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# MEASURING THE MULTIDIMENSIONAL ASPECTS OF POVERTY: A STUDY BASED ON ORANGE WALK DISTRICT, BELIZE

Nigeli Sosa

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Nigeli Sosa was a participant in the MA Programme (ECD 94/95) at the Institute of Social Studies.

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Supervisor: G. Pyatt
Second Supervisor: H. White

**Comments are welcome and should be addressed to the author:**
c/o Publications Office - Institute of Social Studies - P.O. Box 29776
2502LT The Hague - The Netherlands

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## ABSTRACT

This paper proposes a measure of poverty which is based on specific indicators of living standards. The author maintains that examining the actual living conditions of those persons living in a household provides a better and more comprehensive indicator of poverty. Thus data from the most recent population census was utilized to grade the living conditions of each household and thus quantifies the level of poverty that exists in the district of Orange Walk, Belize. Subsequently, an analysis of the determinants of poverty is presented via a logit model.

# TABLE OF CONTENTS

## LIST OF TABLES

## LIST OF FIGURES

# CHAPTER I

## Introduction

The main objective of economic development is to raise the living standard and general well-being of the people in the economy on a sustainable basis. But the manner in which this is carried out can have either positive or negative effects on the situation of the poor. In the past, much emphasis was placed on growth maximization as the ideal path to development assuming that growth would automatically trickle down to the needy and result in a fairly equal distribution of income. However, it was later believed that the trickle down effect was limited and that often increased growth was accompanied with an unequal distribution of income. In the 1960s, the scope of this approach was widened and emphasis was placed on poverty eradication, employment and income distribution. The dissatisfaction with this approach that higher levels of employment and improved standard of living for all would automatically result from growth, irrespective of the pattern used, began to emerge in the early 1970s. By the mid-1970s, attention shifted to the provision of basic needs as the right approach to economic development and more recently the spotlight has been on human development.

If the UNDP's approach to development is adopted, then certainly the illness of poverty will be addressed. According to the 1990 Human Development Report, human development "is a process of enlarging people's choices". The options which "range from political, economic and social freedom to opportunities for being creative and productive," are not static over time and are numerous. However, the most important ones are to live a long and healthy life, to be educated and to *have access to resources necessary for a decent standard of living*. Gaining access to these three elements will grant the individual the ability to have access to the remaining choices. Among these are political freedom, personal security, participation in the community and guaranteed human rights. The report emphasizes that development should be much more than simply the improvement in income and wealth. Rather, *income should be viewed as a means to obtaining a better standard of living rather than as an end in itself.*

But for many people, particularly those who are living from hand to mouth, all this talk about improvement of living standards is only wishful thinking and may never become a reality for them. Some may aspire that someday they might be able to live in a nice house and be able to have the facilities that others may already have. Still, others may only aspire to be able to provide an education for their children. Yet, the conditions under which these people live makes it so difficult, but not impossible, for them to get out of their misery.

The viewpoint is taken in this paper that the lack of choices is reflected in the manner in which people live. Thus, one of the principal objectives of this paper is to determine, via analyzing the conditions under which the people live, who the deprived people are. For as stated by the World Bank (1990):

> *"Knowledge about the poor is essential if governments are to adopt sound development strategies and more effective policies for attacking poverty. How many poor are there? Where do they live? What are their precise economic circumstances? Answering these questions is the first step toward understanding the impact of economic policies on the poor."*

**Overview of the Study**

Poverty has traditionally been viewed as the lack of resources necessary to obtain a minimum level of basic needs. The justification for such definitions of poverty lies in "the argument that the lack of resources is highly correlated with other, less easily quantified, concomitants of poverty; thus resource inadequacy is viewed as a reasonable *proxy* for the full set of poverty attributes". (Oster, et al, 1978)

Aturupane (1994), reviews several works done on the relationship between income and social indicators and concludes that "... income growth, while important, is not the primary determinant of improvement in social indicators." So while increased income per capita is a desirable end in a development strategy, it is not in itself a sufficient condition for human development for it is not guaranteed that the increase in income will be fairly distributed and translated to increased levels of human development.

Therefore, in this paper, the approach to identifying the poor via the lack of income is disregarded, a decision which is justified later on in the discussion. Instead, another measure is proposed which encompasses more of this "full set of poverty attributes". The author, in trying to make the best use of the available database, takes the approach that there are certain visible signs of poverty which are not necessarily picked up by either consumption or income. The data used for the purpose of this study is that portion of the 1991 population census database corresponding to the district of Orange Walk. The population census is a rich source of information as it provides details of every household and every person living in the household. The details are numerous and only those of major importance are used for the purposes of this study. Its advantage over other available surveys lies in the extent of the coverage. The decision to make this study solely on the district of Orange Walk was due in part to the availability of the

data[1]. Given this constraint, I opted for the district of Orange Walk since this is where I lived for 20 years and it is the district that I know best.

What the author depicts as a poor person depends on three dimensions of deprivation. It is the author's view that for a person to have a decent standard of living, he should have three basic things which are as follows[2]:

1) good housing conditions
2) basic facilities (water, fuel, light and toilet)
3) adequate room space

The lack of any of these conditions would be an indication that the household is living in poverty.

Chapter II introduces the reader to the highlights of the Belizean economy. A more detailed description is made of Orange Walk Town which is District that is being analyzed in this paper. Chapter III makes a review of the literature on poverty. Here the focus is on the interpretation of the word "poverty" as it has evolved over the years. The author's viewpoint that poverty is more that simply the lack of income is concretized and this sets the stage for identifying the poor via the proposed methodology. In Chapter IV, the justification for searching for other ways of identifying the poor is presented. Here also the methodology proposed is discussed at length. In Chapter V, the main determinants of poverty are presented via logit regression. How is it that the probability of being poor changes as age varies? This and other factors are discussed also in this section. Chapter VI tells the story about the poor. Who they are. Where do they live, etc. After having looked at all the above, recommendations for poverty alleviation is made. Finally the conclusion is arrived at that the method proposed served as a good measure of poverty. While it has helped us to better understand the poor, their situation will only improve if investments in improving their capabilities is made.

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1 The population census database is under the responsibility of the Central Statistical Office. Given the confidentiality of the data, that portion of the database corresponding to the Orange Walk District was made available to me for purposes of this paper only.

2 Here it is assumed that the satisfaction of hunger takes priority over any of these aspects of living standard. It is only after one has eaten that the extras are invested in any of the areas pointed out.

## CHAPTER II

### Overview of the Belizean Economy

Belize is a very small country with an area of 8,864 square miles. It is bordered to the north by Mexico, to the west and south by Guatemala. It's population at mid-year 1991 was estimated to be 194,300. Traditionally, Belize has been an agricultural-based economy. In the past, the country's principal exports were logwood and mahogany. This then shifted to its primary export being sugar. Up to the early 1980s, sugar was the dominant good that was being produced and then diversification began to take place in the areas of citrus, bananas, garments and marine products. The composition of GDP has not changed much since 1980. In 1980, the primary, secondary and tertiary sectors accounted for 22.0% , 23.0% and 58.0% of GDP[3], respectively. By 1992, a slight shift can be observed from the primary to the secondary sector given the increased developments in the tourist industry. In 1992, the shares of these sectors in GDP were 19.0%, 26.0% and 57%, respectively.

Per capita GDP has increased steadily from BZ$2,233 in 1980 to BZ$3,257 in 1992. However, if one takes a look at Figure 1, which depicts the trend in real private per capita consumption, what can be seen a deterioration in this welfare indicator. Real private consumption per capita decreases steadily during the period 1980 to 1985. This is a reflection of the serious internal and external imbalances experienced during this period. Between 1980 - 1984, growth in real GDP merely averaged 0.4%. In the fiscal accounts, Central Government's position moved from having a current surplus of $8.25 mn in fiscal year 1980/81 to a deficit of $6.26 mn in fiscal year 1983/84. During this same period, its overall deficit increased from $4.1 mn to $18.7 mn. The deficit in the current account of the balance of payments also increased from 1980 to 1984 from $10.5 mn to $13.0 mn. Towards the end of 1984, net official reserves had eroded from $13.2 mn to a negative $0.2 mn. As a consequence. in early 1985, SDR 7.125 mn was received from the IMF under a Standby Arrangement for balance of payments support.

In the two years that followed, 1985 and 1986, there was gradual improvement in the economy. Real GDP grew by 0.41 percent in 1985 and by 3.0 percent in 1986. The deficit in the current account of the balance of payments was down to $8.5 mn at the end of 1986 while that in the fiscal accounts was almost nil and international reserves increased to $4.9 mn and $16.6 mn, respectively in the two years.

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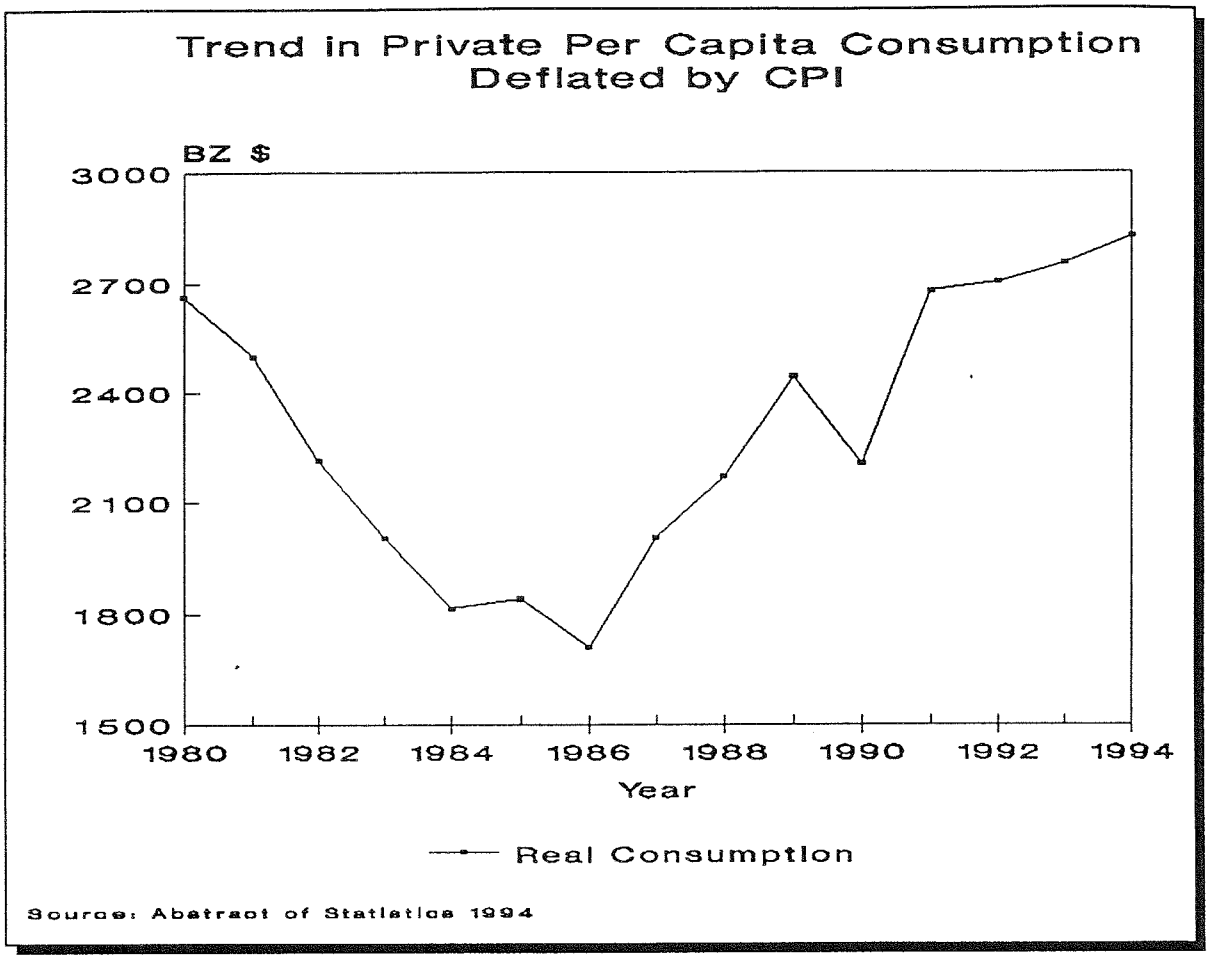
[3] The sum of the percentages of these three sectors will exceed 100 percent since imputed bank service charges is another component of GDP and is negative.

FIGURE 1




Since 1986, there has been tremendous growth in the economy in response to increased domestic and foreign investment and a favorable external environment. Real GDP grew at an annual average of 8.41 % from 1987 to 1993 and was distributed evenly amongst all sectors of the economy. Growth in the primary, secondary and services sector was on average, 9.11%, 8.63% and 8.06%, respectively.

The improvement in the economy is once again reflected in Figure 1. Real private consumption has increased annually, except for a decline from 1989 to 1990. However, it should be noted that the level achieved in 1992 is still lower than what it was 12 years earlier.

ORANGE WALK TOWN

Orange Walk is the third largest district in Belize and is situated in the northern part of the country. Its first inhabitants, the Mayas, dates back to the year 500 B.C. However, it is estimated that around 925 A.D. the great Maya civilization collapsed for reasons that, to date, still remain unknown. By the 1700s the people who had settled down to live in Orange Walk were largely logwood cutters and were later joined by persons seeking refuge from the war of the Castes that was taking place in Mexico. Up to the 1880s the principal activities in the district included logging, chicle gathering, milpa cultivating and subsistence farming, cattle raising and the cultivation of sugar cane which was mainly utilized for the production of rum. To date, the most important economic activities in the area is still agriculture with sugar cane being the principal crop.

This tiny bit of history is mentioned to demonstrate that the people and its economy have come a long way in the 110 years that followed. In 1991, the total population of Orange Walk District was 30,505 which represented an annual average population growth of 2.7% over the eleven year period from 1980. This population growth, however, was not concentrated in either rural or urban areas but was rather equally distributed amongst both regions.In 1980, the share of the population living in rural and urban areas was 63.1% and 36.9%, respectively. By 1991, this composition changed only slightly in favor of the rural areas to 64.3%. Over the period 1980 to 1991, the composition of the population in terms of sex did not vary much. While in 1980 males comprised 52.5% of the population and females 47.5%, in 1991 the ratio stood at 52.2% and 47.8%, respectively.

**TABLE 1**
**ETHINICTY OF POPULATION**
**OF ORANGE WALK DISTRICT**

| Ethnic Groups | 1980 | 1991 |
|---|---|---|
| Mestizos | 64.1 | 71.7 |
| Creoles | 11.2 | 7.4 |
| Indigenous Indians | 7.1 | 9.1 |
| Other | 17.6 | 11.8 |

The ethnicity of the population of Orange Walk is very diverse and its composition has changed somewhat over the period 1980 to 1991. The largest ethnic group in 1980 was the Mestizos comprising 64.1% of the total population od Orange Walk District and further increased by 1991 to 71.7%. This could be as a result of the increased migrants from Central America who settled to live in Orange Walk either seeking refuge or employment. Over the eleven year period under consideration, the percentage of Creoles fell from 11.2% to 7.4% of the population

while the Indigenous Indians share of the population increased by 2 percentage points to 9.1% in 1991. This could be indicative of the larger family size of the Indigenous Indians.

**TABLE 2**
**AGE STRUCTURE OF POPULATION OF ORANGE WALK DISTRICT**

The age structure of the population of Orange Walk shifted somewhat from the year 1980 to the year 1991. The number of persons of age less than fifteen years fell from 48.5% of the total population to 44.9%. The number of persons between the ages of 15 to 65 years increased by 3.7 percentage points from 48.2% in 1980 to 51.9% in 1991. There was also a very slight reduction during this period in persons of age 65 years and older of 1 percentage point.

| Age Range | Actual Figures | | Percentage of Total | |
|---|---|---|---|---|
| | 1980 | 1991 | 1980 | 1991 |
| 0-4 | 4,145 | 5,164 | 18.2% | 16.9% |
| 5-14 | 6,897 | 8,547 | 30.3% | 28.0% |
| 15-24 | 4,632 | 6,299 | 20.4% | 20.6% |
| 25-34 | 2,721 | 4,271 | 12.0% | 14.0% |
| 35-44 | 1,720 | 2,656 | 7.6% | 8.7% |
| 45-54 | 1,208 | 1,579 | 5.3% | 5.2% |
| 55-64 | 664 | 1,027 | 2.9% | 3.4% |
| 65 + | 751 | 962 | 3.3% | 3.2% |
| Total | 22,738 | 30,505 | 100.0% | 100.0% |

## CHAPTER 111
## THEORETICAL FRAMEWORK

### Overview

Definitions of poverty are numerous and have evolved over the years. Pre-twentieth century poverty definitions were, for the most part, economic and typically defined as the lack of resources necessary to acquire subsistence levels of the basic needs. This concept of setting the poverty line at that level which is the required for people to be physically efficient has been referred to as subsistence poverty. While initially this method of conceptualizing poverty served the purpose of making the general public aware of the poverty situation in the United Kingdom[4], it has strongly been criticized on the basis that the needs of a human being goes beyond the maintenance of life itself and consideration should also be taken of the social needs of the person.

The evolution of this definition of poverty has been largely in two areas. Firstly, the scope of the "required minimum needs" has been broadened. And secondly, there has been an increase in the extent to which sociocultural attributes are viewed as important and necessary components of a poverty definition.

It is important to bear in mind that deprivation is multidimensional and income is only one of the dimensions by which a person can be perceived as being poor. Others which can be equally or more important are factors such as improved housing conditions, better health care, etc.

### Addressing the different aspects of human needs:

"Human development is the ultimate objective of economic development" (Griffin & McKinley, 1994). The importance in human development stems from the fact that emphasis is being placed on the enrichment of human lives. As Streeten[5] states in a nutshell, "Human development puts people back at the center stage, after decades in which a maze of technical concepts had obscured this fundamental vision".

According to the 1990 HDR, the enrichment of human lives will come about from enlarging the choices available to them. The options which "range from political, economic and social freedom to opportunities for being creative and productive," are not static over time and are numerous. Amongst the options, some of the most

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4 Refers to the pioneering work on poverty for the United Kingdom which was done by Booth and Rowntree toward the end of last century.

5 See Streeten, 1994.

important ones are to live a long and healthy life, to be educated and to have access to resources necessary for a decent standard of living. Once these are obtained, then gaining access to the other options such as political freedom, personal security, participation in the community and guaranteed human rights will be facilitated.

> *The term human development here denotes both the process of widening people's choices and the level of their achieved well-being. It also helps to distinguish clearly between two sides of human development. One is the formation of human capabilities, such as improved health or knowledge. The other is the use that people make of their acquired capabilities, for work or leisure. (UNDP, 1990)*

Emphasis is placed in the report on the approach that development should be much more than simply the improvement in income and wealth. Rather income should be viewed as a means to obtaining a better standard of living rather than as an end in itself. For it has been demonstrated in countries such as Pakistan[6] that rapid economic growth does not necessarily translate into progress in human development. And likewise, in countries such as Botswana, Malaysia and Sri Lanka, even in the absence of good growth, significant improvements in human development were made. This finding led to the focal message of the HDR being "that while growth in national production (GDP) is absolutely necessary to meet all essential human objectives, what is important is to study how this growth translates -or fails to translate- into human development." (UNDP, 1990)

This failure of growth to translate into human development is what this research paper is concerned with. For poverty goes beyond the mere lack of income into dimensions which are less tangible but of equal or even greater importance. To get a better understanding of this, an insight is provided into the concept of poverty.

### The Concept of Poverty

There are principally two ways in which the word 'poverty' is used. Firstly it is used in a the broad sense to denote the entire spectrum of deprivation and illbeing which would include not only the lack of income but other dimensions necessary for wellbeing. These other dimensions of poverty include physical, social, economic, psychological/spiritual, and political factors. As Chambers describes: "Income matters, but so too do other aspects of wellbeing and the quality of life - health, security, self-respect, justice, access to goods and services, family and social life, ceremonies and celebrations, creativity, the

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[6] This conclusion was arrived at for Pakistan in a country study by UNDP. See UNDP, 1992.

pleasures of place, season and time of day, fun, spiritual experience, and love." (Chambers, 1995) In a study done by Jodha[7] 1988 it was observed that there are other things that people valued more than simply additional income. In this study, although the people's real per capita income had decreased by 5 percent over the study period, they still considered themselves better off than they previously were because of having improved housing conditions, not having to migrate for work, and wearing shoes regularly.

It is observed that deprivations and wellbeing have many dimensions. Chambers identifies eight dimensions of deprivation of which the better recognized are poverty, social inferiority and isolation. Poverty in this case refers to the lack of physical necessities, assets and income and goes beyond those who are income-poor. Social inferiority is defined as being "genetically inferior or disadvantaged, including gender, caste, race and ethnic group, or being a 'lower' in terms of class, social group or occupation, or linked with age, as with children and sometimes daughters-in-law." Isolation refers to being on the periphery and cut off from the provision of the various goods and services that others enjoy such as transport and communication, social services and markets, etc. The other dimensions of deprivation are physical weakness, vulnerability, seasonality, powerlessness and humiliation.

By focusing on the many dimensions of poverty, the realities of the poor are taken into consideration and hence policies that are taken to alleviate poverty will greatly improve the wellbeing of the poor. In this paper, the method used to identify the poor as described in the following chapter, takes into consideration a few of these dimensions of deprivation such as poverty, social inferiority and isolation.

Secondly, the word 'poverty' is used in the narrow sense to describe a low level of income or consumption. For example, Booth describes the poor, in his pioneering work towards the end of the nineteenth century, as being those whose means are barely sufficient to achieve a decent independent life while the very poor are those whose means are simply insufficient to cover the bare necessities. A more precise definition is later presented by Rowntree who states that the poor are those whose income is insufficient to maintain physical efficiency. Consideration here is made not only of food as the main provider of physical efficiency but also shelter, clothing and certain household sundries. (Holman, 1978)

Poverty definitions such as these are very popular and are characterized by the households' inadequate command of resources over the basic needs. Traditionally, this

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[7] Extracted from Chambers, 1995

command over resources had been defined in terms of income. One of the reasons for this as suggested by Chambers is that income data is much easier to measure than other factors which could be even more representative of illbeing.

The basket of "needs" though, has always been a topic of dispute and had therefore undergone several variations. Until the end of the nineteenth century, needs were meant to consist of food, clothing and shelter. By the mid-1970s, however, the ILO clearly specifies another aspect to be taken into consideration as part of the basic needs of a person. The first concept specified by the ILO is in accordance to what already existed and includes certain minimum standards that a family requires for private consumption. This basket of needs was comprised of food, shelter, clothing as well as certain household equipment and furniture among others. The second part, consisted of essential services that are provided for and by the community at large. Included in this element are safe drinking water, sanitation, public transport, health and education facilities. It also emphasized the participation of the people in the decision making process and the overall fulfillment of basic human rights which arises once an absolute level of basic needs is satisfied. Addressing this broader basket of the basic needs is what is required for the fulfillment of a person's life.

**Measuring Poverty**

There are several ways in which poverty can be measured. The simplest and most commonly used is the headcount index. This measures gives the proportion of the population with a standard of living below the poverty line. While this index tells us how many poor people there are it tell us nothing about the depth of the situation. This however is taken care of by the poverty gap index which is the average across all the households of the individual gaps between the standard of living of the poor households and the poverty line. It provides us with an indication of how much resources is necessary to eradicate poverty. According to the World Development Report 1990, China's poverty gap in 1985 was 3 percent of aggregate consumption whilst that of India for the same period was 12 percent of aggregate consumption. The third measure is the poverty severity index which reflects the distribution of living standards amongst the poor and hence gives the status of inequality amongst the poor. Whilst a transfer from a poor family to one that is poorer, leaves the headcount index and the poverty gap index, unchanged, the severity index would show an improvement. For purposes of evaluating the effects of policy on poverty, therefore, the severity index serves as a better tool than the others. This can be demonstrated by looking at the increase of the price of rice in a study made in Java, Indonesia. In this case, because the households close to the poverty line were producers of rice, an increase in the price of rice poor would have reduced both the headcount index and the poverty gap, assuming that the benefits if the price increase accrues to the producers. However, because the poorest of the poor were

net consumers of rice, then they were adversely affected by an increase in the price of rice and therefore reflected in a worsening of the severity index.

Poverty can either be measured in absolute or relative terms. Some of the earliest studies done to quantify the extent of poverty were based on an absolute poverty line. According to Ravallion (1992), an absolute poverty line is one which is fixed in terms of the living standard indicator being used, and fixed over the entire domain of the poverty comparison. And according to Todaro (1994), absolute poverty is meant to represent a specific minimum level of income needed to satisfy the basic physical needs of food, clothing, and shelter in order to ensure continued survival.

On the other hand, relative poverty is regarded as those whose standard of living are considered too far removed from the rest of the society in which they live. (Holman, 1978). Yet as Ravallion (1992) puts it :""Poverty" can be said to exist in a given society when one or more persons do not attain a level of well-being deemed to constitute a reasonable minimum by the standards of that society."

In this paper, poverty will be measured in relative terms and by using the headcount index.

## CHAPTER IV

## DEFINING THE POVERTY LINE

### Introduction

In the previous chapter it was seen that poverty encompasses more dimensions than simply the lack of income. The interest of this paper lies in capturing some of these other dimensions such as income-poverty, social inferiority and isolation. In this chapter, it is proposed that by directly analyzing the housing conditions in which people live, the access and type of facilities that is used by the household and the degree of overcrowdedness that exists in the household, these other dimensions of poverty can be captured. The methodology used in grading the three factors above mentioned is described in detail and consequently used in identifying who the poor are.

The findings indicate that 20.5% of the population of Orange Walk District are poor. The three main factors which have been identified as contributing to this situation is than the head of poor households are less educated that the head of the non-poor households. Also, the poorer households are larger in number than the non-poor households and lastly, poor households are more concentrated in the rural area.

### Elements in defining the poverty line

Three dimensions of poverty, (income-poverty, social inferiority and isolation) are directly reflected in the elements used to define the poverty line. These three elements which form the basis for distinguishing the poor households from the non-poor households are housing conditions, type of facilities utilized and overcrowding.

i) Housing Conditions

A house matters because of the protection (from the environment, weather, animals, etc.) that it provides to the persons living in the house. But living under a roof is not the end of the story. The conditions of the house matters not only for health and sanitation reasons but for social status as well. Houses are made of different materials, some which are more resistant to rain and wind than others. Living in a house that is made of the worst possible materials, does reflect on the social status of the person and can lead to social inferiority which is just one of the dimensions of poverty that is being considered.

The author believes that any person living under the poorest housing conditions, do so out of necessity and not out of choice. What does this house look like? Picture a house

whose walls are made of pimento[9] and possibly plastered with white lime, whose roof is thatched, and with a dirt floor. Does this type of house really exist? Yes and it is quite common, especially in the rural areas. In fact, 20.3% of total houses have all these three characteristics. The materials for building such a house (pimento) are obtained from the forest with very little monetary cost thus reflecting another dimension of poverty which emphasizes the lack of income. The tools required for obtaining the material for such a house is merely a machete. One needs only to know the best time for cutting the pimento and the rest is just a matter of time and labor.

Poverty is reflected in this case not because the persons living in such a house are starving because I doubt very much that would be the case. While these persons can be considered income-poor, they are also socially inferior as a result of their housing conditions. There is not a dime to spare in such a household. Perhaps the kids are going to school and this is very good. More than likely the kids even get presents for Christmas. However, this is accomplished with lot of sacrifice, perhaps borrowing from relatives or even charity but not without the cost to one's dignity and self-respect. Each new day is faced with the question of where the next meal will come from. It comes but there is just never enough to cover for all the needs. As a result the most important needs such as food and clothing and medical and educational will take priority. Then there is just never a penny extra to get a better house. Then as night falls, its just another prayer that someday there will be enough to get a decent house.

ii) Type of facilities used in the household

The second criteria that is utilized in distinguishing a poor household from a non-poor household is the type of utilities that the household uses. Consideration is taken of the sources of water, lighting and fuel as well as the type of toilet that the household has. I believe that one cannot pass judgement just by looking at each of these utilities individually. It is quite possible that a household is using perhaps coal or wood as its source of fuel. By this alone one cannot determine whether this household is poor or not. However when all of the facilities are seen in conjunction, it provides a better picture of the household. In this paper therefore, a household is considered to be poor only if while having the best in one of the facilities, he has the worst in the remaining three. Which means that in the best case, a household will still have the worst in three of the four facilities under consideration. For example, assume that a household has water piped into the house (the best case scenario when it comes to water), it would still be deemed poor if the main source of lighting used by that household was candles, if the household did not have a toilet and if the principal source of fuel was either coal or wood.

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[9] This is the stem of a palm tree used for building houses.

Poverty in this case is reflected in several dimensions. Firstly it reflects income-poverty, isolation and also social inferiority. Many of these people are cut off from the provision of public utilities such as water and electricity simply because they live in a remote area or because the population of the village is too small. In many instances, they are even isolated from the education system. Not having the basic facilities also put pressure on the social status of the household and more so having to resort to the river or stream as one's main supply of drinking water is in itself, unhealthy.

iii) Overcrowding

The third criteria used for determining whether a household is poor is the degree of overcrowdedness. A household is said to be overcrowded if there are six or more persons per bedroom. This also includes houses in which several persons live but which do not have a bedroom. Once again I assume that if people do not have much space it is due to having no choice. The incorporation of this criteria into the selection process captures those households who have a decent house with all or most of the facilities but who can still be considered to be poor since they lack the resources to expand the house so as to have more space per person. Here it is assumed that these households would prefer to build a bedroom rather than an additional living room or a study room, etc. Or if they had a large house they would prefer to have several small rooms rather than having one large room. Therefore, having six or more persons to one single bedroom is indicative of being poor.

Income-poverty in this case, is just one of the dimensions of poverty that is reflected in the conditions under which people live.

Variables

The variables to be used for determining the poverty line are as follows:

1) **Wall** - refers to the outer structure of the house.
2) **Floor** - the lower surface of the house.
3) **Roof** - the upper covering of the house.
4) **Water** - principal source of water used for drinking and other purposes.
5) **Toilet** - refers to the type of toilet used.
6) **Fuel** - main type of fuel used for cooking
7) **Lighting** - main source of lighting.
8) **Persons living in households** - refers to the number of persons who share at least on daily meal with the household.
9) **Number of bedrooms in each household** - total number of sleeping quarters but excludes temporary ones.

**Value judgement**

The value judgement used for this paper is that the acceptable standard of living is taken to be that in which the majority of the population live (i.e. in excess of 50% of the population). If the majority of the population have for example water piped into their dwelling, then those not having piped water would be considered as poor.

## METHODOLOGY

**Assigning values to the variables**

The database which I utilized consisted of the entire series of variables that made up the population census questionnaire. This was maintained in its original form and manipulated using the computer software Dbase IV. The first phase in the identification process of the poor involved assigning values to the various options that corresponded to each of the variables under consideration. For example, for the variable wall, there were eight options that could have been chosen by any household. The range of possible materials used for the construction of the outer walls of the household were stucco, makeshift, stone, brick, wood, a combination of wood and concrete, concrete and other. For the variable roof, there were six options and for the variable floor the options were only four.

The ultimate purpose of assigning values to the various options of these variables, was to comprise a housing index, a facilities index and a bedroom index. These would then be indicative of the conditions in which members of a household live since by themselves, the variables cannot help us to distinguish between the poor and the non-poor households. That is to say, a household with a dirt floor need not be classified as poor if the rest of the house is made of the best materials and moreover the household have the best facilities and is not overcrowded. A better judgement can be made when one has the entire picture of the house. But one cannot combine cement and wood and dirt. Therefore, a value is assigned to each material and each source of utility that the household has. This now allows to classify a household given its corresponding total assigned value.

Given the value judgement that the acceptable standard is that which most of the population have, then the first step for assigning the variables a value was to count the number of houses that used each option for each variable. For example in the case of material used for flooring there were only four options that a persons could have answered. These were dirt, wood, cement or tile. When we count the households which had the various options, in order of ranking from most to least, they are as follows: cement (56%), wood (25%), dirt (15%) and tile (4%). In this case, the acceptable standard would be a cement flooring. Once the acceptable standard is determined, it is

assigned a value of three. This was done because I was interested in evaluating four different levels of wellbeing. a) the extreme poor, b) the poor, c) the average and d)the rich. The range of the values therefore take the values of 1 for the extreme poor and 4 for the rich. The value of three therefore which is assigned to that option which most of the household have, is because this is the average household. Now that the average has been determined, the other options are ranked around the option that has been fixed at three. How is this done? It is done by looking at the cost of material and ranking them in that order. In the example we are using, dirt is cheaper than wood, wood is cheaper than cement, and cement is cheaper than tile. Since cement is fixed at three and tile is more expensive that cement then tile is assigned the value of four. Likewise the cheapest is assigned the value of one and wood is assigned the value of two. This procedure is done for each of the variables under consideration the details of which follows.

**i) Housing materials:**

The idea here is to assign a value to each type of material that is utilized for the construction of the various parts of the house (i.e. the outer walls, floor and roof). The range of the value is from a minimum of one (1) to a maximum of four (4). The ranking is done with respect to the cost of the material utilized. Therefore, the value of one will be given to the cheapest material and the value of four given to the most expensive. The values of the housing materials are as per Table 3 below.

TABLE 3

VALUES ASSIGNED TO HOUSING MATERIALS

| Wall | Value | Roof | Value | Floor | Value |
|---|---|---|---|---|---|
| Stucco | 1 | Thatched | 1 | Dirt | 1 |
| Makeshift | 1 | Other | 2 | Wood | 2 |
| Other | 1 | Sheet-Metal | 3 | Cement | 3 |
| Stone | 2 | Concrete | 4 | Tile | 4 |
| Brick | 2 | Tile | 4 | | |
| Wood | 3 | Shingle | 4 | | |
| Wood & Concrete | 4 | | | | |
| Concrete | 4 | | | | |

What is important to note here is that in several cases there were more than four options to which a value had to be assigned. Nevertheless the range of the assigned values remained 1 to 4. In this case, the value four is assigned to all those material which are more expensive than what the average household had. This is done even though amongst these options some are more expensive than others. For purposes of this paper, this doesn't really matter. What we would gather is that these households are better off than the average and that suffices for now. When deciding between the ones and the twos however, this was done using my personal judgement.

It must be pointed out though that to have a consistent system of assigning values for each type of material, the value of three (3) was assigned to that material which is utilized by most households for all the variables. From Table 4, we see that after having assigned the value to the various materials used and having ranked them accordingly, then the greater share of the people use the material that is assigned the value of three. This is consistent with the assumption made about the acceptable standard of living.

TABLE 4
VALUES ASSIGNED TO THE HOUSING MATERIALS
AND ITS DISTRIBUTION

| Wall | | | Roof | | | Floor | | |
|---|---|---|---|---|---|---|---|---|
| Value | Amount | Percentage[10] | Value | Amount | Percentage | Value | Amount | Percentage |
| 1 | 1,156 | 20.34 | 1 | 793 | 13.96 | 1 | 854 | 15.03 |
| 2 | 11 | 0.19 | 2 | 304 | 5.35 | 2 | 1,420 | 24.99 |
| **3** | **2,643** | **46.52** | **3** | **4,121** | **72.53** | **3** | **3,175** | **55.88** |
| 4 | 1,872 | 32.95 | 4 | 464 | 8.17 | 4 | 233 | 4.10 |

10 Represents the number of households with the specific characteristic under consideration as a percentage of total households.

ii) **Facilities**

The same rationale as for the housing materials was employed for the assigning values to the facilities that the household have. Here I must point out that in some instances, there was no monetary cost involved (as is the case of water). The decision therefore of assigning the value between one and two had to do with sanitation rather that cost. What is consistent throughout all the variables is that always, 4 is preferred to 3, 3 is preferred to 2, and 2 is preferred to 1.

TABLE 5
VALUES ASSIGNED TO FACILITIES

| Water | | Lighting | | Toilet | | Fuel | |
|---|---|---|---|---|---|---|---|
| Sources | Val. | Sources | Val. | Types | Val. | Sources | Val |
| River stream | 1 | Other | 1 | None | 1 | Coal | 1 |
| Other | 1 | Gas | 2 | Other | 2 | Wood | 1 |
| Standpipe | 2 | Kerosene | 2 | Pit -Latrine | 3 | Other | 1 |
| Well-tank-public | 2 | Electricity | 3 | Septic-Cesspit | 4 | Oil | 2 |
| Public piped into Yard | 3 | | | | | Gas | 3 |
| Private catchment | 3 | | | | | Electricity | 4 |
| Public piped | 4 | | | | | | |
| Private Piped | 4 | | | | | | |

Once again the value of three was assigned to that option which the majority of the people utilize. This was possible for all the facilities except in the case of lighting. Here the option which was most commonly used as the source of lighting was electricity (thereby having a weight of 3). However there was no other option that could have either been more expensive or more desirable and therefore in this category, the value of four does not exist. The various sources of the facilities and its corresponding values are stated in Table 5.

TABLE 6
VALUES ASSIGNED TO THE FACILITIES
AND ITS DISTRIBUTION

| Water | | Light | | Toilet | | Fuel | |
|---|---|---|---|---|---|---|---|
| Value | Percen-tage | Value | Percen-tage | Value | Percen-tage | Value | Percen-tage |
| 1 | 1.16 | 1 | 1.28 | 1 | 2.82 | 1 | 41.09 |
| 2 | 10.12 | 2 | 36.41 | 2 | 0.21 | 2 | 1.21 |
| 3 | 45.27 | 3 | 62.0 | 3 | 78.76 | 3 | 57.23 |
| 4 | 43.45 | 4 | 0.0 | 4 | 18.22 | 4 | 0.46 |

The ranking of the assigned values is once again consistent with the assumption made that whatever facility that the majority os household have will be considered to be the level of what is socially acceptable. The is pointed out in Table 6 above.

Persons per bedroom

In looking at the amount of persons per each bedroom, it is hoped to get an idea of how the people in the household actually live. Here, the number of persons living in the household was divided by the number of bedroom that the house has. The range was from .25 of a person per room to 20 persons per room. Since 44.7 percent of the households were living 2 to 3 persons per bedroom, this was taken to be the "acceptable standard".

There were quite a number of households that did not have a bedroom. This problem was dealt with in the following manner. If there was only 1 to 2 persons living in a house with no bedroom, the value assigned to them was 4. This was because they were not overcrowded though they lacked privacy. If however, there was more than two persons in a house with no bedrooms then they were assigned the minimum value of 1.

TABLE 7
ASSIGNED VALUES OF PERSONS PER BEDROOM

| Values assigned to persons per bedroom | | | |
|---|---|---|---|
| Range of Persons Per Bedroom | Values | Number of Households | Percentage of Total |
| 6 - 20 | 1 | 1,073 | 18.88 |
| 4 & 5 | 2 | 968 | 17.04 |
| **2 & 3** | **3** | **2,538** | **44.67** |
| .25 - 1 | 4 | 1,103 | 19.41 |

**Indexing**

What does all of this lead to? Once the values have been assigned to the household for the various housing materials, facilities and persons per bedroom, then an index is constructed for each of these (to be referred in this text as housing index, facilities index and bedroom index, respectively). These were constructed as (actual value - minimum value)/(maximum value - minimum value[11]). Each of these indices ranges from a minimum of .25 to 1. For those households that utilizes material for walls with value of 1 and material for floor with value 1 plus material for roof with value one, then their index would be 0.25. Its interpretation is that it is made up of the worst materials for all three components of the house (wall, floor and roof). This then enables us to forms the basis for identifying the poor from the non-poor.

TABLE 8
DISTRIBUTION OF HOUSEHOLDS
AS PER THE HOUSING INDEX

| Range of Index | Number of Households | Percentage |
|---|---|---|
| 0 - .25 | 335 | 5.90 |
| 0.26 - .50 | 762 | 13.41 |
| .51 - .75 | 2,856 | 50.26 |
| .76 - 1.00 | 1,729 | 30.43 |

The following tables gives us an idea of the actual number of households and their corresponding percentage of the total for the different ranges of the indices. From the Housing index, we see that there are 5.9% of the total households whose house is made up of the worst possible material (refer to Table 8). These would be those classified as the extreme poor.

11 The minimum value was zero and the maximum value was four.

The poor would be those falling in the range of .26 - .5 and amount to 13.4%. The percentage of households who fall in the average range is 50.3% of total households while there are 30.4% who have the very best housing conditions.

**TABLE 9**
**DISTRIBUTION OF HOUSEHOLDS AS PER FACILITIES INDEX**

| Range of Index | Number of Households | Percentage |
|---|---|---|
| 0 - .25 | 1 | 0.02 |
| 0.26 - .50 | 484 | 8.52 |
| .51 - .75 | 3,522 | 61.99 |
| .76 - 1.00 | 1,675 | 29.48 |

However, if we have a look at the facilities index, (refer to Table 9) those who fall in the bottom quartile is merely 0.2% of total households while the poor in this case would be 8.5% of total households. These tow indices (housing index and facilities index) both give us different estimates of the percentage of poor households. The facilities index show that 62% of total households have the average facilities while 29.5% have the best in facilities.

**TABLE 10**
**DISTRIBUTION OF HOUSEHOLDS AS PER BEDROOM INDEX**

| Range of Index | Number of Households | Percentage |
|---|---|---|
| 0 - .25 | 1,073 | 18.88 |
| 0.26 - .50 | 968 | 17.04 |
| .51 - .75 | 2,538 | 44.67 |
| .76 - 1.00 | 1,103 | 19.41 |

A look at the bedroom index indicates that 18.9% of total house-holds would be classified as the extreme poor if we were to look at the index in isolation of the others. (refer to Table 10) The three indices presents to us a different picture of the number of poor households. But given that we have defined poverty not only as being income deprived but by the other dimensions stated earlier, then the poor are identified by a combination of all three indices as stated later in this chapter.

**Correlation between the three indices**

To see the degree of correlation between each of these three sets of indices, the Spearman's rank correlation was performed. The values of the variables were ranked in order and where the values appeared in more than one instance, the average of all the ranking was taken. In all three cases, the coefficient of correlation was significant which leads us to conclude that there is some correlation between them.

TABLE 11
NUMBER OF HOUSEHOLDS FALLING WITHIN THE
SPECIFIED RANGES OF THE FACILITIES INDEX & HOUSING INDEX

| HS_Index | Facilities Index | | | | |
|---|---|---|---|---|---|
| | 0 - .25 | .26 - .50 | .51 - .75 | .76 - 1.00 | Total |
| 0 - .25 | 0 | 61 | 266 | 8 | 335 |
| .26 - .50 | 0 | 83 | 602 | 77 | 762 |
| .51 - .75 | 0 | 36 | 1,375 | 1,445 | 2,856 |
| .76 - 1.00 | 0 | 9 | 490 | 1,230 | 1,729 |
| Total | 0 | 189 | 2,733 | 2,760 | 5,682 |

Using the above Table 11, a chi-square test of association was also performed. The calculated value obtained was 1,354.58 while the critical value with 9 degrees of freedom at a 99 percent level of probability was 21.67. This leads us to reject the null hypothesis of no association and leads us to conclude that there is a significant association between the two indices.

Again, a chi-square test of association was also performed to see the association between the bedroom index and the housing index using the data on Table 12. The calculated value obtained was 602.75 while the critical value with 9 degrees of freedom at a 99 percent level of probability was 21.67. This leads us to reject the null hypothesis of no association and leads us to conclude that there is a significant association between the two indices.

TABLE 12
NUMBER OF HOUSEHOLDS FALLING WITHIN THE
SPECIFIED RANGES OF THE BEDROOM INDEX & HOUSING INDEX

| | Persons per bedroom Index | | | | |
|---|---|---|---|---|---|
| HS_Index | 0 - .25 | .26 - .50 | .51 - .75 | .76 - 1.00 | Total |
| 0 - .25 | 113 | 96 | 87 | 39 | 335 |
| .26 - .50 | 208 | 279 | 214 | 61 | 762 |
| .51 - .75 | 403 | 603 | 1,304 | 546 | 2,856 |
| .76 - 1.00 | 116 | 223 | 933 | 457 | 1729 |
| Total | 840 | 1,201 | 2538 | 1,103 | 5,682 |

The chi-square test of association was also performed to see the association between the bedroom index and the facilities index using the data on Table 13. The calculated value obtained was 547.77 while the critical value with 9 degrees of freedom at a 99 percent level of probability was 21.67. This leads us to reject the null hypothesis of no association and leads us to conclude that there is a significant association between the two indices.

TABLE 13
NUMBER OF HOUSEHOLDS FALLING WITHIN THE
SPECIFIED RANGES OF THE BEDROOM INDEX & FACILITIES INDEX

| | Persons per bedroom Index | | | | |
|---|---|---|---|---|---|
| FAC_Index | 0 - .25 | .26 - .50 | .51 - .75 | .76 - 1.00 | Total |
| 0 - .25 | 0 | 0 | 0 | 0 | 0 |
| .26 - .50 | 41 | 76 | 37 | 35 | 189 |
| .51 - .75 | 598 | 734 | 1,041 | 360 | 2,733 |
| .76 - 1.00 | 201 | 391 | 1,460 | 708 | 2,760 |
| Total | 840 | 1,201 | 2,538 | 1,103 | 5,682 |

**Justification for the proposed methodology**

The most commonly used methods of determining a poverty line are those based on specifying the minimum income that is necessary to satisfy the basic minimum consumption needs. But while income does tell us how much a person is able to consume, whether the person does spend his income on what is necessary is another matter. In other words, there is no guarantee that a person who is earning the minimum to satisfy his hunger will choose to spend on nutritious food or on food at all. But not making the right choice on what to spend one's income is not the only matter of concern. Of greater importance is the fact that income in itself is only one of the dimensions of poverty which is of interest to us in this paper.

From the previous chapter, it was seen that for the poor, income was not all that matters. This dimension has to do with the manner in which people live and takes into consideration the housing conditions, the grade of utilities and overcrowdedness. All these aspects of poverty are captured in the population census and are more reliable than the available income data simply because these conditions are visible to the eye (that of the person conducting the interview). For as pointed out in Holman (1978), "in our society the social distance or gap between different individuals and different sections of the population involves not just income but factors such as housing conditions, job security and educational opportunity."

In justifying why the poor can be accurately identified by the way the conditions under which they live, we look at two things which are: 1) the correlation of income with the three indices and 2) the how those items which constitutes the "minimum basic need" as recommended by the ILO are reflected in the proposed methodology.

**Proposed methodology and income**

In the population census, 63 percent of the head of households stated their annual income. The data for these 63 percent of the households was used to make a series of chi-square tests of association between income and each of the three indices (housing index, facilities index and bedroom index). The values of the levels of income are as follows:

Level 1: 0 - 8,639
Level 2: 8,640 - 15,839
Level 3: 15,840 - 23,039
Level 4: 23,040 and higher

TABLE 14
NUMBER OF HOUSEHOLDS FALLING WITHIN THE
SPECIFIED RANGES OF INCOME & FACILITIES INDEX

| Income Level | Facilities Index | | | | |
|---|---|---|---|---|---|
| | 0 - .25 | .26 - .50 | .51 - .75 | .76 - 1.00 | Total |
| 1 | 0 | 744 | 1,467 | 446 | 2,635 |
| 2 | 0 | 58 | 343 | 307 | 708 |
| 3 | 0 | 6 | 51 | 52 | 109 |
| 4 | 0 | 2 | 39 | 57 | 98 |
| Total | 0 | 810 | 1,900 | 862 | 3,572 |

Using the data on Table 14, a chi-square test of association was performed and the calculated value of 280. 46 was obtained. Given that the critical value, for 9 degrees of freedom was 21.67 at the 99 percent probability level, then we reject the hypothesis of no association.

TABLE 15
NUMBER OF HOUSEHOLDS FALLING WITHIN THE
SPECIFIED RANGES OF INCOME & HOUSING INDEX

| Income Level | Housing Index | | | | |
|---|---|---|---|---|---|
| | 0 - .25 | .26 - .50 | .51 - .75 | .76 - 1.00 | Total |
| 1 | 200 | 467 | 1,324 | 666 | 2,657 |
| 2 | 12 | 32 | 325 | 339 | 708 |
| 3 | 1 | 4 | 49 | 55 | 109 |
| 4 | 0 | 2 | 37 | 59 | 98 |
| Total | 213 | 505 | 1,900 | 862 | 3,572 |

In the case of the housing facilities, the calculated value obtained was 268.73 which once again leads us to reject the hypothesis of no association.

Lastly, for the bedroom index, the same conclusion is arrived at as in the previous two tests. The calculated value in this case, using data from Table 16, was 280.46 which is greater than the critical value of 21.67 for 9 degrees of freedom at the 99 percent level of probability. Since in all three cases, there is an association between income and each of the indices, then we can conclude that the methodology proposed is as good a proxy

for measuring poverty as is income. Moreover given that the proposed methodology is based on the population census, the identification of who the poor are is more precise.

TABLE 16
NUMBER OF HOUSEHOLDS FALLING WITHIN THE SPECIFIED RANGES OF INCOME & BEDROOM INDEX

| Income Level | Bedroom Index | | | | |
|---|---|---|---|---|---|
| | 0 - .25 | .26 - .50 | .51 - .75 | .76 - 1.00 | Total |
| 1 | 681 | 599 | 1,156 | 221 | 2,657 |
| 2 | 114 | 63 | 375 | 156 | 708 |
| 3 | 15 | 7 | 63 | 24 | 109 |
| 4 | 8 | 2 | 52 | 37 | 98 |
| Total | 818 | 671 | 1,646 | 438 | 3,572 |

**Proposed methodology and minimum basic needs**

1. Food

One of most important items in the basket of minimum needs is food intake. In the methodology that is proposed in this paper for identifying the poor, persons falling in the category of being poor because of the lack of food, are clearly captured. That is to say, it is quite likely that if a person is living in the worst conditions that they might even be deprived of food. If this is the case then they are captured in the set of persons classified as poor in this paper. On the other hand, persons who are living under the best conditions would be less likely to suffer from starvation. This is so because they have more assets which they could dispose of in exchange for food. Clearly, it is assumed that the satisfaction of hunger takes preference over any material good.

2). Clothing

Once again the same rationale as that which was employed in the food is utilized here. If a person can afford to live in a nice house with all the facilities and enough room for each person, then they will not be walking around naked. If there are such people who lack clothing, they are most likely to be found in the group of households which also lack decent housing and other vital utilities.

3.) Shelter

This aspect of basic needs is inherent in the methodology applied for identifying the poor. Shelter is one of the components that is utilized for determining whether a household is poor or not and therefore it is directly addressed.

4). Safe drinking water

This is again one of the factors that is directly taken into consideration in the proposed methodology for identifying the poor. Households whose main source of drinking water is a stream or river are classified as poor.

5). Sanitation

This aspect of basic needs is once again addressed directly in the proposed methodology. The manner in which waste disposal is taken care of is directly related to sanitation and therefore addressed.

6). Education

Education in Belize, up to the Sixth Form level is free. However, there are costs such as transportation, uniform books, etc. that a parent would have to meet if the child is attending school aside from the opportunity cost in terms of labor and income of sending the child to school. It is quite likely that if a child is deprived of a primary education because the parent cannot afford the costs, that they would also fall in the category of those who also lack decent housing and utilities. At a higher level of education, the this theory would not necessarily hold. This is so because there are only three secondary schools in the District of Orange Walk, two of which are located in the urban area and one in the rural area. As a result the cost is much higher and even families living in the rural area and who are more or less living under decent conditions would find it somewhat difficult to send their child to secondary schools or higher levels.

**Criteria for Identifying the Poor**

Having assigned each household their corresponding indices, then it is just a matter of defining who the poor are. A household is considered to be poor in the context of the study if they fall within the parameters of the categories specified below:

a) It has a housing index less than or equal to .25 or
b) if it has a housing index greater than .25 but whose facilities index was less than or equal to .50 or
c) if it has a housing index greater than .25 and whose facilities index was greater than .50 but whose bed index was less than or equal to .25

**Headcount Index of the poor**

When this method is employed, we get that there are 1,162 households that are poor, representing 20.5% of total households. The breakdown of this number by the three criterion defined above is as follows:

1) There are 335 households whose housing index was .25
2) There are 128 households who are living in average to good houses but who do not have adequate facilities.
3) There are 699 households who are living in average to good houses, who have adequate facilities but who are overcrowded.

**Location**

Of the 1,162 households who are classified as being poor, 196 are located in the urban area while 966 are distributed in the rural areas. This means that 9.0% of the total households in the urban area are poor while 27.6% of the households in the rural areas are poor. This, however, is not surprising. In the district of Orange Walk there are over 30 villages. Some of these are quite a distance from Orange Walk Town and their access to public utilities is very limited.

TABLE 17
CLASSIFICATION OF POOR AND NON-POOR BY LOCATION

| Location of Household | Actual numbers | | As a percentage of total | |
|---|---|---|---|---|
| | Poor | Non-poor | Poor | Non-poor |
| Urban | 263 | 1,917 | 4.6 | 33.7 |
| Rural | 1,069 | 2,433 | 18.8 | 42.8 |

**Sex of head of household**

Belize on a whole is a very partriarcal society and once there's a male in the house he is considered the head of the household. Those female head of household are mainly single mothers or who are either divorced or widowed. Of the total population, 88.5 percent of households are headed by males and only 11.5 are headed by females. However, the incidence of poverty amongst the poor, the greater for male headed households than for female headed households. (refer to Table 17)

TABLE 18
CLASSIFICATION OF POOR AND NON-POOR BY SEX

| Sex of head | Actual numbers | | As a percentage of total | |
|---|---|---|---|---|
| Household | Poor | Non-poor | Poor | Non-poor |
| Male | 1,212 | 3,819 | 21.3 | 67.2 |
| Female | 120 | 531 | 2.1 | 9.3 |

**Education level of head of household**

The highest level of education of 71 percent of the poor households is primary education. Another 24 percent have no education whatsoever. Another 3 percent have secondary education and the remaining two percent have higher education. It is not very common that someone with a university education to be poor. However, it is not impossible. Here, a detailed look was taken at three households whose head had a university degree but who were classified as poor. At first instance I thought it was an error. However, by looking at the details of the house, I concluded that they were indeed poor. Of these three head of households, one was classified as poor because of overcrowdedness and the other two because they lacked the essential facilities. However, it was also observed that these persons were living in the rural area and were self employed. Table 19 shows that there are proportionately more persons with no education amongst the poor households than amongst the non-poor households. On the other hand, the proportion of the non-poor with an education higher than the primary level is 18.3 percent while only 5 percent of the poor have higher education.

TABLE 19
CLASSIFICATION OF POOR AND NON-POOR BY EDUCATION

| Level of education of head of | Actual numbers | | As a percentage of respective category | |
|---|---|---|---|---|
| Household | Poor | Non-poor | Poor | Non-poor |
| None | 327 | 527 | 24.6 | 12.1 |
| Primary | 938 | 3,026 | 70.4 | 69.6 |
| Secondary | 52 | 580 | 3.9 | 13.3 |
| Pre-Uni | 11 | 117 | 0.8 | 2.7 |
| University | 4 | 100 | 0.3 | 2.3 |

**Average number of persons**

The average number of persons living in poor households is 6.39 as opposed to 5.11 in non-poor households. As can be observed from Table 19, there are 20.6 percent of poor households whose number of persons exceeds 8 while this same proportion for the non-poor is reduced to 11.8 percent.

TABLE 20

CLASSIFICATION OF POOR AND NON-POOR BY NUMBER OF PERSONS

| Number of persons in Household | Actual numbers | | As a percentage of respective category | |
|---|---|---|---|---|
| | Poor | Non-poor | Poor | Non-poor |
| 0 - 4 | 505 | 1,850 | 37.9 | 42.5 |
| 5 - 8 | 553 | 1,986 | 41.5 | 45.7 |
| 9 - 12 | 236 | 453 | 17.7 | 10.4 |
| 13 - 16 | 33 | 54 | 2.5 | 1.2 |
| 17 - 20 | 5 | 7 | 0.4 | 0.2 |

**Comparing the rural poor and the urban poor**

Total persons living in the rural areas 19,617 persons of which 31.4 percent fall in the category of poor. For the urban area, the poor only represent 11.7 percent of the total urban population of 10,880 people.

The composition of the urban population with respect to sex is almost proportionate with 657 of the 1,274 being males and 617 being females. In the rural areas there are more males than females but this is mere fate.

Generally, it seems that the poor households tend to be larger in terms of persons living in the household. The average amount of persons living in an urban poor household is 6.5 persons while the same average for the urban non-poor is reduced to 4.75. These 6.5 persons are comprised of 1 head of the family, .79 spouse, 3.5 children and 1.2 other persons who can either be relatives or not. This is indicative of the practices of having extended families. What we see happening here is a strain on those who are working. Because of the size of the household, more is spent on consumption of basic needs. Usually large households tend to have greater dependency burdens. The dependency ratio is measured as the number of dependents divided by the total number of members in the household. In the case of the urban poor, for the dependency ratio is 75 percent

which means that only 25 percent of the total poor urban population are working. This ratio drops to 68 percent for the urban non-poor.

For the rural poor household, the same holds. The average amount of persons living in a rural poor household is 6.4 persons while those living in a rural non-poor household is 5.3 persons. The dependency ratio for the rural poor is 76 percent while that for the rural non-poor is 71 percent. As compared to the urban area, we see that the rural area, because of family size have greater dependency ratio both the poor as well as the non-poor.

# CHAPTER V

## DETERMINANTS OF POVERTY

**Overview:**

To be able to determine what the factors that contribute to the probability of a household being poor, a logit regression is performed. The results indicate that as the head of the household obtain a higher level of education, the probability of being poor decreases. With respect to age, it was noted that as the head of the household get older, the probability of that household being poor decreases. This relationship holds only up to the age of seventy, after which the relationship is reversed. As expected, the probability of being poor is higher for household with larger numbers of persons than for the ones with fewer persons. The sex of the head of household does not contribute significantly to the probability of being poor but the ethnic group of the head of the household does. Also, the probability of a household being poor is greater for those households which are located in the rural areas.

**Model Specification:**

When the nature of a dependent variable is qualitative rather than continuous, and represented by a dummy variable, there are special estimating problems that may arise performing a regression. In such cases, even though the values of the regressand are 0 and 1, predicted value of the regressand takes values beyond this range of 0 - 1. In such cases, a logit regression solves this problem as it always predicts probabilities located between 0 and 1.

The measure used in this paper to identify the poor households was dependent on three principal aspects of living standards. A household was considered to be poor if the housing conditions are very bad, if the facilities which it utilizes are poor or if the members of the household live in an overcrowded state. But what are the factors that contribute to the probability of a household being poor or not? To answer this question the following model was specified:

$$Poor = \beta_1 + \beta_2 Age + \beta_3 Age2 + \beta_4 Edu2 + \beta_5 Sex + \beta_6 Pers + \beta_7 Urban + \beta_8 Eth + \mu$$

and a logit regression performed given the dichotomous categorical nature of the regressand. The choice of regressors are mostly directly related to the head of the household, though the location of the household and the number of persons living in the household were also included. These regressors are the ones which I believe are the most important but are by no means exhaustive. The database is quite extensive and other factors such as migration, employment and land ownership could have been

utilized. However, I was limited by the capacity of the software package used to perform the regressions. Micro TSP has a limit of eight variables and therefore posed the constraint of specifying a more general model. Nevertheless, the results of the regression did provide us with the necessary information to be able to get a better understanding as to what some of the principal determinants of poverty are.

Description of Variables:

**Poor** - represents the category under which the household is classified. It takes the value of 1 when the household is poor and the value zero otherwise.

**AGE** - represents the age of the head of the household. The range of this series is a minimum of 15 years and the maximum was 94 years.

**AGE2** - represents the age of the head of the household elevated to the power of two. This was done so as to obtain the relationship whereby the probability of being poor decreases with age but only up to a certain age after which the relationship is reversed.

**EDU2** - represents the highest educational level that the head of the household has attained raised to the power of 2. This was obtained to assign a greater weight to higher levels of education. The total levels utilized are five which are no education, primary education, secondary education, pre-university education, and university education.

**SEX** - represents the sex of the head of the household. The value of 1 is assigned to males and zero for females.

**PERS** - represent the number of persons living in the household. This number is comprised of persons who usually live and share at least one daily meal with the household. The range of this series was a minimum of 1 person and the maximum of 20 persons living in the household.

**URBAN** - represents the location of the household in the urban or rural area. The value of 1 is assigned to the urban area and zero otherwise.

**ETH** - represents the ethnicity of the head of the household. The value of 1 is assigned to creoles and the value of zero otherwise.

The coefficients, standard error and t-statistic for each of the regressors are stated in Table 21 below. A priori, $\beta_2$, $\beta_4$, $\beta_7$ and $\beta_8$, are expected to be negative while $\beta_3$, $\beta_5$,

and $\beta_6$ are expected to be positive. As the results indicate, in all cases the estimated coefficients have the a priori expected signs. Except for the regressor SEX, all the regressors are statistically significant at the 5 percent level.

TABLE 21
RESULTS OF LOGIT REGRESSION

| Variables | Values of the Estimated Coefficients | | Std. Error | t-Statistic |
|---|---|---|---|---|
| Constant | $\beta_1$ | 0.6376 | 0.3247 | 1.9637 |
| Age | $\beta_2$ | -0.0653 | 0.0141 | -4.6312 |
| Age2 | $\beta_3$ | 0.0005 | 0.0001 | 5.0000 |
| Edu2 | $\beta_4$ | -0.2012 | 0.0203 | -9.9113 |
| Sex | $\beta_5$ | 0.0944 | 0.1254 | 0.7528 |
| Pers | $\beta_6$ | 0.1531 | 0.0128 | 11.9609 |
| Urban | $\beta_7$ | -1.0203 | 0.0890 | -11.4640 |
| Eth | $\beta_8$ | -0.4134 | 0.1673 | -2.4710 |

The interpretation of the coefficients is that they give the change in the log of the odds ratio of being poor per unit increase in the corresponding variable. For example, the estimated coefficient of the variable education, indicates that the attainment of an additional level of education, lowers the odds that the household be poor. Likewise, the odds that a household be poor is decreased if the household is located in the urban area as opposed to the rural area. As the head of the household gets older, the odds of the household being poor decreases. This relationship holds up to the age of 65. Between the ages of 65 and 70, the odds of being poor remains constant and after the age of 70 the relationship is reversed and the odds in favor of being poor increases. Lastly, if the head of the household is a Creole, then the odds of being poor decreases. On the other hand, the higher the number of persons living in the household, the greater are the odds of being poor. If the head of the household is a male, the odds of that household being poor also increases though as mentioned earlier, this variable proved to be insignificant.

By utilizing the values of the estimated coefficients $\beta_1 ... \beta_8$, then the probability of a household of being poor for different values of the variables can be calculated using the formula below,(Gujarati,1988)

where $e$ is the familiar base of the natural logarithm. For example, a person with the following characteristics: a non-creole, male person living in the rural area, 40 years of

$$P_i = E(Poor = 1|\beta_i) = \frac{1}{1 + e^{-(\beta_1 + \beta_3 Age + \beta_3 Age2 + \beta_4 Edu2 + \beta_5 Sex + \beta_6 Pers + \beta_7 Urban + \beta_8 Eth + \mu)}}$$

age, with only primary level education, and having 6 persons living in the household, would have a probability of being poor of 9.9 percent. This was arrived at by substituting the values of the estimated coefficients as per Table 21 in the formula above, along with the values of the variables as follows: Age = 40, Age2 = 1,600, Edu2 = 4, Sex = 1, Pers = 5, Urban = 1, and Eth = 0.

The effect on the probability of being poor of changes in the values of a specific variable can be calculated while maintaining the values of the remaining variables fixed. For example, the pure effect of the location of the household on the likelihood of being poor can be captured in the above mentioned example by changing the value of urban from 1 to 0, (urban is a dummy variable where 1 represents urban and 0 represents rural). In this case, the probability of the household being poor increasing from 9.9. percent to 23.4 percent as a result of the location of the household changing from urban to rural.

To capture similar effects of some of the other variables on the probability of being poor, values were specified for three different scenarios (worst case, average case and best case). The values of the variables for these scenarios are set as indicated in Table 22

In these scenarios, the values were set at that level where the probability of being poor was the highest, the calculated average and where the probability of being poor was the lowest, respectively. For example, in the worst case scenario, the age of the head of household where the probability of being poor is at its highest, is 15 years. However, when it is seen in conjunction with that value of the variable Pers for which the likelihood of being poor it at its peak (20 persons), the situation becomes unrealistic . It is highly improbable to find a person fifteen years to age and being the head of a household comprised of twenty persons. I therefore opted for that age and that number of persons that was more realistic and which would be representative of a worst case such as a person of 30 years and being the head of a household comprised of 10 persons. The value of the worst possible level education is having no education at all. Though the variable sex was not statistically significant, the odds of being poor are in favor of males and therefore this is the sex that is utilized for the worst case scenario. For the location of the household, since the odds of being poor are in favor of households located in the rural area, then in the worst case, this is where the household would be located. And lastly the head of the household would be a non-creole.

TABLE 22
VALUES ASSIGNED TO VARIABLES FOR INDICATED SCENARIOS

| Variables | Worst Case | Average Case | Best Case |
|---|---|---|---|
| Age | 30 | 42 | 65 |
| Education | None | Primary | University |
| Sex | Male | Male | Female |
| Number Persons | 10 | 5 | 1 |
| Urban-Rural | Rural | Rural | Urban |
| Ethnicity | Non-Creole | Non-Creole | Creole |

In the average case scenario, the age and education of the head of the household are the calculated averages using the 5682 observation. Likewise, the number of persons living in the household is also the average. However, as the average for the dichotomous variables sex, urban-rural and ethnicity are meaningless, then the median was used as being the representative for the "average household". The values for the best case scenario posed no conflict within themselves.

EDUCATION:

To determine the probability that a household be poor for the different levels of education that the head of household can possibly have, we will fix the values of the variables age, sex, number of persons, urban-rural, and ethnicity as per their corresponding values in the Table 21. This is done for the three scenarios while varying only the levels of education and the corresponding probabilities stated in Table 23. Given these values for the worst, average and best case scenario then from Figure 3, we can see that as the head of household attains a higher level of education, the probability of that household being poor decreases significantly. This holds for all the three scenarios but the impact of an additional level of education on poverty is stronger in the worst case scenario. From the Table 23 we see that the

TABLE 23
PROBABILITY OF BEING POOR FOR DIFFERENT LEVELS OF EDUCATION

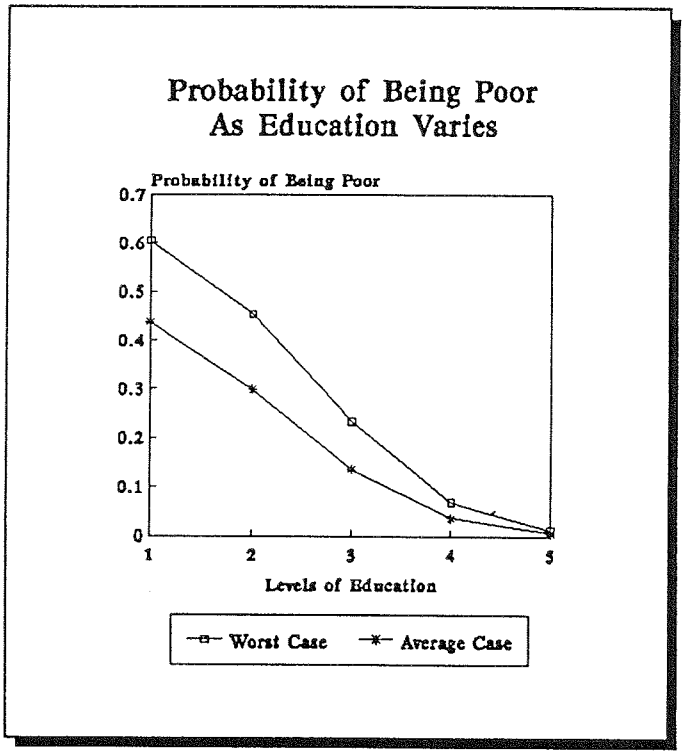
Percentages

| Levels of Education | Probability of Being Poor In the Various Scenarios | | |
|---|---|---|---|
| | Worst | Average | Best |
| None | 60.4 | 43.8 | 4.5 |
| Primary | 45.4 | 29.9 | 2.5 |
| Secondary | 23.3 | 13.5 | 0.9 |
| Pre-Uni | 6.9 | 3.7 | 0.2 |
| University | 1.2 | 0.6 | 0.0 |

probability of achieving primary education decreases the probability of being poor by 15 percentage points, 13.9 percentage points and 2.0 percentage points in the worst, average and best case scenarios, respectively. When all other variables are the worst possible, if the head of the household had pre-university education then the probability of being poor is 6.9% while if his education is at a university level the chances of being poor is 1.2%. In the best case scenario, if the head of household has no education, then the chances of being poor is 4.5% and at the highest level of education, the probability is reduced to zero.

FIGURE 2

What is interesting to note here is that as the head of the household attains a higher level of education, the gap between the probability of being poor in the worst case and average case scenarios are closing in. As a result while the gap in the probability of being poor is 16.6 percentage points for a head of household who has no education, when the head of household has a pre-university level this gap is reduced to 3.2 percentage points. Furthermore the gap is reduced to only 0.6 percentage points when the head of the household has a university degree.




**AGE:**

Here we are interested in seeing what the probability of being poor is as the head of household gets older. This exercise is carried out while varying age and fixing the values of all the other variables in the various scenarios as per Table 21. The results are shown in Table 24. What this shows is that in the worst case scenario, a person, 15 years of age and head of a household in the rural area has a 74.8 percent probability of being poor and is reduced to the minimum of 41.2 at the age of 70. Thereafter the inverse relationship that existed between age and the probability of being poor is reversed and an additional year of age beyond the age of 70 leads to an increase in the probability of being poor. In the average case scenario, this person at fifteen years of age would have a probability of being poor of 45.4 percent. The minimum probability of being poor is

once again reached at the age of seventy. In the best case scenario, the age does not contribute significantly to the probability of being poor. The reason is that the education level in the best case scenario is a university degree. This being the case, the chances of being poor is practically eliminated. Therefore in this case, age becomes a lesser important factor in determining the probability of being poor or not.

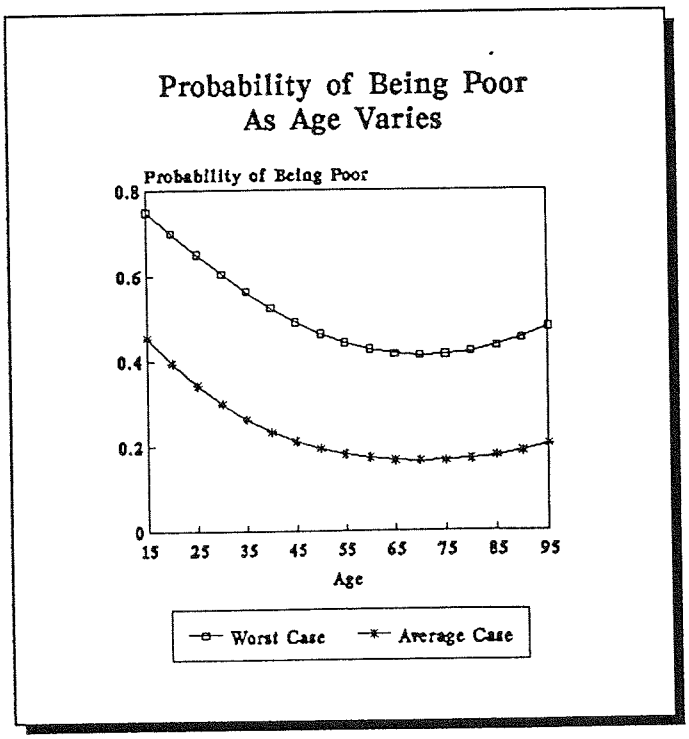
TABLE 24
PROBABILITY OF BEING POOR
AS AGE VARIES

Percentages

| Age of Head of Household | PROBABILITY OF BEING POOR IN THE VARIOUS SCENARIOS | | |
|---|---|---|---|
| | Worst | Average | Best |
| 15 | 74.8 | 45.4 | 0.2 |
| 20 | 69.9 | 39.4 | 0.1 |
| 25 | 65.0 | 34.2 | 0.1 |
| 30 | 60.4 | 29.9 | 0.1 |
| 35 | 56.1 | 26.3 | 0.1 |
| 40 | 52.2 | 23.4 | 0.1 |
| 45 | 48.9 | 21.1 | 0.1 |
| 50 | 46.2 | 19.4 | 0.0 |
| 55 | 44.1 | 18.1 | 0.0 |
| 60 | 42.6 | 17.2 | 0.0 |
| 65 | 41.6 | 16.6 | 0.0 |
| 70 | 41.2 | 16.4 | 0.0 |
| 75 | 41.4 | 16.5 | 0.0 |
| 80 | 42.1 | 16.9 | 0.0 |
| 85 | 43.4 | 17.6 | 0.0 |
| 90 | 45.2 | 18.7 | 0.0 |
| 95 | 47.7 | 20.3 | 0.0 |

By looking at Figure 3, it can be seen that in both scenarios, the relationship between additional years of age and the probability of being poor are the same. The slope of the curve decreases up to age 70 and then increases. Also the difference in the probability of being poor for the two scenarios does not vary much. It ranges from a maximum of 31 percentage points when age is 20 years to a minimum of 25 percentage points when the age is 60 years. The effect of a reduction is poverty is greatest during the ages of 15 to 20. In the worst case scenario, moving from age 15 to 20 reduces the likelihood of being poor by 4.9% while moving from ages 50 to 55 only reduces this probability by 2.1%.

FIGURE 3



## NUMBER OF PERSONS:

With respect to the number of persons living in a household, we see that with each additional person the probability of being poor increases. (See Table 25) In the worst case scenario, this probability ranges from 30.9 percent with the number of persons being two, to a probability of being poor of 87.6 percent when the number of persons is twenty. The probability range of the average case scenario is from 15.4 % to 74.2%. In the best case scenario, the probability of being poor is minimal even when the number of persons is at its highest. This results from the effect of education which more than compensates for the increase in the probability of being poor resulting from increased number of persons.

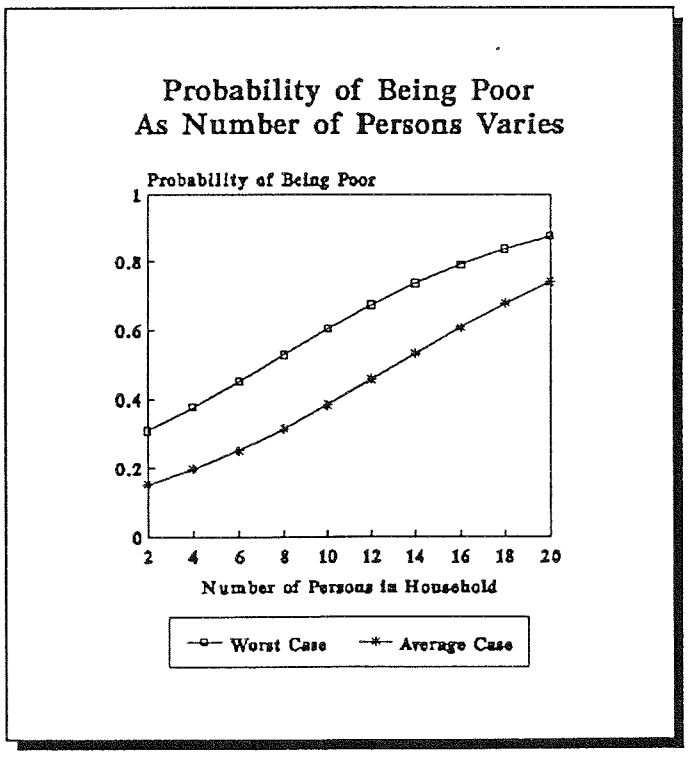
TABLE 25
PROBABILITY OF BEING POOR
AS NUMBER OF PERSONS VARIES

Percentages

| Number of Persons in Household | PROBABILITY OF BEING POOR IN THE VARIOUS SCENARIOS | | |
|---|---|---|---|
| | Worst | Average | Best |
| 2 | 30.9 | 15.4 | 0.0 |
| 4 | 37.8 | 19.9 | 0.1 |
| 6 | 45.2 | 25.2 | 0.1 |
| 8 | 52.9 | 31.4 | 0.1 |
| 10 | 60.4 | 38.3 | 0.1 |
| 12 | 67.4 | 45.8 | 0.2 |
| 14 | 73.7 | 53.4 | 0.3 |
| 16 | 79.2 | 60.9 | 0.4 |
| 18 | 83.8 | 67.9 | 0.5 |
| 20 | 87.6 | 74.2 | 0.7 |

FIGURE 4

Figure 4 depicts the probability of being poor for the different number of persons in the household. Here the gap between the two scenarios widens up to when the number of persons in the household is 12 and then closes in. The probability of being poor rate the worst case scenario increases at an increasing rate up to the number 10, after which it increases but a decreasing rate. In the average case scenario, the probability of the household being poor increases at an increasing rate up to the number 14 and the increases at a decreasing rate.



## CHAPTER VI

## What can be said about the poor?

### Introduction

The headcount index of the poor, as presented in Chapter IV, indicated that 20.45 percent of total households in the district of Orange Walk are poor. But up to this point we still don't know why one sector seems to be poorer than another sector. In this chapter, the answer is seeked to three questions. Firstly, why is it that the proportion of female headed households who are poor is less than that of poor male headed households? Secondly, why is it that the incidence of poverty for households located in the rural areas is greater than for those located in the urban area? Lastly, why is it that the incidence of poverty amongst the ethnic group Creole is lower than that for the other ethnic groups?

### Sex of head of household

The sex of the household was not statistically significant in the regression analysis (as shown in the previous chapter). Nevertheless, if we take a look at the difference between female headed households and compare these to the male headed households, it can be seen that there are proportionately less poor female headed households than poor male headed households. Of the total 651 female headed households, 15 percent are poor while of the 5,031 male headed households, 21 percent are living in poverty.

TABLE 26

RESULTS OF CHI-SQUARE TESTS OF ASSOCIATION

| | Education | Age | Persons | Urban | Ethnicity |
|---|---|---|---|---|---|
| Calculated Value | 30.71 | 99.26 | 61.95 | 138.17 | 19.82 |
| Critical Value | 18.48 | 16.81 | 11.34 | 6.63 | 6.63 |
| Degrees of freedom | 7 | 6 | 4 | 1 | 1 |
| Probability level | 99.00% | 99.00% | 99.00% | 99.00% | 99.00% |

But what are the factors that contribute to this state? To answer this question, a chi-square test of association was done for the variable sex and each of the other variables which were utilized in the regression to explain poverty, individually. In this case for example, data was obtained for the education of the head of household by levels, age of the head of household by levels, number of persons in the household, the location of the

household and the ethnicity of the head of the household. This data was obtained for both male and female headed households. The results of the chi-square tests performed (see Table 26) show that the association between the sex of the head of the household and each of the determinants of poverty are highly significant at the 99 percent probability level and we therefore reject the hypothesis of *no association* between sex and the other variables.

But in order to pinpoint why it is that poor female headed households are proportionately less than poor males headed households, the formula for the chi-square test of association was modified from the sum of $(a_{ij} - e_{ij})^2 / e_{ij}$ (where $a_{ij}$ is the actual frequency observed for the *j*th cell entry in the *i*th row and $e_{ij}$ is the corresponding expected frequency) to $(a_{ij} - e_{ij})/e_{ij} * 100$ so as to preserve the sign of the statistic. This was interpreted in the following manner. Given the values in Table 27, which gives the results of the $(a_{ij} - e_{ij})/e_{ij} * 100$, then the negative values that corresponds to the female headed household between the ages 15 years to 55 years mean that there are less female headed households in these age brackets than the frequency which was expected. Furthermore, the positive sign on the remaining age brackets indicate that there are more female headed households in these brackets than that which was expected. As a result, it can be concluded that the combination of the under representation of the females in the age brackets 15 - 55, and the over representation of them in the age brackets 56 - 75, contributes to the lower probability that a female headed households to poor as compared to male headed households.

**TABLE 27**
**ACTUAL VALUES LESS EXPECTED VALUES**
**AS A PROPORTION OF EXPECTED VALUES**

| Sex of head of household | Age group of head of household | | | | | | |
|---|---|---|---|---|---|---|---|
| | 15-25 | 26-35 | 36-45 | 46-55 | 56-65 | 66-75 | 75+ |
| Males | 4.57 | 3.43 | 0.61 | 0.11 | -7.19 | -7.24 | -15.45 |
| Females | **-35.30** | **-26.54** | **-4.71** | **-0.89** | **55.56** | **55.96** | **119.37** |

Having done these tests for age against each of the other determinants of poverty, it can be concluded the probability of being poor is lower for a household which is headed by a female than that which is headed by a male. (See Table 28 for details). The results of the test between the sex of the head of the household as opposed to the various levels

of education, indicate that female headed households are less educated than male headed household. This being the case, one would expect to have proportionately more poor female headed households as compared to poor male headed households. But we have seen that this is not the case and in fact the reverse is true. This is possible because, if we look at the other determinants of poverty, all the odds against poverty are in favor of female headed households. That is to say, female headed households have fewer members than male headed households and therefore the probability that a female headed household be poor is less than that of a male headed household. Likewise, we expect that the older the head of the household, up to 70 years of age, the lesser is the probability of being poor and this is exactly the case for female headed households. The proportion of female headed household in the higher age groups is larger than that for the male headed households. Another factor that helps to counteract the increased probability of poverty in female headed households due to lower levels of education is that female headed households are concentrated largely in the urban area. Lastly, it is expected that if the head of the household is of the ethnic group creole, then the probability of being poor decreases. From the data it can be seen that the ethnicity of female headed households are mostly creole thereby reducing the probability of the household being poor.

**TABLE 28: MATRIX OF THE DETERMINANTS OF WHY THE INCIDENCE OF POVERTY IS HIGHER AMONG FEMALE HEADED HOUSEHOLDS AS OPPOSED TO MALE HEADED HOUSEHOLDS**

| Poverty Determinant | Relationship of determinant to probability of being poor | Results from Chi-Square tests of association | Effect on probability of being poor |
|---|---|---|---|
| Education | As the head of a household obtains a higher level of education, the probability of being poor decreases. | Male headed households are better educated than female headed households. | $P_F(Poor) > P_M(Poor)$ |
| Age | As the head of household gets older (up to the age of 65), the probability of being poor decreases. After the age of 70 the probability of being poor increases. | Female headed household are proportionately over-represented in the higher age groups than the male headed households. | $P_F(Poor) < P_M(Poor)$ |
| Number of persons in the household | As the number of persons living in the household gets larger, the probability of being poor increases. | Female headed households have fewer members than male headed household | $P_F(Poor) < P_M(Poor)$ |
| Urban - Rural | The probability of being poor increases if the household is located in the rural area and decreases if the household is located in the urban area. | There are fewer female headed households in the rural area. | $P_F(Poor) < P_M(Poor)$ |
| Ethnicity | The probability of being poor decreases if the head of the household is Creole. | There are proportionately more Creole female head of households. | $P_F(Poor) < P_M(Poor)$ |

**Location**

Of the 1,162 households that are classified as being poor, 196 are located in the urban area while 966 are distributed in the rural areas. This means that 9.0 percent of the total households in the urban area are poor while 27.6 percent of the households in the rural areas are poor. This, however, is not surprising. In the district of Orange Walk there are over 30 villages. Some of these are quite remote from Orange Walk Town and their access to public utilities is very limited.

Once again, by doing the chi-square tests of association for the variable Urban against the other determinants of poverty, a better insight is gotten as to why there is a higher tendency for households located in the rural areas to be poor as opposed to households located in the urban areas. The results of these tests are presented in Table 29 below and indicate that the association between the location of the household and education, persons, sex and ethnicity are highly significant at the 99 percent probability level and we therefore reject the hypothesis of *no association* between the location of the households and these variables. Age is the only variable that is not significant and we therefore accept the null hypothesis of no association between the age of the head of household and the location of the household.

TABLE 29
RESULTS OF CHI-SQUARE TESTS OF ASSOCIATION

| | Education | Age | Persons | Sex | Ethnicity |
|---|---|---|---|---|---|
| Calculated Value | 426.74 | 3.73 | 77.64 | 138.17 | 243.41 |
| Critical Value | 6.63 | 16.81 | 11.34 | 6.63 | 6.63 |
| Degrees of freedom | 4 | 6 | 4 | 1 | 1 |
| Probability level | 99.00% | 99.00% | 99.00% | 99.00% | 99.00% |

As was done with sex, a series of test was carried out to determine why a greater proportion of households were poor in the rural area as opposed to those in the urban area. The results to these are stated in Table 30 below. In the test performed on the location of the household as opposed to education, it is observed that the head of households in the urban area are better educated than the head of households in the rural areas. As a result of this, the probability of being poor if the household is located in the rural area is greater than those located in the urban area. By testing the location of the households against the age of the head of the household, it is concluded that there

are proportionately more older head of household in the urban area than in the rural area. This again is in favor of reducing the probability of being poor for households that are located in the urban area. Households in the urban area have less members living in the household than those in the rural area. The average number of persons living in an urban household is 5 as opposed to an average of six in a rural household. As seen previously, there are more female headed households in the urban area than in the rural area. Lastly, with respect to ethnicity, there are proportionately more creole headed households in the urban area than in the rural areas and therefore decreases the probability for the urban household to be poor.

TABLE 30: MATRIX OF THE DETERMINANTS OF WHY THE INCIDENCE OF POVERTY IS HIGHER FOR HOUSEHOLDS LOCATED IN THE RURAL AREA THAN FOR THOSE LOCATED IN THE URBAN AREA

| Poverty Determinant | Relationship of determinant to probability of being poor | Results from Chi-Square tests of association | Effect on probability of being poor |
|---|---|---|---|
| Education | As the head of a household obtains a higher level of education, the probability of being poor decreases. | Urban head of households are better educated than rural head of households. | $P_U(Poor) < P_R(Poor)$ |
| Age | As the head of household gets older (up to the age of 65), the probability of being poor decreases. After the age of 70 the probability of being poor increases. | There are proportionately more older head of households in the urban area than in the rural area. | $P_U(Poor) < P_R(Poor)$ |
| Number of persons in the household | As the number of persons living in the household gets larger, the probability of being poor increases. | Urban households have less members living in the household as compared to the rural areas. | $P_U(Poor) < P_R(Poor)$ |
| Sex | The probability of being poor increases if the head of the household is a male. (Though the t-stat shows that this is insignificant). | There are more female headed households in the urban areas than in the rural areas. | $P_U(Poor) < P_R(Poor)$ |
| Ethnicity | The probability of being poor decreases if the head of the household is a Creole. | There are proportionately more Creole head of households in the urban area than in the rural area. | $P_U(Poor) < P_R(Poor)$ |

**Ethnicity**

The ethnic groups that are considered here are creoles and non-creoles. From the data it was noticed that 9.4 percent of creoles are poor while 21.5 percent of non-creoles are poor. The results of the chi-square test of association as shown in Table ... indicate that in all cases, except age, the calculated value is greater than the critical value. This being the case, we conclude that the association between the ethnicity of the head of the household and the variables education, persons, urban and sex are significant at the 99 percent probability level and we therefore reject the null hypothesis of no association.

TABLE 31
RESULTS OF CHI-SQUARE TESTS OF ASSOCIATION

| | Education | Age | Persons | Sex | Urban |
|---|---|---|---|---|---|
| Calculated Value | 57.39 | 5.75 | 13.90 | 19.82 | 243.41 |
| Critical Value | 6.63 | 16.81 | 11.34 | 6.63 | 6.63 |
| Degrees of freedom | 4 | 6 | 4 | 1 | 1 |
| Probability level | 99.00% | 99.00% | 99.00% | 99.00% | 99.00% |

Why is it that creole headed poor households are proportionately less than non-creole headed poor households? By looking at Table 32 which gives the results of the tests performed, it can be seen that creole headed households have all the characteristics that decreases their probability of being poor. To begin with, creole headed households are better educated than non-creole headed households. As a result the probability of being poor is lesser for creole headed households than otherwise. Creole headed households are fewer in number than non-creole headed households and the age of the households are in the higher age groups. There are proportionately more creole female headed households than male headed households which also contributes slightly to the reduction in their probability of being poor. Lastly, it is noted that there are creole headed households are concentrated in the urban area as opposed to the rural areas.

TABLE 32: MATRIX OF THE DETERMINANTS OF WHY THE INCIDENCE OF POVERTY IS HIGHER FOR HOUSEHOLDS WHOSE HEAD OF HOUSEHOLDS ARE CREOLES

| Poverty Determinant | Relationship of determinant to probability of being poor | Results from Chi-Square tests of association | Effect on probability of being poor |
|---|---|---|---|
| Education | As the head of a household obtains a higher level of education, the probability of being poor decreases. | Creole headed households are better educated than non-creole headed households. | $P_C(Poor) < P_{NC}(Poor)$ |
| Age | As the head of household gets older (up to the age of 65), the probability of being poor decreases. After the age of 70 the probability of being poor increases. | The proportion of Creole headed household in the higher age groups are larger than the non-creole headed households. | $P_C(Poor) < P_{NC}(Poor)$ |
| Number of persons in the household | As the number of persons living in the household gets larger, the probability of being poor increases. | Creole headed households have fewer members than non-creole headed households. | $P_C(Poor) < P_{NC}(Poor)$ |
| Urban-Rural | The probability of being poor increases if the household is located in the rural area and decreases if the household is located in the urban area. | There are proportionately fewer Creole headed households in the rural area. | $P_C(Poor) < P_{NC}(Poor)$ |
| Sex | The probability of being poor decreases if the head of the household is female. | There are proportionately more Creole female head of households. | $P_C(Poor) < P_{NC}(Poor)$ |

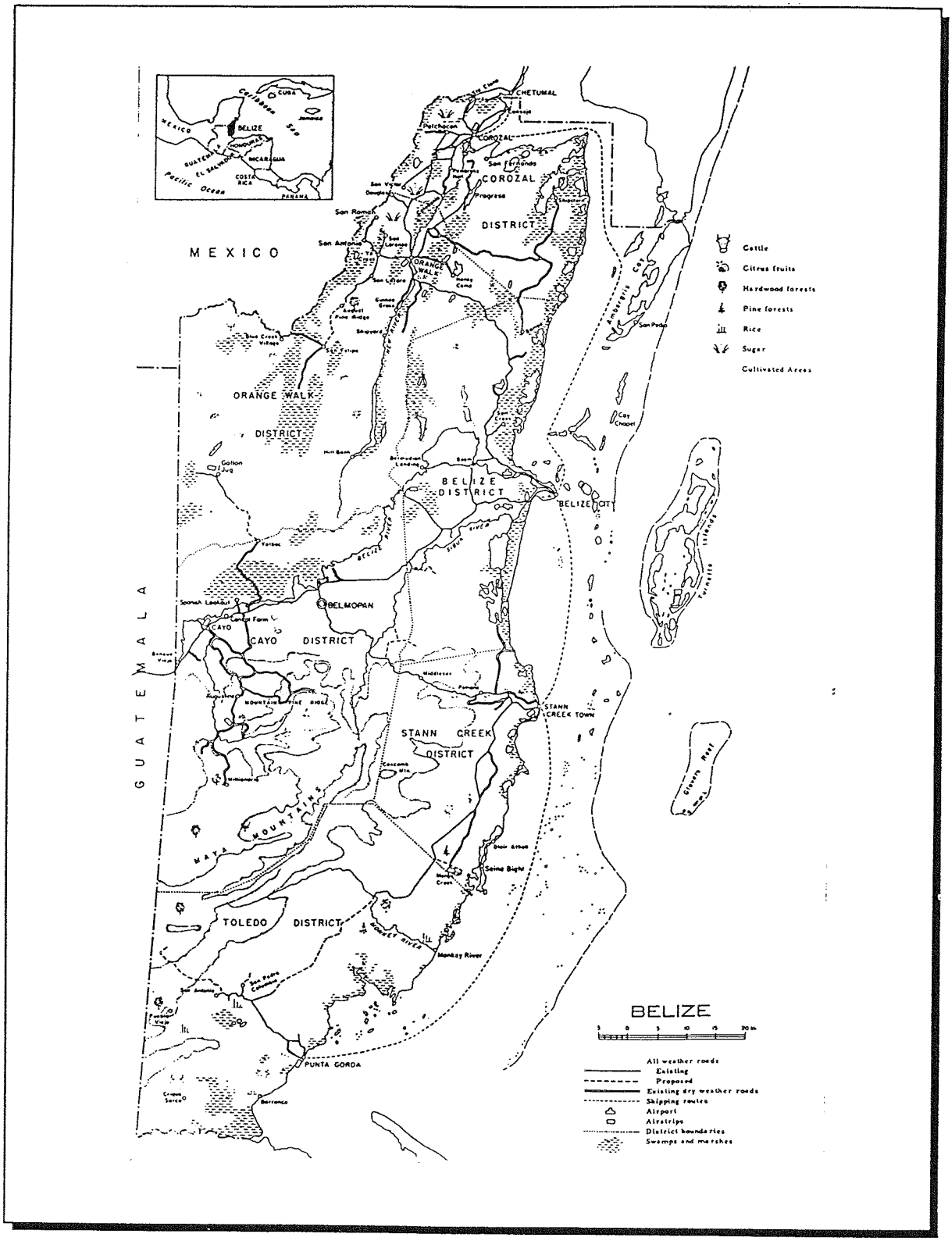
## SUMMARY AND CONCLUSIONS

One of the objectives of this paper was to identify the poor via their living conditions as opposed to their lack of income. Having done this, it was observed that the three indices that were used in this paper to identify the poor, housing index, facilities index and bedroom index, are associated with income and as such provided a good proxy not only for income-poverty but for the other dimensions of poverty as well.

Having identified who the poor are, it was found that 20.4 percent of the population of Orange Walk District were poor and were mainly concentrated in the rural area. The sex of the household was not a significant determinant of poverty. Poor households also had larger number of persons living in the household than those who were not poor. Head of households of poor households were proportionately less educated than those of non-poor households.

By looking at the results of the logit regression, we see that the most effective tool in eradicating poverty is by educating the poor. However, because of the sparse population in some of the rural areas, the cost of providing all levels of education is not feasible. In some cases even providing primary education may not be feasible. In fact there are to date, only three secondary schools in Orange Walk. Of these, two are located in the urban area and one in the rural area. It is unfortunate that it is the people who are poorest who are faced with the higher cost of education. It is those people living in the villages who are faced with the additional cost of transportation and meals. This is the main problem of the poor who live in the rural areas. The cost of education is just too much even though there are no school fees. Investing in human capital is the route via which the illness of poverty can be addressed. The manner in which this will be carried out, however, is discussion for another paper.

## FIGURE 5


MEXICO
GUATEMALA
CHETUMAL
COROZAL
DISTRICT
ORANGE WALK
DISTRICT
BELIZE
DISTRICT
BELIZE CITY
BELMOPAN
CAYO
CAYO DISTRICT
STANN CREEK
DISTRICT
STANN CREEK TOWN
MAYA MOUNTAINS
TOLEDO DISTRICT
PUNTA GORDA
Cattle
Citrus fruits
Hardwood forests
Pine forests
Rice
Sugar
Cultivated Areas
BELIZE
All weather roads
Existing
Proposed
Existing dry weather roads
Shipping routes
Airport
Airstrips
District boundaries
Swamps and marshes

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