rapport entre les types des centres et le réseau routier. Ce n'est que si les centres sont aisés à atteindre tant pour la population que pour les services rendus à partir de plans plus élevés qu'une concentration d'organismes est justifié. Le tableau ci-dessous illustre la chose :

Rapport entre les types de centres et les types de routes

Types de centres	Types de routes
centre primaire additionnel	sur route de quatrième ordre
centre primaire	au carrefour de routes de quatrième ordre et de routes tertiaires
centre secondaire	au carrefour de routes de quatrième ordre et tertiaires avec une route secondaire
centre tertiaire	au carrefour de routes de quatrième ordre et de routes tertiaires et secondaires avec une route primaire

Il faut enfin, sur le plan national, arrêter des normes pour les différents organismes desservants sociaux et économiques. Cela veut dire que l'on fixe le nombre des personnes indispensables pour bien faire fonctionner une unité desservante donnée. Cela se laisse exprimer par les proportions numériques suivantes:

- une école pour 1500 personnes,
- une clinique pour 2000 personnes,
- un centre sanitaire pour 50,000 personnes,
- six magasins pour 1000 personnes, etc.

En fixant ces standards il ne faudra pas seulement s'inspirer de la situation existante mais il faudra aussi tenir compte du niveau de service en rapport avec les développements prévus pour tel ou tel territoire déterminé. L'application pratique des normes devra se pratiquer avec toute la souplesse nécessaire en tenant compte de l'ouverture du territoire dont il s'agit, les moyens de transport dont on pourra disposer de la densité de la population et le niveau du service à donner.

DIRECTIVES ET METHODES DE TRAVAIL SUR LE PLAN REGIONAL

Dans ce groupe d'éléments de modèle se trouve indiquée la façon dont on peut procéder à l'analyse de la situation actuelle. Cela demande de solides notions quant à la répartition actuelle de la population, l'utilisation du sol, la nature et l'envergure de l'organisation desservante actuellement existante et des modes d'habitation. Importante est encore, outre cela, une analyse de la structure sociale et économique.

Par rapport à la situation future il importe de disposer d'une carte suffisamment exacte de la future mise en valeur du sol pour qu'on puisse déduire la future répartition de la population ainsi que le mode d'habitation le plus opportun.

Il est de même nécessaire de se faire une idée nette de la structure socio-économique future que l'on peut s'attendre à voir se produire dans le territoire dont il s'agit.

En pratique ces renseignements ne deviennent disponibles que s'il est mis au point pour une région donnée un plan régional dont le plan des centres constitue une partie intégrante.

Une fois que l'on dispose de ces données on peut procéder de la façon suivante en établissant un plan des centres:

a L'on peut, en se servant des organismes sociaux-économiques existants, répartir les concentrations organiques existantes en les divers types de centres. Les types indiqués au Tableau 2 se sont vus adjoindre deux types nouveaux en vue de désigner certaines situations transitionnelles. Ce sont les centres primaires „en puissance” et les centres secondaires „en puissance”.

b Puis, l'on tire autour de toutes les concentrations existantes sauf celles des noyaux desservants additionnels, un cercle dont le rayon est identique au rayon d'action fixé sur le plan national pour les centres primaires. Ce rayon peut varier d'un pays à l'autre et se trouve déterminé par des facteurs physiques et socio-économiques tels que l'intensité de la mise en valeur du sol, sa dénivellation, son accessibilité, le mode d'habitation existant et la répartition des concentrations organiques existantes.

c Une fois que ces cercles, c'est-à-dire les districts théoriquement desservis, sont portés sur la carte, l'on peut déterminer:

1 quels sont les districts théoriquement observés qui empiètent l'un sur l'autre, c'est-à-dire qui se font concurrence.

2 quels sont les districts non encore couverts par un service théorique, dans le territoire déjà antérieurement occupé ou dans les régions encore à occuper, c'est-à-dire quels sont les districts non encore suffisamment desservis par les activités de ces centres.

Ces deux données permettent de choisir parmi les concentrations existantes déjà dans l'ancien territoire et aussi de désigner des endroits où il faudrait mettre sur pied de nouveaux centres afin de couvrir autant que possible, d'une part, à l'avenir, tout le territoire habité par des districts théoriquement desservants tout en évitant d'autre part, autant que possible tout empiètement.

d Une fois que l'on a déterminé les localités où aménager les futurs centres primaires, on peut procéder à arrêter les emplacements des centres primaires qui rempliront en même temps les fonctions de centres secondaires.

Pour cela on commence par tirer un cercle sur la carte autour de tous les centres classés comme centres secondaires ou de catégorie supérieure (en puissance). Le rayon de ce cercle est égal au rayon volant sur le plan national.

Ensuite on procède, tout comme indiqué pour les centres primaires à un choix tel parmi les centres existants ou les centres primaires nouveaux à mettre sur pied, que toute la région à occuper à l'avenir se trouve couverte par les districts desservants théoriques des centres secondaires sans qu'il en résulte un excès d'empiètements.

e Les centres tertiaires devront en général être prévus dans un cadre national.

f Lorsque les divers types de centres ont été arrêtés, le rapport, indiqué au Tableau 2,

entre respectivement les types de centres et ceux des routes, permettra d'établir un projet de réseau routier.

Tous ces travaux de planification aboutissent à une carte où figurent les emplacements des centres des divers types ainsi que le réseau routier s'y rapportant.

Ce résultat est parfois dénommé „plan-centres” et fait en général partie d'un plan régional.

DIRECTIVES ET METHODES POUR LA PLANIFICATION DE CENTRES SUR LE PLAN LOCAL

Ces directives commencent par indiquer comment l'on peut s'y prendre pour établir l'emplacement définitif de centres nouveaux ou pour étendre des centres déjà existants tout en tenant compte de sol, de la topographie, de l'accessibilité, des organes desservants existants et des aspects régionaux.

Puis, il est indiqué de quelle façon il est possible de déterminer la future ampleur de la population pour les régions agraires en prenant comme point de départ la future mise en valeur du sol, la future envergure des entreprises, l'envergure des familles et l'extension de la partie desservante de la population.

L'on peut évaluer la nature et le nombre des organes futurs à prévoir dans le centre en établissant un rapport entre les standards fixés sur le plan national avec la population prévue.

Lorsque l'on connaît ce qui viendra, en fait de population, habiter dans le centre même ainsi que des organes à placer dans le centre, il est possible de mettre sur pied un projet urbanistique. Il est à recommander, en ce faisant, d'agencer les organes par groupes, par exemple, de prévoir un quartier industriel à côté d'un quartier d'organes desservants, qui se décompose en deux pôles rapprochés formés d'unités desservantes d'une part surtout économiques et de l'autre surtout sociales. Outre cela, il faut projeter un quartier résidentiel. Le plan urbanistique doit être souple et susceptible d'adaptation en ce sens qu'il doit pouvoir être réalisé par étapes dont chacune constitue un ensemble alors qu'une extension demeure possible même si le maximum le plus favorable prévu pour la population dans l'avenir se trouve dépassé.

DIRECTIVES IMPORTANTES POUR L'EXECUTION DU PLAN-CENTRES

Il est nécessaire, à cet égard d'attirer l'attention sur le fait que pour suivre un système d'installation touchant les unités desservantes socio-économiques, il est essentiel que les autorités puissent disposer de suffisamment de terrain aux centres et dans leurs environs. Si l'on veut parvenir à réaliser le projet d'affectation du sol projeté il est nécessaire de

créer une loi concernant la zonification. D'autres mesures légales et administratives sont importantes aussi telles que la politique des licences, l'ordonnance de police, les ordonnances de voirie sur les constructions, etc.

Comme la mise à exécution d'un plan-centres regarde bien des organisations, il faudra investir une autorité de la compétence coordinatrice, en particulier par rapport aux fonds disponibles pour rendre les terrains arables pour implanter des installations d'utilité publique, etc.

Pour terminer suivent encore un certain nombre de directives concernant la façon dont on peut déterminer les zones à desservir administrativement ainsi que la façon dont il faut encadrer socialement le plan-centres, d'une part, et d'autre part, la façon dont le plan peut appuyer certains programmes de développement social.

LES ANALYSES DE CAS

Dans la seconde partie de la présente publication on trouvera indiqué à l'aide de trois analyses de cas comment mettre en pratique les directives et les méthodes de travail discutées dans la première partie pour la planification des centres.

Le premier cas analysé joue dans le Surinam (Amérique du Sud). Dans le cadre d'un plan régional, un plan-centres a été mis au point pour un territoire de près de 40.000 hectares pour lequel on prévoit dans l'avenir une population de 50.000 âmes. Les résultats sont indiqués sur la carte V.

Au Surinam, le plan-centres portait tant sur du territoire ancien que sur du territoire neuf. L'analyse du second cas traite de la mise sur pied d'un plan-centres pour une zone d'irrigation entrant dans le projet Euphrate en Syrie. Cette région a une surface totale de 525.000 hectares dans lesquels 155.000 entrent en ligne de compte pour l'irrigation. La future population est évaluée à 170.000-200.000 âmes. Les résultats figurent sur la carte VI. Le plan-centres faisait partie d'un plan régional et portait surtout sur des terres neuves.

L'analyse du troisième cas concerne l'établissement d'un plan-centres pour le district de Besut dans l'état de Trengganu en Malaisie, district pour lequel un plan régional a été établi. Ce plan centres portait sur des terres tant anciennes que neuves. Les résultats en figurent sur la carte X.

Dans les trois analyses on a commencé par adapter le modèle (c. à-d. les directives, les normes et les méthodes de travail) à la situation du territoire.

Puis on a recueilli autant que possible de données qui ont été portées dans le modèle et qui sont importantes pour la mise sur pied d'un plan-centres sur le plan régional. Ce rassemblement de données parut pouvoir se faire en général dans un délai de six mois.

La mise au point du plan-centres sur le plan régional et en conformité des directives indiquées à cet effet réclama de un à deux mois.

Pour l'analyse seulement du cas concernant le Surinam il a été indiqué comment les directives importantes pour l'élaboration des projets urbanistiques trouvent leur application sur le plan local.

Dans ces trois analyses de cas il n'est que sommairement insisté sur les mesures sociales qui sont d'importance pour la suite de la mise à exécution.

ZUSAMMENFASSUNG

Diese Publikation will eine kurze und systematische Beschreibung des Planungsprozesses für den Versorgungsapparat ländlicher Gebiete in Entwicklungsländern geben. In Teil I wird das Relationsmodell beschrieben, auf dem dieser Prozess gründet. Teil II zeigt mit Hilfe von drei Fallstudien wie das Modell in der Praxis angewendet werden kann.

Es besteht eine Beziehung zwischen der Entwicklung eines Agrargebietes und dem dort vorhandenen Versorgungsapparat. Unter Versorgungsapparat versteht man im folgenden die Gesamtheit der sozialen und ökonomischen Einrichtungen wie Schulen Märkte, Geschäfte usw. in einem bestimmten Gebiet.

Das Ergebnis einer landwirtschaftlichen Entwicklung ist an der Steigerung des Volkseinkommens zu messen. Eine solche Zunahme ist für die Bevölkerung jedoch nur dann von Bedeutung, wenn sie das Mehreinkommen auch sinnvoll verwenden kann. Mit anderen Worten: dies erfordert einen Versorgungsapparat, der diese Ausgaben ermöglicht. Ist dies nicht der Fall, wird bei der Bevölkerung der Anreiz fehlen, grössere Anstrengungen zu unternehmen und sich den Veränderungen anzupassen, die fast immer mit sich schneller vollziehenden Entwicklungen in der Landwirtschaft einhergehen.

Nicht nur Art, Qualität und Quantität der Einrichtungen, aus denen der Versorgungsapparat besteht, sind wichtig, sondern auch dessen räumliche Struktur, m.a.W. die Streuung dieser Einrichtungen in dem betreffenden Gebiet.

Die meisten landwirtschaftlichen Entwicklungen erfordern eine beträchtliche Anpassung der bestehenden sozialen und verwaltungstechnischen Struktur. Familienstrukturen wie Stämme und Sippen verlieren oft ganz oder teilweise ihre Funktionen, während grössere Siedlungsgruppierungen an Bedeutung gewinnen.

Kleine dörfliche Siedlungsgemeinschaften müssen vor der Dienstleistungsfunktion grösserer Dörfer weichen. Viele neue Organisationen wie Bewässerungsgemeinschaften, Ge-

nossenschaften, Bauernverbände usw. werden für die Landwirte eine wichtige Rolle spielen. Die Einführung neuer Organisationsformen, ein schwieriger und zeitraubender Prozess, kann vereinfacht werden, wenn die geographische Streuung innerhalb des Siedlungsschemas, jedoch vor allem des Versorgungsapparates so gestaltet ist dass er konkrete Anhaltspunkte für diese Organisationen bietet. Mit anderen Worten: es muss eine Raumordnungsstruktur des Versorgungsapparates geschaffen werden, die die Arbeitsweise und dadurch die Einführung dieser neuen Organisationsformen vereinfacht und fördert.

Das Vorgegangene beinhaltet, dass bei der Erstellung von Entwicklungsplänen für Agrargebiete der zukünftigen Gliederung und Raumordnungsstruktur des Versorgungsapparates gebührende Aufmerksamkeit geschenkt werden muss.

Da dieser Planungsprozess sehr kompliziert ist, wenn auch bestimmte Grundsätze und Basiselemente unveränderlich sind und der Verlauf dieses Prozesses unter verschiedenen Umständen völlig unterschiedlich sein kann, ist eine Darstellung anhand eines Modells empfehlenswert.

Ein Modell ist eine vereinfachte Darstellung einer Erscheinung wobei durch das Weglassen von Einzelheiten versucht wird, bessere Kenntnis über das jeweilige Phänomen zu erhalten.

Man unterscheidet verschiedene Arten von Modellen. In dieser Veröffentlichung wurde ein theoretisches Modell, ein Relationsmodell, verwendet. Es gibt nicht nur die verschiedenen Variablen und Komponenten an, aus denen sich das zu untersuchende Phänomen zusammensetzt, sondern zugleich auf nichtmathematische Weise die Zusammenhänge, die zwischen den verschiedenen Elementen bestehen.

Das in dieser Veröffentlichung verwendete Bezugsmodell zeigt die verschiedenen Elemente – Kriterien, Richtlinien und Arbeitsmethoden –, die bei der Planung der Raumordnungsstruktur des Versorgungsapparates eine Rolle spielen sowie auch ihre Wechselbeziehungen.

Diese Elemente sind in drei Kategorien gruppiert: Richtlinien und Kriterien auf nationaler Ebene, auf regionaler Ebene und auf lokaler Ebene.

Schliesslich wurde noch eine Anzahl Massnahmen schematisch wiedergegeben, die bei der Ausführung des Planes wichtig sind, der aus der vorgeschlagenen Methodik hervorgeht.

RICHTLINIEN UND KRITERIEN AUF NATIONALER EBENE

Man ist davon ausgegangen, dass die Zusammenlegung der Versorgungseinheiten in Zentren ein besseres Funktionieren der Einrichtungen zur Folge hat da dadurch eine intensivere Nutzung der Einrichtungen gefördert und die Schaffung gemeinnütziger Einrichtungen ermöglicht wird. Das Wohnklima wird damit verbessert. Überdies können die verschiedenen Schwerpunkte, sofern sie gut geplant sind, eine räumliche Struktur aufweisen, die die Entwicklung neuer Organisationen begünstigt.

Wenn die Zusammenlegung zum Ausgangspunkt für die Standortpolitik sozialer- und

ökonomischer Einrichtungen in ländlichen Gebieten wird, dann wird eine Schwerpunkt-Kategorisierung erforderlich. Die folgende Tabelle gibt eine Übersicht über die wichtigsten Zentren für die Planung in ländlichen Gebieten.

Wichtige Zentren für die Planung in ländlichen Gebieten und ihre Hauptmerkmale

Typ	andere gebräuchliche Bezeichnung	Einwohnerzahl	Einsugsbereich
Kleinzentrum (additionell)	Kleingemeinde	< 1.500	2 km
Unterkzentrum (primär)	örtliches Zentrum	1.500-5.000	3- 6 km
Mittelzentrum (secondär)	grosses Dorf	5.000-10.000	8-20 km
Oberzentrum (tertiär)	Stadt, Grossstadt	>10.000	> 20 km

Bei der Erstellung von Schwerpunktplänen geht man von theoretischen Versorgungsgebieten aus. Diese werden mit Hilfe von Kreisen angegeben, deren Durchmesser dem Erfassungsradius in Tabelle 1 entspricht. Daneben unterscheidet man administrative Versorgungsgebiete. Das sind Gebiete, die die tatsächliche Einflussphäre der Mehrzahl der in einem Zentrum vorhandenen Versorgungseinheiten wiedergeben. Die administrativen Versorgungsgebiete sollten soweit wie möglich mit den Bezirks- und Ressortenteilungen der verschiedenen staatlichen Dienststellen übereinstimmen sowie mit Zensusgebieten den territorialen Einheiten, die als Grundlage für die Erfassung von statistischem Material für Entwicklungspläne dienen.

Wenn sich alle diese Gebiete decken, dann ist eine günstige geographische Basis vorhanden, auf der eine koordinierte Entwicklungspolitik und eine realistische gemeinschaftsbildende Politik auf dem lokalen Ebene durchgeführt werden können.

Eine andere Richtlinie, die auf nationaler Ebene festgelegt werden muss, ist die Verbindung zwischen den verschiedenen Zentrums typen und dem Strassennetz. Nur wenn die Zentren sowohl für die Bevölkerung als auch für die Dienste, die von höheren Instanzen geleistet werden, gut erreichbar sind ist eine Zusammenlegung der Dienstleistungseinrichtungen gerechtfertigt. Untenstehende Tabelle gibt dieses Verhältnis wieder.

Verhältnis zwischen den jeweiligen Zentren und Strassen

Zentrumstyp	Strassentyp
Kleinzentrum	an einer Strasse vierter Ordnung
Unterkzentrum	an einem Schnittpunkt von Strassen dritter und vierter Ordnung

Mittelzentrum	an einem Schnittpunkt von Strassen vierter und dritter Ordnung sowie einer Strasse zweiter Ordnung
Oberzentrum	an einem Schnittpunkt von Strassen vierter, dritter und zweiter Ordnung sowie einer Strasse erster Ordnung

Schliesslich müssen auf nationaler Ebene Massstäbe für die verschiedenen sozialen und ökonomischen Versorgungseinrichtungen festgelegt werden. Das heisst, es muss festgestellt werden, wie viele Einwohner für das Funktionieren einer Versorgungseinheit erforderlich sind. Dies kann mittels folgender Verhältniszahlen ausgedrückt werden: eine Schule für 1.500, eine Klinik für 2.000 Einwohner und ein Gesundheitszentrum für 50.000 Einwohner, 6 Geschäfte für 1.000 Einwohner usw. Bei der Festlegung dieser Kriterien darf man nicht nur von der gegenwärtigen Situation ausgehen, sondern man muss auch das Versorgungsniveau berücksichtigen, das mit den für ein bestimmtes Gebiet geplanten Entwicklungen zusammenhängt. Die Anwendung dieser Kriterien muss elastisch erfolgen, wobei Erschliessungsgrad des betreffenden Gebiets, die verfügbaren Beförderungsmittel, die Bevölkerungsdichte und das Versorgungsniveau berücksichtigt werden müssen.

RICHTLINIEN UND ARBEIDSMETHODEN AUF REGIONALER EBENE

In dieser Elementgruppe des Modells wird angegeben, auf welche Weise die Analyse der heutigen Situation durchgeführt werden kann. Dies erfordert Einsicht in die gegenwärtige Bevölkerungsstreuung, in die Bodennutzung, in Art und Umfang des bestehenden Versorgungsapparats und in das Siedlungsschema. Daneben ist eine Analyse der sozioökonomischen Struktur von Wichtigkeit.

Hinsichtlich der zukünftigen Situation muss man über einem Flächennutzungsplan verfügen, aus dem die zukünftige Bevölkerungsverteilung sowie das günstigste Siedlungsschema abzuleiten sind.

Zudem ist es erforderlich, einen Einblick in die voraussichtliche sozial-Struktur in dem betreffenden Gebiet zu erhalten.

Diese Informationen sind praktisch nur dann erhältlich, wenn Regionalpläne aufgestellt werden, von denen der Zentrumsplan einen Teil bildet.

Sind alle diese Angaben vorhanden dann kann bei der Erstellung eines Zentrumsplans wie folgt vorgegangen werden:

a Anhand der bestehenden sozioökonomischen Versorgungseinrichtungen kann man die bestehenden Einrichtungsschwerpunkte in verschiedene Typen einteilen. Die in Tabelle 2 genannten sind, um bestimmte Übergangssituationen bezeichnen zu können, durch zwei neue Typen erweitert worden, und zwar den potentiellen Primärzentren und den potentiellen Secondärzentren.

b Sodann wird um alle bestehenden Einrichtungsschwerpunkte um Kleinzentren angenommen, ein Kreis gezogen, dessen Radius dem Einzugsbereich entspricht, der für Unterzentren auf Landesebene festgestellt ist. Dieser Radius kann von Land zu Land unterschiedlich sein und wird durch physische und sozioökonomische Verhältnisse bestimmt: Intensität der Bodennutzung, Geländebeschaffenheit und Erschliessung, das bestehende Siedlungsschema und die Streuung der bestehenden Einrichtungsschwerpunkte.

c Sind diese Kreise, die sogenannten theoretischen Versorgungsgebiete, auf der Karte gezogen, kann festgestellt werden:

1 Welche theoretische Versorgungsgebiete einander überschneiden, d.h. welche Schwerpunkte miteinander konkurrieren.

2 Welche Gebiete des bereits früher besiedelten oder in Zukunft zu besiedelnden Landes noch nicht von theoretischen Versorgungsgebieten erfasst werden, d.h. welche Gebiete durch die Versorgungseinrichtungen nur unzureichend versorgt werden können.

Anhand dieser Feststellungen kann eine Auswahl aus den bestehenden Schwerpunkten getroffen und der Standort neuer Zentren in den bereits besiedelten Gebieten bestimmt werden. Damit wird bezweckt, für das gesamte zukünftige Siedlungsgebiet weitgehend theoretische Einrichtungsschwerpunkte vorzusehen und Überschneidungen möglichst zu vermeiden.

d Ist der Standort der zukünftigen Unterzentren einmal festgelegt, dann können diejenigen unter ihnen festgestellt werden, die zugleich die Funktion eines Mittelzentrums erfüllen sollen. Dabei wird zuerst um alle Schwerpunkte, die als potentielle Mittelzentren oder Oberzentren klassifiziert sind, ein Kreis gezogen, dessen Radius dem Einzugsbereich auf nationaler Ebene entspricht.

Dann wird wie bei den Unterzentren eine Auswahl aus den zu planenden Unterzentren getroffen, so dass das gesamte zukünftige Siedlungsgebiet von theoretischen Versorgungsschwerpunkten der Mittelzentren bedeckt wird, wobei vermieden werden muss, dass sich die Einzugsgebiete zu häufig überschneiden.

e Oberzentren werden im allgemeinen auf nationaler Ebene geplant werden müssen.

f Sind die verschiedenen Zentrumstypen festgestellt, kann aufgrund der in Tabelle 2 angegebenen Relation zwischen Zentrums- und Strassentypen ein Strassennetz entworfen werden.

Das Resultat dieser Planungstätigkeit ist eine Karte, die die Standorte der verschiedenen Zentrumstypen und des zugehörigen Strassennetzes zeigt. Meist wird dieser Karte eine Erläuterung hinzugefügt.

Dieses Endprodukt wird als „Zentrumsplan“ bezeichnet und ist meist Teil eines Regionalplans.

RICHTLINIEN UND METHODEN FÜR DIE PLANUNG VON ZENTREN AUF LOKALER EBENE

Diese Richtlinien zeigen zuerst, wie man bei der endgültigen Lokalisierung neuer Zentren oder beim Ausbau bestehender Zentren vorgehen kann, wobei dem Boden, der Topographie, der Erschliessung, den landschaftlichen Aspekten und den bestehenden Versorgungseinrichtungen Rechnung getragen wird.

Dann wird angegeben, wie man die zukünftige Bevölkerungszahl für Agrargebiete feststellen kann, ausgehend von der zukünftigen Bodennutzung, Betriebsgrösse der Familiengrösse und dem Umfang der zu versorgenden Bevölkerung.

Die zukünftigen Ausstattung kann nach Art und Umfang dadurch geschätzt werden, dass die auf nationaler Ebene festgelegten Kriterien für Versorgungseinrichtungen auf die voraussichtliche Bevölkerung bezogen werden. Wenn die zukünftige Bevölkerungszahl des Zentrums sowie die Anzahl der Versorgungseinrichtungen bekannt ist, kann ein Städtebauplan erstellt werden. Hierbei ist es empfehlenswert, die Einrichtungen zu gruppieren, z.B. indem man neben einem Versorgungsbezirk – der in zwei dicht nebeneinander – gelegene Pole überwiegend ökonomischer und überwiegend sozialer Versorgungseinheiten zerfällt – einen Industriepark plant. Darüber hinaus muss das Wohngebiet geplant werden. Der Städtebauplan muss so flexibel sein, dass er in Phasen verwirklicht werden kann, die jeweils ein selbstständiges Ganzes bilden. Ferner muss eine Erweiterung möglich bleiben, auch wenn die Bevölkerungszahl das vorgesehene Maximum in der Zukunft überschreiten sollte.

WICHTIGE RICHTLINIEN FÜR DIE AUSFÜHRUNG DES PLANS

Hierbei muss u.a. darauf hingewiesen werden, dass für die Standortpolitik in bezug auf socioökonomische Versorgungseinheiten von grosser Bedeutung ist, dass der Staat in und um die Zentren über eine ausreichende Bodenreserve verfügt. Will man den vorgeschlagenen Flächennutzungsplan verwirklichen, ist eine Gesetzgebung über den Bebauungsplan erforderlich. Auch andere gesetzliche und administrative Massnahmen sind von Bedeutung: Lizenzvergabe, Polizeiverordnungen, Bauverordnungen usw.

Da viele Organisationen in die Ausführung des Schwerpunktplanes einbezogen sind muss eine übergeordnete Instanz mit der Koordinierung bezüglich der verfügbaren Mittel für die Baureifmachung der Grundstücke, der Anlage von gemeinnützigen Versorgungseinrichtungen usw. betraut werden.

Schliesslich wird noch eine Anzahl Richtlinien darüber gegeben, wie administrative Versorgungsgebiete festgelegt werden können und in welcher Weise der Zentrenplan einerseits sozial flankiert und andererseits zur Unterstützung bestimmter sozialer Förderungsprogramme dienen kann.

DIE FALLSTUDIEN

Im zweiten Teil dieser Veröffentlichung wird anhand von drei Fallstudien gezeigt, wie die im ersten Teil erläuterten Richtlinien und Arbeitsmethoden zur Planung von Zentren in der Praxis angewandt werden können.

Die erste Fallstudie befasst sich mit Surinam (Südamerika). Im Rahmen eines Regionalplans wurde ein Schwerpunktplan für ein Gebiet von fast 40.000 ha aufgestellt, für das mit einer Einwohnerzahl von 50.000 gerechnet wird. Die Ergebnisse sind auf Karte 5 dargestellt. In Surinam bezog sich der Schwerpunktplan sowohl auf bereits bestehende als auch auf geplante Siedlungsgebiete.

Die zweite Fallstudie behandelt die Erstellung eines Schwerpunktplanes für ein Bewässerungsgebiet im Rahmen des Euphratprojektes in Syrien. Es handelt sich hier um ein Gebiet mit einer Gesamtoberfläche von 525.000 ha, 155.000 ha kommen für Bewässerung infrage. Für die Zukunft rechnet man mit 170.000 bis 200.000 Einwohnern. Die Ergebnisse sind auf Karte 6 verzeichnet. Der Schwerpunktplan war Teil eines Regionalplanes und bezog sich vor allem auf noch zu erschliessende Gebiete.

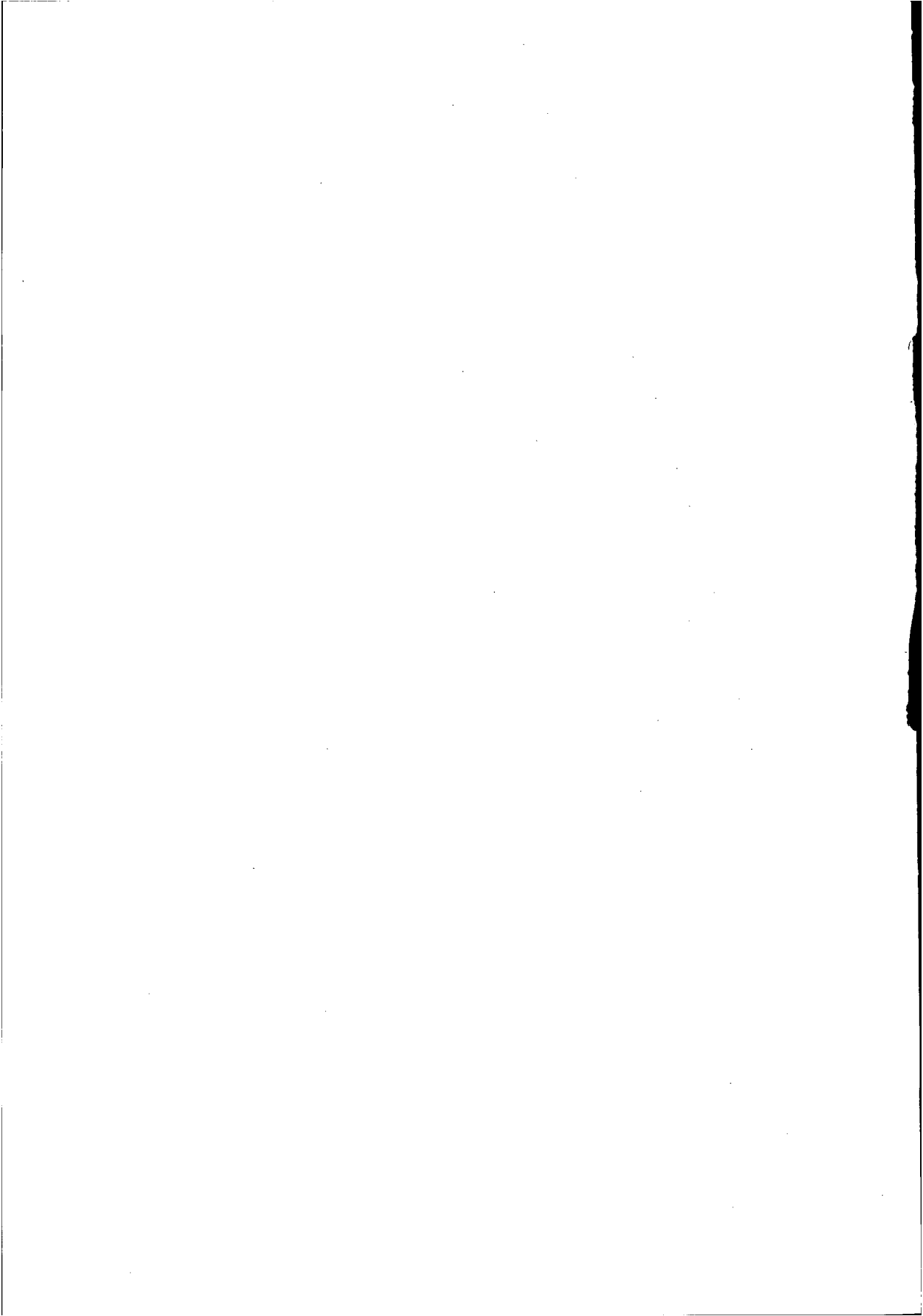
Die dritte Fallstudie bezieht sich auf die Erstellung eines Schwerpunktplanes für den Distrikt Besut des malaisischen Staates Trengganu für den ein Regionalplan aufgestellt wurde. Dieser Schwerpunktplan bezog sich sowohl auf bereits bestehende als auch auf geplante Siedlungsgebiete. Die Resultate sind auf Karte 7 angegeben.

Bei allen 3 Fallstudien wurde zuerst das Modell (d.h. die Richtlinien, Kriterien und Arbeitsmethoden) an die Landesverhältnisse angepasst.

Daraufhin wurden die Daten gesammelt, die im Modell angegeben und für die Erstellung eines regionalen Schwerpunktplanes wichtig sind. Es zeigte sich dass diese Angaben im allgemeinen innerhalb von vier bis sechs Monaten gesammelt werden konnten. Die Erstellung des regionalen Schwerpunktplanes unter Einhaltung der Richtlinien erforderte ein bis zwei Monate.

Wie die Richtlinien für die Erstellung für Städtebaupläne auf lokaler Ebene angewandt werden können, zeigt nur die Fallstudie über Surinam.

Die sozialen Massnahmen, die für die weitere Ausführung des Plans wesentlich sind, werden in diesen drei Fallstudien nur kurz behandelt.



RESUMEN

El objeto de esta publicación es de dar una descripción breve y sistemática del procedimiento implicado en compilar planes para las organizaciones de servicio de las áreas rurales en los países en desarrollo. Parte I describe el modelo de relación en el cual está basado el procedimiento. Parte II ilustra, con la ayuda de tres „case studies” (Casos de aplicaciones prácticas) como un modelo puede ser aplicado en la práctica.

Por un lado hay una relación entre el desarrollo de un área agrícola y por el otro, la de las organizaciones de servicio que existen dentro de él. Por organizaciones de servicio, se entiende la totalidad de las facilidades de servicios sociales económicos disponibles en cierta área: escuelas, mercados, tiendas etc.

El resultado de un desarrollo agrícola puede ser casi siempre medido por un aumento en el ingreso de la población. Tal aumento, sin embargo, solo será de importancia para la población si ésta puede gastar su ingreso aumentado de una manera que le valga la pena. En otras palabras debe existir una organización de servicio disponible para posibilitar que gaste su dinero. Si este no es el caso, la población tendrá poco estímulo para hacer un esfuerzo en adaptarse a los cambios que casi siempre se asocian con un desarrollo agrícola acelerado.

No son solo de importancia el tipo, la calidad y la cantidad de facilidades, componentes de las organizaciones de servicio, pero también su ubicación, es decir, la manera en que están distribuídas por todo el área.

Normalmente cualquier desarrollo agrícola demanda ajustes considerables de parte de la estructura social y administrativa existente. Los grupos de parentesco, por ejemplo, la tribu pierden a menudo su función parcialmente o totalmente mientras que los grupos territoriales más grandes adquieren más importancia. Los grupos territoriales pequeños (la aldea), deben ceder más y más a los pueblos de tamaño mayor en la función de propor-

cionar servicio. Muchas organizaciones nuevas comienzan a jugar un gran rol de mayor importancia en la vida de los campesinos: ej la comisión de riego, la cooperativa, la sociedad de campesinos etc.

La introducción de nuevos sistemas organizadores, un procedimiento difícil que toma mucho tiempo, puede simplificarse si la estructura física del modelo residencial y especialmente la de las organizaciones de servicio ofrece una iniciación lógica para las actividades de estas organizaciones nuevas. Es decir, las organizaciones de servicio deben ser creadas con una estructura física que adopta los métodos de las organizaciones nuevas, facilitando de esta manera su introducción.

Lo mencionado anteriormente implica, que cuando se compilan planes de desarrollo para áreas agrícolas, se debe prestar atención a la futura composición y a la estructura física de las organizaciones de servicio.

Ya que este proceso de planificación es extremadamente complicado y que parece variar mucho bajo diferentes circunstancias, aunque algunos principios y elementos básicos permanecen iguales, se recomienda describir la situación por medio de un modelo.

Un modelo es una descripción simplificada de un fenómeno por el cual se trata, omitiendo los detalles, de adquirir mejor percepción del fenómeno que se estudia.

Se puede diferenciar varios tipos de modelos. En ésta publicación se ha empleado un modelo teórico que es además un modelo de relación. Este es un modelo que no solo muestra las diferentes variantes y componentes del cual consiste el fenómeno estudiado, pero también revela de una forma, no matemática, la relación que existe entre las diferentes partes.

El modelo de relación usado en esta publicación muestra los diferentes elementos — prtrones, criterios, instrucciones y métodos que contribuyen a la planificación de la estructura física de las organizaciones de servicio además de sus conexiones mutuas.

Los elementos han sido agrupados bajo tres encabezamientos a saber, aquellos aplicables a 1 al nivel nacional 2 al nivel regional 3 al nivel local.

Finalmente se presentan otras medidas de importancia para la ejecución del plano que resultan de la metodología del plano sugerido.

INSTRUCCIONES Y CRITERIO A NIVEL NACIONAL

La idea básica es que una concentración de unidades de servicio en centros da como resultado un funcionamiento más eficiente de estos servicios ya que la concentración promueve su uso mas intenso. La concentración tambien facilita la instalación de servicios públicos que mejoran las condiciones de vida de esas personas que proporcionan los servicios. Además, los diferentes centros, siempre que estén bien planificados, pueden tener una estructura espacial que promueve el desarrollo de nuevas comunidades territoriales.

Si la concentración es el punto de partida de una política para establecer servicios sociales

y económicos en áreas rurales se necesita una clasificación de los distintos tipos de centros.

En la lista que se da a continuación se enumeran los tipos de centros de más importancia comprendidos en la planificación de áreas rurales.

Tipo de centro	Otros nombres usados frecuentemente	Tamaño de población	Radio de acción
Centro primario adicional	Aldea	1500	2 km
Centro primario	centro local, pueblo	1500- 5000	3- 6 km
Centro secundario	pueblo grande, villa chica	5000-10000	8-20 km
Centro terciario	ciudad-villa	10000	20 km

Cuando se diseñan planos de centros, se emplean áreas de servicio teóricos. Estos se indican por medio de círculos con un radio igual al radio de acción ya mencionado. También se diferencian áreas de servicios administrativos. Estas son áreas que representan la esfera real de influencia de la mayoría de unidades de servicio presentes en un centro. Las áreas de servicio administrativos deben coincidir en lo posible con los distritos de los diferentes servicios del gobierno y con las unidades de censo, por ej las unidades territoriales en las cuales se reúnen material estadístico que se utiliza en proyectos de desarrollo. Si se logra hacer coincidir estas áreas, existirá una base geográfica efectiva en la cual se podrá ejecutar una política de desarrollo coordinada y existirá una base real de la cual podrán surgir comunidades rurales viables.

Otra pauta que se deberá establecer a nivel nacional es la relación entre los tipos de centros y la red caminera. Solo se justifica la concentración de servicio si la población tiene buen acceso a los centros y a esos servicios proporcionados desde niveles superiores. A continuación se tabulan las relaciones entre tipos de centros y tipos de carreteras:

Tipos de centros	Tipos de carreteras
Centro adicional primario	sobre carretera cuaternaria
Centro primario	en uniones de carreteras cuaternarias y terciarias
Centro secundario	en uniones de carreteras cuaternarias y terciarias y de una carretera secundaria.
Centro terciario	en uniones de carreteras cuaternarias, terciaria y secundaria y de una carretera primaria.

Los últimos puntos que se deben determinar a nivel nacional son las normas para los distintos servicios sociales y económicos. Es decir, se debe decidir cuanta gente se necesita

para el funcionamiento satisfactorio de una unidad de servicio. Esto podrá manifestarse en las siguientes índices: una escuela por cada 1500 personas, una clínica por cada 2000 personas, un centro sanitario por cada 50000 personas, seis tiendas por cada 1000 personas etc.

Cuando se está estableciendo estas normas, no se deben basar solamente en la situación existente pero tambien al nivel de servicio relacionado al desarrollo que ha sido proyectado para la región.

Estas normas deben ser aplicadas con una cierta flexibilidad, considerando la accesibilidad del área, el transporte proporcionado, la densidad de la población y el nivel de servicios requeridos.

PAUTAS Y METODOS DE TRABAJO A NIVEL REGIONAL

Este grupo de elementos del modelo demuestra como se puede analizar la presente situación. Para hacer esto se necesita poder discernir la presente distribución y el modelo del establecimiento de la población, el uso del terreno, la naturaleza y extensión de las organizaciones de servicio. Además sera útil un análisis de la estructura socio-económica. Referente a la situación futura, se deberá tener disponible un mapa preciso del futuro uso del terreno del cual será posible derivar una distribución de la población venidera y tambien un modelo de establecimiento conveniente.

Aparte de esto, se necesita discernir la futura estructura social y económica que es de esperar en tal área. En la mayoría de los casos solo será disponible esta información en cuanto el plan de centros forme parte del plan regional.

Una vez reunidos estos datos, se podrá continuar de la siguiente manera:

a Las concentraciones de servicio existentes podrán ser clasificados bajo diferentes tipos de centros. Aparte de los tipos ya mencionados se puede agregar dos tipos adicionales para indicar una fase transitoria: centros potenciales primarios y secundarios.

b Luego se traza un circulo alrededor de todas las concentraciones existentes (con la excepción de centros de servicio adicionales) con un radio igual al radio de acción que ha sido establecida para centros primarios a nivel nacional. Este radio puede variar de un país al otro y se determina por medio de las circunstancias físicas y socio-económicas: La intensidad del uso del terreno, la accesibilidad y los accidentes geográficos, el modelo de establecimiento existente y la distribución de concentraciones existentes de servicios.

c Una vez trazados estos círculos (áreas de servicio teóricos) sobre el mapa, podrá observarse:

1 Que áreas teóricas se sobreponen, o en otras palabras son los centros competidores.

2 Cual de las áreas ocupadas ahora o en el futuro no están adecuadamente cubiertas por la funciones de servicio de los centros.

En base de estas dos observaciones, podrá decidirse si es necesario agrandar algunas concentraciones existentes o establecerse nuevos centros primarios por una parte para cubrir efectivamente toda la futura área ocupada con áreas téricas de servicio y por la otra parte, para prevenir, dentro de lo posible que no se sobrepongan estos centros.

d Una vez que se haya decidido la ubicación de los futuros centros primarios, se seleccionarán los centros primarios que también cumplirán así mismo la función de centros secundarios. Al hacer esto se traza sobre el mapa, un círculo alrededor de aquellos centros que han sido clasificados como centros potenciales secundarios o centros de mayor importancia con un radio igual al radio de acción planeado para centros secundarios a nivel nacional.

Luego se hace una elección de los centros existentes o de centros primarios proyectados, de la misma manera que se hace de los centros primarios, para que, de este modo sin sobreponerse demasiado toda la futura área ocupada esté cubierta de áreas teóricas de servicio de centros secundarios.

e Los centros terciarios normalmente tendrán que ser planeados dentro de una organización nacional.

f Una vez establecidos los distintos tipos de centros, se podrá diseñar un sistema caminero con la ayuda de la relación entre tipos de centros y tipos de caminos ya mencionados.

El resultado de estas actividades de planificación es un mapa donde podrá verse la ubicación de varios tipos de centros y la red caminera correspondiente. Normalmente se agrega una descripción. El producto final es designado como „Centres Plan” (Plan de Centros) y casi siempre forma parte de un plan regional.

INDICACIONES Y METODOS PARA PLANEAR CENTROS A NIVEL LOCAL

En primer lugar estas indicaciones dan una idea cómo se puede decidir la ubicación definitiva de centros nuevos o la expansión de los viejos — considerando el suelo, la topografía, la accesibilidad, aspectos de paisaje y los servicios existentes.

Además demuestra cómo se puede determinar la futura población en áreas agrícolas usando como base al uso futuro del terreno, el tamaño de las propiedades y de las familias y el número de la población que se ocupará de los servicios.

Podrá estimarse la naturaleza y la cantidad de servicios que es de esperar, comparando las normas fijadas a nivel nacional con la población proyectada en ese centro.

Una vez que se sepa la cantidad de personas que vivirán en el centro mismo, y el número de servicios que se establecerán allí, se podrá realizar el plano del pueblo.

Al hacer esto se recomienda agrupar los servicios ej: que se planeé una zona de servicio que se separa en dos polos de unidades predominantemente económicas y de servicio social. Además se debe planear una zona residencial y si es necesario una zona industrial. El plano del pueblo debe ser flexible en el sentido que, se pueda ejecutar en fases, cada

una completa por si misma, todavía posibilitando expansión aunque se haya excedido el óptimo estimado de la futura población.

INDICACIONES IMPORTANTES PARA LA EJECUCION DEL PLANO DE CENTROS

Estas indicaciones se concentran entre otras cosas en el hecho que para mantener una política de establecimiento de unidades de servicio, el gobierno debe tener a su disposición suficiente terreno en el centro mismo y a sus alrededores. Si el plano propuesto de uso de terreno se realiza, se necesita legislación respecto a la zonificación.

Además otras medidas legislativas y administrativas son de importancia: la política de otorgar permisos, reglamentos policiales, ordenanzas de edificación etc.

Ya que la ejecución de un plano de centros depende de muchas organizaciones, un cuerpo debe encargarse de la coordinación de todas las actividades. Esto incluye a los recursos disponibles para la preparación del terreno de construcción, la instalación de servicios públicos etc.

Finalmente se da una cantidad de indicaciones para mostrar cómo se pueden fijar las áreas administrativas de servicio y cómo por una parte, un plano de centros debe recibir apoyo en aspecto social y por otra parte como puede apoyar ciertos programas sociales de desarrollo.

LOS „CASE STUDIES” (CASOS DE APLICACIONES PRACTICAS)

La segunda parte de esta publicación demuestra con la ayuda de tres „case studies” como poner en práctica las instrucciones y métodos de trabajo para la planificación de centros. El primer „Case study” se refiere a Suriname (Sud América). Se ha compilado un plan de centros dentro de un esquema de un plan regional para un área de casi 40.000 hectáreas y se espera que su población será de 50.000. Los resultados podrán verse en el mapa V. Estos planos de centros incluyen los terrenos viejos y nuevos.

El segundo „Case study” trata sobre un plano de centro para una de las regiones de riego del Proyecto Eufrates en Siria. Esta región tiene un área total de 525.000 hectáreas, de los cuales 155.000 son apropiados para el riego. Se estima que la futura población será de 170.000 a 200.000.

Los resultados se podrán ver en el Mapa VI. Este plano de centros formaba parte de un plano regional y se refería principalmente a tierras nuevas.

El tercer „Case study” es sobre un plano de centros para el distrito de Besut del Estado de Trengganu en Malasia, para el cuál se ha compilado un plan regional.

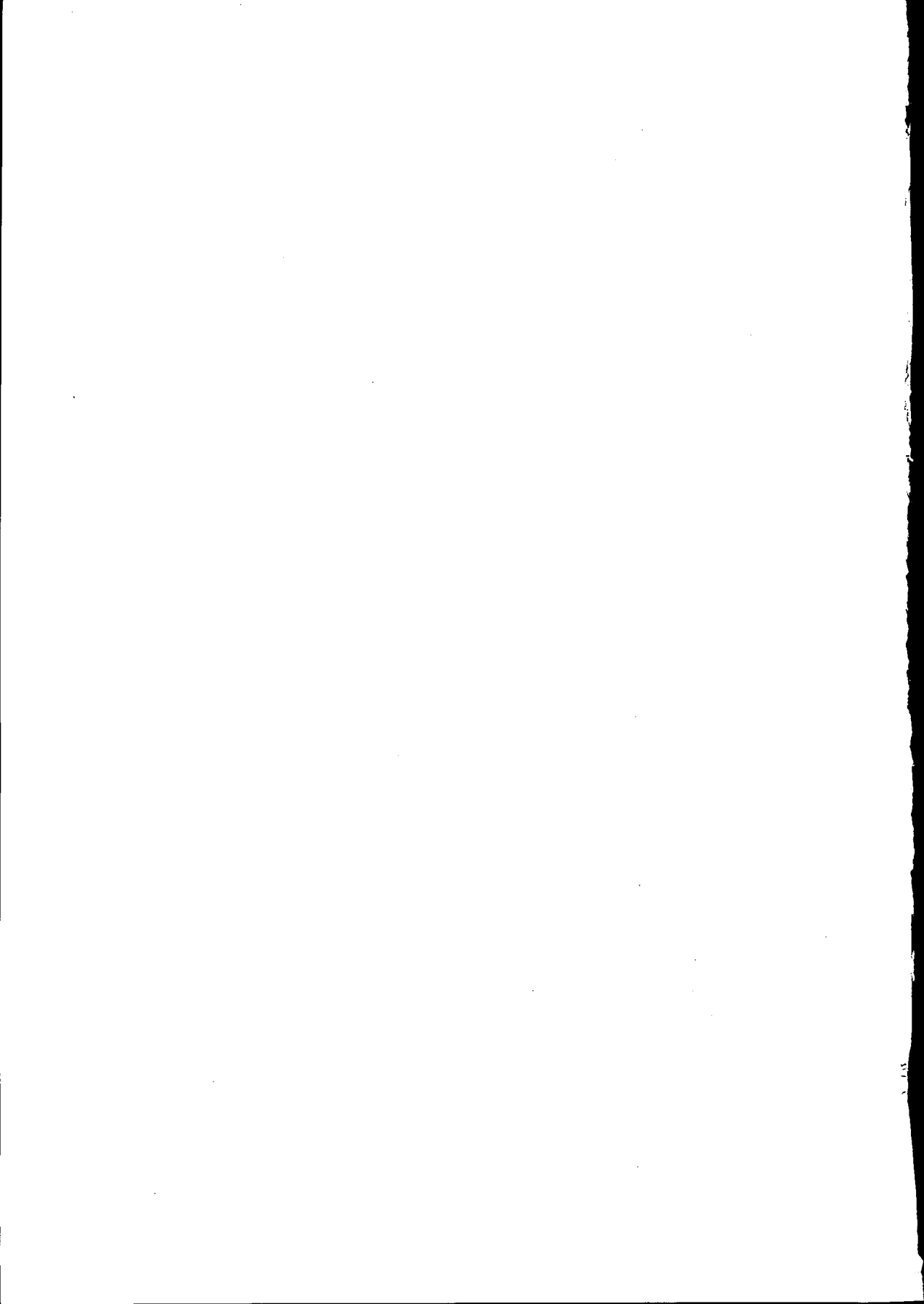
El plano de centros se refería a los terrenos viejos y nuevos. Los resultados podrán verse en mapa X.

En los tres casos se adapta en primera instancia, el modelo (las instrucciones, normas y métodos de trabajo) al país mismo.

El próximo paso era reunir todos los datos posibles, que según el modelo eran de importancia para compilar un plano de centros a nivel regional. Se descubrió que en general se podía reunir esta información en un período de 4 a 6 meses. Se necesitó 1 a 2 meses para compilar los planos de centros de acuerdo con las instrucciones.

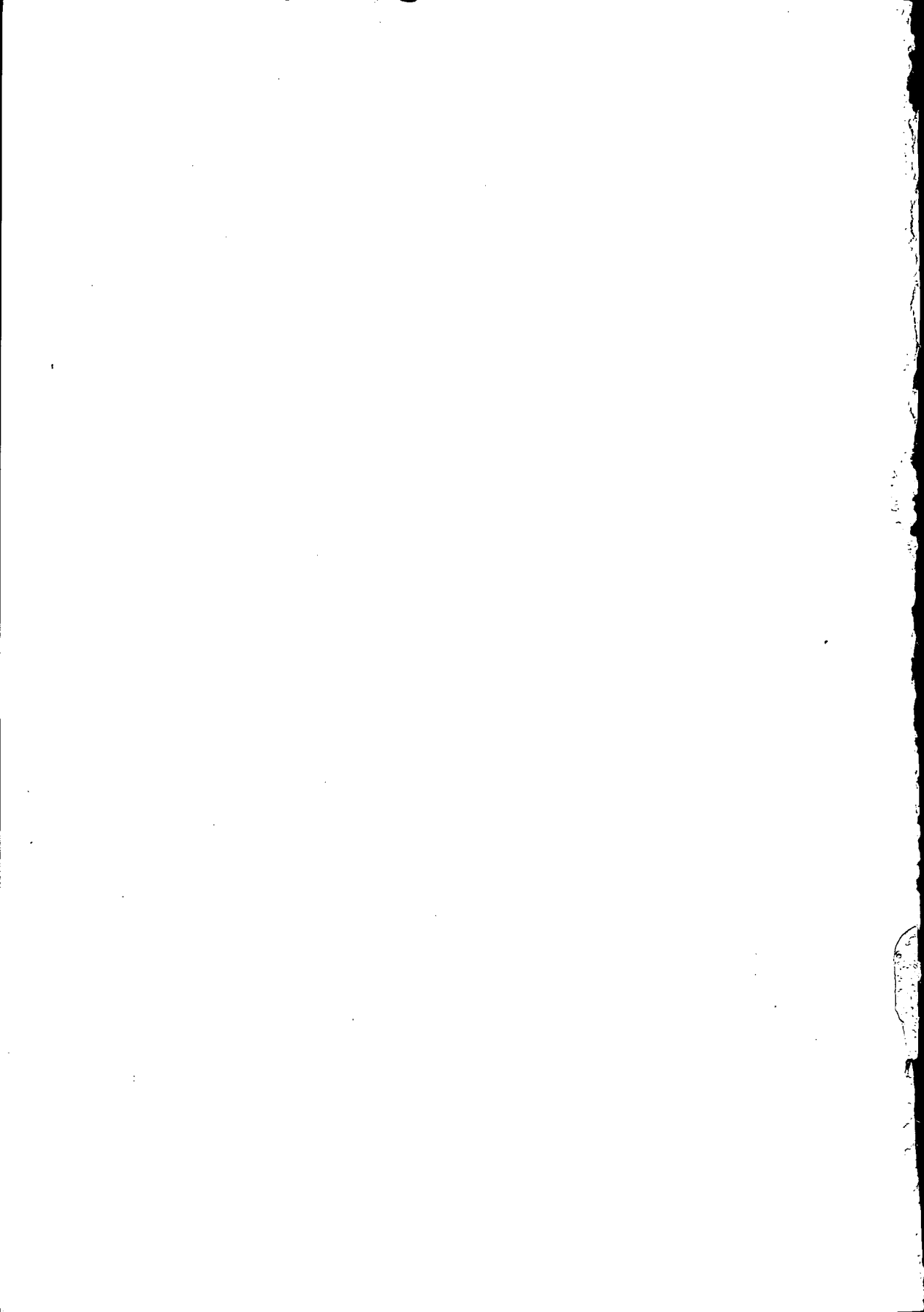
Solo pueden verse las instrucciones para ejecutar un plano de ciudad en el , Case study" de Suriname.

En los „case studies" se refiere muy brevemente a las medidas sociales que son de importancia para continuar la ejecución del plano.

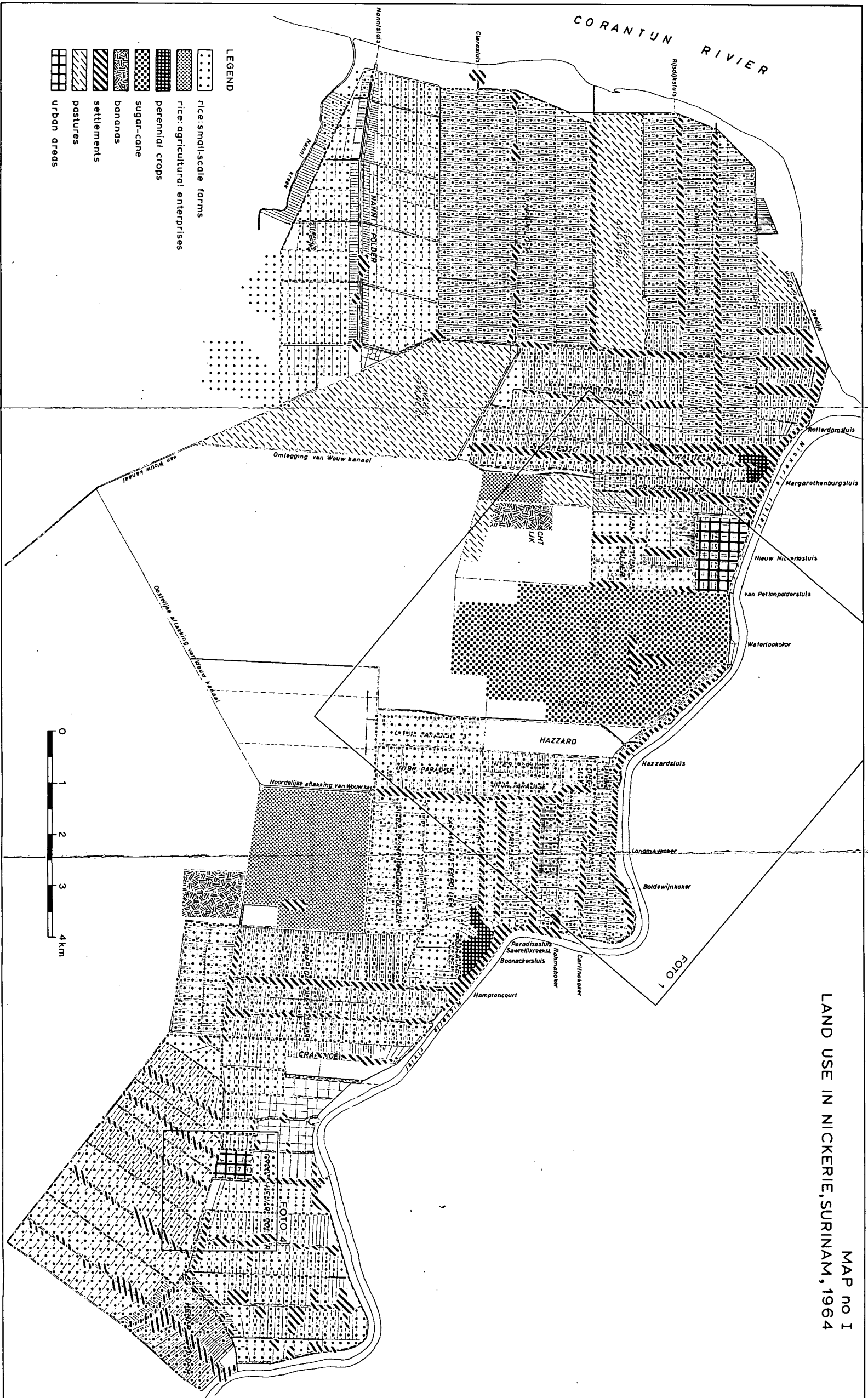


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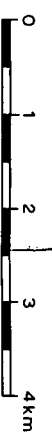
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- BUREAU LANDELIJKE OPBOUW 1956: Wooncentrum Groot Henar-polder Paramaribo (Stencil)
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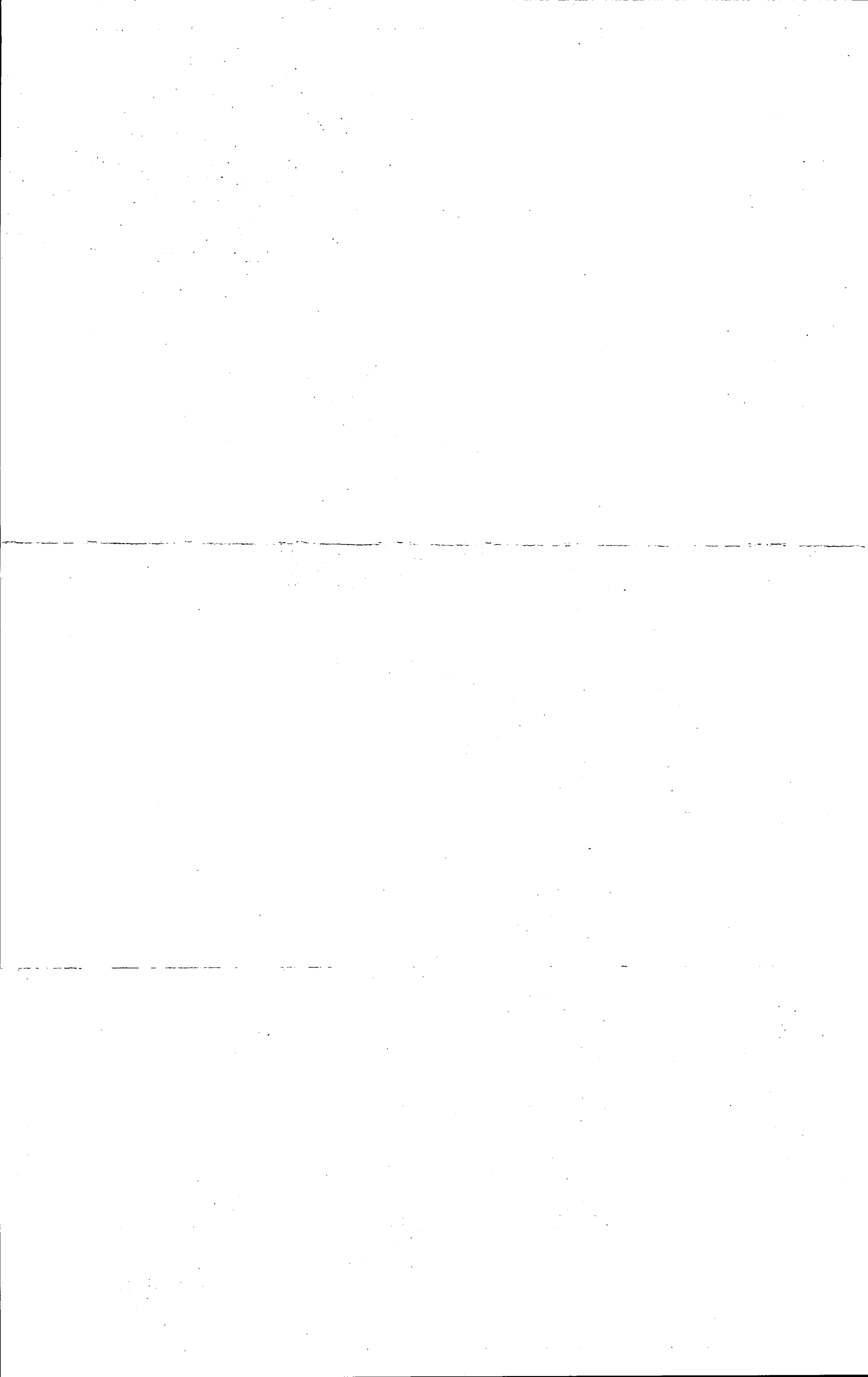


MAP no I
 LAND USE IN NICKERIE, SURINAM, 1964

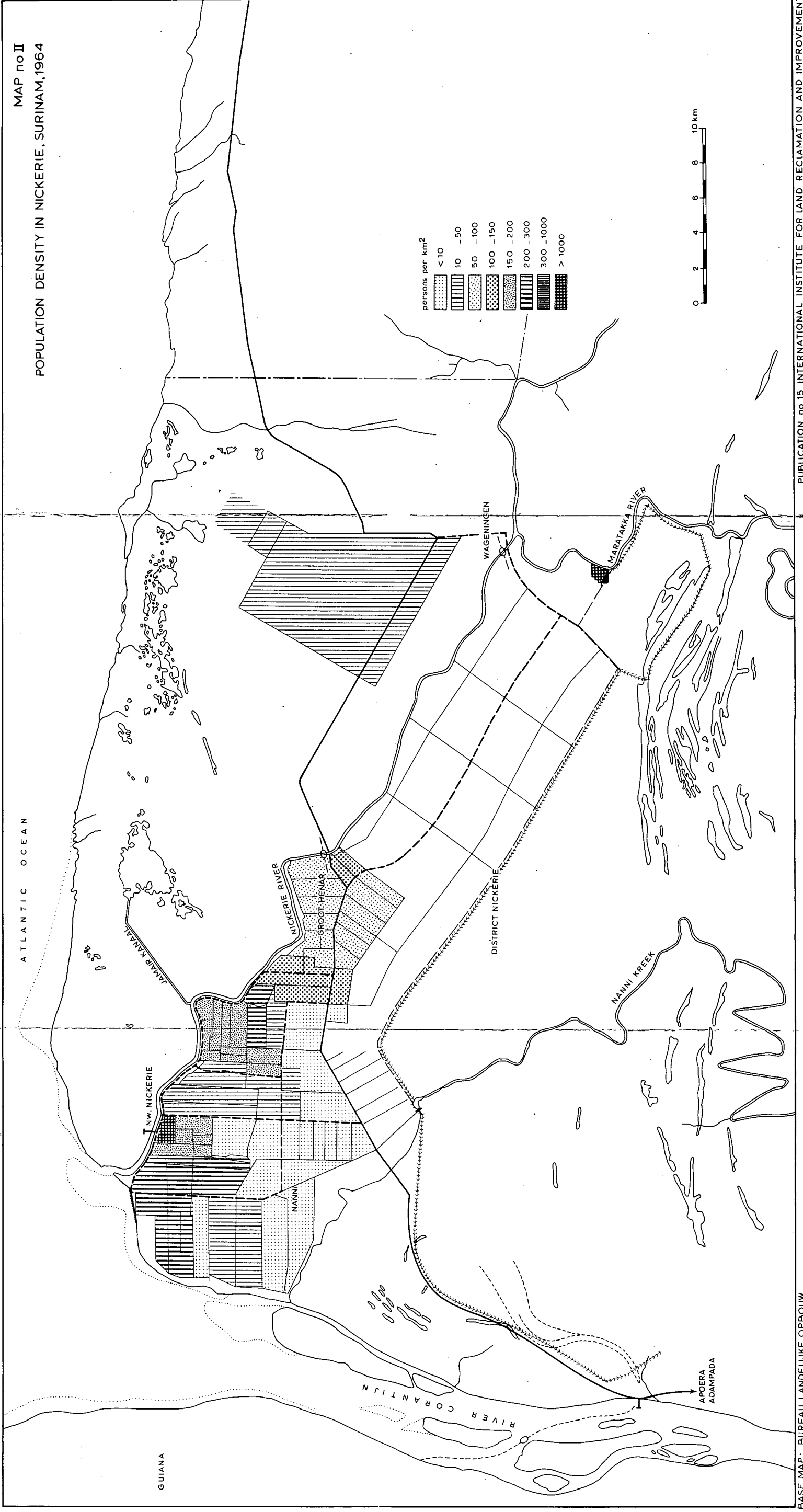


- LEGEND**
- rice: small-scale farms
 - rice: agricultural enterprises
 - perennial crops
 - sugar-cane
 - bananas
 - settlements
 - pastures
 - urban areas





MAP no II
POPULATION DENSITY IN NICKERIE, SURINAM, 1964



ATLANTIC OCEAN

JAMIE KANAKI

NW NICKERIE

NICKERIE RIVER

SROOT-PENAP

NANNI

WAGENINGEN

DISTRICT NICKERIE

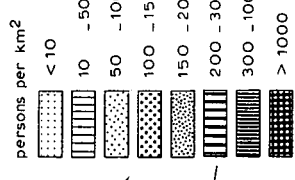
MANNI CREEK

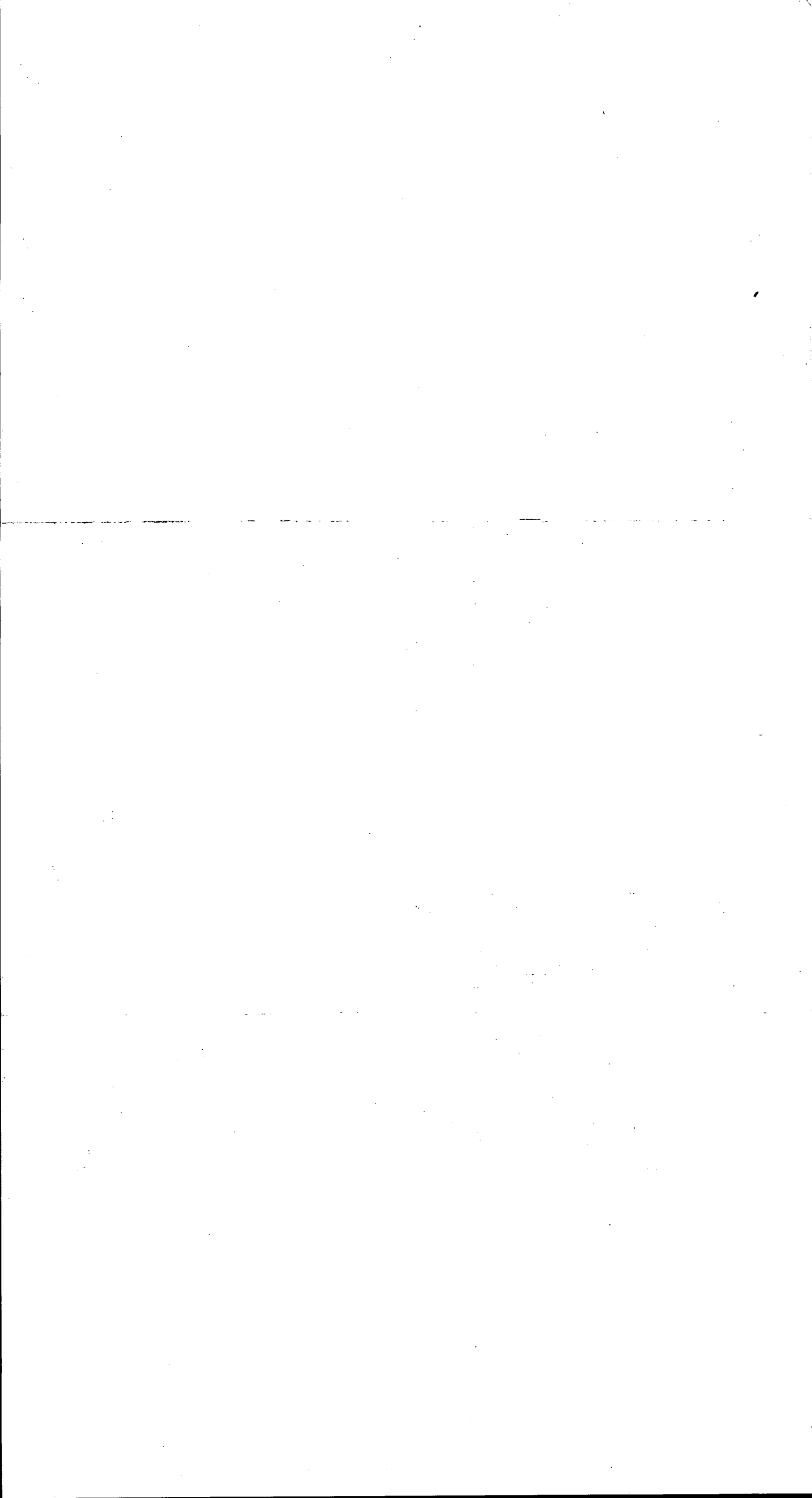
MARATAKKA RIVER

RIVER CORANTIJN

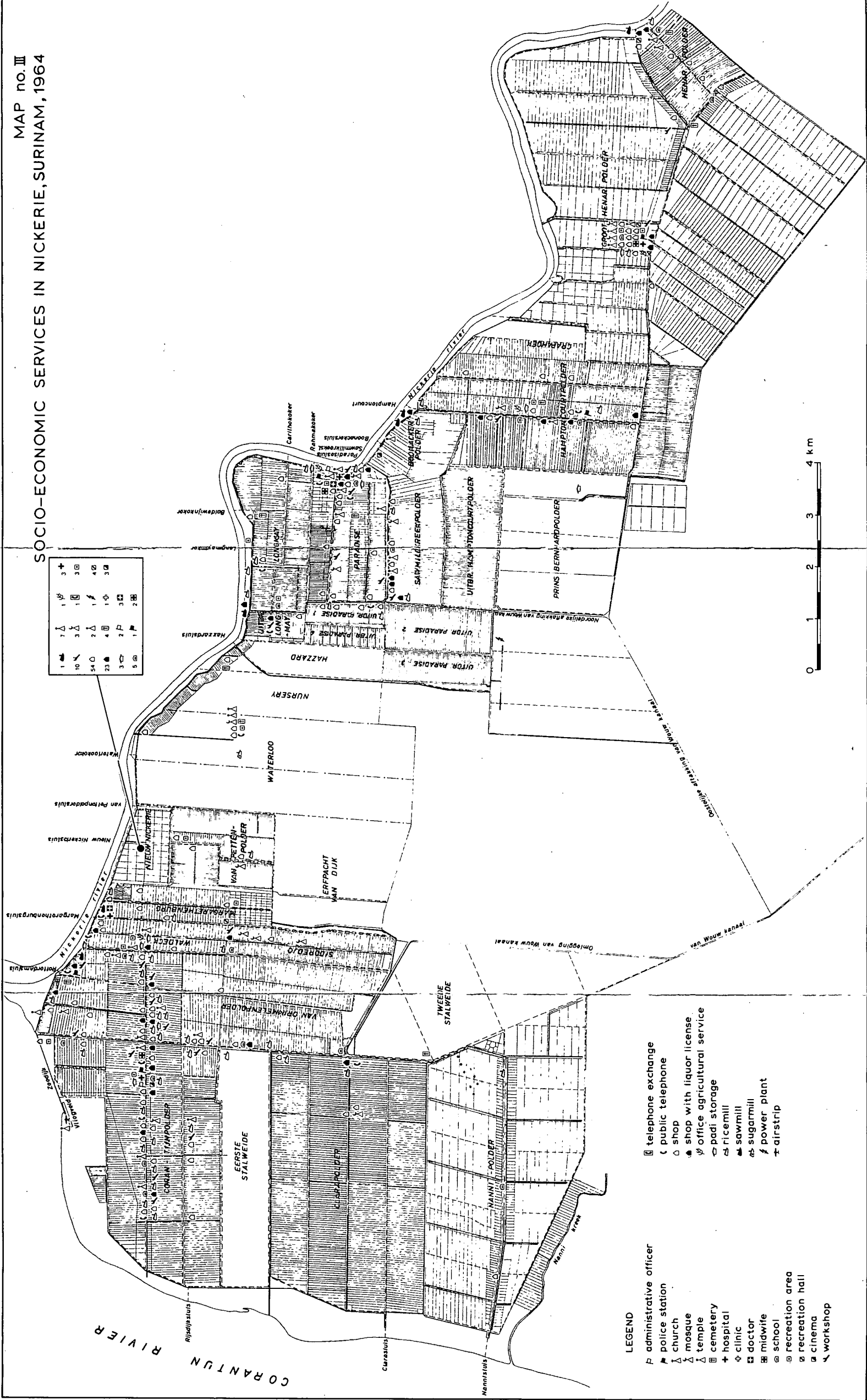
AFOERA
ADAMPADA

GUIANA



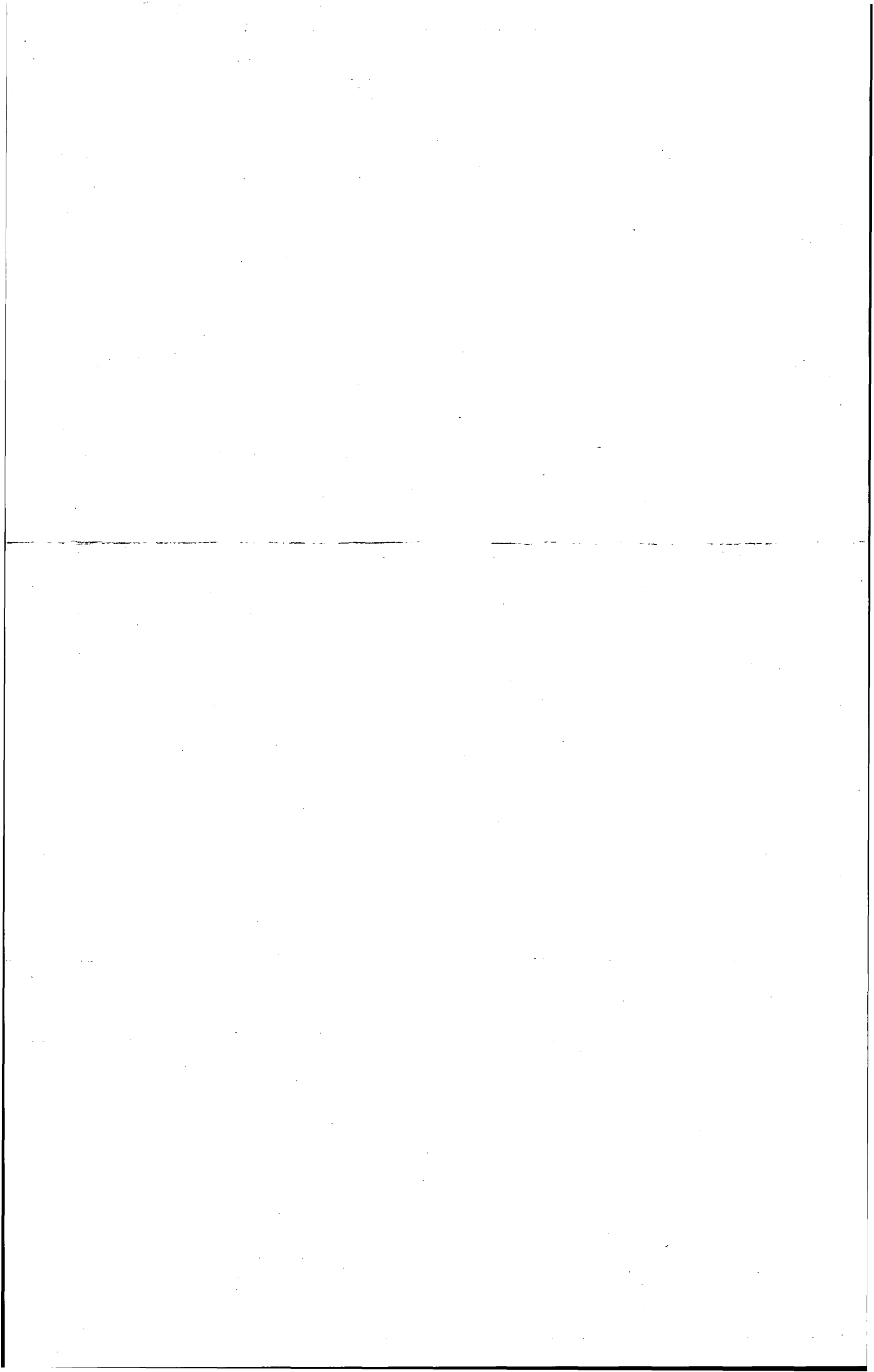


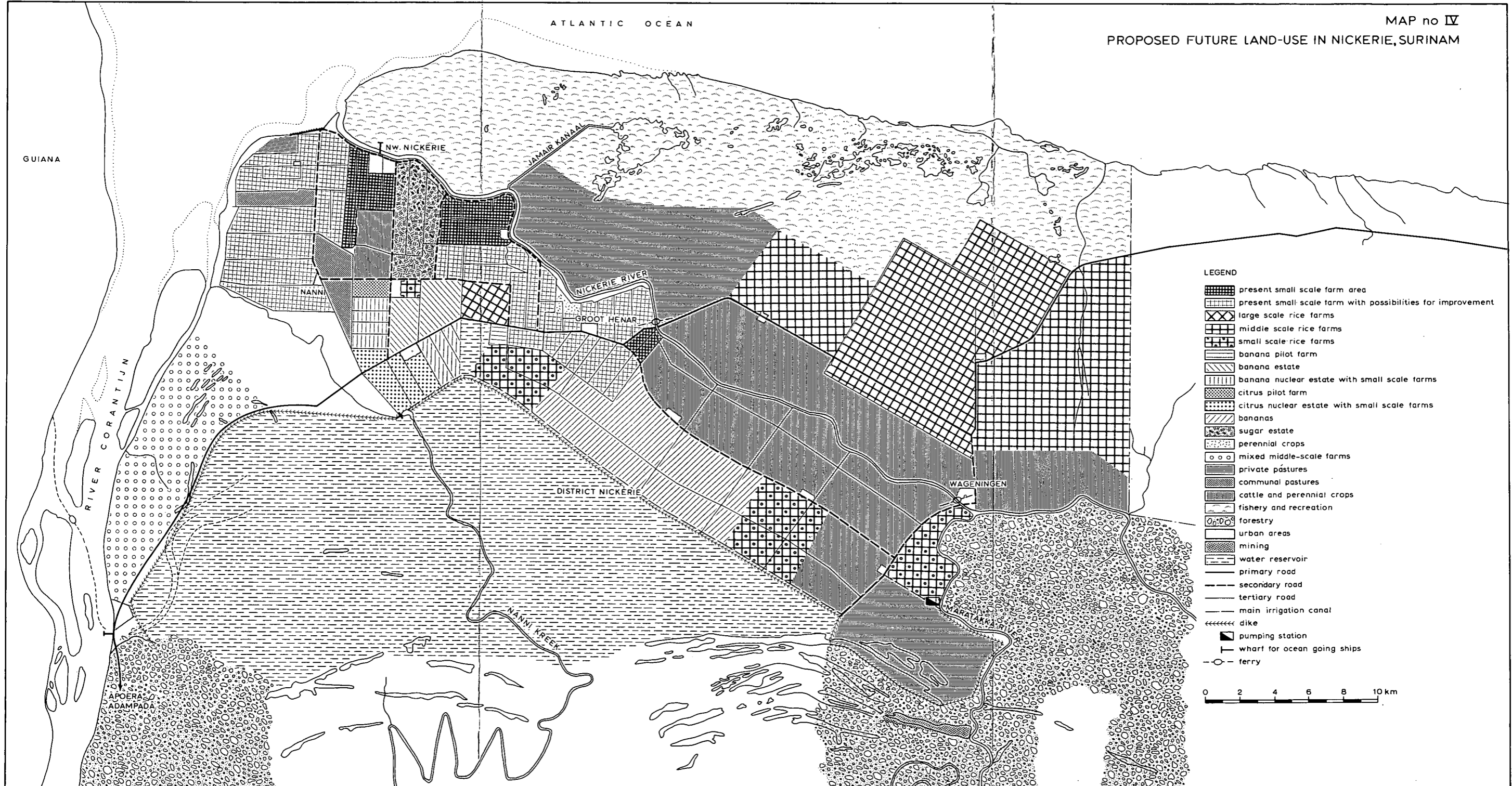
MAP no. III
SOCIO-ECONOMIC SERVICES IN NICKERIE, SURINAM, 1964



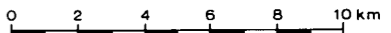
1	2	3	4	5
6	7	8	9	10
11	12	13	14	15
16	17	18	19	20
21	22	23	24	25
26	27	28	29	30
31	32	33	34	35
36	37	38	39	40
41	42	43	44	45
46	47	48	49	50
51	52	53	54	55
56	57	58	59	60
61	62	63	64	65
66	67	68	69	70
71	72	73	74	75
76	77	78	79	80
81	82	83	84	85
86	87	88	89	90
91	92	93	94	95
96	97	98	99	100

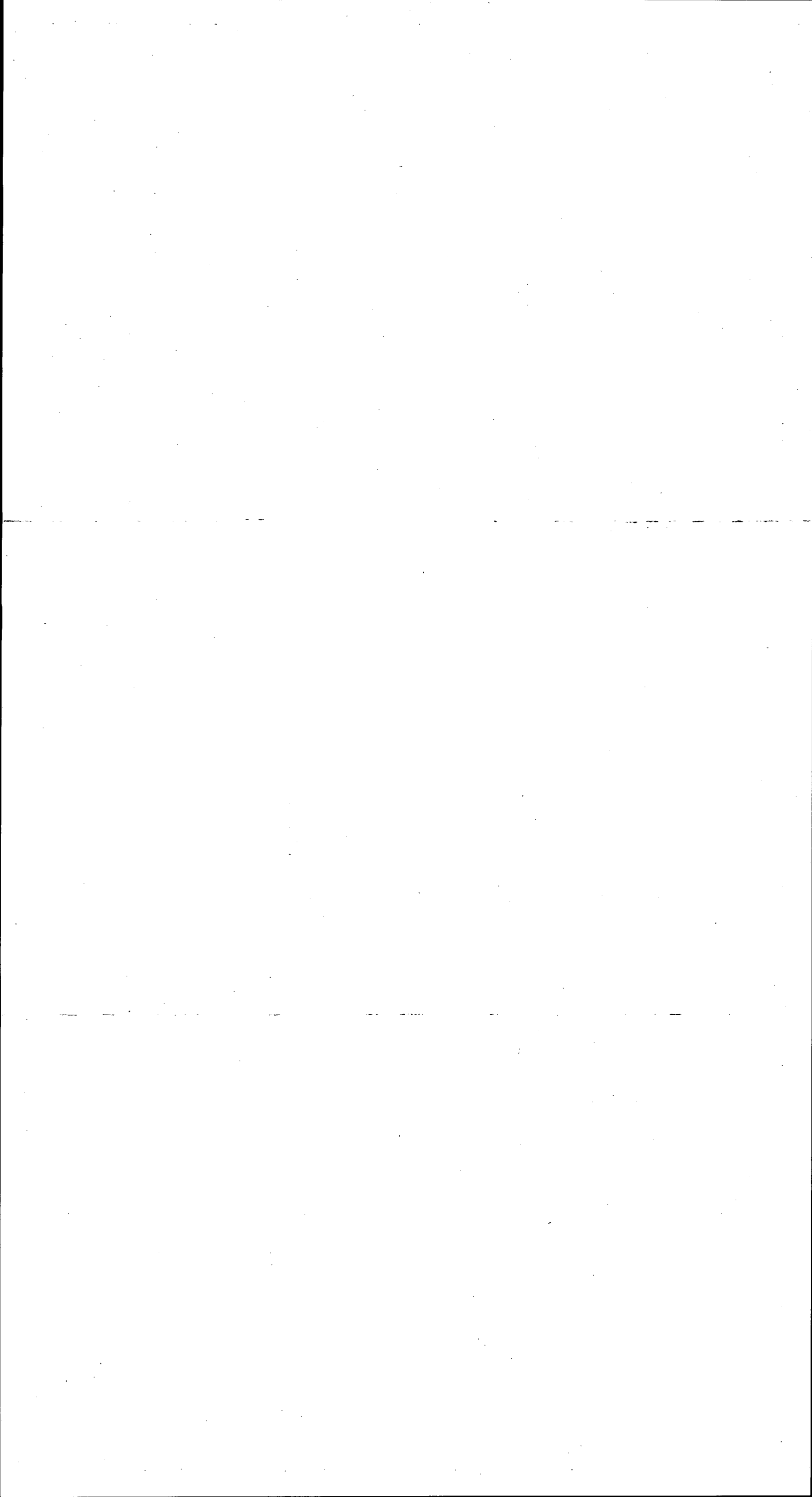
- LEGEND**
- P administrative officer
 - ☒ police station
 - ⊕ church
 - ⊕ mosque
 - ⊕ temple
 - ⊕ cemetery
 - ⊕ hospital
 - ⊕ clinic
 - ⊕ doctor
 - ⊕ midwife
 - ⊕ school
 - ⊕ recreation area
 - ⊕ recreation hall
 - ⊕ cinema
 - ⊕ workshop
- ☒ telephone exchange
 - ☒ public telephone
 - ⊕ shop
 - ⊕ shop with liquor license
 - ⊕ office agricultural service
 - ⊕ padi storage
 - ⊕ ricemill
 - ⊕ sawmill
 - ⊕ sugarmill
 - ⊕ power plant
 - ⊕ airstrip



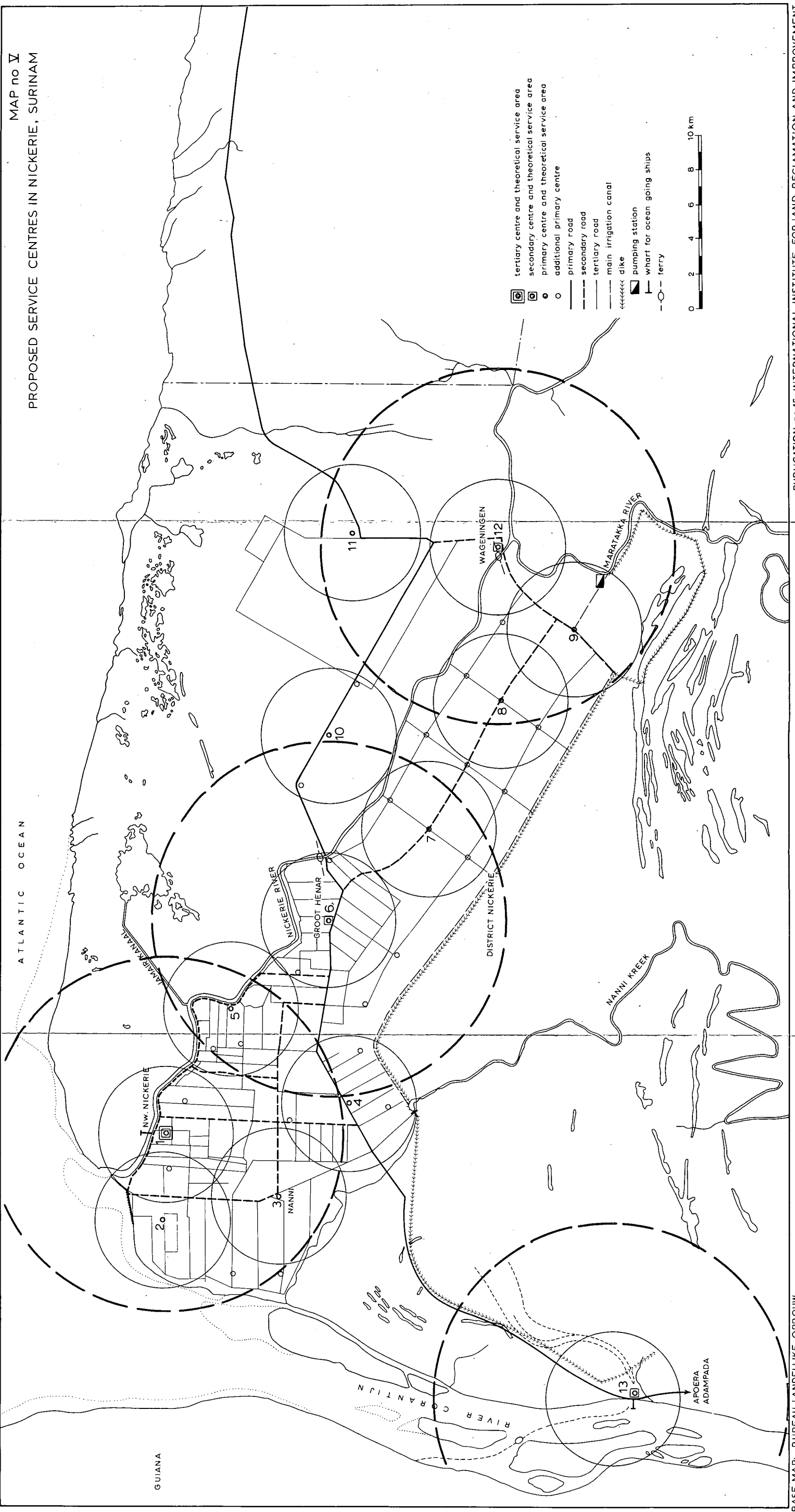


- LEGEND
- present small scale farm area
 - present small scale farm with possibilities for improvement
 - large scale rice farms
 - middle scale rice farms
 - small scale rice farms
 - banana pilot farm
 - banana estate
 - banana nuclear estate with small scale farms
 - citrus pilot farm
 - citrus nuclear estate with small scale farms
 - bananas
 - sugar estate
 - perennial crops
 - mixed middle-scale farms
 - private pastures
 - communal pastures
 - cattle and perennial crops
 - fishery and recreation
 - forestry
 - urban areas
 - mining
 - water reservoir
 - primary road
 - secondary road
 - tertiary road
 - main irrigation canal
 - dike
 - pumping station
 - wharf for ocean going ships
 - ferry





MAP no V
 PROPOSED SERVICE CENTRES IN NICKERIE, SURINAM

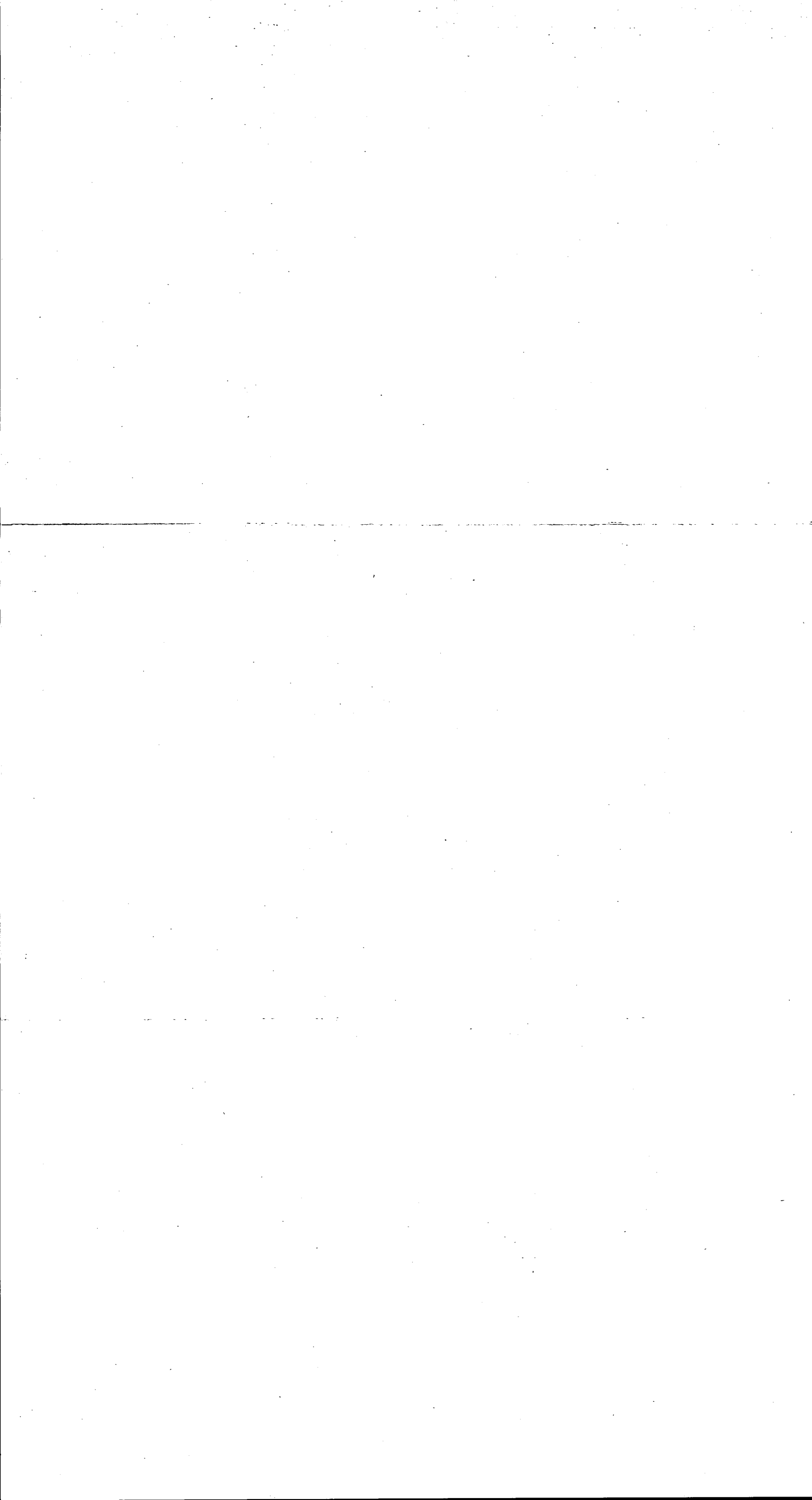


- tertiary centre and theoretical service area
- ◻ secondary centre and theoretical service area
- primary centre and theoretical service area
- additional primary centre
- primary road
- - - secondary road
- tertiary road
- main irrigation canal
- ←←←← dike
- ▣ pumping station
- wharf for ocean going ships
- ferry



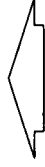
ATLANTIC OCEAN

GUIANA



MAP no VI

SERVICE CENTRES FOR IRRIGATION
REGION 1 IN THE EUHRATES PROJECT
SYRIA



- primary road
- secondary road
- tertiary road
- ⊙ 27 tertiary centre with number
- 15 secondary centre with number
- 31 existing primary centre with number
- 31 new primary centre with number
- - - radius of the primary function
- - - boundary between regions 1 and 2
- ▭ main irrigation canal
- pumping station
- - - drainage possibility
- boundary of technically irrigable area



