

**AN ANALYSIS OF THE INDEX OF UNSATISFIED
BASIC NEEDS (NBI) OF ARGENTINA WITH
SUGGESTIONS FOR IMPROVEMENTS**

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INTRODUCTION

This paper responds to a Government of Argentina request for an assessment of their index of unmet basic needs(NBI). The first section provides some background on poverty measurement and the use of synthetic indices of this type. The second section reviews, against this background, the NBI index of Argentina. Finally, the third section makes recommendations.

BACKGROUND

Many countries make efforts to define those within the general population that are living in poverty. Among other reasons, this is done to help improve the targeting of social programs. Poverty is usually defined through some monetary measure; i.e. the poor are those having an income or consumption level below some minimum line. Social programs can then be targeted directly to them, or to areas having a high percentage of poor. Current best practice is to move to measuring a poverty line in terms of consumption expenditures, rather than income, since consumption is more stable, more closely linked to welfare, and usually more accurately measured.

However, there are many aspects of poverty that are important and do not appear in monetary measures. These include access to public services, esp. health and education, distribution of income within the community and within the family, discrimination by gender or race, environmental conditions, political instability and corruption, human rights abuses, and crime, violence and other negative social conditions. While the list of possible factors is almost endless, many observers have suggested a focus on “basic needs”. While there is some debate about what needs are “basic”, these are generally thought to mean some minimal level of nutrition, education, housing, health, water and sanitation.¹

In many countries in Latin America, including Argentina, it is common to use an index of unsatisfied basic needs (Necesidades Basicas Insatisfechas or NBI) to measure poverty. Most NBI indices include such indicators as access to clean water, quality of housing, crowding, education level of household head, school attendance, nutrition, and others (see Appendix 1). The NBI index possesses an advantage, in that it is normally based on census data, which is specific to small localities. Consumption/income data is often based on a sample survey, which cannot be disaggregated to small localities because of the limited sample size. Most LSMS² surveys, for instance, are based on samples of only 3-5,000.

There are two broad methods for constructing NBI indices common in Latin America. The first is to develop a composite index with some sort of system of weights to combine various indicators. This approach is used in 5 of the 13 countries shown in Appendix 1, including Bolivia, Ecuador, Honduras, Peru and Panama. Normally, each variable is defined in terms of a normal range, so that the measured result can be transformed into an index number. This facilitates combining with other variables. In this case, some judgement must be made about what level of the overall index constitutes “poverty”. The biggest problem with the composite index approach, however, is the choice of weights. Since there is no objective measure of overall welfare, there is no way to determining if the weights for the various indicators are somehow “correct”.

¹ Paul Streeten, S. J. Burki, M. Haq, N. Hicks and F. Stewart, *First Things First: Meeting Basic Human Needs in Developing Countries* (New York, 1981), Ch.1.

² Living Standards Measurement Study, a type of multi-purpose survey developed by the World Bank to measure poverty and living conditions.

An alternative approach popular in many countries is to identify thresholds for each indicator, making each a dichotomous, rather than continuous, variable. A person is considered poor if he/she is deficient in any one of the several indices that make up the basket of indicators. Extreme poverty is sometimes defined as a deficiency in two or more indicators. This avoids the weighting problem, but requires judgements about the cut off values or thresholds for each variable, which implicitly weights the results. In this case, the NBI is not an index at all, but a series of thresholds used to define poverty. However, this approach means that the greater the number of indicators used to measure NBI, the greater the level of poverty is likely to be. There will likely be more people with unmet basic needs (BN) if one uses seven variables, than if one uses only five, etc. In practice, the number of variables used by various countries varies enormously (see Appendix 1). Costa Rica and Honduras use only four indices, Venezuela and Colombia use 5, Ecuador and Uruguay 6, Paraguay 7 and Bolivia 10.³

In general, we see that an NBI index of any type can serve three purposes:

- serve as a proxy for income;
- indicate non-monetary aspects of poverty; or
- indicate deficiencies in basic service availability.

If the NBI index is a proxy for income-poverty, for instance for smaller localities, then the proper weights are easy to define. They are those that make the best estimation of per capita income or consumption. Alternatively, they could be used to estimate percentage of the population below the poverty line. Such approximations can be made by regressing household survey data at the national level, and using the resulting regressions to approximate poverty or income per capita at a local level, drawing on the more detailed data of a census or similar survey that lacks income questions..

If the objective is to measure non-monetary aspects of poverty, then the weights for the index are undefinable. However, the indicators used should measure some aspect of poverty (or results), and not some form of input or service designed to produce a favorable result. For instance, good health measured by lower infant and child mortality is a desired result, and improved health services, sanitation or water supply is an input. Most NBI indices seem to mix up inputs and results. Thus it is common to find results (illiteracy, malnutrition,) mixed in with service deficiency indicators (lack of water, sanitation, school attendance, etc.). In some cases, a variable relating education of the household head and the dependency ratio is used (Argentina, Venezuela, Uruguay), which further mixes in a quasi-income variable.

In addition, it is not clear that mixing together various indicators adds much value. The fact that two areas have the same overall index may mask substantial differences in levels of health, education or infrastructure services. To design an appropriate anti-poverty strategy, one would have to know these details; i.e. whether to focus on education, health, etc. Therefore, it is not clear what one gains from an composite index, particularly if it is made up of indices of service deficiencies.⁴

Internationally, various indices have been suggested for comparing basic needs attainment between countries. Most of these indices suffer from the same problems enumerated above.⁵ In the 1970s, Morris attempted to introduce a Physical Quality of Life Index, based on a straight combination of three social

³ Data for South America is from the paper by INDEC, "La Medición de la Pobreza por Medio de Datos Censales en Algunos Países de América Latina" (C. Cantarella, V. Garnica, A. Lucarini, F. Olmos, D. Rodriguez), October, 1996. Data for Central America and Peru based on information collected by World Bank project staff.

⁴ See Martin Ravallion, "Issues in Measuring and Modeling Poverty", *Economic Journal* 106 (September, 1995) for a general discussion of this issue.

⁵ Norman Hicks and Paul Streeten, "Indicators of Development: The Search for a Basic Needs Yardstick", *World Development* 7 (1979), pp. 567-80.

indicators, life expectancy, literacy and infant mortality⁶. More recently, the UNDP has developed its Human Development Index, which consists of two social indicators, life expectancy and educational attainment, combined with per capita income. The index gives equal weight to each component. In recent reports, it has introduced a second index, which takes the HDI and drops per capita income and substitutes a composite index composed of access to health services, access to safe water, and the percentage of malnourished children under five. This they label as the Human Poverty Index (HPI)⁷, and results in an index that is completely divorced from any income measure.

However, the HPI index now confuses what is being measured, since it includes both indicators of *results* (life expectancy, nutrition, illiteracy) as well as *inputs* (water, access to health services, school enrollment). It is not clear if the objective is to measure poverty in a non-monetary way, or to measure access to public services that could reduce that poverty.

THE NBI OF ARGENTINA

In the case of Argentina, the NBI index uses a group of dichotomous variables to identify poor areas. A person is considered poor if they live in a household having:

- more than three persons per room (crowding);
- living in a house made of irregular materials, or in rented quarters (housing);
- not having an indoor flush toilet (sanitation);
- having a child between 6 and 12 years that is not attending school (school attendance);
- having four or more persons per person working and a household head with 2 or less years of primary school (subsistence capacity).

The main problem with this NBI index, like many, is that it is a mix of indicators without a clear purpose. Most of these indicators are inputs, rather than results, and some are proxies for income or consumption expenditures. The first two, crowding and housing conditions, are clearly related to household income, while having a flush toilet may be as well. Likewise, the fourth variable measures school attendance, but not achievement, and it is not clear whether the lack of school attendance is related to availability of services or not. Finally, having four or more persons per employed person, or a household head with only 2 years of primary education, is essentially a proxy for average household income, the presumption being that those with inferior educations and large households are spreading a small income over many people.

Is it a Proxy for Income? If we judge the NBI index against the three possible uses described above, we need to judge first if it is a good proxy for income. A study undertaken by de Arrieta and Caminos, using the 1996 EPH survey, showed that the two most important variables are crowding and sanitary conditions, while school attendance is rarely important.⁸ (see Table 1). Housing conditions are moderately important, and show very wide fluctuations between regions. As shown in Table 1, the housing variable indicates poverty in 19.8% of all NBI households, but the range over the 27 regions is from .3% to 56.8%. The small influence of education is related to the choice of variable and its threshold. This variable indicates poverty when a household has a child aged 6-12 not enrolled in school. Since

⁶ Morris, M. D. Measuring the Condition of the World's Poor: The PQLI Index (Oxford: 1979)

⁷ UNDP, Human Development Report, 1997 (New York, 1997).

⁸ Maria Ester R. de Arrieta and Joaquin R. Caminos, "Niveles de Vida, Pobreza E Ingresos en los 27 Aglomerados Relevados Por la Encuesta Permanente de Hogares" Govt. of Argentina, Subsecretaria de Inversion Publica Y Gasto Social, documento de Trabajo no. 3/97, p. 20.

primary school enrollment in Argentina is practically 98%, there are few households to be classified as poor because of this indicator.

TABLE 1
PERCENTAGE OF HOUSEHOLDS WITH NBI BY TYPE OF DEFICIENCY

	Mean	Standard Dev.	Range	
			Min.	Max.
Crowding	39.8	9.0	24.1	62.9
Sanitary Conditions	51.6	17.6	16.3	79.8
Housing	19.8	14.8	.3	56.8
Education	3.1	1.9	0.0	8.1
Subsistence Capacity	21.0	5.8	12.4	33.8

Source: de Arrieta and Caminos. Note: based on averages of 27 regions; NBI= index of unmet basic needs

Despite what appears to be strong link to income, the link in actual practice is relatively weak. For instance, de Arrieta and Caminos⁹ found that, when looking at household in the lower 40% of the income distribution in each of 27 urban areas, only about one-third (13.6% of total population) were deficient in terms of unsatisfied basic needs. However, for those in the upper 60%, about 8% were deficient in terms of NBI (4.8% of total population).

TABLE 2
PER CAPITA FAMILY INCOME AND NBI
(% of population, 1996)

Income	With Unsatisfied Basic Needs	Without nsatisfied Basic Needs
Low (lower 40%)	13.6	27.1
Medium-High	4.8	54.5

Source: de Arrieta and Caminos Note: data based on averages of 27 regions.

In this case, the use of the NBI instead of income would result in an error rate of 32%. This is divided into 27% of the population who do not have unmet basic needs but fall into the lower 40% (Type A error), and an additional 5% of the population who have unmet basic needs but are not poor on income grounds (Type B error). However, this study is flawed in that it is examining the data for the lower 40% for each region, and thus the "poverty line" is not constant across regions.

In a slightly different approach, Suarez¹⁰ examined data for 1991-96 for the area of Greater Buenos Aires and focused on the lowest three deciles of the income distribution. She found that while 62% of the population within this group were below the poverty line, only 28% were deficient in terms of NBI (in 1996). Furthermore, while the numbers below the poverty line had risen since 1991 (from 54 to 62%), the numbers with deficient basic needs had *fallen*, from 32 to 28% (for the lowest three deciles).

One problem with the analyses above is that they do not define a poverty line, but use a substitute, such as the lower 40%. One problem in Argentina is the absence of a good survey at the national level of

⁹ Arrieta and Caminos, p. 27

¹⁰ Ana Lourdes Suarez, "Hogares de Bajos Ingresos del Gran Buenos Aires, Los Cambios Operados Entre 1991 Y 1996", Govt of Argentina, Subsecretaría de Programación Macroeconómica, Documento de Trabajo no 13/96, Diciembre, 1996.

living conditions which would enable us to define a poverty line and relate it to social conditions. Such a survey is available for 1996 for two of the poorest rural areas, Salta and Misiones. The sample covers 584 households in rural areas.¹¹ Analyzing the data using frequency tables, we see how often the overall NBI index and its individual components correctly predict poverty status. The results are given in Table 3.

TABLE 3
HOUSEHOLDS BELOW POVERTY LINE BY NBI STATUS,
SALTA AND MISIONES, 1996
(percent)

<u>NBI Status</u>	<u>Percent of HH Below Poverty Line</u>
Deficient in at least 1 BN	69.7
Crowding	51.4
Housing	77.7
Sanitation	40.2
School Attendance	39.0
Subsistence Capacity	39.4
Dependency Ratio	39.6
Education of HH head	66.4

Note: HH = household, BN = basic need
Source: Bank staff estimates

Overall, the NBI correctly predicts poverty status in 70% of the cases in these rural areas (a somewhat better percentage than found before in largely urban areas). Within the NBI indices, the housing variable is relatively good (78% accuracy) while sanitation (40%), school attendance (39%) and subsistence capacity (39%) are relatively poor in making predictions. In other words, if the housing variable were used by itself, the NBI could improve its prediction accuracy from 70% to 78%; the addition of the other variables only worsen the accuracy. The subsistence capacity variable can be broken into its components. As can be seen in Table 3, the education of the household head is a better indicator than the dependency ratio, and the combination of the two is worse than the education variable by itself.

In summary, these studies suggest that the current NBI indicator is not a very good proxy for income, and major improvements could be made to the current index to achieve a closer fit. However, if one assumes that the goal of the NBI is to track aspects of poverty that are not captured in income or consumption measures, then a different approach is needed.

Does it Measure Non-Monetary Poverty? One can think of a number of indicators that would point to some of the worst manifestations of poverty, that may or may not be linked to income levels. These might be related to such factors as a lack of access to public services, discrimination within the family in the distribution of income, or consumer ignorance. These might include, as a first approximation, such indicators as life expectancy, life expectancy of women, infant and child mortality, child malnutrition, illiteracy and low levels of school completion. The present NBI considers only low levels of school completion, which it mixes with the dependency ratio in a quasi-income measure. There is no measure of poor health or nutrition. Rather, it is assumed that these are linked to crowding, sanitation, etc. Information on how the NBI relate to these non-monetary indicators is not abundant. However, one study relating child malnutrition to the NBI shows that there is substantial child malnutrition in households that

¹¹ This from a LSMS type survey. For further discussion of the survey and the data, see Tom Wiens, "Analysis of Rural Poverty in Argentina", LAIER, World Bank, November 10, 1997

have no unsatisfied basic needs. As shown in the Table 4 below, the overall rate of chronic malnutrition is 6.1% for the seven urban areas given in a study by INDEC (based on a survey conducted in 1994). The overall rate of malnutrition for the entire sample is 6.1%, but for households with unsatisfied basic needs, the rate is 8.2%. However, even in household without unsatisfied BN, it is still 4.9%.¹²

TABLE 4
NBI AND CHRONIC MALNUTRITION FOR CHILDREN AGED 2-5.
(percent)

	Total	HH with NBI	HH w/o NBI
Total	6.1	8.2	4.9
Greater Buenos Aires	6.2	7.7	5.3
Conurbano	6.8	8.4	5.5
Mendoza	5.8	12.7	2.1
Rosario	5.2	8.6	2.7
Neuquen	7.1	12.5	5.2
Rio Gallegos	4.8	3.5	5.1
Salta	5.5	10.6	3.8

Source: INDEC

One can also see from Table 4 that the NBI index varies widely between areas. In Mendoza, almost all households with malnutrition are also those with unmet BN. However, in Rio Gallegos, there is actually a higher rate of malnutrition among households having no unmet basic needs than among the supposedly poorer group with unmet basic needs.

Does it Measure Infrastructure Deficiencies? Finally, one could argue that the NBI is useful because by measuring infrastructure deficiencies, it could be useful for planning interventions of various types. However, the measures of infrastructure here are very partial, and mostly related to housing. There are no measures of potential access to health centers, schools, etc.. The focus is largely on housing services which in many cases are proxies for income, rather than faulty public sector provision of services. In addition, one would have to ask again the question: what is being gained from a composite index. Individual indices would seem more useful. For instance, interventions to improve water supplies should go to areas that are poor and lack clean water. Targeting water supply interventions with a general index made up of many variables is likely to result in mistargeting of the intervention.

CONCLUSIONS

From this brief survey I reach the following three conclusions:

1. *Need for Improved Surveys of Living Standards.* While some sort of NBI index might be useful, there is no substitute for a good, nation-wide survey of living conditions that combines income and consumption data with family economic and social characteristics, including employment, housing status, use of public services, health, nutrition and education data. Such surveys are common in Chile (CASEN) and have been developed and used by the World Bank in many member countries (LSMS). At the present time, Argentina lacks such an integrated survey, but is moving in that direction. It is extremely important that this be done as quickly as possible.

¹² INDEC, *Infancia y Condición de Vida*, Buenos Aires, 1995. Chronic child malnutrition is defined in terms of height/age.

2. *NBI as an Income Proxy.* Even with a good living standards study, it might be necessary to develop a proxy indicator to be used at the municipality or department level. In this case, the results from the nation-wide survey could be used in conjunction with Census data to estimate poverty rates or per capita income at the municipality level. The correct weights for this index would be those derived from the regression that most closely approximate poverty or per capita income.

3. *Restructure the Present NBI.* The present NBI should be restructured to measure the non-monetary aspects of poverty. In this approach, it should be used to measure the manifestations of poverty that might not be necessarily related to income levels, but could represent either the lack of access to public services, ignorance, maldistribution or other factors. These indicators could be used singly to develop poverty maps that would overlay the income-poverty map, or they could be combined into a composite index. However, the combination of indicators is still an art, rather than a science, and it is difficult to give advice on how to choose the ‘right’ weights.

In terms of composition, I would suggest that the revised NBI index focus on some key deficiencies that indicate poverty, but are not “input” related. These are:

- Education: Literacy, or school completion levels
- Health: Life expectancy, or under 5 child mortality
- Nutrition: chronic child malnutrition (height/age)

Education is key to reducing poverty. Literacy is a good measure of education results, but can be difficult to measure. An alternative is the number of years of schooling completed, particularly of income earners or household heads. This indicator is more related to inputs, rather than results, but seems to be clearly related to poverty and is better than school attendance rates. For health, life expectancy calculations measure the health status of the entire population. They do not measure morbidity rates, and they may be difficult to calculate at a local level. Under 5 child mortality rates are a useful substitute, and can usually be taken from standard household surveys. While malnutrition can be overcome with sufficient consumption expenditures on food, malnutrition exists within families when there is a poor internal distribution within the family of food resources. Thus, adding a measure of child malnutrition would appear useful. This can be measured either by “stunting” (height/age) or by “wasting” (weight/age). However, stunting appears to be the preferred index among experts. In each case, if data is available, it might be useful to disaggregate the indices by gender, to capture any degree of discrimination against women.

The above index would be superior to the present index, in that it would focus on results, would not be heavily focused on housing, and would give greater weight to health variables (missing in the present index entirely). It should be a supplement to a income-poverty, however, preferably one based on consumption expenditures.

APPENDIX I

BASIC NEED INDICATORS IN LATIN AMERICA

Country	Number of Indicators	Type of Indicator	Poverty Definition
Argentina	5	Housing, crowding, sanitation-toilet, school attendance, dependency ratio combined with education level head HH	poor if deficient on the basis of any one indicator
Bolivia	10	Housing, crowding, safe water, sanitation-toilet, school attendance, illiteracy, health and social security, electricity	weighted index compiled of 4 indicators (Housing, Health, Education,) 4 indicators together compiled of 13 variables
Colombia	5	Housing, crowding, sanitation-toilet, school attendance, dependency ratio combined with education level head HH	poor if deficient on the basis of any one indicator
Costa Rica	4	Access safe water, access sanitation, crowding, access to education	poor if deficient on the basis of any one indicator
Ecuador	5	Crowding, access to safe water, access to sanitation and waste disposal, education head household,	weighted, Water, sanitation, waste and education 100,50,25 or 0 points, crowding 100,75,50,25,0 points
El Salvador	4	Crowding, school attendance, access safe water, access sanitation	poor if deficient on the basis of any one indicator
Honduras	4	Water, malnutrition, basic sanitation, illiteracy	weighted index; water = 40%; others 20%.
Nicaragua	5	Access safe water, access sanitation, crowding, school attendance, dependency ratio combined with education level head HH	poor if deficient on the basis of any one indicator, extremely poor if deficient on the basis of two or more indicators
Paraguay	7	Housing, crowding, access safe water, school attendance, illiteracy, level of education, durable consumer goods	poor if deficient on the basis of any one indicator
Panama	10	Housing (no access safe water, no access sanitation, no electricity, crowding,...), Education (illiteracy, no school attendance,...), Health (births without professional help, infant mortality, malnutrition)	Weighted Index compiled of three indicators, compiled of 11 variables, (% lowest value = highest value-observed value/highest value-lowest value). Index represent not household level, but relative level proportion of households in poverty by district
Peru	8	child malnutrition, illiteracy, crowding, school attendance, water, sewerage, electricity, inadequate roof	weighted index with child nutrition to be given 50%, others 7.1%.
Uruguay	6	Housing, crowding, safe water, sanitation-toilet, school attendance, dependency ratio combined with education level head HH	poor if deficient on the basis of any one indicator
Venezuela	5	Housing, crowding, safe water, toilet-sanitation, school attendance, dependency ratio combined with education level head HH	poor if deficient on the basis of any one indicator