UNITED NATIONS
ECONOMIC COMMISSION FOR EUROPE
CONFERENCE OF EUROPEAN STATISTICIANS

Seminar "The way forward in poverty measurement"
 2-4 December 2013, Geneva, Switzerland
Item 4 of the provisional agenda
Session 3: Interlinkages between poverty, inequality,
vulnerability and social inclusion

Within subjective poverty, multidimensional poverty and food security: a glance at the living conditions of households and children in Colombia

Prepared by the National Administrative Department of Statistics (DANE)

Within the subjective poverty, the multidimensional poverty and food security: a glance at living conditions of Colombian households [1]

Luz Andrea Piñeros L
lapinerosl@dane.gov.co

Andrés Clavijo A
amclavijoa@dane.gov.co

2013-II

Abstract

This paper studies the relationship between subjective poverty, multidimensional poverty and food security of Colombian households. The aim is to see how far our measure of subjective poverty correlates with the different components that are part of the multidimensional poverty measurement. Econometric analysis show the existence of a significant positive relationship between the perception of household poverty with 12 of the 15 categories that currently comprise the Multidimensional Poverty Index (MPI); the deficiencies in income may mean the inability of households to consume certain basic goods and services that are measured by means of the Multidimensional Poverty Index (MPI) and food security. Furthermore, the results suggest that there is no statistical evidence that support that the size of the family or single-parent households increase the probability that the household perceives itself to be poor.

Keywords: subjective poverty, living conditions, multidimensional poverty index, food security and poverty measurements.
JEL Classification: I30, I32, I10, I20, I31.

Introduction

By monitoring of Millennium Development Goals (MDGs), this paper explores the relationship between subjective poverty, multidimensional poverty and food security relating to Colombian households. Hence, we hereby analyze the objective dimensions of poverty and how they impact the perception of poverty in households from their everyday environment to their material conditions.

Poverty is a phenomenon of multiple dimensions. The deficiencies in income may mean the inability to obtain certain commodities; the perception of poverty can be increased when the lack of food is present in the households, therefore food security becomes an important concept in the perception of poverty (subjective poverty) on behalf of households.

For 2012, the Food and Agriculture Organization of the United Nations (FAO) presented its report on food safety whereby it is shown that social protection is essential to accelerate the reduction of hunger. They propose that it should protect the most vulnerable population, which does not benefit from economic growth and it needs to be an adequate social protection system that enables these households to properly manage risk and improve their productivity technologies.

In this regard, Alkire and Foster (2007) show that human progress (understood as welfare, the expansion of freedoms and the fulfillment of the MDGs) covers many aspects of life such as food, education and employment. The indicators of income and consumption can be a suitable approach for measuring multidimensional poverty. Nonetheless, these indicators are just an approximation with respect to the absence of freedoms.

Hence, Alkire and Foster (2011) propose a multidimensional measurement that provides an alternative approach in order to study the characteristics of poverty. Depending on how poverty is understood and analyzed, the orientation of the generation of public policies can be determined. Therefore, the paper proposes a methodology that sees poverty as a concept with multiple deprivations simultaneously experienced by individuals; poor people face a wide range of deprivations.

When studying poverty through quality of life surveys, Benjamin et al. (2012) propose a methodology for the monitoring of poverty based on a utility function based on observable aspects that may be provided by the surveys, and subsequently, through a multidisciplinary study, where a list is made pertaining to the subjective conditions and their relationship with objective measures of poverty, noting that the marginal utilities of happiness and satisfaction are related to the family environment, health, safety, values and freedoms.

In this sense, this paper contributes to knowledge with respect to the social economy of Colombia to the extent that it performs a comprehensive study of poverty in Colombia in terms of material conditions and the perception of poverty. This research aims to study the relationship between subjective poverty, food security and multidimensional poverty and how such perception of poverty (subjective poverty) is based on structural measures relating to living conditions.

Motivation

In order to better study the relationship between multidimensional poverty, subjective poverty and food security, it is important to look at the characterization of the Colombian population in these areas. Thus, according to the ENCV (2012) 42.4% of households in Colombia consider themselves to be poor; the perception of poverty is higher in rural areas where 67.7% of households consider themselves to be poor and lower in urban areas where only 35.3% of the population considers itself to be poor (see Table 1).

Table 1. Subjective poverty according to the head of household or spouse

		Households perception of poverty : yes		Households perception of poverty : no	
	Households	Frequency	%	Frequency	%
All country	13.060.304	5.541.754	42.4%	7.518.385	57.6%
Township	10.187.831	3.596.898	35.3%	6.590.933	64.7%
Remaining areas	2.872.473	1.944.856	67.7%	927.452	32.3%

Source: ENCV (2012). Authors' calculations.

In turn, the Multidimensional Poverty Index (MPI) for 2012 showed an incidence rate at the level of persons, of 27% nationwide; for urban areas it was 20.6% and is more severe in rural areas with an incidence rate of 48.3%. At the level of households, 21.6% of households are multi-dimensionally poor; in urban areas 15.8% of households are poor, whereas 42.2% of rural households are poor.

When studying at the level of variables that comprise the MPI, we found in general - except for the barrier of access to services for early childhood care, long-term unemployment, the absence of health insurance and critical overcrowding - there is less deprivation in the urban areas than in rural areas. The greatest challenges in Colombia at the level of variables are those related to educational conditions, especially low educational attainment (53.1%) and employment conditions, approximately 80% of workers do not contribute to pension funds or are unemployed (see Table 2).

In terms of the childhood and youth MPI component, school absenteeism is 3.0% in urban areas and 7.9% in rural areas; if we look at the educational lag (At the right level); it exceeds 30% in urban areas and reaches 40.6% in rural areas.

Table 2. Deprivations that compose multidimensional poverty
Incidence per household

Variable/ Deprivations	All country	Township	Remaining áreas
Educational Conditions			
Low school Achievement	53.1%	44.1%	84.9%
Literacy	12.1%	8.2%	26.0%
Children and youth conditions			
Truancy	4.1%	3.0%	7.9%
Educational lag	33.3%	31.3%	40.6%
Barriers to services for early childhood care	9.4%	9.8%	7.9%
Child labor	3.7%	2.8%	7.0%
Labor Conditions			
Long-term unemployment	10.0%	10.6%	7.9%
Informal employment	80.0%	76.4%	93.0%
Health Conditions			
No assurance	17.9%	18.3%	16.7%

Barriers to access to health services	6.6%	5.9%	9.1%
Public services and housing conditions			
No access to improved water source	12.3%	3.0%	45.2%
No sewage disposal	12.1%	7.8%	27.3%
flats inadequate	5.9%	2.2%	19.4%
Walls inadequate	2.2%	2.1%	2.2%
Critical overcrowding	13.1%	13.2%	12.5%

Source: ENCV (2012). Authors' calculations.

On the other hand, in Colombia, 23.9% of households sometime in the last 30 days ran out of food due to the lack of money (see Table 3). This shows that the issue of food security is essential to many Colombian households and is a synonym of risk management and vulnerability where it is the duty of the state to intervene. The figure is higher for the rural areas since 31.7% responded that they sometime ran out of food due to the lack of money, whereas in the urban area, the frequency is less and only 21.5% of households responded affirmative.

Table 3. Food security
Incidence per household

	Yes	No
All country	23.9%	76.1%
Township	21.5%	78.5%
Remaining areas	31.7%	68.3%

Source: ENCV (2012). Authors' calculations.

We can observe in Table 4, the relationship between households that consider themselves to be poor (subjective poverty), households with lack of food and households that are multi-dimensionally poor (MPI). It is interesting to compare the investigators' different measurements with respect to what is socially known as a poor household, in this case the measurement of MPI, compared to what each household perceives as poverty. The differences between subjective and objective poverty change over time. That makes it important to continuously validate our instruments for poverty measurement.

Finally, we can see that in 2012 in Colombia there were multi-dimensionally poor households, which at the same time were rated as subjectively not poor, and vice versa, households those were not multi-dimensionally poor, but at the same time were rated as subjectively poor. Such situations represented 33.28% and 35.76% of households, respectively.

The households that suffered from a lack of food and considered themselves poor are the 69.94% on the other hand only the 34.78% considered themselves poor but they did not suffer of lack of food.

Table 4. Percentage of poor households according to subjective poverty vs. MPI

|		**Multidimensional poverty**		**Lack of food**	
Subjective poverty		Yes	No	Yes	No
	Yes	66.72%	35.76%	69.94%	34.78%
	No	33.28%	64.24%	30.06%	65.22%

Source: ENCV (2012). Authors' calculations.

Graph 1 compares the 15 subcategories that comprise the MPI with each household's own perception of their situation of poverty. Board (A) presents the households without these subcategories[2], whereas panel (b) presents the households that do not lack these subcategories. At first glance it is observed that board (B) is more uniform in its distribution than Board (A).

The above means that when households lack any MPI subcategory, it would be expected that most households were assessed as poor and that does not happen. Households with illiteracy, dirt floors, no school attendance, no water supply, no walls, no sewerage are most likely to consider themselves subjectively poor.

---

[2] Please refer to Appendix 1 MPI subcategories

Graph 1. Percentage of deprived households according to subjective poverty and MPI sub-categories
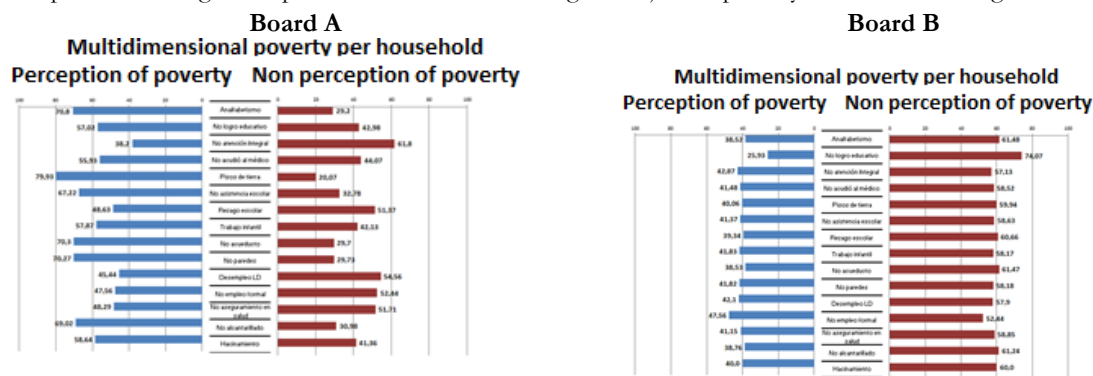
Source: ENCV (2012). Authors' calculations.

Data and methodology

We used the Quality of Life National Survey of the year 2012 (ENCV 2012), which is a cross-sectional survey conducted by the National Administrative Department of Statistics (DANE) to 21,383 households. This survey gathers basic information for the measurement with respect to the living conditions of the citizens and it serves as a tool for the creation of poverty and inequality indicators. Furthermore, it enables the monitoring of the variables needed for the design and implementation of public policies and the Millennium Development Goals (MDGs).

It includes nine modules. Module A contains the identification and control of the household, Module B the data of the dwelling, Module C household services, Module D household characteristics and composition, Module E health, Module F caring for children under five years, Module G education, Module H workforce and Module L food security. The unit of analysis that will be used is the household and the sample selection is as follows:

Table 5. Sample selection

Households 2012	Number of observations	All country
Total sample	21.383	13'060.139
Township households	13.072	10'187.831
Remaining areas	8.311	2'872.473

Source: ENCV (2012). Authors' calculations.

Table 6. Descriptive statistics according to subjectively poor households vs. subjectively not poor households

	Households perception of poverty		
	Yes	No	Wald Test
Poor Households according to MPI	**66.72%**	**33.28%**	***
Household education Conditions			
Low educational attainment	57.02%	42.98%	***
Literacy	70.80%	29.20%	***
Children and youth conditions			
Truancy	67.22%	32.78%	***
Low school achievement	48.63%	51.4%	***
Barriers to services for early childhood care	38.20%	61.8%	***
Child labor	57.87%	42.1%	***
Work Conditions			
Long-term unemployment	45.44%	54.6%	**
Informal employment	47.56%	52.4%	***
Health			
No assurance	48.29%	51.7%	***
Barriers to access to health services	55.93%	44.1%	***
Housing and Utilities			
No access to improved water source	70.30%	29.7%	***
No sewage disposal	69.02%	31.0%	***
flats inadequate	79.93%	20.1%	***
Walls inadequate	70.27%	29.7%	***
Critical overcrowding	58.64%	41.4%	***
Geographic location			
Urban	35.31%	0.6469	***
Rural	67.71%	0.3229	***
*** Significant at 99%, ** Significant at 95%, * Significant at 90%			

Source: ENCV (2012). Authors' calculations.

Two exercises are proposed. The first consists of asking ourselves to what extent our measure of subjective poverty corresponds to that of multidimensional poverty. Thus, it is examined whether the determinants of these two measures are affected in the same direction and intensity. The second exercise is to analyze what is the impact upon subjective poverty of factors such as each of the categories that make up the non-weighted MPI and food security. The general model is presented below:

$$(1) \quad SPi = \alpha_0 + \gamma_1 X_i + \beta \vec{C}_i + \varepsilon_i$$

Being i the households surveyed and where:

· SPi is the perception of poverty on behalf of the household, being 1 if the household is considered to be poor and zero otherwise.
· X_i is a vector of socio-economic variables, where γ_1 represents the weights that indicate the relative importance of the different factors with respect to subjective poverty.
· C is the model's vector of controls, where if it is a single-parent household, the number of persons per household, geographic location (1 if it is urban and 0 if it is rural) and the logarithm of household monetary income are found.

Equation 2 presents the multidimensional poverty index as the sole determinant of subjective poverty.
$$(2) \quad SPi = \alpha_0 + \gamma_1 MP_i + \beta \vec{C}_i + \varepsilon_i$$
· MP_i takes the value 1 if the individual is multi-dimensionally poor, i.e. the household lacks at least 5 subcategories composing the index and zero otherwise.

Equation 3 is the same as equation 2 but instead of using the compacted MPI, the 15 subcategories that comprise it are taken without weighting at start into the equation.
The DMP_i Variable in Appendix 1 lists all subcategories.
$$(3) \quad SPi = \alpha_0 + \gamma_1 DMP_i + \beta \vec{C}_i + \varepsilon_i$$

Equation 4 takes the food security variable (FS) as the sole determinant of subjective poverty.
$$(4) \quad SPi = \alpha_0 + \gamma_1 FS_i + \beta \vec{C}_i + \varepsilon_i$$
· The food security variable (FS) is the way to measure food security within the household where 1 is whether the household answered yes to the following question: in the last 30 days, have you ever in your home ran out of food due to a lack of money?

Finally Equation 5 is the full model, which gathers all explanatory variables from the previous equations.
$$(5) \quad SPi = \alpha_0 + \gamma_1 DMP_i + \gamma_1 FS_i + \beta \vec{C}_i + \varepsilon_i$$

Results

This section presents the results of the main estimations. In the first part, by means of a simple correlation exercise, the direction and strength of the relationship between subjective poverty, food security and multidimensional poverty are shown. Finally, the marginal effects of the binary dependent variable model are presented - in this case subjective poverty - in order to determine the likelihood of the sense of poverty through observable characteristics such as multidimensional poverty, food security, single-parent households, the differences between the urban and rural and household's size.

Table 7 shows that the three variables have a significant positive correlation between them, which indicates that the projections of the variables in the linear regression will tend to grow together. The value of the highest correlation is the relationship between food security and subjective poverty, which explains that the perception of poverty may increase when no food is available in the households.

Table 7. Correlation matrix

	Subjective Poverty	Multidimensional poverty	Food security (1 is lack of food)
Subjective Poverty	1,0		
Multidimensional poverty	0.24***	1,0	
Food security (1 is lack of food)	0.27***	0.23***	1,0

*Significant at 10%, **Significant at 5%, ***Significant at 1%.
Source: ENCV (2012). Authors' calculations.

The marginal effects of the discrete choice model – probit - show that as the perception of food insecurity and multidimensional poverty increase, and there is no statistical evidence that the number of children per household or single-parent household increase the probability of perceiving themselves as poor. The results are statistically significant.

On the other hand, to inhabit urban areas and to belong to a single-parent household also has a negative and significant effect on the probability of perceiving oneself as poor (see Table 8).

Table 8. Marginal effects of maximum log-likelihood

	m1 b/se	m2 b/se	m3 b/se	m4 b/se
Dependent Variable: Subjective poverty				
Lack of food	0.256***		0.257***	0.231***
	[0.013]		[0.012]	[0.014]
Poor by multidimensional poverty index	0. 160***			
	[0. 013]			
Log household monetary income	-0.112***			-0.079***
	[0. 006]			[0.006]
Single-Parent household	-0. 003			0.010***
	[0. 011]			[0.012]
Number of children per household	0.012**			0.006***
	[0. 004]			[0.005]
Urban population (Urban = 1)	-0.207***			-0.155***
	[0.011]			[0.012]
Illiteracy		0.139***	0.114***	0.105***
		[0. 015]	[0.015]	[0.016]
Low school achievement		0.203***	0.189***	0.126***
		[0.01]	[0.011]	[0. 013]
school absenteeism		0. 104***	0.093***	0.093***
		[0.025]	[0.027]	[0.028]
school lag		-0.001	-0.013	-0.01
		[0.01]	[0.011]	[0.013]
Barrier to access to services for early childhood care		-0.073***	-0.075***	-0.070***
		[0.017]	[0.017]	[0.019]
child labor		-0.014	-0.004	-0. 015
		[0.024]	[0.025]	[0. 025]
Long-term unemployment		-0. 002	0,000	-0.01
		[0.016]	[0.016]	[0.038]
No formal employment		0. 137***	0.123***	0.076***
		[0.013]	[0.013]	[0. 015]
Without health insurance		0.026*	0.017	0. 033***
		[0.013]	[0. 013]	[0.014]
Barriers to health care given a necessity		0.088***	0.061**	0.055*
		[0.019]	[0.02]	[0.021]
Without access to improved water source		0.138***	0.144***	0.032***
		[0.012]	[0.013]	[0. 015]
No sanitation		0.111***	0.085***	0.074***
		[0.014]	[0.015]	[0.016]
Inappropriate Material homes		0.156***	0.135***	0.061***
		[0.019]	[0.02]	[0.02]
Inappropriate Material of exterior walls		0.092**	0.063**	0. 076**
		[0.031]	[0.031]	[0.033]
critical overcrowding		0.122***	0.089***	0.101***
		[0.016]	[0.016]	[0.017]
Log likelihood	-10591,972	-12756,951	-12352,84	-10323,62
Observations	21382	21382	21382	21382

Standard errors in brackets
* p<0.1, ** p<0.05, *** p<0.01
Source: ENCV (2012). Authors' calculations.

Conclusions

When studying the structural quantitative methods used to measure poverty with the subjective method, it is found that that there is a significant positive relationship between the perception of poverty on behalf of the households and most subcategories composing the MPI. There is no clear statistical evidence to say that the school lag decreases or increases the likelihood that a household perceives itself as poor, the same as child labor and long-term unemployment.

The lack of food security in the household has a positive and significant relationship with the subjective perception of poverty to the extent that by not consuming any food due to the lack of money has a consequence of vulnerability in the household since it could affect the vital functions of the body, thus increasing the likelihood of fatigue and illness.

This paper combines the Colombian objective-quantitative and the subjective qualitative methods of poverty analysis. Therefore, the results indicate the existence of a positive relationship between the question on the perceived adequacy of poverty and the fuller set of consumption components.

Since the multidimensional poverty index covers five dimensions, it enables studying poverty, as the lack of freedom and thus it is essential so as to have a better understanding of the subjective perception of poverty of Colombian households.

Poverty is a complex phenomenon of multiple characteristics. By studying the Colombian case, one realizes the structural differences that occur between urban and rural; a proposal of a specific multidimensional poverty index for each area could be suggested with respect to a future paper.

References

Alkire, S. and Foster, J. (2007). Counting and Multidimensional Poverty. Chapter 3. This chapter summarizes S. Alkire and J. Foster, Counting and multidimensional poverty measures, OPHI Working Paper Series 7, 2007.

Alkire, S. y Foster, J. (2011). Understandings and misunderstandings of multidimensional poverty measurement. J Econ Inequal (2011) 9:289--314. DOI 10.1007 /s10888-011-9181-4. Springer Science+Business Media, LLC 2011.

Benjamin, D., Heffetz, O., Kimball, M., y Szembrot, N. (2012). Beyond happiness and satisfaction: Toward well-being indices based on stated preference. NBER Working Paper 18374.

Food and Agriculture Organization of the United Nations (FAO). 2012. The State of Food Insecurity in the World: Economic growth is necessary but not sufficient to accelerate reduction of hunger and malnutrition. IFAD, WFP and FAO.

Appendices

Appendix 1

Adaptation for Colombia of the multidimensional poverty index developed by Alkire and Foster (2007) and developed by the National Planning Department (DNP), who adapted and performed the calculations of the MPI for Colombia based on the Quality of Life National Survey (ENCV) of 1997, 2003, 2007 and 2010. The team redefined and adapted the dimensions and indicators and used the concept of households rather than individuals to define deprivation.

The DNP reviewed the variables frequently used in other indicators applied in Latin America and in the country such as the Human Development Index, the Human Poverty Index, the Subjective Index of Conditions, the Index of Social Cohesion (ECLAC), and the Index of Human Opportunities, among others. A direct relationship with social policy was sought, so that variables were subject to change through public policy.

Further, the availability of information was verified in the Quality of Life Surveys produced by the National Administrative Department of Statistics (DANE) and each variable was subject to an analysis of sample precision, taking those variables whose coefficient of variation was less than 15%.

We selected five dimensions that are measured by means of 15 indicators defined at the household level. These are: (i) Household education conditions, (ii) Conditions of children and youth, (iii) Work, (iv) Health and (v) access to public utilities and housing conditions.

In this sense, since the public policies are implemented at the household level, the MPI is estimated at the household level. Therefore, opportunities and achievements of an individual are based on the capabilities of the household.

In this way, those households whose MPI is equal to or greater than 5/15 deprivations are considered to be poor. The weights, dimensions and the variables that constitute the MPI for Colombia are presented below.
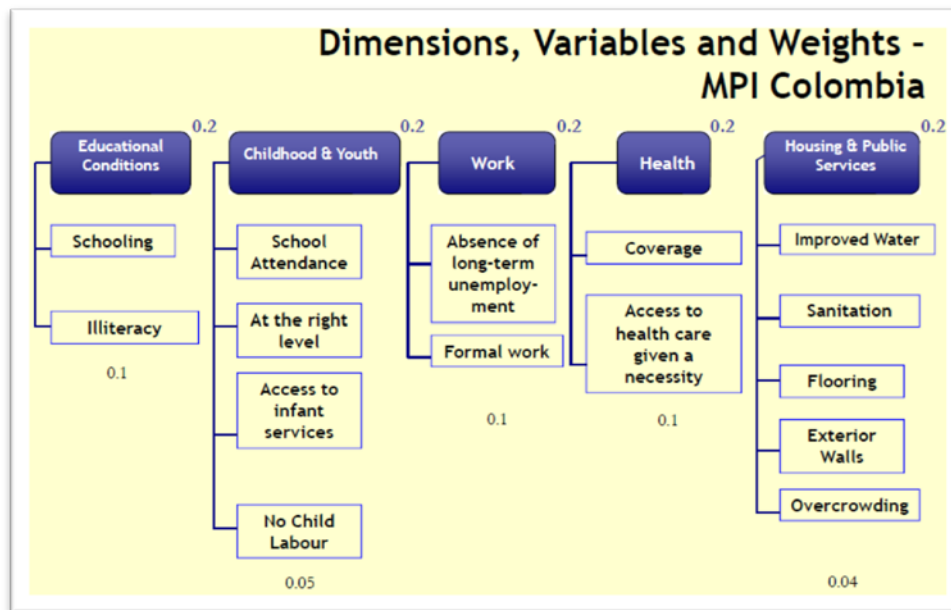
Multidimensional Poverty Index (MPI) Variables[3]
Educational conditions
Educational attainment: a person is considered to be deprived if they belong to a household where the average education of persons 15 years and over is less than 9 years of education.
Illiteracy: a person is considered to be deprived if they belong to a household in which there is at least one person 15 years and over who cannot read and write.
Child and Youth Conditions
School attendance: a person is considered to be deprived if they belong to a household that has at least one child between 6 and 16 years not attending an educational institution.
School lag: a person is considered to be deprived if they belong to a household that has at least one child between 7 and 17 years with school lag (number of years completed less than the national standard).
Access to services for early childhood care: a person is considered to be deprived if they belong to a household that has at least one child 0-5 years without access to all comprehensive care services (health, nutrition and care).
Child labor: a person is considered to be deprived if they belong to a household that has at least one child between 12 and 17 years working.
Work
Long-term unemployment: a person is considered to be deprived if they belong to a household that has at least one person of the Economically Active Population (EAP) unemployed for over 12 months.
Formal employment: a person is considered to be deprived if they belong to a household that has at least one employed person who has no affiliation to pension or is unemployed.
Health
Health insurance: a person is considered to be deprived if they belong to a household that has at least one person over 5 years of age that is not insured in health.
Health service considering a need: a person is considered to be deprived if they belong to a household that has at least one person who in the last 30 days had an illness, accident, dental problem or any other health issue that has not involved hospitalization and that in order to treat this health issue did not go to a general practitioner, specialist, dentist, therapist or a health institution.
Public utilities and housing conditions
Access to improved water source: a person is considered to be deprived if they belong to a household that has no tap water utility. And in the case of households in the remaining areas, they obtain water from artesian wells, rain water, river, spring, tank car, water carrier or other source.

---

[3] The following information is taken from the Press Bulletin of monetary poverty and multidimensional poverty of Colombia 2012. DANE.

Excreta disposal: a person is considered to be deprived if they belong to a household that has no sewerage utility. And in the case of rural households, they have an unconnected toilet, tide or do not have a toilet.

Floors: a person is considered to be deprived if they belong to a household whose dwelling has dirt floors.

External walls: a person is considered to be deprived if they belong to a household whose dwelling has rough wood walls, table, plank, bamboo, other vegetable, zinc, cloth, cardboard, waste or it does not have walls. And a household in the remaining areas is deemed to be deprived if their dwelling has bamboo walls, another vegetable, zinc, cloth, cardboard, waste or it does not have walls.

Critical overcrowding: a person is considered to be deprived if they belong to a household where there are 3 or more persons per room. A household in the remaining areas is considered to be deprived if there are more than 3 persons per room.