RURAL DEVELOPMENT IN NORTH CENTRAL JAVA INDONESIA

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by

C.B.HERMAN EDYANTO

DEPARTMENT OF GEOGRAPHY
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RURAL DEVELOPMENT IN NORTH CENTRAL JAVA INDONESIA

ABSTRACT

This study is concerned with the development of coastal rural areas in Northern Central Java-Indonesia. It examines some aspects of rural development processes, including physical and socio-economic factors. The main objectives are :

1. to determine the factors significant in coastal rural development; and

2. to specify the kecamatans (sub-districts) most suitable for development purposes based on the evaluation of those factors.

Rich in natural resources, coastal rural areas have a high potential for development but this needs to be properly managed for development. The significant factors for this were identified using factor analysis

Regional development in Central Java needs to be broken down into more detail programmes, especially if rural development is the object of the study. As in many rural areas in Indonesia, agriculture is the basic predominant activity in the coastal rural area together with fisheries. Therefore, rural development is often concerned with agricultural development. Discussion of the main problems in the specific area is important. This may include consideration of physical, social and economic and cultural problems. Several problems have, therefore, been recognized, namely: the unsatisfactory nature of agriculture development programmes in accelerating rural development, the scarcity of capital, and the lack of explicit programmes of coastal rural development. Identification of some potential sectors for development, however,can help the planners to overcome such problems. Thus, physical, social and economic sectors should be examined. This leads to the definition of the significant factors for coastal rural development.

This study has identified that commercial factors can accelerate development in rural areas; rural development needs adequate investment so that rational allocation measures should be devised. The distribution of development subsidies to rural areas can not be carried out effectively in the indiscriminate way hitherto used by the Government. Therefore the allocation of funds to development should be concentrated on selected kecamatans. Thus to develop these coastal areas an appropriate selection strategy must be evolved. By identifying the critical factors, the kecamatans best suited for development can be identified based on the appropriate strategy.

THE CONTENT OF THE STUDY

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01.Objectives

With particular reference to the northern coastal region of Central Java, this thesis has the following major aims :

a.To present an analytical description of the kecamatans of northern Central Java from the available published material, both environmental and socio-economic.

b.To identify the significant factors affecting potential development in selected kecamatans, representative of the classes identified by no a. above.

c.To evaluate the potential development of these kecamatans with that implied by Government policy for their development, and to select those kecamatans which are most likely to respond to the current development policy.

d.To identify the possible impact of the implementation of current development policies on the coastal zone of northern Central Java; and to make suggestions concerning environmental management.

02.Data required

These aims will be pursued by :

2.1.Reviewing and assessing the available data and literature relating to the coastal zone of northern Central Java :

a.environmental information, relating to geology, soils, topography, and climate;

b.social data, concerned with of population distribution and

density, and employment, educational and social facilities;

c.economic data referring to the agricultural sector, to trade, transportation, and the marketing system; and to rural industry and the service sector;

2.2.Examining :

a.Western strategies for rural development;

b.Central Government policies for rural development in Indonesia; and

c.local Government policies concerned with development.

03.Techniques

3.1.The techniques used in this analysis are ;

a.Quantitative evaluation of statistical data relating to the study area in the base year (1984).

b.Qualitative evaluation of social factors relating to certain sectors of the study area.

c.Qualitative evaluation of economic statistics relating to the study areas.

d.Qualitative evaluation of cultural aspects of coastal rural areas.

e.Comparative study of some strategies of rural development proposed by Western scientists.

f.Qualitative evaluation of Central and Local Government

programmes for rural development.

04.Procedures

1.Discussing current development theories in their application to Indonesia, and in particular Central and Northern Central Java, and a describing current development policies in relation to these areas.

2.From the data in 2.1. After analysis of the data, to select of their physical, social and economic factors which are most significant in relation to development policies.

3.Evaluating the requirements of the policies, with the significant elements produced by point 3 above, and thus to select the sectors and areas where development policies are most likely to work. This will be done using the following techniques:

a.Analysis of certain coastal rural sectors in the study area which are indicated as significant for development.

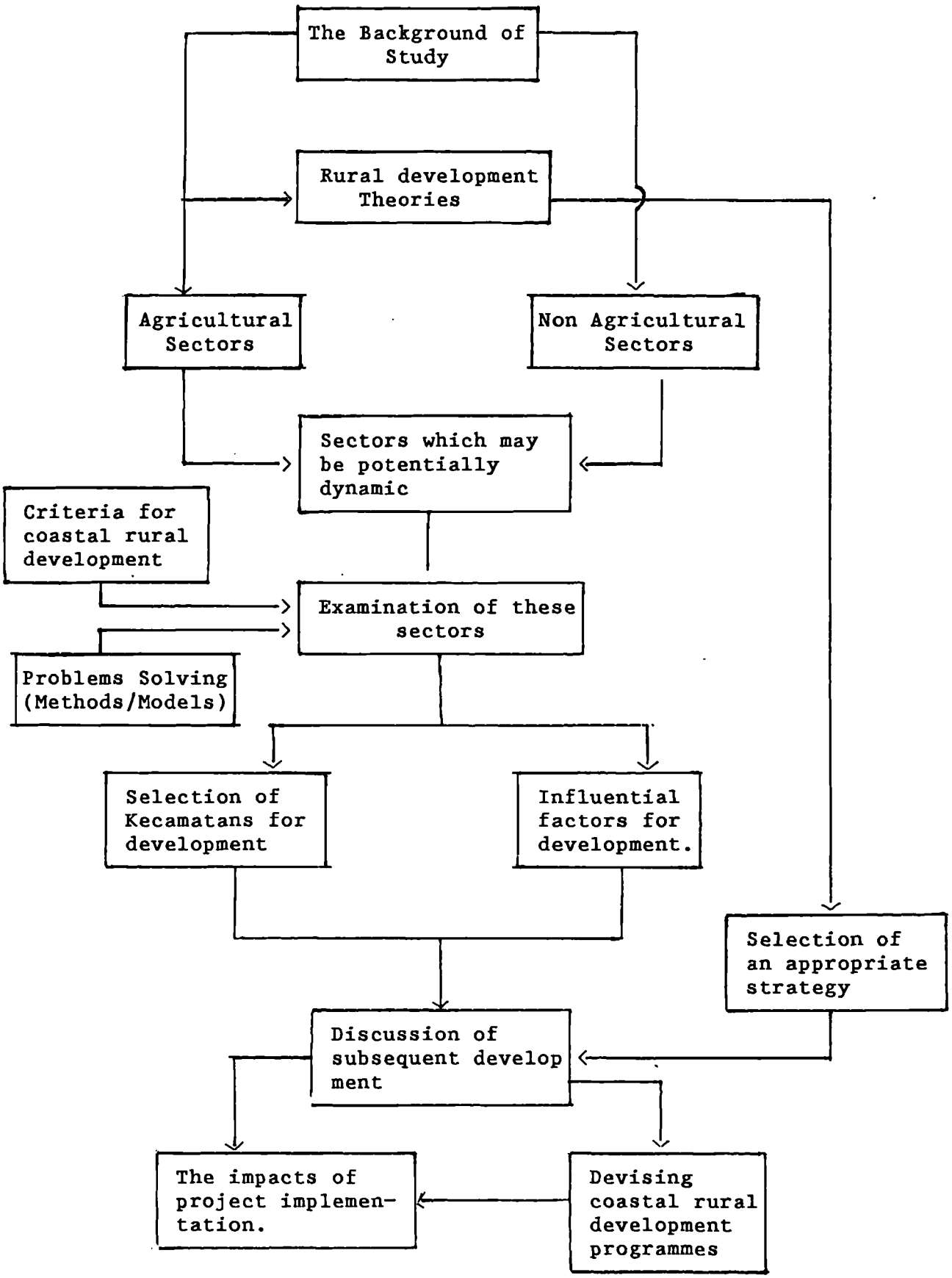
b.Reduction of the number of variables in order to facilitate analysis and to select significant elements by the factorial analysis method. This analysis will be made by computer.

c.Selection of certain strategies for rural development and application of the appropriate strategy to the significant elements as a result of the computer processing.

05.Assumptions

FIGURE 1.0

FRAMEWORK OF STUDY



To achieve this purposes and objectives, certain initial assumption are made:

1.that selected kecamatans are able to effect a successful level of investment in certain sectors.

2.that successful development of selected kecamatans can be achieved with the limited development funds available.

3.It is necessary to establish priority of kecamatans for development in coastal rural area on which the promotion of selected kecamatans may be based.

4.that coastal rural areas can stem or reverse rural emigration by creating areas of opportunity within each kecamatan, based on their individual advantageous elements for development.

5.that guided development of selected kecamatans can accelerate the development of coastal rural areas.

CHAPTER I

INTRODUCTION

CHAPTER I

INTRODUCTION

Countries in Southeast Asia face common problems in developing coastal rural areas and their associated resources. The principal problems arise from the twin effects of a rapidly increasing population and limited natural resources. Increasing population densities lead to accelerating rates of exploitation of traditional resources, such as fisheries, coral. The limitations in natural resources relate to both renewable and non- renewable resources, in the agricultural and in the nonagricultural sectors of the economy, inevitably affecting the economic viability of the region as a whole in the long term. The combination of the above trends results in a progressive decline in available natural resources, particularly near population centres. People have to travel further and expend more energy in order to obtain the same return and eventually the harvest even of renewable resources ceases to be economically viable. At the same time, people living in these areas have legitimate expectations, going beyond the fulfillment of basic needs.

Population growth alters the socio-economic and physical character of the region. Attention must therefore be directed towards solving the inherent problems of inadequate opportunities, facilities, services, and infrastructure in these areas. Such changes may be expected in coastal rural areas in many developing countries, and the problems they cause are severe enough to require the adoption of a well thought-out strategy to develop both the available resources and the social

and economic opportunities available to the local population. The government of Indonesia recognizes the importance of developing coastal rural areas as a potentially dynamic sector of the national economy. This recognition is reflected in the Government's objectives for rural development, which include paying increased attention to remote rural areas: to developing their economic infrastructure, and to creating self-reliant bases for rural development (Third Five Year Development Plan of Central Java Province 1979/1980-1983/1984, Central Java Province Government, 1979,Book 3,p27). The second and the third of these objectives each imply the development of rural resources, including agriculture, human resources, and the nonagricultural activities. However, development programmes intended to achieve these objectives have not been formulated clearly enough by the various levels of government- central, state and local- in preparing specific plans. There is therefore a need for a more detailed analysis of the problems in order to set out an appropriate development strategy, and to identify the significant factors affecting the choice of a development policy.

This study is concerned with analyzing some of the major problems facing coastal rural areas in northern Central Java. The discussion will also examine the unsatisfactory elements of previous policies, namely agricultural development programmes. It is not intended to underestimate the role of the agriculture sector in terms of sustaining rural development, however, but it is also intended to examine the importance of other sectors involved in the rural development process. It is also necessary to discuss different rural development concepts in rela-

tion to developing coastal rural development strategy for handling these problems. The main principle on which this whole analysis was based is an attempt to select significant factors for the potential development of coastal rural areas. It is therefore important to define what coastal rural development is and why it is necessary. The following questions will be considered :1.what are the environmental problems of coastal areas?; 2.what are their roles and functions in development?.

These questions are tackled in Chapter I and II of the study. This chapter gives an introduction to the major objectives of the study by presenting alternative strategies, which are discussed in Chapter II. It is also important to understand the background of the study in both its regional and local contexts, and Chapter III deals with this. Chapter V attempts to assess particular potential factors for rural development, and this examination serves as the basis of Chapter VI. The link between theory and practice is discussed in Chapter IX in the context of rural development policy and its effects. It will be argued that the strategy most likely to be successful would be to develop a number of selected centres, thus ensuring efficient implementation of the overall coastal rural development programme.

In any event to provide the same level of development for all villages at once is impossible; but on the other hand, simply subsidizing each village with a relatively small grant will do little to encourage the rational development of rural areas. It is therefore necessary to find a strategy which will stimulate the efficient management of rural resources,

accelerate the rate of rural development, ensure the effective implementation of development programmes, and be appropriate to the particular conditions in the study areas. Although several different programmes have been implemented already by the Indonesia Government, satisfactory results have not yet been achieved. Specific problems have been encountered with several programmes in northern Central Java precisely because there was no overall strategy to guide these activities. The development plans for rural areas which has been approved by Central Government do not take into account the resource potential of each village especially villages in coastal rural areas, and therefore cannot ensure coordinated development of the region as a whole. The rural development programme in Indonesia is in fact to be a top-down programme, and the bottom-up approach has been neglected.

Since only some of the centres can be developed because of restricted funds it is necessary to select those areas which have the greatest potential for development. In the various sectors of development a selective strategy may be more effective as an alternative to general and indiscriminate coastal rural development.

It is therefore important to develop suitable detailed strategies for rural development, to identify the dynamic sectors, and to specify the basic principles underlying these strategies.

I.1.The Coastal Zone

The coastal zone is made up of a complex web of interrelated resources, natural and man-made, renewable and non-renewable. It forms the interface between land and sea, and between marine salt water and terrestrial fresh water. It is not easy to place precise boundaries on the zone and definitions abound in the literature. Individual authors tend to define the area with reference to the purpose of their study. Ketchum (1972), for example, considers the combination of demographic, functional, and geographical aspects on his definition:

> 'The coastal zone is a broad band of dry land (shoreland) and adjacent ocean space (water and submerged land in which land ecology and use directly affect ocean space ecology, and vice versa). Functionally, it is a broad inter -face between land and water where production, consumption and exchange processes occur at high rates of intensity. Ecologically, it is an area of dynamic biochemical activity but with a somewhat limited capacity for supporting various types of human use. Marine influence (salt water) penetrates into estuarine areas to various extents, and the effects of ocean tides may extend even further upstream than salt penetration....

Other authors define it by emphasizing the physical aspects and one of the most straightforward of these definitions is given by the United States Commission on Marine Science, Engineering and Resources (1969):

> The coastal zone is a region of transition between two environments,the land and the sea It has been defined as that part of the land affected by its proximity to the sea and that part of the ocean affected by its proximity to land.

Since the former stresses the socio-economic and environmental aspects as well as physical aspect, it is more appropriate for this study. For this reason, the study interprets the coastal rural area simply as 'a region of transition between two environments, the land and the sea, where production, consumption and exchange processes occur at high or low rates of intensity'.

I.2.Rural Areas

The term 'rural' is applied to a wide variety of areas, and can be defined by a number of criteria (Mason,p25). This variety leads Clout to conclude that no definition has widespread applicability (Clout,1972). However, the terms 'rural' is most generally understood as the antithesis of the term 'urban'. So, everything that is not 'urban' is 'rural'. The term 'urban' is usually characterized by population concentration, occupying a cluster of built-up areas in a compact space by the dominance of non-agricultural occupations, and by the existence of 'incorporated' local government, in varying combinations. The term 'rural area' might also be defined simply as one in which agriculture and forestry are the predominant form of productive economic activity (Whitby, et al, p 7). Thus, 'rural development' pertains to the development of agricultural, mineral, water, fishery and forestry resources for the prosperity and well-being of the rural population and the advancement of the rural economy. In a physical context, a coastal area is an area which is adjacent to the sea, and where almost all activities are directly or indirectly influenced by

these coastal resources. Economically, fishing is usually an important predominant form of productive economic activity.

The term 'development' may be seen broadly as an improvement in the quality of life of the population, including social, cultural and political welfare as well as economic opportunities. Courtenay (1985,p.2) , argues that development implies improvements in opportunities for education, participation in cultural and sporting activities, provision of adequate health care and a pleasant living environment, freedom from servitude to other people or institutions, as well as the chance to be properly fed, clothed and sheltered. Myrdal defined development as the upward movement of the whole social system (Myrdal,1968). The International Conference of Population (1983) described the term 'development' as an integrated process of interrelated economic, social and political changes, the ultimate aim of which is the constant improvement of the well-being of the entire population. Easterlin defines 'development' as a rapid and sustained rise in real output per head and attendant shifts in the technological, economic and demographic characteristics of society' (Easterlin, 1968). Mabogunje categorizes the term 'development' under 4 major headings,

1.Development as economic growth
2.Development as modernisation
3.Development as distributive justice
4.Development as socio-economic transformation

He discusses each of these separately in order to support his definition (Mabogunje, 1980,pp 35-50). The World Bank (Harris,1982, p 15) defines rural development as 'a strategy designed to improve the economic and social lives of a specific group ot people, the rural poor'. Mabogunje also describes

rural development by empahisizing socio-economic aspects. Thus:

> Rural development is concerned with the improvement of the living standards of the low-income population living in rural areas on a self sustaining basis, through transforming the socio-spatial structures of their productive activities (Mabogunje, p.94)

Taylor gives a similar definition of rural development :

> '... a series of qualitative and quantitative changes occurring among a given rural population and whose encouraging effects indicate in time a rise in the standard of living and favourable changes in the way of live'. (Taylor, 1975).

Another author,Kulp, defines rural development as

> 'the set of economic and social development activities peculiar to the process of transforming the traditional as a whole'(Kulp, 1970,p 14).

All these provide different perspectives and emphases in development. On the basis of these definitions, however, , coastal rural development may be defined as a strategy designed to improve or to change the economic and social life of people living in coastal areas, so as to achieve a rise in the standard of living through transformation of the socio-spatial structures of their productive activities.

It is necessary to point out that some authors imply that social and economic life in rural areas should be changed through a 'modernisation' process. Einstad points out that 'historically, modernisation is the process of change toward those types of social, economic, and political systems that have developed in Western Europe and North America from the seventeenth century to the nineteenth century and have then spread' (Einstad, 1966, p 1). Modernisation[1] may be seen as the vehicle for accelerating the development of rural areas.

Mabogunje argues that : 'development is nothing if it is not the effective diffusion of innovations (Mabogunje,p 114). Therefore, in this study coastal rural development is seen primarily as a process of change in which economic advancement is the basic factor.

I.3.Definition of problem

Specific rural development policies have been in force in Indonesia since 1950, and have focused on the need to provide sufficient food for the country's large population (Hardjono,1983). The prime aim has been agricultural development and this has affected the overall rural development strategy; since agricultural development has been the principal policy of Central Government, it is reflected in the development plans of the Local Government agencies in the rural areas, which have concentrated on making each village, self-sufficient in food supplies. The implementation of this strategy has not yet been completed.

The failure of the 1956-1960 Development Plan to achieve its targets in the agricultural sector, and the failure of Land Reform Programme in 1960 (which was inspired by the ideology of the Communist Party) showed the ineffectiveness of these for rural development strategies. There was a slow progress of rural development during the period 1950-1965. After 1965, the agricultural sector was still given priority, in order to achieve self-sufficiency in rice production through intensified cultivation. Several programmes have since been launched by Central Government, such as 'Bimas' (Mass Guidance) which is designed to boost rice production, 'Inmas' (Mass

Intensification) which attempts to extend to farmers such services as the provision of high-yield seed and guidance by extension workers and 'Insus' (Special Intensification), which selects the land for intensification. All these programmes are manifestations of the fundamental Government strategy of developing the agricultural sector and to intensifying food production. They indicate that rural development policy in Indonesia is as yet not directed towards a broad spectrum of development because it is still concentrated on the encouragement of plantation crops and is of more benefit to the villages which have an orientation towards large-scale rice cultivation rather than coastal villages with a different resource base. The implementation of rural development programmes also seems to neglect other resources which can be identified as having potential for development, and in particular some nonagricultural aspects. Though rural development in Indonesia is often identifiable with agricultural development, it also acknowledges that social and cultural factors have a significant influence in determining development, but the results of the implementation of such programme do not satisfy rural people as a whole. Taylor argues that rural development is a much wider concept than simply agricultural development, although the agricultural production base must usually be a vital component of any rural development programme (Taylor, 1975). In essence, both natural and human resources must be recognized as the basic to any rural development. Both involve a number of variable elements. Some of these are related to the heterogeneous nature of coastal rural regions, and they must be assessed in order to establish the factors

significant to development in these areas. The heterogeneity of coastal rural regions is reflected in the natural resource base, in available facilities, and the potential interest in the human resource. Unfortunately, they are rarely perceived the significant elements for development either by Central or by Local Government.

In most developing countries, like Indonesia, capital is scarce, and any capital needed for coastal rural development must compete with other demands for financial support. The policy for rural development is also different from country to country. In Indonesia, the Government has provided rural areas with development subsidy and certain rural development programmes such as Family Planning Programme and Family Welfare Education (PKK) . However this subsidy does not correspond to the demands for financial support in all rural areas. It is true that around 80 per cent of the Indonesian people are living in rural areas, but Government policy for allocating development subsidies to villages is deficient compared with the subsidies available to regencies or to provinces. In 1984, for example, the total development subsidy for 67534 villages was only 0.9 per cent of total actual Government development expenditure (Table 1.1), and 17 per cent of the total development subsidy of the administrative areas.

Table 1.1

Actual Government Development Expenditure of Indonesia
(x Rp 1000,000,000)

Type of expenditure	79/80	80/81	81/82	82/83	83/84
1. Department-Institutions	1480.3	2533.3	2724.6	3260.9	3219.6
2. Development subsidy to villages	31.0	50.7	70.5	88.4	91.6

3. Development subsidy to regencies	87.1	119.4	162.7	193.9	194.1
4. Development subsidy to provinces	100.7	166.7	215.0	253.0	253.0
5. Investment through the banking system	252.8	476.5	480.9	336.6	591.7
6. Fertilizer subsidy	125.0	283.6	371.4	420.2	324.2
7. Construction of primary school	155.8	249.8	374.5	267.4	549.3
8. Regional Development Contribution	71.4	87.2	94.5	105.2	132.4
9. Sanitary Facilities/ Public Health Centre	30.0	50.4	78.8	80.3	87.3
10.Construction and rehabilitation of market	12.4	2.5	6.0	4.5	10.6
11.Replanting and Afforestation	40.8	48.6	70.4	49.4	59.4
12.Timor Timur Province	6.6	6.4	6.8	5.8	5.2
13.Road Facilities	13.0	25.9	54.8	42.4	64.6
14.Others	291.0	385.5	565.3	326.7	448.7
15.Projects aids	1316.3	1429.7	1663.9	1924.9	3867.5
T o t a l	4014.2	5916.1	6940.1	7359.6	9899.2

Source : Statistical Year Book Central Bureau of Statistic of Indonesia

Table 1, shows that regional areas are still the focus for development by Central Government. First priority was given to development at the province level; the second, to the regency level; and last to the rural areas. To implement rural development programmes, the Government has decided to subsidize each village with only Rp.1,000,000 per year (i.e. a total of $1575 in 1981). This policy was carried out as a response to a desire for the equitable distribution of development subsidies. However, this subsidy was not enough to finance significant development in rural areas, and with such a limited subsidy, development in all sectors in rural areas is difficult to achieve.

Another dimension of these problems is regional planning by Central Government. Regional planning is at present expressed in the current Third Five-Year Development Plan for Central

Java Province. In this plan there is, however, as yet no explicit programme of coastal rural development and coastal rural development has been very slow because there is no guidance provided for it. An appropriate strategy is needed for this purpose. The development of both the natural and the human resources is an important issue for the development of these heterogeneous areas. It is the purpose of this thesis to identify the various elements in development, and to select the most significant factors. Thus, in order to suggest how coastal rural areas might be developed, several strategies for rural development will be discussed, an appropriate strategy will be formulated , and its application to the development of coastal rural areas will be examined.

I.4.Database

Such a study of coastal rural development in northern Central Java thus requires the collection of a variety of data sets concerning the coastal rural environment, including the facilities and activities in these areas, current development policies, and also the role of the particular study areas in a regional context.

The information required may be categorized thus :

1.Economic;
2.Social;
3.Physical;
4.Demographic;
5.Environmental.

Such a varied data base requires the use of several sources, and different techniques need to be used. Integral to the research method is the need for this information to be collec-

ted at district level, both general information concerning the study areas and specific information for more detailed examination.

The general information relates to population, rural facilities and rural transportation , and is taken from published materials. Specific information, local area problems or farmers incomes, for example, has been obtained by a questionnaire survey of Regional Planning and Development Office of Central Java Province.

With regard to the kecamatans selected for study, information was collected from the following sources :

1.Documents published by Central or Local Government, such as report, books, maps and plans.

2.Information and results surveys of local Government or institution.

Published documents includes maps, reports and statistical year books. Other published materials have been examined such as :

1.The Third Five-Year Development Plan of Central Java Province 1979/80 -1983/84

2.Central Java Statistical Year Book 1984.

3.Statistical Year Books of 9 Regencies : Pati, Rembang, Demak, Jepara, Kendal, Pekalongan, Batang, Brebes and Pemalang (database:1984).

Other information was obtained from Government offices, in particular The Ministry of Public Works, the Home Ministry, the

Provincial Planning Offices, the Directorate of Geology and other Government institutions. This information is relevant to the activities of these Ministries or to Local Government in the study area.

I.5.Field Survey

Field survey is a means of investigating special problems relevant to the aims of the present study. Questionnaire survey are usually executed to establish the nature of the problems experienced by rural people in the villages such as their day-to-day activities, and their economic circumstances.

The field surveys were a means of investigating special problems relevant to the aims of the present study. Sampling techniques are usually used by some researchers in the study areas where hundreds or thousands of respondents might be interviewed. Ideally, the sample size should be at least five percent of the total population (Leven,1982). However, a questionnaire survey may not always be necessary provided that :

1.some information relevant to the objectives of the study is available in Local Government offices;

2.surveys with the same object have been executed by other researchers or institutions, so that their results may be utilized by others.

This study considers the important of questionnaire, but because of time and resource constraint, a traditional sample survey of individual village members could not be undertaken.

Groups of people of stature within the village were interviewed. The survey of all sub-districts in the study areas, however, were undertaken by Public Works Ministry and Provincial Planning and Development Office. The author believed that this added to the reliability of the data.

The present study thus utilizes field survey data obtained by both Provincial Planning and Development Offices and also field survey data from the Public Works Ministry. Questionnaires in the Public Works Ministry attempt to establish the social and economic aspects of life in rural areas, and the local problems experienced by coastal people. These results are of use in the present study, in that almost all the data provided can be utilized for analysis and assessment relevant to its aims. Without a substantial budget it is not easy for an individual researcher to plan and implement such a survey in a large region of variable accessibility, so that information from the work of others is essential to the achieving of the objectives of present study.

I.6.The 'kecamatan' (sub-district) in development programmes

Development programme regions may be viewed at 3 different scales, regional, urban, and rural regions. This categorization is essential if effective policy decisions are to be made as part of a development plan. A programme region is an area for which particular decisions are made on an economic, a social or a physical basis. Since the implementation of a rural development policy requires the power to act, and this power rests more with Government than with private agencies, such regions need to be defined as administrative areas, under political

jurisdiction at a defined level. In this study,the 'kecamatan' has been accepted as the representative unit in coastal rural areas because it is a sub-district administrative area and also constitutes the smallest unit of the organizational structure of Government in Indonesia. Furthermore, the study of rural development requires comparative statistical data and these are normally collected on a kecamatan basis. Thus it is unavoidable that existing programming units are used as a basis for study. The optimal planning unit will also vary according to the problem under investigation. For example, a question such as the selection of coastal villages for selective development in an area containing several villages with different potential for development must be dealt with at the sub-district level, whereas other questions affecting a wide area can be handled only on a regional basis. The kecamatans chosen for this study are :

Regency	: Rembang	Demak	Pekalongan
Kecamatan	: 1.Sarang	1.Wedung	1.Tirto
	2.Kragan	2.Bonang	2.Wiradesa
	3.Sluke	3.Karangtengah	3.Sragi
	4.Lasem	4.Sayung	
	5.Rembang		
	6.Kaliori		
Regency	: Pati	Kendal	Pemalang
Kecamatan	: 1.Batangan	1.Kaliwungu	1.Ulujami

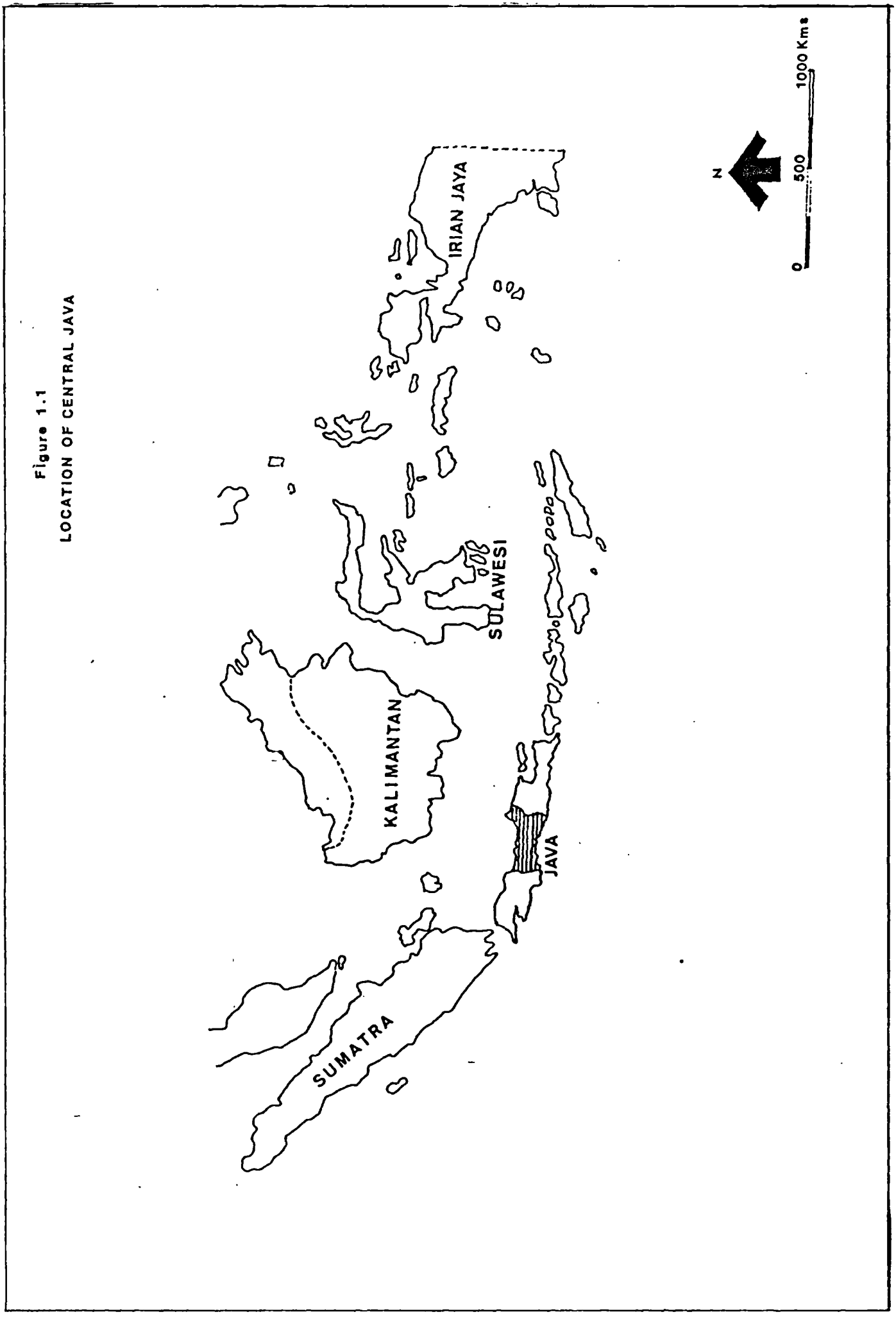


Figure 1.1
LOCATION OF CENTRAL JAVA

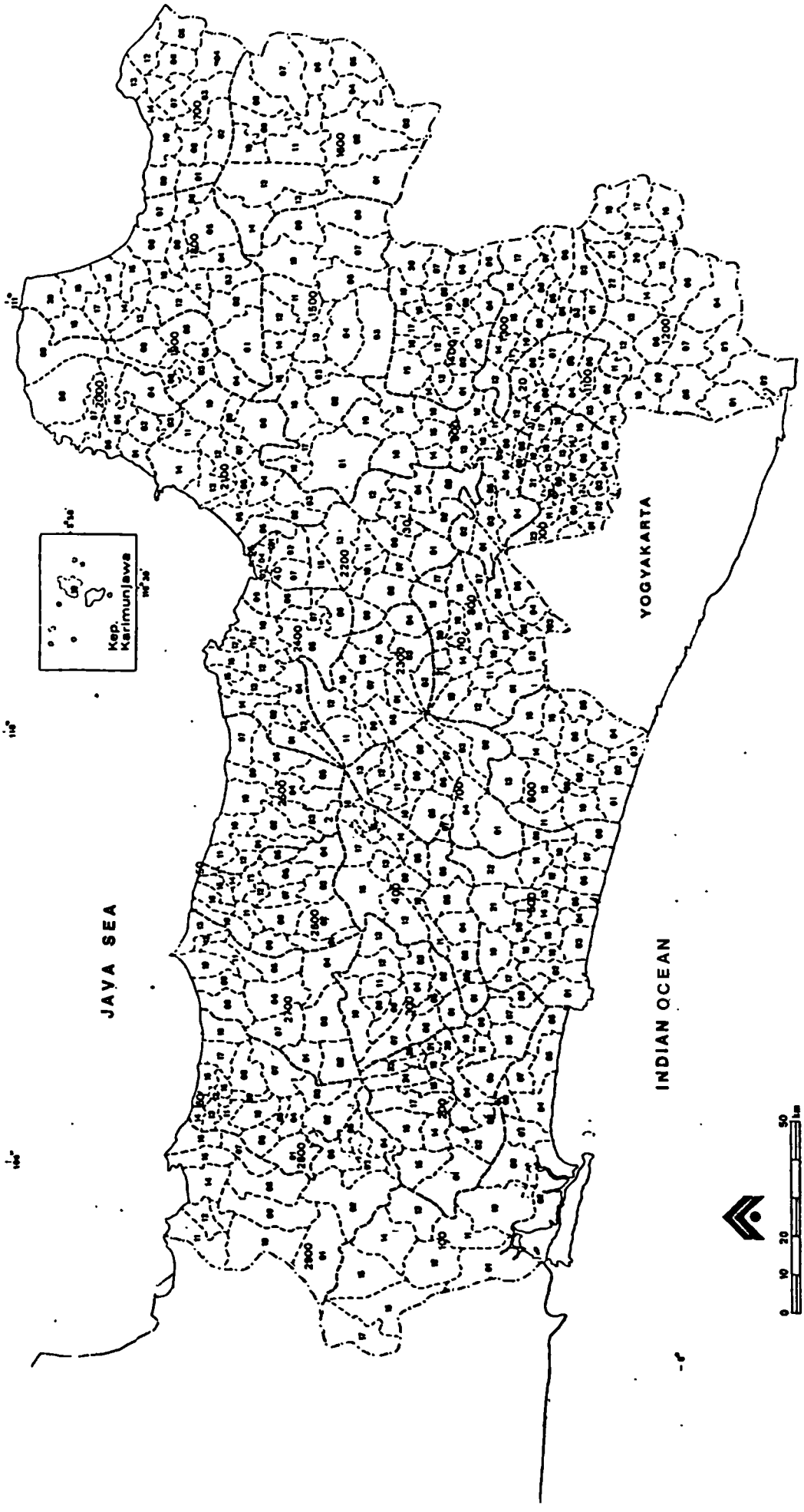


Figure 1.2
ADMINISTRATION MAP
OF KECAMATANS IN CENTRAL JAVA

	2.Juwana	2.Brangsong	2.Petarukan
	3.Wedarijaksa	3.Kendal	3.Taman
	4.Margoyoso	4.Patebon	4.Pemalang
	5.Tayu	5.Cepiring	
	6.Dukuhseti	6.Kendal	
Regency :	Jepara	Batang	Brebes
	1.Keling	1.Gringsing	1.Brebes
	2.Bangsri	2.Limpung	2.Wanasari
	3.Mlonggo	3.Subah	3.Bulakamba
	4.Jepara	4.Tulis	4.Tanjung
	5.Kedung	5.Batang	5.Losari

(See figure 1.3)

Before proceeding further, it is important to define the function of the kecamatan within the overall Government system.

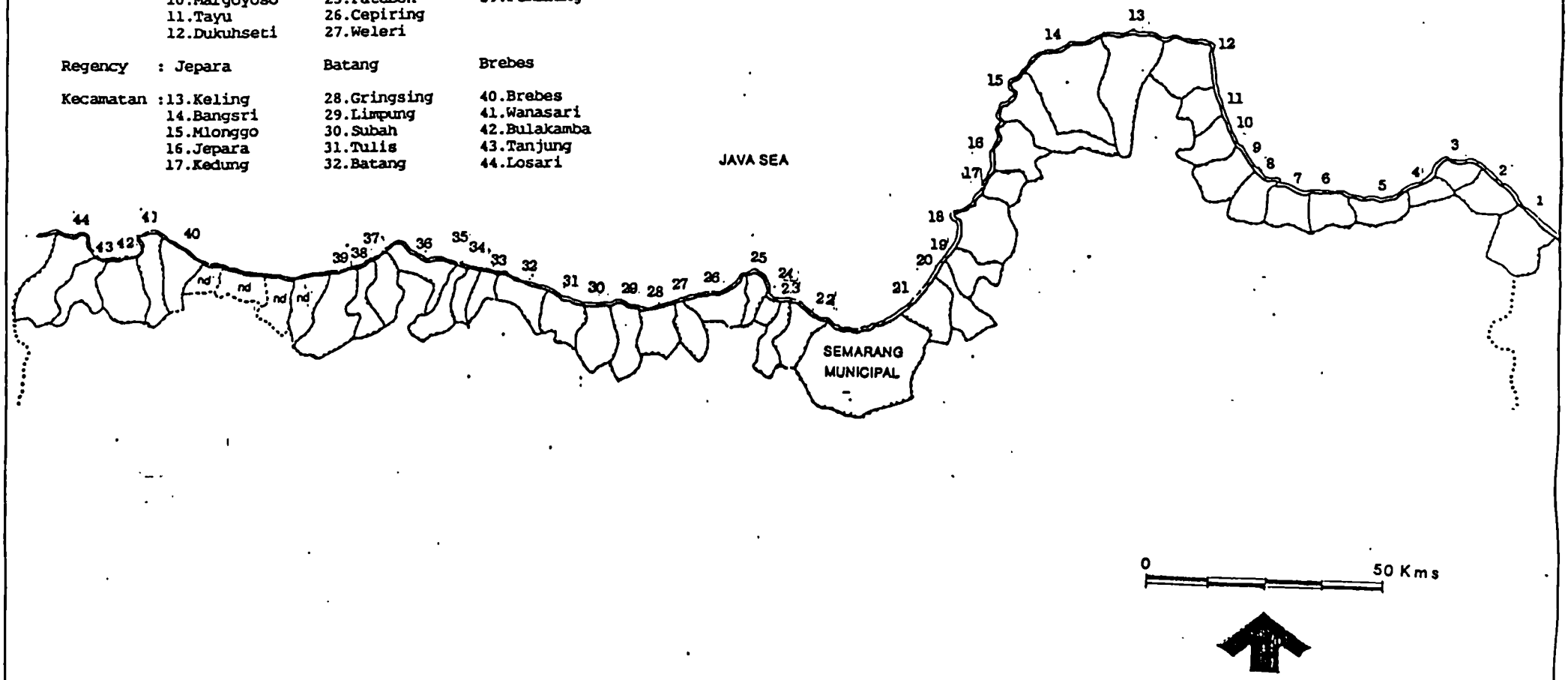
I.7.Organizational Structure: The Government Systems in Indonesia

The Government organization in Indonesia is based on the centralisation principle as laid down in the Constitution of 1945, this provides for the direct control of every aspect of development in the provinces to be recognised and validated by Central Government. The strength of the Central Government is expressed in the system for the implementation of programmes, by a hierarchy of officials through to the sub-district level of administration. Thus the implementation of a rural develop-

Regency	: Rembang	Demak	Pekalongan
Kecamatan	: 1.Sarang	18.Wedung	33.Tirto
	2.Kragan	19.Bonang	34.Wiradesa
	3.Sluke	20.Karangtengah	35.Sragi
	4.Lasem	21.Sayung	
	5.Rembang		
	6.Kaliori		
Regency	: Pati	Kendal	Pemalang
Kecamatan	: 7.Batangan	22.Kaliwungu	36.Ulujami
	8.Juwana	23.Brangsong	37.Petarukan
	9.Wedarijaksa	24.Kendal	38.Taman
	10.Margoyoso	25.Patebon	39.Pemalang
	11.Tayu	26.Cepiring	
	12.Dukuhseti	27.Weleri	
Regency	: Jepara	Batang	Brebes
Kecamatan	:13.Keling	28.Gringsing	40.Brebes
	14.Bangsri	29.Limpung	41.Wanasari
	15.Mlonggo	30.Subah	42.Bulakamba
	16.Jepara	31.Tulis	43.Tanjung
	17.Kedung	32.Batang	44.Losari

Figure 1.3

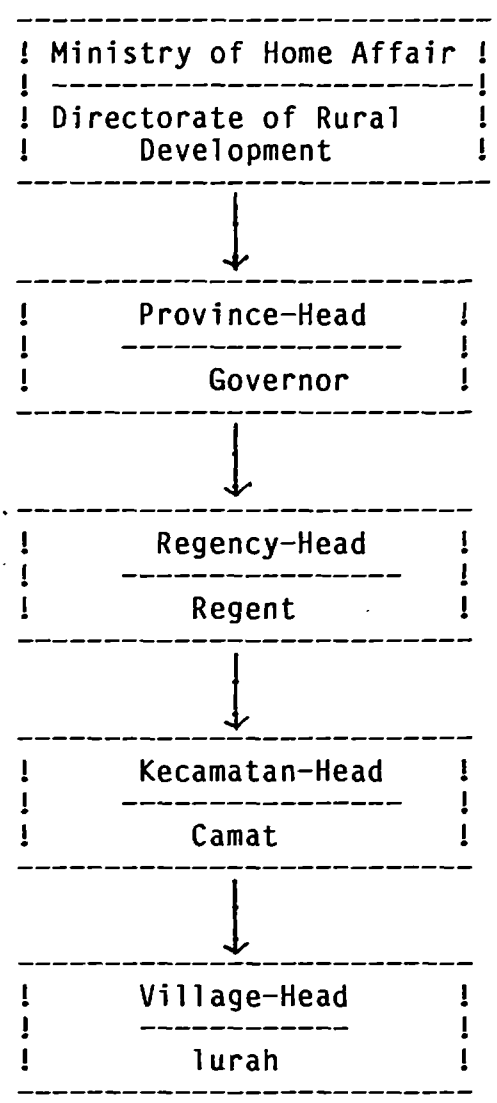
STUDY AREA



nd = no data available

ment plan is undertaken and controlled by the Ministry of Home Affairs through the Governor of the Province. The governors, in turn, delegate this responsibility to 'bupatis' (regents), then ,to the 'camats' or sub-district heads, who are responsible to the bupatis. Thus, a kecamatan, controlled by a 'camat', is the smallest unit in the organizational structure of the system. The camat, however, is in charge of several desas (villages) which are headed by 'lurahs' or village-headmen, and in performing his role an individual camat will be assisted by the 'lurahs' under his jurisdiction.. Table 1.2 summarizes this system.

Table 1.2
Organizational Structure of System of Government in Indonesia, in Relation to Rural Development



I.8.Structure of the Study

The study is divided into three sections. The first section (Chapter I-IV) is an Introduction and Literature Review. These chapters consider the background of the study of northern coastal rural Central Java, and examine particular theoretical concepts relating to development strategies. These chapters also provide background information concerning the physical, social, economic and environmental features of the area of study.

The second section (Chapter V,VI, VII, and IX) examines some of the factors affecting development and the priority of kecamatans and also the proposed programmes for individual groups of kecamatans for development. implementation of development programmes in a kecamatan selected.

The third section (chapter X and XI) discusses the implementation of development programmes in a kecamatan selected, and likely the impact of development to the social, economic and environmental aspects.

The 'Content of the Study' section sets out the objectives, techniques, data and procedure and assumption of the study on which it is based.

Chapter I contains some definitions and formulations and a data base.

Chapter II is a review of literature relating to rural development strategies These concepts have been taken from Western theories, and the objectives, the targets and the description of the development process are discussed. It also discusses the current regional and rural development strategy in Central Java.

Chapter III discusses the Government Policies at national and local scales in relation to rural development.

Chapter IV provides background information about the study area, a geographical description of the region and a summary of its basic social and economic conditions.

Chapter V, VI, and VII examines the basic consideration for

programme implementation examines some factors in development and justifies the selection of particular kecamatans, in relation to the criteria used and the method of applying them in the selection process.

Chapter VIII sets up the priority of kecamatans for development based on the potential factors analysis and the proposed programmes of individual groups of kecamatans.

Chapter IX discusses the implementation programme in the kecamatans selected.

Chapter X attempts to apply the alternative concept for selected kecamatan development.

Chapter XI discusses the effects of this policy on the environment, and also consider the problems which might be experienced in the kecamatans not selected.

Chapter XII sets out several conclusion from the study as whole.

CHAPTER III

RURAL DEVELOPMENT STRATEGIES : THEORETICAL FRAMEWORK

CHAPTER II

RURAL DEVELOPMENT STRATEGIES : THEORETICAL FRAMEWORK.

Indonesia, like other Third World Countries, is faced with many problems in choosing suitable rural development strategies. Many theories have been posited by Western scholars as the basis for developing a strategy for rural or regional development. Several countries, for example India, Iran, Korea and Malaysia have attempted to apply Western development concepts. (Lo,Fu Chen & Salih,Kamal,1976) India applied the Growth Pole concept in devising its rural growth center programme. Malaysia adopted it in order to develop its industrial sector, whereas Korea applied Growth Pole theory in devising its industrial city development policy for the southern coast of Korea, in the context of a decentralisation plan. Iran adopted it as the basis of its industrial policy (ibid). Of course, there is justification for the application of Western concepts in attempting to tackle the problems of rural, regional, and in some cases, national development. The concepts must, however, be understood and evaluated accurately before they are adopted as a strategy for development in any developing country. Rondinelli and Ruddle (1978) consider that theories and principles of spatial planning are in many cases elusive, abstract, and inconclusive. They further conclude that, as in other fields of development administration, many prescriptions for spatial planning have been derived from the experience of Western industrialized countries. Some prescriptions are simply not transferable and others have to be carefully adapted to unique local needs and constraints.(Rondinelli,Ruddle,1978, p.14) It is clear that for the successful application of these Western

concepts ,it is necessary to clearly identify key factors in local situation. A discussion of these development strategies, including the Growth Pole, Spatial Integration, Small City Development and Agropolitan Development concepts, is clearly necessary. The aim of this discussion is to analyze and compare these different strategies in order to select one appropriate to coastal rural development.

II.1.The Growth Pole Strategy

The Growth Pole concept was originated by the French economist, Perroux, whose work focused on the development of 'growth poles' in economic space. This theory offers an ideal solution to the planning problems encountered in remote and pressured rural areas (Cloke,1979,p.28) The Growth Pole approach identifies two opposing forces governing the movement of economic prosperity, namely

1.the 'backwash effect' (Myrdal, 1957,p.28) or the 'polarization effect' (Hirschmann,1958,p.p 100-117). This is the tendency of central nodes to attract factors of production such as entrepreneurial skills, labour, raw materials and investment from their surrounding areas; and

2.the 'spread effect' (Myrdal,1957) or 'trickling down effect' (Hirschmann, 1957).These are forces causing the spread of development and prosperity from a centre to its periphery. The Growth Pole concept is based on the belief that growth does not appear everywhere at the same time; it occurs at points or poles of growth, with variable terminal effects on the whole of the economy (Perroux, Francois,1970,p.p.94).

Perroux defines 'Growth Poles' only and specifically in relation to abstract economic space and not in relation to geographic space, which he dismisses in 1950 as 'banal' (Darwent,D.F.1975,p.540) Boudeville, another writer on the Growth Pole theory, extended Perroux's original work to take account of the geographical dimension ,identifying what he termed 'Growth Centres'. The 'Growth Centre' is a somewhat wider concept than the 'Growth Pole', and is not closely related to Perroux's initial 'Growth Pole' notion (Darwent, p 548). Thus Glasson suggests, to keep the distinctions clear and in perspective, the term 'Growth Pole' should be used to refer to the original concept of Perroux without any specific geographical dimension, while the term Growth Centre or growth point should refer to a spatial location (Glasson, 1974,p.146). The Growth Pole and Growth Centre theories are the most frequently used bases for planning the concentration of investment in selected areas. The key elements of Perroux's ideas are : the leading industry concept, the polarisation concept and the spread effect concept. Glasson explains these concepts as follows. The concept of leading industries and propulsive firms recognises that at the centre of each Growth Pole is a large company belonging to a leading industry, which dominates other economic units. Rapid growth of the leading industry induces the polarisation of other economic units into the pole of growth. Implicit in this process of polarisation are the various agglomeration economies (internal and external economies of scale). The concept of spread effects recognise that in time the dynamic propulsive qualities of the growth pole radiate outwards into the surrounding space. (Glas-

son,1979, p 147). In fact,this trickling-down or spread effect is a useful analogue model with which to view coastal rural development. The effect has an ability to stimulate rural activities in some sectors, by creating opportunities for employment, and stemming urbanization in rural areas. On this basis Growth Pole Theory appears to justify the concentration of development at certain points in coastal rural areas, so taking advantage of these trickling-down effects. However, the Growth Pole Model has evolved through investigation at regional and national levels, and the operational valued the model in a microcosm is very much dependent on the diluting effects of scale (Cloke, 1979.p.28). The relative importance of the spatial dimension has also been sustained by Kuklinski and Taylor (1972). Kuklinski claims that Growth Poles are of national significance, in as much as their development affects not only the structure of the regions in which they are located but also inter-regional correlations, and therefore the country as a whole, thus Growth Centres are basically intra-regional in character (Kuklinski,Antoni (ed)., 1972,p.126). These differences in functions are closely related to differences of scale. Taylor also identifies the importance of differences of scale and argues that growth centres can be divided according to scale into national ,regional and local centres (Taylor,1975,p.308). Thus, the Growth Centre concept can be seen to have detached itself, at least in part, from the theory which gave its birth, and this has led to Growth Centres being defined in different ways with the various definitions placing more or less emphasis on the question of scale (Cloke,1979). In relation to rural development, Cloke further argues that the

local scale is of critical importance and that developmental efforts should be concentrated first at the local level (Cloke,1979 in Taylor,1975 p.309)

Some authors in defining Growth Centres give emphasis to different components of the concept. Allen and Hermansen emphasize service provision :

> '...a centre at a regional level in addition to its main function as a regional service centre, also provides a prosperous and reasonably diversified industrial structure The centre should be growing or show potentials for growth of economic activity,employ ment, population and income. Such a centre should be above certain population levels , or if it is to enjoy self sustaining growth be planned for such a level.

(Hermansen, T.,1969)

Nichols emphasises self-sustaining growth:

> '..an urban centre of economic activity which can achieve self- sustaining growth to the point that growth is diffused outwards into the pole region and eventually beyond into less developed regions of the nations.

(Nichols,V.,1969.)

Hansen provides a useful working definition by considering communities or places and their activities :

> 'By a growth centre or centres is meant a complex consisting of one or more communities or places which, taken together, provide or are likely to provide, a range of cultural, social, employment trade and service functions for itself and its associated rural hinterland.

(Hansen,1972,p.169)

Hansen's definition may be suitable for use in defining a growth centre or centres in coastal rural areas, since the conditions mentioned above are reflected in these areas. It offers a tool for development policy which is suitable in object, form and composition as well as in goals and objectives for coastal rural development.

Although the normative value of the Growth Centre concept, especially to the planners, is considerable, its explanatory value is limited and should not be over-emphasized. Darwent (1969,p.48) points out that such ideas as the claim that it is better to concentrate investment in centres than to scatter it round, and that bigger centres will be better than smaller ones in the amount of growth produced from a given level of investment abound in the literature, without any concrete theory to justify them. It is difficult to deny, however, that such concentration of investment can allow the most efficient use of capital resources. Ominde (1971) suggests that concentration in selected centres ensures that

> '...input of capital resources into the rural areas is used with the maximum possible efficiency and to the greatest possible benefit of the regional economy and the convenience of the local people.

The function such centres of rural development should perform include social, economic and service elements; specifically, the stimulation of economic and commercial growth, especially in small-scale enterprise, the diffusion of innovation, the provision of adequate services for their hinterlands, and the coordination of governmental and local developmental planning. Kuklinski suggests that the place of Growth Centres, related to rural development planning is in the interface between rural and urban sectors. In Kenya, for example, the small urban centre is the interface between rural and urban sectors and plays a vital role in development (Kuklinski,1969,p.309). The reasons are stated as follows.

1.Small-villages cannot individually support social and commercial services which require support population

of thousands.

2.Public-sector service options are constrained by limited and diminishing resources.

3.Private-sector service and some public sector services (such as gas) will not be provided where they are unprofitable, and rural areas often fall in this category.

4.Mobile services mean high running costs and offer a low quality of service.

(Ayton,1980)

These reasons above clearly identify economies of scale as a principal issue, which demand a similar economy of location for some facilities. For example, building one large health centre is usually more economic than building several smaller ones. Similarly, having one or two large shops with all their customers within easy reach is more viable than having several small retail outlets with a scattered clientele. According to Moseley, the mechanisms of the Growth Centre concept include economies of agglomeration, economies of infrastructure and service provision in the spread of development to peripheral areas, and the introduction of intervening opportunities for areas of development (Moseley,1974) This may be relevant to the significance of Growth Centres for coastal rural development since it supports some activities of coastal rural area. One of these mechanisms, the spread of development to the periphery, is a significant factor in transmission of economic prosperity from centre to periphery. The Growth Centre in this

case could play a major role as a medium between rural and urban areas. The hinterland will benefit from the concentration of resources in the Growth Centre in terms of accessibility, whereas urban sectors will also benefit as a result of reduced transport costs. This concept can also be applied to rural areas, provided that the scale of analysis is diluted. The Growth Centre concept, therefore, is important both as a rural development theory, and as a prescription for planning purposes which offers some problem-solving capability. Its main value is in relation to the connection between the hinterland and the centre.

II.2.The Agropolitan Strategy

The Agropolitan approach was proposed by Friedmann as a strategy for development from below and is only aimed at rural areas. This approach is conceived as a response to the increasing dominance of the transnational corporations in spatial development planning, reflected in the widespread adoption of the Growth Centre strategy in developing countries. Based on the assertion that this strategy is not conducive to rational distribution of development, Friedmann's approach attempted to tackle the distribution problem by jointly solving production and distribution problems, although dealing with each separately. The agropolitan approach assumes that the satisfaction of basic needs should be the first-stage objective of development; that the resource base for the development of productive forces must be continuously expanded, and that development should be organized on a territorial basis (Friedmann, and Weaver,1979, p.194)

The agropolitan approach rests on four major bases.

1. Basic conditions

The requirements for successful agropolitan development constitute three difficult, yet essential conditions :

a. Selective territorial closure. This refers to a policy of enlightened self-reliance at relevant levels of territorial integration: district, regional and national. Selective closure is a way to escape from the fetishism of growth efficiency. It is an expression of faith in the ability of a people to guide the forces of their own evolution. It means less reliance on outside aid and investment, involvement of the masses in development, initiation of a conscious process of social learning, diversification of production, and pooling of resources. It means learning to say 'we' and to assert a territorial interest. (Friedmann & Weaver,1979)

b. Communalization of productive wealth. This means that the power to determine the ultimate uses and disposition of land and water rests with the appropriate territorial community.

c. Equalization of access to the bases for the accumulation of social power, which is conceived as a resource capable of raising the individual's sense of potency. Where social power is more equally distributed, the ground is prepared for co-operative relations. The basis for the accumulation of social power includes productive assets in terms of land, water, tools and financial resources, information,knowledge, skills, social and political organization. Equal access to

these means that within territorially integrated communities, everyone is to have an equal chance of gaining access to the use of common resources for production and adaptive use.

2.The territorial framework

The territorially organized communities in which agropolitan development is to occur are situated at the intersection of three abstract spaces, i.e. cultural space, political space, and economic space. At the intersection of the abstract spaces, agropolitan districts are the smallest territorial units capable of providing for the basic needs of their inhabitants with only marginally important resource transfers from outside. The estimated demographic characteristics of these agropolitan districts are : a density of at least 200 persons per square kilometer of cultivated area, and a total population of 15,000 to 60,000 . The inclusion of a country town within the district would increase the population of the district by 5000 to 20,000 . Roughly speaking, Friedmann suggests that agropolitan districts should have from 20,000 to 100,000 people.

3.Expansion of production

The strengthening of economy at all levels involves the expansion of production, mainly from the agropolitan district and the level immediately above it, the region. In turn, this means conforming to the principle of the self-reliance. There are five principles of the self-reliant development relevant to the strengthening of the economy :

1.diversifying the territorial economy;

2.expansion of intra-regional and interregional (domestic) markets;

3.maximum physical development constrained by the need for conservation;

4.self-financing of development, 5.promoting social learning.

4.Role of the state.

Self-reliance requires self-finance, and self-finance requires self government Thus, Agropolitan theory here emphasises the importance of the decentralisation of authority.However, although according to this theory Agropolitan districts should be autonomous, they are not, however, necessarily sovereign units. They are parts of a larger territorial system -the nation- which in turn is linked into the all- embracing functional system of the world economy. The role of the state is thus at once protective,developmental,facilitative, regulatory, and redistributive. Friedman further asserts that in an Agropolitan society the central state is strong . Increased power at district and regional level requires increased of power at the centre.

The Agropolitan approach to development can thus be summarized as an approach which tries to bring together questions of production and distribution in the same solution by shifting the bulk of developmental activities to where the people are, and which stresses a development from within in which human energies are released in freely cooperative relations (ibid,p204). Seen in the context of the tradition of mutual help in village life in Indonesia, the Agropolitan concept may

be perceived as beneficial, because it would strengthen the foundation for cooperative relationships among people. This concept also sustains the aims of human resource development by building from within, based on the community's own resources, skills, discoveries and learning. The refusal to seek transfusion of strength from 'donor' countries abroad inherent in the Agropolitan strategy reflects the high degree of self-reliance which must be established with this approach. The other aims of the Agropolitan strategy such as involving the masses in development, initiating a conscious process of social learning, diversifying production, and pooling resources, can become a base for self- sufficiency in rural development. These aims may well be appropriate to the development of rural agriculture in Indonesia, where self-sufficiency for all villages has become the main target of central government policy. In addition, the current administration system for the pooling of resources in Indonesia, already reflects the territorial framework of the Agropolitan model, with the district level of administration representing the Agropolitan district. In Central Java the Indonesian Government has organized village cooperatives with pooled resources into a federation which covers a sub-district with a population of 25,000 - 30,000 . This population level corresponds to Friedmann's suggested Agropolitan district population level.

For implementation of this concept, however, three conditions must be established:

1.a self-governing unit must constructed, with authority over its own productive and residential activities in the

Agropolitan district, so that the rural community can make its own decisions and plan its own development based on existing resources;

2. to avoid the draining of resources from rural to urban areas , all profits from the rural resources management must be reinvested so as to encourage subsequent development activities at local level.

3. minimum and maximum limits for land-ownership must be established for agricultural management, and land-reform must be implemented in order to achieve efficient management of land resources in the rural areas.

These conditions would be an essential basis for planning an appropriate coastal rural development strategy. The rural population works in agriculture or in fishponds culture management. This concept may be an appropriate approach to coastal rural development in terms of the satisfaction of the basic needs of the coastal people, in land reform establishment, and in standardization for land management. The standardization is essential, especially in the determining of the minimum and maximum areas for fishpond area management, or wetland agriculture near the rivers.

II.3. The Spatial Integration Strategy

The strategy of Spatial Integration was proposed by Rondinelli and Ruddle (Rondinelli and Ruddle,1978) The main objective is to ensure economic growth and equitable distribution of its results by a balanced approach to development. The idea is that developing nations need a middle course between

centralized and decentralized investment, between continued growth of large metropolitan areas and the scattering of resources among small towns and villages (Rondinelli & Ruddle P 52)

The basic principle of the Strategy is the functional integration of growth in the national, urban-rural and industrial-agricultural sectors. It also attempts to construct a bridge between opposing theories, namely centralization and decentralisation . The centralization argument is eventually that large cities are catalysts in national development. It advocates metropolitan centres as foci of investment, services, and functions. On the other hand, the advocates of decentralisation are skeptical of the increasing growth of primate cities, and argue for decentralized urbanization and investment in rural areas.(Rondinelli &Ruddle. p.43). The advocates of centralization theory believe that concentration of investment in the primate city or a few metropolitan areas is necessary in developing countries, because their primate cities or metropolitan areas- an inheritance of the colonial era - are an appropriate base for the development of dynamic activities, such as the industrial and transportation sectors and for the development of a skilled work force. In brief, there are three advantages of primate cities as centres for concentration of investment.

1.in the primate cities there is more likelihood of import-export firms becoming established;
2.primate cities are usually provided with the necessary infrastructure, services, utilities etc.,and have cheap

transport systems.

3.the primate cities are the foci of domestic transport and communication networks.

The other main argument for centralisation is that it is appropriate to the conditions of developing countries and in particular to their lack of capital.

In opposition to this , the advocates of decentralisation refuse to accept the primate cites as desirable centres of development. They believe that the expansion of GNP should be the major goal of national policy, and view economic criteria as the primary basis of strategy design (Rondinelli &Rudd-le,1978,p.48). Decentralisation is concerned with spreading development through dispersed investment at the lower end of the spatial hierarchy, in small towns, villages, and rural hinterlands (ibid). It is argued that, unlike the primate cities in developed countries, those in developing countries are incapable of providing enough jobs for the migrants coming to these cities. In addition, they are also incapable of providing all necessary public facilities and services, such as housing, The argument for decentralisation asserts that the continuation of migration from rural areas creates urban poor and squatter settlements and adds to the physical deterioration and social demoralisation of the city. These conditions may accelerate the decline of urban life, so that primate city development, in fact, cannot be relied upon to stimulate regional development.

Rondinelli (1978) asserts that neither of these arguments is adequate. If the centralisation argument is adopted, urban-rural disparity problems become incapable of solution. For example,Hirschman argues for massive investment in entire locations despite recognizing that such a policy would accentuate center-periphery differences (Hirschman.,1958). The proponents of decentralisation,on the other hand, simplify the causes of urban agglomeration. With regard to rural economic development, it is recognised that a lack of strength in marketing, and an inadequate infrastructure will be a handicap in rural areas. From the view point of geography-economic (geonomic)analysis, rural impoverishment is commonly related to difficulties of access to the urban centres or cities. It is therefore argued, in the light of these problems,that a new theory of development is necessary . Rondinelli proposes a concept of spatially balanced development, namely the Integrated Urban Rural Development Strategy. This concentrates on the development of cities of intermediate size. These can function as regional industrial and commercial centres, 'way stations' or absorbtion points for rural-to-urban migrants, and locations for decentralized transportation, marketing,service and government functions (Rondinelli,1978,p.176). The intermediate city can also play a critical 'brokerage role' between the rural areas and smaller towns within its area of influence and the metropolitan centre. Metropolitan areas are thus viewed as the highest level of the hierarchy of cities. Metropolitan areas have made an indisputable contribution to the development of Third World nations as centres of major finance, social, educational, administrative and cultural

development. In most Third-World countries they act as 'engines of development'(Rondinelli ibid).

This strategy, however, also emphasises the integration of communities and their productive activities into a national economy as a major objective of transformation. Rondinelli argues that neither the goal of increased productivity and income nor the goal of greater equity in income distribution can be attained without increased interaction between villages, market towns, intermediate cities and metropolitan areas, without integrating urban and rural functions into a national spatial system (Rondinelli, p160). He further asserts that integration promotes transformation at every level of the spatial hierarchy and at every stage of a nation's development.

A complex set of linkages which transforms and integrates urban and rural areas may involve physical, economic, technological and social relationship and population movements, provision of services and the development of political, administrative and organizational patterns. Without national political, administrative, financial and technical support, integrated rural development programmes fail. National inputs must be substantive, extensive and continuous (Rondinelli,p.139). Therefore, the application of this strategy requires the satisfaction of several conditions:

1.high-level political commitment;

2.organizational support from national bureaucracies; and

3.the willingness and ability of ministries and agencies to

establish a set of complementary policies and programmes to reinforce rural development projects and to support rural transformation (ibid).

The relevance of this concept to rural development will be seen from the fact that the intermediate city is required to play a crucial 'brokerage role' between rural areas and small cities within its area of influence.

II.4.Central Place Theory

Central Place theory can be viewed as a spatial theory of development associated with the location, status and hierarchy of urban settlements. An understanding of the relative degree of centrality of any given village or country town might be seen as crucial for the determination of its future role in the region, for its development as a central place or location for population growth (Woodruffe, B.J.,1976,p.6). This theory was originated by Christaller in 1933 and has since been extensively developed. With this approach the settlement is seen as the basic unit in a hierarchy of population centres. Settlements which are essentially centres of regions were called by Christaller 'central places'. Other researchers have applied this theory in their investigations of rural population centres. Bracey, for example, has applied this theory in his work on South-West England to investigate the English central village (Bracey,1962,p.42). Even though Christaller (1966) has developed his theory of central places from his original postulation, his fundamental classification of settlements is not as detailed as Bracey's Christaller's theory of hexagonal

service areas surrounding each settlement paved the way for a recognition of a nested hierarchy of settlements, with the ranking of an individual settlement in this hierarchy being dependent on the size of the settlement and its level of service provision. This idea has a relation to the key settlement concept, which looks to higher order settlements for certain services.Christaller's hierarchy of settlements assumes that a well- developed urban system with one large city, a smaller number of towns and a large number of villages and hamlets already exists in the hypothetical region. To decide which settlements are central places, he assumes that there is a hierarchical set of urban settlements and uses this set as a basis for describing the arrangement of market areas and the number and distribution of urban centres (Lisley,1984 - p 32).

The existence of a hierarchy of settlements based on the concept of a nucleated settlement which acts as a focus for the servicing the surrounding tributary area, has been further highlighted by Dickinson (1964). This recognition of a service centre-hinterland relationship has a direct bearing on the planned promotion of service centres in the countryside (Cloke, 1979,p.41). For example, Bracey's (1962), analysis of the distribution of retail and service outlet in Somerset,distinguished three different orders of central villages. First-order central villages have 20 shops or more, second-order central villages, 10-19, and third order, 5-9. Bracey's hierarchy of settlements was based on the functions of a central place, and describes the relationships which exist not only between village and countryside, but between village and town and town and city (Lisley,1984.,p.12).

A central place function is thus any activity carried on in an urban place which derives at least part of its support from people living in the rural areas around it. With regard to coastal rural development, the central place concept might be useful in cases where the growth centre concept is able to give some tentative theoretical justification for the promotion of rural settlement. Central place theory could then make an equally important contribution in terms of an understanding of the distribution system in the flow of goods and services in rural areas. The application of this concept as a development strategy would, however, require an analysis to be made on a regional level. In this case, the central place hierarchy would have to be determined from city down to village level. Such a hierarchy would relate to Proudfoot's grouping of business centres into Central Business Districts, Regional Business Centres, Neighbourhood Business Centres, and Local Business Centres (Proudfoot,M.J.1937, p.59).

Theoretically, such a hierarchy would play an important role in stimulating rural development. Another hierarchy is, however, proposed by Dickinson, based on the classification of settlements by population : regional centres with populations of more than 250,000; provincial centres 60,000-100,000 ; district centres 5000-60,000; local centre 1000-5000, and rural centres (300-1200). Dickinson's classification is a static concept, in that it does not take into account the facts that services and facilities are dynamic, that the quality and nature of services change, that populations become more mobile and that the structure of village populations differs widely and alters with time (Pacione,1984, p.37).

The role of the central place concept in rural development might be that it would enable a rural growth dynamic to be generated which allows for the processes of change, as traditional attitudes are eroded to accept modernisation by diffusion processes. Thus it is said that there is a relationship between Central Place Theory and Diffusion Theory. Barry, for example, has collated the reasons cited by various authors for considering hierarchical filtering to be the diffusion process, Among them is 'market searching', according to which an expanding industry exploits market opportunities in a large-to-smaller sequence, (Chauncy,, 1954, p315-348). Other causes cited are a 'trickling-down' process in which an activity faced with rising wage rates in larger cities moves to smaller cities in search of cheaper labour, an 'imitation' process, in which entrepreneurs in smaller centres mimic the actions of those in larger cities, and a simple probability mechanism in which the probability of adoption depends upon the chance that a potential entrepreneur residing in a given town will learn of an innovation, a probability which declines with the size of the town. In detailed study of diffusion theory, Hagerstrand has shown how the geographic spread of an innovation could be analyzed and modelled with reference to such concepts as information flows, decreases in interaction and contacts over distance, resistance to change, and barriers to the flow of information and ideas (Lisley, p.61). Thus, the application of central place theory might play a major role in accelerating coastal rural development. A necessary corollary to employing central place theory as a planning tool is comprehension of the diffusion process. The immediate relevance

of central place theory to coastal rural development is that it offers a dynamic explanation of development by allowing for a changing central place hierarchy. The inability of smaller settlement to offer a wide range of goods and services may effect depopulation. Cloke (1979) notes that an important feature of the central place concept concerns the changing nature of settlement hierarchy over time. This he discusses it with the purpose of developing the Key Settlements concept.

II.5.Key Settlements Concept

The key settlement concept was introduced by Peake (1916), who came to the forefront of rural planning affairs at the end of the First World War. This concept was developed by Morris (1925) to put his ideas into practice in the context of contemporary rural planning. It is not a 'pure' concept since it has in effect been moulded by a configuration of the various concepts already reviewed. Key settlements can be defined as those 'which propose the concentration of rural facilities into selected centres but do not extend concentration to the location of development' (Parsons,1976.p.19). This is a concept which has been used as a means of providing rural dwellers with essential services and facilities at reasonably accessible locations (Woodruffe,1976,p.24). The principle behind the key settlement concept is that of concentrating limited financial resources in developing countries in a small number of centres rather than dispersing investment thinly throughout all settlements (Johnston, et al, 1981) Key settlements are found in various forms. Some are essentially service centres ,and some are associated largely with public investment in facilities

such as education or health and in local authority housing schemes. Yet others are associated with other types of residential development. Woodruffe (1976,p 24) distinguish these forms. In some countries key settlements are identified as possible growth points for industry and other forms of employment.

The objectives of this concept are:

1.the concentration of residential development in selected centres, this facilitates polarization of the infrastructure and services, and this tends to be the optimum pattern for the economic provision of such facilities. The centre itself can be defined as the location at which the concentration of services is situated, whereas the service area is 'the area whose population is primarily dependent on that centre for its various services';

2.the justification for the policy's use entails the ability of a settlement to accept residential growth. A key settlement policy ,in theory, also allows the the conservation of settlements whose environmental quality is such that further large-scale growth would be inappropriate (Cloke,1979,p.26).

Cloke asserts that by key settlements strategies it should be possible to ensure that those settlements selected as growth centres are environmentally and socially capable of receiving the designated expansion (ibid). The most interesting feature of this concept in relation to the present study is that key settlement policies in remote rural areas have been used where little current growth exists, and so the policy provides a pos-

sible framework for an exercise in the promotion of growth (ibid). Cloke also justifies the use of key settlement policies in remote rural areas in that this type of strategy is the most efficient and economic means of servicing a scattered settlement pattern. In addition, the policy produces a discriminating pattern through which available resources can be concentrated on those growth centres which are situated in areas of greatest need. Key settlement has an important role in several aspects. The Warwickshire Area Health Authority identifies them as follows (Cloke,1979):

1.key settlement policy effects a polarization of infrastructure and service provision into selected areas, and this provision in rural areas as a whole bears a direct relationship to population thresholds;

2.some form of settlement hierarchy exists even in pressured rural areas, on which the promotion of selected key settlements may be founded;

3.key settlements perform two major growth functions:

   a.the centrifugal spread of development and prosperity to the periphery;
   b.the centripetal movement of population within as well as from outside the rural area;

4.identification of key settlements allows the conservation of settlements whose environmental quality is such that further large scale growth would be inappropriate;

5.an inflexible attitude towards growth in non-key settlements, especially when linked to inappropriate selection of key settlements may cause physical an social hardship in healthy communities;

6.Planning authorities are able to adhere to stated key settlement policy guidelines in everyday decision-making when faced with contradictory social economic and political pressures.

Thus the key settlement concept uses some principles of central place theory and assumes that the focusing of services, facilities and employment in one selected settlement will satisfy the essential needs of the surrounding villages and hamlets and that in the long term such concentration is more economic than the dispersion of facilities (Woodruffe,1976,p. 6)

Key settlements have a special characteristic in terms of rural planning. What separates a key settlement policy from other forms of rural planning is not only that a comprehensive function in terms of housing, services, and employment is attributed to the growth centre itself but also the fact that the policy incorporates an overview of the settlement pattern as a whole and lays special emphasis on the relationships between the key settlement and the other settlements it serves (Cloke,1979,p.24)

This concept, in fact, integrates several relevant theoretical notions such as growth centre and central place theories, and also threshold analysis. In rural development, key settlements are expected to be centres with sufficient dynamism, and an economy diversified enough to stem out-migration and to act as social, economic, cultural and political centres for their hinterlands.

It might be adopted in the developing countries since it is a flexible concept. Some reasons will be given and discussed in sub-chapter IX.1

II.1.5.1. Centrality

Key Settlements policy is molded from a combination of various concepts. In relation to the rural settlement policies, Cloke argues that definite links can be made between various formative theories and the course taken by post-war rural settlement planning (Cloke,1983,p.72). Two factors, however, temper the importance of these links; first, the theories may have been used largely to justify policies founded on economic and administrative expediency, and second, the actual decisions that are subsequently taken often bear little relation to either the policy or its assumed theoretical justification (Gilg,1985). Nevertheless, four factors have been directly influential in the production of rural settlement plans:

1.A hierarchical settlement pattern (central place theory);
2.Service threshold;
3.Economies of scale;
4.Growth centres.

These theories all tend to lead to policies of centralization and in particular to the idea of 'Key Settlements' in which both population growth and service provision are concentrated. This centrality concept has been widely adopted. Beavon (1977), Marshall(1969) and Parr (1977) emphasize the importance of the centrality concept in illustrating the problems involved in empirical central place studies. In fact, centrality,

defined as the degree to which a town serves its surrounding area, can be measured only in terms of goods and service offered (Carter,Harold.1981,p.60). Cloke (1979) identifies two basic methods of centrality measurement which have continuing importance to rural planners as part of the process of identifying and selecting key centres. The first method uses services as indicators (A.E.Smailes (1944&1961); G.Hartley (1961); J.S.Duncan (1955); J.E.Brush (1953); H.Carter (1955); I.G.Weekley (1956); W.I.Carruthers (1962); G.M.Lomas (1964); see in Davies, W.K.D., 1966). Service indicators have been important in the selection of Key Settlements in Britain, but not without critism on the grounds that selected indicating criteria are often arbitrary and that the resultant settlement categorization can be erroneous (Carter, 1972). The second method is concerned the delineation of hinterlands (Green (1950); Johnston (1966); Carruthers (1957); Taafe (1962))*

There have been almost as many ways of actually measuring centrality as there are central places. Davies (1970) assigns functional index values to the study of towns, but his study of service centres in Wales used a functional index based on the location coefficient developed in studies of industrial location. A location coefficient was calculated for one outlet of all functional types, using the formula :

$$C = t/T \times 100$$

where : C = location coefficient of function t,

t = the number outlets of function t in a place

*in Davies, W.K.D. 1966

T = total number of outlets of function t in the area studied

The degree of centrality is given by multiplying of the relevant location coefficient by the number of outlets of each functional type present in a settlement. Addition of all the centrality values attained by any settlement produce the functional index values. The advantage of this method is that each functional type is immediately comparable, since the location coefficient reduces all functions to a common base.

Bennison, however, contends that a functional index measures nodality, the aggregate importance of a settlement (Bennison, D.J.1978) This measurement of centrality is, thus, still questioned.

Centrality measurements can be 'absolute' or 'relative'. The latter uses the population and functional outlets as indicators. This method is the most common (Davies (1970), Carruthers (1957) and Bennison (1978)). In 'absolute' terms, centrality can be measured from the size, and functional equipment of particular settlements. This, however, can give a distorted picture of a settlement system because although places may differ in size and functional equipment, they can have similar centrality values (Kargbo,p15). Bennison (1978) proposed the calculation of centrality ratios for each function in each settlement of a region. His formula considers population in relation to each function . This is done by the use of the formula :

$$CRis = Fis/Pst$$

where :

CRis = Centrality ratio of i

Fis = Number of functional units of function i in settlements as a percentage of the total number of functional units of i in region r

Pst = Population of settlements as a percentage of the total population of region T (Bennison,D.J.,1978,p372).

This formula is adopted for measuring the centrality settlements in the selected kecamatans. The functional outlets used have been chosen according to the data which are available. The application of this concept and its results of the calculation are discussed in Chapter VI.

II.6.Indonesian Rural Development

In the Second Five-Year Development Plan, the policy for rural development formed part of a larger plan, known as the Regional, Urban and Rural Development Plan. This policy was continued in the Third Five- Year Development Plan. The Regional Plan provides for the distribution of development by provision of subsidies. The aim of this Plan is to redistribute development activities, and particularly their benefits, more evenly over the regions. This is the machinery which has been used by the Government in seeking to set the spread -effect or trickling-down effect in motion.

Since rural development is therefore implicitly included in this Plan, it can be seen as part of the effort to redistribute development activities and their benefits to the rural areas. The Second Five-Year Development Plan did not explicitly state a systematic rural development policy; this policy must be inferred from the various parts of the Plan. The planning objectives are listed as follows:

> 1.The establishment of economic and managerial institutions in the villages by the district or provincial government is perceived as another rural development objective which relates to agricultural development in terms of the provision of credits, extension services and marketing facilities.
> (Second Five Year Development Plan :The Government of Indonesia 3:79)

> 2.Another objective is to increase the employ ment opportunities and incomes of the rural people by agricultural development,diversify cation of the rural economy and other infra structural development works.
> (ibid 3:97)

> 3.The main objective of rural development is to lay down a strong foundation upon which the rural community can grow and develop on a self reliant basis.
> (ibid 3:81)

> 4.The active participation of the rural population in development activities must be promoted, so that more of them can contribute to the achieve ment of development objectives and reap the benefit thereof.
> (ibid 3:78)

> 5.Another significant objective is to exercise the tradition of mutual help (gotong-royong) among the villagers, by the provision of small annual grants to each village. The utilization of this grant is left entirely to the villagers discretion, sometimes involving additional self -generated funds. This programme is also aimed at enhancing self - help and participatory activities at the rural level.
> (ibid 3:104)

The implementation of a rural development programme is to be

carried out as part of the regional, urban and rural development strategy, in the form of the provision of subsidies to the provincial and district governments as well as directly to the villages. In fact, these respective authorities provisionally plan how these subsidies are to be used, but then the authorities must make proposals to the Central Government and request its approval for implementation, within prescribed guidelines. In general, development priorities in Indonesia are essentially set by Central Government, while provincial and district governments function only as agents of Central Government in the implementation of policies, although they can ease these policies according to local conditions.

Three kinds of subsidies are provided and supported by Central Government. These are:

1.Provincial Subsidies

Provincial subsidies are mainly intended for the development and maintenance of roads and irrigation systems under provincial management, the development of health and sanitary facilities, building of primary school buildings, reafforestation , and other projects under provincial jurisdiction. In terms of the development budget, the amount of each subsidy is usually expressed in terms of volume of work, such as the length of road, the size of areas to be built up.

2.District Subsidies

District subsidies are different from provincial subsidies. They are decided on per capita basis, but are also aimed at the development of the infrastructures such as roads, bridges, irrigation reafforestation and flood control. However, special

attention is paid to labour-intensive programmes, and low-technology strategies, in an effort to increase employment in rural areas.

3.Village Subsidies

Village subsidies are given by Central Government to fund village projects. Discretion in spending these subsidies is left entirely to the recipients. However the total value of these subsidies is small (Rp.1000,000 per village, or roughly equivalent to US S 1575 in 1981 (Hardjono,1983). This might be seen as an insignificant amount, but Local Government expects rural people to add their contribution, so that the village projects can be funded and implemented. Generally, village projects are concerned with practical schemes initiated by the rural people themselves. It is assumed, however, that the local initiative which this programme involves will also help to develop the managerial capabilities of the village administration. These subsidies are co-ordinated by the respective administrations.

The implementation of some Government projects in provincial and district areas is, however, in the hand of planning boards and other agencies under government control. Activities, such as planning, monitoring,and evaluating the development programme, are the responsibility of these agencies. Rural development in this case, is under the jurisdiction of the district government, and therefore planning and rural development implementation are controlled by the district planning board. However, provincial and central planning boards are subordinate to the hierarchy, and tend to have a very

generalized approach to planning, monitoring, and evaluation.

4.Other Sectoral Programmes

Although provincial governments have the authority to plan and to develop their areas, some programmes in rural areas are administered directly by particular ministries, such as the Ministries of Public Works, of Health and of Transmigration, which are also concerned with rural development. The Ministry of Public Works, administers programmes for rural housing and other facilities, the Ministry of Health administers family planning and rural health programmes, and the Ministry of Transmigration administers the transmigration programmes.

The most important ministries concerned with rural development programmes are Ministry of Agriculture and the Ministry of Home Affairs. Several agricultural development programmes have been launched and implemented, such as the 'Bimas' (Mass Guidance) programme. The 'Bimas' programme is adopted from the rural agriculture development programme devised by students of the Bogor Agricultural Institute and is concerned expressly with increasing the production of rice, which is the staple food of almost all Indonesian people. This small project laid the foundation for the Nationwide Intensification Campaign, which was started in 1967 (Hardjono,1983,p.48).

Historically, because of the political chaos prior to 1965, the 'new order' government which took over from the 'old order' administration, chose a western orientation. As a consequence, development policies immediately changed, especially rural development policy. Satisfaction of the basic need of the

people become the major theme of agricultural development. The major policy adopted by the new government in the field of rural development was a renewed attempt to achieve self-sufficiency in rice production through intensified cultivation (Hardjono, 1983 p-49),. Thus, the Bimas programme aimed to achieve self-sufficiency in rice, as well as to raise the incomes of peasant farmers. This programme called for the introduction of new technologies and cultivation practices into the traditional agricultural patterns of the peasant society. It was supported by a package of services, including the supply of high-yielding seed, fertilizers and insecticides at subsidized prices and access to financial credits.

In 1973 a second programme was introduced by the Government. This is known as 'Inmas' (Mass Intensification) It differs from 'Bimas' in that it does not provide operating credits for farmers, although the other services, notably the provision of high-yielding seed and guidance by extension workers, are available. This programme was devised on the assumption that farmers who had participated in Bimas for several seasons would have improved their incomes to such an extent that they would not need cash loans for land preparation. In actual fact, however, 'Inmas' represented an attempt to extend services to farmers who were in arrears on 'Bimas' repayments and so could not be given new loans, and also to tenants who since they do not own the land they cultivate did not quality for Bimas assistance (Hardjono,1983).In reality, the 'Inmas' programme was as an attempt by the Indonesian Government to ensure that new high-yielding type of paddy were planted in place of local varieties of rice.

The third programme known as 'Insus' (Special Intensification) was introduced in 1979. The basis of 'Insus' is the introduction of group farming in place of individual effort. This is a special programme which chooses certain areas of wetland agriculture for intensification. Areas of irrigated land of about 50 hectare size are selected for this purpose and all farmers owning or working the land in these areas are obliged to participate.

From the study of these programmes it is clear that the agricultural sector is still seen by the Government largely as a vehicle for overcoming the problems posed by the chronic deficit in indigenous rice production.

II.7.Conclusion

Therefore several strategies are available for guiding rural development. On one hand, rural development should concentrate on fulfilling basic needs, and thus it would be necessary to emphasize agricultural development; but on the other hand, rural development can also be stimulated by the non-agricultural sectors of the economy. These arguments, underly every rural development programme.

Referring back to the different concepts discussed, implicitly, some authors have based their arguments on the selection of a particular element for special development, with the assumption that the affected region is homogeneous. The Growth Pole concept depends for its success on developing a leading industry, whereas the Agropolitan concept emphasizes its success on agriculture development. Table 2.1 presents the sum-

Table 2.1

The summary of the concepts of the rural development.

No	Item	Indonesian Rural Development	Growth Pole Concept	Agropolitan Concept	Spatial Inte - gration Concept	Central Place Concept	Key Settlement Concept
1.	The stress of the deve lopment	Economic Development	Economic Development	Social Development	Economic Development	Economic Development	Socio-Economic Development
2.	The style of management	Top-down	Top-down	Bottom-up	Top-down and Bottom-up	Top-down	Top-Down
3.	The sector of develop- ment.	Agriculture (Green Revolu tion)	Industry	Agriculture	Agriculture and Industry	Trade	Settlement + Socio-economic Facilities
4.	The link between concepts & national economy	Integrated	Integrated	Closeness of the region. Decentrali sation of agro- district.	Integrated	Integrated	Integrated
5.	The origi- nal target of develop ment	Rural areas	Urban areas	Rural Areas	The integra- ted develop- ment both urban and rural areas	The balance of the urban and rural areas	Rural Areas

mary of these concepts.

All these concepts assume that the region to be developed is homogeneous, they do not consider the fact that a village or a kecamatan contain a group of elements significant to development, and these groups may different from one kecamatan to another. These essential elements will be identified only when there is detailed analysis of the region to which the programme applies is used. Therefore, this study aims to identify some of these significant elements in different kecamatans as the basis for development.

CHAPTER III

THE INDONESIAN GOVERNMENT'S POLICIES FOR REGIONAL DEVELOPMENT

CHAPTER III

THE INDONESIAN GOVERNMENT'S POLICIES FOR REGIONAL DEVELOPMENT

This chapter examines the present strategy of Central and Local Governments policies for rural development, and those for regional development, in Central Java.

III.1.The Strategy for Development in Indonesia

Indonesia has been trying to promote growth in its national economy. It is also important to stabilize and to improve the welfare of the people; therefore national economic development is directed towards achieving growth in personal income. This, however, has created problems. Two of these are the uneven distribution of activities, and the uneven distribution of the benefits of development, both within regions and within groups. The fact that these problems can be readily understood, since to pursue a high level of economic growth and to improve efficiency special attention is paid to the most productive activities, such as mining, forestry, and estate development. Furthermore, import substitution industries were developed in the main cities, to decrease dependence upon imports: economic development occurred principally in regions with an abundance of natural resources, and in the main cities.

The disparities of income and wealth between urban and rural populations therefore increased between 1970 to 1976, when the differential of income per capita rose from 142 % to 184 %. In Java, the disparity of income between rural and urban population was even higher, namely 163 % to 209 % (Five Year Develop-

ment Plans). Industrialization which was concentrated in the main cities has partly caused this widening of the disparity between rural and urban area. Rural areas with a high population pressure, however, tend towards differential development, because agricultural development most benefits the land owner with a large area to manage. This simulates urbanization because the poor tend to immigrate creates new problems. The government has, therefore, adopted a spatial development approach through regional policies which are directed towards national economic development. Several dissimilar approaches to regional spatial development with different goals, assumptions, and methods, have already been discussed as theoretical concepts (chapter II).

III.2.The Strategy and Regionalization of Development in Central Java

Development strategy in Central Java was focused on the economic sector , with other sectors supplementary to it. Stress has been placed on :

a.decrease of population pressure.

b.acceleration of development in four regions ; namely :

1.the North-West of Central Java Province with Tegal-Pekalongan as its centre of development;

2.the North-East of Central Java Province with Semarang as its centre of development;

3.the South-East of Central Java Province with Surakarta

as its centre of development; and

4.the South-West of Central Java Province with Cilacap as its centre of development.

The results of the application of the development strategy during the Second Five-Year Development Plan of Central Java Regions, were:

1.Semarang, the main city in Central Java has been growing rapidly in almost in all sectors of its life.

2.a tendency for differential development patterns to evolve in each of these four special regions:

a.the development of 'belts' encouraged by the transportation facilities, such as provincial roads. In Central Java, the provincial roads which stimulated such strips of development were:

1.the Semarang-Brebes-Cirebon line;
2.the Semarang-Magelang-Yogyakarta line; and
3.the Semarang-Klaten-Yogyakarta line.

b.the concentration of development in isolated centres; these have developed rapidly because they have some special potential base for development. For example: Kudus city has developed because of the multiplier effect of the cigarette industry, and of printing industries;

c.the growth of 'minus' regions. They are so called because they possess natural constraints, such as climatic limitations, a lack of natural resources, or because of geographical isolation or remoteness;

d.the consequent existence of 'middle' regions which reflect the 'average' conditions in Central Java. They are the areas not included in a,b, or c, above.

These regional types are mapped in figure 3.1.

To develop Central Java , the Local Government has characterized particular sectors, namely:

1.agricultural, especially rice fields in the lowland plains area. This sector was expected to have a high potential in creating employment opportunity. In the upland plain , several commodities, such as maize, cassava, soybean, groundnut, vegetables and sun flower were recommended to be grown;

2.industrial, such as rubber, plastic, metal, chemical, food processing. Another important industry is construction. It has an important role to support physical development in these regions;

3.tourism, because Central Java is supported by some recreation areas.

Implementation of such strategy attention, therefore, should be paid to the particular aspects, namely:

1.the balance of development within Central Java Province; and

2.the balance of development between Central Java and other regions.

Several strategies have been planned to employ the former, such as

a.Differential of Growth Strategy

It allocates the funds for physical development, such as industrial,utilities and facilities. Some programmes were designed for industrial development which has marketing oriented to the capital city: Semarang. Other facilities, namely; port, would be encouraged for development and drainage system for irrigation would be improved. Tegal city has been determined as a centre of the metal industry, Salatiga and Magelang as centres of agro-industries, and Surakarta as a centre of the textile industry. This strategy would be employed by implementing particular programmes, namely:

1.improvement of the main road from Brebes to Semarang and Surakarta. To the east :Semarang - Magelang - Yogyakarta and Surakarta - Klaten - Solo;

2.enhancement of the functions of Semarang port and restructuring of the regions in industrial estates;

3.industrial estate development in Tegal, Pekalongan, Magelang, Salatiga and Klaten and also development of training centres;

4.encouragement institutions for industrial development;

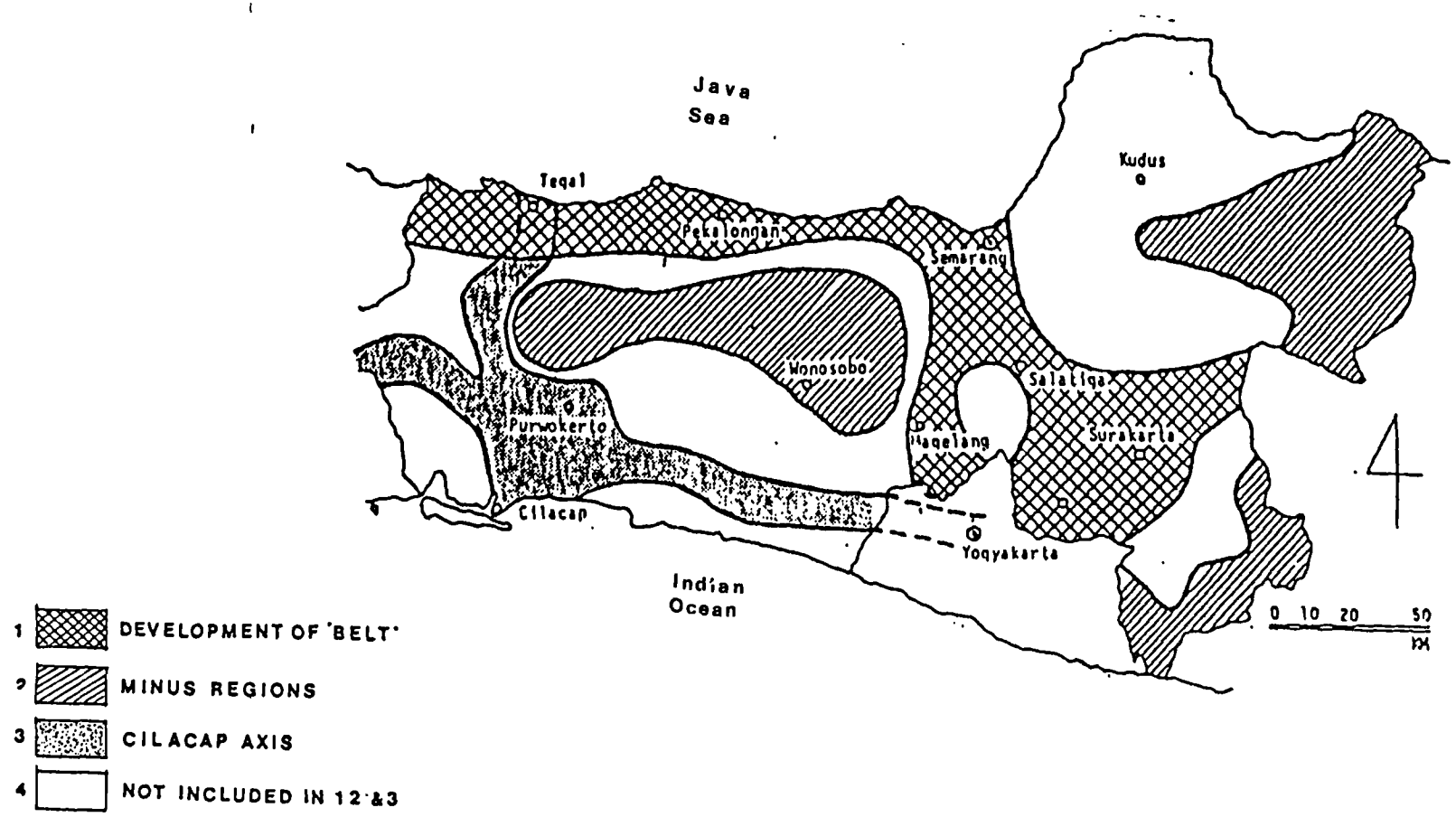
5.rehabilitation of flood control and drainage system of Pemali and Comal rivers;

6.development of dams and improvement irrigation systems in Semarang-Demak and Kudus regions;

7.housing development and Kampong Improvement Programmes in

Figure 3.1

DISTRIBUTION OF POTENTIAL REGIONS FOR DEVELOPMENT



Source : The Third Five Year Development Plans of Central Java 1979/80-1983/84

urban areas.

b.'Minus' Regions Development Strategy

This strategy is purposed to raise the standard of living of rural people by identifying and then overcoming the causes of poverty. The 'minus' region between Gunung Slamet and Gunung Ungaran, for example, has been identified to have two serious problems for development, namely:

1.marketing for agriculture products; and

2.the appropriate commodities

To employ this strategy, particular programmes were launched by the Local Government especially to support rural development in this area. These are: 1.improvement of rural-urban roads; 2.guidance in agricultural activities; 3.improvement of marketing system; and 4.development of agricultural products processing.

c.Cilacap Axis Strategy

This strategy aims to develop Cilacap as a centre of development since it has a port to support development. Thus, it has better prospects for future development than other regions in south Central Java. To employ this strategy, four targets should be developed:

1.to establish new generators for electricity;

2.to provide this area with adequate fresh water for industries;

3.to determine particular sites for industrial areas;

4.improvement the main road from Cilacap-Tegal, Cilacap-Bandung and Cilacap-Yogyakarta.

Another strategy is;

d.Population Strategy.

This strategy intends to allocate development funds for overcoming the population problems. Thus, it aims to stem the population growth by establishing transmigration and family planning programmes.

The Local Government has considered the advantages and disadvantages of these strategies. The advantage of Differential Growth Strategy, is that it accelerates the economic growth of Central Java rapidly, but it could create a deep gap between 'minus' and other regions. The 'Minus' Strategy, however, can improve this gap, but to employ this strategy a high investment must be provided. The Cilacap Axis Strategy may have the same condition with the 'Minus' Strategy. The Population Strategy has an advantage to stem the growth of population, but it also needs a high investment in implementation programmes.

Based on this consideration, the Local Government decided to formulate a new strategy the so called 'Revised Mixed Strategy'. It is a combination of these strategies, but some assumptions are used. They are:

1.The government investment in the 'strategic' regions, i.e. all regions where the development programmes are emphasized, would be doubled compared with 'non- strategic regions';

2.Intensification of family and transmigration programmes could

stem the population growth;

3.Entrepreneur investment would affect the migration of population to certain regions;

4.The proportion of entrepreneur investment would be conformed with the Government investment based on the resource base in particular regions;

5.The rate of return of investment is determined by the sectors of investment and not by the location

Thus, to implement this strategy, a priority for development of regions should be established by the Local Government. They are:

I.The First Priority for Regional Development

This priority is divided into four regions, i.e.:

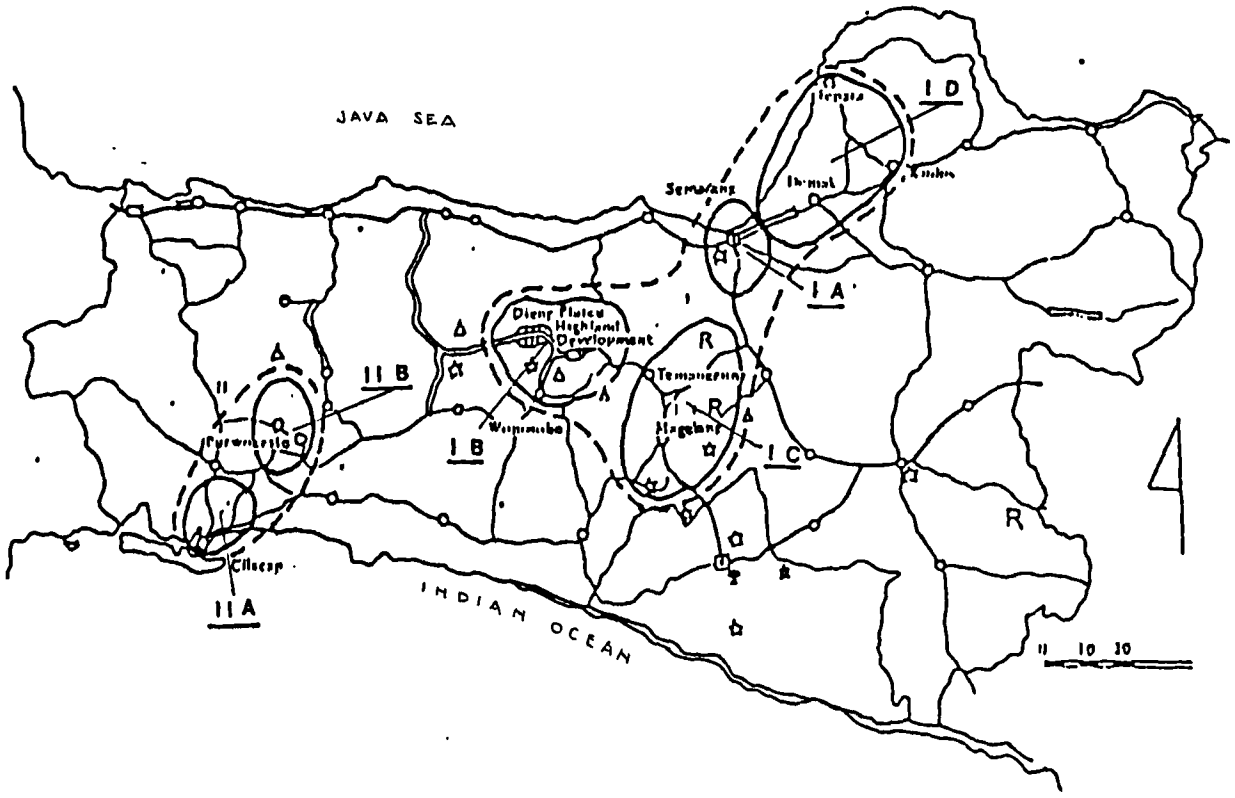
1.A region for development which comprises :Semarang municipal. This region, called as I-A Region, has two development programmes, namely: industrial and urban development.

2.The regions which are called as I-B Regions. These regions are Dieng and Wonosobo upland plains. Two sectors were intended to be developed in these regions, i.e. agriculture and tourism.

3.The regions which are called as I-C Regions which comprises: Magelang, Tumenggung, and Semarang Regency. In these regions, tourism, agriculture and agro-industry sectors would be encouraged.

Figure 3.2

THE PRIORITY OF REGIONS FOR DEVELOPMENT



Source : The Third Five Year Development Plans of Central Java 1979/80-1983/84

4.The regions which called as I-D Regions which includes three regencies, namely: Demak, Kudus and Jepara. These regions would be developed by improving the agricultural system, establishing agro-industries and encouraging industrial development.

I.The Second Priority for Regional Development

This includes two regions. They are:

1.A region called the II-A Region which comprises particular areas surrounding Cilacap city. In this region industrial and trade sectors would be developed. Improvement of utilities, such as electricity generator, fresh water and the main road would be implemented.

2.A region called the II-B Region. This region includes three cities namely: Purwokerto, Banyumas and Baturaden. Three sectors were proposed to be develop in this region: Agriculture, Tourism and Education and Cultural (Figure 3.2).

But development of Revised Mixed Strategy is not meant to ignore other regions for development. This strategy is purposed to obtain the best result for development of Central Java.

III.3.Policies and Actions for Rural Development

During Pelita I (Five Year Development Plan), Pelita II, and Pelita III, the Central Government and the Local Government of Central Java have carried out rural development through sectoral programmes, or regional programmes, or by the President's

Instruction in the Rural Development Aid Programme. These programmes proposed to enhance human resources as well as the facilities and utilities in rural areas. The implementation of Central Government and Local Government rural development programmes was attempted through the UDKP system (Development Work-Area Unit). UDKP is an integrated rural development system, which involves departments, institutions, the private sector, and societies, from planning through to implementation.

From the third of Five Year Development Plan the following programmes have been implemented:

1.President's Instruction For Rural Development Aid:
- Development of village irrigation.
- Development of village transportation facilities.
- Development of government facilities.
- Development of social facilities.

2.Sectoral Programmes and Regional Programmes:
- Development of economic facilities to support rural development.

What local government has done in rural area was commendable. Several problems were recognized. These were :

1.limitation of the opportunity to work in non-agriculture sectors;

2.a low level of rural education which constrained the extent of choice of employment for the population, or their adoption of modern technology;

3.the young are the highest proportion of the population in rural areas: thus the opportunity for work had to be expan-

ded and projected into the future;

4.a variable resource base in the rural areas created uneven development, which could seriously affect the rate of rural development. Unfortunately, the Government's subsidy policies did not consider this aspect.

The problems of coastal areas were thus caused by the limitations imposed by several factors: these were reflected in lower levels of income, a lack of knowledge and skill, an imbalance between available trained manpower and available natural resources, and the unsuitability of structure linking central government to the development programmes. Nor did the rural institutions operate effectively, and necessary economic facilities were not established. Thus, several Government programmes,such as family planning, the removal of mal-nutrition, infant care, the reduction of illiteracy, indeed education in general, and housing restoration, had little significant impact on the situation in rural areas.

III.4.Regional Planning Policies in Central Java

The development policies and projects in the regions of Central Java were implemented either by the government or by the private sector. The provision of electrical power, and implementation of transportation facilities are carried out by e Government, but housing development for example, by both Government and private sector. Within the Five Year Development Plan, the administration in Central Java proposed to develop each sector in line with Central Government policy,and to comply fully with the prescribed Guidelines on State Policy.

The main directions and characteristics of regional development are:

1.compatibility between Regional development and sectoral growth;

2.harmony between inter-Regional growth rates;

3.stimulation of social initiatives and participation by the people;

4.the raising of regional incomes and improvement in Government apparatus;

5.enhancement of the consciousness and capability of the population;

6.improvement of functional coordination within the Regions, and the promotion of inter-Regional cooperation in the field of development.

7.encouragement of rural development in local rural areas;

8.rearrangement of the administrative borders of a number of the Regions.

According to the Guideline on State Policy the purposes of Regional development, are the utilization of the potential available in the Regions, and an acceleration of the development growth rate in the more backward Regions, and an enhancement of the role of backward Regions.

Long-term regional development targets are to be implemented step by step, involving the setting of priorities for the crucial sectors for development, in order to achieve an acceleration in the development process.

The aims for development in Central Java are set out in the basic pattern of the Five Year Development Plan for Central Java Province. It formulates three purposes:

1.To integrate overall national development programmes for Indonesia;

2.To raise the standard of living and social welfare provision for the people by:

a.solution of the main problems in Central Java, in order to accelerate the achievement of development objectives.

b.enhancement of the efficiency of developing regional potential,by using the natural and human resources available, and by taking into account the function of the ecosystem;

3.To provide a strong foundation for subsequent stages of regional development.

In Central Java the average income was under the national rate. In the third Five Year Development Plan, therefore, the Central Java Government has paid particular attention to the undeveloped regions in the previous Five Year Development Plans. This priority purposed to enhance and expand employment opportunities, especially for farmers and fishermen. In the industrial sector the policy was to establish labour intensive

industries in Central Java, while in the transmigration programme local government had tried to increase spontaneous transmigration and development of education. Then also local government had aimed to improve the standard of living of population by improving income.

Those objectives had been confirmed, so ten targets which would be achieved during the Third Five Year Development Plan were determined namely:

1. to provide the main requirements, such as food and clothes with the acceptable price, and also housing which was directed towards both rural and urban areas;

2. to increase and expand the functions of economic and non-economic sectors, such as education, religion, and young generation by improving the distribution of goods system, services and social facilities;

3. to control the population growth rate by establishing family planning and transmigration programmes;

4. to enhance and expand the employment opportunity;

5. harmony between rural and urban development to stem urbanization from rural to urban areas;

6. to develop natural base for the people welfare and to maintain the ecosystem of the environment;

7. improvement of land-use;

8. to support private sector in economic activities and to involve the low level of income group in economic development process;

9. improvement education system by expanding the education opportunity for the people at school age;

10. to improve Government apparatus.

The fifth of these was to achieve a balance between rural and urban development in order to deal with social problems, such as increasing urbanization and uneven income distribution.

Conclusion

Regional development in Central Java needs to be broken down into more detailed programmes, especially if rural development is the object of the study. Rural development is often concerned with agriculture development since agriculture is the main sector in supporting the majority of rural people. In the specific area, such as in coastal rural areas, discussion of the main problems is important. This may includes physical, social and economic and cultural problems. Several problems have, therefore, been recognized, namely: the unsatisfactory nature of agriculture development programmes in accelerating rural development, the scarcity of capital, and there is no explicit programme of coastal rural development. Identification of some potential sectors for development, however,can help the planners to overcome such problems. Thus, physical, social and economic sectors should be examined. This leads to define the significant factors for coastal rural development. By examining particular

rural development strategies and recognizing significant factors, an appropriate strategy, therefore, can be proposed to be adopted.

CHAPTER IV

THE STUDY AREA : GENERAL BACKGROUND

CHAPTER IV

THE STUDY AREA : GENERAL BACKGROUND

This chapter describes the study area. Its location in the context of Indonesia as a whole is an important factor in relation to its development. The regional setting of Central Java is considered, since it is the Province where the study area is located, the basic environmental and geographical characteristics of the area are described. Central Java is situated between the Provinces of East and West Java . To the north it is bounded by the Java Sea,and to the south it is bounded by the Indian Ocean, and the Yogyakarta Region. It thus extends between 108° 30' and 111° 30' East longitude and from 6° 30' to 8° 30' South latitude.

IV.1.Central Java Province

Central Java is one of the 27 Provinces of Indonesia. It is divided into 29 Regencies, 497 'kecamatan' (sub-districts), and 8175 'desas' (villages) The location of these Regencies and kecamatans is shown on Figure 4.1. Central Java Province covers an area of approximately 32553.527 square kilometres and had an estimated population of about 26.6 million in 1984. This represents a population density of about 818 persons per square kilometre. This compares with a national average population density of about 175 in 1984. The most highly populated area in Central Java was Surakarta Municipal, with a density of about 11,194 persons per square kilometre.

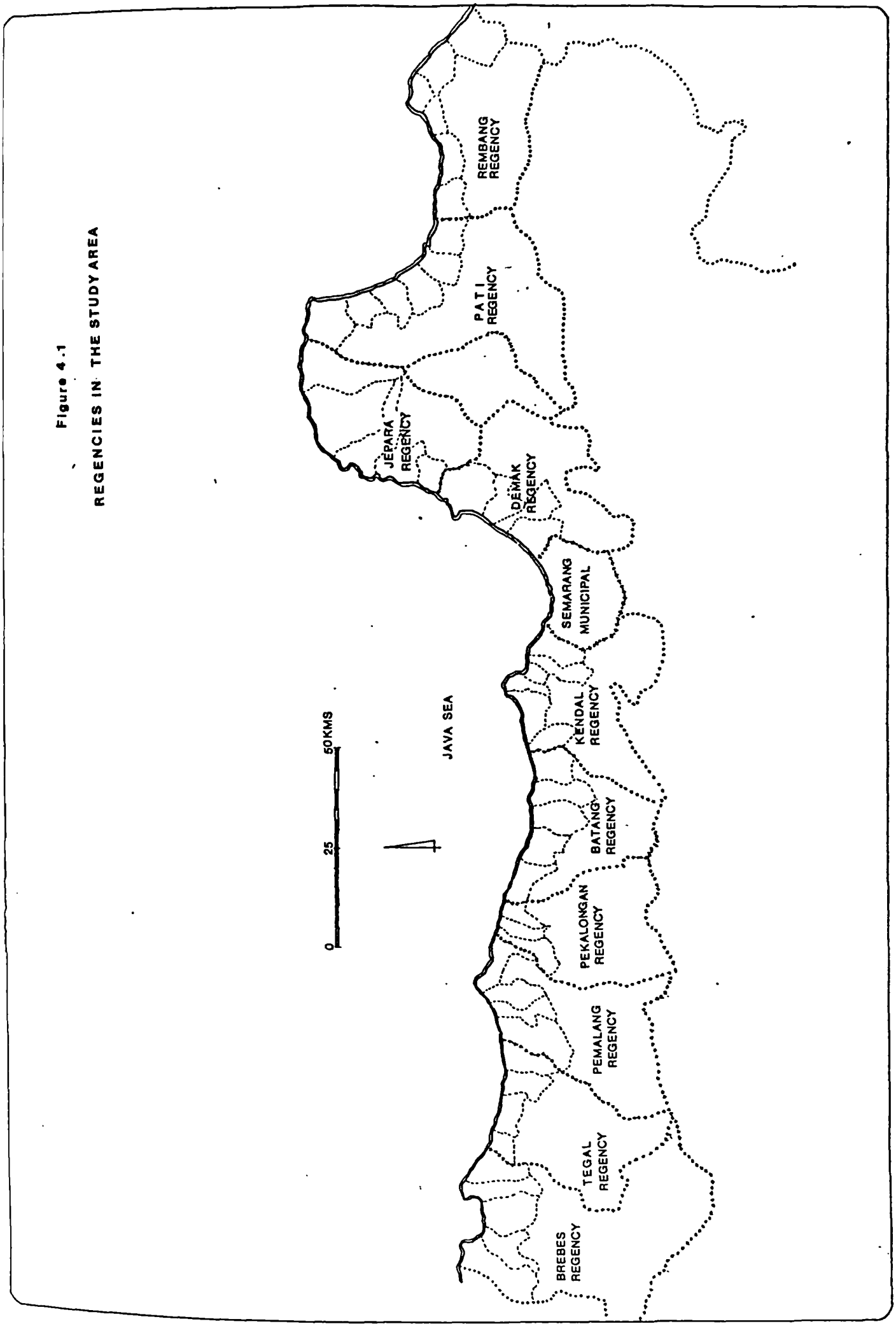


Figure 4.1

REGENCIES IN THE STUDY AREA

Distribution of Population In Central Java.

Population distribution can be viewed from at least two perspectives:

1.overall or general analysis;
2. urban and rural analysis.

From the second perspective, Central Java has 31 significant urban centres with a total population of 3.7 million or more . Semarang Municipal is the Provincial capital with the area of about 30616 hectares. It is the most highly populated area, with about 1 million inhabitants in 1984. This is the most important urban centre, where almost all government institutions and facilities are concentrated.

Most of the population of Central Java lives in the rural areas. The rural population of Central Java in 1984 constituted 86 per cent of the total. Thus, the majority of the population still depend on agriculture as the main source of subsistence and income. In 1982, 57.74 per cent of the rural population worked in the agricultural sector, and 12.92 per cent in trade, 11.56 per cent in rural industry sector, 10.86 per cent in the service sector and 6.92 per cent in other sectors. Table 4.1. shows this distribution.

Table 4.1.

Percentage of employed by industry in Central Java in 1982.

Industry	Male		Female		Male + Female	
	Urban	Rural	Urban	Rural	Urban	Rural

1.Agriculture	9.98	62.15	7.36	50.88	8.90	57.74
2.Industry	18.30	8.65	17.76	16.10	18.80	11.56
3.Trade	18.70	7.22	41.49	21.78	28.06	12.92
4.Service	31.36	12.19	26.84	8.79	29.50	10.86
5.Others	21.66	9.79	6.55	2.45	15.46	6.92
Total	100.00	100.00	100.00	100.00	100.00	100.00

Source : Statistical Office of Central Java 1984.

An interesting feature in this Province of Indonesia is that some of the rural population in the coastal areas managed fishponds besides working as fishermen. This has made Central Java the most important Province for fishpond culture in Java, and the second largest in Indonesia, after South Sulawesi Province. In 1983, some 13,579 households were engaged in fishpond culture in Central Java. This represents a quite high proportion of the population, considering the fact that family sizes are large in the Province. The Statistical Office of Indonesia calculated that the average family size in Indonesia in 1983 as 5 persons per family, so that the total population working in fishpond culture in the Province may be about 68,000. The area of individual fishponds managed varies: some are less than 1 Ha, and a few more than 15 Ha. These data are shown in Table 4.2.

It also shows that the coastal rural area also has an important role to play in the rural development programme. Therefore, coastal rural settlements and their activities must be taken into serious account in any development programme.

Table 4.2

Number of household with fishpond culture and distribution of cultivation areas in Indonesia in 1983.

Province	Total number of Hs holds	Cultivation area (Ha)													
		<1.00		1.00-1.99		2.00-2.99		3.00-3.99		4.00-4.99		5.00-9.99		10.00-14.99		>15	
			%		%		%		%		%		%		%		%
D.I.Aceh	9440	1705	18	2492	26	2410	26	1415	15	590	6	623	72	205	2	-	-
DKI Jakarta	1067	120	11	347	32	219	21	199	19	61	6	81	7	10	1	30	3
West Java	7882	800	10	1521	19	1620	21	1029	13	831	11	1415	18	323	4	343	4
Central Java	13579	3188	23	4219	31	3097	23	1457	11	854	6	646	5	72	0.6	46	0.4
East Java	8511	1909	22	1380	16	1219	14	1015	12	840	10	1609	19	332	4	207	3
N.T.B.	2921	1442	49	959	33	327	11	84	3	34	1	75	3	-	-	-	-
South Sulawesi	13657	3934	29	2526	19	2313	17	1198	9	876	6	1994	15	517	3	265	2
Other Provinces	3390	1191	35	603	18	588	18	316	9	241	7	286	8	105	3	60	2
Indonesia	60447	14289	24	14081	23	11793	20	6713	11	4327	7	6729	11	1564	3	951	1

Source : Sample Census of Fishpond Culture 1983, Statisticsl Office on Indonesia

IV.2.The Importance of Coastal Rural Development

There is reason to believe that coastal rural development has an important role in national development, which is wider than its significance to Central Java, since Indonesia as a whole has about 7122 coastal villages. Most coastal villages in Indonesia are situated in remote areas. Thus, if attention was given to this area in Central Java, it could well benefit people living in these remote areas, and begin to eliminate the economic, social or cultural isolation of such villages.

Another vital aspect of these coastal areas is their potential for development. A large proportion of Indonesia's food products come from coastal areas, including fish, salt, coconut, seaweed, shell-fish and so on. Such coastal resources are not generally managed effectively. Some research into marine resources, such as shell fish, has demonstrated that effective management could increase the income of the coastal rural people considerably (Bardach,1972). Coastal areas can also be considered for other resource management projects. Knox (1984) has considered the use of these environments. He distinguishes three distinct coastal zones, and suggests appropriate uses for each, together with infrastructure development:

1. Peat soil and swamp forest : conservation, traditional existing multiple (coconut/rice) cultivation, swamp forest management for wood production (timber/charcoal).

2. Mangrove forest : conservation, traditional uses (fire wood, building materials,etc), management for timber/charcoal

production, harvesting for pulp production, brackish-water fishpond development, agricultural development (e.g.rice).

3.Coral reefs: conservation, management for multiple use, mining for coral rock.

In Indonesia, coastal rural areas also constitute a barrier for national defence.

In terms of national income, coastal rural areas are important sources of revenue. Most developing countries generate their principal revenue by managing their natural resources, including both their agricultural products and mineral resources. This is seen as a basis for developing their industries, and thus the entire economy. Coastal rural development makes an important contribution and requires a multisectoral approach which should include both agricultural and rural industrial development and the establishment and improvement of the social infrastructure and services. Human resource development is another factor which may be seen as a catalyst, and indeed the prime mover in rural development.

Thus, coastal rural development involves the management of a combination of physical, economic, and social factors. The most influential factors are probably social; such as the ability of the population to increase its skills, and the potential of the labour force. Economic factors are also important : the productivity of agriculture, the availability of light industry, and of transportation facilities. The natural environment also makes its contribution in the suitability of the land for particular kinds of development.

Thus, with their considerable potential, coastal rural areas must be recognized as having an important role to play in national economic development.

IV.3.Background to The Study Area

The study area is situated in Central Java Province on the coastline of the Java Sea. It is located close to the equator between 6° 30' and 6° 50' South latitude. It comprises forty-four kecamatans, and nine of the ten local government areas (Provincial Statistical Office Central Java) forming the Northern part of Central Java. The Tegal Regency is excluded because of absence of data. The nine local government areas are the Rembang, Pati, Jepara, Demak Kendal, Batang, Pekalongan, Pemalang, and Brebes Regencies, and their administrative boundaries are shown in Map 3.1. The kecamatans of the study area stretch 350 kms from west to east, and all are adjacent to the sea . The study area is about 3253.89 square-kilometres.

The forty-four kecamatans differ in important respects: physical, economic, cultural and social. These aspects will be discussed in the next sub chapter.

IV.3.1.Environmental Aspects

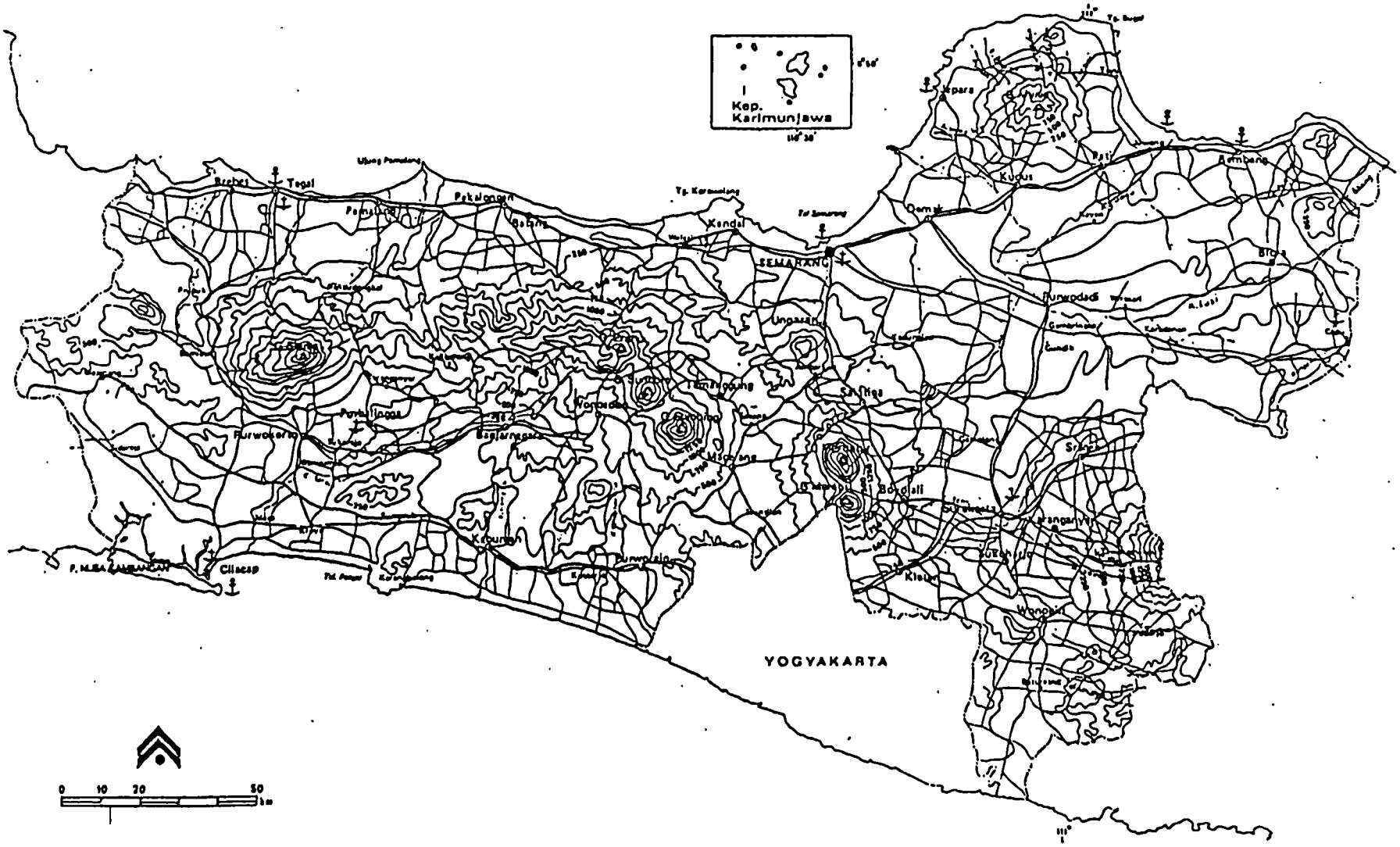
The environmental aspects include landforms, drainage, sedimentation, vegetation, geology, rainfall, and land use.

IV.3.1.1.Landforms

Almost all of these kecamatans are situated in the coastal

Figure 4.2

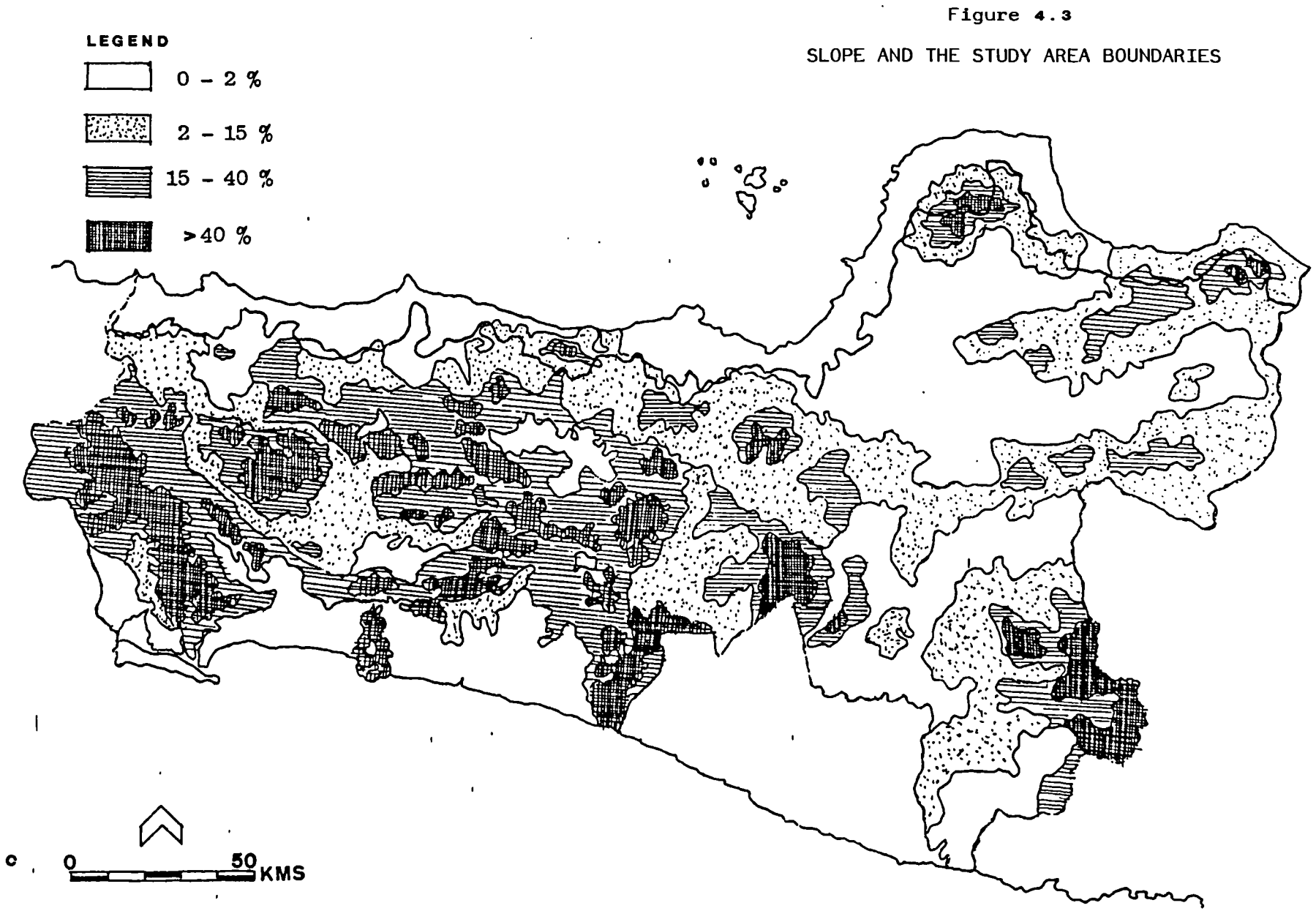
TOPOGRAPHY AND ROADS IN CENTRAL JAVA



Road

Figure 4.3

SLOPE AND THE STUDY AREA BOUNDARIES



plain and are only 0 - 10 meters height above sea level. The Northern part of Jepara Regency is the exception in that is hilly. In the south of the study area, there are wooded hills and high mountains with some active volcanoes. The natural drainage network is complex, and is of fundamental importance in affecting the land reclamation process. Rivers and streams tend to carry away some of the topsoil eroded from riverine slopes.

IV.3.1.2.Drainage

The Northern part of the Central Java coast has no extensive swamps, since the natural slope of the land is sufficient to permit good natural drainage. The dendritic patterns formed by the rivers drain through the study area northwards to the Java Sea. Three rivers provide the main drainage namely the Pemali, Comal and Bodri (Table 4.3).

Table 4.3

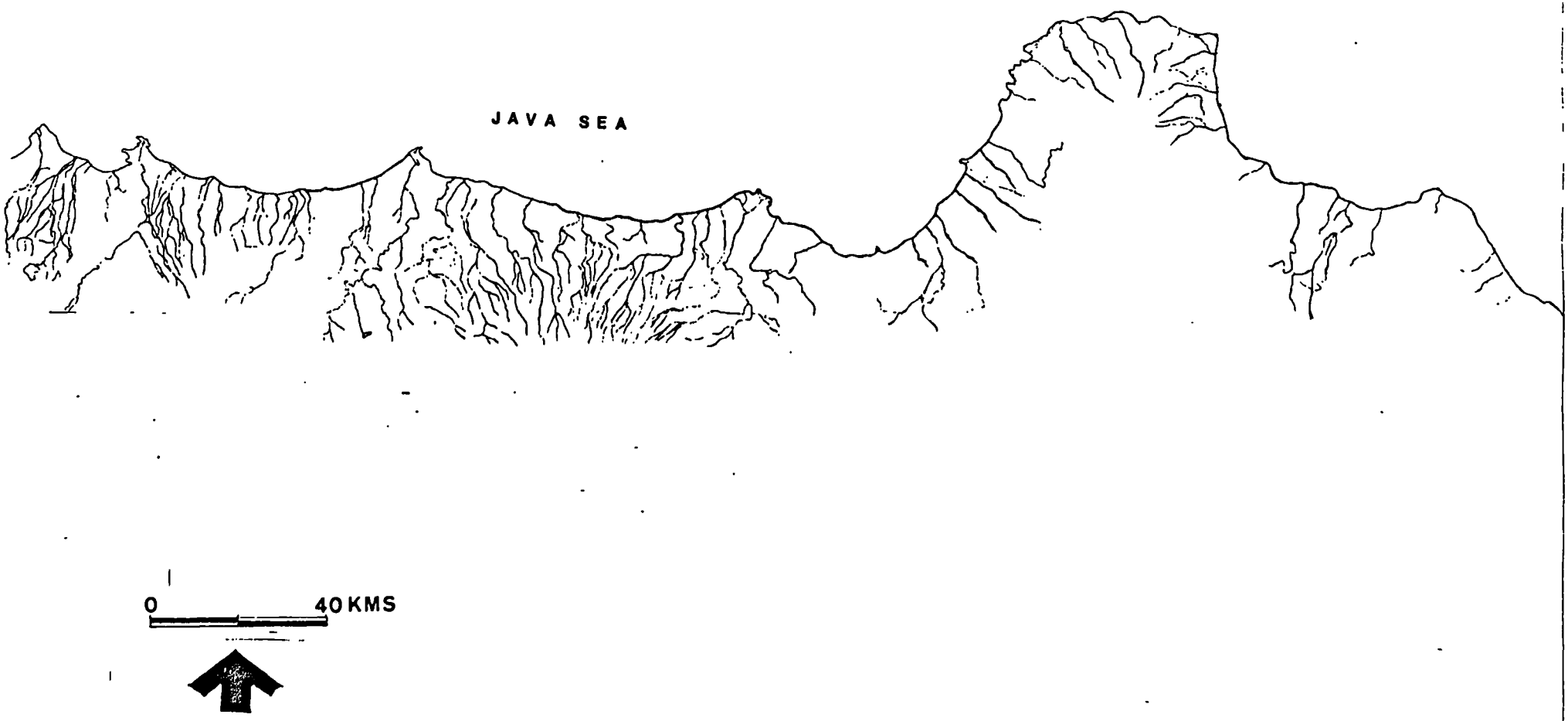
Main Rivers in Northern Central Java

Name	Length (km)	Flow (m3/sec.)	Water Volume (1,000,000 m3)
Kali Pemali	125.5	n.a	n.a
Kali Comal	165	15.5	487.3
Kali Bodri	80	46.0	14555

Source : Directorate General of Irrigation of Indonesia.

Figure 4.4

DRAINAGE SYSTEM IN THE STUDY AREA



In all the kecamatans these rivers and tributaries play an important role in relation to water supply and irrigation in wet-land agriculture.

IV.3.1.3.Sedimentation

Some rivers which enter the Java Sea are active in coastal sedimentation. Every year the coastline changes at the mouth of these rivers, because they carry down large quantities of silt. The very heavy load, the decreasing flow rate of these rivers as they approach the coast, and the shallow seas of the Sunda Platform, combine to make rapid sedimentation of the estuarial regions a characteristic feature of contemporary relief forms and drainage patterns (Dobby,1973.p.55). The rate of coastal advance seaward on the Sunda platform is in places phenomenally rapid; the Cimanuk and Solo deltas in Java, for example, are advancing at a rate of 100 metres annually. On average the Central Java coastline is being extended northwards at an estimated rate of 9 metres per year.

These sedimentation processes in northern coastal Java are caused by volcanic activity, and erosion in the drainage basins. Wherever there are active volcanoes, great quantities of ash are thrown out regularly. This unconsolidated ash without vegetation cover is rapidly washed into the streams and by subsequently deposited in the estuaries and coastal areas. At the same time the rates of erosion in the drainage basin are high. The Lusi River,for example, shows an overall erosion rate in its basin of 87 mm per annum. Even in some small

Javanese streams the degradation of the drainage basin approaches 3 mm per annum. This compares with a rate of destruction of 0.006 mm in the Danube Basin, and a rate of 0.005 mm in the Marne(Dobby, 1973,p.49). Sedimentation not only creates new lands areas, but also new environments for coastal vegetation succession.

IV.3.1.4.Vegetation

The study area is largely a coastal area, and its vegetation may be distinguished both from lowland vegetation, and from mountain vegetation. Short herbs, grasses, shrubs with creeping stems and fleshy leaves are predominant on the shores. These plants are salt-tolerant. Behind this littoral zone there is a distinctive strip of what may be called beach woodland, or beach forest. In some areas mangroves are the dominant plants in the areas close to the sea. The dominant species are Rhizophora, Avicennia and Soneratia. On muddy shores and estuaries in northern Central Java, the growth of mangrove is extremely rapid. Where mangroves develop, silt is deposited at a rapid rate. The mangrove zone thus both raises the surface level and progressively extends itself farther seaward. Beach woodland forms a ribbon sometimes stretching more than 70 metres inland from the shore. It consists mainly of coconut palm, nipa palm (Nipa fructicans), the leathery-leafed Inophylum sp., Baringtonia sp., and Calophyllum sp.(Dobby,1973). Much of the coastal vegetation zones has been replaced by fishponds. Knox (1974) observes that much mangrove has been cut down to supply fuelwood for the rural population. This will be discussed further in Chapter VII, in relation to

possible future coastal area management schemes.

IV.3.1.5.Geology

Thus most of the northern coastal region of Central Java is an alluvial plain resulting from these river deposits, a variety of sands, gravels, silt and clays with generally moderate to high permeability. The region between the Batang and Kendal Regencies is somewhat different in terms of lithology. This region is mainly an alluvial plain with poorly productive aquifers in the north part, and to the south and east, marls, clay marls and Globigerina marls with intercalations of sandy tuffs, sandy limestone, and sandstone, claystones and tufaceous clay are found. The plain here shows generally low permeability.

Several areas, such as those around Tanjung Brebes, Ujung Pematang and Tanjung Korowelang, display areas of groundwater salinity near the surface due to sea water encroachment or inland salinity. Observations of the productivity of aquifers shows that almost all the study area has extensive and highly productive aquifers with wells yielding around than 5 litres per second.

IV.3.1.6.Rainfall

The study area has a tropical climate, with two distinct seasons,a dry season and the wet season. The former lasts from April to October, and the latter from November to March, with peaks in December and January. Precipitation is least in July and August, since this region is then influenced by the

Australian Continental air masses. Annual rainfall is about 2000 mm, and so the study area has overall a wet tropical climate. The highest rainfall is 3430 mm, in Kecamatan Limpung, whereas the lowest is 492 mm, in Kecamatan Lasem.

It will be seen that the western part of the study area receives a heavier annual rainfall than the eastern part. The average daily relative humidity is between 72 and 85 %, with a maximum of 100 % and a minimum of 50 %. The daily range of temperatures every month is 21.1 degrees C (69 degrees F), to 32.8 degrees C maximum (89 degrees F).

IV.3.1.7.Land Use

Climate, soil and topography, influence the type and growth of vegetation. Indonesia as a whole has a large number of forest areas; mainly in Sumatra, Kalimantan and Irian. Most areas would be covered naturally with extensive and complex tropical forest. Man has modified the natural environment considerably. People need food, and man has continually enlarged the area of agricultural activity, extracted an increased amount of fuelwood by clearing the forest. In Java, the area of forest is shrinking from annually. In 1979 the area of forest was 531105 hectares or 15.52 per cent of the total area but by 1980 it had fallen to 510827 hectares (14.92 %). There is clearly also a relationship between the population growth, and the area of land needed for a variety of uses.

In Central Java Province the area under crops, including irrigated land and shifting cultivation/bare land, constituted 7.16 per cent of total area (Provincial Statistical Office of

Table 4.4

Land Use in the Study Area in 1984 in hectares and Percentage of Total Area

Kecamatan	1	%	2	%	3	%	4	%	5
1.Sarang	600	5.48	8643	79	1649	15	43	0.52	10935
2.Kaliori	682	11.63	4546	77.41	0	0	644	10.96	5872
3.Rembang	800	14.92	4313	80.46	10	0.24	235	4.38	5360
4.Kragan	845	12.38	5540	81.17	335	4.80	105	1.55	6825
5.Sluke	219	5.72	3097	80.96	412	10.77	97	2.55	3825
6.Lasem	469	12.13	2824	73.08	225	5.84	346	8.95	3864
7.Batangan	774	16.43	2568	54.53	0	0	1367	29.03	4709
8.Juwana	977	18.35	2911	54.69	0	0	1434	26.94	5322
9.Wedarijaksa	2003	23.02	5344	61.41	191	2.21	1163	13.56	8701
10.Margoyoso	1191	18.72	4412	69.37	0	0	757	11.90	6360
11.Tayu	564	11.32	3764	75.56	0	0	653	13.10	4981
12.Dukuhseti	2261	22.09	4359	42.77	2267	22.24	1304	12.79	10191
13.Kedung	1205.	28.34	2609	61.35	0	0	438	10.31	4252
14.Jepara	1894	29.79	4020	63.24	0	0	443	6.97	6357
15.Mlonggo	2050	19.95	7444	72.44	0	0	782	7.61	10276
16.Bangsri	2365	19.38	9832	80.55	7.51	0.07	0	0	12205
17.Keling	1880	8.32	16595	73.41	4111	18.18	19	0.08	22605
18.Sayung	1287	15.33	5960	71.00	0	0	1147	13.67	8394
19.Karangtengah	537	10.70	3917	78.05	0	0	565	11.25	5019
20.Bonang	570	6.70	7030	82.60	0	0	910	10.70	8510
21.Wedung	375	3.35	7929	70.86	142	1.26	2744	24.52	11190
22.Kaliwungu	707	7.39	3708	38.75	3586	37.47	1567	16.38	9568
23.Brangsong	694	10.60	2020	59.95	507	15.04	148	4.41	3369
24.Weleri	1151	21.35	3622	66.62	422	7.76	232	4.27	5437
25.Cepiring	1355	23.77	4041	70.91	0	0	303	5.32	5699
26.Patebon	762	20.72	2383	64.82	0	0	531	14.46	3676
27.Kendal	526	21.14	1741	71.11	0	0	181	7.74	2448
28.Gringsing	795	10.70	5954	80.19	333	4.50	342	4.60	7424
29.Limpung	727	12.98	4169	74.45	316	5.64	388	6.93	5600
30.Subah	1026	8.34	8311	67.58	2711	22.04	249	2.03	12297
31.Tulis	1521	28.96	3199	60.92	68	1.30	463	8.81	5251
32.Batang	673	23.76	2075	73.27	0	0	84	2.97	2832
33.Bragi	1677	26.44	4461	70.35	0	0	203	3.20	6341
34.Tirto	1073	41.33	1455	56.05	0	0	68	2.62	2596
35.Wiradesa	1128	36.47	1586	51.27	0	0	379	12.26	3093
36.Pemalang	890	10.46	4967	59.01	2410	28.74	150	1.79	8417
37.Taman	1623	24.13	4400	65.41	503	7.49	200	2.97	6726
38.Petarukan	1667	20.60	6092	75.29	0	0	332	4.11	8091
39.Ulujami	887	15.54	4042	70.85	0	0	776	13.61	5705
40.Losari	652	7.65	5976	70.11	150	1.77	1745	20.47	8523
41.Tanjung	946	15.79	4185	69.85	0	0	860	14.36	5991
42.Bulakamba	723	7.45	8597	88.70	0	0	372	3.85	9692
43.Wanasari	508	7.18	5457	77.22	0	0	1102	15.40	7067
44.Brebes	1391	15.96	4679	53.71	0	0	2279	30.33	8771
T O T A L	46652	15.03	214867	69.22	27001	8.69	28150	9.06	310367

LEGEND :

1.Settlement area
2.Cultivated area
3.Uncultivated area
4.Dyke/Lake/swamp and others.
5.Area of kecamatan.

Source: Provincial Statistical Office of Central Java 1984

Central Java). This is mainly on the lowland plain which stretches from the west to the east of study area. Most of bare land and shifting cultivation is found in hilly areas, and in non-irrigated areas, where second crops, such as soy-bean cassava, or sweet potatoes are planted. The area under forest is only 0.88 per cent of total. Of this forest, 81 % is occupied by 'homogeneous forest', 15.5 percent 'extensive jungle', and the remainder 'dense jungle' (Provincial Statistical Office of Central Java) (Table 4.4).

The low percentage of land under forest reflects the fact that almost all the study area has been developed for a variety of uses. From Table 4.4 it will be seen that 15 per cent of the total study area is occupied by settlements, and that cultivated land dominates the study area (69 per cent). Other forms of ll are dykes, lakes and swamps. The remainder of the area is uncultivated, including forest, which occupies 9 per cent of the total study area. The land use in the study area obviously reflects the major occupations of the people, and the high percentage cultivated shows that most people in this area still work in the agricultural sector.

IV.3.2.Social Aspects

The social dimension includes the demographic aspects, rural education, the social facilities and the rural health service.

IV.3.2.1.Demographic

The demographic aspects include population distribution,

population density, the labour force and occupations.

IV.3.2.1.1.Population Distribution , Size and Age Composition

According to data collected from the kecamatans by the Ministry of Public Works, the total population of the study area in 1984 was about 3 million. This constituted 41.69 per cent of the total population of the nine Regencies in which the study area is located and 11.27 per cent of the total population of Central Java. The nine Regencies are Brebes, Batang, Pemalang, Pekalongan, Kendal, Jepara,Demak, Rembang, and Pati. The population of the study area was characterized by an annual growth rate of 1.27 per cent, compared with an average of 1.21 per cent in the Regencies and 1.40 per cent in Central Java Province over the 1978-1984 period. There is an uneven distribution of population in the study area. Some kecamatans, such as Bangsri, Pemalang, Taman, Petarukan, Bulakamba and Brebes have a total population exceeding 100,000, while the smallest population was in Kecamatan Sluke, with just over 20,000 . As regards population density, Kecamatan Batang had the highest figure with 2285 people per square kilometre. The population density in the study area varied between 300 and 2400 people per square kilometre. The kecamatans with a high density, i.e.more than 1000 per square kilometre,were : Rembang, Wedarijaksa, Margoyoso, Tayu, Kedung, Kendal, Sragi, Tirta, Wiradesa, Pemalang, Taman, Petarukan, Ulujami, Losari, Jepara, Cepiring, Bulukumba, Wanasari, and Brebes. The lowest density was in Kecamatan Keling, with 379 per square-kilometre. The total population of the study area, and the density in every kecamatan are shown in Table 4.5. A comparison of the

population in the study area, in the 9 Regencies and in Central Java Province as a whole, is presented in Table 4.6.

Table 4.6

Population, area, and population density in study area, 9 Regencies and Central Java Province

Region	Population	Area (Sq-km)	Density (pop./sq-km)
Study area	3000676	3253.89	922
9 Regencies	7197384	6175.59	1165
Central Java	26620950	22288	1194

Sources : 1.Jawa Tengah dalam Angka 1985, Kantor Statistik Propinsi Jawa Tengah.
2.Data data pokok Kecamatan di Jawa Tengah, Departement Pekerjaan Umum.

The age composition of the population is determined by the levels of fertility, mortality and migration in the past. Like many regions in Indonesia, the study area has a predominantly young population . This is shown by the data presented in Table 4.7 and Figure 4.6

Table 4.7

Age and sex composition of the population of the study area in 1984.

Age group	Absolute Numbers			% of total population			Females
(Years)	Male	Female	Total	Male	Female	Total	Males
0 - 4	234953	233153	468106	7.83	7.77	15.60	0.992
5 - 9	216049	213048	429097	7.20	7.10	14.30	0.986
10 - 14	191441	180041	371484	6.38	6.00	12.38	0.940
15 - 19	149433	163537	312970	4.98	5.45	10.43	1.094
20 - 24	126927	144333	271260	4.23	4.81	9.04	1.137
25 - 29	122128	129029	251157	4.07	4.30	8.37	1.056
30 - 34	81018	87020	168038	2.70	2.90	5.60	1.074

Table 4.5

Population Density in the Study Area

Kecamatan	1	2	3
1.Sarang	42321	109.35	387
2.Kaliori	30401	58.72	517
3.Rembang	63985	53.60	1194
4.Kragan	42652	68.25	625
5.Sluke	21251	38.25	555
6.Lasem	38049	38.64	985
7.Batangan	32680	47.09	694
8.Juwana	64597	53.22	1214
9.Wedarijaksa	94659	87.01	1088
10.Margoyoso	57680	63.60	907
11.Tayu	55408	49.81	1112
12.Dukuhseti	47755	101.91	468
13.Kedung	45640	42.52	1073
14.Jepara	99574	63.57	1566
15.Mlonggo	81030	102.76	788
16.Bangsri	113145	122.05	927
17.Keling	87885	226.05	388
18.Sayung	50560	83.94	602
19.Karangtengah	39604	50.19	789
20.Bonang	63161	85.10	742
21.Wedung	59999	111.90	536
22.Kaliwungu	68628	95.68	717
23.Brangsong	32877	33.69	975
24.Weleri	82686	54.37	1520
25.Cepiring	78631	56.99	1379
26.Patebon	39052	36.76	1062
27.Kendal	40055	24.48	1636
28.Gringsing	46163	74.24	621
29.Limpung	48084	56.00	858
30.Subah	52103	122.97	423
31.Tulis	46642	52.51	888
32.Batang	96501	28.32	3407
33.Sragi	88223	63.41	1391
34.Tirto	58000	25.96	2234
35.Wiradesa	68095	30.93	2201
36.Pemalang	138715	84.17	1648
37.Taman	116240	67.26	1728
38.Petarukan	116818	80.91	1443
39.Ulujami	73114	57.05	1281
40.Losari	90888	85.23	1066
41.Tanjung	62486	59.91	1042
42.Bulakamba	111397	96.92	1149
43.Wanasari	92515	76.67	1369
44.Brebes	120727	87.71	1376

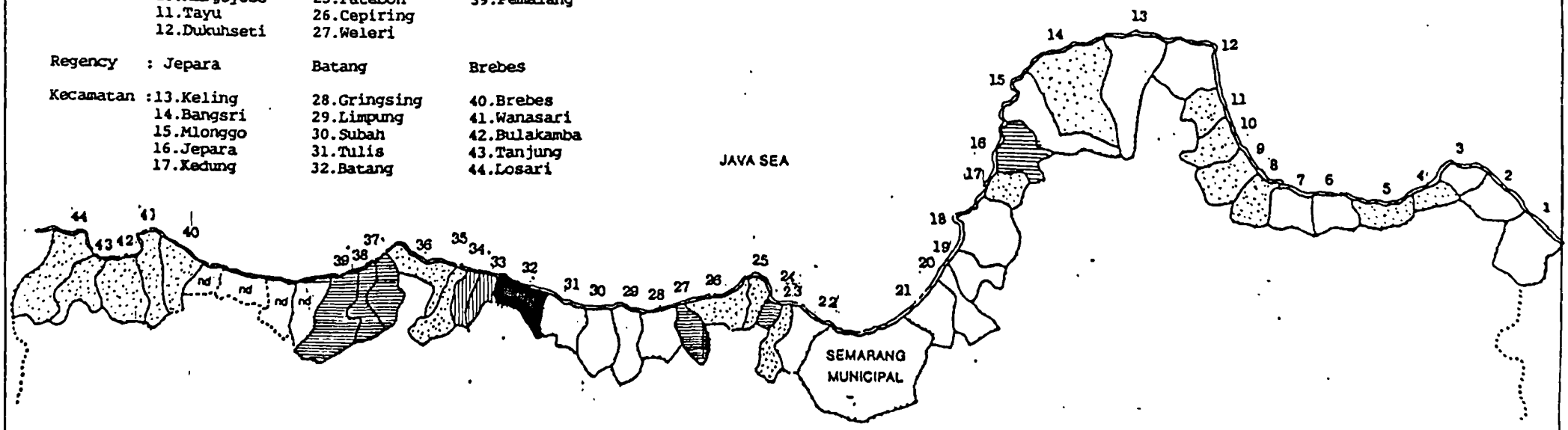
Note :

1 = Number of population.
2 = Kecamatans areas (km-square).
3 = Population/km-square.

Regency	: Rembang	Demak	Pekalongan
Kecamatan	: 1.Sarang	18.Wedung	33.Tirto
	2.Kragan	19.Bonang	34.Wiradesa
	3.Sluke	20.Karangtengah	35.Sragi
	4.Lasem	21.Sayung	
	5.Rembang		
	6.Kaliori		
Regency	: Pati	Kendal	Pemalang
Kecamatan	: 7.Batangan	22.Kaliwungu	36.Ulujami
	8.Juwana	23.Brangsong	37.Petarukan
	9.Wedarijaksa	24.Kendal	38.Taman
	10.Margoyoso	25.Patebon	39.Pemalang
	11.Tayu	26.Cepiring	
	12.Dukuhseti	27.Weleri	
Regency	: Jepara	Batang	Brebes
Kecamatan	:13.Keling	28.Gringsing	40.Brebes
	14.Bangsri	29.Limpung	41.Wanasari
	15.Mlonggo	30.Subah	42.Bulakamba
	16.Jepara	31.Tulis	43.Tanjung
	17.Kedung	32.Batang	44.Losari

Figure 4.5

POPULATION DENSITY IN 1984



LEGEND

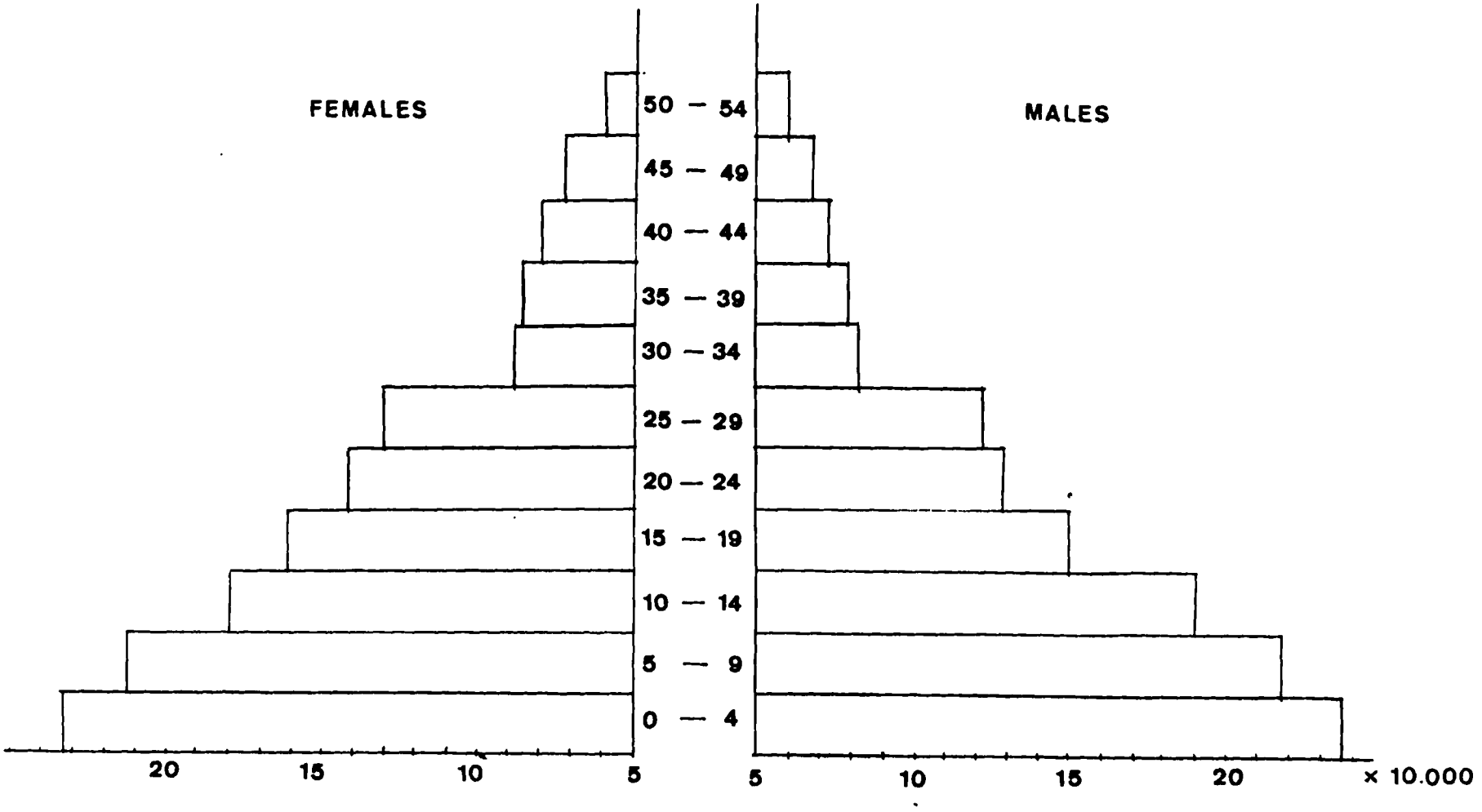
- 387-890 people/ km-square
- 891-1394 people/ km-square
- 1395-1897 people/ km-square
- 1898-2400 people/ km-square
- 2401-2903 people/ km-square
- 2904-3407 people/ km-square

0 50 Kms

nd = no data available

Figure 4.6

DIAGRAM OF AGE AND SEX COMPOSITION OF THE POPULATION
IN THE STUDY AREA IN 1984



35 - 39	79218	85219	164437	2.64	2.84	5.48	1.076
40 - 44	73216	79518	152734	2.43	2.65	5.09	1.090
45 - 49	75617	82219	157836	2.25	2.74	5.26	1.217
50 - 54	59714	64214	123928	1.99	2.14	4.13	1.075
55 -	60914	68715	129629	2.03	2.29	4.32	1.128
Total:	1470630	1530046	3000676	48.73	51.27	100.00	1.052

Source : Data Pokok Kecamatan di Jawa Tengah in 1984.

Thus, nearly one seventh of the population is below 5 years of age, while the number of males in the age group 0-4 years was higher than that of females. In 1984 the percentage of males in the 0-4 years age group was 7.87 compared with 7.77 females. These figure could be due to a higher death rate of females in the 0-4 age group. The number of male births is thus probably higher than the number of female births. But, the overall ratio of females to males was 1.04, that is there were slightly more males than females. The age composition of the population can be inferred from the data for the study area. According to the population survey by age group in 1984, the population pyramid had the form shown in Figure 4.6. The 5-9 year and 10-14 year groups accounted for 14.30 per cent and 12.38 per cent of the total population respectively.

IV.3.2.1.2.Labour Force and Occupations

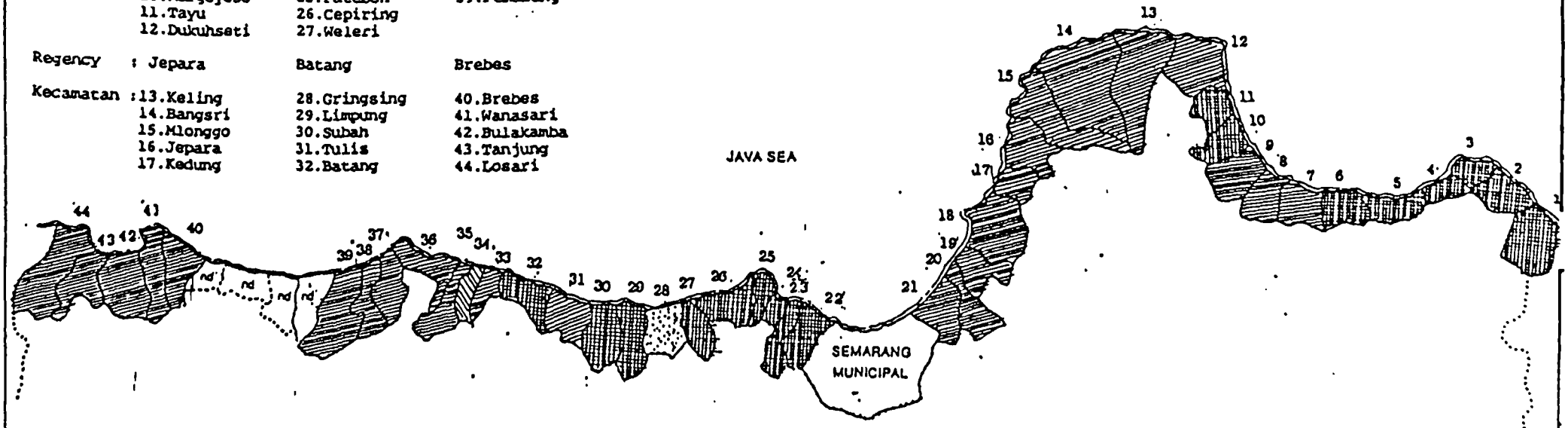
One of the most prominent population characteristics is the broad base of the age pyramid. People aged below 15 years constitute 41.28 per cent of the country's total population. The age group 15 - 54 constitutes 53.40 per cent, while people aged 55 years and above make up only about 4.32 per cent of the total population. With regard to the sex composition, 51.27

Figure 4.7

WORKING AGE (15 - 50 YEARS)

DISTRIBUTION

Regency	: Rembang	Demak	Pekalongan
Kecamatan	: 1.Sarang	18.Wedung	33.Tirto
	2.Kragan	19.Bonang	34.Wiradesa
	3.Sluke	20.Karangtengah	35.Sragi
	4.Lasem	21.Sayung	
	5.Rembang		
	6.Kaliori		
Regency	: Pati	Kendal	Pemalang
Kecamatan	: 7.Batangan	22.Kaliwungu	36.Ulujami
	8.Juwana	23.Brangsong	37.Petarukan
	9.Wedarijaksa	24.Kendal	38.Taman
	10.Margoyoso	25.Patebon	39.Pemalang
	11.Tayu	26.Cepiring	
	12.Dukuhseti	27.Weleri	
Regency	: Jepara	Batang	Brebes
Kecamatan	:13.Keling	28.Gringsing	40.Brebes
	14.Bangsri	29.Limpung	41.Wanasari
	15.Mlonggo	30.Subah	42.Bulakamba
	16.Jepara	31.Tulis	43.Tanjung
	17.Kedung	32.Batang	44.Losari



LEGEND

- 36.88 - 29.09 %
- 39.10 - 41.30 %
- 41.31 - 43.51 %
- 43.52 - 45.72 %
- 45.73 - 47.93 %
- 47.94 - 50.14 %

0 50 Kms

nd = no data available

per cent of the study area's population were females, and 48.73 per cent were males. On the basis of the age-sex structure, only 53.4 per cent of the study area's population come within the 'economically active' group (15 - 54 years), of which males constitute 48 per cent and the females 52 per cent. While the males in this age category comprise 25.31 per cent of the total male population, their female counterparts constitute about 27.83 per cent of the total female population. This implies that a large percentage (46.6) of the population is economically dependent on a relatively small working group and on what is at present a largely inefficient economy. The high expansion potential of this large group of young people is another important factor, particularly because of the slight predominance of girls and young women of reproductive age(15-40 years) combined with a tendency to early marriage and high fertility. Other important factors are; the economic and service problems of individual households and families reflecting the high dependency ratios; pressures on the meager available employment opportunities, with many young people looking for work; and many young people with little or no work experience.

As regards the types of employment of the employed population. In 1984, the figures show that about 840,000 people, or 52.86 per cent of the total economically active age group, were working in agriculture . Light industry was the second largest employer, with 2.85 per cent of the total population and 5.34 per cent of the total economically active population. Table 4.8 shows the figures for employment in the study area.

Table 4.8

Employment of the population in the Study Area in 1984

Industry	Absolute Number	Percentage of total population	Percentage of total population of working age
Farming	846960	28.22	52.86
Fishing	599957	1.99	3.74
Government Official/Army	41896	1.39	2.61
Trade	79655	2.65	4.97
Light Industry	106156	3.53	6.62
Transport	20672	0.69	1.29

Source: Collected from secondary data.

The concentration of the labour force in farming shows that, at the time of the survey, this was the main economic activity of the population, and was more important than sea fishing, for example. In terms of rural economic development, therefore, the agricultural sector must have a major role .

IV.3.2.2.Education

One of the most serious but little-noticed problems caused by high population growth rates in less developed countries is their effect on education. In some areas, particularly in coastal rural Central Java, so many children are reaching school age that schools cannot be built or staffed fast enough to accommodate them. The government has recognized this problem and instituted a programme to develop educational facilities in rural areas. It was put into effect by a 'Presidential Instruction'.

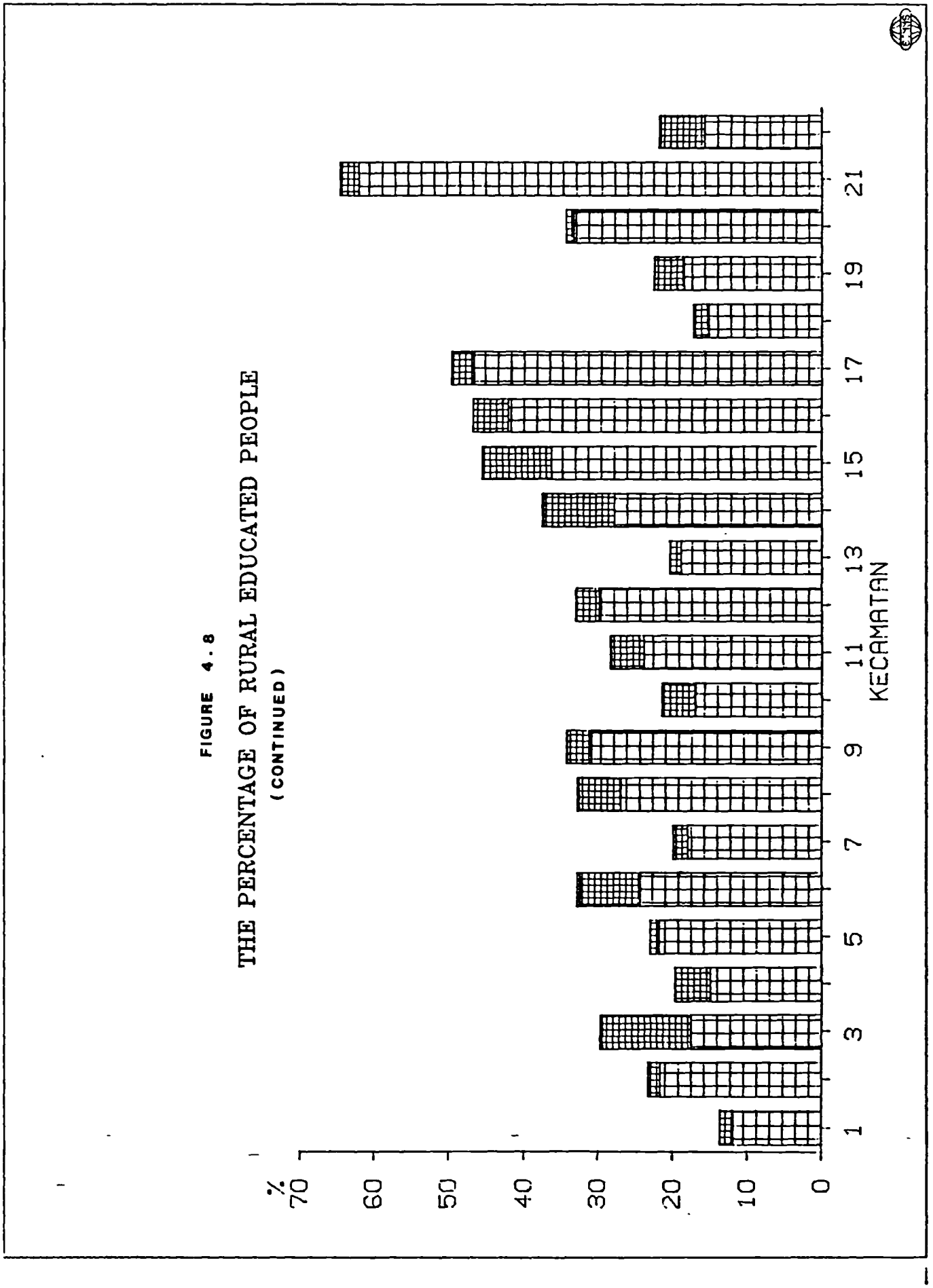
In addition to the shortage of educational facilities, however, the lack of awareness of parents of the need to enroll their children in school and the economic deprivation of many families are a further major problems in the study area. Education, however, is considered a basic need of the people.

Several indicators are available for measuring the level of education in a region, such as the literacy rate and the school enrollment rate. Unfortunately, data concerning literacy is not available, since the Government has declared that Indonesia has no illiteracy. It must, however, be presumed that the percentage of illiteracy in the study area is still significant. In the study area the number of children of elementary school age in 1984 was 774369 , and the number of children of junior and senior high school age was 565026, or 25.8 per cent and 18.8 percent of the total population respectively. There were 2154 elementary schools, 165 junior high schools and 73 senior high schools in the study area in 1984. If each elementary school with 6 classes served the children in this area on a two-shift system, with each school enrolling about 480 students (a class consists of 40 pupils),in theory the 2154 schools had approximately 2067840 pupil. On this basis the provision of elementary school facilities is seen as more than adequate. Junior and senior high schools generally have 3 classes with 40 pupils per class. Thus, if we calculate the number of pupils in both junior and senior high schools working on a two-shift system, we see that there were only 57120 pupils in these schools which is inadequate for the population of school age. Not all the children in the study area could continue their schooling, however, since most are compelled by their parents

FIGURE 4.8

THE PERCENTAGE OF RURAL EDUCATED PEOPLE

(CONTINUED)



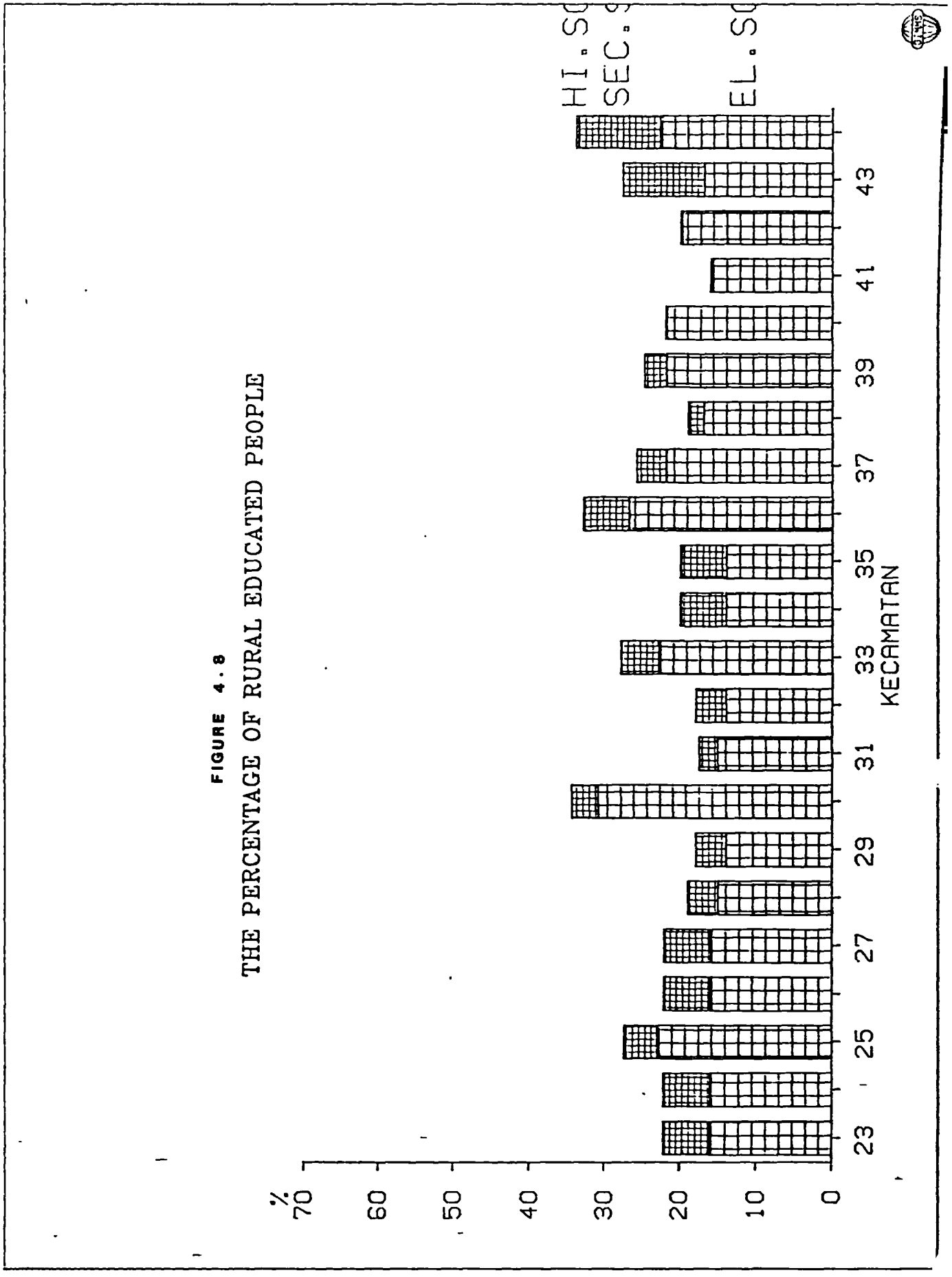


FIGURE 4.8
THE PERCENTAGE OF RURAL EDUCATED PEOPLE

Table 4.9

Number of Schools in the Study Area

Kecamatan	1	2	3	4	5	6
1.Sarang	24	2	0	92	8	0
2.Kaliori	32	1	3	89	3	8
3.Rembang	55	7	7	80	10	10
4.Kragan	40	2	2	91	4	5
5.Sluke	24	2	0	92	8	0
6.Lasem	33	6	4	77	14	9
7.Batangan	32	1	0	97	3	0
8.Juwana	45	7	2	83	13	4
9.Wedarijaksa	53	0	0	100	0	0
10.Margoyoso	34	3	1	89	8	3
11.Tayu	37	6	2	82	13	5
12.Dukuhseti	24	2	0	92	8	0
13.Kedung	43	2	1	93	4	3
14.Jepara	93	8	6	87	7	6
15.Mlonggo	71	6	0	92	8	0
16.Bangsri	98	6	2	92	6	2
17.Keling	77	7	2	90	8	2
18.Sayung	40	1	0	98	2	0
19.Karangtengah	31	1	1	94	3	3
20.Bonang	34	2	0	94	6	0
21.Wedung	35	2	0	95	5	0
22.Kaliwungu	37	4	1	88	10	2
23.Brangsong	23	1	0	96	4	0
24.Weleri	57	5	2	89	8	3
25.Cepiring	43	4	2	88	8	4
26.Patebon	30	2	0	94	6	0
27.Kendal	36	7	6	73	14	13
28.Gringsing	37	3	1	90	7	3
29.Limpung	48	2	1	96	4	2
30.Subah	50	3	0	94	6	0
31.Tulis	43	2	0	96	4	0
32.Batang	68	8	5	84	10	6
33.Srogi	59	2	1	95	3	2
34.Tirto	29	1	0	97	3	0
35.Wiradesa	44	3	3	88	6	6
36.Pemalang	93	11	4	86	10	4
37.Taman	72	3	0	96	4	0
38.Petarukan	89	4	3	93	4	3
39.Ulujami	51	3	0	94	6	0
40.Losari	51	3	0	94	6	0
41.Tanjung	48	4	2	89	7	4
42.Bulakamba	47	4	0	92	8	0
43.Wanasari	53	2	2	93	4	3
44.Brebes	66	9	8	80	11	9

Note : 1.Elemetary School
2.Junior High School
3.Senior High School
4.The percentages of Elementary School to the Total Schools in a Kecamatan
5.The percentages of Junior High School to the Total Schools in a Kecamatan
6.The percentage of Senior High School to the Total Schools in a Kecamatan

Source: Data Pokok Kecamatan Jawa Tengah 1984/1985
Dit Jen. Cipta-Karya Dept. P.U

to help with work. This is particularly the case with the children of fishermen. Almost all the families dependent on fishing have a very low income, and as a result, the children have little opportunity to continue their studies . Another problem is the location of elementary schools. It is often found that elementary schools are not located in the settlements, and may be inaccessible to the children requiring to be taught. The existing number of elementary schools in the study area is, however, theoretically, sufficient to serve the population. The distribution of educational facilities in the study area is shown in Table 4.9

IV.3.2.3.Rural Health Facilities

A drive to improve the health of the people has been launched by the Indonesian Government, by improving :

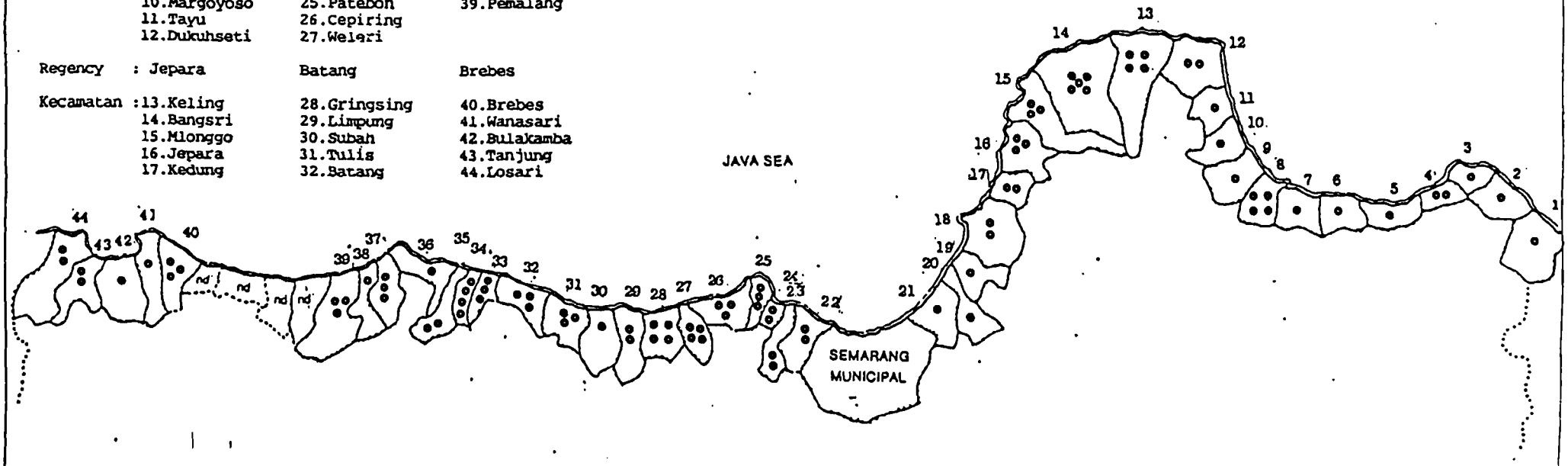
1.the health services available, particularly in the rural areas and development centres;
2.health care for both men and women at productive ages, and for children;
3.preventative health care with reference to contagious diseases.

Health and disease are factors which significantly affect both the demographic structure and trends, and the activities, capabilities and efficiency of people in work. In many tropical countries, particularly in rural areas, a high proportion of the population will be chronically affected by one or more disease. Nutritional diseases, for example, are common in Indonesian coastal regions. Public health data for Central

Figure 4.9

DISTRIBUTION OF PUBLIC HEALTH

Regency	: Rembang	Demak	Pekalongan
Kecamatan	: 1.Sarang	18.Wedung	33.Tirto
	2.Kragan	19.Bonang	34.Wiradesa
	3.Sluke	20.Karangtengah	35.Sragi
	4.Lasem	21.Sayung	
	5.Rembang		
	6.Kaliori		
Regency	: Pati	Kendal	Pemalang
Kecamatan	: 7.Batangan	22.Kaliwungu	36.Ulujami
	8.Juwana	23.Brangsong	37.Petarukan
	9.Wedarijaksa	24.Kendal	38.Taman
	10.Margoyoso	25.Patebon	39.Pemalang
	11.Tayu	26.Cepiring	
	12.Dukuhseti	27.Weleri	
Regency	: Jepara	Batang	Brebes
Kecamatan	:13.Keling	28.Gringsing	40.Brebes
	14.Bangsri	29.Limpung	41.Wanasari
	15.Mlonggo	30.Subah	42.Bulakamba
	16.Jepara	31.Tulis	43.Tanjung
	17.Kedung	32.Batang	44.Losari



LEGEND

Community Health Service

nd = no data available

Java show that the most common diseases reported in hospitals and health centres in 1984 were: Cholera (11,815 cases) and morbili (4886). Unfortunately no data is available at kecamatan level. However, some information is available from the Public Health Authority of Pekalongan Regency. It was reported in 1984 that malaria (22546 cases), tuberculosis (12683), anemia (15393), influenza (70100) and skin infections (31906) were dominant diseases in the coastal region. Reported deaths from cholera in the 1981-1984 period in Central Java were: 466 in 1981, 690 in 1982, 213 in 1983 and 80 in 1984, which may reflect improvements in water supply in some areas.

To improve public health, community health programmes have been initiated. A major aspect of this implementation is the increased availability of health facilities such as hospitals and public health centres. The provision of such facilities constitutes the main factor in improving the health of the rural population. The first indications of contagious diseases in these areas can be detected immediately by medical assistants through medical examination, and the health services are then able to take prompt measures to prevent epidemic spread, such diseases as malaria and typhoid can be controlled in other ways. In the study area the health facilities comprise hospitals, public health centres (Puskesmas), public health sub-centres (Puskesmas Pembantu) and maternity clinics (B.K.I.A). Table 4.9. shows the availability of such health facilities in the study area.

IV.3.3.Economic Aspects

In rural areas the connection between man and his culture and the environment is very strong. The people manage the land or the sea resources to meet their basic needs. The main occupations of the rural population are obviously agriculture, including farming, forestry and estate management, and fishing. The predominance of these occupations has an important influence on customs and social life.

The interrelation between the rural population and the natural environment in the coastal area can be viewed as a system with four components : the village, the land, the sea, and the coast. A knowledge of their interrelations is necessary in order to effect the planning of the management of natural resources. The relationship between these components can be analyzed from an economic viewpoint, under two main headings; namely agricultural activities, which involve a relationship between man, land and water, and fishing, which involves a relationship between man and water.

IV.3.3.1.Agricultural Activities

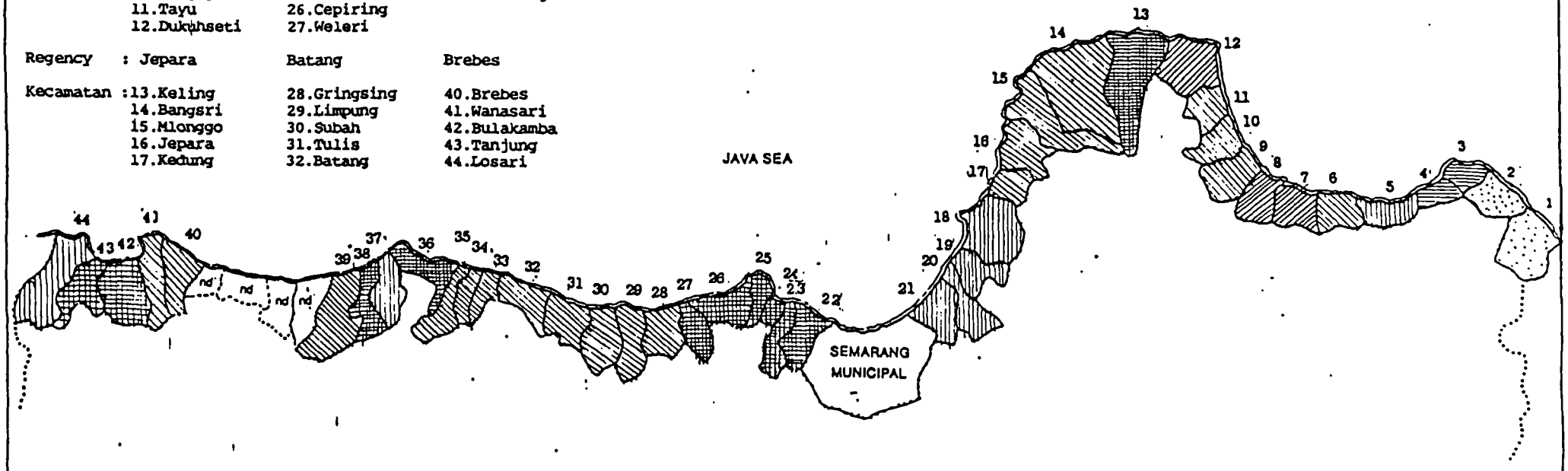
The study area constitutes a lowland plain. This environment allows the people to establish the agricultural activity, because the irrigation systems needed for agricultural production depend on the topography of the area.

The agricultural and fishing systems found in the area are : 1.irrigated rice fields; 2.non-irrigated rice fields; 3.fishpond-culture; 4.estate management; and 5.private plots.

Figure 4.10

PRODUCTION OF PADDY

Regency	: Rembang	Demak	Pekalongan
Kecamatan	: 1.Sarang	18.Wedung	33.Tirto
	2.Kragan	19.Bonang	34.Wiradesa
	3.Sluke	20.Karangtengah	35.Sragi
	4.Lasem	21.Sayung	
	5.Rembang		
	6.Kaliori		
Regency	: Pati	Kendal	Pemalang
Kecamatan	: 7.Batangan	22.Kaliwungu	36.Ulujami
	8.Juwana	23.Brangsong	37.Petarukan
	9.Wedarijaksa	24.Kendal	38.Taman
	10.Margoyoso	25.Patebon	39.Pemalang
	11.Tayu	26.Cepiring	
	12.Dukuhseti	27.Weleri	
Regency	: Jepara	Batang	Brebes
Kecamatan	:13.Keling	28.Gringsing	40.Brebes
	14.Bangsri	29.Limpung	41.Wanasari
	15.Mlonggo	30.Subah	42.Bulakamba
	16.Jepara	31.Tulis	43.Tanjung
	17.Kedung	32.Batang	44.Losari



LEGEND

0.90 - 1.83	tonnes/ha
1.84 - 2.76	tonnes/ha
2.77 - 3.69	tonnes/ha
3.70 - 4.62	tonnes/ha
4.63 - 5.35	tonnes/ha
5.56 - 6.50	tonnes/ha

0 50 Kms

nd = no data available

Most rice fields, where the terrain is suitable for wet land agriculture, use an irrigation system, supplied from dams on local rivers and streams. This irrigated rice field system sustains rice production better than the non-irrigated system. In 1984 the output from wet land paddy production was 714367 tonnes, or 9.36 per cent of total rice production in Central Java, and the harvested area was 153239 hectares. By comparison, the non irrigated rice field system produced only 180196 tonnes in the same year (1984). According to a survey by the Ministry of Public Works, the irrigation systems used in wet land paddy cultivation in Central Java are of 3 kinds, namely, technical irrigation, semi-technical irrigation, and simple irrigation. The total area of wet land paddy in the region was 95362 hectares or 69.5 per cent of the total study area. Of this about 48756 hectares (51 per cent) was under technical irrigation, 23578 hectares (25 per cent) under semi-technical irrigation, and the rest (23028 hectares, 24 per cent) was devoted to simple irrigation systems. Technical irrigation is the specialized form of irrigation for rice fields. Irrigation is provided through three channels known as primary, secondary and tertiary . Water can be distributed regularly, and all technical irrigation systems are built, controlled and maintained by the Government. Semi-technical irrigation is a form of technical irrigation, but most of these systems, except for the principal water distribution system, are managed and maintained by the local people. Simple irrigation systems are very different from these and are devised, constructed, and maintained by rural people. The water is usually distributed irregularly. The production of paddy in

the study area is shown in Figure 4.10.

Another type of rice field system in study area is the unirrigated rainfed field. In 1984, the area devoted to unirrigated rice fields was 41798 hectares.

Table 4.10

Area and irrigation systems of wet field paddy in study area and 9 Regencies and Central Java Province

	Technical irrigation system (ha)	Semi technical irrigation system (ha)	Simple irrigation system (ha)
Study area	48756 (51.13%)	23578 (24.73%)	23028 (24.14%)
9 Regencies	160552 (56.88%)	44111 (15.63%)	77624 (27.49%)
Central Java Province.	367210 (50.37%)	133030 (18.25%)	228734 (31.38%)

Sources:- Data data pokok kecamatan di Jawa Tengah, Departemen Pekerjaan Umum Indonesia, 1984.
- Jawa Tengah Dalam Angka 1985.

Note : 9 Regencies are : Kabupaten Rembang, Kabupaten Pati, Kabupaten Jepara, Kabupaten Demak, Kabupaten Kendal, Kabupaten Pekalongan,Kabupaten Pemalang, Kabupaten Brebes.

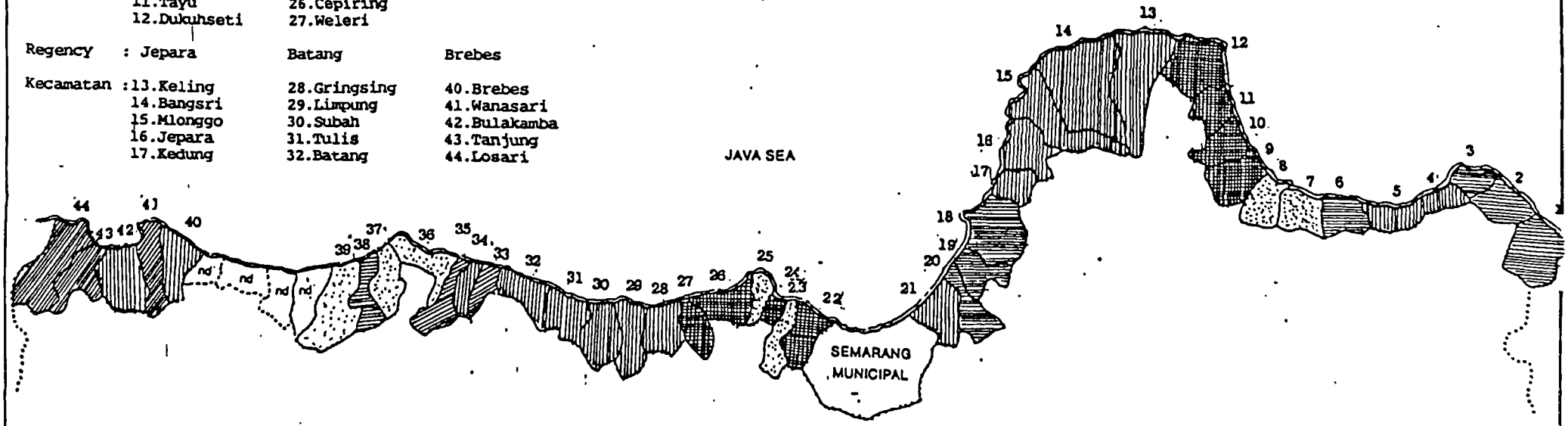
The secondary crops in the study area are maize, cassava, soybean, little green pea and sweet potatoes. These crops are usually planted in dry arable land and provide the population with secondary food supplies. However, some farmers often plant these crops in their rice fields during the dry season, as a substitute for rice for their own food. The harvested area for second crops and the production of these crops is shown in Table 4.11 and productivity in figures 4.11 to 4.15

Other plants adopted for dry land cultivation are vegetables such as ;onions,cabbages, cucumbers, chillies,beans, tomatoes and eggplants.

Figure 4.11

PRODUCTION OF CASSAVA

Regency	: Rembang	Demak	Pekalongan
Kecamatan	: 1.Sarang	18.Wedung	33.Tirto
	2.Kragan	19.Bonang	34.Wiradesa
	3.Sluke	20.Karangtengah	35.Sragi
	4.Lasem	21.Sayung	
	5.Rembang		
	6.Kaliori		
Regency	: Pati	Kendal	Pemalang
Kecamatan	: 7.Batangan	22.Kaliwungu	36.Ulujami
	8.Juwana	23.Brangsong	37.Petarukan
	9.Wedarijaksa	24.Kendal	38.Taman
	10.Margoyoso	25.Patebon	39.Pemalang
	11.Tayu	26.Cepiring	
	12.Dukuhseti	27.Weleri	
Regency	: Jepara	Batang	Brebes
Kecamatan	:13.Keling	28.Gringsing	40.Brebes
	14.Bangsri	29.Limpung	41.Wanasari
	15.Mlonggo	30.Subah	42.Bulakamba
	16.Jepara	31.Tulis	43.Tanjung
	17.Kedung	32.Batang	44.Losari



LEGEND

- 00 -3.75 tonnes/ha
- 3.76 - 7.50 tonnes/ha
- 7.51 -11.25 tonnes/ha
- 11.26 -15.00 tonnes/ha
- 15.01 -18.75 tonnes/ha
- 18.76 -22.50 tonnes/ha

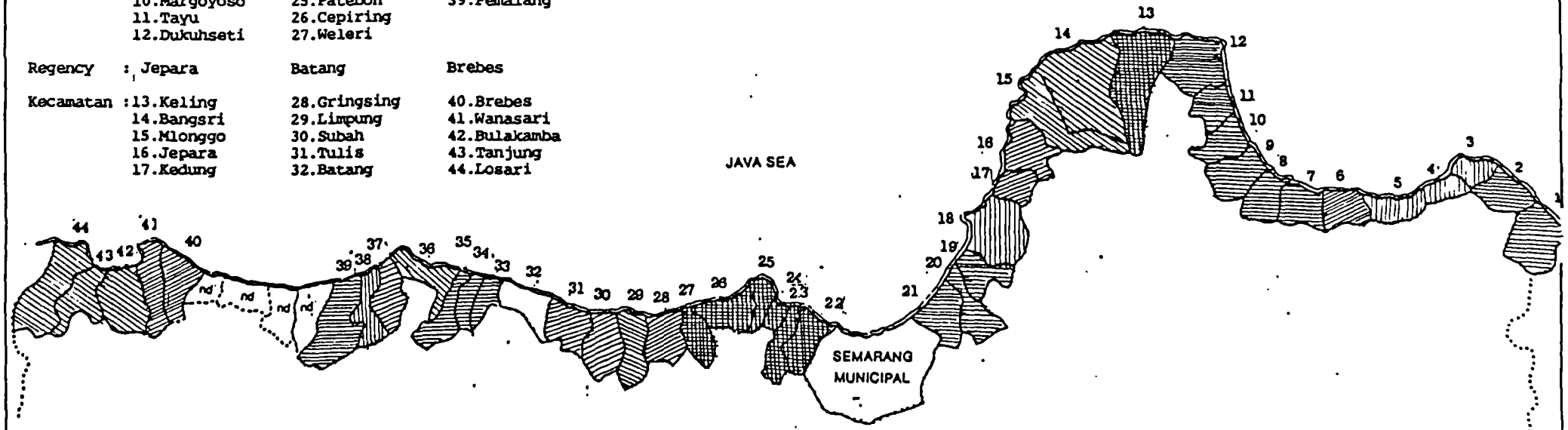
0 50 Kms

nd = no data available

Figure 4.12

PRODUCTION OF MAIZE

Regency	: Rembang	Demak	Pekalongan
Kecamatan	: 1.Sarang	18.Wedung	33.Tirto
	2.Kragan	19.Bonang	34.Wiradesa
	3.Sluke	20.Karangtengah	35.Sragi
	4.Lasem	21.Sayung	
	5.Rembang		
	6.Kaliori		
Regency	: Pati	Kendal	Pemalang
Kecamatan	: 7.Batangan	22.Kaliwungu	36.Ulujami
	8.Juwana	23.Brangsong	37.Petarukan
	9.Wedarijaksa	24.Kendal	38.Taman
	10.Margoyoso	25.Patebon	39.Pemalang
	11.Tayu	26.Cepiring	
	12.Dukuhseti	27.Weleri	
Regency	: Jepara	Batang	Brebes
Kecamatan	:13.Keling	28.Gringsing	40.Brebes
	14.Bangsri	29.Limpung	41.Wanasari
	15.Mlonggo	30.Subah	42.Bulakamba
	16.Jepara	31.Tulis	43.Tanjung
	17.Kedung	32.Batang	44.Losari



LEGEND

- 0 - 0.5 tonnes/ha
- 0.6- 1.0 tonnes/ha
- 1.1- 1.5 tonnes/ha
- 1.6- 2.0 tonnes/ha
- 2.1- 2.5 tonnes/ha
- 2.6- 3.1 tonnes/ha

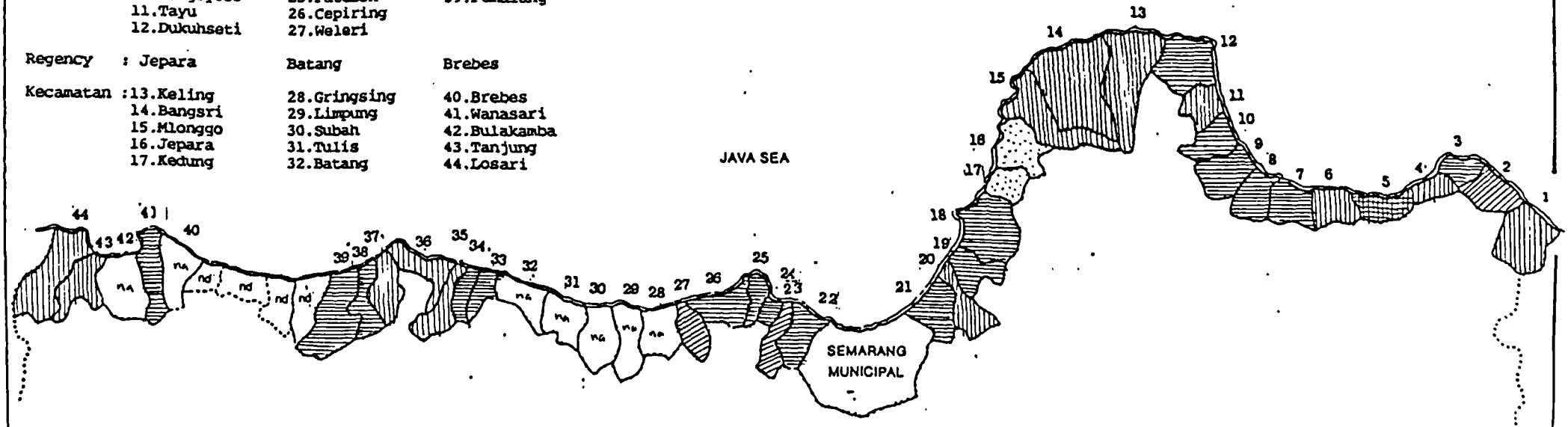
0 50 Kms

nd = no data available

Figure 4.13

PRODUCTION OF LITTLE GREEN PEA

Regency	: Rembang	Demak	Pekalongan
Kecamatan	: 1.Sarang	18.Wedung	33.Tirto
	2.Kragan	19.Bonang	34.Wiradesa
	3.Sluke	20.Karangtengah	35.Sragi
	4.Lasem	21.Sayung	
	5.Rembang		
	6.Kaliori		
Regency	: Pati	Kendal	Pemalang
Kecamatan	: 7.Batangan	22.Kaliwungu	36.Ulujami
	8.Juwana	23.Brangsong	37.Petarukan
	9.Wedarijaksa	24.Kendal	38.Taman
	10.Margoyoso	25.Patebon	39.Pemalang
	11.Tayu	26.Cepiring	
	12.Dukuhseti	27.Weleri	
Regency	: Jepara	Batang	Brebes
Kecamatan	:13.Keling	28.Gringsing	40.Brebes
	14.Bangsri	29.Limpung	41.Wanasari
	15.Mlonggo	30.Subah	42.Bulakamba
	16.Jepara	31.Tulis	43.Tanjung
	17.Kedung	32.Batang	44.Losari



LEGEND

- 0.0 - 0.31 tonnes/ha
- 0.32- 0.62 tonnes/ha
- 0.63- 0.93 tonnes/ha
- 0.94- 1.24 tonnes/ha
- 1.23- 1.55 tonnes/ha
- 1.56 -1.86 tonnes/ha

0 50 Kms

nd = no data available

Regency : Rembang — Demak — Pekalongan

Kecamatan :
1.Sarang, 2.Kragan, 3.Sluke, 4.Lasem, 5.Rembang, 6.Kaliori
18.Wedung, 19.Bonang, 20.Karangtengah, 21.Sayung
33.Tirto, 34.Wiradesa, 35.Sragi

Regency : Pati — Kendal — Pemalang

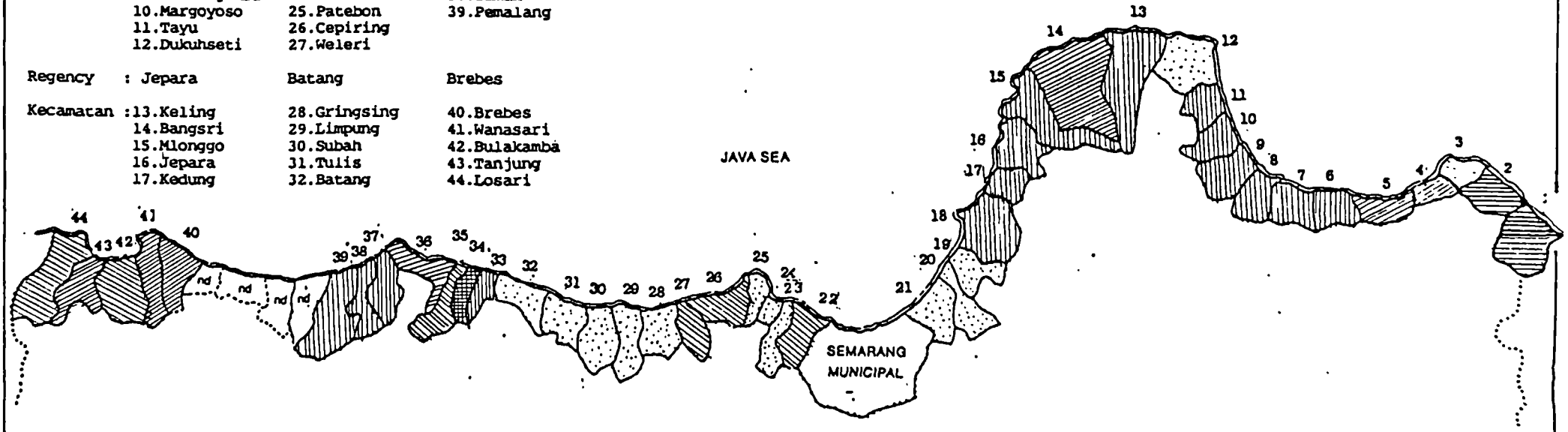
Kecamatan :
7.Batangan, 8.Juwana, 9.Wedarijaksa, 10.Margoyoso, 11.Tayu, 12.Dukuhseti
22.Kaliwungu, 23.Brangsong, 24.Kendal, 25.Patebon, 26.Cepiring, 27.Weleri
36.Ulujami, 37.Petarukan, 38.Taman, 39.Pemalang

Regency : Jepara — Batang — Brebes

Kecamatan :
13.Keling, 14.Bangsri, 15.Mlonggo, 16.Jepara, 17.Kedung
28.Gringsing, 29.Limpung, 30.Subah, 31.Tulis, 32.Batang
40.Brebes, 41.Wanasari, 42.Bulakamba, 43.Tanjung, 44.Losari

Figure - 4 .14

PRODUCTION OF SOYBEAN



LEGEND

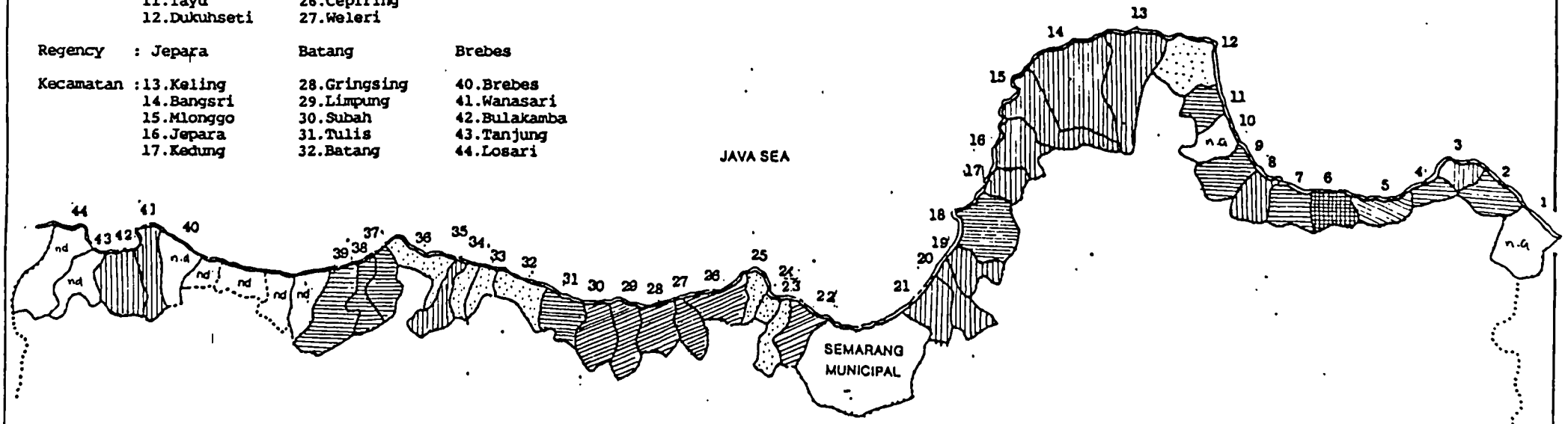
- 0.0 - 0.23 tonnes/ha
- 0.24 - 0.46 tonnes/ha
- 0.47 - 0.68 tonnes/ha
- 0.69 - 0.91 tonnes/ha
- 0.92 - 1.14 tonnes/ha
- 1.15 - 1.37 tonnes/ha

0 — 50 Kms

nd = no data available

Regency	: Rembang	Demak	Pekalongan
Kecamatan	: 1.Sarang	18.Wedung	33.Tirto
	2.Kragan	19.Bonang	34.Wiradesa
	3.Sluke	20.Karangtengah	35.Sragi
	4.Lasem	21.Sayung	
	5.Rembang		
	6.Kaliori		
Regency	: Pati	Kendal	Pemalang
Kecamatan	: 7.Batangan	22.Kaliwungu	36.Ulujami
	8.Juwana	23.Brangsong	37.Petarukan
	9.Wedarijaksa	24.Kendal	38.Taman
	10.Margoyoso	25.Patebon	39.Pemalang
	11.Tayu	26.Cepiring	
	12.Dukuhseti	27.Weleri	
Regency	: Jepara	Batang	Brebes
Kecamatan	:13.Keling	28.Gringsing	40.Brebes
	14.Bangsri	29.Limpung	41.Wanasari
	15.Mlonggo	30.Subah	42.Bulakamba
	16.Jepara	31.Tulis	43.Tanjung
	17.Kedung	32.Batang	44.Losari

Figure 4.15
PRODUCTION OF SWEETPOTATOES



LEGEND

- 0.0 - 0.25 tonnes/ha
- 0.26 - 4.50 tonnes/ha
- 4.51 - 6.75 tonnes/ha
- 6.76 - 9.00 tonnes/ha
- 9.01 -11.25 tonnes/ha
- 11.26 -13.52 tonnes/ha

0 50 Kms

nd = no data available

Table 4.11

Harvested area and production of secondary crops in Study Area, 9 Regencies and Central Java Province in 1984

		Study area	9 Regencies	Central Java Province
Maize	Prod.(tonnes)	44251	232244	1225635
	Harvested area (ha)	26606	138844	645465
Cassava	Prod.(tonnes)	206884	707063	3116256
	Harvested area (ha)	18038	57765	288988
Sweet Potatoes	Prod.(tonnes)	8817	46138	230103
	Harvested area (ha)	1349	7020	26204
Little green pea	Prod.(tonnes)	11408	27641	100339
	Harvested area (ha)	31400	29833	104430
Soybeans	Prod.(tonnes)	3393	20915	151585
	Harvested area (ha)	3765	22619	153328

Sources : - Kabupaten dalam angka 1984 (9 books of compilation data of 9 Regencies.
- Dinas Pertanian Tanaman Pangan Propinsi Jawa Tengah (Agriculture service).

In areas adjacent to the sea, fishpond culture is predominant. In the areas closest to the coast, the people can earn their living by combining several activities, including farming, fishpond culture and sea-fishing, and some have two or more sources of income in these areas. A common activity is fish-pond culture, which is known as 'tambak'. Tambak is carried on along the flat shores of salt marshes and provides a step in the reclamation of land from the sea. The three most important

fish species reared in fishponds are the milkfish (Chanos-Chanos), the banana prawn (Panaeus marguensis) and Tilapia mosambica (Knox, p.63). Tambak production provides some 6 per cent of the total Indonesian fish production by weight and 12 per cent by value (Knox,p19). The temperature, water salinity, type of soil and topography of the study area are ideal for fishpond cultivation and the local population establish 'tambaks' by excavating the marsh areas, and sometimes by clearing the mangrove forests. Both types of land, marsh and mangrove forest, ensure continuity of brackish water supply for the ponds during period of drought, by mixing sea water with fresh water from a simple irrigation system. The total area of 'tambaks' in the study area in 1984 was 24016.56 hectares and they had a total production of 18506 tonnes (Source: Statistical Year Book of 9 Regencies of Study Area). In the period 1981 to 1983, however, the total area devoted to 'tambaks' declined. In 1981 the area was 25596 hectares, in 1982 it decreased to 24314 hectares, and in 1983 it decreased again to 23734.5 hectares. It appears that other uses have been made of this land, mainly by extending settlements.

In another sector, sea fishing, work is not possible in every month of the year. The constraint is that the catch is influenced by the climate. At the height of the rainy season, December to January, the catch decreases, because the west winds generally create high waves in the sea which preclude fishing. However, from May to August, when rainfall is lowest, the catch increases. Sea fish production in 1984 in the study area was 28730 tonnes. This constituted 22.86 per cent of the total production in Central Java Province. Table 4.12 shows

sea fish production from 1980 to 1984.

Table 4.12.

Sea Fish Production In Central Java
Classified by Producing Area from 1980-1984.

Regency	Years				
	1980	1981	1982	1983	1984
Rembang	12629.5	28330.2	18486.1	16554.5	19036.1
Pati	1736.5	1369.0	1367.8	2160.8	9772.6
Jepara	3524.3	2958.6	4216.0	2236.9	2310.9
Demak	2597.1	1642.6	1661.6	2028.8	2024.4
Kendal	1977.8	1571.2	2302.1	1663.8	2397.4
Batang	13126.1	10209.6	22245.6	7462.1	6549.6
Pekalongan	28.7	351.6	413.1	371.3	781.3
Pemalang	3407.7	11162.2	7107.5	2933.2	5724.4
Brebes	544.0	700.0	461.8	279.3	696.4
TOTAL	39570.9	58295.0	582616.6	35690.7	49293.1
Central Java Province.	108385.5	87613.5	111625.6	112775.9	126666.9

Source : Jawa Tengah Dalam Angka 1985.

The annual sea fish production shows a fluctuation between 35000 and 58000 tonnes. The highest production in the study area was achieved in 1981. In contrast,this was the year of lowest output for Central Java generally within the five-year period, from 1980 to 1984. The 1984 fishery production was 126000 tonnes, an increase of 12.32 per cent from the previous year.

Another aspect of agricultural activity is animal husbandry. This is an important activity providing both food and cash income through sale of animals. In addition to increasing the

basic food supply per capita, the Government has launched a drive to increase consumption of animal protein in the Five-Year Development Plan. The supply of meat will, theoretically, be increased in line with the population growth. Meat stocks for consumption are determined by the availability of cattle, and so encouraging the rural population to increase animal husbandry will help to increase the supply of animal protein. Figures for the 9 Regencies show that in 1984 the number of cattle, goats sheep, pigs and horses was higher than in 1983, whereas the number of buffalo declined. The increase in cattle was 5.42 per cent, goats 0.21 per cent, sheep 7.03 per cent, pigs 41.51 per cent and horses 7.35 per cent, whereas the decrease in buffalo was 2.06 per cent. In Central Java as a whole, the livestock population from 1979 to 1984 shows an upward trend for almost all types of livestock, except horses.Cattle for example, increased from 920000 in 1979 to 1000000 in 1984. Unlike the other livestock, however, horses show a decrease during this period (see Table 4.13).

Table 4.13

Livestock population in study area, 9 Regencies and Central Java, 1983 to 1984

		Study area	9 Regencies	Central Java
Cattle	1983	-	211686	1033178
	1984	58924	223172	1042321
Buffalo	1983	-	125023	304180
	1984	39599	122443	319636
Goat	1983	-	558632	2339575
	1984	-	559832	2279509
	1983	-	10853	145989

Pig	1984	14347	15359	135580
Horse	1983	-	5627	25068
	1984	-	6041	24334
Sheep	1983	-	234321	1155367
	1984	-	250802	1183473
Goat + Sheep	1983	-	792953	3494942
	1984	236259	810634	3462982

Sources : -Jawa Tengah Dalam Angka 1985.
-Data data Pokok Kecamatan Jawa Tengah 1984, Departmen Pekerjaan Umum

IV.3.3.2.Transportation Facilities.

Transportation is a vital supporting factor in sustaining both economic and social activities. It can also be used for assessing the level of access to urban areas or to the centre of the region, and assessing interregional flows. Transport of persons and goods for particular purposes is economically useful in so far as it provides a service, and is referred to by economists as a factor of production (Robinson,1978,p-8). The availability of transportation influences the movement of persons and goods, and hence the efficiency of distribution and marketing. It also affects the use of social facilities by the rural population. The essential of transportation is reflected in the opinion that an efficient transportation system is able to accelerate the development of the economic sector through the exchange of goods on an interregional basis, leading to more rapid regional development. Another function of transportation is to enable rural products to be marketed in other regions, and in this way to open up remote areas from their previous isolation. The transportation pattern of the

Figure 4.16

NETWORK OF ROADS IN CENTRAL JAVA

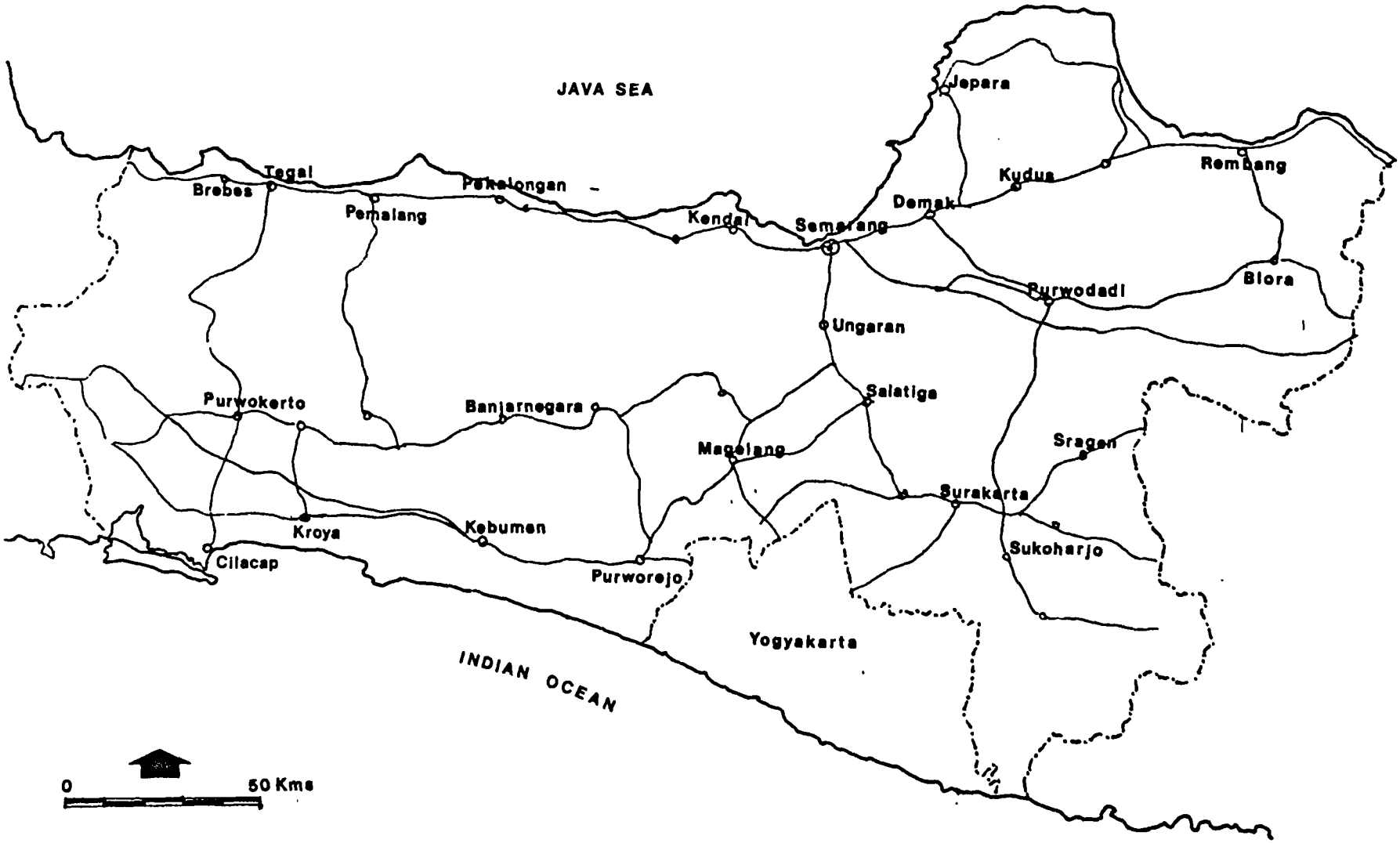
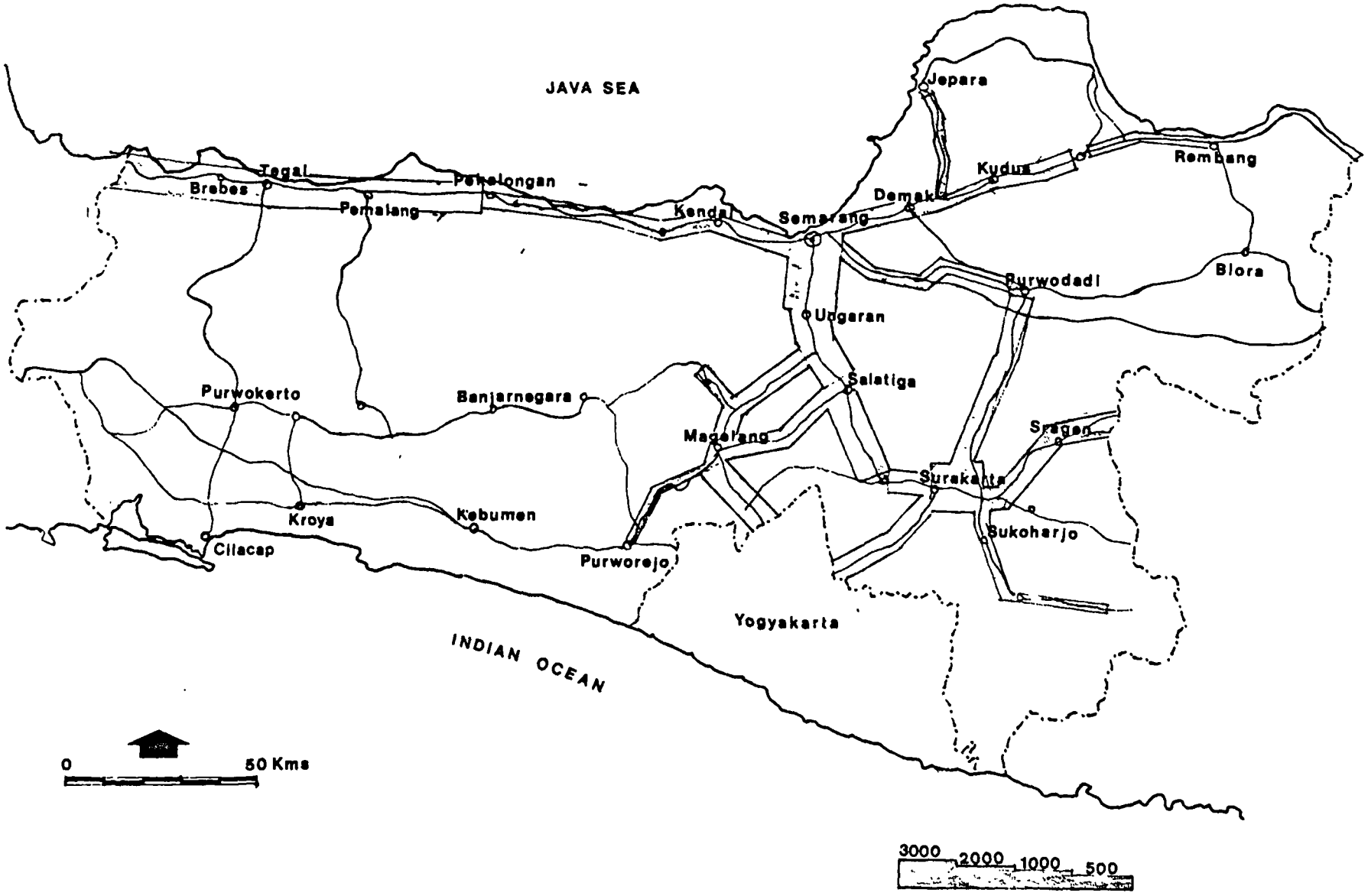


Figure 4.17

DAILY TRAFFIC FLOW IN CENTRAL JAVA IN 1974



Source: JICA (Japan International Cooperation Agency)

study area constitutes part of the Central Java main regional road network. There are 3 main regional roads in the area :

-'Jalur Utara' (Northern line), which connects the West Java region;

-'Jalur Utara-Selatan' (Northern-Southern line), which connects Semarang-Yogyakarta-Surakarta;

-'Jalur Selatan' (Southern Line) which connects the West Java region, Gombong -Yogyakarta- Surakarta, and the East Java region (Figure 4.16).

These regional roads are used very intensively and the average daily volume of traffic on these roads is very high. As an illustration, 'Jalur Utara' carried 2000-3000 vehicles per day in 1974 *), whereas 'Jalur Utara-Selatan' carried more than Jalur Utara with 3500 - 4000 vehicles per day (Figure 4.17). Generally, these regional roads are better than 'kabupaten' (Regency) roads. Most coastal rural roads are non asphalted, i.e. gravel and earth roads. The total length of asphalted road in the study area in 1984 was 686 kms or around 33.7 per cent of the asphalted roads in the 9 Regencies, and 8 per cent of the total asphalted road in the Province. The total length of the coastal rural road was 1707 kms, but some of these roads were in poor condition, and were not maintained by the local government.Thus it can be seen that transportation facilities do not fully support rural activities. Consequently, socio-economic facilities such as :markets, schools and health centres were often unavailable to the population of the remote coastal rural areas. If transportation constitutes a basis for rural economic development, it is clear that the road network

Table 4.14

Modes of Transport in the Study Area
(in percentages)

Kecamatan	1	2	3	4	5	6	7	8	9
1.Sarang	0.46	1.56	1.05	1.43	5.08	-	7.19	0.03	1.13
2.Kaliori	0.46	0.46	0.81	1.76	1.96	-	5.09	-	2.76
3.Rembang	10.39	5.40	7.25	5.66	6.33	-	13.77	8.24	1.16
4.Kragan	1.53	3.32	1.75	0.93	12.54	-	5.40	0.24	0.30
5.Sluke	0.30	3.32	-	0.47	1.34	-	8.08	-	3.23
6.Lasem	3.05	10.48	3.40	3.40	4.46	-	11.08	6.70	-
7.Sayung	2.14	0.52	0.23	2.30	1.96	1.39	1.20	0.17	3.89
8.Karangtengah	2.44	0.58	1.29	2.22	2.85	0.46	10.48	0.20	2.30
9.Bonang	0.30	0.26	0.94	2.16	2.68	5.56	-	0.03	3.17
10.Wedung	0.30	2.92	1.63	1.96	1.96	8.80	-	0.17	1.13
11.Kaliwungu	3.82	6.96	2.80	4.01	2.77	5.56	1.50	7.60	1.87
12.Brangsong	0.76	2.80	1.05	1.49	4.38	2.31	-	10.55	1.37
13.Weleri	0.05	6.90	4.91	6.06	15.70	3.70	3.60	18.82	4.62
14.Cepiring	4.28	5.47	4.56	6.16	10.70	15.74	8.68	4.56	5.58
15.Patebon	2.45	1.95	1.87	4.05	11.69	2.78	9.60	1.60	2.80
16.Kendal	13.30	5.47	5.73	5.25	1.43	4.63	-	10.14	2.84
17.Gringsing	2.45	5.01	3.04	2.08	2.94	1.62	3.90	0.82	1.40
18.Limpung	3.36	5.01	1.40	2.08	-	-	-	-	-
19.Subah	1.99	4.30	3.16	2.32	-	0.23	-	-	0.62
20.Tulis	2.90	3.06	3.04	1.83	-	0.69	0.60	0.78	10.06
21.Batang	9.17	8.66	2.22	11.27	-	12.27	8.68	15.82	7.00
22.Sragi	-	-	5.38	-	4.91	18.30	0.30	4.60	7.71
23.Tirto	-	-	9.70	-	0.09	7.18	-	11.10	4.54
24.Wiradesa	-	-	10.18	-	4.19	8.80	0.60	7.32	4.21
22.Pemalang	19.18	7.88	12.40	12.21	-	-	-	-	10.30
23.Taman	8.71	1.89	2.12	4.90	-	-	-	-	4.53
24.Petarukan	0.16	0.59	6.43	9.54	-	-	-	-	15.03
25.Ulujami	0.62	2.28	1.64	4.45	-	-	-	-	4.73
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Total vehicles	654	1536	855	12863	1121	432	334	2938	93946

Note :

1.The percentages of the number of private car
2.The percentages of the number of public car
3.The percentages of the number of truck
4.The percentages of the number of motor-cycle
5.The percentages of the number of hackney-carriage
6.The percentages of the number of cart
7.The percentages of the number of tricycle
8.The percentages of the number of bycicle
- = no data available
No data available for other kecamatans

Source: Bappedaa Tingkat I Field Survey in 1985

of the study area are in urgent need of improvement.

Some economists stress the importance of road development in Indonesia as a means of enhancing the economic potential of each region. Thus, the value of a rural road project is often determined on the basis of its contribution to urban economic development. Unfortunately, this approach ignores the value of rural road development for the rural area itself. Rural areas are generally considered to have low economic potential by road planners. The study area in question is a lowland plain straddling the main road connecting Brebes and Jepara Regencies. The study area would benefit from road development, especially in the case of remote coastal areas which are not provided with roads at the present. The modes of transport in the study area are predominantly road-based, such as bus, truck , bullock cart and dog cart, but sea transport is also significant. Motor boats and sailing boats are used mainly for transporting goods.Table 4.14 shows the relative significance of the various modes of transport in the study area in 1984.

IV.3.3.3. Coastal Rural Industry

The main form of industry in the study area is light domestic industry using simple technology with small numbers of workers on each enterprise. The raw materials for this industry come mainly from local sources, being either products of the agricultural sector, or natural resources. Most rural industries in the study area are still oriented towards the agricultural and fishery sectors and are on a small scale. For example, the 'tahu' industry (food made from soybean), fish

paste industry (a fish paste made from shrimp or small fish pounded fine) , the salted fish industry, the shrimp chip industry (shrimp and cassava flour or fish flakes and rice dough, cut in slices and fried to crisp chips). Industries based on natural resources such as the building material industries and the salt industry have an equally small scale of production. The total number of people employed in these industries in the study area in 1984 was 20635, and their distribution among the kecamatans was uneven. The highest number of people employed in light industry was in Kecamatan Keling, whereas Kecamatan Pemalang had the lowest number.

The labour force of the study area in 1984 was 1.4 million persons, of whom 106156 worked in the rural industries sector. Two kinds of rural industry sectors can be distinguished : extraction industry and manufacturing industries. Both have a small-scale of production. Extraction industries produce mainly building materials, such as concrete blocks, tiles, roof tiles, bricks etc, by processing local resources such as sand, quicklime and clay. These industries still use simply technology, and almost all their output is supplied to the urban areas. The rural manufacturing industries in the study area are generally agricultural commodity processing industries. The specific characteristic of the rural manufacturing industry is that it is dependent upon the progress of the agricultural sector. As an illustration, Table 4.15 presents types of rural industries in 16 kecamatans.

Table 4.15

Rural Industries in the Study Area

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
WEDUNG	a.	-	123	14	-	-	3	26	-	-	-	58	-	-	-	8	-	-	-	-
	b.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	c.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LASEM	a.	2	2	2	4	-	33	9	1	8	7	8	-	12	6	1	-	-	-	-
	b.	-	-	1	-	-	-	11	-	1	18	2	2	4	3	4	-	-	-	-
	c.	-	-	-	1	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-
SARANG	a.	-	12	7	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
	b.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	c.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
KALIORI	a.	-	-	22	-	20	1	10	-	-	-	-	-	22	-	-	-	-	-	-
	b.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	c.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
REMBANG	a.	1	23	14	3	27	97	11	-	-	-	11	-	43	-	-	-	-	-	-
	b.	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	c.	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SLUKE	a.	-	-	3	-	4	-	-	-	-	-	-	-	4	-	-	-	-	-	-
	b.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	c.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
KRAGAN	a.	-	-	5	-	-	27	-	-	-	-	-	-	13	-	4	-	-	-	-
	b.	-	2	3	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	c.	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-
KALI	a.	1	-	21	14	-	-	-	-	-	-	-	1	-	-	1	1	1	1	-
WUNGU	b.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	c.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BRANGSONG	a.	-	-	10	-	-	2	5	-	-	-	69	-	34	-	-	-	51	-	-
	b.	-	-	6	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
	c.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WELERI	a.	1	-	33	4	-	-	36	-	3	-	-	2	8	-	-	-	-	-	-
	b.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	c.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CEPIRING	a.	-	-	13	-	-	4	-	-	-	-	71	-	92	-	-	-	-	-	-
	b.	-	-	-	-	-	-	-	-	-	1	2	-	-	-	-	-	-	-	-
	c.	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PATEBON	a.	-	-	4	12	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-
	b.	-	-	-	-	-	4	-	-	-	-	-	-	-	-	1	-	-	-	-
	c.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
KENDAL	a.	-	6	2	-	-	4	-	-	21	-	11	8	6	-	3	-	-	-	3
	b.	-	-	3	-	-	1	1	-	-	-	-	1	-	-	-	-	-	-	-
	c.	-	-	1	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-
SAYUNG	a.	-	15	4	-	-	-	-	-	-	-	21	-	-	-	-	-	-	55	-
	b.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	c.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
KARANG	a.	-	-	-	-	-	7	1	-	-	1	1	-	-	-	-	-	-	-	-
TENGAH	b.	-	8	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	c.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BONANG	a.	-	-	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	b.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	c.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Source : Bappeda , Social and Economy Survey of Kecamatans in Central Java, 1985.

Note :
a.Number of rural industrial workers less than 5
b.Number of rural industrial workers between 5 and 19
c.Number of rural industrial workers more than 20

01.Slaughterhouses and meat processing
02.Fish preservation industry
03.Rice mill industry
04.Food manufacturing
05.Sugar mill
06.Manufacture of daily food
07.Manufacture of species (the prawn paste, salt) and ice
08.Manufacture of animal food (the pellet)
09.Manufacture of bottle drink
10.Ready made cloth manufacturing
11.Handy craft industry (the rattan, bamboo and wood)
12.Papers processing industry
13.Metal manufacturing
14.Spare-part industry
15.Manufacturing of toys, music, finery
16.Manufacture of tea, coffee, chocolate and sweat.

These rural industries do not yet make a significant contribution to the regional income. They are generally considered to constitute an unproductive sector. Their output is very small and produced by traditional and simple technology. The main impediments to their growth are the limitations of capital and skills. Managerial and marketing skills are noticeably lacking in the local populations.

To enhance and stimulate industry in Central Java, the local government has invited foreign and local investors to invest capital in all regions of Central Java. However, capital has only been invested in certain regions. This circumstance can be shown by the distribution of investment in Central Java. In 1980, 45.15 per cent of foreign and local investment in Central Java was concentrated in Semarang area; in Kendal, Batang, Pekalongan, Kudus, and Surakarta the percentages were 11.95, 6.38, 6.15, 5.02, and 15.74 per cent respectively, and the remainder was distributed among the other regions, the proportion in each case being less than 5 per cent. This has, therefore, created an imbalance of investment. Investors always consider market accessibility and demand, in order to achieve a maximum return from their capital. Market demand depends on the ability of society to buy and consume the goods, and this in turn depends on the per capita income level. High per capita incomes are generally found only in some urban areas, and investors therefore have a tendency to put their capital into urban areas. Nevertheless, coastal rural resources can produce profits for investors, especially in industries based on marine or coastal products, such as; fish, sea-weed, coconut, salt etc. However, investors must be aware of these

resources and encouraged by the Government to provide the necessary capital for development.

Certain light industries in the 16 kecamatans will be considered in this study. Most of these employ fewer than 50 persons, and few of them have a labour force between 50 and 100 persons. Table 4.15 shows the details of all industries in the kecamatans.

IV.3.3.4.Markets

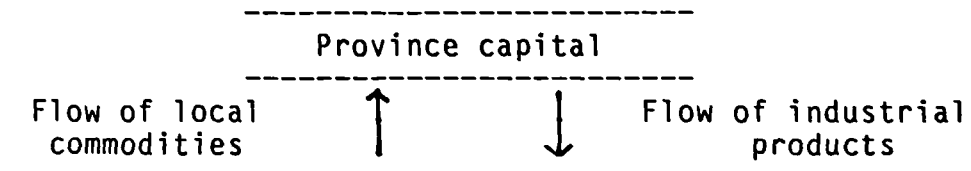
In Java, especially in the study area, markets are known as 'pasars'. The 'pasar' (probably from the Persian 'bazaar'), or traditional market, is at the same time both an economic institution and a way of life; it is a general mode of commercial activity reaching into all aspects of society, and a socio-cultural world almost complete in itself. The 'pasar' is a commercial place, where local products can be offered and certain industrial products distributed. The characteristics of basic commodities traded in 'pasar' are: compact,easily portable. 'Typical examples are foodstuffs, textiles, small items of hardware, the range of which can be increased or decreased gradually by degrees;....' (Geertz,1963,p.31) Basic commodities such as rice, fish, vegetable oil, paraffin, fire-wood and domestic durables such as crockery, textiles, household furnishings etc, are the major goods to be marketed. One of the more important commodities is fish. This is highly perishable, but it is a major foodstuff. Fish and other perishable commodities need be distributed to consumers as quickly as possible, and the 'pasar' plays an

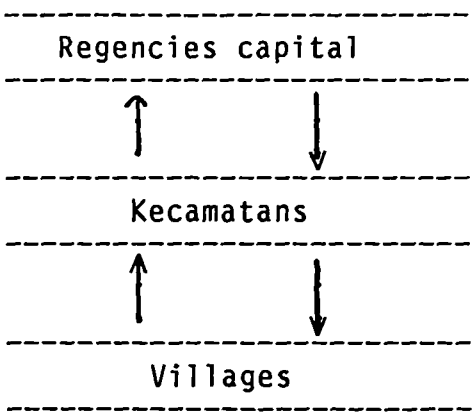
important role in this function. Rahayu (1971) describes the system for marketing sea-fish in Kecamatan Rembang. She reports that fresh fish is usually consumed by local people, whereas preserved fish is marketed through the kecamatan. Steaming and smoking constitute the main forms of preserving fish. The fish marketing system is not well managed. Local fishermen choose to sell their fish to brokers as soon as they land it. In fact, the fishermen would be better to sell their fish by auction. According to Rahayu, 15 per cent of sea-fish landed is marketed in the vicinity of Rembang Regency; 50 per cent is processed by salting and is distributed to Semarang, Solo and Blora; 35 percent is processed as steamed fish and is marketed in Juwana, Pati, Kudus, Blora and Jatirogo.

The study area displays a network of markets, linked by roads. In village markets not all commodities in daily use are marketed. Household utensils, for example ,are generally found only at kecamatan or regency market level. Industrial products such as, motor boat engines and spare-parts can only he bought at Regency or provincial capital level. Fuel for the motor boats is bought by coastal rural people in the regency capital. Some industrial products are distributed from the province capital down to the Regency capital, and then to the kecamatans and ultimately to the villages. So, in theory, the flow of goods and services can be illustrated as in Figure 4.18.

Figure 4.18

Flow of goods and services in the study area





In practice, however, peddlers play a major role in distributing goods to the rural population, buying the goods in the Regency capital and selling them directly in the village. The main exception is perishable commodities, which are usually transported direct from rural to urban areas.

CHAPTER V

BASIC CONSIDERATIONS FOR THE ASSESSMENT OF POTENTIAL FACTORS

CHAPTER V

BASIC CONSIDERATIONS FOR THE ASSESSMENT OF POTENTIAL FACTORS FOR COASTAL RURAL DEVELOPMENT.

This chapter will discuss the significant elements in the assessment of development potential. Before attempting to make an overall assessment of the potential of an area for development, however, it is important to identify the major determinants of rural development. It is also essential to recognise the distinctive character of the potential of coastal rural areas for development, since these areas have their own typical physical, economic, social and cultural characteristics . In this section some of the relevant factors will be examined.

V.1.Natural Resources as Factors in Development

Many researchers have focused on the significance of the availability natural resources as a determinant of development. The meaning of 'resource' has a relationship with its environment. Whitby and Willis (1978.p.21)) define 'resources' as 'the means for producing goods and services that are used to satisfy human wants'. These are two kinds of 'resource':

1.ecological and agricultural -the materials provided by living, biological systems, and the socio-economic implications of those systems. These are expressed in the agricultural, animal husbandry and forestry activities of the communities;

2.non agricultural -mineral exploitation and energy production, and their implications, expressed primarily in activities such as household and community crafts and small-scale industries, and more rarely in modern industrial development (Moss and Swindell,1975,p181).

Natural resources is defined as all those naturally occurring phenomena which are sometimes referred to as 'gifts of nature', such as land, air, water, minerals, forests, fish, quiet,pleasant landscape and so on (Whitby and Willis 1978). Thus, three types of natural resources can be distinguished : mineral resources, water resources, and ecological (including biological) resources. Natural resources, which are possibly most characteristic of rural areas, include agricultural, land, soil, woodland, water, wildlife, and mineral. In some geographical work, natural resources have been perceived as the main factor affecting the relation between man and his environment with regard to spatial variations in development.Most geographers focus upon three major classes of interrelated earth features :

a.Natural features (including climate, terrain, surface and underground water, soils, economic minerals, and native plants and animals);

b.Human populations, including numbers and characteristics;

c.Human constructions necessary for living on the earth and using its resources (including settlements,farms, factories, mines, domesticated plants and animals,and transportation facilities)(Finch,1957p.vii).

Few authors have seen natural resources as absolute determinants in economic development,but some consider them to have played a significant role in either permitting or preventing it. In general, however, both geographers and planners have viewed natural resources as only one factor amongst many, and see development resulting from a combination of several factors. Natural resources are only one element in the analysis.

Other authors emphasize other factors, such as the cultural and social aspects and diminish the importance of natural resources. Waterstone, for example, stresses the significance of social aspects in his model of rural development and takes into account every possible social or cultural aspect of society which could have some bearing on development. (Waterston,1979,pp230-240).

Another viewpoint, known as economic development examines a combination of socio-cultural and physical aspects, and is significant in the general area of development studies. These three aspects, physical, socio-cultural, and economic, have influenced the approaches of geographers. It is, therefore, not surprising that geographical analysis has, to a large extent, been dependent on the other disciplines in formulating its concepts and ideas concerning rural development in the Third World.

Natural resources, however, must be catalogued and mapped, so that their distribution can be recognized. This is, in some perspectives, seen as the core of the geographers's work. Ginsburg (1960) mentions that 'distribution of natural resour-

ces is one of geography's traditional objects of research and a contribution can be made to the study of underdevelopment by an examination of the role played by natural resources'. The role of natural resources in low-income tropical countries is vital in supporting the viability of their economies. Stamp (1960) argues that the major problem in developing countries is the relationship between population size and the availability of physical resources, and especially land resources. Steel (1967) also points to the profound dependency of some developing countries on their natural resources for economic development

Natural resources are generally categorized as renewable and non-renewable. The renewable resources includes land and soil fertility, water availability, climate, soil fertility in relation to plant and animal production. Minerals and fossil fuels are considered non-renewable supplies. In some developing countries development depends almost exclusively on the availability of such resources especially non-renewable. In Indonesia, for example, nearly 75 per cent of national income comes from oil production. Hodder(1968) describes the role of natural resources in developing countries thus : 'the importance of natural resources to developing countries is relatively greater than to the developed countries of the world. In low - income tropical countries rich natural resources can have great significance as sources of exports and foreign investment, while poor resources may form some limitation to growth). He considers that the natural resources base is potentially adequate for substantial development, given sufficient knowledge about these resources and their use (p14).

He further argues that 'there is no justification for ignoring natural resources altogether in any development analysis, and that there are real dangers in any tendency to underestimate[1] the role of natural resources in tropical development' (p.14). In this study of rural development special attention will be paid to natural resources. With regard to the coastal environment, certain aspects such as the climate, hydrology, and topography are especially important in relation to the natural resources of the region. Climate, for example, influences the fishing season and affects the rice planting pattern. Hydrology has an important role in agriculture with reference to irrigation systems and fishpond cultures. Mining might also be included in this discussion with regard to the production of iron and coal. Topography also affects the population occupation in coastal areas since it is one of some considerations in developing fishpond culture.

V.2.Trade and Markets as Factors in Development

It has been mentioned that resources are often unevenly distributed. Several regions are favoured with abundant resources, whereas other regions have little. The main question relevant to regions having few resources is 'how can their economy be developed without a significant natural resource base?'. The development of trade is advocated as the answer to that question by some since active trade may compensate for the lack of natural resources. Advanced countries are usually importers of a wide variety of primary commodities which serve as raw materials for industry, whereas developing countries are generally exporters of such commodities. In playing down the

role of natural resources, however, it is pointed out that trade can remove certain of the restraints suffered by an underdeveloped country because of its resource deficiencies. Ginsburg (1960) recognized the role of trade for the developing countries by stating that: 'Trade and transportation are the devices by which inequalities among nations in resource endowment may be minimized'. It might be relevant to study how a country like Japan, with few natural resources, has developed its economy. Japan is successful on its industrial development. Trade, however, is not only conducted internationally, it is also active internally on a rural level. At this level, trade is concerned with local commodities, and is a relationship between urban and rural areas and between different rural communities. If natural trade is to develop,transportation is a vital factor. Another factor of trade is effective marketing. Marketing is concerned with identifying demands for various goods and services and making arrangements to supply them through an efficient distribution network (Davies,1976,p.1). Etemad (1984) in his marketing study asserts that marketing has a potent role in economic development, and puts forward a process of organization for more efficient and accelerated development in which user satisfaction and value play a central role. Marketing is but one of approaches to rural development. Malgavkar (1976,p.163) claims that the provision of social facilities such as health, recreation, sanitation, water supply and education also means that employment is created in agriculture, agro-business, handicrafts, services, etc. Such work opportunities are, however, dependent on the demand for products and services. Marketing

is related to such rural development programmes. In some Third-World countries like India, China, Egypt and Brazil economists are realizing that effective marketing has a key role to play in the advancement of social programmes relating to family planning, adult education, hygiene, etc. (Kindra, 1984,p.3)

The marketing approach involves identifying demands for goods and services. Malgavkar classifies demand under two broad headings, first, local demands for work or for production of goods and services, and second, external demands for rural products. Stimulating both local and external demands is in fact a principal aim of rural economic development. Geographically, marketing activities are manifested in the provision of market locations, and a large number of markets indicates a dynamic economy. Thus, a promotion of marketing can encourage development in rural areas.

V.3.Human Resources as Factors in Development

The human factor is recognized by some authors as the prime mover in all economic activities. People are the main factor in sustaining agricultural, industrial, mining, service and other activities. Todaro (1981) in his study of human resources emphasizes the role of human resources more than either capital or material resources. He asserts that 'most economists would probably agree that it is the 'human resources' of a nation, rather than its capital or its material resources which ultimately determine the character and pace of its economic and social development'. He quotes Harbison:

> 'Human resources....constitute the ultimate basis for wealth of nations. Capital and natural resources are passive factors of production; human beings are the active agents who accumulate capital, exploit natural resources, build social, economic and political organizations and carry forward national development'.

(Harbison,1973.,p.3)

The human population is a major potential resource in a Third-World country like Indonesia, in that it provides a huge potential labour force . According to Simon and Neal (1986.p.2), in dynamic economies higher population growth means an increasing supply of constantly improved inputs (i.e.human capital). To develop natural resources, skilled labour and managerial expertise are needed. It is true that the labour force in Third-World nations is generally less educated, less experienced and less skilled than their counterparts in the developed world. Thus the need for education to develop skills is emphasized as a means of resolving this problem. Harbison (1973) argues : 'Clearly, a country which is able to develop the skills and knowledge of its people and to utilize them effectively in the national economy will be enable to develop anything else'. The relevance of education for human development is thus reflected in the rate of development of a country. The better educated the population, the more rapid the development which may be expected. In a rural areas, an essential resource is the availability of a large labour force. Such workers can be a potential motor for developing all rural activities.

V.4.Social Facilities as Factors in Development

There are four important interrelated elements in human development: health, education, nutrition, and fertility . Improvements in one area can facilitate improvements in others and reinforce all aspects of development. Streeten (1981) argues that provision of education and health services often make a greater contribution to improving labour productivity than do most alternative investment. Education is basis, but is not yet provided for all people in Third-World countries, particularly in rural areas, even though it is recognised by some governments that education is the key to development. At present, in many developing countries formal education has become one of the largest 'industries' and the greatest consumer of public revenue. Poor nations have invested huge sums of money in education. Todaro (1981,p.292) identifies some reasons for this: first, literate farmers with at least a primary education are thought to be more efficient and more responsive to new agricultural technologies; second, trained craftsmen and mechanics who can read and write are better able to keep up to date with changing products and materials; third, secondary school graduates with mathematical and other skills are needed in order to perform technical, and executive functions in growing public and private bureaucracies and in the former colonial countries many educated people were needed to replace departing expatriates; and fourth, university graduates with advanced training are needed to provide the professional and managerial skills needed in the public and private sectors of a modern state. Furthermore, parents understand that in an

economy with a shortage of skilled manpower, the more schooling and certificates their children can accumulate, the better will be their chances of finding secure and well-paid jobs. For the poor especially, more years of schooling are perceived by parents to be the only avenue of hope for their children to escape from poverty. Education is thus a basic precondition for many economic activities in both urban and rural areas.

Another necessary social facility is public health. This is closely related to the quality of human resources. 'Mens sana in corpore sano' is not merely a motto, but a practical necessity for every person. People cannot work effectively if they are physically or mentally ill or malnourished. Lack of good health affects a person's attitude toward work, initiative, creativity, learning ability, energy, and capacity for heavy or sustained work or thought (Kamarck,1976) The FAO remarks that chronic disease in association with malnutrition produces a cumulative debilitating effect, which interferes with the individual's capacity to work and hence lowers his production and earnings (FAO 1966,12). Hodder (1968,p.68) identifies poverty and ignorance as the chief causes of malnutrition and malnourished poor people have little resistance to disease. Thus, the rural public health service cannot be concerned solely with medical work, both curative and preventive, but also has an informative function in promoting the general health awareness. Public health therefore involves the provision both of hospitals and public health centres, but population threshold should be considered to provide such facilities for the rural people, since a hospital is very expensive to set up in rural areas and has a higher service

area than 'Puskesmas' (public health centre) (see Chapter VI). Good rural health might be affected by the quality of doctors or nurses, thus it is difficult to measure, but the provision of public health centres in rural areas at least reflects the contribution of such facilities in rural development. For the physical planner and geographer, the potential of health might, therefore, be manifested by the provision of community public health centres in the rural areas.

V.5.Transportation as a Factor in Development

Transportation is a significant part of the infrastructure for both economic and social activities. In Third-World countries transport and communications commonly take over 40 per cent of the total public outlay in development planning (Hodder,1968., p.160). The relationship between transport and economic development has been discussed by a number of authors, and many aid funds have been selectively applied to this particular field of development, since it is now generally accepted that the improvement of transport constitutes perhaps the most valuable single contribution to economic, social and political development (Hodder,1968). Hodder gives two major reasons for emphasizing the role of transport in economic development: first, transportation is seen as being essential to colonization, and thus vital to the extension of the settlement of a region. He quotes Humphreys's (1946) study of transportation in South America, which shows the role of transport in the opening up of certain regions in that continent; second, improved and extended transport facilities are necessary to the widening and fusion of the markets in areas already settled,

and in stimulating further production for internal or external trade, thus encouraging the growth of a modern exchange economy. He quotes Kindleberger (1966.p.167) in stating that the provision of cheaper transport fuses markets, bringing additional buyers and sellers into contact with one another, thus increasing elasticities of demand and supply.

Transport increases rural-urban trade, allowing a free exchange of goods between them, with commodities moving from rural to urban areas, and industrial products will be transported to rural areas. Thus, as the economy develops the need for transport becomes more vital.

It also has important social functions. A fundamental feature of social life which has developed during the last century is the separation of work and residence. This has been made possible by transport developments, enabling people to live in a better environment and at the same time allowing them to travel to a place where the reward for their labour is higher (White and Senior 1983).

In the agricultural sector, improved transport facilities make possible the intensification of agricultural production, by giving improved access to fertilizers, pesticides and farming equipment. Conversely, local products can be more readily transported to the urban centres. Thus improving transportation facilities has a most important role in rural development.

V.6.Agriculture as a Factor in Development

Agriculture has often been viewed as a passive partner in the

development process, but it is now generally regarded as an active and equal partner with the industrial sector (Thorbecke,1969,p.3). The relevance of agriculture to economic development is that it can raise the level of real income per capita, especially in Third-World Countries with a significant rural population. In some less developed countries, the agricultural subsector producing for exports tends to be highly commercialized, in contrast with the subsector producing food for domestic consumption (Thorbecke,1969,p.5). Ghatak and Ingersent (1984.p.31) give two reasons why, in most less developed countries, development based on structural diversification of the economy is constrained by a low rate of growth in the marketed output of domestic agriculture: first, the domestic sector is an important source of raw materials for use in industries such as textiles and food processing, as well as being the principal source of food for consumption by the growing numbers of people employed in industry; second, as agriculture becomes more and more closely integrated with other sectors of the economy, due to the changing resource structure, and to urbanization effects, the multiplier effects of increased agricultural production and incomes assume an increasing importance in relation to the growth in demand for the products of domestic industry, and the consequent demands for labour and other inputs. So the agricultural sector, as the principal source of food for consumption by non-agricultural workers and raw materials for industry, faces an increasing demand, which it may be unable to satisfy if it is not actively developed.

In rural areas, the agricultural sector must constitute the basis for rural development. Waterstone (1972,p.234) argues that '..it is also true that if agricultural development does not have a high priority in a rural development programme, rural communities are unlikely to be able to accumulate funds from current income to establish, maintain and operate clinics, schools, access roads and other infrastructures and services'. Thus, the role of agriculture in rural socio-economic development is clearly specified.

Agriculture also constitutes the basis of trade at various levels, local, regional and national . At local level, the agricultural sector supports both inter- and intra-village and inter- and intra-subdistrict trade, and supplies local urban areas by providing commodities. At regional level, the agricultural sector has a major role in supplying to areas with a population engaged in non-agricultural work. Nevertheless, foodstuffs are the main import of some developed countries, and rice, for example, is imported by some Third-World countries On the other hand specialised commodities, for example,cloves, can support the trading balance if exported on a large scale.

The agricultural sector therefore has four major roles to play in the development of rural areas. They are:

1.to supply food and raw materials to the industrial sector;

2.to widen the domestic market for industrial goods through increased purchasing power within the rural sector;

3.to facilitate inter-sectoral transfers of the capital needed for industrial development (including the infrastructure);

4.to increase foreign exchange earnings through agricultural exports.

Thus the relevance of agriculture to economic development in encouraging rural development cannot be doubted.

V.7.Rural Industry as a Factor in Development

Heavy industrial enterprises, is not relevant to the less developed countries in the tropical world (Hodder,1980,p157) There is a growing opinion that the main objective of industrial development policy in tropical countries should be the encouragement of a variety of cottage, small-scale industrial enterprises, since it can deal most effectively with three obstacles to industrialization, namely lack of skilled labour, lack of capital and the narrowness of domestic and foreign markets (Hodder, 1968). The promotion of small and medium scale industries, therefore, becomes a major concern of development policy for these countries. The terms 'small' and 'medium' refer to the size of establishments. Suhartono (1988) argues that 'although the characteristics of establishments will not necessarily change dramatically with changes in size, establishments of different sizes do vary in such respects as the use of technology, pattern of employment, nature of products, orientation of markets and financiingarrangements'. The most commonly used in measuring the size of an establishment in the number of workers. In the developed economies, small- scale means less than 200-300 workers, in the developing countries, where the average plant size is smaller, small-scale generally refers to establishments with less than 50 workers.

In Indonesia, establishment with less than 5 workers (1-4 workers) are classified as cottage and household industries; between 5 and 50 workers as small-scale, between 50 and 100 as medium-scale, and more than 100 as large-scale (Suhartono, 1988 p.41). Small-scale manufacturing in rural areas in Indonesia has quite old roots, but there is still disagreement between economists as to whether to give priority to industry or agriculture in rural areas. Streeten (1972) argues that the answer to this question is not 'either /or', but 'both/and'. Industry needs agriculture and agriculture needs industry, and for some purposes even the division into such categories is wrong. Hodder (1968,p139) gives three widely divergent viewpoints: first, the view that increased agricultural production is the only sure foundation for successful industrialization at a subsequent stage in the development of an economy; second, only a rapid increase in industrialization can ever enable a developing country's economy to break out into something approaching that of a developed country; third, and somewhere in between the two other standpoints, is the view that agricultural and industrial development planning cannot usefully be considered separately, and that they are equally important.

In poorer countries industrialization has a special role to play. Streeten (1972,p.281) points out that, generally, poorer countries have a significantly larger proportion of the population engaged in producing food. To rise above poverty, industrialization is necessary, for it means the application of power both to production and to transport. Output and consumption per head can rise only with the help of developing technology. In this sense, development, including rural develop-

ment, may be seen as industrialization. Other authors agree that rural industries are crucial to rural economic development. Wu and Ip (1980), have studied rural development in China. They conclude that rural development ultimately must include non-agricultural activities in order to raise overall rural income. Those communes or brigades which rely for a major part of their total income on small-scale industrial units and other sideline activities have enjoyed a much higher level of collective income (and distributed collective income) than those relying predominantly on agriculture . Rural industry in Third-World Countries has its own special characteristics. Waterstone (1979,p.236) describes them thus: small-scale, labour intensive, light industries with low capital requirements.... . Another author, Streeten (1972) suggests that agro-industries should be established in developing countries. He claims that 'we need progress in agriculture to provide industry with food, raw materials and, again, markets (and in some cases, exports) (Streeten,1972p.285). It is clear that industry can survive in rural areas since it is concerned with production and human resources in agricultural sector; rural industry is of benefit to the people, because it provides seasonal jobs for agricultural workers.

Another important aspect of rural industry is that it can create a forward linkage for rural economic development. The creation of rural industries and rural public works can contribute to the absorption of some of the large and rapidly growing underutilized labour force. Workers can be mobilized in supporting rural industrial development by constructing public works such as feeder roads, houses and schools. These

activities will encourage rural development as a whole.

CHAPTER VI

ASSESSMENT OF THE SIGNIFICANCE OF THESE FACTORS FOR DEVELOPMENT IN COASTAL KECAMATANS

CHAPTER VI

ASSESSMENT OF THE SIGNIFICANCE OF THESE FACTORS FOR DEVELOPMENT

Several factors affecting rural development have been considered. In this section a method will be involved to identify particular factors and the variables which represent them for development in coastal kecamatans. The method of study which is used is 'Factor Analysis'.

VI.1.Factor Analysis as a Method for Data Processing

Factor Analysis is a branch of multivariate statistical analysis which is concerned with the internal relationships of a set of variates. Schilderinck (1970,p.1) gives the following definition:'Factor Analysis is an attempt, based on statistical observations , to determine the quantitative relationships between variables where the relationships are due to separate conditioning factors or general causal factors. By a relationship is meant 'a certain pattern of motion between two or more of the variables under examination'. The aim of Factor Analysis is to group by means of a transformation the unarranged data formed by the variables under examination. Factor analysis is widely used for data analysis. It is based on the assumption that there are a number of general causal factors which give rise to the various relationships between the variables under examination. There is no restriction on the content of the data. It may be observational data on the utilities of the game theory matrix, on group behaviour, on hypothetical values, on earthquakes, on movements of gas molecules etc. Indeed, any matrix can be factor analyzed (Rum-

mel,197 ;p.13). Factor Analysis is a method which is used to extract the essential characteristics of the situation represented by the data matrix, constructed by the measurement of a large number of selected variables.

The single most distinctive characteristic of factor analysis is its data-reduction capability (Nie,1970,p.209) Given an array of correlation coefficients for a set of variables. Factor Analysis enables us to see whether some underlying pattern of relationship exists such that the data may be 'rearranged' or 'reduced' to a smaller set of 'factors' or 'components' that may then be taken as 'source variables' accounting for the observed interrelations in the data. Thus selection of the original variables and criteria is crucial to valid analysis of the situation they represent.

VI.2.Criteria Used to Assess the Significance of Individual Kecamatans for Development

The basic factors have already been identified. The specific criteria for assessing the significant elements in the individual kecamatans and the variables which represent them, need to be considered. Four groups of criteria have been recognized based on socio-economic factors. They are:

1. Human resource availability;
2. Agricultural potential;
3. Transportation infrastructure;
4. Social facility provision.

Each of these criteria will be represented by several variables,which will be called the 'potentiality variables' of the kecamatans. By analyzing these variables it will be pos-

sible to assess the potential of each kecamatan for development. Table 6.1 shows the variables represent these criteria.

Table 6.1

The criteria and variables used in

Factor Analysis

Criteria	Variables
1.Human resource availability	= Annual percentage rate of population growth. = Scores of number of educated people per 1000 population of educational age. = Ratio of labour force per 1000 population. = Ratio of number of light industry workers per 1000 population. = Number of merchants per 1000 population. = Ratio of number of transportation workers per 1000 population.
2.Agriculture potential	= Ratio of number of farmers per 1000 population. = Ratio of number of fishermen per 1000 population. = The average of fish productions per 1000 population (tonne/1000 population). = Rice production per hectare (tonne/ha). = Index value of the production of secondary food per hectare (Rp.100,000/ha). = Score of livestock per 1000 population.
3.Transportation infrastructure	= Index values of road (kms). = Ratio of number of trucks per 1000 farmers and fishermen . = Index values of the distance to the capital of regency (kms). = Index values of the distance to the capital of province (kms). = Ratio of number of passenger cars per 1000 population.
4.Social facility provisions	= Ratio of number of elementary schools per 1000 population of elementary school age. = Ratio of number of junior and senior high schools per 1000 population of junior and senior high school age. = Ratio of number of public health facilities per 1000 population. = Ratio of number of markets per 1000 population. = Ratio of number of cooperative units per 1000 population.

These criteria and variables will be discussed in the next sub-chapter.

VI.2.1.Human Resource Availability.

This criterion is a breaking down from sub-chapter V.3. The progress of rural development depends on human resources. Human agents are needed to mobilize capital, manage rural resources, create markets and carry on trade. The degree of development of human resources may be a more realistic and reliable indicator of modernisation and economic development than any other single measure. It is a necessary condition for all types of growth, social, political,cultural and economic (Harbison p.14). There are two categories of indicators for human resource development. Harbison (p.24) categorizes them as:

(1)those which measure a country's stock of human capital. The stock of human capital indicates the level of development which has been achieved;

(2)the levels of educational attainment, or the number of persons, in relation to the population or labour force as a whole who are in 'high-level' occupations.

The levels of educational attainment are assessed by determining the number of persons in the population who have completed particular levels of education. These are the first (primary or elementary), second (secondary), and third (higher education) level. The last is particularly related to

strategic occupational groups, such as scientists, engineers, managers, and persons in the foreman or skilled worker category.

Both groups of indicators provide a measurement of the human capital of each country and are important for countries which would plan intelligently. Based on these considerations, the human potential of the study area is indicated by two groups of variable, namely the social and the non agricultural.

The social group includes two variables, they are :

1. The level of formal education of rural population;
2. The demographic aspects.

1.Level of formal education of rural population

Formal education is the basis for human development in terms of either skill or of knowledge. It is a prerequisite for effective rural development. For a kecamatan to have a high development potential, it requires a population with a high standard of education, or a larger than normal proportion of the population educated to the first level. However, a significant number of people educated to the second or third levels is needed in order to accelerate development in the area. Thus the numbers of individuals per 1000 reaching each of the three levels of education are important to be analyzed. They are variables of this criterion. The variables which are included here are:

Table 6.2

Distribution of Population Based on the Education Level

	1	2	3	4	5	6	7
1.Sarang	42321	5039	730	7	11.9066	1.7249	0.016540
2.Kaliori	30401	6599	481	21	21.7065	1.5822	0.069077
3.Rembang	63985	11226	7613	204	17.5447	11.8981	0.318825
4.Kragan	42652	6389	2059	8	14.9794	4.8274	0.018756
5.Sluke	21251	4641	252	4	21.8390	1.1858	0.018823
6.Lasem	38049	9287	3087	150	24.4080	8.1132	0.394228
7.Batangan	32680	5879	640	4	17.9896	1.9584	0.012240
8.Juwana	64597	17492	3682	143	27.0787	5.7000	0.221372
9.Wedarijaksa	94659	29515	3097	129	31.1803	3.2717	0.136279
10.Margoyoso	57680	9770	2518	92	16.9383	4.3655	0.159501
11.Tayu	55408	13425	2464	79	24.2293	4.4470	0.142579
12.Dukuhseti	47755	14331	1491	48	30.0094	3.1222	0.100513
13.Kedung	45640	8603	697	13	18.8497	1.5272	0.028484
14.Jepara	99574	28264	9570	203	28.3849	9.6109	0.203868
15.Mlonggo	81030	29569	7655	53	36.4914	9.4471	0.065408
16.Bangsri	113145	48049	5301	83	42.4667	4.6851	0.073357
17.Keling	87885	41334	2671	21	47.0319	3.0392	0.023895
18.Sayung	50560	7712	1048	22	15.2532	2.0728	0.043513
19.Karangtengah	39604	7364	1678	45	18.5941	4.2369	0.113625
20.Bonang	63161	21226	626	26	33.6062	0.9911	0.041165
21.Wedung	59999	37561	1549	56	62.6027	2.5817	0.093335
22.Kaliwungu	68628	10861	4183	141	15.8259	6.0952	0.205455
23.Brangsong	32877	5332	2053	70	16.2180	6.2445	0.212915
24.Weleri	84553	13089	5041	171	15.4802	5.9619	0.202240
25.Cepiring	78631	18036	3411	158	22.9375	4.3380	0.200939
26.Patebon	39052	6182	2380	83	15.8302	6.0944	0.212537
27.Kendal	40055	6340	2442	83	15.8282	6.0966	0.207215
28.Gringsing	46163	6850	1705	37	14.8387	3.6934	0.080151
29.Limpung	48084	6600	1757	29	13.7260	3.6540	0.060311
30.Subah	52103	15980	1844	30	30.6700	3.5391	0.057578
31.Tulis	46642	6859	1179	20	14.7056	2.5278	0.042880
32.Batang	96501	13700	4200	77	14.1967	4.3523	0.079792
33.Sragi	88223	20570	4141	107	23.3159	4.6938	0.121284
34.Tirto	58000	7986	3334	97	13.7690	5.7483	0.167241
35.Wiradesa	68095	9379	3915	113	13.7734	5.7493	0.165945
36.Pemalang	138715	37288	8524	295	26.8810	6.1450	0.212666
37.Taman	116240	25624	4779	58	22.0440	4.1113	0.049897
38.Petarukan	116818	19272	7166	207	16.4975	6.1343	0.177199
39.Ulujami	73114	15844	2251	61	21.6703	3.0788	0.083431
40.Losari	90888	20222	2018	44	22.2494	2.2203	0.048411
41.Tanjung	62486	10229	1189	25	16.3701	1.9028	0.040009
42.Bulakamba	111397	22358	2247	57	20.0706	2.0171	0.051168
43.Wanasari	92515	15788	10209	59	17.0653	11.0350	0.063773
44.Brebes	120727	28219	12921	416	23.3742	10.7027	0.344579

Note : 1 = Number of population
2 = Number of graduated pupils at the elementary school.
3 = Number of graduated pupils at the secondary school
4 = Number of graduated pupils at the high school.
5 = Graduated pupils at the elementary school as a percentage of the population in the respective Kecamatans
6 = Graduated pupils at the secondary school as a percentage of the population in the respective Kecamatans
7 = Graduated pupils at the high school as a percentage of the population in the respective Kecamatans

a.The numbers of individuals per 1000 reaching the first level

This figure reflects the ability of the kecamatan to adopt new technology, assimilate information, introduce new agricultural products etc. A large number of people educated to this level will facilitate development. Table 6.2. presents the distribution of the population according to education level. The total number of people with the first level of education in the 44 kecamatans in 1984 was 705,883 The high value of this variable shows that all the kecamatans have a potential for development, since such people can serve as mediators between uneducated rural people and the sources of information. This variable is given a weighting of one.

b.The number of individuals per 1000 reaching the second level

This level includes education in junior or senior high school or similar institutions. It must be noted, however, that the levels of skill and knowledge acquired at junior and senior high school level are somewhat different. A kecamatan with a high value on this variable has a greater potential to adopt new technology or to modernize. This variable is accordingly weighted more heavily than first-level figures. The number of people is therefore giving a weighting of 3 (Harbison,1973, p.24.).

c.The number of individuals per 1000 reaching the third level.

Further education (College or University) is the highest level

of formal education .Those who have achieved this level, constitute an elite skilled labour force with maximum potential for the investment of strategic human capital in rural development. The main occupations of skilled people relevant to the rural development programme are as entrepreneurial, managerial, and administrative personnel in both public and private sector establishments, including educational and medical institutions. Other occupations include technical personnel such as agricultural technicians, nurses, industrial technicians, engineers and supervisors of semi-skilled workers (Harbison,1973, p.15).These jobs are important in supporting rural development programmes. These occupations are, however, not treated separately because no data is available. This variable is considered the most important, and so is given a greater weighting than the second level. Harbison (p.24) considers a weighting of 10 to be appropriate.

2.Demographic aspects

These are concerned with population growth and occupations. This includes two variables, namely:

1.annual percentage increase of population; and

2.labour force as a proportion of the total population.

a.Annual percentage increase of population

The annual percentage increase of population is used as an indicator for rural development, since there is a tendency of population to concentrate in certain areas which are favoured

by the existence of particular resources and activities. Thus a fertile soil will attract a high concentration of population, working in agriculture. This variable is identified as the important mediator of the human resources available to support the development of such resources in the future. In this study a kecamatan which has a high annual percentage increase of the population is seen as being favourable to future development.

b.Labour force as a proportion of the total population

With a total population of about 3 million in 1984, the study area has a large potential labour force. The actual figure in 1984 was 1.4 million taking the working age range as 15 - 50. The labour force is an important factor in the rural economy because it is needed to enhance output in the agricultural sector, to sustain the service sector, and to make a significant contribution to activities in the commercial sector. Fleisher and Kneisner (1980.p.7) describe the role of labour as an essential ingredient in the production of nearly every commodity, in relation to natural resources such as soil, water and mineral deposits. By the time they enter the production phase these natural resources have usually undergone several stages of treatment or refinement. Fleisher and Kneisher (1980) further state that labour is a very highly refined resource. The labour force is thus essential for all activities in rural areas, and a major ingredient of rural development programmes.

A.Non-agricultural occupations

The non agricultural sector makes a contribution to rural economic activities. It can absorb a large labour force, which is especially important if agriculture cannot provide employment for the entire labour force in the area. Angus and Robertson (...) have shown the distribution of manpower in various sectors of the economics of a number of countries in 1920, 1930, 1950 and 1960. The number of people employed in the agricultural sector has generally declined during these years. In undeveloped countries, for example, the capability of the agricultural sector to absorb manpower declined from 78.8 per cent in 1920 to 70.0 per cent in 1960 (Mortimer,1973,p. 34-35). At the same time, the number of people employed in other sectors such as services and industry rose from 13.5 per cent to 19.4 per cent and 8.9 per cent to 9.5 per cent respectively (ibid). To the extent to which the non-agricultural sector may activate the rural economy, it will support rural development programmes. The importance of the non-agricultural sector can be assessed by means of several variables; namely :

a.number of workers in small-scale industry per 1000 population

b.number of merchants per 1000 population

c.number of workers in transportation per 1000 population

a.Number of light industry workers per 1000 population

The resources of the study area are related to agriculture and

mining. Industry is dominated by cottage and small-scale enterprises. Light industry, using local agricultural resources and minerals, has potential for development, both in expanding the work opportunities in the area,and in encouraging investors to develop these resources. Light industry could absorb a larger labour force, and reduce unemployment. So, it is clear that rural area with a significant number of workers in light industry can enhance coastal rural development.

2.Number of merchants per 1000 population.

Other non agricultural occupations are involved with commercial activity. Commerce provides an economic link between rural and urban areas, and has a beneficial effect on the rural economy, stimulating the development of marketing and transportation facilities. The presence of merchants in kecamatans encourages the widening of rural commercial activities. The commercial sector must therefore be considered in any evaluation of potential for rural development. The larger the number of merchants, the greater the potential of the commercial sector to facilitate development.

c.Number of workers in transportation per 1000 population

Workers in the transportation sector are employed as bus or truck drivers or as their assistants, as mechanics, or as vehicle owners. Transport is a relatively recent significant employer in the study area. Transportation can be viewed as a medium for modernisation in rural areas. It helps in imparting information from urban to rural people, and a self-perpetuating

social diffusion process whereby 'messages' are transmitted from urban to rural residents can be accelerated by the development of transport facilities. It is thus clear that transportation workers must play an important role in rural development, since they operate and develop this sector.

B.The agricultural sector

This includes 2 variables:

a. Number of farmers per 1000 population.

A specific characteristic of the coastal rural area being studied is that it is dominated by activities in the agricultural sector activity (see Table pop.occupation). This is reflected in the large number of people working in this sector, the majority of whom are employed in cultivation, and in particular in both wet land agriculture (for example, rice production) and fishpond culture. Thus the agricultural sector makes a significant contribution to rural economic development, and human resources interacting with natural resources make the major contribution to success in this sector.

b.Number of fishermen per 1000 population

In view of the geographical situation of the study area, it is not surprising that there are many people working as fishermen. Fishing must be taken into account because of its contribution to the revenue of the area of study. In this respect, a fisherman may be defined as a person engaged full-time in catching or cultivating fish. In general, the greater the num-

ber of fishermen, the greater the catch or yield of fish. In other words there is a correlation between the number of fishermen and fish production, this both contributes to the economy and supports other activities.

VI.2.2.Potential in the Agricultural Sector

Coastal villages may be divided into four major categories :
- villages oriented to rice field field farming;
- villages oriented to fishing;
- villages oriented to fishpond culture;
- villages oriented to estate management.

Agricultural development must fulfil the following objectives: to increase farmers' incomes; to increase agricultural production, to create new employment opportunities, to satisfy the demand for food and industrial raw materials, and to promote other activities. These agriculture productions are:

a.Fish production per 1000 population.

The total catch in Central Java shows a relative high annual increase over the last 17 years (approximately around 5.8 tonnes extra per year) (Statistik Lingkungan Hidup Prop.Jateng). The value of the catch has also risen on average by 39.5 per cent per year (ibid). This shows that the fishery sector makes a major contribution to rural income. Figures for the Gross Regional Domestic Product of Central Java by industrial origin at current market prices 1980-1983 show that the fishery sector contributed more than 100 million rupiahs in 1983. Most of the marine fish exploited up to the present time are coastal

species, both demersal and pelagic. Tuna and skipjack are caught mainly for export. Shrimps are caught by both private fishermen and those employed by large companies which have developed because they command a good selling price on international markets. The milk-fish (Chanos-chanos) is the main product of fishpond culture, and makes a significant contribution to rural revenue. It is therefore reasonable to include the fishery sector as a significant contributor to any rural development programme.

b.Potential rice production

Most of the kecamatans in the study area are situated in the lowlands drained by a number of rivers, which are be managed for irrigation. Thus, the case study area has two main forms of resource use ; on the coast, most people work as fishermen, and inland most people work as rice farmers. Rice is the staple diet of Indonesia and is usually grown as a wet land crop. It can be planted in coastal areas provided with irrigation, so long as there is no infiltration of saline water. The rivers and their tributaries have played a major role in leaching out the salt and reclaiming the saline land in these areas. Rice production of the study area in 1984 demonstrates good prospects for the future, especially with regard to the village self-sufficiency programme. (quote actual figures for rice production) Rice growing encourages the growth of other sectors, such as transportation, commerce, and services. Rice production is therefore a major factor in sustaining and improving rural development. Assessment of the kecamatans in the study area is achieved by evaluating the rice

Table 6.3

Livestock Population in 1984 in the Study Area

Kecamatan	1	2	3	4	5	6	7	8	9	10
1.Sarang	5768	136.29	0	0	57	1.35	7215	170.48	0	0
2.Kaliori	6260	205.91	28	0.92	58	1.90	2049	67.40	63	2.07
3.Rembang	6230	97.36	7	0.11	74	1.16	3920	61.26	2919	45.62
4.Kragan	5631	132.02	0	0	137	3.21	6137	143.88	0	0
5.Sluke	3391	159.57	0	0	52	2.44	6497	305.72	0	0
6.Lasem	4415	116.03	0	0	50	1.31	5816	152.85	525	13.80
7.Batangan	1884	57.65	173	5.29	126	3.85	2997	91.70	0	0
8.Juwana	1273	19.64	1329	20.57	102	1.58	3262	50.49	895	13.85
9.Wedarijaksa	0	0	995	10.51	1583	16.72	7344	77.58	370	3.90
10.Margoyoso	0	0	142	2.46	3208	55.61	21	0.36	3928	68.10
11.Tayu	28	0.50	741	13.37	72	1.30	2620	47.28	44	0.79
12.Gukuhseti	0	0	823	17.23	96	2.01	2998	62.76	151	3.16
13.Kedung	375	8.21	625	13.69	29	0.63	2778	60.86	0	0
14.Jepara	1876	18.84	330	3.31	97	0.97	6570	65.98	0	0
15.Mlonggo	3845	47.45	917	11.31	5	0.06	7280	89.84	20	0.24
16.Bangsri	6386	56.44	2730	24.13	78	0.68	9598	84.83	0	0
17.Keling	8132	92.53	1649	18.76	73	0.83	8240	93.76	185	2.14
18.Sayung	0	0	567	11.21	19	0.37	3764	74.44	0	0
19.Karangtengah	2	0.05	476	12.02	70	1.76	3506	88.53	0	0
20.Bonang	0	0	1187	18.79	50	0.79	2849	45.10	0	0
21.Wedung	0	0	1689	28.15	24	0.40	1534	25.57	0	0
22.Kalinyungu	180	2.62	864	12.59	51	0.74	4666	67.98	0	0
23.Brangsong	54	1.64	364	11.07	55	1.67	3665	111.47	0	0
24.Weleri	89	1.07	876	10.59	207	2.50	3181	38.47	0	0
25.Cepiring	333	4.23	734	9.33	128	1.62	3457	43.96	0	0
26.Patebon	505	12.93	351	8.99	68	1.74	1078	27.60	0	0
27.Kendal	96	2.39	382	9.53	13	0.32	1180	29.45	0	0
28.Gringsing	83	1.79	967	20.95	62	1.34	62	150.35	6941	150.35
29.Limpung	848	17.63	920	19.13	7	0.14	11790	245.19	0	0
30.Subah	664	12.74	3940	75.62	3	0.06	13965	268.02	0	0
31.Tulis	70	1.50	943	20.22	5	0.10	4482	96.09	3070	65.82
32.Batang	123	1.27	802	8.31	35	0.36	3753	38.89	0	0
33.Sragi	0	0	1270	14.39	41	0.46	6358	72.06	0	0
34.Tirto	91	1.12	490	8.45	2	0.03	3214	55.41	0	0
35.Wiradesa	147	0.36	541	7.95	37	0.54	7143	104.89	0	0
36.Pemalang	2	0.01	2372	17.09	22	0.16	7957	57.36	0	0
37.Taman	62	0.53	2200	18.92	54	0.46	6366	54.76	0	0
38.Petarukan	7	0.06	1891	16.18	18	0.07	5327	45.60	0	0
39.Ulujami	0	0	1627	22.25	32	0.43	6069	83.00	0	0
40.Losari	0	0	597	6.56	127	1.39	12218	134.42	2120	23.32
41.Tanjung	0	0	209	3.34	11	0.17	5972	95.57	27	0.43
42.Bulakamba	0	0	1649	14.80	73	0.65	10007	89.83	0	0
43.Wanasari	0	0	468	5.06	59	0.64	5252	56.76	0	0
44.Brebes	54	0.44	834	6.90	42	0.35	5223	43.26	30	0.25

Note :

1 = Number of cattles
2 = Number of cattle per 1000 population
3 = Number of buffaloes
4 = Number of buffaloes per 1000 population
5 = Number of horses
6 = Number of horses per 1000 population
7 = Number of goats and sheep
8 = Number of goats and sheep per 1000 population
9 = Number of pigs
10 = Number of pigs per 1000 population

Source : Collected from Compilation Data books (Kabupaten Dalam Angka 1984) of 9 Regencies

production of each per hectare.

Kecamatan with a high unit are rice production may be considered to have more potential for development.

c.Secondary Food Production

Beside rice, other crops such as maize, cassava, sweet potatoes, soybeans, little green peas and peanuts (groundnuts) also constitute important crops in the study area. It is important to consider them since they are widely used as substitutes for, and a supplement to the main food crop;rice. They contribute both to the nutrition and to the income of the local people. In this study, the production of secondary food crops per hectare will be weighted by the price of individual crop, based on the market price in 1984.

d.Livestock per 1000 population

Another variable which relates to income is animal ownership. Livestock in Indonesia comprises six kinds of animals : cows, buffaloes, horses, goats, sheep and pigs (Figure 6.3). Chicken and ducks are also important food sources, but are not included in this study because no data are available. The various types of livestock are weighted in different ways in this study. Cows, buffaloes and horses are given a higher weighting (5) than goats, sheep, and pigs (1). This weighting is based on a comparison of local market prices of cow and goat meat in 1984.

VI.2.3.Transportation Facilities

The importance of transportation has already been considered (p.131) A more efficient transportation permits the creation of

a commercial exchange pattern which can accelerate rural development. The physical condition of the transport facilities also influences the rate of movement of goods and people. With regard to the study area, it is possible to distinguish 3 kinds of road systems; asphalt, gravel and earth roads. The provision of asphalt roads is clearly of more benefit to the kecamatan, in terms of rural economic growth. The provision of gravel roads is clearly more beneficial than the construction of earth roads, but the provision of any type of road is important. Almost all the kecamatans in the study area are connected by asphalt roads maintained by the regencies, but, some villages near the coast are still connected by rural gravel or earth roads. This study discusses these two kinds of roads, namely asphalt and rural roads.

a.Length of asphalt roads

Asphalt roads in the kecamatans are either internal rural roads or regional roads. Asphalt roads give the kecamatan access to other kecamatans and they minimize travelling times thus preventing commodities ,such as fish, vegetables and fruit from deteriorating during delivery to the markets. All asphalt roads are managed by the state, provincial, or regency governments. To compare kecamatans with respect to this facility, those with the greater lengths of asphalt roads are considered as having the better basis for furtherdevelopment. The value on this variable is given a weighting of 2. The weighting is based on the estimated average speed at which people can travel on asphalt roads, compared with that for gravel roads.

b.Length of rural roads

Rural roads are gravel and earth roads. Gravel roads usually connect individual villages with regional roads. They are the principal roads by which a kecamatan can market its products in more distant areas. Gravel roads also enable the kecamatan to increase the effectiveness of its economic production, because they afford workers access to their work-places, as well as products to their markets. This variable measures the total length of all gravel and earth roads in each kecamatan, and is given a weighting of one.

c.Number of trucks per 1000 farmers and fishermen.

Trucks have an important role for the trade sector, especially in kecamatans which are predominantly agricultural, and in which other modes of transport, such as railways, are not available. Individual trucks typically have a lower capacity than railroad cars, ranging from 1 to 20 tonnes (Morrill,1970 ,p121). Their great advantage is that they make door-to-door transport possible with no change of mode. The average truck-load in study area is 3 tonnes (The Public Work Ministry Survey). This is the main form of transport for most agricultural products, such as rice and secondary crops, and for fish from coastal to urban areas. A kecamatan with a large number of trucks will obviously be better able to sustain and enhance its development. This variable is assessed by relating the number of trucks in each kecamatan and the number of people working as farmers and fishermen . These are the most important primary occupations of the coastal population, the farming and fishery

sectors produce the greatest volume of products requiring transportation.

d.Number of passenger cars per 1000 population

Passenger transport is an also important factor in development. People need transport for many purposes such as shopping, marketing, travelling ,etc. Cars are thus an indirect factor in development, and creating the opportunity for major changes in life style. Efficient passenger transport can speed up information flows from urban to rural areas, thus further accelerating development. This variable is assessed by comparing the number of passenger cars with the total population.

VL2.3.1 .The orientation of the kecamatans

This aspect show of the study attempts to the influence of the regional centre in terms of possible rural population movement.

a.Distance to the capital of the regency and the province

These variables have a close relationship with the diffusion concept of rural modernisation or development. Agricultural innovation, socio-economic and political change are diffused from the urban down to the rural areas. Riddell (1970,p.129) identifies this diffusion process in his study in Sierra Leone. He acknowledges the influence of distance in spreading information from urban areas: 'the spread of political, social, economic and institutional change is funneled through the transportation network and cascaded down the urban hierarchy' This clearly implies a significant influence of distance in the

acceleration of some information transfer to rural people. The structure of central place shows how development has spread from centres to the rural areas and this underlines the fact that the distance influences the development process:

> 'a system of modes of various sizes, at different distances, linked with varying intensities, influencing areas contiguous and between, structuring, focusing,and serving their hinterlands, and acting as emergent poles of attraction for the surrounding population'
> (Gould, 1970,p169).

Grigg (1984) argues that the diffusion of agricultural innovations is influenced by distance. He concludes that the shorter the distance to the resource the faster the agricultural innovation will be adopted. It, thus, is clear that the distance will influence the process of innovation in rural areas. This is why the distance between kecamatan and capital of the regency or of the province is assigned an important role in evaluating potential for rural development.

VI.2.4.Availability of Social and Economic Facilities

This section discusses educational and health facilities as variables for rural development. There is now considerable agreement that public schools and certain types of interventions directed at improving health should be regarded as public goods which merit government support because such actions improve the 'quality' of society's human resources (Johnston and Clark,1982). Thus the provision of social facilities will reflect a region in contributing to national goals of economic and social development, and at rural level can encourage development as a whole. These variables include :

a.number of schools per 1000 population;
b.number of public health centres per 1000 population;
c.ratio number of cooperative units per 1000 population;
d.number of markets per 1000 population.

a. Number of schools per 1000 population

Educational provision is very significant in rural development. Pants (1976,p.174) argues that the failure of the unparalleled economic growth in developing countries during the 1960's to reduce economic inequalities has forced them to think again on the meaning of 'development'. These nations are seen to be in need not only of economic but also intellectual development through education, as a catalyst for developing talents and capacities of the individual. The success of the education system will depend, at least in part, upon the provision of education facilities. In the study area 26.68 per cent of the population are children of elementary school age, the provision of adequate facilities is clearly very important. Secondary education, however, has been hitherto considered more significant, since those who reach and pass through the level reach a somewhat higher level of knowledge. In Indonesia education is an important factor in furthering national development. A basic aim of its development plan is to provide primary education for all Indonesian children by building and staffing primary schools all over the country. This national objective makes no distinction between rural and urban education. Thus, the provision of the education facilities will sustain the progress of human development in rural areas

as well as urban. The number of schools in relation to population is therefore a significant variable.

b.Number of public health centre per 1000 population

Rural health is essential factor for the rural people. The Indonesian Government encourages it by distributing public health service (Puskesmas) in all villages. In India direct investment in man in order to develop his mind and to protect his health, is considered not only to produce better citizens, but also enable them to improve the return from investments made in agricultural production (Modie, p.124). This may indeed increase their income in the future. Development , therefore, will be reflected in the provision of health facilities. The better the provision the better are the kecamatans fitted for development. This variable thus includes the available rural health facilities, including Mother and Child Health Services, and the Central and Sub-Central Public Health facilities provided in individual kecamatans. This is compared to the population.

c.Number of cooperative unit per 1000 population

One dimension of community development is the setting up of formal local organizations to foster, or service, rural development. Like aided-self- help projects, this process concentrates on community organization as an important aspect of rural development (Mosher,1976, p.185). Cooperatives may be a part of the mechanism designed to distribute some of the benefits of production. This may be the products of agricul-

ture, home industries, rural handicrafts etc. The aim of rural cooperation is to help the farmers to market their products and to stabilize their price so that the farmers welfare can be guaranteed. Rural cooperative units may also provide inputs to the agricultural sector, such as seeds, fertilizer, and pesticides. In some developing countries special attention has been given to the establishment and development of such cooperatives. In Indonesia, for example, cooperatives were launched in the fourth Five Year Development Plan. They promote a wide range of activities, including the marketing, smallholder estates, animal husbandry, fisheries, village industries and handicrafts, smallholder mining, village electricity, credits for smallholders, housing construction, and in the distribution of goods for production or consumption. The policy of promoting cooperatives is mainly aimed at promoting their role, but without giving them a monopoly position. This policy is also directed towards enabling them to accumulate their own capital and to increase their credit- worthiness with the banks. Thus, cooperative units provide important facilities supporting a wide range of activities in rural areas. This reflects the dynamic of rural economies, and can contribute to the acceleration of rural development. In this study, the number of such cooperative units in relation to population is used as a variable to indicate the ability of individual kecamatans to provide these facilities.

d.Number of markets per 1000 population.

According to Bohannan (1962,p1) there are two distinct meanings of the word 'market' :

1. the institution of the market place
2. the principle of market exchange

The market place is a specific location where a group of buyers and a group of sellers meet. The market principle is the determination of prices by the forces of supply and demand regardless of the site of the transactions. In this variable only the previous meaning is implied in calculation. The provision of markets is not merely aimed at economic viability, but may also induce other important activities such as services and transportation provisions. The consequence is that all rural activities will be encouraged to develop. A large number of market places in any region thus also reflects the dynamic of rural economy activity. Thus, a kecamatan which is already provided with an adequate market network may be identified as a significant area for further development.

VI.3.Application of the Model

In this study, Factor Analysis package programme has been used by the author. This is the straight SPSS computer programme. The steps of this programme are as follows:

1.preparation of the correlation matrix;

the programme constructs an m x n matrix, where m is the sampling units and n the variables.In this step, m is the set of kecamatans, and n the variables which have been considered earlier. In this study there are 44 sampling units and 22 variables . Thus, the study produces a 44 x 22 matrix (

Table 6.4

Variables matrix of the coastal rural development

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
002.15	171.60	489.00	364.00	118.00	003.00	014.00	000.73	038.80	001.71	024.76	445.76	030.00	001.07	020.00	010.00	000.57	002.23	000.20	000.02	000.12	000.07
001.28	271.90	489.12	371.00	009.00	010.00	001.00	005.23	000.43	005.25	063.54	486.93	030.00	002.56	030.00	010.00	000.23	004.14	000.56	000.03	000.10	000.29
001.22	563.80	496.83	105.00	032.00	016.00	025.00	008.51	184.40	002.89	056.29	304.14	060.00	017.62	030.00	020.00	001.30	003.32	000.92	000.01	000.12	000.51
001.92	294.90	500.60	384.00	049.00	014.00	026.00	007.15	045.00	000.90	031.87	414.34	030.00	001.10	020.00	010.00	001.19	003.77	000.20	000.02	000.16	000.14
001.46	255.90	489.06	559.00	019.00	006.00	010.00	004.23	011.19	002.00	024.68	629.74	030.00	000.00	030.00	010.00	000.70	004.44	000.40	000.04	000.14	000.04
001.83	562.40	489.05	282.00	005.00	100.00	094.00	014.86	000.00	002.51	043.26	401.33	030.00	011.29	030.00	020.00	004.23	005.48	001.12	000.05	000.13	000.02
000.89	241.20	474.05	409.00	009.00	016.00	007.00	001.71	019.76	004.37	026.99	265.28	010.00	000.66	030.00	020.00	000.18	003.73	000.13	000.03	000.03	000.06
000.91	463.10	470.92	252.00	031.00	074.00	034.00	008.84	000.37	004.50	019.89	147.92	040.00	004.60	030.00	020.00	001.05	002.64	000.61	000.06	000.01	000.06
000.78	423.60	471.76	373.00	000.39	043.00	020.00	005.96	000.03	005.11	047.24	135.94	030.00	006.04	030.00	020.00	000.97	002.13	000.00	000.01	000.06	000.01
001.53	317.00	480.74	294.00	000.09	034.00	035.00	004.12	001.77	004.98	040.15	184.60	030.00	007.52	030.00	020.00	001.18	002.28	000.30	000.01	000.05	000.03
000.72	388.20	481.86	238.00	003.00	031.00	011.00	006.22	022.20	005.10	070.32	078.41	030.00	009.50	030.00	020.00	001.82	002.50	000.62	000.01	000.09	000.01
000.82	403.00	463.40	291.00	010.00	005.00	007.00	001.03	000.48	004.60	037.14	104.42	020.00	003.97	020.00	020.00	000.71	001.96	000.18	000.04	000.20	000.04
000.42	235.80	475.79	358.00	097.00	028.00	016.00	002.17	000.81	004.82	025.26	105.92	010.00	003.77	030.00	030.00	001.38	003.63	000.29	000.04	000.04	000.02
001.31	591.40	473.32	128.00	037.00	122.00	027.00	007.23	000.49	004.95	041.05	112.22	020.00	019.29	030.00	030.00	003.03	003.56	000.61	000.03	000.01	000.30
000.98	653.50	473.24	350.00	031.00	046.00	017.00	001.93	001.05	005.24	047.23	207.72	010.00	001.22	030.00	030.00	000.69	003.34	000.30	000.04	000.01	000.01
000.80	562.30	473.47	358.00	004.00	056.00	018.00	007.07	000.92	005.31	047.99	247.33	010.00	002.10	030.00	020.00	001.43	003.30	000.31	000.04	000.01	000.04
000.71	562.30	473.40	354.00	004.00	001.00	008.00	007.74	000.96	005.59	049.29	320.10	030.00	003.21	020.00	020.00	001.03	003.34	000.45	000.04	000.01	000.06
003.13	219.30	475.63	369.00	004.00	009.00	010.00	000.99	000.00	003.25	037.62	097.60	050.00	000.18	030.00	030.00	000.16	002.86	000.10	000.01	000.07	000.00
001.66	323.30	475.60	436.00	003.00	012.00	023.00	002.62	000.00	003.16	024.11	116.19	040.00	000.95	030.00	030.00	000.63	003.31	000.21	000.02	000.10	000.10
000.79	370.10	478.33	364.00	063.00	004.00	019.00	004.86	014.96	003.80	027.09	084.26	030.00	000.43	030.00	030.00	000.11	001.99	000.13	000.01	000.06	000.04
001.09	713.30	476.69	434.00	103.00	007.00	002.00	006.25	001.76	003.11	035.41	082.67	060.00	000.69	030.00	030.00	000.55	002.14	000.14	000.03	000.08	000.03
001.07	361.50	489.39	316.00	000.81	048.00	022.00	005.20	000.12	005.89	075.52	099.88	050.00	001.86	030.00	030.00	001.56	002.13	000.17	000.02	000.08	000.04
001.13	369.20	501.41	443.00	011.00	027.00	031.00	006.32	002.11	005.80	057.47	140.23	020.00	001.03	030.00	030.00	001.30	002.99	000.14	000.06	000.09	000.06
001.28	361.60	489.50	290.00	010.00	026.00	030.00	006.18	000.25	006.00	075.77	066.79	010.00	002.22	030.00	030.00	001.28	002.73	000.37	000.05	000.10	000.02
001.39	378.00	493.47	456.00	007.00	040.00	016.00	006.60	013.92	005.80	072.31	074.32	030.00	001.66	030.00	030.00	001.07	002.33	000.34	000.01	000.08	000.01
001.69	362.20	489.47	435.00	021.00	043.00	030.00	006.30	000.49	005.70	034.43	074.92	040.00	001.37	030.00	030.00	000.77	003.05	000.22	000.08	000.10	000.10
001.53	361.70	489.40	265.00	012.00	026.00	030.00	006.19	007.96	005.70	053.59	053.93	040.00	005.33	030.00	030.00	002.09	003.56	001.42	000.05	000.17	000.07
001.75	267.00	368.82	302.00	007.00	016.00	037.00	003.40	000.43	004.97	037.36	198.51	010.00	004.20	030.00	030.00	000.76	003.43	000.42	000.08	000.04	000.08
001.64	251.00	481.34	265.00	006.00	213.00	017.00	003.12	003.32	004.89	039.29	318.99	010.00	001.48	030.00	030.00	001.27	004.27	000.30	000.04	000.04	000.04
000.92	417.70	494.29	624.00	003.00	023.00	038.00	003.38	000.00	004.81	037.68	444.86	030.00	001.38	030.00	030.00	001.02	003.85	000.26	000.00	000.04	000.08
000.86	226.20	474.06	405.00	005.00	021.00	013.00	006.88	001.50	004.90	032.65	205.55	030.00	002.12	030.00	020.00	000.98	003.77	000.20	000.06	000.08	000.13
001.73	278.90	479.46	367.00	004.00	114.00	011.00	003.68	012.17	004.97	018.17	058.77	030.00	000.82	030.00	030.00	000.65	003.02	000.65	000.03	000.03	000.58
001.96	386.10	478.08	347.00	002.00	057.00	047.00	002.85	007.84	005.40	044.56	101.76	060.00	002.86	030.00	020.00	000.25	002.62	000.13	000.02	000.01	000.04
001.96	324.70	469.89	186.00	003.00	027.00	044.00	001.83	000.20	004.82	035.69	074.61	010.00	013.30	030.00	020.00	000 91	001.93	000.07	000.05	000.00	000.22
001.96	324.60	453.75	144.00	085.00	061.00	094.00	004.85	000.00	005.21	036.45	122.59	010.00	008.18	030.00	020.00	001.03	002.50	000.39	000.06	000.04	000.23
000.96	473.20	473.46	079.00	038.00	038.00	022.00	020.17	002.96	005.16	030.35	091.88	020.00	016.20	030.00	020.00	000.70	002.60	000.52	000.02	000.00	000.32
000.40	348.00	476.58	350.00	023.00	033.00	032.00	003.46	011.58	006.50	029.72	094.58	020.00	000.70	030.00	020.00	000.19	002.39	000.12	000.01	000.00	000.04
000.38	365.70	475.18	365.00	006.96	012.00	031.00	001.92	024.07	003.43	030.05	078.22	030.00	002.33	030.00	020.00	000.38	002.92	000.29	000.02	000.02	000.05
001.78	318.30	476.13	352.00	031.00	028.00	068.00	003.30	006.39	005.95	035.02	128.36	020.00	000.74	030.00	020.00	000.37	002.68	000.19	000.01	000.00	000.12
000.92	292.80	466.61	034.00	003.00	000.00	002.00	002.09	000.36	002.82	039.73	173.64	040.00	011.60	030.00	010.00	000.38	002.10	000.16	000.02	000.02	000.01
001.78	225.00	466.80	036.00	030.00	015.00	030.00	004.45	000.42	005.57	029.72	103.02	020.00	003.73	030.00	010.00	000.97	002.88	000.48	000.03	000.03	000.02
000.69	265.10	466.27	029.00	001.00	000.19	015.00	000.00	000.42	005.68	065.97	120.73	030.00	012.05	030.00	010.00	000.31	001.58	000.18	000.01	000.03	000.01
000.50	506.40	466.03	016.00	004.00	000.00	006.00	005.63	000.02	005.14	051.47	068.16	030.00	012.90	030.00	010.00	000.52	002.14	000.21	000.01	000.04	000.01
001.08	588.40	466.67	273.00	012.00	000.00	061.00	005.63	000.01	005.02	033.90	058.89	040.00	000.81	030.00	010.00	000.52	002.05	000.70	000.02	000.03	000.17

Columns Variables

1 = Annual percentage rate of population growth
2 = Scores of number of educational level
3 = Ratio of number of labour force per 1000 population
4 = Ratio of number of farmer per 1000 population.
5 = Ratio of number of fishermen per 1000 population
6 = Ratio of number of light industry workers per 1000 population.
7 = Ratio of number of merchants per 1000 population
8 = Ratio of number of transport labour per 1000 population.
9 = Ratio of number of fish productions per 1000 population.
10 = Rice production per ha (Ton/ha)
11 = Index values of the production of secondary food per hectar (x Rp.100,000)
12 = Scores of livestocks per 1000 population.
13 = Index values of rural road (kms).
14 = Ratio of number of trucks per 1000 farmers and fisherman
15 = Index values of distance to the capital of regency (kms).
16 = Index values of distance to the capital of province (kms).
17 = Ratio of number of passenger cars per 1000 population.
18 = Ratio of number of elementary school per 1000 population at elementary school age.
19 = Ratio of number of junior and senior high school per 1000 population at junior and senior high school age.
20 = Ratio of number of public health per 1000 population
21 = Ratio of number of market place per 1000 population.
22 = Ratio of number of cooperative unit per 1000 population.

Table 6.4). By processing this data matrix correlation between the variables are produced.

2.extraction of initial factor;

the data-reduction possibilities are explored by constructing a set of new variables on the basis of the interrelations thus exhibited in the data. In this step, all variables will be processed to produce a new set of 'principal components'. The first principal component produces the single best summary of the linear relationships exhibited in the data (Nie,1975,p.470). The second component is defined as the second best linear combination of variables, under the condition that the second component is 'orthogonal' to (i.e has no correlation) with the first. To be orthogonal to the first component, the second component must account for the proportion of the variance not accounted for by the first one. Thus, the second component may be defined as the linear combination of variables which best accounts for the residual variance after the effect of the first component is removed from the data (Nie,N.H., 1975)

3.rotation of factors into terminal factors.

the components are rotated to produce the terminal factors. Using a rotated solution, each variable is accounted for by a single significant common factor. The rotated factor loadings are therefore conceptually simpler than the unrotated ones and the whole structure thereby simplified. The major options available to the analyst are orthogonal rotation or oblique rotation. Orthogonal factors are

mathematically simpler to handle, while oblique factors are empirically more realistic (Nie.1975,p.473) The rotational method is used in order to achieve simpler and theoretically more meaningful factor patterns. The aim in this step is to get the best linear combination of variables. Five different methods of factoring can be used in this step. They are :

1.PA1 principal factoring without iteration;
2.PA2 principal factoring with iteration;
3.RAO Rao's canonical factoring;
4.ALPHA alpha factoring;
5.IMAGE image factoring.

The choice between these is made on the basis of the particular needs of a given data set, and what the analyst wants from the results of extraction process. In this study, the option PA2 has been chosen for finding the principal factors for the following two reasons. First, PA2 automatically replaces the main diagonal elements of the correlation matrix with communality estimates; Second, PA2 employs an iteration procedure for improving the estimates of communality, and it should be noted that PA2 can handle most of the initial factoring needs of the users. Furthermore, this is at present the most widely accepted factoring method. The use of PA2 is also recommended by Nie especially for analysts with limited experience of factor analysis. (Nie,1975, p.480)

The next step is to identify the specific rotational methods. Three orthogonal rotational methods are available : quartimax, varimax and equimax. Oblique rotation is an alternative. This

study uses varimax orthogonal rotation. The varimax criterion centres on simplifying the columns of a factor matrix and defining a simple factor as one with only 1s and 0s in the column. It is named varimax because the simplification is equivalent to maximizing the variance of the squared loadings in each column. This method of rotation is the most widely used and is in effect a modification of quartimax.

The final step is to interpret the results of the factor analysis. From the factor analysis 8 factors were obtained. Table 6.5 presents the ranking of the factors based on Eigen value and percentage variance. Factor 1 has the highest Eigenvalue and accounting for 21.7 per cent of the total variance. Thus Factor 1 constitutes the 'strongest' factor, since it contains the most significant variables affecting the development of the kecamatans. The ranking by Eigenvalue and percentage variance indicates the relative importance of the factors, since both reflect the influence of the variables on the individual factor. The higher the Eigenvalue and percentage variance, the greater the number of variables affecting the factor.

Table 6.5.

Factor analysis results:
Factors, Eigenvalues and percentage variance

FACTOR	EIGENVALUE	PCT OF VAR	CUM PCT
1	3.03681	21.7	21.7
2	2.83328	20.3	42.0
3	2.33156	16.7	58.7
4	1.71334	12.3	70.9
5	1.37847	9.9	80.8
6	1.05339	7.5	88.3
7	0.99790	7.1	95.5
8	0.63602	4.5	100.0

Source: Sub Programme of Factor Analysis.

Table 6.6

VARIMAX ROTATED FACTOR MATRIX

	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4	FACTOR 5	FACTOR 6	FACTOR 7	FACTOR 8
VAR01	0.46312	0.09830	-0.07265	-0.33898	-0.49004	0.13825	0.23876	0.01292
VAR02	0.13486	-0.09302	-0.04899	0.06890	0.74542	-0.08442	0.12275	0.05996
VAR03	-0.00393	0.18249	0.23151	0.18064	0.09935	0.16255	0.42436	0.11804
VAR04	-0.10063	0.87833	0.29348	-0.06116	-0.01227	0.07229	0.10260	-0.14145
VAR05	-0.05212	0.00694	-0.03197	-0.56150	0.20526	0.18220	-0.03539	0.07286
VAR06	0.55882	0.13408	0.04179	0.09979	0.02128	-0.24549	-0.14464	0.13642
VAR07	0.51088	-0.11130	-0.05972	-0.09504	-0.06263	-0.10423	-0.06743	-0.03469
VAR08	0.05369	0.11074	-0.13962	-0.34366	0.68985	0.06749	0.20343	-0.04355
VAR09	-0.08758	-0.17568	0.17065	-0.04020	0.04733	0.20667	0.34052	0.62223
VAR10	0.01870	0.09278	-0.46607	0.56494	0.03498	-0.29743	-0.35094	-0.05676
VAR11	0.02742	-0.10751	-0.14093	0.69150	0.14625	0.21349	0.16333	-0.06234
VAR12	0.01170	0.06150	0.86083	-0.11583	-0.10935	0.16873	0.05379	0.04293
VAR13	-0.05387	0.03281	-0.11559	-0.07310	0.15868	0.14388	0.72792	0.10693
VAR14	0.23502	0.72775	-0.06933	0.13836	0.21187	-0.06255	0.01122	0.29619
VAR15	0.24602	0.07015	-0.24608	0.23173	0.06625	-0.40789	0.02336	0.04850
VAR16	0.30845	0.59025	-0.34874	0.11674	0.18254	-0.05052	-0.10021	0.08321
VAR17	0.78045	-0.14403	0.21425	0.23690	0.32475	0.23704	-0.05666	-0.01101
VAR18	0.50629	0.29127	0.67889	0.03146	0.00062	0.06132	-0.15867	0.15268
VAR19	0.52907	-0.17580	0.12305	0.12918	0.20176	0.20567	0.00922	0.35116
VAR20	0.37712	0.16404	-0.05488	-0.13870	0.00756	0.18287	-0.54402	-0.03705
VAR21	0.06979	0.15474	0.16226	0.02022	-0.04731	0.95019	0.18028	0.06389
VAR22	0.16379	-0.09564	-0.01533	-0.13177	-0.02587	-0.10542	0.03095	0.77692

Source: sub-programme Factor Analysis

Table 6.6 shows that Factor 1 constitutes the most significant factor, since it contains some variables from all the criteria postulated as being important for the development of kecamatans. These variables are determined from the factor loading table based on the assumption that all variables which have a coefficient equal to or greater than 0.50 are dominant relative to variables with a coefficient lower than 0.50 (Rummel,1967). These variables are presented in Table 6.6 which shows that there are five variables which have a coefficient equal to or greater than 0.50 in Factor 1:

1.VAR06 : number employed in light industry to 1000 population;

2.VAR07 : number of merchants to 1000 population;

3.VAR17 : number of passenger cars to 1000 population;

4.VAR18 : number of elementary schools to the 1000 population in age group 5-15;

5.VAR19 : number of junior and senior high schools to 1000 population in age group 10-20.

Other variables in this factor are neglected, since their coefficients, are lower than 0.50. This Factor may be described as the 'commercial potential factor' and shows where rural industry and commerce are important sectors producing commercial goods. These activities are supported by transportation facilities and merchant,s who distribute goods to consumer in both rural and in urban areas. Education facilities are also significant, contributing indirectly to a number of activities in certain kecamatans. As well as providing opportunities for the rural population to increase their knowledge and skills, education also enables rural people to

produce, market, and distribute commodities more effectively. This combination of all these variables is an indicator of the potential for the development of commercial activities.

In factor 2, there are 3 variables :

1.VAR04 : number of labour engaged in farming to 1000 population;

2.VAR14 : proportion of goods transported by lorry;

3.VAR16 : distance of the kecamatan from the capital of the province.

It indicates the orientation of rural population movements. These variables can be described further as follows. The potential of farming labour will reflect a high potential for agricultural development, and is supported by the transportation of goods by lorry, so that the agricultural products can be marketed easily from rural to urban areas. The relationship between urban and rural areas is also indicated by the orientation of rural population movement from rural to urban, and urban to rural areas, which is reflected by variable 16. All kecamatans which are identified as having significant values on these variables also have a tendency to attract people from urban areas to these areas. Thus, this factor is called the 'pull factor'. It is an indication of the way particular kecamatans develop as regards agriculture, transportation, and marketing in meeting the needs of accessible urban areas.

Factor 3 is influenced principally by 2 significant variables. They are :

1.VAR12 : numbers of livestock to 1000 population;

2.VAR18 : provision of elementary school facilities.
In this Factor VAR12 has a higher coefficient than VAR18, so that this factor may be called 'animal husbandry' factor.

There are 3 variables affecting factor 4,namely :

1.VAR10 : proportion of main food crop (rice); and
2.VAR11 : the output of the secondary food crops.
VAR05 : number of fishermen to 1000 population, has a negative value. This means that this Factor indicates potential for agricultural development, especially in crop management, and this affects in declining interest in the fishery sector as agriculture develops. Some fishermen will change their occupation to farming. This Factor is, therefore, called the 'potential of crops development'.

There are 2 significant variables which influence factor 5 :
1.VAR02 : education level of the rural population; and
2.VAR08 : the labour engaged in transport to 1000 population.
This Factor relates to human development and the modernisation process, and is termed the 'human resource factor'. Increased transportation is the product of modernisation and the introduction of technology; this encourages rural people to work in this sector. Hence, the rural population is introduced to new activities and technology and itself becomes involved in the modernisation process, and the education sector sustains the acceleration of the modernisation process. This Factor therefore indicates which kecamatans have the greatest potential for human resource development.

Factor 6 is influenced by only one variable, the number of markets to 1000 population. Marketing has an important role to play in rural economic viability, and the development of certain kecamatans in this context reflects marketing developments; this Factor is, therefore, termed the 'marketing factor'.

There are 2 variables which influence factor 7 . These are:

1.VAR13 : provision of rural roads; and
2.VAR20 : provision of public health facilities.

This Factor indicates which kecamatans have best communication and health facilities. The provision of rural road means that people will access to reach health facilities, and enables to encourage development of health facilities in rural areas.

In factor 8, there are 2 significant variables:

1.VAR09 : fish production; and

2.VAR22 : rural cooperation.

This Factor is called the 'potential of cooperatives'. The cooperative units can play an important role to help the fishermen in marketing their products with better management. This indicates the main role of social function of cooperative units in developing fishermen welfare.

To identify overall the potential of individual kecamatans, it is necessary to consider the 'Factor Score' an each factor. The Factor Sub-program allows factor scores for each case to be incorporated in the data file and express them in a row-output-data file. Two forms of Factor Score can be produced. When

Table 6.7

KACAMATAN	FACTOR SCORE OF SOCIO-ECONOMIC VARIABLES							
	1	2	3	4	5	6	7	8
1.SARANG	-0.861893	-0.453297	1.015651	-2.072824	-1.201716	1.256317	0.723043	-0.383545
2.KRAGAN	-0.190639	-0.078834	1.749238	-1.412435	-0.585500	1.541606	0.778989	0.173630
3.SLUKE	-0.458958	0.743722	2.639298	-0.687345	-0.710739	1.104574	0.297906	-0.428369
4.LASEM	3.683944	-0.855007	2.038401	0.001157	1.175437	0.930747	0.294655	-0.888942
5.REMBANG	0.016057	-1.529819	0.510777	0.375642	0.749214	1.061899	1.818013	4.098238
6.KALIORI	-0.748538	0.459023	1.616083	1.073444	-0.726690	0.418117	-0.031301	1.017448
7.BATANGAN	-0.917170	0.735532	0.976930	-0.197080	-0.482082	-0.892097	-0.813293	0.175944
8.JUWANA	0.173758	-0.397238	-0.203670	-0.970966	0.620346	-1.021168	-0.214738	-0.328422
9.WEDARIJAKSA	-0.551051	0.300891	-0.195501	0.884296	0.312330	0.203786	0.467386	-0.731872
10.MARGOYOSO	0.192426	-0.578315	-0.246831	0.234451	-0.359229	-0.153675	0.594176	-0.730310
11.TAYU	-0.014925	-0.266312	-0.295301	1.569349	0.621122	0.440256	0.695679	-0.301438
12.DUKUHSETI	-1.388864	-0.238206	-0.828571	0.241134	-0.166206	3.507723	-1.197507	-0.103851
13.KELING	-0.635020	-0.106828	1.140808	0.346530	1.124985	-1.205265	-0.596555	-0.292615
14.BANGSRI	0.394432	0.107147	0.794646	0.595151	0.901081	-0.741698	-0.687069	-0.765209
15.MLONGGO	-0.216447	0.488220	0.329959	0.330240	0.628470	-0.672052	-0.908954	-0.216148
16.JEPARA	2.417985	-0.912659	0.141579	0.574342	1.160499	-0.790301	-0.389466	0.788538
17.KEDUNG	0.099610	0.757757	0.360953	-0.132061	0.388324	-0.322642	-1.477328	0.031410
18.WEDUNG	-0.547069	1.203711	-1.238760	-2.518725	3.721642	0.444937	1.419247	-0.788765
19.BONANG	-1.259270	0.221364	-0.673986	-0.783714	0.101273	0.236031	0.089928	0.015168
20.KARANGTENGAH	0.124922	0.875020	-0.189867	-0.506544	-0.691126	0.497570	0.559830	0.075613
21.SAYUNG	0.612853	0.762186	-0.886375	-0.733899	-1.952602	-0.225292	1.836376	-0.683058
22.KALIWUNGU	0.518489	-0.160364	-0.768407	1.691574	0.223573	0.669021	0.943316	-0.733759
23.BRANGSONG	0.218151	0.912491	-0.396640	0.791327	0.206690	0.608464	-0.582616	-0.297641
24.KENDAL	1.256027	0.397228	-0.992957	0.868041	0.150034	1.938962	-0.052720	0.485280
25.PATEBON	0.438260	1.450603	-1.053637	-0.029452	-0.353086	0.766313	-0.348883	0.171890
26.CEPIRING	-0.288992	1.511240	-0.833984	1.359281	0.062588	0.021088	1.066996	-0.333975
27.WELERI	0.103065	0.243287	-0.979542	1.070939	0.023840	0.914700	-0.734364	-0.345268
28.GRINGSING	0.671073	0.264064	-0.444294	-0.673400	-0.706652	0.084923	-2.035994	-0.173171
29.LIMPUNG	0.776025	0.671229	0.723326	0.227297	-0.787043	-0.637297	-0.804394	0.172975
30.SUBAH	-0.320081	1.264213	1.696557	0.644857	0.303147	-0.903803	0.421111	-0.064953
31.TULIS	0.132724	0.739042	0.514531	0.240485	-0.111112	0.240159	-0.774018	0.090026
32.BATANG	0.668813	1.132914	-0.814526	-0.667729	-0.790079	-1.057166	-0.033421	2.326380
33.TIRTO	0.329506	-1.027860	-1.010485	-0.780739	-0.766292	-1.109323	-0.475041	0.032148
34.WIRADESA	0.756061	-0.820547	-0.971006	-1.185482	-0.739428	0.125298	-1.213283	0.474378
35.SRAGI	0.034206	0.846451	-0.568613	0.299639	-0.831851	-1.408889	1.681907	-0.260363
36.ULUJAMI	0.046017	0.401022	-0.392121	-0.213567	-0.799119	-1.178996	0.094388	-0.067287
37.PETARUKAN	-1.248676	0.516215	0.277371	-0.371448	0.193679	-1.431433	0.247505	0.203125
38.TAMAN	-1.107805	0.391820	-0.244993	0.467836	0.139936	-0.957870	-0.542876	-0.070574
39.PEMALANG	-0.421518	-1.207178	-0.584836	-0.768322	0.968577	-1.197720	-0.572007	1.309414
40.BREBES	-0.205568	-0.489685	-0.584295	-0.305230	0.280272	-0.389223	0.576660	-0.180644
41.WANASARI	-0.970933	-1.942237	-0.343261	0.882715	0.440840	0.202185	-0.084584	-0.387233
42.BULAKAMBA	-1.389082	-2.024478	-0.539897	1.098959	-0.486098	-0.266323	0.116818	-0.485908
43.TANJUNG	1.051692	-1.927129	-0.404787	-0.323777	-0.853287	0.112667	-0.680439	-0.894227
44.LOSARI	-0.973591	-2.380479	0.161137	-0.533798	-0.397918	-0.765310	0.527064	-0.703905

source : Sub-programme of Factor Analysis

Principal-Component Analysis is being used, the correlation between the composite Factor Score variable and the respective factor will be 1 since it produces an exact solution. When any of the other factoring methods is used, a Factor Score coefficient matrix is derived such that the correlation between the composite Factor Score variable and the respective Factor is maximized, but the correlation will generally not be 1 (Nie,1975.p488). In this study, factoring method :PA2 has been used to process the data. The Factor Score also indicates the weight of individual cases. The higher the value of the Factor Score, the greater the weight of the individual cases. Table 6.7 presents the Factor Scores of individual kecamatans. This table shows that there are 3 kecamatans with a Factor-Score coefficient numbers greater than 1. These kecamatans are therefore identified as the significant regions for development. On the other hand, all kecamatans with a Factor-Score coefficient of minus 1 or below are categorized as less significant for development. To ease the inferential analysis, Table 6.7 has been represented graphically (Figures 6.1,6.3,6.5 to 6.15).

The Factor-Scores have thus been used to identify the kecamatans with the greatest potential. Table 6.7 and Figures 6.1 to 6.16 may then be interpreted. Thus the interpretation of Factor 1 shows that there are 23 kecamatans which have good commercial potential. They are: Kecamatan Lasem, Rembang, Juwana, Margoyoso, Bangsri, Jepara, Kedung, Karangtengah, Sayung, Kaliwungu, Brangsong, Kendal, Patebon, Weleri, Gringsing, Limpung, Tulis, Batang, Tirto, Wiradesa, Sragi, Ulujami and Tanjung. Kecamatan Lasem has the highest Factor-Score

Coefficient in this respect (Figure 6.2.)

Factor 2 reveals that there are 25 kecamatans which are influenced by the pull factor and have greater potential for development in the agricultural sector (Figure 6.4). They are : Kecamatans Sluke, Kaliori, Batangan, Wedarijaksa, Bangsri, Mlonggo, Kedung, Wedung, Bonang, Karangtengah, Sayung, Brangsong, Kendal, Patebon, Cepiring, Weleri, Gringsing, Limpung, Subah, Tulis, Batang, Sragi, Ulujami, Petarukan, Taman.

Factor 3 shows that there are 17 kecamatans which appear to have best potential for animal husbandry development (Figure 6.6). They are Kecamatan Sarang, Kragan, Sluke, Lasem, Rembang, Kaliori, Batangan, Keling, Bangsri, Mlonggo, Jepara, Kedung, Limpung, Subah, Tulis, Petarukan and Losari.

There are 22 kecamatans shown by Factor 4 to have real for crops development (Figure 6.8). They are : Kecamatan Lasem, Rembang, Kaliori, Wedarijaksa, Margoyoso, Tayu, Dukuhseti, Keling, Bangsri, Mlonggo, Jepara, Kaliwungu, Brangsong, Cepiring, Weleri, Limpung, Subah, Tulis, Wiradesa, Taman, Wanasari, and Bulakamba.

Factor 5 indicates that there are 24 kecamatans which benefit from better human resources (Figure 6.10). They are Kecamatan; Lasem, Rembang, Juwana, Wedarijaksa, Tayu, Keling, Bangsri, Mlonggo, Jepara, Kedung, Wedung, Bonang, Kaliwungu, Brangsong, Kendal, Cepiring, Weleri, Subah, Ulujami, Petarukan, Taman, Pemalang, Brebes and Wanasari.

23 kecamatans are shown by Factor 6 to be significantly affected by the marketing factor (Figure 6.12). These are : Kecamatan Sarang, Kragan, Sluke, Lasem, Rembang, Kaliori, Wedarijaksa, Tayu, Dukuhseti, Wedung, Bonang, Karangtengah, Kaliwungu, Brangsong, Weleri, Cepiring, Patebon, Kendal, Gringsing, Tulis, Tirto, Tanjung and Wanasari.

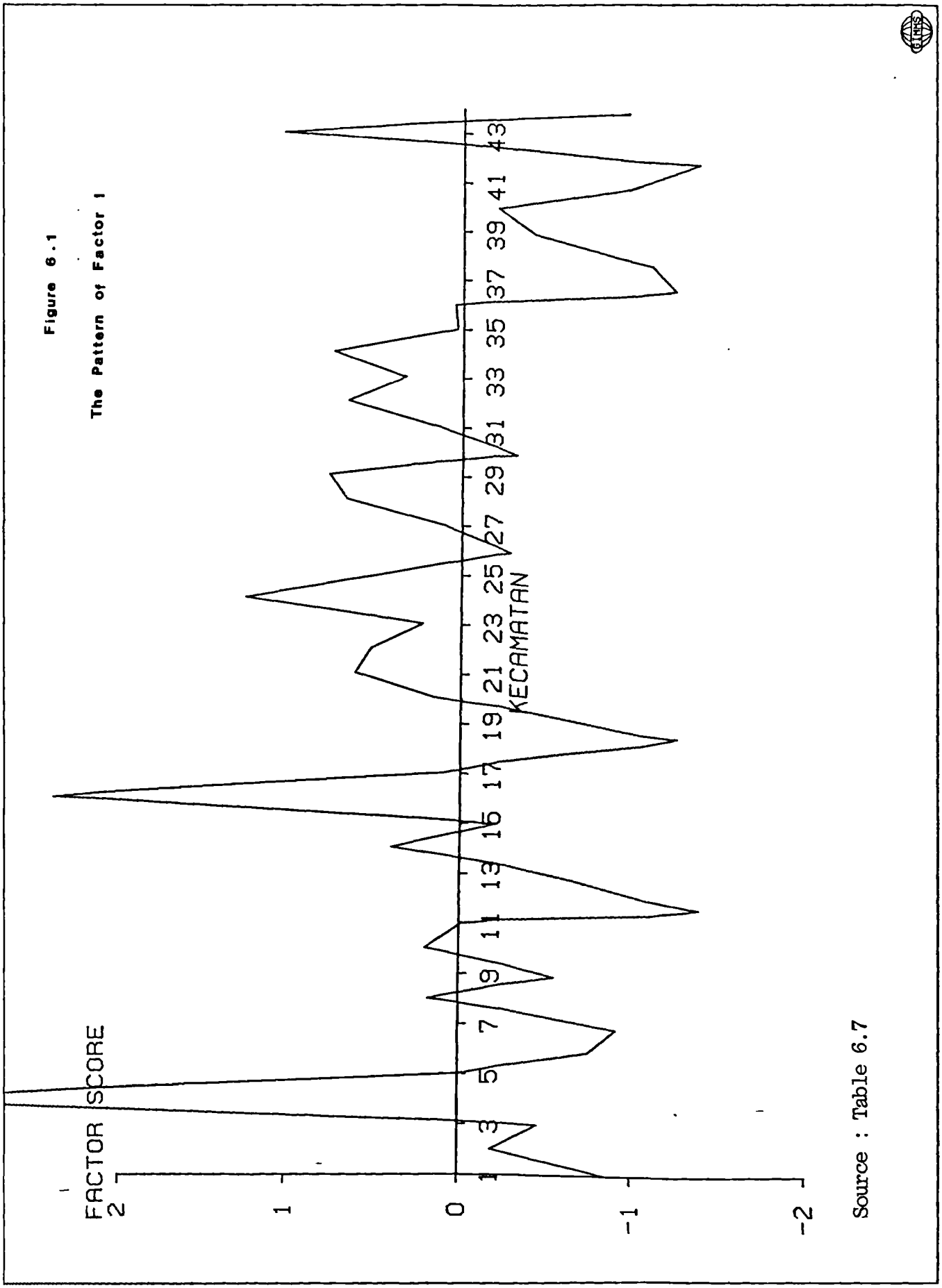
Regarding Factor 7, 21 kecamatans benefit from better communications and public health facilities (Figure 6.14). These are : Kecamatans Sarang, Kragan, Sluke, Lasem, Rembang, Wedarijaksa, Margoyoso, Tayu, Wedung, Bonang, Karangtengah, Sayung, Kaliwungu, Cepiring, Subah, Sragi, Ulujami, Petarukan, Brebes, Bulakamba and Losari.

By interpretation of Factor 8, 17 kecamatans are revealed as having potential for fishery development (Figure 6.16). They are : Kecamatans Kragan, Rembang, Kaliori, Jepara, Kedung, Bonang, Karangtengah, Kendal, Patebon, Limpung, Tulis, Batang, Tirto, Wiradesa, Petarukan and Pemalang.

Factor 1 is principal factor since it contains most significant variables. So based on this Factor , the priority of kecamatans for development can be determined. As can be seen in Table 6.7. Kecamatan Lasem has the highest Factor Score coefficient (3.683944). It is thus favoured for development. Conversely, kecamatans Dukuhseti and Bulakamba are indicated as having the least potential for development. Their Factor-Score Coefficients are : -1.388864 and -1.389082 respectively. Thus the priority of the kecamatans for development can be set out (Table 6.8).

Figure 6.1

The Pattern of Factor 1



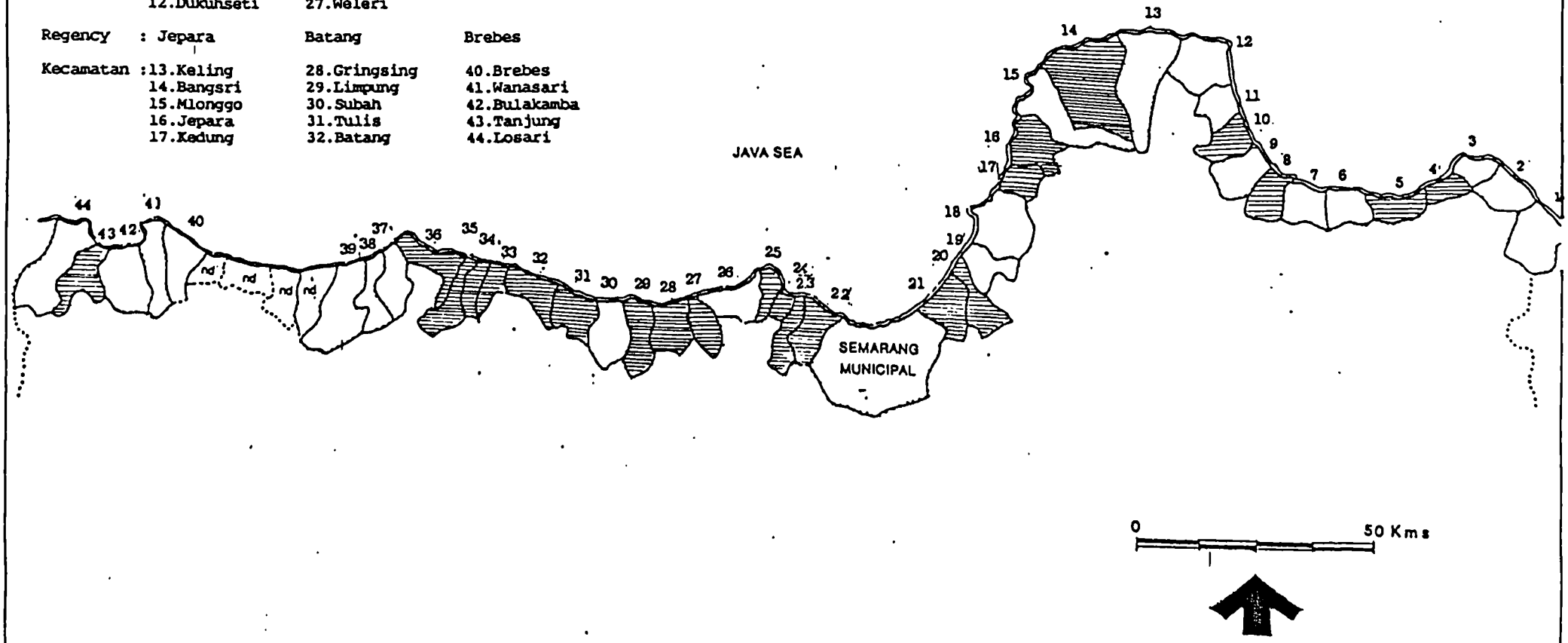
Source : Table 6.7

Regency	: Rembang	Demak	Pekalongan
Kecamatan	: 1.Sarang	18.Wedung	33.Tirto
	2.Kragan	19.Bonang	34.Wiradesa
	3.Sluke	20.Karangtengah	35.Sragi
	4.Lasem	21.Sayung	
	5.Rembang		
	6.Kaliori		
Regency	: Pati	Kendal	Pemalang
Kecamatan	: 7.Batangan	22.Kaliwungu	36.Ulujami
	8.Juwana	23.Brangsong	37.Petarukan
	9.Wedarijaksa	24.Kendal	38.Taman
	10.Margoyoso	25.Patebon	39.Pemalang
	11.Tayu	26.Cepiring	
	12.Dukuhseti	27.Weleri	
Regency	: Jepara	Batang	Brebes
Kecamatan	:13.Keling	28.Gringsing	40.Brebes
	14.Bangsri	29.Limpung	41.Wanasari
	15.Mlonggo	30.Subah	42.Bulakamba
	16.Jepara	31.Tulis	43.Tanjung
	17.Kedung	32.Batang	44.Losari

Figure 6.2

THE SIGNIFICANT KECAMATANS FOR DEVELOPMENT

BASED ON FACTOR I

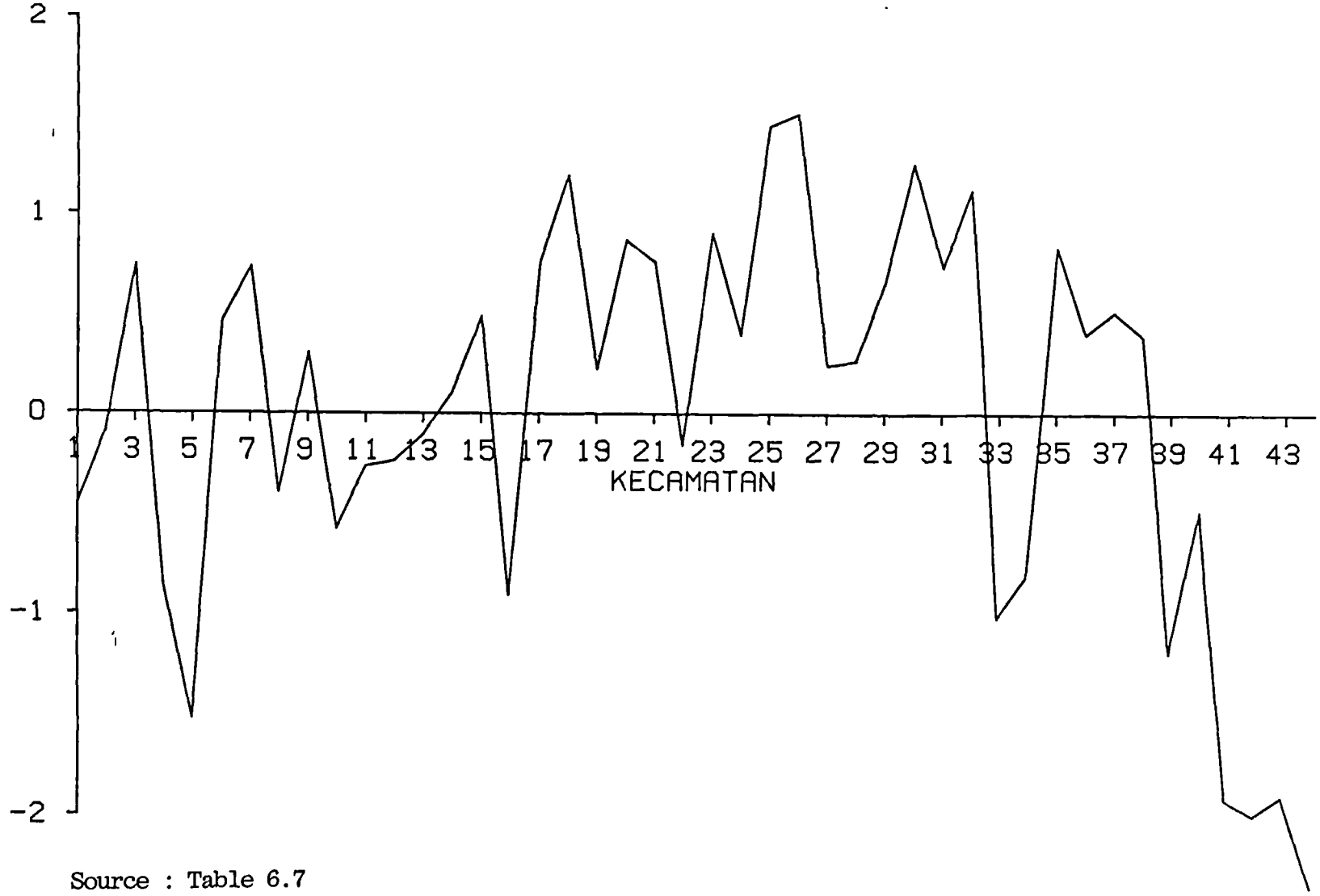


Source : Figure 6.1

nd = no data available

Figure 6.3

The Pattern of Factor II

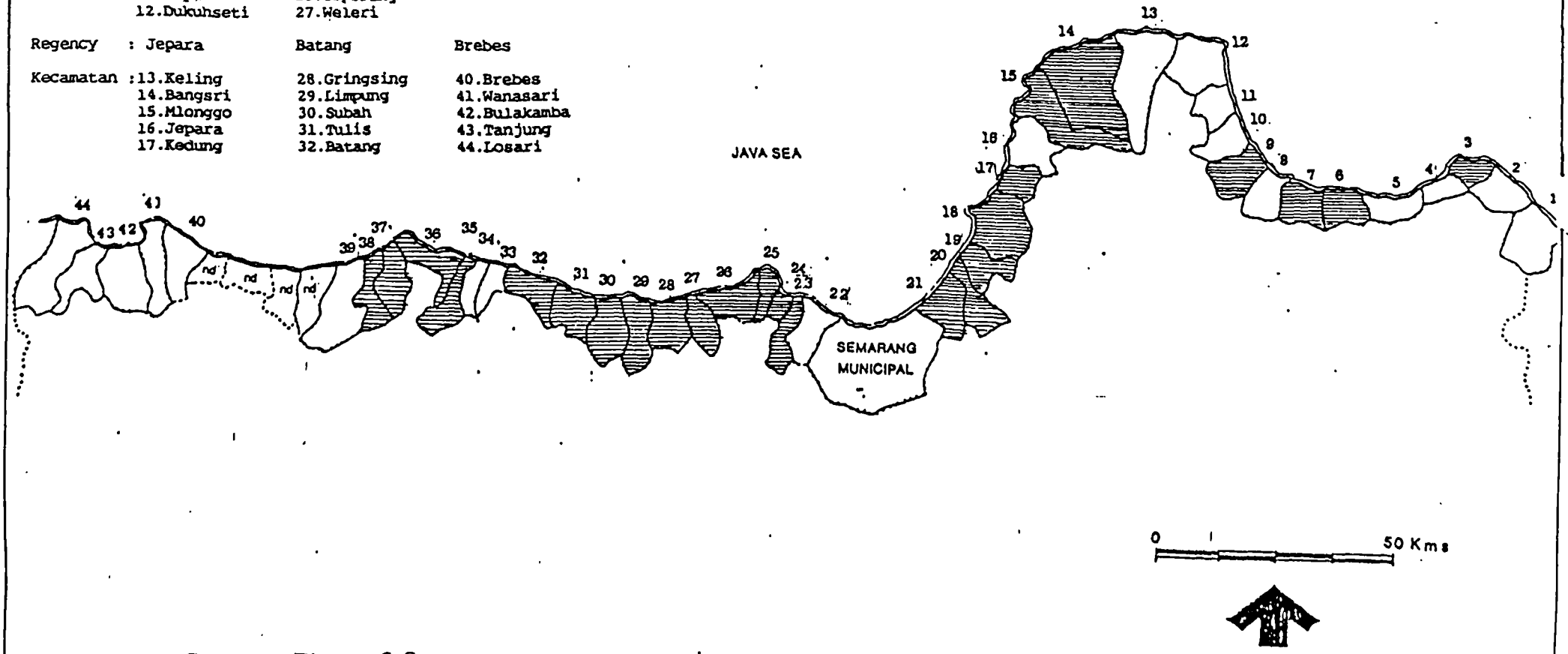


Source : Table 6.7

Figure 6 . 4

THE SIGNIFICANT KECAMATANS FOR DEVELOPMENT BASED ON FACTOR 2

Regency	: Rembang	Demak	Pekalongan
Kecamatan	: 1.Sarang	18.Wedung	33.Tirto
	2.Kragan	19.Bonang	34.Wiradesa
	3.Sluke	20.Karangtengah	35.Sragi
	4.Lasem	21.Sayung	
	5.Rembang		
	6.Kaliori		
Regency	: Pati	Kendal	Pemalang
Kecamatan	: 7.Batangan	22.Kaliwungu	36.Ulujami
	8.Juwana	23.Brangsong	37.Petarukan
	9.Wedarijaksa	24.Kendal	38.Taman
	10.Margoyoso	25.Patebon	39.Pemalang
	11.Tayu	26.Cepiring	
	12.Dukuhseti	27.Weleri	
Regency	: Jepara	Batang	Brebes
Kecamatan	:13.Keling	28.Gringsing	40.Brebes
	14.Bangsri	29.Limpung	41.Wanasari
	15.Mlonggo	30.Subah	42.Bulakamba
	16.Jepara	31.Tulis	43.Tanjung
	17.Kedung	32.Batang	44.Losari

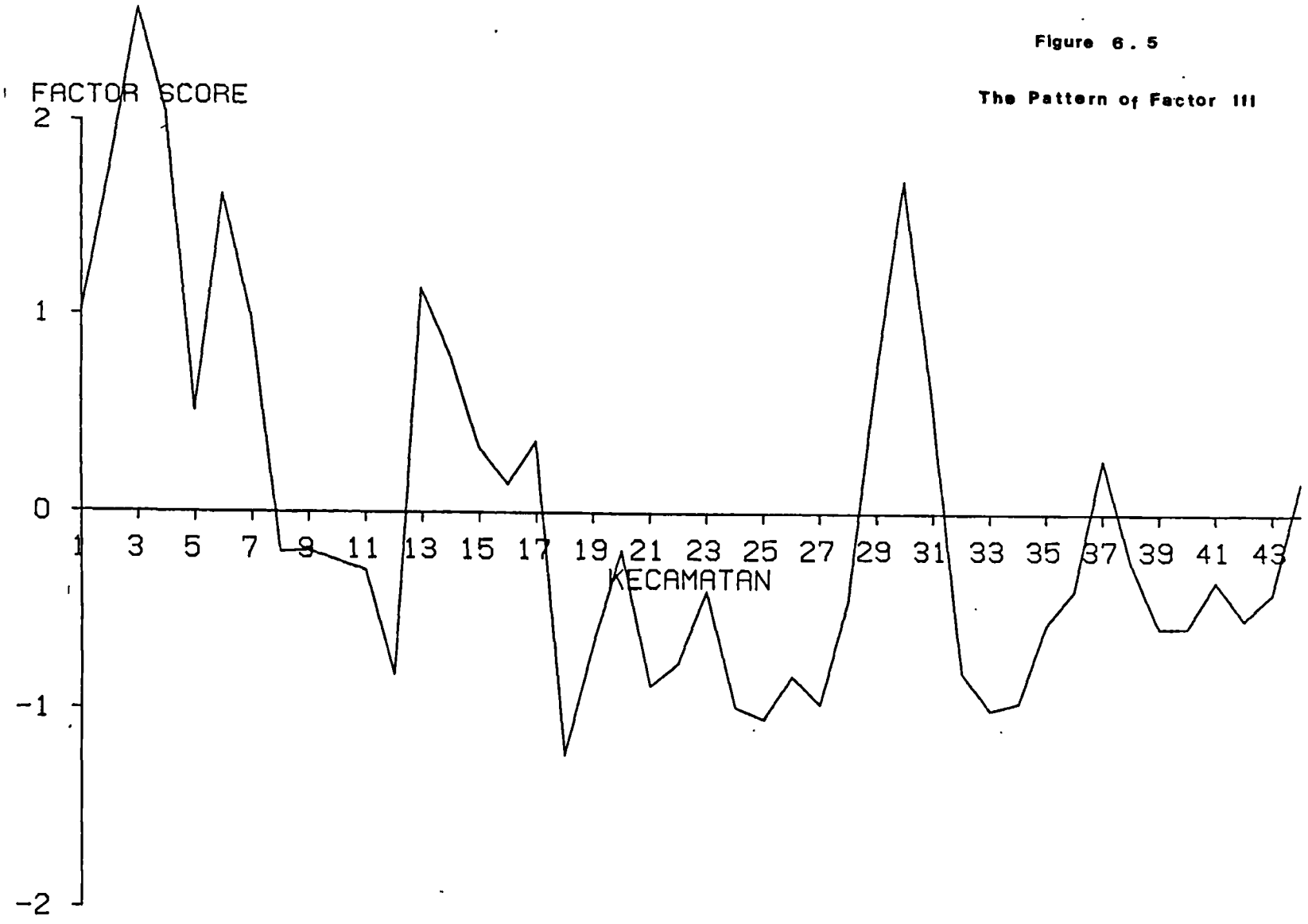


Source : Figure 6.3

nd = no data available

Figure 6.5

The Pattern of Factor III

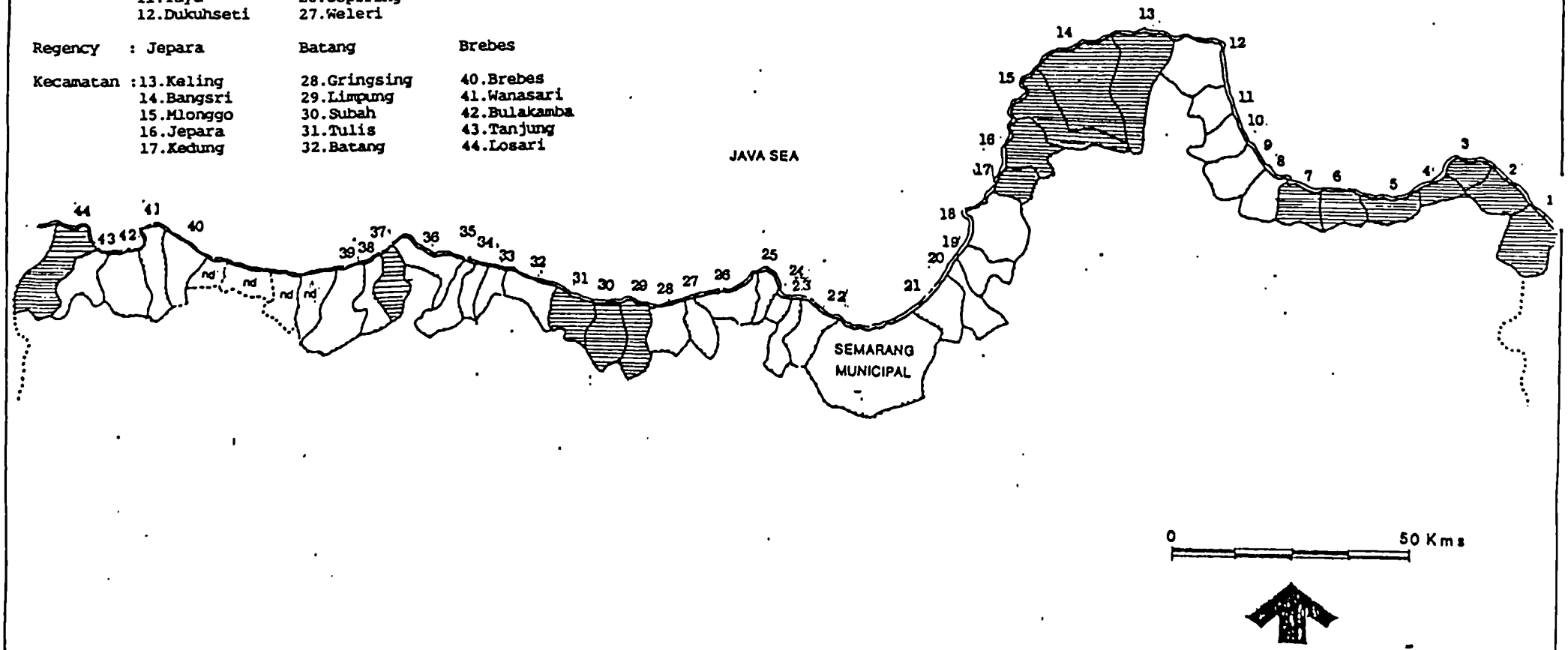


Source : Table 6.7

Figure 6.6

THE SIGNIFICANT KECAMATANS FOR DEVELOPMENT BASED ON FACTOR 3

Regency	: Rembang	Demak	Pekalongan
Kecamatan	: 1.Sarang	18.Wedung	33.Tirto
	2.Kragan	19.Bonang	34.Wiradesa
	3.Sluke	20.Karangtengah	35.Sragi
	4.Lasem	21.Sayung	
	5.Rembang		
	6.Kaliori		
Regency	: Pati	Kendal	Pemalang
Kecamatan	: 7.Batangan	22.Kaliwungu	36.Ulujami
	8.Juwana	23.Brangsong	37.Petarukan
	9.Wedarijaksa	24.Kendal	38.Taman
	10.Margoyoso	25.Patebon	39.Pemalang
	11.Tayu	26.Cepiring	
	12.Dukuhseti	27.Weleri	
Regency	: Jepara	Batang	Brebes
Kecamatan	:13.Keling	28.Gringsing	40.Brebes
	14.Bangsri	29.Limpung	41.Wanasari
	15.Mlonggo	30.Subah	42.Bulakamba
	16.Jepara	31.Tulis	43.Tanjung
	17.Kedung	32.Batang	44.Losari

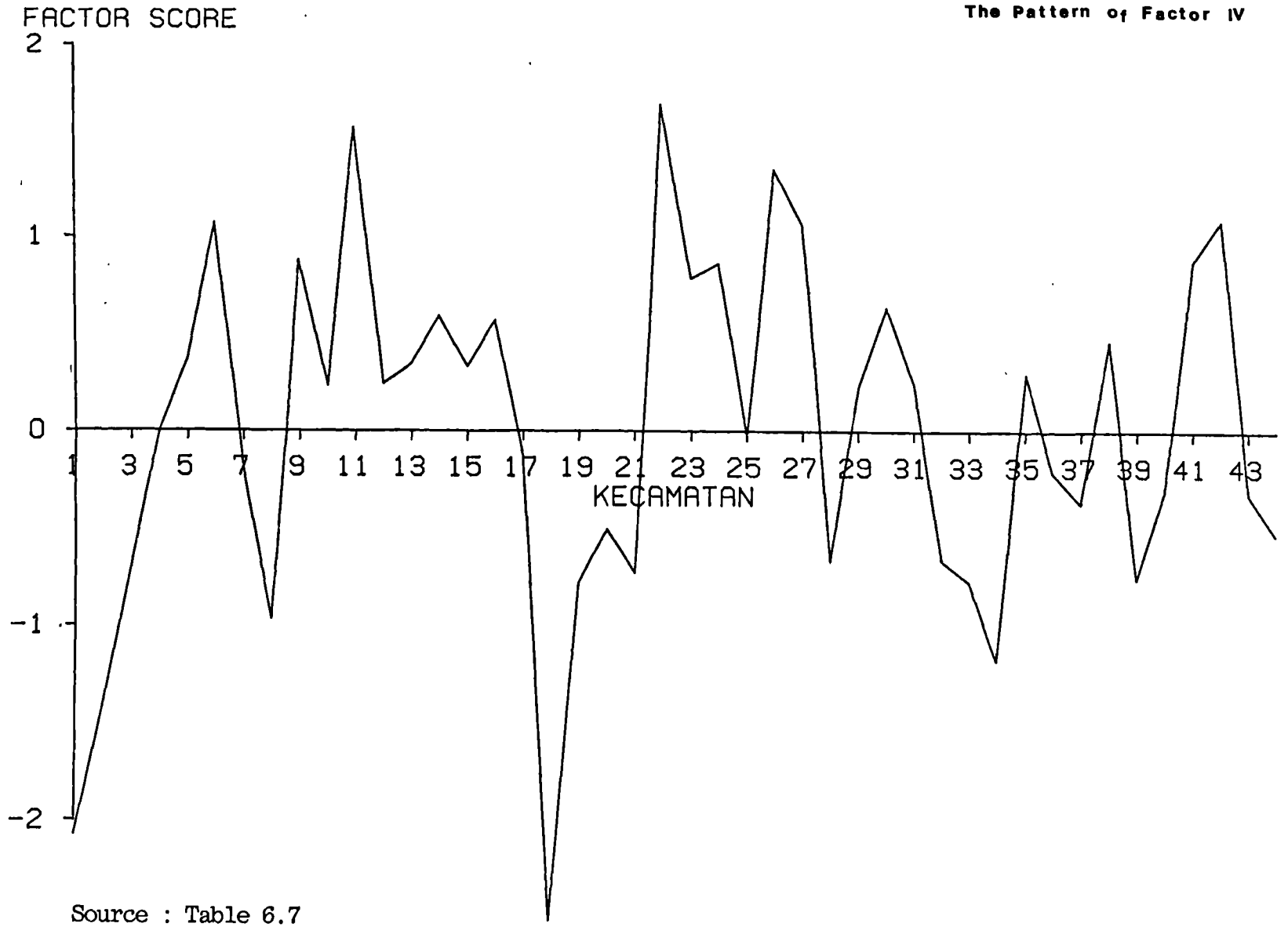


Source : Figure 6.5

nd = no data available

Figure 6.7

The Pattern of Factor IV



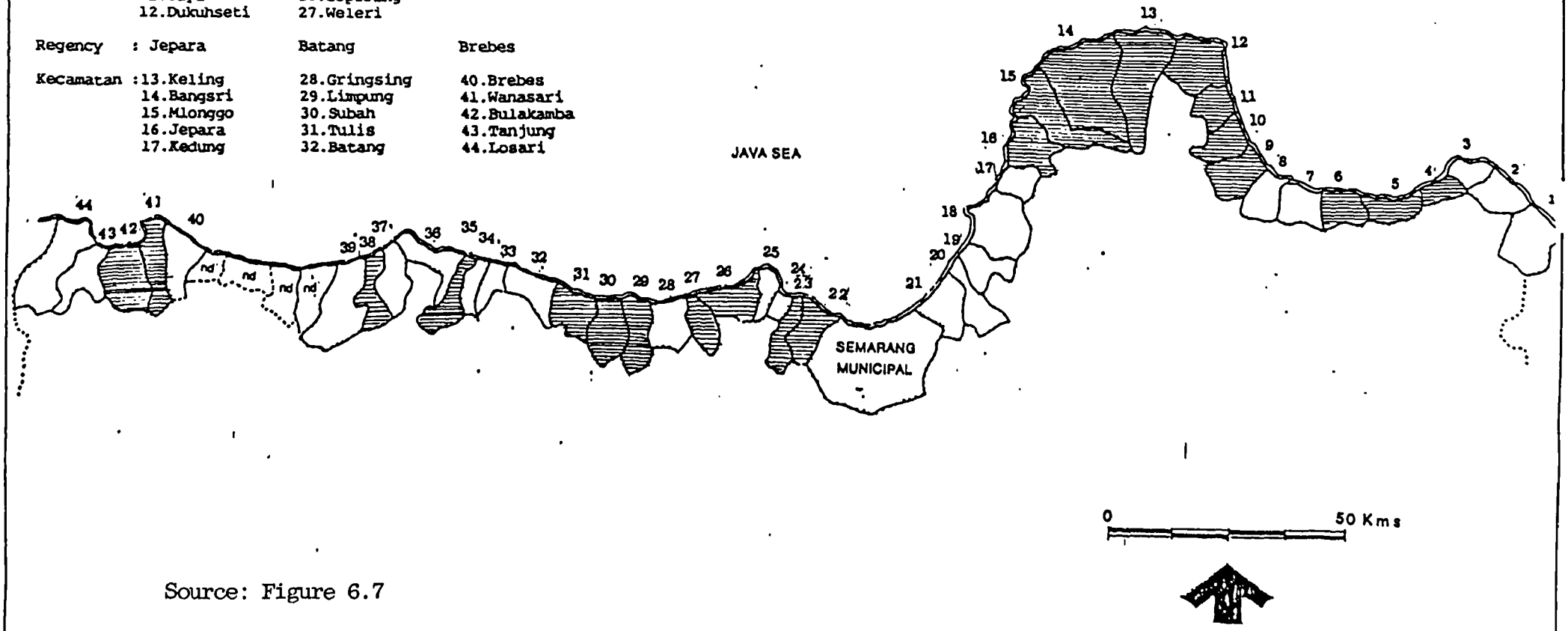
Source : Table 6.7

Figure 6.8

THE SIGNIFICANT KECAMATANS FOR DEVELOPMENT

BASED ON FACTOR 4

Regency	: Rembang	Demak	Pekalongan
Kecamatan	: 1.Sarang	18.Wedung	33.Tirto
	2.Kragan	19.Bonang	34.Wiradesa
	3.Sluke	20.Karangtengah	35.Sragi
	4.Lasem	21.Sayung	
	5.Rembang		
	6.Kaliori		
Regency	: Pati	Kendal	Pemalang
Kecamatan	: 7.Batangan	22.Kaliwungu	36.Ulujami
	8.Juwana	23.Brangsong	37.Petarukan
	9.Wedarijaksa	24.Kendal	38.Taman
	10.Margoyoso	25.Patebon	39.Pemalang
	11.Tayu	26.Cepiring	
	12.Dukuhseti	27.Weleri	
Regency	: Jepara	Batang	Brebes
Kecamatan	:13.Keling	28.Gringsing	40.Brebes
	14.Bangsri	29.Limpung	41.Wanasari
	15.Mlonggo	30.Subah	42.Bulakamba
	16.Jepara	31.Tulis	43.Tanjung
	17.Kedung	32.Batang	44.Losari

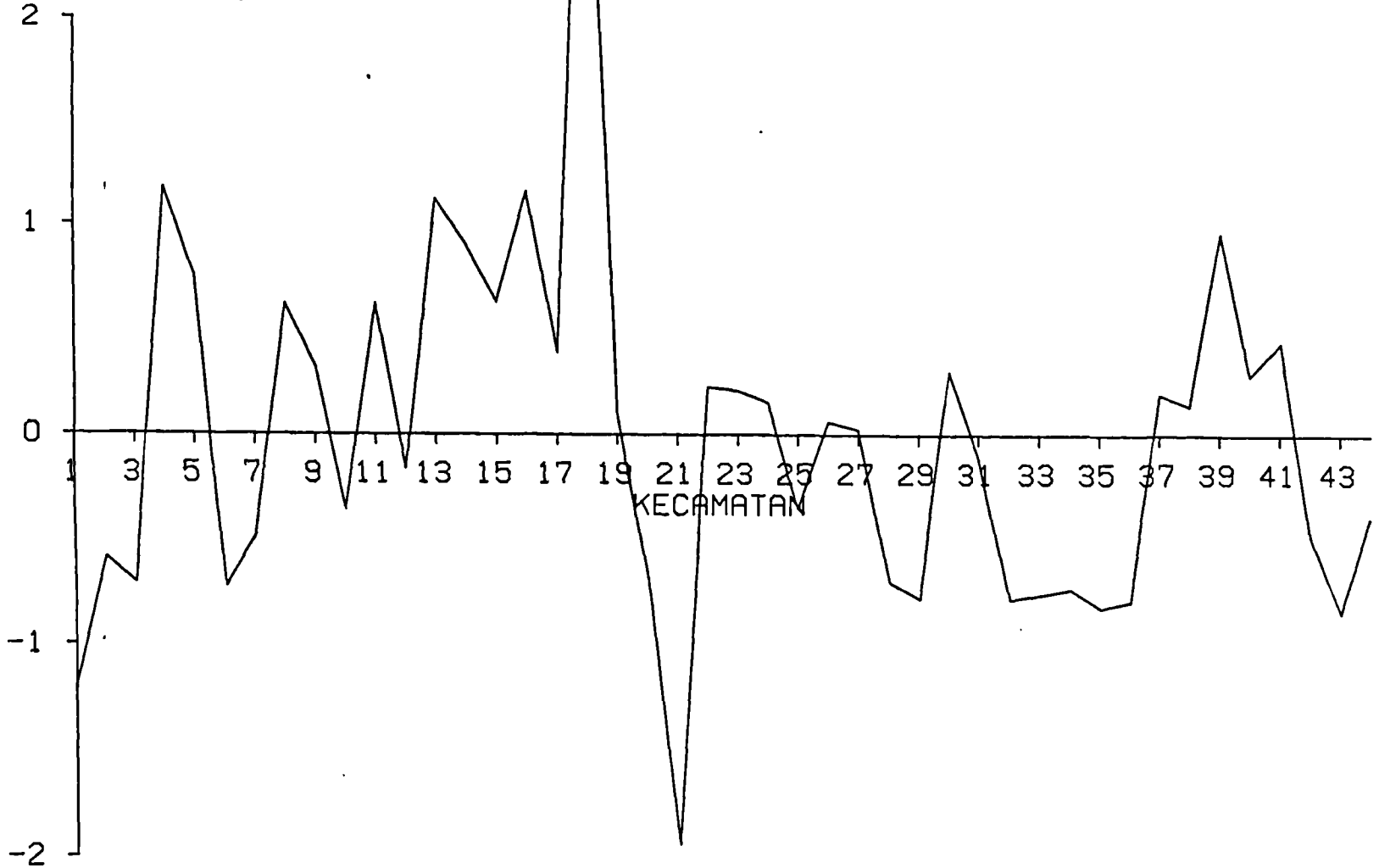


Source: Figure 6.7

nd = no data available

Figure 6.9

The Pattern of Factor V



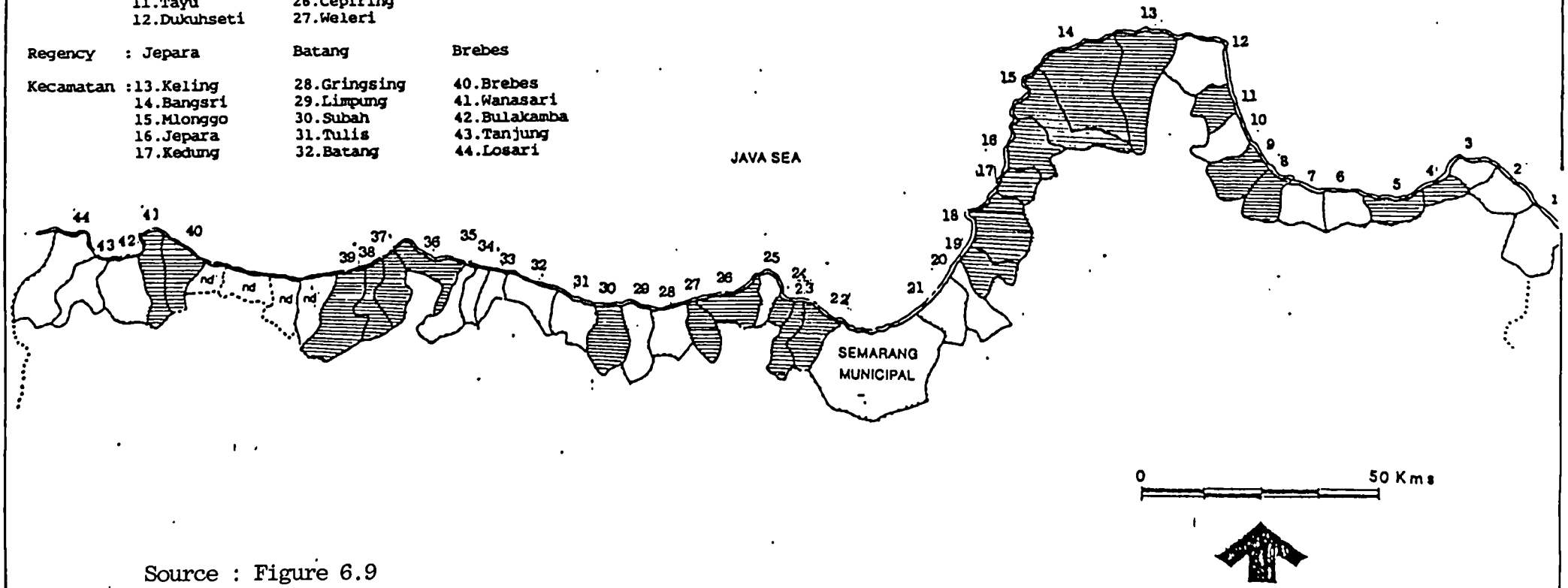
Source : Table 6.7.

Figure 6.10

THE SIGNIFICANT KECAMATANS FOR DEVELOPMENT

BASED ON FACTOR 5

Regency	: Rembang	Demak	Pekalongan
Kecamatan	: 1.Sarang	18.Wedung	33.Tirto
	2.Kragan	19.Bonang	34.Wiradesa
	3.Sluke	20.Karangtengah	35.Sragi
	4.Lasem	21.Sayung	
	5.Rembang		
	6.Kaliori		
Regency	: Pati	Kendal	Pemalang
Kecamatan	: 7.Batangan	22.Kaliwungu	36.Ulujami
	8.Juwana	23.Brangsong	37.Petarukan
	9.Wedarijaksa	24.Kendal	38.Taman
	10.Margoyoso	25.Patebon	39.Pemalang
	11.Tayu	26.Cepiring	
	12.Dukuhseti	27.Weleri	
Regency	: Jepara	Batang	Brebes
Kecamatan	:13.Keling	28.Gringsing	40.Brebes
	14.Bangsri	29.Limpung	41.Wanasari
	15.Mlonggo	30.Subah	42.Bulakamba
	16.Jepara	31.Tulis	43.Tanjung
	17.Kedung	32.Batang	44.Losari

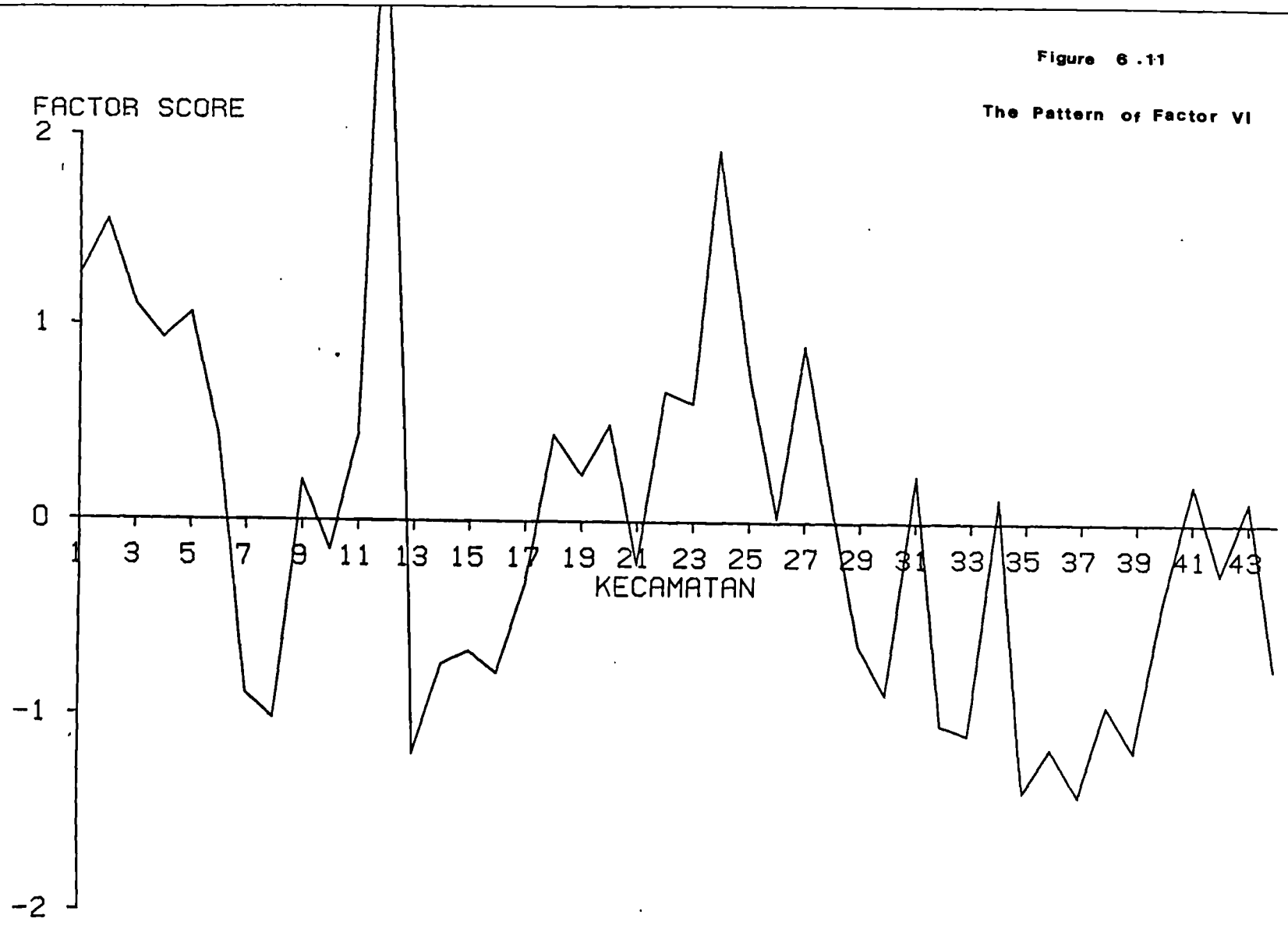


Source : Figure 6.9

nd = no data available

Figure 6.11

The Pattern of Factor VI



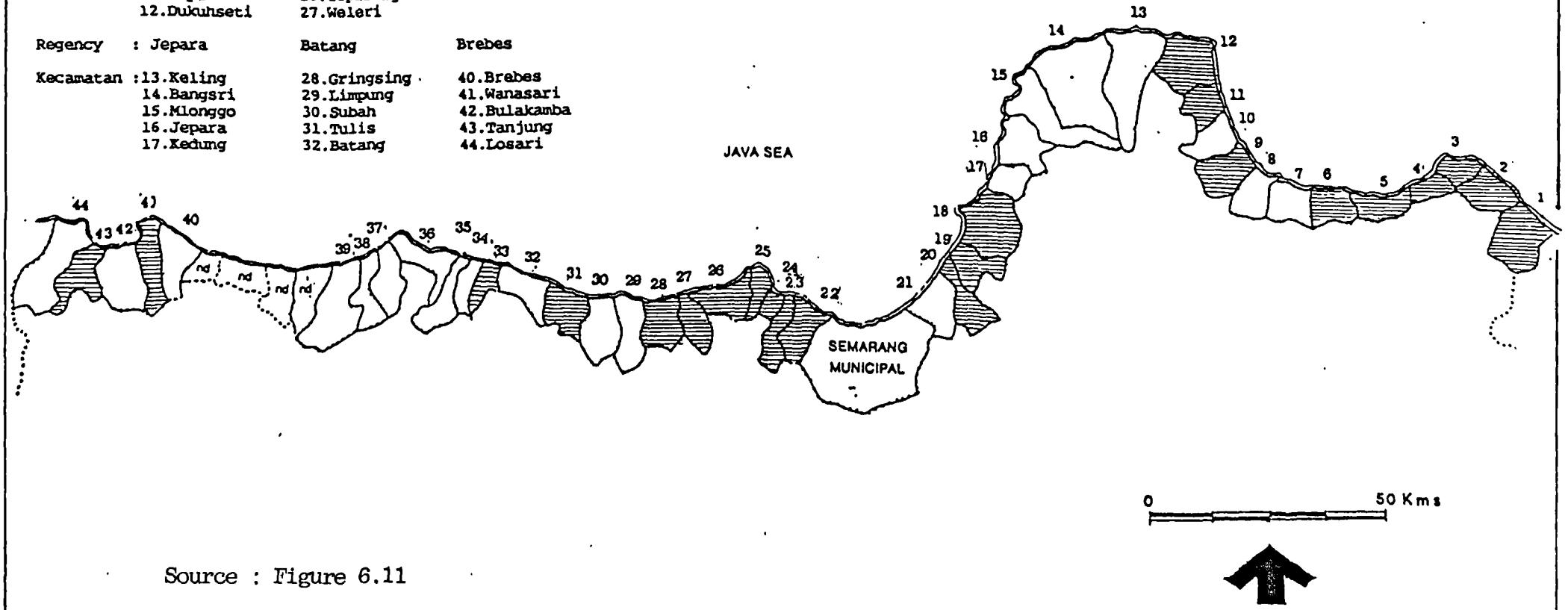
Source : Table 6.7

Regency	: Rembang	Demak	Pekalongan
Kecamatan	: 1.Sarang	18.Wedung	33.Tirto
	2.Kragan	19.Bonang	34.Wiradesa
	3.Sluke	20.Karangtengah	35.Sragi
	4.Lasem	21.Sayung	
	5.Rembang		
	6.Kaliori		
Regency	: Pati	Kendal	Pemalang
Kecamatan	: 7.Batangan	22.Kaliwungu	36.Ulujami
	8.Juwana	23.Brangsong	37.Petarukan
	9.Wedarijaksa	24.Kendal	38.Taman
	10.Margoyoso	25.Patebon	39.Pemalang
	11.Tayu	26.Cepiring	
	12.Dukuhseti	27.Weleri	
Regency	: Jepara	Batang	Brebes
Kecamatan	:13.Keling	28.Gringsing	40.Brebes
	14.Bangsri	29.Limpung	41.Wanasari
	15.Mlonggo	30.Subah	42.Bulakamba
	16.Jepara	31.Tulis	43.Tanjung
	17.Kedung	32.Batang	44.Losari

Figure 6.12

THE SIGNIFICANT KECAMATANS FOR DEVELOPMENT

BASED ON FACTOR 6

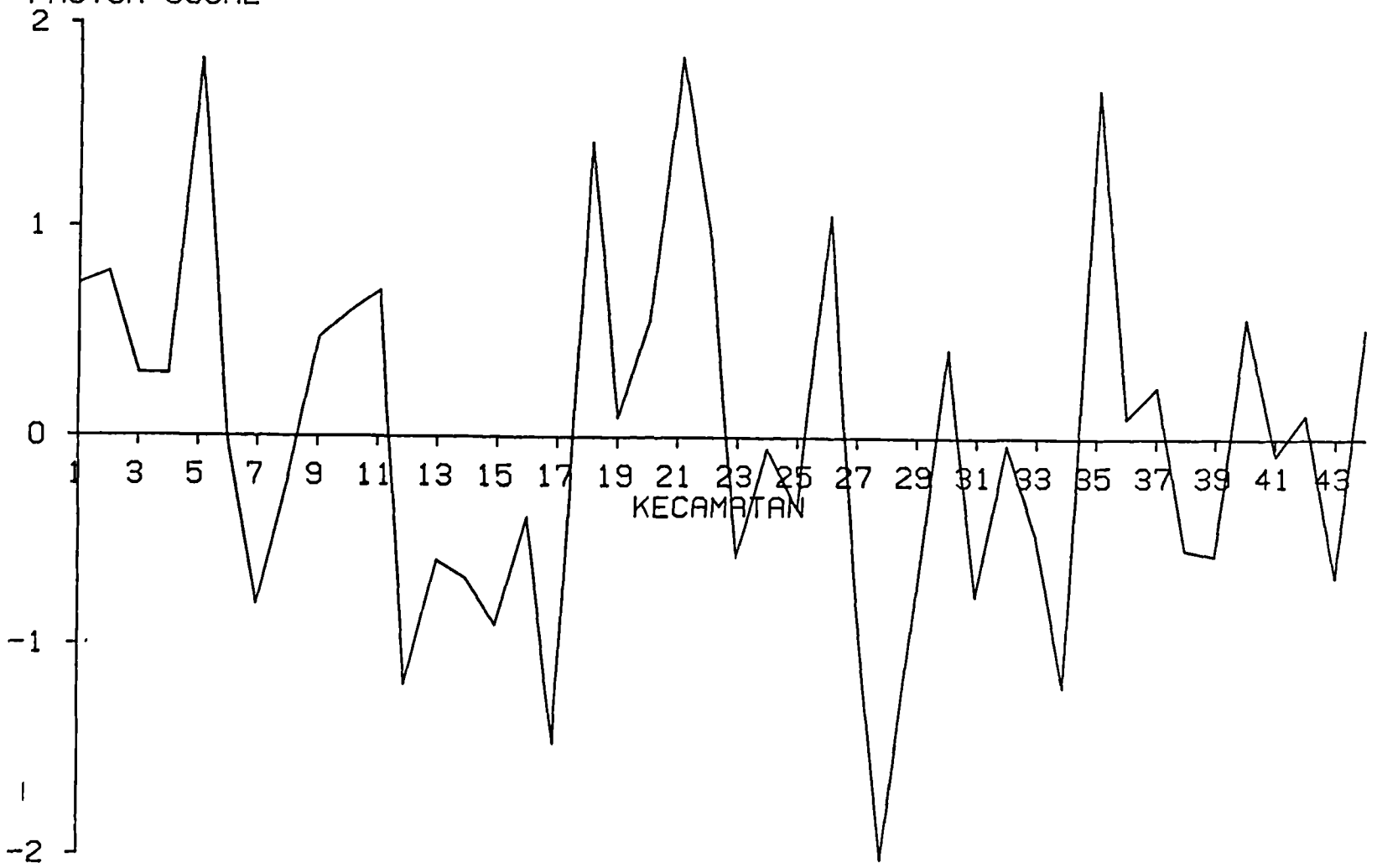


Source : Figure 6.11

. nd = no data available

Figure 6 . 13

The Pattern of Factor VII

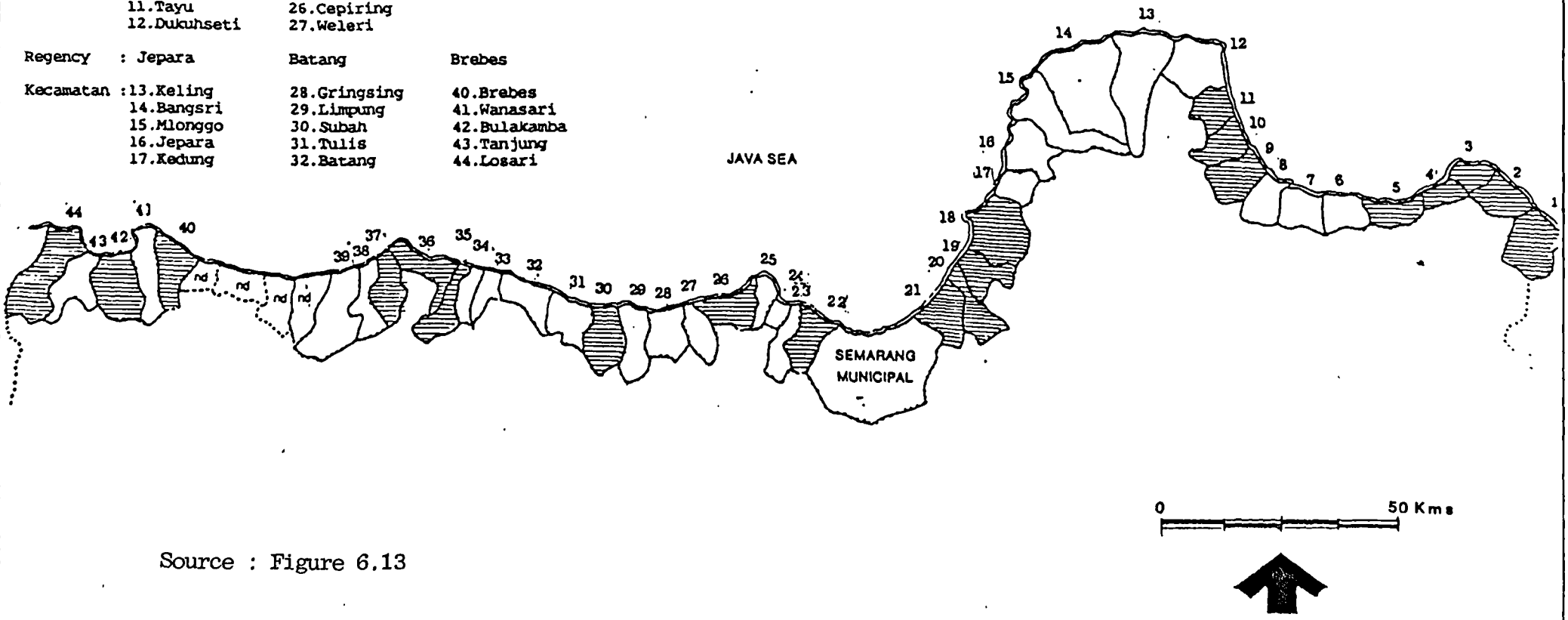


Source : Table 6.7

Figure 6.14

THE SIGNIFICANT KECAMATANS FOR DEVELOPMENT BASED ON FACTOR 7

Regency	: Rembang	Demak	Pekalongan
Kecamatan	: 1.Sarang	18.Wedung	33.Tirto
	2.Kragan	19.Bonang	34.Wiradesa
	3.Sluke	20.Karangtengah	35.Sragi
	4.Lasem	21.Sayung	
	5.Rembang		
	6.Kaliori		
Regency	: Pati	Kendal	Pemalang
Kecamatan	: 7.Batangan	22.Kaliwungu	36.Ulujami
	8.Juwana	23.Brangsong	37.Petarukan
	9.Wedarijaksa	24.Kendal	38.Taman
	10.Margoyoso	25.Patebon	39.Pemalang
	11.Tayu	26.Cepiring	
	12.Dukuhseti	27.Weleri	
Regency	: Jepara	Batang	Brebes
Kecamatan	:13.Keling	28.Gringsing	40.Brebes
	14.Bangsri	29.Limpung	41.Wanasari
	15.Mlonggo	30.Subah	42.Bulakamba
	16.Jepara	31.Tulis	43.Tanjung
	17.Kedung	32.Batang	44.Losari

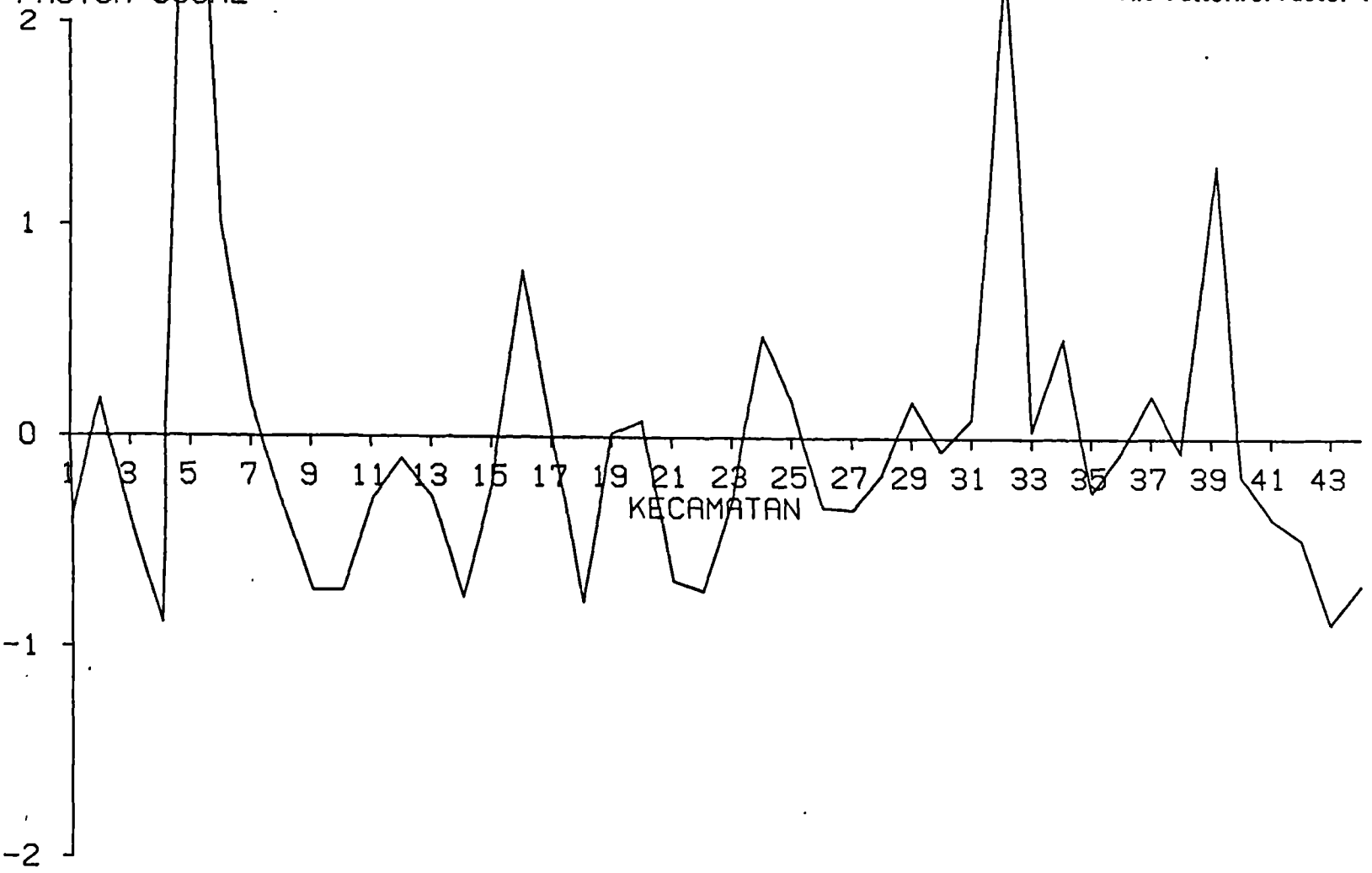


Source : Figure 6.13

nd = no data available

Figure 6.15

The Pattern of Factor VIII



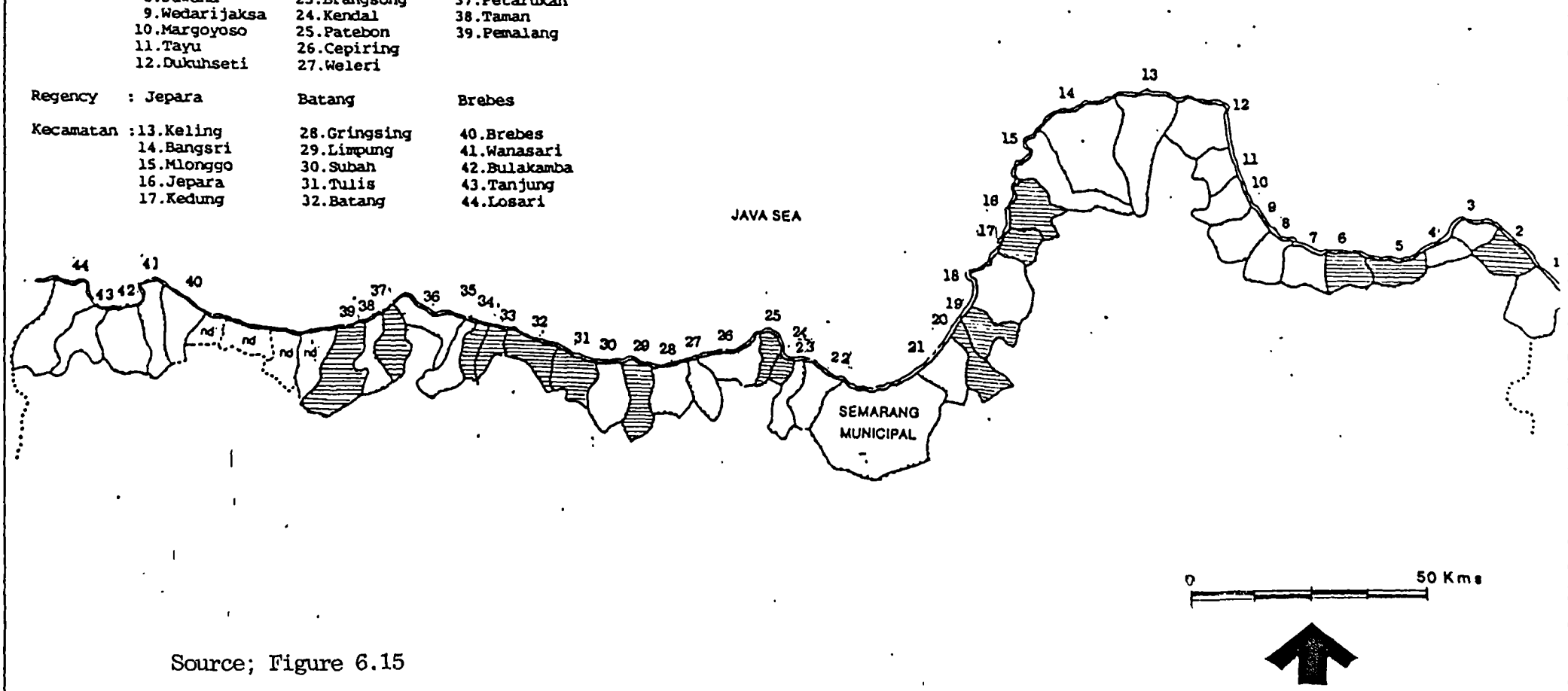
Source : Table 6.7

Regency	: Rembang	Demak	Pekalongan
Kecamatan	: 1.Sarang	18.Wedung	33.Tirto
	2.Kragan	19.Bonang	34.Wiradesa
	3.Sluke	20.Karangtengah	35.Sragi
	4.Lasem	21.Sayung	
	5.Rembang		
	6.Kaliori		
Regency	: Pati	Kendal	Pemalang
Kecamatan	: 7.Batangan	22.Kaliwungu	36.Ulujami
	8.Juwana	23.Brangsong	37.Petarukan
	9.Wedarijaksa	24.Kendal	38.Taman
	10.Margoyoso	25.Patebon	39.Pemalang
	11.Tayu	26.Cepiring	
	12.Dukuhseti	27.Weleri	
Regency	: Jepara	Batang	Brebes
Kecamatan	:13.Keling	28.Gringsing	40.Brebes
	14.Bangsri	29.Limpung	41.Wanasari
	15.Mlonggo	30.Subah	42.Bulakamba
	16.Jepara	31.Tulis	43.Tanjung
	17.Kedung	32.Batang	44.Losari

Figure 6.16

THE SIGNIFICANT KECAMATANS FOR DEVELOPMENT

BASED ON FACTOR 8



Source; Figure 6.15

nd = no data available

Table 6.8

The Ranking of Kecamatans for Development
Based on the Socio-Economic Aspects

Priority	Kecamatan	Priority	Kecamatan
01.	Lasem	23.	Rembang
02.	Jepara	24.	Tayu
03.	Kendal	25.	Kragan
04.	Tanjung	26.	Brebes
05.	Limpung	27.	Mlonggo
06.	Wiradesa	28.	Cepiring
07.	Gringsing	29.	Subah
08.	Batang	30.	Pemalang
09.	Sayung	31.	Sluke
10.	Kaliwungu	32.	Wedung
11.	Patebon	33.	Wedarijaksa
12.	Bangsri	34.	Keling
13.	Tirto	35.	Kaliori
14.	Brangsong	36.	Sarang
15.	Margoyoso	37.	Batangan
16.	Juwana	38.	Wanasari
17.	Tulis	39.	Losari
18.	Karangtengah	40.	Taman
19.	Weleri	41.	Petarukan
20.	Kedung	42.	Bonang
21.	Ulujami	43.	Dukuhseti
22.	Sragi	44.	Bulakamba

Source : Table 5.6

To determine which Factors influence the development of these kecamatans, the values of Factor 1 and Factor 2, have been plotted (Figure 6.17). It will be seen that the Factor-Score Coefficients are distributed in groups in quadrants 1,2,3 and 4. All those plotted in quadrant 1 are positive on both Factor 1 (the commerce factor) and factor 2 (the pull factor). This implies that all the kecamatans in this quadrant have a high potential for development based on the pull factor and the rural commercial factor. These kecamatans are : Kedung, Bangsri, Sayung, Karangtengah, Brangsong, Weleri, Patebon, Kendal, Gringsing, Limpung, Tulis, Batang, Sragi, Ulujami. Kecamatan Batang, Sayung and Limpung have much higher scores than the other kecamatans, and are therefore most favoured in these

Figure 6.17
SCATTERED DIAGRAM OF

RELATIONSHIP BETWEEN FACTOR 1 AND FACTOR 2

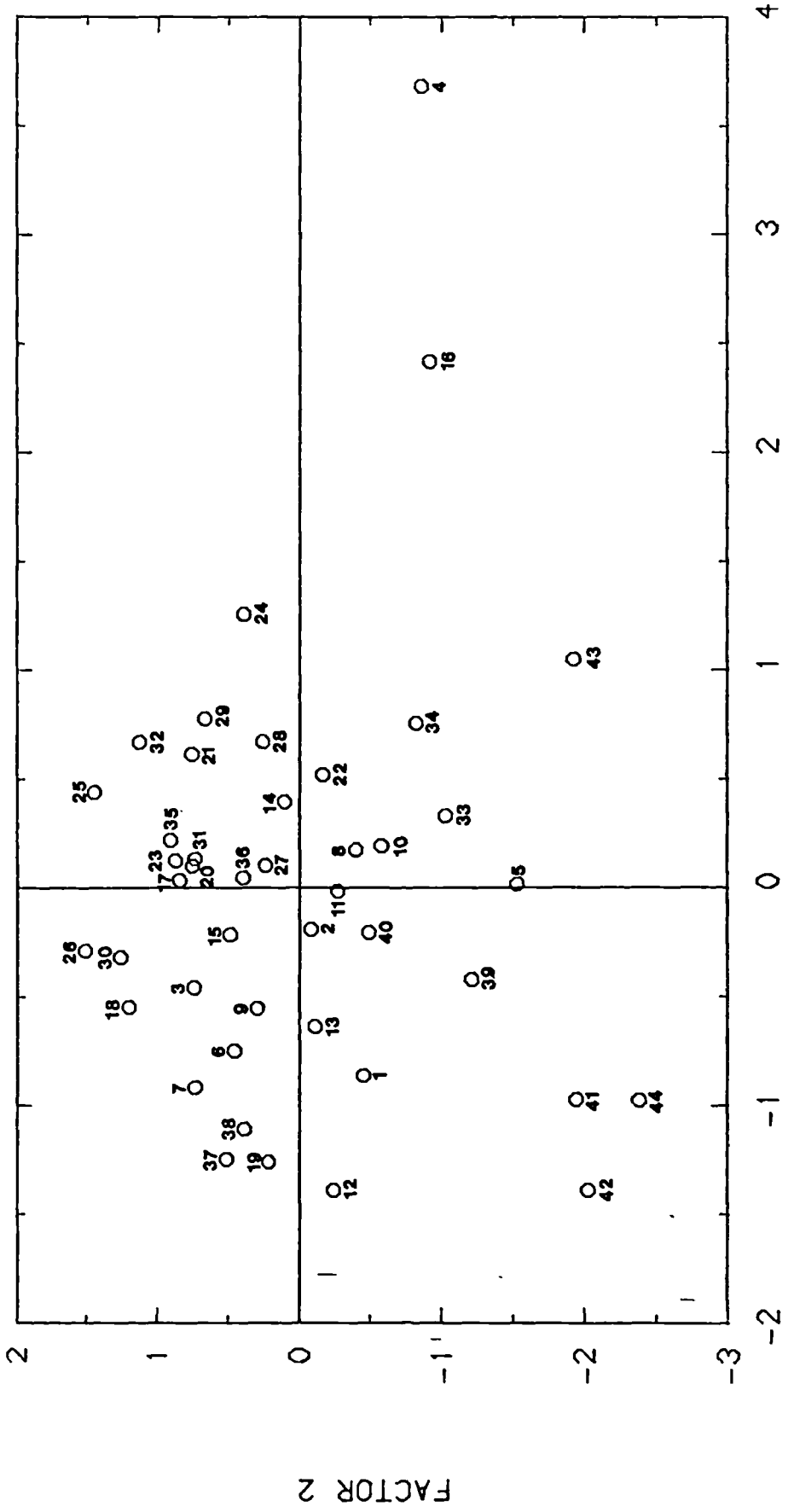
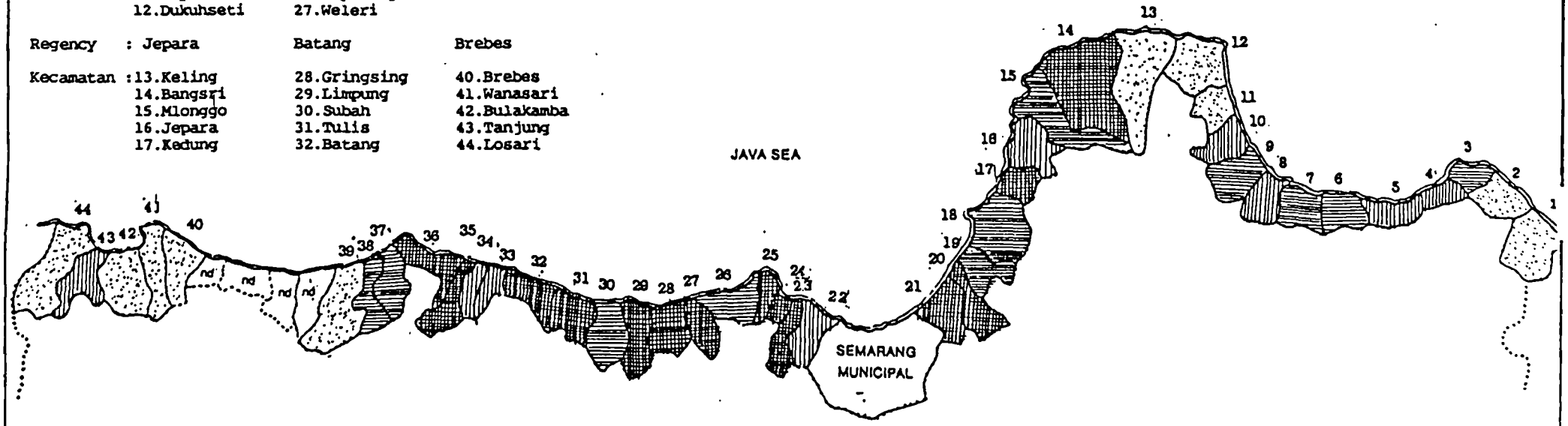


Figure 6 18

PRIORITY KECAMATANS FOR DEVELOPMENT
BASED ON SOCIAL-ECONOMIC FACTORS

Regency	: Rembang	Demak	Pekalongan
Kecamatan	: 1.Sarang	18.Wedung	33.Tirto
	2.Kragan	19.Bonang	34.Wiradesa
	3.Sluke	20.Karangtengah	35.Sragi
	4.Lasem	21.Sayung	
	5.Rembang		
	6.Kaliori		
Regency	: Pati	Kendal	Pemalang
Kecamatan	: 7.Batangan	22.Kaliwungu	36.Ulujami
	8.Juwana	23.Brangsong	37.Petarukan
	9.Wedarijaksa	24.Kendal	38.Taman
	10.Margoyoso	25.Patebon	39.Pemalang
	11.Tayu	26.Cepiring	
	12.Dukuhseti	27.Weleri	
Regency	: Jepara	Batang	Brebes
Kecamatan	:13.Keling	28.Gringsing	40.Brebes
	14.Bangsri	29.Limpung	41.Wanasari
	15.Mlonggo	30.Subah	42.Bulakamba
	16.Jepara	31.Tulis	43.Tanjung
	17.Kedung	32.Batang	44.Losari



LEGEND

- Group of kecamatans which are affected by Factor 1 and Factor 2
- Group of Kecamatans which are affected by Factor 2
- Group of Kecamatans which are affected by Factor 1
- Group of Kecamatans whcih are not affected by Factor 1 and Factor 2

0 50 Kms

Source : Figure 6.17

nd = no data available

respects.

In quadrant 2, however, different scores are obtained for each of the pair of the two Factors . Factor 1 (the commerce factor) has a negative score, whereas Factor 2 (the pull factor) has a positive value. It can thus be argued that the pull factor is the most significant factor for development of these kecamatans, but that they have a low potential for trading their products. The kecamatans in this category are: Kaliori, Sluke, Batangan, Wedarijaksa, Mlonggo, Bonang, Wedung, Cepiring, Subah, Taman, and Petarukan. Thus it might be argued that in order to assist the marketing process , a road improvement programme, the development of rural infrastructure and the development of occupational and managerial skills, are all needed.

As in quadrant 2, quadrant 3 includes kecamatans with different scores for the two Factors. However, here Factor 1 (the commerce factor) has a positive value, whereas factor 2 (the pull factor) has a negative value. This implies that all kecamatans in this quadrant could be developed on the basis of commerce, but , they do not yet have the potential to attract workers out of the agricultural sector. The kecamatans in this quadrant are : Rembang, Lasem, Juwana, Margoyoso, Jepara, Kaliwungu, Tirto, Wiradesa, and Tanjung.

Kecamatans in quadrant 4 have negative values in both Factors. Thus kecamatans in this quadrant have the lowest potential for development, and cannot be expected to develop on the basis of these factors. These kecamatans are : Sarang, Kragan, Tayu, Dukuhseti, Keling, Pemalang, Losari, Bulakamba, Wanasari and

Brebes.

Based on this analysis of the relationship between Factor 1 (the commerce factor) and Factor 2 (the pull factor), the kecamatans are plotted in Figure 6.18.

VI.4.The Criteria Used to Assess the Relative Significance of Environmental Factor

Viewed from the economic aspect, the allocation of limited funds for investment is not effective and efficient if it is simply distributed evenly in all kecamatans. Thus selective investment in kecamatans is the only available alternative. To achieve this process of selection a priority ordering of kecamatans for development has been made based on socio-economic factors. This ranking, however, does not take account of the physical factors which have been identified as significant in their influence on the development process. In fact, there is a relationship between human activity and environmental conditions because human activities are influenced by the productivity and availability of natural resources.

In these rural coastal areas three essential aspects will be considered. First, the importance of developing rural areas for the rural people; Second, the importance of developing rural areas in the context of regional development; Third, the importance of developing rural areas in conjunction with coastal development.

These three aspects imply a dilemma, on one hand, the need to increase production and on the other, the need to protect the quality and productivity of environment. The goal of 'maximum

production', that is trying to achieve maximum economic growth, conflicts with 'maximum protection', that is the protection of natural environment, which characterizes ecological development. The conflicting uses in in the same system should, however, be optimized. Two possible solutions to this dilemma are suggested:

1.to compartmentalize the environment so as to provide highly productive and highly protected areas as separate units, subject to different management strategies;

2.to compromise between the quantity of production and the quality of environment (Lohani and Thank 1977,p.661).

In this study the previous solution is used. To meet point 1 above, all kecamatans have been allocated a priority for development. Thus, those kecamatans which are categorized as having a high potential for development would be developed as highly productive regions. Kecamatans which have a low potential would concentrated on conservation. Point 2 represents the need of 'dynamic equilibrium' between a stress arising from a development activity in the environment and an antistress which is planned in the same environment (Lohani and Thank,1977). In this study, it can be carried out by monitoring system in the progress of projects implementation.

The nature of the terrain,including the presence of rivers, mountains and coastal features, will have some bearing on the activities engaged in. If water is readily available, this will encourage the growth of settlements and agricultural activity. It is clear that the characteristics of the physical

environment closely affect the life of rural people.

The physical environment may be studied using several groups of variables such as topography, rainfall, sedimentation, the rivers and the land-use of the region. The selection of variables used in this study is based on their relevance to economic activity in coastal rural areas. These groups of variables are now discussed.

1.Topography

Topography is sometimes identified as the determining factor for some activities, and it significantly influences the characteristic of land-use in certain areas. In the lowland plain areas, some people work in agriculture activity such as crops plantation, and in the hilly land in husbandry activity. Large areas of fertile plains form important and productive farming areas in many parts of the world, and it is these areas which have given prosperity to the whole country in which they lie (Stringer and Davies,1966,p.5). On such plains, the soil is often rich, the land flat and movement is easy. These factors encourage settlement and, in turn, industry.

The form and nature coastline also plays its part in influencing man's activities. A lowland-plain along a coast or major river is often dominated by productive wet-land agriculture, aquaculture since the characteristics of the area leads itself to such development. The characteristics of land-use in certain areas can be analyzed using slope characteristics as a basis (Flown,1970,p.146). Thus an area with the slope of 0-5 per cent is identified as appropriate for agriculture and

physical urban development,but, drainage may be a major problem in such areas. At the other end of the scale an area with the slopes in excess of 50 percent is suitable only for forest conservation (Flown,1970). The policy of transmigration programme of Indonesia, however, defined that forest conservation should be established in an area with the slopes in excess of 40 per cent. In this study, therefore, topography will be approximately assessed by the slope distribution within the individual kecamatans. Those which are dominated by slopes of 0 - 2 per cent will score 5, whereas those dominated by slopes greater than 40 per cent will score by 1 (see Appendix E)

2.Rainfall

Mankind depends for food, and other products, either directly or indirectly upon plants. Most plants require a great deal of water to develop to their potential but such moisture is very unequally distributed. Whitbeck (1970) states that 'if rainfall is favourable for crops, millions of people may live even in region of continuous heat as they do in Java, for example'. The ideal climate, from the stand point of food production, is generally one in which rainy season and warm season coincide. This is significant to development in any region. In this study, rainfall totals in each kecamatan have been used to characterize these differences.

3.Rivers

Of all the relief features of the earth, rivers and river valleys have probably played a most significant part in enhancing man's welfare.

> 'Historically, large rivers were commercial highways, but they are sometimes also the very life of peoples, the source of their inspiration, the basis of their wealth,and the cement of their nationality. (Whitbeck,p.234).

In some agricultural countries, a river or stream is a 'vein' in the field, and rivers are the main source of irrigation for wet-land plantations. The yield of irrigated agriculture is often better than that of unirrigated agriculture. Irrigated wet-land agriculture in Central Java, for example, is able to produce two harvests of paddy each year. Thus, a kecamatan which has a significant network of rivers, has an advantage in relation to development.

4.Reclamation

Reclamation land is 'the process by which flooded or waste is made usable, especially for agriculture. It includes the drainage of marshes, of lakes or the shallower part of the sea-floor, together with the improvement of heath-lands and their restoration'(Goodall,1987,p.397). 'Natural' reclamation may take place by the sedimentation processes along the shoreline, which produces new land. Such land is the habitat of certain distinctive plants such as mangroves. In northern Central Java, mangroves and their associated vegetation quickly establish themselves on sand banks, thus hastening the rate of sedimentation. Sedimentation may sometimes be a problem, but it can be seen as a growing natural resource in the economy of coastal rural people. Aquaculture, for instance, has been established a long time ago, in the sedimentation area in the northern coastal areas of Java. This area may also be an appropriate area for fishpond-culture especially for milk-fish

(Chanos-chanos). Milk-fish culture is appropriate on area with the following conditions: the soil should be soft, jellylike, hydrophylic and biologically active, with muds containing about 4 per cent humus and large amounts of clay (Bardach,et al,1972). It is ,therefore, clear that some parts of the study area can be recognized as appropriate for the expansion of aquaculture. In this study, the areas of tambaks in each kecamatan have been used as the indicator variable.

5.Land Use

The intensity of human activities is reflected in the pattern of the use of land, including settlements, agricultural land, industrial areas, recreation areas. Land use can also be used as an indicator of the demand for land by the population. An increase in population causes a higher demand for land for settlements, social and economic facilities, as well as agriculture. This requires the provision of land to meet such demand. A kecamatan which has a high percentage of uncultivated land and where the topography of its land is well suited to some activities, is therefore recognized as having potential for the expansion of productive activities and the associated settlements. In this study, four components of land use have been scored, namely: settlement area, dyke/lake/swamp, cultivated area and uncultivated area. A score of 4 will be given to the kecamatan which has a high percentage of uncultivated land. Cultivated area, dyke/lake/swamp, and settlement area will be scored of 3, 2 and 1 respectively.

VI.5.Application of the Model

Assessment of the values of variables was performed by Factor Analysis. The study produced a 44 x 5 matrix (Table 6.9). This matrix feeds into a Factor Analysis programme similar to that previously described (sub-chapter VI.1). Based on the computing process of this matrix, the result of the rotated factor matrix has been produced as can be seen in Table 6.10.

Table 6.10

Varimax Rotated Factor Matrix
of Physical and Environmental Factors

	FACTOR 1	FACTOR 2	FACTOR 3
VAR01	0.13675	0.41241	-0.29247
VAR02	0.00740	-0.49495	0.00912
VAR03	0.56135	0.19349	0.05652
VAR04	-0.03794	-0.07278	0.49363
VAR05	-0.54534	0.15887	0.28094

Source : Sub Programme of Factor Analysis.

Table 6.10 shows that there are two variables significant in Factor 1. They have coefficients number larger than 0.50 These variables are : Reclamation land (0.56135) and Landuse (-0.54534). The latter has a negative value. Though reclamation land management has great potential, decreasing of land availability is already a characteristic. This may be termed

Table 6.9.

Matrix Data of Environmental Factor

```
004.00 001.00 000.28 002.00 303.52
005.00 002.00 007.80 000.00 265.78
005.00 001.00 001.99 001.00 266.02
004.00 002.00 000.52 001.00 278.19
004.00 002.00 000.94 000.00 296.78
004.00 001.00 006.34 001.00 272.63
005.00 004.00 023.42 000.00 238.08
004.00 004.00 022.21 001.00 236.30
004.00 003.00 011.67 000.00 243.21
004.00 003.00 008.85 002.00 250.63
004.00 003.00 011.30 003.00 264.20
004.00 003.00 011.01 001.00 264.94
001.00 002.00 010.82 002.00 233.01
001.00 005.00 001.76 001.00 231.45
002.00 003.00 001.07 002.00 252.49
002.00 005.00 001.31 003.00 261.31
002.00 005.00 000.62 004.00 301.43
005.00 004.00 003.94 001.00 255.67
005.00 006.00 003.23 001.00 267.35
005.00 004.00 003.07 001.00 275.90
005.00 004.00 006.23 003.00 270.01
003.00 003.00 017.84 001.00 306.28
005.00 003.00 003.91 000.00 259.43
004.00 003.00 002.50 002.00 260.79
004.00 002.00 005.79 000.00 247.14
005.00 003.00 004.76 001.00 244.10
004.00 003.00 004.61 001.00 249.95
001.00 004.00 001.01 001.00 278.47
001.00 006.00 000.00 000.00 272.75
002.00 004.00 000.00 000.00 303.30
005.00 004.00 000.72 001.00 234.54
005.00 004.00 000.00 001.00 249.51
004.00 003.00 002.31 001.00 243.89
004.00 005.00 001.88 001.00 214.72
004.00 003.00 008.82 000.00 214.80
005.00 005.00 000.86 001.00 306.03
004.00 005.00 001.48 001.00 256.26
004.00 004.00 000.56 000.00 254.69
004.00 005.00 021.34 001.00 255.31
004.00 003.00 017.84 002.00 266.00
004.00 003.00 002.68 003.00 254.06
004.00 003.00 004.16 002.00 281.25
004.00 003.00 010.99 001.00 269.64
004.00 003.00 027.81 002.00 237.75
FINISH
```

Note: Column Variable

1	Topography
2	Rainfall
3	Reclamation land
4	River
5	Landuse

Table 6.11

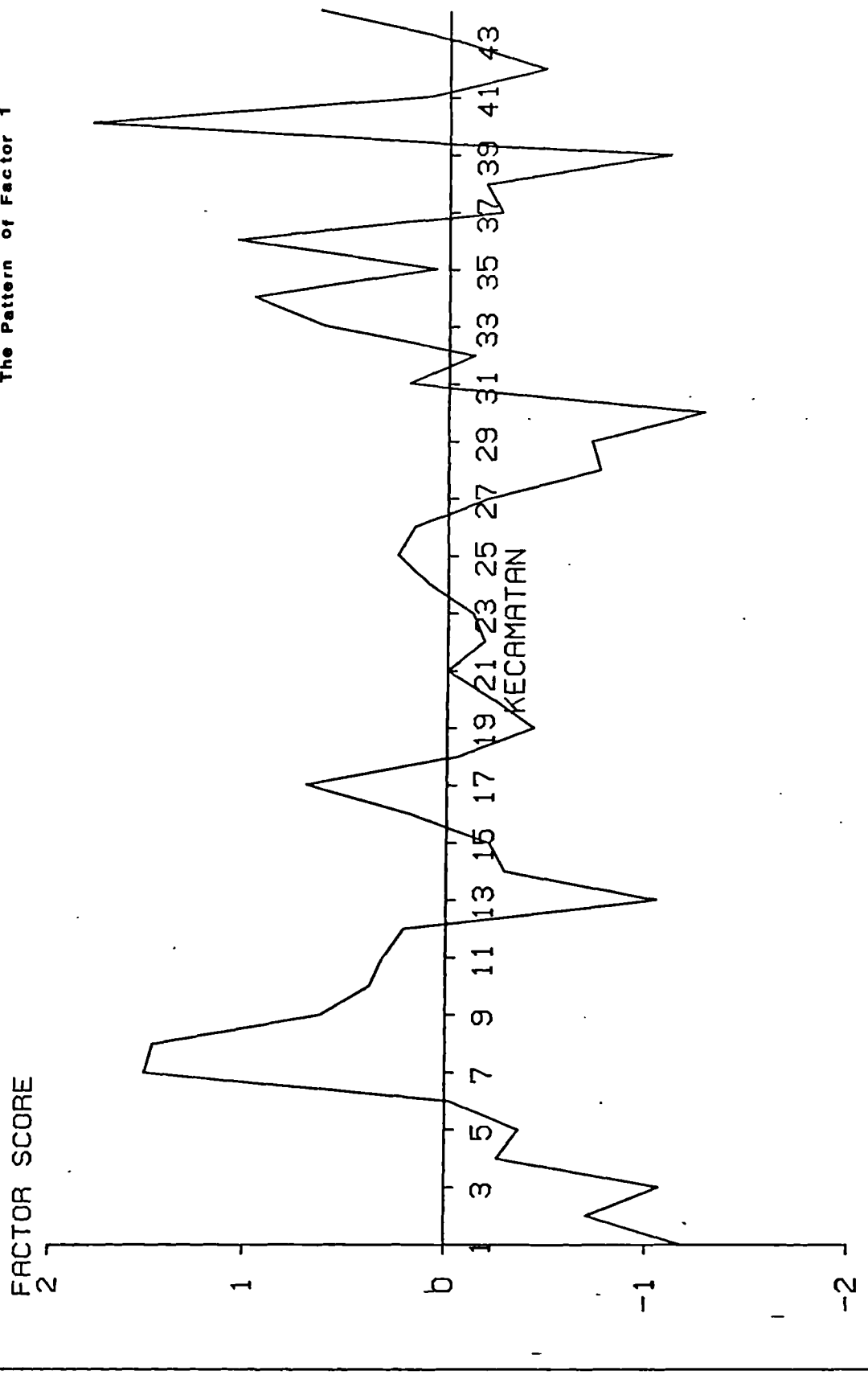
Factor Score of Environmental Variables

	1	2	3
01.SARANG	-1.179357	1.054985	0.656854
02.KRAGAN	-0.707886	0.540510	-0.046661
03.SLUKE	-1.068192	0.744228	-0.275983
04.LASEM	-0.260721	0.947343	0.033970
05.REMBANG	-0.367690	1.054014	-0.307058
06.KALIORI	-0.022761	0.890542	-0.635471
07.BATANGAN	1.500252	0.355725	-0.630008
08.JUWANA	1.457605	0.018404	-0.061348
09.WEDARIJAKSA	0.620447	0.190050	-0.622655
10.MARGOYOSO	0.380436	0.134369	0.255365
11.T A Y U	0.314174	0.282751	0.876581
12.DUKUHSETI	0.208291	0.339840	0.018073
13.KELING	-1.050667	-0.835373	1.799382
14.BANGSRI	-0.291110	-1.148220	0.969356
15.MLONGGO	-0.212611	-0.557662	0.476937
16.JEPARA	0.185611	-1.611819	-0.007581
17.KEDUNG	0.701270	-0.449919	0.677826
18.WEDUNG	-0.053067	0.160506	0.631967
19.BONANG	-0.433427	0.197701	-0.233117
20.KARANGTENGAH	-0.227513	-0.520779	-0.351807
21.SAYUNG	0.000559	0.037506	-0.423925
22.KALIWUNGU	-0.183747	0.599218	0.769415
23.BRANGSONG	-0.126637	0.421878	-0.798914
24.KENDAL	0.093663	0.059753	-0.270003
25.PATEBON	0.251052	0.276281	-0.509478
26.CEPIRING	0.164839	0.413345	-0.687647
27.WELERI	-0.203657	0.079361	0.228066
28.GRINGSING	-0.761998	-0.887329	0.479260
29.LIMPUNG	-0.718716	-1.578842	-0.064622
30.SUBAH	-1.289915	-0.395629	0.102422
31.TULIS	0.198204	-0.224402	-0.709195
32.BATANG	-0.127660	-0.107604	-0.569586
33.TIRTO	0.621939	-0.962492	-0.724409
34.WIRADESA	0.977791	-0.128202	-0.975405
35.SRAGI	0.065113	-0.046896	-0.380481
36.ULUJAMI	1.064219	-0.155271	0.100000
37.PETARUKAN	-0.265508	-0.285261	-0.752302
38.TAMAN	-0.183353	-0.601786	-0.303736
39.PEMALANG	-1.118726	0.092340	0.015170
40.BREBES	1.796442	0.454042	0.517153
41.WANASARI	0.118741	0.381231	0.066196
42.BULAKAMBA	-0.485308	0.299565	0.473933
43.TANJUNG	-0.029046	-0.005011	0.592366
44.LOSARI	0.648295	0.477175	0.601298

Source : Sub-programme of Factor Analysis

Figure 6.19

The Pattern of Factor 1

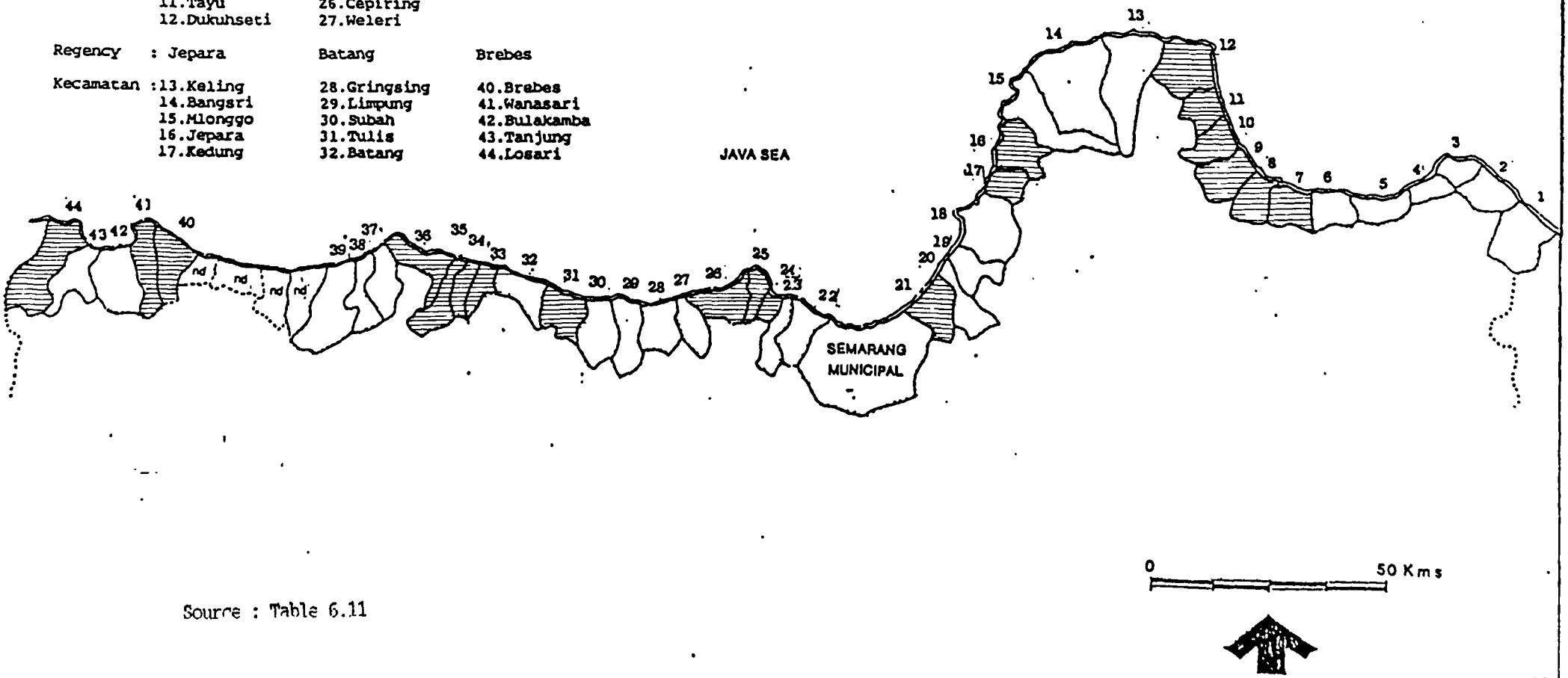


Source : Table 6.11

Figure

The Significance Kecamatans for Development
Based on Factor 1

Regency	: Rembang	Demak	Pekalongan
Kecamatan	: 1.Sarang	18.Wedung	33.Tirto
	2.Kragan	19.Bonang	34.Wiradesa
	3.Sluke	20.Karangtengah	35.Sragi
	4.Lasem	21.Sayung	
	5.Rembang		
	6.Kaliori		
Regency	: Pati	Kendal	Pemalang
Kecamatan	: 7.Batangan	22.Kaliwungu	36.Ulujami
	8.Juwana	23.Brangsong	37.Petarukan
	9.Wedarijaksa	24.Kendal	38.Taman
	10.Margoyoso	25.Patebon	39.Pemalang
	11.Tayu	26.Cepiring	
	12.Dukuhseti	27.Weleri	
Regency	: Jepara	Batang	Brebes
Kecamatan	:13.Keling	28.Gringsing	40.Brebes
	14.Bangsri	29.Limpung	41.Wanasari
	15.Mlonggo	30.Subah	42.Bulakamba
	16.Jepara	31.Tulis	43.Tanjung
	17.Kedung	32.Batang	44.Losari



Source : Table 6.11

nd = no data available

the 'physical development factor'. The significant kecamatans based on physical factor, this matrix will be evaluated by the PA2 factoring method.

Kecamatans can be ranked according to Factor Scores (Table 6.12). Some kecamatans which have a positive value are identified as having physical potential for development.

Table 6.12

The ranking of kecamatans for development based on the environmental aspect

No of priority	Kecamatan	No of Priority	Kecamatan
01	Losari	23	Sayung
02	Batangan	24	Brangsong
03	Juwana	25	Batang
04	Pemalang	26	Petarukan
05	Sragi	27	Kaliwungu
06	Keling	28	Kendal
07	Brebes	29	Mlonggo
08	Wiradesa	30	Bonang
09	Wedarijaksa	31	Kaliori
10	Margoyoso	32	Taman
11	Tayu	33	Jepara
12	Cepiring	34	Sluke
13	Dukuhseti	35	Karangtengah
14	Tulis	36	Bulakamba
15	Patebon	37	Lasem
16	Bangsri	38	Limpung
17	Tanjung	39	Gringsing
18	Weleri	40	Kedung
19	Tirto	41	Rembang
20	Wedung	42	Ulujami
21	Kragan	43	Sarang
22	Wanasari	44	Subah

Source: Table 6.11.

To identify the significant factors for development Factor 1 and Factor 2 would be examined. The Varimax Rotated Factor Matrix table reveals no single significant variable is indicated in Factor 2. It, however, indicates two less significant variables, which have coefficient bigger than 0.40 in this Factor, namely topography (0.41241) and rainfall

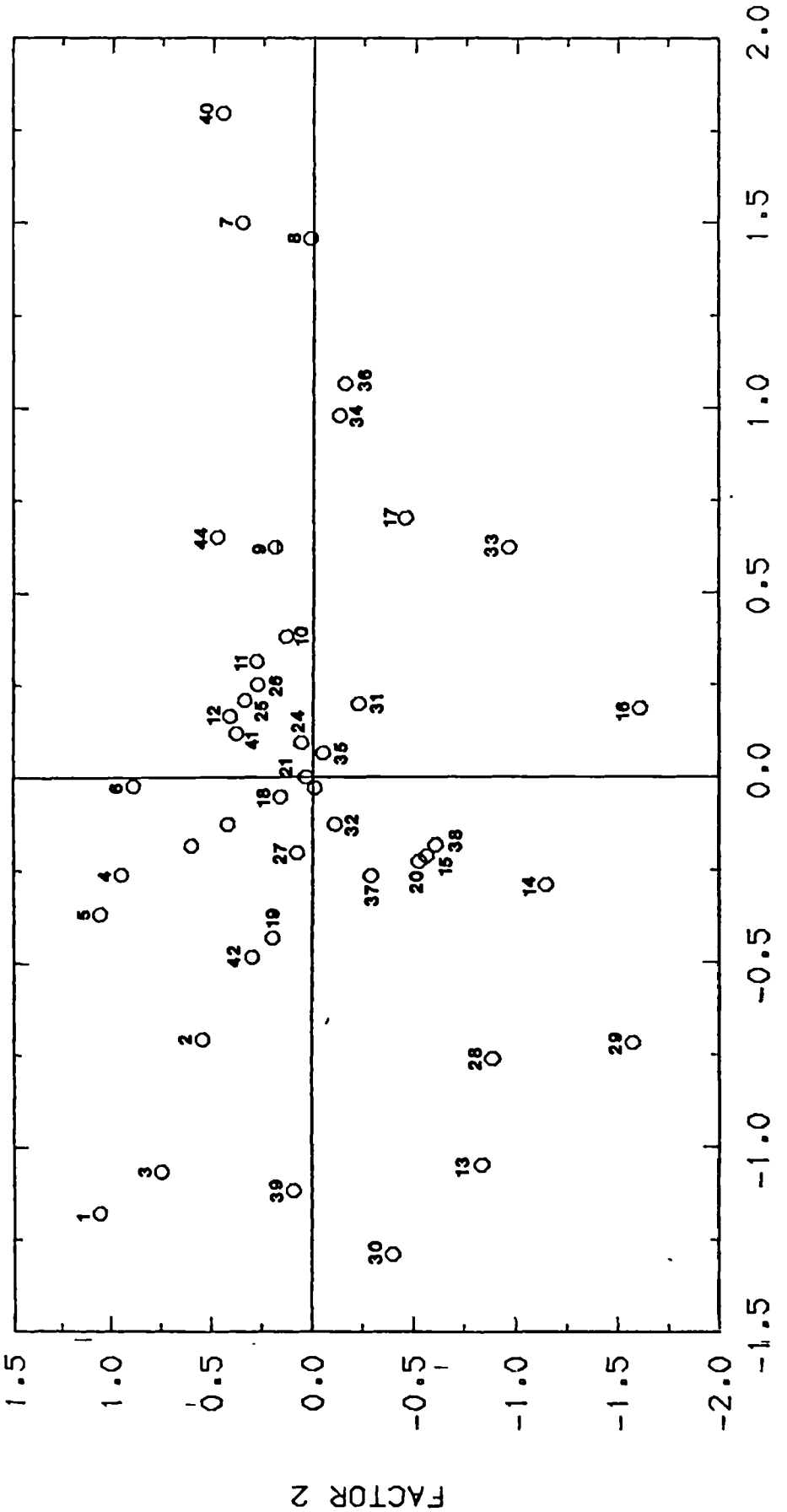
(-0.49495). The latter shows a negative value which means that the locations of study areas are affected by the season, and thus it influences the fertility of land. An area which has a low land fertility (negative score) might be recommended as an ideal location for particular activities, such as fishpond cultivation for example. This Factor is, therefore, called 'potential of location factor'. Thus the results of Factor Analysis plotted in Figure 6.20 can be interpreted.

All the kecamatans which are included in quadrant 1 will have positive scores in both Factor 1 (reclamation management) and Factor 2 (potential of location). Thus, these kecamatans are identified as the most favoured kecamatans from the perspective of reclamation coastal land and potential location development. These kecamatans are : Kecamatan Batangan, Juwana, Wedarijaksa, Margoyoso, Tayu, Dukuhseti, Wedung, Patebon, Cepiring, Weleri, Brebes, Tanjung and Losari.

Quadrant 2 shows a different value between Factor 1 and Factor 2. Factor 1 has a negative value and Factor 2 has a positive. Thus, it can be argued that all the kecamatans in this quadrant have potential of location for development, but they have a low potential for reclamation coastal land management. Kecamatans which are included in this group are : Sarang, Kragan, Sluke, Lasem, Rembang, Kaliori, Karangtengah, Sayung, Kaliungu, Brangsong, Kendal, Ulujami and Bulakamba.

As in quadrant 2, quadrant 3 includes kecamatans with different scores for the Factor 1 and Factor 2. In this quadrant, Factor 1 has a positive values, whereas Factor 2 negative. This implies that all kecamatans in this quadrant could be developed

Figure 6.20
SCATTERED DIAGRAM OF
RELATIONSHIP BETWEEN FACTOR 1 AND FACTOR 2



on the basis of 'reclamation land management', but,the have a low 'potential of location' for development. The kecamatans in this group are: Keling, Tulis, Tirto, Wiradesa, Sragi, Pemalang and Bangsri.

Kecamatans in quadrant 4 have negative values in both Factors. Thus it can be argued that these kecamatans have a low potential to be developed on the basis of 'reclamation land management' and 'potential of location'. All the kecamatans which are included in this group are : Kecamatan Mlonggo, Jepara, Kedung, Gringsing, Bonang, Limpung, Subah, Batang, Petarukan, Taman and Wanasari.

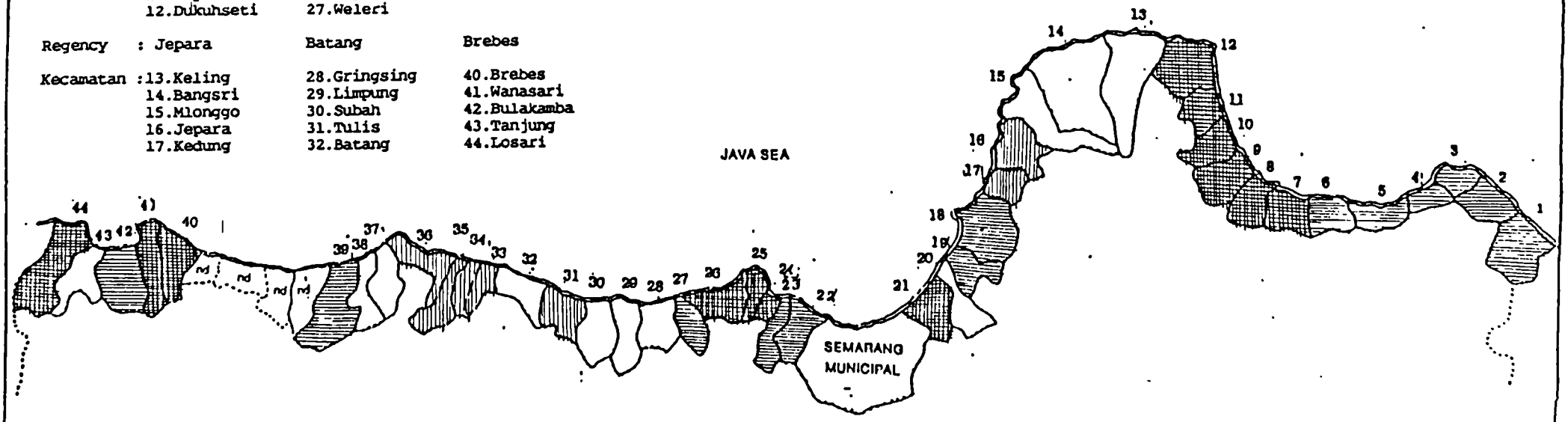
These groups of kecamatans are mapped in Figure 6.21.

Regency	: Rembang	Demak	Pekalongan
Kecamatan	: 1.Sarang	18.Wedung	33.Tirto
	2.Kragan	19.Bonang	34.Wiradesa
	3.Sluke	20.Karangtengah	35.Sragi
	4.Lasem	21.Sayung	
	5.Rembang		
	6.Kaliori		
Regency	: Pati	Kendal	Pemalang
Kecamatan	: 7.Batangan	22.Kaliwungu	36.Ulujami
	8.Juwana	23.Brangsong	37.Petarukan
	9.Wedarijaksa	24.Kendal	38.Taman
	10.Margoyoso	25.Patebon	39.Pemalang
	11.Tayu	26.Cepiring	
	12.Dukuhseti	27.Weleri	
Regency	: Jepara	Batang	Brebes
Kecamatan	:13.Keling	28.Gringsing	40.Brebes
	14.Bangsri	29.Limpung	41.Wanasari
	15.Mlonggo	30.Subah	42.Bulakamba
	16.Jepara	31.Tulis	43.Tanjung
	17.Kedung	32.Batang	44.Losari

Figure 6 : 21

PRIORITY KECAMATANS FOR DEVELOPMENT

BASED ON PHYSICAL DEVELOPMENT FACTOR



LEGEND

- Group of Kecamatans which are affected by Factor 1 and Factor 2
- Group of Kecamatans which are affected by Factor 2
- Group of Kecamatans which are affected by Factor 1
- Group of Kecamatans which are not affected by Factor 1 and Factor 2

0 50 Kms

Source : Figure 6.20

nd = no data available

CHAPTER VIII

EXAMINATION BY THE GUTTMAN SCALE METHOD

CHAPTER VII

EXAMINATION BY THE GUTTMAN SCALE METHOD

The kecamatans most favourable for development have been identified, using Factor Analysis, and simple scoring to establish a priority.The results of the Factor Analysis can, however, also be assessed using the Guttman Scale Method. Different results may well be obtained, but these differences can be tolerated as far as they do not differ radically. Similarity in the results will, however, provide strong confirmation of the usefulness of the assessment.

VII.1.The Guttman Scale Method.

This approach was devised by Guttman (1944,1950). Social scientists, particularly those engaged in psychological and attitudinal research, have developed a large number of techniques for combining individual items into scales and indexes. Some of these techniques are quite simple. Some social scientists use the index systems. Likert Indices (Likert,1932) , for example, are computed simply by summing the responses to a number of items, each taking a value from 5 (agree strongly) to 1 (disagree strongly), and are assumed to be measuring part of the same underlying continuum (Nie,1970,p.529, Dunn,1983,p.102-122) The Guttman Scale is part of 'scalogram analysis' which attempts to assess and utilize the interrelationships and/or operating characteristics of the component items. Guttman Scale Analysis is a means of evaluating the underlying operating characteristics of three or more items in order to determine whether their interrelationships meet the

special properties which define the Guttman Scale (Nie,1970). To use this method validly, several conditions must be met. First, the scale must be unidimensional, that is, the component items must all measure movement towards or away from the same single underlying focus. The substance of this focus is varied. It might be racial prejudice, technological development of societies or study alternative towns for the capital of regency. The units of study may be individuals, nations or regions.Secondly, the scale must be cumulative, in which the different responses to the foci would place the individuals in a perfect order. Ideally persons who answer several questions favorably all have higher ranking than those who answer the same questions unfavorably.

Nie(1970) gives an example of the applications of Guttman Scale Analysis, using social-distance scales, because the underlying concepts of these types of scale are directly related to the operational definitions and procedure used in developing the scales (Nie,1970, p.529-530). Each item in Guttman Scale must be ordinal to the degree of having the capacity of being divided at some point into two portions such as 'pass' or 'fail',or 'yes' or 'no'. There is no problem in precoding these items if the respondents are required to give a simple 'yes' or 'no' response, since there is then no need to select cutting points. In general, however, respondents or observations which have values equal to or greater than the selected cutting points are considered to have 'passed' an item, while those having values less than the cutting point are considered to have 'failed' the item (Nie,1970)

VII.1.1.Application of the Guttman Scale Method.

The steps of this method are :

1.To create a (m x n) matrix where 'm' is number of cases and 'n' is number of the defined variables. In this step all the variables are arranged in such a way that the unidimensional and cumulative Scale requirements can be met. In this study there are 10 variables and 44 cases. The variables used are the socio-economic variables since they are more dynamic than relating to the physical environment.The (44 x 10) matrix applying to this study is shown in Table 7.1

2.The second step is to decide on the 'cutting point' of each variable. In this study kecamatans which have values greater than the selected cutting point are considered to have 'passed' and they will be marked by +. On the other hand, kecamatans which have values less than the selected cutting point are considered to have 'failed' and are marked by -. The selected cutting point in this study has been defined by calculating the mean value for each variable. Table 7.2. shows the cutting points of the ten variables, and Table 7.3. set out the results of the analysis in terms of 'passed' or 'fail' criteria.

VII.1.2.Variables Used for the Method.

In this study, 10 variables have been selected. which are identified as the qualified to underly the Guttman Scale Method. It is assumed that all these variables meet the required conditions being both unidimensional and cumulative.

The variables used are now considered in order. They are:

VAR20: Number of the public health units per 1000 population.

Physical health is the basis for the people to move their physical-environmental development. The provision of health facilities reflect that the physical welfare of the people is maintained. This is the most important variable than the other. This is why it is placed first.

VAR02: The score on 'educational level'

This variable supports the first variable since it constitutes the foundation of human resource development, and is important in sustaining both 'economic' and 'social' development. No activity can be enhanced without the knowledge and skill provided by appropriate education.

VAR19: Number of secondary schools per 1000 population at the secondary school age.

This variable relates to VAR02 in being a measure of educational facilities. Kecamatans with a high provision have a better chance to develop since they can receive and disseminate new information and technology better than kecamatans which have a low provision.

VAR18: Number of elementary schools per 1000 population of elementary school age.

This also relates to educational potential.The provision of elementary schools indicates an investment on human resources at a basic level.

VAR06: Number of workers in light industry per 1000 population.

This reflects the potential for the development of light industry. It may also encourage agricultural activity, since some of these industries use agricultural products as raw materials.

VAR04: Number of farmers per 1000 population.

This supports VAR06 in agroindustry development. The majority of the rural activities is still in agriculture. Thus, the provision of farmers indicates the basis upon which to develop the agricultural sector.

VAR07 : Number of merchants per 1000 population

Merchants are the middleman between the urban and the rural communities. This variable indicates the degree for marketing development in agriculture and light industry.

VAR13 : Index values of the rural road

The flow of goods and passengers from and to rural areas is served by rural roads and there is an information dimension also. This variable is therefore significant.

VAR15 : Index value of the distance to the regency capital; and VAR16 : Index value of the distance to the regional capital. These are indices of accessibility, and are clearly important to development.

Thus, VAR20 (health) is seen as the most significant variable than VAR02 (education), and VAR02 is more significant than

VAR19 since secondary schools are more significant than elementary levels. VAR18 is more significant than VAR06, and VAR06 than VAR04, and so on. Table 7.1 thus shows the data base for the application of the Guttman Scale Method.

The computer sub-programme employed enables the user to select from several criteria which facilitate the evaluation of the scalability of the items, such criteria include a coefficient of Reproductibility and Coefficient of Scalability (Nie,1970, 532-533). The unidimensional and cumulative scale of the Guttman Method is indicated by the 'Coefficient of Reproductibility' which is a measure of the extent to which a respondent's scale score is a predictor of the whole response pattern. Mathematically, it is 1 minus the result of dividing the total number of errors by the total number of responses, and it varies from 0 to 1. Sub-programme of Guttman Scale method produces Coefficient of Scalability. It also varies from 0 to 1 and should be well above 0.6 if the scale is truly unidimensional and cumulative. This method is run by computer using SPSS programme. As the result of this computing process in the Guttman Scale Method, the scale for the kecamatans for development is shown in Table 7.5.

The Guttman Scale Method produces groups of kecamatans by defined levels, but it does not yet assign an order of priority. All variables are weighted based on the importance level, thus the weight of 10 is given to the most significant variable, namely VAR20, the weight of 9 to the next variable less significant than VAR20, namely VAR02, the weight of 8 to the VAR19, and so on. But, the scores of weighting are not

Table 7.1

Some variables which are used for Guttman scale method.

1	2	3	4	5	6	7	8	9	10
171.60	000.20	002.23	000.02	364.00	003.00	014.00	030.00	020.00	010.00
271.90	000.56	004.14	000.03	371.00	010.00	001.00	030.00	030.00	010.00
563.80	000.92	003.32	000.01	105.00	016.00	025.00	060.00	030.00	020.00
294.90	000.20	003.77	000.02	384.00	014.00	026.00	030.00	020.00	010.00
255.90	000.40	004.44	000.04	559.00	006.00	010.00	030.00	030.00	010.00
562.40	001.12	005.48	000.05	282.00	100.00	094.00	030.00	030.00	020.00
241.20	000.13	003.73	000.03	409.00	016.00	007.00	010.00	030.00	020.00
463.10	000.61	002.64	000.06	252.00	074.00	034.00	040.00	030.00	020.00
423.60	000.00	002.13	000.01	373.00	043.00	020.00	030.00	030.00	020.00
317.00	000.30	002.28	000.01	294.00	034.00	035.00	030.00	030.00	020.00
388.20	000.62	002.50	000.01	238.00	031.00	011.00	030.00	030.00	020.00
403.00	000.18	001.96	000.04	291.00	005.00	007.00	020.00	020.00	020.00
235.80	000.29	003.63	000.04	358.00	028.00	016.00	010.00	030.00	030.00
591.40	000.61	003.56	000.03	128.00	122.00	027.00	020.00	030.00	030.00
653.50	000.30	003.34	000.04	350.00	046.00	017.00	010.00	030.00	030.00
562.30	000.31	003.30	000.04	358.00	056.00	018.00	010.00	030.00	020.00
562.30	000.45	003.34	000.04	354.00	001.00	008.00	030.00	020.00	020.00
219.30	000.10	002.86	000.01	369.00	009.00	010.00	050.00	030.00	030.00
323.30	000.21	003.31	000.02	436.00	012.00	023.00	040.00	030.00	030.00
370.10	000.13	001.99	000.01	364.00	004.00	019.00	030.00	030.00	030.00
713.30	000.14	002.14	000.03	434.00	007.00	002.00	060.00	030.00	030.00
361.50	000.17	002.13	000.02	316.00	048.00	022.00	050.00	030.00	030.00
369.20	000.14	002.99	000.06	443.00	027.00	031.00	020.00	030.00	030.00
361.60	000.37	002.73	000.05	290.00	026.00	030.00	010.00	030.00	030.00
378.00	000.34	002.33	000.01	456.00	040.00	016.00	030.00	030.00	030.00
362.20	000.22	003.05	000.08	435.00	043.00	030.00	040.00	030.00	030.00
361.70	001.42	003.56	000.05	265.00	026.00	030.00	040.00	030.00	030.00
267.00	000.42	003.43	000.08	302.00	016.00	037.00	010.00	030.00	030.00
251.00	000.30	004.27	000.04	265.00	213.00	017.00	010.00	030.00	030.00
417.70	000.26	003.85	000.00	624.00	023.00	038.00	030.00	030.00	030.00
226.20	000.20	003.77	000.06	405.00	021.00	013.00	030.00	030.00	020.00
278.90	000.65	003.02	000.03	367.00	114.00	011.00	030.00	030.00	030.00
386.10	000.13	002.62	000.02	347.00	057.00	047.00	060.00	030.00	020.00
324.70	000.07	001.93	000.05	186.00	027.00	044.00	010.00	030.00	020.00
324.60	000.39	002.50	000.06	144.00	061.00	094.00	010.00	030.00	020.00
473.20	000.52	002.60	000.02	079.00	038.00	022.00	020.00	030.00	020.00
348.00	000.12	002.39	000.01	350.00	033.00	032.00	020.00	030.00	020.00
365.70	000.29	002.92	000.02	365.00	012.00	031.00	030.00	030.00	020.00
318.30	000.19	002.68	000.01	352.00	028.00	068.00	020.00	030.00	020.00
292.80	000.16	002.10	000.02	034.00	000.00	002.00	040.00	030.00	010.00
225.00	000.48	002.88	000.03	036.00	015.00	030.00	020.00	030.00	010.00
265.10	000.18	001.58	000.01	029.00	000.19	015.00	030.00	030.00	010.00
506.40	000.21	002.14	000.01	016.00	000.00	006.00	030.00	030.00	010.00
588.40	000.70	002.05	000.02	273.00	000.00	061.00	040.00	030.00	010.00

Columns Variables

VAR02 = The scores number of educational level

VAR19 = Ratio of number of junior and senior high school to the 1000 population at junior and senior high scool age.

VAR18 = Ratio of number of elementary school to the 1000 population at elementary school age.

VAR20 = Ratio of number of central health communities to the 1000 population

VAR04 = Ratio of number of farmer's labour to the 1000 population.

VAR06 = Ratio of number of light industry workers to the 1000 population.

VAR07 = Ratio of number of merchants to the 1000 population

VAR13 = Index values of road (kms).

VAR15 = Index values of the distance from kecamatans to the regencies's capital city (kms).

VAR16 = Index values of the distance from kecamatans to the province's capital city (kms).

involved in the execution of the programme. To obtain this order of priority, all variable are scored by considering 'cutting point' of individual variables. In this study, the 'cutting point' is defined as the mean value of each individual variable. Thus, a kecamatan which has a score of variable higher or lower than 'cutting point' is marked '+' or '-'.

In this study, the weight and 'cutting point' of variables thus:

Table 7.2

Variables, Weight and Cutting Point for the Variables Used in the Individual Computation by the Guttman Scale method

Variables	Weight	Cutting Point
VAR20	10	0.03
VAR02	9	378.20
VAR19	8	0.357
VAR18	7	2.945
VAR04	6	305.72
VAR06	5	34.20
VAR07	4	26.16
VAR13	3	28.64
VAR15	2	30.00
VAR16	1	21.80

Table 7.3

Cutting point scores of variables

Kecamatan	VAR20	VAR02	VAR19	VAR18	VAR04	VAR06	VAR07	VAR13	VAR15	VAR16	TOTAL
1.Sarang	-	-	-	-	+	-	-	+	-	-	2
2.Kaliori	+	-	+	+	+	-	-	+	+	-	6
3.Rembang	-	+	+	+	-	-	-	+	+	+	5
4.Kragan	+	-	-	+	+	-	+	+	-	-	4
5.Sluke	+	-	+	+	+	-	-	+	+	-	6
6.Lasem	+	+	+	+	-	+	+	+	+	+	9
7.Batangan	+	-	-	+	+	-	-	-	+	+	5
8.Juwana	+	+	+	-	-	+	+	+	+	+	8
9.Wedarijaksa	-	+	-	-	+	+	-	+	+	+	6
10.Margoyoso	-	-	-	-	-	+	+	+	+	+	5
11.Tayu	-	+	+	-	-	+	-	+	+	+	6
12.Dukuhseti	+	+	-	-	-	-	-	-	-	+	3
13.Kedung	+	-	-	+	+	-	-	-	+	+	5
14.Jepara	+	+	+	+	-	+	+	-	+	+	8
15.Mlonggo	+	+	-	+	+	+	-	-	+	+	7
16.Bangsri	+	+	-	+	+	+	-	-	+	+	7
17.Keling	+	+	+	+	+	-	-	+	-	+	7
18.Sayung	-	-	-	-	+	-	-	+	+	+	4
19.Karangtengah	-	-	-	+	+	-	-	+	+	+	5
20.Bonang	-	-	-	-	+	-	-	+	+	+	4
21.Wedung	+	+	-	-	+	-	-	+	+	+	5
22.Kaliwungu	-	-	-	-	+	+	-	+	+	+	5
23.Brangsong	+	-	-	+	+	-	+	-	+	+	6
24.Weleri	+	-	+	-	+	-	+	-	+	+	5
25.Cepiring	-	-	-	-	+	+	-	+	+	+	5
26.Patebon	+	-	-	+	+	+	+	+	+	+	8
27.Kendal	+	-	+	+	-	-	+	+	+	+	7
28.Gringsing	+	-	+	+	+	-	+	-	+	+	7
29.Limpung	+	-	-	+	-	+	-	-	+	+	5
30.Subah	-	+	-	+	+	-	+	+	+	+	7
31.Tulis	+	-	-	+	+	-	-	+	+	+	6
32.Batang	+	-	+	+	+	+	-	+	+	+	8
33.Bragi	-	+	-	-	+	+	+	+	+	+	7
34.Tirto	+	-	-	-	-	-	+	-	+	+	4
35.Wiradesa	+	-	+	-	-	+	+	-	+	+	6
36.Pemalang	-	+	+	-	-	+	-	-	+	+	5
37.Taman	-	-	-	-	+	+	+	-	+	+	5
38.Petarukan	-	-	-	-	+	-	+	+	+	+	5
39.Ulujami	-	-	-	-	+	-	+	-	+	+	4
40.Losari	-	-	-	-	-	-	-	+	+	-	2
41.Tanjung	+	-	+	-	-	-	+	-	+	-	4
42.Bulakamba	-	-	-	-	-	-	-	+	+	-	2
43.Wanasari	-	+	-	-	-	-	-	+	+	-	3
44.Brebes	-	+	+	-	-	-	+	+	+	-	5

Note : + = equal or higher than cutting point score
- = lower than cutting point score

Table 7.4.

The Priority of Kecamatans for Development by Running the Guttman Scale Programme

0ITEM..	A		B		F		G		C		D		E		H		J		I		
0RESP..	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	TOTAL
T																					
A 10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
B	ERR																				
L																					
E 9	0	1	0	1	0	1	0	1	0	1	0	1	1	0	0	1	0	1	0	1	1
X		ERR																			
8	2	2	1	3	0	4	1	3	1	3	0	4	2	2	1	3	0	4	0	4	4
			ERR																		
7	2	5	4	3	4	3	3	4	1	6	2	5	1	6	3	4	0	7	1	6	7
						ERR															
6	5	4	4	5	6	3	7	2	4	5	3	6	3	6	2	7	2	7	0	9	9
								ERR													
5	10	2	9	3	6	6	7	5	8	4	8	4	5	7	6	6	1	11	0	12	12
										ERR											
4	6	0	5	1	6	0	2	4	5	1	4	2	2	4	3	3	2	4	1	5	6
												ERR									
3	0	2	2	0	2	0	2	0	2	0	1	1	2	0	1	1	1	1	1	1	2
														ERR							
2	3	0	3	0	3	0	3	0	3	0	3	0	2	1	0	3	3	0	1	2	3
																ERR					
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
																		ERR			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1GUTTMAN SCALE 09:33:49 09/03/87 PAGE 3

Source : Sub-programme of Guttman Scale Method

Table 7.3 presents the results of 'cutting point' of individual variables, and Table 7.4 shows the priority of kecamatans for development. There is one kecamatan in the first order, namely Lasem, and are four kecamatans in the second order, namely Juwana, Jepara, Patebon, and Batang. There are 7 and 9 kecamatans in the third and and fourth orders respectively. These orders are shown in Table 7.5

Table 7.5.

The Order of Kecamatans Based on Guttman Scale Method

Order I	Order II	Order III	Order V
Lasem	Juwana	Mlonggo	Kaliori
	Jepara	Bangsri	Sluke
	Patebon	Keling	Wedarijaksa
	Batang	Kendal	Tayu
		Gringsing	Brangsong
		Subah	Tulis
		Sragi	Wiradesa

Order V	Order VI	Order VII	Order VII
Rembang	Kragan	Dukuhseti	Sarang
Batangan	Sayung	Wanasari	Losari
Margoyoso	Bonang		
Kedung	Tirto		
Karang-	Ulujami		
tengah	Tanjung		
Kaliwungu			
Wedung			
Weleri			
Cepiring			
Limpung			
Pemalang			
Taman			
Petarukan			
Brebes			

Sometimes, two or more kecamatans have a similar pattern of scaling for their variables. In this case, assessment will depend on the precise data base of the individual kecamatan. The most significant kecamatan is than put higher in the order.

Table 7.6.

Priority for kecamatans development
based on Guttman Scale Method

No.	Kecamatan	No.	Kecamatan
1.	Lasem	23.	Pemalang
2.	Jepara	24.	Batangan
3.	Juwana	25.	Kedung
4.	Batang	26.	Limpung
5.	Patebon	27.	Weleri
6.	Keling	28.	Karanganyar
7.	Mlonggo	29.	Taman
8.	Bangsri	30.	Cepiring
9.	Gringsing	31.	Kaliwungu
10.	Subah	32.	Petarukan
11.	Kendal	33.	Margoyoso
12.	Sragi	34.	Kragan
13.	Sluke	35.	Tanjung
14.	Kaliori	36.	Tirto
15.	Rembang	37.	Ulujami
16.	Tayu	38.	Bonang
17.	Wedung	39.	Sayung
18.	Brangsong	40.	Dukuhseti
19.	Wiradesa	41.	Wanasari
20.	Wedarijaksa	42.	Sarang
21.	Tulis	43.	Losari
22.	Brebes	44.	Bulakamba

For example, Kecamatan Kaliori and Kecamatan Sluke (Table 7.3.) have the same variables which fulfil the criteria of Guttman Scale Method. They have the same scaling score of variables 20,19,18, 04, 13, and 15.The problem might be faced is to put these kecamatans in order. The individual data base was therefore examined. Thus the complete sequence of the order of priority can be determined. The results are shown in Table 7.6.

VII.2.Comparison of the Results from the Two Methods of Analysis

From the results of Factor Analysis of socio-economic characteristics and the Guttman Scale Method (Table 6.8 and Table 7.6), the difference between the two methods can be seen. Two reasons cause these differences:

1.The different number of variables used in each assessment.

There are 10 variables which are utilized in Guttman Scale method. They are selected to fulfil the unidimensional and cumulative conditions. In Factor Analysis method, however, there are 22 variables of socio-economic characteristics are involved in the calculation.

2.The differences in the criteria and the approach.

The criterion of the 'cutting point' in the Guttman Scale Method, assesses all the variables which fulfil the conditions mentioned in point 1. It is thus a the simple method of obtaining an order of priority. Factor Analysis, however, processes all the variables using considerably more complex calculations, and iterations are programmed in order to

Table 7.7

Comparison Between the Priority of Kecamatans Using Factor Analysis and Guttman Scale Methods

by using Factor Analysis				by using Guttman Scale			
1	2	1	2	1	2	1	2
01.Lasem		23.Rembang		01.Lasem		23.Pemalang	
02.Jepara		24.Tayu		02.Jepara		24.Batangan	
03.Kendal		25.Kragan		03.Juwana		25.Kedung	
04.Tanjung		26.Brebes		04.Batang		26.Limpung	
05.Limpung		27.Mlonggo		05.Patebon		27.Weleri	
06.Wiradesa		28.Cepiring		06.Keling		28.Karanganyar	
07.Gringsing		29.Subah		07.Mlonggo		29.Taman	
08.Batang		30.Pemalang		08.Bangsri		30.Cepiring	
09.Sayung		31.Sluke		09.Gringsing		31.Kaliwungu	
10.Kaliwungu		32.Wedung		10.Subah		32.Petarukan	
11.Patebon		33.Wedarijaksa		11.Kendal		33.Margoyoso	
12.Bangsri		34.Keling		12.Sragi		34.Kragan	
13.Tirto		35.Kaliori		13.Sluke		35.Tanjung	
14.Brangsong		36.Sarang		14.Kaliori		36.Tirto	
15.Margoyoso		37.Batangan		15.Rembang		37.Ulujami	
16.Juwana		38.Wanasari		16.Tayu		38.Bonang	
17.Tulis		39.Losari		17.Wedung		39.Sayung	
18.Karangtengah		40.Taman		18.Brangsong		40.Dukuhseti	
19.Weleri		41.Petarukan		19.Wiradesa		41.Wanasari	
20.Kedung		42.Bonang		20.Wedarijaksa		42.Sarang	
21.Ulujami		43.Dukuhseti		21.Tulis		43.Losari	
22.Sragi		44.Bulakamba		22.Brebes		44.Bulakamba	

Source : Table 6.8 and Table 7.6

optimize the result.

Thus, it is not surprising that the results of the two methods are different. If Table 6.8. and Table 7.6. are examined (Figure 7.7) more closely, in fact the differences between the results of the two methods are not as great as at first appears and the validity of the use of Factor Analysis is thus confirmed. Several kecamatans have the same ranking in these Tables, such as Kecamatan Lasem, Jepara and Bulakamba. Few kecamatans are different such as Kecamatan Tanjung, Keling and Mlonggo.

The exclusive use of one method is probably not justified, but using both Factor Analysis and the Guttman Scale Method together can be valuable for assigning an order of priority in relation to development. In this study, the results of Factor Analysis are used as the primary ranking. It may be argued that there is an optimization of the data base as in Factor Analysis, should produce a more satisfactory result. Furthermore, Factor Analysis indicates significant factors in relation to the development of kecamatans, while other methods are unable so to do.

CHAPTER VIII

THE PRIORITY OF KECAMATANS AND PROPOSED PROGRAMMES FOR DEVELOPMENT

CHAPTER VIII

THE PRIORITY OF KECAMATANS AND PROPOSED PROGRAMMES FOR DEVELOPMENT

This chapter discusses the subsequent development for these kecamatans by identifying the priority, proposed programmes and the role of significant factor for physical manifestation.

VIII.1.Priority for Development Based on Socio-economic and Environmental Factors

In chapter VI, individual socio economic and environmental factors have been discussed and evaluated. These factors interact and therefore further assessment is needed to identify the kecamatans which might have priority in development. To achieve this the kecamatans will be further examined based on relative different socio-economic and environmental factors. The socio-economic analysis has already grouped all kecamatans based on the 'commerce' and 'pull' factors. This produced four groups. They are :

1.Group 1: high values on the 'commerce' and 'pull' factors (quadrant 1);

2.Group 2: high values on the 'commerce' factor (quadrant 3);

3.Group 3: high values on the 'pull' factor (quadrant 2);

4.Group 4: low values on both the 'commerce' and the 'pull' factors (quadrant 4).

Four groups of kecamatans have also been distinguished based on the characteristics of the environment. These groups are :

1.Group 1: high values on the 'reclamation management' and

'potential of location' factors (quadrant 1);

2.Group 2: high values on the 'reclamation management' factor (quadrant 3);

3.Group 3: high values on the 'potential of location' factor (quadrant 2);

4.Group 4: low values on both the 'reclamation management' and 'potential of location' factors (quadrant 4).

The socio-economic and environmental factors are first combined together by a scoring method. All kecamatans which are included in groups 1, 2, 3 and 4 , for both socio-economic and environmental factors are scored as 4, 3, 2 and 1 respectively.

Kecamatans with scores of 4, 3, 2, and 1 are identified to have the 'higher', 'high', 'low' and 'lower' potential for commerce and pull factors , and, 'very good', 'good', 'poor', and 'very poor' prospect for physical and environmental factors.

Table 8.1 shows the scores of both factors and the total scores. Thus, a kecamatan which has a total score of 8 is identified to have 'very good' potential in terms of coastal reclamation management and location factors and to have a 'high potential' in the sense of commerce and pull factor. These are: Kecamatans Weleri and Patebon. They are included in Group A.

Kecamatans which have total scores of 7 can be divided into 2 groups:

1.Group B : 'very good' on the commerce and pull factors, and

Table 8.1.

Scoring Technique for Socio-Economic and Environmental Factors

Kecamatan	Socio-Economic Factors	Environmental Factor	Total
1.Sarang	1	2	3
2.Kaliori	2	2	4
3.Rembang	3	2	5
4.Kragan	1	2	3
5.Sluke	2	2	4
6.Lasem	3	2	5
7.Batangan	2	4	6
8.Juwana	3	4	7
9.Wedarijaksa	2	4	6
10.Margoyoso	3	4	7
11.Tayu	1	4	5
12.Dukuhseti	1	4	5
13.Kedung	4	1	5
14.Jepara	3	1	4
15.Mlonggo	2	1	3
16.Bangsri	4	3	7
17.Keling	1	3	4
18.Sayung	4	2	6
19.Karangtengah	4	2	6
20.Bonang	2	1	3
21.Wedung	2	4	6
22.Kaliwungu	3	2	5
23.Brangsong	4	2	6
24.Weleri	4	4	8
25.Cepiring	2	4	6
26.Patebon	4	4	8
27.Kendal	4	2	6
28.Gringsing	4	1	5
29.Limpung	4	1	5
30.Subah	2	1	3
31.Tulis	4	3	7
32.Batang	4	1	5
33.Sragi	4	3	7
34.Tirto	3	3	6
35.Wiradesa	3	3	6
36.Pemalang	1	3	4
37.Taman	2	1	3
38.Petarukan	2	1	3
39.Ulujami	4	2	6
40.Losari	1	4	5
41.Tanjung	3	4	7
42.Bulakamba	1	2	3
43.Wanasari	1	1	2
44.Brebes	1	4	5

'good' potential in terms of reclamation management. Kecamatans in this group are : Bangsri, Tulis and Sragi.

2.Group C : 'very good' on the reclamation management and location factors, and 'high potential' on the commerce factor for development. These kecamatans are : Juwana, Margoyoso, and Tanjung.

Kecamatans which have total scores of 6 are divided into 3 groups:

1.Group D: 'high potential on the commerce factor, and 'good' prospect for the reclamation management factor development. These kecamatans are: Tirto and Wiradesa.

2.Group E: 'high potential' on the commerce and pull factors, but 'poor' potential on the 'location' factor for development. These kecamatans are: Sayung, Karangtengah, Brangsong, Kendal, and Ulujami.

3.Group F: 'very good' potential on the reclamation management and location factors, and 'high potential' on the pull factor for development. All kecamatans in this group are : Batangan, Wedarijaksa, Wedung, and Cepiring.

Kecamatans which have total scores of 5 are divided into 4 groups:

1.Group G: 'good' potential on the reclamation management factors, and 'high potential' on the pull factors. But, there is no one kecamatan included in this group.

2.Group H: 'high potential' on the commerce factor, and 'good'

potential on the location potential factors. Kecamatans in this group are: Rembang, Lasem, and Kaliwungu.

3.Group I: 'high potential' on the commerce factor and pull factors, but 'very poor' on the physical and environmental factors. These kecamatans are : Kedung, Gringsing, and Limpung.

4.Group J: 'very good' potential on the reclamation management and location factors, but 'low potential' on the commerce and pull factors for development. All kecamatans in this group are: Tayu, Dukuhseti, Losari, and Brebes.

Kecamatans which have total scores of 4 are also divided into 3 groups:

1.Group K : 'high potential' on the commerce factor, but 'very poor' prospect on the reclamation and location factors for development. Only one kecamatan in this group, namely Jepara.

2.Group L : 'good' potential on the reclamation management factor, but 'low' potential on the commerce and pull factors. Kecamatans which are included in this group are : Keling and Pemalang.

3.Group M : 'high potential' on the pull factor, and 'good' potential in terms of location factor for development. These kecamatans are: Kaliori and Sluke.

Two groups of kecamatans which have total scores of 3, namely:

1.Group N : 'low potential' on the commerce and pull factors, but 'good' potential on the location factor. Kecamatan in this group are: Sarang, Kragan, and Bulakamba.

2.Group O : 'high potential' on the pull factor, but 'very poor' on the reclamation management and location factors. These kecamatans are : Mlonggo, Bonang, Subah, Taman, and Petarukan.

Only one kecamatan in Group P which has a total score of 2, namely Wanasari. This group is identified to have a low potential on both socio-economic and environmental characteristic for development. The summary of this assessment is shown in Table 8.2.

The range of total scores, is further divided into four groups priority of kecamatans on the basis of their prospects for development. Thus, kecamatans which are identified to have 'high' potential on socio- economic, and 'very good' prospect on environmental factors are grouped in the 'first priority'. This includes all kecamatans in Group A which have total scores of 8.

Kecamatans which have total scores of 6 and 7 indicate a good prospect in both the socio-economic and the environmental characteristics for development. They are grouped in the 'second priority'. This includes Groups B, C, D, E, and F.

Kecamatans which have total scores of 4 and 5 indicate poor prospect for development. They are grouped in the 'third priority'. This includes Groups G, H, I, J, K, L, and M.

Table 8.2

Groups of Kecamatans Based on the Total Scores of Socio-economic and Physical Environmental Characteristics

Character.	S	P	S	P	S	P	S	P	Kecamatans:
Value	4	4	3	3	2	2	1	1	
Group A :	X	X							Weleri
T.S :8	X	X							Patebon
Group B :		X	X						Bangsri
		X	X						Tulis
		X	X						Sragi
Group C :	X			X					Juwana
	X			X					Margoyoso
T.S :7	X			X					Tanjung
Group D :			X	X					Tirta
			X	X					Wiradesa
Group E :	X					X			Sayung
	X					X			Karangtengah
	X					X			Brangsong
	X					X			Kendal
	X					X			Ulujami
Group F :		X			X				Batangan
		X			X				Wedarijaksa
		X			X				Wedung
T.S :6		X			X				Cepiring
Group G :									-
Group H			X			X			Rembang
			X			X			Lasem
			X			X			Kaliwungu
Group I	X						X		Kedung
	X						X		Gringsing
	X						X		Limpung
	X						X		Batang
Group J		X						X	Tayu
		X						X	Dukuhseti
		X						X	Losari
T.S :5		X						X	Brebes
Group K			X					X	Jepara
Group L				X			X		Keling
				X			X		Pemalang

(Continued)

Group M	X	X		Kaliori
T.S :4	X	X		Sluke
Group N		X	X	Sarang
		X	X	Kragan
		X	X	Bulakamba
Group O	X		X	Mlonggo
	X		X	Bonang
	X		X	Subah
	X		X	Taman
T.S :3	X		X	Petarukan
Group P			X	X	Wanasari
T.S :2				

Note :

S = Socio-economic characteristics.
P = Physical-environmental characteristics.
T.S = Total Score

Table 8.3.

Summary of the Scoring Technique for Socio-Economic and Environmental Factors

Scores of Socio-economic characteristics	Score of Environmental characteristics			
	4	3	2	1
4	Weleri Patebon T.S=8	Bangsri Tulis Sragi T.S=7	Sayung Karang-tengah Brangsong Kendal Ulujami T.S=6	Kedung Gringsing Limpung Batang T.S=5
3	Juwana Margoyoso Tanjung T.S=7	Tirta Wiradesa T.S=6	Rembang Lasem Kaliwungu T.S=5	Jepara T.S=4
2	Batangan Wedarijaksa Wedung Cepiring T.S=6	- T.S=5	Kaliori Sluke T.S=4	Mlonggo Bonang Subah Taman Petarukan T.S=3
1	Tayu Dukuhseti Losari Brebes T.S=5	Keling Pemalang T.S=4	Sarang Kragan Bulakamba T.S=3	Wanasari T.S=2

Note : T.S = Total Score

Source: Table 8.2

Kecamatans which have total scores of 2 and 3 is classified as a very poor prospect for development. They are grouped in the 'fourth priority'. This includes Groups N, O, and P.

Table 8.3. presents the summary of the Groups of kecamatans based on the total scores in both the socio-economic and the environmental characteristics, and the results of this assessment is shown in Table 8.4.

Table 8.4.

Priority of Groups of Kecamatans for Development Based on Socio-Economic and Environmental Aspects

First Priority	Second Priority	Third Priority	Fourth Priority
Weleri	Bangsri	Rembang	Sarang
Patebon	Tulis	Lasem	Kragan
	Sragi	Kaliwungu	Bulakamba
	Juwana	Kedung	Mlonggo
	Margoyoso	Gringsing	Bonang
	Tanjung	Limpung	Subah
	Tirta	Batang	Taman
	Wiradesa	Tayu	Petarukan
	Sayung	Dukuhseti	Wanasari
	Karang-tengah	Losari	
		Brebes	
	Brangsong	Jepara	
	Kendal	Keling	
	Ulujami	Pemalang	
	Batangan	Kaliori	
	Wedarijaksa	Sluke	
	Wedung		
	Cepiring		

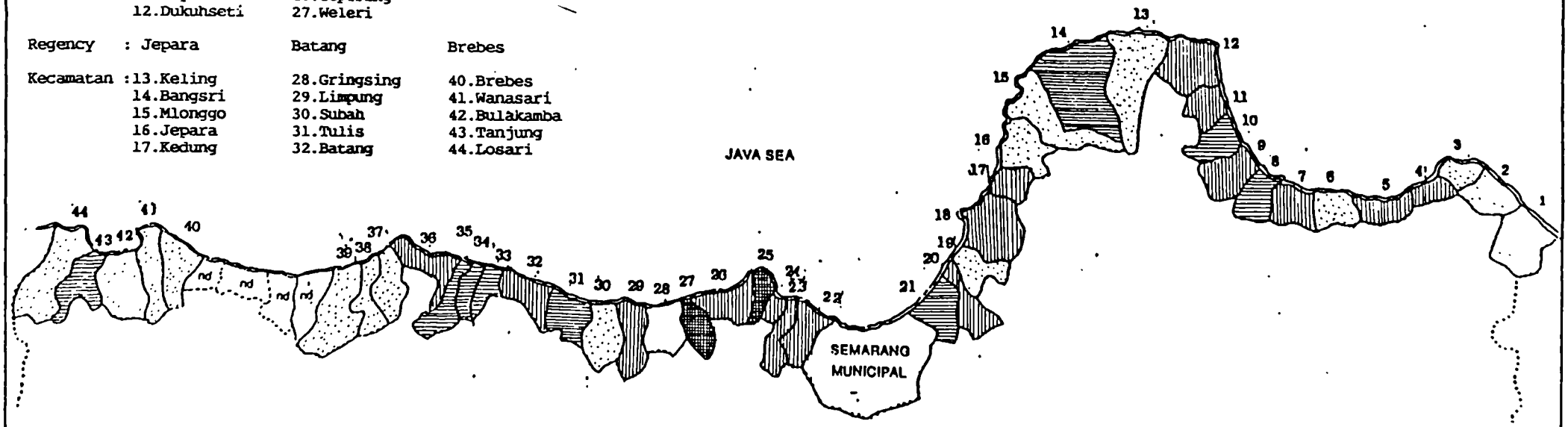
Source: Table 8.3.

More detailed assessment of these groups is now possible. The first group constitutes those kecamatans which have 'very high' potential in both the socio- economic and in physical resources. These kecamatans have potential for development in relation to human resources and rural light industries particularly those producing products intended primarily for the use of farmers. They also show high potential on the 'pull factor'

Figure 8 . 1

Groups of Significant Kecamatans Based on the Potential of Socio – Economic and Environmental Aspects for Development

Regency	: Rembang	Demak	Pekalongan
Kecamatan	: 1.Sarang	18.Wedung	33.Tirto
	2.Kragan	19.Bonang	34.Wiradesa
	3.Sluke	20.Karangtengah	35.Sragi
	4.Lasem	21.Sayung	
	5.Rembang		
	6.Kaliori		
Regency	: Pati	Kendal	Pemalang
Kecamatan	: 7.Batangan	22.Kaliwungu	36.Ulujami
	8.Juwana	23.Brangsong	37.Petarukan
	9.Wedarijaksa	24.Kendal	38.Taman
	10.Margoyoso	25.Patebon	39.Pemalang
	11.Tayu	26.Cepiring	
	12.Dukuhseti	27.Weleri	
Regency	: Jepara	Batang	Brebes
Kecamatan	:13.Keling	28.Gringsing	40.Brebes
	14.Bangsri	29.Limpung	41.Wanasari
	15.Mlonggo	30.Subah	42.Bulakamba
	16.Jepara	31.Tulis	43.Tanjung
	17.Kedung	32.Batang	44.Losari



LEGEND

- Group of kecamatans with the first priority
- Group of kecamatans with the second
- Group of kecamatans with the third
- Group of kecamatans with the fourth

0 50 Kms

nd = no data available

for agricultural development. Small-scale industries can be promoted, especially industries which use agriculture products as their raw materials. Trade development will encourage other sectors, such as service and transportation. Kecamatans in this group have good accessibility to the regency centres. In addition, the land in coastal zone presents a great opportunity for developing fispond culture.

Kecamatans in the group of 'second priority' also have a high potential as revealed by the 'commerce' or the 'pull' factor, but less potential than the previous group. These kecamatans can be divided on the basis of these different factors. Thus, Kecamatans such as Juwana, Margoyoso, Tirto and Wiradesa are have good prospects in relation to the 'commerce' factor. Rural light industry and trade might be the basis for development in these kecamatans. The provision of transport facilities would provide an opportunity for them to market their products outside their immediate hinterland. The others such as Kecamatans Batangan, Wedarijaksa, Wedung and Cepiring show a high values on the 'pull' factor and are supported mainly by the agricultural sector. Even though they have a low potential in relation to commercial activity, development of this sector could contribute to rural agroindustry. All the kecamatans in this Group also show good prospects for coastal area development.

The third group is categorized to have a low potential and little prospect of coastal area development. They are solely sustained by their 'pull' factors. Thus, they might develop agroindustry such as cooking oil, salt fish and smoke fish

industries.Those included in this group are: Kecamatan Kedung, Gringsing, Limpung and Batang.

Kecamatan Rembang, Lasem, Jepara and Kaliwungu have good potential in terms of commercial development alone. These kecamatans might develop trade and small-scale industries. Infrastructure is important in supporting development of these kecamatans. Other kecamatans, including Sluke, and Kaliori, have potential as revealed by the 'pull' factor for agricultural development, but they do not have good prospects in relation to physical resources.

The fourth group of priority includes those kecamatans which are have low potential as shown by both the 'commerce' and 'pull' factors, and also are poorly endowed with physical resources.These kecamatans present real problems in relation to rural development. Certain programmes might, however, be launched to assist their progress.

The programmes proposed for individual groups of kecamatans are discussed in the next sub-chapter.

VIII.2.Proposed Programmes for Individual Groups of Kecamatans.

By referring to the priority assigned to the kecamatans for development particular programmes may be proposed for implementation in the individual groups of kecamatans. There are several variables which contribute to the importance of the factor 'commerce'. These are the existence of rural industry, of rural trade, of transport provision, and of education development and facilities. Small-scale industries also promote the agricultural sector, and sustains agro-industrial

development. They also constitute an employment-oriented development strategy with emphasis on small-scale activities with a low capital investment. These not only offer employment and income opportunities for the rural poor, such as small farmers and landless labourers in particular, but also facilitate their participation in development. They might also facilitate economic growth to the extent that such small-scale activities become sufficiently efficient economically to be competitive with urban-based, large-scale enterprises. (Chuta, Enyinna and Sethuraman S.V.,1984,p.4)

The main objectives of a small-scale industries programme would be :

1.to utilize local resources, including the agricultural sector;

2.to provide gainful off-season employment for villagers;

3.to begin to stem rural-urban migration;

4.to increase overall income by organising village-based industries.

Such development also includes the encouragement of home industries, which can be an additional means of livelihood in fishing communities. Small-scale agro-industry and home industry are also dependent upon the locally available supplies of raw materials. These activities also fulfil a number of other aims :

1. to make markets available for products;

2. to provide training in handicrafts and industrial skills;

3. to provide rural people with capital and equipment.

Particular industries such as rice-milling, food processing ,and food preparation should be developed.

The use of biological resources as the main engine of the 'pull factor' must also be promoted. This sector includes :

1.Fisheries. Fishing is the main source of livelihood for the majority of coastal people.Most of the fishermen still use boats equipped with traditional fishing gear. This activity needs support in several ways:

a.the provision of marketing facilities, such as cold stores and appropriate marketing structure;

b.the training of fishermen;

c.capital investment in the modernisation of fishery activities, perhaps by providing fishermen with 'soft' loans for fishery equipment in accordance with the fisheries development programme;

e.the provision of a better infrastructure such as landing places and wharfs.

2.Fishpond culture. This needs to be promoted, since it can provide fishermen with income outside the normal catching season. However, only a few species of fish which can live in brackish water can be reared in fishponds. At present

fishpond cultivators still manage their fishponds by traditional methods. To improve fishpond culture it is necessary to take the following measure :

a.to extend the areas where fishpond culture is possible;

b.to train the cultivators in better methods;

c.to provide the cultivators with soft loans for equipment and other capital investment.

3.Smallholder estates. They may be promoted as a way of encouraging agricultural development. The types of marketable commodities which can be cultivated in coastal areas include coconuts, crops which are adapted to saline soil conditions, 'nipah' (Nypa fructicans) and 'rumbia'. The encouragement of the cultivation of these commodities involves the preparation of land, the provision of high quality seeds, the elimination of pests and the provision of processing facilities, such as mills and vegetable oil processing plants. The cultivation of food crops can sometimes be improved by providing efficient drainage systems. Nipah and 'rumbia' can be grown for local scale. 'Rumbia' leaves are used for making thatched roofs ,and 'nipah' provides a drink, which can also be processed to give sugar. To expand these activities, however, training, including assistance in improving field work and courses in cultivation technique is needed. 'Soft' loans for the provision of fertilizers, tools, and pesticides etc, are also needed.

4.Live stock breeding. This also could be promoted in these areas, particularly poultry, rearing species, capable of consuming local feedstuffs, including the by-products of the fishery industry. To develop this the following measures are especially appropriate:

1.to train people in improved poultry farming;

2.to publicise the advantages of poultry-keeping among fishermen especially.

Thus groups of kecamatans may be characterized as being most suited to the implementation of particular programmes (Table 8.5)

Table 8.5.

Proposed Programmes for Groups of Kecamatans Based on the Priority for Development

Priority	Potential for development	Proposed programmes	Group of Kecamatans
I	good:'environmental','commerce' & 'pull' factors favourable.	-small-scale agroindustry -fishpond culture intensification and extension -rural infrastructure development. -centres of services, trade and facilities -human resources development	Group A
II	mainly 'commerce', second,'environmental') (less potential than I)	-fishpond culture -food manufacturing, particularly fish processing. -establishing facilities to support these activities.	Groups C and E and D
	mainly 'environmental' second,'commerce' (less potential	-agricultural development, particularly farming and	Groups B and F and D

	than I)	small-holder estates -fishpond culture -trade	
III	only 'commerce' factor favourable	-enhancement of small-scale industry particularly non-agricultural raw material-oriented e.g.salt -improvement of infrastructure	Groups I, H, and K.
	only 'pull' factor favourable	-transportation improvement -live-stock breeding ,especially poultry	J and L and M
V	no favourable factors	-Conservation and recreation	N, O and P

VIII.3.The Role of the Market Place as a Physical Manifestation of the Commercial Sector

The development of commerce has been identified as the most significant sector for furthering coastal rural development expressed in the form of a pattern of markets, which represent the foci of exchange and trade. In order to operate each market needs a location and the site where the market exists is called a market -place. The market-place may therefore be defined as 'a site with social, economic, cultural and other functions where there are a number of buyers and sellers, and where the prices offered and accepted by them are affected by the decisions of the other (Cyril,1965,p.8). The market-place is a physical manifestation of commercial activities, and fulfils a number of functions :

1.supporting rural economic development in some sectors, including agricultural and rural industry; 2.encouraging the growth of transportation; 3.creating new employment opportunities for the rural work-force

There is clearly a link between commerce and other activities, such as small-scale rural industries; the spatial distribution of market centres is therefore important. Marketing is based on the flow of goods, not only from the rural region outwards, but also from urban to rural areas; Small-wares, textiles and paraffin, needed by rural people are example of this. Thus, rural markets have two functions, i.e. distribution of urban products and marketing of rural products.

The scale of market services is usually affected by population size, particular distribution and character. Each market has specific characteristics relating to particular population groups. Moreover,every type of commodity has its own special range, which differs at different 'nodes', and is not the same in all directions from the same centre, but varies according to objective and subjective economic distance. In network studies settlements are referred to as nodes, but more generally the term implies an urban centre which is nodal to a surrounding region (Jilbert, John,1983,p.132). The process of collection and distribution of production involves extreme regional differentiation of activities, and the geography of consumption involves demands for similar baskets of goods that repeat themselves in many regions (Duncan,1960). Collection and distribution points thus interlock in a complex web of exchange. Collection may involve several steps but ultimately, metropolitan centres provide points of focus. Similarly, distribution involves several steps, including both wholesaling and retailing, and metropolitan centres therefore also have a distribution role. They serve as collection points for regional specialties and as location where regional specialties

are produced and then exported. They are assembly points for the goods demanded by their surrounding consuming regions and are also major consumers themselves, drawing in needed products from other cities as well as from their hinterlands. Intercity exchanges are the points about which such an economy is organized. It is in the cities that the geographics of production and consumption interlock (Duncan, 1960).

Thus a market centre hierarchy exists and the essence of the geography of retail and service business is the clustering of establishments in market centres visited by surrounding consumers. Markets are a point of focus. Consumers want a market-place location which permits them to conduct their business with a minimum of effort, and if a choice of location is available will always prefer to travel the shortest distance. Berry (1967) argues that for differing activities centrality therefore has meaning on different scales; in any area a variety of central places will thus exist. He discusses the central-place theory explanation of different travel distances for different goods and services: grocery shopping, hospitals, health centres. He points out, further, that a business located in a certain area will attract consumers on a frequent basis and over a short distance (see also Meyer& Huggett.,1979,p.12)

CHAPTER IX

IMPLEMENTATION OF DEVELOPMENT PROGRAMMES FOR SELECTED KECAMATANS

CHAPTER IX

IMPLEMENTATION OF DEVELOPMENT PROGRAMMES FOR SELECTED KECAMATANS

The analysis has assessed all the kecamatans in the study area with reference to defined variables, and selected particular kecamatans for priority in development ,based on the significant factors considered to be significant. The implementation of various development programmes must now be examined, and a strategy appropriate to this study should be determined.

IX.1.Option of Strategies for Coastal Rural Development

On the basis of the concepts discussed in Chapter II, different sectors can be distinguished in rural development. To determine those appropriate to a particular kecamatan, it is necessary to remember the basic purpose of this study,namely to achieve optimum development by concentrating limited funds in selected centres.

Such centres can provide the following advantage (Van Dusseldorp,1971): first, the various elements influence one another and concentration of facilities stimulates this interaction, whereas on the other hand there will be less intensive interaction if the facilities are spread out thinly over the whole area; Second, once several services are grouped together, the concentration of population will, in many cases more readily justify the provision of public utilities such as water and electricity. At the same time, more attention can also be given to connecting the centre with the general road system. This will result in more efficient functioning of the services, thus improving the quality of life of those residing in the

centre; Third, if the agricultural structure is to be improved and production increased, a complex of radical measures has usually to be taken. Many of these have important organizational implications; for example, in the establishment of cooperatives, of farmers associations, and of marketing and processing facilities, in the granting of credit and the setting up of irrigation and/or drainage schemes. If these can be set up within the framework of a modern infrastructure, they will function more satisfactorily.

Several criteria are used to judge how these purposes are best served, in the light of the concepts considered in Chapter II. These criteria are:

1. concentration of financial resources in certain centres. Concentration means that for a given capital outlay a higher level of service can be provided than would be the case without concentration;

2. using limited development funds. This criterion is related to restricted availability of funds for development in Indonesia. It is to achieve maximum output with limited financial inputs;

3. relationships between concepts and the significant factors for development, principally the 'commerce' factor in this study. The concept may be considered to be acceptable if it is appropriate and relevant to the factor;

4. integration with other existing facilities. It is important to create a harmonious relationship between the development factor and the existing facilities, since in this way some of

the obstacles to the implementation of a rural development programme can be avoided;

Table 9.1 sets out the relationships between the concept and the criteria.

Table 9.1

Qualitative Assessment for various Concepts

Concept	Criteria			
	1	2	3	4
1.Indonesian Rural Development	-	-	-	-
2.Growth Pole	+	-	+	-
3.Agropolitan	-	+	-	-
4.Central Place	+	+	+	-
5.Spatial Integration	+	-	-	-
6.Key Settlement	+	+	+	+

Note :

1.Concentration of financial resources.
2.Limited availability of development funds.
3.Relationships between concept and development factors.
4.Integration with existing facilities

+ = Yes

- = No

Thus it may be argued that the Key Settlement concept is most appropriate for development in the kecamatans.The concept rests on the assertation that combining several theories will give advantages with regard the desired result. Misra (1976,p.59-60), for example, also builds his rural development concept by amalgamating the ideas of the Growth Pole, the Central Place and the Spatial Diffusion. However, Misra's and Cloke's, concepts have similar features in that both are based on the concentration of socio-economic services in centres. In this study the Key Settlement concept has been chosen as a strategy for development. There are several reasons for this :

1.The Key Settlement concept provides a basis for achieving optimum results with minimum finance available for development;

2.It constitutes a discriminating method by which available resources can be concentrated on those growth centres which are situated in areas of greatest potential;

3.In the rural context, key settlements may be regarded as small-scale growth centres and can therefore provide a framework for the formulation of local development strategies;

4.Key Settlements are capable of exhibiting the common functional characteristics of small growth centres;

5.Basic services and public utilities are most effectively established in places where there is the greatest demand from the local population;

6.The Key Settlement policy provides crucial service and infrastructural development, especially with reference to transport facilities, which is necessary for promoting agricultural development;

7.A Key Settlement acts as a centre for the collection and distribution of goods to and from remoter villages so that an expansion in commercial activity is encouraged;

8.A Key Settlement policy would provide a framework for developing a spatially integrated hierarchy of settlements, and also provide vital links to and between urban centres;

9.If the provision of a combination of facilities and services is planned by considering a population threshold, a Key Settlement could attract sufficient people to support an adequate range of basic services;

10.A Key Settlement policy can bridge the gap between a higher order Key Settlement and its hinterland and create a framework for justifying the provision of health service facilities. An advantage of Key Settlement policy is that it would help to solve the problem of health provision in a scattered settlement pattern, by enabling particular centres to attain the required population threshold. It, therefore, might make possible an economic provision of health services, and the development of a more general distribution of health facilities in the region.

For these reasons, therefore , a Key Settlement policy for development can be justified as the appropriate concept to apply to the development of selected kecamatans in the study

area.

IX.2.The Relevance of Key Settlement Policies in Developing Countries

The question concerning with the relevance of concept selected and its application in Third World Countries has been stressed in this section. This is crucial to the efficient and successful operation of key settlement planning systems in rural areas, especially in in the study area.

Three points of this concept have been perceived as the tools for solving problem. First, the principal behind this concept, namely :

1.concentration of financial resources in particular centres;

2.if a key settlement is defined as 'where certain villages will gain new housing' (Rawson and Roger,1972), thus it includes some forms of concentration and elements of housing and service provision in selected rural areas, and consequently could be applied to any rural planning policy;

3.the potential of key settlement policy in incorporating an overview of the settlement pattern as a whole and lays special emphasis on the relationships between key settlement and other settlements served by it.

These points are relevant as a planning solution to some of the problems of rural areas in Third World Countries including Indonesia.

Some authors observe the key settlement policy as the basis for rural planning ,and the idea of ideal village form which would

be of sufficient size to overcome basic service thresholds. Peake (1922), for example, observes that:

> "the main concern was to plan for the future of English rural settlements at time it was not generally realised that villages need to be planned at all"

Hwakar (1981.p.39) quotes it in arguing the relevance of this concept to the developing countries. He states that 'this type situation appears to be the prevailing attitudes towards rural planning in many of the Third World Countries'. Thus, this type situation also appears in Indonesia. The fact is that Indonesia , like many developing countries, is concerned with the problems of urban areas. It was reflected in the actual government development expenditure of Indonesia in 1984 which shows that development subsidy to urban areas was higher than a rural. It seems that development of rural area was not to be the first priority. But, Peake (1922) reminds the British planners to pay more attention to the rural areas in achieving the better life in the future for the rural people, and it thus appears to be the relevant to the present planning situation in many developing countries.

This has also been conceived by Peake by stating:

> "All the everyday requirements of health, education and recreation needed by most of the inhabitants would be found within the village itself, while the population would be sufficient to command reasonable transport facilities to the neighbouring towns, where they could satisfy their rarer needs" (Cloke, 1979, p24)

Thus, his contribution is more significant than just providing the academic germ of the key settlement concept. Peake demanded planned action at an early stage so that rural imbalance

could be accommodated on a gradual day-to-day basis rather than in retrospect (Cloke,1979). He urges the planners on replacing and replanning British villages upon some well-considered model and to construct them of sustaining a community life in keeping with a modern conditions. His observation is still relevant to the present day of rural situation in Indonesia. Almost all commonest buildings are temporary and are buiit from woven bamboo. But, in recent years more permanent buildings are being establishing in villages, and therefore they are necessary to be planned based upon considered model. This leads to establish the viable communities for the provision of service and construction of permanent buildings.

Morris (1925) contributes to the inception of the key settlement notion was in his attempt to apply his idea in practice. His idea was to provide the educational services in the dispersed rural settlement pattern. He suggests the planners to solve the problems in rural areas in a wider horizon than usual. In addition, planners should be concerned not merely with economic efficiency, not merely with sewers and roads but with the total scene" (Ree 1973,p.20 in Cloke 1979). He emphasises the importance of provision of social facilities including education for the whole adult community. He proposes and instigates for the 'Village College' which was centralised secondary school for a number of contributory villages by day, and an adult education centre and for other social functions outside normal school hours. The centralised secondary school idea, thus relevant to the development of education programmes in many Third World Countries, such as Indonesia. This idea could be integrated with the national programme for the

provision of secondary school in rural areas.

IX.3. Relationship Between Key Settlement Concept and Significant Factors and Its Relevance for Development in the Kecamatans

With regard to these functions, the key settlements selected for special assistance must satisfy the requirements of the 'commerce' factor in kecamatan development. There are 5 variables involved in Factor I (see Table...):

1. VIAR06 : Number of light industry workers per 1000 population;
2. VIAR07 : Number of merchants per 1000 population;
3. VIAR17 : Number of passenger cars per 1000 population;
4. VIAR18 : Number of elementary schools per 1000 population of elementary school age;
5. VIAR19 : Number of secondary schools per 1000 population of secondary school age.

Thus, in terms of socio-economic services, all the variables contributing to Factor I are relevant to the functions of key settlements.

The proportion of industrial workers reflects the significance of light industry in the key villages. Key settlements can develop this activity if the range of facilities needed is made available, by establishing the appropriate infrastructure, especially water and electricity supplies, and credit. Employment, resource mobilization and dispersion of industries are the main objectives of encouraging small-scale industry and to establish such industries in the key villages, it is important to consider the facilities for developing human resources. This relates to the level of technology to be employed in this sector. By supporting and developing success-

ful small-scale industries, the key settlements would prove more attractive to rural people and to further investment.

The number of merchants and of passenger cars, reflects the potential of rural commerce and its ability to stimulate economic activity. The major role of large rural markets is to offer services and supporting commercial activities in rural areas. The latter is strongly dependent on the activities of merchants both in the commercialization of agriculture and in industrial products. Key settlements would not only reinforce the rural market in transforming the subsistence economy in the rural region, but also encourage them as growth centres. It creates a tier of collection and distribution of goods system and produces an efficient of transportation.

The provision of elementary and secondary schools, provide a basis for further development of education and training. This concerns with the function of key settlements as centres of basic and social services. It considers several conditions such as the concentration of population and radius of service in relating to the population threshold for such provision. But the problems faced by the planners are concerned with the provision of facilities, services, housing and employment within the framework of a scattered settlement pattern. A Key settlement can meet such conditions since it offers a sufficiently large population and economies of scale to allow the concentration of such facilities.

Economic viability for the provision of a wide range of these and other services and facilities, can, therefore, be expected.

IX.4. The Functions of Key Settlements : a proposal

The Key Settlements concept amalgamate several factors to define a Key Settlement. Growth potential has been identified as one of several factors contributing to this concept, the settlement is seen as acting as a small scale growth centre in a rural area.

It is important to identify the functions of key settlements. In determining these functions, some rural planners consider the growth factor the starting point for rural development planning (Cloke, 1970). Every key settlement has different potential depending on its ability to perform its function, and it should be realized that the potential functions are not automatically realised merely by the selection of particular settlements. The realisation of these functions will be affected by : 'the kind of investment that is made in the key settlements, their mix and combination, the nature of development policies pursued within them by the State and Local Governments and by the private sector' (Cloke,1970).

Some functions of key settlements have already been identified,and need to be related to the significant factors upon which development might be based. Hwakar (1981) identifies the functions of key settlements thus:

1.Public and social service

Key settlements have a convenient location for the decentralisation of public services and facilities. They offer economies of scale to allow the concentration within

them of health, education, welfare and other services, so that they can serve as rural centres for a variety of basic social services and facilities. The principal justification of the Key Settlement policy in this respect is that it offers an economically viable means of providing these facilities. Thus elementary and secondary schools, adequate access roads, small-scale storage, health clinics, market facilities, local transport, a postal service and a local bus and truck need to be provided in key villages.

2.Processing and supply centres

Evaluation of key settlements as small growth centres points to their role as a source of employment in rural areas. It is generally recognized that attracting manufacturing industries into rural areas is a problem for Key Settlement policy. One of the principal production factors, employment, is ,however, readily available in these areas. In Indonesia, where agriculture is the predominant economic activity, settlements will function as primary processing, grading, supply and service centres. By providing markets, transport, service and local distribution centres, and opening up the potential of large population, agricultural production in the hinterland will be encouraged. Subsequently, an increase in agricultural production and the diversification of rural economies, will attract other small-scale agro-industries to key villages, which would create new employment opportunities.

3.Small-Scale Industrial Centres

Dewar (et al,1986) identifies four distinct sets of settlement policy issues. One of these issues is that settlement policy as an instrument affecting regional economic growth and interregional disparities. This, in turn, has had two areas of focus: an urban-industrial focus, where settlement is seen as an instrument for promoting industrial development, particularly in underdeveloped regions; and a rural focus, where settlement is used as an instrument for promoting and stimulating productive rural development. Key settlements can function as possible growth points for small-scale industry to meet these purposes.

There are several reasons for developing small-scale industrial activities in the key settlements: the need to encourage employment,the local availability of resources and the need to disperse industries to rural areas. However, some problems such as lack of skills, absence of tooling and repair facilities, and inadequate institutional credit facilities are recognised as major problems. Thus the national banks need to play an important role as suppliers of finance, and the Ministry of Industry, through the Agency for Small-Scale Industry Development (BIPIK), can help the development of these activities.

As small-scale industrial centres, key settlements need to train their manpower, and to develop an understanding of the operation of small scale industry. With such knowledge and training, small-scale industry can be expanded .

There are several necessary conditions for attracting small-scale industries to rural areas, such as an appropriate industrial site, good transport access, the need for basic services, for labour, a readily accessible market for goods, and available credit facilities. Certain small-scale industries are more relevant to the study area than others (sub chapter VIII.2). They use local raw materials and services, and such small-scale industries can further support the objective of Key Settlement policy which is to select appropriate villages for small-scale industry development backed up by local resources. Thus creates employment opportunities and the consequent diversification of the rural economy. As a result, the living standards of rural people will rise. So, it is reasonable to suggest that key settlements provided with such services and the basis for small-scale industries might begin to stem rural-urban migration.

Key settlements have also been proposed to act as local marketing centres, the centres of attraction of rural migrant, centres of social transformation and centres of innovation. Thus, certain considerations in selecting key settlements is important.

The results of the analysis of the study area show that these functions, particularly points 1,2 and 3, are clearly connected with the significant factors for which have been identified for development in the kecamatans. The relevance of the Key Settlement concept to these significant factors needs now to be examined.

IX.5.The Application of the Key Settlement Concept

Two significant socio-economic factors were identified, namely the 'commerce' and 'pull' factors. It has been shown that the Key Settlement constitutes an appropriate concept for selective development. This concept incorporates an overview of the settlement pattern as a whole and lays special emphasis on the relationship between the key settlement and the other settlements served by it (Cloke,1979,p.24). Thus the concept can be integrated not only on a village level, but also on a kecamatan level. The manifestation of 'commerce' factor implementation in rural area would be seen as the development of trade. The relevance of Key Settlement policy to this factor is that it promotes a hierarchy of goods and service provision at a different level since distribution of goods are gradated in the market place.

The Key Settlement concept also incorporates the notion of the Central Place. This can be adopted not only on regional scale, but also on the local scale. Newman (1967,p.43) affirms that regional planning necessarily involves the promotion of a hierarchy of central places, and it is apparent that central place theory has provided a frame-work and data-base from which key settlement policies have evolved in rural areas.

In this study, Key settlements are regarded as small-scale growth centres and can also function as central places. Key settlements constitute centres from which various kinds of goods and services are obtained by the rural population, and offer the shortest distance for access to establishments serving the rural population.

Centres are scaled in five sizes : hamlets, villages, towns, cities and the regional capital corresponding to the levels and steps of the central-place hierarchy. Small centres offer goods and foodstuffs on lower-order village level. The hamlet, for example, has only one or two stores. The village is provided with a range of different kinds of retail, service businesses and establishments. The regional capital is provided with retail and service establishments, speciality shops, and cultural and professional services. (Williams, T.R.,ed.,1984,p.1-2). High-order places are therefore more widely spaced than lower-order places. The steps of the hierarchy of centres can be shown as follows.

Table 9.2

Levels in the Central Place Hierarchy

	Level of centre						
Order of Function	Hamlet	Village	Town	Small City	Reg. City	Reg. Metro.	Nat. Metro.
Lowest	*	*	*	*	*	*	*
2		*	*	*	*	*	*
3			*	*	*	*	*
4				*	*	*	*
5					*	*	*
6						*	*
7							*

Source : Berry, Brian J.L.p.16

Even though a key settlement is provided with certain facilities, in some cases it does not serve all the rural people in its area, because the population is distributed unevenly, and must obtain many kinds of goods and services from facilities located at widely separated places (Rushton, Gerard.,1979,p.31). People are interested in the locations

providing these facilities which are 'most accessible' to them. For goods and services whose provision is at public expense, the people responsible for locating the facilities have an interest in providing the best service within budget restrictions. Thus, they too have an interest in locating the facilities so as to be 'most accessible' (Rushton p.31). Therefore, the provision of commercial facilities should be assessed on the basis of the distance which people need to travel in order to reach them. A question must be answered by planners in relation to the provision of commercial facilities in any area, namely whether the existing pattern effectively serves all those living in these areas. This question is concerned with the imbalance between the provision of facilities and the demands of the population and the provision of commercial facilities is often sparse and some settlements are outside any service area. Commercial facilities must therefore be developed in order to meet the demand.

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, services are established in places where there is greatest demand from the population or where political pressure insists on improvements. This does not 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. (Van Dusseldorp, 1971,p.18) The question which thus arises is how can the most suitable locations for key settlements be selected?. Woodruffe (1976.p.25) argues that the selection of these settlements

depended on:

1.existing social facilities, including primary (and in some cases secondary) schools, shop, village hall and doctor's surgery, and public utilities (electricity, water, sewerage);
2.existing sources of employment (excluding agriculture) in or near the vicinity of a village;
3.their location in relation to bus routes or railways providing adequate services;
4.their location in relation to principal traffic roads and the possibility that new development may create a need for a by-pass;
5.their location in relation to urban centres providing employment, secondary schools, medical facilities, shop and specialized facilities or services. (Key settlements are not appropriate near main urban centres);
6.their location in relation to other villages which will rely on them for some services;
7.the availability of public utilities capable of extension for new development;
8.the availability and agricultural value of land capable of development;
9.the effect on visual amenities.

Point 1 concerns with the centrality measurement of the settlements, and thus, it is considered to be involved in the calculation to select key settlements in the study area.

IX.6. The Proposed Settlements Hierarchy

The concept of the regional polarization proposes as a set of spatial poles, with one of them (called the dominant pole) having larger flows than other poles of the same order (Boudeville,J.R.,1966). Christaller produced evidence of sequence of marketing centres of differing levels in Bavaria (Cloke,1979). At local level, Dickinson highlighted a hierarchy of settlements by introducing the concept of a nucleated settlement which acted as a focus for the servicing of a surrounding tributary area (Dickinson, 1932). Thus this concept envisages a system and hierarchy of communities, and it is closely related to central place theory. Cloke (1979) gives 3 reasons in which central place theory can be applied to rural key sett-

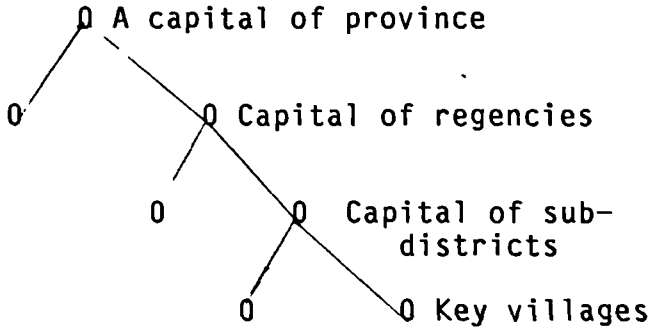
lements.

1.'natural' centres exist within hierarchies of settlements;
2.central place concept concerns the changing nature of the settlement hierarchy overtime;
3.central place concepts have been extensively used in the selection of rural key settlements.

This study highlights Central Place theory in conjunction with the idea of polarization region concept. The latter brings forward by Boudeville (1966) concerns with the hierarchy of centres in a region. It is described as analogous to that of a capital of province, the capitals of regencies, the capitals of sub-districts and key villages distributed in a region. Thus, in Central Java, the capital of province : Semarang, would be the first order centre since it constitutes a dominant core. The capitals of surrounding regencies acting as the satellites of this core would be the second order centres, such as Kendal, Pekalongan, Demak, Kudus, and Batang. The capital of 'kecamatans' acting as satellites of the capital of regencies would be the third order centres, and the key villages surrounding the capitals of 'kecamatans'would be the fourth order centres. Thus in the study area the spatial distribution of Key Settlements can be proposed as shown in Table 9.3

Table 9.3

The Hierarchy of Centres in a Region



Boudeville (1966) asserts that it is instinctive to visualize a

system and hierarchy of communities from metropolis down to the villages. He has, however, set an important foundation of spatial distribution system of the centres. Another author, Christaller (1966) works with the same concept , but he emphasises this concept on the basis of retail and service provision. He argues that different goods or services required a different range and threshold. The polarised region concept might be able to explain his argument. Thus a most dominant core to be the highest service centre and serves surrounding centres, and these centres to be the high order centres and serve other lower order centres. Such hierarchy also implies different levels as the means of the provision of facilities and both the various and the number of goods and services. Christaller (1966), further builds his theory of goods and service distribution on his model of hexagonal shape field of influence of service.

It is useful to analyze the economic activities of the central place, especially the provision of retail and service functions. Bourne notes that goods and services are ranked in higher and lower orders depending upon the demand threshold (i.e.the minimum viable level of population and/or income required to support the service) and the range of goods (Bourne, L.S. & Simmons J.W.,1978, p.171). Christaller places settlements as centres of hexagonal fields of influence, settlements exist in a hierarchy in which higher order places have all the goods and services that lower orders have. The effect of this is that higher order places will be more widely spaced than lower order places. The Key Settlements concept can bridge the gap between urban centre and lower order villages.

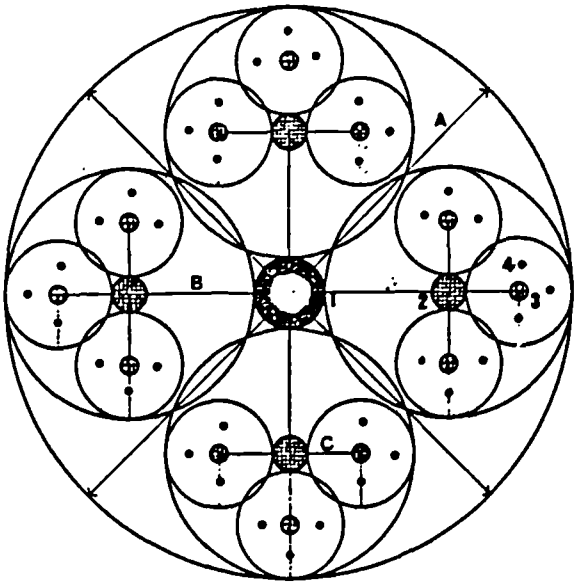
At local level, Key Settlements are expected to fill the lower tier of settlement hierarchy. Thus a stabilized of spatially integrated system of settlement is created. This is a flexible model to guide the rural settlement planning in the future. Furthermore, it is a tool for adopting key settlement policy to establish lower tier of centres if the lower order settlement system has not been adequately developed. A key settlement will thus be seen as a higher order centre, and other village centres will form satellite settlements around it. These settlements ,therefore, form a spatially integrated system.

Compared with other centres, the capital of a kecamatan has a larger range of retail and services with the largest range in the capital of the regency. Higher in the hierarchy of such retail and service centres, it is likely that the area serviced by a higher order centre will completely contain the service areas of the centres directly below it. Thus it is possible that the service area of a secondary centre may fall inside the service areas of two or more tertiary centres. The service area of the primary centre would comprise the retail and service areas of a number of secondary centres, and the secondary centres would include the service areas of a number of tertiary centres.

The hierarchy of Key Settlements in a region, therefore, can be conceptualized.

Figure 9.1

A Hierarchy of Key Settlements



A.Radius of service areas of primary centre
B.Radius of service areas of secondary centre
C.Radius of service areas of tertiary centre

1.Primary Centre
2.Secondary Centre
3.Tertiary Centre
4.Centre of local settlements

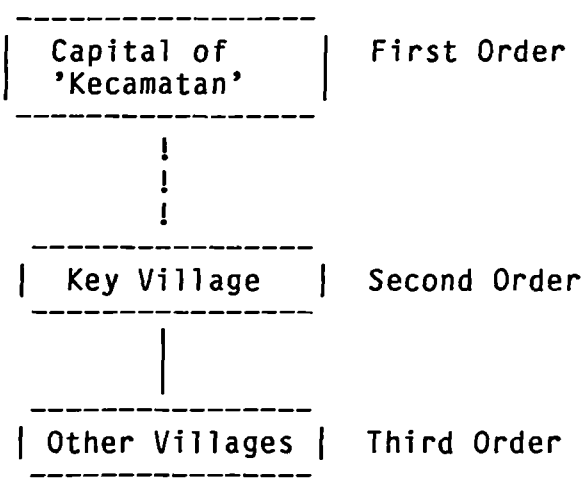
Source :Sujarto,Djoko.,198 ,'Distribusi Fasilitas Sosial', (Social Facilities Distribution) Paper , Institute of Technology Bandung, Unpublished.

This figure shows that at the regency level. The capital constitutes the primary centre, whereas the capitals of kecamatan function as secondary centres. Other villages act as the tertiary and quartery order centres. At kecamatan level, however, the capital acts as the primary centre. At this level other village centres can be categorized as second order. Figure 9.2 shows the hierarchy of key settlements at Kecamatan

level.

Figure 9.2.

Hierarchy of settlements at Kecamatan Level



IX.7. Functional Hierarchy of Settlements, and Thresholds for Service Units

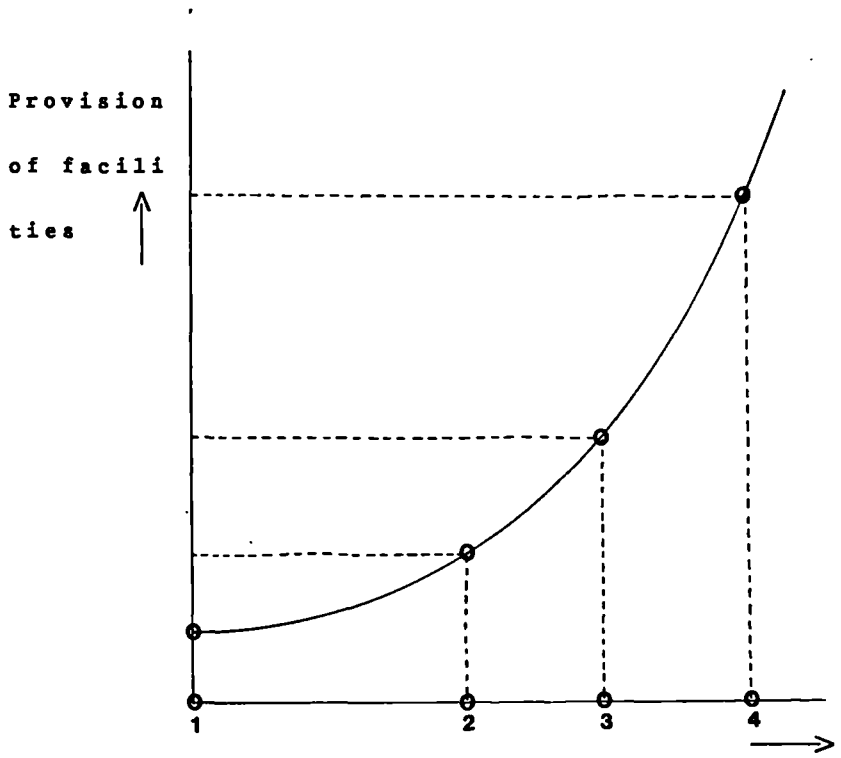
It is not surprisingly observed that there are fewer large centres than small ones in a region, but, in terms of the provision of facilities, different types of centres will have a different balance and combination of types of facilities. At regency level, for example, the capital is the seat of local government, the location of the central hospital, as well as possessing a large number of government institutions, in addition to other service facilities and economic enterprises.

At kecamatan level, a centre of kecamatan is seen as the primary centre. This village contains services whose frequency of use is not on a daily basis for the majority of the population. A centre of this type is identified by the provision of junior and senior high schools, of a small number of economic facilities, and of a public health centre and a

maternity clinic. Secondary centres are smaller villages and contain all the services which are of primary importance to the rural population, such as primary schools, public health clinics, markets and shops. This hierarchy of service centres is represented in Figure 9.3

Figure 9.3

Relationship between type of centres and provision of facilities.



1 = Centre of local settlements

2 = Tertiary centre

3 = Secondary centre

4 = Primary centre

The provision of facilities, therefore, is related to the population of each individual order centres. The link between

access to services and settlement policy lies in the concepts of range and threshold. A threshold has been defined as 'the minimum population that is required to bring about the offering of a certain good for sale or to sustain any service, and the range of good as the maximum distance over which people will travel to purchase a good or derive a service offered at a central place' (Carter,1972). Thus, services cannot be provided everywhere in space. They require adequate levels of support or thresholds to be economical, whether those thresholds are measured in terms of finance, levels of use or other criteria (Dewar, et al.,1986). Simultaneously,they have a limited and definable radius of attraction or range; and different services have different ranges: there are certain distances beyond which people cannot travel economically to use a service. Therefore, a certain amount of concentration is required for reasonable levels of service provision. This situation could be a crucial consideration for facilities provision particularly in rural areas, where population tends to be scattered and thinly spread. It is obvious that settlements which serve surrounding areas become extremely important as holding points for services and facilities. Thus the criteria by which the desirable population of individual centres may be decided need to be considered.

IX.8.Proposed Population Size of Each Level of Key Settlement

Population is apparently to be the basis of economic threshold in terms of facilities provision. This is purposed to allow the concentration of residential development into certain selected centres and enables a similar polarization of

infrastructure, and services, and this tend to be the optimum economic pattern for the provision of such facilities.

Cloke (1979,p.29) argues that 'discussion in any theoretical of small growth centres that the scale inherent in the key rural settlement idea must be defined so that the size of a key settlement may be equated with the minimum size of a centre which would be able effectively to carry out the different roles of a growth centre'. Population, however, could indicate the minimum size of such centre. A summary of several researchers, however, has been made, in attempting to define it. There are multitudinous problems in delineating a maximum settlement population that is defined as rural by certain researchers.

The populations of places with a different status in Indonesia has been examined by Sufaat (1962) who determines the minimum population for villages, for sub-districts and for districts (Table 9.4).

Table 9.4

Types of centre and their population sizes

Status	Population	Range	Note
Village	7000	5000 - 10000	
Sub-district	28000	20000 - 40000	A sub-district comprises 3 - 6 villages
District	84000	60000 - 120000	A district comprises 9 - 18 villages and 2 - 6 sub-districts

Source: Sufaat,1962.

This standard might not be directly relevant to the existing

populations in rural area at present, and in some cases it needs significant modification. But this study adopts Sufaat's standard since some villages have population less than 10000, thus suggests the figure of 10000 a maximum population for a village.

The relationship between particular centres and population is shown by Dusseldorp (1971). He states that :'fixing a standard is very important when a centre 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 need into account' (Dusseldorp,1971). Haggett (1968) formulates the rule that for a given function there is a lower population level at which no settlement has the specific function, while conversely there is an upper population level at which all settlements have this function.The threshold for existing functions, empirically established, is thus important for settlement planning. These standards, however, differ from country to country as a result of varying levels of development, and government policy. These standards are usually established at national level ,but must be applied to local situations very flexibly. There are two factors which may make it necessary to deviate from the established threshold; these are the distribution of population, and the accessibility of the area. Van Dusseldorp categories the relationship between settlement status, population and radius of action as follows.

Table 9.5

Types of status of centre for planning in rural areas, and main characteristics

Status	Population	Radius of Action
Hamlet	<1500	<2 kms
Local centre village	1500 - 5000	3 - 6 kms
Large village or Small town	5000 - 10000	8 - 20 kms
City or Large town	>10000	>20 kms

Source : Van Dusseldorp (1971)

With regard to the population of the Indonesian villages, Dusseldorp's standard might be appropriate to be adopted to the study area. This reason has also been considered since there is no such information is found in Indonesia.

IX.9. Proposed Distribution of Facilities

By adopting Key Settlements concept, 'commerce' factor would be treated as the provision of commerce facilities development and it includes markets, and shops. But it also cannot be separated from the provision of social facilities. The Key Settlement concept, however, allows development of both commerce and social facilities together.

The provision of facilities, also needs consideration in terms of the scale of service, i.e. local and regional. At local scale, it includes all facilities which serve the small group of settlements such as elementary school, local shops, police station, public health clinic, maternity clinic cooperation unit and local sport area. At regional scale, it includes all

facilities which are provided for the people in both local and regional scale. These facilities are; hospital, cinema, senior high school, restaurant, mosque, church, and bank. Several facilities such as bookseller, tailoring, shoe repair, motor repair, watch repair, junior high school, and carpentry also serve the rural population at both local and regional scale. The provision of these facilities is suggested should be based on the population threshold calculation. According to Sufaat, a cinema can be supported by a region with a population of 40,000. He also proposes that a hospital should serve a region with a population between 60,000 and 120,000; a minimum population of 3200 is needed to justify an Elementary School, and a minimum to support a Junior and a Senior High School is 14,000 and 42,000 respectively. The Public Works Ministry also defines a population threshold to provide these facilities. It proposes 1600 for a an Elementary School, 6000 for a Junior High School and a Senior High School. A maternity clinic, however, needs to serve a population of 10,000. Table 9.6. compares between both standards for population thresholds.

Table 9.6.

Comparison Between Sufaat and Public Works Ministry Standard of Population Threshold

Facility	Public Works Ministry (population)	Sufaat (population)
Dispensary	10,000	n.a
Cinema	n.a	40,000
Regional Market	30,000	
Bank	n.a	n.a
Cooperation Unit	n.a	n.a
Rice Barn	n.a	n.a
Shops/kiosks	2,500	n.a
Bookseller	n.a	n.a
Carpentry	n.a	n.a
Tailoring	n.a	n.a

Shoe repair	n.a	n.a
Watch repair	n.a	n.a
Motor repair	n.a	n.a
Butcher	n.a	n.a
Restaurant	n.a	n.a
Local market	n.a	5,000-10,000
Sub-distric market	n.a	20,000-40,000
Element. School	1,600	3,200
Junior High School	6,000	14,000
Senior High School	6,000	42,000
Public Health Clinic	6,000	30,000
Maternity Clinic	10,000	10,000
Hospital	n.a	60,000-120,000
Mosque	n.a	40,000
Church	n.a	40,000
Small mosque	n.a	n.a
Chapel	n.a	n.a

Sources: 1.Sufaat,1962.
2.Public Work Ministry, 1972.

Table 9.6 enables the need of facilities in the settlement to be calculated. According to Public Works to provide an elementary school is required for a settlement which is supported by a population of 1600, or 50 per cent less than the minimum suggested by Sufaat.

Many facilities, however, do not have a standard population threshold, such as carpentry, shoe repair, bank, butcher, watch repair, motor repair and restaurant.These facilities can, however, be integrated with market places and are in fact found in almost all market places in Indonesia. The appropriate approach to the evaluation of these facilities is to identify the service radius of each. The cooperative unit, for example, serves the people at local level, and the minimum population suggested to support this facility is 10000 (Sufaat,1962). This might be applied to these other facilities.

This study is not intended to discuss all kecamatans with their different potential for development. But focusing in one of the most significant kecamatans may be useful in explaining the

application of the appropriate strategy in detail. Chapter X will, therefore, discuss Kecamatan Weleri for development by adopting Key Settlements concept.

CHAPTER X

KECAMATAN WELERI AS A CASE STUDY

CHAPTER X

KECAMATAN WELERI AS A CASE STUDY

In this chapter, the application of the Key Settlement concept will be discussed in detail, in relation to Kecamatan Weleri, which is one of the most significant kecamatans in the study area. All the important kecamatans revealed by the Factor Analysis can be used as planning units, and all the villages constitute foci of the analysis.

X.1. Background to the Area

Kecamatan Weleri is one of the fifteen kecamatans in Kendal Regency. It is situated in the north west of this regency and surrounded by kecamatans Pageruyung, Sukorejo, Gemuh and Cepiring. In the north it is bordered by the Java Sea. The details of its location are shown in Figure 10.1 representing the regency setting.

Kecamatan Weleri is a lowland plain area, covering about 63 square kilometers or 6.3 per cent of the total area of Kendal Regency. Administratively, Kecamatan Weleri is headed by a 'camat' who is in charge of its 32 villages, which vary in their size of population.

X.1.1.Population Distribution

The population of Kecamatan Weleri in 1984 was 82000 people A breakdown of the structure of the total population shows that 49 per cent of it was male and the rest was female, 38.8 per cent was under 15 and the percentage over 55 was 8.54 per cent (see Table 10.1)

Figure 10.1

Kendal Regency

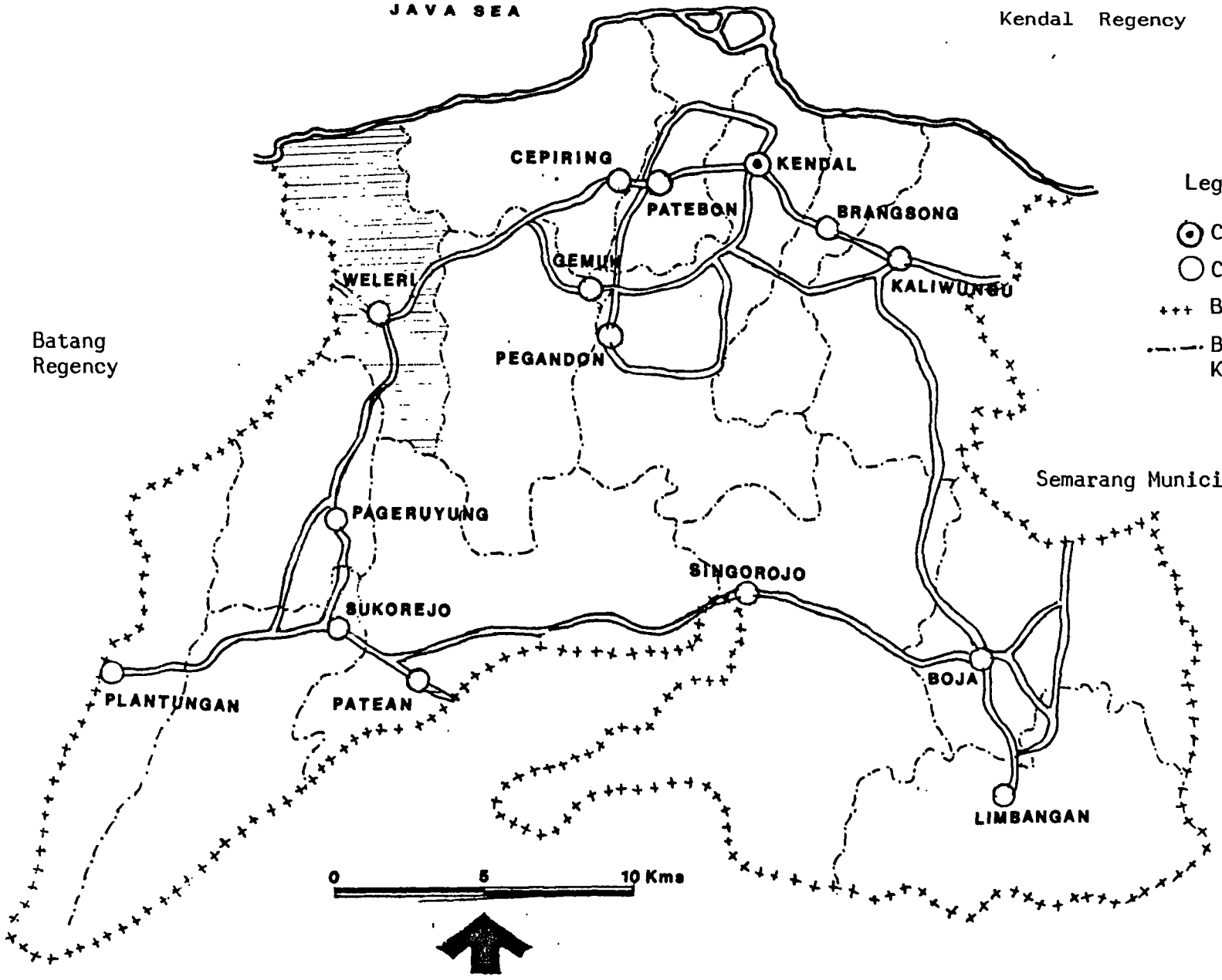
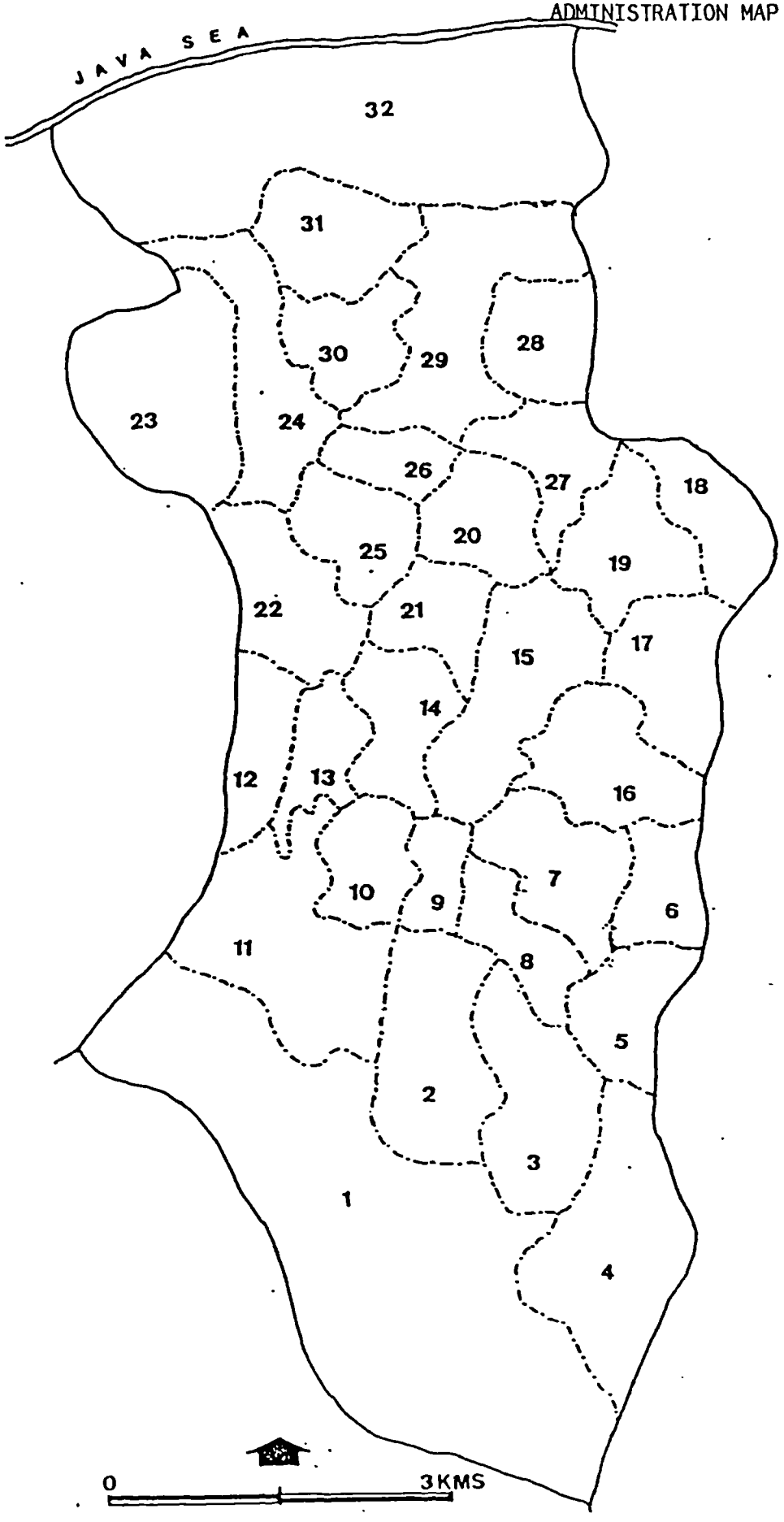


Figure 10.2

ADMINISTRATION MAP OF KEC.WELERI



Villages:

1.Sidomukti
2.Penyangkringan
3.Bumiayu
4.Manggungsari
5.Sumberagung
6.Ngasinan
7.Weleri
8.Nawangsari

9.Karangdowo
10.Penaruban
11.Sambongsari
12.Karanganom
13.Payung
14.Pucuksari
15.Tratemulyo
16.Montongsari

17.Wonotenggang
18.Pojoksari
19.Randusari
20.Karangsari
21.Parakan
22.Tambaksari
23.Jatipurwo
24.Rowosari

25.Tanjungsari
26.Tanjunganom
27.Sendangdawuhan
28.Kebonsari
29.Bulak
30.Gebanganom
31.Gempolsewu
32.Sendangsikucing

Table 10.1

Age and Sex Distribution of the Population of Kecamatan Weleri in 1984

Age	Male	%	Female	%	Total	%
0 - 4	5385	13.36	5382	12.70	10767	13.02
5 - 9	5914	14.67	5458	12.88	11372	13.75
10 - 14	4951	12.28	4861	11.47	9812	11.87
15 - 19	4306	10.68	4666	11.01	8972	10.85
20 - 24	3430	8.51	4026	9.50	7456	9.02
25 - 29	2958	7.34	3301	7.79	6259	7.57
30 - 34	2047	5.08	2174	5.13	4221	5.10
35 - 39	2205	5.47	2352	5.55	4557	5.52
40 - 44	2144	5.32	2411	5.69	4555	5.51
45 - 49	2153	5.34	2081	4.91	4232	5.12
50 - 54	1584	3.93	1873	4.42	3457	4.18
> 55	3232	8.02	3792	8.95	7024	8.49
TOTAL	40309	100.00	42377	100.00	82686	100.00

Source: 'Data Pokok Kecamatan di Jawa Tengah' Ministry of Public Works.

The number under 15 reflected the high fertility rate. Wertheim (1955) argues that if 40 % or more of the population are under 15, then the Crude Birth Rate is round 40 part per million. On this basis Kecamatan Weleri has also a high fertility rate.

The lower age limit for economic independence is taken to be 15. To be a farmer or a fisherman experience, knowledge and physical strength is necessary. The upper limit of the economically independent persons is taken to be 55. From Table 10.1 the calculated burden of dependency is 89.2, which means that every 100 independent workers support 89.2 economically dependent persons. In monetary terms, the burden of dependency carried by a Kecamatan Weleri household is higher than in Central Java Province as a whole. People continue to live largely at subsistence level since the amount of money earned to supplement the provision of food and goods from

agriculture and fishing is small. Table 6.2 shows the average income of the people in Kecamatan Weleri during 1979-1983.

Table 10.2

Per Capita Income Kecamatan Weleri, 1979-1983

Year	Income (Rupiah)	Income (£)(currency=1988)
1979	42689.32	15.24
1980	48670.82	17.38
1981	65503.81	23.39
1982	67672.05	24.17
1983	84763.30	30.27

Source: Bappeda Team Survey 1985

Even though the average income has increased about 19 per cent per year, it does not yet exceed the 'poverty line'. This measures by food consumption as a common indicator of the level of poverty in rural Java and relating food sufficiency to income sufficiency, took 240 kg of rice equivalent per person per year (Palmer, 1977). Thus, with the price of rice of Rp.250 per kg in 1981, for example, this Kecamatan was categorized as poor.

To discover a reliable figure for income in Third World countries is not easy, since some respondents dislike giving their real income. But, their economic condition might be identified in another indicator. Edmunsend (1977) argues that 'housing is one of the clearest indicators of economic wealth....'. Thus, it reflects the quality of life of the people in this kecamatan. There were 15700 houses in Kecamatan Weleri in 1984. 88.54 per cent of these were temporary, and made from bamboo or board without separate floors. Semi-permanent houses were recorded at 4.74 per cent, whereas permanent houses represented only 6.70 percent of the total

number of dwellings.

The area of kecamatan Weleri is 62 square-kilometers. This represents a high density of population of about 3000 persons per square- kilometer. In the study area the most densely populated areas were Kecamatan Penyangkringan, with about 4500 people per square-kilometer and Kecamatan Nawangsari and Kecamatan Penaruban which have 2800 and 3600 people per square-kilometer respectively. There are 4 village areas which have population density of less than 1000/square-kilometre, they are Sidomukti, Sambongsari, Parakan and Sendangsikucing. Table 6.3 shows the population distribution in Kecamatan Weleri in 1984.

Table 10.3

Population distribution and density in Kecamatan Weleri in 1984

Village	Area (sq-km)	Population	Pop/sq-km.
1.Sidomukti	8.16	3266	400
2.Penyangkringan	1.75	7765	4437
3.Bumiayu	1.52	3058	2011
4.Manggungsari	1.92	2742	1428
5.Sumberagung	1.22	2725	2233
6.Ngasinan	0.84	998	1188
7.Weleri	1.39	4157	2990
8.Nawangsari	0.98	2705	2760
9.Karangdowo	2.44	2499	1024
10.Penaruban	1.02	3663	3591
11.Sambongsari	3.83	3134	818
12.Karanganom	1.10	2415	2195

13.Payung	1.06	1210	1141
14.Pucuksari	0.99	1281	1293
15.Tratemulyo	1.03	2199	2135
16.Montongsari	1.37	1929	1408
17.Wonotenggang	1.14	1318	1156
18.Pojoksari	0.99	1149	1152
19.Randusari	1.48	1093	738
20.Karangsari	1.38	1807	1309
21.Parakan	2.65	893	336
22.Tambaksari	1.72	2133	1240
23.Jatipurwo	1.05	2189	2084
24.Rowosari	1.72	2659	1545
25.Tanjungsari	1.21	2301	1901
26.Tanjunganom	0.68	898	1320
27.Sendangdawuhan	1.51	1702	1127
28.Kebonsari	1.47	1890	1285
29.Bulak	2.53	5400	2134
30.Gebanganom	1.24	1408	1135
31.Gempolsewu	4.73	8431	1782
32.Sendangsikucing	8.32	1669	200

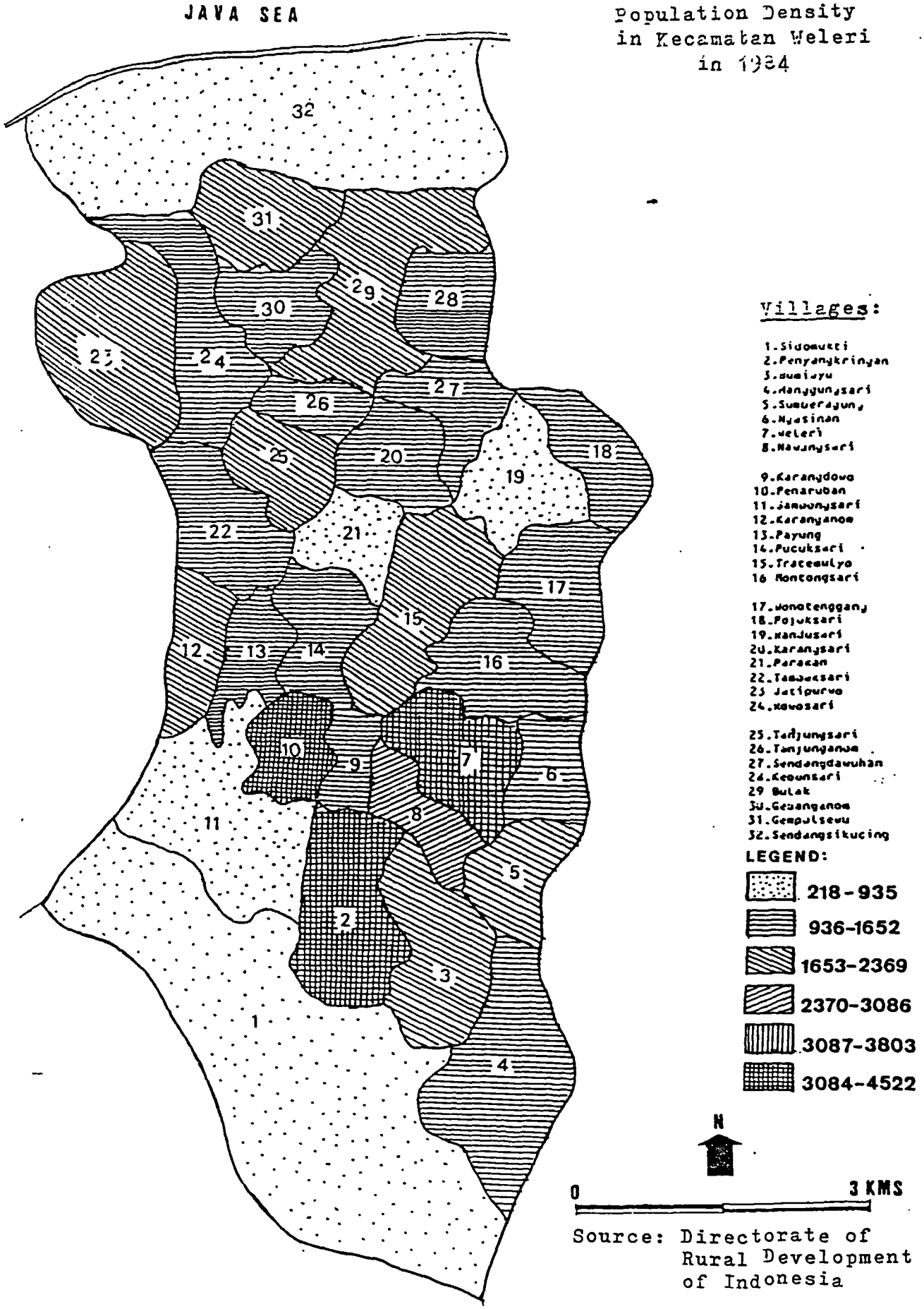
Source : Directorate of Rural Development.

X.1.2. The Settlement Unit

The basic settlement unit is simply a group of dwellings. Following the definition used in 1971 Population Census of Indonesia (Central Bureau of Statistic 1976,xii) a household consists of a person or group of persons occupying a part or the whole of a building, and generally eating together from one kitchen. The household is thus the smallest group in Javanese society and also forms the basic economic unit for production

Figure 10.3

Population Density in Kecamatan Weleri in 1984



Source: Directorate of Rural Development of Indonesia

and consumption. In this Kecamatan a household usually consists of a single nuclear family, but may also include dependent adults and distant relatives; for example ,a newly wed-couple may continue to live with one of the parents until their own household can be established. Settlement units may therefore be studied on the basis of households.

X.1.3. Size of Households

The size of the family varies significantly. The Rural Development Directorate (1984) gathered data for all the kecamatans in Kendal Regency, and the average number of persons per household in Kecamatan Weleri was 4.7 slightly higher than Kendal Regency as a whole (4.6) (Statistical Bureau Of Central Java Province 1984). Bulak village had the largest average household, with 8.3 persons per dwelling. Gebanganom village, however, had only 3.6 persons per household. Table 10.4 below shows the size of the household in Kecamatan Weleri as a whole.

Table 10.4

The Family Size of Kecamatan Weleri

Village	Pop.	No.of House-holds	Family size
1.Sidomukti	3266	734	4.44959
2.Penyangkringan	7765	1157	6.71132
3.Bumiayu	3058	742	4.12129
4.Manggungsari	2742	593	4.62395
5.Sumberagung	2725	629	4.33227
10.Penaruban	3663	720	5.08750
11.Sambongsari	3134	721	4.34674
12.Karanganom	2415	543	4.44751
13.Payung	1210	246	4.91870
14.Pucuksari	1281	280	4.57500
15.Tratemulyo	2199	434	5.06682
16.Montongsari	1929	444	4.34459
17.Wonotenggang	1318	324	4.06790
18.Pojoksari	1149	279	4.11828

19.Randusari	1093	237	4.61181
20.Karangsari	1807	412	4.38592
21.Parakan	893	191	4.67539
22.Tambaksari	2133	470	4.53830
23.Jatipurwo	2100	488	4.30327
24.Rowosari	2659	546	4.86996
25.Tanjungsari	2301	505	4.55644
26.Tanjunganom	898	219	4.10046
27.Sendangdawuhan	1702	423	4.02364
28.Kebonsari	1890	433	4.36490
29.Bulak	5400	645	8.37209
30.Gebanganom	1408	383	3.67624
31.Gempolsewu	8431	1731	4.87059
32.Sendangsikucing	1669	379	4.40369

Source : Kecamatan Weleri Office 1984.

There is no information about the population of each village centre , except for Kecamatan Kendal, containing the Regency Capital. There were 50 per cent of the population or about 21000 people lived in the urban centre of this kecamatan, Kendal City. Thus, there is little alternative, but to assume that approximately 50 per cent of the total population of each village live in the central village. Thus, the population of each village centre can be estimated, in order to work out the centrality index for this kecamatan.

X.2. The Functional Settlement System in Kecamatan Weleri

Kecamatan Weleri is a sub-district which is headed by a 'camat'. All 32 villages are under the camat's administration. The capital of Kecamatan Weleri is Weleri and it plays an important role as the centre of government service. Important offices such as those of The Regent, the Rail Way, the Education and Cultural bodies, the Land Use administration, the Department of Agriculture and the Police are located here. Thus, other activities, such as trade, services, transportation and small-scale industry have been encouraged. Thus, it func-

tions as the centre of services, trade, education and health. Unlike the capital of the Regency, Weleri does not function fully as a collector of local goods. Local agricultural products are often sold directly to the capital of the Regency, or to other major urban markets. Weleri, however, serves local markets as the distributor of urban products such as cloth, sweets, shirts, small-wares,canned food, sugar, flour, paraffin and kitchen tools. Thus, transportation also plays an important role. Weleri also functions as the collector of local goods, and it has a good prospect to enhance this function because it is provided with the railway and a main inter-regional road, which transport local products out of the Kecamatan easily. Thus, it has prospects of functioning as a major commercial centre.

In the village areas people are dispersed, but, there are group of dwellings, and one of these may function as the centre of the village. This centre usually has a greater number of people than other settlements. Certain economic and social facilities are generally concentrated in the central village,such as village head office, institutions, public health community, local market. But, apart from Weleri village, none have sufficient facilities. By developing the function of these village centres, they could be encouraged to become local centres of some commercial importance in relation to the area of which they form the central focus.

There are five markets in this Kecamatan, situated in Weleri, Penyangkringan, Karangdowo, Rowosari, Sendangdawuhan and Gempolsewu. These markets developed primarily to serve the local

people, but they provide important alternative shopping or marketing facilities for neighbouring villages. From the point of view of the flow of goods and services certain goods, whose investment curve is continuous along its entire length, for example textiles, are usually marketed by large-scale traders, whereas where there is a jump between small and large-scale operations, for example furniture, the traders tend to remain small units. In relation to other goods such as dry season crops, household furnishings, and prepared foods, market traders control the trade up to the point where marginal increases in inventory can no longer be profitably made. Non-perishable commodities, once injected into the market network, tend to move in circles, passing from trader to trader for a fairly extended period before they come within the reach of the genuine consumer. Almost all local products come from the agricultural sector such as vegetables, fish, rice, soybean, groundnut and cassava. In some cases these products are sold to middlemen by the farmers at a low price, and then distributed to urban markets. Local traders supply such commodities to the local population.

Rural economic development, however, should be carried out in line with social development. Rural development emphasis on the role of village centres necessitates a ranking of these centres in an objective manner so that the results gained by one worker can be duplicated if the need arises. Such results could be used as a basis for the provision of services at different level (Kargbo,1982). Beavon (1977), and Parr (1977) illustrates the less emphasis of the problems involved in empirical central place study. One of the problems is concer-

Table 10.5

Functional Outlets

Centre of Village	Population	Dispensary	Cinema	Public Market/ Animal Market/ others	Bank	BUUD/KUD (Rural Cooperation)	Village Rice-Barn	Shops Kiosks Stall	Book-seller	Carpentry	Tailoring	Shoe-repair	Watch-repair	Motor-repair	Butchers	Restaurants	Element. School	Junior High Sch	Senior High Sch	Public Health	Maternity	Hospital	Mosque	Church	Village offices	LSD Bldg	Sport Area
1.Sidomukti	3266	-	-	-	-	1	1	7	-	-	-	-	-	-	-	-	3	-	-	-	-	-	2	-	1	-	-
2.Penyangkringan	7765	-	-	1	-	1	-	40	1	2	1	-	1	1	1	1	6	1	2	-	-	-	2	-	1	-	-
3.Bumiayu	3058	-	-	-	1	-	-	33	-	-	-	1	-	-	-	-	2	-	-	-	-	-	2	-	1	-	-
4.Manggungsari	2742	-	-	-	-	-	-	14	-	-	1	-	-	-	-	-	3	-	-	-	-	-	2	-	1	-	-
5.Sumberagung	2725	-	-	-	-	-	-	15	-	-	-	-	-	-	-	-	3	-	-	-	-	-	2	-	1	-	2
6.Ngasinan	998	-	-	-	-	-	-	13	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1	-	1	-	-
7.Weleri	4157	1	1	-	-	-	-	25	1	2	2	2	1	2	-	2	4	2	-	-	1	-	1	-	1	-	-
8.Nawangsari	2705	-	-	-	-	-	-	42	-	-	-	-	-	-	-	-	1	1	-	1	1	-	-	2	1	-	-
9.Kerangdowo	2495	-	-	1	-	-	-	108	-	2	1	-	-	-	-	-	2	1	-	-	1	-	2	-	1	-	-
10.Penaruban	3663	-	-	-	-	-	-	9	-	-	-	-	-	-	-	-	2	2	-	-	1	-	2	1	1	-	-
11.Sambongsari	3134	-	-	-	-	1	1	10	-	-	-	-	-	-	-	-	2	-	-	-	-	-	2	1	1	-	-
12.Kerangan or	2415	-	-	-	-	-	-	14	-	1	-	-	-	-	-	-	2	-	1	1	-	-	1	-	1	-	-
13.Payung	1210	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1	-	1	-	-
14.Pucuksari	1281	-	-	-	-	-	-	14	-	-	-	-	-	-	-	-	1	-	-	-	-	-	2	-	1	-	-
15.Tratemulyo	2199	-	-	-	-	-	-	3	-	-	1	-	-	-	-	-	2	-	-	-	-	-	2	-	1	-	-
16.Montongsari	1529	-	-	-	-	-	-	12	-	-	-	-	-	-	-	-	2	1	-	-	-	-	1	-	1	-	-
17.Wonotenggang	1318	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	1	-	-	1	-	-	1	-	1	-	-
18.Pojoksari	1149	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	1	-	-	-	1	-	1	-	1	-	-
19.Rendusari	1093	-	-	-	-	-	-	3	-	-	-	1	-	-	-	-	1	-	-	-	-	-	2	-	1	-	-
20.Kerangsari	1807	-	-	-	-	-	-	6	1	-	-	-	-	-	-	-	2	-	-	-	-	-	2	-	1	-	-
21.Perakan	893	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	2	-	-	1	1	-	1	-	1	-	-
22.Tanbaksari	2133	-	-	-	-	1	-	16	-	-	-	-	-	-	-	-	2	-	-	-	-	-	1	-	1	-	-
23.Jatipurwo	2185	-	-	-	-	-	-	9	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1	-	1	-	-
24.Rowosari	2659	-	-	-	1	1	1	31	-	-	-	-	-	-	1	-	2	1	-	-	-	-	1	-	1	-	-
25.Tanjungsari	2301	-	-	-	-	-	-	12	-	-	-	-	-	-	-	-	2	-	-	-	-	-	1	-	1	-	-
26.Tanjungenor	898	-	-	-	-	-	-	9	-	-	-	-	-	-	-	-	1	-	-	-	-	-	2	-	1	-	-
27.Sendangdawuhan	1702	-	-	1	-	-	-	21	-	-	-	-	-	1	-	-	2	-	-	1	1	-	2	-	1	-	-
28.Kebonsari	1890	-	-	-	-	-	-	5	-	-	-	-	-	-	-	-	2	-	-	-	-	-	2	-	1	-	-
29.Bulak	5400	-	-	-	-	-	-	4	-	-	1	1	-	-	-	-	3	-	-	-	-	-	3	-	1	-	-
30.Gebangenor	1408	-	-	-	-	1	-	11	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1	-	1	-	-
31.Gempolsewu	8431	-	-	1	1	-	-	3	1	1	2	-	-	-	1	1	6	-	-	1	1	-	4	-	1	-	-
32.Sendangsikuting	1669	-	-	-	-	-	-	5	-	-	-	1	-	-	-	-	1	-	-	-	-	-	2	-	1	-	-
T o t a l	82686	1	1	5	5	4	3	503	5	6	9	7	2	3	4	4	67	9	3	6	7	0	52	4	32	2	7

Source : Kecamatan Weleri Office,1985.

ned with the measurement of settlement centrality Kargbo,1982,p.123). Centrality values in each settlement gives the functional index of a settlement. Thus, measurement of settlement centrality is, therefore, important.

X.2.1.Settlement Centrality

Social facilities have been used to indicate the settlement centrality. But, only a few functional outlets exist out of Weleri village. Banks, for example, are found in five villages namely, Bumiayu, Tambaksari, Rowosari, Gebanganom and Gempolsewu. These are important since they provide credit or capital, and have, in fact, provided such credit for agricultural development. Other facilities, such as drug stores, a cinema, shops, and the offices of rural cooperatives are also found in this kecamatan (Table 10.5)

The listing of these outlets is important in order to consider the settlement centrality in the kecamatan. Centrality index formula (see II.5.1) is used to measure settlement centrality in Kecamatan Weleri. Based on table 10.5. centrality index of individual village centre is produced as shown table 10.6. Weleri village centre has the highest score, and the second is Penyangkringan, the third is Sendangdawuhan. Figure 10.4 presents the array of centrality ratios of these centres.

X.3.Criteria for the Selection of Key Settlements

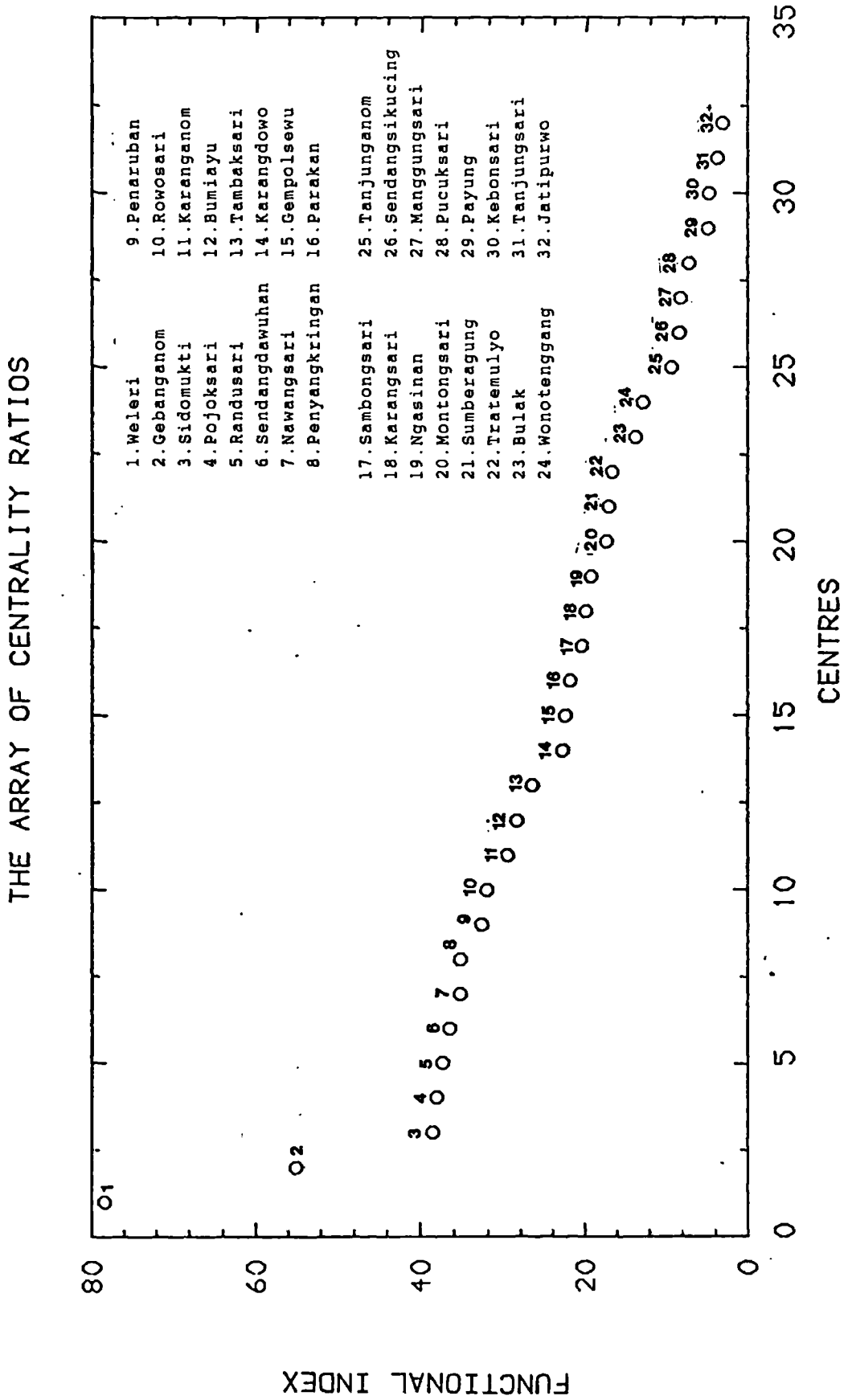
To determine the most suitable location for a Key Settlement, criteria must be specified. The following criteria are crucial for choosing and locating such settlements:

Table 10.6

Centrality Indices of Functional Outlets in Kecamatan Weleri

Centre of Village	Dispensary	Cinema	Public Market/ Animal Market/ Others	Bank	BUUD/KUD (Rural Cooperation)	Village Rice-Barn	Shops Kiosks Stall	Book-seller	Carpentry	Tailoring	Shoe-repair	Watch-repair	Motor-repair	Butchers	Restaurants	Element. School	Junior High Sch	Senior High Sch	Public Health	Maternity	Hospital	Mosque	Church	Village offices	LSD Bldg	Sport Area	Total Score
1.Sidomukti	-	-	-	-	3.16	6.44	0.35	-	-	1.80	1.94	2.10	-	1.58	-	0.13	1.68	-	1.95	-	-	0.97	-	0.79	12.66	-	38.62
2.Penyengkringan	1.33	-	1.33	-	1.33	-	0.85	2.66	2.66	0.76	0.82	0.88	0.82	0.66	2.66	0.95	0.70	7.09	0.82	1.33	-	0.40	-	0.33	5.32	1.52	35.28
3.Bumiayu	3.38	-	-	6.76	-	-	1.77	-	-	1.93	2.07	2 -	2.08	1.69	-	0.80	1.80	-	2.08	-	-	1.03	-	0.84	-	-	26.52
4.Manggungsari	-	-	-	-	-	-	0.83	-	-	2.15	-	2.51	2.34	1.88	-	1.35	-	-	-	-	-	1.16	-	0.94	-	-	8.33
5.Sumberagung	-	-	-	-	-	-	0.90	-	-	-	-	-	-	1.89	-	1.36	-	-	-	-	-	1.17	-	0.95	-	8.67	17.27
6.Ngasinan	-	-	-	-	-	-	2.14	-	-	-	-	-	-	-	-	1.23	-	-	-	-	-	1.59	-	2.58	-	11.84	19.40
7.Weleri	2.48	6.63	2.49	-	2.49	-	0.99	4.97	4.97	2.84	3.06	1.65	3.06	1.24	9.94	1.18	2.65	-	1.53	2.48	19.89	0.38	-	0.62	-	2.84	78.42
8.Nawangsari	-	10.19	-	-	-	-	2.55	-	-	-	-	-	-	-	-	0.45	2.03	-	-	3.82	-	-	15.28	0.96	-	-	35.26
9.Karangdowo	-	-	-	-	-	-	7.10	-	8.27	-	-	-	-	2.06	-	0.98	2.20	-	-	-	-	1.27	-	1.03	-	-	22.94
10.Penaruban	2.82	-	2.82	-	2.82	-	0.40	-	-	1.61	1.73	1.88	1.74	1.41	-	0.67	3.00	-	1.74	2.82	-	0.87	5.64	0.70	-	-	32.70
11.Sambongsari	-	-	-	-	-	8.79	0.52	-	-	-	-	-	-	-	-	0.78	-	-	2.03	-	-	1.01	6.59	0.82	-	-	20.57
12.Kerangan-	-	-	-	-	-	-	0.95	-	4.25	-	-	2.85	2.63	2.14	-	1.02	-	11.41	2.63	-	-	0.65	-	1.07	-	-	29.65
13.Peyung	-	-	-	-	-	-	0.40	-	-	-	-	-	-	-	-	1.02	-	-	-	-	-	1.31	-	2.13	-	-	4.87
14.Pucuksari	-	-	-	-	-	-	1.75	-	-	-	-	-	-	-	-	0.96	-	-	-	-	-	2.48	-	2.07	-	-	7.26
15.Tratemulyo	-	-	-	-	4.70	-	0.22	-	-	2.68	-	3.13	-	2.35	-	1.12	-	-	-	-	-	1.44	-	1.17	-	-	16.84
16.Montongsari	-	-	-	-	-	-	1.02	-	-	-	3.25	3.57	3.25	-	-	1.28	2.85	-	-	-	-	0.82	-	1.33	-	-	17.49
17.Wonotenggang	-	-	-	-	-	-	0.12	-	-	-	-	-	-	3.92	-	0.93	-	-	4.82	-	-	1.20	-	1.96	-	-	12.97
18.Pojoksari	-	-	-	-	-	23.98	0.43	-	-	-	-	-	-	-	-	1.07	-	-	-	8.99	-	1.38	-	2.25	-	-	38.12
19.Rendusari	9.45	-	-	-	-	-	0.45	-	-	5.82	-	5.82	-	-	-	1.12	-	-	-	9.46	-	2.90	-	2.36	-	-	37.40
20.Karangsari	-	-	-	-	-	-	0.54	11.43	-	-	-	-	-	-	-	1.36	-	-	3.82	-	-	1.76	-	1.43	-	-	20.06
21.Pareksan	-	-	-	-	-	-	0.37	-	-	-	7.12	-	7.12	-	-	2.76	-	-	-	-	-	1.78	-	2.85	-	-	22.05
22.Tambaksari	-	-	4.84	9.69	-	-	1.23	-	-	2.77	-	-	-	2.42	-	1.15	2.58	-	-	-	-	0.74	-	1.21	-	-	26.66
23.Jatiputwo	-	-	-	-	-	-	0.67	-	-	-	-	-	-	-	-	0.56	-	-	-	-	-	0.72	-	1.18	-	-	3.14
24.Rowosari	3.88	-	3.88	-	3.88	-	1.92	-	-	2.22	2.38	2.56	2.38	1.94	-	0.93	2.07	-	2.38	-	-	0.60	-	0.97	-	-	32.06
25.Tanjungsari	-	-	-	-	-	-	0.86	-	-	-	-	-	-	-	-	1.07	-	-	-	-	-	0.69	-	1.12	-	-	3.74
26.Tanjunganom	-	-	-	-	-	-	1.65	-	-	-	-	-	-	-	-	1.37	-	-	-	-	-	3.54	-	2.87	-	-	9.44
27.Sendangdewuhan	-	-	6.07	-	-	-	2.03	-	-	3.47	-	4.05	-	3.03	-	1.45	3.24	-	3.74	6.07	-	1.87	-	1.52	-	-	36.54
28.Kepohsari	-	-	-	-	-	-	0.43	-	-	-	-	-	-	-	-	1.30	-	-	-	-	-	1.68	-	1.37	-	-	4.79
29.Bulak	-	-	1.91	-	1.91	-	0.12	-	-	1.09	1.18	1.27	1.17	0.96	-	0.68	1.02	-	1.15	-	-	0.88	-	0.48	-	-	13.87
30.Gebanganom	7.34	19.57	-	14.68	-	-	1.26	-	-	-	-	-	-	-	-	0.87	-	-	-	-	-	1.11	-	1.83	-	8.39	55.11
31.Gempolsewu	1.22	-	1.22	2.45	1.22	-	0.56	2.45	1.22	1.40	0.75	0.81	0.75	0.61	2.45	0.87	0.65	-	0.75	1229	-	0.75	-	0.30	-	1.40	22.63
32.Sendangsikuting	-	-	-	-	-	-	0.49	-	-	-	3.81	-	-	-	-	0.74	-	-	-	-	-	1.91	-	1.54	-	-	8.50

Figure 10.4


THE ARRAY OF CENTRALITY RATIOS
1.Weleri
2.Gebanganom
3.Sidomukti
4.Pojoksari
5.Randusari
6.Sendangdawuhan
7.Nawangsari
8.Penyangkringan
9.Penaruban
10.Rowosari
11.Karanganom
12.Bumiayu
13.Tambaksari
14.Karangdowo
15.Gempolsewu
16.Parakan
17.Sambongsari
18.Karangsari
19.Ngasinan
20.Montongsari
21.Sumberagung
22.Tratemulyo
23.Bulak
24.Wonotenggang
25.Tanjunganom
26.Sendangsikucing
27.Manggungsari
28.Pucuksari
29.Payung
30.Kebonsari
31.Tanjungsari
32.Jatipurwo
FUNCTIONAL INDEX
CENTRES
0
20
40
60
80
0
5
10
15
20
25
30
35

1.The number of people served: that is population;

2.The provision of socio-economic facilities: that is functions;

3.The provision of roads;

4.The geographical location in relation to urban centres.

These criteria will be used for determining key villages.

1.Number of people served

Population is a prime factor and is determined by the rural population density. This is derived from information obtained from the Directorate of Rural Development of the Home Affairs Ministry. The administrative boundaries of villages are superimposed on the density map and each administrative unit scored according to its density. On this basis it is then possible to estimate the provision of facilities within villages in different parts of the study area with respect to the potential population that would be served by each village. The Indonesian Public Works Authority uses a population threshold of 1500 for the provision of a primary school, and 6000 for the provision of a secondary school. These population thresholds are also applied to the provision of other facilities such as health, recreation and religion. However, the administrative boundaries are still used for identifying appropriate villages as key villages.

2.Provision of Facilities

A Key Settlement as a service centre is dominated by non-agricultural activities, and always has a residential function

for people working in those activities (Van Dusseldorp,1971,p19). Sometimes, however, some or all of the people engaged in agriculture will also live in the centre. Both social and economic activities are potent factors in urban development. Key settlements can be characterized by a concentration of socio-economic facilities, and thus, if a village is already dominated by these,it will have a potential as a key village for development. Cloke (1979, p.178) indicates that one of the areas in which settlement policy is most likely to succeed is in the concentration of service provision. Thus the existence of facilities such as transportation, marketing, utilities and a social infrastructure, is an important criterion for the selection of the key centres for development. The scoring applied to available social facilities is based on :

1.numbers of markets, banks, shops and village enterprise units;

2.the concentration of education facilities, of health services and places of worship.

A village scores high is thus an appropriate location for development as a Key Settlement.

3.The provision of roads

This factor evaluates the position of the key settlement in relation to omnibus routes providing adequate services. This is a quality of the location which expresses the ease with which it may be reached from other places. It therefore

reflects the available opportunities for contact, provision, and interaction. Key Settlements, therefore, should be selected by evaluating the available routes to other centres where goods and services are provided. Thus, it should have an accessibility to other places.

Accessibility is measured by distance. Distance, whether measured physically or by the time, effort, and cost required to traverse it, is the spatial dimension of separation. A location near a major road is favourable because it is easily linked in to the network by feeder roads. There are three kinds of roads in Indonesia: namely State, Province and Regency roads. A State road is built and maintained by Central Government and usually acts as a connecting road between two or more provinces; a Provincial road by the Provincial Government and is usually a link between regencies; a Regency road by Local Government and connects kecamatans and villages. The physical condition of roads are also different, Provincial and Regency roads are generally asphalted, but at kecamatan level some rural roads are gravel or earth, and thus they affect the convenience, and the travel time as the variables of accessibility. In this study, a high score is given to a kecamatan if it is served by asphalt roads, and a low score if earth. A kecamatan which is served by gravel roads is scored between them.

4.Location relative to urban centres

As one of several criteria for the recognition of Key Settlements in Devon, Cloke (1979,p.151) argues that a Key Sett-

lement must not be too near to an urban centre. The reason is obvious, in that a town will provide all the needed services and facilities provided in a Key Settlement. Therefore, in rural Central Java, a Key Settlement should not be located within the service range of an urban centre. Assessment of this factor will be derived from the distance between centres on the kecamatan and regency level. Thus the farther the Key Settlement is from a major urban centre , the higher its score.

X.4.Units to which the Criteria are Applied

The technique applied to selecting Key Villages uses the administrative boundaries. It is based on the assumption that a village which has a high score on these criteria will occupy a high position in the settlement hierarchy. An advantage of this approach is that it would facilitate the implementation of Government location policy, since it takes into account the administrative boundaries. Another advantage is that such villages constitute the smallest community unit in the administrative region of a kecamatan. It therefore displays a degree of homogeneity This technique can also be used on a regional scale. The grid technique is an alternative method but does not relate the evaluation to the essential administrative base.

X.5. Scoring Technique and Proposed Key Villages

To identify the most suitable locations for key villages, data have been selected from a field survey in Kecamatan Weleri, executed in 1985. All villages in Kecamatan Weleri have been

examined. The result of the evaluation shows clearly the difference between villages in relation to the provision of facilities. The villages may therefore be ranked in a hierarchy. The scoring technique enables a hierarchy of settlements to be constructed on the basis of the four criteria.

The scoring technique has been applied in assessing the accessibility of the villages in this Kecamatan. The existence of a road in a village has been taken as the main factor in accessibility. The provision of an asphalted road in a village is scored 3, a gravel road 2 and an earth road 1. Table 10.7 shows the accessibility scores of villages.

Table 10.10 shows the ranking of villages in Kecamatan Weleri according to the provision of socio-economic facilities. Table 10.5 is used to examine this criterion. The highest score, 4, is given to village centres which are classified as rank 1. Scores 3,2 and 1 are given to village centres which are classified as rank 2,3 and 4 respectively. The highest rank in Kecamatan Weleri is found in Weleri village. The second highest is Gempolsewu village.

To assess the relative location of villages to urban centres, the distance of each village from the nearest urban centre has been measured. In this study Kendal City ,the capital of the Regency, is the relevant urban centre. All villages are, therefore, be ranked and be scored. The farther the distance from the urban centre, the higher the rank and the score. Table 10.9 presents the scores of this criterion.

Table 10.7.

Scores of Accessibility Variable

Village	I Asphalted road	II Gravel road	III Earth road	Score I	Score II	Score III	Total Score
1.Sidomukti	+	+	+	3	2	1	6
2.Penyangkringan	+	+	-	3	2	-	5
3.Bumiayu	-	+	+	0	2	1	3
4.Manggungsari	-	+	+	0	2	1	3
5.Sumberagung	-	+	+	0	2	1	3
6.Ngasinan	+	+	+	3	2	1	6
7.Weleri	+	+	+	3	2	1	6
8.Nawangsari	+	+	+	3	2	1	6
9.Karangdowo	+	+	+	3	2	1	6
10.Penaruban	+	+	+	3	2	1	6
11.Sambongsari	+	+	+	3	2	1	6
12.Karanganom	+	+	+	3	2	1	6
13.Payung	+	+	-	3	2	0	5
14.Pucuksari	-	+	+	0	2	1	3
15.Tratemulyo	-	+	+	0	2	1	3
16.Montongsari	+	+	+	3	2	1	6
17.Monotenggang	+	+	+	3	2	1	6
18.Pojoksari	+	+	+	3	2	1	6
19.Randusari	-	+	+	0	2	1	3
20.Karangsari	-	+	+	0	2	1	3
21.Parakan	-	+	+	0	2	1	3
22.Tambaksari	+	+	+	3	2	1	6
23.Jatipurwo	+	+	+	3	2	1	6
24.Rowosari	+	+	+	3	2	1	6
25.Tanjungsari	-	+	+	0	2	1	3
26.Tanjunganom	+	+	+	3	2	1	6
27.Sendangdawuhan	+	+	+	3	2	1	6
28.Kebonsari	-	+	+	0	2	1	3
29.Bulak	+	+	+	3	2	1	6
30.Gebanganom	-	+	+	0	2	1	3
31.Gempolsewu	+	+	+	3	2	1	6
32.Sendangsikucing	+	+	+	3	2	1	6

NOTE :

+ = provided with this type of road

- = not provided with this type of road

Table 10.8

Scores of Population Served
Variable

Village	1	2	Score
1.Sidomukti	8.16	418	1
2.Penyangkringan	1.75	4522	6
3.Bumiayu	1.52	2110	3
4.Manggungsari	1.92	1506	2
5.Sumberagung	1.22	2356	3
6.Ngasinan	0.84	1366	2
7.Weleri	1.39	3098	5
8.Nawangsari	0.98	2913	4
9.Karangdowo	2.44	1085	2
10.Penaruban	1.02	3810	6
11.Sambongsari	3.83	857	1
12.Karanganom	1.10	2330	3
13.Payung	1.06	1283	2
14.Pucuksari	0.99	1445	2
15.Tratemulyo	1.03	2279	3
16.Montongsari	1.37	1517	2
17.Wonotenggang	1.14	1287	2
18.Pojoksari	0.99	1303	2
19.Randusari	1.48	779	1
20.Karangsari	1.38	1418	2
21.Parakan	2.65	393	1
22.Tambaksari	1.72	1327	2
23.Jatipurwo	1.05	2227	3
24.Rowosari	1.72	1633	2
25.Tanjungsari	1.21	2024	3
26.Tanjunganom	0.68	1541	2
27.Sendangdawuhan	1.51	1226	2
28.Kebonsari	1.47	1387	2
29.Bulak	2.53	2193	3
30.Gebanganom	1.24	1256	2
31.Gempolsewu	4.73	1814	3
32.Sendangsikucing	8.32	218	1

Note :
1 = Area of village
2 = Population density

Table 10.9

Scores of the Distance to Urban Centre Variable

Village	1	2
1.Sidomukti	15.75	6
2.Penyangkringan	15.00	6
3.Bumiayu	14.25	5
4.Manggungsari	13.95	4
5.Sumbersgung	12.75	3
6.Ngasinan	12.30	2
7.Weleri	13.20	3
8.Nawangsari	13.65	4
9.Karangdowo	14.10	4
10.Penaruban	14.40	5
11.Sambongsari	15.60	6
12.Karanganom	15.15	6
13.Payung	14.55	5
14.Pucuksari	14.10	4
15.Tratemulyo	13.05	3
16.Montongsari	12.45	2
17.Wonotenggang	11.40	1
18.Pojoksari	10.80	1
19.Randusari	11.70	2
20.Karangsari	12.90	3
21.Parakan	13.50	4
22.Tambaksari	14.55	5
23.Jatipurwo	15.75	6
24.Rowosari	14.85	5
25.Tanjungsari	14.10	4
26.Tanjunganom	13.65	4
27.Sendangdawuhan	12.15	2
28.Kebonsari	12.30	2
29.Bulak	13.20	3
30.Gebanganom	14.10	4
31.Gempolsewu	14.40	5
32.Sendangsikucing	14.55	5

Note :
* It is a geographical distance measured from these villages to Kendal city.

Scoring technique by using
Sturgess formula: $k = 1 + 3.32 \log n$

$= 1 + 3.32 \log 32$

$= 6$

$$\text{Range} = \frac{15.75 - 10.80}{6}$$

$= 0.825$

10.80 - 11.62 scored 1
11.63 - 12.45 scored 2
12.46 - 13.27 scored 3
13.28 - 14.10 scored 4
14.11 - 14.92 scored 5
14.93 - 15.75 scored 6

Table 10.10

Scores of Socio Economic Facilities Variable

Village	01	02	03	04	06	07	08	09	10	11	12	13	14	15	16	17	18	19	Total No of types	Rank
1.Penyangkringan	x	x	x	x	x	x			x	x	x			x			x	x	13	1
2.Gempolsewu	x	x	x	x	x	x		x		x	x	x	x						12	2
3.Weleri	x	x	x	x	x	x	x	x	x		x								11	3
4.Nawangsari	x	x	x	x			x	x	x	x		x			x				11	3
5.Karangdowo	x	x	x	x	x	x	x	x	x	x									11	3
6.Rowosari	x	x	x	x	x	x			x	x			x	x					11	3
7.Sendangdawuhan	x	x	x	x	x	x	x	x		x		x							11	3
8.Sidomukti	x	x	x	x	x	x								x		x		x	10	4
9.Penaruban	x	x	x	x	x	x		x	x						x				10	4
10.Sambongsari	x	x	x	x	x	x								x	x	x			10	4
11.Pojoksari	x	x	x	x	x	x	x	x								x			10	4
12.Karanganom	x	x	x	x	x	x						x					x		9	5
13.Montongsari	x	x	x	x	x	x	x		x										9	5
14.Parakan	x	x	x	x	x		x					x							9	5
15.Bumiayu	x	x	x	x	x			x					x						8	6
16.Ngasinan	x	x	x	x	x	x	x				x								8	6
17.Wonotenggang	x	x	x	x	x	x						x							8	6
18.Tambaksari	x	x	x	x	x	x							x						8	6
19.Tanjunganom	x	x	x	x	x	x	x												8	6
20.Bulak	x	x	x	x	x	x	x												8	6
21.Gebanganom	x	x	x	x	x						x		x						8	6
22.Sendangsikucing	x	x	x	x	x					x									8	6
23.Sumberagung	x	x	x	x	x						x								7	7
24.Payung	x	x	x	x	x	x													7	7
25.Pucuksari	x	x	x	x	x		x												7	7
26.Tratemulyo	x	x	x	x	x		x												7	7
27.Randusari	x	x	x	x	x		x												7	7
28.Karangsari	x	x	x	x	x		x												7	7
29.Jatipurwo	x	x	x	x	x	x													7	7
30.Kebonsari	x	x	x	x	x		x												7	7
31.Manggungsari	x	x	x	x	x														6	8
32.Tanjungsari	x	x	x	x	x														6	8
The number of types:	32	32	32	32	32	31	21	15	8	7	6	6	6	5	4	3	3	2	2	279

Note :

1.Shops/Kiosks/Stalls
2.Village Office
3.Elementary School
4.Surau
5.Mosque
7.Asphalted road
8.Dam
9.Maternity
10.Junior High School
11.Public market
12.Sport area
13.Public health
14.Bank
15.BUUD/KUD (rural cooperation unit)
16.Church
17.Village Rice Barn
18.Senior High School
19.LSD (Social Community Service)

Table 10.11

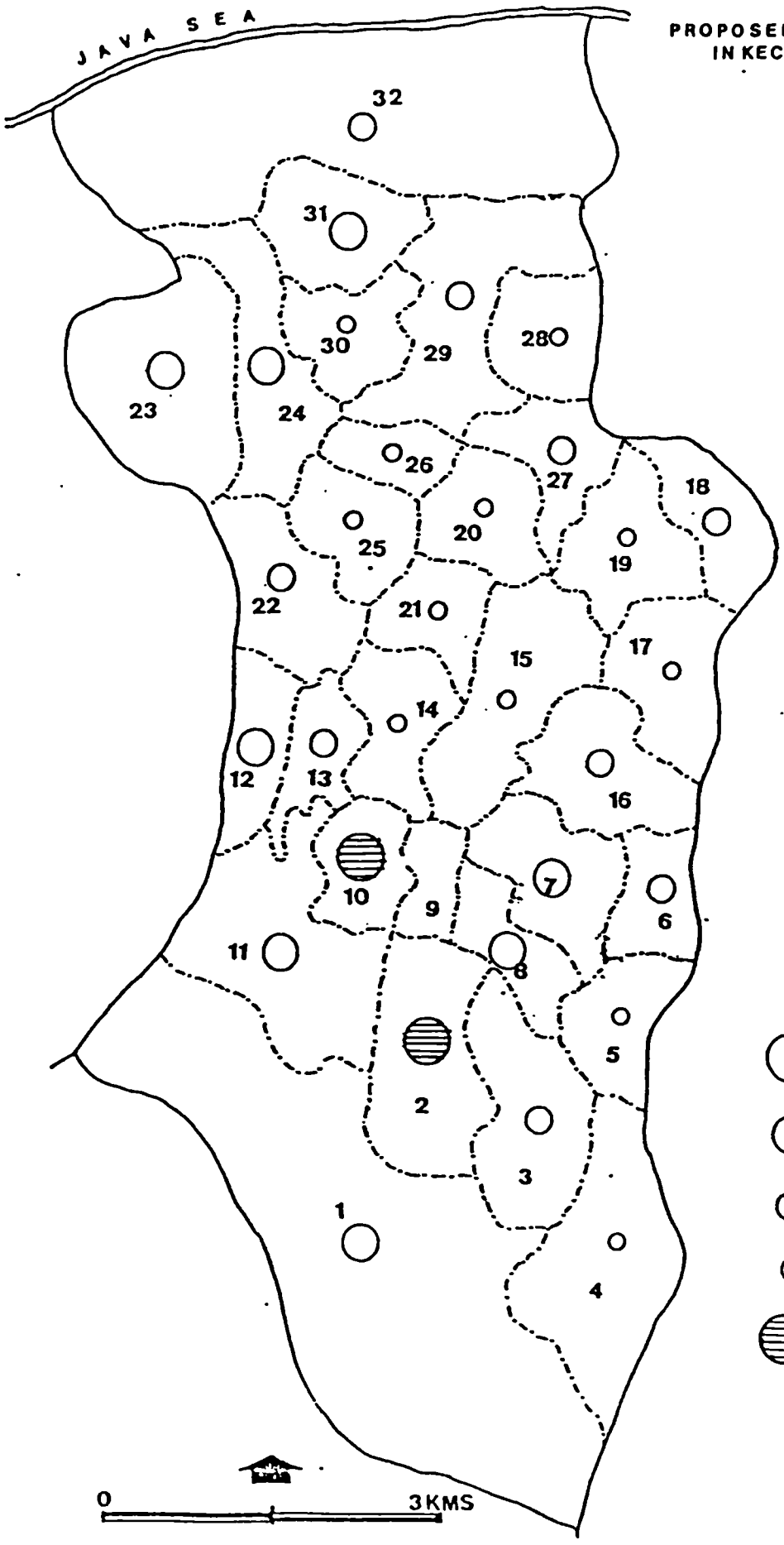
Total Scores of All Variables

Village	1	2	3	4	Total Score
1.Sidomukti	6	1	6	3	16
2.Penyangkringan	5	6	6	4	21
3.Bumiayu	3	3	5	2	13
4.Manggungsari	3	2	4	1	10
5.Sumberagung	3	3	3	1	10
6.Ngasinan	6	2	2	2	12
7.Weleri	6	5	3	3	17
8.Nawangsari	6	4	4	3	17
9.Karangdowo	6	2	4	3	15
10.Penaruban	6	6	5	3	20
11.Sambongsari	6	1	6	3	16
12.Karanganom	6	3	6	2	17
13.Payung	5	2	5	1	13
14.Pucuksari	3	2	4	1	10
15.Tratemulyo	3	3	3	1	10
16.Montongsari	6	2	2	2	12
17.Wonotenggang	6	2	1	2	11
18.Pojoksari	6	2	1	3	12
19.Randusari	3	1	2	1	7
20.Karangsari	3	2	3	1	9
21.Parakan	3	1	4	2	10
22.Tambaksari	6	2	5	2	15
23.Jatipurwo	6	3	6	1	16
24.Rowosari	6	2	5	3	16
25.Tanjungsari	3	3	4	1	11
26.Tanjunganom	6	2	4	2	14
27.Sendangdawuhan	6	2	2	3	13
28.Kebonsari	3	2	2	1	8
29.Bulak	6	3	3	2	14
30.Gebanganom	3	2	4	2	11
31.Gempolsewu	6	3	5	4	18
32.Sendangsikucing	6	1	5	2	14

Note :
1 = Accessibility
2 = Population served
3 = Distance to urban centre
4 = The provision of social facilities

FIGURE 10.5

PROPOSED KEY SETTLEMENTS IN KEC. WELERI



Villages:

1. Sidomukti
2. Penyangkringan
3. Bumisyu
4. Manggungsari
5. Sumberagung
6. Ngasinan
7. Weleri
8. Nawangsari
9. Karangdowo
10. Penaruban
11. Sambongsari
12. Karanganom
13. Payung
14. Pucuksari
15. Tratemulyo
16. Montongsari
17. Wonotenggang
18. Pojoksari
19. Randusari
20. Karangsari
21. Parakan
22. Tambaksari
23. Jatipurwo
24. Rowosari
25. Tanjungsari
26. Tanjunganom
27. Sendangdawuhan
28. Kebonsari
29. Bulak
30. Gebanganom
31. Gempolsewu
32. Sendangsikucing

FIRST ORDER

SECOND ORDER

THIRD ORDER

FOURTH ORDER

KEY SETTLEMENTS

The scores as all these criteria for all the villages in Kecamatan Weleri are shown in Table 10.11 The maximum score for any village is 21 and the minimum score is 8. Villages which score between 21 and 19 are categories as highest-order centre of key settlement. Conversely, villages with scores between 8 and 11, and 12 and 15 are classified as low and high-order centres respectively. With regard to these criteria, it is seen that Penyangkringan and Penaruban villages are high-order centres. This shows that even though Weleri Village is the capital of the Kecamatan, it does not constitute the highest order of settlement hierarchy.Based on this table, therefore, the key villages in kecamatan Weleri can be discerned. Thus the highest order centres are proposed as the key settlements of this Kecamatans. Figure 10.5. presents the proposed key villages in Kecamatan Weleri. They would, therefore, have characteristics as proposed in sub-chapter VI.4.

X.6.Planning for Commercial Facilities in Kecamatan Weleri

A Key Settlement policy offers a framework for implementing the commercial development such as local markets and shops. But, to provide such facilities the population threshold and the application method must be considered. This section discusses the need of such facilities and its distribution in this Kecamatan.

X.6.1.The Need of Commercial Facilities in Kecamatan Weleri

The necessary provision of commercial facilities is determined by the minimum population needed to support the centre. Accor-

ding to De Chiara and Koppelman (1975), the minimum population to support a community centre is 35,000, whereas the Department of Public Works of Indonesia bases the planning of markets on a minimum population of 30,000. With a population of more than 80,000, Kecamatan Weleri, therefore, should have 2 or more commercial centres. At local scale, however, the provision of local market needs to be supported by a population of 10,000 (Sufaat,1962).This implies that Kecamatan Weleri should have 8 local markets.

Beside the population threshold, there are two other aspects which affect the provision of such facilities, namely the existing facilities available, and the range of their service areas.

There are 5 market places in Kecamatan Weleri at 5 villages, i.e.Penyangkringan, Karangdowo, Rowosari, Sendangdawuhan and Gempolsewu. Almost all these markets serve the rural population on a neighbourhood scale. The Penyangkringan market, however,has a wider service area than the others. It functions not only on a neighbourhood scale, but also on a community level. The existing higher-order market does not yet serve all the people in this kecamatan, and thus certain low-level centres have been recognized as operating at a neighbourhood level (see figure 10.7).

Although almost all areas in the Kecamatan are served by market places at the neighbourhood level, not all are served evenly. The importance of the market place at the neighbourhood level is based on the fact that the economic viability of a rural area is not only sustained by community markets, but also by

neighbourhood markets.

The circle method may be applied to the assessment of the areas of population served and can show which areas are not served. By recognizing the number of facilities, the service area radius at neighbourhood level can be calculated using the formula:

$$x \text{ II } R^2 = A$$

where :

x = number of facilities

R = radius of service area at the given level

A = the study area.

Thus, in theory the radius of market service at the neighbourhood level in Kecamatan Weleri should be:

$$8 \text{ II } R^2 = 64440000$$

$$x = 1600 \text{ m}$$

To assist in determining suitable locations for new market places, a location plan must be established. Two methods may be used :

1.Circle method;

2.Bisection method.

These methods have been applied by Shimadas and Benyamin Fisher for regional development in India (Nanerji, Shimadas and H.Benyamin Fisher, 19..).The circle method has also been applied by Brush and Gauthier (1968) in relation to rural service areas in Gloucestershire.

The bisection method is an approach to the problem of choosing service areas by considering the distance between two or more centres on the same level in the hierarchy. The maximum distance is determined by halving the distance between them. This is an appropriate method to define centres only at the regional level, and is not applicable at the local level.

X.6.2. The Circle Method

Circles of a given radius outline the service areas, in regions that assumed are to be homogeneous; the morphology of the regions is neglected. It is also assumed that the population is distributed evenly through the region. This method is applied in this study, since it is an approach which facilities the allocation of particular facilities, by considering the limiting distances to be travelled in order to reach them. Figure 10.6 shows the distribution of market places in Kecamatan Weleri and also their service areas. Almost all areas are served. Penyangkringan village, as the highest-order centre, has a wider service area than the other centres. Its circle is labelled A. This study has adopted the radius of service area of Brush and Gauthier's study with the assumption that the ability of the Indonesian people to reach such services on foot is the same with the Gloucestershire people. They suggest a distance of 3 miles (4.8 kilometres) for the highest-order centre, and 1 mile (1.6 kilometres) for lower-order centres (Brush and Gauthier, 1968). A service area radius of 4.8 kms represents an area of about 72.34 square-kilometers. Other centres have a radius of 8.04 square-kilometers and their circles are labelled B,C,D and E (Figure

Figure 10.6
DISTRIBUTION OF MARKET PLACE LOCATIONS IN KECAMATAN WELERI

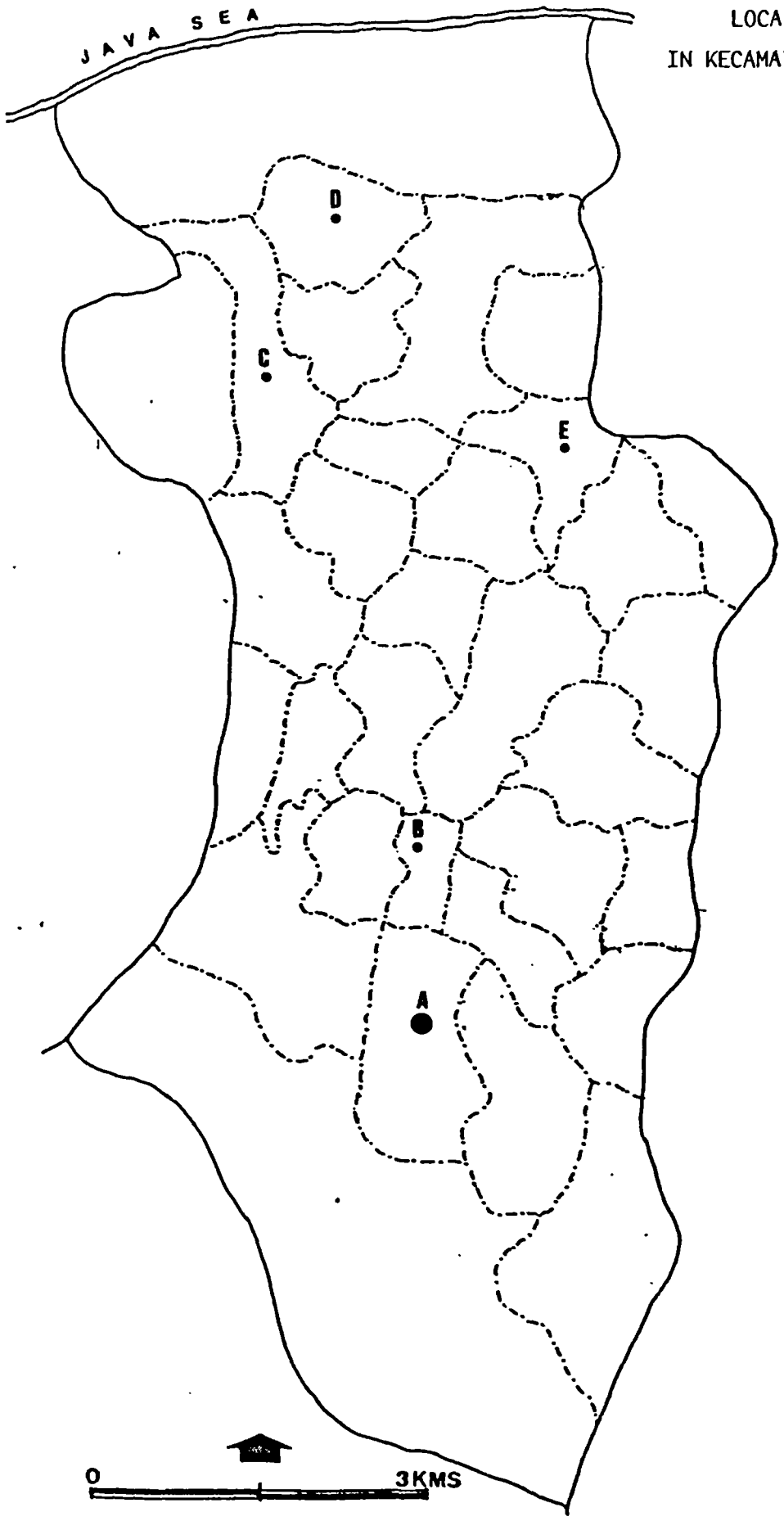
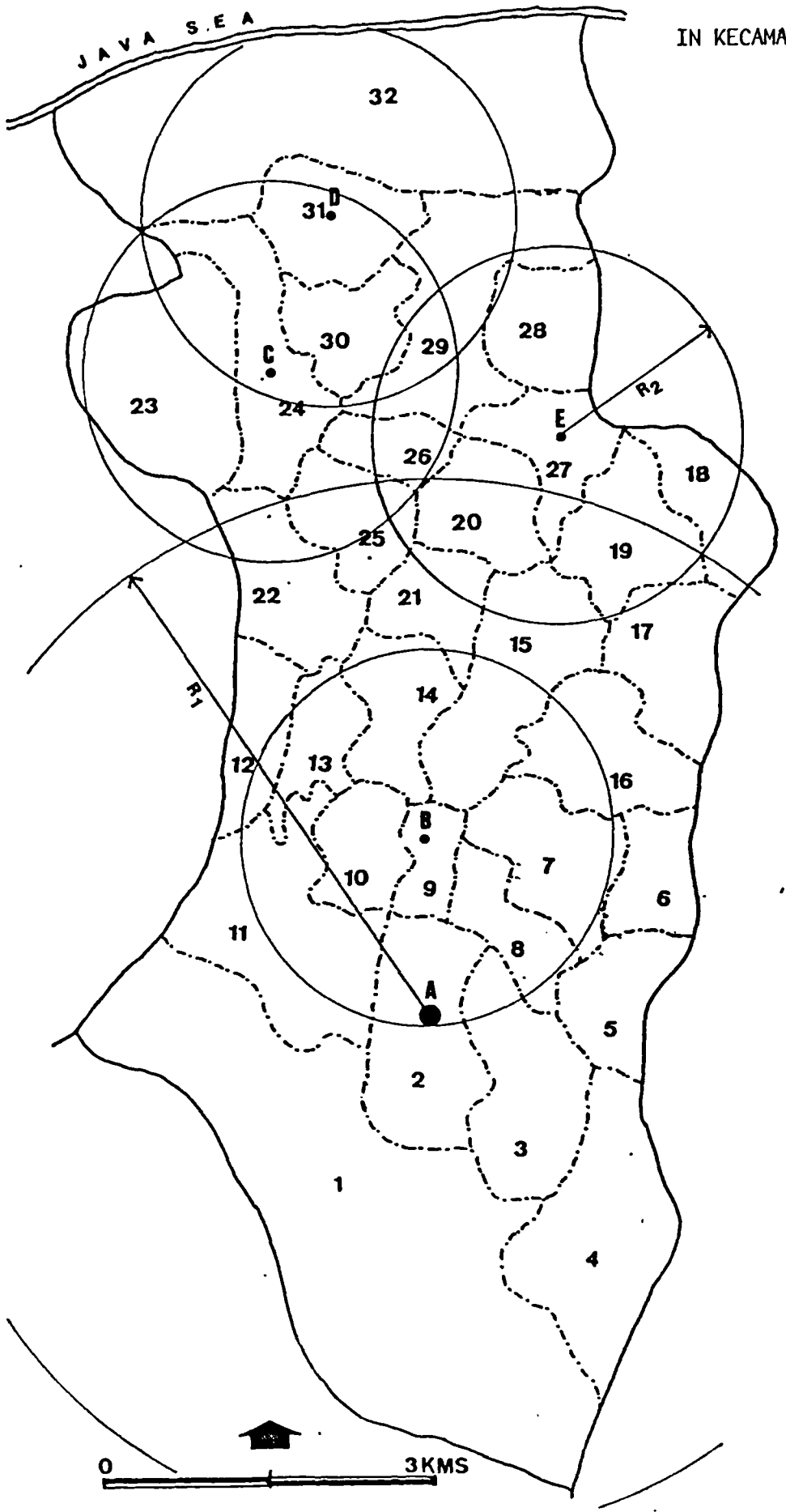


Figure 10.7

SERVICE AREAS OF MARKET PLACES

IN KECAMATAN WELERI



Villages:

1. Sidomukti
2. Penyangkringan
3. Bumiayu
4. Manggungsari
5. Sumberagung
6. Ngasinan
7. Weleri
8. Nawangsari
9. Karangdowo
10. Penaruban
11. Sambongsari
12. Karanganom
13. Payung
14. Pucuksari
15. Tratemulyo
16. Montongsari
17. Wonotenggang
18. Pojoksari
19. Randusari
20. Karangsari
21. Parakan
22. Tambaksari
23. Jatipurwo
24. Rowosari
25. Tanjungsari
26. Tanjunganom
27. Sendangdawuhan
28. Kebonsari
29. Bulak
30. Gebanganom
31. Gempolsewu
32. Sendangsikucing

Figure 10.8
PROPOSED NEW MARKET PLACES LOCATIONS BY USING CIRCLE METHOD

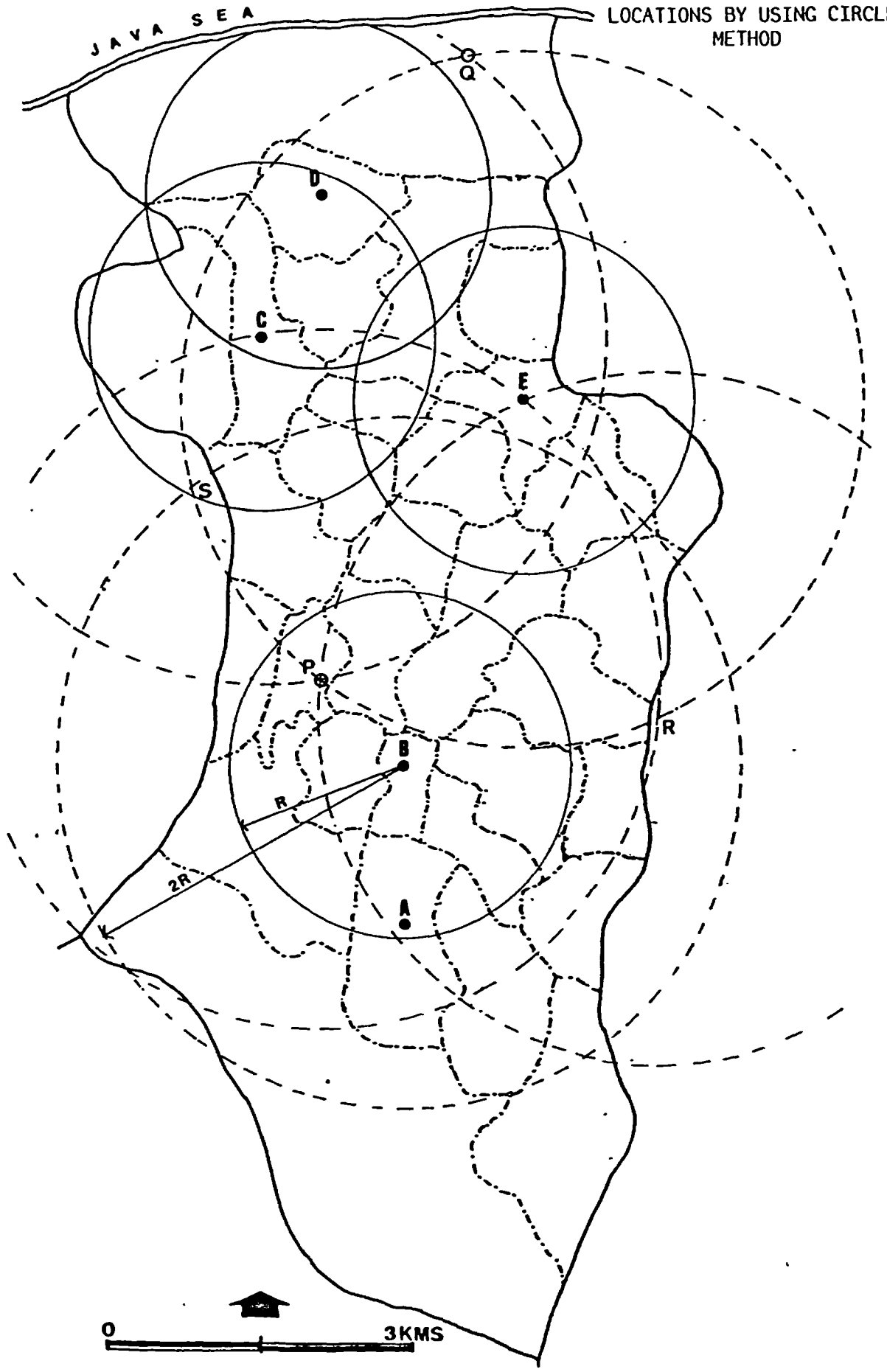
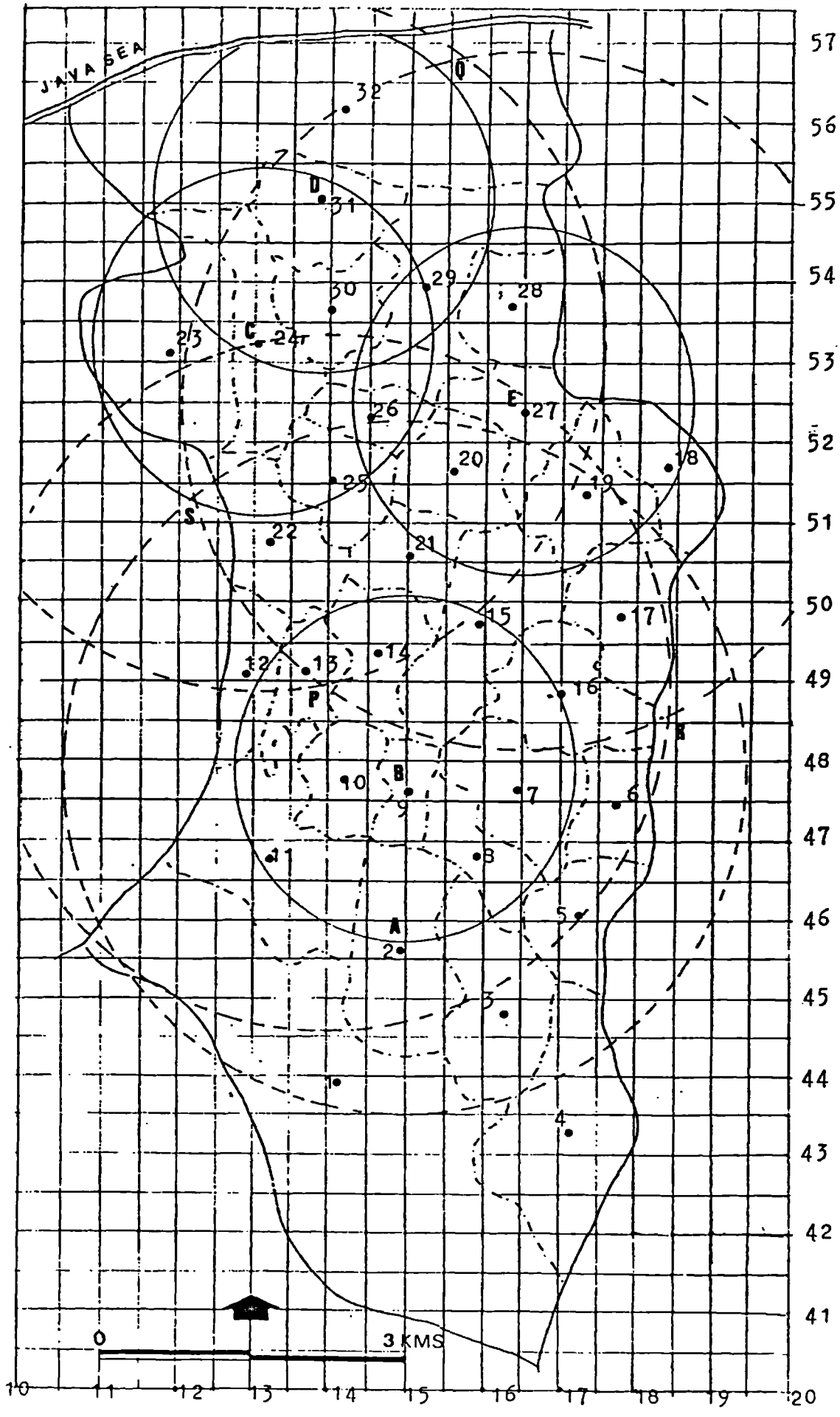


Figure 10.9

COORDINATES OF MARKET PLACE LOCATIONS BY USING GRID



10.7). These circles show the service areas of markets at the of neighbourhood level.

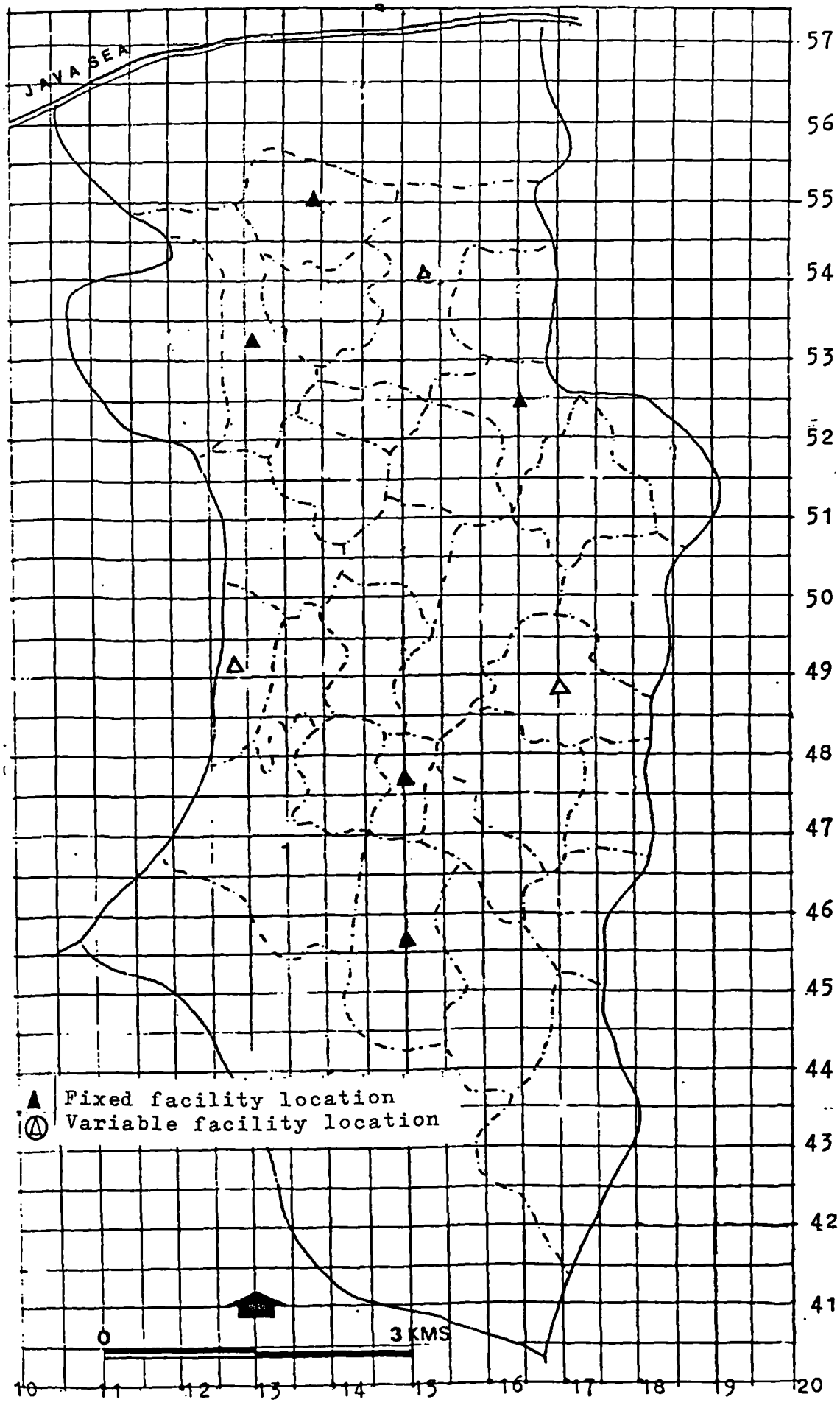
To find appropriate locations for new facilities, the outer circles of existing markets are drawn, with the radius of the outer circle set at 2R. New market locations can thus be found at the intersections of these outer circles. The intersection of outer circles C and E, for example, gives two new market locations at P and Q, and intersection of outer circles P and E gives R and S. In this way a general market location plan can be devised. These points, therefore, are suggested as locations for new markets. Figure 10.9 illustrates the suggested locations of the existing, and the proposed new, markets in Kecamatan Weleri.

X.6.2.1.Modification of the New Market Locations

It has already been argued that the lack of facilities and their poor distribution raises important functions concerning the present role of centres in the study area. These centres are to be the concentration of facilities and of the people. In theory the location of market places highlights the concentration of facilities for people. If the provision of the overall facilities is designed to be for people then the present pattern leaves much to be desired and the roles of the centres are limited. It may thus be argued that modification of the location pattern is needed. In this study, such modification takes both population distribution and the present pattern of centres into account. The fact is that almost all centres are inadequately developed, so that they cannot act as an accelerator to encourage the development of the rural

FIGURE 10.10

PROPOSED
MODIFICATION OF MARKET PLACE LOCATIONS USING CIRCLE METHOD



economy. Development of these centres is thus necessary. To achieve this, stimulation for the activities of the existing centres is also needed. Thus, modification of the market location also deals with the present centres in order that they may play a more positive role in rural economic development.

Considering Figure 10.9 a modification of market locations may be suggested. There are several alternative centres which might be selected as appropriate locations to modify the location P namely Tambaksari, Karanganom, Payung, Pucuksari and Parakan villages. These centres are the nearest established centres to location P.

A highest-order centre, however, might be considered the first priority for development. In this case Karanganom Village would be chosen as a new facility location. In case of location Q, the nearest centre is Bulak Village, so that the implementation of development might be concentrated here. For location R, Montongsari Village is the most appropriate location to develop. Figure 10.10 shows the pattern of the location of market facilities in Kecamatan Weleri.

X.6.3.The Location-Allocation Programme to Determine the Optimum Location of Markets

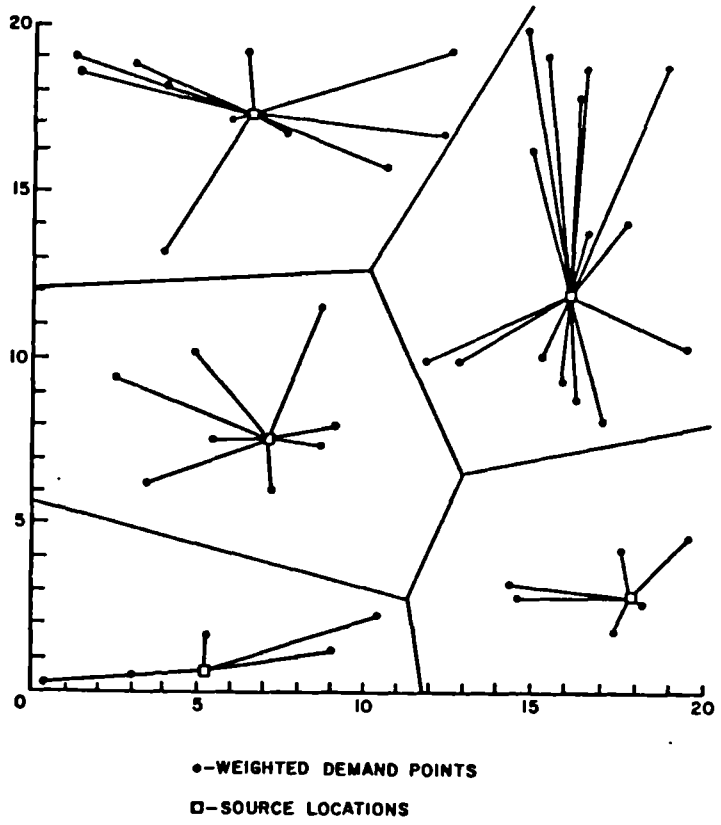
The circle method is a simple means for establishing a general location plan. This method needs modification, however, since it neglects the actual demand for such markets. To find an optimal market location, several other factors must be taken into account, such as demand and cost. With a given distribution of demand, and given sources with known capacities, the

market should be located so that the total cost of transportation involved in satisfying the demand is minimized. In this respect, Rushton (1979) discusses a multi-facility location in continuous space, assuming that the region is a homogeneous plane. The basic idea underlying this method is that the best location for any one facility depends on the locations of the others in the system. The particular problem of facility location relating to demand and minimum transportation cost has been recognized, and the objective of this method is to minimize the average unit distance from the demand points to the closest supply point. In the case of a multi-facility the demand points are clustered around their respective supply centres.

An alternative heuristic algorithm has been developed by Rushton to solve the multi-facility problem; this involves partition (grouping) of the demand points with each facility best located with respect to its group. An algorithm is a computational strategy for accomplishing a given goal through a series of formal steps. This algorithm starts with partitions surrounding arbitrary facility locations. Then, it redefines the groups around the new locations and finds new centre locations for the new groups.

FIGURE 10.11.

The Multi-Facility Location Problem on the Plane



The multi-facility location problem on the plane.
Unpublished paper by James A Kohler.

With this algorithm, the best location for a new facility will not always be found, since it cannot insure that the best result will be produced. To find the best location, the algorithm is run again, using the same set of data, but starting with different centre locations. The result may be better or worse than the results of other runs of the which number of iterations required before stability occurred.

Goodchild (1973) defines the basic problem algebraically as follows:

$$\text{Min} \sum_{i=j}^{n} \sum_{j=1}^{m} Iij\ Cij$$

subject to

$$\sum_{j=1}^{m} Iij = Si$$

and

$$\sum_{i=1}^{n} Iij = Dj$$

where : Iij is the unknown allocation from source i to demand point j

Cij is the known cost per unit allocated

Si is the known supply available at source i

Dj is the known demand at point j.

In the simplest case, cost is equated with linear distance, i.e

$$Cij = \sqrt{(xi-uj)^2 + (yi-vj)^2}$$

where : xi,yi are unknown source locations

uj,vj are known demand locations

With the application of this method, the general location plan produced by the circle method can then be adopted as a guide for finding an optimal location of facilities.

A programme of location planning applied in this study is introduced by Goodchild (1973) The principal problem tackled is that of constrained location-allocation in continuous space. This programme can also be applied to solve the unconstrained location-allocation problem, since the algorithm used is rather general. Two kinds of information are needed to run this programme: the co-ordinates of demand points and of supply points. Existing centres are considered as fixed centres whereas 'suggested' values for the unknown coordinates of the facility location are considered as free centres. In the case of Kecamatan Weleri, 4 villages have market places at lower-order centre level,namely Karangdowo, Rowosari, Sendangdawuhan, and Gempolsewu, and 1 has a market place at high level, namely Penyangkringan. Penyangkringan village centre has, however, been involved in the calculation as one of four centres at lower-order level. The reason for this is that, although it is a high order centre, it also functions as a centre which serves the rural population as a lower-order centre.

8 market places are needed in Kecamatan Weleri. There are 5 existing markets which means that 3 facilities need to be located in areas not presently served by markets. The existing

markets are fixed-facility locations whereas the 'suggested' markets are considered to be variable-facility locations. In this study a number of variable facility location coordinates have been examined, in accordance with the algorithm. These coordinates define the arbitratry starting centre locations. These coordinates are as follows.

Fixed facility locations :

A = (150,458)

B = (151,478)

C = (131,533)

D = (138,550)

E = (166,525)

Variable facility locations (arbitrary) are :

Test 1	Test 2	Test 3	Test 4
P = (140,490)	P = (145,500)	P = (150,505)	P = (135,505)
Q = (155,560)	Q = (165,550)	Q = (155,550)	Q = (155,545)
R = (180,488)	R = (175,495)	R = (175,490)	R = (165,500)

Table 10.12 shows the results of running this programme using the suggested variable-facility location coordinates.

Table 10.12

Results of running programmes using

data from tests 1 , 2 , 3 and 4.

Test 1	Test 2
Fixed facility locations:	Fixed facility locations :
A = (149.457)	A = (149,457)
B = (143,478)	B = (143,478)
C = (130,533)	C = (130,533)
D = (138,549)	D = (138,549)
E = (165,524)	E = (167,521.3)
Variable facility locations:	Variable facility locations:
P = (137.7,503.5)	P = (137.7,503.5)
Q = (142,563)	Q = (153,540)
R = (165,477)	R = (165,477)
Total cost : 0.8630E+06	Total cost : 0.7816E+06

Test 3	Test 4
Fixed facility locations :	Fixed facility locations :
A = (149,457)	A = (149,457)
B = (143,478)	B = (143,478)
C = (130,533)	C = (130,533)
D = (138,549)	D = (138,549)
E = (167,521.3)	E = (167,521.3)
Variable facility locations:	Variable facility locations :
P = (137.7,503.5)	P = (137.7,503.5)
Q = (153,540)	Q = (153,540)
R = (165,477)	R = (165,477)
Total cost : 0.7816E+06	Total cost : 0.7816E+06

It will be seen that these tests give not too different results. Test 1 gives solution:

New facilities: P is located on coordinate (137.7,503.5)
Q is located on coordinate (142,563)
R is located on coordinate (165,477)

But the results of the total cost are different. Test 1 is the higher total cost than the others, whereas tests 2, 3 and 4, give a similar total cost. Therefore, their solutions are considered to be the optimal locations for the new centres of market place in Kecamatan Weleri.

As a result of Test 2, several iterations have been produced. The first iteration locates the new facilities thus:

P is located on coordinate (141.4,502.2)
Q is located on coordinate (153,540)
R is located on coordinate (170,488)

The second iteration locates the new facilities thus:

P is located on coordinate (137.7,503.5)
Q is located on coordinate (153,540)
R is located on coordinate (165,477)

The third iteration locates the new facilities thus:

P is located on coordinate (137.7,503.5)
Q is located on coordinate (153,540)
R is located on coordinate (165,477)

And the fourth iteration locates the new facilities thus :

P is located on coordinate (137.7,503.5)
Q is located on coordinate (153,540)

Figure 10.12

ILLUSTRATION OF FIXED AND VARIABLE FACILITY LOCATIONS IN KECAMATAN WELERI

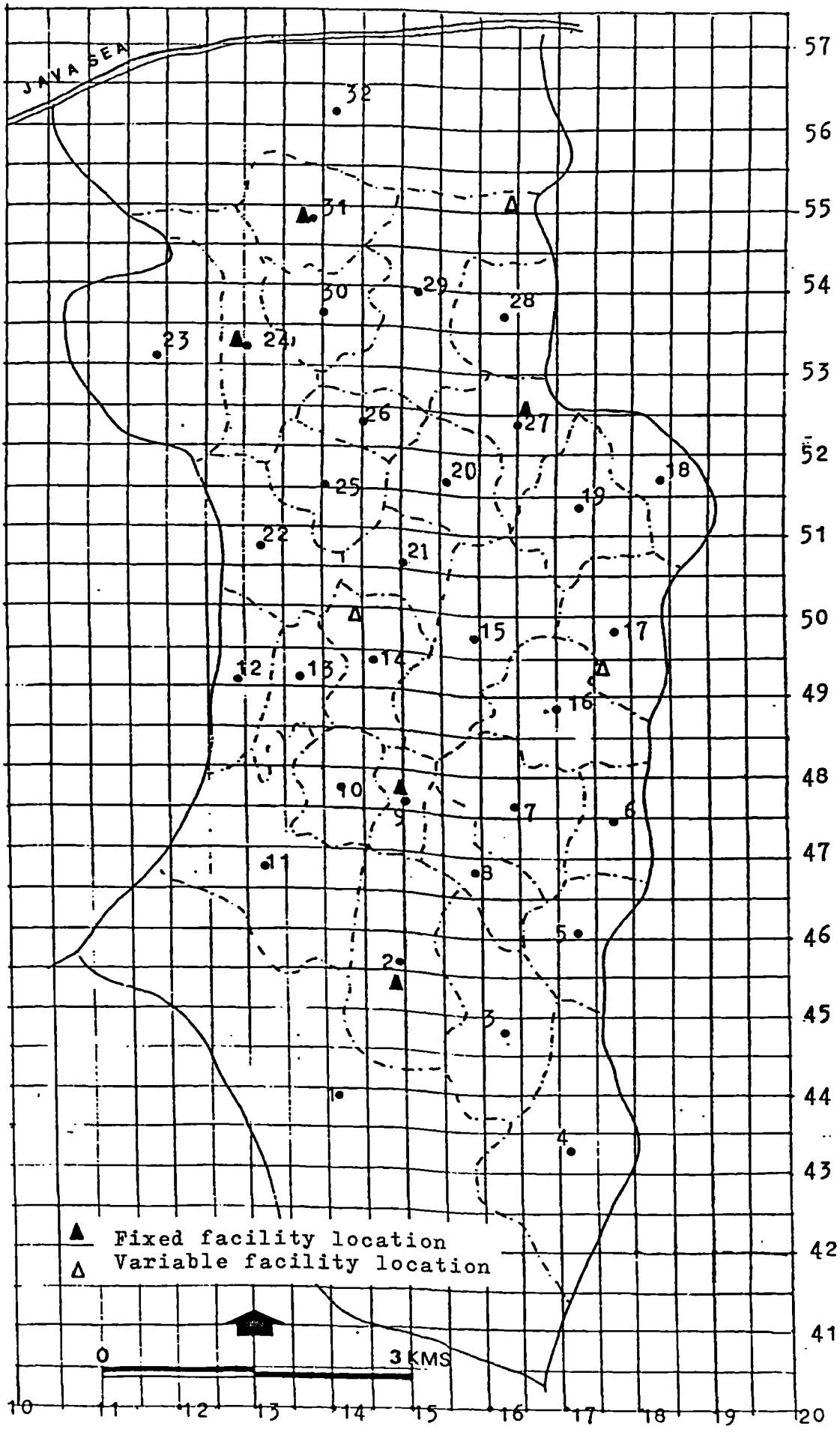


Figure 10.13

OLD CENTRES COORDINATES (AFTER TEST 2)

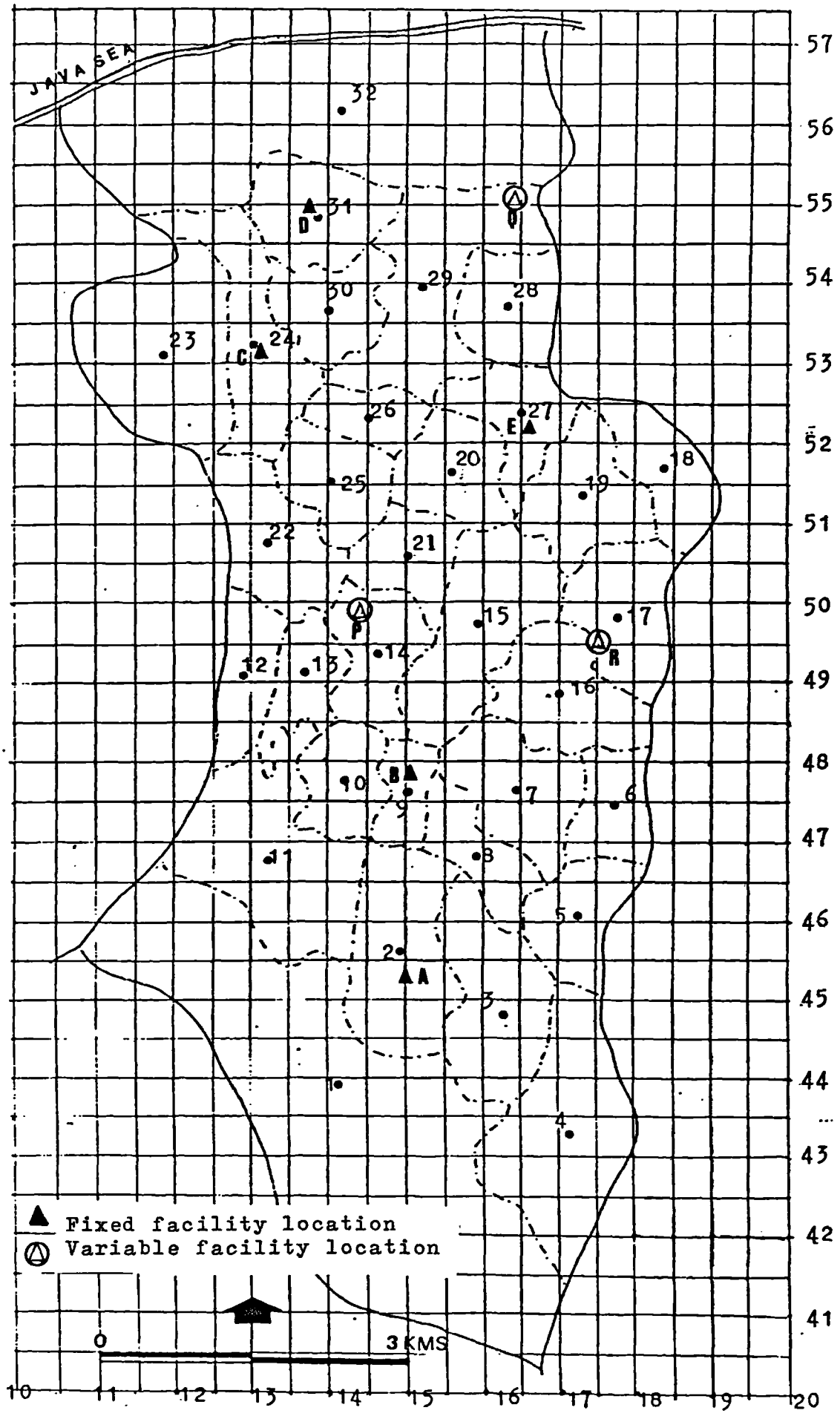


Figure 10.14

FIRST ITERATION

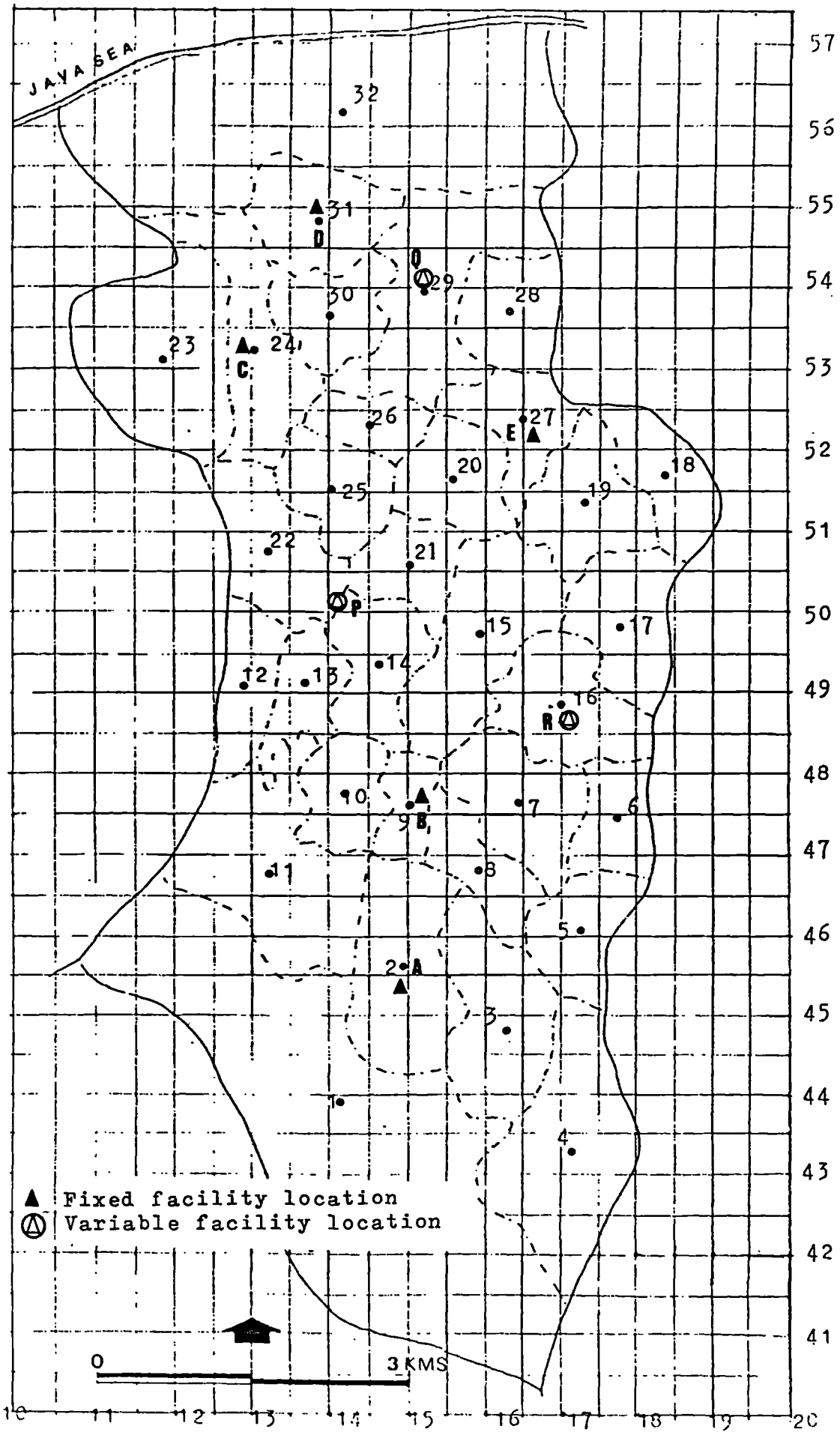


Figure 10 . 15

SECOND ITERATION

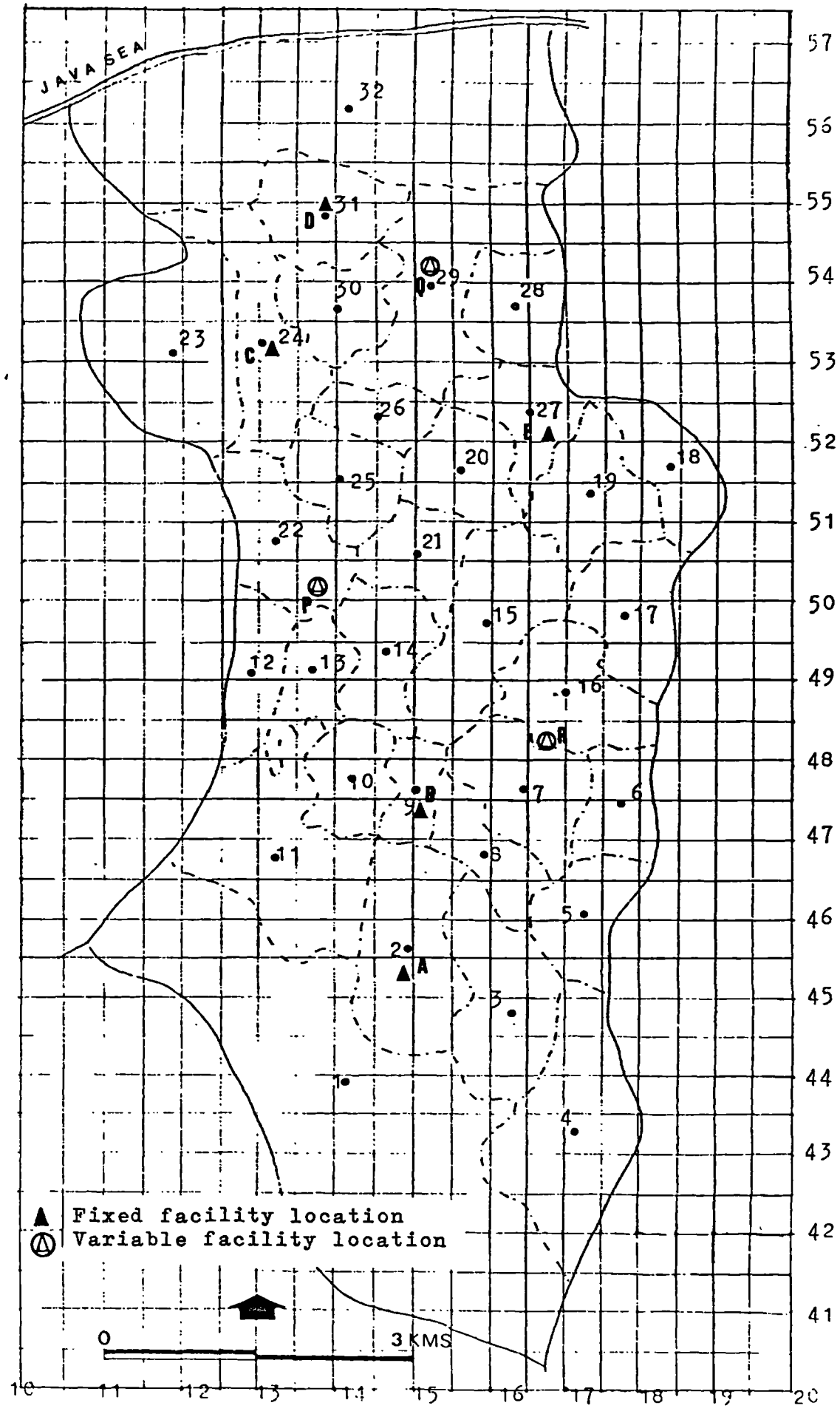
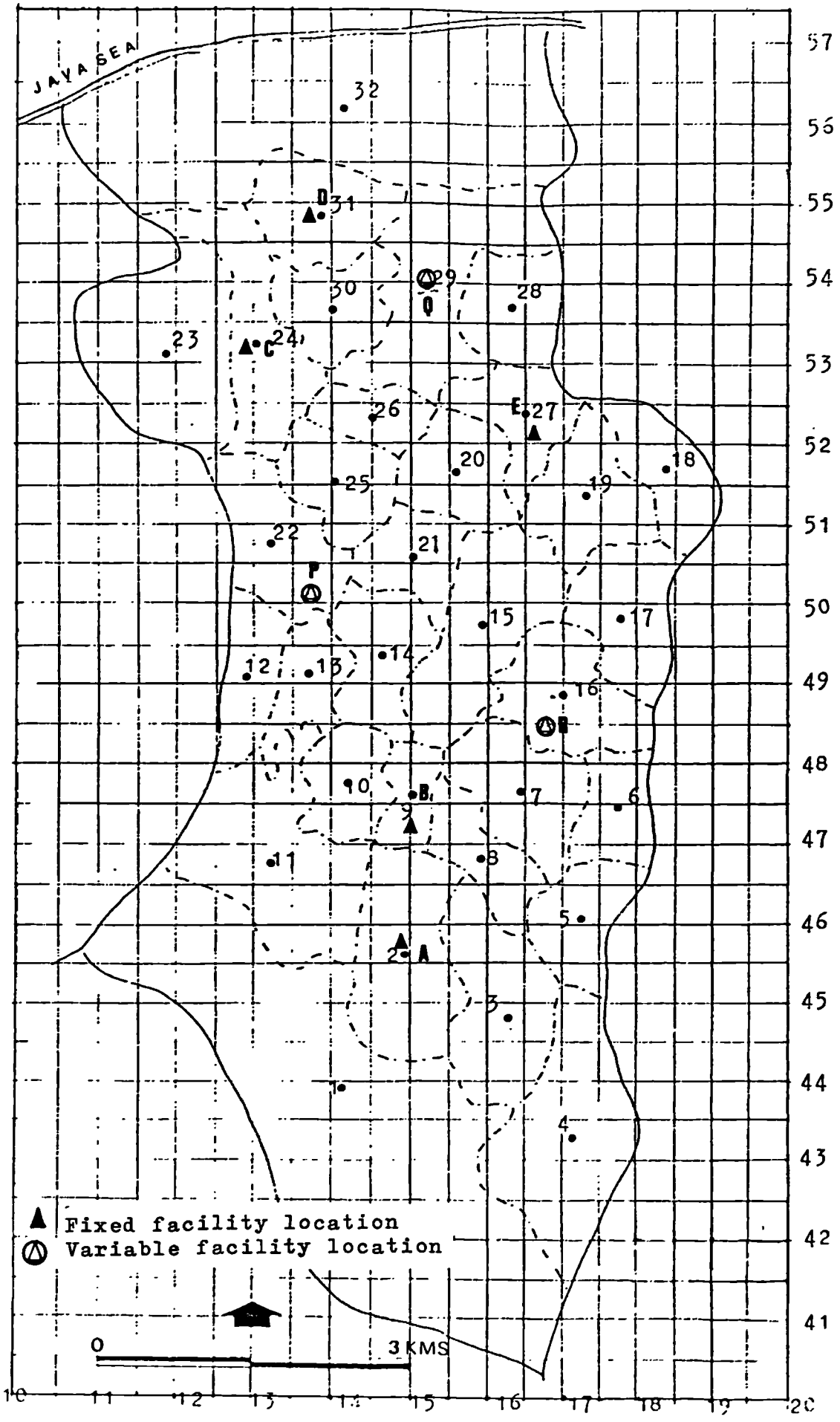


Figure 10 . 16

THIRD ITERATION



R is located on coordinate (165,477)

The fourth iteration constitutes the optimal location of facilities. Figures 10.11 to 10.15 shows the results of these iterations. These points, theoretically, are the optimum for new facilities in this Kecamatan.

By the same way, this method can also be applied for finding the optimum of location facilities for other facilities.

X.7. Level of Inadequacy of Facilities

The centrality ratio has already been discussed (Bennison,1978 see Sub-chapter II.5.1). The levels of inadequacy of the functional units in Kecamatan Weleri based on centrality ratios will now be examined. All the functional units will be considered in general, and then a more detailed analysis will be developed.

With reference to Table 10.6 , if the centrality ratio of any function is greater than 1.0, there are functional units surplus to the demand for that function by the population in the settlement. It can also be argued that a village which has a surplus is supported by a demand originating outside its boundaries. Equilibrium between demand and supply produces a centrality ratio of equal to 1.0. If the ratio is less than 1.0, then the demand exceeds the supply in that settlement. It is possible, therefore, to identify settlements which are at present inadequately developed. Table 10.13 shows the percentage levels of inadequacy in Kecamatan Weleri. There are two functional outlets for which the percentage of centres with

Table 10.13

Percentage Levels of Inadequacy By Functional Units

Functional Establishment	Percentage of settlements with centrality ratios greater than 1.0	Percentage of settlements with centrality ratios equal to 1.0	Percentage of sentlements with centrality ratios less than 1.0
1.Drug store	3.12	0	96.88
2.Cinema	3.12	0	96.88
3.Market Place	15.62	0	84.38
4.Banking	15.62	0	84.38
5.Rural Cooperation Unit	12.50	0	87.50
6.Village Rice Barn	9.37	0	90.63
7.Shops/kiosk/ Stall	31.25	0	68.75
8.Bookseller	14.28	0	85.71
9.Carpentry	15.62	0	84.38
10.Tailoring	21.87	0	78.13
11.Shoe repair	18.75	0	81.25
12.Watch repair	6.25	0	93.75
13.Motor repair	9.37	0	90.63
14.Butchers	12.50	0	87.50
15.Restaurant	9.37	0	90.63
16.Elementary School	53.12	6.25	40.63
17.Junior High School	21.87	0	78.13
18.Senior High School	6.25	0	93.75
19.Public Health Centre	18.75	0	81.25
20.Meternity	25.00	0	75.00
21.Mosque	53.12	6.25	40.63
22.Church	9.37	0	90.63
23.Village Social Unit	6.25	0	93.75
24.Sport Facilities	18.75	0	81.25

Source · Table 10.5

surplus demand exceeds 50 per cent. These functional outlets are related to social services. In relation to the rest of the functional outlets, however, almost all centres have centrality ratios less than 1.0 indicating that these centres are inadequately provided for. Provision of these facilities is therefore clearly indicated. To support rural industrial,for example, outlets such as markets should be provided, thus enhancing rural economic viability.

X.8.The Need of Other Facilities

The provision of other facilities also needs consideration. It is suggested, that the provision of such facilities should be based on the population threshold calculation. The Public Works Ministry's threshold seems more appropriate for the provision of elementary schools,since 25,62 per cent of the population in this Kecamatan in 1984 was at the elementary school age. Only 18.60 per cent were actively at school; thus 7.02 per cent was not being educated. Thus the Public Works Department threshold may be validly adopted.

Unlike the previous provision of the education facility, the provision of Senior High Schools is small. Most people who graduate from the Junior High School are at present unable to continue their study, since their parents are poor, and need the children to work. Thus, to provide a high level of these facilities at present is not justifiable. Sufaat threshold is, therefore, thus reasonable to be adopted for this purpose. This consideration has also been used to define the population threshold.

Table 10.14. shows the need for particular facilities in Kecamatan Weleri based on the population threshold.

Table 10.14.

Population Threshold and Proposed Facilities in Kecamatan Weleri

Facility	Population threshold	Existing facility	Proposed number of facility	Number of new facilities planning
Dispensary	10,000+	1	8	7
Cinema	40,000*	1	2	1
Sub-District Market	30,000*	0	2	2
Local market	10,000*	5	8	3
Bank	20,000*	5	4	-
Cooperation unit	10,000*	4	8	4
Elementary School	1,600+	67	50	-
Junior High School	6,000+	9	13	4
Senior High School	42,000*	3	2	-
Public Health Clinic	6,000+	6	13	7
Maternity Clinic	10,000+	7	8	1
Hospital	60,000 - 120,000*	0	1	1
Bookseller	20,000*	4	4	0
Carpentry	10,000*	8	8	0
Tailoring	7,000*	9	12	3
Shoe repair	7,000*	7	12	5
Watch repair	7,000*	2	12	10
Motor repair	7,000*	3	12	8
Butcher	5,000*	4	16	12

Source : * = Sufaat,1962,'Standard Standard Rencana Perkampungan' (Rural Planning Standards) Department of Public Works.

+ = Public Works Ministry, 1974,'Standard Perumahan Tidak Bertingkat',

X.9.Planning for Other Facilities

The provision of other settlement facilities can also be guided

by adopting circles to create a general location plan and to produce an optimum location plan. The steps of locational planning processes are similar with the marketing place location planning in sub-chapter X.6.3. Circles method has been adopted and also the location-allocation programme is run to determine and to modify the new location of facilities. Individual facility is run for 3 times by taking a different coordinate point.

Based on population thresholds, in theory, not all facilities should, however, be proposed in this Kecamatan. The existing number of banks, for example, could serve the people in this Kecamatan as a whole. The problem is that some these banks are concentrated in particular areas, and as a consequence they have limited service areas. Thus even distribution of these facilities in this area is needed. Therefore, relocation planning is suggested.

Facilities such as dispensaries, cinemas, local market places, sub-regional markets, cooperative units, public health services, junior high schools, tailors, and several others are examined by using the location-allocation programme. Some facilities, such as elementary schools are not relocated by this programme, the reason is that great majority of centres in this Kecamatan have centrality ratios greater than 1 for these facilities (53.12 %), indicating that such centres are adequately provided for. But others such as banks and senior high schools can be run to see whether relocating is desirable.

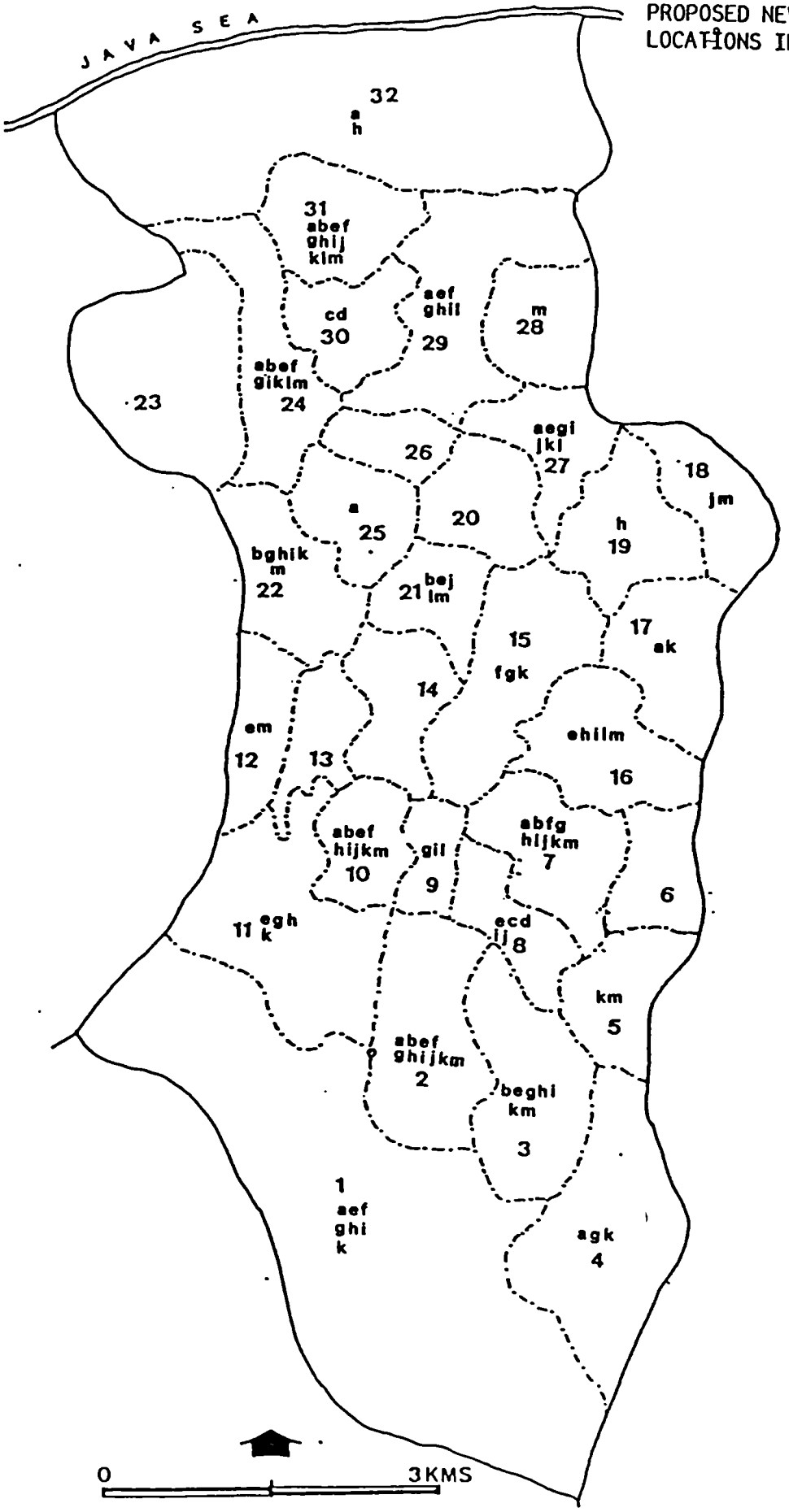
X.10.Distribution of New Facilities

The most efficient location for new facilities are related to the maximum total cost for travelling. People have a tendency to select the nearest facilities in order to minimize transport cost. Thus, it is important for the planner to consider this aspect in planning.

Location-Allocation Programme is designed to tackle this problem. The new locations of facilities would be selected by considering the lowest value of transport cost identified by the results of running programmes which involves several coordinates of variable-location. Dispensary facilities, for example, were tested for three times. The third test, however, has been decided as the new locations of these facilities, since it has the lowest value of transport cost (appendix). Another facility: cooperative unit, has adopted the second test in determining its new locations. The results of these selected tests, then be compiled and plotted in Figure 10.17

The results of LAP running programme show that some new facilities are concentrated in certain settlements. Gempolsewu, for example, has the highest concentration of facilities. Certain facilities, such as a butcher, a shoe repair, a watch repair, a cooperative unit, a tailor, a motor repair, public health centre and local market might be established here. The second highest number of facilities should be established in two villages, namely Rowosari and Penyangkringan and the third highest should be establised in Penaruban and Weleri.

Figure 10.17
PROPOSED NEW FACILITIES LOCATIONS IN KEC.WELERI



Villages:

1. Sidomukti
2. Penyangkringan
3. Bumiayu
4. Manggungsari
5. Sumberagung
6. Ngasinan
7. Weleri
8. Nawangsari
9. Karangdowo
10. Penaruban
11. Sambongsari
12. Karanganom
13. Payung
14. Pucuksari
15. Tratemulyo
16. Montongsari
17. Wonotenggang
18. Pojoksari
19. Randusari
20. Karangsari
21. Parakan
22. Tambaksari
23. Jatipurwo
24. Rowosari
25. Tanjungsari
26. Tanjunganom
27. Sendangdawuhan
28. Kebonsari
29. Bulak
30. Gebanganom
31. Gempolsewu
32. Sendangsikucing

Note:

a. Watch repair
b. Dispensary
c. Cinema
d. Sub-regional market
e. Public Health service
f. Cooperation Unit
g. Tailor
h. Shoe repair
i. Junior high School
j. Maternity clinic
k. Butcher
l. Local market
m. Motor repair

X.11.Modification of Proposed Key Settlements in Kecamatan Weleri

New locations of facilities have been identified in sub-chapter X.10. above. It is assumed that these new locations are optimal. Thus, they have a good prospect for development. Modification of proposed key settlements, however, will be executed by superimposing proposed key settlements discussed in sub-chapter VII.2 and proposed new location of facilities discussed in sub-chapter VII.11. From analysis of this superimpose a wise measure to modify proposed key settlements locations can be made. The advantages of this modification are : to obtain the best location in terms of facilities planning and to reduce the number of less efficient of proposed key settlements in terms of the prospect of new facilities provision in the future. Scoring technique is used for superimposing (Table 10.15). Based on figure 10.5 , the first order key villages would be scored by 4, the second order by 3 and the third and fourth are 2 and 1 respectively. A new facilities location which has a high concentration of proposed facilities would be scored by 4, conversely locations which have no or low concentration would be scored by 1.

There are three new key settlements found by the analysis. They are Weleri, Rowosari and Gempolsewu (Figure 10.18). and are proposed as the modification of the previous proposed Key Settlements in Kecamatan Weleri. These new proposed Key Settlements will act not only as the centres of facilities service for the rural people, but also function as centres of processing and supply or small-scale industries (see sub-chapter

Table 10.15

Superimposing Between the Potential of Location for Proposed Facilities Distribution and the Proposed Order of Key Settlements

Village	1	2	3
1.Sidomukti	3	3	6
2.Penyangkringan	4	4	8
3.Bumiayu	3	2	5
4.Manggungsari	1	1	2
5.Sumberagung	1	1	2
6.Ngasinan	1	2	3
7.Weleri	4	3	7
8.Nawangsari	1	3	4
9.Karangdowo	1	2	3
10.Penaruban	4	4	8
11.Sambongsari	1	3	4
12.Karanganom	1	3	4
13.Payung	1	2	3
14.Pucuksari	1	1	2
15.Tratemulyo	2	1	3
16.Montongsari	2	2	4
17.Wonotenggang	1	1	2
18.Pojoksari	1	2	3
19.Randusari	1	1	2
20.Karangsari	1	1	2
21.Parakan	1	1	2
22.Tambaksari	2	2	4
23.Jatipurwo	1	3	4
24.Rowosari	4	3	7
25.Tanjungsari	1	1	2
26.Tanjunganom	1	1	2
27.Sendangdawuhan	3	2	5
28.Kebonsari	1	1	2
29.Bulak	3	2	5
30.Gebanganom	1	1	2
31.Gempolsewu	4	3	7
32.Sendangsikucing	1	2	3

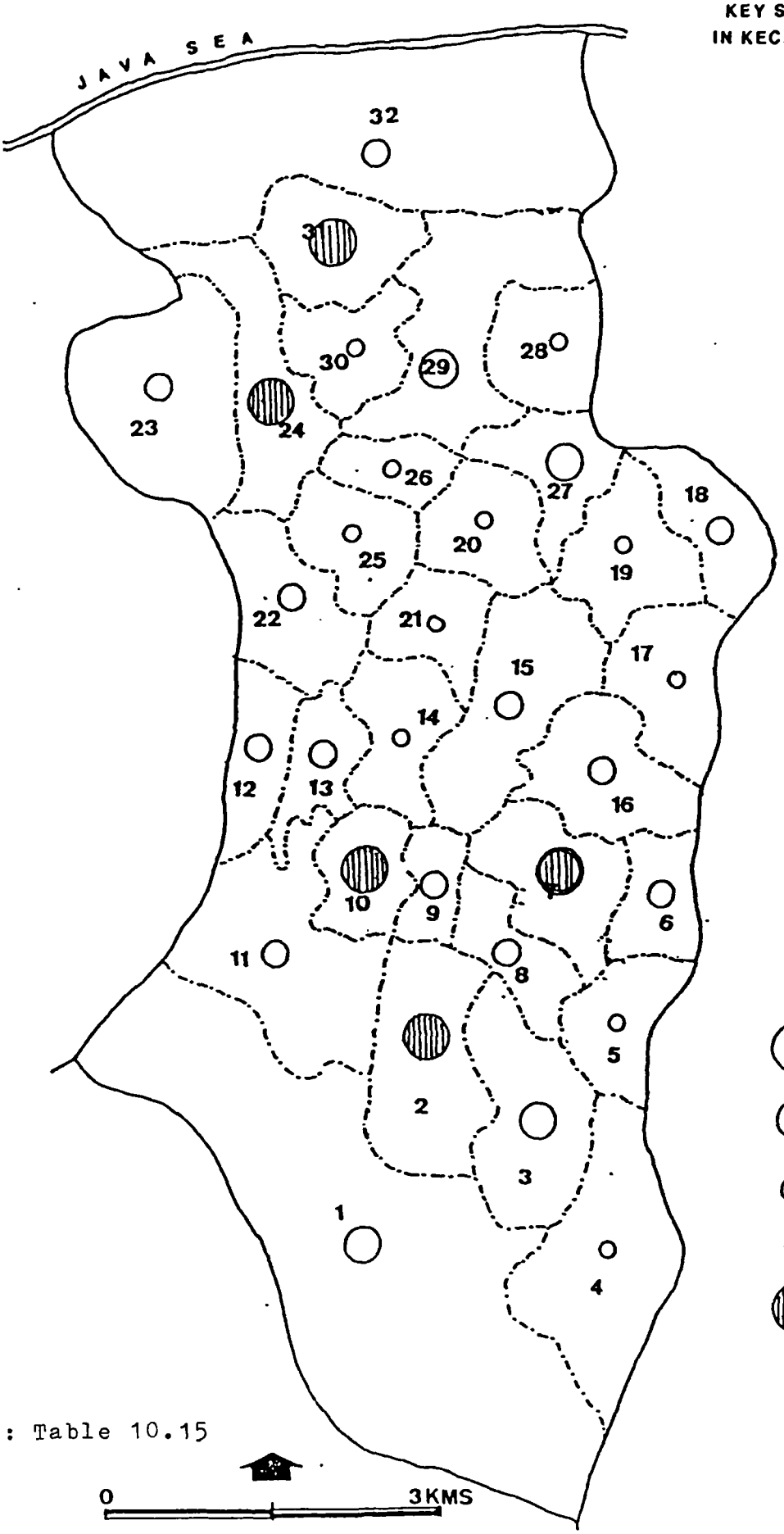
Note : 1.The scores of the potential of location for proposed distribution of facilities (FIGURE 10.17)

2.The scores of proposed order of key settlements. (TABLE 10.11)

3.Total score.

FIGURE 10 . 18

PROPOSED MODIFICATION OF KEY SETTLEMENTS IN KECAMATAN WELERI



Villages:

1.Sidomukti
2.Penyangkringan
3.Bumisyu
4.Manggungsari
5.Sumberagung
6.Ngasinan
7.Weleri
8.Wawangsari
9.Karangdowo
10.Penaruban
11.Sambongsari
12.Karanganom
13.Payung
14.Pucuksari
15.Tratemulyo
16.Montongsari
17.Wonotenggang
18.Pojoksari
19.Randusari
20.Karangsari
21.Parakan
22.Tambaksari
23.Jatipurwo
24.Rowosari
25.Tanjungsari
26.Tanjunganom
27.Sendangdawuhan
28.Kebonsari
29.Bulak
30.Gebanganom
31.Gempolsewu
32.Sendangsikucing

FIRST ORDER
SECOND ORDER
THIRD ORDER
FOURTH ORDER
KEY SETTLEMENTS

Source: Table 10.15

IX.4).

VII.13. Implementation at the Regency Scale

It is necessary to consider the master plan of its individual regency. This means that proposed development programmes of selected kecamatans should be compatible with the existing master plan of each regency. To promote the significant factor for development, the proposed concept, therefore, should be applied flexibly. Thus, the proposed concept should not only be applied for the selected kecamatans but also for all kecamatans in the regency level. Planning policies must therefore take this into consideration along with other socio-political and cultural factors.

All kecamatans which are planned, implemented and controlled by Local Governments. Therefore, it is important to integrate the development programmes of selected kecamatans with the Master Plan of the individual regency. To achieve this the elements of individual development plans for kecamatan significant to regency policy should be identified. Then, the proposed plan should be flexible. If these criteria are observed then the basic principles can be applied not only to the selected kecamatans but also for all kecamatans in an individual regency. It is therefore important that key settlement development can be made fulfil these conditions.

For example, the local government of Kendal regency has defined its development policy by dividing the area for which it is responsible into 6 regions (Five Year Development Plan of Central Java Province, p.46). These are:

1.Development Region 1: allocated for industrial development, and as the site of local government. Kecamatan Kendal is the chosen region, and Kendal City is the centre for development.

2.Development Region 2: allocated for intensive agricultural development Kecamatans Brangsong and Weleri have been chosen as the centres for development.

3.Development Region 3: allocated for development of the commercial sector. Kecamatan Weleri is the centre for development.

4.Development Region 4: allocated for fishery development. Kecamatans Weleri and Gempolsewu are the centres for development.

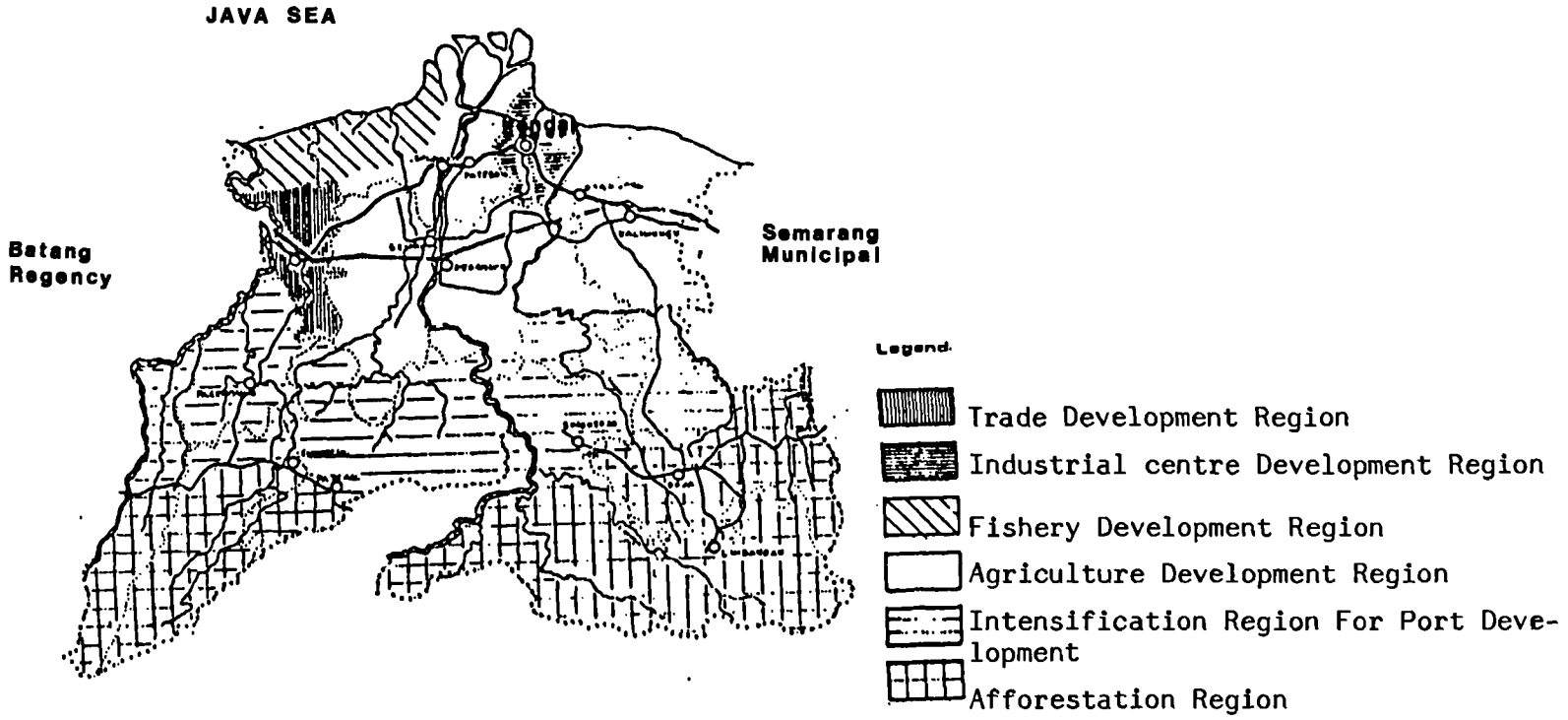
5.Development Region 5: allocated for estate intensification. The centres for development are Kecamatans Boja and Sukorejo.

6.Development Region 6: allocated for estate and forest development It is to be devoted to replanting and afforestation. (see Figure 10.19)

Thus with reference to these Development Regions individual development of selected kecamatans using key settlements can be adapted to the defined policy for each Development Region. The commercial sector, for example, can be developed succesfully in

Figure 10.19

REGIONAL PLANNING OF KENDAL REGENCY



Source : The Third Five Year Development Plans of Central Java 1979380 - 1983/84

Kecamatan Weleri with both urban and rural products promoted as the main goods for transaction. In Kecamatan Patebon, however, agricultural products may be seen as the main goods for commercial activity. In Kecamatan Kendal agro-industry products might be the main goods for transaction.

Since the key settlements concept constitutes an appropriate basis for planning in the context of development in regencies a hierarchy of settlements at regency level can be constructed. This is based on population and the provision of facilities in individual key settlements. For example, referring to Figure 10.1, the first order settlement is Kendal City. The second order settlements are : Pegandon, Gemuh, Cepiring, Weleri, Patebon, Brangsong, Kaliwungu, Pageruyung, Sukorejo, Plantungan, Singorojo, Platen, Limbangan and Boja (the capitals kecamatans). The third order settlements includes all the key villages in each kecamatan. The types of industry in this regency can be characterized by reference regard to the hierarchy of centres. Industrial development in the first order centre serves a wider area than that of the regency itself. Urban centre as in the case of first order settlements provides a suitable labour force. A sophisticated technology may be used by some of these industries, and some of them use non-agricultural production as raw material. Nevertheless, even in this first order centre, wherever possible, industries which use raw material from the agricultural sector may be preferred. Agroindustry may be developed in the second order settlements, with a lower level of technological demand. Another characteristic of these industries is a low demand for capital; and they are labour-intensive and small scale. The third order

centre is concerned with agriculture, and related industries which are small scale, with a very low capital requirement, and unsophisticated low level technology. Table 10.16 shows the relationship between the order of the centres and the characteristics of the proposed industries within regency.

Table 10.16.

Relationship between order centres and the characteristics of the proposed industries

Hierarchy	Characteristics of rural industry
First order centre	- Large and medium-scales units of production; - Capital-and labour-intensive; - Using the agricultural and non agri cultural raw materials; - High and semi-high technologies; - High skill labour requirement.
Second order centre	- Agro-industries; - Low capital requirement; - Semi high technologies; - Labour intensive; - Medium and small-scale units of production.
Third order centre	- Industries based on local agriculture; - low capital requirement; - low technologies; - small-scale units of production.

CHAPTER XI

PROBLEMS IN THE KECAMATANS SELECTED FOR DEVELOPMENT

CHAPTER XI

PROBLEMS IN THE KECAMATANS SELECTED FOR DEVELOPMENT

There are two problem areas which may be recognized in the kecamatans selected for development by the methods set out in this study i.e.

1.programme implementation;
2.environmental impacts.

These need to be analyzed and discussed in relation to the proposals set out.

XI.1.Programme Implementation

From the standpoint of the implementation of rural development programmes, problems inevitably arise because their implementation is spread over the responsibilities of several Government ministries. These ministries maintain separate offices through the regional hierarchy down to the district level. It is impossible to implement development programmes without effective coordination between them. Development of the commercial sector for example, is not simply to be effected by local government, but also involves transportation and services which are the responsibility of the Public Transport and Tourism Ministries respectively. Development of one sector inevitably requires support from other sectors; this can be achieved only by coordinating the work of ministries responsible both laterally and vertically in the administrative hierarchy.The Central Planning Board must thus play an important role in coordinating such programmes. But the present relegation of rural develop-

ment to a simple sub-sector makes it difficult for it to attain the necessary priority in the overall development picture. The Ministry of Home Affairs is the only agency concerned with national, urban and rural development. Unfortunately, rural development is administered only at Directorate General level, which is not helpful to set up intersectoral coordination programmes. Hence, implementation of rural development programmes is still dependent on the separate policies of each ministry. Thus coordinating policies,backed up by suitable institutions, is needed to avoid competition between ministries, which is a common occurrence.

Commercial development is ,theoretically, achieved through the programmes of the Ministry of Trade. But, in practice, it involves various local government institutions if it is to be implemented. Thus, developments promoted by Central Government need to be evaluated by the Regional Planning Boards, which may have different priorities in the same area of development. Another problem of development in kecamatans selected is that it is misleading to consider the formulation of a rural development policy for any study area in isolation, because these kecamatans are an integral part of a broader region. This has significant implications for any development policy. More local planning policies should therefore take this into consideration. Then also development in kecamatans selected should be integrated with local government policies and planning. Where there is a conflict of policy at different levels, if local government is unable to accept the lower level proposals, an attempt should be made to graft the significant elements into the later concept, in order to spur development

processes. Flexibility at all levels is therefore a prime requirement for effective development planning. As a consequence of this any proposed development should be appreciated by all the kecamatans at regency level, and must be incorporated into local government policies and planning.

Thus integrated programmes are the key to the implementation of sectoral as well as multi-sectoral development successfully. The applications of the key settlement concept ,however, would insure integration with the existing development programmes. Rationalization of the settlement pattern has also been compared with the existing patterns. Thus the key settlement concept can be adapted to these situations, since such settlements are found in various forms. Woodruffe (Woodruffe,p.24) identifies key settlements as possible growth points for industry and other forms of employment in some counties (see Chapter II sub chapter II.5); It is therefore a flexible concept which can be adapted for use as a strategy in rural development in the areas of study (see Chapter IV). However, some form of overall organization for directing the integration is necessary in order to ensure efficiency and effectiveness in achieving coastal rural development.

XI.1.1.The Organization of Coastal Rural Development

The success of a key settlements policy thus requires strong coordination. It is a long term programme for rural development, and by understanding the significant role of Central Government, a Central Planning Board has been suggested as the means of general coordination for these programmes. It would be supported by the ministries which are concerned with coastal

rural development including the Ministries of Trade , Home Affairs, Environment and Public Works. The Ministry of Trade would guide development in the commercial sector in the context of regional planning as a whole. The Ministry of Home Affairs would process and administer all proposed programmes. The Ministry of Environment would be responsible for assessing the environmental impact of physical development in the coastal areas, and this has an important role in managing proposed projects. The programmes would be supervised, revised, monitored, and evaluated by this Ministry throughout their life. The Ministry of Public Works would have a special responsibility for practical physical development, and all projects would be discussed with them in relation to their implementation. This Ministry would maintain active links with Public Works Departments in Provinces and regencies. Other Ministries would provide key settlements with facilities to support the main thrust of development. The Ministry of Education is responsible to provide rural education, in the form of buildings and and the teachers and technicians required for all levels of training and teaching.

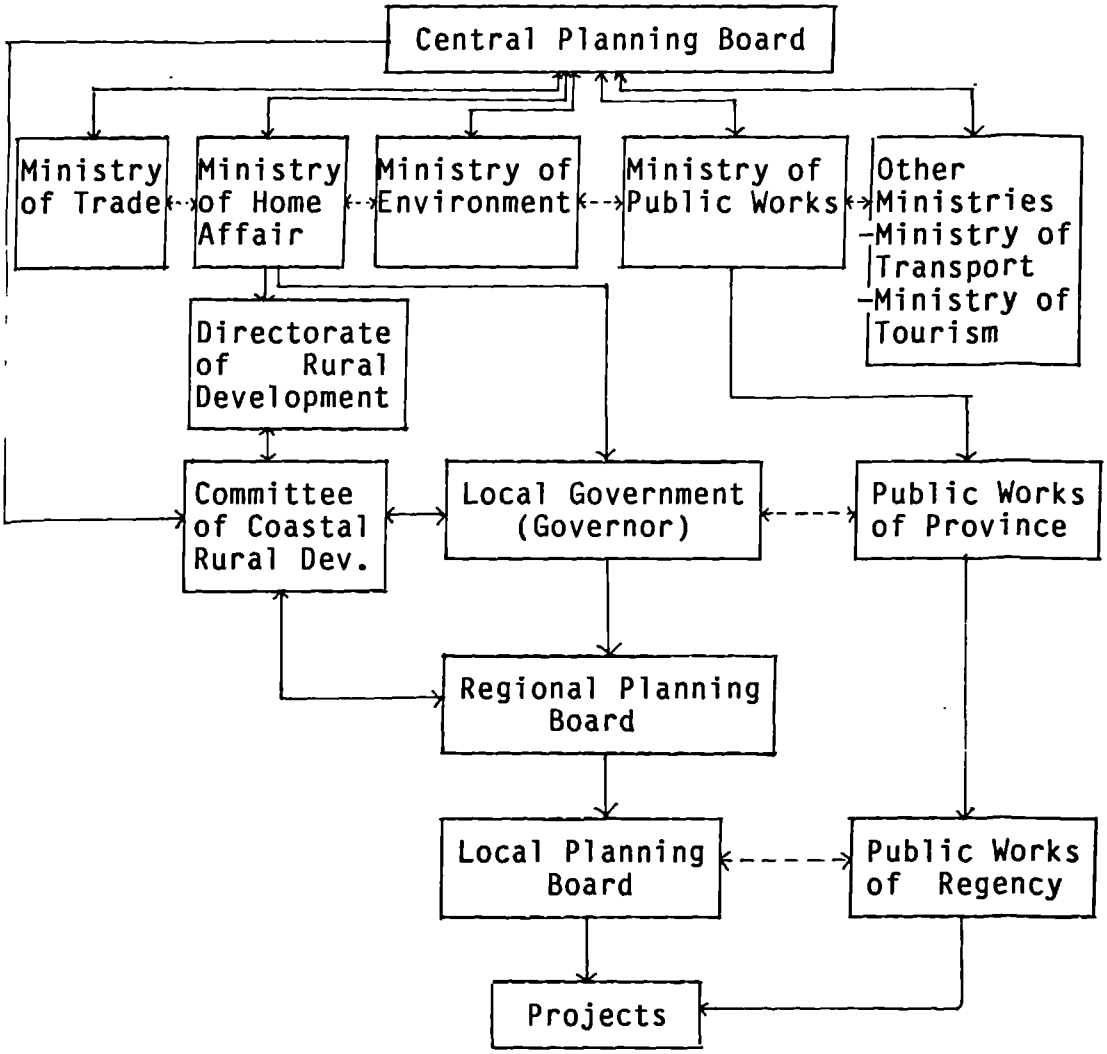
The Ministry of Transport would be responsible to provide the means for transporting people and goods and for promoting new routes. Together with the Ministry of Public Works it is also responsible for planning and maintaining both the regional and the rural roads. In some situations the Ministry of Tourism will also need to be involved. Thus, horizontally, the link amongst these Ministries constitute a line of coordination, whereas vertically, each Ministry has links with its subordinate levels.

To implement development programmes the Central Planning Board would need to contact with the Governor, as the head of province, and the Regional Planning Board would represent the Governor in planning and implementation of development programmes. The Ministry of Home Affairs clearly control local government directly since they are subordinate to it.

Coastal rural development in North Central Java would be steered by the Governor , but, everyday administration would be the responsibility of a team (committee) for coastal rural development, authorized by the Governor, under the Central Planning Board. This committee will foster a better understanding by local authority government and state government agencies in order to achieve an affective implementation of development proposal. It is suggested that an advisory committee should also be set up with representatives from each Ministry. It is aimed to smooth of the work of committee and to assist in coordinating plans and programmes. The Regional Planning Board would coordinate the technical operations of the duties of the services and institutions. This needs to be drawn as a diagram. The system described is shown diagrammatically in figure 11.1.

Figure 11.1.

The System of Coordination Suggested For Commercial Development Programmes in Kecamatans



——— Coordination Line
----- Indirect Coordination Line

XI.1.2.Problems in Kecamatans Not Selected for Development

The main issue in prospect for those kecamatans not selected for development projects is that some development is taking place, but only slowly, and unevenly; some kecamatans are performing relatively well, others not so. The problems are, therefore,

1.how to quicken the pace of the development process in unselected kecamatans without damaging the environment ;and

2.how to find significant sectors in the space-economy as the basis for further development.

In those kecamatans not selected, there are often found limited local resources.Another problem related to the raising of the socio-economic levels and encouraging growth is that the skills of the rural people are not adequate to the activities required to use the available resources: furthermore, opportunities are limited for attracting and adopting innovations, and thus affecting significant socio-economic changes. This describes a complex problem in kecamatans not selected. Rural development, however, cannot be confined to the selected kecamatans. It is therefore suggested that in the kecamatans not selected as most suitable for commercial development these criteria should be applied:

1.Development should emphasize the natural environment and its preservation;

2.Conservation should thus be emphasized, as a basis for tourism;

3.Development should aim to have a multiplier effect for the rural people.

Thus the development of tourism and recreation is suggested. This activity could conserve these areas, for environmentally acceptable development. This would create new jobs for the rural people in tourism.

Conservation programmes would allow the regeneration of the mangrove in the coastal zone, and perpetuate that ecosystem. Mangrove provides an important contribution to aquatic life, and provides a place for the nursery, feeding and spawning for certain fish and crustaceans. Thus it has an important role in fishery development. The key settlement policy may well provide an acceptable framework for physical planning to facilitate recreational development.

XI.1.3.The Organisation For Development

The success of such a plan for development also depends on the effectiveness of coordination between Ministries, as does that in those kecamatans selected for commercial development. The Ministries of Home Affairs, Environment, Tourism and Public Works must have an important role managing coastal recreational areas. Other Ministries would be supporters of this programme directly or indirectly, and all would be coordinated by the Central Planning Board. Though each Ministry would have a role in planning and implementing this programme, the Ministry of Environment would have an overriding responsibility for controlling, supervising and evaluating particular projects concerned with development in these coastal areas. The Ministry of Tourism would be responsible for policy decisions regarding the provision of tourism facilities in these areas. It would also be responsible for planning and financing specific recreation projects such as the development of cottages, entertainment facilities, and sea-parks. The Recreational Area Management Board would be responsible for the management of recreational areas. The Ministry of Public-Works

would be responsible for the development of the infrastructure, especially roads. Thus these kecamatans not chosen for commercial development might be developed socio-economically.

XI.2.The Impacts of Development to the Coastal Environment.

One way envisaged to enlighten the employment problem in the coastal rural area is the opening of coastal land for 'tambak' (brackish water fishponds culture). Fishponds culture has been chosen in this study to provide animal protein for the people and foreign exchange. It is potentially labour-intensive, thus it can provide greater employment opportunities for many local people. However, although it provides economic benefits, this activity also has negative impacts to the environment.

Coastal areas more than other lands with development potential face conflicting pressures for allocation to development of resources for conservation. The origin of the pressures are the richness of natural resources of the coast and the high level of attractiveness for development that the coast provides (Amir,Shaul.,1982.). Some authors identify coastal areas as 'marginal' and development of this area could well become a problem for the environment. Marginal areas are defined as 'generally characterized by dispersed, often culturally heterogeneous, populations that use traditional low-energy transformation technologies to manipulate resources primarily for their own consumption' (Ruddle,K., Grandstaff,T.B.,1978). Development and environment are 'two sides of the same coin' (Biswas, 1979). Ruddle and Grandstaff have suggested that 'tranformational' development may be the most appropriate for

these areas.

Biswas (1979) works to elaborate and supplement the ideas and approach put forward by Ruddle and Grandstaff. He identifies two different definitions of marginal land; i.e. development economists and ecologist. The former tends to consider marginal lands as those where any economic return from using the land is low, owing to its low productivity. But the productivity of land is a function of many parameters- such as fertilizers, pesticides, water, energy availability, management practices, market for the products, etc. So what at the present is considered marginal land under a given set of conditions could will become productive land under a different set of conditions. For example, the reclaimed coastal lands were marginal prior to their reclamation, but introduction of fishponds culture following mangrove afforestation surrounding these areas transforms the marginal lands into productive lands. The economic return from the land has increased significantly due to introduction of fisponds culture. The latter tends to consider marginal lands as those whose ecosystems are fragile and hence special care has to be taken in using such lands for farming and grazing.

Some environmentalists emphasize conservation of coastal areas, especially all areas which are adjacent to the sea water since it consists of mangrove forest. The reason is that the coastal zone constitutes an important area for some creatures. Mangrove forest has the important role as a nursery ground for fish and crustaceans. Mangrove litters are converted by microorganism into protein rich material. These microorganism and dentritic

material are consumed by small invertebrates and these invertebrates in turn are consumed by the higher tropic level. So it is important to protect these areas from physical development for other activities. On the other hand, some authors suggest development of coastal areas for the benefit of people. A better management of fishpond culture, for example, will give a good prospect for rural economy. Duncan (1979) states that 'tambak' fisheries alters the mangrove forest less than most other uses. The physical and biological aspects of 'tambak' culture are related to the mangrove forest ecosystem and are dependent to a large extent upon minimizing damage to the ecosystem.

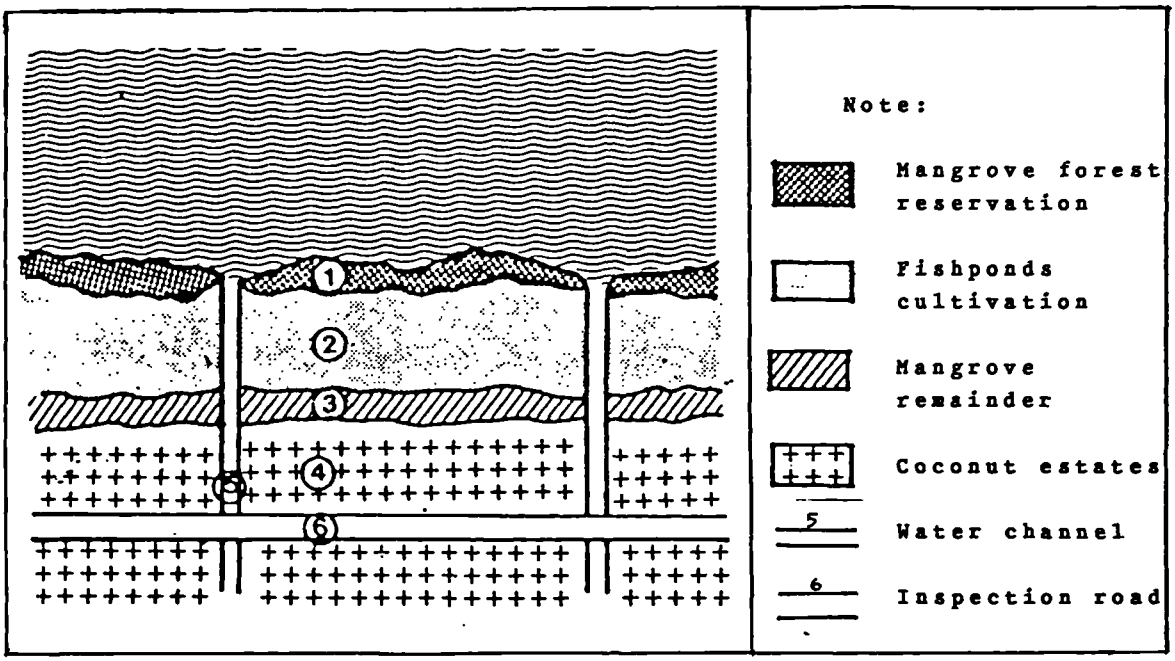
Another resource: mangrove forests, also supply the rural people with fuel wood. In Indonesia the poorer classes wood is the fuel commonly used for cooking purposes. Some village people in coastal rural area have also cut down mangrove trees for it. In some countries; Malaysia for example, mangrove forests have been managed for charcoal, poles and firewood (Ong, J.E.,1982.). In Sabah and Sarawak another 20 percent of the total mangrove forests areas has been licensed for wood-chip production. Wiroatmodjo states that mangrove forest as a resource should be utilized maximally for the production of timber without neglecting their role in the ecosystem, namely supporting the coastal fauna (Wiroatmodjo. P, & Judi.,D.M.1978). He suggests to develop fishpond culture 200 m outward to the inland from the coastline, and keep the space for mangrove forests development between the ponds and the sea. Fishponds culture can be integrated with other activities such as coconut estates or mangrove plantation between two fish-

ponds. In this area mangrove trees can be cut down for rural people own use. By this method the existence of mangrove forests can be maintained.

Figure 11.2. shows the model of reclamation of mangrove forest for fishpond culture.

Figure 11.2.

Model of the reclamation of mangrove forest for fishpond culture.



Source: Wiroatmodjo,P and Judi,D.M., 1978.

Duncan in his study of brackish water fishponds culture has estimated the minimum area for extensification fishpond culture in Aceh (North Sumatra). For extensification the minimum economically feasible unit is 4 hectares. Projecting modest returns net farm income during the life of the loan is estimated to be Rp.354.786 (a total of $558) per year. Net farm income for extensification and intensification after loan repayment, for four hectares, is estimated to be Rp.672.851 (a total of $1060) (Duncan,Bryan L.,1978). Thus some profits can be expected from this activity by the farmers.

To develop marginal land seven general criteria have been suggested by Biswas (1979,p.257-259). These criteria are :

1.Sustainability : Any strategy to develop marginal areas must be sustainable on a long-term basis;

2.Flexibility : It is difficult to forecast accurately the secondary and tertiary effects of project development;

3.Equity;

4.Appropriate technology;

5.Environmental constraints;

6.Strengthening of local capabilities;

7.Information.

(See Appendix B)

These criteria will support the implementation of planning programmes in coastal areas and guide the planners for coastal planning carefully since serious errors in implementation lead to damage the environment.

The impact of development will also affect the socio-economic aspects. Lohani & Thanh identify some major impacts of development activities on rural environments in South-East Asia and describe those rural development activities that have negative impacts for the environment. (Lohani, B.N. & Thanh,N.C., 1977.). But it is quite obvious that, socially, development will have a positive impacts for the rural people

since development is defined as improvement of people life which includes education, health and environment. Development can improve the income of rural people. Infrastructure development, for example, creates an accessibility to market all rural agricultural products. This may encourage the rural people to work more intensively to rise their production by which increasing their income.

This study analyzes from both positive and negative impacts likely the impacts of all significant and unsignificant kecamatans for development and also the proposed actions based on the physical, socio-culture and socio-economic aspects. This is an empirical study since it is not a fully-fledged environmental impact analysis.

Kecamatans which are identified to have favourable 'commerce' factors development, agro-industry might be the dominant variable. It is a basis to support key villages development. The positive impact of the agro-industry development in the Key Settlements is that it will encourage other activities such as local trade and transportation and also rural facilities. Development of rural agro-industry can attract the people from other places. In the long run, the need of social facilities, infrastructure and rural housings will be required. Thus, it will accelerate other activities in coastal rural areas, and will contribute to the agricultural sector since it provides the facilities to process the agriculture products in these areas and better marketing. Development of agro-industry has an effect to the socio-cultural since it can bridge the rural people from traditional to modern activities. It has positive

impacts concerning with creating new jobs and to advance the rural people from the backwardness.

Rural agro-industry in the key villages can also expand the trade activities between rural and urban areas. People can work to non-agricultural sector, so that they do not dependent their life on land cultivation. Agro-industry development can increase a value added to the agricultural products by transforming raw materials to half-done and ready for used materials, and to help the rural people in processing their harvest. In the light of socio-cultural analysis, development of key villages in the basis of rural agro-industries can increase the rural people welfare. At the regency level, it could stem the rural-urban migration since it creates the employment opportunities. Culturally, the traditional attitudes will change gradually to the more modern life.

However, the negative impacts are shown in the social life where the traditional activities such as ; work-sharing might be ignored and as a result the rural people are to be more individual. Modernisation can change the orientation of the social life from the social to the commercial activities.

The negative impacts may also be seen from the supplements of agro-industry development, such as the provision of infrastructure, social facilities and utilities since it can rise the price of land and problems concerning with the availability of land to locate them. To get round the difficulty, a shorter way is often applied : some agricultural areas are occupied. Thus, production areas become smaller and smaller. As a result of this is that uncontrolled agro-industry development can

cause declining of agricultural products.

In the coast, the availability of land reclamation has a positive impact in terms of economic development by establishing some fishponds culture. Some fishermen can work at this activity during the catching off season, so that their life can be supported by another income from this activity. To manage the tropical coastal zones, however, needs a detailed examination (see Knox and Miyabara,1984). Land reclamation development has a positive impact in rising protein by rearing fish in the coast and to increase the income of rural people by managing oyster culture and establishing salt industries. Land reclamation development can be managed for agricultural purposes (Beeftink,1977,p.106).

However, it also has negative impacts such as mismanagement of land reclamation causes damage to some mangrove forests and the habitat of specific creatures in these areas and also spreading malaria disease to the villages surrounding.

The positive impact of agriculture development is that it will not change to the habit of the rural people drastically. But, the less participation of rural people in agricultural development affects to the acceleration of rural development. Promotion of agricultural development can increase the production and to support the agro-industry activities.Thus, agricultural development programme has positive impacts not only to fulfil the basic need of the rural people but also to ensure the viability of rural trade activities.

Agriculture development in coastal areas, especially for certain crops, needs a specific action such as; leaching the saline soil by establishing on irrigation system. Thus, beside leaching the soil it can irrigate wet-land crops areas. Therefore, this facility also allows extensification of land for agricultural development.

It has some impacts to the socio-cultural aspects, especially in agricultural education for the rural people. Agriculture development can improve the system of cultivation in the study area which may increase the output of agricultural production. Crops and cash crops cultivations are recognized to have positive impacts in providing the basic need and income to the rural people.

But, it also has negative impacts, since it cannot accelerate development of these kecamatans. The reasons is that agriculture differs from the industrial economy in that it is linked to a given location and depends on natural factors, and therefore has a biological-technical orientation (Kolbe,et.al.,1983,p.109), whereas non agro-industries do not depend on natural factors. Agro-industry may be influenced by the provision of certain commodity as its raw material. Other commodities can often be used as substitution in processing. Industries which use raw material of coconuts, for example, might be substituted with other commodities such as oil-palm, sun flower seeds and corn to be processed.

Another impact is that uncontrolled extensification of land for this purpose can damage the environment such as flooding and erosion.

In several kecamatans, conservation areas are suggested. Conservation of the coastal zones will ensure the stability of the ecosystem in these areas. It also protects some mangrove forests from the mismanagement of environmental development. But, it has an impact to the socio-cultural aspect, since stagnation of development causes people to stay in their traditional attitude, and to be passive. These kecamatans may have a slow progress in economic development.

The resume of the impacts of the implementation of proposed programmes in individual priority of kecamatans for development can be presented in table 11.1 as follows. It shows likely the impacts of development in the study area based on their significant elements for development. This analysis is to be an important step before the implementations of certain kecamatans are carried out. Development processes involves physical, socio-culture and socio-economic aspects, so that the impact of development will also be recognized in them. In this circumstance the study area will be faced by the various alternatives for development. These alternatives are :

1.The action of development for certain kecamatans should be restricted or minimized so that the negative impact can be avoided.

2.The action of development for certain kecamatans can be carried on by the action of perfecting in implementation and so to minimize the negative impacts.

3.The action of development sould be continued by considering the urgency of the objects for development in the study area

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and if the demand to develop certain kecamatans based on the priority for development is more emphasized.

Table 11.1

The impacts of proposed programmes implementation to the socio-cultural, economic and physical conditions in the study area

Priority of Kecamatans	Socio-cultural impacts		Economic impacts		Physical impacts	
	Positive	Negative	Positive	Negative	Positive	Negative
I Very high potential in terms of social-economic and environment factors	-to increase the rural people welfare -to stem rural-urban migration by creating new jobs. -changing of traditional attitudes to the dynamic life.	-the influence of modernisation can change the traditional life toward commercialization minded and consumtive life pattern. -people tend to be more individual	-creating employment opportunities by which to decrease the dependancy of rural people on land cultivation -rural agro-industries can contribute agricultural activities in processing the agricultural products and marketing -development of land reclamation for fish-ponds culture can increase the income of rural people	-improvement of rural facilities and infrastructure can raise the price of land	-irrigation development for brackish water aquaculture can also support agricultural sector areas.	-a mismanagement for physical development in coastal zone can damage seriously to the environment and spread the disease such as *malaria*
II High potential in terms of socio-economic factors	-agro industry development will bridge the rural people from the traditional to the semi-modern activities -development of *nonagricultural* will create a new area of jobs for the rural people so that unemployment can be decreased. -small agro-industry can proceed the rural people from the backwardness. -education in agricultural aspects can improve the rural people for cultivating these areas.	-the population concentration in these areas in the future will demand to the employment oportunities	-Land crops and estates development can support the viability of rural economy. -accelerating the transformation processes from the raw material to half-done and ready for used materials can rise the value of some products of agriculture -land development for crops and estates can support commerce factor activities in coastal rural areas.	-more occupation of land including agricultural areas to provide certain facilities in these areas can cause declining in agricultural production. -to generate a high value of agricultural products, certain sector such as small processing manufacturers should be provided	-conservation of coastal area will have a positive impact from the damaging of some mangrove forests in these areas. -conservation of land reclamation areas can help the balanced of the environment and to create a new habitat for certain creatures	-uncontrolled small-industry's waste will damage the soil and surface water -uncontrolled expansion land for multi-purposes can damage the environment.
III in terms of environmental factors	-development of infrastructures& processing manufactures can open the coastal rural areas from the isolation.		-to rise food particularly fish salt - industry and oyster cultivation by which increasing rural people income.			-mismanagement of in the coast can damage mangrove forest and the habitat of specific creatures in these areas -waste disposal from processing manufacture can cause pollution to the environment.
	-development of agricultural sector to support rural agro-industries will not change the rural people costum drastically.	-less participation of the rural people in agricultural develop - ment can effect to the acceleration of agro-industry development programme	-succeeding to rise production in agricultural programmes will proceed the rural economy.		-irrigation development can leach the soil to expand the areas for crops and plantation areas.	
IV Low potential in terms of socio economic and environ - mental factors		-People still live with their traditional attitudes		-slow progress in economic development	-conservation of the coastal zone will ensure the stability of ecosystem in these areas.	

Source : table 8.3

CHAPTER XII

CONCLUSION

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CONCLUSION

Coastal rural development in northern Central Java is concerned with the improvement of the economic and social conditions of the rural people. Their income and standards of living are low. In relation to development some basic resources have been recognized, to form the basis of coastal rural development, and some of the problems have been explored. Although rural development is often identified with agricultural development, other sectors have been considered in relation to the contribution they might make.

The main problems facing rural areas are essentially the scarcity of capital, and an adequate development subsidy. Another problem is the inefficient distribution of development funds. The policy of evenly distributing the development subsidy to individual villages has been criticized as ineffective in providing the necessary base for development. The need for efficiency distribution of development funds has ,therefore, been emphasized as a basis for overcoming such problems. Concentrated investment in kecamatans (sub-districts) with defined development potential has been suggested as an alternative to achieve this purpose.

No guidance is available in implementing coastal rural programmes in the study area. Thus an appropriate strategy for recognising the significant factors affecting coastal rural development is required.

All the kecamatans have been examined, and grouped based on analyses of social, economic and physical variables such as; natural resources, trade and markets, human resources, transportation and social facilities. These factors have been assessed in order to identify and evaluate the kecamatans with the greater potential for development. Factor Analysis was used to identify the significant factors and to group the kecamatans on the basis of 22 variables. This method has revealed that the characteristics of the non-agricultural sector in the kecamatans is more significant to development than the agricultural sector which merely supports the other sectors. While in most inland rural areas the agricultural sector is the main sector affecting potential development, in coastal rural areas the areas used for agriculture support development is the significant factor. The 5 significant variables produced are grouped as the "commerce factor", which backs up rural industry; the supporting factor relating to the agricultural sector has been called the "pull factor" of the kecamatans. The "pull factor" is the ability of the agricultural sector to attract people to work in the rural areas and it is the ability of the kecamatans to provide named facilities.

These factors have, therefore, been suggested as the most significant as a basis for selecting particular kecamatans for development.

15 groups of kecamatans have been distinguished are assigned to four groups. In order of priority they are :

1. Kecamatans which have significant physical potential for coastal land development as well as favourable commerce and

pull factors;

2.Kecamatans which are categorized as having a high physical potential for land development, and a favourable commerce factor;

3.Kecamatans which are categorized as having a high commerce and pull factors and a favourable environmental factor;

4.Kecamatans which have no favourable supporting characteristics.

The priority they determined has been used to identify appropriate development programmes, and also to discuss the possible impact of the development programmes.

This study has attempted to identify the problems facing rural areas, to distinguish the kecamatans with greatest development potential, and to evaluate the implementation of strategies for development in the future. Consideration of several strategies of rural development has facilitated the selection of an

appropriate strategy. It has been suggested that the key settlements concept constitutes the most suitable strategy for development of the kecamatans in the study area, since it is able to promote the factors demonstrated as being most significant as a basis for rural development. One of the variables contributing to the commerce factor is especially important, since it has been identified as the most important determinant of this factor. This variable is rural industry. The efficient use of development funds may be achieved by concentrating the limited financial inputs in a small number of centres rather than by dispersing investment thinly to every settlement. This would also effect the most efficient way of servicing of scattered settlements. Moreover, "key settlements" would promote growth in the factors significant for development in the kecamatans with greatest development potential. Other variables which contribute to the commerce factor are the availability of employment, industrial resource and the dispersion of industry. Commercial activity, therefore, has been identified as having a special role in rural economic development in the study area. Furthermore the hierarchy of settlements of different sizes can afford a framework for the collection and distribution of goods since it performs a specialized function in the interactive system with production and trade. Urban centres, however, showed functions as centres for marketing rural agricultural products for the provision of non-agricultural products, including industrial products, as well as providing processing industries for agricultural products.

In Indonesia, however, many urban centres fail to perform these functions for their hinterlands effectively and efficiently. This is probably influenced by the poverty of rural people in relation to the cost of transport, the absence of inadequate infrastructure and the dispersed nature of the rural settlement pattern. Rural people, therefore, have only limited access to the urban services, and the provision of facilities in rural areas and various type of goods is therefore limited. Integrated relations between urban and rural areas can secure the viability of the economy, through commercial activity. Thus the development of the commercial sector has been proposed as a basis for development in the coastal rural areas. It will not only serve the rural areas, but will also affect the urban sector if the two can be effectively linked. The relationship between urban and rural areas must, therefore, be initiated at the kecamatan level. "Key villages" can function as centres of distribution for surrounding areas within the kecamatan. The localized agro-industry sector needs to be promoted to support the viability of commercial activities in these key villages. Thus the role of key villages needs to be emphasized.

The role of key settlements is not only to affect the efficient allocation of funds from the development budget; it has been argued also that such a policy will:

1. help to stem rural-urban migration by creating employment opportunities in rural industry.

2. create a local marketing system by creating a coherent system of nodes within individual kecamatans.

3.provide a basis for infrastructural development by creating a network of centres which optimizes accessibility within, and between kecamatans and major centres.

This study has advocated encouragement of the commercial sector (Factor I) by developing small scale rural agro-industry and its support by enhancing the pull factor (Factor 2) using low level capital for development. But these developments must be accompanied by adequate understanding of the pattern of the system of the spatial organisation of development process in rural areas. The idea of the "Key settlements" has, therefore, been used to characterise it.

The study of the implementation of coastal rural development is restricted to the selected kecamatans. A tentative development procedure has been proposed for the remaining kecamatans. The latter has been based on the development of the less favourable factors. It has been suggested, for example, that recreation might be an appropriate sector to support in the development of these kecamatans.

Development has some impacts in physical, social and economic aspects. The impact analysis of development potential by priority groups of kecamatans has been conducted with reference to the physical, the social and the economic factors. This inductive study has attempted to recognize and identify the impact of development so that evaluation and specification of negative impact can be formulated. It is a basis for development planning in coastal rural area in Central Java.

APPENDIX A

LOCATION-ALLOCATION PROGRAMME

```
C     LOCATION ALLOCATION PACKAGE
C     SEE RUSHTON ET AL FOR DETAILS
C *** MODIFIED 25 & 27 AUGUST 1987: ALL IMPLICIT INTEGER ARRAYS
C *** DECLARED AS INTEGER*4
C
C *** MODIFIED 7 OCTOBER 1987: SOME INTEGER CONSTANTS DECLARED INTEGER*4 AFTER
C *** ITS & NP OVERFLOW.    STATEMENTS WITH YEAR & NR=NR+1 DELETED AS NOT USED
C *** ELSEWHERE.       FMT(11) REMOVED AS NOT USED
C
      DIMENSION C(100,16),XC(16),YC(16),
     1T(11),CDT(510),CDC(16),AX(10),AY(10),BX(10),BY(10),BS(10),
     1DD(10),PD(10),SI(10,10),ALP(11),PC(16),XX(510),YY(510)
      REAL MS,NPR,NPRR,NPRG
      INTEGER*4 MIN,ITS,NP,ICS,IK,IJ,MAX,JA,NS,JTA,KTA
      INTEGER*4 JT(510),JC(16),JP(99),KP(99),IT(100,16),IC(4,510),
     1LT(510),LC(16),JAC(16),JCS(16),I(100,16)
      DATA A1,A2,A3,A4,A5,A6,A7,A8,A9,A10/4HDATA,4HPOPF,4HBARR,4HTITL,
     14HCENT,4HINTE,4HINDI,2HGO,4HSTOP,4HCRIT/
      XRN=0.
      CALL FRANDN(XRN,0)
      DATA NPRR/4HPOWE/
      DATA A11/4HITER/
      DATA NPRG/4HGRAV/,A12/4H    /,A13/4HRESE/
  379 DO 380 J=1,11
  380 T(J)=A12
      NITM=20
      IPF=0
      NB=0
      IINT=0
      NOP=1
      CV=1.0
      IPOW=1
      NPR=1.
      DPARM=0.01
  104 READ(1,399)CC,ICO,ALP
  399 FORMAT(A4,11X,I5,11A4)
      IF(CC.EQ.A11)NITM=ICO
      IF(CC.EQ.A9)STOP
      IF(CC.NE.A1)GO TO 398
      NT=ICO
      IF(IPF.EQ.1)READ(1,ALP)(JT(J),XX(J),YY(J),J=1,NT)
      IF(IPF.EQ.0)READ(1,ALP)(XX(J),YY(J),JT(J),J=1,NT)
      DO 386 J=1,NT
      IF(JT(J).EQ.0)JT(J)=1
  386 CONTINUE
  398 IF(CC.EQ.A2)IPF=1
      IF(CC.NE.A3)GO TO 397
      NB=ICO
      READ(1,ALP)(AX(J),AY(J),BX(J),BY(J),J=1,NB)
  397 IF(CC.NE.A4)GO TO 396
      DO 395 J=1,11
  395 T(J)=ALP(J)
  396 IF(CC.NE.A5)GO TO 394
      NC=ICO
      READ(1,393)(JC(J),XC(J),YC(J),JAC(J),PC(J),J=1,NC)
  393 FORMAT(5X,I5,2F10.0,I1,9X,F10.0)
  394 IF(CC.EQ.A6)IINT=1
```

```
      IF(CC.EQ.NPRR)IPOW=ICO
      IF(CC.EQ.A13)GO TO 379
      IF(CC.NE.NPRG)GO TO 383
      NPR=-1.0
      ALPH=FLOAT(ICO)/1000.
  383 IF(CC.NE.A7)GO TO 392
      NPR=0.
      READ(1,391)NDD,NPD
  391 FORMAT(2I10)
      READ(1,390)(DD(K),K=1,NDD),(PD(K),K=1,NPD)
  390 FORMAT(8F10.0)
      READ(1,390)((SI(J,K),J=1,NDD),K=1,NPD)
  392 IF(CC.EQ.A8)GO TO 389
      IF(CC.EQ.A10)DPARM=FLOAT(ICO)/1000.
      GO TO 104
  389 WRITE(2,360)T,NITM
  360 FORMAT('1 SWITCHES IN EFFECT'/1X,11A4/1X,I6,'ITERATIONS MAX')
      IF(IPF.EQ.1)WRITE(2,361)
  361 FORMAT(' WEIGHTS READ FIRST')
      IF(NB.GT.0)WRITE(2,362)NB,(AX(K),AY(K),BX(K),BY(K),K=1,NB)
  362 FORMAT(I6,' BARRIERS  X1,Y1,X2,Y2'/(4F10.2))
      IF(IINT.EQ.1)WRITE(2,363)
  363 FORMAT(' INTEGER SOLUTION')
      WRITE(2,364)IPOW
  364 FORMAT(' DISTANCE POWER',I4)
      IF(NPR.EQ.1.)WRITE(2,365)
  365 FOR..AT(' MINIMISING DISTANCE')
      IF(NPR.NE.0.)GO TO 368
      WRITE(2,366)NDD,NPD
  366 FORMAT(I6,' DISTANCE LIMITS,',I6,' ATTRACTION LIMITS')
      DO 378 K=1,NPD
      KA=NPD-K+1
  378 WRITE(2,367)PD(KA),(SI(J,KA),J=1,NDD)
  367 FORMAT(F10.2,' X ',10F10.2)
      WRITE(2,369)(DD(K),K=1,NDD)
  369 FORMAT(13X,50(' X')/13X,10F10.2)
  368 IF(NPR.EQ.-1.0)WRITE(2,371)ALPH
  371 FORMAT(' GRAVITY MODEL,ALPHA = ',F10.2)
      WRITE(2,372)DPARM
  372 FORMAT(' CRITICAL PARAMETER ',F10.3)
      WRITE(2,373)(J,XX(J),YY(J),JT(J),J=1,NT)
  373 FORMAT(' DATA BASE'/(I6,2F10.2,I8))
      WRITE(2,374)(J,JC(J),XC(J),YC(J),JAC(J),PC(J),J=1,NC)
  374 FORMAT(' CENTRES'/(2I8,2F10.2,I8,F10.2))
      IF(NB.EQ.0)GO TO 5
      DO 50 K=1,NB
   50 BS(K)=(BY(K)-AY(K))/(BX(K)-AX(K))
    5 JPROB=1
      DO 159 J=1,NC
      IF(JC(J).EQ.0)JPROB=2
      IF(XC(J).EQ.0..AND.YC(J).EQ.0.)GO TO 160
  159 CONTINUE
      GO TO 163
  160 XMAX=-1.0E10
      XMIN=1.0E10
      YMAX=-1.0E10
      YMIN=1.0E10
      DO 161 J=1,NT
```

```
      IF(XX(J).LT.XMAX)GO TO 162
      XMAX=XX(J)
  162 IF(XX(J).GT.XMIN)GO TO 70
      XMIN=XX(J)
   70 IF(YY(J).LT.YMAX)GO TO 71
      YMAX=YY(J)
   71 IF(YY(J).GT.YMIN)GO TO 161
      YMIN=YY(J)
  161 CONTINUE
      DO 72 J=1,NC
      IF(XC(J).NE.0..OR.YC(J).NE.0.)GO TO 72
      CALL FRANDN(XRN,1)
      XC(J)=XRN*(XMAX-XMIN)+XMIN
      CALL FRANDN(YRN,1)
      YC(J)=YRN*(YMAX-YMIN)+YMIN
      WRITE(2,1999) J,XC(J),YC(J)
 1999 FORMAT(1HO,'STARTING LOCN FOR CENTRE',I3,2X,'IS',
     12F10.2)
   72 CONTINUE
  163 NIT=0
      NPRS=NPR
      IF(NPR.EQ.0.)NPR=-1.
      WRITE(2,9)T
   14 WRITE(2,2)NIT
    2 FORMAT(1H1,' ITERATION',I3)
      DO 166 J=1,NT
  166 LT(J)=0
      DO 165 K=1,NC
      LC(K)=0
      DO 165 J=1,NT
  165 I(J,K)=-1
      IF(JPROB.EQ.2)GO TO 164
      NSTOP=NC+NT
      ICS=0
      DO 80 K=1,NC
      IF(JC(K).EQ.0)JC(K)=JC(K)+1
      JCS(K)=JC(K)
   80 ICS=ICS+JC(K)
      WRITE(2,101)
  101 FORMAT(' TRANSPORTATION PROBLEM'/' CAPACITY CONSTRAINTS')
      WRITE(2,45)(JC(K),K=1,NC)
   45 FORMAT(15I8)  ,
      ITS=0
      DO 20 J=1,NT
   20 ITS=ITS+JT(J)
      IF(ICS.EQ.ITS)GO TO 164
      WRITE(2,82)
   82 FORMAT(' CENTRE CONSTRAINTS REVISED TO SUM CORRECTLY')
      NS=0
      DO 83 K=1,NC
      JC(K)=FLOAT(JC(K))/FLOAT(ICS)*FLOAT(ITS)
   83 NS=NS+JC(K)
      JC(NC)=JC(NC)+ITS-NS
  164 DO 99 K=1,NC
   99 JCS(K)=JC(K)
      WRITE(2,45)(JC(K),K=1,NC)
      IF(NB.EQ.0)GO TO 114
      DO 111 J=1,NT
```

```
      X=XX(J)
      Y=YY(J)
      DO 111 K=1,NC
      CX=XC(K)
      CY=YC(K)
      D=(CY-Y)/(CX-X+0.00001)
      DO 112 L=1,NB
      XI=(X*D-Y+AX(L)*BS(L)+AY(L))/(D-BS(L)+0.00001)
      T1=(X-XI)*(XI-CX)
      T2=(AX(L)-XI)*(XI-BX(L))
      IF(T1.GT.0..AND.T2.GT.0.)GO TO 113
  112 CONTINUE
      C(J,K)=((Y-CY)**2+((X-CX)*CV)**2)**0.5
      C(J,K)=C(J,K)**IPOW
      GO TO 111
  113 T1=((Y-AY(L))**2+((X-AX(L))*CV)**2)**0.5+((AY(L)-CY)**2+((AX(L)-CX
     1)*CV)**2)**0.5
      T2=((Y-BY(L))**2+((X-BX(L))*CV)**2)**0.5+((BY(L)-CY)**2+((BX(L)-CX
     1)*CV)**2)**0.5
      C(J,K)=T2**IPOW
      IF(T1.LT.T2)C(J,K)=T1**IPOW
  111 CONTINUE
      GO TO 81
  114 DO 116 J=1,NT
      X=XX(J)
      Y=YY(J)
      DO 116 K=1,NC
  116 C(J,K)=SQRT((Y-YC(K))**2+(X-XC(K))**2)**IPOW
   81 IF(NPR.EQ.1.)GO TO 175
      IF(NPRS.EQ.0)GO TO 167
      DO 170 J=1,NT
      DO 170 K=1,NC
  170 C(J,K)=PC(K)/C(J,K)**ALPH
      GO TO 175
  167 DO 176 J=1,NT
      DO 176 K=1,NC
      DO 172 KA=1,NDD
      IF(C(J,K).LT.DD(KA))GO TO 173
  172 CONTINUE
  173 DO 174 KB=1,NPD
      IF(PC(K).LT.PD(KB))GO TO 176
  174 CONTINUE
  176 C(J,K)=SI(KA,KB)
  175 IF(JPROB.EQ.2)GO TO 131
      N=0
   42 N=N+1
      IF(N.GE.NSTOP)GO TO 43
      DMT=0.
      DO 23 J=1,NT
      IF(JT(J).EQ.0)GO TO 23
      CA=100000000.*NPR
      CB=100000000.*NPR
      DO 22 K=1,NC
      IF(I(J,K).GE.0)GO TO 22
      CC=(C(J,K)-CA)*NPR
      IF(CC.GT.0.)GO TO 24
      CB=CA
      CA=C(J,K)
```

```
      GO TO 22
   24 CC=(C(J,K)-CB)*NPR
      IF(CC.GT.0.)GO TO 22
      CB=C(J,K)
   22 CONTINUE
      CDT(J)=(CB-CA)*NPR
      IF(CDT(J).LT.DMT)GO TO 23
      DMT=CDT(J)
      JTM=J
   23 CONTINUE
      DMC=0.
      DO 25 K=1,NC
      IF(JC(K).EQ.0)GO TO 25
      CA=100000000.*NPR
      CB=100000000.*NPR
      DO 26 J=1,NT
      IF(I(J,K).GE.0)GO TO 26
      CC=(C(J,K)-CA)*NPR
      IF(CC.GT.0.)GO TO 27
      CB=CA
      CA=C(J,K)
      GO TO 26
   27 CC=(C(J,K)-CB)*NPR
      IF(CC.GT.0.)GO TO 26
      CB=C(J,K)
   26 CONTINUE
      CDC(K)=(CB-CA)*NPR
      IF(CDC(K).LT.DMC)GO TO 25
      DMC=CDC(K)
      JCM=K
   25 CONTINUE
      IF(DMC.GT.DMT)GO TO 28
      CM=100000000.*NPR
      JTA=0
      KTA=0
      DO 29 K=1,NC
      JTA=JTA+I(JTM,K)
      IF(I(JTM,K).LT.0)JTA=JTA+1
      CC=(C(JTM,K)-CM)*NPR
      IF(CC.GT.0..OR.I(JTM,K).GE.0)GO TO 29
      CM=C(JTM,K)
      KM=K
   29 CONTINUE
      IJ=JT(JTM)-JTA
      DO 46 J=1,NT
      KTA=KTA+I(J,KM)
   46 IF(I(J,KM).LT.0)KTA=KTA+1
      IK=JC(KM)-KTA
      IF(IJ.GT.IK)GO TO 30
      DO 35 K=1,NC
   35 IF(I(JTM,K).LT.0)I(JTM,K)=0
      I(JTM,KM)=IJ+I(JTM,KM)
      JT(JTM)=0
      GO TO 40
   30 DO 31 J=1,NT
   31 IF(I(J,KM).LT.0)I(J,KM)=0
      I(JTM,KM)=IK+I(JTM,KM)
      GO TO 40
```

```
 28 CM=100000000.*NPR
    JTA=0
    KTA=0
    DO 32 J=1,NT
    KTA=KTA+I(J,JCM)
    IF(I(J,JCM).LT.0)KTA=KTA+1
    CC=(C(J,JCM)-CM)*NPR
    IF(CC.GT.0..OR.I(J,JCM).GE.0)GO TO 32
    CM=C(J,JCM)
    JM=J
 32 CONTINUE
    IK=JC(JCM)-KTA
    DO 47 K=1,NC
    JTA=JTA+I(JM,K)
 47 IF(I(JM,K).LT.0)JTA=JTA+1
    IJ=JT(JM)-JTA
    IF(IK.GT.IJ)GO TO 48
    DO 36 J=1,NT
 36 IF(I(J,JCM).LT.0)I(J,JCM)=0
    I(JM,JCM)=IK+I(JM,JCM)
    JC(JCM)=0
    GO TO 40
 48 DO 33 K=1,NC
 33 IF(I(JM,K).LT.0)I(JM,K)=0
    I(JM,JCM)=IJ+I(JM,JCM)
    JT(JM)=0
 40 GO TO 42
 43 WRITE(2,44)
 44 FORMAT(17H VOGEL SUCCESSFUL)
    DO 300 J=1,NT
    DO 300 K=1,NC
    IF(I(J,K).LE.0)GO TO 300
    LT(J)=LT(J)+1
    LA=LT(J)
    IC(LA,J)=K
    LC(K)=LC(K)+1
    LB=LC(K)
    IT(LB,K)=J
300 CONTINUE
    NB=1
    NP=0
 53 KA=0
    IF(NB.EQ.0)GO TO 213
    WRITE(2,3)NB
  3 FORMAT(1H ,I6,23H REVISIONS IN LAST PASS)
    NP=NP+1
    IF(NP.GT.20)GO TO 402
    KP(2)=1
    NB=0
211 KA=KA+1
    IF(KA.GT.NC)GO TO 53
    IFLAG=1
    JA=0
210 JA=JA+1
    IF(JA.GT.NT)GO TO 211
    IF(I(JA,KA).GT.0)GO TO 210
    KP(1)=KA
    JP(1)=JA
```

```
      KSK=KP(2)
      IF(I(JA,KSK).GT.0)GO TO 6
    7 J=JA
      N=2
      IK=0
  301 IK=IK+1
      IF(IK.GT.LT(J))GO TO 303
      K=IC(IK,J)
      IF(K.EQ.KP(N-1))GO TO 301
      KP(N)=IK
      JP(N)=J
      N=N+1
      IJ=0
  302 IJ=IJ+1
      IF(IJ.GT.LC(K))GO TO 304
      J=IT(IJ,K)
      IF(J.EQ.JP(N-1))GO TO 302
      IF(LT(J).EQ.1)GO TO 302
      KP(N)=K
      JP(N)=IJ
      N=N+1
      IF(I(J,KA).GT.0)GO TO 206
      IK=0
      GO TO 301
  303 N=N-1
      IF(N.EQ.1)GO TO 402
      IJ=JP(N)
      K=KP(N)
      GO TO 302
  304 N=N-1
      IF(N.EQ.1)GO TO 402
      IK=KP(N)
      J=JP(N)
      GO TO 301
    6 IF(IFLAG.EQ.1)GO TO 7
      JP(2)=JA
      IF(JP(3).EQ.JP(2))GO TO 7
      GO TO 8
  206 JP(N)=J
      KP(N)=KA
    8 SS=0
      NO=-1
      MIN=1000000
      NZ=N-1
      DO 305 NN=3,NZ,2
  305 JP(NN)=JP(NN+1)
      NNZ=NZ-1
      DO 306 NN=2,NNZ,2
  306 KP(NN)=KP(NN+1)
      DO 207 NN=1,N
      JJ=JP(NN)
      KK=KP(NN)
      NO=NO+2
      SS=SS+C(JJ,KK)*FLOAT(NO)
      IF(NO.EQ.1)GO TO 215
      IF(I(JJ,KK).LT.MIN)MIN=I(JJ,KK)
      GO TO 207
  215 NO=-3
```

```
207 CONTINUE
    IFLAG=0
    SS=SS*NPR
    IF(SS.GE.0.)GO TO 210
    LT(JA)=LT(JA)+1
    LC(KA)=LC(KA)+1
    LA=LT(JA)
    LB=LC(KA)
    IC(LA,JA)=KA
    IT(LB,KA)=JA
    DO 208 NN=1,NZ,2
    JJ=JP(NN)
    KK=KP(NN)
208 I(JJ,KK)=I(JJ,KK)+MIN
    DO 209 NN=2,N,2
    JJ=JP(NN)
    KK=KP(NN)
    I(JJ,KK)=I(JJ,KK)-MIN
    IF(I(JJ,KK).GT.0)GO TO 209
    IF(NN.GT.2)IFLAG=1
    LZ=LT(JJ)-1
    DO 307 J=1,LZ
    IF(IC(J,JJ).EQ.KK)GO TO 308
307 CONTINUE
    GO TO 320
308 DO 309 L=J,LZ
309 IC(L,JJ)=IC(L+1,JJ)
320 LT(JJ)=LZ
    LZ=LC(KK)-1
    DO 310 K=1,LZ
    IF(IT(K,KK).EQ.JJ)GO TO 311
310 CONTINUE
    GO TO 321
311 DO 312 L=K,LZ
312 IT(L,KK)=IT(L+1,KK)
321 LC(KK)=LZ
209 CONTINUE
    GO TO 210
402 WRITE(2,404)
404 FORMAT(' DEGENERATE TABLEAU - MOVING TO RELOCATION')
    GO TO 4
213 WRITE(2,34)NB
 34 FORMAT(1H ,23HOPTIMAL SOLUTION AFTER ,I8,10H REVISIONS)
    GO TO 4
131 WRITE(2,377)
377 FORMAT(' UNCONSTRAINED ALLOCATION')
    DO 132 J=1,NT
    ZMIN=1.0E20
    CA=100000000.*NPR
    DO 133 K=1,NC
    I(J,K)=0
    CC=(C(J,K)-CA)*NPR
    IF(CC.GT.0.)GO TO 133
    Z=((XX(J)-XC(K))*CV)**2+(YY(J)-YC(K))**2
    IF(CC.LT.0.)GO TO 430
    IF(Z.GT.ZMIN)GO TO 133
    ZMIN=Z
    KA=K
```

```
      GO TO 133
  430 CA=C(J,K)
      KA=K
      ZMIN=Z
  133 CONTINUE
  132 I(J,KA)=JT(J)
    4 TSP=0
      DO 95 K=1,NC
      LC(K)=0
      DO 95 J=1,NT
   95 TSP=TSP+I(J,K)*C(J,K)
      WRITE(2,330)TSP
  330 FORMAT('0COST AT END OF ALLOCATION',G12.4)
      IGO=0
    9 FORMAT(1H1,11A4)
      TSP=0
      ITS=0
      IF(IINT.EQ.1)GO TO 201
      DO 202 J=1,NT
      NP=0
      DO 203 K=1,NC
      IF(I(J,K).EQ.0)GO TO 203
      NP=NP+I(J,K)
      LC(K)=LC(K)+1
      LB=LC(K)
      IT(LB,K)=J
  203 CONTINUE
      JT(J)=NP
      ZMIN=100000000.*NPR
      DO 204 K=1,NC
      Z=C(J,K)
      ZAP=(Z-ZMIN)*NPR
      IF(ZAP.GT.0.)GO TO 204
      ZMIN=Z
      KZ=K
  204 CONTINUE
  202 ITS=ITS+I(J,KZ)
      GO TO 205
  201 DO 17 J=1,NT
      MAX=0
      NP=0
      DO 18 K=1,NC
      NP=NP+I(J,K)
      IF(I(J,K).LT.MAX)GO TO 18
      MAX=I(J,K)
      KA=K
   18 CONTINUE
      LC(KA)=LC(KA)+1
      LB=LC(KA)
      IT(LB,KA)=J
      JT(J)=NP
      ZMIN=100000000.*NPR
      DO 13 K=1,NC
      Z=C(J,K)
      ZAP=(Z-ZMIN)*NPR
      IF(ZAP.GT.0.)GO TO 13
      ZMIN=Z
      KZ=K
```

```
 13 CONTINUE
 17 IF(KA.EQ.KZ)ITS=ITS+MAX
205 SSUM=0
    WRITE(2,376)
376 FORMAT(' RELOCATION SECTION')
    DO 63 K=1,NC
    LB=LC(K)+1
    DO 96 J=LB,100
 96 IT(J,K)=0
    NI=0
    XO=XC(K)
    YO=YC(K)
    LA=LC(K)
    IF(LA.EQ.0)GO TO 63
 61 NI=NI+1
    IF(NI.GT.100)GO TO 147
    SX=0
    SY=0
    SZ=0
    DO 60 J=1,LA
    JA=IT(J,K)
    MS=JT(JA)
    IF(IINT.EQ.0)MS=I(JA,K)
    XS=XX(JA)
    YS=YY(JA)
    SS=SQRT((XS-XO)**2+(YS-YO)**2)**(2-IPOW)
    G=1.0E20
    IF(SS.GT.1.0E-20)G=MS/SS
    SX=SX+XS*G
    SY=SY+YS*G
 60 SZ=SZ+G
147 XN=SX/SZ
    YN=SY/SZ
    IX=XN
    IY=YN
    XD=ABS(XN-XO)
    YD=ABS(YN-YO)
    XO=XN
    YO=YN
    IF(XD.GT.DPARM.OR.YD.GT.DPARM)GO TO 61
    S2I=0
    SX=0
    SY=0
    S1=0
    SS=0
    SP=0
    WRITE(2,62)K,XC(K),YC(K),NI,XN,YN
 62 FORMAT(7HOCENTRE,I4, 20H OLD CENTRE LOCATION,2G12.4/
   1 26H FIRST MOMENT CENTRE AFTER,I6,17H ITERATIONS IS AT,2G12.4)
351 DO 64 J=1,LA
    JA=IT(J,K)
    MS=JT(JA)
    IF(IINT.EQ.0)MS=I(JA,K)
    XS=XX(JA)
    YS=YY(JA)
    SP=SP+MS
    SX=SX+XS*MS
    SY=SY+YS*MS
```

```
      ZI=((XS-XN)*CV)**2+(YS-YN)**2
      Z=((XS-XC(K))*CV)**2+(YS-YC(K))**2
      S1=S1+Z*MS
      SS=SS+Z**0.5*MS
   64 S2I=S2I+ZI**0.5*MS
      JC(K)=JCS(K)
      IF(SP.EQ.0.)GO TO 63
      SX=SX/SP
      SY=SY/SP
      TSP=TSP+SP
      E2=0.0
      IF(S1.NE.0.0) E2=1.0-SP*(((SX-XC(K))*CV)**2+(SY-YC(K))**2)/S1
      IF(JAC(K).EQ.1)GO TO 74
      XABS=ABS(XC(K)-XN)
      YABS=ABS(YC(K)-YN)
      IF(XABS.GT.DPARM.OR.YABS.GT.DPARM)IGO=1
      XC(K)=XN
      YC(K)=YN
74    E1=0.0
      IF(SS.NE.0.0)E1=S2I/SS
      AGT=SS/SP
      IF(JAC(K).EQ.0)SSUM=SSUM+S2I
      IF(JAC(K).EQ.1)SSUM=SSUM+SS
      WRITE(2,65)SX,SY,E1,E2,AGT,SP,SS,S2I
   65 FORMAT(24H CENTRE OF GRAVITY IS AT,2G12.4/  27H FIRST MOMENT EFFIC
     1IENCY IS,G12.4/ 28H SECOND MOMENT EFFICIENCY IS,G12.4, /15H MEAN T
     1RAVEL IS,G12.4,27H TOTAL POPULATION SERVED IS,G12.4/' CONTRIBUTION
     1 COST BEFORE RELOCATION',G12.4,' AFTER',G12.4)
   63 CONTINUE
      TSP=FLOAT(ITS)/TSP*100.0
      WRITE(2,68)TSP
   68 FORMAT(48HOPERCENT POPULATION SERVED BY PROXIMAL CENTRE IS,G12.4)
      WRITE(2,1)SSUM
    1 FORMAT('0 TOTAL COST',G12.4)
  105 NIT=NIT+1
      IF(IGO.EQ.0)WRITE(2,384)
  384 FORMAT(1H0,' THIS IS THE FINAL OPTIMUM SOLUTION')
      WRITE(2,107)
  107 FORMAT('0OUTPUT OF POINTS ALLOCATED TO EACH CENTRE')
      DO 90 J=1,NT
      DO 358 K=1,NC
      IF(IT(J,K).GT.0)GO TO 90
  358 CONTINUE
      GO TO 359
   90 WRITE(2,45)(IT(J,K),K=1,NC)
  359 WRITE(2,108)
  108 FORMAT('0ALLOCATION MATRIX')
      DO 109 J=1,NT
  109 WRITE(2,45)J,(I(J,K),K=1,NC)
      IF(NIT.GT.NITM)GO TO 104
      IF(IGO.EQ.1)GO TO 14
      GO TO 104
      END
      SUBROUTINE FRANDN(X,N)
      IF(N.EQ.0)R=0.5
      C=1234.5678
      R=R*C-FLOAT(INT(R*C))
      X=R
```

```
      RETURN
      END
****
```

APPENDIX B

CRITERIA FOR MARGINAL AREAS DEVELOPMENT

APPENDIX B

CRITERIA FOR DEVELOPMENT

from : Biswas, Asit K,1979,'Management of Traditional Resource Systems in Marginal Areas', Environmental Conservation,Vol.6, No.4, Winter 1979.

Seven general criteria can be formulated for the development of marginal areas, and will now be briefly discussed. It should be noted that they are not in hierarchy order, as the relative importance of different criteria would be site specific.

1. *Sustainability* :-Any strategy to develop marginal areas must be sustainable on a long-term basis. There is a very real danger that, in our effort to develop marginal areas on a crisis basis, we may adopt strategies that could be self-defeating in the long run. One can foresee that we may find ourselves in a far more precarious situation in the mid- or late- 1980s, when demand for food and other resources will predictably be much higher than it is today-owing to both larger population and increased levels of affluence. This could occur as there is a distinct possibility that production from the land could level off, or even start to decline, with Man's reliance on short term, *ad hoc* strategies. History is replete with telling examples of such occurrences from all corners of the earth (Bryson,1975; M.R.Biswas,1979).

   The situation is even more precarious when development of marginal areas is concerned, as their production is often analogous to the dying flicker of a candle. Furthermore, when once a marginal areas has been destroyed, as a rule it becomes more difficult, expensive, and time-consuming, to redevelop it to anything like its former productive capacity. In many case, its economic value and lasting viability are significantly reduced.

2. *Flexibility* :-It is difficult to forecast accurately the secondary and tertiary effects of project development. Lack of knowledge of some of the important environmental process, dearth of long-term reliable data, unavailability of adequate analytical methodologies, and lack of technical expertise especially in many Third World countries, mean that some errors- often serious ones-will be committed during the development process. Hence, it is essential that the planning and implementation strategies should be flexible, and not rigid-so that the problems, as they surface, can be quickly identified and appropriate measures can be taken to counter them. It may even be necessary in some cases to change completely the direction of any development, or even to stop further development until more information can be obtained to assess the situation with reasonable accuracy. For major projects, it may be necessary to divide the developments into different phases, as it takes time for some secondary and tertiary 'costs' to develop and thus become visible.

3. *Equity* :-Ruddle&Grandstaff (1978) have discussed the concept of equity. Suffice it to say that it becomes important to consider the distribution of benefits, and the nature of the beneficiaries. Any social system where benefit distribution is markedly askew, and primarily accrues to a select group of elites or others, is bound to be unstable.

   Current techno-economic analyses emphasize the nature of the benefits but contain very little or no information on the nature of the beneficiaries. Yet,for any social and political decision making, information on who benefits and who pays the cost will inevitably lie at the heart of the decision-making process (A.K.Biswas,1973).

4. *Appropriate technology* :-Technology by itself is neutral, but how technology is used can make the most profound differenced to the development of marginal areas. The type of technology used will depend on a variety of technical, social, economic, and political factors, and what is the most appropriate technology in one country or situation could be quite inappropriate in another to solve an identical problem. The agricultural history of the recent past is replete with examples in which straight technology transfers from over-developed to Third World countries have created more problems than they have solved. A few select examples are the deep-ploughing of the rice paddies in Java by the Dutch, corresponding operations by the British in Burma, failure of the groundnut scheme in Tanzania and of broiler production in Gambia, and the folly of cultivating marginal lands which should never have been broken in Kenya and in several Latin America countries.

   Probably the most spectacular failure was the British plan to develop large- scale groundnut plantations after the second World War, in what was then known as Tanganyika. The area selected was of 3.25 million acres (1,326,000 ha) 70 % of which was uninhabited-for what later turned out to be good reasons. All sorts of 'experts' were recruited for this ambitious project but their advice evidently left much to be desired. Bulldozers were extensively used to remove deep tree-roots. The soil, as in several other similar cases in the tropics, could not stand up to the machines, and there were severe losses due to wind and rain. Artificial fertilizers were used but were not effective because of lack of water, and germination turned out to be difficult in the hard-packed soil. After six years of desperate efforts and capital investment of some $US 100 million, the project was eventually abandoned.

   Technology transfers have often proved unsuccessful because of lack of proper consideration of the social, cultural, educational, economic, and above all ecological, conditions of the local regions to which they were made. But equally dismal has been Man's performance to date in failing to use successfully the technology that is already available. For example, the effects of soil erosion caused by deforestation and flooding were graphically described by the Greek philosopher Plato some 24 centuries ago, and the need for

terracing for agriculture on sloping land was pointed out by Bernard Palissy of France nearly four centuries ago (A.K Biswas,1972). And yet, anyone who has travelled Kenya, Indonesia, the Philippines, or any of several other countries, cannot help but wonder why simple counter-measures, such as the use of terracing, are not taken to prevent soil erosion. The technology has been available for centuries, is widely known, is not expensive to implement, and is urgently needed for medium- and long-term conservation measures; yet too often it remains unused.

5. *Environmental constraint* :-It must be stressed that environment and development are 'two sides of the same coin'. It is unlikely that a development process can be sustainable over a major period of time unless environmental constraints have been considered and catered for within the overall planning framework. The thirteenth FAO Regional Conference for Latin America, at its Seventeenth Session (10-29 November 1973), stressed that 'the major environmental problems facing agriculture, forestry, and fisheries, were not only avoidance of environmental pollution but the ensuring in the development process, of the maintenance of the productive capacity of basic natural resources for food and agriculture through rational management and conservation measures' (FAO,1974). It also 'recognized that agricultural development and world food security depended on careful husbandry of living resources, on their biological laws and ecological balances, as well as on the adjustments of production, supply, and reserves, to demands' (Ibid.).

6. *Strengthening of local capabilities* :-To paraphrase Abraham Lincoln, planning is 'of the people,by the people, and for the people'. Thus, participation of the people in the planning process is essential, as it is their lives and futures that the planning process is trying to enhance. Furthermore, in the ultimate analysis, resources do not exist as such. Man must use his knowledge and the technology that is available to transform his environment extensively into usable resources. Hence, ultimately one can argue that the resources available are directly dependent on the resourcefulness of the people, and what is considered to be non-resource or a pollutant at one place or time could be considered an important resource elsewhere, or for another time-scale.

Within this general framework, it is useful to consider the following factors as well:

i) Use of indigenous resources as much as possible on a rational basis;

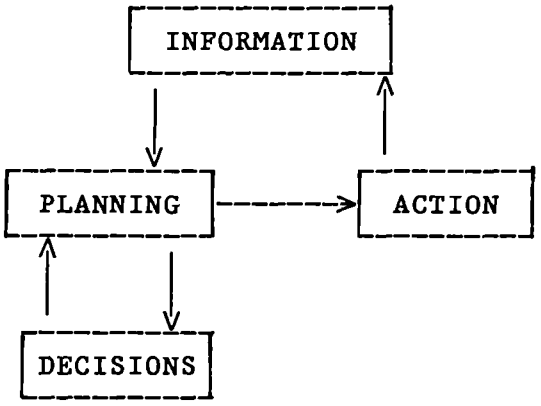
ii) Generation of employment, and thus of capital;

iii) Production of goods, services, and income, especially for those sectors of society whose basic need is least satisfied;

iv) Development processes that use and build on endogenous technical traditions; and that

v) Encourage local research and development systems.

7. *Information* :-It is difficult, or effectively impossible, to plan and implement the development of marginal areas in the absence of reliable information. In fact, one can define management as the process of converting information into action as shown in Fig. 1. Management success depends not



Flow-chart of the management process illustrating the basic components and sequence of events.

only on the quality and extent of the information that is available, but also on what information is selected for use, and is ultimately channelled into the planning and decision-making process (A.K.Biswas,1976).

One can argue that, for optimal development to occur, Man should do what he would do if he had perfect knowledge, and if he was completely rational. Perfect knowledge in this context may be define as information on exact probabilities of each of the alternatives and outcomes and their values to the planners. In other words, information should be available on technological alternatives, their relative costs and benefits to society as a whole, and other relevant data. However, under normal circumstances, various type of information on development of marginal areas in developing countries are hard to obtain, and even if they are available in a few instances, it is not all unusual to find that those who must make the plans do not have access to the data. In other words, one has to accept that imperfect decisions (i.e. not the optimal ones) have often to be made. The situation, however, is not as bad as it seems at first sight. In most cases, the projects that are initially started will give rise to new problems, which require new solutions or radical modifications of the ones that are being attempted-which in turn makes planning a dynamic process. Hence, for development of marginal areas, it is important to devise a planning strategy that is flexible and not based on rigid decisions. In other words, planning should constitute a series of successive decisions, and involve the dynamic programming type of approach.

As more information becomes available, and thus the system becomes better understood, the planning process should be flexible enough to enable a change of direction to be taken, at least if this seems necessary. From n environmental viewpoint, such flexibility is not only desirable but commonly essential, as many of the secondary and tertiary effects of actions are difficult to predict at the beginning of the development process. As such side-effects begin to appear, counter-measures need to be taken to alleviate their overall impacts.

APPENDIX C

RESULTS OF LOCATION-ALLOCATION PACKAGE RUNNING PROGRAMME
FOR INDIVIDUAL FACILITIES

Appendix C

Results of Location-Allocation Package Running Programme for Individual Facilities

Facility: Dispensary

Test 1		Test 2		Test 3	
Old Centres	New Centres	Old Centres	New Centres	Old Centres	New Centres
166,476	165 ,477	166,476	165 ,477	166,476	165 ,477
154,436	149 ,457	153,453	149 ,457	139,452	149 ,457
123,465	137 ,468	137,486	143 ,478	139,474	143 ,478
128,497	137.7,503.5	162,501	159 ,498	136,502	137.7,503.5
164,519	167.6,516.6	140,515	140 ,515	132,528	130 ,533
126,539	130 ,533	129,531	130 ,533	153,543	138 ,549
130,564	142 ,563	152,542	138 ,549	167,512	167.6,516,5
145,550	138 ,549	165,512	165 ,524	165,451	163 ,448
Total Cost	0.8444E+06	Total Cost	0.7756E+06	Total Cost	0.7467E+06

Facility:Cinema

Test 1		Test 2		Test 3	
Old Centres	New Centres	Old Centres	New Centres	Old Centres	New Centres
164,477	154.1,468	164,477	154.5,470.3	164,477	154.5,470.3
145,524	144.1,537.1	130,535	142 ,539.2	156,540	142 ,539
Total Cost	0.1796E+07	Total Cost	0.1794E+07	Total Cost	0.1794E+07

Facility: Sub-district markets

Test 1		Test 2		Test 3	
Old Centres	New Centres	Old Centres	New Centres	Old Centres	New Centres
164,477	154.1,468.0	150,456	154.1,468	150,462	154.1,468
145,524	144.1,537.1	155,540	144.1,537.1	139,510	144.1,537.1
Total Cost 0.1657E+07		Total Cost 0.1657E+07		Total Cost 0.1657E+07	

Facility : Cooperation units

Test 1		Test 2		Test 3	
Old Centres	New Centres	Old Centres	New Centres	Old Centres	New Centres
142,439	142 ,439	142,439	142 ,439	142,439	142 ,439
149,453	149 ,457	149,453	149 ,457	149,453	149 ,457
132,468	143 ,478	132,468	143 ,478	132,468	143 ,478
130,532	130 ,533	130,572	130.7,529	130,532	130 ,533
150,500	144.6,503.9	155,525	153 ,540	168,476	165 ,477
165,510	153 ,540	165,500	158 ,500.6	167,503	167.6,516.5
175,475	165 ,477	164,477	165 ,477	143,513	137.7,503.5
170,425	171 ,433	138,548	138 ,549	153,541	138 ,549
Total Cost 0.8999E+06		Total Cost 0.8386E+06		Total Cost 0.8495E+06	

Facility:Junior High School

Test 1		Test 2		Test 3	
Old Centres	New Centres	Old Centres	New Centres	Old Centres	New Centres
149,457	149 ,457	149,457	149 ,457	149,457	149 ,457
164,477	165 ,477	164,477	165 ,477	164,477	165 ,477
159,468	159.8,467.2	159,468	159.8,467.2	159,468	159.8,467.2
150,476	150 ,477	150,476	150 ,477	150,476	150 ,477

(continued)

143,478	143	,478	143,478	143	,478	143,478	143	,478
170,488	170	,488	170,488	170	,488	170,488	170	,488
130,533	130	,533	130,533	130	,533	130,533	130	,533
145,500	137.7	,503.5	173,434	171	,433	144,437	142	,439
170,520	167	,521.3	142,437	142	,439	162,520	153	,540
145,555	138	,549	134,506	137.7	,503.5	146,444	171	,433
170,440	163	,448	172,512	167	,521.3	176,496	178	,498
135,455	142	,439	153,542	153	,540	157,514	150	,506
155,550	153	,540	144,559	138	,549	138,512	140	,515
Total Cost	0.4699E+06		Total Cost	0.4742E+06		Total Cost	0.6353E+06	

Facility: Public Health Service

Test 1			Test 2			Test 3		
Old Centres	New Centres		Old Centres	New Centres		Old Centres	New Centres	
159,468	149	,457	159,468	149	,457	159,468	149	,457
129,492	129	,492	129,492	129	,492	129,492	129	,492
150,506	150	,506	150,506	150	,506	150,506	150	,506
138,548	138	,549	138,548	138	,549	138,548	138	,549
165,524	165	,524	165,524	165	,524	165,524	165	,524
177,498	178	,488	177,498	170	,488	177,498	178	,498
124,526	130	,533	143,440	142	,439	172,433	163	,448
153,537	142	,439	136,466	143	,478	140,440	142	,439
130,460	137	,448	177,476	173	,461	133,465	137	,468
150,430	142	,439	151,492	159	,498	164,477	165	,477
170,440	163	,448	176,512	184	,518	147,492	143	,478
164,477	165	,477	124,532	130	,533	144,523	140	,515
155,485	143	,478	162,542	153	,540	162,537	153	,540
Total Cost	0.5358E+06		Total Cost	0.6066E+06		Total Cost	0.5663E+06	

Facility: Maternity clinic

Test 1	Test 2	Test 3

(continued)

Old Centres	New Centres	Old Centres	New Centres	Old Centres	New Centres
169,477	165 ,477	169,477	165 ,477	169,477	170.6,462.2
150,476	158 ,468	150,476	158 ,468	150,476	149 ,457
143,477	142.6,478	143,477	142.6,478	143,477	142.6,478
184,518	184 ,518	184,518	184 ,518	184,518	184 ,518
150,506	150 ,506	150,506	150 ,506	150,506	150 ,506
165,524	165 ,524	165,524	165 ,524	165,524	165 ,524
144,548	138 ,549	144,548	138 ,549	144,548	138 ,549
159,468	149 ,457	164,448	149 ,457	143,524	130 ,533
Total Cost 0.9201E+06		Total Cost 0.9201E+06		Total Cost 0.1100E+07	

Facility: Tailoring

Test 1		Test 2		Test 3	
Old Centres	New Centres	Old Centres	New Centres	Old Centres	New Centres
172,433	171 ,433	172,433	171 ,433	172,433	171 ,433
149,456	149 ,457	149,456	149 ,457	149,456	149 ,457
150,476	145.2,475.5	150,476	150 ,477	150,476	150 ,477
165,477	165 ,477	165,477	165 ,477	165,477	165 ,477
159,498	159 ,498	159,498	159 ,498	159,498	159 ,498
153,540	153 ,540	153,540	153 ,540	153,540	153 ,540
138,548	138 ,549	138,549	138 ,549	138,549	138 ,549
125,525	130 ,533	142,437	142 ,439	142,442	142 ,439
137,513	133.3,507.5	133,466	137 ,468	134,471	137 ,468
175,520	167 ,521.3	142,512	133.3,507.5	137,488	137 ,493
140,430	142 ,439	174,513	173 ,514	142,512	140 ,515
165,443	163 ,448	130,532	130 ,533	174,514	173 ,514
Total Cost 0.4885E+06		Total Cost 0.5054E+06		Total Cost 0.5333E+06	

Facility: Shoe reparation

(continued)

Test 1		Test 2		Test 3	
Old Centres	New Centres	Old Centres	New Centres	Old Centres	New Centres
163,448	163 ,448	163,448	163 ,448	163,448	163 ,448
164,477	165 ,477	164,477	165 ,477	164,477	165 ,471
174,514	172.4,518	174,514	172.4,518	174,514	177 ,511.7
153,539	153 ,540	153,539	153 ,540	153,539	153 ,540
155,560	142 ,563	142,536	130 ,533	167,433	171 ,433
125,555	138 ,549	173,457	173 ,461	133,466	137 ,468
120,530	130 ,533	137,492	137 ,493	137,492	139 ,486.3
144,509	141.4,507.9	176,497	170 ,488	159,498	159 ,498
135,475	143 ,478	148,507	150 ,506	142,514	140 ,515
145,455	149 ,457	144,524	140 ,515	163,523	165 ,524
140,435	142 ,439	140,535	130 ,533	124,532	130 ,533
135,465	137 ,468	138,548	138 ,549	138,546	138 ,549
175,495	168.2,492.5	134,470	143 ,478	144,561	142 ,563
Total Cost 0.5058E+06		Total Cost 0.5970E+06		Total Cost 0.6460E+06	

Facility: Watch reparation

Test 1		Test 2		Test 3	
Old Centress	New Centress	Old Centress	New Centress	Old Centress	New Centress
149,456	149 ,457	149,456	149 ,457	149,456	149 ,457
164,477	165 ,477	164,477	165 ,477	164,477	165 ,477
165,430	171 ,433	142,437	142 ,439	172,437	171 ,433
140,431	142 ,439	163,448	163 ,448	173,458	163 ,448
135,487	139 ,486.3	143,477	143 ,478	132,472	143 ,478
139,523	140 ,515	136,492	134.1,495.2	148,491	134.1,495.2
168,514	158.1,508.8	178,492	170 ,488	173,492	168.2,492.5
157,546	153 ,540	166,512	159 ,498	176,512	184 ,518
151,560	142 ,563	162,526	165 ,524	157,516	149.6,513.3
136,549	138 ,549	137,532	130 ,533	132,528	130 ,533
124,530	130 ,533	158,541	153 ,540	153,543	153 ,540

(continued)

179,504	178	,498	138,554	138	,549	137,552	138	,549
Total Cost 0.5610E+06			Total Cost 0.4929E+06			Total Cost 0.5079E+06		

Facility: Motor reparation service

Test 1			Test 2			Test 3		
Old Centres	New Centres		Old Centres	New Centres		Old Centres	New Centres	
164,477	165	,477	164,477	165	,477	164,477	165	,477
149,457	149	,457	149,457	149	,457	149,457	149	,457
167,442	163	,448	153,447	163	,448	154,437	163	,448
132,472	137	,468	168,462	173	,461	137,492	137	,493
141,488	139	,486.3	178,487	170	,488	148,507	150	,506
168,496	170	,498.2	146,477	143	,478	178,496	170	,488
142,506	140.4	,513.6	132,492	134.1	,495.2	168,514	173	,514
144,526	153	,540	163,507	150	,506	142,526	140	,515
124,532	130	,533	182,517	172.4	,518	162,532	153	,540
138,532	138	,549	167,534	153	,540	144,562	138	,549
144,562	142	,563	137,527	130	,533	124,532	130	,533
142,438	142	,439	144,552	138	,549	136,472	143	,478
Total Cost 0.5236E+06			Total Cost 0.4899E+06			Total Cost 0.4954E+06		

APPENDIX D

PRASETYA
ULAH SAKTI BHAKTI PRAJA

BADAN PERENCANAAN PEMBANGUNAN DAERAH TINGKAT I

(BAPPEDA TINGKAT I)

JL. PEMUDA 127-133 TELP. 285591-285592 SEMARANG

SURAT REKOMENDASI RESEARCH/SURVEY

Nomor : R 1707/S/V/1986.

I. D A S A R : Surat Gubernur Propinsi Jawa Tengah tanggal 15 Agustus 1972 Nomor: Bappemda/345/VIII/72.

II. MENARIK : 1. Surat Kadit Sospol Pemerintah Propinsi Daerah Tingkat I Jawa Tengah tgl. 6 Mei 86 no. 070/2333/RSP/V/1986.

2. Surat dari BPP Teknologi Jakarta. tgl. 22 April 86 nomor : 21/P.GGT/PKA/IV/1986.

III. Yang bertanda-tangan di bawah ini Ketua Badan Perencanaan Pembangunan Daerah Propinsi Daerah Tingkat I Jawa Tengah (BAPPEDA TINGKAT I), bertindak atas nama Gubernur Kepala Daerah Tingkat I Jawa Tengah, menyatakan T I D A K K E B E R A T A N atas pelaksanaan research/survey dalam wilayah Propinsi Daerah Tingkat I Jawa Tengah yang dilaksanakan oleh :

1. N a m a : Ir. [illegible] EDYANTO
2. Pekerjaan :
3. Alamat : Jl Pakel Baru 57 B Yogyakarta.
4. Penanggungjawab : Prof. R Moos.
5. Maksud tujuan research/survey : Mengadakan penelitian tentang : "PENGEMBANGAN WILAYAH PANTAI UTARA JAWA TENGAH DAN KAITANNYA DENGAN PENGEMBANGAN SEKTOR TRANS MIGRASI"
6. L o k a s i : Kodya Semarang. Kab. Dati II Rembang, Pati, Jepara, Demak, Kendal, Batang, Pekalongan, Pemalang, Tegal dan Brebes.

dengan ketentuan-ketentuan sebagai berikut :

a. Pelaksanaan research / survey tidak disalahgunakan untuk tujuan tertentu yang dapat mengganggu kestabilan Pemerintah.

b. Sebelum melaksanakan research / survey langsung kepada responden, harus terlebih dahulu melaporkan kepada Penguasa Daerah setempat.

c. Setelah research / survey selesai, supaya menyerahkan hasilnya kepada BAPPEDA TINGKAT I Jawa Tengah.

IV. Surat Rekomendasi Research/Survey ini berlaku dari :

6 Mei s/d Juli 1986.

Dikeluarkan di : S E M A R A N G
Pada tanggal : 6 Mei 1986.

A.n. GUBERNUR KEPALA DAERAH TINGKAT I
JAWA TENGAH
KETUA BAPPEDA TINGKAT I

KABID LITBANG
B/S [illegible]

(Ir. [illegible] RS.....)

TEMBUSAN:

1. Laksus Pangkopkamtibda Jateng/DIY.
2. Kadapol IX Jateng.
3. Kadit Sospol Pemerintah Prop. Dati I Jateng.
4. Bupati Walikotamadya KDH Tk. II ...bsb...pada no 6.
5. Arsip.

PRASETYA
WIRA SAKTI BHAKTI PRAJA

BADAN PERENCANAAN PEMBANGUNAN DAERAH TINGKAT I

(BAPPEDA TINGKAT-I)

JL. Pemuda 127 - 133 Telp. 285591 - 285592 Semarang

Semarang, 6 Mei 86.

Nomor : R/1707/S/V/1986.
Lampiran : 1(Satu) lembar.
Perihal : Pemberitahuan tentang Pelaksanaan Research/ Survey.

Kepada Yth.:
1. Sdr. Walikotamadya KDH TK II Semarang
2. Bupati KDH TK II Rembang
3. Sdr Bupati KDH TK II Pati
4. Sdr Bupati KDH TK II Jepara
5. Sdr Bupati KDH TK II Demak
6. Sdr Bupati KDH TK II Kendal
7. Sdr Bupati KDH TK II Batang
8. Sdr Bupati KDH TK II Pekalongan
9. Sdr Bupati KDH TK II Pemalang
10. Sdr Bupati KDH TK II Tegal
11. Sdr Bupati KDH TK II Brebes.

Menarik Surat Rekomendasi Research/Survey BAPPEDA Tingkat I Jawa Tengah, tanggal : 6 Mei 1986
Nomor : R 1707/S/V/1986., dengan hormat kami memberitahukan dalam wilayah Saudara akan dilaksanakan Research/Survey atas nama :

Ir. HERMAN EDYANTO
.....
.....

Dengan maksud tujuan sebagaimana tersebut dalam surat Rekomendasi Research/Survey BAPPEDA Tk.I Jateng (terlampir).

Besar harapan kami, agar Saudara mengambil langkah-langkah persiapan seperlunya, sesuai dengan ketentuan yang berlaku.

AN. GUBERNUR KEPALA DAERAH TINGKAT I JAWA TENGAH
KETUA BADAN PERENCANAAN PEMBANGUNAN DAERAH
u.b. Kabid Litbang
B/Staf Pelaksana Sie PPW

Ir. RAHARDJO RS

TEMBUSAN Kepada Yth.:
Sdr. Pembantu Gubernur untuk Wilayah :
Pati, Semarang
dan Pekalongan
.....
.....
Arsip.

RURAL RESOURCES SURVEY

CENTRAL JAVA PROVINCE

General Information		
1. Regency	:	
2. Kecamatan	:	
3. Number of villages	:	
4. Administrative border	North :	
	East :	
	South :	
	West :	
5. Area	:..... Ha	
Survey Information		
1. Surveyor's Name	:	
2. Date	:	

II. PHYSICAL ASPECTS

1. Topography : 1.Coast plain
   2.lowland plain (<500 m)
   3.hilly land (>500 m)

2. Altitude : 1. less than 25 m
   2. 25 - 100 m
   3. 100 - 500 m
   4. 500 - 700 m
   5. >700 m

3. Rainfall (frequency) :

Jan	.....	July	.....
Feb	.....	Aug	.....
March	.....	Sept	.....
April	.....	Oct	.....
May	.....	Nop	.....
June	.....	Dec	.....

4. Rainfall (mm) :

Jan	.....	July	.....
Feb	.....	Aug	.....
March	.....	Sept	.....
April	.....	Oct	.....
May	.....	Nop	.....
June	.....	Dec	.....

5.Hidrology

No/area	Used for					
	Agric	Hshold	Fishery	Elect	Transp	Others
Source						
River						
Well						
Lake						
Swampy area						

6.Land Use

a.Rice field : Technical Irrigation .....ha.
Semi-technical Irrigation .....ha.
Non technical Irrigation .....ha.

b.Dry land cultivation : -arable land (unirrigated) .....ha.
-pasturable land .....ha.

c.Fishponds : 'Tambak' fisponds culture .....ha.

d.Estates : -State .....ha
-Enteprise .....ha
-Village .....ha
-Individual

e.Forestry .....ha

f.Built Up area .....ha

g.Total Area Of Kecamatan .....ha

Year :

Sex	Age (year)												
	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
Male													
Female													
Total													

Years and Age Structure of Population

Age Structure	Population															
	19...			19...			19...			19...			19...			
	M	F	T	M	F	T	M	F	T	M	F	T	M	F	T	
0 - 4																
5 - 9																
10 - 14																
15 - 19																
20 - 24																
25 - 29																
30 - 34																
35 - 39																
40 - 44																
45 - 49																
50 - 54																
55 - 59																
60 - 64																
65 - more																
T o t a l																

M = Male
F = Female
T = Total

Population Occupation
in 19..

Occupation	Population
1.Farmer	
2.Fisherman	
3.Industry	
4.Government Official	
5.Military	
6.Retail Trader	
7.Service	
8.Others	

Education	Population
1.Non-Educated	
2.Elementary School	
3.Junior High School	
4.Senior High School	
5.Academy	
6.University	
7.Others	

Net Population Growth

Year	19..	19..	19..	19..	19..	19..
Natality						
Mortality						

Mortality caused by : -disease .....%
-accident .....%
-famine .....%
-others .....%

Migration

Population	19..	19..	19..	19..	19..	19..
Inmigration						
Outmigration						

Reasons:

Population	19..	19..	19..	19..	19..	19..
Inmigration						

Outmigration						
Inmigration						
Outmigration						

Number of education facilities

	No.of Facil.	No.of Student	No.of teacher
Nursery School			
Elementary Sch			
Junior High Sch			
Senior High Sch			
Academy			
University			

The Production and Consumption of Agricultural Products

1.Rice
  Production per year ..... tonnes
  Area ..... ha
  Population consumption ..... tonnes/year
  Surplus production are marketed to .....

2.Corn
  Production per year ..... tonnes
  Area ..... ha
  Population consumption ..... tonnes/year
  Surplus production are marketed to .....

2.Cassava
  Production per year ..... tonnes
  Area ..... ha
  Population consumption ..... tonnes/year
  Surplus production are marketed to .....

3.Sweet Potatoes
  Production per year ..... tonnes
  Area ..... ha
  Population consumption ..... tonnes/year
  Surplus production are marketed to .....

4.Groundnut
  Production per year ..... tonnes
  Area ..... ha
  Population consumption ..... tonnes/year
  Surplus production are marketed to .....

5.Soybean
Production per year ..... tonnes
Area ..... ha
Population consumption ..... tonnes/year
Surplus production are marketed to .....

6.Little Green Pea
Production per year ..... tonnes
Area ..... ha
Population consumption ..... tonnes/year
Surplus production are marketed to .....

7.Coconut
Production per year ..... tonnes
Area ..... ha
Population consumption ..... tonnes/year
Surplus production are marketed to .....

1.Cattle
Number of cattle population in 19.. are .....
Number of cattle which are consumed by the people .....
They are marketed to .....

2.Buffalo
Number of buffalo population in 19.. are .....
Number of buffalo which are consumed by the people .....
They are marketed to .....

3.Goat
Number of goat population in 19.. are .....
Number of goat which are consumed by the people .....
They are marketed to .....

4.Sheep
Number of sheep population in 19.. are .....
Number of sheep which are consumed by the people .....
They are marketed to .....

5.Pig
Number of pig population in 19.. are .....
Number of pig which are consumed by the people .....
They are marketed to .....

Fishery

1.Sea fish

Production of sea fish in 19.. .....tonnes
Number of sea fish which are consumpted by the people .....tonnes/y
They are marketed to .....

2.Fresh water fish

Production of fresh water fish in 19.. .....tonnes
Number of fresh water fish which are consumpted by the people .....
They are marketed to .....

Industry

The main industries in this kecamatan are:

A.a. .....
  b. Number of labour.....
  c. Production.....tonnes/year

B.Raw materials come from:.....
  Kind of materials: .....
  How many (the volume) :.....

A.a. .....
  b. Number of labour.....
  c. Production.....tonnes/year

B.Raw materials come from:.....
  Kind of materials: .....
  How many (the volume) :.....

A.a. .....
  b. Number of labour.....
  c. Production.....tonnes/year

B.Raw materials come from:.....
  Kind of materials: .....
  How many (the volume) :.....

A.a. .....
  b. Number of labour.....
  c. Production.....tonnes/year

B.Raw materials come from:.....
  Kind of materials: .....
  How many (the volume) :.....

A.a. .....
  b. Number of labour.....
  c. Production.....tonnes/year

B.Raw materials come from:.....
  Kind of materials: .....
  How many (the volume) :.....

Trade

Public markets which sell the 9 basic needs of the people

1.Number of daily markets ....
2.Building Area .....ha
3.Total area ..... ha

1.Number of weekly markets .....
2.Building area ..... ha
3.Total area.....ha

1.Number of grossier markets.....

Health Facilities

1.Number of Hospitals.....
2.Number of Public Health Service .....
3.Number of Maternity Clinics .....
4.Number of Dispensary .....

If there is no any hospital in this kecamatan, where will the people go to the doctor?

Transportation

1.Number of trucks .....
2.Number of passengers .....
3.Number of owners car .....
4.Number of other public transport .....
5.Is there any railway station? yes/no

1.The length of state road ..... km
  Condition? .....
2.The length of provincial road .....km
  Condition? .....
3.The length of rural road .....km
  Condition? .....

Other Facilities

1.Number of Bank .....
2.Number of Cooperation Unit.....

APPENDIX E

Table

The score of Land Use Of the Study Area

Kecamatan	A	WEIGH 1	B	WEIGH 2	C	WEIGH 3	D	%	TOTAL
1.Sarang	5.48	5.48	0.52	1.04	79	237	15	45	303.52
2.Kaliori	11.63	11.63	10.96	21.92	77.41	232.23	0	0	644
3.Rembang	14.92	14.92	4.38	8.76	80.46	241.38	0.24	0.24	235
4.Kragan	12.38	12.38	1.55	3.10	81.17	243.51	4.80	4.80	105
5.Sluke	5.72	5.72	2.55	5.10	80.96	242.88	10.77	10.77	97
6.Lasem	12.13	12.13	8.95	17.90	73.08	219.24	5.84	5.84	346
7.Batangan	16.43	16.43	29.03	58.06	54.53	163.59	0	0	1367
8.Juwana	18.35	18.35	26.94	53.88	54.69	164.07	0	0	1434
9.Wedarijaksa	23.02	23.02	13.56	27.12	61.41	184.23	2.21	2.21	1163
10.Margoyoso	18.72	18.72	11.90	23.80	69.37	208.11	0	0	757
11.Tayu	11.32	11.32	13.10	26.20	75.56	226.68	0	0	653
12.Dukuhseti	22.09	22.09	12.79	25.58	42.77	128.31	22.24	22.24	1304
13.Kedung	28.34	28.34	10.31	20.62	61.35	184.05	0	0	438
14.Jepara	29.79	29.79	6.97	13.94	63.24	189.72	0	0	443
15.Mlonggo	19.95	19.95	7.61	15.22	72.44	217.32	0	0	782
16.Bangsri	19.38	19.38	0	0	80.55	241.65	0.07	0.07	0
17.Keling	8.32	8.32	0.08	0.16	73.41	220.23	18.18	18.18	19
18.Sayung	15.33	15.33	13.67	27.34	71.00	213.00	0	0	1147
19.Karangtengah	10.70	10.70	11.25	22.50	78.05	234.15	0	0	565
20.Bonang	6.70	6.70	10.70	21.40	82.60	247.80	0	0	910
21.Wedung	3.35	3.35	24.52	49.04	70.86	212.58	1.26	1.26	2744
22.Kaliwungu	7.39	7.39	16.38	32.76	38.75	116.25	37.47	37.47	1567
23.Brangsong	10.60	10.60	4.41	8.82	59.95	179.85	15.04	15.04	148
24.Weleri	21.35	21.35	4.27	8.54	66.62	199.86	7.76	7.76	232
25.Cepiring	23.77	23.77	5.32	10.64	70.91	212.73	0	0	303
26.Patebon	20.72	20.72	14.46	28.92	64.82	194.46	0	0	531
27.Kendal	21.14	21.14	7.74	15.48	71.11	213.33	0	0	181
28.Gringsing	10.70	10.70	4.60	9.20	80.19	240.57	4.50	4.50	342
29.Limpung	12.98	12.98	6.93	13.86	74.45	223.35	5.64	5.64	388
30.Subah	8.34	8.34	2.03	4.06	67.58	202.74	22.04	22.04	249
31.Tulis	28.96	28.96	8.81	17.62	60.92	182.76	1.30	1.30	463
32.Batang	23.76	23.76	2.97	5.94	73.27	219.81	0	0	84
33.Bragi	26.44	26.44	3.20	6.40	70.35	211.05	0	0	203
34.Tirto	41.33	41.33	2.62	5.24	56.05	168.15	0	0	68
35.Wiradesa	36.47	36.47	12.26	24.52	51.27	153.81	0	0	379
36.Pemalang	10.46	10.46	1.79	3.58	59.01	177.03	28.74	28.74	150
37.Taman	24.13	24.13	2.97	5.94	65.41	196.23	7.49	7.49	200
38.Petarukan	20.60	20.60	4.11	8.22	75.29	225.87	0	0	332
39.Ulujami	15.54	15.54	13.61	27.22	70.85	212.55	0	0	776
40.Losari	7.65	7.65	20.47	40.94	70.11	210.33	1.77	1.77	1745
41.Tanjung	15.79	15.79	14.36	28.72	69.85	209.55	0	0	860
42 Bulakamba	7.45	7.45	3.85	7.70	88.70	266.10	0	0	172
43 Wanasari	7.18	7.18	15.40	30.80	77.22	231.66	0	0	1102
44 Brebes	15.96	15.96	30.33	60.66	53.71	161.13	0	0	4279

LEGEND

A.Settlement area
B.Dyke/Lake/swamp and others.
C.Cultivated area
D.Uncultivated area

Table

Rainfall scoring

Kecamatan	Annual rainfall (mm)	Score
1.Sarang	721	1
2.Kaliori	1263	2
3.Rembang	925	1
4.Kragan	1025	2
5.Sluke	1429	2
6.Lasem	492	1
7.Batangan	2000	4
8.Juwana	2000	4
9.Wedarijaksa	1650	3
10.Margoyoso	1650	3
11.Tayu	1650	3
12.Dukuhseti	1650	3
13.Kedung	1300	2
14.Jepara	2516	5
15.Mlonggo	1568	3
16.Bangsri	2703	5
17.Keling	2651	5
18.Sayung	2016	4
19.Karangtengah	3288	6
20.Bonang	2112	4
21.Wedung	2112	4
22.Kaliwungu	1566	3
23.Brangsong	1561	3
24.Weleri	1561	3
25.Cepiring	1281	2
26.Patebon	1500	3
27.Kendal	1500	3
28.Gringsing	2239	4
29.Limpung	3436	6
30.Subah	2197	4
31.Tulis	2197	4
32.Batang	2365	4
33.Sragi	1866	3
34.Tirto	2455	5
35.Wiradesa	1912	3
36.Pemalang	2825	5
37.Taman	2825	5
38.Petarukan	2136	4
39.Ulujami	2825	5
40.Losari	1718	3
41.Tanjung	1893	3
42.Bulakamba	1728	3
43.Wanasari	1811	3

Note : The ranges of rainfall is determined by Sturges's formula : k = 1 + 3.32 log n
By this formula, there are 6 ranges has been produced. They are :

492 - 980 is scored by 1
981 - 1470 is scored by 2
1471 - 1960 is scored by 3
1961 - 2450 is scored by 4
2451 - 2940 is scored by 5
2941 - 3436 is scored by 6

Table

Number of Rivers in the Study Area

Kecamatan	1
1.Sarang	2
2.Kaliori	0
3.Rembang	1
4.Kragan	1
5.Sluke	0
6.Lasem	1
7.Batangan	0
8.Juwana	1
9.Wedarijaksa	0
10.Margoyoso	2
11.Tayu	3
12.Dukuhseti	1
13.Kedung	2
14.Jepara	1
15.Mlonggo	2
16.Bangsri	3
17.Keling	4
18.Sayung	1
19.Karangtengah	1
20.Bonang	1
21.Wedung	3
22.Kaliwungu	1
23.Brangsong	0
24.Weleri	2
25.Cepiring	0
26.Patebon	1
27.Kendal	1
28.Gringsing	1
29.Limpung	0
30.Subah	0
31.Tulis	1
32.Batang	1
33.Sragi	1
34.Tirto	1
35.Wiradesa	0
36.Pemalang	1
37.Taman	1
38.Petarukan	0
39.Ulujami	1
40.Losari	2
41.Tanjung	3
42.Bulakamba	2
43.Wanasari	1
44.Brebes	2

Table

The Scores of Slope

Kecamatan	SLOPE	
	%	Score
1.Sarang	2 - 8	4
2.Kaliori	0 - 2	5
3.Rembang	0 - 2	5
4.Kragan	2 - 8	4
5.Sluke	2 - 8	4
6.Lasem	2 - 8	4
7.Batangan	0 - 2	5
8.Juwana	2 - 8	4
9.Wedarijaksa	2 - 8	4
10.Margoyoso	2 - 8	4
11.Tayu	2 - 8	4
12.Dukuhseti	2 - 8	4
13.Kedung	>40	1
14.Jepara	>40	1
15.Mlonggo	15-40	2
16.Bangsri	15-40	2
17.Keling	15-40	2
18.Sayung	0 - 2	5
19.Karangtengah	0 - 2	5
20.Bonang	0 - 2	5
21.Wedung	0 - 2	5
22.Kaliwungu	8 -15	3
23.Brangsong	0 - 2	5
24.Weleri	2 - 8	4
25.Cepiring	2 - 8	4
26.Patebon	0 - 2	5
27.Kendal	2 - 8	4
28.Gringsing	>40	1
29.Limpung	>40	1
30.Subah	15-40	2
31.Tulis	0 - 2	5
32.Batang	0 - 2	5
33.Sragi	2 - 8	4
34.Tirto	2 - 8	4
35.Wiradesa	2 - 8	4
36.Pemalang	0 - 2	5
37.Taman	2 - 8	4
38.Petarukan	2 - 8	4
39.Ulujami	2 - 8	4
40.Losari	2 - 8	4
41.Tanjung	2 - 8	4
42.Bulakamba	2 - 8	4
43.Wanasari	2 - 8	4
44.Brebes	2 - 8	4

Note:0-2 percent slope is scored by 5
2-8 percent slope is scored by 4
8-15 percent slope is scored by 3
15-40 percent slope is scored by 2
>40 percent slope is scored by 1

GLOSSARY

GLOSSARY OF PRINCIPAL TERMS USED

Planning is in theory concerned with the identification of equity and efficiency goals, and these form the standard of comparison with the actual situation by which a planner determines whether or not a problem exists (Le Breton, and Hennig,1961).

Resources are the means for producing goods and services that are used to satisfy wants. Many of the problems in society are caused by the way in which resources are employed with a view to satisfying human wants. It is useful to divide resources into 3 main groups :

1.Natural resources -all those gifts of nature such as land, air, water, minerals, forests, fish, quiet, pleasant landscape and so on.

2.Labour -all human resources, mental and physical, inherited or acquired.

3.Capital -all equipment, including everything man-made which is not consumed for its own sake, but which may be used up in the process of making other goods (Whitby, and Willis.,1978.)

Kecamatan is the unit of Government which stands between Kabupaten (Regency) and the village. It represents the lowest rung in the government's administrative hierarchy. It is thereby able to engage most directly in the coordination of village and intervillage development activities, many view the sub-district as a kind of natural development unit and with increasing frequency government development programmes are being designed with the sub-district occupying a more important administrative role in their execution. (Birowo & Hansen, 1981,p.14)

Green Revolution : the term 'Green revolution' is widely used in the literature on agriculture and has a number of different meanings. However, all meanings have a common reference point, a breakthrough in food production. There are frequent references to 'input packages' in the cultivation process,such as ; high yielding varieties of seeds, modern irrigation facilities (such as tubewells), the use of chemicals and fertilizers and pesticides. In broader context the term 'Green Revolution' has also been used to include the introduction of such inputs as farm machinery, particularly tractors and their associated implements. (Ashraf, Mohammad.,1985)

Diffusion is the process, usually but not necessity gradual, by which elements or systems of culture are spread; by which an invention or a new institution adopted in one place is adopted in neighbouring areas and in some cases continuous to be adopted in adjacent ones until it may spread over the whole earth. (Kroeber, Alfred.L.,in Edwin R.A.Seligman,p. 139.)

Ecology can be defined in several ways,as :

1.the total relations of the animal to both its organic and its inorganic environment. (Haeckel, Ernst. in Krebs, Charles.J.,1978)

2.scientific natural history. (Elton, Charles.,1972).

3.the scientific study of the distribution and abundance of organisms. (Andrewartha, H.G.,1961.)

4.the scientific study of the interactions that determine the distribution and abundance of organisms. (Krebs, Charles.J.,1978).

Ecosystem: biotic community and its abiotic environment; the whole earth can be considered as one large ecosystem.

Environment: all the biotic and abiotic factors that actually affect and individual organism at any point in its life cycle.

Community : group of populations of plants and animals in a given place; ecological unit used in a broad sense to include groups of various sizes and degrees of integration.

Abiotic factors : characterized by the absence of life; include temperature, humidity, P.H.,and other physical and chemical influences.

Biotic factors :environmental influences caused by plants or animals; opposite of a biotic factors.

Built-up area : the part of a town covered with buildings. The boundary of a built-up area is not always obvious, for it does not necessarily coincide with the town boundary. For example, there may be pockets of farm land within town; conversely, sub urban development may spill over into surrounding rural areas. The term is variously defined to suit the conditions of different urban areas. (Buchannan, R.O,1974.p.34)

Agriculture : A term broadly equated with farming which includes the cultivation of crops and the rearing of livestock. Agricultural practices are influenced by climate, soil, relief, and allocation of market. In a more limited sense, agriculture means only the growing of crops, while the rearing of livestock is called animal boundary (Buchannan, R.O. p.5).

Mangrove : the common name of plants growing in a muddy, tropical or subtropical saline environment. Specifically, it refers to several species of plants of the Rhizophoraceae family. They are tropiOcal trees growing on tidal flats, in bays, lagoons and river mouths. Mangrove trees have short trunks and long curved roots. Some species have root-like organs for plantaeration. Mangrove roots help the accumulation of silt which gradually builds up to form dry land, thus extending the coastline (p.135).

Marginal land : land that is uneconomical to cultivate because of unfavourable physical conditions and high probability of crops failures. Example of suchs lands occur along the borders of deserts (p.136)

Reclamation land is the process by which flooded or waste is made usable, especially for agriculture. It includes the drainage of marshes and of lakes or a shallower part of the sea-floor, the improvement of heath-lands and the restoration. (Goodall, Brian.,1987.p.397).

Economies of scale :

1.Money earned or saved through modern large-scale marketing and through purchasing and processing large quantities of raw materials.

2.A decrease in the average per unit cost of a product resulting from large -scale production. Generally, at least up until some production level, average cost will go down as plant size increase. (Larkin, Robert P. & Peters, Gary L.,1983.,p.80)

Land Use is any kind of permanent or cyclic human intervention to satisfy human needs, either material or spiritual or both, from the complex of natural and artificial resources with together are called 'land'. (Vink, A.P.A.,1975).

Leading industries i.e.those propulsive industries that are relatively new, working at an advanced technological level, facing rapidly increasing demand, and having a strong capacity of generate, adopt and transmit innovations throughout their sphere of influence. Furthermore, the pole as a whole should be large enough to exert a dominant influence over its industrial environment. (Hansen, Niles.1972., p170).

Backward-linkage effect or the input-provision, derived demand, i.e.every non primary economic activity, will, induce attempts to supply through domestic production the inputs needed in that activity.

Forward-linkage effect or the output-utilization i.e.,every activity that does not by its nature cater exclusively to final demands, will induce attempts to utilize its outputs as inputs in some new activities. (Hirschman, Albert.O.,1958.).

Growth Pole: to keep the distinctions clear and in perspective, the term growth pole can be taken to refer to the original concept of Perroux without any specific geographical dimension, while the term growth centre or growth point refers to a spatial location (Glasson, John.,1974.p.146).

Modernisation is defined as : 'the process of social change in which development is the economic component. Modernisation produces the societal environment in which rising output per head is effectively incorporated that produce (and consume) rising output must understand and accept the new rules of the game deeply enough to improve their own productive behaviour

and to diffuse it throughout their society.....' (Mabogunje,180,p 38).

A fully-fledged of Environment Impact Analysis comprises: 1.discussion of proposed development activities; 2.discussion of components of the environment which might be affected by the impact of development activities; 3.discussion of the weigh of the environment impact analysis and the importance of special attention should be paid in detail for it. 4.the alternatives guidance for solving problems and protecting from the the negative impact to the environment. (Suryaatmadja,1979.p.3).

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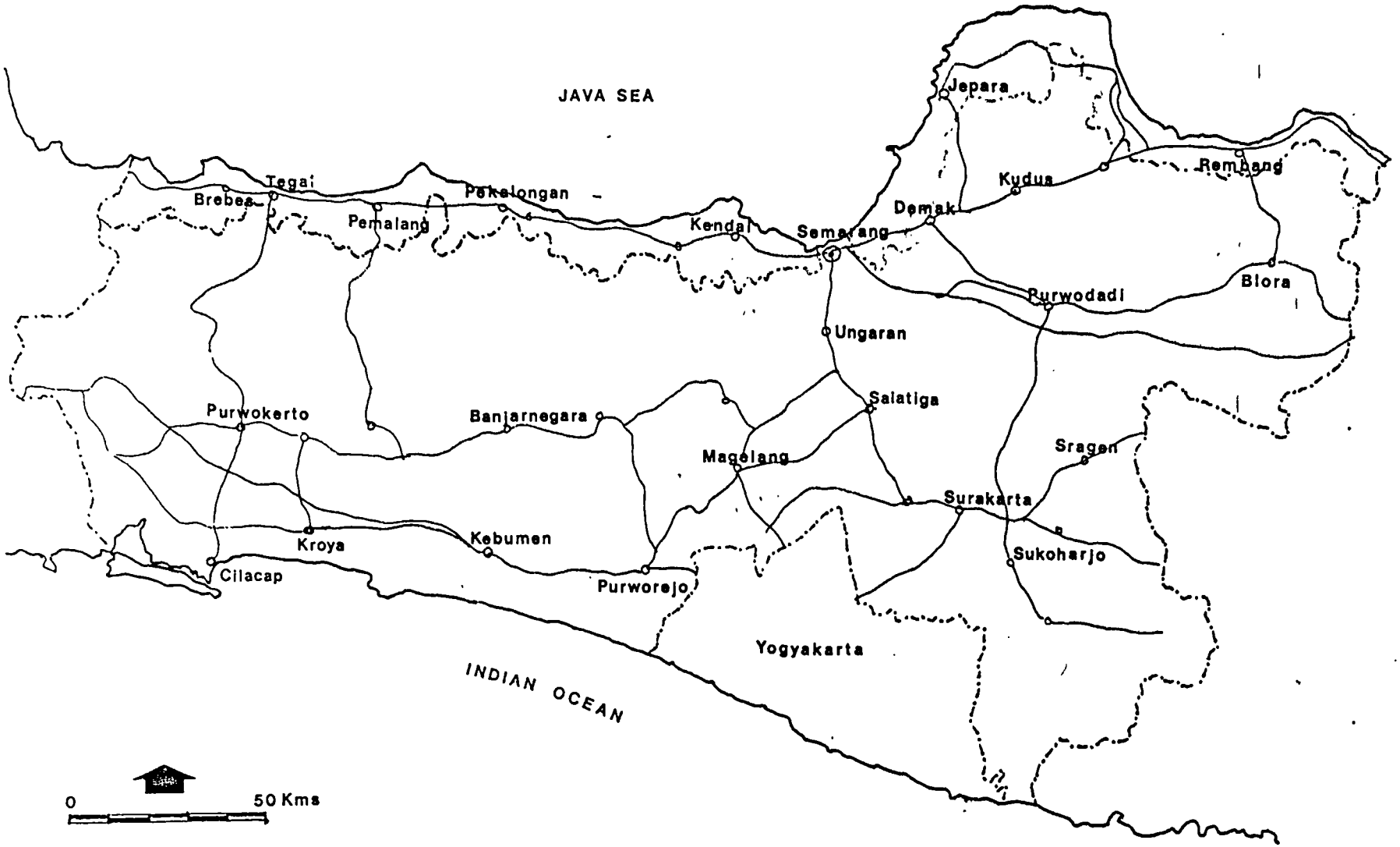
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