NECESSITY OF ESTIMATION OF HOUSING DEPRIVATION : RULE OUT THE *RULE OF THUMB*

Dr. Saptarshi Chakraborty

Abstract

Housing deprivation is one of the real indicators which must be taken into consideration in measuring poverty. Income, the most popular of the indicators, does not only lack in completeness of measurement, but also undergo a limitation that it is the most difficult variable to estimate. This paper claims that study of housing deprivation is necessary and estimates it for a small village by simple procedures. It finds that general policy prescriptions are not economically scientific and are basically based on some rules of the thumb which may not be true in all cases. Instead, a proper formal calculation of deprivation indices is needed for the choice of target groups such that rectification measures not only reduces overall deprivation of the group but also removes the inequalities within different sections of the group.

Key words: Housing deprivation, Estimation, Rule, Qualitative data.

1. Introduction:

Housing deprivation is one of the real indicators which must be taken into consideration in measuring poverty. Income, the most popular of the indicators, does not only lack in completeness of measurement, but also undergoes a limitation that it is the most difficult variable to estimate. Whereas, conversion of qualitative data to numerical ranks is difficult in case of housing deprivation, income deprivation is easy to calculate, but what does such calculation infer when income is never estimated correctly? Governments tend to avoid incorporating housing deprivation in poverty estimates probably to bury the infrastructural inadequacy. This paper claims that study of housing deprivation is necessary and estimates it for a small village by simple procedures discussed in "Chakraborty S. (2010), Housing Deprivation: Concept and Measurement. *Academic Spectrum*, Vol.1,No.1." and "Chakraborty S. (2010), Positive Discrimination in rectifying Housing Deprivation Inequality: Caste may not be the Basis. M S Academic, Vol.1,No.1" In addition, this paper investigates whether there is any gap in deprivation levels between the different groups of people of that population.

2. Basic Structure and Methodology:

Various groups $N = \{1, 2, \ldots n\}$ comprising either of male, female, adult, children or total villagers are to be considered whose deprivation are to form the principal interest of this study. Let **d** denote the degree of housing deprivation for the group **N** such that **d** is an increasing function of d_i $(i = 1, 2,\ldots, n)$ where d_i denotes the degree of individual i's housing deprivation. Hence we may write $d = F(d_1, d_2, d_3, \ldots d_n)$. We assume that d_i lies in the interval [0,1] and an individual is

said to be deprived if and only if $d_i > 0$. However, it is to be admitted that this paper does not distinguish between individuals who do not suffer from housing deprivation but who have different levels of achievement in terms of housing. The intuitive conclusion about this formulation is that the degrees of 'overachievements' in terms of housing, of individuals, who are not deprived in terms of housing, are irrelevant for the purpose of measuring the housing deprivation of the group. This is, of course, exactly analogous to the literature on poverty measurement where no distinction is made between the different non-poor individuals.

In the process we assume that all the individuals living in the same housing unit enjoy the same standard of housing by ignoring any intra-household differences that may exist in this respect. It is obvious that in judging the standard of housing available to the individuals in a household, one has to take into account many different attributes like condition of roof, the amount of available floor space, type of toilet facilities, etc. Indeed, this multiplicity of the relevant attributes, together with the quantitative nature of some of these attributes, constitutes a major source of complexity in evaluating the standard of housing. To judge the standard of housing available to the individuals in a household, this paper takes into consideration a set of various different relevant attributes **Z** (relating to adequacy, environment, sanitation, comfort, etc.**)**. For every individual i ∈ N and for every attribute x, let $\mathbf{y_i(x)}$ denote i's actual consumption of attribute x. since many of the attributes are qualitative rather than quantitative in nature, we are to assume and assign a relevant real number[2] to denote its level. Let for every attribute x, let **r(x)** denote the benchmark level of the consumption of attribute x, i.e. r(x) is the level of consumption which is considered satisfactory. For example, if x_i is 'drinking water facilities', then r(x) is 'piped drinking water' which this paper considers the best possible alternative. But then, as these are qualitative in nature, they are denoted by **b(x)**, which then is converted, to a real number r(x) by a rule to be discussed later. It follows that individual I's consumption of attribute x is satisfactory if and only if $\mathbf{y_i(x) \geq r(x)}$. We assume that, for every i ∈ N, the degree of housing deprivation, d_i, is a function of $y_i(x)_{x \in z}$ and $r(x)_{x \in z}$. Thus, the function can be written as:

$$d_i = f(y_i(x)_{x \in z} \, , \; r(x)_{x \in z})$$

3. The Criteria and the Attributes:

Though there are numerous attributes which are relevant in judging the standard of housing enjoyed by the members of the household, this papers focuses and considers a set of only 20 such attributes. These attributes are partitioned into four groups each of which is called as **criterion**. The partitioning of the attributes are not entirely arbitrary; it has an intuitive basis in so far as the attributes in each criterion relate to a specific intuitive aspect of housing. The four criteria henceforth will be called adequacy (A), sanitation (S), environment (E) and comfort (C). Following are the explanations of each criterion and its elements.

3.1 **Structural Adequacy (A):** The basic purpose of a house is to provide protection against the elements and this is the aspect that is captured by this

particular criterion. This paper considers a set $\{a_1, a_2, a_3\}$ of following three attributes for this criterion to explain structural adequacy of a house.

    i)   Condition of the roof (**a_1**)
    ii)   Condition of the walls (**a_2**)
    iii)   Condition of the floor (**a_3**)

However, it is to be admitted that many other attributes could have been included into this criterion for its exhaustiveness, but as field data is generally collected by surveyors, who actually are not dwellers of those houses, one has to totally depend on their value judgments which generally is also a fact that it is difficult for them to judge exactly in cases when such attributes[3] cannot be understood just by seeing it externally.

    3.2 Sanitation (S): Habitat without sanitary facilities may offer protection from the elements but may cause serious health problems and hence sanitary facilities constitute a basic necessity. This paper considers the criterion of sanitation to be a set, $\{s_1, s_2, s_3\}$ of following three attributes:

    i)   Quality of drinking water (**s_1**)
    ii)   Quality of water for bathing and washing (**s_2**)
    iii)   Toilet facilities (**s_3**)

It is tempting to assume that in view of the reality of rural India, one can afford to ignore the toilet facilities. However given that toilet facilities are important for hygienic living, this paper seeks to capture that concept of 'absolute deprivation' rather than 'relative deprivation. Given this, the fact that most of the rural population of India does not hahe proper toilet facilities either in the house itself or in the compound of the house, is not a compelling reason for not including toilet facilities as a relevant attribute.

    3.3 Environment (E): Health and hygiene outside the floor area is as important as that inside. Taking this into consideration the criterion of environment is considered a set $\{e_1, e_2, e_3\}$ of following three attributes:

    i)   Presence or absence of stagnant water near the house (**e_1**)
    ii)   Presence of garbage in around the house (**e_2**)
    iii)   Presence of cattle/other animals in proximity (**e_3**)

It is to be admitted that many other[4] attributes could have been included into this criterion for its exhaustiveness, but as only such attributes are common to villages in India, this paper considers the aforementioned. However, one can add many other attributes that may be suitable for a particular place or village where the actual survey and the study are to be done.

    3.4 Comfort (C): Here we gather together several attributes which, individually, may not be essential as any of those included in structural

adequacy, sanitary facilities and environment, but which are important for comfortable living. This criterion of comfort encompasses:

i) Floor space per adult equivalent (c_1)
ii) Room per adult equivalent (c_2)
iii) Presence of electricity (c_3)
iv) Presence of separate kitchen (c_4)
v) Distance from the source of drinking water (c_5)
vi) Distance from the source of water for washing and bathing (c_6)

For the purpose of calculating the amount of floor space per person and the number of rooms per person, a child[5] should not have the same status as an adult[6], since children need less space at home than adults. It can be assumed, though arbitrarily, that a child of no more than 5 years should count as $\frac{1}{4}$th of an adult and a child of more than 5 years should count as $\frac{1}{2}$ an adult. The number of adult equivalent has to be calculated for each household using these conversion factors. Note that the floor space per adult equivalent is intended to be an indicator of the amount of space that members of the household have while the number of rooms per adult equivalent is intended to capture the amount of privacy that they enjoy.

4. Numerical Representation of Consumption Levels:

Some of the attributes, like floor area per adult equivalent, come with obvious numerical measures for corresponding consumption levels. In contrast, the condition of walls does not have any such obvious measure and in real life is judged qualitatively by saying whether it is broken or not. But for numerical analysis the issue is how to transform such qualitative data into some numerical value. Note that numerical measures that seek to capture qualitative judgments cannot have a compelling obviousness of the 'natural' numerical measures available in the case of an attribute such as the floor space enjoyed by a person. They must involve judgments, and, to that extent, they must involve an element of arbitrariness. However, so long as the underlying judgments are made clear, they do serve a useful purpose.

4.1 Specification of Achievement Levels: For an attribute **x**, the different possible qualitative levels have to be specified. As for example, for the criterion **A** (Structural Adequacy) and a_1 (condition of the roof), one can consider four levels of achievements listed in ascending order:

i) Very poor and will leak if it rains ($a_1.1$)
ii) Roof will partly leak in some parts of the house ($a_1.2$)
iii) Roof will not leak but still needs repair ($a_1.3$)
iv) Good ($a_1.4$)

In general, for any given attribute x, one has to distinguish in quantitative terms, **t[x]** levels of possible achievements (x.1), (x.2), …, (x.t[x]). In

Appendix I, we identify the different qualitative levels of achievements for the other attributes.

4.2 Benchmarks for the Different Attributes: For every attribute x, a qualitative 'benchmark' level, b[x] has to be specified, such that any household that falls short of that benchmark is deprived in terms of x. As for the condition of the roof a_1, we consider the achievement level $a_1.4$ to be the benchmark so that any household achieving only $a_1.1$, $a_1.2$ and $a_1.3$ will be considered to be deprived in terms of condition of the roof. Thus b[a_1] is $a_1.4$. The Benchmark Levels of all the attributes have been discussed in Appendix I.

4.3 Specification of Numerical Scores: let i be a given individual and x be a given attribute. Suppose the level of i's achievement in terms of x is **x.k** and b[x] is **x.k**. The achievement score **$y_i(x)$** for x is to be specified as **(k-1)** and the numerical benchmark score **r(x)** for x to be **(k-1)**. Consider the following example. Suppose, in terms of the condition of the roof a_1, household i's achievement level is 'roof will partly leak in some parts of the house' (**$a_1.2$**). Then i's achievement score $y_i(a_1)$ is given by (2-1) = 1 and noting b[a_1] = $a_1.4$, the benchmark score of a_1 is (4-1) = 3. At the risk of emphasizing the obvious, it may worth be explaining the intuitive procedure underlying this method for specifying **$y_i(x)$** and **r(x)**. The procedure is actually the procedure for assigning rank numbers under the well known **Borda**[7] rule, supplemented by the rule of normalization. Since there are four possible achievement levels for the roof a_1, the rank numbers for them range from 1 to 4, a higher number being assigned to a higher achievement level; like rank number assigned to the benchmark level b[a_1] = $a_1.4$ is 4. These numbers are then normalized by deducting 1 from each of them, so that the lowest possible achievement level ($a_1.1$) is assigned the number 1 and the benchmark level b[a_1] is represented by the benchmark score 3.

5. The Function f: Given the scores $y_i(x)$ and r(x) for each attribute x, the overall deprivation **d_i** of individual i can be obtained by a three-stage technique. First, for every individual i and every attribute x, his or her deprivation in terms of that attribute can be represented as:

$$d_i(x) = \begin{cases} 0 & \text{if } y_i(x) \geq r(x) \\ \dfrac{r(x) - y_i(x)}{r(x)} & \text{if } y_i(x) < r(x) \end{cases}$$

Where individual **i** is said to be deprived of the attribute x if $y_i(x) < r(x)$ and thus $d_i(x) > 0$. Intuitively, an individual is deprived in terms of attribute x if and only if i's achievement score falls short of the benchmark score for x. further, the degree of deprivation, if any, is the shortfall from the benchmark score expressed as a percentage of the benchmark score.

Once the level of deprivation of an individual is obtained for each attribute $d_i(x)$, the deprivation of individual i for each criterion $d_i(X)$ can be obtained by the following two alternative measures.

$$d'_i(X) = \frac{\sum d_i(x)}{|x|}$$

$$d''_i(X) = \begin{cases} 0 & \text{if } \sum \frac{r(x) - y_i(x)}{r(x)} \leq 0 \\ \dfrac{\sum \frac{r(x) - y_i(x)}{r(x)}}{|x|} & \text{if } \sum \frac{r(x) - y_i(x)}{r(x)} > 0 \end{cases}$$

The two alternative ways of computing the degree of deprivation in terms of X differ insofar as $d''_i(X)$ allows deprivation in terms of one attribute in X to be compensated by over-achievement in terms of another attribute in X, where $d'_i(X)$ does not allow for such compensation or trade-off. Therefore if one uses $d'_i(X)$ as a measure of i's deprivation in terms of X and i happens to be deprived in terms of any attribute in X, then I will turn out to be deprived in terms of criterion X, no matter how high i's achievements in terms of the other attributes in X may be. However, for all X in {A,S,E} and all x in X, the benchmark score in terms of x is also the highest of all the possible achievement scores for x, and therefore,

$$for\ all \quad x \in \{A, S, E\} \quad and\ for\ all \quad x$$

$$\in X \quad we\ must\ have \quad \frac{r(x) - y_i(x)}{r(x)} > 0$$

$$for\ all \quad x \in \{A, S, E\} \quad we\ must\ have \quad d'_i(X) > d''_i(X)$$

It is only for X=C that $d'_i(X)$ and $d''_i(X)$ may diverge as the benchmark level is not the top-most level. The judgment is that none of the attributes in C is as 'essential' as those in A, S or E. therefore, in thinking of a household's deprivation in terms of comfort, it does not seem unreasonable to allow for the possibility of the shortfall in terms of one attribute in C being partly or fully cancelled out by the over-achievement in terms of another attribute in C. For example, it is not implausible to argue that the shortfall in terms of 'kitchen' arriving from the absence of kitchen could be compensated, at least partially, by an over-achievement in terms of 'floor space per adult equivalent'.

The overall deprivation of an individual i is assumed to a weighted average of the deprivations of i in terms of each of the four criteria. However, since for every criterion X, there may be two conceptually different measures of deprivation $d'_i(X)$ and $d''_i(X)$, and since $d'_i(C)$ is actually different from $d''_i(C)$, there must be two different distinct versions of the overall deprivation d_i for individual i.

$d'_i = w(A).\,d'_i(A) + w(S).\,d'_i(S) + w(E).\,d'_i(E) + w(C).\,d'_i(C)$
$d''_I = w(A).\,d'_i(A) + w(S).\,d'_i(S) + w(E).\,d'_i(E) + w(C).\,d'_i(C)$

where w(A), w(S), w(E) and w(C) are non-negative weights adding up to 1. These weights can be considered equal and taken to be each equal to ¼ or in any other fashion as the investigator perceives about the importance of the criterion. Suppose the investigator opines that 'comfort' is not that much essential, he may consider w(A) = w(S) = w(E) = 2/7 and w(C) = 1/7.

6. Aggregation of Individual Deprivation Levels:

Once derived a measure of housing deprivation of every individual in N, the process to measure the housing deprivation of the group N is similar to measuring income poverty of a group, given the percentage shortfall of each individual from the poverty threshold. For this, the three measures can be used, the **Sen Measure**, the **Quadratic Measure** and the **Simple Average** each of which can be based either on $(d'_1, d'_2 \ldots d'_n)$ or on $(d''_1, d''_2 \ldots d''_n)$. Thus there are actually six different measures of housing deprivation on N. Measures based on $(d'_1, d'_2 \ldots d'_n)$ are termed as **Type - I** and those based on $(d''_1, d''_2 \ldots d''_n)$ are termed as **Type – II**.

Let **J** be the set of all I in N such that $d'_j > 0$. Let **p** be the cardinality of J. Index the individuals in J as j(1), j(2), ….j(p) in such a way that $\mathbf{d'_{j(1)} \leq d'_{j(2)} \leq \ldots\ldots \leq d'_{j(p)}}$. For all I in J, the rank of i, denoted by **q(i)**, is defined to be **v** where **I = j(v)**. Then,

$$Sen\ Measure\ (Type-I) = \frac{2 \sum_{i \in J} q(i).d'_i}{n(p+1)}$$

$$Quadratic\ Measure\ (Type-I) = \frac{\sum_{i \in J}(d'_i)^2}{n}$$

$$Simple\ Average\ (Type-I) = \frac{\sum_{i \in J}(d'_i)}{n}$$

Type – II measures can be defined similarly in terms of d''_i. The Sen measure was first introduced in his classic paper Sen (1976). The Quadratic measure is a distinguished element of the class of poverty measures considered by Foster, Green and Thorbecke (1984). The Simple Average is just the aggregate of all deprivations divided by the total number of individuals in the group under consideration but this measure has serious limitations insofar the intuitively compelling 'transfer axiom'.

7. The Village

Banspahari, a village in the coal field areas of the district of Burdwan in West Bengal, India, consists of **78** households with a total population of **497**. Out of these **all** belong to Scheduled Tribes (ST). There are no other Caste people in this village. The distribution of the total population among different groups that this paper considers is shown in Table 1 below.

Table 1: Basic Statistics

	Entire Village	SC	ST	OBC	GENERAL
Total Population	497	0	497	0	0
Children	182	0	182	0	0
Adults	315	0	315	0	0
Adult males	155	0	155	0	0
Adult Females	160	0	160	0	0
No. of Households	78	0	78	0	0

8. Data and Observations

The data of housing in this village has been collected as a part of a much larger project the purpose of which is to study the various aspects of housing deprivation of people in backward areas. There are several observations that must be stated about this date at the outset.

First, the data collected on each house is based on direct observation and assessment of an investigator who visited the house and not on the assessment of the house by the people living in it. For example, it was the investigator's observation and judgment that decided whether the roof of the house is under 'very poor and will leak if it rains' or under 'will not leak if it rains, but still in need of some repair'. This of course, involves the subjective judgment of the investigator, but it is not clear how one can avoid subjective judgments in such matters.

Secondly, every house of the village was observed by one investigator at only one point of time rather than over a period of time, and the different questions in the questionnaire were answered by the investigator on the basis of his observation on the house at that particular point of time. This clearly has its limitations. If the roof of the house is usually badly damaged in every monsoon, but is regularly repaired after the monsoon, and if the investigator happens to observe it only after the monsoon, then the fact that the roof is regularly in a damaged state during the monsoons will not be reflected in the observations of the investigator. One way of avoiding such difficulties would have been for the investigator to make repeated visits to the same household over a year or so, but this was not practicable. Another way of handling such difficulties can be to ask the members of the household questions involving the state of the house over a period of time, even though the investigator visits the house at only one point of time. However, this paper does not include data with such modified questions and thus is one such limitations of this study.

Lastly, there are a few cases of non-response to some questions and some cases where the response sounded vague. In such cases, in such cases, investigators relied on neighbors. But, these instances are very less in number and are expected not to influence the results largely.

This paper organizes its findings in various charts and tables which deal with two distinct aspects of the analysis of housing deprivation. First, the histograms show, for different groups of individuals, the distribution of deprivation in terms of specific criteria, and also the distribution of overall housing deprivation. Second, the tables give indices of housing deprivation for different groups of individuals, calculated on the basis of alternative measures of housing deprivation.

9. Classification of Population into Groups

In addition to the total population of the village, this paper considers groups of individuals, defined in terms of:

i) age [adults and children]
ii) sex [males and females]
iii) age & sex [adult males and adult females]

The partition of the total population into the above groups has an obvious interest since, in rural India; age and sex are believed to have a close relation with deprivation status. The significance of the partition in terms of age and sex may not be so transparent. Since, this paper ignores intra-household differences; it may be asked why one should introduce the principles of sex and age in identifying the groups that may be of interest in this context. The reason for considering age and sex is that, in India, there is a general presumption that the number of children tends to be higher in more deprived households. If this is true, then one would expect to see a greater degree of deprivation among children than among adults. Similarly, in West Bengal, the opportunity for employment is likely to be higher for men than among women. Also, traditionally, men handle the job of repairing their house to a greater extent than women. Therefore, one would expect that individuals in households with a relatively larger number of adult women are more likely to suffer from housing deprivation than individuals in households with a relatively larger number of adult men. However, since neither the consideration of employment nor the consideration of differential ability to do the physical work of repairing the house is relevant in the context of children, this paper considers the distinction on the basis of sex for adult population only.

10. The Distribution of Deprivation

From Chart – 1 it is clear that most of the households in the village suffer from severe deprivation in terms of sanitation and environment. The severity of deprivation with respect to sanitation, in particular, is obvious from the fact that no household has the satisfactory achievement level (piped water) for drinking purpose. All of them draw drinking water from well/hand-pump and have to rely on river/pond for bathing/washing. None of them too have toilet facilities within their house premises. On the other hand, the village does better in terms of adequacy and comfort. For the criterion sanitation, there are almost no villagers who have very low levels of deprivation.

The performance of these villagers with respect to comfort improves when trade-offs are permitted between the attributes in the criterion of comfort as compared to the situation where no such trade-offs are permitted. This can be seen

from the Chart – 1. This shows that there are some people who have over-achievements in various attributes of comfort.

11. Indices of overall deprivation for different groups

The indices of overall deprivation for different groups of individuals in the village may be of great use so far as the nature of policy prescriptions are concerned. This may help policy makers to choose the right target group or the right policy for the group. To compare the deprivations of the various groups, this paper considers the following index for the relative gap between the concerned groups. For every measure of deprivation, H, and every ordered pair of groups (N', N"), the index of deprivation gap (DGI) is the proportion by which the deprivation of N' exceeds the deprivation of N". Thus, we have:

$$DGI = \frac{DI_{N'} - DI_{N''}}{DI_{N''}}$$

where $DI_{N''}$ is the deprivation index of N" under the measure of H (Sen, Quadratic or Simple Average) and $DI_{N'}$ is the deprivation index of N' under the measure of H. The following are the groups considered and their gaps in deprivations.

11.1 MALE and FEMALE.

People in rural India, even today, are discriminated with respect to sex, as far as housing facilities are concerned. Whether such happens in this particular village and whether sex specific correctional measures are to be adopted demands relative gap analyses concerning Men and Women, the results of which are as follows:

Table 2: Relative Gap between FEMALE and MALE Population when w(C) = 1/4

First Measure considering d'i			Second Measure considering d"i		
Sen's Measure	Quadratic Measure	Simple Average	Sen's Measure	Quadratic Measure	Simple Average
0.000	0.004	0.001	0.000	-0.006	-0.004

The above results[8] show that when no trade-off is allowed, women are 0.4% less[9] deprived than men. This result is in accordance to our hypothesis. However, when trade-off is permitted in comfort, the picture reverts and it is obtained that those women are now 0.6% less deprived than men. It follows that, either women have over achievement in some of the attributes of comfort and such over-achievement compensates other attributes when trade-off is allowed; or men do not have over achievement in any of the attributes of comfort. But then, the gap between the deprivation levels is very small and hence no distinct or significant difference in gap can be thereby stated. Note that the above results are when **w(c)=1/4.** When w(c) is decreased from ¼ to 1/7 and then to 0, we obtain the following results:

Table 3: Relative Gap between FEMALE and MALE Population when w(C) = 1/7

First Measure considering d'i			Second Measure considering d"i		
Sen's Measure	Quadratic Measure	Simple Average	Sen's Measure	Quadratic Measure	Simple Average
-0.001	0.002	0.001	-0.002	-0.003	-0.002

Table 4: Relative Gap between FEMALE and MALE Population when w(C) = 0

First Measure considering d'i			Second Measure considering d"i		
Sen's Measure	Quadratic Measure	Simple Average	Sen's Measure	Quadratic Measure	Simple Average
0.000	0.000	0.000	0.000	0.000	0.000

The above results show that when the importance of comfort decreases to 1/7, the gap between men and women reduces and that when comfort is not taken as a criterion, men and women are equally deprived. It implies that, women are overall more deprived than men with respect to the criterion comfort. But when trade-off is allowed, the situation reverses implying that women have over achievement in some of the attributes of comfort, though on the whole they lack behind men.

11.2 ADULT MALE and ADULT FEMALE.

As stated earlier, there are apriori reasons to expect that, other things remaining the same, households with relatively more adult women and fewer adult men are likely to have a greater degree of deprivation. It is thus of some importance to examine the relative deprivation of adult male and adult female population, the results[10] of which are tabulated below.

Table 5:   Relative Gap between ADULT FEMALE and ADULT MALE when w(C) = 0

First Measure considering d'i			Second Measure considering d"i		
Sen's Measure	Quadratic Measure	Simple Average	Sen's Measure	Quadratic Measure	Simple Average
0.00	0.00	0.00	0.00	0.00	0.00

Table 6:   Relative Gap between ADULT FEMALE and ADULT MALE when w(C) = 1/7

First Measure considering d'i			Second Measure considering d"i		
Sen's Measure	Quadratic Measure	Simple Average	Sen's Measure	Quadratic Measure	Simple Average
0.011	0.001	0.000	0.004	0.006	0.002

Table 7:   Relative Gap between ADULT FEMALE and ADULT MALE when w(C) = 1/4

First Measure considering d'i			Second Measure considering d"i		
Sen's Measure	Quadratic Measure	Simple Average	Sen's Measure	Quadratic Measure	Simple Average
0.012	0.002	0.001	0.010	0.010	0.004

From table 5 it is clear that, adult men and adult women are equally deprived of housing when comfort does not matter. But when comfort gains importance in calculation total deprivation, adult women get more and more deprived in comparison to adult men. It seems that as far as comfort is concerned, men enjoy better facilities. However, when trade-off is allowed, the relative gap between adult women and adult men is lessened. It follows that, adult females might have over-achievements in some of the attributes of comfort which helps in leveling some of the deprivation of other attributes.

11.3 ADULT and CHILDREN.

It is a general perception in rural India that more deprived households tends to have more children. If this is true, then one would expect to find a higher degree of housing deprivation among children than among adults. However the results[11] (see table 8) show that, almost for all measures, children in this village are less deprived than adults and hence the above proposition does not hold for this village.

Table 8:   Relative Gap between CHILDREN and ADULTS

When	First Measure considering d'$_i$			Second Measure considering d"$_i$		
W(c) =	Sen's Measure	Quadratic Measure	Simple Average	Sen's Measure	Quadratic Measure	Simple Average
0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1/7	-0.0417	-0.0151	-0.0075	-0.0545	-0.0703	-0.0351
¼	-0.0500	-0.0268	-0.0132	-0.0812	-0.1284	-0.0634

When comfort is not considered as a criterion, children and adults are equally deprived. However, as comfort gains importance (0 to 1/7 and then to ¼) in calculating overall housing deprivation, the relative gap between children and adults increases from 0% to 12%. It follows that children in this village are more comfortable than adults.

It can also be noticed that almost each of the measures considering d"$_i$ are less than the corresponding values of d'$_i$. This shows that the overachievements in attributes of criterion of comfort enjoyed by children levels out some of the deprivation in other criteria. Hence, the relative gap between adult and children increases when trade-off is allowed.

12. CONCLUSION

For more accurate assessment of an individual's well-being or deprivation, one may need to identify the various 'real' dimensions of well-being and asses the individual's overall well-being or deprivation on the basis of the individual's achievements in terms of these dimensions. Also, even if one considers income to be an accurate indicator of overall well-being or deprivation, for policy purposes one may still need information about achievements or deprivations of an individual or a community in terms of specific real indicators of well-being like environment, sanitation, education facilities, political stability, etc. Governments know that different sections of the population develop at different pace and are deprived at different levels, but tend to follow a rule of thumb in most cases, for instance, MALE population are less deprived than the FEMALE population and that CHILDREN are less deprived than ADULTS. This paper claims that such rules are not always true and that positive discrimination must be done only after formal calculation of deprivation indices. For example, when policies are taken to rectify housing deprivation, all the sections of the group are considered homogeneous and equally deprived. For this village it was found that, men and women are equally deprived when comfort does not matter. But when a deeper analysis is done, it is found that if trade-off is allowed, men become more deprived than women implying that women have over achievement in some of the attributes of comfort. In addition, when 'adult males' and 'adult females' are considered, it was obtained that adult males are more comfortable than adult females in their houses. It is thus an indication to the policy makers that similar rectification measures for men and women can be taken but only for those targeting the criteria 'adequacy', 'sanitation' and 'environment'. For the criterion 'comfort', policy should be such that it also levels and equalizes the differences between men and women and adult males and adult females. To know what the exact policy should be, one has to go for extensive comparative static analysis[12] for the village.

For this village it was also obtained that 'children' suffer much less from housing deprivation than 'adult' people. This gap between adults and children was found mainly due to the differences in the criterion comfort. When trade-off is allowed within the attributes of comfort, the gap between adults and children increases, indicating the fact that children have over-achievement in some of the attributes of comfort. It may be such that adults take much care for their children and allow them the lion share of comfort. However, such conclusions cannot be recommended from this study as this study doesn't optimize on policy prescriptions.

This paper claims that in order to rectify housing deprivation, policy makers either go for helicopter policies or implements positive discrimination that are not economically scientific being based on some rules of the thumb which may not be true in all cases. Instead, a proper estimation of deprivation is needed and target groups have to be chosen such that on one hand the overall deprivation of the group is lessened and on the other, different sections of the unevenly deprived people gets leveled.

References:

i) Chakraborty S. (2010), Housing Deprivation: Concept and Measurement.