Management of Land and other Resources for Inclusive Growth: India 2050

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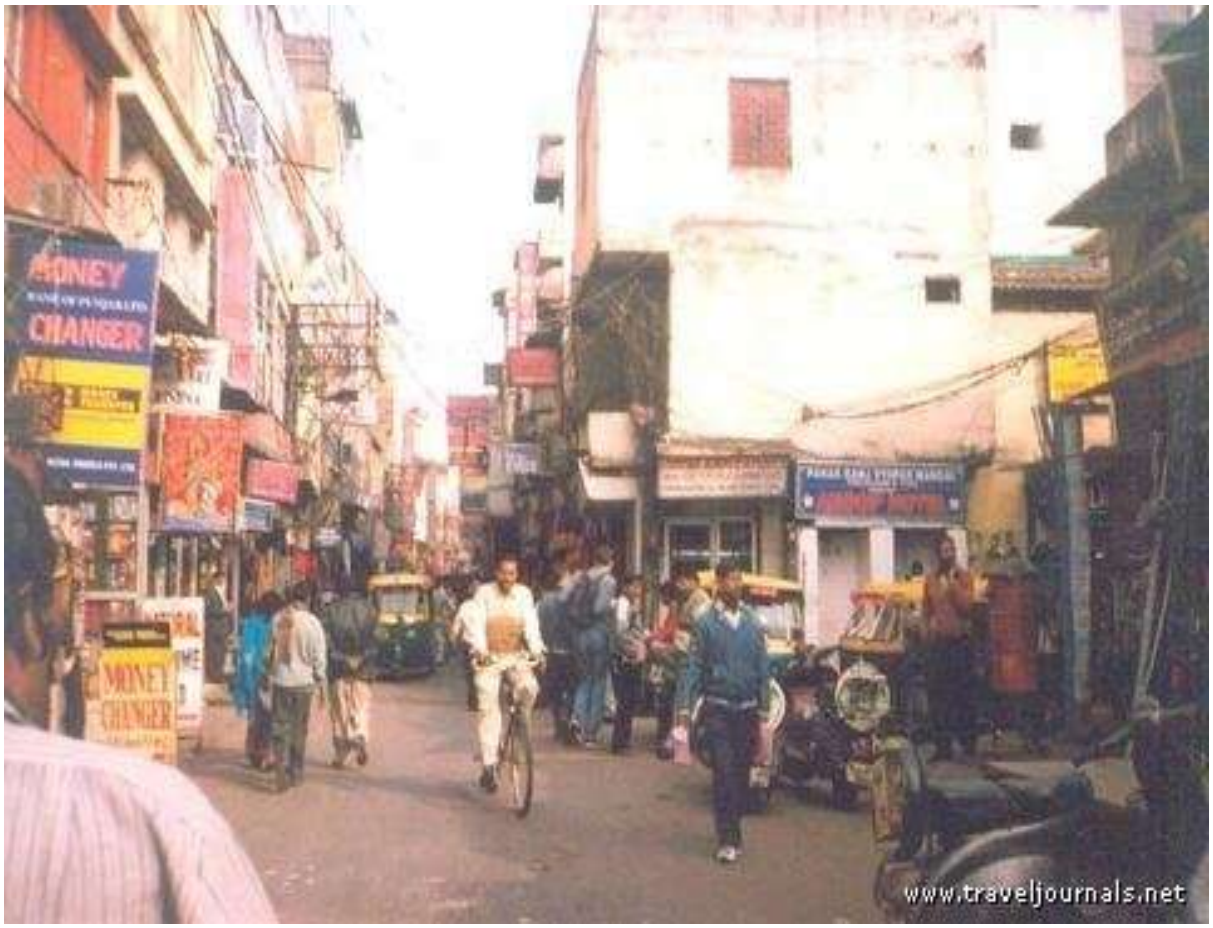

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CONTENTS

LIST OF TABLES

LIST OF BOXES

Management of Land and other Resources for Inclusive Growth: India 2050

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Synopsis

This paper proposes an alternative holistic model for urban and rural development taken up in tandem that can, in the long run, promote a rational and equitable utilization of national resources and economic growth. Part I of the paper presents a comprehensive overview of the current status of the economy characterized by growing inequality, low agricultural productivity, land availability for urbanization and various competing demands, water resource mismanagement, unemployment, underemployment and low levels of skill development. Part-II proposes an alternative model of urbanization, better resource management and development that can lead to distributed prosperity or what has been called 'inclusive growth'.

1. Introduction

Land (including minerals and forests), water and energy are the major resources which have to be managed in an integrated way for sustainable development, since **India has only 2% of the global land, 4% of water but 16% of the population of the world.** At present, land use is very poorly regulated, and both government departments as well as private agencies are acquiring and grabbing land wherever possible, and using it for their limited purpose without considering any integrated planning and use of land. The management of human and financial resources is also critical for sustainable and inclusive growth. At present the natural resources are being developed and used at a comparatively faster rate during the last decade due to increased economic activity. It is only through the careful and integrated management of these resources that we can provide livelihood for all and prosperity to the nation and each household.

At present, the GDP growth of approximately 8% in the previous 5 to 6 years has been mainly contributed by the services sector and industry sectors. **Agriculture currently contributes 18.5 per cent to the GDP while supporting 51% of the population, which cannot be sustained if those dependent on agriculture have to be moved out of poverty.** At present the population living on agriculture is being sustained through subsidies in the form of cheaper water, energy and fertilizer besides fixing a minimum purchase price, and almost half the country's population is below the poverty line (BPL).

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It is obvious that a new way for raising quality of life in the rural areas would have to be found which would require a major shift in terms of how the problem is addressed. This will draw on careful planning and regulated use of all resources as well as the innovation and entrepreneurship capabilities of our population. **Our paper suggests a vision and plan that includes an alternative urbanization model and various policy measures to address these problems.** Our analysis suggests that with efficient use of land and water a minimum culturable area of 185 million ha (including net 65 mha irrigated area with 150 per cent intensity) along with 65 mha for forests would be needed to meet the food production requirement of 455 million tonnes in 2050 and maintaining the ecology and forest produce. Only the balance 45 mha would be available for other purposes like urbanization, industrialization and infrastructure. The industry and service sectors will support most of the population and this will lead to higher GDP growth. Sustainable population on agriculture and forest activities has been projected in this plan at about 400 million (out of a total population of 1.6 billion in 2050).

Our paper suggests that population distribution among the different type of urban areas should be planned and designed in such a way, through appropriate policy measures, that a majority of the urban population (600 million out of a total planned urban population of 1 billion) is located in 4000 small towns with a population of 1.5 lakh each. These towns would be within easy reach from the villages making all facilities of education, health, skill training institutes, financial services and entertainment etc. available, suitable to local requirements. This needs a major focus for inclusive development of the population living in small towns and villages. Most of the jobs and new skill creation can be focused on the younger population of 18 to 35 years. The balance urban population of about 400 million would be distributed in bigger cities including metro cities.

In order to carry out these measures we suggest **autonomous public regulatory bodies** (with adequate authority) to frame rules, allocate land and water for various purposes, in an integrated manner so as to sustain development as well as ecology. The regulatory bodies will not only allocate land and water and frame the rules for the same; they will also strictly monitor the implementation of their directives. The regulatory bodies would be located in each state with basic principles and policies being framed by the central body in consultation with the state bodies. In framing the policies for efficient use and monitoring local gram sabha/panchayat would also have to be involved fully with suitable degree of authority delegated to them.

PART I

2. GROWING INEQUALITY IN THE INDIAN ECONOMY

World over, despite the recent recession, the benefits of globalization are being celebrated in all types of economies. India's own economic strength has increased tremendously in the last 15 years with the GDP reaching the growth rate of approximately 8% per annum in the last 5-6 years. Yet the wealth distribution across the strata of society has become far more dangerously uneven than the pre-globalization era. In fact, the gains of this growth have not trickled down to small towns and villages because most of the development has centered on and around the cities and major towns. Poverty and inequity have worsened in the last decade and a half. The Gini coefficient (with values of zero for no inequality and one for extreme inequality) for India was relatively low and stable for many decades but has

been rising in the last two decades. It was 0.32 in 2004-05 on the basis of NSS consumption data. Moreover, the extent of inequality in India is actually much higher than this, as the Gini coefficient often refers to inequality of income distribution, while in India's case it refers to distribution of consumption expenditure (Bardhan 2009)[2].

For the number and percentage of persons below the poverty line, the Planning Commission estimates that 27.5 per cent of the population, or nearly 302 million people, was poor in 2004, down from 36 per cent in 1993 (Planning Commission, 2008b). However, estimates of the poor population by different agencies vary substantially. Recently, in 2008, the N C Saxena committee set up by the Planning Commission itself estimated that over half the country's population is below the poverty line! This growing inequality has now become a pressing issue for the country and needs to be addressed, sooner than later, as in the case of most high growth economies.

This unfortunate situation has very negative consequence for the country's poor. The country's per capita income at current prices is a little over Rs 37,000 per annum (GOI 2009b). In purchasing power parity terms, this is equivalent to approximately Rs 150,000 per annum. But the purchasing power is unevenly distributed as indicated in **Table 1** below. Thus, there is wide inequality between top 10% and the bottom 25%. The contribution towards GDP is also mostly by the top 10%, and the 8% plus growth rate also primarily involves and benefits the top 10 to 30% of the population. The service sector and industry cater primarily to their needs in big urban areas.

Table 1
Purchasing power of various sections of society

Population in percentage	Purchasing power	Location of the population
Top 10%	High	Mostly urban
Upper middle class 20%	Moderate and growing	Mostly urban
Lower middle class 20%	Basic necessities plus some consumer goods	Mostly urban and some in rural areas
Poor (Just above poverty line - APL) 25%	Just basic necessities	Rural and slums in urban areas
Poorest (BPL) 25%	Even basic necessities not available	Rural and slums in urban areas

Source: Authors' estimates based on reports of various national and international agencies.

The worrisome issue of poverty in the country, despite the rapid GDP growth, is intricately linked with a number of several equally complex issues of continuing low agriculture productivity, mismanagement of land, water and energy resources, extremely poor infrastructure in rural areas (power, roads, telecommunications), growing unemployment/marginal employment in rural areas and the inability of a

[2] Bardhan points out that according to NCAER collection of income data in the households survey 2004-05, the Gini coefficient of income inequality for India is as high as 0.535.

vast sections of illiterate and unskilled population to respond to the needs of the rapidly changing economy.

3. LOW AGRICULTURAL PRODUCTIVITY

The relative share of the agriculture sector in GDP has been consistently falling (see **Table 2** below). The share of agriculture, forestry and fishing in GDP has decreased from 24 per cent in 2001-02 to 18.5 per cent in 2006-07. The compounded annual growth rate (CAGR) (see **Table** 3 below) of the GDP as a whole during the tenth plan period (2002-07) was 7.6 per cent, while the CAGR for agriculture, industry and services were 2.1, 8 and 9.5 respectively (Planning Commission, 2008b: 139). In terms of the sectoral share of employment, **agriculture and mining provided employment to 66.08 % of the workforce in 1983, this has consistently fallen to 50.80 per cent in 2006-07**. And the Planning Commission estimates that during the ten-year period 2006-07 to 2016-17, there will be a net decrease of 4 million agricultural workers. Again, it is notable that the number of **main workers** in agriculture declined by 18 million during the period 1991-2001 while there was a large increase in marginal workers in agriculture during the same period. **The incidence of unemployment in rural agricultural households increased from 7.73 per cent in 1983 to 15.26 in 2004-05** (**Table 4**). It is more than evident that with the sharply declining share of agriculture in GDP as well as employment, it will be extremely difficult to lessen poverty and economic inequality in the country without reducing the dependence on agriculture by shifting substantial population from agriculture to the industry and service sectors.

Table 2: Sectoral Share in GDP (in %)

Year	Agriculture, Forestry, and Fishing	Industry (Manufacturing)	Services
2001-02	24.0	25.0 (14.8)	51.0
2002-03	21.5	25.8 (15.2)	52.7
2003-04	21.7	25.6 (15.0)	52.7
2004-05	20.2	26.1 (15.1)	53.7
2005-06 (QE)	19.7	26.2 (15.1)	54.1
2006-07 (RE)	18.5	26.6 (15.5)	54.9

Note: The data given here are not comparable with the data used in the Ninth Five Year Plan and MTA Documents as the base year has been changed by CSO from 1993-94 to 1999-2000.

Table 3: Growth Rates

Sector	CAGR in Ninth Plan	CAGR in Tenth Plan
GDP	5.5	7.6
Agriculture, forestry, and fishing	2.0	2.1
Industry (manufacturing)	4.5 (3.8)	8.0 (8.7)
Services#	8.1	9.5

Construction is included in Services. Figures in parentheses relate to manufacturing.
Source: Central Statistical Organization, quoted in GOI (2008b).

Source: Planning Commission (2008b) quoting Press Note, 31 May 2007, National Accounts Statistics 2007, CSO.

Table 4
Incidence of Unemployment among Rural Agricultural Households
(CDS basis)

Year	Unemployment Rate (%)
1983	7.73
1993-94	9.50
1999-2000	12.29
2004-05	15.26

CDS: Current daily status
Source: Planning Commission (2008a)

Indian agriculture is currently among the lowest in the world in terms of productivity (**Table 5**). The gross fixed capital formation in agriculture also fell from 3.1 per cent of GDP in the Sixth Plan period, (1980-85), to an estimated 1.9 per cent in 2005-06. During the eleven-year period 1994-2005, the rate of increase in per worker GDP in agriculture was only 2.24 per cent per annum as compared to 4.35 per cent per annum annual growth in overall GDP per worker. In view of emphasis on high-value floriculture and horticulture for export, between 1990 and 2005, the respective cropped areas under cereals and pulses fell from 103.3 mha and 24.7 mha to 97.7 mha and 22.5 mha.

Table 5
International Yield Comparisons across a Range of Agri-commodities
Yield in Wheat (kg/ha)

Country	2003	2004	2005	2006	% change '06 over' 03
China	3,931.96	4,252.07	4,275.39	4,455	13.30%
France	6,249.89	7,578.74	6,988.67	6,740.72	07.85%
India	2,610	2,713.18	2,601.57	2,618.96	0.34%
USA	2,971.67	2,902.91	2,902.17	2,825.28	-4.93%

Yield in Rice (kg/ha)

Country	2003	2004	2005	2006	% change '06 over '03
China	6,060.78	6,308.73	6,250.83	6,265.15	3.37%
India	3,117.66	2,975.06	3,152.08	3,123.08	0.20%
Indonesia	4,542.65	4,536.49	4,574.62	4,771.93	5.05%
Vietnam	4,638.74	4,855.26	4,883.32	4,891.43	5.45%

Source: FAO Production Yearbook, various years

Agricultural holdings also declined from 1991 to 2001. Given the status of the agriculture sector it comes as no surprise that thousands of farmer suicides – a national shame – continue unabated and it is reported that 40 per cent of the farmers want to quit their traditional occupation.

The falling productivity in agriculture is being caused by several interlinked factors - low productivity of land due to use of chemical fertilizers and pesticides over long periods, soil and water pollution, inefficient use of land and water resources, poor extension and advice services, declining public investment in agricultural research, development and infrastructure, absence of land redistribution and emphasis on modern seed technology. In fact, according to the report of International Assessment of Agricultural Science and Technology for Development (IAASTD),

progress in agriculture has been achieved in many cases at a high social and environmental cost, making poor people vulnerable to high food prices amid extremely low incomes (Steiner, 2008). The country provided about $1 billion in subsidies to 550 million farmers in 2001, and is obliged by the World Bank and the IMF to eliminate even this.

While the contribution of agriculture to GDP has fallen from 56 per cent of GDP in 1950-51 to 18.5 per cent in 2006-07, there have been corresponding increases in the share of industry and services sector[3], as discussed above. Modern services account for 15 per cent of GDP but employ 8 per cent of the workforce, whereas traditional services account for 39 per cent of GDP and employ 20 per cent of the workforce (Shariff 2007).

Industry and services are more often located in urban areas. As may be seen from **Table 6** below, the urban share of net domestic product has gone up from 37.65 per cent in 1971 to 51.7 per cent in 2000. It is clear that in future too an increasing percentage of the NDP will come from urban areas and from the services and manufacturing sectors. Also, as **Table 7** shows, the percentage of the poor in urban areas (19.9) is less than the percentage of the poor in rural areas (23.9).

Table 6
Urban Share of Net Domestic Product (NDP)

Year	% Share
1970-1	37.65
1980-1	41.09
1993-4	45.73
1999-2000	51.70

Source: Central Statistical Organization (2007: 192-3).

Table 7
Percentage of Poor in Different Size Classes of Cities/Towns

City/Town Size	1993-4	1999-2000
Large Towns/Cities	18.4	14.2
Medium Towns/Cities	27.6	20.4
Small Towns	33.2	24.2
All Urban Areas	27.4	19.9
Rural Areas	35.7	23.9

Source: Kundu & Sarangi (2005)

The vast untapped reservoir of humanity in rural India is waiting to be integrated into the regional, national (and therefore, stepwise, into the global) economy. This integration is urgently necessary for economic as well as for ethical reasons as the millions of marginalized people continue to suffer due to wrongful policies and lack of a supporting infrastructure.

Our ex-president Abdul Kalam has been vigorously advocating for the 'Providing urban facilities in rural areas' (PURA) approach to develop our villages and take

[3] Services sector can be broken up into modern and traditional categories, the first covering IT, communications, wholesale business, banking and insurance and the second occupations such as manual transportation, small hotels and restaurants and artisanal professions.

pressure off from big urban areas but this approach has not been seriously taken up by the government or policy-makers.

4. LAND AVAILABILITY AND COMPETING DEMANDS

Since land is limited and its demand for various purposes is increasing in an unplanned manner it is extremely important to plan for appropriate land use for the future.

Table 8
Land area of India by usage: current and projections for 2020 and 2050 (mha)

Usage	Area reported (1995-96)	Area reported (2005-06)	Projection for 2020	Projection for 2050
Culturable area	**195***	**194**	**185**	**185**
Net sown area	142	142	142	142
(Net* irrigated area)	(54)	(60)	(65)	(65)
(Net rainfed area)	(88)	(82)	(77)	(77)
Area covered by trees and pasture#	15	14	15	20
Culturable waste land	14	14	09	05
Current fallows	14	14	11	10
Other fallows	10	10	08	08
Forest area	69	69	65	65
Non-agriculture use (urban, road, etc)	22	25	40**	45
Barren	19	17	15[@]	10[@]
Total area reported	305	305	305	305

Note: Fractions have been rounded off for 1995-96 & 2005-06.

* Net area refers to the actual area covered on the ground and should not be confused with the claimed irrigation potential.

This includes orchards and areas with low tree density, that are not classified forests and which yields fruits or NTFP, primarily for local use.

** Since pace of urbanization, industrialization and infrastructure growth have accelerated.

[@] Some of the barren and degraded land would have to be improved and used for non-agriculture use.

Source: GOI, Ministry of Agriculture (2007) for current land area; projections by authors.

Land availability (**Table 8**) as reported is 305 mha in the year 2005-06. The culturable area is 194 mha including 60 mha net irrigated area and the balance 134 mha rainfed area (including wasteland, trees and pastures, etc.). The forest area is

69 mha while non-agricultural area is 25 mha and barren area is 17 mha. In recent years the pace of urbanization, industrialization and other infrastructure requirements has started to move faster than assumed earlier and as such these uses are likely to occupy more land than envisaged earlier. There is a possibility that the culturable area and the forest area would be encroached upon. It is, therefore, necessary to have an integrated planning of non-agricultural use so as not to affect the agricultural and forest production to ensure food security and environment. Now there is also a demand for producing petroleum products like diesel and petrol from crops. **A public regulatory authority (PRA) needs to be set up to plan in advance, regulate land use, inform all concerned, and then monitor the use of land[4].**

The concentration of land ownership is also intensifying, as seen in the unprecedented race for acquiring agriculture land in all region of the country for creation of SEZs, setting up of industry, hydro projects, thermal power stations, road transport and disposal of waste. The repercussions of this land takeover are extremely alarming.

The haphazard use of land is caused by a lack of integrated policy for land use for various purposes. The state governments and private players use the areas owned by them according to their requirements. There are no rules and regulatory acts to encourage an integration of the requirements for various purposes. At present the demand has suddenly arisen for:

(a) expansion of cities
(b) industry and infrastructure development
(c) defence and railways
(d) agriculture – food, bio-fuel, cash crop, orchards
(e) forest and its products
(f) mining – the major ones are iron ore for steel, bauxite for aluminium and coal.

5. URBANIZATION

The historical trend of growth of urban population is being fuelled by the massive economic growth in the post-globalization period. As a consequence, the demand for land for various purposes is increasing in an unplanned manner.

Tables 9 and 10 below provide basic information on urbanization trends and urban population in India over the last few decades.

The UN report on World urbanization prospects (UN, 2005) predicts 55 per cent of Indians will live in cities by 2050.

Table 9
Total and Urban Population (in millions) in India

Year	Total	Urban	Per cent
1951	361.09	62.44	17.3
1961	439.23	78.94	18.0
1971	548.16	109.11	19.9

[4] For a brief discussion and outline on the design and working of a public regulatory system operating at multiple levels in the context of water resources, see Kathpalia and Kapoor (2006).

1981	683.33	159.46	23.3
1991	846.39	217.55	25.7
2001	1,027.02	285.35	27.8
2007*	1,134.25	332.01	29.3

Source: ADB (2009)--Estimated using United Nations (2005) projections of growth rates.

Table 10

Some basic facts of India's Urbanisation: 2001	
Total urban population	▪ 285 million ▪ percentage to total population of India (27.78) ▪ percentage to world's urban population (10.02) ▪ percentage to Asia's urban population (21.10) ▪ larger than the total population of small countries like France, Germany ▪ larger than the total population of big countries like Brazil, USA ▪ larger than the total population of parts of continents like Eastern Africa, Western Asia, Western Europe ▪ larger than the total population of the whole continent of Australia
Top population of 35 million-plus cities	▪ 107.88 million ▪ percentage to total urban population (37.8) ▪ these 35 cities belong to the large group of 206 million-plus cities of Asia
Total population of 393 class-I cities	▪ 195.95 million
Including million-plus cities	▪ Percentage to total urban population (68.67)

Source: Sivaramakrishnan et al (2005)

According to Sivaramakrishnan et al (2005) natural increase accounts for the principal share of urban growth of a little under 60 per cent. The share of new towns within the context of the census is less than 10 per cent. Territorial expansion of urban areas provides another 13 per cent whereas net rural-urban migration has contributed only about 21 per cent to the overall urban growth.

The study further brings out that class I cities and towns have grown at a faster rate. The bulk of India's urban population of about 69 per cent lives in such cities. The number of metropolitan cities has also gone up to thirty-five from twenty-three with 38 per cent of the urban population living in such cities. **Large city growth has therefore been the most significant component of urban growth.**

6. UNEMPLOYMENT AND UNDERUTILIZATION OF HUMAN RESOURCES

Low productivity of the country's huge rural agrarian economy has created large scale unemployment and underemployment in the country. It is a paradox that with the opening of Indian economy and subsequent economic growth the unemployment rate in the country has been going up. It was 6.06 per cent in 1993-94, 7.31 per cent in 1999-2000, 8.28 per cent in 2004-05 and 8.36 per cent in

2006-07. However, this was primarily due to a sharp drop in the pace of creation of work opportunities in agriculture, as noted in **Table 4** above. However, according to Planning Commission projections, the unemployment rate is expected to fall to 4.83 per cent in 20011-12 and to 1.12 per cent in 2016-17 (all figures in this section are from Planning Commission 2008a).

India has one of the largest labour forces in the world but the least number of skilled workers. According to the NSS 61st round, among persons aged 15-29 years, only 2 per cent are reported to have received formal vocational training. The proportion of trained youth in India is one of the lowest in the world. The corresponding figure is 96 per cent in Korea, 75 per cent in Germany and 80 per cent in Japan, for instance. Moreover, even in the next few years 80 per cent of the new entrants to the workforce will have no opportunity for skill training as the training capacity in the country is only 3.1 million per annum against 12.8 million new entrants to the workforce per annum (Planning Commission 2008a).

Also, 39 per cent of the Indian labour force is illiterate, 25 per cent has had schooling up to the primary level while 37 per cent has had schooling up to the middle or higher level. Consequently, **although we have the youngest population in the world (median age in 2000 – 24, as compared to 30 for China, 38 for Europe and 41 for Japan), at least 70 per cent of the workforce in both rural and urban areas does not possess any identifiable marketable skills.**

The vast unskilled, uneducated workforce not only is a huge burden for the planners, it also undermines the desired global competitive strength and exposes the economy to the risk of stagnation. The growing mismatch between the size/quality of educated manpower and the demands of newly emerging sectors is going to be a serious challenge in the next decade. And as Shariff points out, due to increase in domestic demand a substantial labour and skill pool is needed to sustain even the domestic markets. For instance, Nasscom (the National Association of Software and Services Companies) estimates a national shortage of almost 5 lakhs software engineers by 2010. This, in turn, exerts pressure on the global demand for labour, either manifested by fewer people leaving India or a rise in exports of manufactured goods and services (Shariff 2007).

PART II - TOWARDS AN ALTERNATIVE MODEL OF DEVELOPMENT

The above problems being faced by a society that aims at becoming an economic power and at the same time wants to take the fruits of economic development to the most underprivileged citizen demand concerted policies based on long-term forecasts. The development history of the country shows that the host of mismanaged subsidies and other development policies have not helped in improving the condition of the agriculture-dependent population and in reducing inequality. As Khosla and Dey (2006) observe, the rural population is caught in a vicious development trap, where adequate levels of services are not provided in rural areas because of problems on both the demand and the supply side. On the demand side, the population has a low ability to pay for them. The aggregate demand for services is therefore low. On the supply side, because of lack of adequate infrastructure, the cost of services demanded and supplied leads to high cost of services and often a total non-provision of these services. This leads to low effective demand for goods and services, which feeds back to low incomes. Similarly, a number of commentators have observed that what villages need most is good transportation links to the markets and services in urban areas. For instance,

Indiresan (2008), who is a strong advocate of the PURA approach along with ex-President Abdul Kalaam, emphasizes this point.

The key to poverty removal and reduction in inequality is therefore, economic empowerment of people by providing the essential infrastructure, skills and services to the poor, developing their entrepreneurship and enabling access to markets through better transportation and connectivity. At the same time, it is necessary to have an integrated planning of both agricultural and non-agricultural sectors so as to increase agricultural production in order to ensure food security and conserve the environment. This has to keep in view the increase in population and its stabilization by 2050. Through this integrated planning the major inefficiencies of the rural economy can be tackled relatively easily by making simple changes to the system so as to increase productivity. Khosla and Dey argue that even a modest 10% increase in economic productivity would mean 14 billion US dollars of additional income (see section 7.1 below). This could potentially raise the country's growth rate above 10% (Khosla and Dey, 2006).

7. RE-ENGINEERING URBANIZATION

Since most of the jobs are being created through expansion of industry, services and trade, which are largely urban-based activities at present, it is obvious that the population from the villages would either shift to urban areas or travel to these areas if they are nearby. According to Khosla and Dey (2006), urbanization of a country's population is both a cause and a consequence of economic development. The problem, therefore, is how can one urbanize the population of rural India without the attendant rural to urban migration? Clearly the solution is to urbanize the rural population in place. This urbanization can be achieved in place only by bringing to the rural population all the services and functionalities that are normally only available in cities to the rural area itself. **Table 11** below lists the goods and services for which rural people visit towns and cities. **Table 12** lists the population thresholds for selected services in India.

In the light of the above, we argue that the foremost strategy in working out a rejuvenating rural economy and ushering a new wave of agriculture productivity and economic growth is a complete restructuring and reorienting the current rapid urbanization process. This orientation needs to be achieved through integrated planning with efficiency and cost effectiveness in the least time (with improved logistics and implementation schedules) as seen, for instance, in building of Metro Rail in Delhi. **Indeed, reverse migration and stabilization of economically vulnerable populations at their very roots can be a realistic proposition due to emerging social, economic, technological and environmental changes.** In making this argument we disagree with the policy conclusion arrived at by Sivaramakrishnan et al that special efforts for the growth of small and medium-sized towns are futile.[5]

[5] According to Sivaramakrishnan et al (2005), "there is not much merit in pursuing a program for small and medium towns. While the case for improving urban services is common across the board, a program like the Integrated Development of Small and Medium Towns (IDSMT) has not succeeded in reducing or deflecting large city growth. Whether in comparatively developed states like Maharashtra or Punjab or in other states like Bihar or Rajasthan, it is seen that the growth rates of IDSMT towns continue to be below the average growth rates for the small and medium towns in the state and well below the rate of class I cities."

Table 11
List of Services and Goods for which Rural People Visit Towns/Cities in India

I. Consumer Goods
- Kerosene
- Beedi / Cigarette / Tobacco
- Tea powder
- Soap (washing / toilet)
- Footwear (leather / plastic)
- Cotton cloth (dhotis / saris)
- Books (notebook / texts)
- Electrical goods (bulbs, battery, torch)
- Medicine (ayurvedic, allopathic)
- Woollen clothing (blankets, sweaters)
- Grocery (sugar, salt, edible oils, dal)
- Tea and snacks

II. Durable Consumer Goods
- Radios / Transistors / TV
- Bicycles
- Furniture (cots / chairs / tables)
- Utensils (aluminium, brass, copper, bronze)
- Jewellery (silver, gold)
- Hardware

III. Farm Inputs
- Seeds
- Fertilizers
- Pesticides / insecticides
- Farm implements (diesel oil / petrol)
- Farm machinery (pump sets, diesel engines, tractors)

IV. Construction Materials
- Cement
- Wood
- Bricks and tiles
- Steel rods and fabricated structures

V. Repair of Equipment
- Tractor repair
- Pump and motor repair
- Diesel engine repair
- Cycle repair
- Radio repair
- Watch repair

VI. Education
- Primary school
- Middle school
- Secondary school
- Senior school / junior college
- College / technical training institute
- University

VII. Medical Services
- Government dispensary
- Govt. hospital (in-patient treatment)
- Private allopathic doctor
- Maternity centre
- Veterinary services

VIII. Public Services
- Courts (tehsil / district)
- Tehsildar's office
- District commissioner's office
- Block level offices
- Patwari / village muncif
- Gram panchayat office / meeting place
- Post office
- Telegraph office

IX. Sale of Farm Products
- Grain
- Cash crops (variable)
- Vegetables
- Milk / ghee

X. Credit
- Primary credit societies
- Land mortgage banks
- Scheduled banks
- Co-operative banks
- Money lenders

XI. Entertainment
- Cinemas
- Fairs
- Festivals

XII. General Services
- Carpenters
- Blacksmiths
- Goldsmiths
- Tailors
- Cobblers
- Barbers
- Priests
- Astrologers

XIII. Social Needs
- Marriages and related affairs
- Friends / relatives
- Social gatherings / functions
- Religious gatherings / functions
- Pilgrimage
- Caste panchayats

Source: Ramachandran (1989)

Table 12
Population Thresholds of Selected Services in India

Selected Services	Population Thresholds
Daily newspapers	55,000
District headquarters	52,000
Colleges	25,000
Tehsil headquarters	15,000
Cinema houses (permanent)	10,500
Banks	8,000
Secondary schools	5,000
Dispensaries (allopathic)	5,000
Cloth shops	17,00
Tea shops	1,100
Grocery shops	750
Tailor shops	750
Barber shops	750
Primary schools	500

Note:
1. Population thresholds refer to the population of the centre in which they are offered.
2. The estimates of thresholds are based on author's field studies.

Source: Ramachandran (1989)

One way to address this problem is to initiate reverse migration through creation of in-situ work opportunities in an autonomous and integrated manner. For achieving this, **what is now required is to create small towns. These will be created 50 to 100 km *from existing cities* and will cater to the needs of their population and to villages within a 20 km radius. We propose that 4000[6] small towns should be established -- either by developing existing towns (of 50-60 thousand population) or by building new ones, with average one and a half lakh population -- within the next 10 years. These towns will be specially designed to develop manufacturing and marketing and agricultural processing infrastructure as suitable to the local conditions, along with building of power, communication and transport infrastructure, provisions of skills, services and comprehensive network of civic amenities of high quality.** The planning for each location will ensure creation of facilities for education and health. Similarly effort has to be made towards the designing of 'nano' houses and other day to day necessities which are within the purchasing power and requirement of the inhabitants. **In this re-modeling of urbanization, 60 crores of the population out of the total of 160 crores as estimated in 2050 will be in small towns so that no village is beyond 20 km from smaller towns (except in a few remote hilly or desert areas, etc.).**

Each of the 4000 towns planned in this way will become a focal point attracting necessary private investments and expertise. In fact, it is estimated that an average population of one and a half lakh can provide a viable proposition for private

[6] The number of blocks in the country is about 7000.

investments. According to Deveshwar, CMD of ITC, for instance, "There are 6.4 lakhs villages and 60% of these villages have fewer than 1,000 people. So income levels in these villages will not justify creating infrastructure and connectivity for these low-density settlements. That is why very few companies service below-100,000 markets. So our model-e-Choupal-at one level helps the farmer improve his productivity and access to markets, and at another level, we are converting them into an economic entity and creating markets for tomorrow" (www.livemint.com, 25 May 2009). Such facilities would also encourage consolidation of smaller villages, say with a population of 5000 or less, into larger settlements, on a voluntary basis.

If infrastructure like power, communication, info-tech, education, health can be developed and facilitated by the government, then private investment will also flow faster. This development model would become inclusive and homogenous so that GDP growth will get more evenly distributed. An urbanized population spread more evenly over a large number of cities would be a better option for the future than a handful of overcrowded mega cities. Orienting urbanization this way will provide work opportunities at the grassroots so that the overcrowded cities are decongested.

Table 13 below gives the suggested distribution of population of 160 crores (1.6 billion) for the year 2050, while **Table 14** gives the estimated land requirement for different non-agricultural purposes in 2050.

Table 13
Ideal Population Distribution and Land Required in Year 2050

Type of settlement	Population per settlement	Number of settlements	Total population 2050	Population density/ hectare	Land requirement (mha)
Mega cities	2 crore	10	20 crore	400	0.5
Big cities	50 lakh	24	12 crore	400	0.3
Cities	10 lakh	100	10 crore	400	0.25
Small towns	1.5 lakh	4000	60 crore	200	3.0
Bigger villages	10 thousand	6,000	6 crore	100	0.6+0.1 for livestock
Small villages	2 thousand	260,000	52 crore	100	5.2+1.0 for livestock
Total		4,134 urban + 266,000 rural	160 crore		10.95 mha

Note 1: In this scenario 58 crore population, 36.25 per cent, will be rural, and 102 crore population, 63.75 per cent, will be urban.

Note 2: About 800 districts are expected by 2050 (as against 676 districts at present). A little over half of these districts will be rural districts, without major cities.

Note 3: With urbanization and consolidation of villages, total number of villages is expected to come down to 266,000 from 638,000 at present.

Note 4: A typical rural district will have 7 to 10 small towns, 10 to 15 bigger villages and 500 small villages. The majority of small towns and bigger villages (about 75%) will be located in the predominantly rural districts, while about 25% of small towns and bigger villages will be located in the more urbanized districts.

Currently, some of these benefits have already started moving down from cities to smaller cities and towns. Some businesses of IT and communication, agro-processing and small industries have started moving to the backwater moffusil areas mainly because of cheaper infrastructure facilities being provided by the state. Many non-metros have benefited from these changes. As local economies grow in size, markets too will diversify and more jobs will be created in and around these cities. States like Kerala and Tamil Nadu have demonstrated that this could be achieved. These two states have built a seamless network of small towns and villages well connected by roads and communication links.

Table 14
Land requirement for different non-agricultural purposes, 2050*

1	Households	9.5 mha
2	Industries	15.0 mha
3	Roads, rail, airport & seaport	15.0 mha
4	Mining, rivers, etc.	5.5 mha
	Total	**45.0 mha**

* Refer to Table 8 above
Source: Authors' estimates

The Kerala government has also recently announced that it is working on a 25-year land use master plan. This draft policy, expected to be presented to the state cabinet in November-December 2009, reportedly incorporates a number of policy suggestions made in this paper. For instance, it will ration land for housing, agriculture and industry, to boost food production and to avert an 'imminent eco catastrophe' (Ajayan 2009).

7.1 Rural Infrastructure & Services Commons (RISC): Khosla and Dey Model

Khosla and Dey (2006) have also suggested a similar model for distributed urbanization for the country. Named as RISC (Rural Infrastructure & Services Commons), this model is built around development of 5000 urbanized clusters each covering within its command, population living within a 40 kilometers circle so that one can cover most of the rural population. Although similar to our proposal, this model talks about urbanized clusters with a population of one lakh while we are proposing towns with one lakh population to provide infrastructure and services to villages within a 20 km radius. Most of the population in each circle would be about 20 km from the cluster center, well within a bicycle commute of such a center. These 5000 cluster centers could provide the basis for small, but critical mass towns around which the rural economy could develop. In fact, much of this infrastructure exists around existing small Tier III/IV towns (about 4000 of them), the 5000 or so railway stations the 5000 'haats' or informal weekly markets in the country,

These clusters are to be the focus of most rural investment rather than scattering it among individual villages. This will result in a critical mass for each cluster of 100 villages or 100,000 villagers rather than a larger number of sub-critical mass

individual villages. As a result, the money will get a substantially higher rate of return and spurring economic growth. According to the authors, these clusters could provide the infrastructure for power, communication, healthcare, education and government services to kick-start market economy; create sufficient demand for goods and services so the system can become autocatalytic. The idea here is to make available at the center of such a circle all the services and functions that are normally only available in a city.

Furthermore, the core set of infrastructural services can support a full set of appropriate services critical for rural economic development. These services will be reliable and inexpensive so that users who require these as part of their inputs can use them easily and efficiently at optimum prices. The critical mass of consumers and producers together with cost-effective infrastructure, that reduces the cost of services, will achieve autocatalytic criticality and hence significantly enhanced economic growth.

Economic Validity of Distributed Urbanization: Khosla and Dey have also indicated the economic returns possible from the RISC model. Assuming the current average daily per capita income in rural areas of 1 US dollar (or 360 USD for the whole year), then the annual income of the 100,000 target population of a single RISC cluster will be about 36 million US dollars (equivalent to 1620 million or 162 crore rupees, at current conversion rates). Assuming that the presence of the RISC actually increases productivity and economic efficiency so that the economic output of the population goes up by say 10%, the increase in economic output will be roughly 3.6 million US dollars in a year (Rs 16 crore approximately). If half of this increased output is considered as increased income of the population, then nearly 2 million US dollars per year will be in hand to pay for the services available at the RISC. Therefore, the annual gross revenues per RISC will be around 2 million US dollars (Rs 9 crore approximately) and the aggregate revenue for about 5,000 RISCs is approximately 10 billion US dollars (Rs 450 billion or Rs 45,000 crores) in a year.

8. CONDITIONS FOR ESTABLISHING EFFICACY OF DISTRIBUTED URBANIZATION MODEL

The design of 4000 small-town urbanization model will require creation of several conditions to establish its efficacy for delivering self-sustaining development at the grassroots. These conditions are: enhancing agriculture productivity in the surrounding rural areas of a town, rational and sustainable use of land and water resources, bringing about occupational shift of people as per the needs of the town economy, preparation of entrepreneurs, creation of infrastructure and various services and access to markets (local/ regional/ national/ global).

The identification of towns can be done on the basis of population of 50,000 to 70,000 which could then go up to about 1.5 lakh by the year 2050. The population of 1 to 1.5 lakh has been considered suitable because it could attract private investment with a reasonable return in the field of education, health institutions, skill training of various kinds (there is huge shortage of masons, carpenters, electricians, mechanics etc. already) and all other facilities which are available in bigger towns. The basic infrastructure would have to be initiated and facilitated by the government. A large number of ITI and Engineering colleges by the government are being setup and being improved. A large number of such colleges/institutes are also being approved in the private sector. Most of these could be located in small towns (one lakh population). Even industries and other

professionals with suitable skilled staff would find it attractive to stay in small towns and provide services to villages. As the recent industrial and SEZ projects have indicated, they want to be located near the bigger towns so as to be able to provide all facilities to their staff. If good facilities are provided in small towns then such projects and industries will be willing to come up in small towns. Even doctors and health staff with all professional and personal facility would be willing to stay there and serve the villages better through mobile vehicles.

The land allocated for efficient use should be such that both urbanization and industrialization grow vertically rather than horizontally as indicated in the above table. All projects should indicate land required and how efficiently it is being used, when submitted for environment clearance.

Recently UP Government has issued a notification calling for qualification for planning and development of new townships in Uttar Pradesh. This only indicates a permissible F.A.R. 2.5 under total area of township. There is no mention of the population density in these townships. Similarly, Haryana Government is being pressed to increase the density of population from 625 persons per hectare to 1500 with the higher ground coverage area from 35% to 50%, in order to build smaller, more affordable homes, in the Gurgaon area. **This indicates the immediate necessity of setting up Public Regulatory Authority which could frame the rules keeping all aspects in view and then monitor the situation and the implementation of those rules.** Some state governments are setting up new townships that are planned and designed in an integrated way, considering all land use aspects and requirements. Punjab government, for instance, is setting up the Mullanpur township in Greater Mohali region with a 25 year Master Plan (Jurong Consultants 2008).

8.1 Population Sustainable on Agriculture Land

The table below gives the operational holding required under irrigated, rainfed and trees and pastures required to sustain a family of 5 persons with higher productivity using new techniques. In the case of forest areas only 50 million ha has been taken into account for small income groups, who depend upon minor forest produce (MPF) while the balance 15 mha would generate higher income through timber.

Table 15
Population Sustainability and Minimum Requirement of Land: India 2050

	Minimum land required for decent living per family of 5	Total area (mha)	Population sustainable (million)
Irrigated land	4 ha	65	81*
Rainfed land	10 ha	75	37.5
Trees & pastures	4 ha	20	25
Forest areas	5 ha	50**	50
Total population sustainable on agriculture and allied			193.5
Population sustainable on other non-farm activities and farm labour in villages			206.5
Total population in all villages			400

* Rounded off from 81.25 million

** Only 50 mha has been taken into account for small income groups (MFP); the balance 15 mha would generate higher income because of timber use.

Source: Authors' estimates

8.2 Bring about Agricultural Turn-around

An essential requirement for the development of a small town as enterprise will be the development of agriculture in its surrounding 'feeder villages' located within a circle of 20 km radius. It will require instilling a 'new green revolution' through adoption of a package of green practices. Productivity per unit of land will have to be increased through better seeds, bio-fertilizers and bio-pesticides, better crop management as per agro-climatic and soil zones. It will also require creation of bigger operational units without change of land ownership for reducing the cost of production through contract system, collective agriculture, product processing and storage to avoid wastage and marketing system and logistics. Pollution of land, soil and water, and damages to crops through industrial waste, especially from small units and coal dust, will be a top priority through proper treatment at source and heavy penalty for non-compliance.

The report of International Assessment of Agricultural Science and Technology for Development (IAASTD) also recommends that agricultural science place greater emphasis on safeguarding natural resources and on 'agro-ecological' practices, including the use of natural fertilizers, traditional seeds and intensified natural practices and reducing the distance between the producer and the consumer. At present about 30 per cent of the produce is wasted between the producer and the consumer. Ways to discuss this wastage are discussed below in sections 8 and 9.

Box 1: A Policy on Sugarcane

Sugarcane area and production varies according to sugarcane and sugar market price and export subsidy. In north India, the sugarcane area also varies according to wheat price which is an alternate crop during the part of the same period. Sugarcane production can be stabilized by liberalizing the sugar industry, making it free to produce sugar or ethanol directly according to internal requirement at market price with assurance of ethanol purchase in quantity and price, which should be contracted for at least 3-5 years. At present, ethanol produce from sugar is being exported for gaining carbon points, which is not desirable way of obtaining carbon points. Since sugarcane crop consumes huge amount of water, the export of its products, in fact, implies exporting subsidized water. Therefore, neither sugar nor ethanol should be allowed to be exported. The area under sugarcane should be restricted to the 4 to 5 mha, as at present.

The efficiency of water use for irrigated agricultural is 35-40% at present which can with better management and operation be increased to at least 60-70%. Pollution of fresh water should also be avoided by treating industrial effluents and sewage before putting it back to the river system. Use of chemical fertilizers and pesticides in agriculture should be reduced. Use of these over a long period has led to the agricultural land becoming deficient in organic matter and other minor elements. It is therefore necessary to use organic fertilizers and pesticides, which would also help in reducing the huge fertilizer subsidy besides improving soil productivity through increased organic content with higher water retention. As indicated in **Table 16** below, if the net irrigated area is restricted to 65 mha and the cropping intensity increased from 135% to 150%, then a production of 280 million tonnes of food grains with a average productivity of 4 tonnes/ha could be easily achieved (it is already been achieved in various other countries). In rainfed areas, which at present have a productivity of about 1 tonne/ha, this can be increased to 2.5 tonnes/ha giving a production of 175 million tones. ICRISAT has already demonstrated that agricultural productivity of more than 2.5 tonne per ha can be achieved in India.

Thus the total production can be 455 million tonnes in 2050. The area sown at present is 142 mha, which should not be allowed to be decreased. In fact some of the degraded land of all types should be improved and reclaimed.

Table 16
Production of food grains

S. No.		Unit	Present (2005-2006)	2020	2050
1.	Net area sown	mha	142	142	142
2.	Gross cropped area	mha	194	210	220
3.	Gross area used for food grains	mha	122	130	140
4.	Percentage of area irrigated	percent	46	50	50
5.	Gross irrigated area	mha	56	65	70
6.	Average Productivity (per ha) of Irrigated Area	tonne/ha	2.6	3.5	4
7.	Production of Food (Irrigated)	million tonne	146	227	280
8.	Rainfed Area Under Food Crop	Mha	66	65	70
9.	Average Productivity (per ha) of Rainfed Area	Tonne	0.95	2.00	2.50
10.	Food Production (Rainfed)	million tonne	63	130	175
11.	Total Food Production	million tonne	209	357	455
12.	Efficiency of Water Use (Ground & Surface)	percent	40	70	70
13.	Intensity of Cropping in Irrigated Area	percent	135	150	150

Note: 1. Fractions have been rounded off.

2. In order to achieve above production it would be essential to increase the water use efficiency from 40% to 70% (taking surface and groundwater together) and increase the intensity of cropping in irrigated area from 135 to 150, which are both achievable with concerted effort.

3. Food grains include rice, jowar, bajra, maize, wheat, barley, gram, tur/arhar.

Source: Figures for 2005-06 are from GOI, Ministry of Agriculture (2007 - Tables 4.1 to 4.4 and 14.4).

8.3 Water resources development and use

Development of rural economy around a small town as unit also demands rational use of water resources. In 11th Five-Year Plan, the irrigation sector, both central and in the states, has been provided funds as follows:

Table 17
Water Resources: Overall outlay for 11th Five-Year Plan (Rs crore)

State plan	182050
State sector schemes - Accelerated irrigation benefit program (AIBP) and others	47015
Central plan	3246
Total	232311

Source: Planning Commission (2008b)

The corresponding physical targets for work on major, medium and Extension, Renovation, and Modernization (ERM) projects are as follows (**Table 18**).

Table 18
Physical Target

No. of Projects included in Eleventh Plan	Major	Medium	ERM*
Completion of Projects			
Tenth Plan projects spilling into Eleventh Plan	166	222	89
New projects of Eleventh Plan	78	145	86
Total	244	367	175
Projects likely to be completed in Eleventh Plan	72	133	132

Source: Planning commission (2008b)
There are many unapproved projects which are being funded by state government as indicated by Planning Commission.
* ERM – Extension, Renovation, and Modernization

Necessity of ERM projects arises due to negligence of maintenance and repairs to existing projects on yearly basis. This is because the state governments are unable to provide funds from the normal budget (non-plan) while when the stage of EMR arises, these projects get funds from the Plan sector. **In view of the above, no new major or medium projects should be taken up but the amount could be more usefully spent on ERM projects and effort made to complete all the spillover projects.** Some of the Plan funds could also be spent on improving management and efficiency on other identified existing projects where maintenance and repair are being neglected so as to avoid these projects reaching the EMR stage.

Moreover, due to major rainfall occurring in 4-monsoon months, storages are necessary for distributing water throughout the year. New storage should be mostly by recharging groundwater through water harvesting of various kinds, maintaining minimum required river flows and using small storages on existing natural and man-made drainages, and avoiding pollution of water.

In future, major and medium dams should be constructed for generating power and flood moderation only and drinking water where absolutely necessary. The power should be generated for base load mostly during the whole year, to help maintain a certain minimum flow in the river downstream to make it alive. This necessity has been now understood in USA and they have already started operating the existing hydel projects for base load requirement, as stated by Prof. Geoffrey E Petts of University of Westminster. **No stretch of natural drainage, from a small stream to a river should be without minimum flow of water with 90% probability and no untreated water should be released from industry or urban areas.** Climate change is bound to make some changes in the occurrences of rainfall, in location, quantity, frequency and timing. But if the development of water resources is spread all over ranging from small water harvesting structures to big dams with efficient management and prevention of pollution, the impact of climate change can mostly be taken care of.

The area under the command of the existing projects (where water is not reaching due to whatever reason) should be reviewed and every effort made to supply water by efficient management, otherwise alternative means of livelihood should be encouraged or provided through training of youth in suitable skills. Even the projects under construction should be reviewed accordingly. This would also reduce repair, maintenance and management costs. The area taken out of command could

use groundwater along with water harvesting wherever possible. However effort should be made to provide an alternative livelihood before putting them out of command.

Table 19
Water Requirement for Various Sectors

Sector	NCIWRD - Water Demand in bcm		
	2010	2025	2050
Irrigation	557	611	807
Drinking water	43	62	111
Industry	37	67	81
Energy	19	33	70
Others	54	70	111
Total	**710**	**843**	**1180**

Source: Planning Commission (2008b)

The National Commission on Integrated Water Resources Development (NCIWRD) has indicated the water requirement for various sectors (**Table 19**). There is a necessity to improve the efficiency of water use in all sectors by recycling, reuse and avoiding pollution. However the maximum scope remains in the irrigation sector where a number of steps should be taken as indicated elsewhere in the paper. **Since the net irrigated area could be restricted to 65 mha with 150% intensity of irrigation and 70% irrigation efficiency to save upto 10-15% of water (while ensuring food security - see Table 8 above), no more water should be diverted from rivers. Now the focus should be on management, operation and maintenance of existing systems rather than new irrigation projects. Since the livelihood opportunities are more in the services and industrial sectors, new irrigation projects should no longer be considered as means to remove regional imbalances.**

8.4 Infrastructure, Services and Market Access

Over the next 15 years, India would need something like 50 billion sq ft of new housing and billions of sq ft of commercial construction. Much of this will have to be located in currently rural areas. The required investments will be astronomical. Therefore, the need for coordination, allocation of capital and logistics is critical. The features of the suggested small-town model in terms of economic viability, scale of operation and networking among the towns themselves will be ideal to meet the needs of providing affordable commercial infrastructure and housing in rural India. As discussed above, the small towns will serve as service centers to cover all villages within a radius of 20 kilometers in order to provide education, health, communication, financial and other services that are being provided in the larger towns and cities at present.

Market Access: The non-agricultural production of rural India is extremely diverse. The internet has lowered the barriers significantly for market access. Even small producers of handicrafts can reach consumers all the way across the world. Information about products and their characteristics that suit the market most will help in driving the rural economy to produce what is needed. This will generate employment and preserve traditional skills, while tuning them to national and global demand. In this connection, the CII-Ministry of Panchayati Raj initiative on Rural Business Hubs is excellent (www.rbh.in).

8.5 Human Resources: Bringing about Productive Occupational Shift

It has been estimated by various institutions that in another 10-15 years time India could be the country where the young population with skill and knowledge would be available, which most of the other countries except populous countries like China and Indonesia may require. It should be our aim to train the younger generation right from now for our own economic growth besides providing services to other countries through export of skilled manpower. **A big chunk of our human resources are and would be available in smaller towns and surrounding villages. It would be economical to train them in smaller towns rather than bigger towns. Some industries and services have already started moving in this direction and government and private effort should be combined to accelerate the process.**

1. In the table below on purchasing power of various sections of society, five categories have been mentioned, namely, top, upper middle class, lower middle class, poor (above poverty line - APL), poorest (below poverty line - BPL). In order that the poor are enabled to have a dignified existence, our target should be that in the next few decades we gradually eliminate last two categories by increasing the income levels of the poor (**Table 20** below). This was done in the railways long time back by eliminating the third class. Our effort should be that all those currently under the categories of the poor should be able to move up at least to the lower-middle class level. We should try that their income increases up to the limit which is tax free (at present this limit is Rs 2.5 lakh/annum).

2. It could be possible to achieve this by imparting various types of skills required at present in the small towns, as suggested above. If good roads and public transport are provided, people can travel to these towns, learn the skills and avail of the services available even while living in villages. This would go a long way towards increasing the access to education and health facilities and will have a tremendous impact on educational attainment, skill-building and health standards in the country. The current younger generation, in the age-group 18-35 years, will benefit the most in this design of things.

Table 20
Purchasing power--various sections of society and target for 2050

Population in percentage	Purchasing power	Location of the population	Target for 2050
Top 10%	High	Mostly urban	10%
Upper middle class 20%	Moderate to high	Mostly urban	50%
Lower middle class 20%	Basic necessities plus some consumer goods	Mostly urban and some in rural areas	40%
Poor (APL) 25%	Just basic necessities	Rural areas and slums in urban areas	-
Poorest (BPL) 25%	Even basic necessities not available	Rural areas and slums in urban areas	-

Source: Authors' estimates based on various studies

A large proportion of India's poor attached to agriculture and traditional services need to be shifted out to industry and modern services, which in turn suffer from a shortage of skilled human resources. The creation of small town-based urbanization will trigger this occupational shift. For the country, the proportion of the workforce in agriculture, industry and services should change to 45 per cent, 20 per cent and

35 per cent respectively over the next 10-15 years. Ultimately, by 2050, the total population sustainable on agriculture and forest should be only about 40 crores (25%), including people dependent on handicrafts, animal husbandry and other services (see **Table15** above and Shariff, 2007).

The above occupational shift will require human resource investments especially in states with lower levels of literacy but a huge pool of young people such as Uttar Pradesh, Bihar, Madhya Pradesh, Assam and Rajasthan. On the whole about 100 million people need to be provided with appropriate education and skills over time so that they can make the necessary switch. The 4000 small-town development model will thus ensure that India shows the way as a producer, consumer and supplier of skilled hands. Further, since much of the forest, mineral and tribal-occupied areas overlap, their balanced management through the small-town model in tribal areas will ensure benefits to the population in these areas besides environmental safeguards, forest produce and its marketing. In forest areas, lease /contract mono-culture should be either limited or avoided and multiple bio-diversity should be encouraged. The idea is that by 2050 only 25% of the population living in the villages is able to produce adequate food grains and yet has the essential facilities comparable to the facilities in urban areas.

Economies of Scale in Manpower Training: Although training human resource manpower is expensive, the average costs of this decrease when more people are to be imparted standardized training in large batches. One can imagine private training firms such as NIIT providing these services. A large number of training and education enterprises too will become viable.

Identifying and Encouraging Entrepreneurs: The fuel that powers any modern economy is the pool of entrepreneurs in it. Among the 700 million rural population of India, there must be hundreds of thousands of latent entrepreneurs, who need to be identified and promoted. One of the foremost requirements for the success of the distributed urbanization model will be to scout this hidden talent.

Cultural Rejuvenation and Creativity: Within the small-town ambience, its vibrant economy will automatically support a rejuvenation of local cultures and art forms providing opportunities to hundreds of hitherto unknown and unsung talented people - scientists, teachers, economists, dramatists, musicians, innovators, artists, poets, filmmakers, philosophers, reformers in the catchment population of over a lakh people. The tapping of this talent will help in promoting arts and literature as well as a number of social innovations for community welfare. As Khosla and Dey (2006) point out, to neglect (as it is happening in today's milieu) such talent is both ethically wrong and economically shortsighted. And it is an unimaginable loss to the nation and to the world at large that simply because we lack the resources for the proper tools and training, these people are never able to achieve their potential.

9. POLICY CHANGES

9.1 Land use

The land and water available, if managed properly, would be sufficient for a population of 1600 million in 2050 with much better standard of livelihood. The authors estimate that sufficiency is achievable provided the land and water is used very efficiently by all concerned, with innovative management. The environment and inclusive development could both be balanced, as indicated earlier, by maintaining a GDP growth of 8-10% for the next three decades.

- The present forest area and other tree cover are about 23 percent of the recorded total area of the country. This may at best go up to 25-26 per cent. Therefore the present target of going up to 33 percent should be revised in order to keep a balance between the environment and other requirements for development.

- Forests, tribal areas and mines overlap in the belt from Gujarat to Orissa; planning and development in these areas has to take care of livelihoods with minimum displacement. The provisions of the Land Acquisition Bill and the Resettlement and Rehabilitation Bill have to be fine-tuned keeping in mind these concerns.

- In order to ensure food security (production) and other requirements the culturable area of 185 million ha would have to be ensured as given in Table 8 above. This would enable a food production of 455 million tones by the year 2050 with efficient use of land, water and better management (Table 16 above). This is estimated to be the food requirement for the population at that time.

- Effort should be made to use any area for two or three purposes. Especially areas which have been used for building and infrastructure. The solar system of generating power should be utilized on all buildings and infrastructure wherever possible so that no extra land is required for this purpose. Similarly all these areas should also harvest water and recharge the ground water wherever it is below 5 meters (condition in October) as they have stopped the natural process of recharge. This should form part of the project and should be part of the rules for building construction.

- It should also be ensured that wherever wind power is generated the same land should be fit to be used for agriculture purposes and should not be located near the habitats of the villages to avoid noise nuisance. Otherwise it should be on land which cannot be used for any other purpose.

- No land should be used for dumping wastes of urban areas and agricultural wastes. Efforts should be made through appropriate scientific research to convert all these wastes into some form of energy and bio-fertilizers.

- Wetlands, tanks etc. should actually be enhanced and conserved so as to be used for ground water recharge, flood moderation etc. The low lying areas near rivers should be so used, so as to allow ground water recharge and flood moderation.

- Conservation of agriculture land over a longer period can best be achieved by using bio-fertilizers and bio-pesticides rather than chemical fertilizers. Nitrogenous chemical fertilizers are subsidized and used in excess; this pollutes the land and water over a period of time and the degraded land is difficult to treat. All agriculture bio-mass wastes should be used for this purpose and for producing bio-fuels.

- Research enhancement should be focused to come up with innovations to effectively increase the productivity of agricultural products, specially food and sugarcane per unit of land and water, comparable to international standards.

- There should be quick transmissions of research results to farmers through manufacturers and bulk purchasers of agriculture products, besides government's agriculture extension system, which needs to be improved.

- While encouraging retail outlets to large firms to avoid losses of agriculture products (which amount to about 30 per cent) from the field to the retail outlet, the rules governing them should also require them to help the farmers with finance, lease of machinery, technical knowledge and other inputs, specially to groups of small farmers so as to encourage bigger operational holdings. Mono-cropping under contract should be avoided in large continuous areas.

9.2 Water Use

About a century ago most of the water flowed into the rivers keeping them alive and helping in urbanization and industrialization along their banks. Since then with the introduction of irrigation by diverting the water from the river we have reached a stage where most of the rivers run dry for almost 8 to 9 months. The flood moderation during the monsoon period was obtained by the water spreading over the low lying areas adjoining the river bed, wetlands and recharge to the ground water. Most of the water logged areas were drained out back into river. Even the urban and industrial areas were drained out, mostly untreated into the river.

- Now the present situation demands a reversal of these policies; that is, all effort should be made not to divert any water from the river system especially for irrigation so that a minimum flow is maintained in the river itself including the tributaries and small Naalahs to help maintain the environment and ground water recharge. This flow should be maintained at 90% probability of water throughout the year. In order to ensure these storages of all sizes, small, medium and large, could be built for flood moderation and hydroelectric generation. However, while building these storages we should ensure minimum displacement of people and those displaced should be rehabilitated properly and provided training for new skills for their change of livelihood. No run-of-the-river hydroelectric generation should be allowed because it diverts the water through the tunnel leaving the river length of 20 to 30 km absolutely dry. This affects the people, life of the river and the environment. The hydroelectric generation located on the main river/stream should also be run mainly as a base station throughout the year with 90% probability so as to maintain the minimum flow as indicated above. This would also decrease the cost of installation of turbines.

- A minimum flow throughout the year will imply less polluted water, besides ensuring the life of the river and moderation in the flood level. It could also encourage cultural festivities (including ritual bathing), tourism and recreation along the river. In the lower parts of the main river, navigation would become most essential when no more land can be spared for national highways and rail transport.

- The policy of draining out all water wherever it gets collected in low lying land of all urban areas and big infrastructure like roads etc. has to be changed. Since the surface area has been stopped from infiltrating the water to ground water, special arrangements would have to be made to recharge the ground water. The recharge arrangements should be made at various places wherever it is locally possible but not collected together for recharge or drained out at one place.

- As indicated in **Table 8 and 16** only 65million ha irrigated area is required for ensuring food and other agricultural products for the population in 2050. This would obliviously require more efficient use of water with higher productivity. The focus should be on completing projects already under construction and up-grading existing projects rather than taking up new projects in major and medium water resources development.

- All the attention should be on management and maintenance of existing water resources projects.

- Earlier agriculture was considered as the main source of livelihood for major portion of the population but now the livelihood opportunities are fast changing from agriculture to services and industries, including manufacture. Therefore, there is no need to transfer water from one basin to another basin, or spreading the water thinly over a larger area to ensure livelihood of low quality.

9.3 Market Access and Financial Services

Bina Agarwal has suggested that ways of increasing productivity from small holdings to collectivities of farmers should be framed with the following six principles: (i) voluntariness; (ii) small size, constituted of, say, groups of 10-12 or 15-20 farmers; (iii) socio-economic homogeneity or marked social affinities among members; (iv) participatory decision-making in production, management and distribution; (v) checks and penalties for containing free riding and ensuring accountability; and (vi) group control over the returns and a fair distribution of the benefits, as decided transparently by the members (Agarwal 2010).

At present retail services by big corporates have been started in various states like Tamil Nadu, Maharashtra, Karnataka, Punjab, etc. But no specific regulator has been appointed or rules framed. It is necessary to ensure that these corporates not only buy a specific agriculture product but also help the farmers technically and financially, providing equipment on lease specially to small farmers and provide transport from the farm to the warehouses and cold storages and then to the retail outlets. In order to ensure that the small retailers in various towns do not go out of business even they should be supplied on wholesale rates. This would avoid the wastage of 30% of the produce from farm to the consumer but would also reduce the cost. Consequently, both the farmer and the consumer would gain.

In order to save the wastage of agriculture products and surplus over demand in certain years, the agriculture processing industries should be encouraged in small towns. This will also help in establishing the prices from year to year and reduce the fluctuation of income to the farmer.

The Agricultural Produce Marketing Act, the Cooperative Societies Act and other acts should be suitably amended and rules and regulations should be framed for food processing industries, contract farming and retail.

Besides access to markets, the poor need affordable credit to come out of the cycle of poverty. The box below lists a set of guidelines suggested by the Asian Development Bank for financing for poverty reduction for the urban poor.

Box 2
Tenets for Financing Framework for Poverty Reduction for the Urban Poor

Broadly, a financing framework for poverty reduction should be based on the following tenets:

- First, improve market based linkages of the urban poor for (a) micro-credit, (b) social and economic infrastructure, (c) micro-enterprises, and (d) shelter.
- Second, improve the affordability of financial intermediation by reforming the legal and regulatory systems, both at the state and local levels.
- Third, enhance institutional and financial sustainability of poverty reduction programs through (a) community based lending and savings initiatives, (b) leveraging internal resources and budgetary funds, (c) building partnerships between stakeholders, and (d) enhancing community empowerment.
- Fourth, rationalize subsidies in order to (a) increase borrower options, (b) reduce service delivery and transaction costs, (c) build consensus among various stakeholders, and (d) strengthen their capacities to identify and implement sub-projects.

Source: ADB (2009)

References

Agarwal, Bina (2010), 'Rethinking Agricultural Production Collectivities,' Economic and Political Weekly, February 27, 2010, Vol. XLV No. 9

Ajayan (2009), Kerala government aims at 25-year master plan for land use,' Mint, 23 November, 2009

Asian Development Bank (2009) Urban Poverty in India, BS Books, New Delhi

Bardhan, Pranab (2009), 'How unequal a country is India?' Business Standard, 05.09.2009

Central Statistical Organization (2007), National Accounts Statistics 2007, New Delhi: Government of India

FAO (2008), Production Yearbook, Food and Agriculture Organization, Rome

Government of India (2007), Agriculture Statistics, Ministry of Agriculture

Government of India (2009a), India: Urban Poverty Report 2009, Ministry of Housing and Urban Poverty Alleviation and Oxford University Press, New Delhi

Government of India (2009b) Economic Survey 2008-09

Indiresan, P. V. (2008) 'Rurbanisation is solution', The Hindu Business Line, 12.0.2008

Jurong Consultants (2008), Mullanpur Local Planning Area, Greater Mohali Region Punjab, Master Plan Report 2008-2031

Kathpalia, G N and Kapoor, Rakesh (2006) Charting a New Course: A Strategy for Sustainable Management of India's Water Resources in the 21st Century, Alternative Futures and Daanish Books, New Delhi

Khosla, Vinod and Dey, Atanu (2006), RISC – Rural Infrastructure & Services Commons: A Model for Implementing the "Bicycle Commute Economy." http://www.khoslaventures.com/a-model-for-implementing-the-bicycle-commute-economy

Kundu, Amitabh and Nijanjan Sarangi (2005), 'Employment Guarantee-The Issue of Urban Exclusion', Economic and Political Weekly, 40(30): 3642-6

Planning Commission, Government of India (2008a), 'Eleventh Five Year Plan: 2007-2012' Vol I, Oxford University Press, New Delhi

_____, Government of India (2008b), Eleventh Five Year Plan: 2007-2012, Vol III, Oxford University Press, New Delhi

Ramachandran, R. (1989), Urbanization and Urban Systems in India, New Delhi, OUP

Shariff, Abusalah (2007), 'Problem of Numbers: Skill shortage could scupper high growth rates', Times of India, 22 November, 2007

Sivaramakrishnan, K C, Amitabh Kundu and B. N. Singh (2005), Handbook of Urbanization in India, Oxford University Press, New Delhi

Steiner, Achim (2008), 'New agricultural practices counter-productive', International Assessment of Agricultural Science and Technology for Development (IAASTD), UNEP Intergovernmental Plenary Meeting Opening, Address April 7

United Nations (2005), 'World Urbanization Prospects, 2005 Revision', Department of Economic and Social Affairs, Population Division, New York

Annexure 1

Public Regulatory System Operating at Multiple Levels for Water

By **regulation** we mean: (i) allocation of water for different areas; (ii) the pricing of water for different uses within a state; and (iii) laying down of rules and guidelines for water development projects. Also, monitoring of the actual allocation done.

The functions of the Public Regulatory System will include the following:

- Framing rules for allocation of water at different levels upto the sub-watershed level (10,000 ha) and for pricing of water for different uses. Also, making the rules for development of new water projects at various levels.
- Regulation of groundwater level, upper and lower limits, on advice of hydrological experts.
- Regulation of downstream releases.
- At the sub-watershed level, the regulatory body will advise about the allocation of water for different uses, such as for agriculture, forestry and industrial units to be set up.
- At the sub-watershed level the regulatory body will also advise farmers on cropping patterns.
- Pricing of water for different uses (in different areas).
- Monitoring of the allocation done and of the rules for development of water projects.
- Framing guidelines for giving **limited areas** on lease to private parties for water development, management etc.

Ultimately, these functions will be carried out by the River Basin Organisations (RBOs), but till such time that the RBOs are created autonomous regulatory bodies will have to be set up at various levels, as shown below in **Box 3**.

Box 3
Public Regulatory System at Multiple Area Levels

- Lowest level: Gram Sabha or Village Water Committee under panchayat (1000 ha)
- Sub-watershed level (10,000 ha)
- Watershed level (50,000-1 lakh ha) (corresponds to district level)
- Sub-river basin or tributary level
- Full river basin level (RBO)

Annexure 2

Public Regulatory System at Multiple Levels for Land

By regulation we mean: (i) allocation of land for different purposes; (ii) the pricing of land for different uses within a state; (iii) framing rules and guidelines for land development and rehabilitation of inhabitants for safeguarding the land for agriculture and forest purposes and environment protection; (iv) monitoring of the actual allocation and implementation of the rules.

Box 4
Public Regulatory System at Multiple Administrative Levels

- Lowest level: Gram Sabha/Panchayat (upto 10 thousand ha)
- Block level (10-50 thousand ha)
- District level (up to 1lakh ha)
- State level
- Policy Issues to be coordinated at the central level.

Functions of the Public Regulatory System

1. Identify 7,000 small towns including existing towns of 50 to 60 thousand population.
2. Survey to identify existing facilities of education, skill development, health, services and trades of various kinds, agriculture processing, manufacturing of other articles from local raw materials, energy development and availability of water (rainfall, surface, ground water).
3. Plan for upgrading the efficient use of land, water and local generation of energy.
4. Earmark land for agriculture, forests, urbanization, industry and infrastructure for each village (6,000 population) small towns and the district level.
5. The public representatives at each level should be involved and consulted for fixing the land use for each purpose.
6. To monitor the efficient use of allocated land and development for the next 30 years.