



DETERMINING RURAL POVERTY IN MANGA DEL CURA – ECUADOR NON DELIMIT ZONE

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ABSTRACT

This paper shows the implementation of the direct method, also called unsatisfied basic need index, indirect or poverty line method, Gini coefficient and Lorenz curve in Manga del Cura non delimited zone in Ecuador. The data used are the result of the processing of questionnaires applied to the people living in the zone. Simple probabilistic randomized sampling was applied for data processing (136 questionnaires). Housing and minimum equipment for home were analyzed, together with infrastructure, access to education and home subsistence ability. Results show that residents have more than one unsatisfied basic need, among them overcrowding, in an infrastructure that does not guarantee the minimum sanitary standards needed. These people live under the line of poverty because their average earnings correspond to 271, 37 USD, not enough to cover the cost of a basic food basket and Ecuadorian vital food basket. Engel and Gini coefficients demonstrate that there is equity in income distribution, what does not necessarily constitutes an indicator of good economic conditions, on the contrary, in this particular case, they indicate that this population group has similar, under 300.00 USD, monthly incomes.

Keywords: Unsatisfied basic need index, Line of poverty, Gini coefficient, Lorenz curve.

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Contribution/ Originality

This is the first study of the kind carried out in Manga del Cura non delimited zone in Ecuador and it contributes a new socio-economic and environmental perspective of community evaluations. Besides, it opens new research lines to Ecuadorian scientific community

1. INTRODUCTION

Poverty measuring forces recognition of the relationship between the analysis unit and the wellbeing of the studied population. It encompasses varied conceptual and methodological aspects leading researchers to choose a quantification method.

According to Atkinson (1987) the first to combine mathematics with observations of population poverty was Booth, who designed a map of poverty in London during the period from 1892 to 1987. In the XX century, Rowntree (1901) quoted by Domínguez and Martín (2006) carries out an innovative study of poverty based on people's nutritional requirements

Sachs (1992) establishes that it is during the 40s of the XX century when the World Bank carries out the first studies on poverty at world scale. Before that time, poverty used to be understood as a statistic operation consisting in comparing the income per capita in different countries.

In the decade of the sixties, Ornati, quoted by Domínguez and Martín (2006) develops an important study

establishing a population – consumption relationship. As a result of this study, he proposed to consider poor those population groups that cannot afford what Occident defines as a minimum good and vital service basket.

During the seventies, the World Bank generates the first notion of absolute poverty and standards of living. At the same time it establishes a line, below which a population is considered poor. In 1973 the World Bank launches the first definition of absolute poverty...*so degraded by disease, illiteracy, malnutrition, and misery living conditions that deny their victims the basic human needs; so deprived living conditions that prevent the empowerment of genes given to the individual at birth); so degraded living conditions, that insult human dignity - this is poverty*"

During the 80, the term *poverty* changes its perspective and begins to be understood as a multidimensional phenomenon, where the rent is only a factor of human development. Thus poverty is, and has been for a long time a central topic in the analysis of social situation in any country. This has led these countries to make great efforts to quantitatively delimit this phenomenon, with the purpose of analyzing its characteristics and changes in time, and also to relate it with other relevant variables in the economic and social fields (INDEC, quoted by Mathey (2007)). The concept poverty has different definitions. On the one hand definitions by FAO (Organización de las Naciones Unidas para la Agricultura y la Alimentación) BM (Banco Mundial) (2001) which describe it on the basis of the US \$1:00/day consumption rate international poverty line. On the other hand there are general conceptions as those expressed by Rubio and Fernández (1995) who state that poverty is the incapacity to generate growth in the work marginal product allowing the increase of choice in different consumer goods

According to Renshaw and Wray (2004) even when the definitions of poverty are so diverse, as well as authors' approaches to this term, only two conventional methods of poverty identification have been recognized: poverty line and unsatisfied basic needs (UBN) methods. Poverty line method is an indirect method characterized by the setting up of the minimum income or spending allowing an adequate life level, in accordance with certain selected standards. Under this view, people who have an income or consumption spending under poverty line, which has been established to identify homes and individuals lacking the capacity to afford neither caloric consumption costs nor basic needs or a certain standard of living, are considered poor (Hernández *et al.*, 2005).

Poverty line is an estimation of the monetary value of a good and service basket satisfying the basic needs of an average (typical) family. Obviously, the level at which this line is settled in any given country, depends on its development level and also on what is meant in this country by *basic needs*. Most studies on poverty consider two poverty lines: one referred to as *extreme poverty*, also known as *indigence* and the other known as *moderate poverty* or simply *poverty*. The extreme poverty line is defined as the value of a consumer basket allowing an average (a typical) family afford its minimal food needs as it has been defined by the World Health Organization on the basis of the value of a consumer basket guaranteeing about 2.250 kilocalories a day per adult. To moderate poverty, besides food consumption value, an estimated value of all those basic nonfood goods is added. It is precisely due to the existing difficulty for defining *the line of poverty* that to calculate poverty indexes using two or more lines is recommended. This way over or underestimation mistakes can be avoided.

Unsatisfied basic need method defines a house as poor when regardless of the amount of money earned as income, its members cannot accede to goods and services considered basic for their social and personal development (De los Campos, 2000). The spread of poverty throughout the world has made necessary to conceptualize this term, so that measures to its alleviation be taken. This paper intends to make public the poverty conditions in which the population on Manga del Cura non Delimited Zone under the influence of Daule Peripa Dam live, through the application of the direct and indirect method, Gini coefficient and Lorenz curve.

2. MATERIALS AND METHODS

The study was made in Manga del Cura non Delimited Zone (Fig 1), known as non-delimited, because it is in dispute between Manabi and Guayas provinces . Starting from Purpusa river in the North, it extends for 488 km² to reach the confluence between Oro and Peripa rivers. The zone shapes an elongated map surrounded by two feeders of the river Daule. To the North, it limits with El Car men canton (Manabí province), to the South with El

Empalme canton (Guayas province), to the East with Santo Domingo de los Tsachilas canton (Santo Domingo province), Buena Fe canton, (Los Ríos province) and to the West with El Carmen, Chone and Pichincha cantons (Manabi province) (Montoya *et al.*, 2013)

The main population centers are Santa María, El Paraíso - La 14, Santa Teresa, La Caoba, El Descanso, San Ramón de Armadillo, La Palizada, Río Amazonas and La Bramadora.

The population considered for this study comprises peasant families living in the zone which, According to the Social Program Beneficiaries Identification and Selection System (SELBEN) include 10 166 households. In order to determine the sample, a randomized simple probabilistic sampling ($p: < 0.05$) was applied using the equation described by Santoyo-Cortés *et al.* (2000). 136 questionnaires were applied and the quantitative model with economic indicators for measuring poverty was designed. The direct method or unsatisfied basic need index (NBI) was applied together with the indirect method also known as Poverty Line, Gini Coefficient and Lorenz curve

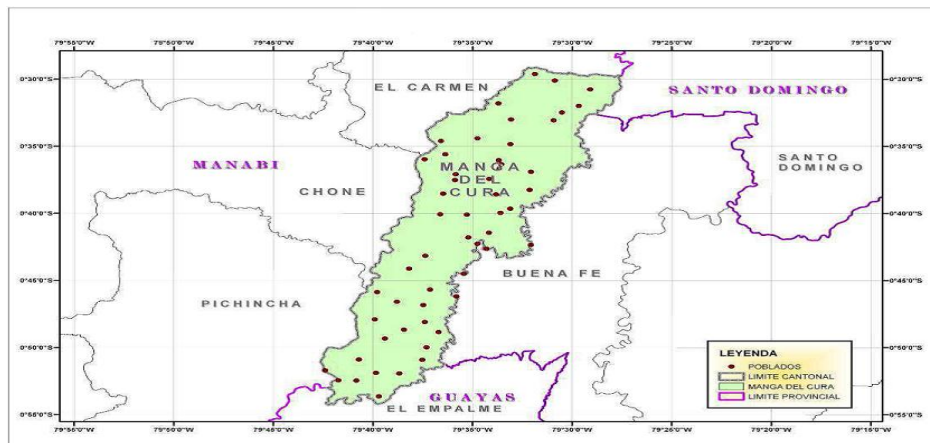


Figure-1. Study zone map

(Source: Ecuadorian Spatial Institute. IEEE 2013)

2.1. Unsatisfied Basic Need Index

906 714, 721, 724

For the application of unsatisfied basic need (NBI) method the variables detailed in Chart 1 were studied

Chart-1. Necessities, dimensions and indicators for determining unsatisfied basic needs)

Basic Need	Dimension	Indicators critical values
Housing and minimum household equipment	I Type of House	Households living in non-conventional houses (boarding houses, pensions, hotel rooms, facilities which were not built for housing such as wagons and other types of mobile homes.
	II Overcrowding	Households with more than two people living in the same room excluding the bathroom and the kitchen.
Infrastructure which would guarantee minimum sanitary standards	III Drinking water availability	Households using water from aljibes, streams, ditches, brooks and rivers for cooking and drinking
	IV Type of sewage disposal system	Households: a) Without sanitary toilets, b) Sanitary toilets without instant water release, shared with other households
Access to education services	V School attendance	Households with at least one school-age (6 to 12 years) child, who doesn't attend the school. There still exist educational centers with only one teacher for all the grades No secondary school exists in the community
Household's subsistence capacity	VI Householders with family burden and low educational level	Households having four or more people per employed member and a householder who has not completed Third grade at school.

Source: Authors'

2.2. Poverty Line

To calculate the line of poverty 136 households, for which family income and expenditure were determined, were selected

2.3. Engel Coefficient

Engel coefficient was calculated using food expenditures and total expenditures (Brown quoted by [Schneider et al. \(2002\)](#) through the application of the following equation (1):

$$\text{Engel' coefficient} = \frac{\text{Food expenditures}}{\text{Total Expenditures}} \quad (1)$$

Among the most used inequality measures Lorenz Curve (LC) is found. It allows to appraise the whole distribution of income and, at the same time, calculate Gini coefficient

2.4. Gini Coefficient

It measures the inequality of income among the population, in a 0 to 1 interval (where 0 corresponds to perfect equality). To measure this coefficient the equation proposed by Brown, quoted by [Schneider et al. \(2002\)](#) in which income and studied population values have to be accumulated, was used. (equations 2)

$$G = \left| 1 - \sum_{k=0}^{k=n-1} (X_{k+1} - X_k)(Y_{k+1} + Y_k) \right| \quad (2)$$

(Where)

X= population accumulated proportion

Y= income accumulated proportion

For information processing, the Statistical Product and Service Solutions program, also known as SPSS, was used. This program is used at national and international level by enterprises and institutions as one of the most effective tools for data processing and statistical analysis ([SPSS, 1999](#))

3. RESULTS AND DISCUSSION

3.1. Unsatisfied Basic Need Index (INB)

It was determined that 35.29% of household walls were made of wood; 34.45% are mixed (made of wood and cane); 19.33% were made of concrete and 10.92% were made of cane. In relation to roofs, it was found that zinc is the predominant building material in the zone with 81.51% and 18.49% correspond to other supplies. Concerning floors, the most frequently used material is wood, (74. 79%) and for the remaining 25.21% other materials were used. The number of rooms per household varies from one to six, with a ratio of two rooms per home and six the average number of people living in each house. These figures are indicators of overcrowding in Manga del Cura Non Delimited Zone, where more than two people were found to reside per room ([Lentini and Palero, 1997](#)).

Water supply in the studied zone is carried out from open pits (87.40%) and sewage is stored in cesspools (42.02%) and latrines and open air (26.05% and 15.97% respectively.

It was found that 38.60% of households in the studied area have children in school age, 100% of which attend school. Householders' age was established to be about 44 years or less (50%). These householders finished only 6th grade primary.

Results show that the majority of interviewees live in humble overcrowded households lacking water and sanitation, what evidences a poverty situation in coincidence with [Freire et al. \(2014\)](#) statistical analysis. This author indicates that 65.50% of national population is poor, judging by unsatisfied basic needs, and lives in rural

areas. According to unsatisfied basic need index, poverty has been diminishing with a 5.04% population rate (Fig. 2).

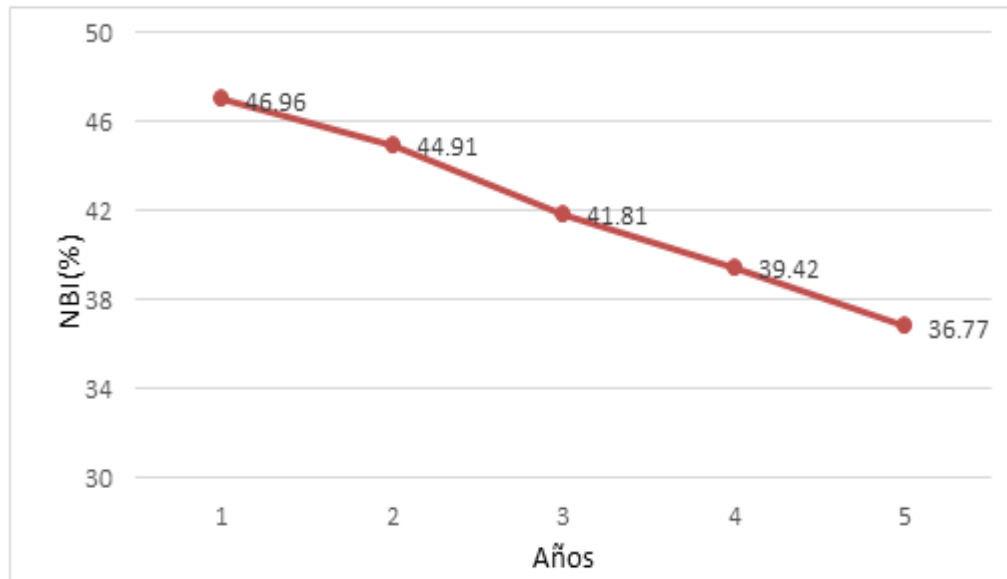


Figure-2. Evolution of poverty according to Unsatisfied Basic Needs index

Source: Authors'

3.2. Poverty Line

The main source of income for the 80% of householders is agricultural wage, which is generally carried out during the whole week for a 10 USD average daily payment; agriculture represents 20% of the income, cocoa being the main culture in the zone. Other sources of income are trading (selling fish and victuals), working as maids in other places, and in the area of services as mechanics, among others. It was known that 60% of households are beneficiaries of BDH (Human Development Bonus) given by the Central government and which consists of 50 USD a month. These data coincide with those presented by Sánchez (2014) who states that more than 60% of BDH beneficiaries belong to rural areas.

The average income of a household in the studied zone is 271.37 USD, what is different from that presented by Nieto (2011) who indicates that the basic monthly salary for the year 2015 was 365 USD. None of these values is enough to cover the average cost of the Basic Food Basket (BFB) either the Ecuadorian Vital Food Basket (VFB), established at 664.94 and 480.79 USD respectively for that same year (Fig. 3). These two indicators allow to state that households belonging to Manga del Cura Non Delimited Zone under the influence of Daule Peripa dam are below the poverty line. Engel coefficient inverse resulted to be 1.65. When comparing these values with other values at national level, National Institute of Statistics and Census Instituto Nacional de Estadísticas y Censo (INEC) (2015) reported that extreme poverty in the country was 8.97% and in the rural area it varied from 17.22% to 19.74% what is considered a non-significant difference from statistical point of view for the given period. In March 2015, Gini coefficient reached 0.455 at the national level and 0,452 in the rural area while the family income per capita against the extreme line of poverty at international level was 46.27 dollars a month. According to this indicator, a person whose income is below the extreme poverty line is considered extremely poor.

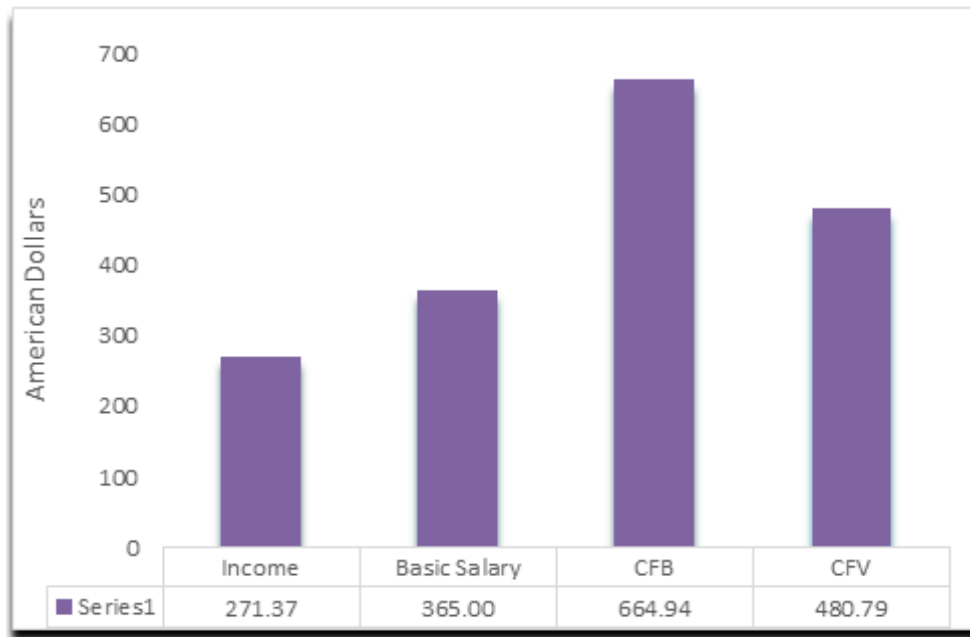


Figure-3. Basic Food Basket cost in Manga del Cura non Delimited Zone

Source: Authors'

3.3. Gini Coefficient

Gini Coefficient was determined to be 0.09, what indicates that in Manga del Cura Non Delimited Zone exists an equitable rent distribution. At national level in the year 2013 this coefficient was established at 0.485 against the 2012's 4.77. In 2014 it was 0.459 and in 2015 it was 0,452 This evidences a tendency toward rent equity

3.4. Lorenz Curve

It can be observed in Lorenz curve that the studied zone people's income is equitably distributed. This curve is a graphic way of showing rent distribution among a population Núñez (2006); Renshaw and Wray (2004). On it, accumulated population percentages are related to the rent accumulated percentages received by this population. On the abscissa axis the population is "arranged" going from the lowest rent percentiles, on the left, to the highest rent, on the right. The ordinate axis represents rents (Fig.4)

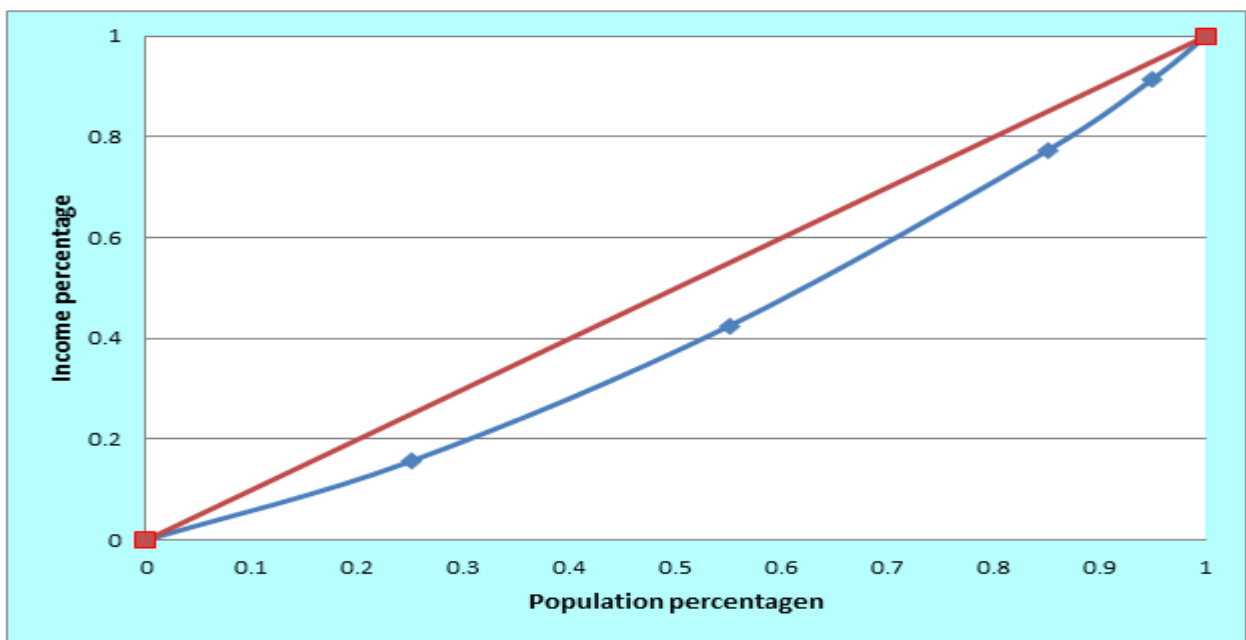


Fig-4. Lorenz Curve for Manga del Cura Non Delimited Zone Residents' Income

Source: Authors' creation

4. CONCLUSIONS

According to the unsatisfied basic needs method, there exists poverty in Manga del Cura Non Delimited Zone due to the overcrowded living conditions of its population and to the lack of infrastructure guaranteeing their minimum sanitary standards. In the same way, the application of poverty line method demonstrated that these people are below the line of poverty, since their incomes are not enough to cover neither the cost of the basic food basket nor the Ecuadorian vital food basket. Concerning rent distribution, it was determined that it is equitable, which does not necessarily indicates that the population is in good economic conditions, it's rather that all the inhabitants perceive the same family incomes, not exceeding the cost of the vital food basket

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