

# Beyond “GDP Growth”

New Delhi, 1<sup>st</sup> October 2008

Pavan Sukhdev

# Who (and Why) are We ?

The Green Indian States Trust (GIST), an NGO, was created to encourage India's policy and opinion makers to overcome their almost exclusive dependence on the archaic and limited economic compass of "GDP Growth" to measure and manage India's progress. GIST's vision is to create conditions for India to transit into sustainable development.

“GDP Growth” does not capture many vital aspects of national wealth and well-being, such as changes in the quality of health, the extent of education, or the quality and quantity of natural resources. Thus GDP accounts are inadequate to evaluate the trade-offs encountered by India's policy makers, and in the absence of an appropriate ‘sustainability’ yardstick,, the concept of ‘sustainable development’ in India remains at best an elusive dream. Visible symptoms of unsustainable development include large & persistent disparities in wealth levels between rural and urban communities, inadequate public investment in health & education, rapid natural resource depletion, and a widespread incidence of the “vicious cycle” of chronic poverty and environmental degradation in forest-dependent communities.

GIST thus promotes sustainable development by encouraging governments to make use of a holistic alternative - environmentally adjusted GDP. GIST has published a series of 8 monographs, under its Green Accounting for Indian States Project (GAISP), which adjust for externalities such as the un-marketed services of forests (carbon storage, bio-diversity values, ecological services, etc), the hidden costs of agriculture, losses in freshwater quality and depletion of sub-soil assets. Human capital externalities have also been evaluated and adjusted. Accounting and adjusting for externalities will make sustainable and efficient use of a country's resources.

# “GAISP” : 2003 to 2008

## .....THE PRODUCT



## THE TEAM.....

**Prof. Rajiv Sinha**

**Pavan Sukhdev**  
**Sanjeev Sanyal**

**P. Yesuthasan**

**Dr. Haripriya Gundimeda**

**Dr. Pushpam Kumar**

# How good a measure of Well-being is GDP Growth ?

.... *some opinions*

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**Partha Dasgupta & Karl-Goran Maler**

*Environmental & Resource Economics : Some Recent Development (July 2004)*

“ GNP per head (or, for that matter, HDI) can increase during an extended period even while wealth per head declines. Studying trends in GNP per head, or HDI, can be misleading in regard to economic prospects that may lie ahead. They could also mislead if we were to assess the past economic performances of nations solely in their terms”.

**Bill McKibben**

*Deep Economy : The Wealth of Communities and the Durable Future ( March 2007)*

“Growth, at least as we now create it, is producing more inequality than prosperity, more insecurity than progress .....We'll no longer be able to act wisely, either in our individual lives or in public life, simply by asking which choice will produce More.”

# Human Well-being

Does Well-Being come from more Production ? Or from more Capital ?



***“well-being is not just growth, it is also health, environment, spirit and culture”***

- Increase in *per capita availability of total capital* should be viewed as progress
- Conventional GDP indicator not concerned whether increases came at the expense of natural capital or human capital
- Real costs of depletion / degradation of natural capital is *felt* at the micro-level but not recorded by conventional GDP, nor brought to the attention of policy makers

# How good a measure of Well-being is GDP Growth ?

## .... some *examples*

### The following ARE included in computed “GDP growth” :-

- increase in government and private spending on flood damage & drought losses
- increase in medical spending on respiratory diseases
- increase in spending on school & university buildings
- the repair and reconstruction activity after the Tsunami

### The following are NOT included in computed “GDP growth” :-

- reduction of flood damage & and drought losses by increasing forest density & forest cover
- reduction of ambient air pollution by using cleaner fuels, greening cities
- increase in human capital (i.e. earnings potential) through education
- the loss of lives and livelihoods due to the Tsunami

# India's "9% GDP Growth" Obsession...

## India can sustain 9% growth: PM

BS REPORTER  
New Delhi, 14 February

Prime Minister Manmohan Singh today expressed confidence that, given the current rates of savings and investment, the country will sustain economic growth of close to 9 per cent in the medium term.

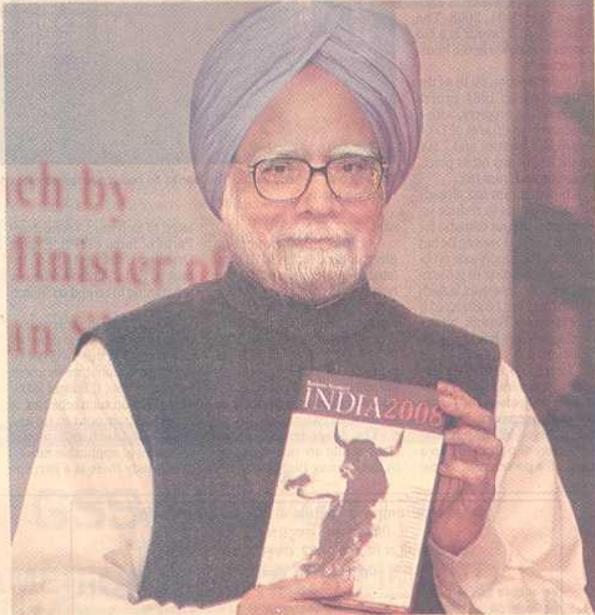
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"Our objective is to ensure that this growth process is inclusive, in all dimensions, and can be sustained while holding inflation under check. It has been our endeavour to ensure that inflation does not get out of control," Singh said while releasing *Business Standard India 2008*, the first offering of BS Books, the books division of Business Standard Ltd. The 300-page book has 14 chapters, written by pioneering economists and administrators, many of whom are *Business Standard* columnists.

The prime minister said sustained development was not like going to a free dinner party but required sound macro-economic policies designed to raise savings, investment and productivity.

The challenge, he said, was to get the policy right. "If we can get both politics and prices right, the economy would be on surer ground for sustained growth. That is not just a challenge for political parties. It is equally a challenge for those who are in the business of shaping mindsets."

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economy like India's could sustain fairly high rates of growth based on stable and sustained growth in the home market, even if there was turbulence in global markets. "I also believe that

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**BS Books, 15<sup>th</sup> Feb 2008**

## ECONOMY, FINANCE & MARKETS

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SATURDAY 16 FEBRUARY 2008

# 9% growth on despite slowdown: PM

Our Bureau  
NEW DELHI

PRIME Minister Manmohan Singh on Friday expressed confidence that the country will be able to achieve 9% growth rate. However, interest rate policy would focus on holding the price line — growth cannot be at the expense of inflation which hurts the poor and strains the polity.

However, he also admitted the country cannot be completely insulated from chilly global winds that may blow in its direction.

"I do not see a reason why we cannot sustain 9% growth even in the face of a global slowdown. The domestic economy has the potential to sustain such growth. The challenge before us is to ensure we tap into the potential and make it work for us," Mr Singh said, adding that all possible steps would be taken to help the in-

dustry. He was addressing a gathering of industrialists at FICCI's 80th AGM.

Speaking at FICCI's golden jubilee auditorium where a picture of Mahatma Gandhi smiled down on the gathering from the backdrop, Mr Singh echoed his theme that industrialists served as trustees of society. "Patriotism is not the monopoly of the political class," he said, underlining the shift in ideology: fanatics are no longer untrustworthy exploiters but partners in progress. "I sincerely believe the government and business can achieve a lot by working together to create both income and employment, wealth and welfare, prosperity and progress. Our captains of industry have played a vital role in nation-building. I salute you and wish you all success," Mr Singh said.

He took pains to describe what his government has done over four years and, for the next five years through the 11th Five-Year Plan, proposed to build physical and social infrastructure that



Prime Minister Manmohan Singh (R) and FICCI president Habil Khorakiwala at the inauguration of industry body's 80th annual session in New Delhi on Friday.

industry needs to sustain growth.

The prime minister also explained why battling inflation was top priority of his government. "An important policy stance we have adopted to ensure that growth is more inclusive has been to keep inflation under check...

Some of you are not happy about our emphasis on inflation control. It is things differently. Inflation is an invidious tax. It hurts the poor more than the rich." Mr Singh said the government's initiatives in agriculture and rural development, infrastruc-

ture, education and healthcare, along with efforts to keep inflation under check, would step up economic growth and make it more inclusive.

In all, prime minister's speech appeared as an attempt at showcasing the UPA government as the rightful custodian of impressive and inclusive economic growth. PM gave his government credit for higher growth and putting in place the basic architecture necessary for ensuring the growth is broad-based. Mr Singh also cited slower growth rate for the period 1997 to 2002 to portray how previous governments failed to fuel the economic growth. "The governments of the day were unable to insulate. They were nee-

Plan. He called it the most ambitious expansion in educational opportunities in the country since Independence.

He also highlighted the government's achievements in the infrastructure sector. "I read a lot about the poor state of our infrastructure. In effect, facts tell a different story." He cited airport modernisation, revolutionary transformation in railways and revival of private participation in power generation as key instances of turnaround in infrastructure sector.

In a positive signal to the industry, the prime minister chose not to mention his government's controversial proposal to impose job quotas in private sector for the underminded

**FICCI, 16<sup>th</sup> Feb 2008**

increase in actual outlays in the 11th an idea whose time had come.

**"GDP Growth" is a daily mantra... but...**

**....Are we measuring what matters ?**

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***Multiple Choice Question :***

**Which of the following was achieved by 9% GDP Growth ?**

- 9% improvement in our citizens' *health* ?**
- 9% more *education* – either quantity or quality ?**
- 9% increase in our citizen's *well-being* ?**
- 9% decrease in *poverty* ?**
- None of the above ?**

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# “Beyond GDP”

An International conference :  
November 19th & 20th, 2007, Brussels

*“Because National Accounts are based on financial transactions, they account nothing for Nature, to which we don’t owe anything in terms of payments but to which we owe everything in terms of livelihood.”*

Bertrand de Jouvenel, 1968

40 years  
later

Courtesy of European Parliament



650 delegates (politicians, scholars, institutions, corporations ) from over 50 countries supported the momentum to go “Beyond GDP”

**Conclusion :** *“GDP is unfit to reflect many of today’s challenges, such as climate change, public health, education and the environment”*

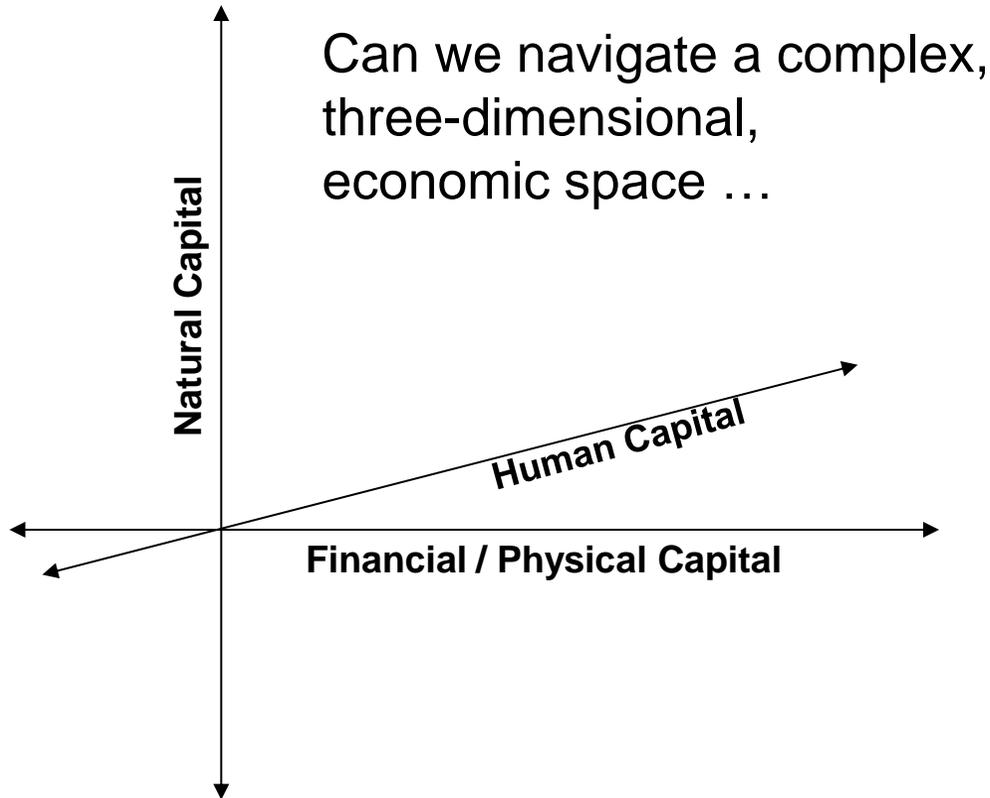
## Green GDP for India ..... is in the News !

**Economic Times, DELHI, 15th Sept 2008** : Concerned over the growing alarm over global warming, the Prime Minister's Office (PMO) has asked the ministry of statistics & programme implementation (MoSPI) to work out a system for computing the country's green GDP. Value of the resources degraded or polluted in the process of economic expansion will be used as a deflator on the real GDP to arrive at the country's green GDP.

India's green GDP would be significantly lower than its real GDP since economic growth here is resource-intensive.

According to officials in the MoSPI, the ministry has also been asked to speed up work on the national database of natural resource accounting, the primary requirement for calculating green GDP. The green GDP numbers might form a part of prime minister's national plan on climate change, which seeks to promote sustainable development.....

# Navigation Challenge Ahead !



... with a simple economic compass ?

***Question : Are there any better quantitative measures of progress ? Yes, two...***

## ***Alternative 1 : Green GDP***

- ❑ captures and integrates into National Accounts many significant externalities that are not reflected in traditional GDP accounts drawn up under the SNA (System of National Accounts of the UN)**
- ❑ Includes the valuation of non-marketed services of environmental assets, calculating the real value of education as a generator of future income, and present-valuing future liabilities such as pollution abatement costs and health costs.**
- ❑ Flow externalities as well as unaccounted depreciation / appreciation of capital Stock are estimated & internalized**
- ❑ Economic modelling and Contingent Valuation techniques are used to quantify & price externalities**
- ❑ For an accounting period, the exercise arrives at a revised value of net assets, and the difference year-on-year is a true measure of national savings, or “genuine savings”.**
- ❑ Alternatively, flow and stock adjustments for natural capital and human capital externalities can be estimated and posted alongside classical (unadjusted) annual GDP statistics.**

## ***Alternative 2 : Inclusive Wealth***

- ❑ measurement highlights the importance of holistic measures of “wealth” and its average availability to citizens**
- ❑ National wealth should include not just a measure of manufactured assets and financial assets (physical capital), but also natural capital (oil, other minerals, forests, freshwater resources, cropland, fisheries, etc), human capital (knowledge and skills), and social capital (institutional and legal infrastructure, political maturity, social harmony, etc).**
- ❑ Contingent valuation techniques are used to price non-marketed assets such as natural capital and educational capital and liabilities such as future health costs**
- ❑ Annual increases/ decreases in per-capita physical & financial capital, natural capital, human capital and social capital are estimated**
- ❑ Sustainable growth is that which increases per-capita national wealth, defined in this ‘inclusive’ or holistic manner**
- ❑ “Green GDP” and “Inclusive Wealth” use the same “stock” or “national balance sheet” numbers, and can also be published simultaneously**

# “Green GDP” Adjustments

Stock Adjustments  
Flow Adjustments

<b>2002-03</b> (INR Mio / % of NDP or NSDP)		<b>Assam</b>	<b>Himachal</b>	<b>Bihar</b>	<b>India</b>
GSDP or GDP		354,314 100.0%	159,460 100.0%	897,150 100.0%	<b>19,295,454 100.0%</b>
NSDP or NDP		317,208 89.5%	142,024 89.1%	787,033 87.7%	<b>17,083,824 88.5%</b>
<b>M2</b>	Agriculture Losses - Soil Erosion, Sedimentation, Quantity changes	-4,980 -1.6%	-1,135 -0.8%	-12,054 -1.5%	<b>-258,605 -1.5%</b>
	Agriculture - Subsidies	-9,670 -3.0%	-2,604 -1.8%	-21,457 -2.7%	<b>-312,634 -1.8%</b>
<b>M1</b>	Forests - Depletion of Timber/Carbon, Fuelwood, NTFP	-663 -0.2%	-51,394 -36.2%	-1,032 -0.1%	<b>-74,639 -0.4%</b>
	Forests - understated services of Timber/carbon, Fuelwood, NTFP	1,703 0.5%	56,539 39.8%	-11,683 -1.5%	<b>154,524 0.9%</b>
<b>M7</b>	Forests - Ecological Services Lost	-21,624 -6.8%	-10,470 -7.4%	-3,287 -0.4%	<b>-190,403 -1.1%</b>
	Forests - unstated benefits of Ecological Services	8,064 2.5%	5,274 3.7%	8,119 1.0%	<b>225,504 1.3%</b>
<b>M4</b>	Forests - Depletion of ecotourism and bioprospecting	-23,660 -6.7%	-13,078 -8.2%	-2,711 -0.3%	<b>-461,525 -2.4%</b>
	Forests - unstated ecotourism and bio-prospecting benefits	9,356 2.6%	632 0.4%	2,529 0.3%	<b>137,144 0.7%</b>
<b>M8</b>	Freshwater - Water Quality Losses	-4,294 -1.4%	-13,808 -9.7%	-42,755 -5.4%	<b>-586,586 -3.4%</b>
<b>Stock Adjustments</b>		<b>-55,221 -17%</b>	<b>-89,885 -62%</b>	<b>-61,839 -8%</b>	<b>-1,571,758 -9%</b>
<b>Flow Adjustments</b>		<b>9,453 3%</b>	<b>59,841 42%</b>	<b>-22,492 -3%</b>	<b>204,538 1%</b>

Source :  
Monographs  
# 2,1,7,4,8

## India's Natural Resource Losses, measured in GDP terms

( Net Resource Loss Adjustments as % of Gross State Domestic Product ; 2002-03 ; "Floor values")

Natural Resource State	Fresh- water	Forest Biomass	Forest Bio- diversity (‘use values’ only)	Forest Eco- Services	Capital Loss (as % of GSDP)
	Freshwater Quality	Timber, Fuel- wood, Carbon storage, NTFP	Eco-Tourism, Bio-prospecting	Water storage, Flood control, Topsoil retention	
<b>Bihar</b>	<b>- 5.4 %</b>	<b>- 4.7 %</b>	<b>- 0.0 %</b>	<b>- 0.4 %</b>	<b>- 10.5 %</b>
<b>Himachal</b>	<b>- 9.7 %</b>	<b>- 2.0 %</b>	<b>- 7.8 %</b>	<b>- 7.4 %</b>	<b>- 26.9 %</b>
<b>Goa</b>	<b>-17.6 %</b>	<b>+0.4 %</b>	<b>-1.7 %</b>	<b>- 5.1 %</b>	<b>-24.0 %</b>
<b>Uttar Pradesh</b>	<b>- 17.5 %</b>	<b>- 0.1 %</b>	<b>-1.4 %</b>	<b>- 1.8 %</b>	<b>-20.8 %</b>
<b>India</b>	<b>-3.4 %</b>	<b>+0.4 %</b>	<b>-1.7 %</b>	<b>+0.5 %</b>	<b>- 4.2 %</b>

Source : GIST's "Green Accounting for Indian States Project" (GAISP) Monographs # 1, 4, 7, & 8.

**Note** : for forest services, these are **net** 2002/03 GSDP adjustments, i.e. **after positive adjustments** for unaccounted service flows... i.e. stock losses from deforestation (**net** of re-growth) exceed flows

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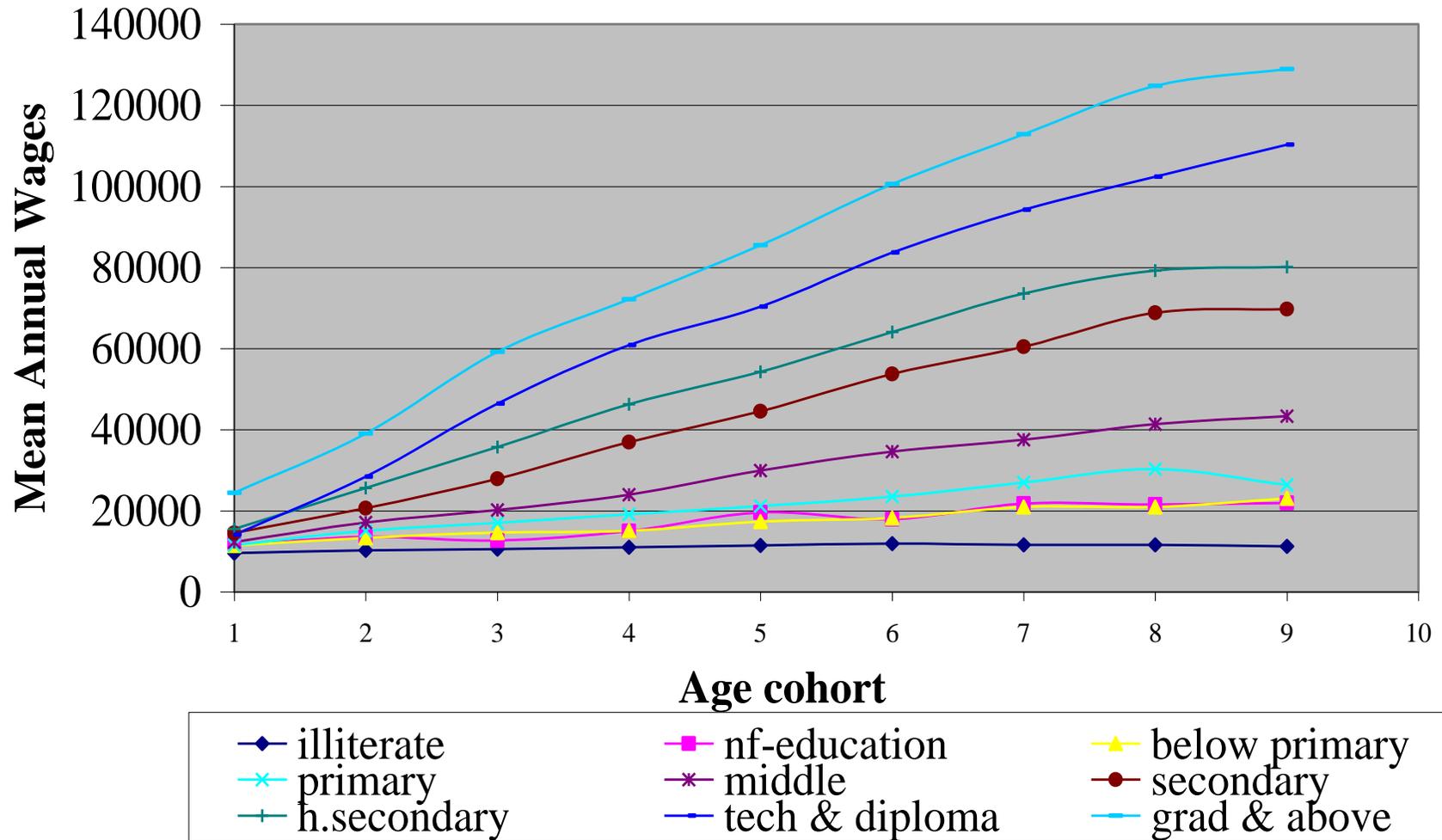
# Applications of “Green GDP”

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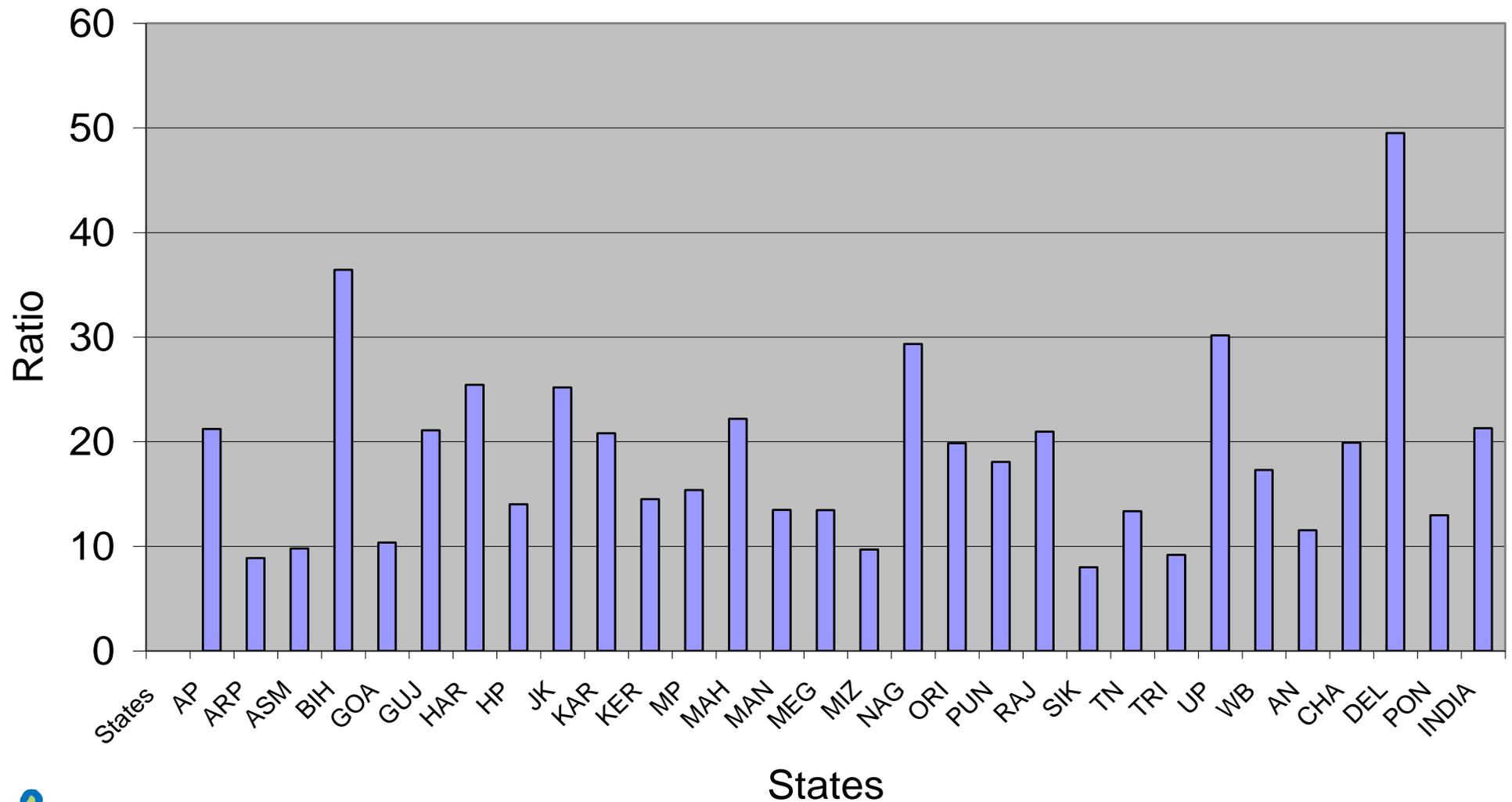
Some practical applications of our approach.....

- 1. Benchmarks for transfers between states (eg: Himachal /...) and between neighboring countries (eg: Nepal / India) through Payments for Ecosystem Services agreements (“PES”) for downstream water provision and regulation**
- 2. indicative sectoral returns on investment, to improve budgetary allocations to those areas with the biggest “bang for the buck” for society as a whole (eg : Education, Forests, etc)**
- 3. benchmarks for calculating the cost-benefit of major projects (eg : big dams)**
- 4. benchmarks for calculating compensatory afforestation rates ...**

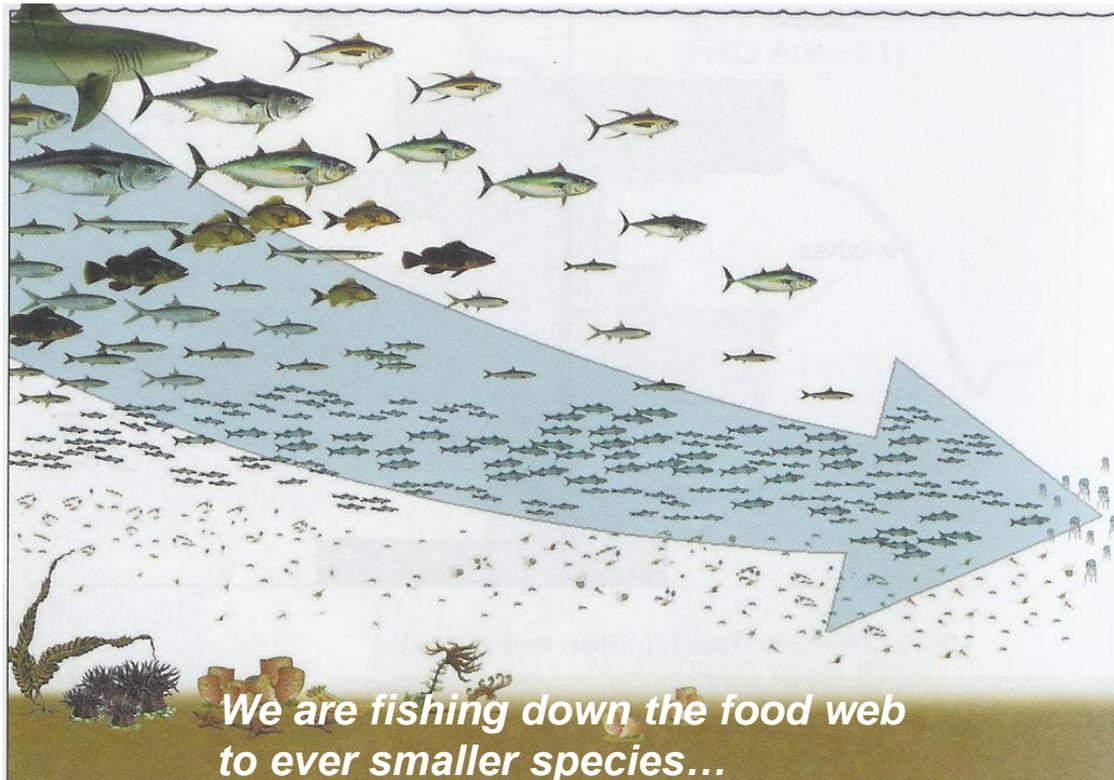
# Mean Annual income of persons for different educational level by age cohort for the year 1998



# Gross human capital formation/Expenditure allocated on education



## Example : The Global Loss of Fisheries



- ❑ **Perverse Subsidies are a key driver of the loss of fisheries**
- ❑ **Half of wild marine fisheries are fully exploited, with a further quarter already over-exploited**
- ❑ ***at risk : \$ 80-100 billion income from the sector***
- ❑ ***at risk : est. 27 million jobs***
- ❑ ***but most important of all.....***

***at risk : Health ... over a billion rely on fish as their main or sole source of animal protein, especially in developing countries.***

Source: Ben ten Brink (MNP) presentation at the Workshop: *The Economics of the Global Loss of Biological Diversity* 5-6 March 2008, Brussels, Belgium. Original source: Pauly

# Linkages between forests and food security

## Direct Linkages

- 1) Agriculture
- 2) Fisheries
- 3) Forest food, &
- 4) Energy

## Indirect Linkages

- The moisture and nutrient leaching from adjoining forests maintains the fertility of agricultural fields.
- Aquifers and rivers fed by forests are often the only source of irrigation for poor farmers.
- Windbreaks and shelterbelts protect crops from drying and damaging winds.
- Avifauna controls rodent and insect species.
- Source of fodder for feeding livestock and potential storehouses of biodiversity.
- regulating the volume and fluctuations of stream flows
- provide a shaded riparian environment favorable for the development of smaller life forms on which fish feed.
- Mangrove swamps provide habitat and nurseries for many fish species.
- Forests maintain potable water due to the filtering capacity of rich humus.

# Forests and the Poor

- **Forest foods guard against food insecurity.**
- **Value of ntfp's harvested can be substantial (one study estimates 48% of total income).**
- **Provide cash income to locals through sale of ntfp's, especially when crops fail. (i.e. it means a much larger value for poor households than simple economics suggest.)**
- **Provide timber for construction,**
- **Fodder for animals (30 per cent of fodder requirements are met by grazing in forests).**
- **Fuel wood for energy needs – & not just for the poor ( At present, fuel wood accounts for 20-30 per cent of all energy used in India)**

# “GDP of the Poor”

Gross domestic product in India (2003) (INR millions)	24,695,640 (617,391\$)
Contribution of agriculture, forestry, livestock and fishing (INR millions)	5,054,988 (126,374\$)
Of which contribution by the poor (per hectare value multiplied with area of small holdings / less than 1 ha) (INR millions)	1,140,987
Percentage contribution of agriculture, forestry and fishing to GDP	20.5
Population dependent on agriculture, forestry and fishing in India	543
Of which poor (60% of people dependent on agriculture have less than 1 ha holdings)	(478)
Per capita agricultural GDP of the poor	2,387 (60\$)
Per capita GDP for the rest of the population (less GDP of the poor and rest of the population 700 million )	33,649 (841\$)
Adjustments for Unrecorded timber and fuel wood from forestry GDP (INR millions)	154,521 (3,863\$)
Adjustments for contribution of ntfps to the economy (INR millions)	41,890 (1,047\$)
Adjustments for ecotourism and biodiversity values (INR millions)	242,953 (6,073\$)
Adjustments for other ecological services (INR millions)	225,504 (5,638 \$)
Adjusted contribution of agriculture, forestry and fishing to GDP (INR millions)	1,805,855 (7.3% of GDP)
Per capita adjusted agricultural GDP for the dependent population (in INR)	3,778 (94\$)
Per capita adjusted GDP for the entire population (in INR)	24,093 (602\$)
Equity adjusted cost per person for agriculture dependent community (in INR)	5,038 (126\$)

❑ Example : 2002-03 , from GAISP

❑ 540 Million engaged in farming, animal husbandry, informal forestry, fisheries

❑ ESS add “only 7.3%” to classical GDP, or

❑ ESS add 57 % to “GDP of the Poor”

❑ Replacement of those ESS would be beyond the capacity of the poor

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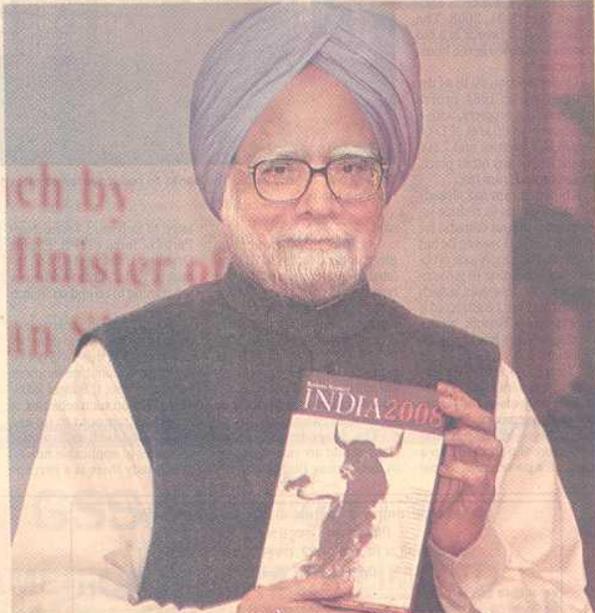
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dustry. He was addressing a gathering of industrialists at FICCI’s 80th AGM.

Speaking at FICCI’s golden jubilee auditorium where a picture of Mahatma Gandhi smiled down on the gathering from the backdrop, Mr Singh echoed his theme that industrialists served as trustees of society. “Patriotism is not the monopoly of the political class,” he said, underlining the shift in ideology: *hambas* are no longer untrustworthy exploiters but partners in progress. “I sincerely believe the government and business can achieve a lot by working together to create both income and employment, wealth and welfare, prosperity and progress. Our captains of industry have played a vital role in nation-building. I salute you and wish you all success,” Mr Singh said.

He took pains to describe what his government has done over four years and, for the next five years through the 11th five-Year Plan, proposed to build physical and social infrastructure that



Prime Minister Manmohan Singh (R) and FICCI president Habil Khorakiwala at the inauguration of industry body’s 80th annual session in New Delhi on Friday.

industry needs to sustain growth.

The prime minister also explained why battling inflation was top priority of his government. “An important policy stance we have adopted to ensure that growth is more inclusive has been to keep inflation under check...

Some of you are not happy about our emphasis on inflation control. I see things differently. Inflation is an iniquitous tax. It hurts the poor more than the rich.” Mr Singh said the government’s initiatives in agriculture and rural development, infrastruc-

ture, education and healthcare, along with efforts to keep inflation under check, would step up economic growth and make it more inclusive.

In all, prime minister’s speech appeared as an attempt at showcasing the UPA government as the rightful custodian of impressive and inclusive economic growth. PM gave his government credit for higher growth and putting in place the basic architecture necessary for ensuring the growth is broad-based. Mr Singh also cited slower growth rate for the period 1997 to 2002 to portray how previous governments failed to fuel the economic growth.

“The governments of the day were unable to inspire. They were preoccup-

Plan. He called it the most ambitious expansion in educational opportunities in the country since Independence.

He also highlighted the government’s achievements in the infrastructure sector. “I read a lot about the poor state of our infrastructure. In effect, facts tell a different story.” He cited airport modernisation, revolutionary transformation in railways and revival of private participation in power generation as key instances of turnaround in infrastructure sector.

In a positive signal to the industry, the prime minister chose not to mention his government’s controversial proposal to impose job quota in private sector for the underprivileged

**FICCI, 16<sup>th</sup> Feb 2008**

**“GDP Growth” is our daily mantra... but**

**Are we measuring what matters ?**

**Are we measuring what we manage ?**

**Can we go “Beyond GDP Growth” before it is too late ?**

# Next Steps for GIST....

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- Construct “Green GDP” Time Series : 2004-05, 2006-07,.....**
- Publish this “Green GDP” every 2 years**
- Calculate Sensitivity to Social Discount Rates**
- Calculate Sensitivity “Median values” vs “Floor Values”**
- Agriculture : Fertilizers and Pesticides impacts**
- State-specific Assessments and ‘Green GDP’**
- Research & design a Bihar-Nepal “PES” Agreement**
- Design a “Corporate Green Accounts” template**
- ..... And.....**
- Raise Money for all of the above !***

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**Thank You !**

**Conclusion :** “GDP is unfit to reflect many of today’s challenges, such as climate change, public health, education and the environment”

**650 delegates (politicians, scholars, institutions, corporates) from more than 50 countries supported the momentum to go “Beyond GDP”**

- short term: raise awareness by Human Development Index and Ecological Footprint
- long term: strive for Integrated Environmental and Economic Accounting
- set of key indicators capturing
  - social cohesion,
  - good governance and
  - well-being
- well-being is not just growth, it is also health, environment, spirit and culture
- UN 2011 milestone of standard environmental accounts
- policy and business:
  - “triple bottom-line accounting” deals with people, planet and profits
  - integration of social and environmental factors reduce risk to reputation and costs
  - wealth of corporation is more than the stock price

## Appendix 2 : Some Agricultural facts

- ❑ Per capita availability of agricultural land ↓ from 0.48 ha in 1951 - 0.14 ha in 2001 ( a decline to under 1/3<sup>rd</sup> ...)
- ❑ Food grain production ↑ from 50 MT in the 1950s - 209 MT in 2001 (an increase of 4 x)
- ❑ Fertilizer consumption ↑ from 0.3 MT in the 1960s - 16 MT in 2001 (an increase of 53 x)
- ❑ Pesticide consumption ↑ from 2353 T in the 1960s to 48 350 T in 2001(an increase of 20x)
- ❑ ↑ in use → serious environmental degradation
- ❑ 53% of all land (around 174 M ha) suffers from varying degrees of degradation
- ❑ The average loss of topsoil due to erosion is 19.6 t/ha

*Direct bearing on food production and livelihood of the poor*

## Appendix 3

# “Human Capital” formation : the Income-based approach

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measures the total human capital by the total discounted values of his expected future stream of earnings in his lifetime.

Forward-looking (prospective) because it focuses on expected returns to investment.

Jorgenson and Fraumeni (1989, 1992) – the most comprehensive study to date

***They define the “investment in human capital in any year as the sum of lifetime incomes for all individuals born in that year and all immigrants plus the imputed labor compensation for formal schooling for all individuals enrolled in the school”.***

## Appendix 3 – cont'd

### Valuation Methodology for “Human Capital”

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**Average wage cannot be used - factors such as skills, parental background and quality of schooling, etc. cannot be observed using wages**

**Following approach adopted**

**Step 1:**

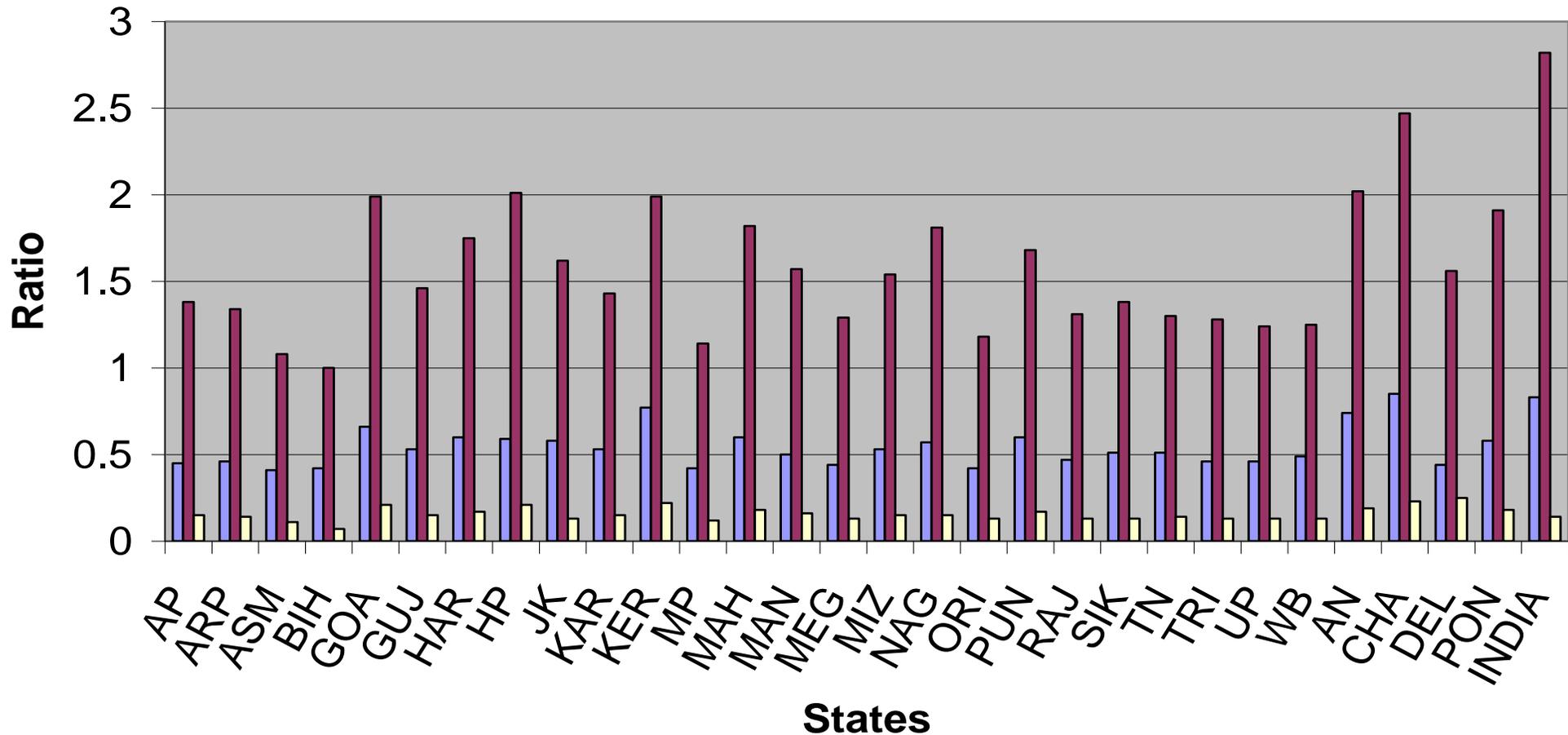
**we used the Mincerian earning function approach.**

**The wage of an individual is assumed to depend on level of schooling, skills possessed, technical qualifications, on-job training (job experience is used as a proxy) and other socioeconomic characteristics that represent the innate abilities of the individual**

**Step 2: From this earning function we estimated the marginal rate of return for different levels of schooling and obtain the predicted wages for different age cohorts by educational levels**

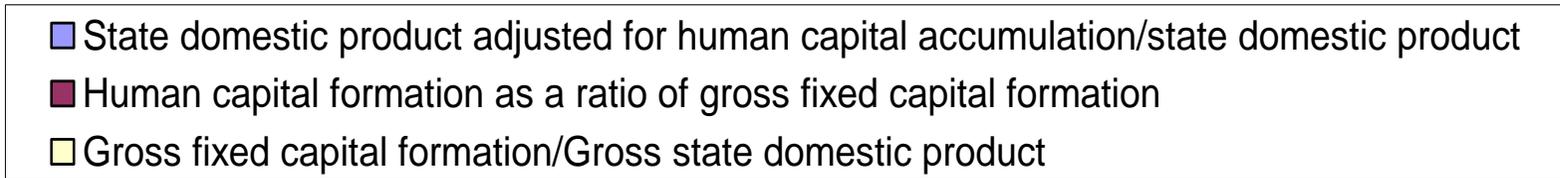
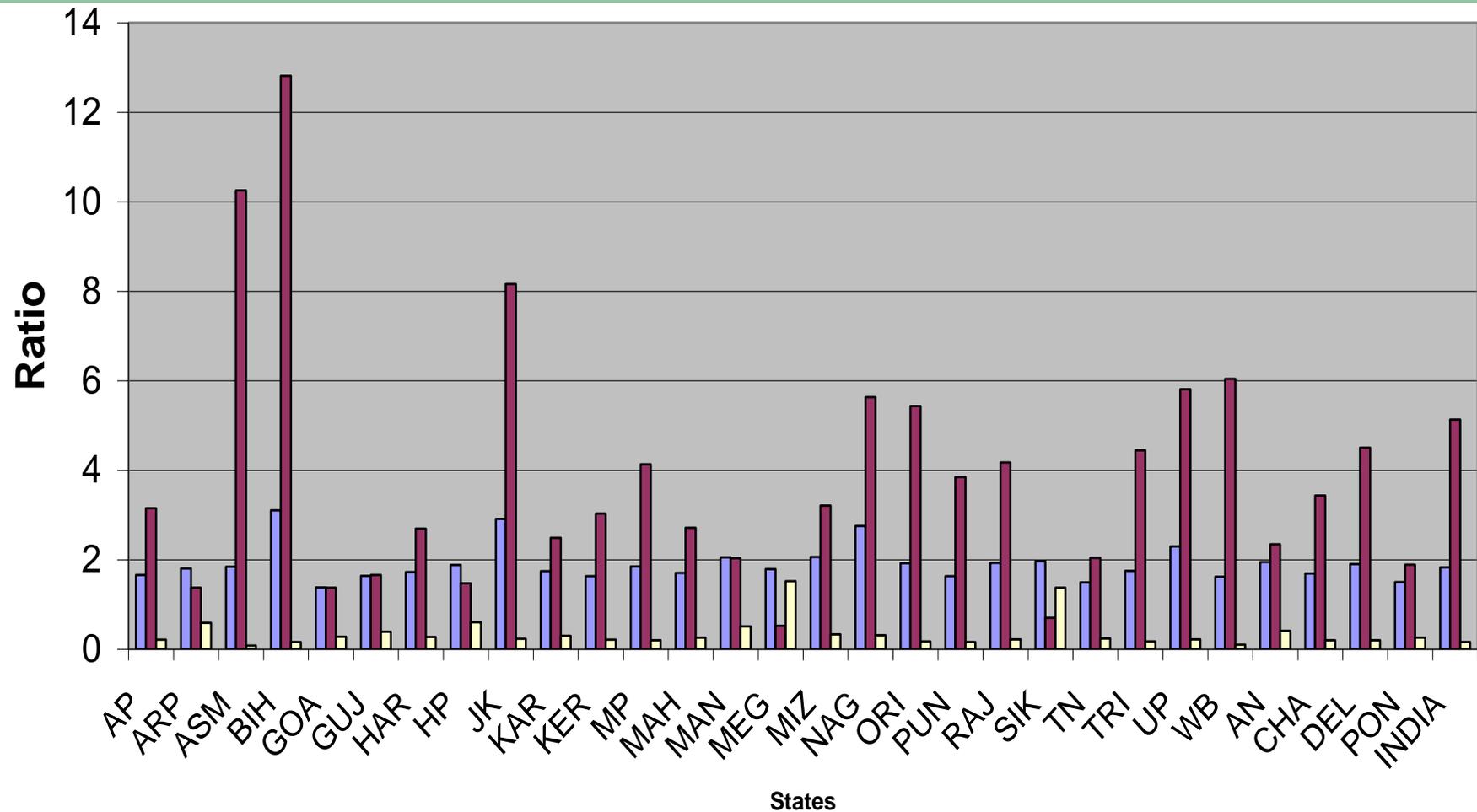
# Appendix 3 – Cont'd

## Percapital human capital and human capital accumulation



# Appendix 3 – Cont'd

## Comparison with national accounting indicators (GSDP, HCF)



# Appendix 4 - GDP of the Poor

## How do we identify who are the rural poor ?

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### **Agriculture - Main workers**

Cultivators - 103 million - of which less than 1 ha holdings 60%

**Agricultural labourers-** 63 million - all considered poor

### **Agriculture - Marginal workers** - all considered poor

Cultivators - 24 million

Agricultural labourers - 43 million

**Fishing, hunting, plantation and other activities** - 10.3 million (as per census 2001) but studies vary in their estimates

**Forest dependent population** (from FAO study) - 275 million

**Total - 477 million (approx)**

## Appendix 4 – Cont'd

### “GDP of the Poor” India Example - Rural Poor

Gross domestic product in India (2002-03) ( <b>INR millions</b> )	24,695,640 (617,391\$)
Contribution of agriculture, forestry, livestock and fishing ( <b>INR millions</b> )	5,054,988 (126,374\$)
Of which contribution by the poor (per hectare value multiplied with area of small holdings less than 1 ha) ( <b>INR millions</b> )	1,140,987
Percentage contribution of agriculture, forestry and fishing to GDP	20.5
Population dependent on agriculture, forestry and fishing in India	543
Of which poor (60% of people dependent on agriculture have less than 1 ha holdings)	(478)
Per capita agricultural GDP of the poor	2,387 (60\$)
Per capita GDP for the rest of the population (less GDP of the poor and rest of the population 700 million )	33,649 (841\$)

Source : 2002/03 GDP data , and GAISP monographs

## Appendix 4 – cont'd - “GDP of the Poor”

### India Example – Rural Poor (cont'd)

Adjustments for Unrecorded timber and fuel wood from forestry GDP (INR millions)	154,521 (3,863\$)
Adjustments for contribution of ntfps to the economy (INR millions)	41,890 (1,047\$)
Adjustments for ecotourism and biodiversity values (INR millions)	242,953 (6,073\$)
Adjustments for other ecological services (INR millions)	225,504 (5,638 \$)
Adjusted contribution of agriculture, forestry and fishing to GDP (INR millions)	1,805,855 (7.3% of GDP)
Per capita adjusted agricultural GDP for the dependent population (in INR)	3,778 (94\$)
Per capita adjusted GDP for the entire population (in INR)	24,093 (602\$)
Equity adjusted cost per person for agriculture dependent community (in INR)	5,038 (126\$)

Source : 2002/03 GDP data , and GAISP monographs