

THE SUDOKU OF GROWTH, POVERTY AND MALNUTRITION:
Policy Implications for Lagging States

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* Any views expressed in the paper are those of the author and do not necessarily reflect those of the Planning Commission or the Govt of India. The author thanks K L Datta for assistance in generating consumption share data.

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1 INTRODUCTION

There is a view favoured by anti-globalisation activists, left economists and the global/international socialists that faster growth in India has not reduced poverty. A sub-set of these personalities go so far as to assert that higher growth may even have caused or contributed to the widening of inter-State gaps in income and poverty. On the periphery of this group are those who assert that growth is the least important issue among dozens that they can list. On the other extreme, are a small number who assert that the faster the growth the better and as long as growth is fast there is not much else that the government needs to worry about. Perhaps a careful examination and analysis of the facts can help resolve some of these issues, even though it is unlikely to convince these extremes. The present paper analyses the data on inter-State variations in growth and poverty, to see what we can learn about economic growth and social welfare, with a view to improving planning and policy formulation.

Virmani (2005, 2006, 2006c) has presented an extensive analysis of aggregate growth from 1951-2 to 2004-5. In this analysis, central government policies such as those relating to the external sector, monetary, central fiscal and industrial policies that are the preserve of the Central government are considered. Inter-State differences in growth are however, likely to arise either from conditions in the States that effect the impact of Central policies or differences in policies that are the preserve of the State governments. The present paper analyses inter-State variations in growth, poverty and nutrition using recent data, to see what we can learn about economic growth and social welfare, with a view to improving planning and policy formulation. Because large sample NSS data is available for 1993-4, 1999-2000 and 2004-5 and the SGDP series in 1993-4 prices are available from 1993-4 to 2004-5, we focus on this period.

1.1 Social Welfare

Individual welfare (W) depends not only on the private consumption, which in turn is dependent on private disposable income (Y_d), but also on Public Goods and Services (Pgs) supplied by the State. The latter must be distinguished from transfers (Tr) and subsidies (s) that directly or indirectly enhance the purchasing power of individuals and are finally expressed in consumption. The following Welfare function for the representative person illustrates.

$$(1) W = W (Y_d, Pgs), Y_d = (1-t+s+Tr) Y, Pgs = (t-s+Tr) Y$$

Where disposable private income Y_d depends on taxes (t), subsidies (s) and other transfers (Tr). In a poor country like India, Social Welfare must give additional weight to the income/consumption of the poor. We can take account of this by adding a distributional term like the poverty rate.

(2) $W = W (Y_d, \text{Poverty rate, Pgs}),$

The next section analyses the first aspect of Welfare, per capita GDP and its growth. Section 3 deals with the second important determinant of Social welfare, poverty and analyses its links to growth and other aspects. Section 4 discusses the role of Public health and education and investigates one of the outcomes, nutrition. It also sheds light on why malnutrition is more prevalent than poverty. Section 5 concludes the paper.

2 GROWTH

As shown in Virmani(2006, 2006c) aggregate economic growth accelerated in the 1980s from an average of about 3.5% per annum between 1951-52 and 1979-80 to about 5.8% per annum during 1980-1 to 2004-5. More recent data shows that aggregate growth averaged about 5.5% per annum during 1980-81 to 1994-95 and has accelerated further to an average of 6.8% per annum during 1995-96 to 2006-07. Ahluwalia and Bajpai & Sachs have shown that the acceleration in growth was less in the poorer States, so that inter-state inequality in per capita income has increased.

We find that the cross-state Gini co-efficient of per capita GDP distribution weighted by population has increased from 0.60 1993-4 to 0.63 in 2004-5, a compound annual change of about 0.35% per annum. The distribution on which it is based is shown in Figure 1. Paradoxically, the co-efficient of variation (CV) of the SGDP growth rates during 1983-4 to 1993-4 was higher than during 1993-94 to 2004-05 (for the States for which data is available for both periods). While the mean of State growth rates increased from 4.6% per annum in the first period to 5.6% per annum in the second, reducing the CV from 0.24 to 0.21 (Table 1). If we divide the period of the nineties into the two sub-periods, one from 1993-4 to 1999-2000 and the other from 2000-1 to 2004-5, we find that the degree of variation in SDP growth rates has declined marginally from a CV of 0.38 to a CV of 0.35 (Table 2).

Figure 1: Distribution of per capita SGDP weighted by population

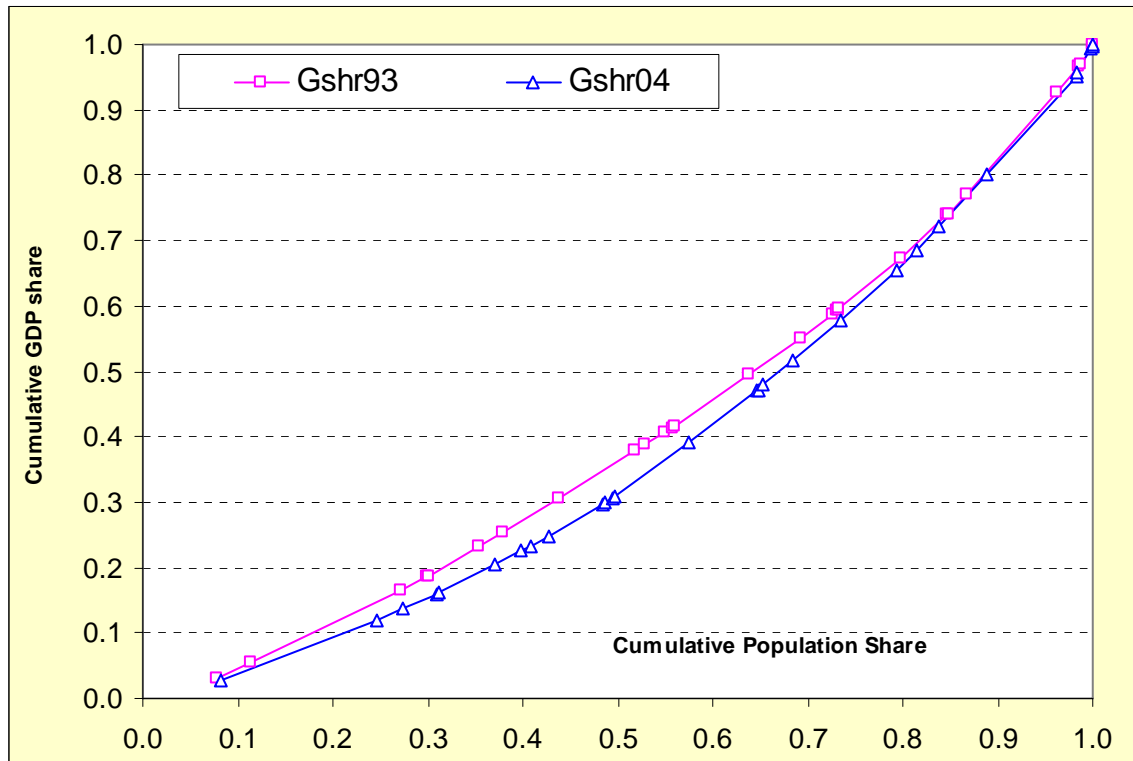


Table 1: Variation in SGDP growth rates

<u>States (16)</u>	<u>Compound annual SGDP gr</u>	
	2004-5 1993-4	1993-4/ 1983-4
Mean	5.6%	4.6%
Std. Dev.	1.2%	1.1%
CV	0.21	0.24
Andhra Pr.	5.9%	5.3%
Assam	3.5%	3.1%
Bihar	4.5%	2.6%
Gujarat	7.3%	4.1%
Haryana	6.3%	5.5%
Himachal Pr.	6.8%	5.0%
Karnataka	6.9%	5.4%
Kerala	6.2%	4.7%
Madhya Pr.	4.3%	4.2%
Maharashtra	5.7%	6.9%
Orissa	5.0%	2.9%
Punjab	4.4%	5.0%
Rajasthan	6.6%	4.4%
Tamil Nadu	5.5%	5.7%
Uttar Pradesh	4.3%	4.0%
West Bengal	7.1%	4.7%

Table 2: Variation in Growth Rates during 1990s

All State\UT	Compound annual SGdp gr rate			Compound PcSgdp gr rt		
	2004-5	1999-00	2004-5	2004-5	1999-00	2004-5
	1993-4	1993-4	1999-00	1993-4	1993-4	1999-00
Mean	6.1%	6.2%	6.1%	4.0%	4.0%	4.0%
Std. Dev.	1.9%	2.3%	2.1%	1.7%	2.3%	1.9%
CV	0.31	0.38	0.35	0.44	0.58	0.47

2.1 Hypothesis

Two hypotheses have been suggested for the relative rise in the growth rates in the better off States. Rodrik and Subramanian (2004) find a significant role for registered manufacturing in explaining variations in inter-State growth rates. The alternative hypothesis relates to the absolute and relative slow down in agricultural growth in the poor States. The arguments go as follows: The poorer States have a larger proportion of their population in rural areas and dependent on agriculture. Slower growth of agriculture will have a greater impact on the growth of the poorer States. Agricultural growth has clearly been slow during the period under consideration than it was earlier. There is also some indication that agriculture growth has decelerated more in some though not all the poorer States.

The third hypothesis is implicit in the concern expressed by Ahluwalia (2000) in the context of his inter State analysis, and the possibility that the coverage and quality of infrastructure may be affecting the growth of poorer States. The statements of businessman, economist, intellectuals, media and foreign commentators and visitors are based on the assumption that all “infrastructure” is critical to growth. Electricity is perhaps the most important representative of “infrastructure” though the latter is not defined (in the UN system of National accounts) but intuitively understood by every one. Ahluwalia (2002) found both electricity and telecommunications important in explaining inter-state differences in growth during 1991-2 to 1998-9.

In this paper we put forward two other hypotheses. One rests on the distinction between Public and Private Goods, and a grey area in between, which is associated with substantial externalities, that we term ‘Quasi-public’ goods. In this section we are concerned with Public goods that are vital to investment and production and externalities that are critical to growth.¹ Information², Roads, Policing³ and urban planning⁴ are the clearest

¹ As against Public goods and externalities that may affect Consumer welfare, but do not directly affect economic growth. These are considered separately in the context of poverty and Social welfare.

examples of public goods that are vital to investment and growth. On the other hand, electricity, though an important input into modern production, is a private good. Given the economies of scale in distribution, one can make a case for the electricity distribution network to be treated as a quasi-public good in rural areas. As the density of potential users is inversely related to cost of distribution, there is an externality argument for public subsidies for areas of intermediate density.⁵ However, economic agents do have the option of generating electricity through a variety of methods including diesel generating sets at a cost. Though the latter may be considered excessive in a country with a corruption free, efficient well regulated network, it is not so compared to the price charged by un-regulated public monopolies in India.

Telephone networks are different from electricity networks in one fundamental respect, they have network externalities – the benefit of the network increases exponentially as more people join it. Private means of communication are therefore not a substitute for public telephone networks. On the other hand, as a mobile networks cost about 1/100th of land line networks and any wire can be used to supply internet telephony, communication is now a very competitive private good given rational policy and regulation. However, if there is no mobile footprint in a given geographic area then it is much more of a public good than electricity, as private substitutes are many orders of magnitude costlier or inferior. Telecom is a quasi-public good in a habitation where there is no telephone (VPT or individual) and a public good thereafter (given rational policy and good regulation).

Railway networks lie on the other extreme as they have a host of traditional competitive modes of transport (waterways, roads of all varieties, air). Railways have a comparative advantage in long distance haulage which can be fully internalised through rational regulation, that mimics competition but retains the incentive for development and maintenance of the network. Given modern regulation, railway services in Indian conditions are therefore

² Information is the purest (non-rivalrous, non-excludable) but also the most varied and complex public good.

³ More broadly the rule of law and equality before the law, which includes the police, legal system and courts.

⁴ I stress ‘Urban Planning’ as against ‘Urban facilities and civic services’ because private individuals can never substitute the former while the latter can easily be provided by the private sector if the State did not monopolise them and/or constrain them with red tape. Urban govt must however to take full responsibility for providing quasi-public goods like drainage, sewage and drinking water systems and public transport systems.

⁵ Contrary to conventional wisdom the extension of the transmission network may not be socially beneficial and one must look for non-conventional local generation systems with low distribution costs.

a private good, and a public monopoly by reducing x-efficiency and wasting resources can have a negative effect on growth.⁶

In our view therefore, public and quasi-public goods that affect investment are likely to be more important determinants of inter-State variation in growth than other infrastructure goods and services.⁷ This would be particularly so in the relatively poorer or backward States, which have not shared in the growth acceleration.

The fifth hypothesis for inter-state differences in growth, proposed in this paper, is related to services as the drivers of growth since the 1980s. Much of the acceleration in aggregate growth has come from an acceleration of growth in the service sector. Certain services have accelerated more than others in the aggregate. Bosworth, Collins and Virmani (2007) noted that though software and related services have received a lot of attention, the acceleration of the service sector's growth, "has been more broadly based, including trade, transportation, and community and personal services." We hypothesise, that economic growth in poorer States has not accelerated because services that have propelled national growth have not accelerated proportionately. This can help us identify State policies that can help accelerate the growth of poorer States.⁸

If we combine this with the previous hypothesis, then we would expect that services which are particularly dependent on, or whose growth is associated with, the development of public and quasi-public goods are likely to prove important in explaining inter-State differences in growth. For instance there are small but very significant quasi-public goods associated with travel and tourism. These include historical monuments, cultural and religious sites, cultural (including religious) traditions, events, local art and crafts and natural attractions (such as water bodies, rivers, waterfalls; forest and animal reserves). It also includes prosaic public services items like clean drinking water, public toilets, lawns and flower beds at these sites. Preservation, enhancement and development of these quasi-public goods by the State or local governments will impact the economy through the sectors mentioned by Bosworth, Collins and Virmani.

⁶ The measurement of value added by railways within a State is however, much more difficult.

⁷ Other examples of quasi-public goods are dams and canals.

⁸ Policies that are a joint product of the Centre and the States, such as labour policy, rules and procedure are more difficult to analyse. We know that rigid labour policies that discourage labour intensive industries will have the greatest negative effect on poorer States with larger low skilled labour. However, migration and mobility of capital can complicate the effect of State specific variations in these policies.

2.2 Data & Analysis

We use the national account data by State (and UTs) and Sector. The SGDP at constant 1993-94 prices is available for most States by sector. For a few States or UTs it is available only till 2003-4(1) or 2002-3(2).⁹ For each sector we calculate the compound annual rate of growth between 1993-4 and 2004-5 and use this as the basic data for analysis. In the case of some States and UTs data is missing for one or more sectors (e.g. communications in Punjab, Sikkim and Jammu & Kashmir).

Table 3 presents the summary statistics of economic growth across States by sector. Column 2 of the table shows that the two modern service sectors Communications and Banking and Insurance were the fastest growing sectors across States. Further, communications is also considered an infrastructure, and in the days of land lines would have been considered on par with electricity as a candidate for characterisation as a quasi public good in rural areas. Note also that there was little difference in the mean growth rate of the Secondary and tertiary sectors. Column 3 and 4 show the standard deviation and coefficient of variation of the growth rate across States for each sector. The electricity sector has the highest standard deviation of growth rate with a coefficient of variation of over 1. The primary sector and its four components have the highest co-efficient of variation. Though one expects the variability in agriculture growth rates to be high because of rainfall variation, the high variability in mining and fishing is somewhat surprising!

Finally column 5 of Table 3 shows the correlation of the growth of each sector with the total GDP of the State. At a broad level, the secondary sector is found to have a higher correlation (0.75) with total growth than the tertiary sector (0.7). If we look at individual sectors, 'Trade, hotels and Restaurants' is found to have the highest correlation of 0.67 with total SDP, followed by registered manufacturing with 0.5 and communication with 0.44. On the negative side agricultural growth is almost uncorrelated with total SDP, while forestry and fishing have a negative correlation. Electricity sector has a modest correlation of 0.19.

⁹ As one of the latter is Andaman & Nicobar Islands, so we drop this from our regression analysis. The quality of SGDP data is reviewed by Ahluwalia (2002).

Table 3: Summary Statistics of State Growth 1993-4 to 2004-5

	Sector	Mean	Std.Dev	Coef Var	Correll
	1	2	3	4	5
1	Agriculture	2.1%	3.3%	1.55	-0.02
2	Forestry	1.4%	3.5%	2.53	-0.39
3	Fishing	3.3%	6.0%	1.84	-0.45
4	Mining	4.4%	7.6%	1.72	-0.28
ST	Primary	1.3%	7.3%	5.82	-0.24
5	Manufacturing	5.4%	4.1%	0.75	0.41
5.1	Manuf Reg	5.8%	4.3%	0.74	0.50
5.2	Manf Unreg	4.7%	3.8%	0.82	0.21
6	Construction	8.4%	4.3%	0.51	0.22
7	Electricity	7.0%	8.6%	1.22	0.19
ST	Secondary	7.2%	3.4%	0.47	0.75
8	Trans,Com etc	10.9%	3.3%	0.30	0.56
8.1	Railways	5.9%	3.5%	0.59	-0.10
8.2	OtherTransport	7.3%	3.2%	0.44	0.05
8.3	Storage	4.5%	4.1%	0.90	-0.17
8.4	Communication	21.1%	5.2%	0.25	0.44
9	Trd,htls,rsts	6.3%	3.3%	0.53	0.67
10	Bank, Insurance	10.8%	2.3%	0.22	-0.06
11	REst,BusServ	5.4%	2.4%	0.44	0.36
12	Govt admin	6.1%	1.4%	0.24	0.08
13	Other Services	6.7%	2.3%	0.34	0.25
ST	Tertiary	7.4%	1.5%	0.21	0.70
14	SDP total	6.2%	1.9%	0.31	1.00

We do the model testing in two versions of the models (a and b), without and with communications as the latter is missing for three States/UTs. The results are summarised in Table 4. We test the first three hypotheses by regressing the compound annual growth rate of State Domestic product (GrSdp) between 1993-4 and 2004-5 on the growth rates of SDP from agriculture (GrSag), registered manufacturing (GrSmreg) and electricity (GrSelec). All three coefficients are significant at the 1% level of confidence when communications is not included (model 1a).¹⁰ The R^2 is also a relatively high 0.86 with the adjusted R^2 at 0.84. When the communication variable is introduced (model 1b), it is highly significant, but both registered manufacturing and electricity become non-significant while agriculture is barely significant.

¹⁰ Growth of unregistered manufacturing is in contrast not significant at the 10% confidence level. Though growth of GDP from Railways is significant in this equation it is not so when communication growth is introduced.

Investment in Roads, Dams and Canals is not captured separately in the national accounts, but is included in the construction sector. However, the construction sector includes a much larger proportion of private construction. Because of their Public good character, value added by Roads and Dams & canals is not measured separately, but is part of the value added by the users of these public goods, the road transport and agriculture sectors respectively. In the case of roads the externality is much broader in terms of general economic activity. For those who have travelled regularly down any highway over a number of years, will have noticed how economic activity, including shops and Dhabas, spring up along newly built or improved/widened highways in 3-5 years. Such important externalities are probably captured best by the sector, “Trade hotels and restaurants.” Besides roads, communication is also essential for growth of trade, which in turn is necessary for the development of agriculture, mining and manufacturing in rural areas.

Table 4: Summary Table of Regression Coefficients- Dependent Variable is State GDP growth

Variables	Model 1a	Model 1b	Model 2a	Model 2b	Model 3a	Model 3b	M3b(sure)
<i>Rate of Growth of (cmpnd)</i>							
Agriculture	0.4216 3.2***	0.1786 1.8*			0.08964 1.0	0.0403 0.54	0.0225 0.42
Manufacturing regd	0.5473 6.5***	0.1479 1.4			0.2258 3.6***	0.1919 2.6**	0.1911 3.6***
Electricity	0.1986 3.6***	0.0416 1.1			0.0107 0.28	-0.0205 -0.65	-0.0117 -0.52
Communication		0.2195 5.2***		0.1454 5.1***		0.0645 1.6	0.0722 2.5**
Trade, hotel, restraunts			0.6031 7.8***	0.3858 5.4***	0.4361 5.4***	0.3726 5.4***	0.4329 8.6***
Construction			0.2362 4.2***	0.0752 1.5	0.2001 3.4***	0.1533 2.5**	0.0845 1.9*
F (Chi for SURE)	52	86	181	233	123	159	1267
Prob > F (Chi)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
R-squared	0.86	0.94	0.93	0.97	0.96	0.98	0.98
Adj R-squared	0.84	0.93	0.92	0.96	0.95	0.97	
Root MSE	0.026	0.018	0.018	0.013	0.014	0.014	0.010
No of observations	29	26	29	26	29	26	26
Notes: 1. Numbers in bracket are t (z) statistics, Stars show confidence level *=10%,**=5%,***=1%							
2. In the SURE regression growth rates of the variable 'trade,hotels,rest.', communications and registered manufacturing were treated as dependent on total state gdp growth[uses z(not t) stat].							

We therefore test the fourth and fifth hypothesis by regressing SDP growth on the growth of the sectors “Trade, Hotels and Restaurants (GrTrHtlRes),’ ‘construction (GrConst) without and with ‘Communications

(GrCom).¹¹ The results are shown under the columns Model 2a and 2b of the table. In the absence of communication growth variable, both variables are highly significant (at 1% level). The R^2 and R^2 (adj) are 0.94 and 0.93 respectively, both higher than those in model 1a, indicating that model 2a has higher explanatory power than model 1a. When communications is introduced into the model (2b) it is highly significant but construction growth becomes non-significant. The R^2 and R^2 (adj) are 0.97 and 0.96 respectively, both higher than those in model 1b, but now the gap is narrower.

How do we choose between the different models. The fact that both sets of models give significant results suggests that they may be subject to missing variable bias. We therefore run the regression by including all the variables identified. The results are given in columns marked model 3a and 3b. Agriculture growth and electricity growth are not significant in either equation, indicating that they do not explain even a fraction of the difference in growth rates across States and UTs during the period following the “new economic policies” initiated in the 1990s. The only variable from the first three hypothesis that survives is the rate of growth of registered manufacturing (at 5% level), while both ‘trade, hotels and restaurants’ and constructions variables associated with the last two hypothesis are significant at 1% level.¹²

We find that growth of SGDP affects the variables, growth of communications and trade, hotels and restaurants at a 1% level and registered manufacturing at 10% level. The coefficients of these variables could therefore be biased by the simultaneity problem. We therefore rerun the last equation (model 3b) using SURE. This confirms that these three variables are significant, though the level of significance increases to 1% for registered manufacturing and falls to 10% for construction. The communication growth variable is also found to be highly significant (at 1% level). The other two variables, growth of agriculture and electricity remain non-significant.

¹¹ The constant term is not significant as we would normally expect in a regression with growth rates as dependent and independent variables. It is therefore dropped. 3(***) 2(**) and 1(*) means significant at 1%, 5% and 10% level of confidence.

¹² The rate of growth of railways has a negative and significant impact on overall growth. Given the government monopoly of railways and the well known non-rational pricing of railway services, there are two possible explanations. (a) That for political reasons Railway administration has deliberately favoured backward/slower growing States. (b) That higher railway value added is associated with inefficient economic activity that crowds out efficient value added growth. Both, reinforce the urgency of introducing competition in railway services under the umbrella of an independent professional regulator.

The numerical impact of the four sectors identified as drivers of State GDP (SGDP) growth is quite high. A 1% difference in the rate of growth of ‘Trade, hotels and restaurants’ and 1% in registered manufacturing can result in 0.43% and 0.19% difference (respectively) in the rate of growth of GDP. This impact is much larger than the average share of these sectors in all India GDP of 0.145 and 0.13 respectively during 1993-4 to 2004-5. The impact of a 1% difference in Telecommunications and Construction growth on SGDP growth is 0.07% and 0.08% respectively. This impact is also greater than their average share in all India GDP of 0.025 and 0.051 respectively. To illustrate the impact consider Uttar Pradesh (divided), which grew at 4.3% per annum 2.1% points (or 1/3rd) lower than the 26 State mean of 6.4% per annum. If the rate of growth of Trade et al, manufacturing (regd) and construction in UP was raised to the mean rate of 6.9%, 6.4% and 8.7% respectively, Uttar Pradesh(divided)’s SGDP would have grown at 6.4% per annum. Assam and Bihar could correspondingly have grown at 5.4% and 6% per annum instead of 3.5% and 4.5% respectively.¹³

2.3 Implications and Policy Recommendations

Virmani (2005) identified the “double dualistic” structure of the economy, predominantly in the manufacturing sector, as a drag on productivity growth and unskilled employment generation.¹⁴ The current paper deepens our understanding of this phenomenon. Despite labour policy rigidities and other policy distortions such as SSI reservations and tax exemptions that have created this dualism, the registered manufacturing sector remains a driver of economic growth in India. Though the policy distortions have eliminated India’s competitive advantage in “*labour-intensive mass manufacturing*,” vis-à-vis China and other labour-surplus countries with more flexible labour markets, this is not so for “*semi-skilled labour intensive goods*.” On the contrary (we hypothesise that) India’s entrepreneurs have responded to policy induced handicaps by;

- (a) Focussing on niche markets that do not require high volume production.

¹³ For skeptics we have also subjected the final model with these four variables to further tests, by introducing other variables into the equation. None of the co-efficients is positive and significant. We do however, find an Indian States version of the ‘*Natural resource curse*.’ The growth of forestry and mining are both found to be negative and significant when introduced into the final equation. As noted in earlier foot notes, growth of GDP from railways also has a significant negative effect.

¹⁴ Rodrik and Subramanian (op cit) also found that the size of the registered manufacturing sector in a state was a good predictor of subsequent growth.

- (b) Outsourcing labour intensive parts of the production process including service activities that were formerly part of ‘manufacturing’
- (c) Fragmenting production into smaller units that are subject to less rigid labour rules & procedures.
- (d) Using and/or developing technology and systems that substitute semi-skilled for unskilled labour as the labour rules are less rigid on the former.¹⁵
- (e) Using more capital-intensive methods and processes.

Thus India has developed (in our view) a comparative advantage in ‘*semi-skilled labour intensive*’ manufacturing that is visible in automobile components and specialised chemicals, drugs and pharmaceuticals. Those States that have been able to apply labour rules and procedures flexibly, reduce bureaucratic red tape, curb the predation by government monopoly service providers and provide a more attractive investment environment have benefited. One must *caution*, however, that *as long as labour rigidities remain, this sector cannot generate unskilled employment at a pace necessary to correct the distorted structure of employment (2/3rd of labour force in agriculture).*

The informal, unorganised and predominantly service related sector is a major part of the dual economic structure. Most observers have been too mesmerised by Information Technology, IT enabled Services and high tech services to notice that the rest of the service sector is also important. Bosworth, Collins and Virmani (2007) showed that the fastest growth in total factor productivity has been in the services sector and that too during the 1980s when IT and ITES were not even a speck on the horizon. The current paper goes beyond earlier analyses to show that a humdrum sector like ‘Trade, Hotels and Restaurants,’ has been a major driver of growth since 1993-4 (the market reform phase).¹⁶ If we examine these results and then step beyond them an interesting narrative emerges of economic development through trade, commerce, tourism and urbanisation.¹⁷ With rigidities in labour policy and low literacy/primary education levels stymieing the growth of ‘*labour intensive mass manufacturing*’, States have differentiated themselves in the 1990s by their relative growth of trade, commerce, tourism, and real estate development and construction.

¹⁵ Necessity is the mother of invention. There is evidence of this in the Textile sector (Tiwari(2006))

¹⁶ Haryana under Chief Minister, Shiri Bansi Lal, was probably the first State in India to recognize and utilize the potential of Tourism, Hotels, restaurants.

¹⁷ Where the latter is defined not through the formal criteria for urban vs. rural area but its essence.

For rural areas (villages, habitation) to utilise their comparative advantage they have to be connected to markets and towns. Sometimes the comparative advantage has to be developed in the form of historical monuments, cultural/religious sites or natural resources (water bodies & courses). Roads and communication are necessary condition for this to happen. State policies, rules and regulations that facilitate this process, then lead to faster growth, through construction of shops, workshops, restaurants, offices, hotels and housing both on the town roads extending into the countryside as well as on roadside villages. The quality range is wide and diverse from a 'dhabha' to an air cooled or air conditioned restaurant to an eating place in an air conditioned mall, as is the diversity in the education and skill levels of the employees needed to service these establishments.

2.3.1 Roads

The importance of roads in economic development has gradually come back on the agenda over the last decade, after relative neglect for half a century. This is reflected in Central government programs like the NHDP and PMGRY. It is still not clear however, whether State governments recognise their critical importance. I would recommend road development as the number one focus program for all poor States and regions in the country. States must have a detailed operational plan for building a comprehensive road grid connecting every village and habitation within a time bound framework. At the high end we would also find a mix of high quality offices and communication services coupled with Business services (call centres).

- (a) All cities in the country must be connected by National highways that are constructed and maintained to Middle Income country standards.
- (b) All towns in every State must be connected to each other by State Highways of a standard that can sustain traffic at least 30 KPH during adverse conditions such as the monsoons.
- (c) Each village must be connected to the nearest town by an all weather metalled/surfaced district highway. Each village must be connected to all neighbouring village by a road of a standard suitable to the traffic.
- (d) All remaining habitations must be connected to the grid within 10 years.
- (e) New highways must identify and Plan for the emergence of shopping and trading areas near villages and highway/road intersections. This will entail development of small stretches of parallel local roads,

- underpasses for rural traffic and designation/acquisition of contiguous areas on the non-highways side of the parallel roads for commercial activity.
- (f) State road transport, goods and passenger, must be de-licensed to build rural and local entrepreneurship in road transport. At most, States could have a system of registration along with registration fees. Registration should be automatic unless there is a pattern of systemic violation of road rule. Registration fees should be automatically transferred to a road maintenance organisation at the local or State level charged with maintaining district/State highways.
 - (g) All octroi posts and other barriers to intra-State traffic must be dismantled.

2.3.2 Communications

The communication revolution is already sweeping the country. Its impact on the rural areas of the country can be expedited if some anomalies in policy and regulation are corrected.

- (h) The USO fund must be used to expedite extension of telephony and internet into the rural areas. It should for instance hold subsidy auctions for extending the mobile footprint into areas of non-presence.
- (i) Optical fibre cables, land lines and all other wires going into the rural areas must be subject to open access with the TARI ensuring that reasonable rates are charged for access. The DOT and the Telecom commission should stop siding with BSNL if they are genuinely interested in extending communications to rural areas.
- (j) TRAI had previously recommended that all physical mobile infrastructures in rural areas should be sharable. We should go further and completely un-bundle the local loop in rural areas so that they can get the benefits of competition that urban areas are already benefiting from.

2.3.3 Let a 100 Towns Bloom

Allow and encourage private entrepreneurs to build thousands of new towns/townships in semi-urban, semi-rural areas. Government has the responsibility of connecting these to the nearest highway and water-supply mains. Planning water reservoirs, solid waste disposal and sewage treatment and public transport systems is also State governments' responsibility. States must scrap forthwith, expropriatory sections of the Rent control act(s)

and corresponding rules and procedures, so that the private sector can build and provide rental accommodation for the lower middle class and the poor.

3 POVERTY

The question of whether growth is a necessary or sufficient condition for the elimination of poverty has been long debated. The focus of our investigation is very precise: To what extent do interstate differences in average per capita income of States (as measured by the NAS) explain interstate differences in poverty rates as measured by the official poverty data?

3.1 All India Poverty

The overall poverty picture at the national level is presented in Table 5 and Table 6. **Error! Reference source not found.** Over the 11 year period from 1993-4 to 2004-5, the proportion of poor below the poverty line and the absolute number of poor have declined. The poverty ratio has declined by 23% from 36% of population to 27.5% while the number of poor has declined by 6% to 301.7 million (Table 5). The other noteworthy feature is the convergence of rural and urban poverty rates from a gap of 4.9% points in 1993-4 to 0.8% points in 2004-5. This suggests that the rural and urban areas are getting better integrated in terms of movement of workers, goods and services and the price differentials that drive them.

Table 5: National Poverty Ratio (Head count ratio)

	1993-94	1999-2000	2004-05	
	URP	MRP	URP	MRP
<u>RURAL</u>				
Poverty Ratio	37.3	27.1	28.3	21.8
Number of Poor (Million)	244.0	193.2	220.9	170.3
<u>URBAN</u>				
Poverty Ratio	32.4	23.6	25.7	21.7
Number of Poor (Million)	76.3	67.0	80.8	68.2
<u>TOTAL</u>				
Poverty Ratio	36.0	26.1	27.5	21.8
Number of Poor (Million)	320.4	260.3	301.7	238.5

Some commentators have speculated that the rate of poverty reduction has slowed because poverty declined by about 8.5% points during the 10 year period from 1983-4 and 1993-4 by about 8.4% points in the 11 year period from 1993-4 to 2004-5. Despite the rise in growth rate of GDP. The

decline was however 19% in the former and 23% in the latter, indicating that the rate of decline was virtually unchanged between these two periods. A similar picture emerges if we look at the 1990s (Table 6).

Table 6: Change in Poverty Rate between 1993-4 and 2004-5

	<u>(Percent point per year)</u>		<u>(Compound annual)</u>	
	1993-94 to 2004-05	1999-2000 to 2004-05	1993-94 to 2004-05	1999-2000 to 2004-05
	<u>URP</u>	<u>MRP</u>	<u>URP</u>	<u>MRP</u>
1 Rural	0.78	1.06	2.48	4.26
2 Urban	0.60	0.38	2.07	1.68
3 Total	0.77	0.87	2.40	3.56

3.2 Distribution Function

Given an income or consumption distribution $f(y)$, and a poverty line Y_p the proportion of people below the poverty line (poverty rate or head count ratio) is given by, $F(Y_p)$ where F is the cumulative distribution. The Head count ratio or proportion of people below the poverty line is therefore,

$$(3) \quad F(Y_p) = F(Y; Y_a, \Omega) | Y = Y_p,$$

where Y_a = the average or mean of the income or consumption distribution and Ω is a distributional parameter(s) like variance. If the distribution for each state is assumed to be drawn from the same family of distributions and differ from each other in terms of the mean and distribution parameter(s) then we can differentiate this distribution around the poverty line Y_p (which is the same in real value across Indian States) to obtain,

$$(4) \quad dF(Y_p) = F_1(Y_p; Y_a, \Omega) dY_a + F_2(Y_p; Y_a, \Omega) d\Omega | \text{at } Y = Y_p$$

Where F_1 and F_2 are respectively the differentials of the cumulative distribution with respect to mean income or consumption and the distributional parameter, evaluated at $Y = Y_p$. If we divide both sides of equation (4) by F and rearrange we obtain an elasticity form of the equation.

$$(5) \quad dF/F = (Y_a F_1/F) (dY_a/Y_a) + (\Omega F_2/F) (d\Omega/\Omega) | \text{at } Y = Y_p$$

3.3 Empirical Estimation

The estimating equation based on equation (5) can be written as,

$$(6) \quad \text{GrPoverty}_i = A \text{GrPcSgdp}_i + B \text{GrShrL40R}_i + C \text{GrShrL40U}_i + \epsilon_i$$

with $i = 1 \dots n$ are the States, A, B and C are parameters to be estimated and ϵ is the error term. GrX_i denotes compound annual rate of change of the variable X in State i between 1993-4 and 2004-5, Poverty is the poverty rate or head count ratio for the State, PcSgdp is the per capita State GDP, ShrL40R is the share of the lower 40% of the State's rural population in rural consumption and ShrL40U is the share of the lower 40% of the State's urban population in urban consumption.

For the poverty rates (dependent variable) we use the official poverty estimates for 2004-5 and 1993-99 estimated from the uniform recall period (URP) data for each State. We can also obtain MRP estimates for 1993-4 and use these along with official MRP based estimates for 2004-5.¹⁸ As we estimate the equations in difference form using State panels, the new States of Jharkhand, Chattisgarh and Uttranchal have to be left out of the estimation as poverty estimates are not available for 1993-4..

For the independent variables we use National account data for Per capita State GDP. It is however also possible to use the average MPCE calculated from the survey data, by converting 1993-4 data to 2004-5 prices using the same deflators that are used to derive the poverty line in current prices. Though the Gini co-efficient is a standard measure of overall income distribution, it is not a good measure of the distribution around the poverty line. Bhalla (2002) therefore developed a direct measure of distribution, which he calls 'Shape of Distribution Elasticity' (SDE). In this paper we use the share of bottom 40% of the population in rural and urban areas as the distribution variable. One of the reasons for using this variable to represent distributional factors is that in cross country regressions this variable has proved significant in explaining differences in poverty.¹⁹ Alternative variables such as the share of the bottom 20% etc. turn out to be non-significant in the cross-country context.

Ahluwalia (1978), Bell et al., (1994), Ravallion and Datt (1996) and Datt and Ravallion (1998), have shown that agricultural output or productivity is linked to poverty.²⁰ If agricultural and non-agricultural growth have significantly different impact on overall (combined rural & urban) poverty it would imply that the pattern of growth can have distributional consequences. This along with the fact that a large proportion of the poor live in rural areas and are directly or indirectly linked to agriculture, implies rural-urban segmentation of markets for factors (labor,

¹⁸ MRP poverty data for States is taken from Sen and Himanshu (2004)

¹⁹ See Virmani (2006) or Virmani (2006d).

²⁰ There are also emperical analysis linking inflation differentials to poverty rates.

capital) and goods. Labour market segmentation could be due to lack of information about non-agricultural/urban jobs, transaction costs of moving to the urban area, lack of mobility for social and other reasons or lack of required education/skills. Goods market segmentation could be partly due to poor transport and communication links, while capital/credit market segmentation is generally related to information problems and rule of law (contractual arrangements, enforcement).

The issue of the special link between agriculture growth and poverty suggested by the above research, can be reframed in the present context as follows: Whether agriculture growth contributes something additional to poverty reduction that is not captured by growth in average per capita income/consumption and the distributional parameter used. We test this hypothesis by introducing the compound annual growth rate of State GDP from agricultural between 1993-4 to 2004-5 (GrSgAg) as an additional variable in equation (5) to obtain an alternative estimation equation,

$$(7) \text{GrPoverty}_i = A \text{GrPcSgdp}_i + B \text{GrShrL40R}_i + C \text{GrShrL40U}_i + D \text{GrPcSgAg}_i + \epsilon_i$$

The least squares estimates of equation (6) and (7) are summarised in table Table 7. The most important result is that per capita State domestic product is significant at the 1% level of confidence in all these estimates. There is thus no factual basis to the ideological position that income growth has had a neutral or perverse effect on interstate poverty gaps. Estimating equation (6) shows that every 1% increase in per capita State GDP results in a 1% reduction in the poverty rate (columns 2 and 6 of table Table 7). The second result is that only the rural distribution is statistically significant, with a 1% improvement in the distribution leading to a 0.8% reduction in the poverty rate. This simple regression explains between 63 and 67% of URP based poverty. The results for MRP based poverty are similar.²¹

If we estimate the model with agriculture growth, this variable is highly significant and modifies the impact of the other variables (column 3). Every 1 per cent increase in agriculture growth reduces the rate of URP poverty by 0.45%, in addition to its effect on average per capita GDP. This model therefore has about 9% more explanatory power for URP poverty. The introduction of agriculture growth also reduces the impact of per capita

²¹ As there are no official estimates of MRP distribution available for 1993-4 we have used the distributional parameters derived from the URP distribution. They are therefore not strictly comparable.

income by 14% and of consumption shares of lower 40% of rural population by about 25%. Third, the consumption share of the lower 40% of urban population (-0.83) now becomes significant and higher than that of rural shares(-0.62). Lastly as a consequence the model now explains a higher 74% and 81% of the overall difference in reduction in poverty rates across states.

Table 7: Estimated coefficients for poverty equations

<u>Dependent Variable =</u> <u>Independent Variables</u>	1	2	3	4	5	6	7
	PovertyUrp	PovertyUrp	PovertyUrp	PovertyUrp	PovertyMrp	PovertyMrp	PovertyMrp
Per Capita State GDP	-1.025 -7.0***	-0.863 -6.3***	-1.06 -7.8***	-0.982 -6.8***	-0.922 -6.6***	-0.902 -7.3***	
Per Capita State GDP non-agri							
Cons share of lower 40%:Rural	-0.821 -2.1**	-0.621 -1.8*	-0.736 -2.0*	-0.656 -1.8*	-0.583 -1.7	-0.597 -1.8*	
Cons share of lower 40%:Urban	-0.655 -1.6	-0.832 -2.3**	-0.793 -2.1**	0.132 0.3	-0.147 -0.3		
State GDP from agriculture		-0.454 -3.1***				-0.291 -1.9*	-0.275 -2.0*
State per capita GDP from agriculture			-0.447 -2.3**				
F	17	19	16	23	21	21	
Prob > F	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
R-squared	0.67	0.76	0.73	0.77	0.81	0.81	
Adj R-squared	0.63	0.72	0.68	0.74	0.77	0.77	
Root MSE	0.031	0.027	0.029	0.031	0.027	0.027	
No of observations	28	28	28	24	24	24	

The fourth column shows the regression results of the same model if the growth of SGDP from agriculture is replaced by per capita SGDP from agriculture. The results are substantially the same except that the effect of per capita GDP growth reverts to 1 and the effect of rural and urban shares is now almost identical.

3.4 Policy Implications

Thus we find that though differences in agriculture growth across States provide no explanation for differences in SGDP growth, they are important in explaining differences in total poverty reduction.

3.4.1 Agriculture: Public Goods

There are two approaches to agriculture growth. One based on detailed and comprehensive analysis of all the problems that have arisen in the agriculture sector/ rural areas across this vast country and lists every policy, institutional and program change needed for agriculture to thrive. We can call this the *symphonic* approach where all the instruments play in harmony to produce good results. The other approach, which could be called the *quartet*, identifies a few critical actions that government must take which are particularly important for agriculture/rural development. There are three public goods and one quasi-public good which may be particularly lacking in poor, backward regions, namely knowledge/information, rule of law, permanent all weather roads, and assured irrigation.

Many of the poorest regions are still characterised by semi-feudal relations in land, labour and credit markets. In the absence of rule of law there is nothing to keep traditional feudal families from transforming into tin pot oligarchs who supply spurious fertiliser, pesticides etc. and use strong arm methods to collect overdue loans or extract indentured labour. The answer is to strengthen and empower modern market institutions such as MFIs and organised distribution companies that want to build a reputation and a brand and therefore have a stake in the rule of law, not tie them up in with a welter of new controls and bureaucratic red tape.

Historically the, continental interior, geographically remote and hilly areas are least likely to have been connected to the main transport corridors and therefore the gaps are likely to be widest.

R&D on crop and non-crop agriculture and animal husbandry, including new varieties, operational methods and management practices has traditionally been generated by government universities and transmitted to farmers by public organisations. The deterioration in volume and quality of this knowledge transfer must be reversed. The synergies between telecom connectivity, internet access, e-governance, e-learning and e-marketing must be exploited.

3.4.2 Water management

Water is essential for drinking, personal hygiene, sanitation and irrigation. From a global comparative perspective, India is a relatively water-scarce country and global environmental changes threaten to make this worse. Yet our limited water resources are either not fully utilized (flow to the sea) or are misused (depleting ground water). Public water supply systems also need to make better use of rain water.

There is an urgent need to improve the comprehensiveness and quality of water planning and management at every level (Centre, State, district, town, panchayat, and smallest farmer). Water harvesting, water shed development, recharge of water bodies and aquifers, must be planned and implemented in every nook and corner of the country. Education and demonstration of models with the active participation of NGOs can play an important role. Dams and canals have a place in cutting down the flow of water into the sea, recharging aquifers and supplying dry areas and parched towns. Tube wells in depleting aquifers must be discouraged through proper pricing of electricity and perhaps even water.

3.4.3 Primary Education

Literacy can help in acquiring knowledge about job opportunities, tools and productivity. Government must ensure that every member of the labour force, every citizen, has the education that (s)he is supposed to acquire with the completion of Primary education. But this education must also be made more relevant by providing information on agriculture and allied subjects and training them on how to access relevant information in future.

We should not declare premature victory for Primary education and move on to higher levels and once again deprive the poor of their access to basics while satisfying the middle classes hunger for secondary education. The latter can be better achieved through a modern, transparent, regulatory system that minimises the problem of asymmetric information,²² fosters competition in supply²³ and empowers them to get value for the 3% of GDP that they already spend on private education.

Every youth, rural or urban, after completing primary education must also have access to the six thousand or so globally identified skills. This requires a massive joint effort by government, NGOs and private skill providers. Government must provide funding for the poor while all possible

²² For instance see Virmani (2005, 2006b).

²³ By de-licensing and appropriate land use policy.

private and foreign expertise and experience is attracted to India to provide training in all these skills in the next five years.

3.4.4 Conclusion

This section confirms that average per capita GDP is an important determinant of poverty. It also shows that higher agriculture growth has an impact on poverty reduction in addition to its normal contribution to overall GDP growth. A special focus on agricultural growth in poorer states and in States with opportunities for productivity improvement can therefore be justified in terms of poverty removal even though it may not have any impact on overall growth. The empirical results also justify an added focus on rural roads and telecom connectivity (in addition to the general effects found earlier) to the extent that they promote the development of agriculture. Development of rural connectivity also improves market integration and labour mobility, which in turn will remove the differential and segmented impact of growth on rural and urban poverty.

This section also shows that the consumption share of bottom 40% of the population is an important determinant of poverty. Targeted benefit programs should therefore focus on the bottom 40% of the population. It is essential to set up a comprehensive data base with unique IDs, photographs and Bio-metric identification, that will eliminate fraud and help identify the poorest 30% to 40% of the population.²⁴

4 QUASI-PUBLIC GOODS

Information/knowledge, personal security and the rule of law (provided by the State), and Roads are among the public goods that impact both investment and growth and the personal welfare of all individuals including the poor. Two of the most neglected Public goods from both these perspectives are appropriate information or knowledge and Urban/civic planning and policy. The quality of life in cities, towns and contiguous rural areas can depend critically on the quality of Planning and policy for these areas. This includes land use planning and public transport and policies that ensure that rental accommodation is profitably built for the poor and lower middle class. It also includes communicable and vector borne diseases. The effect of such neglect (or lack of competence) tends to cumulate over time as more migrants stream into growing towns and urbanisation increases. This

²⁴ See for instance, Virmani (2007) for a detailed exposition of the information and monitoring systems needed.

may be a factor in the slowdown in the decline of urban poverty rates in several States.

There are three basic aspects of information: The source or repository of the information, access to this source/repository and the ability to understand the information. All three can be different for each type of information. The paradox of information is that the person needing the information does not know where it exists or exactly what it is. If the latter was untrue (s)he would already possess the information. It is therefore in the national public interest to ensure that certain types of information are made available to citizens (or sub-groups of them) in a form that they can understand. Public health information is one such type of information that can have multiple benefits. Literacy and basic education may be an essential complement of this process.

In a low income (poor) country like India Social Welfare must give additional weight to the access of the poor to Public goods. The Supreme Court mandated police reforms will improve the quality of policing and the personal security of the poor.²⁵ Similarly the creation of a comprehensive road grid that connects every habitation in the country (village, town or city) will be of great benefit to the poor as it will increase availability and reduce the cost of transport.

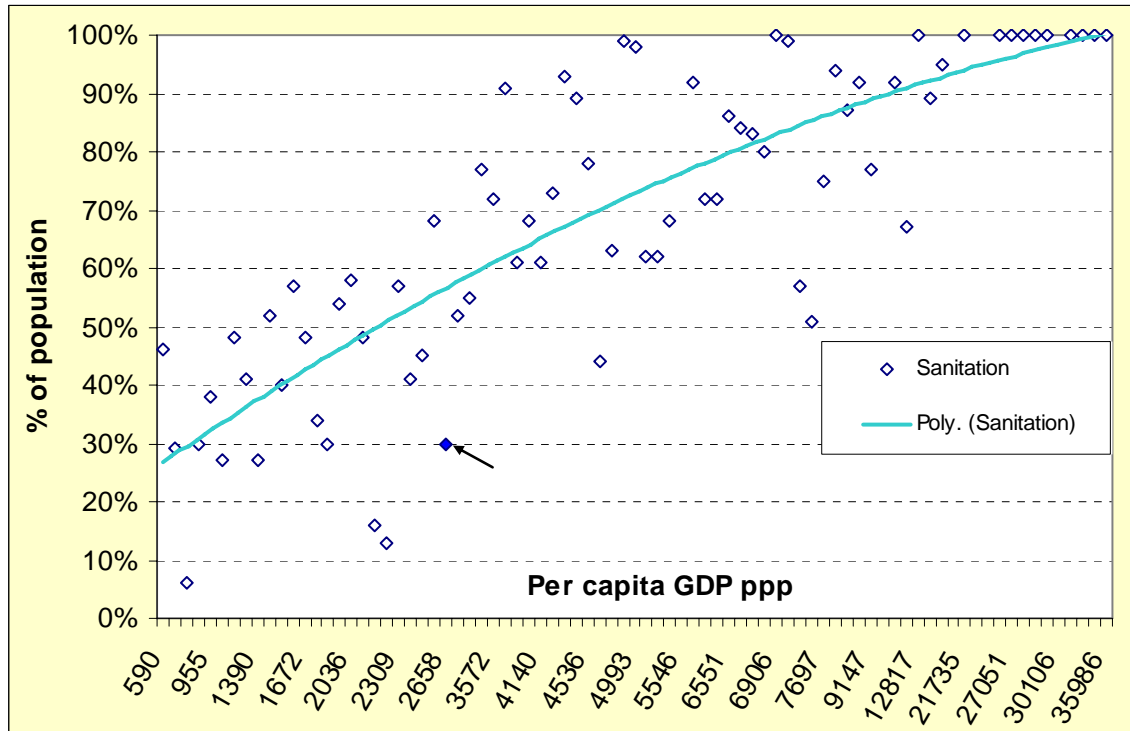
4.1 Public Health

We can enhance social welfare further by adding services that have some public good character or externality and are particularly relevant to the poor, to the list of public goods. The two most important ones are Public health and literacy. Historically the greatest advances in longevity and mortality reduction have come not from treatment of individual disease but from public health. This includes modern drainage and sewerage systems (sewage treatment plants), drinking water systems that produce and deliver disease free water and solid waste disposal systems. The current position is illustrated by the low proportion of the population with access to improved sanitation facilities (In figure 2, India is coloured dot at arrow). The impact of this neglect is reflected in two well known facts; One, 'Delhi belly' is infamous throughout the World and the Delhi middle class has to use water filters to protect itself from tap water borne disease. Two, India is still home

²⁵ The media, supported by the public, must carry out a campaign to implement police reform. They must particularly put pressure on those States that have refused to make any reforms, by exposing the pathetic state of law and order!

to communicable and vector borne diseases that have been eliminated in most countries outside sub-Saharan Africa.

Figure 2 : Per cent of Population with Improved Access to Sanitation



Public health also includes public education about nutrition, hygiene and disease to reduce the problem of asymmetric information. Literacy, numeracy and primary education aids in this process, socialises agrarian residents for modern manufacturing and services and contributes to the general well being and is therefore also a quasi-public good. Together these can contribute immensely to the quality of life of all citizens and particularly the poor. The legacy of neglect of these public and quasi-public goods and services is still reflected in the lack of emphasis by State governments to universal (100%) coverage of a standard that is visible in actual outcomes. This must change radically.

4.2 Malnutrition

A study of the nutrition problem in India illustrates the multiple ramifications of Information/knowledge transmission and of Public health policy and programs. In 2004-5 the all India poverty rate was 21.8% using the Mixed (30-365 days) recall period and 27.5% using the Uniform (30 day) recall period. Malnutrition in children under 3 years of age as measured by the National Family health survey 2005-6 (NFHS 3) was much

higher. Stunted and Underweight children constituted 38.4% and 45.9% respectively of children under 3. The cross State correlation between poverty rates and malnutrition rates was around 0.7 (using either MRP or URP based estimates). At least 30% of this cross-State variation in nutritional status of children was therefore totally uncorrelated with the variation of poverty rates across States. The malnutrition results are based on norms derived from a US sample and these norms are being revised based on samples from Asia, Latin America and Africa. It is expected that the malnutrition rates resulting from these new norms would be *different*. The broad picture outlined above is not however likely to change significantly.

The improvement in the nutrition status of children has also been disappointing. Over the seven years between 1998-9 and 2005-6 malnutrition has declined by only 1.1 per cent points while stunting has declined by 7.1 per cent points. This compares with a 4.3 per cent point decline in the poverty rate between 1999-2000 and 2004-5 (MRP). Though stunting has declined at a marginally faster annual rate (1.0%) than poverty (0.9%), the decline in percentage of underweight children is minuscule. The implication is drawn that existing policies and programs are not making a significant dent on malnutrition and need to be improved. To do this, however, we need to first find out what are the important factors responsible for malnutrition.

4.3 Potential Causes

There are three broad aspects of malnutrition that must be kept in mind when devising strategies for dealing with it.

- 1) The ability to access such food items. This depends on household income or ability to sustain certain levels of consumption. The rate of Poverty (Head count ratio) is the standard indicator. Other possible indicators could include assets such as land and housing.
- 2) Household/family knowledge and information about good nutrition. This includes knowledge about the locally available foods that are good from the nutrition perspective. This can be based on, (a) traditional age old knowledge (old wives tales). (b) Ability to read coupled with availability of appropriate reading material on nutrition. (c) Access to media such as newspapers, radio and TV, coupled with propagation of such information on the radio (d) Special programs that directly educate mothers about child rearing and nutrition such as ICDS.

3) State of health. Even if the right kind of food and nutrition is available a child may not be able to consume and/or absorb it properly due to ill health or sickness. For instance a child suffering from diarrhoea much of the time is unlikely to be able to ingest much good and healthy food and absorb the nutrition, even if it is freely available and provided to the child by the mother/parents. Historically it has been demonstrated across many countries that public health measures like clean drinking water, sanitation, sewerage, control of communicable and epidemic diseases and public health education play an important role in reducing mortality rates at every age and across gender. In the Indian environment access to water and toilets, breast feeding (to impart immunity in an unhealthy environment), access to sound health advice/treatment, prevalence of vaccination and availability of vitamin supplements are possible indicators.

Clearly the level of consumption, represented by the poverty rate is a variable that has to appear in any explanation of cross- State differences in malnutrition. In addition based on (2) and (3) above we can build two distinct models to explain malnutrition.

Model 1: Information and Knowledge

In this model, variations in nutrition, beyond those dependent on ability to purchase nutritional food and health services, depend on information and knowledge about appropriate foods, cooking, nutrition, health and hygiene and child rearing practices. Traditional learning about child rearing from mothers and grandmothers, level of education, exposure and access to media including ownership of radios and/or TV and exposure/access to programs like ICDS would affect nutritional practices. As the first variable is not directly measurable we assume that early marriage or early birth of first child reduces the time that a young female has to learn sound traditional practices by observation, listening and questioning.

+ - -/+ - + +

Malnutrition=f(Poverty, Media exposure, Household TV, education, early marriage/childbirth, govt info programs)

Household TV can be a force for good or bad depending on the programs watched and the time spent. Thus, household TV by increasing access to information may reduce malnutrition. On the other hand watching junk food and other advertising and reducing the time spent on child rearing may increase it.

Model 2: Child health and nutrition

+ - +/- - - -

Malnutrition = f(Poverty, toilet access, Diarrhoea, Breastfeeding, Vaccination, Vitamin supplement)

The prevalence of diarrhoea would clearly increase malnutrition, while the availability of sound treatment would reduce it. Thus available measures may not distinguish clearly between these two effects. Access to toilet facilities and clean drinking water would reduce water borne diseases including diarrhoea and thus tend to reduce malnutrition. However when the even the quality of municipal piped water supply cannot be trusted available measures are not able to distinguish between contaminated and clean water. Breast feeding at birth would tend to minimise the effect of feed based on poor water quality. It is also reported in medical journals to increase long term immunity. Vitamin A and other supplements have been proposed by many to address malnutrition problems.

4.4 Empirical Results

We use the NFHS3 data set for States to analyse the effects of the potential causes of nutrition identified above. We start with the commonly used measure of the proportion of children under age 3 who are malnourished, in particular underweight in the State (Underwt). First we estimate a naïve model that says that malnutrition is the result of poverty. This can also serve as a benchmark.²⁶

$$(8) \text{ Underwt} = 24 - 0.67 \text{ PovUrp}, \quad R^2 = 0.50, \quad R^2 (\text{adjusted})=0.48.$$

(7.3)^{***} (-5.2)^{***}

$$(9) \text{ Underwt} = 25 - 0.77 \text{ PovMrp}, \quad R^2 = 0.49, \quad R^2 (\text{adjusted})=0.47.$$

(8.4)^{***} (-5.1)^{***}

These equations suggest that about 50% of the variation in malnutrition across states can be explained by poverty.²⁷ However, the

²⁶ One, two and three stars represent significance at the 10%, 5% and 1% level.

²⁷ Asset variables are not significant in this equation. If the consumption shares of lower 40% of urban and rural population are introduced into this equation they are significant at the 1% and 5% confidence level. The sign of the latter is, however, perverse: A higher share of bottom 40% in rural areas leads to greater malnutrition. This could be due to a change in behavior ('keeping up with the Joneses') that results in higher purchase of non-food items at the cost of food once a certain threshold is crossed and discretionary purchases become feasible.

results can be misleading as they do not take account of the other potential causes of malnutrition discussed earlier.²⁸

Given the data available in the NFHS3 survey for 2005-6, model 1 is specified as follows:

$$(10) \text{ Underwt}_{3i} = f(\text{Povurp04}_i, \text{mediaexp}_i, \text{hhtv}_i, \text{erlymrgf}_i, \text{eduf8}_i, \text{pcicds}_i)$$

$i = 1 \dots n$ the number of States and where,

Povurp04 = Poverty rate in 2004-5 based on uniform recall period (%)

Mediaexpf = Women 15-49 with regular exposure to media (%)

HhTv = Households that have a TV (%)

Erlymrgf = Women age 20-24 married by age 18 (%)

Eduf8 = Women who have completed 8 years or more of education (%).

Pcicds = Per capita expenditures on ICDS program in State in 2005-6.

To evaluate the effect of the ICDS program we estimate this equation without and with Pcicds. Columns 2 to 4 of the table below show the results of the basic model without ICDS. There is one surprise. Education does not seem to affect the nutrition outcomes as the education variable is not significant at the 10% level. The lack of significance of the education variables suggests that mere literacy is not enough. The right kind of information regarding nutrition, hygiene etc. has to be made available to and be accessible to the target audience. Thus education system does not seem to impart any knowledge that is directly useful in improving nutrition outcomes. However, education does have an indirect effect in that it seems to be an important determinant of regular media exposure (footnote 1 of Table 8).

Poverty and media exposure are highly significant determinants of malnutrition and better nutrition respectively. The presence of a TV seems to have a perverse effect on child nutrition. As noted earlier these could be due to a number factors including promoting junk food and non-food expenditures at the cost of nutritious food, and reduction of time spent on child care. Though household TV may contribute to regular media exposure, it is not a significant determinant of the latter in the subsidiary

²⁸ Missing variable bias.

equations for the sure model estimation.²⁹ Our variable for early marriage is not significant in the OLS estimate when the education variable is present but is significant when it is dropped. This suggests that our use of this variable as an indicator of traditional learning is correct. Overall the model explains 81 to 84% of the interstate variation in malnutrition among children under 3 years of age.

Table 8: Dependent variable is % of children younger than 3 in 2005-6 who are underweight

1	2	3	4	5	6	7	8
	Model 1a	Model 1a	Model 1b	Model 1c	Model 1c	Model 1d	Model 1d
		Sure ¹			Sure ¹		Sure ¹
<i>Independent Variables</i>							
Poverty Rate URP (%)	0.289 2.6**	0.290 2.9***	0.285 2.7**	0.186 1.6	0.185 1.9*	0.179 1.6	0.180 1.9*
Media Exposure (female) %	-0.426 -3.4***	-0.424 -3.8***	-0.434 -3.8***	-0.388 -3.3***	-0.367 -3.6***	-0.401 -3.7***	-0.388 -4.1***
Married by 18yr (F 20-24yr) %	0.188 1.6	0.190 1.8*	0.201 2.3**	0.113 0.97	0.126 1.3	0.135 1.5	0.140 1.8*
HH with TV (%)	0.220 2.2**	0.221 2.5**	0.214 2.3**	0.095 0.86	0.095 1.0	0.086 0.8	0.097 1.1
Education(female) 8th or higher %	-0.280 -0.17	-0.027 -0.19		-0.044 -0.3	-0.035 -0.3		
Per capita expenditure on ICDS				-0.067 -2.1**	-0.074 -2.8***	-0.066 -2.2**	-0.073 -2.8***
Constant	46.55 4.2***	46.19 4.7***	45.86 4.5***	58.06 5.0***	55.99 5.7***	56.89 5.4***	55.50 6.0***
F (chi in Sure)	22	142	29	22	177	28	177
Prob > F	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
R-squared	0.84	0.84	0.84	0.87	0.86	0.86	0.86
Adj R-squared	0.80		0.81	0.83		0.83	
Root MSE	4.6	4.1	4.5	4.3	3.7	4.2	3.7
No of observations	28	28	28	28	28	28	28
Notes: Fn ¹ Mediaexpf=19***+0.33*** Hhelect+0.6*** eduf8 (R ² =0.83); Hhtv=-2.6+0.69*** hhelect(R ² =0.71)							
Numbers in bracket are t statistics, Stars show confidence level *=10%, **=5%, ***=1%							

When the ICDS variable is included in the model 1 equation, education remains non-significant, but the size of the impact and the degree of significance of household TV, early marriage and poverty is reduced, with the first becoming non-significant (columns 5 to 8). In the presence of the ICDS program, the residual impact on malnutrition is about 55% for poverty and 70% for early marriage 70% of the impact without ICDS. This means that the ICDS program has been successful in reversing any mis-information provided by TV and reducing the information/knowledge handicap imposed by early marriage and poverty.

²⁹ It was therefore dropped from the estimating equation.

We find that the available drinking water variable namely access to piped drinking water is not a significant factor in nutrition. This is surprising if we associate municipal piped water supply with better quality of water. The few reported surveys along with our personal experience of the quality of water in the capital indicate that this assumption is not justified. Unless there a source of poisoning or serious pollution nearby, well water may be superior to piped water in many situations as it undergoes natural filtration. Access to water of a defined standard would better capture the public health factor, which is a significant factor in explaining nutrition.

Given the data available in the NFHS3 survey for 2005-6, model 2 is specified as follows:

$$(11) \text{Underwt3}_i = f(\text{Povurp04}_i, \text{hhtoiltacs}_i, \text{cdiar2whf}_i, \text{chlddpt}_i, \text{chldvita}_i, \text{brst1hr}_i)$$

$i = 1 \dots n$ the number of States and where,

hhtoiltacs = % of households in State that have access to a toilet,

cdiar2hf = Children who got diarrhoea in the last two weeks who were taken to a health facility (%).

Chlddpt = Children 12-23 months who have received 3 doses of DPT vaccine (%)

Chldvita = Children age 12-35 months who received a vitamin A dose in last 6 months (%)

Brst1hr = Children under 3 years breastfed within one hour of birth (%)

We can also see the impact of ICDS in this context by adding PCicds to it.

The estimates for model 2 are given in columns 2 and 3 of Table 9. All variables in the model are found to be significant, and the model explains 82% of the interstate variation in malnutrition, marginally lower than the 84% explained by the model 1 (for both estimates based on SURE procedure). The residual impact of poverty on malnutrition is somewhat lower in this model than in model 1 though the difference is not statistically significant. Household access to toilets, breast feeding of infants and vaccination of children have the expected sign. The effect of vitamin A

supplements is the opposite of the hypothesised. This suggests that there is something wrong with the process of supplementation. This could be due to the absence of any link between vitamin A deficiency and the receipt of the supplement and/or the replacement of vitamins by spurious products. Alternatively the receipt of these pills could be leading to adverse changes in food consumption behaviour. Similarly the proportion of children with diarrhoea that go to a health facility seems to worsen malnutrition. This implies that a visit to a health facility after a diarrhoea attack has a negative effect on nutrition. It implies that, either (a) the treatment provided by the health facility does not compensate for the effect of inconvenience to the patient even if the staff sincerely does its job and knows what treatment is appropriate, or (b) That the staff is indifferent or incompetent and either provides no treatment or wrong treatment which worsens the situation.

Table 9: Dependent variable Children younger than 3 in 2005-6 who are underweight(%)

1	2	3	4	5	6
	Model 2a	Model 2a	Model 2b	Model 2b	Model 2c
		Sure ¹		Sure ¹	Sure ¹
<i>Independent Variables</i>					
Poverty Rate URP (%)	0.250 2.0*	0.242 2.3**	0.193 1.4	0.181 1.6	0.149 1.4
HH access to toilets	-0.175 -3.0***	-0.174 -3.5***	-0.174 -3.0***	-0.178 -3.6***	-0.192 -4.1***
Diahoric chld(2wk):Health facility	0.158 2.2**	0.186 2.3***	0.123 1.6	0.144 2.2**	0.141 2.1**
Chld Breast fed in 1 hr of birth	-0.090 1.4	-0.094 -1.7*	-0.045 -0.6	-0.038 -0.059	
Child vaccination (DPT 3 shots)	-0.282 -3.6***	-0.293 -4.3***	-0.320 -3.7***	-0.035 -4.9***	-0.037 -5.7***
Children receiving Vitamin A	0.226 6.5***	0.259 2.6***	0.226 6.5***	0.287 2.9***	0.290 2.9***
Per capita expenditure on ICDS			-0.053 -1.1	-0.054 -1.3	-0.069 -2.0*
Constant	50.40 6.5***	49.02 7.4***	55.90 6.2***	55.90 7.3***	58.32 7.8***
F (chi in Sure)	17	135	15	148	148
Prob > F	0.0000	0.0000	0.0000	0.0000	0.0000
R-squared	0.82	0.82	0.83	0.83	0.83
Adj R-squared	0.77		0.77		
Root MSE	5.0	4.4	5.0	4.3	4.3
No of observations	29	29	29	29	29
Notes:Fn ¹ hntoiltacs=135***-0.88***povurp04+2.1*** eduf8-1.2***edu0(R ² =0.7); cdia2hf = -23 + 0.85*** cdia2ors + 0.76** eduf0 - 0.71* eduf8 - 0.24*** pcicds (R ² = 0.65); brst1hrf = 144*** - 0.53** erlymrgf + 1.6*** eduf8 - 1.3*** edu0 (R ² =0.65); chlddpt = 71*** + 1.1*** eduf8 - 0.39* eduf0 - 0.17***pcicds (R ² = 0.47); chldvita = 19 + 0.62***erlymrgf + 1.6*** eduf8 - 0.7*** edu0 (R ² =0.4); Numbers in bracket are t statistics, Stars show confidence level *=10%, **=5%, ***=1%					

If the ICDS variable is introduced into the model 2 equation and estimated by OLS, it is not significant but also eliminates the significance of poverty, breast feeding of infants and visit of a child with diarrhoea to a health facility (Table 9, column 3). The 'SURE' estimate however shows that the last variable remains significant (column 4). The supplementary equations for this model (given in footnote of table) suggest that ICDS is tending to reduce visits to the health facility visits and reduce vaccination of children. Dropping of the breast feeding variable from the model equation and re-estimation with SURE procedure makes the ICDS variable significant at 10% but leaves poverty non-significant. This suggests that the impact of ICDS on nutrition is not as clear cut in model 2 as in model 1.³⁰

As both models seem to work the question, which arises is whether we can sharpen our policy conclusions by integrating them in some way. We do this in an ad hoc way by first dropping the variables that are clearly not significant in either model, namely education and early breast feeding of infants. Then the two models are integrated without the ICDS variables model 3a). The results are shown in column 2 of Table 10. Three variables, toilet access, TV ownership and vitamin A supplements, loose significance completely and are dropped. The modified model is estimated without the ICDS variable (column 3) and then with the ICDS variable (column 4). Both the vaccination variable and the ICDS are found to be non-significant. Column 5 therefore shows the final version of this ad hoc model without these two variables.

The combined model therefore contains the poverty rate, two information variables from model 1 (media exposure and early female marriage) and one health variable (children with diarrhoea in the last 2 weeks who were taken to a health facility) from model 2. This model 3 therefore explains a marginally higher proportion of interstate variation (0.86-0.88) than model 1(0.84-0.86) or model 2(0.82-0.83). The co-efficient on poverty is also of the same order of magnitude as in the final versions of models 1 and 2, in the range of 0.14 to 0.18. The co-efficient on regular media exposure (-0.36 to -0.4) and early marriage (0.16 to 0.18) are comparable to those in model 1(-0.39 & 0.14 respectively). The co-efficient on the variable children with diarrhoea in the last 2 weeks who were taken to a health facility (0.11 to 0.2) is also similar to that in model 2 (0.14).

³⁰ The results for malnutrition up to 5 year olds is similar except that poverty and ICDS are both highly significant.

Table 10: Dependent variable is Children younger than 3 in 2005-6 who are underweight (%)

1	2	3	4	5
	Model 3a	Model 3b	Model 3c	Model 3d
	Sure ¹	Sure ²	Sure ³	Sure ⁴
<i>Independent Variables</i>				
Poverty Rate URP (%)	0.173	0.149	0.141	0.175
	1.8*	1.8*	1.7*	2.1**
Media Exposure (female) %	-0.491	-0.440	-0.398	-0.363
	-3.8***	-4.4***	-4.0	-4.5***
Married by 18yr (F 20-24yr) %	0.181	0.176	0.162	0.178
	2.3**	2.5**	2.3**	2.5**
HH with TV (%)	0.037			
	0.36			
HH access to toilets	0.020			
	0.33			
Diahoric chld(2wk):Health facility	0.158	0.164	0.114	0.200
	2.3**	3.2***	1.9*	4.4***
Child vaccination (DPT 3 shots)	0.100	0.090	0.055	
	0.9	1.3	0.8	
Children receiving Vitamin A	0.006			
	0.06			
Per capita expenditure on ICDS			-0.034	
			-1.2	
Constant	44.94	45.47	49.60	43.07
	5.2***	5.7***	5.6***	5.4***
F (chi in Sure)	192	187	198	177
Prob > F	0.0000	0.0000	0.0000	0.0000
R-squared	0.87	0.87	0.88	0.86
Adj R-squared				
Root MSE	3.7	3.7	3.5	3.8
No of observations	28	28	28	28
Notes: Fn ¹ (subsidiary equations estimated in SURE)				
hhtoiltacs=116***-0.79***povurp04+2.0*** eduf8-1.0***edu0 (R ² =0.7);				
chldvita = 39** + 0.51***erlymrgf + 1.6*** eduf8 - 0.85*** edu0 (R ² =0.41);				
Hhtv=-4.2+0.71*** hhelect(R ² =0.71)				
Mediaexpf=43***+0.31*** Hhelect+0.9*** eduf8 - 0.3* eduf0 (R ² =0.84);				
cdiar2hf =4.3 + 0.73*** cdia2ors - 0.35 eduf8 + 0.45 eduf0 - 0.27*** pcicds (R ² = 0.67);				
chlddpt = 65** + 1.3*** eduf8 - 0.43 eduf0 - 0.16***pcicds (R ² = 0.50);				
Fn ² (subsidiary equations estimated in SURE)				
Mediaexpf=40**+0.27*** Hhelect+0.93*** eduf8 - 0.25 eduf0 (R ² =0.84);				
cdiar2hf =20 + 0.62*** cdia2ors - 0.11 eduf8 + 0.28 eduf0 - 0.31*** pcicds (R ² = 0.67);				
chlddpt = 82** + 1.5*** eduf8 - 0.63 eduf0 - 0.22***pcicds (R ² = 0.51);				
Fn ³ (estimates are almost the same as in Fn ²)				
Fn4 (subsidiary equations estimated in SURE)				
Mediaexpf=37***+0.32*** Hhelect+0.87*** eduf8 - 0.24 eduf0 (R ² =0.84);				
cdiar2hf =15 + 0.70*** cdia2ors - 0.18 eduf8 + 0.33 eduf0 - 0.32*** pcicds (R ² = 0.67);				
Numbers in bracket are t statistics, Stars show confidence level *=10%, **=5%, ***=1%				

Our conclusions regarding the importance of information, knowledge and education are therefore strengthened. At least as far as child nutrition and health are concerned, the negative aspects of the available health system (mistreatment, negligence, non-treatment) seem to be more powerful than any positive effect that vaccination etc may have. Further even the information benefits of ICDS may be less than more focused and effective public health education through the media and schools.

4.5 Policy Implications

Improvement of public health education and public health facilities clearly has a positive effect on nutrition outcomes. The ICDS program seems to have helped in providing public health education to mothers and thus contributed to the outcome. The policy implications, however, extend beyond nutrition to other health outcomes. A comprehensive program for improving civic amenities of a public health nature to a defined standard is necessary to remove visible symbols of divide between rich and poor that slums and other neighbourhoods with poor drainage and sewage create.

For every existing town, States must plan and install a modern drainage, sewerage and water supply system with water storage and purification, sewage treatment plants and garbage disposal sites. The impact in terms of economic activity, health and nutrition can be enormous. Government should help develop consultancy firms that can Plan and organize such systems and organizations that can compete with each other to build these systems across the country. Once 100% coverage of towns is attained, we should extend the planning effort to semi-urban areas and villages in co-operation with Panchayati Raj institutions and NGOs. We may not be able to match the quality of public health and civic services routinely found in the villages of High income country's, but we must target a quality level equal to that of middle income countries.

This brings us back to the broader question of other quasi-public goods that are of critical importance to the poor. Literacy can help in acquiring knowledge about hygiene, nutrition and sanitation. Government must ensure that every citizen, has the education that (s)he is supposed to acquire with the completion of Primary education. But this education must also be made more relevant by providing information on matters that will improve their lives (health, hygiene, nutrition) and equip them to find useful information.

5 CONCLUSION: Pro-Poor Growth

Many sectors of the economy are directly under the purview of the States, in terms of policy or government expenditure or both. There are, however, still Central government policies (e.g. labour) that impede aggregate economic growth or poverty reduction. Given such growth constraining policies, each State has the option of adjusting its own rules and procedures to minimise the negative effects of these Central policies as well as to improve the policies that come directly under its purview. States that have done so have been more successful in accelerating growth during the 1990s, while those that have not done so have seen little acceleration. Some States have even deteriorated because of worsening governance and deteriorating investment climate in the State. This paper has concluded that the most critical areas distinguishing State growth performance have been communication and highways and connecting roads, which are the age old arteries of commerce. To multiply the benefits of these two growth drivers we must provide a positive policy environment for the growth of trade, hotels, restaurants, construction, real estate and townships. The paper therefore recommends that the poorer States' expenditure allocation put primary emphasis on roads and the country build an interconnecting road grid of a standard equal to that of the middle income countries.

The paper also shows that inter-State differences in poverty rates can be largely explained by differences in per capita GDP, agricultural growth and the share of the bottom 40% of the population in consumption. Thus the only way to eliminate poverty is to accelerate growth, focus programs on agriculture and rural development in the poorer states and target subsidies on the bottom 40%. The last implies that to eliminate exclusion errors, anti-poverty programs must include a certain proportion of people just above the poverty line. Further, subsidies must be eliminated for the upper 50% of the population, as they have little direct social welfare benefits, but distort incentives and thus have a negative effect on growth. The latter indirectly reduces social welfare.

The paper demonstrates, by analysing nutrition outcomes, that the greatest social welfare benefits from direct intervention by government to improve the lot of the bottom 40% can come if it focuses on two long neglected quasi-public goods. First, Public health including communicable disease and vector control, quality drinking water, drainage, sewerage and solid waste disposal in every city, town and village in the country .

Second universal primary education and literacy to a global standard that is visible in outcomes. Curricula must be tailored to transform agricultural households into workers in modern manufacturing and service and empower them to deal with difficult informational issues. These include utilising their benefits under government programs, safeguarding their health and dealing with health and education providers. Declaring victory based on enrolment and moving on to higher levels will not help the poor, but perpetuate the poor performance in basic education. This has to be augmented by increasing their access to specific skill, by unleashing the abilities of the service sector.

5.1 Five Point Program

We can summarise the implications for government planning and programs in a five point action program for pro-poor growth:

5.1.1 National Road Grid

Roads are both literally and figuratively the pathways to the growth of agriculture, services and industry. Connect every village (habitation), town and city with all-weather, paved/ metalled roads of specified standard in five (10) years. Road connectivity is particularly important in the poorer States and regions, where growth has not picked up. The existence and quality of the roads should be monitor able by a web enabled information system.³¹

Remove controls and restrictions on trade and transport at the State and local level. Plan for the provision of land on the sides of district roads and block road junctions so that economic activity, such as trade, hotels, restaurants and repair facilities can spring up. Plan National and State highways keeping in mind that underpasses and/or parallel local roads may have to be built in many places as economic activity spring up on the sides.

5.1.2 Public Health & Town Planning

For every existing town, plan and install a modern drainage, sewerage and water supply system with water works, sewage treatment plants and garbage disposal sites. The impact in terms of economic activity, health and nutrition can be enormous. Help develop consultancy firms that can Plan and organize such systems and organizations that can compete with each other to build these systems across the country. Once 100% coverage of towns is attained, extend the planning effort to semi-urban areas and villages in co-operation with Panchayati Raj institutions and NGOs.

³¹ According to the World Bank, World development indicators 2007, only 47% of Indian roads are paved.

Allow and encourage private entrepreneurs to build hundreds of new townships / towns in semi-urban, semi-rural areas. Connect these to the nearest highway and water-supply mains. Scrap expropriatory sections of the Rent control act(s) and corresponding rules and procedures, so that the private sector can build and provide rental accommodation for the lower middle class and the poor.

5.1.3 Water Management

There is an urgent need to improve the comprehensiveness and quality of water planning and management at every level (Centre, State, district, town, panchayat, and smallest farmer). Water harvesting, water shed development, recharge of water bodies and aquifers, must be planned and implemented in every nook and corner of the country. Education and demonstration of models with the active participation of NGOs can play an important role. Dams and canals have a place in cutting down the flow of water into the sea, recharging aquifers and supplying dry areas and parched towns. Tube wells in depleting aquifers must be discouraged through proper pricing of electricity and perhaps even the pricing of water coupled with grant of per farmer water credits.

5.1.4 Education and Skills

Universal Primary education is too readily identified with universal enrolment and low drop-out rates, rather than the ability to count, read, write and explain at the primary completion level. Before declaring victory and moving on to target universal secondary education we must ensure that every young person (25 or below say) meets the global standard of Primary education. Government must set up testing, standards and certification systems that can determine if these standards have been met.

The only way to ensure this is to empower every youth with a debit card, which allows him/her to purchase primary education from any school including any government school. The set of authorized uses of the debit card will be fully funded by the government. The funding of the government school and part of the administrators/teachers' pay must be linked to the total debit card receipts (monthly fees paid through the debit card). These schools must also be graded by an independent education rating agency, relative to the private schools, so that students/parents have the information to make choices.

Every youth, rural or urban, after completing primary education must also have access to the six thousand or so globally identified skills. This

requires a massive joint effort by government, NGOs and private skill providers. Government must provide funding for the poor while all possible private and foreign expertise and experience is attracted to India to provide training in all these skills in the next five years.

5.1.5 Telecom Connectivity

The USO fund must be used to ensure that the mobile footprint covers 99% of India in the next five years. Open access to physical infrastructure and land lines (including telegraph and electricity wires) and fibre optic networks must be ensured in rural areas for attaining universal access to internet in the next 10 years.

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