Quietly They Die: A Study of Malnourishment Related

Deaths in Mumbai City

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Introduction

The aim of this report is to examine the extent of malnutrition among slum children in Mumbai and suburbs. Over the last decade, a great deal of attention has been paid to malnutrition in the tribal areas of Maharashtra. The attention of the media and planners has been focussed almost exclusively on rural and tribal malnutrition. However, malnutrition among urban children, particularly the economically vulnerable slum population has been almost entirely neglected, with the exception of a very few studies. Even the Maharashtra Human Development Report gives no estimates of malnutrition among the 0-2 age group in Greater Mumbai. This at least partly reflects the belief that malnutrition is exclusively a consequence of backward social practices. Malnourishment is seen as some sort of a "cultural failure", specially among medical activists. Because the urban slums populations are seen to be more culturally homogenous with the urban non-slum populations, a high incidence of malnourishment is not expected to occur in urban slums.

As far as urban slums are concerned, problems other than nutrition have got the larger share of attention from policy makers. Problems of urban slums are generally evaluated from the point of view of the non-slum urban population, which sees slums as a "problem" to be solved rather than as an integral and necessary part of the urban environment. Attention gets focussed open eradicating slums visually, rather than improving the lot of the populations living within slums.

It is very important to reexamine this position. For one, economists have consistently argued that labour and non-labour incomes are a critical determinant of

the nutritional status of the household. For households that cannot afford the nutritionally sufficient minimum consumption bundle, malnutrition will occur irrespective of their ethnic or spatial location. Even among the tribal population, our field-work has shown that labour and non-labour incomes are a far more critical determinant of nutritional status in comparison to cultural attitudes. With the increasing joblessness among urban poor, there is reason to believe that substantial malnutrition could be prevalent among the urban population. Also, the incidence of malnourishment is a function of the coverage of basic health infrastructure. Malnourishment is very likely to occur when insufficient incomes co-exist with poor coverage of basic amenities and health services.

Secondly, the sheer numbers involved in a city like Mumbai make it very important to examine the extent of mal-nutrition. Even if the extent of urban malnutrition is somewhat lower than its rural incidence, the absolute numbers could be very high. This alone would make it important to study the extent of malnutrition in Mumbai.

Because of these two reasons, we have undertaken this study to determine the extent of malnutrition in Mumbai. We have chosen a sample of 1000 households in eight kaccha settlements in Mumbai. Five of these settlements are in the Eastern suburbs whereas the other five are in the Western suburbs (see map 1 and the list of settlements in the appendix. The details of the two samples are also given in the appendix). This sample was taken in November -December 2002.

In order to have a standard of comparison, we also conducted a similar survey in six villages of Taluka Jawhar, District Thane (see map 2 and the list of villages in the appendix). The Taluka of Jawhar is notorious for high levels of child and infant mortality for nutrition related reasons. This survey was undertaken in July – August 2002.

In this study, we have concentrated on the incidence of malnourishment among children under the age of five. We have classified girls and boys separately in order to enable us to examine gender differences if any. The 0-5 classification is internationally accepted and hence data are available for comparative purposes from other countries and regions for this age group. Also, a lot of initial development of the child is concentrated in this age group. Hence, it is important to analyse this age group separately. Children above the age of 5 go to school and are also a part of the work force. Many children avail of mid-day meals in the school and also contribute to household economic activity. Hence, their nutritional status is likely to be different from the younger group. Hence, the subgroup 0 yrs to 5 yrs has been isolated.

The study is organised as follows. Chapter 1 discusses the concept of malnutrition, the various measures that have been used in the study and the effect of malnutrition on growth. Chapter 2 discusses our empirical findings. **Our central empirical finding is that the incidence of malnourishment among urban slum children is very close to the incidence in tribal villages situated among the tehsil of Jawhar which is known to have a serious problem of malnourishment.Because of the sheer numbers involved., a similar incidence gets translated into a**

3

minimum estimated number of 800 deaths in Mumbai from malnourishment related causes. The actual number could be far higher, somewhere in the range of 1500-3000. Chapter 3 discusses implications of our findings and some possible policy remedies.

I. Definition and Measures of Malnutrition:

Malnutrition means "An inadequacy or deficiency in the quality of several essentials nutrient which if made good enables a person to lead a healthy active life "'.

Malnutrition refers to impaired capacities of human body because of nutrient and health related inputs. The essential nutrient required from food by the human body are : carbohydrates, proteins, fat, vitamins & minerals. The last two are classified as minor nutrients & required in the small quantities. The main concern all along has been with protein -calorie malnutrition". At the same time, recurrent infections can also impair human body capacity.

This definition of malnutrition then has the implication that achieving significant improvements may require the removal of a number of possible constraints on increased food availability, better housing & water supply, better basic health services , better standards of personal hygiene , better knowledge of child care & nutrition as well as greater motivation[iii]".

1.1 Anthropometric Measures of Child Malnutrition:-

Given a child's weight, height, sex and age, its nutritional status has conventionally been expressed in three ways:

- Gender specific height for age

- Gender specific weight for height

- Gender specific weight for age

  Each of these indicators evaluates a different aspect of the child's nutritional status. Height for age reflects a child's past or chronic nutritional status. Children who are too short for their age are called **stunted**. Weight for height reflects more a child's current nutritional status, because weight can fluctuate because of acute disease whereas height can not. Children whose weight is too low relative to their heights are called **wasted**. The third indicator, weight for age combines information of the former two indicators as weight is influenced by thinness and by height. Children whose weight is too low for their age are called **underweight**. By consequences, being wasted is a better indicator for the determination of short term survival, whereas sensitivity and specificity of survival in a one or two year period is highest for weight for age[iv]. The following section discusses the Z-score measure which is normally used to identify malnourished children.

1.2 Measurement of Anthropometric Indicators

The Z - Score

  The nutritional status of a child is normally expressed in the Z score of the concerned indicator. Weight & height of children of a certain age group follow more or less the normal distribution. The height for age Z score (HAZ) compares the height of a child of a certain age with the median height of a healthy reference population of that age group[v] , the weight for age Z score (WAZ)   does the same for weight ; & the weight   for   height Z score (WAZ)

compares the weight of a child of a certain height with the reference median weight for a child with the same height..

The value of the Z score can be conceived as the number of standard deviation that the child is away from the median of the concerned indicator of the children of that age / sex group from the standard population. Mathematically,

$$\text{Z score} = \frac{\text{(Child's Anthropometric value - Median of reference population)}}{\text{Standard deviation of reference population.}}$$

The basic idea is to assume that the given child comes from a healthy population. Under this null hypothesis, the Z - score should follow the standard normal distribution. If the value of the Z score is sufficiently low that it has a very small probability of occurring, we reject the null hypothesis and classify the child as malnourished. The usual cut-off pint is to classify all children with indicators below two standard deviations as malnourished.

The Z score measures the size of the probability that the child will have a score that low or lower if it is a part of the reference population. A Z score for height for age less than two standard deviations indicates stunting. Similarly, a Z scores less than two standard deviations for height for weight indicates wasting.

II. Effects of malnutrition:-

II. 1 Malnutrition and effect on productivity: -

People enjoying superior nutritional status enjoy greater capacity for physical work . They are also able to endure longer hours at manual work. They can perform a greater range of tasks (e.g. lift heavier loads) & accomplish them in less time. In short, they are capable of getting more done over a day .A person of low nutritional status suffers from the handicap that he has to work long hours if he is to earn his keep through manual work done. It has been demonstrated that a malnourished individual will be too costly for a prospective employer, even though his reservation wage" is lower than that of a well nourished individual™. This means that malnourished individuals might be competed out of the job market by better nourished individuals.

I I. 2 Malnutrition and effects on intelligence: -

Different studies show that malnutrition may impair intellectual capacity for life. Investigation indicate that the number of cells within the brain increases linearly until birth & then more slowly until six months of age, after which there is little if any increase in brain cell number. Malnutrition could very well stop cell division, stunt growth & impair the functions of the brain. The malnourished child could never completely recover from early nutrient deprivation. Widespread malnutrition then could diminish the intellectual capacities of entire populations. Malnutrition during early childhood may permanently impair the functions of the brain. It s effect is devastating[viii].

II.3 Effect of malnutrition on resistance to diseases: -

The list of illnesses due to malnutrition is extensive. Deficiency of protein manifests itself in different ways in infants & adults. The infant loses weight, shows stunted growth & may succumb to infections. After weaning, a prolonged deficiency of protein may cause a condition known as Kwashiorkor. Deficiency of vitamin A leads to night blindness. Deficiency of vitamin D causes rickets in children and osteomalacia in adults. Vitamin Bl (Thiamine) mild deficiency in the diet results in anorexia (loss of appetite), digestive disturbances and vague neurotic pains. A frank deficiency for a prolonged time causes diseases known as beriberi, which have two types as A) dry beriberi B) wet beriberi. Deficiency of Riboflavin leads to burning sensation of the eyes, lips and tongue. Severe deficiency of Nicotinic acid causes a diseases known as Pellagra characterised by the symptoms like soreness of mouth and tongue, diarrhea , mental disturbance and anemia. Deficiency of folic acid in the diet results in the development of macrocytic anemia. This disease commonly occurs in pregnant women subsisting on ill balanced diet. Deficiency of Vitamin C in the diet causes the diseases known as scurvy which causes weakness & irritability, bleeding under the skin and the joints, tender swollen and bleeding gums, and failure of healing or delayed healing of wounds and of bone fractures. Deficiency of Calcium leads to Tetanus, hyperirritabilities, tooth-decay and excessive bleeding due to delayed coagulation. Prolonged deficiency of iron in the diet prevents the formation of hemoglobin and causes anemia. If sufficient iodine is not taken in the diet, enlargement of the thyroid gland takes place, resulting in goiter. Malnutrition not only may lower

resistance to diseases, but it may actually cause malfunctions of the body that have little to do with viruses and bacteria.

II.4 Effects of Malnutrition on Human growth: -

The different tissues which make up the body grow at different rates. Indeed some such as the skin consist of cells which are continuously produced to replace cells which have died. Others such as nerve & muscle tissues are formed during the process of growth in childhood & adolescence and cannot later be replaced but even within these broad groups, different types of tissues are formed at different rates in a complex process. Height like other human characteristics is determined by both genetic & environmental factors and the interaction between them, but contrary to popular belief, there is no single 'gene for height'. Instead it is thought that many genes interact with many features of the environment to determine the height of any individual. A child requires an adequate intake of nutrient to maintain its body to undertake physical activity and to grow. In addition it must combat disease and other forms of stress, such as cold and emotional deprivation. Studies of children show, clearly that if the normal balance between the supply of nutrients to the body and the demands on those nutrient in upset for e.g. by a decline in food intake or by a need to combat disease then the child's growth will rapidly be affected. It seems as if the child's body attempts to protect itself by sacrificing growth. Weight will normally be first affected but height, growth and change in other anthropometric indicators of growth will soon follow.

II.5 Malnutrition and effect of infection

Nutrition is not sole determinant of health. Food adequacy standards depend upon other factors as well, including potable water, immunisation and general medical care, sanitation and personal hygiene, water borne and water based diseases such as cholera & typhoid. Hepatitis on the one hand and guinea worm on the other are immediate examples of why nutrition is not sufficient for good health. While diarrhea infections (a central cause of infant and child death in poor countries) are not usually transmitted by contaminated water, they are spread by contact, & can be contained by washing in clean water. It means that a person's nutrition requirement diminishes, at least up-to a point, as her environment improves. On the demand side, infections create an additional need for nutrition by increasing a person's metabolic rate and the rate of breakdown of tissues. Indirectly they also reduce the supply of nutrient. This they do for a variety of reasons. First, infection often reduces a person's appetite. Second, it lowers the person's ability to absorb nutrients by affecting the-functioning of the gastro-intestinal tract. Third, there is increased loss of major macro nutrients, vitamins, and minerals through the feces because of the increased speed of transit of the food that is eaten. And fourth, infection results in the direct loss of nutrient in the gut. Malnutrition is frequently precipitated by outbreaks of infectious diseases, such as gastroenteritis. The debilitating effects of infectious diseases go beyond undernourishment. Infection can lead to an increase in the excretion of micro-nutrients and deficiencies in any of these are damaging.[IX]

II.6 Effects of Malnutrition on Schooling and academic performance: -

Malnourishment has a negative impact on school enrolment & grade attainment of young (five to eleven year old) children. A child's height for age was found to be the single best predictor of weather or not the child was enrolled in school. For grade attainment, once again height was found to be an important determinant for those children who are enrolled in school. Taller children tended to be in higher grades than shorter children of the same age. Low weight for height or low hemoglobin would indicate a situation of acute malnutrition, i.e. current as distinct from long term nutritional deprivation. Since enrolment is a measure of current status but not on grade attainment, which is a measure of the cumulative effect of past behaviour, weight for height has a positive impact on enrollment & as predicted , no additional effect of weight for height on grade attainment. The negative coefficient on height for age is highly significant supporting the hypothesis that children whose growth is stunted delay school enrollment longer.

Attention among school children with iron deficiency is impaired. In light of the deficits observed among iron deficit anemic children, it is not surprising to observe that these children are on the average behind in school attention . As iron deficiency anemia affect school aptitude, chronic iron deficiency is likely to have cumulative adverse effects on school learning & educational progress.

Chapter 2

Estimates of Mal nourishment

In this chapter, we present estimates of the incidence of malnutrition among children in Mumbai slums. We compare them with those for children in Jawhar taluka of Thane, using the Z score measure. The Z-score estimates of incidence of stunting, wasting and under-weight: Individuals who lay below two standard deviations by the Z- score were classified as stunted, wasted or underweight.

I.I Incidence of Moderate to Severe Malnourishment

Table 3.1 Incidence among Tribal children under age 5

(figures are percentages)

Villages	Stunting		Wasting	
	Boys	Girls	Boys	Girls
Adakhadak	0	25.0	16.66	25.0
Dharampur	0	20.0	0	40.0
Pimpalgaon	3.1	9.3	6.25	6.25
Nehale budruk	4.5	4.0	4.5	4.0
Nehale khoord	8.3	0.0	4.1	0.0
Raitale	20	0.0	20.0	0.0

Thus, one sees significant extent of stunting among girls in Adhakdak and Dharampur, whereas the incidence of stunting is higher among boys in Raitale and

Nehale budruk. However, for the tribal sample as a whole, a significant difference among sexes is not apparent.

Table 1.2 compares this incidence with the incidence of stunting and wasting among slum children in Mumbai in the 0-5 age group.

Table 3.2 Incidence of Stunting and wasting among Slum children under age 5

Stunting	Percentage of Stunted children		Percentage of Wasted Children	
	Boys	Girls	Boys	Girls
Matunga (west)	13.3	0.0	6.6	0.0
Dadar	8.1	6.3	5.1	4.7
Matunga (East)	0.0	0.0	0.0	0.0
Mahim	22.5	8.6	4.76	2.1
Bandra	14.8	3.0	4.0	0.0
Mankhurd	13.6	0.0	0.0	4.5
Kurla	25.0	0.0	0.0	0.0
Vikroli (East)	9.0	0.0	0.0	2.9
Vikroli (West)	0.0	0.0	0.0	5.88
Ghatkopar	2.1	0.0	0.0	0.0

The overall incidence of stunting is the highest in the suburb of Mahim. The incidence of stunting is lowest in Matunga East. The figures in Kurla, Mahim and Mankhurd are comparable to the worst incidence villages in the Jawhar sample.

Stunting refers to low height for age, reflecting a relatively long term malnutrition status. Stunting is slowing of skeletal growth and stature resulted from extended periods of inadequate food intake and bouts of child-hood infections. Stunting generally occurs very early on in life, starting perhaps at birth. The high prevalence of stunting is thought to reflect poor maternal nutrition during pregnancy and low birth weight, as well as gradual nutritional damage in the first years of birth. Repeated bouts of childhood illness, such as diarrhea reduce the intake and absorption of nutrients. Additionally, if sick children have no access to medical care, the extent of stunting is higher. A shortened duration of breast-feeding also indirectly contributes to stunting if it raises the probability of an infection. Most studies of urban-rural comparisons find greater incidence of stunting in rural areas." However, in our case, the sample being that of slum children, there is not too much of a difference. The conditions of life and labour in kutcha slums are not very different from those of rural areas in Jawhar. Most mothers are employed in manual work, which makes sustained breast -feeding impossible. Due to early exposure to water and solids, children contract infections very early in life. In our group discussions, it was brought out that one of the major costs of obtaining health-care is the earnings foregone in taking the child to the public health facility. Typically, public health facilities in urban areas are heavily in demand. This creates long waiting periods. The cost of waiting turns out to be very high for parents who are casually employed. One of the problems of urban low-skilled casual employment is that the employee is easy to replace. Consequently, jobs can be lost through remaining even occasionally absent. This is a channel through

which the specific characteristics of urban labour markets have implications for the nutritional well-being of urban population.

Also, infections are rampant among children because of a lack of access to amenities like clean drinking water or toilets. Most sources of drinking water are infected. Reliable drinking water can only be bought at a substantial cost. While conducting our field work, we spoke to people who were buying drinking water at prices ranging from 50 paise to a rupee per liter. The drinking water bill for a family of five would work out to be a substantial amount per month.

The urban data point to a greater incidence of stunting among boys than girls, though in the rural sample, such a difference is not apparent. Except in Vikroli and Ghatkopar, the incidence is much higher among boys in the under five age group. This difference is difficult to account for. Most studies have shown that there is usually no significant difference between boys and girls as far as the incidence of stunting is concerned™.

Taking the two samples as a whole, we find that 17.81 % boys in Jawhar taluka and 17.58% boys in urban slums are classified as stunted. For girls, the two percentages are 12.81% and 5.99% respectively. We have already pointed to the fact that urban girls seem to have a smaller incidence of stunting compared to urban boys as well as rural girls. We are not in a position to explain this difference. As a result, we have decided to reserve judgement on the incidence of stunting among urban girls. The incidence of stunting

among urban slum boys is very close to the incidence among boys of the same age in rural Jawhar.

Another measure of undernourishment is weight for age. Wasting is defined as low weight for height. Stunting is an indicator of chronic malnutrition, whereas wasting is an indicator of acute malnutrition. There is a notable difference in the relative incidence of stunting and wasting in rural and urban areas. **For the urban and rural samples, the overall incidence of wasting among boys is 5.03 % and 12.22 % respectively, though the incidence of stunting is very similar in both the samples. Similarly, the incidence of stunting among urban and rural girls is 4.11 % and 20.25 % respectively. This might be because of two reasons :**

- Stunting measures long term, acute malnourishment whereas wasting measures short term acute malnourishment. Stunting is very long term, whereas wasting is quickly reversible. In the urban areas, stunting is more prevalent implies that urban malnourishment is not as much a function of access to food; it is primarily governed by infra-structural factors like access to health care, clean drinking water, incidence of bouts of child hood infection, mother's nutrition as well as her ability to breast-feed. On the other hand, in tribal areas, food scarcity too seems to be important. For the tribal sample, the incidence of wasting is higher than the incidence of stunting. The incidence of stunting among tribal girls is lower than among

tribal boys, but the incidence of wasting among tribal girls is higher. Discrimination against the girl child seems to be practiced not via less infant health care or breast feeding, but via a lower allocation of food. This seems to have disappeared in the urban setting.

- It is possible that food availability is lot more seasonal in tribal areas as compared to Mumbai. The tribal data were collected in July-August 2002 when agricultural activity was at its peak. This being the pre-harvest season, food is also not abundant. Hence, what we have observed could be seasonal wasting. There is evidence to show that the seasonal wasting incidence is likely to be higher for girls. It is possible that this seasonal high incidence is corrected for after the harvest, and that the average incidence of wasting is not significantly higher than in Mumbai.

- The reason why in general, wasting might turn out to be lower is that if the population is stunted as well as underweight, the weight for height can still be normal. This effect too, must exist in our sample.

Below, we give the estimated values of the percentage of children who are underweight in the two regions. Weight for age is a measure of stunting as well as wasting. Individuals with a Z score less than 2 standard deviations for weight for age are called underweight. Because of the difficulties in measuring height, several studies report estimates based on weight /age ratio. In very small children, weight is as good a measure of nutritional status as height. In older children, low weight for age largely

reflects stunting because the weight for height is usually normal. We have given figures on weight for height as that is the most commonly used indicator in international as well as national studies including the Maharashtra Human Development Report. We present below the estimates of under-weight children in tribal Jawhar and compare them with estimates from Mumbai slums.

Table 3.3: Incidence of Weight for Age Malnutrition Among Tribal Children Below Five Years of Age.

Villages	Percentage of Underweight children	
	Boys	Girls
Adakhadak	16.6	50.0
Dharampur	40.0	60.0
Pimpalgaon	21.8	34.3
Nehale (Budruk)	27.2	20.0
Nehale (Khurd)	16.6	28.5
Raitale	40.0	33.3

We see that the incidence of undernourishment when measured as weight for age is much higher than the incidence of stunting. Individuals who are under 2 standard deviations in the Z- score classification are classified as "underweight".

Being underweight is a composite of stunting and wasting. The worst affected village is Dharampur where 60% of girls and 40% of boys are underweight. The extent of stunting too was particularly high in Dharampur. For the tribal sample as a whole, 27.64 % boys were underweight as against 30.43% girls. Thus, the incidence is marginally greater among girls than among boys. The next table presents estimates of the percentage of under-weight children in Mumbai slums.

Table 3.4: Incidence of Weight for Age Malnutrition Among Slum Children Below Five Years of Age.

Region	Percentage of Underweight Children	
	Boys	Girls
Matunga (West)	26.6	8.33
Dadar	35.8	30.9
Matunga (East)	46.1	18.1
Mahim	30.9	39.1
Bandra	25.9	12.1
Mankhurd	27.2	23.8
Kurla	56.2	42.8

Table 3.4: Incidence of Weight for Age Malnutrition Among Slum Children Below Five Years of Age.

Region	Percentage of Underweight Children	
Vikroli (East)	31.8	20.5;
Vikroli (West)	4.1	23.5
Ghatkopar	14.8	26.9

The worst incidence is in Kurla, followed by Matunga and Dadar. **Overall,** the incidence was 28.70% for the whole sample for boys and 30.27 % of the whole sample for girls. This is very close to the incidence among tribal children in Jawahar, which was 27.64% for boys and **30.43% for girls.** Again, this reiterates our conclusions that conditions of child-health care, maternal nutrition, access to clean drinking water and other amenities as well as access to adequate food is no better in urban slums in comparison to backward pockets of remote tribal villages. If we are willing to accept the argument about seasonality that was made above, the average incidence might be quite similar in both the cases. On the other two indicators of underweight and stunting, there is not much of a difference in the incidence between the two populations. A similar conclusion can

be drawn from the next table which compares the percentage of children, who are simultaneously stunted, wasted and underweight.

Table 3.5 The incidence of simultaneous stunting, wasting and underweight

	Urban Boys	Urban Girls	Rural Boys	Rural Girls
Percentage of children who are simultaneously Stunted, Wasted and Underweight	2.32	1.4	2.88	5.43

We find the coincidence of the three measures is rather similar among urban boys and rural boys from Jawhar. However, urban girls are significantly better off compared to rural girls as far as the coincidence of all three indicators is concerned. This is because the incidence of wasting is particularly low among urban girls, as can be seen from table 1.2. If one takes the indicator of wasting out of the comparison, we will observe a similar incidence among the two populations

1.2 Characteristics of households with incidence of malnorishment

We will be able to understand factors associated with malnourishment by examining the specific characteristics of households that show incidence of malnourishment on the three scales used by us, and by comparing these with households that have no incidence. The following table does one such comparison .

The figures in brackets are the values of the characteristics in rows for households that do not show that specific indicator of malnourishment. These households, however, can show incidence of another scale of malnourishment. The variables used for comparison do not certainly exhaust the list of possible candidates. Yet, we have isolated some variables like income, access to toilets and water etc that measure the household's ability to purchase nutrition and its access to social infrastructure respectively. Similarly, we have used years of mother's education since nutritional failure is often thought to be related to the educational level of mothers.

Table 3.6: Some characteristics of households with incidence of malnourishment

Indicator of malnourishment	Average Per Capita Monthly Income (Rs.)	Average years of mothers education	Average distance to water (minutes)	Access to toilets
Stunting	299.00** (374.94)	2.10* (2.06)	5* (6.23)	2 (9.0)
Wasting	247.3** (373.58)	2.08* (2.02)	7* (6.24)	8 (8.7)
Underweight	330.7* (377.54)	1.71* (1.92)	6.5* (6.10)	3.5 (9.9)
Households with no incidence of malnourishment	418.56	2.02	6.1	10.00

**: significant at 5% :

* :not significant at 5%.

The average per capita income of population with the incidence of stunting was Rs. 299.00 per month. The official planning commission poverty line for urban

Maharashtra is Rs.537.00. Angus Deaton has revised Planning Commission Poverty by constructing revised price indices. The revised poverty line for urban Maharashtra is Rs. 385.36[Xiii]. Thus, these households are below the poverty line according to the Planning Commission poverty line as well as the Deaton poverty line. . Their incomes are significantly lower (at 5% level of significance) than the incomes of populations not suffering from stunting, but with the possible incidence of other types of malnourishment. The incomes of households with stunting are significantly lower than incomes of households without stunting, but with the possibility of other types of malnourishment. Incomes of underweight households however are not significantly different from the incomes of populations that have no incidence of underweight children, but could have other incidence. Finally, the per capita incomes of all these sections are statistically lower than the incomes of populations that do not show any incidence of any form of malnourishment. The incomes of households not having any incidence of malnourishment is above the Deaton poverty line but lower than the planning commission poverty-line.

Mother's education is not significantly different in any of the classes. This perhaps implies that malnourishment has more to do with pure income poverty than cultural variables. Similarly, variables like average distance from water do not seem to be significantly different. But one must bear in mind that judgmental variables to come in on this variable. Hence, there are likely to be large errors of measurement on this variable. Percentage of population with access to toilets is significantly lower in the case of households with the incidence of stunting and underweight children.

Access to basic amenities matters in this case. Also, the measurement on this variable is likely to have fewer judgmental errors than the average distance from water variable which is measured in minutes.

1.3 Incidence of Severe Malnourishment:

Individuals who fall below 3 standard deviations of the Z score are classified as severally malnourished. Such individuals are at serious risk to life. Below, we present estimates of the children under 5 years of age in urban and rural areas who fall under this category.

Table 3.7 : Incidence of Severe Malnourishment in Urban and Rural Areas

Indicator	Urban Percentage of Severally Malnourished Children		Rural Percentage of Severally Malnourished Children	
	Boys	Girls	Boys	Girls
Under Weight	1.13	0.75	0.0	0.0
Stunted	5.68	2.63	3.65	2.88
Wasted	0.0	0	0.0	0.0

The over all urban incidence of severe stunting is 3.96%, whereas the overall incidence of severe stunting in rural areas is 3.26%. Urban areas also show severe under-weight incidence. This incidence is 0.94 %. Given the figures in table 1.5, the incidence of simultaneous severe stunting

and underweight is likely to be very low. **Consequently., the total incidence of severe malnourishment in urban areas works out to be 3.96% + 0.94% which is equal to 4.9%. This is greater than the rural incidence.**

Given that the incidence of malnourishment in urban slums is high, we can learn more about the phenomenon by examining the specific characteristics of those households that exhibit incidence of malnourishment on any one of the three scales. We can compare these households with those that show no malnourishment. The difference in specific characteristics like income, access to water, educational differences etc. should allow us to learn more about the factors associated with malnourishment.

1.4 . The Specific Characteristics of Severally Undernourished Urban Children :

Our sample 21 urban children who were severally stunted. Among these, all except three were below one year of age. The average per capita income of the households of these children was Rs.297.00 per month. 66% of the families with the incidence of severe undernourishment were asset less. This is 10% more than the urban sample as a whole. For the urban sample as a whole, 75% of the deliveries were in hospitals. In the case of severally undernourished children however, not a single delivery was in a hospital. For the urban sample as a whole, 38% of expectant or new

mothers received some form of medical attention during the past year. On the other hand, in the case of households with the incidence of severe undernourishment however, not a single mother had received any sort of medical care. This difference was not significant in the case of households with non-severe (under 2 SD) of malnourishment.

Thus we see severe undernourishment essentially as the inability of the urban poor to secure adequate livelihoods as well as access to health care.

1.5 Estimates of Likely Deaths from Undernourishment

Given that the 4.9 % of urban slum children are severally undernourished, we need to find out what the total numbers involved are. For that, we will need to know a) percentage of urban population that lives in kutcha urban slums b) the age-distribution of that population. The next table gives the age distribution of urban population calculated from our sample:

Table 3.8: Age classification of Slum population

Age group in years	Total number	Percent
0-2	189	6.18
2-5	343	11.21
5-15	1053	34.43
15-30	709	23.18
30-50	615	20.11
50-75	135	4.41
75-above	10	0.32
Total	3054	100

17.14 % of the total urban population falls in the 0-5 age group. We do not know the percentage of Mumbai population that lives in kutcha slums. However, we can build different sets of estimates on the basis of different assumptions. We have also obtained the likely number of deaths among severally malnourished children. If we are willing to assume that all the deaths among severally malnourished children are due to nutrition related reasons, then we can see the number of deaths as the consequence of malnourishment. Given that severe malnourishment poses serious threat to life, this assumption might not be unrealistic

Table 3.9: The number of severally malnourished children and the number of likely deaths due to nutrition related reasons in Mumbai.

Assumed percentage of urban population living in Kutcha Slums	Number of Children Severally Malnourished	Likely number of deaths among malnourished children (assumed death rate = 20/1000)
40	39884	800
45	44982	900
50	49980	1000
55	54978	1011
60	54976	1200

Thus, as the percentage of slum population goes up by 5%, the number of deaths in this age group, assuming a mortality rate of 20 per thousand, increases by 100. We are not counting deaths among the five to fifteen group, where the incidence of severe malnourishment is about 3%. We can do a similar exercise for the assumed death rate. Assuming that 50% of the urban population lives in Kutcha slums, we can work out the implications of alternative assumptions regarding death rate.

Table 3.10: Alternative death rates and number of deaths (assuming 50% of urban population lives in Slums)

Assumed death rate per thousand	Estimated Deaths among Severally malnourished Children
15	750
25	1250
30	1500
40	2000
50	2500

Thus, there is a wide range of estimates of deaths. **The smallest is 750 deaths per year, while the highest is 2500 deaths per year.** These are deaths in the zero to five age group alone. We have not counted deaths in the 5-15 age group. The smaller number of 750, which can be interpreted as a floor estimate, should itself be sufficiently alarming. The higher estimated number of 2500 deaths per annum is not

29

necessarily a ceiling estimate. **A recent study showed that death rates among 0-5 age group in Maharashtra is likely to be as high as 82.9 per thousand. In that case, the number of deaths could exceed 4000 deaths per year.** The percentage of slum population is also likely to be above 50%. For instance under the assumption of 80 deaths per thousand and 60 percent of the population living in slums, annual deaths in the 0-5 age group from nutrition related causes alone exceeds 5300. We should add to this the deaths occurring among pucca slums which we have not studied. Additionally, there would be deaths among the 5 -15 group, where the incidence of severe malnourishment is non-negligible.

The fact that at the minimum, 750 children in the city die from undernourishment every year, should call for a serious thinking on this issue. Urban ills like air and sound pollution, which lead to far fewer casualties have attracted a lot more monitoring and crusaders. Unfortunately, little or no attention is being paid to these deaths in Mumbai. All the attention of the media and the administrative machinery is geared to the malnourishment deaths in tribal areas. The likely numbers in a city like Mumbai are going to be substantial. These numbers will grow faster than the city growth rate because the fraction of the population that lives in kutcha bastis is also likely to increase along with the population. The rate of growth of the deaths from malnourishment is therefore going to be perhaps higher in Mumbai than in areas like Jawhar tehsil of Thane.

Chapter 4

Conclusion

We have so far established that as far as the male children are concerned, the extent of malnourishment is similar in the urban slums and tribal villages of Jawhar taluka. The Jawhar taluka is notorious in Maharashtra for a high incidence of malnourishment among children. The fact that the extent is Mumbai is similar is rather alarming. Girls in urban areas tend to be do better than those in rural areas. Yet, the overall numbers affected are pretty high because of the size of the urban population.

In this concluding chapter , we will try to arrive at some policy conclusions. We feel that the following areas need to be looked into:

- **Coverage of Public Health Infrastructure:**

    International evidence suggests that coverage of public health and sanitation facilities reduces the incidence of malnourishment™. The incidence of stunting is shown to be correlated with lack of access to health care and sanitation facilities. Below, we present estimates of the percentages of slum and rural households that have access to various infrastructural facilities. This table demonstrates that most of the differences that occur in the health environment are due to the private characteristics of households rather than publicly provided health care. Urban households show a higher degree of immunisation, a greater knowledge of personal hygiene and family planning. The percentage of deliveries at public hospitals are also high, though the coverage is by no means complete. But, the percentage of people having various illnesses is very similar in both the areas. The

percentage of children who have diarrhea & other illnesses is higher in urban areas.

Table 4.1 Comparative Access to Health Care Infrastructure: Urban and Rural Areas

Type of facility (% availability)	Urban	Rural
Immunised Individuals	95.4	76
Persons suffering from different Illnesses	28.1	28.8
Family planning knowledge	85.9	30
Family planning operation	44	53.4
Kutcha houses	94.9	76.9
Facility of latrine & toilet	6.85	2.6
Personal hygiene	59.4	43
Households with Electricity	45.7	29
Maternal medicine	38.5	62.2
Delivery at hospital	76.2	10.8
Children with diarrhea	12.25	4.77
Children with other illnesses	20.5	21.7
Average distance to water (minutes)	6	12.5
Visit of doctor/nurse	16.8	89.3

Table 4.1 shows the significant incidence of diarrhea and other illnesses that prevails in the urban areas. The urban incidence is larger than the rural incidence. Continued bouts of diarrhea can create heavy nutritional demands on the child's body. Diarrhea is a classic correlate of malnourished children. The percentage of children suffering from other illnesses was also high. More than 93% of the urban kutcha slum

population has no access to toilets. More than 60% of mothers have had no access to medicine of any sort. In this respect, the situation in the rural sample is much better. One among every four deliveries takes place at home, unattended by doctors and nurses. Though a larger proportion of the urban population has knowledge about personal hygiene, the incidence of malnourishment is similar in urban and rural areas. This probably implies that benefits of knowledge are nullified by lack of access to health infrastructure. A study of Delhi slum population has pointed out that the prevalence of illnesses among the slum population is correlated with inadequate public health care. The same study also shows that the financial costs of utilising supposedly free public health facilities can be large. The non-financial costs may also be substantial. In chapter 2, we have drawn a connection between the characteristics of the urban informal labour market that significantly raise the opportunity cost of time spent in queues at public hospitals. The utilisation will increase if these costs can be cut down. Probably a scheme of mobile clinics which visits kutcha slums during evening time (when the opportunity cost of time is at its lowest) seems the most workable option. If the significant cost of using public health is time rather than money, the mobile clinic can also charge a minimum fee to cover its expenses which will be willingly paid.

The specific characteristics of the households with severally stunted children also point to the lack of access to health facilities, as has been pointed out in section 1.3. Hence, one major area of intervention would be to ensure that expectant and new mothers do achieve a minimum amount of health care. It is also necessary to ensure

that all births do take place in hospitals. It is necessary to have a team of social workers/ community representatives who will monitor these factors. Provision of toilets and sanitation facilities would be another step in that direction.

- **Employment and Incomes:**

Most of the households covered by our sample are quite poor. Around 45% of the sample households lie below the Deaton poverty line. More than 50% of the households lie below the Planning commission poverty line. The table below gives the distribution of households according to income.

Table 4.2: Monthly per capita income

Avg. per capita income of house hold (Rs.)	Urban		Rural	
	Number of house hold	Percentage	Number of house hold	Percentage
0	6	0.59	2	0.9
0-50	2	0.19	100	49.1
50-100	17	1.68	59	28.9
100-200	127	12.6	27	13.2
200-300	189	18.7	5	2.45
300-400	223	22.1	1	0.4
400-500	89	8.8	2	0.8
500-600	143	14.2	1	0.5
600-800	131	13	7	3.4
800-1100	59	5.8	0	0
1100-1500	17	1.7	0	0
1500-2000	24	2.3	0	0
2000-3000	11	1	0	0
3000<	1	0.09	0	0
Total	1006	100	204	100

In urban kutcha slums, more than 50% of the households have monthly per capita incomes of Rs. 400 or less. Given high costs of living, these incomes are clearly inadequate. In rural areas, nearly 50% of the households have a per capita income of less than 50 Rs. per month. In spite of these differences, the incidence of malnourishment in urban areas is not significantly lower than that in rural areas. We did not get satisfactory information on the average prices facing rural and urban households; hence we have not been able to compute real incomes. Another difficulty was in reliably estimating the own-farm consumption of the rural poor. Yet, one way of testing whether urban households are significantly better off than the rural households is to look at the assets that the households own. Given that informal sector households do not have much access to financial assets, they typically save through holding physical assets. In group discussions, we found that physical assets like Television sets also serve as consumption smoothing devices; the household saves through purchase of a T. V. set in good times, and sells the T. V. set off during lean times. Thus, asset holding can be a good indicator of an household's economic status. Table 4.2 gives us a comparative profile for urban and rural areas:

Table 4.3 : Holding of Physical Assets

Type of Asset	Urban Households Holding the Asset (in percent)	Rural Households Holding the Asset (in percent)
Fan	16.8	5.4
T.V.(B/w)	25.9	11.5
Tape /Radio	16.2	7.3
Cot/palang	25.1	27.1
Bicycle	2.75	3.65
Scooter/Bike	0.1	2.1

Table 4.3 : Holding of Physical Assets

Type of Asset	Urban Households Holding the Asset (in percent)	Rural Households Holding the Asset (in percent)
Table	3.99	10.6
Chair	7.3	54.0
Cupboard	1.27	2.1
No Assets	58.7	59.7

A very similar percentage of households, i.e. 58.7% in urban areas and 59.7%

households in rural areas are asset-less. Among households that hold assets, rural

households hold more assets in the form of cup-boards, chairs and tables as well

as scooters and bicycles. The assets that a household will hold depend upon the

opportunities that it has. Because the rural poor do not have adequate housing,

they cannot invest in chairs and tables. Where will they keep them? Urban

households hold more assets in the form of TV, radio and tape recorders. One

reason is the inability to hold savings in any financial assets form. The other

advantage of assets like TV, radio and tape recorders, fans is that they are easily

marketable and hence help in smoothing consumption. Just because these items

are luxury goods, their possession should not be interpreted to imply better urban

incomes. The important thing, from our point of view, is that the percentage of

asset-less households is very similar in urban slum areas and in the Jawhar taluka

sample. Thus, the urban slum dwellers do not seem to be able to accumulate much

more of its incomes, in spite of a seemingly much higher level. The urban

cost of living must also be substantially higher than the rural counterpart

36

Another question that we might ask is : how much human capital do the urban slum dwellers accumulate as against the rural population? If the urban poor are wealthier, one might expect a higher level of educational attainment among them.

Table 4.4 : Educational Attainments among slum areas and Jawhar villages

Attainment	Urban	Percent	Rural	Percent
None	950	49.1	396	62.95
Upto-4	378	19.5	95	15.1
S.S.C	569	29.4	130	20.6
H.S.C	16	0.8	5	0.7
Graduation	3	0.15	3	0.4
Total	1932	100	629	100

At all levels of primary and secondary education, urban slum populations do better than the Jawhar sample. However, as education proceeds beyond the SSc level, the gap narrows and reverses itself for graduation. A part of this explanation is the self-selection evident in our choice of the urban sample: More highly educated individuals in urban areas will no longer tend to live in kutcha slums and hence we will tend to underestimate the educational attainment levels of urban slums. The urban poor seem to be saving more in the form of human capital accumulation and would probably also have a higher marginal productivity, giving them somewhat higher earnings.

This should not be allowed to obscure the finding that nearly 50% of the people in our urban sample had had no education whatsoever. These people are

perhaps at the bottom of the urban informal sector labour market. They do not seem to have fixed occupations; they get by through doing sundry things as and when work of any kind that they can do becomes available.

A policy for providing more stable and higher incomes seems to be the need of the day in order to reduce the incidence of malnourishment. A mere relocating of urban slums will not work because income seems to be an important determinant of nutritional status along with access to basic facilities. Redeveloped slum housing will give the poor access to toilets and water, but how will it give them better incomes ? The average income of households with incidence of malnourishment falls substantially short of even the Deaton poverty line, which in turn is substantially lower that the official Planning Commission poverty line. In fact, at such low incomes, they will most certainly not be able to afford even the minimum maintenance and upkeep outgoings and municipal taxes required from Slum Redevelopment Housing.

The problem cannot be tackled without solving the associated problem low incomes , skills, assets and poor employment. Slum Redevelopment is likely to be only a cosmetic solution, which will solve the problem only from the point of view of the non-slum population. A scheme of training people in specific skills that are required by the urban economy can be put in place. Organisations like SEWA have been doing such work in other cities. Women can for example, be trained in care of sick and invalid patients, as ayas etc. Small vocational courses like tailoring can also be seriously explored. This training can either be provided through NGOs or the

government.   However a major hurdle in doing this is the policy of frequent demolitions which will make the exercise impractical.

Because malnutrition has serious consequences for academic performance, policies related to primary and secondary schooling cannot be thought in isolation from these issues. Nutritional status will have to be improved if children's school performance is to be bettered. Providing mid-day meals is one such option. If access to clean water or toilets remains a problem, he effectiveness of mid-day meals can be substantially reduced. Similarly, issues like maternal health and reducing the costs of child-care also need to be considered. A, a broader policy framework which integrates coverage of health care, upgrading of slum facilities and supplementary nutrition in schools will have to be evolved.

We are not in a position to suggest a comprehensive policy package. A suitable policy package can be arrived at over time. It will have to co-opt slum dwellers, N.G.Os working with slums and the government machinery. However, the prerequisite for all this is to acknowledge the problem of large-scale malnourishment in urban areas. The fact that there are at the minimum, seven hundred and fifty deaths a year of children below the age of five because of malnourishment should spark off a debate on the issue. After all, issues like air and sound pollution, which cause far fewer casualties, have been able to attract attention and policies have been devised to counteract them. It is possible to sweep the problem of malnourishment under the carpet because the problem is not as visible as problems of air and sound pollution. . However, such neglect will only lead to many more unaccounted deaths due to

malnourishment. We see the main achievement of this report as contributing to the awareness of the problem of malnourishment among urban children. If this report can raise a debate and lead to concentrated attention on the problem, we will count it as a success.

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Appendix

This appendix describes our data set. The urban sample consisted of 1006 households in kutcha slums across eight slum settlements (see map). The following table describes the slum settlements and the number of households in each.
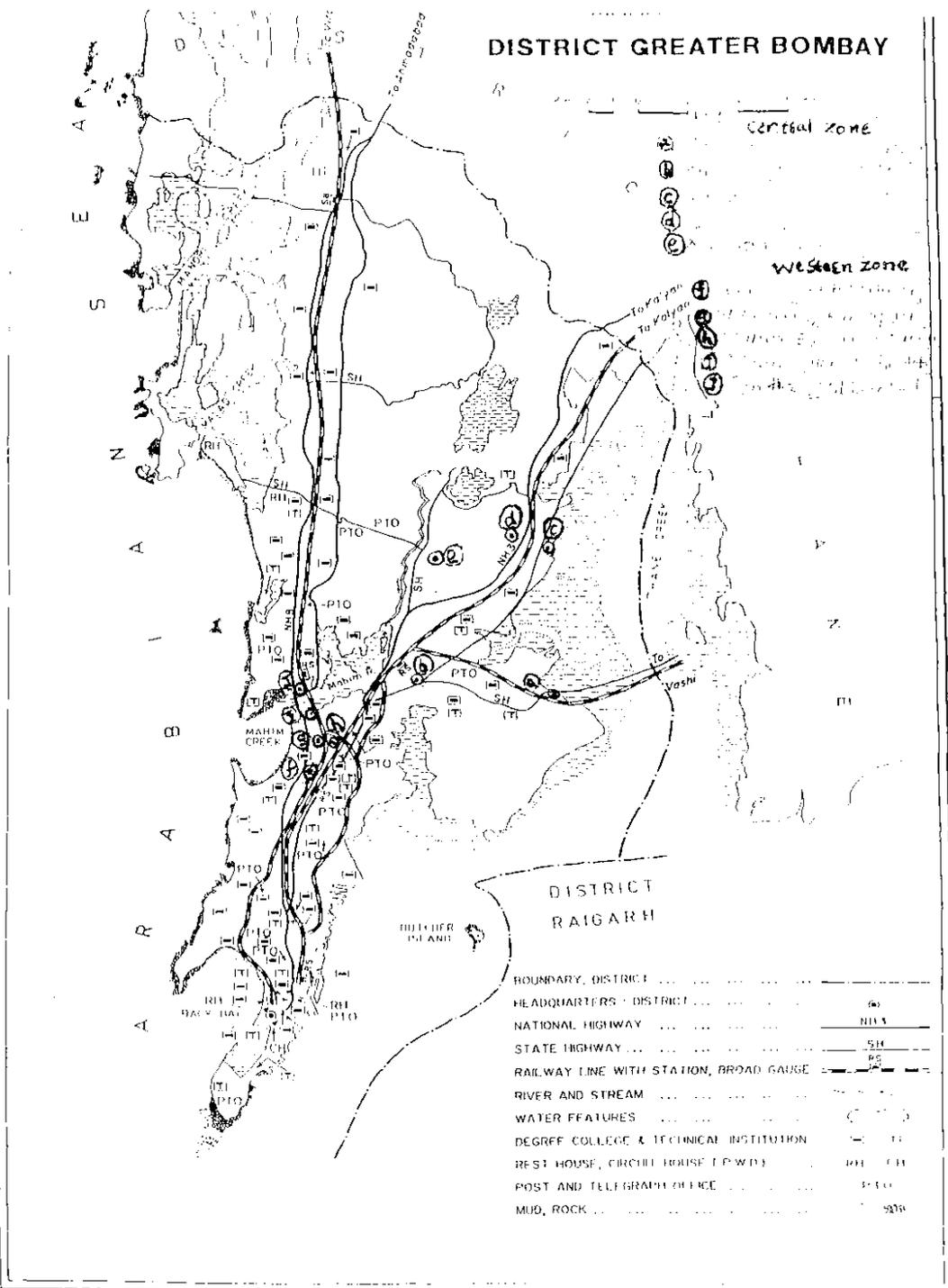
The settlements were chosen according to logistic convenience in rural areas. We tried to see that we had a mix of different types of settlements given the constraints on travel and other resources that we had. The urban samples were chosen so as to give equal weight to eastern and western suburbs. Again, a constraint on travel and other resources was a factor. However, it is difficult to think of systematic biases that would have crept in through our choice of settlements.

Region	Total households
Matunga(West)	56
Dadar	142
Matunga (East)	50
Mahim	204
Bandra	101
Mankhurda	70
Kurla	67
Vikroli (East)	99
Vikroli (West)	71
Ghatkopar	146
Total	1006

The following table describes the villages in Thane (see map) district and the number of houses in each from which we collected data.

Villages	No.
Adkhadak	16
Dharampur	10
Nehale bk	47
Pimpalgaon	61
Nehale hk	39
Raitale	31
Total	204

DISTRICT GREATER BOMBAY

Central zone

Western zone

DISTRICT
RAIGARH

BOUNDARY, DISTRICT ... ...
HEADQUARTERS : DISTRICT ... ...
NATIONAL HIGHWAY ... ...
STATE HIGHWAY ... ...
RAILWAY LINE WITH STATION, BROAD GAUGE
RIVER AND STREAM ... ...
WATER FEATURES ... ...
DEGREE COLLEGE & TECHNICAL INSTITUTION
REST HOUSE, CIRCUIT HOUSE (P.W.D.)
POST AND TELEGRAPH OFFICE ... ...
MUD, ROCK ... ...

MAHARASHTRA

TAHSIL JAWHAR

DISTRICT THANE

Key

(a) → Adkhadak
(b) → Dhasavupul
(c) → Nandde Kh
(d) → Pimpalgaon
(e) → Nidale Kh
(f) → Raitale
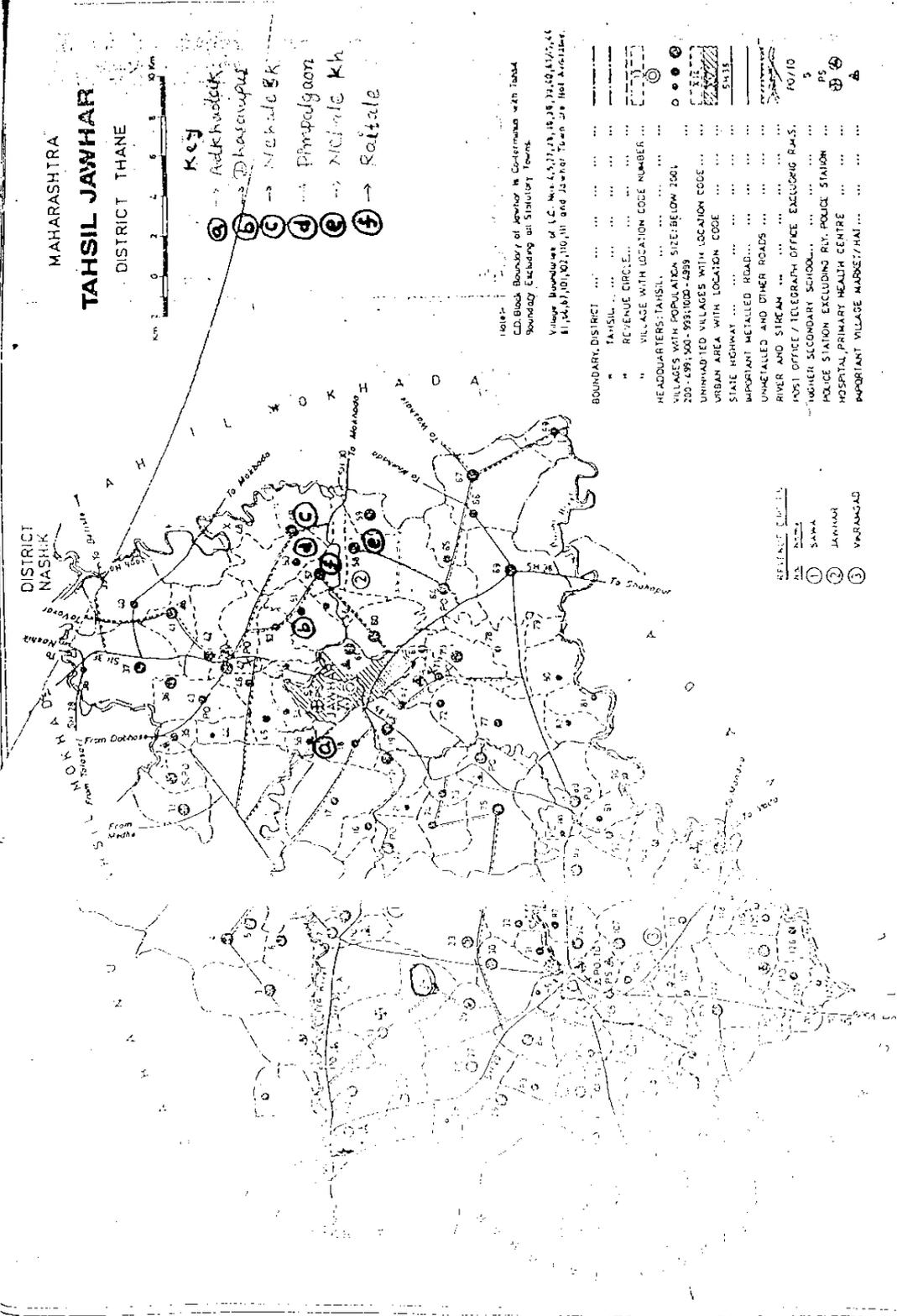
Note:-
C.D Block Boundary of Jawhar in Conformation with Tahsil
Boundary Excluding all Statutory Towns

Village Boundaries of L.C. Nos 4,5,21,24,28,29,33,40,43,47,65,66
81,64,63,101,102,110,111 and Jawhar Town Are Not Available

BOUNDARY, DISTRICT	...	...	...
" TAHSIL	...	...	...
" REVENUE CIRCLE	...	...	...
VILLAGE WITH LOCATION CODE NUMBER	...		
HEADQUARTERS : TAHSIL	...		
VILLAGES WITH POPULATION SIZE : BELOW 200			
200-499; 500-999;1000-4999	...		
UNINHABITED VILLAGES WITH LOCATION CODE	...		
URBAN AREA WITH LOCATION CODE	...		
STATE HIGHWAY	...	...	
IMPORTANT METALLED ROAD	...	...	
UNMETALLED AND OTHER ROADS	...	...	
RIVER AND STREAM	...	...	
POST OFFICE / TELEGRAPH OFFICE EXCLUDING R.M.S.			
HIGHER SECONDARY SCHOOL	...		
POLICE STATION EXCLUDING RLY. POLICE STATION			
HOSPITAL, PRIMARY HEALTH CENTRE	...		
IMPORTANT VILLAGE MARKET/HAT	...	...	

REVENUE CIRCLE
(1) SAKHA
(2) JAMSHET
(3) VARANGAD

DISTRICT NASHIK

DISTRICT NASHIK