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# Trends in Andhra Pradesh with a Focus on Poverty

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Young Lives
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# Summary

As background to the Young Lives study, this paper looks at demographic, socio-economic, and poverty trends for the state of Andhra Pradesh during the 1990s. Substantive changes in the demographic structure, composition of economic activity, and trends in poverty are noted. Additionally, it reviews the literature on poverty measurement issues for generic populations as well as for children. A major unresolved issue is a standard and widely accepted definition of childhood poverty although a number of indicators are commonly presented when discussing quality of life for children. Following this, this paper also presents trends in immunisation coverage, nutrition, and various educational indicators for children in Andhra Pradesh over the 1990s.

# 1. Introduction

Andhra Pradesh is widely thought of as an economy that undertook rapid reforms throughout the 1990s but these reforms didn't lead to significant economic gains. Throughout the 1990s Andhra Pradesh saw an annual growth rate of 4.1% which is comparable to the 1990s national average of 4.2% but is well below the 5.5% growth rates that the fastest growing states like Karnataka achieved (Mishra 2003; Dev and Ravi 2007). However, a number of changes did take place in the demography and economy of Andhra Pradesh and this paper discusses some of these changes with a specific focus on poverty in general and poverty for a specific sub-group: children.

Poverty measurement is inevitably a debated topic since there is a large amount of subjectivity involved in constructing such estimates. Poverty is even more complicated to measure in a rapidly changing economy because existing benchmarks that have been used to measure poverty may no longer be valid. Apart from measurement issues one aspect of poverty is the composition of the poor: Who are the poor? A sizeable fraction of the total poor are children and it is well documented in the literature that poverty for children is a different experience than it is for adults. For example, periods of hunger will not only lead to loss of strength and ability to be active as an adult, but it may also lead to long-term stunting, reduced cognitive ability and susceptibility to diseases (see Karoly et al. 2005 and Boyden 2006 and references therein that develop this idea further). Hence it is surprising that there have been few attempts to quantify childhood poverty in developing countries.[1] An important limitation has always been the lack of data sources that may be used to monitor many different dimensions of childhood and childhood scarcity such as how poverty affects a child's cognitive and physiological development, the role of family and community care for

[1] There are some important exceptions that do provide important details about childhood poverty in developing countries such as Anderson and Hague (2007), Gordon et al. (2003) and White et al. (2003). Anderson and Hague (2007) uses macro data to show that expenditure on public programs for children are positively correlated with child outcomes, economy wide growth and inequality. Gordon et al. (2003) uses cross-sectional micro-data to study the incidence of childhood scarcity in different dimensions. The last paper discusses different definitions of childhood poverty and argues that apart from income scarcity, or nutrition and education and deprivation, social and psychological environments need to be factored in. The study of childhood poverty in developed countries is far stronger; not only in terms of its research focus but also in the quality of data available to study childhood poverty (in India, the National Longitudinal Survey of Youth – NLSY79 which interviewed almost 12,700 young people aged between 14 and 22 when first surveyed in 1979, and NLSY97 approximately 9,000 young people aged between 12 and 17 when first surveyed in 1997 – is the most representative national survey on young people).

children in poverty and the ways in which children themselves respond to their being in poverty by taking on different social and economic roles within and outside the household. This paper briefly reviews some of the reasons why conceptualising childhood poverty in this general sense is complicated.

This paper also updates the debate on poverty trends for India and specifically for Andhra Pradesh. Much of the debate that underlies poverty measurements in India for the 1990s lies around the lack of comparability between the 50th Round of the NSSO survey (collected in 1993-94) and the 55th Round of the NSSO survey (collected in 1999-2000). A number of 'corrections' were made to try and compare the data from the 50th and the 55th round to identify changes in trends during the 1990s. We look at some of these corrections as well as data from the 61st Round of the NSSO (collected in 2004-05). This paper is structured as follows: Section 2 discusses recent and anticipated changes in the demography, economy and society. Section 3 discusses the methods for analysing poverty over space and time and presents the issues on which the current debate on poverty is centred on focusing particularly on Andhra Pradesh (AP). Section 4 discusses measuring childhood poverty, one attempt at conceptualising childhood poverty and trends in three variables that are important dimensions of scarcity for a child: vaccination, nutrition, and participation in primary education. Section 5 concludes.

# 2. Andhra society and economy

Andhra Pradesh looks a lot different today from how it did at the end of the 1980s due to a number of demographic and economic changes that it experienced during the 1990s. A key point in time for the Indian economy was 1991 when a financial crisis on its balance of payments was resolved by borrowing from the IMF on the condition of reduced government deficits as well as increasing liberalisation and competition in its domestic markets. Much of the recent increase in economic growth in India (and many of its states) post-dates these reforms. For Andhra Pradesh, however, the average growth rate in the post-reform period (4.1% per annum) was not much different from its pre-reform rates in the 1980s (3.9% per annum). While the rate has not changed substantially, there have been important changes in the sectoral composition of the economy as well as increasing decentralisation of legislative and decision-making powers through the 73rd Amendment (Panchayat Act granting decision-making abilities to local bodies in villages in rural areas) and the 74th Amendment (Nagarpalika Act granting decision-making abilities to local bodies in cities and towns in urban areas) to the Constitution of India. Each of these have important implications for how local public goods are distributed as well as the degree of participation and change that citizens in Andhra Pradesh now have compared to the pre-1990 period.

## 2.1 Demographic changes

Demographic changes are a precursor to changes in the way people live their lives, form and maintain relationships, and allocate personal wealth within lifetimes and across generations. Demographic changes also forecast the size of the healthy population (in terms of general public health as well as the fraction dependent on the economically active population) that a country will have access to and this is a key ingredient in policy making. The overall trend across the world, including India, has been an increasing aging of the population as people live longer and many choose to maintain increasingly longer economically active lives, and shorter periods of fertility, so that society as a whole sees lower birth and death rates. These changes

are mirrored in Andhra Pradesh. I use data collected from the Sample Registration System (SRS) to look at a few key variables that describe the changing demographic structure of India and specifically Andhra Pradesh. The SRS is a large-scale demographic survey whose sample frame is continuously updated with every census and provides annual estimates for various demographic variables (for e.g. birth rate, death rate, etc.) at national and state levels.

Table 1 details trends in conditional life expectancy (conditional on having survived to a specific age) at different ages for Andhra Pradesh and India. Conditional life expectancy (LE) is a measure of length (in years) of remaining life and is calculated as the probability weighted sum of all possible ages where each probability is the probability of surviving to the next higher age conditional on having survived till the current age. Life expectancy at birth in Andhra Pradesh had been close to, or a little less than, the average all-India life expectancy at birth during the early 1970s. However, by the latter half of the 1980s and particularly mid-1990s we find that boys and girls, particularly girls, born to parents in Andhra Pradesh tend to have a life-expectancy (LE) at birth that is higher than their counterparts in the rest of India (LE for girls in Andhra Pradesh is about 2.5 years longer than the national average). Consequently, it is surprising that this trend is reversed for conditional life expectancy by age five and higher; LE is lower for males and females from Andhra Pradesh when compared to the national average and this gap in life expectancy increases with age.[2] Mechanically, this reversal in the LE gap between Andhra Pradesh and India may only be explained by a phenomena that shrinks the probability of survival faster by age 5 for males and females in Andhra Pradesh relative to their counterpart national survival probabilities. Further research is needed to identify the causal pathway for this LE gap reversal and this is likely to be of major policy relevance.

**Table 1.** *Conditional life expectancy in years at selected ages by sex*

| | | India | | | Andhra Pradesh | | |
|---|---|---|---|---|---|---|---|
| **At Age** | **Period** | **Total** | **Male** | **Female** | **Total** | **Male** | **Female** |
| 0 | 1970-75 | 49.7 | 50.5 | 49 | 48.8 | 48.4 | 49.3 |
| | 1986-90 | 57.7 | 57.7 | 58.1 | 59.1 | 58.2 | 60.4 |
| | 1992-96 | 60.7 | 60.1 | 61.4 | 62 | 60.8 | 63 |
| 5 | 1970-75 | 57.5 | 57.5 | 57.7 | 55.3 | 54.8 | 55.8 |
| | 1986-90 | 61.7 | 60.9 | 62.5 | 61.2 | 60.2 | 62.6 |
| | 1992-96 | 63.2 | 62.1 | 64.4 | 62.5 | 61.4 | 63.2 |
| 50 | 1970-75 | 20.4 | 19.8 | 21.3 | 19.2 | 18.3 | 20.1 |
| | 1986-90 | 22.7 | 21.7 | 23.7 | 22.1 | 19.9 | 21.1 |
| | 1992-96 | 23.8 | 22.5 | 25.1 | 22.7 | 21.6 | 23.4 |
| 70+ | 1970-75 | 8.9 | 8.6 | 9.2 | 8 | 7.7 | 8.2 |
| | 1986-90 | 9.9 | 9.4 | 10.1 | 9.1 | 8.9 | 9.3 |
| | 1992-96 | 10.7 | 10 | 11.4 | 9.4 | 9.2 | 9.1 |

Source: Registrar General of India (1999)

With longer life expectancy setting in over time it is natural to expect to see declining birth, fertility, death and infant mortality rates as society has better control over their own and their offspring's life (timing birth, ensuring survival, and increasingly investing in offspring). In Table 2 we see trends for India and Andhra Pradesh for the period 1987 to 1997 for three key demographic measures – the birth rate, death rate and the natural population growth rate. Both India and Andhra Pradesh show a declining trend on each of these three variables with Andhra Pradesh showing faster declines for birth measures (a -25.7% decline in birth

[2] Data for ages 1, and 60 are not shown since 1 follows LE trends at 0 while 60 follows LE at 5, 50 and 70+

rates for Andhra Pradesh compared to -15.5% for India), and a slower decline for death related measures (a 16.2% decline in death rates for Andhra Pradesh compared to a national average for India of -18.3%). While the population of Andhra Pradesh was growing roughly at the national rate in 1987, these differing trends have meant that the state's natural population growth rates has declined almost twice as quickly as the decline the entire country saw during the 1990s. If present trends continue one immediate implication of this is that the average age of the population of Andhra Pradesh will be larger than the rest of India and aging will be an important concern for this state.

Looking at rural-urban differences in these trends we find that there are some important differences between Andhra Pradesh and India. In rural Andhra Pradesh, birth rates declined twice as fast as the national birth rates, while death rates and infant mortality rates declined substantially slower than their national rates. Thus, while the natural rural population growth rate for both Andhra Pradesh and India are declining, rural Andhra Pradesh (30.7%) was declining more than twice as fast as the national rural population rate (12.3%) and this parallels the aggregate trends for Andhra Pradesh and India. However, in urban Andhra Pradesh, decline in birth rates are only a few percentage points higher than the national rates while the death and infant mortality rates declined a few percentage points faster than the national rates. Thus, the decline in the population growth rate for urban Andhra Pradesh was a few percentage points higher (7%) than the rate seen for the entire country over the 1987-97 decade. The difference between the 30.4% decline in the natural population growth rate for Andhra Pradesh and the 14.1% decline for the entire country appears to be largely driven by rural changes in Andhra Pradesh.

**Table 2.** *Changes in key demographic variables for India and Andhra Pradesh (1987-97)*

| Variable | Region | State/Country | 1987 | 1997 | Change (%) |
|---|---|---|---|---|---|
| Birth rate (per 1000) | Rural | All India | 33.7 | 28.9 | -14.2 |
| | | Andhra Pradesh | 30.9 | 23.1 | -25.2 |
| | Urban | All India | 27.4 | 21.5 | -21.5 |
| | | Andhra Pradesh | 28.2 | 20.5 | -27.3 |
| | Total | All India | 32.2 | 27.2 | -15.5 |
| | | Andhra Pradesh | 30.3 | 22.5 | -25.7 |
| Death rate | Rural | All India | 12 | 9.6 | -20.0 |
| | | Andhra Pradesh | 9.9 | 9.1 | -8.1 |
| | Urban | All India | 7.4 | 6.5 | -12.2 |
| | | Andhra Pradesh | 7.3 | 5.9 | -19.2 |
| | Total | All India | 10.9 | 8.9 | -18.3 |
| | | Andhra Pradesh | 9.9 | 8.3 | -16.2 |
| Infant mortality rate | Rural | All India | 104 | 77 | -26.0 |
| | | Andhra Pradesh | 87 | 70 | -19.5 |
| | Urban | All India | 61 | 45 | -26.2 |
| | | Andhra Pradesh | 59 | 37 | -37.3 |
| | Total | All India | 95 | 71 | -25.3 |
| | | Andhra Pradesh | 79 | 63 | -20.3 |
| Natural growth rate | Rural | All India | 22 | 19.3 | -12.3 |
| | | Andhra Pradesh | 20.2 | 14 | -30.7 |
| | Urban | All India | 19.5 | 15 | -23.1 |
| | | Andhra Pradesh | 20.9 | 14.6 | -30.1 |
| | Total | All India | 21.3 | 18.3 | -14.1 |
| | | Andhra Pradesh | 20.4 | 14.2 | -30.4 |

Source: Registrar General of India (1999)

Demographic changes also affects the age at which individuals choose to have their children. Table 3 shows a breakdown of fertility rates by age for both India and Andhra Pradesh. Quite interestingly, absolute fertility rates are almost two times higher for the 15 to 19 age group for Andhra Pradesh than for India suggesting that the age distribution at which fertility occurs is substantially younger than the national distribution. In addition, this age group has the second largest fertility rate within Andhra Pradesh across all age-groups suggesting that this age group is a major contributor to the total number of births taking place. What makes this particularly curious is that the legal age of marriage for women in India is 18 years of age and while this is not perfectly enforced in the country, it appears that this restriction is even more lax in Andhra Pradesh. Additionally, while the age group showing large declines in fertility is the 15 to 19 age group for the nation, substantial declines in fertility appears to be taking places in the 25 to 49 age categories for Andhra Pradesh. Thus, over the 1990s we find a rapid decline in the age at which parents have children has set-in in Andhra Pradesh. This appears to be quite contrary to the traditional predictions of fertility behaviour in which a woman's time is increasingly valued in purely economic roles and a quantity–quality trade-off has set in among off-spring.

**Table 3.** *Trends in age-specific fertility rates 1986-96*

| Age group | India | | | Andhra Pradesh | | |
|---|---|---|---|---|---|---|
| | 1986 | 1996 | % Change | 1986 | 1996 | % Change |
| 15-19 | 91.1 | 55.3 | -39.30 | 144.1 | 119.3 | -17.21 |
| 20-24 | 252.8 | 229.1 | -9.38 | 255.1 | 221.5 | -13.17 |
| 25-29 | 216.4 | 188.1 | -13.08 | 179.7 | 105.7 | -41.18 |
| 30-34 | 139.2 | 112.4 | -19.25 | 109.2 | 43.2 | -60.44 |
| 35-39 | 78.6 | 56.6 | -27.99 | 50.5 | 14.4 | -71.49 |
| 40-44 | 37.9 | 28.3 | -25.33 | 21.2 | 4.4 | -79.25 |
| 45-49 | 14.9 | 10.2 | -31.54 | 9.1 | 0.4 | -95.60 |

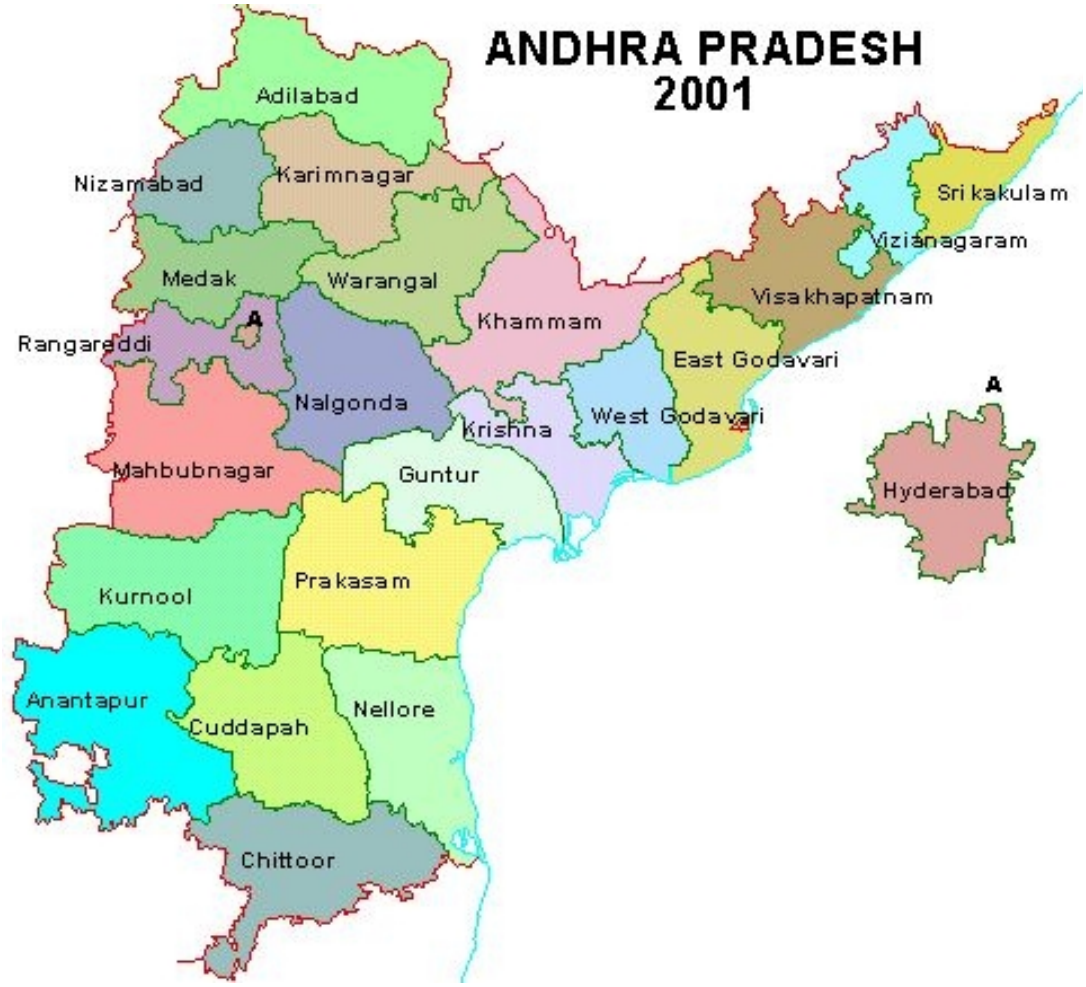
Source: Registrar General of India (1999)

Finally, the Registrar General of India (1999) also estimates maternal mortality rates for India and 15 of India's biggest states for 1997. While the national maternal mortality rate is estimated to be at 408 deaths per hundred thousand live births, Andhra Pradesh has a reasonably low maternal mortality rate of 154 deaths per hundred thousand live births.

## 2.2 Socio-economic and political changes

The population of Andhra Pradesh stood at almost 75.72 million at the 2001 census and it accounts for 7.37% of the India's population, making it the fifth largest of all the 35 states. The state continues to be largely rural with only 27% of the population living in urban areas. With over 80% of the population dependent on agriculture, the rural part of the state continues to drive much of the Andhra Pradesh economy. Andhra Pradesh was the first state in post-independent India that was crafted out of existing political units to unite a group of people who speak the same language – Telugu (Gray 1971). It comprises of three distinct sub-regions – coastal Andhra (comprising of Srikakulam, Visakhapatnam, East Godavari, West Godavari, Krishna, Guntur, Ongole, and Nellore districts), Rayalaseema (comprising of Kurnool, Cuddapah, Chittor, and Anantapur districts), and Telengana (comprising of Khammam, Nalagonda, Warangal, Karimnagar, Medak, Nisamabad, Aadilabad, Mahabubnagar, and Hyderabad districts) (see Figure 1).

**Figure 1.** *Administrative map of Andhra Pradesh*




Source: Office of the Registrar General, India

About 85% of the population identifies Telegu as its mother tongue (also identified as the second most commonly spoken language in India), another 7.5% identify Urdu, and about 3%, Hindi as their mother tongue. A number of other languages are also identified as a mother tongue by the remaining population such as Tamil, Kannada, Marathi, Oriya, etc. The dominant religion in Andhra Pradesh is Hinduism (75%) followed by Islam (11%) and Christianity (3.5%). Like much of the rest of India, Andhra Pradesh too had largely been a state where the Congress Party kept winning state elections till N.T. Rama Rao formed the Telegu Desum Party (TDP) – a political party that has been voted into power at the state government for substantial periods of time since 1982 (they held power between 1984 and1988 and then again between 1994 and 2004).[3]

A key feature of elections in Andhra Pradesh has been its large voter turnout particularly in comparison to the national average as seen in the general elections (the election for the lower house of the country) as seen in Table 4. Data from the Election Commission of India shows that this number is quite uniform within the population so that when it broken up into

[3] Suri (2002) presents an in depth study of political processes from 1947 to the 1999 Lok Sabha Elections and Panchayati Elections of 2001. This not only brings in the different phases of elections over time (the formative years, the congress dominance up to 1982 and the TDP years) but also presents a discussion of the emergence of different political factions over time.

the reserved categories (SC and STs) and the general population each sub-group has uniformly high voter turnouts for national elections. Importantly, the electorate appears to have become more focussed on party identities rather than candidate identities (or manifestos) drawn from either Congress or TDP; over time this has meant the erosion of the independent candidates and other political parties in state level politics (Suri 2002).

**Table 4.** *Voter participation in Andhra Pradesh in the 1990s*

| General election | Voter Turnout | |
|---|---|---|
| | Andhra Pradesh | India |
| 1991 | 61.42% | 56.73% |
| 1996 | 63.02% | 57.84% |
| 1998 | 66.00% | 61.97% |
| 1999 | 69.14% | 59.99% |

Source: Election Commission of India website

Apart from the national and state elections a key extension in democratic powers has been to local bodies in both rural (73rd Amendment to the Constitution of India) and urban (74th Amendment to the Constitution of India) areas. Elections to the panchayat, a group of 5 elected leaders at the village level, have taken place in 1995 and then again in 2001. This allows for the election of about 250,000 locally elected representatives of which 34% have been reserved for members from scheduled castes and scheduled tribes. One of the main differences between the state and panchayati level elections is that the smaller, regional (or state specific) parties, other than TDP and the Congress, and independent candidates still remain quite active politically (see Suri (2002) for detailed party-by-sub-region analysis of local elections). A number of interesting changes have also been introduced under the aegis of the 74th Amendment however, much of the recommended changes have yet to be adopted (Mathur 2007). One of the possibilities under the 74th Amendment is allow directly elected mayors to govern cities and this allows for the possibility of mayors being elected independent of the political entity ruling the state government (the Congress party won many of the municipal and mayoral elections while the TDP had formed the government at the state level) allowing citizen greater options (Kumar 2005). However, some of these reforms have also been reversed with the state government going back to having mayors indirectly elected from within a group of councillors elected within the cities (see Viswanath 2005). This move allows greater role for political lobbying and allows the political party at the state level greater participation in urban matters and suggests that far greater political representation and accountability has been achieved in rural areas under the 73rd Amendment than in urban areas.

Table 5 shows that per capita in Andhra Pradesh income grew at a rate roughly comparable to the national average. Important changes are also seen in the composition of economic activity in Andhra Pradesh and these roughly mirror the changes seen in India. Throughout the 1990s the share of agriculture in total state domestic produce has remained around 30%, but this has been declining slowly. Much of this is matched by a corresponding expansion in the share of the services sector; the services sector has been averaging a share of about 44% throughout the 1990s. The composition of the industrial sector in economic activity has remained stable at 25%. Looking at sectoral growth rates (instead of just composition) during the period between 1990-91 and 1999-2000 we find that all the three sectors showed growth but the services sector grew the fastest at 16.1% while agriculture and allied activities grew the slowest at 13.2% (industry grew at 15.7%).

**Table 5.** *Economic and social growth in Andhra Pradesh in the 1990s*

| Variable | 1990-91 | 1999-2000 | Growth |
|---|---|---|---|
| **Per capita income (Rs.)** | | | |
| *India* | 8156 | 11514 | 4.24% |
| *Andhra Pradesh* | 7532 | 10642 | 4.08% |
| **India** | | | |
| Agriculture and allied | 32.2% | 25.2% | 29.1% |
| Industry | 27.2% | 26.7% | 27.1% |
| Services | 40.6% | 48.1% | 43.8% |
| **Andhra Pradesh** | | | |
| Agriculture and allied | 32.1% | 26.4% | 30.2% |
| Industry | 25.1% | 26.6% | 25.7% |
| Services | 42.8% | 47.0% | 44.0% |

* Performance measured as an exponential growth estimate

** Performance measured as the average sectoral share (1993-94 prices)

Source: Mishra (2003)

Looking at levels instead of growth rates we find that per capita income in Andhra Pradesh was about Rs. 624 less than that of India's in 1990-91 and this gap increased to about Rs. 874 by the end of the 1990s. How large is this gap? In 1993-94 the poverty line for Andhra Pradesh was estimated to be Rs. 163.02 per month (or Rs. 1956 per year) for rural areas and Rs. 278.14 (or Rs. 3337) (see Table 6). Thus, the gap ranges between a third to a fifth of the poverty line for Andhra Pradesh in the early 1990s. The per capita income in 2004-05 was estimated to be Rs. 26,581 for Andhra Pradesh and Rs. 27,517 for India as whole. In 2004-05 the poverty line for Andhra Pradesh was estimated to be Rs. 293 per month (or Rs. 3,516 per annum) for rural areas and Rs. 543 per month (or Rs. 6,517 per annum) for urban areas suggesting that the gap between the national and state per capita income (Rs. 936) still constitutes about a quarter to one-seventh of the poverty line. Thus, while Andhra Pradesh has been successful in maintaining its growth rate with the rest of India there still remains an important shortfall in the level of per captia incomes with respect to the national average.

# 3. Poverty

Poverty measurement attempts to measure scarcity within a population and there is much debate even about what scarcity it is appropriate to measure. The context of scarcity ranges from single dimensional measures such as the number of calories consumed, income earned, consumption expenditures made, or assets owned, to more difficult and multi-dimensional measures of scarcity such as well-being.[4] To some extent the context of poverty may be resolved by looking carefully at the policy question that one is trying to respond to when making poverty measurements. For example, disaster policies may be better informed by policies based on calories consumed today while policies to encourage income growth (and not necessarily maintaining subsistence consumption) may look at productive asset scarcity. The main point really is that ranking of a group of individuals is unlikely to be identical under different notions of scarcity and thus, the right notion of scarcity is contextual and needs discussion and clarity up-front. Apart from the appropriate dimension on which to measure scarcity, a lot of subjectivity, and hence debate, is also associated with defining the level of scarcity below which individuals are identified as poor, as well as the way in which the measure of scarcity is standardised to allow for comparisons across space and over time. Chaubey (1995) and Dercon (2005) provide clear discussions of this and other related complications associated with poverty measurement; we return to some of these issues in the context of poverty measurement and trends in Andhra Pradesh, India.

## 3.1 Poverty measurement in India

Poverty measurement in India began from 1950 and provided the necessary data for the planning-based models that drove policy decisions in the early phase of the post-Independence era. Poverty has largely been, and continues to be, a measurement of scarcity in consumption expenditure.

Central to these consumption expenditure measurements has been the role of the National Sample Survey (known as the National Sample Survey Organisation, NSSO, since the 1970s) which came into being in 1950 to collect nationwide sample survey data and provides repeated, nationally representative, cross-sectional data on a whole range of household characteristics, but most systematically, for household consumption expenditure in India. Currently, data is collected e year however, the size of the sample fluctuates; every fifth year a thick sample is fielded to generate accurate national and sub-national estimates, while in all other years a thin sample is collected for quick and indicative estimates. The last five thick samples were conducted in 1983, 1987-88, 1993-94, 1999-2000 and 2004-05 with sample sizes growing from 6 million (1983) to 13 million (2004-5) on consumption expenditure. The thin samples typically have ranged between 1 and 3 million records. The thick samples are the basis of official poverty estimates made by the Government of India (Deaton and Kozel 2005).

Apart from identifying the relevant dimension of scarcity it is also important to identify who is poor. To do so it is important to specify the level of scarcity, in this case the minimum

[4] Two approaches towards measuring multi-dimensional well-being exist: (a) reducing multiple dimensions of scarcity into a uni-dimensional measure (as with the Human Development Index); and (b) trying to measure scarcity in multiple dimensions. Conceptually (a) is not different from measuring poverty; the only added requirement is an aggregation function to reduce the multiple dimensions into the single dimension; (b) requires an extension of the poverty line in uni-dimensional space to a poverty frontier and thus, a number of additional aspects of poverty may also be studied such as how poverty in different dimension are co-related, the amount of poverty that exists in all dimensions as against those that are specific to a dimension. Duclos et al. (2006) discuss these issues.

consumption expenditure, below which an individual is poor, or identify a poverty line. The poverty line in India has been based on a notion of absolute poverty where the poverty line is defined as the necessary consumption expenditure needed to meet a certain daily calorific requirement. These needs are based on an estimate arrived at on the basis of observed consumer expenditure in 1973-74 and various nutritional norms that were thought appropriate by the Task Force on Projection of Minimum Needs and Effective Consumption Demand. The Task Force suggested different calorific needs, and so different poverty lines, for urban (2100 kcal per capita per day) and rural areas (2400 kcal per capita per day). These calorific thresholds are indexed to a representative consumption basket that ensures that on average it not only meets the urban/rural calorific norm, but also makes allowances for some non-food items (clothing, transport, etc.). A key survey design issue with defining the poverty line is the reference period over which people are asked to recall their consumption expenditure since the recall period is known to affect the volume of self-reported consumption expenditures.[5]

The remaining specification needed to begin making poverty estimates is to standardise these consumption expenditures to account for changes in prices over time and space. Poverty estimates standardise the poverty line for price changes over space and time that affect the cost of purchasing the standard consumption basket. As there are different baskets for rural and urban areas and different state-specific price indices poverty lines, poverty lines vary by time, state and rural and urban areas (see Table 6). The Consumer Price Index for Agricultural Labourers (CPIAL) is used to deflate consumption in the rural areas while the Consumer Price Index for Industrial Workers (CPIIW) is used deflate consumption in urban areas. Price indexes that vary over time and across states and urban and region areas allows consumption expenditure to be standardised and study the entire consumption expenditure distribution (and hence of poverty). Thus, Dhongde (2004) finds that most of the poverty differences between states and the national average is driven by differences in mean income levels rather than differences in the distribution of income. We next look at trends in poverty lines and prevalence of poverty in Andhra Pradesh and in India.

## 3.2 Poverty trends and spatial incidence in Andhra Pradesh

In Table 6 we look at poverty lines, monthly per capita expenditure and estimates for the poverty ratio for both urban and rural areas in Andhra Pradesh and India (Himanhsu (2007) and Dev and Ravi (2007) provide detailed discussion of the national and state level incidence of poverty). We look at the 1983-84, 1993-94, and the 2004-05 NSSO estimates since they used the same survey elicitation recall frame (a uniform recall frame of 30 days for all commodities) while conducting surveys and so are comparable. The 1999-2000 (or the 55th round of the NSSO) experimented with this recall frame while collecting data and so the 1990-2000 estimates that are not comparable to other years. Briefly, the 55th round of the NSSO departed from the existing practice of using a 30-day recall to one in which both 7-day and 30-day recalls were elicited for food items and intoxicants, but only 365-day recall was elicited for durable goods, education, medical expenses, etc. Thus, not only was it not possible to construct measures of monthly expenditure based on a uniform 30-day recall

[5] Consumption expenditure is estimated by tracking household purchases of goods and services over a given length of time (last 1 day, 7 days, 30 days, 365 days, etc.). Not only are different goods and services purchased with different frequencies but the time frame of reference over which people are asked to recall their expenditures affects the self-reported volume of expenditures. Deaton and Kozel (2005) discuss many of the experiments that not only show that the non-monotonic relationship between recall period and poverty estimates with varying recall lengths, but also that there is no one recall period which does better than all others.

period, but also the intensity of the survey interview itself is much higher (either seeking a 7-day and 30-day recall or a 365-day recall) that make responses across rounds non-comparable (Deaton 2003). This is less of a concern with the 2004-5 survey design as it asks respondents to uniformly recall expenditures over a 30-day period (called the uniform recall period consumption distribution, URP) as well as over a 365-day period for 5 infrequently used items (clothing, footwear, durable goods, education and institutional medical expenses) (Planning Commission 2007). Thus, one issue that still remains, even with the 2004-5 NSSO data, pertains to the survey elicitation process remaining different from the 1993-94 period in that different recall periods are used for these 5 infrequently used items. Not only does this raise the threat of affecting the 30-day recall of respondents, but this is likely to also report higher expenditures than a simple 30-day recall would since some expenditures are simply not undertaken on a 30-day frequency (Deaton and Kozel 2005). However, the 2004-5 data does allow researchers to construct consumption expenditure series for a uniform 30-day recall frame to compare with the 1993-94 (and earlier) estimates with this caveat in mind.

A number of interesting things emerge from this table. The first thing to strike is the low rates of rural poverty in Andhra Pradesh (11.2%) compared to the national average (28.3%). This not a new trend and the table also shows that this trend has been historically true for Andhra Pradesh from at least 1983. The census of 2001 reports that about 73% of the population still live in rural areas and so Table 6 suggests that on average rural Andhra Pradesh is doing far better than rural India in terms of the incidence of poverty. Thus rural MPCE for Andhra Pradesh was about Rs 25 more (or about 5% of the poverty line) than the rural MPCE for India in the 2004-05 NSSO estimates. However, this also points to much of what the 'poverty debate' in India has been about – the construction of the poverty lines and concerns with the official price indices used in estimates of poverty in India.

**Table 6.** *Trends in poverty and poverty lines*

| | | Andhra Pradesh | | | All India | | |
|---|---|---|---|---|---|---|---|
| **Year** | | **Poverty line (Rs.)** | **MPCE (Rs.)** | **Poverty ratio (%)** | **Poverty line (Rs.)** | **MPCE (Rs.)** | **Poverty ratio (%)** |
| 1983 | Rural | 72.66 | | 26.53 | 89.5 | | 45.65 |
| | Urban | 106.43 | | 36.3 | 115.65 | | 40.79 |
| 1993-94 | Rural | 163.02 | 289 | 15.92 | 205.84 | 281 | 37.27 |
| | Urban | 278.14 | 409 | 38.33 | 281.35 | 458 | 32.36 |
| 2004-05 | Rural | 292.95 | 586 | 11.2 | 356.3 | 559 | 28.3 |
| | Urban | 542.89 | 1019 | 28 | 538.6 | 1052 | 25.7 |

Poverty line is measured in Rs. per person per month

MPCE or mean per capita consumption expenditure is measured in Rs. per person per month

Poverty ration is the fraction of people whose consumption expenditure is below the poverty line

Sources: NSSO 1006; NSSO 2007; Planning Commission 2007; GOI 2001

## 3.3 The poverty debate

While much of the 'poverty debate' centres around the 1999-2000 NSSO round that used survey instruments that were different from preceding and subsequent surveys, and has generated a number of insights into the construction of poverty indicators. Given the way poverty is measured, changes in the incidence of poverty arise from three sources: (a) a distributional shift in which there is a decline in the fraction of people below the poverty line; (b) a change in the real poverty line; (c) a change in the share of income allotted to different commodities; and (d) a change in measurements practices. An investigation into the trends that we observe would thus look at each of these possible reasons. Two key trends need explanation: one is the overall rate of decline in poverty that is reported in Table 6, and second, the differential rates of poverty decline between Andhra Pradesh and India for rural areas. The latter concern is what suggests that (a), or genuine poverty decline, may not be the only explanation for a rapid decline in poverty rates. Much of the debate has focussed on trying explain the overall trend in poverty decline using either (b) or (d), although there have also been explorations with (c) as to why poverty measurement for Andhra Pradesh may be potentially problematic. This section looks at potential explanations for both.

The exact threshold for the poverty line is determined by the price indices that are used to deflate consumer expenditures. Consequently, much of the debate looks at the way the price indices have been calculated for India (and Andhra Pradesh) to understand the reported decline in poverty in official statistics (such as Table 6).[6] Deaton and Tarozzi (2000) look at the construction and evolution of price indices (CPIIW and CPIAL) used to deflate consumer expenditures in poverty calculations for the period 1987-88 to 1993-94. A trade-off that both the CPIIW and CPIAL make is to update with long gaps (the first in 1960 and the next in 1982) to ensure comparability across series, but this is at the cost of potentially no longer being representative of the villages and markets that they are supposed to represent. An additional threat to generalisability comes from the use of the consumption patterns from the mid-1970s to construct the poverty line. They proceed to construct alternative price indices by calculating the unit value (value deflated by quantity) of each transaction that is reported in the NSSO surveys and they report a number of interesting findings after making this adjustment.

First, Deaton and Tarozzi (2000) show that the share of household budget that is spent on goods in the CPIIW (CPIAL) is on average only 70.7% (63.4%) of total expenditure by 1993-94 suggesting that there is substantial reason to worry about the stability of the composition of households expenditure today and what is used to define the poverty line. Second, there is substantial variation in these mean numbers at even the state level suggesting that there are significant differences within the states form the national trend (suggesting that either consumption preferences or the share of income allotted to the benchmark bundle of commodities that define the poverty line may no longer be stable). Third, they find that that there appears to be little difference in the official CPIIW price series and the one they derive for urban areas, but the CPIAL has been growing much more rapidly than their rural price index suggesting that declines in rural poverty have been understated by 1993-94. They note that there still remain a number of issues in trying to impute prices from survey data: first, some of the expenditures may not have units (e.g. education, transportation etc.), and second, heterogeneity in quality of items bought or sold is unobserved and so unit price variation may actually reflect this rather than genuine price variation. Drawing on the latter, a

[6] Much of the discussion is presented in the 25 January 2003 special issue of the Economic and Political Weekly on poverty in India.

third possible source of variation may come from greater market penetration seen over the 1990s and a reduction of the monopoly of sellers in rural India. However, this work does suggest that there are substantial changes in spending patterns of households and the possibility for the rural price index to rise faster than what the rural consumer expenditure data supports.

From a policy perspective, the key question is what the 'correct' incidence of poverty across space and time for India and its states should be. Deaton and Drèze (2002) answer this question by extending the work of Deaton and Tarozzi (2000) to construct alternative and mutually consistent estimates of poverty in India (and at the state level) for the three years 1987-88, 1993-94 and 1999-2000. To be consistent they restrict the consumption expenditure to the class of all goods for which data is available on a 30-day recall in all the three waves. Following Deaton and Tarozzi (2000) they also update the estimates of price movements to construct alternative poverty lines for each state and region (urban and rural). They also make adjustments to the differential official poverty lines that are in use for rural and urban areas since the official estimates didn't reflect the most accurate picture of household expenditures across states in rural India. A fourth contribution of this paper is their extension of poverty estimators to the poverty-gap ratio that measures the per capita aggregate shortfall of poor people's consumption from the poverty line. The adjustments in this calculation are distributional and non-parametric in that they work at (a) reducing poverty calculation to a subset of the consumption distribution that can be followed over time, and (b) no specific assumption is made to model the way in which price movements takes place; this may be a valid way of modeling price movements provided the process of sub-setting to the list of consumption expenditures that can be followed is strictly ignorable of poverty status – i.e. on average choosing a subset of consumption expenditures doesn't change an individual's poverty status – this could in fact be violated in a number of ways. Deaton and Drèze (2002) themselves note the issue that changes in questionnaire design may alter the way people answer questions (recall differentially); they also, note the possibility that relative prices of consumption items to alter the relationship between the profile of consumption expenditure and poverty; aside from a change due to relative prices alone, there may be changes that take place in consumption profiles that are motivated by changes in quality of goods available, changes in preferences of people at different levels of income, etc. that may equivalently introduce biases in this adjustment procedure. However, under the assumption of strict ignorability of the sub-setting of consumption expenditures, we find that even these adjusted estimates suggest an overall decline in poverty levels at the national and state levels that were seen in the official statistics, although the size of the decline is much smaller.

**Table 7.** *Alternative poverty estimates and estimators*

| Poverty measure | Source | Rural | State | 1987-88 | 1993-94 | 1999-2000 |
|---|---|---|---|---|---|---|
| Poverty ratio | Official | Rural | Andhra Pradesh | 21.0 | 15.9 | 10.5 |
| | | | India | 39.4 | 37.1 | 26.8 |
| | | Urban | Andhra Pradesh | 41.1 | 38.8 | 27.2 |
| | | | India | 39.1 | 32.9 | 24.1 |
| | Adjusted | Rural | Andhra Pradesh | 35.0 | 29.2 | 26.2 |
| | | | India | 39.0 | 33.0 | 26.3 |
| | | Urban | Andhra Pradesh | 23.4 | 17.8 | 10.8 |
| | | | India | 22.5 | 17.8 | 12.0 |
| Poverty gap index | Official | Rural | Andhra Pradesh | 4.4 | 2.9 | 1.8 |
| | | | India | 9.4 | 8.4 | 5.2 |
| | | Urban | Andhra Pradesh | 10.6 | 9.3 | 5.6 |
| | | | India | 10.4 | 8.3 | 5.2 |
| | Adjusted | Rural | Andhra Pradesh | 8.0 | 5.8 | 4.8 |
| | | | India | 9.2 | 7.0 | 5.2 |
| | | Urban | Andhra Pradesh | 4.9 | 3.4 | 1.9 |
| | | | India | 4.8 | 3.7 | 2.3 |

Source: Table 2a and 2b from Deaton and Drèze (2002) based on calculations in Deaton and Tarozzi (2000)

Table 7 shows the key difference between the official estimates and the estimates by Deaton and Tarozzi (2000) – the urban poverty declines faster and thus is substantially lower than rural poverty throughout the 1990s. Thus, the reported gap between rural and urban poverty ratios in official statistics is reversed with adjusted poverty being higher in rural Andhra Pradesh than urban Andhra Pradesh. Additionally, both rural and urban poverty ratios are within a few percentage points of the national poverty prevalence so that Andhra Pradesh is no longer such an outlier. Table 7 also shows a very different profile for the poverty gap index in rural and urban Andhra Pradesh and India. The poverty gap index measures the average depth of poverty of those who are poor and is defined as the mean distance below the poverty line; thus, the adjusted poverty gap index numbers suggest that the average consumption expenditure per person has been declining over 1987-88 to 1999-2000. Additionally, Deaton and Drèze (2002) estimate that rural (urban) budget share on items in the CPIAL (CPIIW) is 68.5% (62.4%) making it one of the 5 lowest shares in India. Consequently, the state's consumption profile is already quite different from the rest of the country but something that remains unaccounted for in the official poverty estimates. A natural question that arises is how robust are these conclusions to alternative assumptions and differing definitions of what is comparable over time.

A number of other papers have built on the work of Deaton and Tarozzi (2000) and Deaton and Drèze (2002) and investigate trends in poverty under different assumptions. Thus, for example Datt et al. (2003) use data from 20 NSS rounds of data for 15 states to train an econometric model which is then used to predict poverty incidence in the 1990 and suggest that poverty declined, but the decline was comparable to what was seen in the past as is normal for out-of-sample prediction since alternative changes in the 1990s would fail to register in the regression coefficients. Or, consider Kijima and Lanjouw (2003) who use individual level data from the 1993-94 to 'fill-in' the missing per capita consumption for the 1999-2000 round (the filled in per capita consumption would be exactly comparable to the 1993-94 version since the predictive model is trained from the same data). By and large each

of these exercises suggests that declines in poverty did take place in the 1990s but were slower than the declines observed in the official statistics. It also raises a number of questions regarding how to update poverty measurement in the future; specifically, the nature of price indices to use, the manner in which to update the original consumption basket of goods that determine the minimum consumption bundle, and the appropriate duration of recall pattern. To ensure that there remains comparability of the poverty series there clearly are advantages of minimising change, but the key really is if consumption benchmarks in the 1970s and price index benchmarks in the early 1990s are appropriate to measure poverty today.

# 4. Measuring childhood poverty

Childhood poverty is less developed as a research area than poverty measurement, particularly in developing countries. This is true both in terms of theoretical constructs on how to measure childhood poverty as well as having data explicitly dedicated to measure different aspects of childhood poverty.[7] Children are a particularly important sub-group of the poor to study for a number of reasons; first, they are a substantial fraction of those who are currently poor;[8] second, the duration of poverty that children experience is known to stunt cognitive and physical development as well as reduce future well-being;[9] and third, childhood is an age at which many key decisions (health check-ups, vaccination, allocation of time to different activities, etc.) are taken for a child by adults and this raises the possibility of choices being made that are not entirely in the interest of the child (Karoly et al. 2005; Boyden 2006).

Measuring childhood poverty requires us to specify the same three things: What is the relevant dimension of scarcity for a child that we are concerned about? What level of scarcity should we define as being the threshold below which children are poor? And how do we compare this scarcity across space and time? Measuring poverty for children is complicated because there are so many more dimensions of scarcity that are critically important and where the ability of children to suffer permanent damage is much higher than adults. One of the responses to this has been to collapse all such issues into just income scarcity as the relevant dimension (see Corak (2005) and references therein who argue that because of better functioning markets in developed countries income-poverty is an adequate measure for rich countries; see also Cornia and Danziger (1997) who argue that income measures are inadequate). However, this seems to be a particularly extreme assumption for developing countries where focusing on income poverty alone will fail to uncover other areas of scarcity that may be more important to target such as malnutrition or access to primary schooling. A

[7] An important exception is the Young Lives Project that is designed to provide access to long-term panel data on children in 4 countries (Ethiopia, Andhra Pradesh in India, Peru and Vietnam). It is following 2 cohorts of children at 3 to 4 year intervals from 2002 to 2016, when the younger cohort will be aged 15 to 16 and the older cohort 22 to 23 years old (Young Lives 2007).

[8] It is estimated that between one-third and half the entire population in developing countries is younger than 15 years of age; for example it is 49% in Ethiopia, 35% in Peru, and 40% in Vietnam (White et al. 2003). We should expect to see similar fractions of the poor population being children if there is no systematic bias for households with children to be richer. The literature expects that larger households tend to be poorer and so we should actually see somewhat larger fractions of the poor being children than the fraction of children in the population

[9] A number of papers exist which show different aspects of long-term retardation in the quality of life due to childhood scarcities. An example is Alderman et al. (2006) who present evidence that pre-school malnutrition, a key condition of childhood poverty, is likely to be causally related with future health and human capital formation using a long term panel data on children in Zimbabwe. See references therein for other studies on nutrition, health, and productivity later on in life.

key problem with a multi-dimensional notion of poverty is to identify the relevant set of dimensions of childhood poverty when such a broad-based notion of poverty is conceptualised.

The few studies that do focus on childhood poverty for the most part use income poverty as their sole criterion, possibly due to ease of finding such data. One of the measures used is per capita income as arrived at on the basis of national income accounts, however, a key problem is that such national per capita measures do not vary within the country according to living conditions and different socioeconomic profile as poverty would be expected to. More reliable and sensitive measures may be developed using household survey data however, even then a number of problems are known to exist with using even survey-based income measures alone. Some of these are: (a) little is known about the income or expenditure needs for children in developing worlds and this makes defining a poverty line difficult; (b) since children do not earn or allocate their income, using income-poverty needs to make some assumption on inter-household sharing of income and typically it is assumed that income is equally shared among each member; this has no empirical justification as of now, (c) major measurement issues arise in taking account of goods that are bought and sold seasonally, those that are home produced in some houses and bought in others and similar issues which are largely shared with measuring population-wide poverty; (d) childhood poverty measures should ideally take into consideration availability of public infrastructure (such as health, transportation, schooling) that is particularly important in formative years; and (e) often knowing a child has access to too little income is uninformative from a policy perspective as it doesn't tell us the type and nature of policy intervention. Thus, knowing that a child's family has low income doesn't tell us if having nutritional supplements at school is more important than having vaccination centres within walking distance (Gordon et al. 2003; White et al. 2003; Cornia and Danziger 1997; World Development Report 2000-01; Boyden 2006).

**Table 8.** *Incidence of childhood poverty (%)*

| **Dimensions of poverty** | **Gordan et al. (2003) estimates** | | | | **Andhra Pradesh** | | | |
|---|---|---|---|---|---|---|---|---|
| | **Peru** | **Ethiopia** | **India** | **Indonesia** | **NFHS 1992-93** | | **NFHS 1998-99** | |
| | | | | | **Rural** | **Urban** | **Rural** | **Urban** |
| Food | 7.4 | 28.5 | 26.3 | | | | | |
| Water | 22.9 | 74.9 | 19.4 | 24 | 26 | 13 | 26 | 16 |
| Sanitation | 25.6 | 83.9 | 68.3 | 15.6 | 93 | 31 | 88 | 28 |
| Shelter | 56.1 | 95.1 | 36.8 | 21.7 | 23 | 13 | 22 | 8.7 |
| Health | 5.7 | 32.3 | 21.4 | 9.8 | 23 | 17 | 7.9 | 4.4 |
| Education | 0.9 | 61.1 | 15.6 | 2.6 | | | | |
| Information | 7.9 | 56.5 | 38.3 | 21.1 | | | | |
| *Absolute poverty* | 35.4 | 94 | 57.2 | 19.8 | 52 | 22 | 44 | 16 |

1. Both NFHS and Gordon et al. (2003) estimates use identical definitions of scarcity; however the NFHS is for children 0 to 36 months old while Gordon et al. (2003) is for children in the 0 to 18 years old
2. The NFHS numbers are weighted using the Andhra Pradesh sampling weights
3. See Gordon et al. (2003) for exact definitions of each dimension of scarcity
4. The underlying data for the table is from Demographic and Health Surveys for different countries.

Table 8 is based on work by Gordon et al. (2003) and is one of the few concerned with childhood poverty that looks at multiple dimensions of scarcity. It shows substantial variation in the incidence of poverty across different dimensions and different countries, and for Andhra Pradesh, there are also changes over the 1990s. Ethiopia by and large shows the largest fraction of people in poverty with over 94% reporting scarcities in two or more dimensions and having the largest fraction of children in poverty in each dimension. Within countries there is substantial variation in incidence of scarcity across dimensions. Over 56% of households in Peru don't have access to shelter or live in highly crowded rooms, and while 95% of Ethiopian children don't have access to shelter there are substantially higher number of children without access to safe drinking water (75%), sanitation (84%), education (61.1%) or even access to information (access to TV, radio, telephone, etc.) (56.5%). In India the incidence of poor sanitation is the highest with almost 68% of all children do not have access to toilets of any kind, while in Indonesia incidence of water scarcity is the highest among children at 24%. If we look at the state of Andhra Pradesh alone we see two issues: first, the incidence of rural and urban poverty is quite different with much of the poverty in Andhra Pradesh being in rural Andhra Pradesh. Second, the incidence of poverty differs in composition in Andhra Pradesh from the national composition and this composition changes over time. Thus, the incidence of poor sanitation for children in rural Andhra Pradesh is higher than the incidence in Ethiopia, while the incidence of scarcity of shelter is substantially lower in Andhra Pradesh than in India. A key difference in the numbers is that the Andhra Pradesh number refer to children in the 0 to 36 month age group while the rest of the table looks at children in the 0 to 18 year age category, however, they do show that there is substantial variation in the incidences of poverty across dimension, space and time so that it is important to have poverty measures that are flexible enough to respond to identify such changes.

Cross-national studies using the Global Burden of Disease data found that 98% of all deaths in children younger than 15 years of age occur in developing countries and that five of the top ten leading killers are communicable, peri-natal, and nutritional disorders largely affect children (Murray and Lopez 1997). The next three subsections discuss indicators of scarcity for children on three key domains (immunisation, nutrition and education) to see how children in Andhra Pradesh and India are faring.

## 4.1 Immunisation

According to most careful estimates over 3 million children die every year from vaccine preventable diseases (VPDs) and most of these fatalities occur in developing countries (Kane and Lasher 2002). Vaccination (or immunising a child) is perhaps one of the most cost-effective initiatives available to reduce life-long morbidity and fatalities. However, vaccination coverage is far from complete globally and this has been a particular problem in India. An evaluation of VPD coverage in 2001-02 found that over 18 million children didn't receive any vaccine coverage whatsoever in that year alone (WHO India 2004). Table 9 presents trends in full vaccination against six key vaccine preventable diseases for children in the age group 12- to 23-months.[10] Table 9 shows that full immunisation coverage has been increasing for rural India over time, however for urban India, the increase in immunisation coverage from 1992-93 to 1998-99 (over NFHS1 to NFHS2) has subsequently stagnated so that coverage rates have slipped by 3 percentage points by 2005-6. This stagnation in

[10] The vaccinations are the BCG , measles and three doses each of DPT and polio vaccines (excluding polio vaccine given at birth) that prevent against tuberculosis, measles, diphtheria, pertussis (whooping cough), tetanus, and polio.

immunisation coverage is particularly strong for Andhra Pradesh where both urban and rural full immunisation rates show substantial declines. Full immunisation rates in urban Andhra Pradesh declined by 22 percentage points from 1998 while rural areas show a decline of 11 percentage points. This retrogression in immunisation rates in Andhra Pradesh is worrying since it suggests that larger fraction of this cohort will be needlessly exposed to many diseases that can cause lifetime morbidity and fatalities.

**Table 9.** *Trends in full immunisation coverage for 12- to 23-month old children*

| | All India | | | Andhra Pradesh | | |
|---|---|---|---|---|---|---|
| **Wave** | **Urban** | **Rural** | **Total** | **Urban** | **Rural** | **Total** |
| NFHS 1 | 50.7 | 30.9 | 35.4 | 58 | 40 | 45 |
| NFHS 2 | 60.5 | 36.6 | 42.0 | 73.3 | 53.6 | 59 |
| NFHS 3 | 57.6 | 38.6 | 30.9 | 51.0 | 43.0 | 46.0 |

Sources: NFHS 3 National Report (Table 9.6); IIPS and ORC Macro 2000 (Table 6.7); NFHS 3 (State Facts Andhra Pradesh)

One additional point regarding immunisation is worth noting in trying to understand trends in the exposure of infants to vaccine preventable diseases. One of the shortcomings of the NFHS's definitions of full immunisation pertains to the fact that being vaccinated alone is not sufficient, but it matters at what age the child gets immunised; immunising a child too soon against some diseases may imply that children are exposed to vaccination well before they are physiologically ready for it, while too late implies that children are exposed to the diseases for longer than they need to be. Thus, the population of concern should ideally not just be if children are immunised or not by 23 months but should factor in this age appropriateness of immunisation coverage.[11] An advantage of this alternative definition is that it not only counts children who have not been immunised and also those who have been inappropriately immunised (either too early or too late). An additional advantage of this modified definition is that one can substantially expand the population of children from the 12- to 23-month age group to the entire range from 0 to 36 months. The bottom line however remains that children in Andhra Pradesh and India remain currently far from full immunisation coverage from vaccine preventable diseases and immunisation rates in the past 7 to 8 years have been declining rapidly in Andhra Pradesh.

## 4.2 Nutrition

A large number of studies have established the importance of adequate nutrition to child development (some examples are Murray and Lopez 1997; Karoly et al. 2005; and Alderman et al. 2006). The period from birth to pre-school age is particularly important for physical and cognitive growth and health. Children are known to be particularly vulnerable to growth retardation, micronutrient deficiencies, and even performance in school tests. Typically, an indirect measure of child health has been used to understand the prevalence of nutrition in a sample of children – each child's height and weight at a specified age is benchmarked against population standards on three variables – Height-for-age (stunting), Weight-for-height (wasting) and Weight-for-age (underweight). The height-for-age index is an indicator of linear growth retardation and cumulative growth deficits. The weight-for-height index measures body mass in relation to body length and describes current nutritional status. Weight-for-age

[11] One of the few papers to take into account the age appropriate targeting of vaccines when looking at correlates of immunisation in India is Datar et al. (2007). They use age appropriateness as defined by the GoI's Ministry of Family Welfare's Ideal National Immunisation Schedule.

is a composite index of height-for-age and weight-for-height and is a good measure of malnutrition. For each of these three measures, individual children are defined as exhibiting stunting, wasting or being underweight if the they are more than two standard deviations below the reference mean from the reference population (IIPS & ORC Macro 2007).

Table 10 presents trends in nutrition over the duration of the National Family Health Surveys, i.e. from 1992-93 to 2005-6. One key across the three waves lies in the fact that the NFHS 1 estimates are for children up to 48 months of age, while both NFHS 2 and NFHS 3 estimates are children up to 36 months of age; consequently, most of the subsequent discussion is based on the 1998-99 and the 2005-06 numbers. One of the most interesting facts from Table 10 is the fact that all three variables systematically tend to be worse for children in urban areas in comparison to rural areas. Over time we find that stunting and being underweight has been gradually declining in both urban and rural areas, possibly a little faster in rural areas than in urban areas. Being wasted however seems to have gone up over the period 1998-99 to 2005-6. Finally, while the prevalence of stunting and being underweight in Andhra Pradesh is roughly comparable to the national rates of prevalence, the prevalence of wasting is about half of the national rates. Thus, on average children in Andhra Pradesh are doing far better than the entire country on at least one dimension – weight for height.

## 4.3 Education

Education and literacy is strongly correlated with most measures of well-being and economic growth. Looking back over the past 4 decades one sees that literacy rates in India and Andhra Pradesh have been steadily rising (see Table 11). While the literacy rate in Andhra Pradesh has always been below the national average, literacy has been expanding faster there than in India with faster gains for males (a 65% increase for India versus 115% for Andhra Pradesh from 1971 to 2001) and particularly for women (145% for India versus 219% Andhra Pradesh from 1971 to 2001). Reddy and Rao (2003) suggest that one of the reasons for this is the state government programme called Akshara Sankranti, is literacy campaign that has been focussing on women's literacy initiated in 2000. While important gains from the programme are likely, Andhra Pradesh had already started showing faster expansion in literacy rates for both men and women by the 1991 census. While important gains have been made, over 49% of women remain illiterate as of 2001 pointing to the fact that literacy for women remains a serious issue in Andhra Pradesh.

**Table 10.** *Trends in nutritional indicators using the National Family Health Surveys*

| | | All India | | | Andhra Pradesh | | |
|---|---|---|---|---|---|---|---|
| **Variable** | **Wave** | **Urban** | **Rural** | **Total** | **Urban** | **Rural** | **Total** |
| Stunted | NFHS1* | 44.8 | 54.1 | 52.0 | NA | NA | 49.1 |
| | NFHS2** | 54.0 | 41.1 | 51.0 | 41.6 | 29.7 | 38.6 |
| | NFHS3** | 47.2 | 37.4 | 44.9 | 37.3 | 27.4 | 33.9 |
| Wasted | NFHS1* | 15.8 | 18.0 | 17.5 | NA | NA | NA |
| | NFHS2** | 20.7 | 16.3 | 20.0 | 9.5 | 7.6 | 9.1 |
| | NFHS3** | 24.1 | 19 | 23.0 | 12.5 | 13.0 | 12.7 |
| Underweight | NFHS1* | 45.2 | 55.9 | 53.4 | NA | NA | 45.0 |
| | NFHS2** | 45.3 | 34.1 | 42.7 | 40.7 | 28.6 | 37.7 |
| | NFHS3** | 43.7 | 30.1 | 40.4 | 40.4 | 29.1 | 36.5 |

Sources: NFHS 1 National Report (Table 10.9); NFHS 2 National Report (Table 10.3); Andhra Pradesh Report for 1998-99 (Table 7.10)

* For children up to 48 months of age

** For last two children up to 36 months of age

**Table 11.** *Trends in literacy rates*

| Year | Source | All India | | | Andhra Pradesh | | |
|---|---|---|---|---|---|---|---|
| | | **Persons** | **Male** | **Female** | **Persons** | **Male** | **Female** |
| 1971 | Census | 34 | 46 | 22 | 25 | 33 | 16 |
| 1981 | Census | 44 | 57 | 30 | 36 | 48 | 25 |
| 1991 | Census | 52 | 64 | 39 | 44 | 55 | 33 |
| 1994 | NCAER | 54 | 66 | 40 | 50 | 61 | 39 |
| 1997 | NSSO | 62 | 73 | 50 | 54 | 64 | 43 |
| 2001 | Census | 65 | 76 | 54 | 61 | 71 | 51 |

Source: Cited in Reddy and Rao (2003)

Each number is the percentage literate for a group in a year

Table 12 breaks up the state level literacy rates for Andhra Pradesh into district level trends; we see that there is substantial variation in literacy rates within Andhra Pradesh ranging from 45.5% in Mahabubnagar to 79% in Hyderabad in 2001. Some of the districts that have shown the largest gains in literacy rates for overall literacy as well as for female literacy are Mahabubnagar, Srikakulam, Nisamabad, Adilabad and Medak. Table 12 also reports the average repetition rates in Class 1 for each of the districts in Andhra Pradesh. The repetition rate is usually thought of as good measure of internal efficiency of a school system as it measures the number repeating Class 1 as a fraction of the total number of children attending Class 1. The repetition rate measures the productivity of the current exam system. Some of the districts that have large repetition rates are Mahabubnagar, Nalgonda, Kurnool, Guntur, Warangal and Medak with rates of repetition in Class 1 higher than 17%. Many of the districts with low literacy rates also have high repetition rates suggesting that there are multiple problems with the education system in the poorly performing districts.

**Table 12.** *District-level literacy trends and repetition rates*

| District | Literacy rates | | | | Repetition rate for Class 1 |
|---|---|---|---|---|---|
| | Total | | Female | | |
| | 1991 | 2001 | 1991 | 2001 | 2001-02 |
| Chittor | 49.8 | 67.5 | 36.4 | 56.5 | 0.2 |
| Cuddapah | 48.1 | 64.0 | 32.4 | 50.8 | 1.4 |
| Adilabad | 33.0 | 53.5 | 20.6 | 41.4 | 5.0 |
| Khammam | 40.5 | 57.7 | 30.5 | 48.2 | 6.6 |
| Krishna | 53.2 | 69.9 | 45.5 | 65.1 | 6.9 |
| Karimnagar | 37.2 | 56.0 | 23.4 | 44.2 | 9.7 |
| Visakhapatnam | 45.5 | 59.5 | 34.6 | 50.0 | 9.9 |
| East Godavari | 48.8 | 65.5 | 42.3 | 61.0 | 10.2 |
| Anantapur | 42.2 | 56.7 | 27.6 | 43.9 | 10.4 |
| Hyderabad | 71.5 | 79.0 | 63.6 | 73.7 | 10.5 |
| Nizamabad | 34.2 | 53.3 | 21.4 | 40.6 | 10.5 |
| Nellore | 47.6 | 65.9 | 37.0 | 57.2 | 11.0 |
| West Godavari | 53.4 | 74.0 | 47.0 | 69.5 | 11.6 |
| Prakasam | 40.3 | 57.9 | 27.1 | 45.6 | 13.5 |
| Rangareddi | 49.1 | 66.3 | 36.9 | 57.0 | 14.8 |
| Vizianagaram | 34.2 | 51.8 | 22.5 | 40.7 | 16.0 |
| Srikakulam | 36.2 | 55.9 | 23.5 | 44.2 | 16.2 |
| Mahabubnagar | 29.6 | 45.5 | 18.0 | 32.8 | 17.4 |
| Nalgonda | 38.0 | 57.8 | 24.9 | 45.1 | 17.5 |
| Kurnool | 40.0 | 54.4 | 26.0 | 41.1 | 17.6 |
| Guntur | 46.4 | 62.8 | 35.9 | 54.2 | 23.1 |
| Warangal | 39.3 | 58.4 | 26.1 | 46.5 | 24.4 |
| Medak | 32.4 | 53.2 | 19.2 | 40.7 | 27.6 |

Source: Mehta (2003)
Sorted by total literacy in 2001

Apart from repeating a class, two other performance measures for a school system that are usually studied are the enrolment and the drop-out ratios. The enrolment ratio is the ratio of children in the 5 to 9 age group who are going to school to the total number of children in the 5 to 9 age group in the area. The dropout ratio is the fraction of the currently enrolled students who fail to stay in the education system in the subsequent year (aside of those who are completing school). Table 13 describes changes in enrolment for children in the 5 to 9 age group and drop-out rates in primary school (for children in the 6 to 11 age group) for the three major sub-regions of Andhra Pradesh as well as Andhra Pradesh as a whole. Quite interestingly, while enrolment ratios have gone up in Andhra Pradesh for boys and particularly for girls the story is more varied within Andhra Pradesh. Enrolment for boys was substantially higher than for girls even in 1992 with the gap being highest in Telengana at almost 30%. While enrolment rates for boys in costal Andhra and Rayalseema have stagnated over the 1990s, Telengana continues to show gains so that by 2000 it is the only region in Andhra Pradesh that collectively has an enrolment ratio of over 90% for boys. Enrolment ratios for girls have systematically increased across the 1990s for all areas in Andhra Pradesh so that all regions individually have enrolment rates above 80%. Expansion in enrolment appear to be particularly impressive for Telengana as enrolment ratio for girls increase from 54% to 87% and boys show increases from 81% to 93%.

**Table 13.** *Enrolment and drop-out trends in Andhra Pradesh*

| Year | Group | 1992 | | 2000 | |
|---|---|---|---|---|---|
| | | **Enrolment (aged 5-9)** | **Drop-out (primary Schools)** | **Enrolment (aged 5-9)** | **Drop-out (primary Schools)** |
| Coastal Andhra | Boys | 86.4 | 44.4 | 82.0 | 33.1 |
| | | (75-96) | (23-61) | (70-101) | (27-44) |
| | Girls | 78.3 | 53.7 | 81.2 | 36.2 |
| | | (68-91) | (44-64) | (71-97) | (30-49) |
| | Total | 82.6 | 48.9 | 81.6 | 34.6 |
| | | (73-94) | (42-63) | (71-99) | (29-46) |
| Rayalseema | Boys | 99.2 | 39.6 | 97.5 | 27.2 |
| | | (88-122) | (21-47) | (81-116) | (18-35) |
| | Girls | 70.4 | 51.6 | 94.8 | 33.8 |
| | | (64-79) | (43-57) | (80-106) | (23-41) |
| | Total | 84.9 | 45.0 | 96.1 | 30.4 |
| | | (76-96) | (31-51) | (81-111) | (20-38) |
| Telengana | Boys | 81.0 | 55.3 | 92.6 | 46.2 |
| | | (68-102) | (25-72) | (67-103) | (8-62) |
| | Girls | 53.9 | 61.7 | 87.0 | 47.2 |
| | | (45-76) | (27-75) | (72-98) | (6-64) |
| | Total | 68.1 | 57.0 | 89.8 | 46.7 |
| | | (59-79) | (26-73) | (69-101) | (7-63) |
| Andhra Pradesh | Boys | 86.2 | 48.5 | 87.7 | 39.4 |
| | | (68-122) | (21-72) | (67-116) | (8-62) |
| | Girls | 58.9 | 56.4 | 84.8 | 41.2 |
| | | (45-91) | (27-75) | (71-106) | (6-64) |
| | Total | 72.7 | 53.6 | 86.3 | 40.3 |
| | | (59-96) | (26-73) | (69-111) | (7-63) |

Source: Population Census as reported in Reddy and Rao (2003)
Note: Children in primary school are expected to be in the 6-11 year age group.

Table 13 also shows that drop-out rates also have systematically gone down in Andhra Pradesh for both boys and girls and this is true for each of the three predominant sub-regions. Again girls show larger declines in drop-out rates, however, in levels boys still have lower drop-out rates in primary school. Again, districts in the Telengana region had the largest drop-out rates in 1992 as well as in 2000 and they tend to show slower rates of decline in drop-out rate than coastal Andhra Pradesh as well as Rayalseema. Thus, while enrolment rates have gone up substantially in Telengana there still remains poor performance on drop-out rates.

# 5. Conclusion

Important socio-economic and demographic changes have been taking place in both India and Andhra Pradesh over the 1990s. Life expectancy of individuals at key ages has been increasing throughout the last four decades, particularly for women. Additionally, the demographic transition from a high fertility and death rate state to low fertility and death rates with a stable population is well underway with the natural population growth rate of the population showing large declines. Another interesting demographic trend is that fertility in Andhra Pradesh is increasingly focussed in the 15 to 29 age group while, for the entire country fertility seems to be the 20 to 34 age group suggesting that on average the age of mothers when they give birth is well below the national average and that this trend became more accentuated over the 1990s.

Economically, Andhra Pradesh and India saw similar rates of growth of per capita income during the 1990s. The composition of economic activity is similar for Andhra Pradesh and India as well with the services sector making up almost half of all economic activity by 1999-2000. Official statistics report that poverty has rapidly declined in India and particularly in Andhra Pradesh. Thus, officially, rural poverty in Andhra Pradesh is less than half the national rural poverty rates. Subsequent work by Deaton and Tarozzi (2000) shows that these poverty trends have been affected by too sharp a decline in the rural price index (CPIAL) for Andhra Pradesh and they suggest corrections that show that while aggregate and rural poverty has declined, its incidence is comparable with the national rates. Additionally, comparing revised estimates from 1987-88, 1993-94 and 1999-2000 shows that the anomaly of urban Andhra Pradesh having higher poverty rates than rural Andhra Pradesh disappears. Extending these corrections to the 2005-6 estimates would considerably revise official estimates in the same direction.

While rich discussions have always taken place in the context of prevalence of inter-state and national poverty in India this discussion has rarely been extended to look at childhood poverty. One of the main issues here has been that childhood poverty has additional methodological challenges and data is even rarer. A key motivation for studying childhood poverty independent of general poverty is that the consequences of poverty are very different and the nature of interventions also needs to be different from that addressing poverty in general. A number of studies that are specific to certain domains of child well being (such as nutrition, child health, or education) have investigated the role of domain specific deficiencies on later child physical, mental and cognitive development. Thus, we know that children in rural areas tend to be poorly immunised when compared to urban areas but children in rural Andhra Pradesh tend to be better immunised than the national average and that these rates of coverage have declined in the past five years. Similarly other studies show that literacy rates are low in India (and Andhra Pradesh) and women seem to have a much higher incidence of illiteracy. Children in Andhra Pradesh have systematically shown lower incidence of stunting, being underweight and particularly being wasted when compared to their national rates. However, few studies have investigated poverty in a holistic manner and this leads to a methodological issue how to consistently define childhood poverty and make comparisons across countries and over time.

Typically, the concept of childhood poverty is posited as deprivation experienced at childhood on any dimension that affects a child's current well-being and future potential. However, this is a subjective notion and needs further elaboration in not just the mechanisms by which childhood deprivation erodes potential in later life, but also the very dimensions of poverty

which matter. A clearer formulation of childhood poverty as the value of a vector spanning multiple dimensions would make it easier to study the incidence of poverty, its trends, and finally, to target sub-populations with specific programmes that address specific deprivations that they may be suffering from. Perhaps specifying how exactly children who are poor are different from children who live in poor households as identified in national poverty estimates (such as those made by the government of India) will be an informative exercise even with a limited sample from which both such estimates maybe calculated. Another issue that needs careful thought is the unit of intervention that would be appropriate for targeting children who are exposed to deprivation. Programmes are traditionally targeted to communities, households, or even individuals with specific and usually observable characteristics. In the context of children this is more problematic due to both data reasons as well as institutionalising care as children will not independently participate in programmes. An additional concern relates to how resources are allocated or reallocated within a household once children are targeted by programmes. In households with or near poverty a possible concern is whether adults are likely to act in the interest of children. Presumably for some dimensions of poverty where observation and monitoring costs are low, community targeting may be sufficient (e.g. providing access to good schools) while in others child deprivation must be addressed individually (e.g. nutrition or vaccination) however, research needs to identify and classify these domains of deprivation.

# Appendix

## Dimensions of childhood poverty

Gordon et al. (2003) look at childhood poverty on 8 different dimensions. For each of these they used specific definitions of scarcity and defined each poverty line more stringently than their internationally used counterparts (for e.g. using 3 standard deviation below the median of the NCHS/WHO reference population instead of 2 standard deviation below the median, etc.). For looking at childhood poverty in Andhra Pradesh, I use the same definitions. The major difference lies in the age groups over which these poverty estimates have been calculated (see note 1 to Table 8). The definitions of scarcity that Gordon et al. (2003) use are:

- **Severe food deprivation:** children whose heights and weights for their age were more than 3 standard deviations below the median of the international reference population, that is, severe anthropometric failure.
- **Severe water deprivation:** children who only had access to surface water (for example, rivers) for drinking or who lived in households where the nearest source of water was more than 15 minutes away (indicators of severe deprivation of water quality or quantity).
- **Severe deprivation of sanitation facilities:** children who had no access to a toilet of any kind in the vicinity of their dwelling, that is, no private or communal toilets or latrines.
- **Severe health deprivation:** children who had not been immunised against any diseases or young children who had a recent illness involving diarrhoea and had not received any medical advice or treatment.
- **Severe shelter deprivation:** children in dwellings with more than five people per room (severe overcrowding) or with no flooring material (for example, a mud floor).
- **Severe educational deprivation:** children aged between 7 and 18 who had never been to school and were not currently attending school (no professional education of any kind).
- **Severe information deprivation:** children aged between 3 and 18 with no access to radio, television, telephone or newspapers at home.
- **Severe deprivation of access to basic services:** children living 20km or more from any type of school or 50km or more from any medical facility with doctors. Unfortunately, this kind of information was only available for a few countries, so it has not been possible to construct accurate regional estimates of severe deprivation of access to basic services.
- **Absolute poverty:** A child is living in absolute poverty only if he or she suffers from two or more severe deprivations of basic human need as defined above.

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