

CHANGES IN RURAL AREAS OF NORTHEAST THAILAND IN THE LATTER HALF OF THE 1980S AS SEEN THROUGH THE NORTHEAST THAILAND VILLAGE INFORMATION SYSTEM

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ABSTRACT

The economic growth of Thailand since the mid-1980s has been remarkable and has transformed the socio-economic environment of rural areas. The Thai government regularly conducts a village-level survey covering all villages in rural areas across the country. Since the 1986 survey, the results have been input into a database. The reliability of the individual data is not necessarily high, but the survey has a big potential for use in view of its wide coverage and continuity. I have been developing a Northeast Thailand Village Information System (NETVIS) as a GIS application with a view to using the village-level survey to identify the transformation of rural areas of Northeast Thailand which is economically less developed than other regions of Thailand. In this paper, I shall explore the applicability of the NETVIS by observing changes in rural areas of Northeast Thailand from several outputs of the NETVIS. Its main data source is contact information collected through socio-economic survey, in contrast to noncontact information obtained by remote sensing, and this is the potential strength of the NETVIS. Contact and noncontact information both have advantages and disadvantages in terms of homogeneity, prompt acquisition, interpretation, and so on, and one of main themes of future study will be to explore what relationships obtain between these two kinds of complementary information.

1. INTRODUCTION

Southeast Asia has become a focus of attention owing to its remarkable economic growth. However, behind the brilliant economic growth, it has long been stressed that many problems remain, including the fact that some areas still lag far behind, and that is proceeding without due regard for environmental sustainability. In Thailand, which is outstanding in Southeast Asia from the viewpoint of development, many governmental and nongovernmental projects have been conducted and more should be planned to solve the problems that have arisen as a result of rapid development of the metropolitan area. Though the aims of the projects vary from one to another, for example, promotion of schooling, reforestation, improvement of hygiene facilities, and building of self-reliance, in all cases detailed information on the target area is indispensable for well-directed planning, monitoring and evaluation.

In Thailand, a village-level survey which aims to support governmental rural development has been conducted covering all villages in the rural areas. This survey includes various topics related to socio-economic situation and is conducted every two years. This provides unique and otherwise unacquirable information on recent changes in rural areas. This information can be used to elucidate not only changes in individual villages but also the differences between regions and situation of a given area relative to its surroundings.

One method to utilize this huge body of regional socio-economic information is to visualize the data by the GIS method. I have been developing the Northeast Thailand Village Information System (NETVIS) covering the Northeast. This paper describes the village database

and its source, the village-level survey, and explains the framework of NETVIS. Finally, some outputs are shown in order to demonstrate and interpret the changes.

2. THE VILLAGE DATABASE

2.1 The Village-level Survey

In framing the Fifth National Economic and Social Development Plan (1982-1986), the Thai government recognized a lack of information on product activities and life in rural areas which was necessary for its policy decisions. Therefore, the National Rural Development Committee, which is under the Office of the Prime Minister, and its working organization, the National Rural Development Cooperation Center, decided to conduct the village-level survey to collect data on the socio-economic situation of each village in rural areas of the kingdom. Villages in suburbs are excluded. Every two years, each Tambon Development Committee surveys the situation of the villages in its *tambon* (sub-district), which is the administrative level above the village, and completes a questionnaire. The data are input into a database at the Information Processing Institute for Education and Development, Thammasat University (Svasti 1988).

The first trial survey was conducted in 1982 and this was expanded to the whole kingdom in 1986. In 1990, the survey was approved by the Cabinet. Since the 1986 survey, the results have been input into a database, which is available for distribution. The village-level survey covers many topics related to the infrastructure, the production environment, education, hygiene and so on besides basic information on population and the number of households. Further details about the topics

are given in an earlier paper (Nagata, 1996).

The administrative village, which is the base unit of the survey, is not always coterminous with the natural village. In Northeast Thailand, however, villages are usually of clustered form, and the administrative and natural villages mostly coincide. The average size of an administrative village is 100 to 200 households and 500 to 1000 people.

2.2 Reliability

There are some drawbacks in the village database. Careless mistakes such as wrong entries and wrong estimations are commonly associated with any questionnaire. Inevitable errors also occur when the data input into the computer, since the survey books are not machine-readable but hand-written. Questions essentially difficult to answer correctly also exist.

Some careless mistakes can be checked by the internal consistency of the data. Not only the total village population, but also its breakdown by sex and age are given. These allow cross-checking and, in some cases, correction of figures. The percentage of apparent mistakes in demographic data in the 1992 survey was 4.8%, and 90% of the mistakes were corrected.

One example of the questions essentially difficult to answer correctly is the average annual sales of a household which is engaged in home industry. The related question of the number of households engaged in this work is easier to answer, but the scale of working varies from one household to another. It is apparent that the surveyors do not obtain an accurate value. Yet, they are often able to present reasonable estimates value which can reasonably be compared with those of surrounding villages.

Thus, we must keep in mind that there are defects. However, these defects are compensated by the coverage of a great number of villages and the provision of a wide variety of otherwise unacquirable information. In one case study, the village database has been used in an attempt to classify villages in Yasothon Province, one of the nineteen provinces in Northeast Thailand (Kono & Nagata, 1992).

3. NETVIS

In the light of my experience in the case study in Yasothon Province, I have been developing a framework with which to utilize the information in the village database for the whole of Northeast Thailand. Many preparative works were required to construct the Northeast Thailand Village Information System (NETVIS) as a GIS application, because a digitized data set of national geographic coordinates information for Thailand is not yet available. Fortunately, since the Reforestation and Extension Project in the Northeast of Thailand of the Japan International Cooperation Agency (JICA-REX) sought to utilize the village database for its target setting and evaluation, I was able to conduct these preparative works as part of the project.

3.1 Components

NETVIS is composed of a unit of databases and a unit of mapping. The former includes the following databases: (a) single-year village databases; (b) a village position database, which is indispensable for mapping and is not provided with the village database; and (c) a village identification database, which correlates the data sets of a village in different survey years, since the identification numbers used to tag villages are not necessarily fixed from one survey to the next. More details about these databases appear in an earlier paper (Nagata, 1996). The unit of mapping includes programs which calculate and modify the data in the unit of databases in order to map them. NETVIS is constructed on MS-Access 2.0 on MS-Windows 3.1.

3.2 Data Mapping

The handling unit in the NETVIS is an administrative village, as in the village database. Over 26,000 rural villages in the Northeast are included in the village-level survey and it is certain that errors exist. So these conditions must be considered in mapping data.

The data maps presented in this paper were composed by calculating an average value or an accumulated value for each mesh. The meshes are of three-minute intervals of both longitude and latitude, that is 5.3 to 5.4 km from east to west and 5.5 km from north to south. The data set of village position is vectored as point data, but the outputs are presented by raster graphics. Each mesh contains 0 to 23 villages, with an average of 4 to 5. To calculate an average in a mesh is also effective to minimize errors. Although it is possible to vary the size of the mesh to meet specific purposes, I have found the three-minute interval to be most suitable as a result of several experiments.

4. CHANGES IN NORTHEAST THAILAND

Northeast Thailand is bounded by the Mae Khong (Mekong) River and Laos to the east and north, Cambodia to the south, and North and Central Thailand to the west. To observe changes in rural areas of Northeast Thailand in the latter half of the 1980s, some outputs from the NETVIS are introduced below. The locations of 85% of over 26,000 villages have been identified and the data on them are used. Small circles on maps below show the locations of provincial capitals.

4.1 Infrastructure

Improvement of infrastructure is one area in which governmental efforts have brought rapid progress. Figure 1 shows the percentage of households supplied with electric power. In 1986, electric power supply was available where population density was relatively high, especially around major local cities. In 1992, only a few areas were left unsupplied.

Figure 2 shows the percentage of households supplied with water by pipeline. In 1986, water supply by pipeline was scarcely available, but in 1992 an improvement can

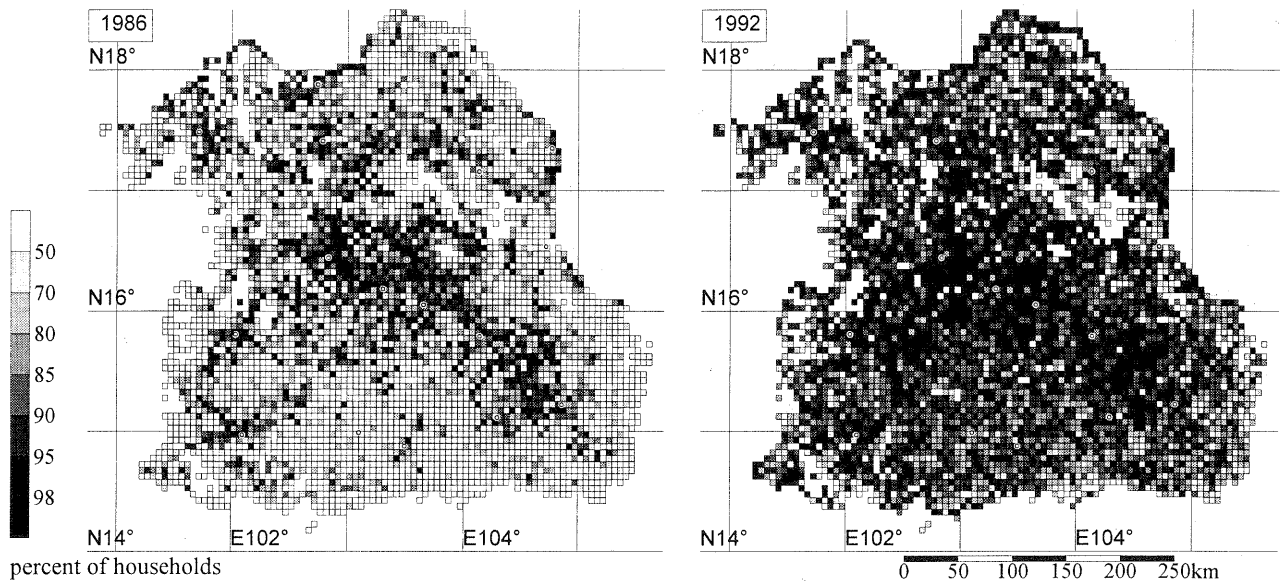


Figure 1 Electric Power Supply

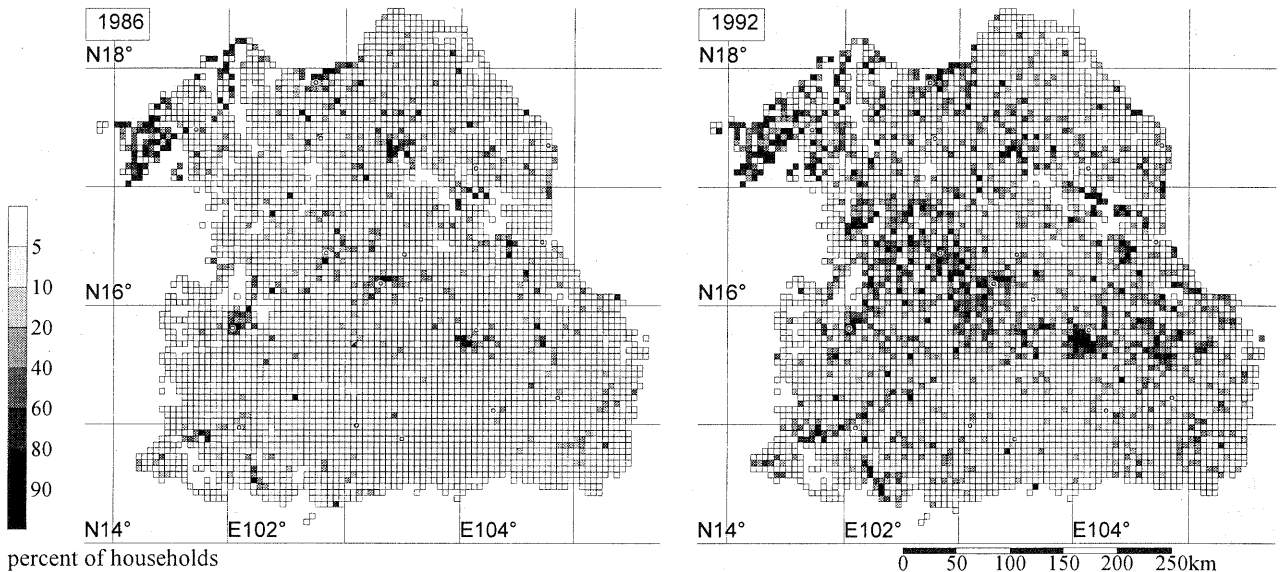


Figure 2 Water Supply by Pipeline

be seen. There are still many villages that suffer a shortage of drinking water at the last stage of the almost half-year-long dry season. Figure 2 indicates that areas along major rivers and mountainous regions, where water is more readily available, are the first to get a piped supply.

4.2 Economic Conditions

The economic growth of the Bangkok metropolitan area has engendered an increase in employment opportunities and that has accelerated the exodus of labor from Northeast Thailand. Figure 3 shows the percentage of households in which one or more members engage in work outside the *tambon*, which includes around 10 villages. The survey also covers the major destination of migrant workers, revealing that about 80% of them work in the Bangkok metropolitan area.

The increase in opportunities to earn cash income has

contributed to a rise in ownership of vehicles. Figure 4, Figure 5, and Figure 6 show the distribution of bicycles, motorcycles, and pick-up trucks, respectively. The data on motorcycles and pick-up trucks suggest that the popularity of motorized vehicles is related to road conditions, trading posts, and local cities. And a relationship with a topographic conditions can be discerned in the distribution of bicycles and motorcycles.

4.3 Hygiene Conditions

Hygiene conditions are also improved. Figure 7, Figure 8, and Figure 9 show the number of patients with dysentery, malaria, and measles, respectively, in the previous two years. These show a clear decline in the incidence of new cases.

In the case of malaria, Figure 8 shows the concentration of new cases along the Mae Khong River and along the border with Cambodia. Formerly, it was not rare in the

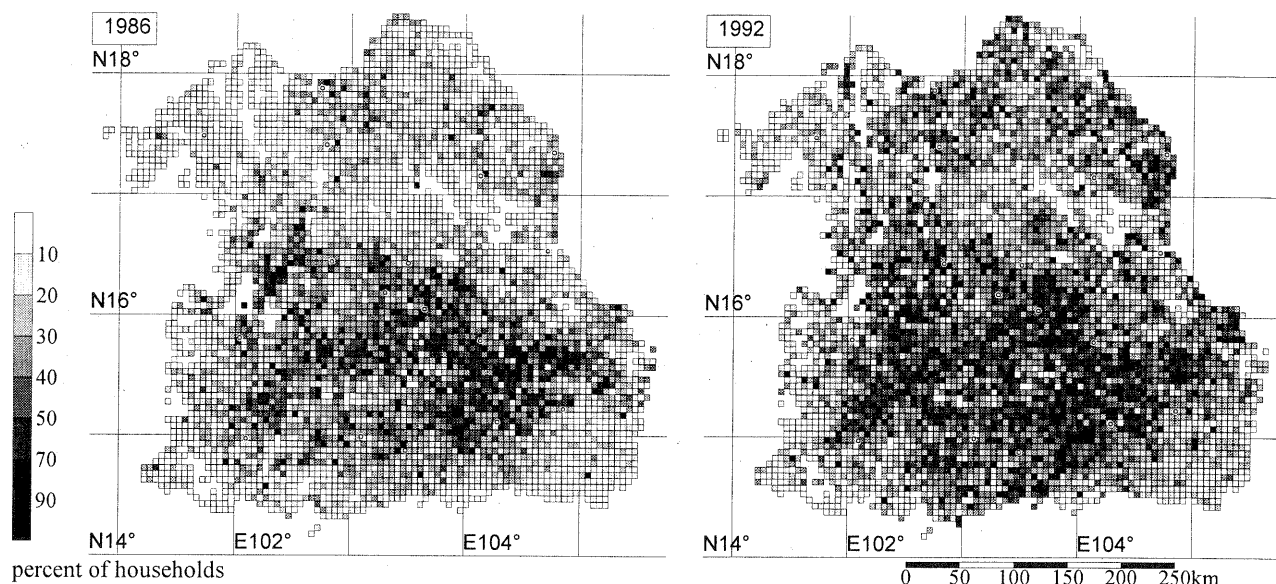


Figure 3 Households Engaged in Work outside the Tambon

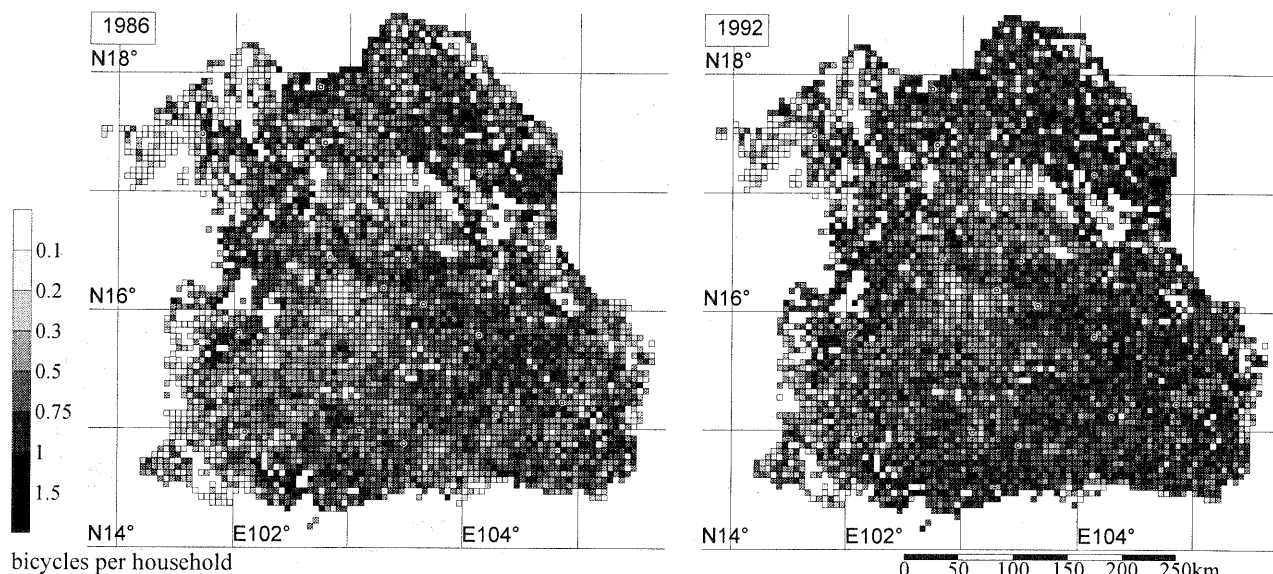


Figure 4 Bicycles

Northeast for people to move a settlement in order to avoid the spread of malaria, but this is now a thing of the past. On further reflection, it may be sign that the thick forests associated with the spread of malaria are disappearing.

5. CONCLUSION

The main data source of the NETVIS is not remote sensing technology but contact information recorded by a survey team. Much labor is required to collect this, and it is also essentially difficult to maintain the homogeneity of the information. Moreover, much time will be required to compile this material into a database and that is ready for distribution. However, it includes information that is hardly obtainable from other data sources, and its value can be enhanced by visualization.

On the other hand, it is easy to maintain the homogeneity

of the data obtained by remote sensing, and the data can be acquired promptly. Much research has been conducted into the technology and the methodology to process these data, but survey of the ground truth is indispensable to verify the interpretation. The village-level survey cannot represent the ground-truth information on vegetation which is necessary for verifying remote sensing data. However, it does show the human life of the community and it does represent the ground truth in a wide meaning.

There are three themes for future study. First is what merits will be produced for planning and evaluation of rural development projects, which are the main purposes of developing the socio-economic database by applying GIS method. I have been concerned in the JICA-REX project to actualize this. Second, what relationships obtain between the socio-economic database like the village database and the data obtained by remote sensing should be clarified. It may well be that the study will suggest a new direction for utilizing the data of

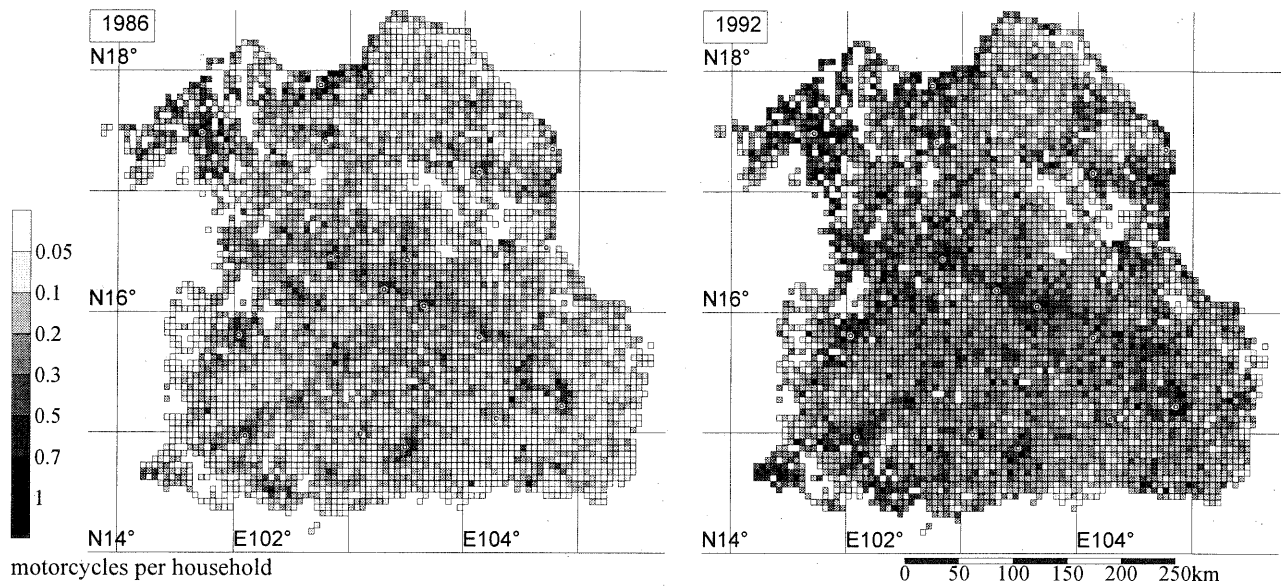


Figure 5 Motorcycles

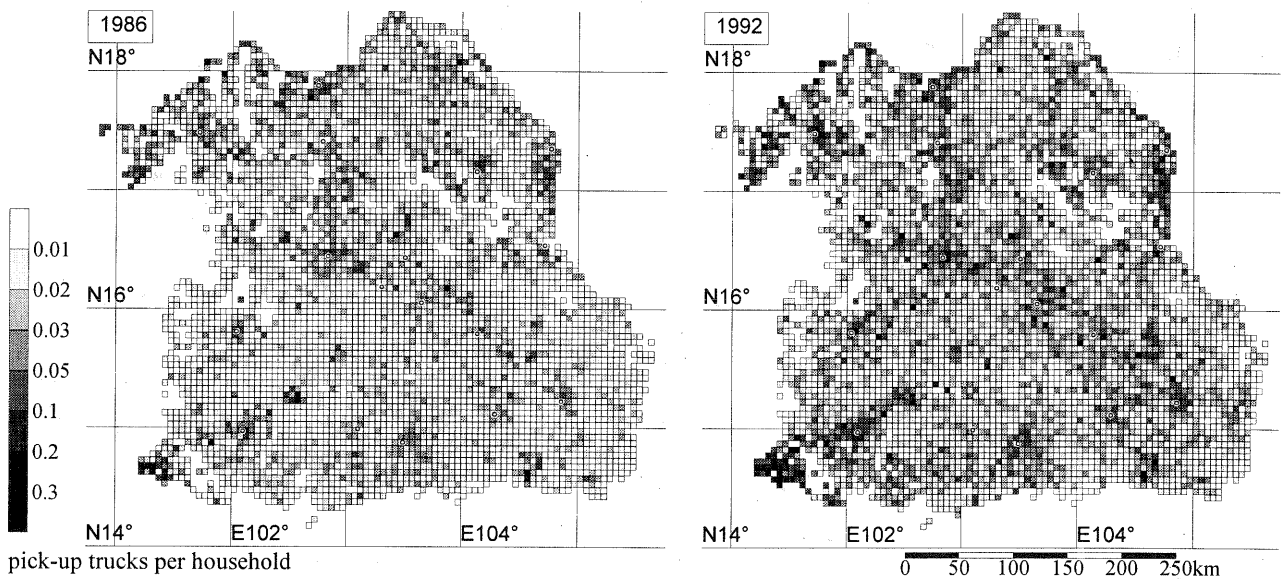


Figure 6 Pick-up Trucks

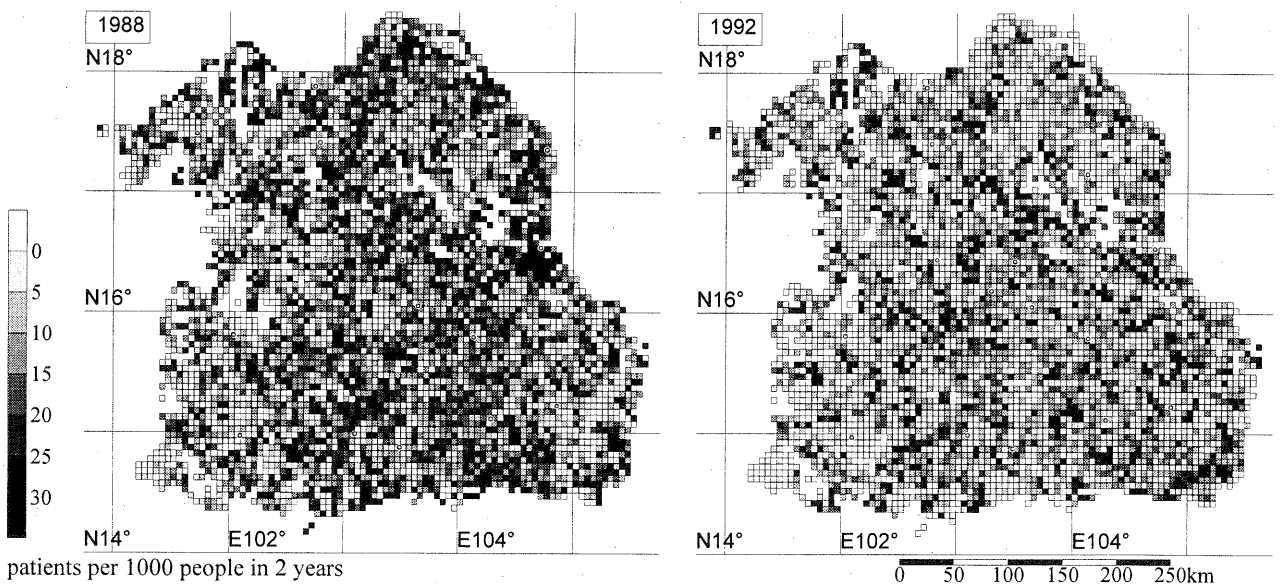


Figure 7 Dysentery

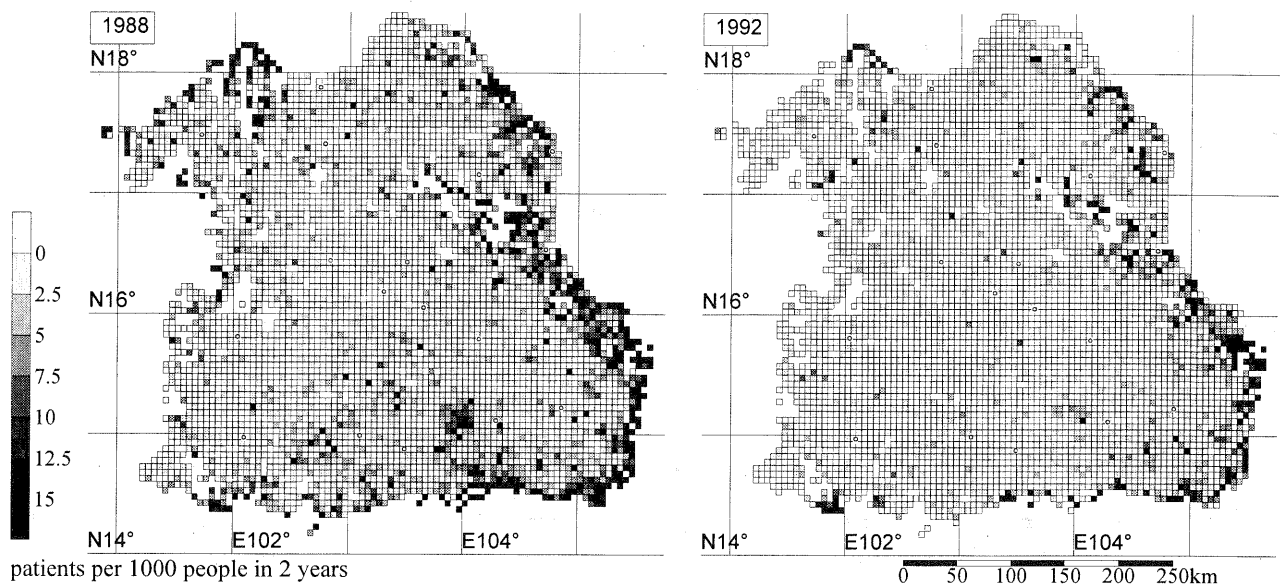


Figure 8 Malaria

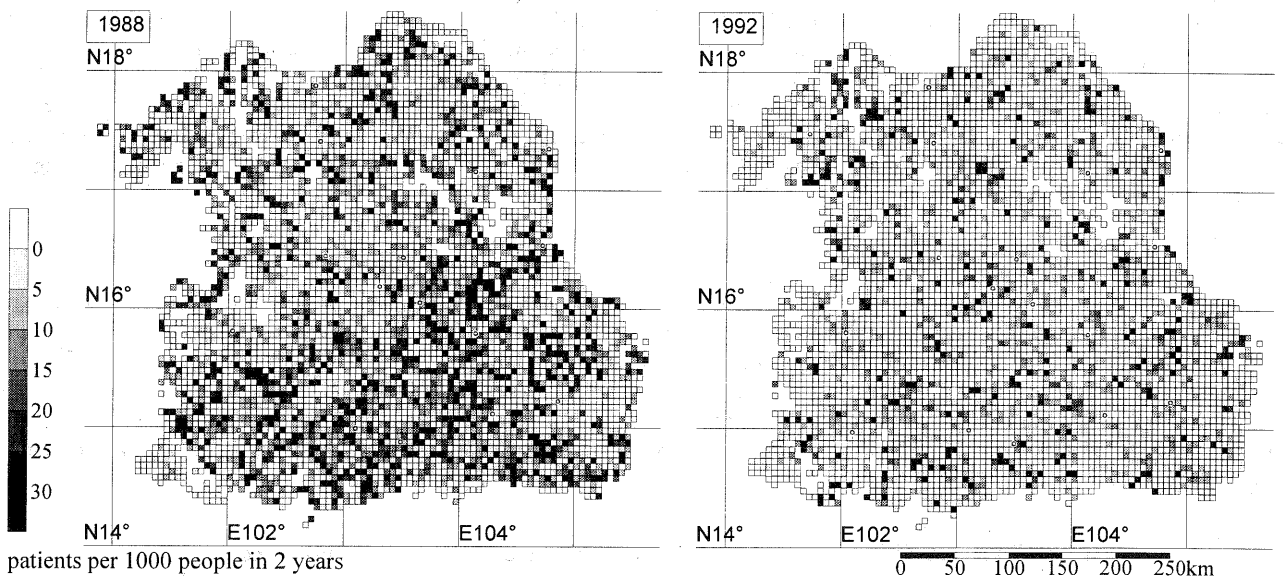


Figure 9 Measles

remote sensing. Third is to develop a rural system model using the NETVIS to examine the possibility of continuous development of this region.

In the light of these themes, I intend to develop the NETVIS into an integrated system incorporating other related data sets such as climatic data, soil data, and so on.

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