

Geospatial Analysis for Assessing the Socioeconomic Conditions in Resettlement Housing Schemes in Siribopura, Hambantota

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Abstract

This study based on GIS analysis is intended to provide an overview of socioeconomic conditions in the resettlement housing scheme established in Siribopura, Hambantota to rehabilitate displaced persons. Several variables such as monthly income, and house and land values were checked for this purpose. Data were gathered from primary and secondary sources. The primary methods were open discussion and questionnaire survey while secondary methods were relevant documentation and websites. Siribopura, which is located in the Hambantota District was the main resettlement area. Majority of people resettled here are those displaced by the tsunami and certain development projects. The variables were checked using discriminate analysis. As per the results, 62.5% or majority of people in the tsunami resettlement area experience a poor quality of life. In the resettlement area set aside for those displaced by the development projects, the majority (90.6%) lead a quality life. Good income generation is the main reason for that. This study makes an important contribution by comparing the socioeconomic lives of the different groups of people and making an assessment about the resettlement project for the benefit of policy makers.

Keywords: Discriminate, Development, Rehabilitation, Resettlement, Housing

Introduction

The world is becoming a common marketplace in which people, no matter where they live, desire to possess the same products and lead a similar lifestyle. Due to the pursuit of these objectives, now people have no particular place for living until their death. Therefore, people shift from place to place due to many reasons, such as conflicts, environmental disasters and development projects.

In the global context, most resettlement programs fall under these three categories. There were 19.2 million displacements associated with disasters in 113 countries across all regions of the world in 2015; events such as floods, storms, earthquakes, volcanic eruptions, wildfires, landslides and extreme temperatures. A 2011 study conducted across ten Indian states found that only 17% of the people displaced by development projects had been resettled (Bilak, 2016).

Studies show that in the Sri Lankan context too people have been displaced due to these three reasons. Especially, people in the Northern Province have been displaced due to conflicts, many of them repeatedly. Other areas of Sri Lanka mostly face environmental disasters like floods and landslides that result in the displacement of people. In recent times much of the displacement of people has been due to development projects. Especially in Hambantota district so many areas have been taken over due to the Port development project and Airport development project. Hambantota district was already badly affected by the 2004 tsunami and many people had been displaced. This resulted in people having to move from place to place, forcing them to commence their socioeconomic life anew. Sometimes life becomes better but it can become worse than before. In this respect the government has provided many facilities. Many people have got a

piece of land, sometimes even with a house. But people are not satisfied with that because earlier they had enjoyed a better life than now (Liu and Yang, 2015).

However, their socioeconomic lives have taken a turn for the worse because of the displacement. This study tries to establish the nature of the changes that have taken place by analyzing various socioeconomic variables through statistical methods.

Rehabilitation programs are initiated to deal with the consequences of displacement. But the resettlement programs have primarily focused on the process of physical relocation rather than on the economic and social development of the displaced and affected people. Rehabilitation can be envisioned as a process that would reverse the risks of resettlement. It suggests a risk handling and reconstruction model of rehabilitation that would be marked by a series of transitions from landlessness to land-based resettlement, joblessness to re-employment, food insecurity to safe nutrition, homelessness to house construction, transformation of morbidity and mortality to improved health and well-being, and social disempowerment and deprivation of common property resources to community reconstruction and social inclusion.

In this way, rehabilitation must improve the well-being of people. The objective of rehabilitation is to overcome the socioeconomic difficulties faced by people who have been displaced due to circumstances beyond their control. This research tries to explain those difficulties.

The results and findings were obtained by using a discriminate model and a number of statistical methods. GIS data for the study were managed by using ARC GIS 10.1 software. The main purpose of GIS usage was to conduct spatial analysis by identifying the allocation of resources. By doing so, this study

hopes to create a detailed map of the study area indicating relevant social and economic factors because that type of map can provide a lot of benefits. For example, the data analysis process becomes easy through the use of such a map, as its visual presentation provides the ideal path to identify spatial variations of all the socioeconomic factors. Also, the particular dataset would prove indispensable for updating the details in any particular area. Based on those reasons GIS analysis was used for data representation in this research (Samat and Harun, 2013).

Problem Statement and Objectives

When people migrate from one place to another place, their lives could possibly become refreshing due to the new society and surroundings. Nevertheless, this change could also affect people negatively. Although people often choose the new location by themselves there is always some variation from person to person because the place is selected according to each person's perceptions. However, when it is left to the government or relevant department to choose the place it does not concern itself about the displaced person's ideas or preferences. Resettlement area will be selected according to government policy. So when people shift to that area they may face problems there (Bilak, 2016).

In the Siribopura study area rehabilitation is provided mainly to two categories of internal migrants. They are, those displaced due to tsunami and those displaced due to the port and airport development projects. It has been pointed out that people who have been resettled in this area are confronting numerous problems such as the following: lack of autonomy to design their own houses, and lack of appropriate counseling services to assist them to resettle and adapt to the new environment. Other crucial issues are no proper linkage of socioeconomic assistance with the real needs of

the displaced people and non-availability of formal property titles (Bandara, 2011).

The social assessments and consultations conducted with these households pointed to a number of direct and indirect as well as permanent and temporary impacts these projects had on the lives of the householders (Jakson , 2000). They include disruptions to their livelihood activities, loss of premises they have been using to conduct their economic activities, loss of their consumer networks, ruptures to their familial kinship and neighborhood ties, etc. Therefore, there are many socioeconomic problems affecting the people resettled in this area. Hence, this study sets out to examine and analyze the socioeconomic conditions in the housing scheme established to rehabilitate displaced persons. This is done by focusing on the conventional and contemporary socioeconomic factors in the rehabilitated housing scheme and by identifying the significant Geospatial variables that could possibly be adjusted to assist the people's rehabilitation.

This research tries to achieve these goals by identifying differences in the socioeconomic conditions of the people before and after resettlement, and to identify the differences between the conventional factors and contemporary factors, and to map out the distribution and significance of the Geospatial variables in the study area.

Literature Review

It has first presented the different approaches to rehabilitation and resettlement and compares the conventional and contemporary socioeconomic conditions. It is important to have an understanding of the changes occurring in the socioeconomic factors when transitioning from the conventional life of the past to the contemporary life. As there are a large number of extant studies

that define the social and economic factors of rehabilitated sites, It had been decided research objectives and the research questions carefully, after precisely identifying the research gap in this field. To address the contemporary socio-economic issues prevailing in the rehabilitated site I have used the capability approach as my main theoretical approach in this research to identify and assess the overall socioeconomic condition. Therefore, this study will examine the relevant matters in the following order.

1. Displacement in the world and in Sri Lankan context
2. Rehabilitation in the world and in Sri Lankan context
3. Conventional and contemporary socioeconomic conditions
4. GIS models to illustrate the spatial distribution

Hence, all of these aspects will be subjected to discriminate analysis and while referring to Geospatial database.

Displacement in the world and in Sri Lankan

Displacement is seen as the consequence of any kind of disruptive process that enforces certain technical and economic choices on persons without giving any serious consideration to those options that would involve the least social and environmental costs to those affected. As mentioned earlier, displacement can occur due to natural disasters, development projects and armed conflicts.

There were 19.2 million new displacements associated with disasters in 113 countries, which occurred across all regions of the world due to events such as floods, storms, earthquakes, volcanic eruptions, wildfires, landslides and extreme temperatures (Bilak, 2016). Over the past eight years, there have been a total of 203.4 million displacements caused by natural disasters. The movement of people whose land is acquired for various development projects is forced, because they are not allowed to remain in their home areas. Even if their rights are fully respected during the process of acquisition of their property and resettlement, a person evicted to

make way for a development project finds himself in a disadvantaged position. Accumulated figures for people displaced by development projects appear to be available only for China and India. In China, the total amounted to 80 million between 1950 and 2015 and in India it added up to 65 million between 1947 and 2010 (Bilak, 2016). The average number of people displaced each year by conflict and violence has risen over the last 13 years. There have been 5.2 million displacements a year since 2013, which equates to 14,000 people forced to flee their homes every day. The following regions of the world can be pointed out as having the highest number of displaced persons as a result of conflict. They are the Middle East and North Africa, Sub-Saharan Africa, Europe and Central Asia, South Asia, Latin America and Caribbean, East Asia and Pacific.

Displacement is a common phenomenon in Sri Lanka too. Displacement occurs here due to three reasons. When considering the world as a whole the tropical belt is the most vulnerable area for natural disasters. For example, Sri Lanka always experiences floods as well as landslides during the monsoon season. Because the monsoon is a recurring event, people are displaced every year. The landslide is one of the major disaster events in Sri Lanka, which has increased in frequency lately. It takes many lives and leaves more people homeless after it strikes than any other disaster event. For example, in 2014 the Koslanda landslide occurred due to heavy rainfall. Because of this massive landslide, large numbers of people were displaced. According to records 150 houses were destroyed, and there was much infrastructure damage (Bandara, 2005). Lately, displacement in the Sri Lankan context is mainly due to development projects. Development projects displace people, who sometimes move out voluntarily but most are evicted by force. So displacement due to development is a crucial issue not only in Sri Lanka but also in the whole world (Makunde, 2016). In

2014 the Sri Lankan government initiated a “Flood Mitigation Plan” around the St. Sebastian South Canal under the Metro Colombo Urban Development Plan (MCUDP). Because of this development project 202 people were displaced (Source: Center, 2009). Earlier, more than two decades of civil war in Sri Lanka between government forces and the Liberation Tigers of Tamil Eelam (LTTE) had devastated large parts of the Island. The war claimed the lives of an estimated 64,000 people and uprooted more than a million others. The war caused widespread destruction in the North and East of the country. It is estimated that the conflict damaged close to 90% of the houses owned by displaced persons in the North and the East (Bandara, 2005).

Rehabilitation around the world and in Sri Lankan context

According to Bilak (2016), every year 15 million people across the world are forced out of their traditional habitats due to public and private development projects. Naturally, this causes much hardship to them. It is estimated that during the last two decades approximately 250-300 million people across the world have been relocated. India and China have by far the highest numbers of development-induced resettlement in the world. India has resettled more than 60 million people between 1950 and 2008, while China resettled 70 million during the same period. As an example, Sarovar is one of the largest dam projects of the Asian region, which is situated across the Narmada River in Gujarat, India. Dam projects like Kainji Dam in Nigeria, Akosombo in Ghana, Kousou Dam in Côte d’Ivoire, and Kariba Dam in Zambia have also resulted in the mass movement of people (Cernea, 2002).

Within the Sri Lankan context a number of rehabilitation projects have been launched in the past. Many of these projects were started to accommodate the people who were displaced by the civil war in the Northern part of the country. Because of the war many people

gave up their lands, some people migrated to India, and others were displaced within this country. Many people moved out from their original places and resettled around the Vanni area (Kibread, 2002). In 2004 Sri Lanka was struck by the Tsunami disaster. A long stretch of the coastal belt was devastated and so people were displaced. Therefore, several rehabilitation projects were initiated in the adjoining interior areas. Following the destruction in the Southern coastal areas a large number of permanent and temporary reconstruction projects were commenced. The study area of Siribopura, selected for this research is a good example of a permanent rehabilitation project that was prompted by the Tsunami disaster.

Being a developing country Sri Lanka has initiated numerous development projects over the years. Due to this people are sometimes required to give up their usual place of residence and resettle in another place. An example of this is Siribopura Resettlement Project in Hambantota. Although it was built as a Tsunami reconstruction project it has now turned into a large village that accommodates not only tsunami victims but also other people who had to leave due to the Port City development project and Mattala Airport development project. Presently there are 520 families in this area including people displaced due to development projects.

Conventional and contemporary socioeconomic conditions

Conventional socioeconomic condition means social and economic factors that usually influence people's lives. These are the factors that determine the condition and quality of people's lives. Some of these factors are state of health, level of education, gender and economic resources. As mentioned earlier, people's socioeconomic conditions tend to change following resettlement and rehabilitation. After that change takes place it becomes the

contemporary socioeconomic condition in that particular society. For example, many people in Siribopura have changed their economic activities after they resettled there. That means many fisheries people changed their livelihood and now run small groceries (Bandara, 2011). For this reason this study attempts to understand how conventional socioeconomic factors gradually transform into contemporary factors and how they influence people.

GIS models to illustrate the spatial distribution

Geographic information, in its simplest form, is information that relates to specific locations. It illustrates four different types of geographic information relating to a typical urban scene (Weerakoon, 2013) . The physical environment is represented by information about vegetation and buildings. In addition, it presents various aspects of the socioeconomic environment (Martin, 2005). For example, there is a research study titled ‘The Spatial Analysis of Socioeconomic Issues in Nepal’ (Brown, 2003). The focus of the present research is to identify women’s perspectives on key issues such as natural resources management, to define the gender-specific division of labor within the farming system, to link socioeconomic indicators to the workload of women, and to examine the spatial context of those interactions within a GIS framework. That study in Nepal effectively presented so many social indicators. Among those it displayed work responsibilities gender-wise. This study makes use of GIS to display the spatial distribution. As such, GIS is an ideal tool to represent real world data, being more effective than any other descriptive method.

Methodology

The methodological procedure of the research consisted of five steps. The first two steps identify the background of the study and define the sample size. The third step lists the most converted

socioeconomic variables of the people who were rehabilitated in Siribopura. The fourth step explains the data analysis, which made use of quantitative methods. Finally, all the analyzed data are used for building the Geospatial linkage to identify the families that lead the best socioeconomic lives.

- i. Selection of the core study area
- ii. Decision on the sample size
- iii. Identification of critical socioeconomic variables
- iv. Data analysis and Geospatial link
- v. Conclusion and Recommendations

Selection of the core study area

Siribopura is the main rehabilitation area in Hambantota district. It has two categories of displaced people, specifically those displaced due to the tsunami and those displaced by development projects. At the beginning, this area had only tsunami displaced people, with each family having a 20 perch block of land with a modest house on it. After 2010, it also began to accommodate people displaced by development projects such as the Hambantota Port and the Mattala International Airport. Each family was allotted 10 perches of land. Now this area is home to a total of 1087 families.

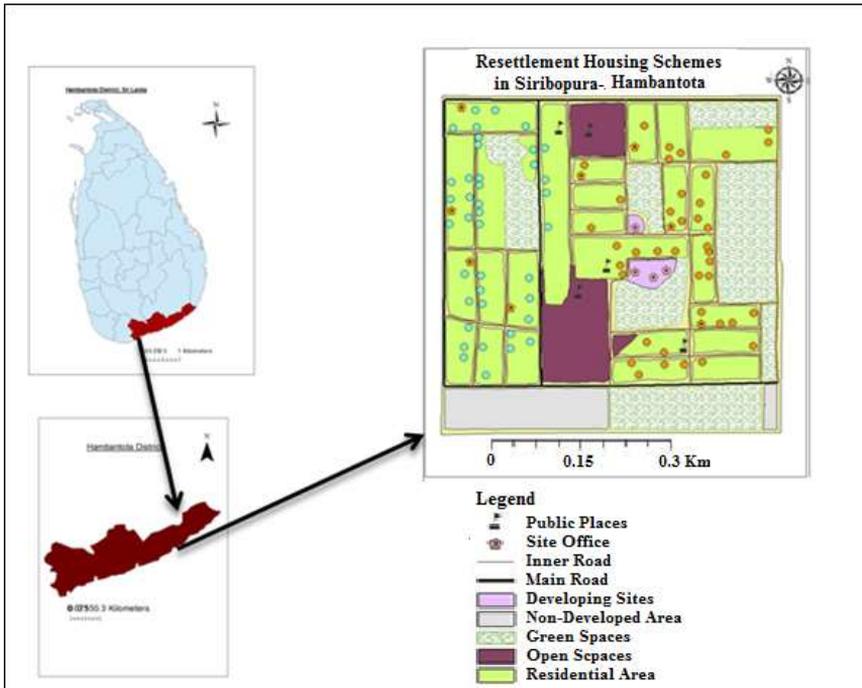


Figure 1: Study area, Siribopura-Hambantota

Decision on the sample size

This research surveyed 80 families selected randomly as the sample from 1087 houses. These 80 families comprised 40 families that were displaced by the tsunami and another 40 families displaced by development projects. Variables were checked within this sample group and the Geospatial database was designed based on this 80 family sample.

Identification of critical socioeconomic variables

Many people who were rehabilitated after the tsunami disaster and development projects found that their socioeconomic lives actually took a turn for the better in the new environment at Siribopura (Ritchie, 2013). For example, most of those people got their own land only after settling in Siribopura. Earlier, most of them were landless persons. Therefore, this research has indicated that their

most critical socioeconomic variables have improved after their rehabilitation. The variables that helped to assess the people’s socioeconomic life were the product of discriminate analysis and Geospatial database. These variables are Monthly income, Health costs, Distance to workplace, and House & Land value.

Data analysis and Geospatial link

Data analysis and results can be represented under two headings, such as one for the tsunami affected persons and the other for those affected by development projects. First, we will consider the socioeconomic condition of people rehabilitated after the tsunami. Following discriminate analysis at the resettlement site accommodating the tsunami victims, the complete socioeconomic data could be represented as in Table 1.

Table 1: Mean values of socioeconomic variables of tsunami resettlement area

Socioeconomic variable	Mean value
Monthly income	Rs 20287.50
Land value	Rs 2,722,500.00
House value	Rs 3,245,000.00
Transport costs	Rs 6,915.00
Water cost	Rs 725.25
Electricity cost	Rs 913.25
Educational costs	Rs 2,126.25
Drugs costs	Rs 507.50
Livelihood costs	Rs 1,366.75
Health costs	Rs 1,087.50

Discriminate analysis was used to calculate the mean levels of the quality of socioeconomic life. According to the classification results majority of the people (62.5%) lead a poor quality life. That means within the tsunami resettlement area there is an issue about the quality of life. In contrast, 37.5% appear to enjoy a satisfactory

quality of life. However, they are in the minority. As for the influential factors, the metrics of the socioeconomic variables are as shown in Table 2.

Table 2: Function values of the socioeconomic variables at tsunami resettlement area

Socioeconomic factor	Function level	Order Place
Monthly income	0.561	1
Livelihood costs	0.313	2
Electricity cost	0.300	3
Educational costs	0.291	4
Health costs	0.282	5
Land value	0.268	6
House value	0.200	7
Water cost	0.116	8
Transport costs	0.109	9
Drugs costs	0.079	10

According to this table, the monthly income, livelihood costs and electricity cost are the top three factors that influence the people’s socioeconomic lives in the tsunami resettlement area. Each of the variables has a correlation with monthly income, which has been proved by regression, and the distribution ranges are displayed in ARC maps. Thus, the influence of these variables could be judged and based on their values a final map was created to determine the socioeconomic level in this area. Those criteria are high income, good infrastructure, high value of land & houses, as well as low livelihood costs.

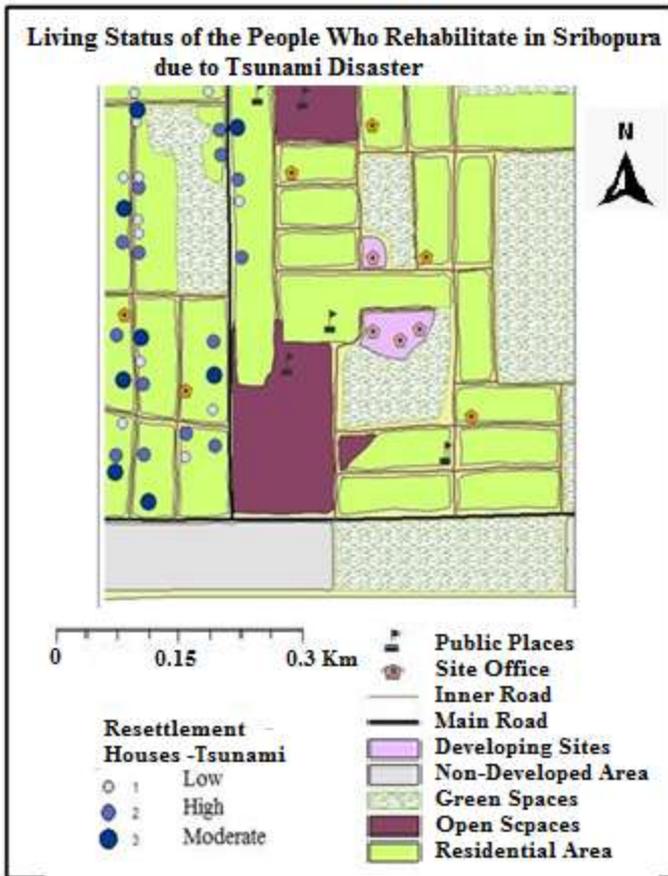


Figure 2: Living status of the people who were rehabilitated in Siribopura after the tsunami disaster

Discriminate analysis was also performed on the resettlement site accommodating those who were displaced due to development projects. According to the results a majority of the people (90.6%) appear to enjoy a quality life. That means at the resettlement houses the quality of socioeconomic life is favorable. However, a minority of 9.4% were not able to lead a good quality of life. In the case of people who resettled due to development projects too, the influence of variables determines the socioeconomic condition. The mean values for this area are shown in Table 3.

Table 3: Mean values of the socioeconomic variables of resettlement area housing people displaced by development projects

Socioeconomic variable	Mean value
Monthly income	Rs 24,937.50
Land value	Rs 3,370,000.00
House value	Rs 2,630,000.00
Transport costs	Rs 851.25
Water cost	Rs 650.00
Electricity cost	Rs 885.00
Educational costs	Rs 1,855.00
Drugs costs	Rs 307.50
Livelihood costs	Rs 875.00
Health costs	Rs 848.00

Table 4: Functional values of socioeconomic variables at resettlement houses accommodating people displaced by development projects

Socioeconomic variable	Function level	Order place	Order
Educational costs	0.559		1
House value	0.549		2
Monthly income	0.513		3
Livelihood costs	0.482		4
Water cost	0.419		5
Transport costs	0.402		6
Land value	0.204		7
Health costs	0.155		8
Electricity cost	0.086		9
Drugs costs	0.038		10

As can be seen, educational costs, house value and monthly income have chiefly determined the socioeconomic condition of people who resettled due to development projects. According to above findings a final map was prepared to illustrate the present

living status of the people who were rehabilitated in Siribopura. In order to identify the best resettlement location, the following variables were used: high income, infrastructure facilities, high value of house & land, and low livelihood costs. Based on these criteria the socioeconomic lives were categorized as low, high and moderate.

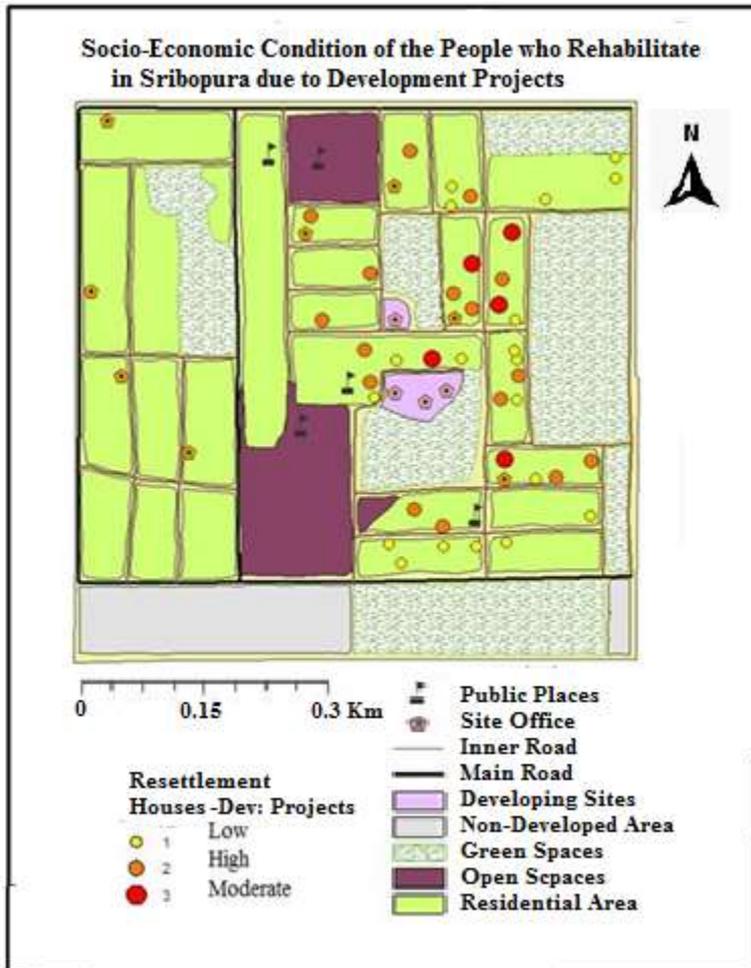


Figure 3: Living status of the people who were rehabilitated in Siribopura after being displaced by development projects

Conclusion and Recommendations

According to the findings of this study, a majority of the people in the tsunami resettlement area are leading poor quality socioeconomic lives. In the resettlement houses occupied by people evicted due to development projects also some of them do not enjoy quality socioeconomic lives. GIS analysis can compare through discriminate analysis the socioeconomic lives of these two groups of rehabilitated people.

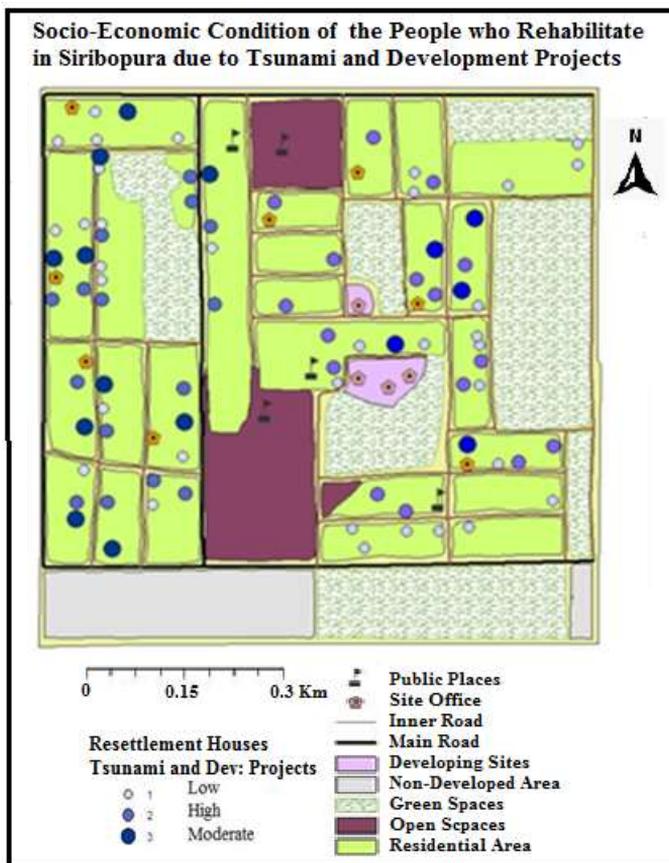


Figure 4: Socioeconomic condition of people who were rehabilitated in Siribopura due to the tsunami and development projects

Accordingly, it has identified some variability in the quality of socioeconomic lives within both groups of people; that is, those who were rehabilitated due to the tsunami and due to development projects. Therefore, the GIS analysis indicates that for the majority of the people in both groups the socioeconomic condition varies from moderate to high level. According to this study, too many people still lead poor quality socioeconomic lives in the tsunami resettlement area. As for people displaced by development projects not all of them lead high quality socioeconomic lives either. The main economy related problems that were identified are low income, difficulties relating to livelihoods and insufficient income generation avenues.

Other social problems are lack of educational facilities, lack of infrastructure facilities and poor housing conditions. To overcome this situation it is important to address these key issues. To achieve that, this research makes the following recommendations:

- Increase the income generation capacity of people.
- Create new employment opportunities in that locality.
- Improve the loan facilities for housing loans and development of infrastructure facilities.
- Provide guidance to start various self-employment projects.
- Give vocational training to the younger generation.

This research has made a good assessment of the quality of the socioeconomic conditions of people before and after resettlement. This research also analyzes the factors that contribute to the quality of resettlement projects. After displacement and resettlement the people must be able to rebuild their lives quickly. The resettlement project must necessarily provide the proper environment to facilitate this. Therefore, it is expected that this research will provide some guidance for policymakers on this topic.

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