Measuring Vulnerability for Indian Slum: A Consumption Based Approach

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Abstract

This empirical study finds that, in India, the percentage of vulnerability varies widely across states, regions, religions, casts and gender of family head. Among the major states of India both poverty vulnerability and welfare vulnerability percentage within the slum is lowest in Delhi and highest in Chhattisgarh. Extent of vulnerability is lower in rural areas compared to urban areas. Peoples belong to Jainism are less vulnerable compare to others and Buddhists are more vulnerable. Peoples belong to General Caste are least vulnerable and STs are most vulnerable. For Indian Slum gender of house head has no significant effect on vulnerability.

Keywords: *Poverty, Vulnerability, Consumption*

1.1: Introduction:

Measuring vulnerability is an important issue for development planners. Theorists have tried to tackle this difficult issue from a dynamic perspective. Vulnerability essentially measures a household's proneness to shock. It tries to quantify the extent to which a family can absorb shocks that may be external to it. Such shocks may be natural (including drought, flood, climate change, some accidents, etc.) or man-made (including recession, food inflation, civil war, etc.). Extreme shock may make almost everybody vulnerable as evidenced by the downfall of many ancient cultures all over the world. However, there are some less severe shocks that might be absorbed if the family is well-equipped to face them.

There are **three** broad approaches in this regard (Hoddinott and Quisumbing, 2003a; 2003b).

1. **The welfare-based approach** (Glewwe and Hall, 1998; Cunningham and Maloney, 2000; Ligon and Schechter, 2003) emphasizes the effect of these shocks on family welfare.
2. **The risk-based approach** lays emphasis on the uninsured exposure to shock (Gaiha and Imai, 2004).
3. **The poverty-based approach** is a dynamic version of poverty. The emphasis here is on the probability to fall below the poverty line (Chaudhuri, Jalan and Suryahadi, 2002, Chaudhuri, 2002).

These three approaches may differ widely. Many families which may encounter large welfare-based shocks may still remain above the poverty line. Similarly, uninsured

exposure to risk may be less severe for households that are well above the poverty level. However, Swain and Floro (2007) try to differentiate between household welfare and utility by arguing that, "While the latter is defined as an abstract measure of satisfaction, welfare is defined as the physical, social, and mental development of human capabilities obtained by means of access to and consumption of basic commodities (such as food, healthcare, education, and shelter), and participation in activities."

A proper analysis of vulnerability ideally requires panel data that could trace down the individual's consumption experience for a sufficiently long time-period. However, such data are rare and difficult to come by, especially for the poor and developing countries. Moreover even if such data are available, they are often not representative. As for example, the ICRISAT panel data that Indian researchers used cover only the semi-arid areas of some parts of south India (Gaiha and Imai, 2004; Gaiha, Imai and Kulkarni, 2007). An alternative is to measure vulnerability by using aggregated panel data (Jha, Imai and Gaiha, 2009).

In fact, the need to incorporate vulnerability measures by using cross-sectional data has sponsored the development of the poverty approach (Chaudhuri, Jalan and Suryahadi, 2002). The basic idea is to identify the household characteristics that "contribute to different per capita consumption levels of households that are otherwise observationally equivalent" (Chaudhuri, Jalan and Suryahadi, 2002). It is then possible to derive an empirical distribution for these features, given certain very restrictive assumptions. Vulnerability is then captured by measuring the probability that a household with these features would fall below the poverty line.

As (Jha, Imai and Gaiha, 2009) argues, there are two important deficiencies of this method. Firstly it is sensitive to distributive assumptions about the error term. Further, the accuracy of the estimates depends upon whether the distribution of consumption across households, given a set of characteristics at a given point in time, is an accurate representation of the time-series variation of the consumption of the households.

Sengupta and Ghose (2010) developed a more direct and simple method. This approach depends on the nature of consumption data as provided by the National Sample Survey Organisation. The approach is non-parametric, as it does not depend on special distributional assumptions. It is also direct as it depends only on the observed consumption data rather than on the household features as emphasized by the poverty approach. In a sense, it is thus free of the uncertainty involved in transmitting these household features into observable income. Again, the various asymmetries involved in the pathway between income and expenditure are internalized in this approach. However, as in all cross-sectional analysis, the impact of general shocks that tends to have an economy-wise effect cannot be analysed.

Following Sengupta and Ghose (2010), in this work, I want to estimate consumption vulnerability of Indian slums from NSS 69th Round, Schedule No. 1.2, data on Drinking water, Sanitation, Hygiene, Housing conditions and survey on slums.

1.2: Objective of the Study

In this study I have the following objectives:

1. To estimate poverty vulnerability and welfare vulnerability separately for rural and urban slums for different states of India.
2. To estimate poverty vulnerability and welfare vulnerability separately for rural and urban slums for different religions of India.
3. To estimate poverty vulnerability and welfare vulnerability for different social groups of India.
4. To estimate poverty vulnerability and welfare vulnerability for male and female headed families of India.

A brief introduction is given in this section. Section-2 gives a brief review of existing literature and research gap. In section-3, I discuss the data features and the methodology used in this study. Section-4 presents estimate of vulnerability position of India by some non-economic factors. Finally, the conclusion is given in Section-5.

2. Review of Literature:

Reviewing the existing literature I have mentioned some of the important works and their findings. Kurosaki (2001) quantitatively investigated vulnerability to risk as a characteristic of dynamic poverty in low income countries. A household is defined as vulnerable to consumption risk if it has to drastically reduce its consumption level when hit by a negative income shock. Chaudhuri et al (2002) found that a household's observed poverty status is an ex-post measure of a household's well-being (or lack thereof). But for thinking about forward-looking anti-poverty interventions that aim to prevent rather than alleviate poverty, what really matters is the vulnerability of households to poverty, i.e., the ex-ante risk that a household will, if currently non-poor, fall below the poverty line, or if currently poor, will remain in poverty. Ligon and Schechter (2003) constructed a measure of 'vulnerability' which allowed them to quantify the welfare loss associated with poverty as well as the loss associated with any of a variety of different sources of uncertainty. Calvo and Dercon (2005) introduced a concept of vulnerability, as a threat of poverty, with downside risk at its core. They defined a vulnerability measure as an assessment of the magnitude of the threat of poverty, measured ex-ante, before uncertainty is resolved. Agarwal et al (2005) in a work on Indian slum found that identification and mapping of all slums is crucial to locate unlisted slums, which are often more vulnerable and usually remain out of any Government program interventions. Devereux et al (2006) found that vulnerability appears to be rising for many Malawians, whose exposure to livelihood shocks is increasing while their ability to cope is decreasing. They identified so many factors which affects vulnerability like erratic rainfall, inequality in landholdings, constrained access to inputs, limited diversification and weak markets demographic and health risks, gendered vulnerabilities, social change

and governance failures, droughts, floods and food price fluctuations, as well as idiosyncratic shocks such as accidents, illness and death of family members, HIV/AIDS, female- and older-headed households, orphans, lack of assets, geographic location, etc.. Gaiha et al (2007) measured the vulnerability of households in rural India, based upon the ICRISAT panel survey. They employed both ex ante and ex post measures of vulnerability. The latter were decomposed into aggregate and idiosyncratic risk, and poverty components. Their decomposition shows that idiosyncratic risks account for the largest share, followed by poverty and aggregate risks. Despite some degree of risk-sharing, the landless or small farmers are vulnerable to idiosyncratic risks, forcing them to reduce consumption. Income augmenting policies therefore must be combined with those that not only reduce aggregate and idiosyncratic risks but also build resilience against them. Janvry and Sadoulet (2008) in a study found that 75% of the world poor are rural people. Half a billion of them are located in countries both vulnerable to rising food prices and with weak capacity to provide social safety nets. For them, agriculture must be the main instrument to respond to the food crisis and escape poverty. Larsen et al (2008) identified the key factors contributing to vulnerability to the 2004 Indian Ocean Tsunami and to emerging vulnerabilities related to post disaster recovery in Sri Lanka and Indonesia. They concluded that the underlying causes of newly emerging vulnerabilities persist due to a lack of mechanisms for collective action in the wider recovery community and their limited capacity to learn to build resilience. Whilst post disaster aid delivery is an important aspect of disaster risk reduction. Swain and Floro (2008) developed a theoretical framework to examine the mechanisms through which the pecuniary and non pecuniary effects of the SHG program on the beneficiaries' earnings and empowerment influence their households' ability to manage risk. They found that SHG members have lower vulnerability as compared to a group of non-SHG (control) members. Jha et al (2009) found that either income or consumption expenditures as measured over short periods of time has been regarded as proxies for the material well-being of households. However, a household's sense of well-being depends not just on its average income or expenditures, but also on the risks it faces. Hence vulnerability is a more satisfactory measure of welfare. They measured the extent of vulnerability as expected poverty, and examined the importance of its determinants. Jha et al (2010) , in an another work, analysed the effects of access to Rural Public Works (RPW) and the Public Distribution System (PDS), a public food subsidy programme, on consumption poverty, vulnerability and under nutrition in India based on the National Sample Survey (NSS) data, 50th round in 1993-1994 and 61st round in 2004-2005. They found significant and negative effects of household participation in RPW and food for work programmes on poverty, under nutrition (e.g. protein) and vulnerability in 1993 and 2004. They confirmed that PDS decreased vulnerability based on 80 percent of the poverty threshold. The same result was found by Imai and Annim (2009). Kurosaki (2010) considered the effect of natural disasters on vulnerability in consumption using two-period panel data from rural Pakistan, surveyed in 2001 and 2004. Empirically he found that the sensitivity of consumption changes to village-level shocks differs across regions, depending upon the nature of disasters and the characteristics of households. Land is effective in mitigating the ill-effects of various types of disasters. Consumption of Northern Punjab villagers are more vulnerable to droughts while Southern Punjab villagers are more vulnerable to pest attacks and Sindh villagers are more vulnerable to

floods. Ranganathan et al (2010) found that rural poor people in developing countries depend on agriculture and are highly influenced by climatic change. They focused sustainable livelihood approaches both at policy and project level to initiate new poverty reduction activities and modify existing activities to improve livelihood incomes. Further, market-based instruments such as credits and crop insurance were also developed to help poor households in many developing countries to cope with the uncertainties. Patnaik and Narayanan (2010) found that the households adopt a wide variety of risk coping measures. These measures are receiving monetary transfers, relief, selling of livestock and borrowing. The means of coping are specific to the nature of shocks created by the disasters. Receiving monetary transfers are the most effective means of coping for households during floods. While monetary transfers are used by households to cope with occupational shocks they are not likely to be used to cope with health shocks. Relief is primarily used by households to cope with the shortfall in income / consumption. Silbert (2011) found that natural disaster risk influenced future poverty rates. He found that smaller, rural and more educated households are less likely to be in poverty in the future. Importantly, these household characteristics are correlated with lower levels of aggregate risk. Ashalatha et al (2012) studied the impact of climate change in many aspects in different locations in the country and concluded that there is high impact on agriculture compared to any other sector in the country. They found that the occurrence of drought have high level of impact on the yield of Rainfed crops. The small and medium Rainfed farmers were highly vulnerable to climate change and to a larger extent the small and medium Rainfed farmers adopted coping mechanisms for climate change compared to large farmers. Jha et al (2012) using ARIS/REDS data set for rural India they measured household vulnerability as expected utility and its components. They concluded that between the years 1999 and 2006 household vulnerability is most explained by poverty and idiosyncratic components. For risk coping strategy, households rely heavily on informal instrument such as their own saving, transfers or capital depletion and they also try to cope with covariate risks by participating in government programmes. A coping strategy using government programmes has vulnerability (idiosyncratic risk component) reducing effects. The expansion of suitably designed government programs has the potential of protecting households efficiently from negative shocks. Iqbal (2013) measured vulnerability to expected poverty (VEP) an ex-anti measure of well-being for Afghanistan. They measured VEP using household consumption expenditure during 2007-2008 to predict probability of future consumption being lower than a specific probability threshold. They indicated that household head education, household head being male, housing condition, and ownership of irrigated agriculture land have a positive effect on consumption. In contrast, the fact that the household is rural or nomadic and proportion of family members under 15 and over 50 years of age have a negative effect on household consumption.

2.1: Research Gap:

Though some research have been done by several economists on this topic but using the latest data set, mainly related to slum peoples, no research have been found. There is almost no research which focused slum peoples all over India. My approach is also

different from others those who addressed vulnerability, except Sengupta and Ghose (2010). In this regard, this research work has some necessity to the society.

3: Data and Methodology

Measuring vulnerability is an important issue for development planners. Vulnerability essentially measures a household's proneness to shock. It tries to quantify the extent to which a family can absorb shocks that may be external to it. Such shocks may be natural (including drought, flood, climate change, some accidents, etc.) or man-made (including recession, food inflation, civil war, etc.). Extreme shock may make almost everybody vulnerable as evidenced by the downfall of many ancient cultures all over the world (or by recent calamities such as the tsunami or Haitian earthquake, earthquake of Nepal, etc.). However, there are some less severe shocks that might be absorbed if the family is well-equipped to face them.

A proper analysis of vulnerability ideally requires panel data that could trace down the individual's consumption experience for a sufficiently long time-period. However, such data are rare and difficult to come by, especially for the poor and developing countries. Moreover even if such data are available, they are often not representative. As for example, the ICRISAT panel data that Indian researchers used cover only the semi-arid areas of some parts of south India (Gaiha and Imai, 2004; Gaiha, Imai and Kulkarni, 2007). An alternative is to measure vulnerability by using aggregated panel data (Jha, Imai and Gaiha, 2009).

However, Sengupta and Ghose (2010) utilized a more direct and simple method. This approach depends on the nature of consumption data as provided by the National Sample Survey in its different rounds. The approach is non-parametric, as it does not depend on special distributional assumptions. It is also direct as it depends only on the observed consumption data rather than on the household features as emphasized by the poverty approach. In a sense, it is thus free of the uncertainty involved in transmitting these household features into observable income. Again, the various asymmetries involved in the pathway between income and expenditure are internalized in this approach. However, as in all cross-sectional analysis, the impact of general shocks that tends to have an economy-wise effect cannot be analysed. As, I have followed the measure developed by Sengupta and Ghose (2010), so I have quoted their theoretical model here for better understanding of the methodology of measuring consumption vulnerability.

3.1: Theoretical Model

Let $U_i = f(x_i)$ be the utility function of the *i*-th family, where U_i is the total utility derived by the *i*-th family and x_i is the actual consumption of a commodity (a basic commodity such as food, health, education) by the *i*-th family .

The household's problem is to maximize utility subject to the budget constraint:

Maximize $U = U(x_i)$ (1)

Subject to: $Y \geq px_i$
The relevant Lagrangian is then:

$$L = U(x_i) - \lambda(px_i - Y) \quad (2)$$

The first order conditions are now:

$$\frac{\partial U(x_i)}{\partial x_i} = \lambda p \quad (3a)$$

$$px_i \leq Y \quad (3b)$$

$$\lambda \geq 0 \quad (3c)$$

$$\lambda(px_i - Y) = 0 \quad (3d)$$

For each family, there is a minimum necessary level of consumption, say $\bar{x}_i$, which may be described as a subsistence level consumption. On the basis of the assumption about the optimum level of *x* for the *i*-th family, we can easily see that the above conditions sustain three types of households:

(i) Well-off families: Non-binding budget constraint, Above subsistence optimum consumption ($\lambda=0$, $px_i < Y$, $\bar{x}_i < x_i^*$). The well-off family has a fund over and above the basic needs. This surplus fund can be used to enrich its well-being.

(ii) Vulnerable families: Binding budget constraint, Above subsistence optimum consumption ($\lambda>0$, $px_i = Y$, $\bar{x}_i < x_i^*$). These families can barely meet their basic needs.

(iii) Severely Vulnerable families: Binding budget constraint, Below subsistence optimum consumption ($\lambda>0$, $px_i = Y$, $\bar{x}_i \geq x_i^*$)

We represent the above results with the help of a simple figure (Figure 1). In order to facilitate this, we first define the indirect utility function as follows:

$$V(p,Y) = \max_{x_i}\{U(x_i) \mid px_i \leq Y\} \quad (4)$$

It can be verified that $\frac{\partial V}{\partial Y} > 0$, for $Y<Y^*$, where Y^* is the income level where the budget constraint is binding. Also $\frac{\partial V}{\partial Y} = 0$, for $Y \geq Y^*$. Now we plot *V* against Y.

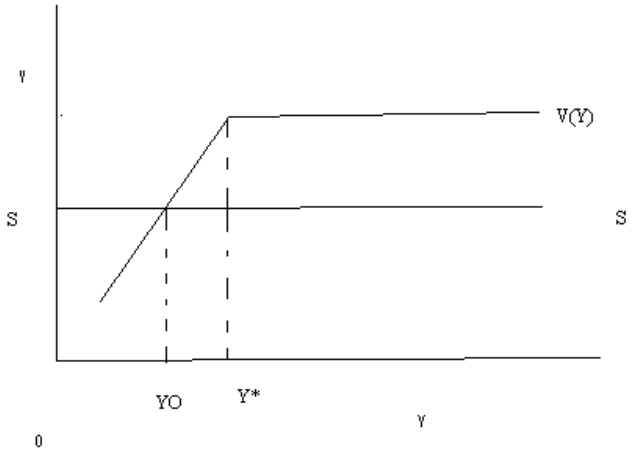

Figure 3.1: Types of Vulnerability.

We can now consider various types of vulnerability and poverty using Figure 3.1.

Poor: This is a static concept. This includes all the families that have an income level below OY_o. These families are in perpetual poverty with their incomes being below the minimum standard of living.

Poverty-based vulnerability: This is a dynamic concept. Suppose the above figure represents a snapshot view at a particular time-point. Now in the near future, the actual income would fluctuate around the current figure. If we assume that there are no large shocks, the poverty-based vulnerability would will include all the families that have incomes less than some OY_o', where Y_o' lies within the close neighbourhood of Y_o and is higher than Y_o. Thus, the volume of the poverty-based vulnerability is likely to be greater than the number of the poor since some non-poor can be trapped into poverty due to fluctuations in income. A portion of the poor can also escape from poverty. However, given the inequality in the wealth structure, this is unlikely to be dominant.

Welfare-based vulnerability: As seen earlier, this would include all the families that have incomes exceeding but being in the close neighbourhood of OY^*. They include families that have presently failed to maximize their incomes or may fail to do so in the future due to fluctuation in incomes. It is clear that the incidence of poverty-based vulnerability would be much less than the incidence of welfare vulnerability.

The above discussion may be put forward in the form of the following three propositions:

Proposition 1: The utility maximization structure given above categorizes the population into the following three different sections:

(i) Poor and poverty-vulnerable (with income being lower than the subsistence level)

(ii) Welfare-vulnerable (with income being sufficiently higher than the subsistence level but not high enough to enable welfare maximization)

(iii) Well-off (with income being well above the optimal level).

Proposition 2: The proportions of people who are poverty-vulnerable are much less than of those who are welfare-vulnerable.

We can consider some simple comparative static using this model. Suppose the subsistence rises. There may be several ways in which subsistence rises without affecting the price. In pre-reform China, for example, a large number of basic necessities (such as medical care, basic food items, primary schooling facilities, etc.) were provided free of cost. Economic reforms changed this scenario completely. Families in China are now forced to buy a large number of such items from the market (Dreze and Sen, 1995). In a very real sense, thus the subsistence level of the families has risen.

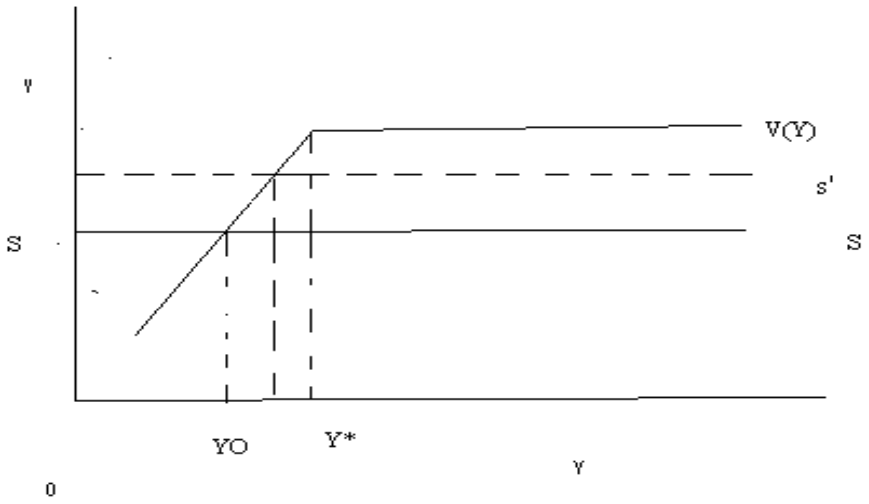

Figure 3.2: Dynamics of Vulnerability.

Figure 3.2 depicts the consequence of such a rise in the subsistence of the pattern of vulnerability in the society on the basis of this model. It is clear that the number of poor (and poverty-vulnerable) has increased due to the rise of subsistence income. However, the number of welfare-vulnerable remains unchanged. A rise in subsistence thus reallocates the welfare-vulnerable among the poor and non-poor by raising the former and lowering the latter. An opposite consequence would occur if the subsistence level income were to fall.

Proposition 3: A rise in the subsistence level raises the number of poor and lowers the number of non-poor though the number of welfare-vulnerable remains the same. The opposite would occur if the subsistence level were to fall.

The above proposition clearly indicates that an unchanged income may not signify that the number of poor has remained unchanged. It depends on the level of subsistence. This explains the Chinese debacle of a rising poverty with rising per-capita income in the post-reform era (Dreze and Sen, 1995). It is also the basis of the current controversy in India regarding the adverse impact of restructuring of the public distribution system (PDS). The argument is often wrongly placed as the debate between the pro-growth and the anti-

growth school. It would be foolish (and perhaps suicidal) to argue against the growth of a country like India. A similarly wrong argument would be to negate the huge income-raising potential of growth and growth-oriented policies. The argument is clearly against policies that raise the subsistence level of the families unless their income rises in the same proportion. The difference is clearly brought out in the argument presented above.

3.2: Data Methodology

3.2.1: Measuring Vulnerability

I now proceed to discuss my methodology. As argued earlier, vulnerability is essentially a dynamic concept necessitating the use of panel data. However, such data are not easy to come by. The ICRISAT data set used by some authors (Gaiha and Imai, 2004) is unusual in that it traces the same households over a period of time. Such type of data is not available for the whole of India. However, the National Sample Survey (NSS) data sets have two advantages in that they cover the whole country and not just the semi-arid parts as the ICRISAT data set does, and that the NSS surveys cover a much larger number of households than the ICRISAT data set. Another advantage of the NSS data is that it has several dimensions like the rural–urban break-up, and break-ups according to social groups, religions, and types of households.

In the case of the NSS data sets, the household consumer expenditure during the last 30 days is to be ascertained through direct questions, out of the following five sources:

1) Purchase,
2) Home-grown/home-produced stock,
3) Receipt in exchange of goods and services,
4) Transfer receipts such as gifts, loans, charities, etc., and
5) Free collection.

Among these five sources, the first three sources are more or less regular but the last two sources are very vulnerable. I estimate the vulnerability percentage on the basis of the ratio of the total vulnerable consumption to the total consumption; this may be called the vulnerability ratio (VR). Like poverty, this is a static concept, which may rise or fall over time. However, unlike poverty, it gives us some idea about the potentiality of a household to face any external shocks. If a poor family has a high VR, obviously it is prone to be vulnerable. Even for a non-poor family, if this proportion is high, the possibility of falling back into poverty is quite high. As far as welfare vulnerability is concerned, a positive VR is itself an indicator of possible welfare loss once these sources dry up."

Using this methodology, developed by Sengupta and Ghose (2010), I have measured two types of vulnerability—poverty vulnerability and welfare vulnerability from the NSS 69th Round, Schedule No. 1.2, data on Drinking water, Sanitation, Hygiene, Housing conditions and survey on slums. This round of NSS data gives us the different types of information about the slum people of India, covering all the states and union territories. But I do not consider here all the states and union territories, only consider 21 major states and they are listed in table 3.1.

In the vulnerability literature, the poor are identified on the basis of per capita consumption. However, many economists (Jalan, *et al.*, 2001) opine that this is not an appropriate method. Poverty is a multi-faceted hydra, covering various aspects of human life such as deprivation in health and knowledge. It would be unwise to bring it down to simple consumption figures. However, it is difficult to estimate such a multiple human poverty indicator at the family level. In this case, the official Below the Poverty Line (BPL) estimate is highly useful. Notwithstanding its frailties, the BPL norm is ideally built on a wide range of indicators that cover various aspects of human deprivation[3]. Hence, we treated the families below the official poverty line as vulnerable. However, in 69th round NSS data families are not classified according as the nature of ration card i.e. figures of official poor is not available. For this reason I have used the Poverty Report of Planning Commission, Government of India, June, 2014 to estimate and identify the poor families. This Poverty Report, published by Planning Commission-2014, provided the Below Poverty Level (BPL) consumption separately for each state and also for rural and urban separately. Using this BPL consumption figure, shown in table 3.1, I have identified, first, the families which are officially poor. After that I have calculated poverty vulnerability percentage and welfare vulnerability percentage as: 1. **Poverty Vulnerability Percentage = 100 {(Poor Families) + Non-Poor families that have V.R > 0.5}/ Total households**
2. Welfare Vulnerability Percentage = 100 {(Poor Families) + Non-Poor families that have V.R > 0}/ Total households.

Using this methodology, I am trying to estimate the percentage of poverty vulnerability and welfare vulnerability for slum people of India as a whole and also compare the same with 21 selected states. I also want to link the percentage of both the types of vulnerability with some geographical, social and religious and economic factors which may influence the vulnerability position of the slum people. To do it I have used only very simple statistical tools like, percentage, proportions etc.

4. Data Analysis and Results:

In this section I have shown the results of the empirical analysis. In this section I have measured consumption vulnerability within the slum areas of India. I have measured two types of consumption vulnerability- poverty vulnerability and welfare vulnerability

[3] In the official BPL census, about 12 indicators are identified, including: ownership of land, housing conditions, clothing, food security, consumer durables, education status, earning capability status, livelihood, child education, indebtedness, migration nature, and special vulnerability. For each indicator, five points are designated. The higher the number of points, the lesser is the deprivation. A family getting less than or equal to 33 points is deemed to be a Below the Poverty Line (BPL) family, while the others are Above the Poverty Line (APL) families.

4.1: State-wise Vulnerability

Table 4.1: Extent of Poverty Vulnerability and Welfare Vulnerability in the Slum Areas of Major States of India

State	Poverty vulnerability % and (rank)	Welfare Vulnerability % and (rank)
Andhra Pradesh	22.86 (5)	53.48 (5)
Assam	38.21 (14)	75.87 (18)
Bihar	53.49 (20)	73.68 (16)
Chhattisgarh	54.22 (21)	79.63 (21)
Delhi	11.92 (1)	29.13 (1)
Goa	20.83 (3)	43.94 (2)
Gujarat	34.55 (11)	60.55 (8)
Haryana	30.41 (9)	43.96 (3)
Himachal Pradesh	27.07 (7)	74.74 (17)
Jharkhand	45.40 (17)	76.61 (19)
Jammu & Kashmir	28.34 (8)	65.38 (11)
Karnataka	36.94 (13)	68.11 (13)
Kerala	17.60 (2)	55.10 (6)
Maharashtra	35.61(12)	58.15 (7)
Madhya Pradesh	48.59 (19)	71.64 (15)
Orissa	44.44 (16)	78.58 (20)
Punjab	26.27 (6)	47.46 (4)
Rajasthan	40.89 (15)	63.82 (9)
Tamil Nadu	22.34 (4)	64.89 (10)
Uttar Pradesh	48.08 (18)	70.99 (14)
West Bengal	32.66 (10)	66.79 (12)
India	34.32	62.98

Source: Author's own calculation from NSSO 69th Round, Schedule 1.2, 2012.

Table 4.1 shows poverty vulnerability percentage and welfare vulnerability percentage for the slum of some major states of India. From the table 4.1, it is seen that within the slum the poverty vulnerability percentage is lowest in Delhi (11.92) followed by Kerala (17.60). The poverty vulnerability percentage within the slum is highest in Chhattisgarh (54.22) followed by Bihar (53.49). In India this percentage is (34.32). The poverty vulnerability percentage is lower than Indian average in Andhra Pradesh, Delhi, Goa, Haryana, Himachal Pradesh, Jammu & Kashmir, Kerala, Punjab, Tamil Nadu and West Bengal. Thus slums of Andhra Pradesh, Delhi, Goa, Haryana, Himachal Pradesh, Jammu & Kashmir, Kerala, Punjab, Tamil Nadu and West Bengal are less vulnerable than average Indian slums. The poverty vulnerability percentage is higher than Indian average in Assam, Bihar, Chhattisgarh, Gujarat, Jharkhand, Karnataka, Maharashtra, Madhya Pradesh, Orissa, Rajasthan and Uttar Pradesh. Thus slums of these states are more vulnerable than average Indian slums.

If we consider the picture of welfare vulnerability for slum areas of different states of India we also get more or less same picture. The welfare vulnerability percentage within the slum is also lowest in Delhi (29.13) followed by Goa (43.94) and highest in Chhattisgarh (79.63) followed by Orissa (78.58). The welfare vulnerability percentage is

(62.98) considering India as a whole. The welfare vulnerability percentage within the slums is lower than Indian average in Andhra Pradesh, Delhi, Goa, Gujarat, Haryana, Kerala, Maharashtra and Punjab. Thus slums of Andhra Pradesh, Delhi, Goa, Gujarat, Haryana, Kerala, Maharashtra and Punjab are less vulnerable than average Indian slum. This percentage is higher than Indian average in Assam, Bihar, Chhattisgarh, Himachal Pradesh, Jharkhand, Jammu & Kashmir, Karnataka, Madhya Pradesh, Orissa, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal. Thus slums of these states are more vulnerable than average Indian slums.

Table 4.2: Rural Urban Break-up of Poverty Vulnerability in the Slum Areas of Major States of India

States	Rural Poverty vulnerability % and (rank)	Urban Poverty vulnerability % and (rank)	Rural Urban Gap
Andhra Pradesh	24.18 (5)	21.53 (6)	2.65
Assam	38.11 (11)	38.49 (17)	0.62
Bihar	56.07 (19)	47.04 (20)	9.03
Chhattisgarh	59.04 (21)	48.23 (21)	10.81
Delhi	4.17 (1)	12.34 (1)	-8.17
Goa	22.22 (4)	19.17 (5)	3.05
Gujarat	41.87 (12)	27.47 (11)	14.40
Haryana	33.78 (10)	26.78 (10)	7.00
Himachal Pradesh	30.13 (8)	15.79 (2)	14.34
Jharkhand	46.47 (14)	43.79 (19)	2.68
Jammu & Kashmir	29.62 (7)	26.67 (9)	2.95
Karnataka	48.61(16)	25.53 (8)	23.08
Kerala	19.18 (2)	15.89 (3)	3.29
Maharashtra	47.76 (15)	23.37 (7)	24.39
Madhya Pradesh	56.88 (20)	38.43 (16)	18.45
Orissa	50.08 (17)	31.16 (12)	18.92
Punjab	20.04 (3)	32.58 (14)	12.54
Rajasthan	44.9 (13)	34.96 (15)	9.94
Tamil Nadu	26.91(6)	17.65 (4)	9.26
Uttar Pradesh	51.93 (18)	41.25 (18)	10.68
West Bengal	33.69 (9)	31.49 (13)	2.20
India	37.41	29.51	7.90

Source: Author's own calculation from NSSO 69th Round, Schedule 1.2, 2012.

Table 4.2 shows poverty vulnerability percentage of slum people in both rural and urban areas of different states of India. From this table it is seen that in all the states, except Delhi and Punjab, poverty vulnerability percentage is higher in rural areas compare to urban areas. This is might be due to higher income opportunity in urban areas compare to rural areas. The rural urban difference of poverty vulnerability is highest in Maharashtra followed by Karnataka. However it is lowest in Assam followed by West Bengal. It is negative in Delhi and Punjab. In these two states poverty vulnerability percentage among the slum is higher in urban areas than in rural areas. This is might be due to the fact that

in Delhi there are very few rural areas compare to urban areas. Thus insufficient rural data compare to urban data might produce this type of result. In case of Punjab, advanced agricultural base in rural areas might produce this type of result.

Now I will compare the poverty vulnerability percentage of different states with respect to average India, both for rural slum and urban slum. There are 10 states where poverty vulnerability percentage within the rural slum is lower than average rural India. These states are Delhi, Kerala, Goa, Punjab, Andhra Pradesh, Tamil Nadu, Jammu & Kashmir, Himachal Pradesh, West Bengal and Haryana. Among these ten states, Delhi took the best position in this respect. The remaining 11 states have higher poverty vulnerability percentage than average rural India. These states are Assam, Gujarat, Rajasthan, Jharkhand, Maharashtra, Karnataka, Orissa, Uttar Pradesh, Bihar, Madhya Pradesh and Chhattisgarh. Among these states Chhattisgarh took the worst position in this respect. It has highest poverty vulnerability percentage.

If we consider the urban poverty vulnerability, then we have 11 states whose poverty vulnerability percentage is lower than all India average. These states are Delhi, Himachal Pradesh, Kerala, Tamil Nadu, Goa, Andhra Pradesh, Maharashtra, Karnataka, Jammu & Kashmir, Haryana and Gujarat. Among them Delhi took the best position, it has lowest poverty vulnerability percentage. Remaining 10 states have higher poverty vulnerability percentage than all India average they are Orissa, West Bengal, Punjab, Rajasthan, Madhya Pradesh, Assam, Uttar Pradesh, Jharkhand, Bihar and Chhattisgarh. Among them Chhattisgarh took the worst position in this respect, it has highest poverty vulnerability percentage for the urban slums.

Table 4.3: Rural Urban Break-up of Welfare Vulnerability in the Slum Areas of India

States	Welfare Vulnerability Percentage		
	Rural (rank)	Urban (rank)	Rural-Urban Gap
Andhra Pradesh	74.79 (8)	32.07 (2)	42.72
Assam	80.58 (14)	61.11 (20)	19.47
Bihar	80.40 (12)	56.81 (16)	23.59
Chhattisgarh	90.04 (20)	66.79 (21)	23.25
Delhi	26.04 (1)	29.29 (1)	-3.25
Goa	49.31 (2)	37.5 (6)	11.81
Gujarat	81.53 (15)	40.29 (7)	41.24
Haryana	50.33 (3)	37.09 (5)	13.24
Himachal Pradesh	84.16 (16)	40.62 (8)	43.54
Jharkhand	88.54 (17)	58.83 (18)	29.71
Jammu & Kashmir	73.46 (7)	54.76 (15)	18.7
Karnataka	100 (21)	36.97 (4)	63.03
Kerala	59.81 (5)	49.97 (11)	9.84
Maharashtra	80.43 (13)	35.70 (3)	44.73
Madhya Pradesh	88.83 (18)	50.58 (12)	38.25
Orissa	89.23 (19)	53.50 (14)	35.73
Punjab	50.84 (4)	44.03 (9)	6.81
Rajasthan	70.92 (6)	59.17 (19)	11.75
Tamil Nadu	78.99 (10)	49.40 (10)	29.59

Uttar Pradesh	78.19 (9)	58.25 (17)	19.94
West Bengal	80.11 (11)	51.78 (13)	28.33
India	74.12	47.83	26.29

Source: Author's own calculation from NSSO 69th Round, Schedule 1.2, 2012.

Table 4.3 shows rural urban breakup of welfare vulnerability percentage of each states as well as India. From this table it is seen that like poverty vulnerability, welfare vulnerability percentage is also higher in rural areas compare to urban areas in all states as well as in all India, except Delhi. This might be due to higher income opportunity in urban areas compared to rural areas. Only in Delhi, like poverty vulnerability percentage, welfare vulnerability percentage is also higher in urban areas compared to rural areas. This is might be due to insufficient rural data compared to urban data of Delhi. The table shows one alarming result that after seventy years of independence in India about half (47.83%) of the urban and three fourth (74.12) of the rural slum population are welfare vulnerable. Another interesting result is that in Karnataka 100% rural slum peoples are welfare vulnerable, whereas it is only about 37% for urban slum. That implies there exists very high regional inequality in income and wealth distribution in Karnataka. Welfare vulnerability percentage within rural slum is lowest in Delhi and obviously highest in Karnataka. However within the urban slum it is highest in Chhattisgarh and lowest in Delhi. If we consider the rural urban gap of welfare vulnerability then we find that it is highest in Karnataka and lowest in Delhi. High rural urban gap implies high regional inequality in income and wealth distribution. From this table it is seen that not only in Karnataka but in most of the states this gap is high.

Now I want to show the position of each of the states vis-a-vis all India with respect to welfare vulnerability percentage in rural and urban areas separately from the rank of each of the states, vis a vis India as a whole, with respect to rural and urban welfare vulnerability percentage. With respect to rural welfare vulnerability percentage, Delhi took the best position and Karnataka took the worst position. There are seven states where welfare vulnerability percentage is lower than all India average. They are Delhi, Goa, Haryana, Punjab, Kerala, Rajasthan and Jammu & Kashmir. Thus rural slums of these states are in a relatively better position. On the other hand there are fourteen states where welfare vulnerability percentage is higher than all India average. They are Andhra Pradesh, Uttar Pradesh, Tamil Nadu, West Bengal, Bihar, Maharashtra, Assam, Gujarat, Himachal Pradesh, Jharkhand, Madhya Pradesh, Orissa, Chhattisgarh and Karnataka. Thus rural slums of these states are in worse position compare to all India average. In this respect Karnataka took the worst position.

If we consider urban welfare vulnerability percentage then Delhi took the best position and Chhattisgarh took the worst position. There are nine states where welfare vulnerability percentage is lower than all India average. They are Delhi, Andhra Pradesh, Maharashtra, Karnataka, Haryana, Goa, Gujarat, Himachal Pradesh and Punjab. Thus urban slums of these states are in a relatively better position compare to all India average. In this respect Delhi took the best position. On the other hand there are twelve states where welfare vulnerability percentage is higher than all India average. They are Tamil Nadu, Kerala, Madhya Pradesh, West Bengal, Orissa, Jammu & Kashmir, Bihar, Uttar

Pradesh, Jharkhand, Rajasthan, Assam and Chhattisgarh. Thus urban slums of these states are in worse position compare to all India average. In this respect Chhattisgarh took the worst position.

4.2: Religion Wise Vulnerability Percentage in India

After examining vulnerability position across different regions of India I, now, try to examine whether religion has any impact on vulnerability position in India or religion wise picture of vulnerability position in India. For this reason I have calculated the vulnerability percentage for all the religious peoples separately and compare them each other. Table 4.4 helps us for this purpose.

Table 4.4: Religion wise Percentage of Poverty Vulnerability and Welfare Vulnerability in India

Religions	Poverty vulnerability (%)	Welfare Vulnerability (%)
Hinduism	36.40	65.07
Islam	40.88	67.16
Christianity	20.90	51.60
Sikhism	19.77	44.33
Jainism	5.94	28.05
Buddhism	46.48	64.43
Zoroastrianism	12.50	25.00
Others	52.55	80.10

Source: Author's own calculation from NSSO 69th Round, Schedule 1.2, 2012.

Table 4.4 shows religion wise percentage of poverty vulnerability and welfare vulnerability in India. From this table it is seen that there exists wide variation in percentage of both poverty and welfare vulnerability across different religions in India. Among all the religions poverty vulnerability percentage is lowest for Jainism followed by Zoroastrianism and highest for Others[4] followed by Buddhism. Thus in India (rural and urban taken together) with respect to poverty vulnerability percentage, slums belong to Jainism are in best position and slums belong to Buddhist are in worst position in this regard. However welfare vulnerability percentage is lowest for Zoroastrianism followed by Jainism and highest for Others followed by Islam. Thus slums belong to Zoroastrianism took the best position in India with respect to welfare vulnerability. The slums which do not belong to above mentioned religions i.e. Others are in worst position with respect to welfare vulnerability.

. 4.3: Caste Wise Vulnerability Percentage in India

Indian peoples are categorised, from long days ago, into various social groups or Castes. In this section I would like to analyse the vulnerability position of Indian slum belong to different castes. Since independence in India a Caste base reservation system prevails. Now I also get the opportunity to verify whether such reservation system has any

[4] Those people who do not belong to above mentioned religions.

necessity to uplift the economic position of slum peoples of India or not. Table 4.5 helps to understand this clearly.

Table 4.5: Caste wise Percentage of Poverty Vulnerability and Welfare Vulnerability in India

Caste	Poverty vulnerability (%)	Welfare Vulnerability (%)
Scheduled Tribe (ST)	56.99	82.68
Scheduled Caste (SC)	47.62	74.91
Other Backward Class (OBC)	37.09	66.85
Others (General)	22.68	50.02

Source: Author's own calculation from NSSO 69th Round, Schedule 1.2, 2012.

From this table 4.5, it is seen that both poverty vulnerability and welfare vulnerability percentage is lowest for General Caste highest for ST. That means slums belong to General Caste took the best position and ST took the worst position with respect to vulnerability. That clearly supports the necessity of Caste base reservation system, which prevails in India since Independence. However my question is if reservation system really helpful to uplift the economic position of the disadvantaged group of peoples or reserved peoples then why do, after seventy years of enjoyment of reservation policy, reserved people till now economically backward? That means policy is not functioning properly. This is might be due to the fact that economically sound peoples of reserved group reaped out the maximum advantage of such reservation policy generation after generation but economically weaker peoples of such reserved group of peoples deprive generation after generation and till now are economically weaker. Thus rather than Caste base reservation system a reservation system based on economic position may be more helpful to reduce poverty and vulnerability position in India.

4.4: Vulnerability Percentage in India By Gender of the House Head

In this section I want to examine whether gender of the house head has any influence on vulnerability position of slum peoples of India or not. For this reason I have calculated both the types of vulnerability percentage for male headed families and female headed families. As India is a paternalist society so it is expected that head of the family is generally a male person, as in most of the cases they are the main earning members of the family. However sometimes female persons also be the head of the family, at least to those family where male earning members are died or female member is most senior of the family. Using table 4.6, I want to compare the vulnerability position of slum peoples for male headed families with that of female headed families.

Table 4.6: Gender of the House Head Wise Percentage of Poverty Vulnerability and Welfare Vulnerability in India

Gender of the House head	Poverty vulnerability (%)	Welfare Vulnerability (%)
Male	36.54	64.51
Female	36.01	65.61

Source: Author's own calculation from NSSO 69th Round, Schedule 1.2, 2012.

From table 4.6, it is seen that poverty vulnerability percentage is slightly higher in male headed slum families compared to female headed families. However, welfare vulnerability percentage is little higher for female headed slum families. In both the types of vulnerability measure difference is very small between male headed families and female headed families. Thus gender of the family head has no significant impact on vulnerability position of Indian slum.

5: Conclusion

After a long journey concerned with discussion of state wise magnitude of vulnerability within the slum areas of India it is now time to conclude about the discussion and end this journey by making a conclusion.

In empirical study about the extent of vulnerability it is found that poverty vulnerability percentage is lower than welfare vulnerability percentage in all the states, which are under study, as well as in India. Among the major states of India both poverty vulnerability and welfare vulnerability percentage within the slum is lowest in Delhi and highest in Chhattisgarh. In India this poverty vulnerability percentage is 34.32% where welfare vulnerability percentage is 62.98.

In all the states, except Delhi and Punjab, poverty vulnerability percentage is higher in rural areas compare to urban areas. This is might be due to higher income opportunity in urban areas compare to rural areas. The rural urban difference of poverty vulnerability is highest in Maharashtra followed by Karnataka. However is lowest in Assam followed by West Bengal. It is negative in Delhi and Punjab. In these two states poverty vulnerability percentage among the slum is higher in urban areas than in rural areas. This is might be due to the fact that in Delhi there are very few rural areas compare to urban areas. Thus insufficient rural data compare to urban data might produce this type of result. In case of Punjab, advanced agricultural base in rural areas might produce this type of result.

Like poverty vulnerability, welfare vulnerability percentage is also higher in rural areas compare to urban areas in all states as well as in all India, except Delhi. This might be due to higher income opportunity in urban areas compared to rural areas. Only in Delhi, like poverty vulnerability percentage, welfare vulnerability percentage is also higher in urban areas compared to rural areas. This is might be due to insufficient rural data compared to urban data of Delhi. The table shows one alarming result that after seventy years of independence in India about half (47.83%) of the urban slum and three fourth (74.12) of the rural slum population are welfare vulnerable. Another interesting result is that in Karnataka 100% rural slum peoples are welfare vulnerable, whereas it is only about 37% for urban slum. That implies there exists very high regional inequality in income and wealth distribution in Karnataka. Welfare vulnerability percentage within rural slum is lowest in Delhi and obviously highest in Karnataka. However within the urban slum it is highest in Chhattisgarh and lowest in Delhi. If we consider the rural urban gap of welfare vulnerability then we find that it is highest in Karnataka and lowest in Delhi. High rural urban gap implies high regional inequality in income and wealth distribution. Not only in Karnataka but in most of the states rural-urban gap is high.

There exists wide variation in percentage of both poverty and welfare vulnerability across different religions in India. Among all the religions poverty vulnerability percentage is lowest for Jainism followed by Zoroastrianism and highest for Others followed by Buddhism. Thus in India (rural and urban taken together) with respect to poverty vulnerability percentage, slums belong to Jainism are in best position and slums belong to Buddhist are in worst position. However welfare vulnerability percentage is lowest for Zoroastrianism followed by Jainism and highest for Others followed by Islam. Thus slums belong to Zoroastrianism took the best position in India with respect to welfare vulnerability. The slums which do not belong to above mentioned religions i.e. Others are in worst position with respect to welfare vulnerability.

From the Caste base analysis, it is seen that both poverty vulnerability and welfare vulnerability percentage is lowest for General Caste highest for ST. That means slums belong to General Caste took the best position and ST took the worst position with respect to vulnerability. That clearly supports the necessity of Caste base reservation system, which prevails in India since Independence. However, rather than Caste base reservation system a reservation system based on economic position may be more helpful to reduce poverty and vulnerability position in India.

If we consider the influence of gender of the house head on vulnerability position of slum peoples of India then we find that poverty vulnerability percentage is slightly higher in male headed slum families compared to female headed families. However, welfare vulnerability percentage is little higher for female headed slum families. In both the types of vulnerability measure difference is very small between male headed families and female headed families. Thus gender of the family head has no significance impact on vulnerability position of Indian slum.

7.3: Policy Suggestions

In India, after seventy years of independence, more than 34% slum peoples are vulnerable. To reduce vulnerability India government should-

1. Introduce several guaranteed employment generation schemes like Mahatma Gandhi National Rural Employment Guarantee Scheme both in rural and urban areas.
2. Proper identification of poor or vulnerable is necessary.
3. Give emphasis on Vocational Education and Training Program to increase earning opportunity of the peoples.
4. Provide institutional loan facilities to establish small scale and cottage industries or businesses.
5. Provide crop insurance to the farmer at times of crop failure due to natural disaster.
6. Provide different types of scholarship for attaining educational institutions.

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